

Urban Tree & Planter Backfill

Custom Blends for Stability, Porosity, and Water Holding

Urban trees have a very difficult environment in which to try to thrive and grow to maturity. In addition to heavier concentrations of vehicle exhaust, higher ambient air temperatures, reflected heat from building glass, and sometimes higher wind velocities from nearby skyscrapers, the most aggravating conditions usually relate to the root zone growing medium, especially the common lack of porosity - lack of air and water access to the roots.

Starting at the soil surface, most urban trees are lucky to have a 4 foot or 6 foot square tree grate surrounding the trunk to protect roots from compaction and allow air and water entry to the root zone. This is critically small when the common street tree would normally have a root system 20 to 30 feet in diameter in non-urban situations. Thus, air and water have access via surface areas of only 16 to 36 square feet instead of 300 to 700 sf. Little wonder that street trees are often stunted and/or very slow to grow.

With over 17 years of experience in porous pavements - getting water to move through a pavement section quickly, growing great stands of grass in sand and gravel, and supporting very heavy loads all, at the same time, Invisible Structures, Inc. believes that use of similar root zone materials for urban tree pit and planter backfill will reduce the horticultural stress on these trees, and provide additional energy to withstand the other environmental obstacles they face.

Eliminate "Fines"

The one significant difference between porous and non-porous pavements is the presence of "fines", or material that will pass a 200 mesh screen. Also classified as clay or silt size particles, fines will enhance compaction, reduce voids (air spaces), and restrict water movement through the pavement cross section. By the simple action of removing (or restricting) fines from the base course material, porosity is achieved.

Structural integrity is maintained by a wide range of particle sizes, varying from fine sand to 1.5" diameter stone, usually crushed to provide angular surfaces which interlock better than rounded surfaces. Sand and smaller stone help to fill large voids and prevent larger stone from rotation or other gross movement.

Eliminate "Organics"

Organics are added to root zone mixtures primarily to hold moisture and make the moisture available to plant roots. Unfortunately, organic materials (moss, leaf mold, compost, etc.) biodegrade, which causes shrinkage of the original mixture mass. Shrinkage equates to settlement, and is not always even and uniform. Moisture retention can be done without biodegradation by several soil amendments, such as Isolite (expanded/fired clay), ZeoPro (modified mineral zeolite), volcanic rock, and others. Synthetic polymers which absorb great amounts of water, but can physically swell and shrink, should be avoided, or used in very conservative quantities after controlled experiments are performed to determine rate of application.

Compaction

We have been promoting porous pavements since 1982, and have found that if the base course material is compacted to 95% Modified Proctor, both structural and horticultural criteria can be satisfied. Most planting bed or tree pit applications should be able to be compacted to only 90 to 95% Modified Proctor to ensure stability of the root ball and adequate air/water exchange.

Root Zone Mixture

If local gravel material sources do not have standard mixtures that meet the low fines requirement, we have clients that have successfully prepared their own base course mixtures by blending 3/4"-1" crushed drainage rock (at 66%) with concrete sand (at 34%) by using a front end loader to do the blending into piles on a hard surface.