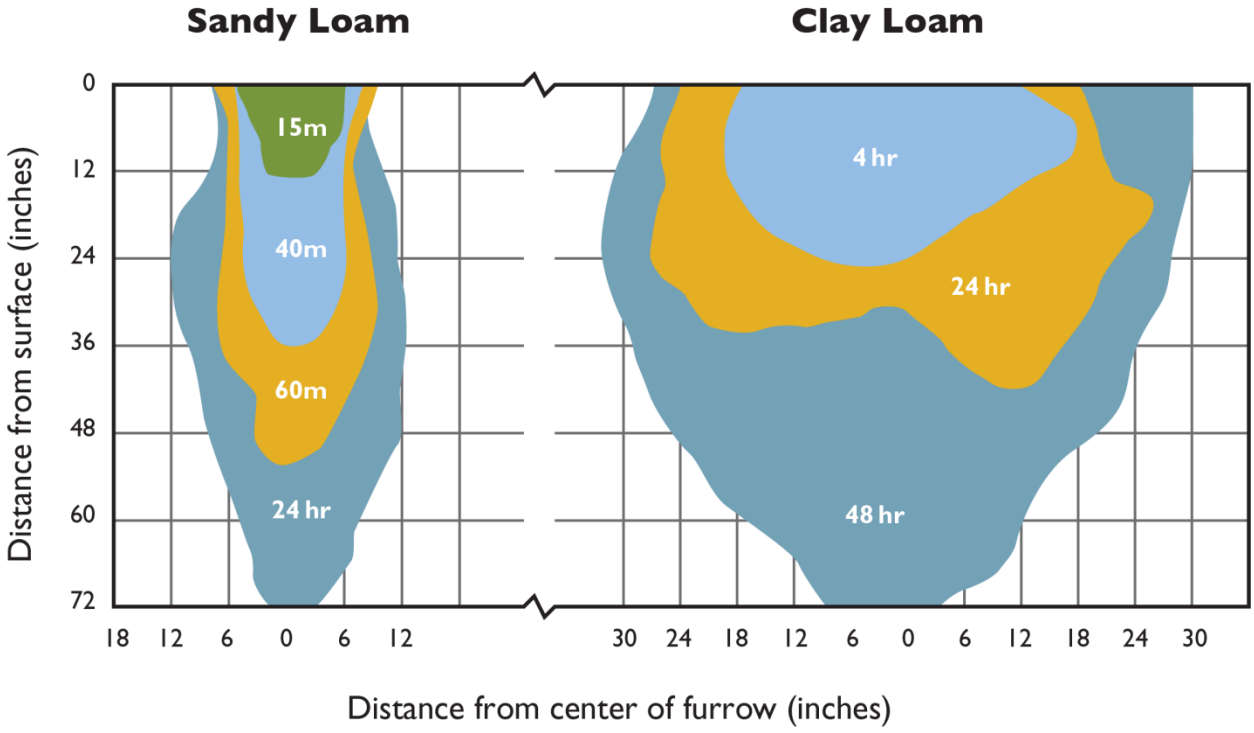
# Infiltration Rate

Irrigation should be scheduled when soils reach 50% of the plant available water point and the amount of water should replenish the root zone to field capacity. The infiltration rate, effective root zone depth, and estimated ET demand determine irrigation frequency and soak cycle needs. Turfgrass species also affects irrigation frequency, since some turfgrasses more effectively resist drought than others.

Infiltration rates depend on soil texture. Sandy soils have higher porosity and greater infiltration rates than silty or clayey soils. The matrix potential of the finer particle soils increases the time to wet the soil. The figure below shows the time and area wetted for two different soils: a 15 minute irrigation cycle on a sandy loam penetrates and wets to a depth of 12 inches and a 40 minute cycle wets nearly 36 inches of sandy loam, while clay loam soil requires hours of irrigation to wet the same profile.




**Infiltration of two different soil types measured in time and area wetted.**

Soils develop unique characteristics called preferential flows that, in some cases, influence or accelerate flow through the profile downward towards groundwater. Examples of preferential flow are as follows:

- Macropores created by larger size particulate, gravel, or wormholes, create channels of preferential flow that direct water downward.

- Uneven mixes of soil types can result in veins of sandier soil that are more conductive than finer particle soils.
- Organic matter, organic residues, and subsurface layers of mixed densities may restrict and direct flow in unique patterns or fingers.
- Finger flow in sand, which acts like a large channel, allows water to rapidly flow through the profile along with any soluble compounds (fertilizer and pesticides).
- Hydrophobic soils repel water and thus the water must find another pathway, flowing (by runoff) towards areas that are wettable or into cracks in the soil.

Preferential flow and restrictions can lead to non-uniform moisture distribution in the root zone. Some areas of turf may be drier and other areas may be wetter, even saturated. Superintendents can develop better and uniform soil conditions by managing the soil compaction and organic matter content or thatch, such as by frequent aerification and top-dressing to provide better root-zone profiles. The use of water dispersants may be required to help water move through hydroscopic soil conditions associated with localized dry spot. Wetting agents, and in some cases organic amendments, may be needed to increase water holding capacity of some soils, particularly sandy soils.

**Preferential flow in soils. Source: Cornell, Soil & Water Lab.**