Landscape
6.0 Introduction
  6.0.1 General Guidelines

6.1 Tree Beds
  6.1.1 Tree Bed
    a Individual Tree Bed
    b Connected Tree Bed
      Table 6a

6.2 Roadway Plantings
  6.2.1 Raised Median
    a Raised Median (Curb Height)
    b Raised Median (12–24 Inches)
    c Pedestrian Mall
  6.2.2 Triangle
  6.2.3 Street End
      Table 6b

6.3 Sidewalk Plantings
  6.3.1 Full Sidewalk
  6.3.2 Ribbon Sidewalk
  6.3.3 Curb Extension
      Table 6c

6.4 Plaza Plantings
  6.4.1 In-Ground Planting Area
  6.4.2 Raised Planting Area
      Table 6d

6.5 Limited-Access Arterial Plantings
  6.5.1 Limited-Access Arterial Plantings
      Table 6e

6.6 Stormwater-Capturing Installations
  6.6.1 Stormwater-Capturing Installations
    a DEP ROW Bioswale
    b DPR Treatment
      Table 6f
6.0 Introduction

Introduction

About this Chapter
This chapter provides general guidelines for the selection, design, installation, and maintenance of plantings in the public right-of-way (ROW). It reflects current practices and initiatives such as PlaNYC, MillionTreesNYC, DOT’s Plaza Program, and DEP’s Green Infrastructure Plan.

The chapter is organized by the location of plantings, except for TREE BEDS (6.1) and STORMWATER-CAPTURING INSTALLATIONS (6.6) as these should be utilized wherever conditions allow.

Benefits of Plantings in the ROW
Vegetation within the public ROW has been shown to provide significant benefits. Generally, these benefits increase exponentially as the size of the plant increases; this is particularly true for trees.

All plantings:
- capture carbon dioxide and particles from the air
- reduce the urban heat-island effect, decreasing energy costs related to air temperatures
- allow for both passive and active stormwater management
- dampen street noise, providing health and psychological benefits
- provide urban wildlife habitat opportunities
- make streets appear narrower to drivers, thereby causing them to drive slower, and enhancing safety
- create a positive aesthetic that attracts customers to local businesses
- increase the value of adjacent properties
- make streets and neighborhoods more attractive

Guidance Sources
More comprehensive guidance on the planning, design, installation, and maintenance of plantings within New York City is contained in sources such as High Performance Landscape Guidelines: 21st Century Parks for NYC (Design Trust for Public Space and DPR, 2011), High Performance Infrastructure Guidelines (Design Trust for Public Space and DDC, 2005), Tree Planting Standards (DPR, 2012), and the Sustainable Urban Site Design Manual (DDC Office of Sustainable Design, 2008).


Applicability and Exceptions
All new projects that significantly impact public and private streets should follow these guidelines. DOT approval will be based on site-specific conditions and cost-effective engineering standards and judgment, with the safety of all street users being of paramount importance.

Usage Categories
This chapter does not apply usage categories to landscape treatments. Plantings are encouraged wherever site conditions allow and appropriate maintenance can be provided. Plants must always be chosen based on site-specific conditions.

There are certain treatments, noted throughout the chapter, that are considered standard. These treatments will be installed and maintained by the city. Other entities may also pursue these treatments and they will generally require less intensive review. Other treatments may also be pursued, but may require more extensive review depending on the complexity of the project.
Reviews & Approvals
Installation of all plantings within the public ROW must be reviewed and approved by DPR and DOT. A forestry permit from DPR is required to install new trees and for any work being performed within 50 feet of existing trees. Proposed stormwater-capturing landscape treatments within the public ROW must be reviewed and approved by DEP, DPR, and DOT. New plantings may be subject to PDC or LPC review, particularly if they are part of a larger streetscape or open space project within its purview.

Designs for planted areas and green infrastructure within the public ROW are still evolving and being tested. Because these treatments may ultimately be maintained by city agencies, the appropriate agencies must be consulted early in the design process so that all such treatments are technically viable and maintainable.

Maintenance Agreements
DPR is responsible for the maintenance of all trees within the public ROW and of Greenstreets locations set forth in an agreement between DPR and DOT. Additionally, DPR maintains all DEP-funded green infrastructure within the public ROW under a three-party agreement between DEP, DPR, and DOT. Other plantings within the public ROW are encouraged but require coordination with appropriate agencies and a maintenance agreement with DOT.

For plantings requiring a maintenance agreement, proposals must be submitted to the appropriate DOT Borough Commissioner. Contact information for DOT Borough Commissioners can be found at nyc.gov/dotcontact or by calling 311.

DPR has shifted the focus of its Greenstreets program towards stormwater capture and has updated its criteria for evaluating Greenstreet requests. DPR still builds traditional Greenstreets in any community but only if they come with full independent funding for construction and maintenance. For more information see “Greenstreet Requests” at www.nycgovparks.org/greening/green-infrastructure.
6.0.1 General Guidelines

General Guidelines

Attention should be given to plants’ color, form, foliage, and texture and how those elements can be combined to create year-round interest. Careful consideration should also be given to the forms and heights plants will reach at maturity and how they interact with other design elements, such as seating, signage, signals, and lighting. Avoid species that DPR has determined to be invasive and select plants that are known to compete well with invasive species. Where possible, given site conditions, designers should accommodate the collection of stormwater and select plants that can withstand both periodic inundation and drought. All species selection must be approved by DPR during the review process.

Project Team
It is recommended that all projects have a consulting arborist (CA), horticulturist, soil specialist, and/or landscape architect on the project team. City and/or state agencies should be involved early on.

Plant Selection
A successful planting design will match plants with existing site conditions and anticipated site use to achieve an aesthetically pleasing, functional, and long-lived landscape. Species selection must be guided by a comprehensive site analysis of the natural and built environment as well as the maintenance plantings are anticipated to need and receive. Plant specification should follow DOT and DPR standards, and, whenever possible, plants should be sourced from a nursery within 200 miles of the project site.

The following guidelines expand on the general policies and principles outlined in the Introduction, with more information pertaining to landscape planting design, installation, and maintenance.
Soils

Soils are crucial to plant health and impact plant selection and project implementation. Adhere to the following guidelines:

- Determine soil quality by testing its texture, pH, organic content, permeability, nutrients, and bulk density
- Preserve existing soils that are capable of supporting healthy plants
- Do not work the soil if it is frozen or sodden
- Add organic matter and/or nutrients to poor-quality soils
- Loosen compacted soil (bulk density of >1.4 grams per cubic centimeter) with mechanical tools and/or by integrating compost. (Use pneumatic excavation within tree-protection areas to preserve roots)

- If new soil is required, construction specifications should include detailed information on desired soil characteristics

Soil volume also affects plant health. It is, therefore, important to maximize soil volume and choose plants that grow well in the available soil volume. Where pavement is necessary in close proximity to trees, consider incorporating a suspended pavement system to provide greater rooting volume.

Microclimate

According to the 2012 USDA Hardiness Zone map, most of New York City falls within Zone 7B, with portions of the Bronx and Staten Island within 7A. However, the site-specific environmental conditions such as sun exposure, wind patterns, and precipitation will ultimately create a unique growing environment for plants. This microclimate must be understood in order to select the most appropriate plants.
Diseases and Pests
Diseases and pests can pose significant risks to plant health and survival. Plants should be selected that are resistant to common ailments, such as anthracnose (leaf spot), or that can withstand outbreaks.

Several pests affect trees in New York City. The two most damaging are the Asian Longhorned Beetle (ALB) and the Emerald Ash Borer (EAB). ALB (Anoplophora glabripennis) is an invasive beetle known to attack several species of trees. Currently the only effective means to control the beetle is to remove infested trees and destroy them by chipping or burning. For more information, visit the USDA’s Animal and Plant Health Inspection Service webpage or the USDA’s APHIS publication regarding ALB in New York.

EAB (Agrilus planipennis) is an invasive beetle that is destroying ash populations across the Northeast and Midwest. As such, ash tree species are no longer being permitted within the city.

Application of pesticides (including herbicides, insecticides, and fungicides) is regulated by the federal EPA as well as New York State Department of Environmental Conservation. Pesticides may only be applied by a NYSDEC Certified Commercial Pesticide Applicator or under the direct supervision of the same. Additionally, pesticides applied to property owned or leased by the city must comply with Chapter 12 of Title 17 of the Administrative Code of the City of New York (Local Law 37 of 2005). Note that this law does not apply to private property. For more information on this law, visit the New York City Department of Health and Mental Hygiene webpage (a816-healthpsi.nyc.gov/ll37) or call 311.
Spacing/Siting Requirements

In the setting of streets, parkways, and expressways, the placement of trees and other plants has a direct bearing on safety and the cost of maintenance. Plants, excluding tree canopies, in the public ROW should not infringe upon the roadway or sidewalk beyond the planting bed. Ultimately, all plantings must follow MUTCD, AASHTO, NYSDOT, DPR, and DOT design standards and guidelines. (See Clearance Diagram above.)

Careful consideration must be given to above- and below-ground constraints; utilities, vaults, and other obstructions may limit the ability to plant. In particular, avoid planting trees directly over DEP water and sewer mains and near steam lines.

Trees and other plantings must not block sight lines at intersections for drivers, cyclists, and pedestrians. At all intersections, trees and any plants that would naturally grow to greater than 2 feet in height must be placed no closer than 35 feet from the curb of the intersecting street and in a manner that does not block the signal or stop sign. (See Corner Clearance Diagram, right.) Trees on medians must be set back 35 feet from the curb at the end of the median.
**Tree Preservation and Protection**
Mature trees should be preserved during construction wherever possible because they provide significantly more benefits than newly planted trees. Such preservation can be complicated and should therefore be guided by a consulting arborist (CA) throughout the project. The following provides general information on how best to approach design with the preservation of existing trees in mind.

Under Section 18-107 of the Administrative Code of the City of New York and Chapter 5 of Title 56 of the Rules and Regulations of the City of New York, all construction work impacting trees within the public ROW must be approved and permitted by DPR. In addition, construction work must follow DPR Tree Preservation Protocols and DPR Forestry Protocol for Planned and Emergency Utility Work. Ultimately, if the removal of a tree is necessary, it must be approved by DPR, and restitution may be required based on a valuation of the trees impacted. This typically involves planting new trees and/or paying a fee to cover the cost of DPR planting the necessary replacement trees.

In order to preserve existing trees, their roots must be protected. Tree roots extend well beyond the visible canopy and are generally within the top three feet of soil. The minimum number of roots a tree needs to survive is called the critical root zone (CRZ) and will be determined by the CA using the International Society of Arboriculture’s Best Management Practices for Managing Trees During Construction (F. Kite, T. Smiley, 2008). The individual CRZ radii should be incorporated into all phases of design and reflected on a CRZ map. The goal is to preserve as many roots as possible beyond the CRZ through sensitive design and the use of best practices during construction.

**1. Scope**
- Include DPR’s Borough Forestry Office in the Scope review to consider potential impacts to trees in siting project scope

**2. Inventory and Assess Existing Tree Resources**
- Certified Arborist (CA) to inventory and assess all trees within and immediately adjacent to project limit lines
- All tree removals must be approved by DPR’s Borough Forestry Office

**3. Design with the Tree in Mind**
- CA to identify potential tree impacts and necessary tree removals

**4. Develop Tree Protection Plan**
- CA to advise and review designs for potential tree impacts
- CA to advise and develop tree protection plan
- 50% and 90% construction documents reviewed by DPR’s Borough Forestry Office

**5. Enforce Tree Protection Plan in Construction**
- Tree protection implemented and enforced by DPR’s Borough Forestry Office and/or CA
- CA to perform initial inspection and approval of installed tree protection measures
- CA to supervise all work within and immediately adjacent to Tree Protection Areas
ABOVE: Root pinning resolves sidewalk heaving while preserving existing trees: Black Locust Triangle, 123rd Street and North Conduit Avenue, Brooklyn (Credit: DPR)

RIGHT: Removing soil from around a tree’s roots through pneumatic excavation allows for work to be done without damaging the tree: LEFT – Fort Totten Park, Queens (Credit: DPR), RIGHT – 235th Street and 119th Avenue, Queens (Credit: Lisa Montana)

Critical Root Zone Diagram

"ISA" CRZ Radius = DBH × 6” – 18”

Determined by the tree species tolerance to construction impacts and tree age

"Absolute" CRZ Radius = DBH × 5”

Protecting only to this CRZ will result in significant life-threatening impacts to the tree

Tree Stem

DBH: Diameter at Breast Height (measured 4.5’ above ground)
Tree Protection Area

The tree protection area (TPA) is the most important tool used in the preservation of existing trees. Generally, the TPA is developed in coordination with the CA during design and is defined by the canopy drip line of the tree. The TPA will always encompass the CRZ. (See Tree Protection Area Diagram.) During construction, the TPA is typically established with a fence or barrier. In circumstances where a majority of roots are growing beneath pavement, special methods should be utilized. (See diagram.) No activity, including non-construction-related activities, may occur within the TPA without approval from DPR and supervision by the CA. If construction work must occur within the TPA, the contractor must work with the CA to employ techniques, such as pneumatic excavation (air spading) to expose and preserve the roots in good condition.

Tree Protection Area Diagram

The TPA diagram provides guidance on tree protection during construction projects in an urban setting.

TOP: Tree protection measures during reconstruction of the Allen Street Malls, Manhattan (Credit: DPR)

BOTTOM: Typical tree protection area (TPA) in a landscape setting; specialized treatments should be used in urban settings: Conduit Avenue, Queens
Plant Installation
All plants must be installed per DOT and/or DPR standards. See DPR’s Planting Specification Checklist. In addition, contact DigNet or call 811 prior to installation to identify utilities and have them field-verified by proper authorities. The optimal time for planting trees, shrubs, and perennials is during the spring and fall, with some trees restricted to spring planting only. In New York City, this corresponds generally to March 1–May 31, and October 1–December 31, weather permitting. No plants should be installed once the ground has frozen.

Period of Establishment
Newly installed plants require consistent maintenance throughout the growing season in order to become established and thrive. Establishment periods vary, but under a DPR planting permit, the installer is required to water and provide regular care for the first two years.

Another strategy to promote successful establishment of plants is to include a progress payment schedule as part of the landscape portion of the contract. This is a mechanism whereby the landscape portion of the contract is paid in installments throughout the period of establishment only when the contractor performs required tasks such as watering. This incentivizes the contractor to perform regular maintenance instead of just replacing plants that have died at the end of the establishment period.

Maintenance
Site design and species selection should correspond to the anticipated level of maintenance a planting will receive following installation. Planting areas should be designed to provide sufficient space for personnel to maintain them. Such design considerations may include, among other things, paths within or surrounding the planting areas. The frequency of available maintenance and skill levels of those providing maintenance are important considerations that must be addressed during design.

Maintenance should include an appropriate level of watering, weeding, pruning, cultivating, and waste removal. Repair of minor washouts, mulching, soil replacement, plant replacement and other horticultural operations may also be necessary. Any existing invasive plants that cannot be removed or outbreaks of new invasive species will have to be managed through ongoing maintenance. Selecting plants that are drought tolerant, are disease resistant, compete well, and have the appropriate form at maturity will reduce maintenance needs.
The city strives to build, permit, and manage as diverse an urban ecosystem as possible. A diverse ecosystem is ultimately more resilient and reduces the risk associated with urban forest management and maintenance. Visit DPR’s webpage on tree care for more information.

In partnership with the New York Restoration Project, DPR will have planted 220,000 street trees (1,000,000 trees total) by 2017. Visit MillionTreesNYC.org for more information.
Tree Bed

Excavated pits that allow for the planting of street trees and other vegetation within the public ROW. This is a standard treatment that DPR installs and maintains. Other entities are also encouraged to pursue this treatment but require a permit from DOT and DPR.

Tree beds are used extensively all over the city and should be used wherever sidewalks exist if conditions allow. **INDIVIDUAL TREE BEDS (6.1.1a)** are currently the only required design, however **CONNECTED TREE BEDS (6.1.1b)** should be used wherever possible to provide improved tree health, and **DEP ROW BIOSWALES (6.6.1a)**—those that take water from the roadway—should be considered wherever DEP Priority CSO Tributary Areas are affected.

**Benefits**

See **BENEFITS OF PLANTINGS IN THE ROW (6.0)**

For further information on the benefits of trees, see the United States Department of Agriculture’s NYC Municipal Forest Resource Analysis

**Considerations**

See **GENERAL GUIDELINES (6.0.1)**

DOT and DPR permits are required to install trees. The permit holder must maintain and guarantee the tree and bed for two years.

DPR contractors will maintain tree beds (individual or connected) planted by DPR for two years after planting, after which each individual property owner is responsible for maintaining the tree-bed(s), while DPR retains responsibility for and jurisdiction over the tree itself; see DPR’s webpage on tree-bed care.

Street trees along a sidewalk. Spacing is dependent on species. The open tree beds allow for water and air to get to the tree roots: Post Avenue, Manhattan (Credit: DPR)
6.1.1 Tree Bed

Design

See GENERAL GUIDELINES (6.0.1)

Meet or exceed minimum size and design requirements of DPR’s Tree Planting Standards contingent upon accommodation of pedestrian capacity and sub-surface constraints

An 8-foot clear path should be maintained in areas with high pedestrian traffic and a 5-foot clear path in areas with low pedestrian traffic. Exceptions may be approved by DOT and DPR on a case-by-case basis. In all cases, a tree bed should not take up more than 50% of the total sidewalk width or reduce the sidewalk width to less than 3 feet.

Where feasible, use CONNECTED TREE BEDS (6.1.1b) instead of INDIVIDUAL TREE BEDS (6.1.1a) to increase root space and stormwater detention capacity.

Diversify street tree species along a block to avoid species blight and plant the largest-canopy species that site conditions allow.

Minimum center-to-center distance between trees is 25 feet, depending on tree species and local conditions, and can be as much as 40 feet if the canopy of an existing, neighboring tree is large. Slightly closer spacing may be appropriate if planting in continuous beds or using narrow growing species.

Do not remove or add topsoil around the rooting area of established trees; mulch is preferred.

Maximize exposed soil to allow more water and air to get to the roots of the tree; if necessary due to high pedestrian traffic, use DPR-approved permeable surface treatments over the tree bed.

Tree-bed guards are recommended.

Application

The New York City Zoning Resolution requires that one tree be provided for every 25 feet of curb frontage for new developments and major alterations; all other spacing requirements per DPR tree-planting standards still apply.

All areas with FULL SIDEWALKS (6.3.1), RAISED MEDIANS (6.2.1), PEDESTRIAN SAFETY ISLANDS (2.2.4), PEDESTRIAN MALLS (6.2.1c), TRIANGLES (6.2.2), and PLAZAS (6.4) CONNECTED TREE BEDS (6.1.1b) should be utilized as an alternative to INDIVIDUAL TREE BEDS (6.1.1a) wherever feasible.

Plants

See Tree-Bed Planting Recommendations (Table 6.A)
6.1.1a Tree Bed: Individual Tree Bed

**Individual Tree Bed**

A tree bed within a sidewalk, median, triangle, or plaza, disconnected from other tree beds, where a tree is planted. This is a standard treatment that will be installed and maintained by the city.

**Benefits**
See benefits of TREE BED (6.1.1)

**Considerations**
See considerations for TREE BED (6.1.1)
The installation of a tree-bed guard requires a permit from DPR

**Application**
See application guidance for TREE BED (6.1.1)
Use CONNECTED TREE BEDS (6.1.1b) rather than INDIVIDUAL TREE BEDS (6.1.1a) wherever possible

**Design**
See design guidance for TREE BED (6.1.1)
Tree-bed sizes may vary depending on site conditions and should be designed to be as large as possible
One of DPR’s four standard tree-bed guards should be used
Tree-bed guard should be 18 – 24 inches high and 18 inches from the curb face; alternatively, a three-sided guard can be installed closer to the curb, with the open side at the curb

**Plants**
See Tree-Bed Planting Recommendations (Table 6A)

Tree bed with standard tree-bed guard. While tree beds may vary in size, larger dimensions allow for more growth: Vanderbilt Avenue, Brooklyn
6.1.1b Tree Bed: Connected Tree Bed

**Connected Tree Bed**

A series of tree beds connected with a continuous trench in order to provide increased root space and stormwater detention. This is a standard treatment that will be installed and maintained by the city.

**Benefits**

- Provides greater space for tree roots than INDIVIDUAL TREE BED (6.1.1a), improving tree health and longevity
- In areas where a RIBBON SIDEWALK (2.2.1b) is inappropriate, connected tree beds provide many of the same benefits
- Additional soil provides more stormwater detention capacity than INDIVIDUAL TREE BEDS (6.1.1a)

**Considerations**

- See considerations for TREE BED (6.1.1)

**Application**

- See application guidance for TREE BED (6.1.1)
- Whenever possible in lieu of INDIVIDUAL TREE BED (6.1.1a)
- Consider RIBBON SIDEWALK (2.2.1b) as an alternative in areas of low-to-moderate land use density per its application guidance and zoning requirements
- Consider DEP ROW BIOSWALES (6.6.1a) in DEP Priority CSO Tributary Areas where conditions are appropriate

**Design**

- See design guidance for TREE BED (6.1.1)
- The trench of connected tree beds should be left uncovered (and, optionally, landscaped) to improve tree root health
- Where pedestrian access is necessary (areas of high foot traffic, limited sidewalk space, or frequent curbside access), pavement can be bridged over the tree-bed trench using a suspended pavement system to increase soil volume

**Plants**

- See Tree-Bed Planting Recommendations (Table 6A)
The DPR list of approved street trees can be found on its website. Tree species should always be selected based on site-specific conditions and approved by DPR.

The following list is a small sampling of perennials and groundcovers that have been successfully used in tree beds in New York City. Large plants or woody shrubs should not be planted in tree beds where there are existing trees. This list is not comprehensive and there is no guarantee that these plants will survive at a specific site. All plants within the public ROW must be selected based on site-specific conditions and approved by DPR.

### Table 6a: Tree-Bed Planting Recommendations

<table>
<thead>
<tr>
<th>Groundcover</th>
<th>Scientific Name</th>
<th>‘Cultivar’</th>
<th>Trade Name</th>
<th>Common Name</th>
<th>Height</th>
<th>Spread</th>
<th>Characteristics</th>
<th>Tolerances</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Gaylussacia brachycerra</td>
<td>Box Huckleberry</td>
<td>1.5’</td>
<td>3’</td>
<td>MAY</td>
<td>✓</td>
<td>Light</td>
<td>−</td>
</tr>
<tr>
<td></td>
<td>Rubus calycinoides ‘Emerald Carpet’</td>
<td>Ornamental Creeping Raspberry</td>
<td>.5-1’</td>
<td>2’</td>
<td>MAY</td>
<td>✓</td>
<td>−</td>
<td>−</td>
</tr>
</tbody>
</table>

**Grasses/Grass-like Plants**

<table>
<thead>
<tr>
<th>Groundcover</th>
<th>Scientific Name</th>
<th>‘Cultivar’</th>
<th>Trade Name</th>
<th>Common Name</th>
<th>Height</th>
<th>Spread</th>
<th>Characteristics</th>
<th>Tolerances</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Miscanthus sinensis ‘Little Kitten’</td>
<td>Little Kitten</td>
<td>1”-3”</td>
<td>1’-1.5’</td>
<td>AUG</td>
<td>✓</td>
<td>−</td>
<td>−</td>
</tr>
<tr>
<td></td>
<td>Festuca glauca ‘Elijah Blue’</td>
<td>Elijah Blue Fescue</td>
<td>.5-1’</td>
<td>1’</td>
<td>JUN</td>
<td>✓</td>
<td>−</td>
<td>−</td>
</tr>
<tr>
<td></td>
<td>Carex morrowii ‘Ice Dance’</td>
<td>Ice Dance Sedge</td>
<td>.5-1’</td>
<td>1’-2’</td>
<td>APR</td>
<td>✓</td>
<td>−</td>
<td>−</td>
</tr>
</tbody>
</table>

**Perennials**

<table>
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<tr>
<th>Groundcover</th>
<th>Scientific Name</th>
<th>‘Cultivar’</th>
<th>Trade Name</th>
<th>Common Name</th>
<th>Height</th>
<th>Spread</th>
<th>Characteristics</th>
<th>Tolerances</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Echinacea purpurea ‘Magnus’</td>
<td>FlowWow Wildberry Coneflower</td>
<td>2’-2.5’</td>
<td>1’-1.5’</td>
<td>JUN</td>
<td>✓</td>
<td>−</td>
<td>−</td>
</tr>
<tr>
<td></td>
<td>Heuchera villosa ‘Miracle’</td>
<td>Miracle Coral Bells</td>
<td>1’-1.5’</td>
<td>1’</td>
<td>JUL</td>
<td>✓</td>
<td>−</td>
<td>−</td>
</tr>
<tr>
<td></td>
<td>Hosta sieboldiana ‘Frances Williams’</td>
<td>Frances Williams Hosta</td>
<td>2’</td>
<td>3’-4’</td>
<td>JUL</td>
<td>✓</td>
<td>−</td>
<td>−</td>
</tr>
<tr>
<td></td>
<td>Lysimachia nummularia ‘Goldilocks’</td>
<td>Goldilocks Creeping Jenny</td>
<td>4’</td>
<td>1’-3’</td>
<td>JUN</td>
<td>✓</td>
<td>−</td>
<td>−</td>
</tr>
<tr>
<td></td>
<td>Phlox subulata ‘Red Wings’</td>
<td>Red Wings Creeping Phlox</td>
<td>6’</td>
<td>2’-3’</td>
<td>MAY</td>
<td>✓</td>
<td>−</td>
<td>−</td>
</tr>
<tr>
<td></td>
<td>Rudbeckia ‘City Garden’</td>
<td>City Garden Black-Eyed Susan</td>
<td>.5-1’</td>
<td>1’-1.5’</td>
<td>JUN</td>
<td>✓</td>
<td>−</td>
<td>−</td>
</tr>
<tr>
<td></td>
<td>Sedum ‘Abbeydore’</td>
<td>Abbeydore Stonecrop</td>
<td>1.5’</td>
<td></td>
<td>AUG</td>
<td>✓</td>
<td>−</td>
<td>−</td>
</tr>
<tr>
<td></td>
<td>Tiarella cordifolia ‘Brandywine’</td>
<td>Foam Flower</td>
<td>1’-1.5’</td>
<td>1’-2’</td>
<td>MAY</td>
<td>✓</td>
<td>−</td>
<td>−</td>
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**Bulbs**

<table>
<thead>
<tr>
<th>Groundcover</th>
<th>Scientific Name</th>
<th>‘Cultivar’</th>
<th>Trade Name</th>
<th>Common Name</th>
<th>Height</th>
<th>Spread</th>
<th>Characteristics</th>
<th>Tolerances</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Chionodoxa forbesii ‘Pink Giant’</td>
<td>Pink Giant</td>
<td>6”-9”</td>
<td>3”-6”</td>
<td>MAR</td>
<td>✓</td>
<td>−</td>
<td>−</td>
</tr>
<tr>
<td></td>
<td>Crocus vernus</td>
<td>Dutch Crocus</td>
<td>6”</td>
<td>4”-6”</td>
<td>MAR</td>
<td>✓</td>
<td>−</td>
<td>−</td>
</tr>
<tr>
<td></td>
<td>Galanthus elwesii</td>
<td>Giant Snowdrop</td>
<td>9”</td>
<td>6”</td>
<td>FEB</td>
<td>✓</td>
<td>−</td>
<td>−</td>
</tr>
<tr>
<td></td>
<td>Narcissus ‘Mondragon’</td>
<td>Mondragon Daffodil</td>
<td>1’-1.5’</td>
<td>.5-1’</td>
<td>MAR</td>
<td>✓</td>
<td>−</td>
<td>−</td>
</tr>
</tbody>
</table>

*Fall Dig Hazard  ALB Host Species  Bloom/Showy Flowers  Showy Fruit  Distinct Foliage  Fall Color  Distinctive Bark  Evergreen*
Roadway Plantings

Roadway plantings are trees, shrubs, groundcovers, perennials, and other vegetation located within the roadbed of a street. Generally, plantings are installed within raised medians or triangles that separate or channelize traffic. Roadway plantings must endure various stresses: salt, wind, drought, damage from vehicles, and limited growing space. These all impact plant health and should guide design and plant selection.
6.2.1 Raised Median

**Benefits**

See **BENEFITS OF PLANTINGS IN THE ROW (6.0)**

Planted medians increase the traffic-calming effect afforded by **MEDIANS (2.2.3)**

**Considerations**

See **GENERAL GUIDELINES (6.0.1)**

Allow adequate room for trucks and buses to make necessary turns without damaging plant material

Consider environmental and physical stresses plants must withstand, including drought/inundation, sun/shade, heat/cold, wind, road salt, garbage, vehicular damage, and compaction

Consider the lifespan and longevity of species, as plant replacement will be difficult and costly

Typically, plantings are watered via a water truck; however, consider how maintenance workers will access the plantings to perform other regular maintenance activities

Excluding trees, median plantings not covered under the DPR-DOT Greenstreets agreement require a maintenance agreement

A **RAISED MEDIAN (2.2.3)** that provides an opportunity for planting. Medians can be 6–7 inches high (at curb height) or 12–24 inches high to provide additional growing medium as well as increased protection. Medians allow for various types of plantings due to their different sizes and lengths. Trees are typical; however, careful consideration must be given to the sight lines of drivers, cyclists, and pedestrians. DPR generally maintains existing median plantings, pursuant to the Greenstreets agreement between DPR and DOT.
6.2.1 Raised Median

Design

See GENERAL GUIDELINES (6.0.1)

See RAISED MEDIAN (2.2.3) for geometric design guidance; all medians must include an area, free of vegetation or obstructions, for pedestrians to safely cross at the intersection.

Where planting trees, see design guidance for TREE BED (6.1.1)

Planted medians should be a minimum of 7-feet wide to allow for 6 feet of planting space with a 6-inch-wide curb on either side. Exceptions may be approved by DOT and DPR on a case-by-case basis. Where conditions allow, an 18-inch-wide curb around the perimeter of the planting bed is preferred.

Provide a minimum 24 inches depth of organic, well-draining soil; 30 – 36 inches is optimal.

Positive drainage below the planting soil is essential. Any impermeable layers of concrete or asphalt must be removed.

Where conditions allow, medians should be planted with large-growing canopy trees.

Tree spacing should be based on the appropriate mature width of the species chosen and must be approved by DPR.

Minimum distance from the curb at the end of the median to the center of the tree trunk is 35 feet.

Where truck and bus traffic is heavy, consider using columnar species to reduce damage to plants.

Consider planting fewer species to provide continuity and reduce overall maintenance needs; select plants that will provide year-round ornamental interest.

Space shrubs and other plants so as to encourage dense, full growth, however, do not overcrowd, which can lead to poor air circulation and encourage the spread of pest and disease problems.

Use drought-tolerant, salt-tolerant species that require little to no pruning or deadheading to maintain their shape, size, vitality, and ornamental interest.

Plants

See Roadway Planting Recommendations (Table 6B)
RAISED MEDIAN

Curb Height

A median that is raised 6 – 7 inches above the roadbed and provides adequate width to allow for plantings. RAISED MEDIAN (CURB HEIGHT) are utilized throughout the city. Trees and other ornamental plantings add to the traffic-calming effect provided by medians.

Benefits

See benefits for RAISED MEDIAN (6.2.1)

Considerations

See considerations for RAISED MEDIAN (6.2.1)

Consider underground utility constraints as excavation beneath the roadbed will be necessary to provide adequate soil volume and positive drainage.

If the roadway can be regraded to a double crown, consider using the median to capture and detain stormwater; See STORMWATER-CAPTURING INSTALLATIONS (6.6.1)

Design

See design guidance for RAISED MEDIANS (6.2.1)

Consider the use of a suspended pavement system and CONNECTED TREE BEDS (6.1.1b)

Plantings must not protrude into the roadway; select plants that will grow densely within the planting bed

Plants

See Roadway Planting Recommendations (Table 6B)
6.2.1b Raised Median: 12–24 inches

**RAISED MEDIAN**

**12–24 Inches**

A median, typically constructed of concrete or stone, 12–24 inches above the roadbed that provides above-ground soil volume for plantings. Generally employed where underground constraints prevent planting at grade and/or along high-speed roadways.

**Benefits**

See benefits for RAISED MEDIAN (6.2.1)

**Considerations**

See GENERAL GUIDELINES (6.0.1)

See considerations for RAISED MEDIAN (6.2.1)

Higher medians can encourage higher motor vehicle speeds; therefore, design the median to the minimum height necessary to accommodate appropriate soil depth.

Consider visibility in relation to the overall height of mature plantings and the raised median (12–24 inches).

Existing trees at potential raised-median sites should be preserved if possible; consider installing the median around the trees to prevent excavation and change of soil grade.

**Design**

See design guidance for RAISED MEDIAN (6.2.1)

Planting beds should be sufficiently wide and deep to provide adequate soil volume for plants: 6 feet minimum soil width (wall to wall) and 24 inches minimum soil depth.

Always excavate through the entire roadbed so the bottom of the planting bed is open and will allow positive drainage.

The roots of plants will be primarily above ground, and are thus more sensitive to freeze-thaw cycles in the winter. Carefully select species which are cold hardy to at least Zone 6A. For added insulation, provide adequate mulch (2–3 inches) at the time of planting and replenish as necessary.

For perimeter plantings, choose plants that will not protrude beyond the edge of the raised wall; plants that cascade over the edge of the wall may be acceptable.

**Plants**

See Roadway Planting Recommendations (Table 6B)
6.2.1c Raised Median: Pedestrian Mall

**Pedestrian Mall**

A wide median that allows for pedestrian use and circulation in addition to plantings. Pedestrian malls, like the Allen Street Malls or the Park Avenue Mall at East 97th Street in Manhattan, provide a safe area for pedestrian use within the roadway. Typically, these malls are DPR property and are maintained by DPR or by neighborhood groups through a maintenance agreement.

**Benefits**

See benefits for RAISED MEDIAN (6.2.1)

**Considerations**

See considerations for RAISED MEDIAN (6.2.1)

- Consider pedestrian and bicycle circulation within the mall
- Consider how the planting design will function with other elements, such as seating, lighting, and artwork
- Consider the collection of stormwater. See STORMWATER-CAPTURING INSTALLATIONS (6.6.1)

Plantings, excluding trees, not maintained by DPR require a maintenance agreement

**Design**

See design guidance for RAISED MEDIAN (6.2.1)

- Adequate access should be provided throughout the mall; planting areas should be designed to accommodate necessary circulation
- A minimum of 8 feet must be provided for a pedestrian-only path, 8 feet for a two-way bicycle path, and 12 – 14 feet, depending on the volume of users, for a shared-use path
- Plant densely to discourage weed growth and pedestrian access through the plantings
- Consider the use of tree-bed guards around planting areas to discourage trampling of plant material

**Plants**

See Roadway Planting Recommendations (Table 6B)

*Left: The same pedestrian mall in the summer, with plantings that provide shade while maintaining visual interest: Park Avenue and 97th Street, Manhattan (Credit: Lynden B. Miller)*

*ABOVE: Strategic tree and plant selection allows for year-round interest. Early flowering trees and bulbs add color in the spring: Park Avenue and 97th Street, Manhattan (Credit: Lynden B. Miller)*

*In the fall, this pedestrian mall features colorful foliage: Park Avenue and 97th Street, Manhattan (Credit: Lynden B. Miller)*

*Evergreens provide color in the winter: Park Avenue and 97th Street, Manhattan (Credit: Lynden B. Miller)*
6.2.2 Triangles

**Triangle**

A planted area of any size and shape, not just a triangle, within the public ROW that generally separates and/or channelizes traffic. Typically, existing planted triangles are maintained by DPR (through the Greenstreets agreement between DOT and DPR) or another entity, such as a neighborhood group through a maintenance agreement.

<table>
<thead>
<tr>
<th>Benefits</th>
</tr>
</thead>
<tbody>
<tr>
<td>See BENEFITS OF PLANTINGS IN THE ROW (6.0)</td>
</tr>
<tr>
<td>Can incorporate community facilities such as seating or other furnishings to encourage social and recreational activities, depending on its size and capacity of the maintenance partner</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Considerations</th>
</tr>
</thead>
<tbody>
<tr>
<td>See GENERAL GUIDELINES (6.0.1)</td>
</tr>
<tr>
<td>May impact street drainage or require catch-basin relocation</td>
</tr>
<tr>
<td>Safe access to plantings for maintenance workers must be provided</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Design</th>
</tr>
</thead>
<tbody>
<tr>
<td>See GENERAL GUIDELINES (6.0.1)</td>
</tr>
<tr>
<td>Where planting trees, see design guidance for TREE BED (6.1.1)</td>
</tr>
</tbody>
</table>

Plants must not protrude into the roadway; plant densely within the planting bed to discourage weed growth and trampling

Use salt-tolerant, drought-tolerant species for plantings

Consider designing the area to capture stormwater runoff. See STORMWATER-CAPTURING INSTALLATIONS (6.6.1)

Planted triangle. Clear paths are provided for pedestrian circulation: Grand Army Plaza, Brooklyn

Planted triangle. Shorter plants are located near the edge to maintain sightlines: Macombs Road and Grand Avenue, Bronx (Credit: DPR)

Planted triangle: Flushing Avenue and 59th Street, Queens (Credit: DPR)
Street End

The public space at the end of a street abutting a boardwalk or body of water. Pedestrian access to the waterfront or boardwalk must be maintained. In some cases, such as street ends in Greenpoint and Williamsburg in Brooklyn, the area is subject to a Waterfront Access Plan (WAP). This plan is created by DCP and outlines specific concerns regarding design, access, and maintenance.

Benefits
See BENEFITS OF PLANTINGS IN THE ROW (6.0)
Provides an opportunity to actively collect and manage stormwater

Considerations
See GENERAL GUIDELINES (6.0.1)
See considerations for TRIANGLE (6.2.2)
Consider physical and environmental stresses when selecting plants; especially if near the coast or a river
If DPR will not maintain plantings, a maintenance agreement will be required

Design
See GENERAL GUIDELINES (6.0.1)
Consult DCP for Waterfront Public Access requirements for adjacent parcels and to allow for coordination with existing or future public access areas and continuous access along the shoreline where appropriate
A minimum 5-foot path for pedestrian access should be provided through a planted area if there is an accessible area beyond the plantings
If a maintenance partner can be identified, consider the use of community amenities, such as street furniture, in conjunction with plantings
Consider the capture of stormwater runoff. See STORMWATER-CAPTURING INSTALLATIONS (6.6.1)

Plants
See Roadway Planting Recommendations (Table 6B)
### 6.2 Planting Recommendations

**TABLE 6B**

**Roadway Planting Recommendations**

Trees, shrubs, groundcovers, perennials, and other vegetation located within the roadbed of a street. Generally, plantings are installed within raised medians or triangles that separate or channelize traffic. This list is not comprehensive and there is no guarantee that these plants will survive at a specific site. All plants within the public ROW must be selected based on site-specific conditions and approved by DPR.

<table>
<thead>
<tr>
<th>Trees</th>
<th>Appearance</th>
<th>Tolerances</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Scientific Name</strong></td>
<td><strong>Cultivar</strong></td>
<td><strong>Trade Name</strong></td>
</tr>
<tr>
<td>Ulmus</td>
<td><em>New Harmony</em></td>
<td>New Harmony Elm</td>
</tr>
<tr>
<td>Ginkgo biloba</td>
<td>(Fruitless Cultivar Only)</td>
<td>Ginkgo</td>
</tr>
<tr>
<td>Juniperus chinensis</td>
<td>‘Keteleeri’</td>
<td>Keteleer Chinese Juniper</td>
</tr>
<tr>
<td>Koelreuteria paniculata</td>
<td>Goldenrain Tree</td>
<td></td>
</tr>
<tr>
<td>Prunus serrulata</td>
<td>‘Okame’</td>
<td>Okame Cherry</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Shrubs</th>
<th>Spread</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hydrangea paniculata</td>
<td>‘DVPinky’</td>
</tr>
<tr>
<td>Cornus sericea</td>
<td>‘Farrow’</td>
</tr>
<tr>
<td>Rosa</td>
<td>‘Radorc’</td>
</tr>
<tr>
<td>Abelia x grandiflora</td>
<td>‘Rose Creek’</td>
</tr>
<tr>
<td>Caryopteris x clandonensis</td>
<td>‘Dark Knight’</td>
</tr>
<tr>
<td>Juniperus chinensis var. sargentii</td>
<td>‘Glauca’</td>
</tr>
<tr>
<td>Lagerstroemia indica</td>
<td>‘Gamad II’</td>
</tr>
<tr>
<td>Potentilla fruticosa</td>
<td>Shrubby Cinquefoil</td>
</tr>
<tr>
<td>Rhus aromatica</td>
<td>‘Gro Low’</td>
</tr>
<tr>
<td>Spiraea x bumalda</td>
<td>‘Goldmound’</td>
</tr>
<tr>
<td>Yucca filamentosa</td>
<td>‘Color Guard’</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Perennials</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Liriope muscari</td>
<td>‘Big Blue’</td>
</tr>
<tr>
<td>Nepeta x ‘Walker’s Low’</td>
<td>Walker’s Low Catmint</td>
</tr>
<tr>
<td>Perovskia atriplicifolia</td>
<td>‘Little Spire’</td>
</tr>
<tr>
<td>Echinacea purpurea</td>
<td>Coneflower</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Grasses/Grass-like Plants</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Chionodoxa forbesii</td>
<td>‘Pink Giant’</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Bulbs</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Narcissus</td>
<td>‘Improved King Alfred’</td>
</tr>
<tr>
<td>Allium</td>
<td>‘Globemaster’</td>
</tr>
</tbody>
</table>

- Fall Dig Hazard
- ALB Host Species
- Bloom/Showy Flowers
- Showy Fruit
- Distinct Foliage
- Fall Color
- Distinctive Bark
- Evergreen
Sidewalk Plantings

Sidewalk plantings are trees, shrubs, groundcovers, perennials, and other vegetation located on the sidewalk. Generally, plantings are located within the sidewalk furnishing zone. Sidewalk plantings must endure limited growing space, compaction, salt, and damage from people, animals, and vehicles; these factors should guide plant selection.
6.3.1 Full Sidewalk

Full Sidewalk

Any planting within the furnishing zone of a Full Sidewalk (2.2.1a) may include street trees, ornamental plantings, stormwater plantings, or other types of vegetation. Street trees should be planted wherever possible. While DPR is responsible for the maintenance of the city’s street trees, other ornamental plantings, such as tree bed plantings, are encouraged but will require a maintenance agreement. DEP ROW BIOSWALE (6.6.1a) are generally installed on sidewalks in DEP Priority CSO Tributary Areas to capture stormwater runoff from the roadway where conditions are appropriate.

Benefits
See BENEFITS OF PLANTINGS IN THE ROW (6.0)

Considerations
See GENERAL GUIDELINES (6.0.1)
See considerations for TREE BED (6.1.1)
Adequate access from the street and to building entrances must be maintained
Consider environmental and physical stresses plants must withstand, including drought/inundation, sun/shade, heat/cold, wind, compaction, garbage, and animal damage
Plantings, other than trees, outside the DPR-DOT Greenstreets agreement will require a maintenance agreement

Design
See design guidance for TREE BED (6.1.1) and SIDEWALK (2.2.1)
Meet minimum size and design requirements of DPR’s Tree Planting Standards
The New York City Zoning Resolution requires that one tree be provided for every 25 feet of curb frontage for new developments and major alterations

Maximize available soil volume and select plants with appropriate shape, form, and ultimate size to allow proper sight lines for pedestrian, bicycle, and vehicular traffic

Consider the installation of DEP ROW BIOSWALE (6.6.1a)

Plants
See Sidewalk Planting Recommendations (Table 6C)

A wide sidewalk can accommodate more expansive planted areas. Such installations are maintained by private partners or DPR. Greenwich Street at Warren Street, Manhattan

Planted area in front of PS 234. Planted areas adjacent to schools can provide educational opportunities. Greenwich Street at Chambers Street, Manhattan (Credit: Lynden B. Miller)

Plantings can be coordinated with benches and other amenities to create a welcoming streetscape. Columbus Avenue at 76th Street, Manhattan

Plants

See Sidewalk Planting Recommendations (Table 6C)
RIBBON SIDEWALKS allow for planting along the curb. They typically occur in more residential areas with low-volume pedestrian traffic. The planting strip generally consists of trees and turfgrass, but can also provide an opportunity for enhanced ornamental plantings.

Benefits
See BENEFITS OF PLANTINGS IN THE ROW (6.0)

Considerations
See GENERAL GUIDELINES (6.0.1)

- May impact underground or overhead utilities
- Consider environmental and physical stresses plants must withstand, including drought/inundation, sun/shade, heat/cold, wind, compaction, garbage, and animal damage
- Planting strips adjacent to ribbon sidewalks must be planted with groundcover vegetation for erosion control if a STORMWATER-CAPTURING INSTALLATION (6.6.1) solution is not used
- The adjacent property owner or other maintenance partner is responsible for maintenance of any plantings other than trees

Design
See design guidance for TREE BED (6.1.1)

- Groundcover other than turfgrass is permitted as long as adequate access every 20 feet via walkable vegetation or another accessible surface is provided from the roadway
- Consider the capture of stormwater runoff. See STORMWATER-CAPTURING INSTALLATIONS (6.6.1)
- Select low-growing plants that will have year-round ornamental interest

Plants
See Sidewalk Planting Recommendations (Table 6C)
6.3.3 Curb Extension

Curb Extension

A CURB EXTENSION that is planted rather than paved.

Benefits
See BENEFITS OF PLANTINGS IN THE ROW (6.0)

Considerations
See GENERAL GUIDELINES (6.0.1)
May impact street drainage and require new catch basins
Landscaping or stormwater source controls not covered by the three-party agreement between DOT, DPR, and DEP or the Greenstreets agreement between DOT and DPR require a maintenance agreement

Design
See design guidance for CURB EXTENSION (6.2.1)
If located at a corner, maintain clear access to the crosswalk and the pedestrian ramp
Where possible, pitch sidewalks to direct water into the planting beds. Additionally, consider the capture of stormwater from the roadway. See STORMWATER-CAPTURING INSTALLATIONS (6.6.1)
Select low-growing plants that will have year-round ornamental interest and not block sight lines. Consider the use of tree-bed guards around planted areas

Plants
See Sidewalk Planting Recommendations (Table 6C)
## Sidewalk Planting Recommendations

Trees, shrubs, groundcovers, perennials, and other vegetation located on the sidewalk. Generally, plantings are located within the sidewalk furnishing zone; see Sidewalks (3.1). This list is intended for wide sidewalks and curb extensions that have ample room for planting. For a small sample of plantings acceptable in tree beds, see Tree Beds (6.1). This list is not comprehensive and there is no guarantee that these plants will survive at a specific site. All plants within the public ROW must be selected based on site-specific conditions and approved by DPR.

### Trees

<table>
<thead>
<tr>
<th>Scientific Name ‘Cultivar’ Trade Name</th>
<th>Height</th>
<th>Shape</th>
<th>Characteristics</th>
<th>Drought-Flood</th>
<th>Light</th>
<th>Salt</th>
<th>High pH</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Quercus phellos</em> Willow Oak</td>
<td>50’-70’</td>
<td></td>
<td></td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Metasequoia glyptostroboides</em> Dawn Redwood</td>
<td>50’-70’</td>
<td></td>
<td></td>
<td>✓ ✓</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Zelkova serrata</em> ‘Village Green’ Village Green Japanese Zelkova</td>
<td>60’-70’</td>
<td></td>
<td></td>
<td>✓ ✓</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Eucommia ulmoides</em> Hardy Rubber Tree</td>
<td>40’-60’</td>
<td></td>
<td></td>
<td>✓ ✓</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Cercis canadensis</em> * Eastern Redbud</td>
<td>20’-30’</td>
<td>APR</td>
<td></td>
<td>✓ ✓</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Maackia amurensis</em> Amur Maackia</td>
<td>20’-30’</td>
<td>JUN</td>
<td></td>
<td>✓ ✓</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Shrubs

<table>
<thead>
<tr>
<th>Scientific Name ‘Cultivar’ Trade Name</th>
<th>Height</th>
<th>Spread</th>
<th>Characteristics</th>
<th>Drought-Flood</th>
<th>Light</th>
<th>Salt</th>
<th>High pH</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Ilex crenata</em> ‘Helleri’ Heller’s Japanese Holly</td>
<td>2’-3’</td>
<td>5’-8’</td>
<td></td>
<td>✓ ✓</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Jasminum nudiflorum</em> ‘Nanum’ Compact Winter Flowering Jasmine</td>
<td>2’-3’</td>
<td>3’-4’</td>
<td>FEB MAR</td>
<td>✓ ✓</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Juniperus chinensis</em> ‘Old Gold’ Old Gold Juniper</td>
<td>2’-3’</td>
<td>4’-5’</td>
<td></td>
<td>✓ ✓</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Rosa x Noatraum</em> Flower Carpet Pink™ Flower Carpet Rose</td>
<td>2’-2.5’</td>
<td>3’</td>
<td>MAY SEP</td>
<td>✓ ✓</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Juniperus conferta</em> ‘Blue Pacific’ Blue Pacific Shore Juniper</td>
<td>5’-1’</td>
<td>4’-6’</td>
<td></td>
<td>✓ ✓</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Grasses/Grass-like Plants

<table>
<thead>
<tr>
<th>Scientific Name ‘Cultivar’ Trade Name</th>
<th>Height</th>
<th>Spread</th>
<th>Characteristics</th>
<th>Drought-Flood</th>
<th>Light</th>
<th>Salt</th>
<th>High pH</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Miscanthus sinensis</em> ‘Adagio’ Adagio Eulalia Grass</td>
<td>2’-3’</td>
<td>2’</td>
<td>FEB</td>
<td>✓ ✓</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Panicum virgatum</em> ‘Hot Rod’ Hot Rod Switch Grass</td>
<td>3’</td>
<td>2’</td>
<td>AUG SEP</td>
<td>✓ ✓</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Koeleria glauca</em> ‘Coilio’ Coolio Blue Hair Grass</td>
<td>1’-1.5’</td>
<td>1’-1.5’</td>
<td>MAR JUL</td>
<td>✓ ✓</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Carex elata</em> ‘Aurea’ Bowles Golden Sedge</td>
<td>1’-1.5’</td>
<td>1.5’</td>
<td></td>
<td>✓ ✓</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Perennials

<table>
<thead>
<tr>
<th>Scientific Name ‘Cultivar’ Trade Name</th>
<th>Height</th>
<th>Spread</th>
<th>Characteristics</th>
<th>Drought-Flood</th>
<th>Light</th>
<th>Salt</th>
<th>High pH</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Achillea millefolium</em> ‘Pretty Belinda’ Pretty Belinda Fernleaf Yarrow</td>
<td>1’-2’</td>
<td>1.5’</td>
<td>JUN JUL</td>
<td>✓ ✓</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Euphorbia</em> ‘Ascot Rainbow’ Ascot Rainbow Variegated Spurge</td>
<td>1.5’-2’</td>
<td>1.5’</td>
<td>JUN</td>
<td>✓ ✓</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Nepeta x faassenii</em> ‘Kit Cat’ Kit Cat Catmint</td>
<td>1.5’</td>
<td>1’-2’</td>
<td>MAY SEP</td>
<td>✓ ✓</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Nipponanthemum nipponicum</em> Montauk Daisy</td>
<td>2’-3’</td>
<td>2’-3’</td>
<td>AUG SEP</td>
<td>✓ ✓</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Bulbs

<table>
<thead>
<tr>
<th>Scientific Name ‘Cultivar’ Trade Name</th>
<th>Height</th>
<th>Spread</th>
<th>Characteristics</th>
<th>Drought-Flood</th>
<th>Light</th>
<th>Salt</th>
<th>High pH</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Allium christophii</em> Star of Persia</td>
<td>1’-2’</td>
<td>5’-1.5’</td>
<td>MAY</td>
<td>✓ ✓</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Fall Dig Hazard  ^ ALB Host Species  Bloom/Showy Flowers  Showy Fruit  Distinct Foliage  Fall Color  Distinctive Bark  Evergreen
Plaza Plantings

Although plazas tend to consist mostly of hardscape to facilitate pedestrian circulation, sitting, and programming, plantings can make them more inviting and can help define spaces within them. Plazas allow for more growth potential and greater diversity of plant species than is possible in more constrained areas such as raised medians and tree beds.

See PLAZA (2.1.4) and PERMANENT PLAZA (2.1.4a) for more information on general plaza design.
**In-Ground Planting Area**

**Benefits**

See **BENEFITS OF PLANTINGS IN THE ROW (6.0)**

- Plants add character to a plaza and provide secondary environmental benefits
- Plazas provide more room for planting and allow for a greater diversity of plants

**Considerations**

See **GENERAL GUIDELINES (6.0.1)**

- Account for existing and proposed pedestrian circulation, especially major desire lines to crosswalks, building entrances, and pedestrian generators such as transit connections
- Plazas should maintain a feeling of openness; plantings should not block critical sight lines through the plaza
- Proximity to vehicular traffic and pedestrian circulation will impact the size and shape of the planting areas
- Positive drainage must be established in all planting areas
- Consider how maintenance workers will access the plantings to perform regular maintenance activities; access to a water source for irrigation should be provided

**Design**

Plantings must be considered in context of the overall plaza design. See **PERMANENT PLAZA (2.1.4a)** for design guidance.

**In-Ground Planting Area**

Planting areas within plazas that are level with the surrounding grade. The size and shape of the area may vary, and it is typically employed where there are few underground constraints.

![Image of In-Ground Planting Area]

**Plaza plantings should provide year-round interest and be appropriate for a given microclimate: Hanover Square, Lower Manhattan (Credit: Lynden B. Miller)**

- Maintain a clear path for any major pedestrian desire lines or defined circulation paths; if the plaza is located in front of a building, provide an additional clear path adjacent to the building
- Provide adequate soil volume/rooting area for plantings; a minimum 24-inch depth and 5-foot width of organic, well-draining soil
- Design plantings in relation to seating areas or other areas of interest to create or define edges, to add visual interest, to provide shade, and/or to provide other protection for plaza users
- Select plants that provide year-round interest; utilize combinations of plants that have contrasting textures, colors, and forms
- Plant densely to discourage littering, trampling and other improper uses
- Direct stormwater runoff into plantings wherever possible. See **STORMWATER-CAPTURING INSTALLATIONS (6.6.1)**

In heavily trafficked areas, consider the use of suspended paving systems to maximize circulation while preventing soil compaction. Consider the use of a tree-bed guard where feasible

**Plants**

See **PLAZA PLANTINGS (6.4): Plaza Planting Recommendations**
6.4.2 Raised Planting Area

Raised Planting Area

Any planting area within a plaza that is raised above grade. The size and shape of the area may vary from site to site and is typically employed where there are underground constraints. The majority of the soil volume is contained within the above-ground structure.

Benefits

See BENEFITS OF PLANTINGS IN THE ROW (6.0) and IN-GROUND PLANTING AREA (6.4.1)

Above-ground planting structures allow the integration of other design elements such as seating and lighting

Raising planters creates opportunities for planting where there are underground constraints

Raised planters create more substantial barriers from vehicles

Raised planters create protection from winter salt spray

Considerations

See GENERAL GUIDELINES (6.0.1)

See considerations for IN-GROUND PLANTING AREA (6.4.1)

Plant selection should be sensitive to the limited amount of soil available for root growth in a raised planter. Due to the limited soil volume, plants should be more drought-tolerant and will need to be watered more often

Soil is less insulated in raised planting beds; freeze/thaw cycles will be more extreme in winter; select plants that are one to two USDA zones hardier to survive these conditions

Design

See design guidance for IN-GROUND PLANTING AREA (6.4.1)

Consider the type of soil that will be used within the raised bed. Specify a soil with good water and nutrient holding capacity.

Raised structures allow for greater variation in topography and a larger variety of seating options

Planting beds, as a general rule, should not exceed 18 inches in height and should maintain visual and physical openness

Raised planting areas can provide additional seating by utilizing the wall of the raised structure as a seat wall; avoid creating long walls that impede pedestrian circulation

Plants

See Plaza Planting Recommendations (Table 6D)
## Plaza Planting Recommendations

The following list provides a small sampling of plants that have been successfully employed in plazas within NYC. This list is not comprehensive and there is no guarantee that these plants will survive at a specific site. All plants within the public ROW must be selected based on site specific conditions and approved by DPR.

### Trees

<table>
<thead>
<tr>
<th>Scientific Name 'Cultivar' Trade Name</th>
<th>Common Name</th>
<th>Height</th>
<th>Shape</th>
<th>Characteristics</th>
<th>Drought-Flood</th>
<th>Light</th>
<th>Salt</th>
<th>High pH</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acer rubrum (and cultivars) ^ *</td>
<td>Red Maple</td>
<td>&gt;40'</td>
<td>MAR</td>
<td>✓ ✓ ✓</td>
<td>✓ ✓</td>
<td>◆ ◆</td>
<td>−</td>
<td>−</td>
</tr>
<tr>
<td>Cornus kousa *</td>
<td>Kousa Dogwood</td>
<td>15'-30'</td>
<td>JUN</td>
<td>✓ ✓ ✓</td>
<td>✓ ✓</td>
<td>◆ −</td>
<td>−</td>
<td>−</td>
</tr>
<tr>
<td>Magnolia x soulangeana *</td>
<td>Saucer Magnolia</td>
<td>MAR</td>
<td>✓ ✓</td>
<td>✓ ✓ ✓</td>
<td>✓ ✓</td>
<td>◆ ◆</td>
<td>−</td>
<td>−</td>
</tr>
<tr>
<td>Ilex x aquipernyi 'Meschick' Dragon Lady™ *</td>
<td>Dragon Lady Holly</td>
<td>&lt;15'</td>
<td>APR</td>
<td>✓ ✓ ✓</td>
<td>✓ ✓</td>
<td>◆ ◆</td>
<td>−</td>
<td>−</td>
</tr>
<tr>
<td>Malus spp. and cultivars Crabapple</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Shrubs

<table>
<thead>
<tr>
<th>Scientific Name 'Cultivar' Trade Name</th>
<th>Common Name</th>
<th>Spread</th>
<th>Height</th>
<th>Shape</th>
<th>Characteristics</th>
<th>Drought-Flood</th>
<th>Light</th>
<th>Salt</th>
<th>High pH</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hibiscus syriacus 'Diana'</td>
<td>Diana Rose of Sharron</td>
<td>&gt;8'</td>
<td>4'-6'</td>
<td>JUL</td>
<td>✓ ✓ ✓</td>
<td>✓ ✓</td>
<td>◆ ◆</td>
<td>−</td>
<td>−</td>
</tr>
<tr>
<td>Vitex agnus-castus *</td>
<td>Chaste Tree</td>
<td>3'-8'</td>
<td>5'-8'</td>
<td>JUL</td>
<td>✓ ✓ ✓</td>
<td>✓ ✓</td>
<td>◆ ◆</td>
<td>−</td>
<td>−</td>
</tr>
<tr>
<td>Prunus cistena</td>
<td>Purple Sand Cherry</td>
<td>&lt;8'</td>
<td>3'-5'</td>
<td>JUN</td>
<td>✓ ✓ ✓</td>
<td>✓ ✓</td>
<td>◆ ◆</td>
<td>−</td>
<td>−</td>
</tr>
<tr>
<td>Cornus alba 'Elegantissima'</td>
<td>Red-Stemmed Variegated Dogwood</td>
<td>6'-8'</td>
<td>5'-8'</td>
<td>APR</td>
<td>✓ ✓ ✓</td>
<td>✓ ✓</td>
<td>◆ ◆</td>
<td>−</td>
<td>−</td>
</tr>
<tr>
<td>Hydrangea quercifolia</td>
<td>Oakleaf Hydrangea</td>
<td>10'-12'</td>
<td>3'-5'</td>
<td>JUL</td>
<td>✓ ✓ ✓</td>
<td>✓ ✓</td>
<td>◆ ◆</td>
<td>−</td>
<td>−</td>
</tr>
<tr>
<td>Prunus laurocerasus 'Otto Luyken' *</td>
<td>Otto Luyken Dwarf Cherry Laurel</td>
<td>&lt;8'</td>
<td>1'-3'</td>
<td>APR</td>
<td>✓ ✓ ✓</td>
<td>✓ ✓</td>
<td>◆ ◆</td>
<td>−</td>
<td>−</td>
</tr>
<tr>
<td>Spiraea thunbergii 'Ogon' Mellow Yellow ®</td>
<td>Golden Thunberg Spiraea</td>
<td>&gt;8'</td>
<td>1'-4'</td>
<td>JUN</td>
<td>✓ ✓ ✓</td>
<td>✓ ✓</td>
<td>◆ ◆</td>
<td>−</td>
<td>−</td>
</tr>
<tr>
<td>Euonymus fortunei 'Coloratus'</td>
<td>Purple-Leaf Winter creeper</td>
<td>6'-8'</td>
<td>3'-4'</td>
<td>MAY</td>
<td>✓ ✓ ✓</td>
<td>✓ ✓</td>
<td>◆ ◆</td>
<td>−</td>
<td>−</td>
</tr>
<tr>
<td>Juniperus squamata 'Blue Star'</td>
<td>Blue Star Juniper</td>
<td>&lt;8'</td>
<td>2'-3'</td>
<td>JUN</td>
<td>✓ ✓ ✓</td>
<td>✓ ✓</td>
<td>◆ ◆</td>
<td>−</td>
<td>−</td>
</tr>
<tr>
<td>Rosa Knock Out ® series</td>
<td>Knock Out Roses</td>
<td>8'-10'</td>
<td>1'-2'</td>
<td>MAY</td>
<td>✓ ✓ ✓</td>
<td>✓ ✓</td>
<td>◆ ◆</td>
<td>−</td>
<td>−</td>
</tr>
<tr>
<td>Yucca filamentosa 'Color Guard'</td>
<td>Color Guard Adam’s Needle</td>
<td>6'-8'</td>
<td>1'-2'</td>
<td>MAY</td>
<td>✓ ✓ ✓</td>
<td>✓ ✓</td>
<td>◆ ◆</td>
<td>−</td>
<td>−</td>
</tr>
<tr>
<td>Buxus ‘Green Velvet’</td>
<td>Green Velvet Dwarf Boxwood</td>
<td>1'-2'</td>
<td>1'-2'</td>
<td>MAY</td>
<td>✓ ✓ ✓</td>
<td>✓ ✓</td>
<td>◆ ◆</td>
<td>−</td>
<td>−</td>
</tr>
</tbody>
</table>

### Perennials

<table>
<thead>
<tr>
<th>Scientific Name 'Cultivar' Trade Name</th>
<th>Common Name</th>
<th>Appearance</th>
<th>Tolerances</th>
<th>Drought-Flood</th>
<th>Light</th>
<th>Salt</th>
<th>High pH</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alchemilla mollis Lady’s Mantle</td>
<td></td>
<td>1'-1.5'</td>
<td>1.5'-2.5'</td>
<td>MAY</td>
<td>✓ ✓</td>
<td>◆ ◆</td>
<td>−</td>
</tr>
<tr>
<td>Amsonia hubrichtii Arkansas Blue Star</td>
<td></td>
<td>2'-3'</td>
<td>2'-3'</td>
<td>MAY</td>
<td>✓ ✓</td>
<td>◆ ◆</td>
<td>−</td>
</tr>
<tr>
<td>Geranium macrorrhizum ‘Bevan’s Variety’ Bevan’s Variety Big-Root Geranium</td>
<td>1'</td>
<td>1'-1.5'</td>
<td>1'-1.5'</td>
<td>MAY</td>
<td>✓ ✓</td>
<td>◆ ◆</td>
<td>−</td>
</tr>
<tr>
<td>Helleborus x hybridus Lenten Rose</td>
<td></td>
<td>1'-1.5'</td>
<td>1'-1.5'</td>
<td>MAR</td>
<td>✓ ✓</td>
<td>◆ ◆</td>
<td>−</td>
</tr>
<tr>
<td>Hemerocallis ‘Happy Returns’</td>
<td></td>
<td>1'-1.5'</td>
<td>1'-1.5'</td>
<td>JUN</td>
<td>✓ ✓</td>
<td>◆ ◆</td>
<td>−</td>
</tr>
<tr>
<td>Liriope muscari ‘Big Blue’ Big Blue Lilyturf</td>
<td>1'-2'</td>
<td>1'-2'</td>
<td>1'-2'</td>
<td>AUG</td>
<td>✓ ✓</td>
<td>◆ ◆</td>
<td>−</td>
</tr>
<tr>
<td>Nepeta x ‘Walker’s Low’ Walker’s Low Catmint</td>
<td>2'-2.5'</td>
<td>2'-3'</td>
<td>2'-3'</td>
<td>APR</td>
<td>✓ ✓</td>
<td>◆ ◆</td>
<td>−</td>
</tr>
<tr>
<td>Sedum Autumn Joy Autumn Joy Stonecrop</td>
<td></td>
<td>1.5'-2'</td>
<td>1.5'-2'</td>
<td>AUG</td>
<td>✓ ✓</td>
<td>◆ ◆</td>
<td>−</td>
</tr>
</tbody>
</table>

* Fall Dig Hazard  ▲ ALB Host Species  ▼ Bloom/Showy Flowers  😊 Showy Fruit  🍎 Distinct Foliage  🐝 Fall Color  🌌 Distinctive Bark  🍃 Evergreen
Limited-Access Arterial Plantings

Landscapes along limited-access arterial highways feature shade and evergreen trees, understory plantings, and turf grass to provide a green buffer for adjacent communities and enhance the natural environment. These areas are typically much larger and allow for a greater diversity of plants than is possible elsewhere. However, irrigation is rarely provided, and plants must tolerate other urban stresses such as wind and salt.
Limited-Access Arterial Plantings

Limited-access arterial highways are high-speed roadways, such as expressways or parkways, with access ramps, no intersections with traffic control, and generally large areas for plantings. The most commonly used ground cover for limited-access arterial highways is turf grass. It has low installation costs, superior ability to control soil erosion, and minimal maintenance requirements. Arterial lawns are mowed about four times during the growing season. No fertilizers or pesticides are used, and there is never supplemental irrigation after establishment.

Benefits

See BENEFITS OF PLANTINGS IN THE ROW (6.0)

Limited-access arterial ROWs often contain large contiguous areas suitable for re-forestation, providing some of the benefits of natural woodland, including corridors for wildlife

Opportunities for greater diversity in trees and other species and preservation of native species where existing conditions are not unduly disturbed

Reduction in glare and a more pleasant experience for motorists

Summer cooling, wind reduction, buffering of negative traffic perceptions, and enhanced aesthetics

Considerations

See GENERAL GUIDELINES (6.0.1)

Planting must comply with DOT design standards and guidelines and NYSDOT guidelines if located within NYSDOT jurisdiction

Limited-access arterial highway landscapes typically receive limited maintenance; there is no weeding or invasive-species removal

Trees should not be planted closer than 20 feet apart to allow for mowing. Space should be provided for maintenance vehicles and crews

Plantings should not create hidden areas that facilitate illegal activities such as dumping or vandalism
Soil can be highly variable in texture, pH, and depth; compaction is typical and can greatly suppress root growth as well as cause drainage problems.

Plants must be able to tolerate various stresses such as reflected heat, salt, drought, wind, and competition from invasive plants.

Plants known to be susceptible to insect or disease problems should not be used.

The Port Authority of New York and New Jersey prohibits plants with fruit that attracts birds near the airports.

Any plantings not maintained by DOT or DPR will require a maintenance agreement; consider DOT’s Adopt-a-Highway program for enhanced maintenance.

**Design**

Limited-access arterial highways without curbside safety barriers must maintain 30-foot clear zones (recovery zones) on either side. Access ramps must have clear zones measuring at least 15 feet on either side. All clear zones must be approved by DOT.

A minimum of 10 feet behind any safety barrier should be clear of trees and other fixed objects.

Arterial landscapes are usually viewed by highway users at fast speeds. Plant large swathes of fewer types of species.

Large-growing shade trees should be spaced to promote maximum growth, typical form, and sturdy structure; interplant large trees with smaller understory trees and/or shrubs to increase the density of plantings.

A good highway plant palette includes hardy species known to thrive and other plants for diversity and interest.

Asphalt mow strips are required around and under objects that mowers cannot pass over.

Incorporate STORMWATER-CAPTURING INSTALLATIONS (6.6.1) where appropriate. Generally, restrictions on space do not apply, so such infrastructure can be much larger.

Mulch around trees, without covering the root flare or trunk, to reduce damage from tractor mowers and greatly improve tree health.

**Plants**

See Limited-Access Planting Recommendations (Table 6E).
The following are plants that have been successfully employed along limited-access arterial roadways. This list is not comprehensive and there is no guarantee that these plants will survive at a specific site. All plants within the public ROW must be selected based on site-specific conditions and approved by DOT and DPR. In cases where NYS DOT has jurisdiction, NYS DOT must also approve the plants and overall design.

<table>
<thead>
<tr>
<th>Scientific Name</th>
<th>‘Cultivar’ Trade Name</th>
<th>Common Name</th>
<th>Height</th>
<th>Shape</th>
<th>Characteristics</th>
<th>Drought</th>
<th>Flood</th>
<th>Light</th>
<th>Salt</th>
<th>High pH</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Trees</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cedrus deodara</td>
<td>‘Shalimar’ *</td>
<td>Shalimar Hardy Deodar Cedar</td>
<td>&gt;40’</td>
<td></td>
<td></td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>◆</td>
<td>−</td>
</tr>
<tr>
<td>Gymnocladus dioicus</td>
<td></td>
<td>Kentucky Coffee Tree</td>
<td></td>
<td></td>
<td></td>
<td>✓</td>
<td>✓</td>
<td>◆</td>
<td>−</td>
<td>−</td>
</tr>
<tr>
<td>Liquidambar styraciflua</td>
<td></td>
<td>Sweet Gum</td>
<td></td>
<td></td>
<td></td>
<td>✓</td>
<td>✓</td>
<td>−</td>
<td>−</td>
<td>−</td>
</tr>
<tr>
<td>Pinus strobus</td>
<td>*</td>
<td>Eastern White Pine</td>
<td></td>
<td></td>
<td></td>
<td>✓</td>
<td>−</td>
<td>−</td>
<td>−</td>
<td>−</td>
</tr>
<tr>
<td>Quercus alba</td>
<td>*</td>
<td>White Oak</td>
<td></td>
<td></td>
<td></td>
<td>✓</td>
<td>−</td>
<td>−</td>
<td>−</td>
<td>−</td>
</tr>
<tr>
<td>Quercus phellos</td>
<td>*</td>
<td>Willow Oak</td>
<td></td>
<td></td>
<td></td>
<td>✓</td>
<td>−</td>
<td>−</td>
<td>−</td>
<td>−</td>
</tr>
<tr>
<td>Styphnolobium (Sophora) japonicum ‘Regent’</td>
<td></td>
<td>Regent Sophora Tree</td>
<td></td>
<td></td>
<td></td>
<td>✓</td>
<td>−</td>
<td>−</td>
<td>−</td>
<td>−</td>
</tr>
<tr>
<td>Tilia tomentosa</td>
<td>‘Sterling’ *</td>
<td>Sterling Silver Linden</td>
<td>JUL AUG</td>
<td></td>
<td></td>
<td>✓</td>
<td>−</td>
<td>−</td>
<td>−</td>
<td>−</td>
</tr>
<tr>
<td>Zelkova serrata</td>
<td>‘Green Vase’ *</td>
<td>Green Vase Japanese Zelkova</td>
<td>15’-40’</td>
<td></td>
<td></td>
<td>✓</td>
<td>✓</td>
<td>−</td>
<td>−</td>
<td>−</td>
</tr>
<tr>
<td>Ilex ‘Nellie R. Stevens’</td>
<td></td>
<td>Nellie R. Stevens Holly</td>
<td>APR</td>
<td></td>
<td></td>
<td>✓</td>
<td>−</td>
<td>−</td>
<td>−</td>
<td>−</td>
</tr>
<tr>
<td>Juniperus chinensis ‘Kaizuka’</td>
<td></td>
<td>Hollywood Chinese Juniper</td>
<td>APR SEP</td>
<td></td>
<td></td>
<td>✓</td>
<td>−</td>
<td>−</td>
<td>−</td>
<td>−</td>
</tr>
<tr>
<td>Cercis canadensis</td>
<td></td>
<td>Eastern Redbud</td>
<td>APR</td>
<td></td>
<td></td>
<td>✓</td>
<td>−</td>
<td>−</td>
<td>−</td>
<td>−</td>
</tr>
<tr>
<td>Cornus mas</td>
<td>‘Golden Glory’</td>
<td>Golden Glory Cornelian Cherry</td>
<td>APR</td>
<td></td>
<td></td>
<td>✓</td>
<td>−</td>
<td>−</td>
<td>−</td>
<td>−</td>
</tr>
<tr>
<td>Lagerstroemia indica x faurei hybrids</td>
<td></td>
<td>Hybrid Crape Myrtle</td>
<td>APR MAY</td>
<td></td>
<td></td>
<td>✓</td>
<td>−</td>
<td>−</td>
<td>−</td>
<td>−</td>
</tr>
<tr>
<td>Malus ‘Donald Wyman’</td>
<td></td>
<td>Donald Wyman Crabapple</td>
<td>APR</td>
<td></td>
<td></td>
<td>✓</td>
<td>−</td>
<td>−</td>
<td>−</td>
<td>−</td>
</tr>
<tr>
<td>Syringa reticulata</td>
<td>‘Ivory Silk’</td>
<td>Ivory Silk Japanese Tree Lilac</td>
<td>APR</td>
<td></td>
<td></td>
<td>✓</td>
<td>−</td>
<td>−</td>
<td>−</td>
<td>−</td>
</tr>
<tr>
<td><strong>Shrubs</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Viburnum rhytidophyllum</td>
<td></td>
<td>Leatherleaf Viburnum</td>
<td>6’-10’</td>
<td>6’-10’</td>
<td>APR</td>
<td>✓</td>
<td>✓</td>
<td>−</td>
<td>−</td>
<td>−</td>
</tr>
<tr>
<td>Forsythia x intermedia cultivars</td>
<td></td>
<td>Border Forsythia</td>
<td>8’-10’</td>
<td>10’-12’</td>
<td>APR</td>
<td>✓</td>
<td>✓</td>
<td>−</td>
<td>−</td>
<td>−</td>
</tr>
<tr>
<td>Myrica pensylvanica</td>
<td></td>
<td>Northern Bayberry</td>
<td>5’-10’</td>
<td>5’-10’</td>
<td>APR</td>
<td>✓</td>
<td>✓</td>
<td>−</td>
<td>−</td>
<td>−</td>
</tr>
<tr>
<td>Cornus racemosa</td>
<td></td>
<td>Gray Dogwood</td>
<td>10’-15’</td>
<td>10’-15’</td>
<td>MAY JUN</td>
<td>✓</td>
<td>✓</td>
<td>−</td>
<td>−</td>
<td>−</td>
</tr>
<tr>
<td>Lonicera fragrantissima</td>
<td></td>
<td>Winter Honeysuckle</td>
<td>6’-10’</td>
<td>6’-10’</td>
<td>APR</td>
<td>✓</td>
<td>✓</td>
<td>−</td>
<td>−</td>
<td>−</td>
</tr>
<tr>
<td><strong>Self-Clinging Vines</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Parthenocissus tricuspidata</td>
<td></td>
<td>Boston Ivy</td>
<td>30’-50’</td>
<td>5’-10’</td>
<td>✓</td>
<td>✓</td>
<td>−</td>
<td>−</td>
<td>−</td>
<td></td>
</tr>
<tr>
<td><strong>Turf Grass</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Festuca arundinacea cultivars</td>
<td></td>
<td>Turf-type Tall Fescue Grass</td>
<td>3’-4’</td>
<td>3’-4’</td>
<td>✓</td>
<td>✓</td>
<td>−</td>
<td>−</td>
<td>−</td>
<td></td>
</tr>
<tr>
<td>Lolium perenne cultivars</td>
<td></td>
<td>Turf-type Perennial Rye Grass</td>
<td>3’-4’</td>
<td>3’-4’</td>
<td>✓</td>
<td>✓</td>
<td>−</td>
<td>−</td>
<td>−</td>
<td></td>
</tr>
</tbody>
</table>

* Fall Dig Hazard  ❈ ALB Host Species  ❊ Bloom/Showy Flowers  ❈ Showy Fruit  ❈ Distinct Foliage  ❈ Fall Color  ❈ Distinctive Bark  ❈ Evergreen
Stormwater-Capturing Installations

Stormwater-capturing installations are areas planted with trees, shrubs, groundcovers, grasses, and perennials that are designed to collect and treat stormwater runoff from the city’s streets. These treatments are also known as “green infrastructure.” Plants are selected for their ability to endure periods of wet weather as well as drought, and in many cases to withstand the impacts of salt, sediment, and contaminants typically found in urban runoff. Using plants and soils to mitigate the impacts of stormwater runoff is an ecologically responsible and economical technique to employ within the public ROW.

**STORMWATER-CAPTURING INSTALLATIONS (6.6.1)** describe general considerations and design principles typical of a green stormwater solution. These treatments can be employed citywide, where appropriate conditions allow.

**DEP ROW BIOSWALE (6.6.1a)** and **DPR TREATMENT (6.6.1b)** are specific city-led strategies for managing stormwater in targeted areas that have the greatest need. These treatments will be built and maintained by the city within priority areas. See DEP Priority CSO Tributary Map. These treatments can be built by private entities outside of DEP priority areas but will require a maintenance agreement.

**Important Terms (NYS Stormwater Design Manual)**
- **Detention**: The temporary storage of storm runoff in a stormwater-capturing installation with the goals of controlling peak discharge rates and providing gravity settling of pollutants
- **Detention Structure**: A structure constructed for the purpose of temporary storage of stream flow or surface runoff and gradual release of stored water at controlled rates
- **Retention**: The amount of precipitation on a drainage area that does not escape as runoff. It is the difference between total precipitation and total runoff
6.6.1 Stormwater-Capturing Installations

Stormwater-Capturing Installations

Benefits

See BENEFITS OF PLANETINGS IN THE ROW

Reduced stormwater entering sewers during storms

Can reduce the frequency and intensity of Combined Sewer Overflows (CSOs)

Healthier plants and greater survival rates when appropriate plants are used

Any planted area that is specifically designed to capture and treat stormwater runoff from the street. The purpose of these treatments is to reduce stress on the city’s combined sewer infrastructure during rain storms. Installations can range from a single tree bed to a bioswale to a rain garden in a triangle or plaza.

Typical inlet design with crushed stone: Westbourne Avenue at Bay 25th Street, Queens (Credit: DPR)

Stormwater-capturing treatments must include overflow controls such as the drain shown here: Francis Lewis Boulevard between 217th and 220th Streets, Queens (Credit: DPR)
### Considerations

- **See GENERAL GUIDELINES (6.0.1)**
- May impact street drainage or require catch basin relocation
- Consider sub-surface conditions:
  - There should be a minimum rate of infiltration of 0.5 inches per hour or the soil must be amended
- Bedrock or groundwater level should be a minimum 9 feet deep, and in some cases deeper, based on the volume of stormwater directed to the site. Exceptions may be approved on a case-by-case basis
- Retrofitting existing plantings may be feasible if there is limited grade change and in situ soils are appropriate; special care must be given to tree roots; existing species must be able to tolerate higher levels of water
- Plants should tolerate salts, sediment, contamination, and highly variable levels of water availability
- Due to existing grading and/or the crown of the road, stormwater installations along the gutter are ideal for stormwater capture, while installations in the center of the road will not capture significant volumes of water unless the road can be regraded
- Leaves, litter, and other material may clog inlets/outlets and could impact overall performance of the STORMWATER-CAPTURING INSTALLATION

### Application

All areas with TREE BEDS (6.1), ROADWAY PLANTINGS (6.2), SIDEWALK PLANTINGS (6.3), PLAZA PLANTINGS (6.4), and LIMITED-ACCESS ARTERIAL PLANTINGS (6.5)

- **See DEP ROW BIOSWALE (6.6.1a) if in DEP Priority CSO Tributary Areas; see DPR TREATMENT (6.6.1b) if not in DEP priority areas**
- Installations can be pursued in partnership with DPR, DEP, or another maintenance partner
- Unused or under-utilized roadway areas that can be re-purposed to collect stormwater
- Consider medians or triangles if the roadway can be regraded to direct water to the center of the road

### Design

- Use canopy trees, low shrubs, and groundcover to maintain visibility
- Maintain an 8-foot clear path in areas with high-volume pedestrian traffic and a 5-foot clear path in areas with low-volume pedestrian traffic
- Installations must be sited at the low point of the street or paved ROW area and receive adequate flow
- Locate treatments at least 10 feet from any below-ground vaults or basements to prevent water damage to these structures
- Stormwater-capturing areas should be sized in relation to the catchment area to handle the volume of water entering into them; minimum depth of 2 feet of soil plus 18 - 24 inches of broken stone
- Select soils that allow more rapid infiltration than typical horticultural soils and resist compaction while still supporting plant material

### Plants

See Stormwater-Capturing Installations Planting Recommendations (Table 6F)

Direct runoff into planted areas via porous pavement, curb inlets, stormwater inlets with sub-surface pipes, or other methods approved by DEP

Utilize a pre-treatment system such as grates, a vegetative filter, or weirs to filter and collect sediment and floatables into a concentrated area; this system should be easy to clean out and will reduce the frequency of maintenance visits

Water entering the planted area should be detained and allowed to infiltrate into the soil, grade soil as a swale or depress the soil level below the inlet/outlet structures

Use gravel berms or concrete weirs to divide the planting bed and increase water detention and infiltration. This treatment also allows for greater manipulation of grades on steeper slopes while helping to concentrate litter that flows into the system

Overflow must be allowed to flow to an existing catch basin; consider the use of graded outlet structures or overflow drains to direct excess water from larger storms into the sewer system
**DEP ROW Bioswale**

A planted area located along the curb of a sidewalk, graded to capture stormwater, and planted with an understory of shrubs and herbaceous material. Curb cuts allow for stormwater from the adjacent roadway to enter the planted area and overflow to exit. DEP, together with DOT, DPR, and DDC, developed designs and protocols to site stormwater bioswales within the public ROW. The city will build and maintain **DEP ROW BIOSWALES** within DEP Priority CSO Tributary Areas, which are areas where CSO volumes are high, combined sewers frequently overflow, and the receiving water bodies need water quality improvements. See DEP Priority CSO Tributary Areas map.

<table>
<thead>
<tr>
<th>Benefits</th>
<th>Application</th>
</tr>
</thead>
<tbody>
<tr>
<td>See benefits of STORMWATER-CAPTURING INSTALLATIONS (6.6.1)</td>
<td>DEP Priority CSO Tributary Areas; see DEP Priority CSO Tributary Areas Map</td>
</tr>
<tr>
<td>Reduced stormwater flows and fewer CSO events in DEP Priority CSO Tributary Areas</td>
<td>Outside DEP designated areas with a maintenance agreement</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Considerations</th>
<th>Design</th>
</tr>
</thead>
<tbody>
<tr>
<td>See considerations for STORMWATER-CAPTURING INSTALLATIONS (6.6.1)</td>
<td>DEP ROW BIOSWALES should follow all DEP and DOT bioswale siting criteria</td>
</tr>
<tr>
<td>See considerations for TREE BEDS (6.1.1)</td>
<td>Maintain an 8-foot clear path in areas of high-volume pedestrian traffic or heavy curbside activity and a 5-foot clear path in areas of low-volume pedestrian traffic</td>
</tr>
<tr>
<td>Consider parking regulations; curbside access must be preserved</td>
<td>Install just upstream from existing catch basins to optimize stormwater capture prior to entering the combined sewer system</td>
</tr>
<tr>
<td>Consider subsurface conditions</td>
<td>Soil and design specifications must adhere to DEP standards</td>
</tr>
<tr>
<td>There should be a minimum rate of infiltration of 0.5 inches per hour or the soil must be amended</td>
<td>DEP Standards for Green Infrastructure call for lengths of 20 feet, 15 feet, or 10 feet, a width of 5 feet, and a depth of 4 feet; deviations from these standards must be reviewed and approved by DOT, DPR, and DEP on a case-by-case basis</td>
</tr>
<tr>
<td>Bedrock or groundwater level should be a minimum 15 feet deep, or 9 feet deep with well-draining soil</td>
<td>Provide 2 feet of engineered soil (see GLOSSARY), as defined by DEP, over 2 feet of an open-graded stone base</td>
</tr>
<tr>
<td>Plants should tolerate salts, sediment, contamination, and highly variable levels of water</td>
<td></td>
</tr>
<tr>
<td>DEP, per the three party agreement, will install <strong>DEP ROW BIOSWALES</strong> within priority CSO Tributary Areas areas and fund maintenance through DPR</td>
<td></td>
</tr>
</tbody>
</table>
Use of 1.2 inches of crushed stone located along the curb serves as a buffer from the roadway and increases infiltration and sediment capture.

Curb cuts at both ends serve as an inlet and outlet for runoff, which slope from flush to the standard 6 – 7-inch reveal; other DEP-approved inlet/outlet structures may be employed based on slopes and runoff velocity.

Concrete aprons outside the inlet and outlet direct runoff into and out of the bioswale.

An approved DPR tree-bed guard is required to discourage foot traffic. The curb side should be open and fencing set back 18 inches from the curb to allow for people exiting from vehicles.

Overflow must be allowed to flow to an existing catch basin; consider the use of graded outlet structures or overflow drains to direct excess water from larger storms into the sewer system.

**Plants**

See Planting Recommendations (Table 6F).
**6.6.1b DPR Treatment**

**DPR Treatment**

A planted area within the sidewalk or roadway, which extends beyond the standard street geometry, and collects and treats stormwater runoff. DPR Stormwater-Capturing Installations are typically larger stormwater-capturing treatments installed and maintained by DPR or another committed maintenance partner. They can be located anywhere in the city as conditions allow. For examples, visit DPR’s webpage on Greenstreets and stormwater management.

**Benefits**

See benefits for STORMWATER-CAPTURING INSTALLATIONS (6.6.1)

Permit greater water capture than what is typical for a DEP ROW BIOSWALE (6.6.1a) due to generally larger installations

Non-standard geometry (i.e., curb extension) enables the greenstreet to capture water and reduce runoff bypass by allowing water to enter directly while also providing the safety benefits typical of a CURB EXTENSION (2.2.2)

**Considerations**

See considerations for STORMWATER-CAPTURING INSTALLATIONS (6.6.1)

Avoid in areas of high foot traffic or curbside activity, including pedestrian desire lines that may be impacted

Within DEP priority areas, the city will construct and maintain DPR TREATMENTS. Outside of these areas, a maintenance agreement is required.

Wiers can separate different levels of a planting area to allow for greater control of slopes and to increase detention: Westbourne Avenue at Bay 25th Street, Queens (Credit: DPR)
DPR has installed treatments of various sizes and shapes throughout the city: Westbourne Avenue at Bay 25th Street, Queens (Credit: DPR)

Water can be collected in a forebay, such as the triangular area shown on the right. This allows sediment and debris to settle before the water continues to the planting area: Westbourne Avenue at Bay 25th Street, Queens (Credit: DPR)

Application
See application guidance for STORMWATER-CAPTURING INSTALLATIONS (6.6.1)

Design
See design guidance for STORMWATER-CAPTURING INSTALLATIONS (6.6.1)

Overall dimension will be determined based on the catchment area, and geometries must be approved by DOT; generally, installations follow striped roadbed area or underused roadway width

Catch basins should be located on the downstream side of the overflow or outlet

Plants
See Planting Recommendations (Table 6F)
### Stormwater-Capturing Installations

**Planting Recommendations**

The following plants have been successfully employed in areas that capture and treat stormwater runoff in New York City. In particular, species listed below can tolerate salts and wide fluctuations in soil moisture. This list is not comprehensive, and there is no guarantee that these plants will survive at a specific site. All plants within the public ROW must be selected based on site-specific conditions and approved by DPR.

### Trees

<table>
<thead>
<tr>
<th>Scientific Name ‘Cultivar’</th>
<th>Trade Name</th>
<th>Common Name</th>
<th>Height</th>
<th>Shape</th>
<th>Characteristics</th>
<th>Tolerances</th>
</tr>
</thead>
<tbody>
<tr>
<td>Taxodium distichum</td>
<td>‘Shawnee Brave’</td>
<td>Shawnee Brave Baldcypress</td>
<td>&gt;40'</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Gleditsia triacanthos var inermis</td>
<td>‘Shademaster’</td>
<td>Shademaster Honeylocust</td>
<td>3'-6'</td>
<td>✓</td>
<td>✓</td>
<td>◆</td>
</tr>
<tr>
<td>Quercus bicolor</td>
<td></td>
<td>Swamp White Oak</td>
<td>3'-6'</td>
<td>✓</td>
<td>✓</td>
<td>◆</td>
</tr>
<tr>
<td>Liquidambar styraciflua</td>
<td>*</td>
<td>American Sweetgum</td>
<td>3'-6'</td>
<td>✓</td>
<td>✓</td>
<td>◆</td>
</tr>
</tbody>
</table>

### Shrubs

<table>
<thead>
<tr>
<th>Scientific Name</th>
<th>Common Name</th>
<th>Height</th>
<th>Spread</th>
<th>Appearance</th>
<th>Characteristics</th>
<th>Tolerances</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aronia melanocarpa</td>
<td>Black Chokeberry</td>
<td>3'-6'</td>
<td>3'-6'</td>
<td>MAY</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Ilex glabra Compacta</td>
<td>Compact Inkberry Holly</td>
<td>3'-6'</td>
<td>3'-6'</td>
<td>✓</td>
<td>◆</td>
<td>−</td>
</tr>
<tr>
<td>Itea virginica Sprich'</td>
<td>Little Henry Sweetspire</td>
<td>3'-5'</td>
<td>3'-5'</td>
<td>JUN</td>
<td>✓</td>
<td>◆</td>
</tr>
<tr>
<td>Cornus sericea Kelseyi</td>
<td>Kelseyi Red Twig Dogwood</td>
<td>2'-3'</td>
<td>2'-3'</td>
<td>JUN</td>
<td>✓</td>
<td>◆</td>
</tr>
</tbody>
</table>

### Perennials

<table>
<thead>
<tr>
<th>Scientific Name</th>
<th>Common Name</th>
<th>Height</th>
<th>Spread</th>
<th>Appearance</th>
<th>Characteristics</th>
<th>Tolerances</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aster ‘Wood’s Pink’</td>
<td>Hardy Aster</td>
<td>1'-1.5'</td>
<td>1.5'-2.5'</td>
<td>AUG</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Echinacea purpurea</td>
<td>Coneflower</td>
<td>2'-3'</td>
<td>2'-3'</td>
<td>JUN</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Epimedium grandiflorum Lilafee’</td>
<td>Bishop’s Hat</td>
<td>1'</td>
<td>1'-1.5'</td>
<td>MAY</td>
<td>✓</td>
<td>◆</td>
</tr>
<tr>
<td>Eupatorium dubium Baby Joe</td>
<td>Baby Joe Pye Weed</td>
<td>1'-1.5'</td>
<td>1'-1.5'</td>
<td>JUL</td>
<td>✓</td>
<td>◆</td>
</tr>
<tr>
<td>Hemerocallis Dwarf Varieties</td>
<td>Daylily</td>
<td>1'-1.5'</td>
<td>1'-1.5'</td>
<td>✓</td>
<td>◆</td>
<td>✓</td>
</tr>
<tr>
<td>Liriope spicata</td>
<td>Creeping Lilyturf</td>
<td>1'-2'</td>
<td>1'-2'</td>
<td>AUG</td>
<td>✓</td>
<td>◆</td>
</tr>
<tr>
<td>Rudbeckia fulgida</td>
<td>Black Eyed Susan</td>
<td>2'-2.5'</td>
<td>2'-2.5'</td>
<td>JUN</td>
<td>✓</td>
<td>◆</td>
</tr>
<tr>
<td>Solidago Dwarf Varieties</td>
<td>Goldenrod</td>
<td>1.5'-2'</td>
<td>1.5'-2'</td>
<td>AUG</td>
<td>✓</td>
<td>◆</td>
</tr>
</tbody>
</table>

### Grasses/Grass-like Plants

<table>
<thead>
<tr>
<th>Scientific Name</th>
<th>Common Name</th>
<th>Height</th>
<th>Spread</th>
<th>Appearance</th>
<th>Characteristics</th>
<th>Tolerances</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carex morrowii</td>
<td>Sedge</td>
<td>1'-1.5'</td>
<td>1.5'-2'</td>
<td>APR</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Carex pennsylvanica</td>
<td>Pennsylvania Sedge</td>
<td>.5'-1'</td>
<td>.5'-1'</td>
<td>JUL</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Hakonechloa macra</td>
<td>Golden Japanese Forest Grass</td>
<td>2'-2.5'</td>
<td>3'-4'</td>
<td>✓</td>
<td>◆</td>
<td>−</td>
</tr>
<tr>
<td>Juncus effusus</td>
<td>Common Rush</td>
<td>2'-4'</td>
<td>2'-4'</td>
<td>JUN</td>
<td>✓</td>
<td>◆</td>
</tr>
<tr>
<td>Panicum virgatum</td>
<td>Switchgrass</td>
<td>3'-6'</td>
<td>2'-3'</td>
<td>JUL</td>
<td>✓</td>
<td>◆</td>
</tr>
</tbody>
</table>

**Legend:**
- ✓: The plant is recommended for use.
- ◆: The plant is not recommended due to potential hazards.
- −: The plant is not considered for use in stormwater installations.
- *: Fall Dig Hazard
- ^: ALB Host Species
- Bloom/Showy Flowers
- Showy Fruit
- Distinct Foliage
- Fall Color
- Distinctive Bark
- Evergreen