SOIL PHYSICAL PROPERTIES DETERMINE THE PERFORMANCE OF BACKFILL MATERIALS FOR DRAINAGE TRENCHES

Managing soil water is one of the most important aspects of managing golf course turf but probably one of the least understood. One common misconception is that soil permeability (infiltration rate) is the most important property related to drainage. While this is true for surface runoff, it is not true for water from rootzone storage. Soil water retention is critically important for the performance of drainage systems in golf course construction. One example in which we see the consequences of this is in backfill materials used in drainage trenches around greens. Infiltration rates are often quoted in inches per hour, and a soil with a low infiltration rate (1 inch per hour) will not hold enough water to be effective in draining the rootzone.

Water retention. A rootzone mix with a high infiltration rate is not capable of holding as much plant-available water as the surrounding rootzone mix. One example we see regularly is channel drains in greens that dry out before the surrounding rootzone. The consequence is that water from the rootzone is not conserved. This can be a real problem, especially when trying to maintain a good surface rootzone. One of the most difficult problems to solve is the situation of a channel drain that is too close to the edge of the rootzone and is not able to hold enough water to be effective. One way to solve this problem is to increase the water retention of the rootzone mix. This can be accomplished by using a soil amendment that increases water retention without sacrificing infiltration rate.

Two other critical properties of soil that determine the performance of backfill materials for drainage trenches are soil physical structure and soil physical properties. Soil physical structure refers to the physical arrangement of soil aggregates. Soil physical properties refer to the physical characteristics of soil particles, such as size, shape, and density. Soil physical structure and soil physical properties are critical to the performance of backfill materials for drainage trenches. A soil with a high physical structure will hold more water than a soil with a low physical structure. A soil with a high physical structure will also have a higher infiltration rate than a soil with a low physical structure. Therefore, it is important to select a backfill material for drainage trenches that has a high physical structure and a high infiltration rate.