

# Linear Storm Water Tree Pit

## Description

A linear storm water tree pit is similar to a traditional street tree pit design, but is modified so the pit accepts and treats storm water runoff and provides an improved planting environment for the tree. A storm water tree pit has additional soil volume, regular irrigation, and better drainage to promote tree growth. A continuous soil trench underneath the pavement connects individual tree pits (Figures 33 and 34).

Linear storm water tree pits are most useful for the following conditions:

- Where existing soils are very compacted or poor.
- Where open space for planting is limited (e.g., highly urban areas) and rooting space can be provided for trees underneath pavement.
- In street tree or other linear applications (although it can be adjusted for a different application, such as clustered plantings in a courtyard).
- New development, or as a retrofit of existing development, when done in conjunction with repair of underground utilities or a streetscaping project that requires sidewalk excavation.

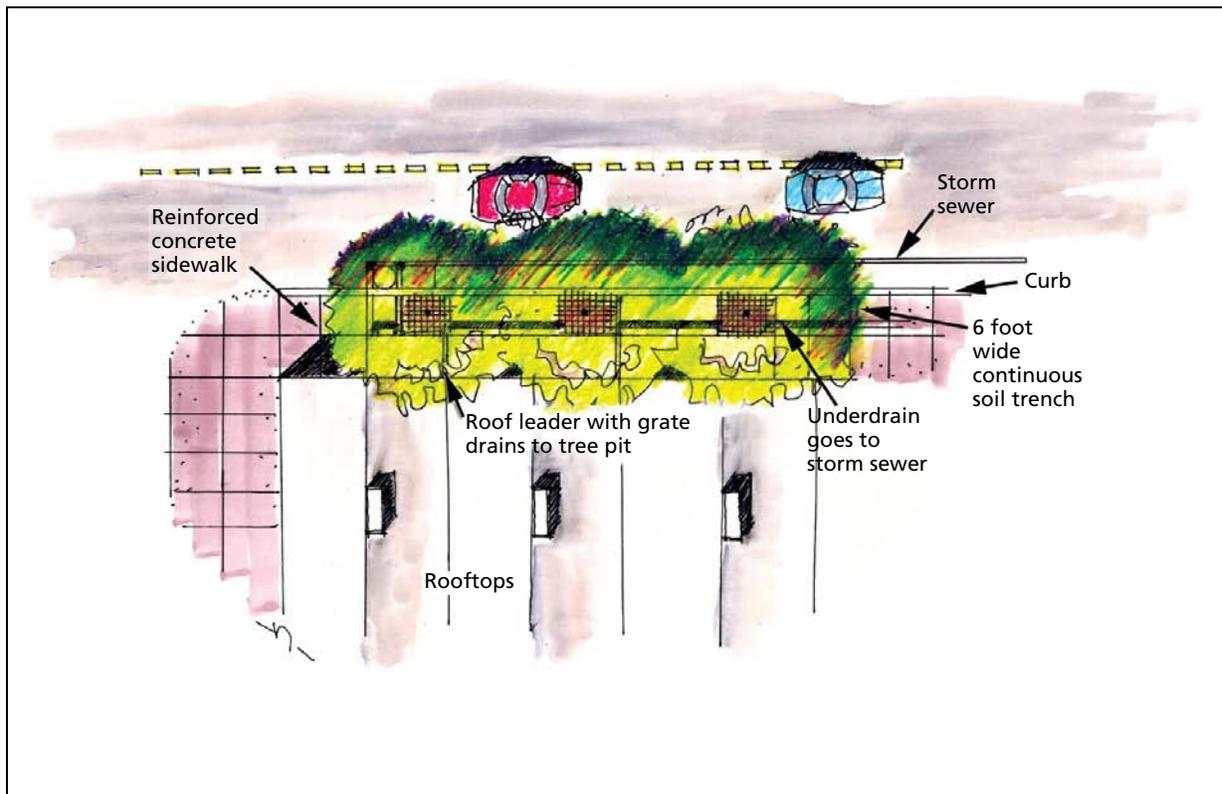


Figure 1. A linear storm water tree pit (plan view) collects and treats storm water that is directed from rooftops.

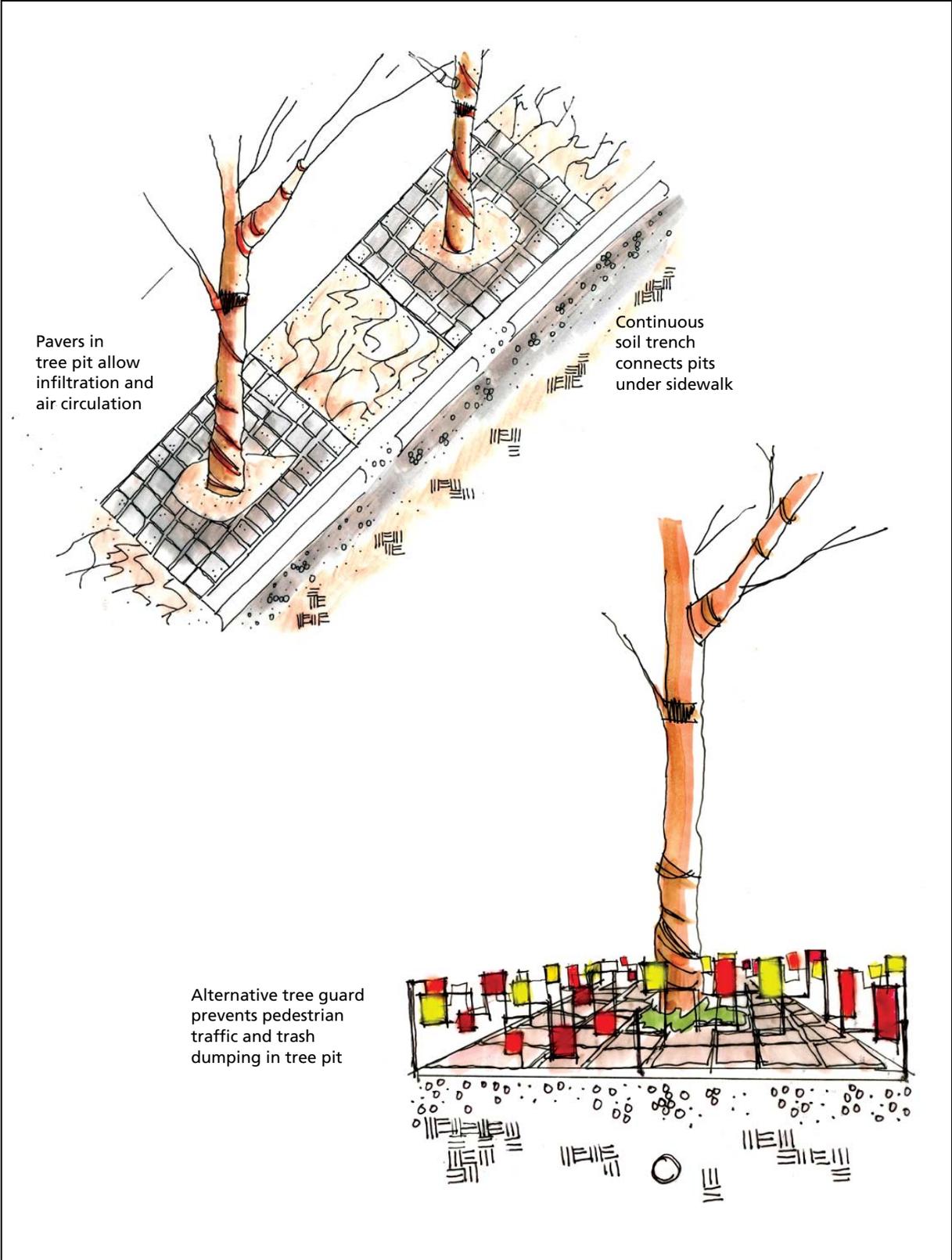


Figure 2. Tree pits are connected through a soil trench, and tree pit protection prevents damage from pedestrian traffic.

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***Design  
Modifications***

- Storm water is directed from rooftops to tree pits using sunken roof leaders covered with grates. An alternative is to use curb cuts to direct street runoff to the pits for added water quality benefits. In this case, a filter screen or cleanout device must be provided to capture trash and litter.
- An underdrain that connects either to existing storm drain inlets or to the storm sewer is installed under tree pits. The underdrain is surrounded by a layer of gravel to provide some filtering. A variation is to add a gravel base under the underdrain to allow some infiltration.
- Trees are planted within a linear trench with filter medium to allow filtering of storm water and shared rooting space for trees underneath pavement.
- Reinforced concrete sidewalks should have wide surface openings to accommodate the mature size of the trees (sidewalks will be cantilevered over planting holes).
- Consider use of structural soils under pavement, which allows tree roots to grow in it and also meets engineering specifications (see Bassuk and others (n.d.) and Part 3 of this manual series for more information).

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***Species  
Selection***

Species selection is critical in storm water tree pits because unmodified site conditions are often highly stressful to healthy tree growth. A mix of hardy species should be selected that are adapted to the following soil and site conditions:

- Tolerant of poor, compacted soils
- Tolerant of salt
- Tolerant of urban pollutants
- Tolerant of inundation
- Tolerant of drought
- Wide spreading canopy

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***General  
Planting  
Guidance***

- Excavate a planting trench 3-4 feet deep and a minimum of 6 feet wide. The volume for each tree should be adequate for the mature size of the tree, assuming some shared soil volume. Backfill trench with filter medium. The top of the planting trench should be slightly below grade to allow space for air circulation.
- Plant at desired spacing intervals.
- Install concrete posts, fencing, or other structures (see Figure 34) to prevent pedestrians from stepping in tree pit (tree grates are not recommended since they can damage the tree if they are not adjusted as it grows).

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*Maintenance*        Use mulch to retain moisture.

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*Topics for Future Research*        Need better method to prevent use of tree pits as trash cans.  
    Develop guidance on sizing and volume of tree pits so as not to direct too much water into pits.

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*Further Resources*    Bassuk, N.; Grabosky, J.; Trowbridge, P.; Urban, J. [N.d.]. Structural soil: an innovative medium under pavement that improves street tree vigor. Ithaca, NY: Cornell University, Urban Horticulture Institute.  
[www.hort.cornell.edu/departement/faculty/bassuk/uhi/outreach/csc/article.html](http://www.hort.cornell.edu/departement/faculty/bassuk/uhi/outreach/csc/article.html)

Hammerschlag, R. S.; Sherald, J. L. 1985. Traditional and expanded tree pit concepts. In: METRIA 5: Selecting and Preparing Sites for Urban Trees. Proceedings of the Fifth Conference of the Metropolitan Tree Improvement Alliance. University Park, PA: The Pennsylvania State University.

Hoke, J. R., Jr., ed. 2000. Architectural graphic standards, 10<sup>th</sup> ed. New York, NY: John Wiley and Sons, Inc.

Urban, J. 1999. Room to grow. Treelink 11: 1-4.

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**This fact sheet was excerpted from:**

Cappiella, Karen; Schueler, Tom; Wright, Tiffany. 2006. Urban Watershed Forestry Manual. Part 2: Conserving and Planting Trees at Development Sites. NA-TP-01-06, Newtown Square, PA: p 49-52. USDA Forest Service, Northeastern Area State and Private Forestry.

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