STORMWATER TREE PIT
FACT SHEET

A Charles River Watershed Association Publication

May 2014

CRWA

STORMWATER TREE PIT FACT SHEET

Alternative Names: Tree Box, Tree Box Filter, Street Tree Well

BENEFITS

Overall

- Reduces stormwater runoff volume, flow rate and temperature
- Increases groundwater infiltration and recharge
- Provides some local flood control
- Treats stormwater runoff
- Improves quality of local surface waterways
- Improves aesthetic appeal of streets and neighborhoods
- Provides wildlife habitat
- Provides shade to nearby buildings to reduce energy costs
- Requires limited space
- Simple to install
- Available in multiple sizes

Volume Attenuation/Flow Reduction

Stormwater tree pits generally capture and treat stormwater runoff from small, frequently-occurring storms but are not designed to capture runoff from large storms or extended periods of rainfall.

Pollutant Removal

Stormwater tree pits have proven to be effective at reducing some of the pollutants of most concern in the Charles River watershed:

- Total Suspended Solids: 85%
- Total Phosphorus: 74%
- Total Nitrogen: 68%
- Metals: 82%[4]

INSTALLATION COST

$8,000 – $10,000, to purchase one prefabricated system including filter material, plants and possibly some maintenance

$1500 – $6000 installation[3, 4, 6]

DESCRIPTION

Stormwater tree pits consist of an underground structure and above ground plantings which collect and treat stormwater using bioretention. Bioretention systems collect and filter stormwater through layers of mulch, soil and plant root systems, where pollutants such as bacteria, nitrogen, phosphorus, heavy metals, oil and grease are retained, degraded and absorbed. Treated stormwater is then infiltrated into the ground or, if infiltration is not appropriate, discharged into a traditional stormwater drainage system. Numerous prefabricated tree pit structures are commercially available. These typically include a ready-made concrete box containing an appropriate soil mixture and may also include plantings, usually one tree or a few small shrubs. Although underground they differ, above ground stormwater tree pits closely resemble traditional street trees and are perfect for urban streets where space is limited. Ideally, stormwater tree pits are employed in conjunction with other stormwater best management practices.

MAINTENANCE

Needs and Frequency

- Periodic inspection of plants and structural components
- Periodic cleaning of inflow and outflow mechanisms
- Periodic testing of mulch and soil for build-up of pollutants that may be harmful to the vegetation
- Biannual replacement of mulch

Cost

$100 – $500 annually/stormwater tree pit

Many proprietors of prefabricated systems will offer annual maintenance plans which can cost up to $500/year, however, if maintenance is performed by the stormwater tree pit owner it can usually be done more economically.[4]

Other

Stormwater tree pits have an average lifespan of 25 years, although vegetation may need to be replaced more frequently.[4]

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190 Park Road
Weston, MA 20453
www.charlesriver.org

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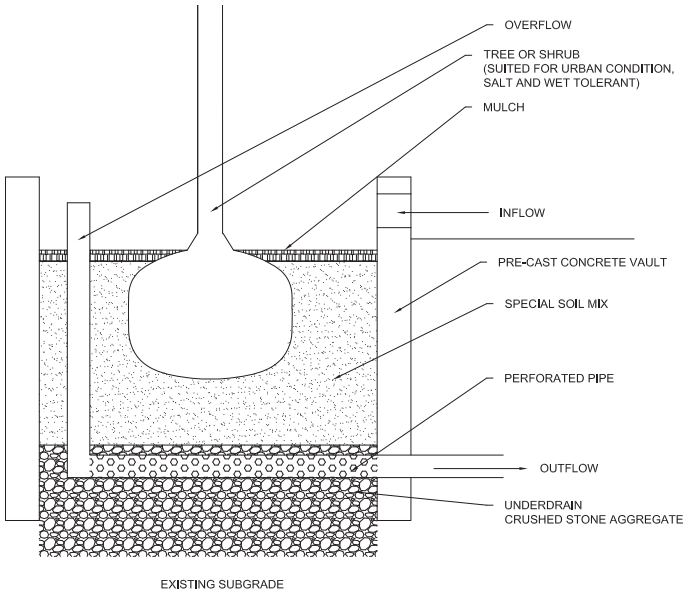
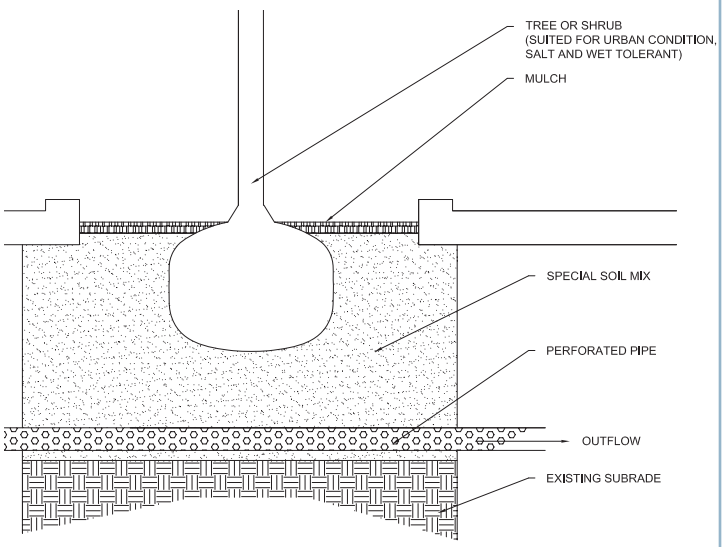
SCHEMATICS



Adapted from:
Low Impact Development Technologies
for Stormwater Management
http://www.unh.edu/erg/cstev/Presentations/index.htm
Accessed 01/22/2008



Adapted from:
Urban Horticultural Institute, New York
http://www.hort.cornell.edu/uhi/outreach/csc/article.html
Accessed 06/16/08

EXAMPLE PROJECTS

Town of Milton
Milton, MA
Tree pits are being installed upgradient of traditional stormwater catch basins to capture and treat stormwater runoff before it enters the stormwater drainage system.[5]

City of Portland
Portland, OR
Stormwater tree pits are being utilized in retrofits of narrow city streets to collect and treat stormwater.

ADDITIONAL CONCERNS OR UNKNOWNS

- Stormwater tree pits should not be placed at a low point as they are not designed to collected large volumes of runoff.
- Stormwater tree pits should be used in conjunction with other systems, such as upgradient of a traditional catch basin or other stormwater best management practice (BMP).

SOURCES

[1]Center for Watershed Protection. (2007, August). Urban Stormwater Retrofit Practices Appendices. Urban Subwatershed Restoration Manual Series.

[2]Coffman, L. and T. Siviter. Filterra® by Americast. An Advanced Sustainable Stormwater Treatment System.

[3]Cooke, I. (2007). Neponset River Watershed Association. Personal Communication.

[4]Low Impact Development Center (LIDC). (2005, November). Tree Box Filters. Low Impact Development for Big Box Retailers. Available at: http://www.lowimpactdevelopment.org/bigbox/lid%20articles/bigbox_final_doc.pdf.

[5]The Neponset River Watershed Association. (2007). NepRWA's Current Projects. Neponset.org. http://www.neponset.org/CurrentProjects.htm.

[6]Roy, S. (2007). GeoSyntec. Personal Communication. 2007.

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