1 General
1.1 All grounding conductors shall be insulated and enclosed in a raceway.
1.2 All ground conductors shall be “GREEN”.
1.3 The use of bare conductors is not permissible except where located in building footings, or where otherwise specified in the Consultant’s Handbook or in the Job Scope.

2 Feeder Conduits
2.1 Provide a separate, insulated, “GREEN”, grounding conductor in each feeder conduit. Bond conductor to each end of enclosing metal raceway.

3 Branch Circuit Conduits
3.1 Provide a separate, insulated “GREEN”, grounding conductor in each branch circuit conduit.

3.1.1 For each electrical system (208V, 240V, 480V, etc.) provide separate “GREEN” wire originating in the source panel for each system in a conduit.

4 Bus Duct
4.1 All bus duct flange ends (when cable connected) shall have a properly sized ground bar with lug (as required) for bonding to the equipment ground bus in switchboards as well as to “XO” in the power transformer throat.

5 Panelboards
5.1 All panel boards and switchboards shall have an equipment grounding bus.

6 Separately Derived Systems
6.1 Separately derived systems shall be grounded per NEC
6.2 Where a neutral conductor is derived a grounding electrode conductor shall be routed to one of the following:
6.2.1 The building grounding electrode system bus bar
6.2.2 A common electrode grounding conductor designed as described in 2008 NEC 250.30(A)(4) for such applications shall be provided in each electrical room containing sub-distribution level equipment. Review proposed locations with Purdue Engineering.

6.2.3 In some cases an instrument ground bus may be installed in certain electrical rooms. Verify with Purdue Engineering on a project-by-project basis. Instrument ground system shall be kept separate (not electrically isolated) except where connected to the building grounding electrode System Bus Bar.

6.2.4 The nearest available effectively grounded structural member

6.2.5 Metal water pipe grounding electrode as specified in 2008 NEC 250.30(A)(1).

Note: This grounding method must be approved by Purdue on a case by case basis.

7 Grounding Electrode System
7.1 Within the building main electrical room, install a copper bus bar, 1/4 by 4 inches of sufficient length (two feet minimum) to act as the grounding electrode system termination point for all grounding electrodes as described in NEC 250.52 A. The bus bar shall be capable of accepting NEMA 2-hole pattern lugs. This bus bar shall be called the building grounding electrode system bus bar. Each conductor terminated thereon shall have a label affixed to it identifying the conductor’s opposite end (i.e. Ufer ground).

7.2 All terminations shall be by exothermic welding “Cadweld”.

7.3 Ground rods shall be 10 feet in length by ¾” diameter.

8 Transformers Serving Buildings on Main Campus
8.1 Utility transformers serving the buildings of the main campus are considered to be separately derived systems. The bonding of the neutral will take place at the transformer only.

8.2 An equipment (supply side) bonding jumper will be routed from the X0 of the transformer to the ground bar of the first building disconnecting means. This conductor will be continuous and one piece of wire with no intermediary splices. (Exception: When the feeder from the transformer is a busway, factory bus bar joints (in the bus bar...
serving as the supply side bonding jumper) are acceptable).

8.3 Size to be based on NEC or 12.5 percent of the largest phase conductor, whichever is larger.

8.4 Transformers shall be bonded with two 4/0 AWG bonding conductors from the ground loop around the transformer.

8.4.1 Terminate bonding conductors using NEMA 2-hole pattern lugs in the transformer and exothermic weld at the ground loop.

8.4.2 Land conductors on the rectangular ground pads near the base of the transformer: one located in the HV compartment, and the other in the LV compartment.

8.5 In addition, each transformer shall have one Grounding Electrode Conductor (GEC) from the transformer grounding system (consisting of the ground ring and ground rods surrounding the transformer) to the “X0” terminal of the transformer. The GEC shall be sized per NEC, but be no smaller than 4/0 AWG bare.

9 Generators Serving Buildings on Main Campus

9.1 Generators serving the buildings of the main campus may or may not be separately derived systems. Consult with Purdue Electrical Engineer for preference in each installation.

9.2 For separately derived generators, the bonding of the neutral will take place at the generator only.

9.2.1 For generators that are separately derived systems, an equipment (supply side) bonding jumper will be routed from the X0 of the generator to the ground bar of the first disconnecting means. This conductor will be continuous and one piece of wire with no intermediary splices.

9.2.2 Size to be based on NEC or 12.5 percent of the largest phase conductor, whichever is larger.

9.2.3 In addition, each generator shall have one GEC (grounding electrode conductor) from the generator grounding system (consisting of the ground ring and ground rods surrounding the generator) to the “X0” terminal of the generator. The GEC shall be sized per NEC, but be no smaller than 4/0 AWG bare for mechanical strength.

9.3 Where generators are not separately derived systems verify that the neutral and ground are not bonded.

9.4 Generators shall be bonded with two 4/0 AWG bonding conductors from the ground loop around the generator. Both of the 4/0 bonding conductors shall terminate (with NEMA 2 hole pattern lugs) on one each of the rectangular ground pads near the base of the generator enclosure.

10 Building Grounding

10.1 At the A/E’s discretion, buildings shall be encircled with an appropriately sized (per NEC) bare, stranded copper conductor.

10.1.1 Conductor shall be buried outside the building foundation and below possible frost line but no less than 36” Below Finished Grade.

10.1.2 A (10’) ten-foot copper-weld ground rod shall be installed at each corner and at 100 to 150 foot intervals along building walls.

10.1.3 The ground loop shall be connected to the main building-grounding electrode.

10.2 All grounds shall be bonded to the ground loop. The ground loop shall be connected to the main building-grounding electrode.

10.3 All exposed steel building columns shall be bonded to this ground loop.

10.4 Concealed building columns shall be grounded at 50 to 75 foot intervals around building.

10.5 All connections of grounding conductors to columns, ground rods, etc., shall be by exothermic welding “Cadmend” or approved for the purpose mechanical crimp splices.

11 Ufer Grounding

11.1 Ufer grounding systems shall be per NEC Article 250 Section III. The foundation rebar shall
be connected to the building column and the ground loop. The ground loop shall be connected to the main building-grounding electrode. All connections of grounding conductors to columns, foundation rebar, other ground conductors etc., shall be by exothermic welding "Cadweld".

11.2 An external electrode shall always be present to prevent foundation damage that can result from high fault currents.

12 Triad and Other Ground Rod Arrangements

12.1 Where two or more ground rods are installed, spacing shall be a minimum of twice the rod length between any two adjacent ground rods.