Sustainable Communities

STORMWATER CONTROL MEASURES IN ULTRA URBAN AREAS

This brochure gives a description and pictures of common stormwater control best management practices, also known as “BMPs” suitable for ultra urban environments. The EPA defines stormwater BMPs as a “technique, measure or structural control that is used for a given set of conditions to manage the quantity and improve the quality of storm water runoff in the most cost-effective manner.” To maximize the benefit of selected BMPs the following factors should be considered including drainage area served, available land, cost, pollutant removal efficiency, and site-specific factors such as soil types, slopes, depth of groundwater table, etc.

These BMPs are designed to efficiently use space while providing stormwater treatment. Appropriately designed, many can provide ancillary benefits including public amenities / site interest, reduction in the heat island effect, air pollution control, and access to green-space.

Best management practices include both structural controls and source controls. Source controls prevent buildup of pollutants and can be highly effective and resource efficient strategies for preventing water quality impairment.

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San Antonio River Authority: Sustainability Design Matrix
http://www.sara-tx.org/sustainability/sustainability_matrix/

Texas Land Water Sustainability Forum
http://texaslid.org/

U.S. EPA—Managing Urban Runoff
http://water.epa.gov/polwaste/nps/urban.cfm

Urban Watersheds Research Institute
http://www.uwtrshd.com/index.html

Urban Design Tools
http://lid-stormwater.net/

Urban Stormwater
http://www.urbanstormwater.com/ green-infrastruture.html

Low Impact Development Center
http://www.lowimpactdevelopment.org/publications.htm#epo03_imp

Environmental & Water Resources Institute of the American Society of Civil Engineers
http://email.asce.org/ewri/LIDInitiatives.html

U.S. DOT Federal Highway Administration

Green Roof on Madison HS Agricultural Teaching Facility, San Antonio, TX
Green Walls and Roofs

Rain Gardens

Rainwater Capture and Reuse

Bioretention

Permeable Pavement

Green roof covers can be optimized to achieve water quantity and water quality benefits.

Green Walls route stormwater through vertically placed planters providing water quality treatment and evapotranspiration.

Stormwater can be routed into cisterns above or below ground to detain the water onsite. The stormwater can then be used to irrigate landscaping or routed into other treatment features for water quality polishing before released offsite. Below ground cisterns can be covered with parking lots, reducing the footprint of the site.

Porous pavement is a permeable pavement surface with a stone reservoir underneath. The reservoir temporarily stores surface runoff before infiltrating it into the subsoil. Runoff is thereby infiltrated directly into the soil and receives some water quality treatment. Porous pavement often appears the same as traditional asphalt or concrete but is manufactured without “fine” materials, and instead incorporates void spaces that allow for infiltration.

Street sweeping is an example of reducing the pollutant from the source.

Planters can be designed in a variety of formats to serve as both as a stormwater control as well as an amenity with trees and public interest.

Green Roofs at Hipolito Garcia Federal Building, San Antonio, TX. Photo Credit: John Davenport, San Antonio Express News

Above Ground Stormwater Cisterns at City of San Antonio One-Stop

Installation of Underground Cistern. Photo Credit: www.cenews.com

Rain Garden in Downtown Columbus, OH Photo Credit: www.centralohioraingardens.org/?cat=8&paged=2

(L) Tree Well Designed as Stormwater Control (Above) Planter integrated into sidewalk. Photo Credit (L and Above) www.flickr.com/photos/svrdesignco

Rain gardens require curb cuts or other inlets for stormwater to enter so that it can be infiltrated or evapotranspired.