

Grounding System Installation

To prevent lightning damage to your equipment, Rain Bird recommends installing a grounding system for the equipment (including controllers, weather stations, and central control systems).

The grounding system discharges lightning-induced electrical current into the earth rather than allow the surge to pass through power wires or field wires to your equipment's electronic components.

Ground Resistance

Ground resistance occurs when grounding system components, or the soil itself, oppose the flow of electricity into the earth. Ground resistance is measured in units called "ohms" (Ω).

The higher the ground resistance (higher ohm readings), the less chance the surge will be shunted to ground rather than to the equipment's electronic components.

Figure 1 shows points where grounding systems can develop resistance.

To decrease ground resistance, Rain Bird recommends irrigating the soil around the grounding system. Each grounding system should have a dedicated irrigation zone with sprinkler heads and its own watering program to maintain soil moisture around the grounding system.

A properly installed grounding system should maintain a maximum ground resistance of 10 ohms, or less.

If you are unable to reach a resistance of 10 ohms or less, you can decrease resistance by surrounding the grounding rods or plates with ground enhancement material, such as POWER SET from Paige Electric Corporation (P/N 1820058), or GEM from ERICO (P/N GEM-25A).

If ground resistance still measures higher than 10 ohms, you can extend the ground rod length as described in "Ground Rod Stacking," or use additional grounding rods, as shown in grounding system design "Y" (Alternate).

Installation Requirements

The following requirements apply to all grounding system designs (design "Y" and the "Grounding Plate" design).

All grounding rods or plates must be connected together below grade with #6 AWG or larger solid bare copper wire.

Install the connecting wire in as straight a line as possible. If you must make a turn or bend in the wire, make the turn in a sweeping curve with a minimum radius of eight inches and a minimum included angle of 90°.

To minimize resistance, the copper wire must be pre-welded to the grounding rods/plates, or welded to the rods/plates using an exothermic welding process at the site.

Make sure all welds are secure before burying the grounding rods. Rods and plates with welded joints do not need periodic visual inspection and can be fully buried (no valve box required).

Measure the ground resistance around the grounding system after installation, and once every year after that.



NOTE: The ground wire from the equipment to the grounding system should be as short as possible and have no bends, kinks, or coils in the wire.

Inspect the grounding system's clamped connections to the equipment (not the welded grounding system connections) once a year to make sure they are secure and corrosion-free.

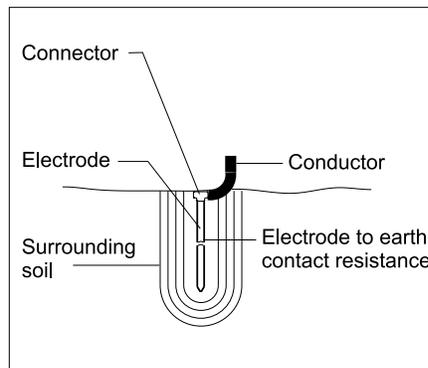


Figure 1: Grounding systems can develop resistance at many points.

Ground Rod Stacking

Threaded couplers (shown in Figure 2) are ground rod splices.

If a single grounding rod fails to produce 10-ohm ground resistance (maximum), threaded couplers can be used to "stack" grounding rods.



NOTE: Use threaded couplers made of the same material as your grounding rods.

Stacking ground rods increases the total effective rod length, decreasing ground resistance.

Joining the rods together with threaded couplers forms a secure connection so the grounding rods can be assembled quickly and easily.

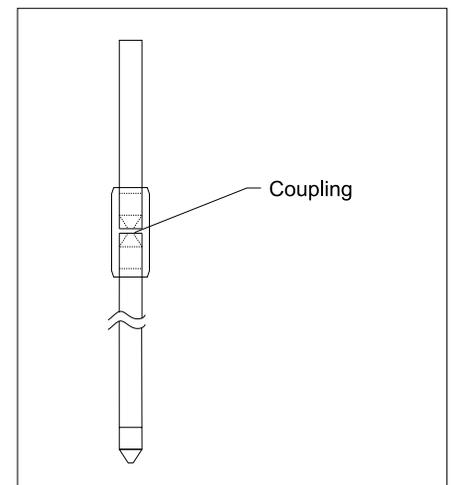


Figure 2: Stacking grounding rods with threaded couplers can help decrease ground resistance.

Grounding System Designs

Design "Y"

Design "Y" (shown in Figures 3 and 4) consists of three, 5/8" -diameter x 8-foot-long, copper-clad grounding rods. Install the rods in a radial 120° star ("Y") configuration.

Each rod must be installed in a true vertical position, at least 16 feet from the equipment.



NOTE: All grounding system diagrams are not to exact scale.

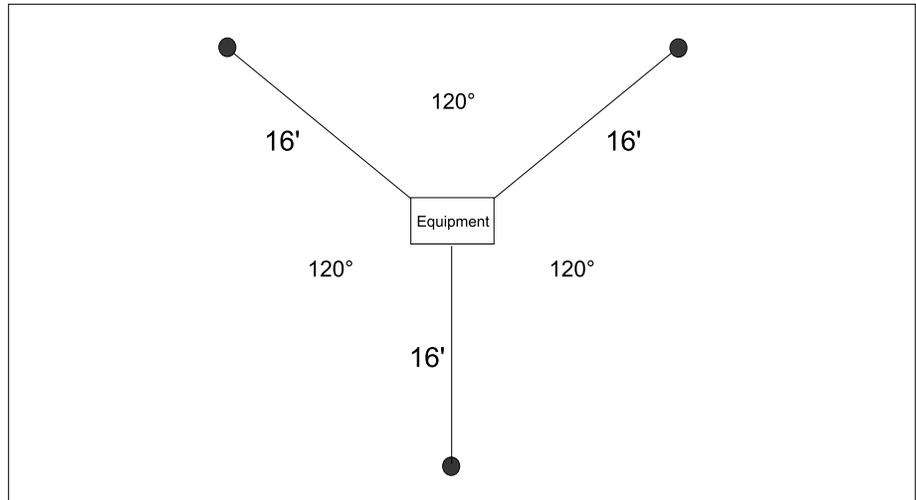


Figure 3: Design "Y" uses three grounding rods installed in a radial 120° "Y-shaped" configuration.

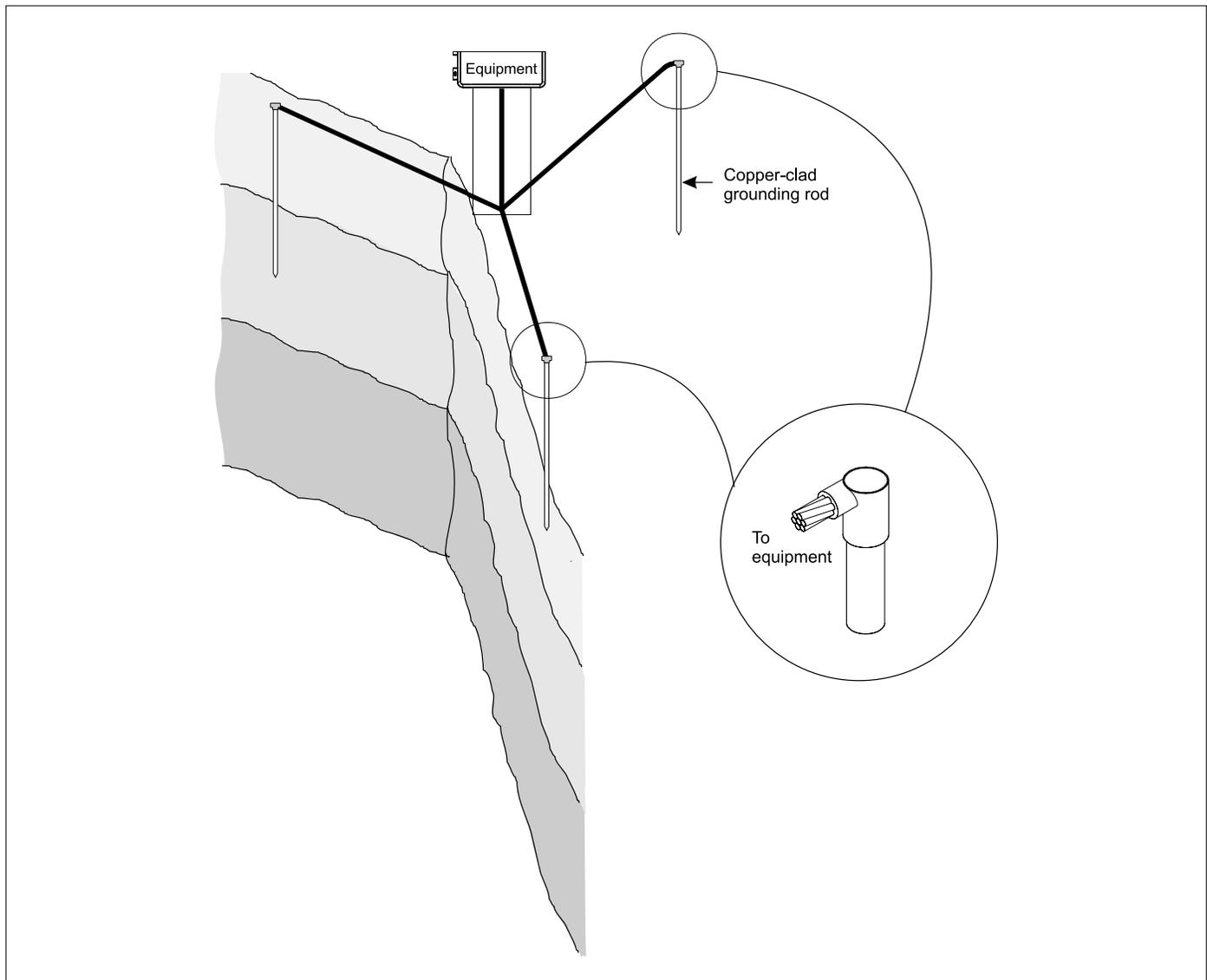


Figure 4: Grounding system design "Y" can be installed as shown, or with ground enhancement material to reduce ground resistance even further.

Design "Y" (Alternate)

An alternate design "Y" (shown in Figures 5 and 6) uses three radials in a 120° star ("Y") arrangement. Each radial consists of three, 5/8"-diameter x 8-foot long copper-clad grounding rods.

The first rod in each radial must be at least eight feet from the equipment. The rest of the rods must be at least 16 feet from any other rod.

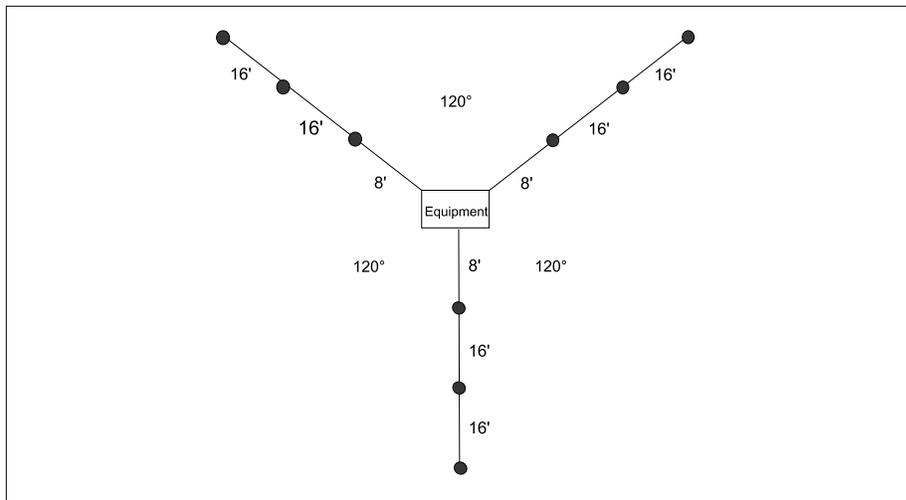


Figure 5: Design "Y" (Alternate) uses nine copper-clad grounding rods installed in a 120° star configuration.

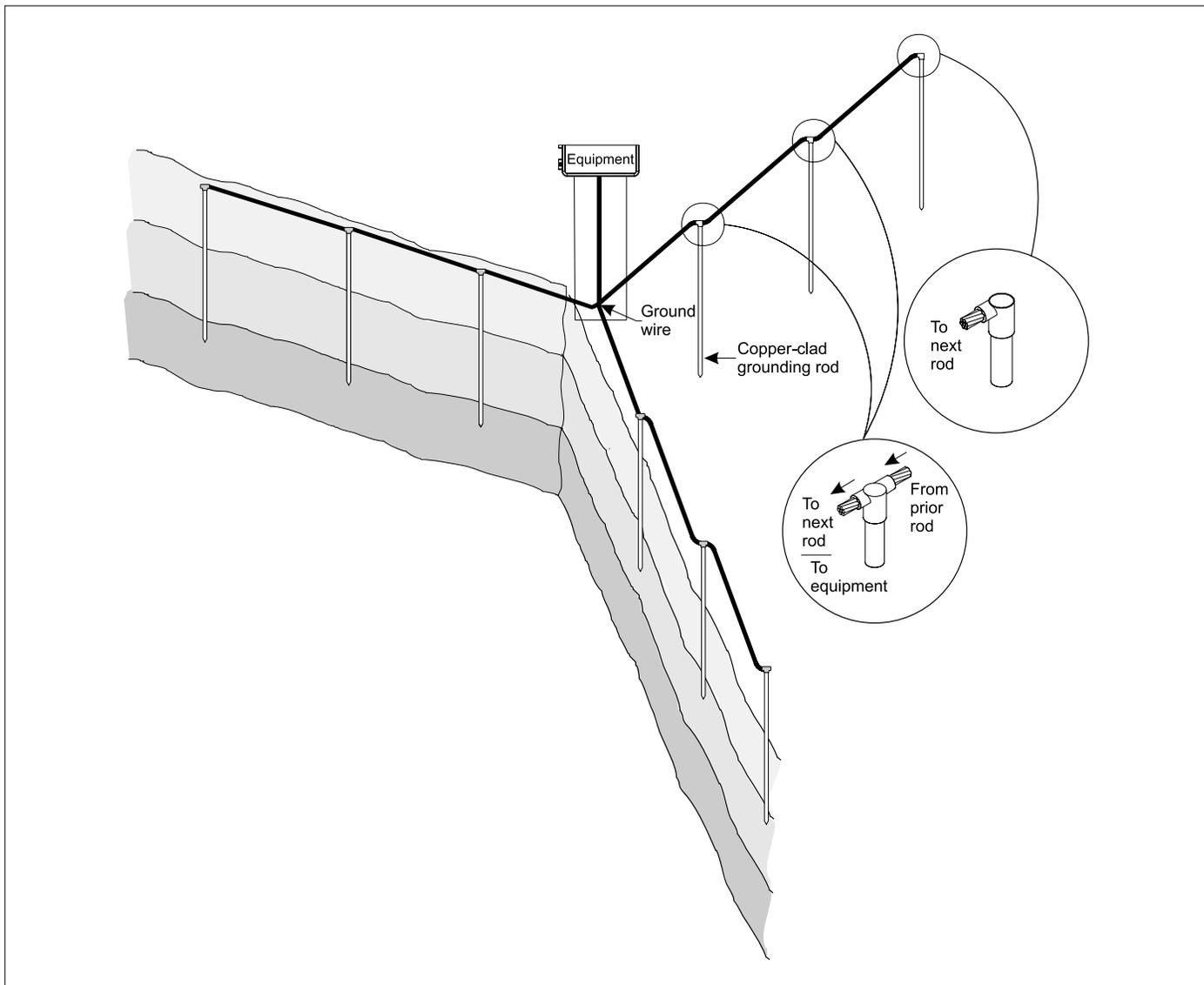


Figure 6: The alternate version of grounding system design "Y" uses nine grounding rods to reduce ground resistance.

Grounding Plate Design

The “Grounding Plate” design (shown in Figures 7 and 8) consists of one vertical 8-foot copper-clad grounding rod at least eight feet from the equipment, and a copper grounding plate (minimum dimensions 4" x 96" x .0625"). Install the grounding plate horizontally, three feet deep and 15 feet from the grounding rod.

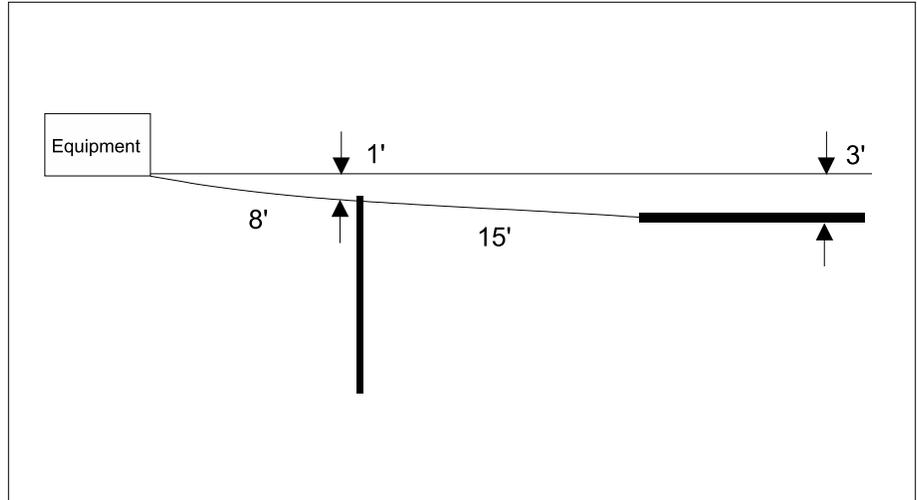


Figure 7: The “Grounding Plate” design uses one copper-clad grounding rod and a rectangular copper grounding plate.

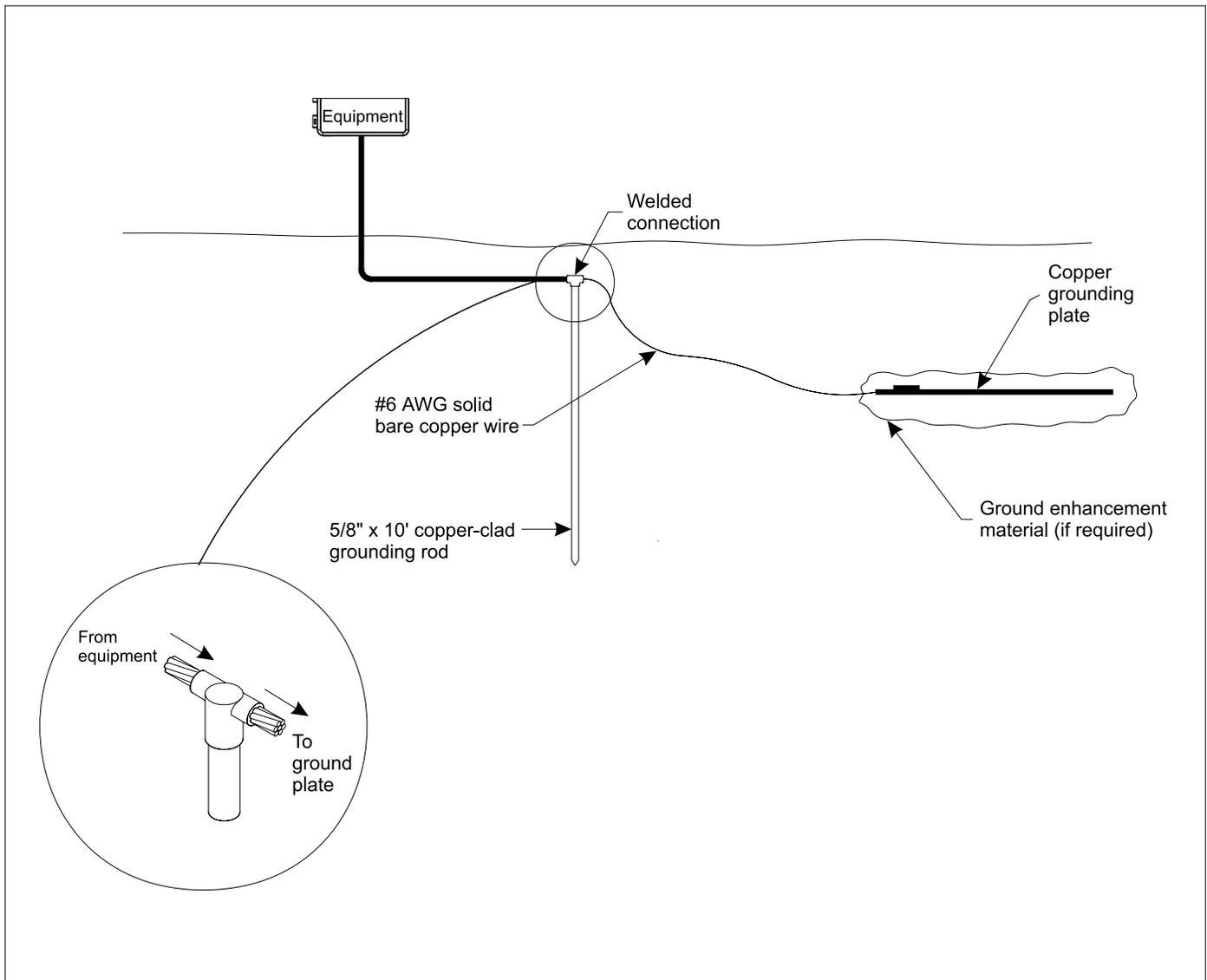


Figure 8: The “Grounding Plate” design may be used with or without ground enhancement material, depending on site conditions.