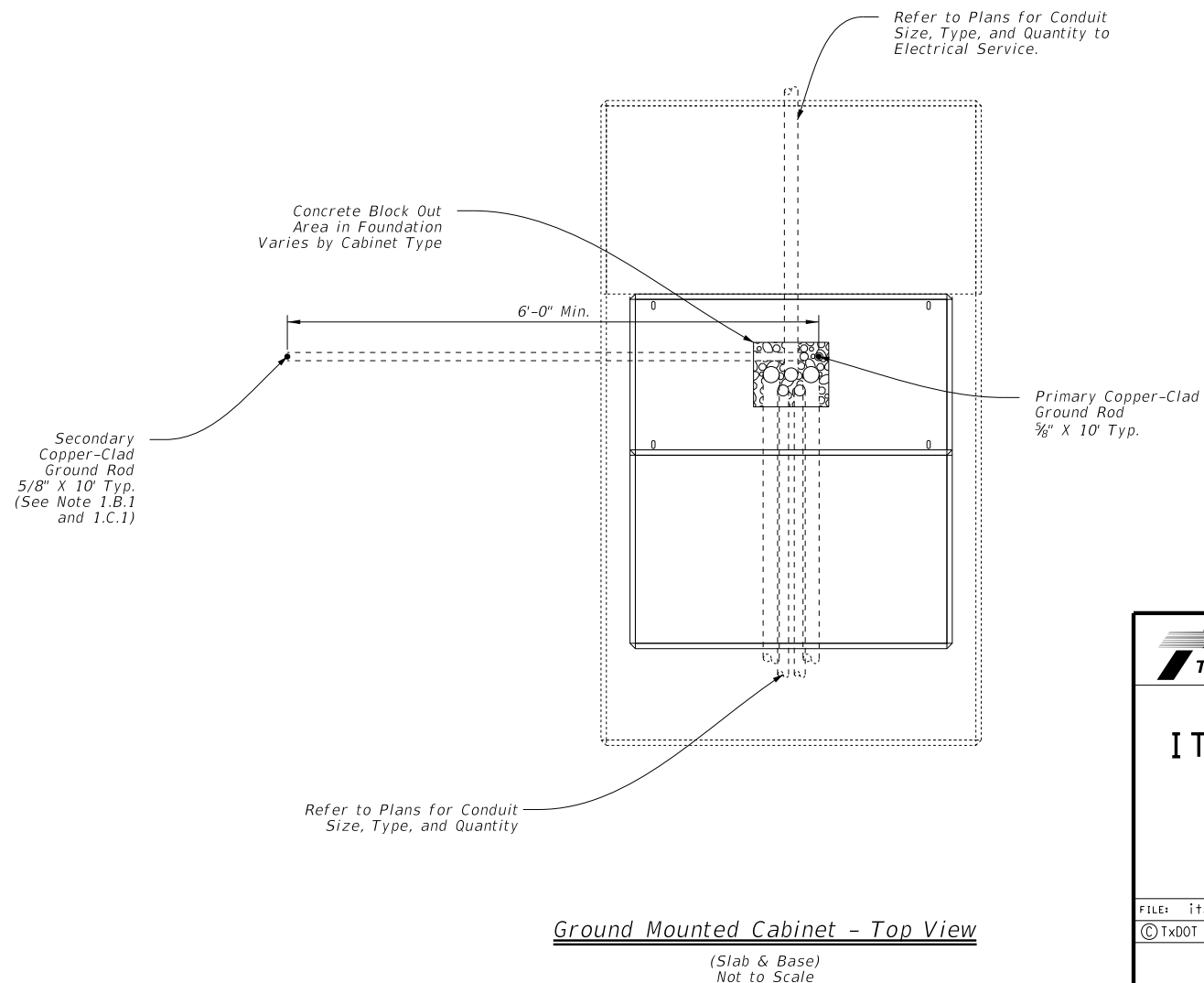
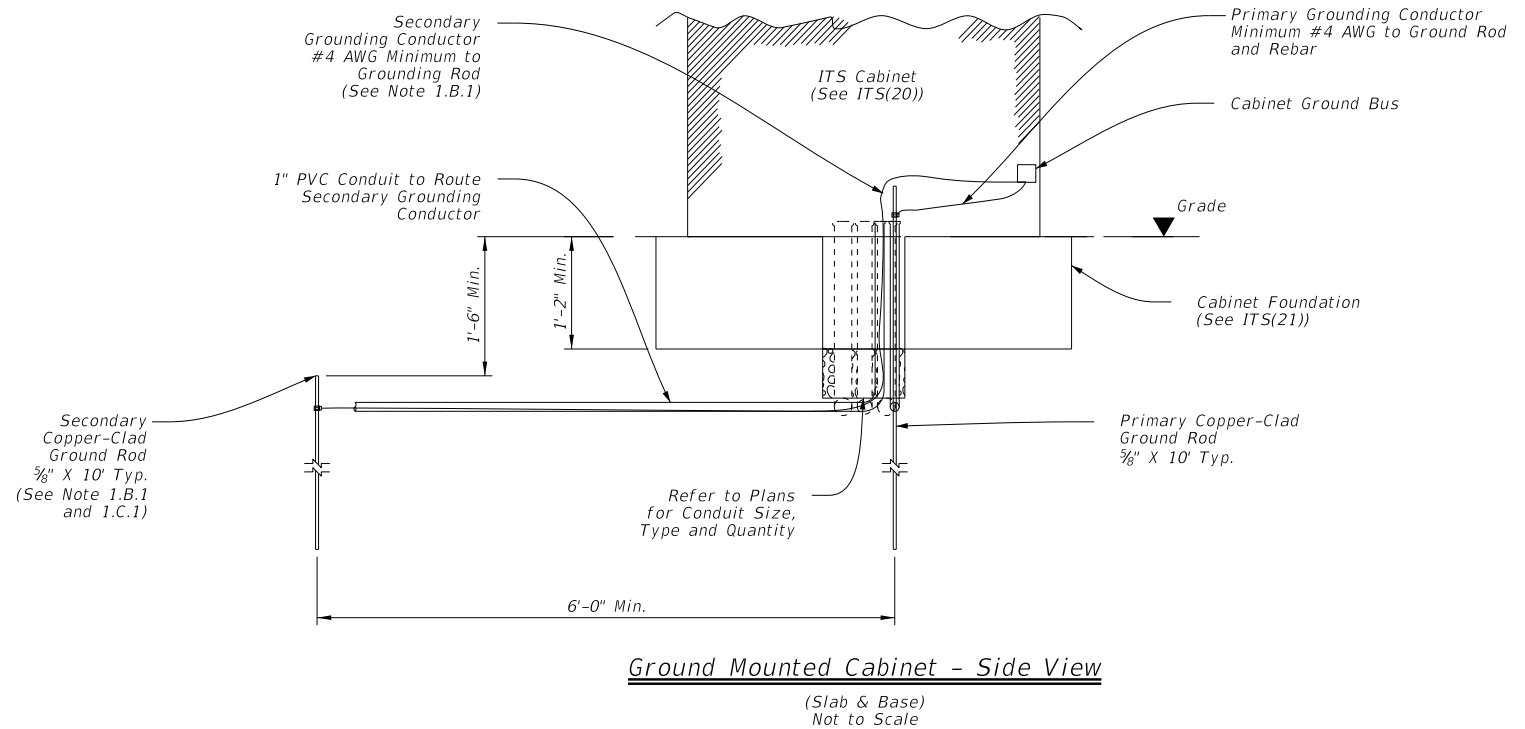


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**General Notes:**

1. Grounding System:
  - A. Description:
    1. Provide ground system consisting of copper wires, ground rods, and concrete-encased grounding electrodes (Ufers), of the configuration shown to minimize potential gradient irregularities, drain leakage, and fault currents to earth.
  - B. Performance:
    1. Provide a grounding system, consisting of a minimum one ground rod, having a resistance not greater than 5 Ohms to ground. Additional ground rods may be added to the system to achieve less than 5 Ohms resistance.
  - C. Design Criteria:
    1. The combined ground resistance of separate systems bonded together below grade may be used to meet the specified ground resistance, but the minimum number of rods indicated shall still be provided.
    2. Measure the resistance of systems requiring separate ground resistance separately before bonding below grade.
    3. Only provide UL-approved materials listed for grounding systems.
    4. Do not combine materials that can form an electrolytic couple that will accelerate corrosion in the presence of moisture, unless moisture is permanently excluded from the junction of such materials.
    5. Submit product data for the materials and products used to perform the work of this section.
  - D. Materials:
    1. Conductors:
      - a. Bare Ground Conductor:
        - 1) For No. 8 AWG or larger bare ground wire sizes, provide soft drawn copper, Class A or Class B, stranded wire meeting the requirements of ASTM B 8.
      2. Ground Compression Connectors:
        - a. Provide molds, thermite packages, and other material for ground compression connectors that are full-rated to carry 100% of the cable rating and which meet IEEE 837.
          - 1) Provide the compression materials from a single manufacturer throughout the project.
          - 2) Provide the items necessary for connecting cable to ground rods.
      3. Ground Rods:
        - a. Provide copper-clad steel ground rods conforming to the requirements specified in UL 467.
          - 1) Diameter: 5/8 in.
          - 2) Length: 10 Ft.
  2. Installation:
    - A. Install grounding components and systems in accordance with the requirements specified in UL 467, IEEE 81, and IEEE 142.
    - B. System Grounding:
      1. Ground Rods:
        - a. Drive ground rods into the ground until the tops of the rods are approximately 18 in. below finished grade.
        - b. If multiple ground rods are needed to meet the minimum resistance of 5 Ohms, space ground rods as evenly as possible, at least 6 feet apart, and so conductors will be connected below grade.
      2. Conductors:
        - a. Provide minimum No. 4 AWG ground wire for system and equipment grounding.
        - b. Using suitable fasteners, securely attach exposed ground wires to structural supports at not more than 2 ft. intervals, where applicable.
        - c. Bends in ground wires greater than 45 degrees are unacceptable.
      3. Cable Connections:
        - a. Use approved exothermic-welded connections for conductor splices and connections between conductors and other components.
    - C. Testing:
      - A. Resistance Test:
        1. Test Procedure:
          - a. The ground-resistance measurements of each ground Rod shall be taken.
            - 1) The resistance to ground shall be measured in accordance with the fall-of-potential method specified in IEEE 81 and IEEE 142.
            - 2) Ground-resistance measurements shall be made in normally dry weather, not less than 48 hours after rainfall, and with the ground under test isolated from other grounds.
          - b. Test reports shall be prepared that indicate the location of the ground rod, the grounding system, and the resistance and soil conditions at the time the test was performed.
        2. Acceptance Criteria:
          - a. The grounding system must have a resistance not greater than 5 Ohms.
          - b. Do not energize any part of the electrical distribution system prior to the resistance testing of that system's ground rods and grounding system, and submission of the test results for approval.
        3. Inspections:
          - a. Prepare and submit as-built record drawings of the grounding system as installed and test reports for approval.



		<b>Traffic Operations Division Standard</b>	
<h2>ITS CABINET GROUNDING DETAILS</h2>			
<h3>ITS(18)-15</h3>			
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