Best Practice: Greenstreets: Greening Roadways

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CITY: NEW YORK CITY **POLICY AREAS: CLIMATE CHANGE; ENVIRONMENT; PARKS AND GREEN SPACES**

BEST PRACTICE

The New York City Department of Parks & Recreation **Greenstreets** program converts areas of paved roadway into green oases filled with trees, shrubs, and groundcover.

ISSUE

An island of unused roadbed is often formed where two or more roads converge. In some cases, this area has been raised with concrete, while in others it is merely channelized (striped) roadbed. Department of Parks & Recreation (DPR) transforms these spaces into pint-sized parks. Medians and traffic triangles in the roadway constitute the most typical Greenstreets.

Additional site opportunities arise when sidewalks are wide enough to allow for curbside, or "bump-out" plantings. Lastly, "blockbusters" are formed when a two-way street meets a one-way street creating a peninsula of roadbed that can be planted to highlight the traffic change for oncoming vehicles. These sites not only beautify the urban landscape, but also calm busy traffic, increase pedestrian safety, provide environment for wildlife, and capture stormwater for irrigation.

GOALS AND OBJECTIVES

Design Goals and Program Objectives
On Earth Day of 2007, Mayor Bloomberg unveiled PlaNYC 2030, an ambitious and practical plan to make New York City sustainable. As part of his plan, DPR has undertaken the creation of 80 new Greenstreets each year, commencing in fall 2007.

Greenstreets enrich city streets by adding lushness and color to the concrete and asphalt hardscape. These roadside gardens add natural beauty to otherwise barren spaces. Furthermore, Greenstreets help clean the air and cool the city, while providing food and habitat for migratory birds and pollinators.

PlaNYC
PlaNYC initiatives include MillionTreesNYC, a citywide, public-private program with the ambitious goal of planting and caring for one million new trees across the City's five boroughs over the next decade. In keeping with this mission, Greenstreets utilize large-canopy trees wherever possible to provide maximum contribution to the urban forest. Central Forestry & Horticulture has identified five neighborhoods with a combined low canopy cover and high asthma rates as most in need of new plantings. To the fullest extent possible, DPR sites new Greenstreets in these *Trees for Public Health* neighborhoods. Species diversity is a pivotal component of all Greenstreet designs, with emphasis placed on plants which best can tolerate tough urban conditions.

Stormwater Capture & American Recovery and Reinvestment Act (ARRA)
By replacing paved roadbed, Greenstreets increase the pervious surface area available to capture stormwater. A one-acre Greenstreet can hold approximately 55,000 gallons of stormwater. Where suitable, sites are designed to actively redirect stormwater runoff into the planting bed, for on-site storage and irrigation of plants. DPR landscape architects employ gently sloping sidewalks, trench drains, curb cuts, bioswales, deep excavation, and crushed bluestone storage reservoirs to accomplish this goal.

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The program has received a $2 million federal stimulus grant under the ARRA to pilot stormwater capture technologies at 26 new Greenstreets in flood-prone neighborhoods. The funding is coming through New York's Clean Water State Revolving Fund, and is therefore being administered by the New York Environmental Facilities Corporation (Department of

Environmental Conservation). Construction will start in spring 2010, and finish in December of 2012. Progress can be tracked at (click on Greenstreets for Stormwater Capture in NYC Watersheds):
http://www.nyc.gov/html/ops/nycstim/html/tracker/infrastructure.shtml

IMPLEMENTATION

Greenstreets are constructed exclusively through Central Forestry and Horticulture's citywide requirements contracts. Proposed sites are surveyed and designed by landscape architects in this division. Designs are then reviewed and approved by NYC Department of Transportation's (DOT) Highway Design and Construction team. Construction of sites is permitted by DOT, following approval of designs. Sites are maintained by the contractor for the first two-years following construction, as per terms of the contract. Once the two-year guarantee period has ended, sites are maintained by the horticultural staff of each borough.

COST

Mayor Bloomberg's PlaNYC 2030 includes a commitment of $15 million in funding for the construction of new Greenstreets from 2007 through 2017. This budget occasionally is supplemented by local elected officials, who provide funds for construction of specific Greenstreets. The sites are maintained by DPR's Maintenance & Operations (M&O) staff and seasonal Greenstreets crews, with funding from each borough's M&O budget.

RESULTS AND EVALUATION

There are currently 2,468 Greenstreets citywide. These planting beds add more than 100 acres of green space to the roadways of New York City. The program is hugely popular, with at least 50 requests coming in each year from community members, elected officials, and Business Improvement Districts.

Macombs Ave & Featherbed La, Bronx

Flushing Blvd & 59th St, Queens

1st Ave & 20th St, Manhattan

Cropsey Ave & Dyker Pl., Brooklyn

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10th Ave & 14th St, Manhattan

Strickland Ave., Brooklyn

111th St, 47th-48th Aves, Queens

Waldo & Greystone Avenues, Bronx

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1st Ave & 20th St, Manhattan

Furmanville Ave & Dry Harbor Rd, Queens

110th St & Amsterdam Ave, Manhattan

Pelham & Stillwell Aves, Bronx

Church & 14th Ave., Brooklyn

Amboy & Richmond Valley Rd, Staten Island

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DPR is partnering with Drexel University, NYC Soil & Water Conservation District, Brooklyn College-CUNY, and Atlas Scientific to conduct a monitoring study of Greenstreets which actively capture stormwater. This research is being funded by a $160,000 grant from the National Science Foundation (NSF), as well as a $63,000 grant from the New York State Department of Environmental Conservation (DEC), and a $71,000 grant from the New York Department of State (DOS).

The NSF grant will be used to study two of the Greenstreets being built with ARRA funds, looking specifically at water fluxes, runoff pollutants, and soil contamination over time. The research will use data acquired from weighing lysimeters, sap flow meters, climate stations, soil moisture probes, tensiometers, and other installed apparatuses. It is our hope that the data collected will confirm that these sites are effectively intercepting runoff, capturing and storing stormwater for plant use, and thereby reducing the need for DPR watering.

TIMELINE

The Greenstreets program was launched in 1996 by former Parks Commissioner Henry J. Stern. There are currently 2,338 sites citywide. Mayor Bloomberg's PlaNYC 2030 includes a strategy to undertake 80 new Greenstreets each year, commencing in fall 2007. This commitment will bring the total number of Greenstreets projects to 3,000 by 2017.

LEGISLATION

The majority of Greenstreets are located in the roadbed on NYC Department of Transportation (DOT) property. For this reason, the Greenstreets program is a partnership between DPR and DOT. Greenstreets are governed by a Memorandum of Understanding between these agencies which dictates that DPR is fully responsible for the sites while they are Greenstreets. DOT may reclaim use of their land at any time desired or necessary.

LESSONS LEARNED

Planting in the midst of a roadbed poses many challenges, as one can imagine. Greenstreets face drought, pollution, road salt, dog waste, litter, and foot traffic, as well as vandalism by people and vehicles. The designers of Greenstreets are constantly learning and adapting with each new Greenstreet constructed. While each site dictates its own needs, DPR landscape architects have developed a strong base palette of plants able to withstand harsh urban conditions. Species are selected for their drought tolerance, salt tolerance, pollution tolerance, low maintenance needs and ability to spread and suppress weeds. In addition, designs must balance goals of aesthetics, species diversity, canopy cover, and stormwater capture with the requirements of roadway geometry. Designers carefully select plants with appropriate mature heights, widths, and habits and arrange them so as not obstruct driver visibility or compromise pedestrian safety.

TRANSFERABILITY

Greenstreets hold potential for any city or town seeking to maximize green space and reduce impermeable surface area in the right of way. Arguably, not every road geometry and volume of traffic can accommodate planting beds. However, where there is adequate width and depth available for excavation and planting, these sites can yield maximum benefits for minimum expenditure. New York City is not the only municipality to implement right of way greening. Innovative programs have arisen across the country in cities such as Portland, Seattle, Chicago, and Philadelphia. Furthermore, similar projects can justifiably fall within the scope of a Department of Public Works or Watershed Department.

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