PLANT SELECTION + CARE

Caitrin Higgins, LEED AP BD+C
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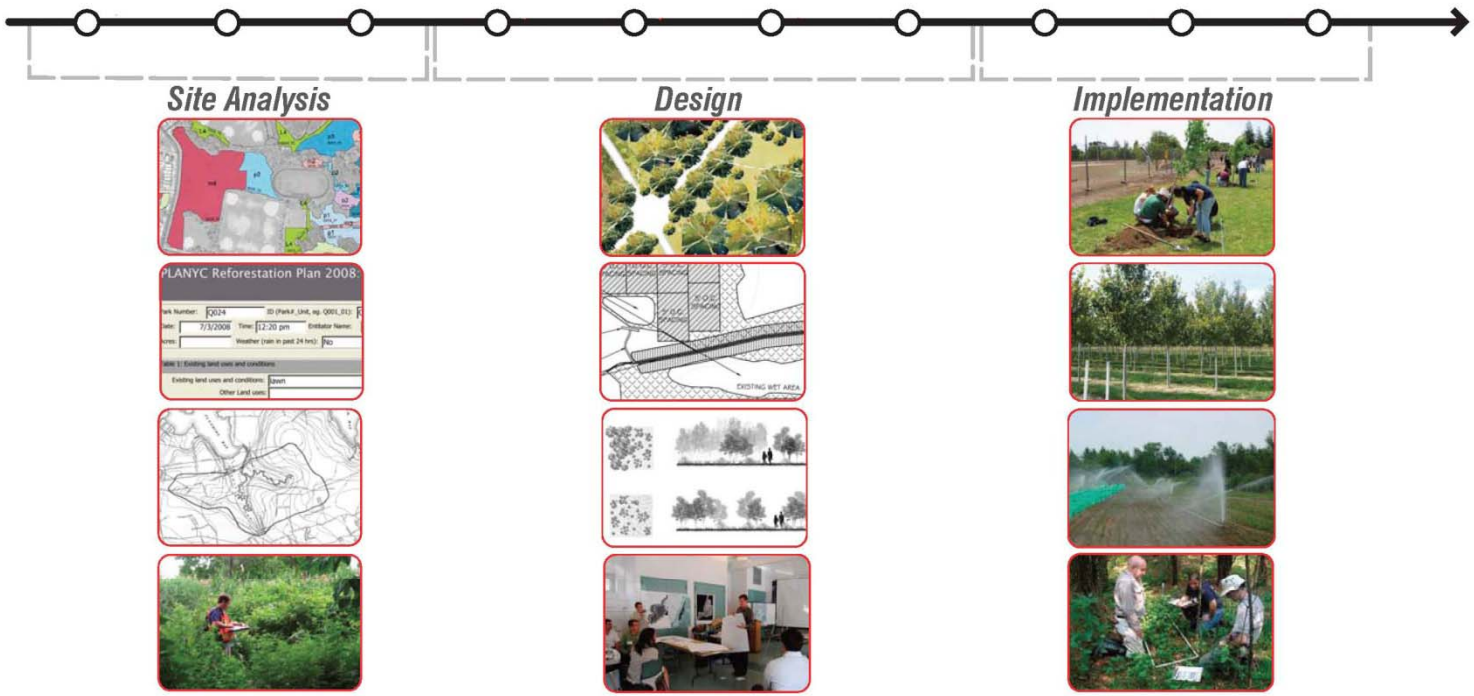
Piet Oudolf

THE DESIGN PROCESS



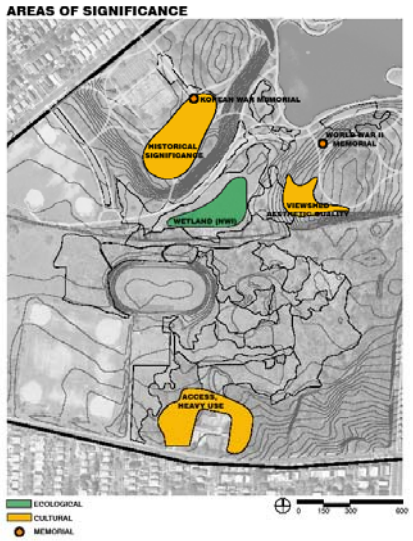
SITE ANALYSIS: An approach for identifying and analyzing the existing natural, built, and social characteristics of the site.

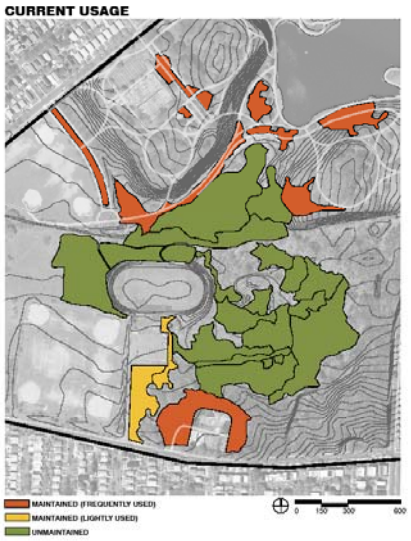
The process of Site Analysis helps you select the right plant for the right space and the right function.

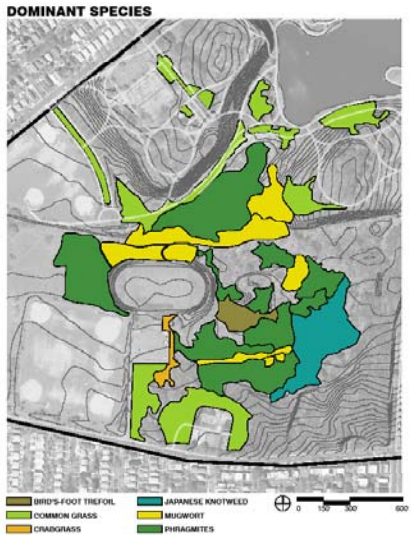
SITE ANALYSIS FOR RAIN GARDENS

Things to consider:

- Plant hardiness
- Topography
- Sun exposure
- Wind exposure
- Soil characteristics (texture + quality)
- Space constraints + limitations
- Rain garden size
- Road salts
- Vehicle + pedestrian traffic
- Adjacencies







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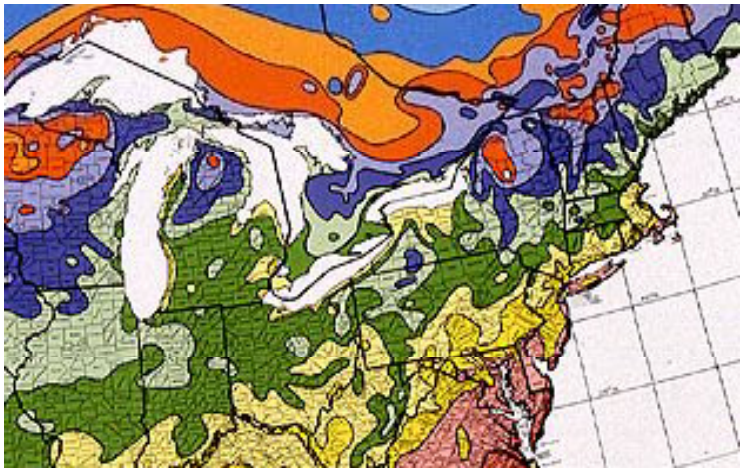
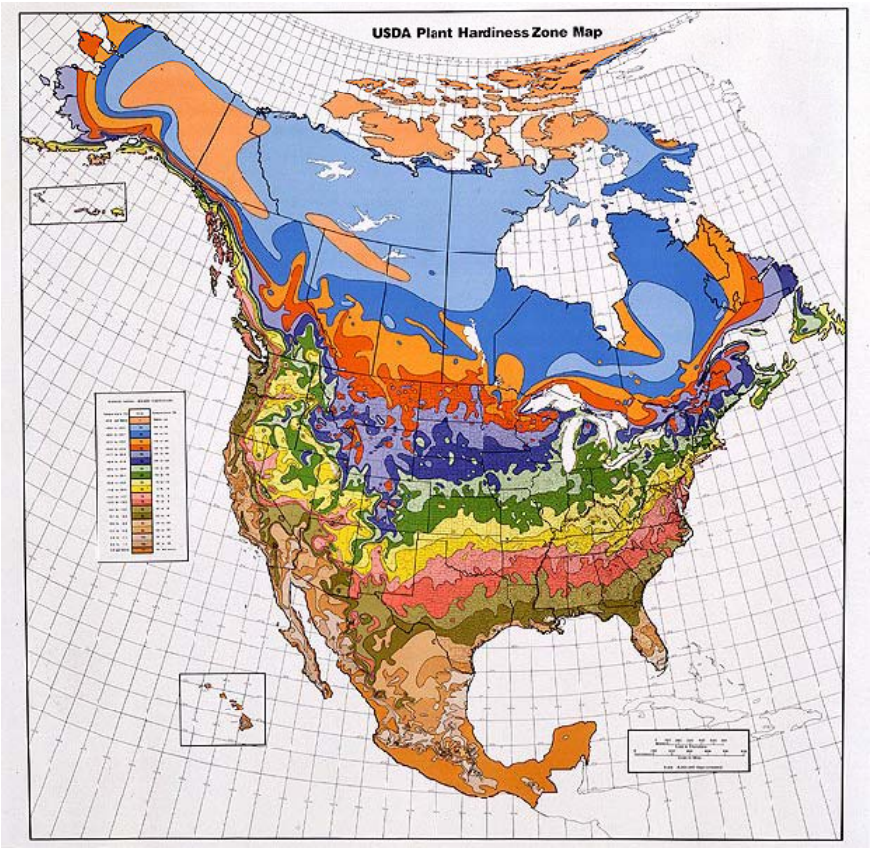
SITE ANALYSIS: PLANT HARDINESS

Plant Hardiness Zone

- USDA map (www.hardiness-zone-map.com)
- MA: Zones 5-7
- Climate change may affect zone boundaries (moving north)





SITE ANALYSIS: EXPOSURE

Sun Exposure:

- Many plants suitable for rain gardens prefer full sun
  - **full sun:** more than 6 hours of direct sunlight per day
  - **partial sun:** 3-6 hours of direct sunlight per day
  - **partial shade:** 3-6 hours of sunlight, with relief from the intense late afternoon sun
  - **full shade:** less than 3 hours of sunlight per day, with filtered sunlight during the rest of the day

Wind Exposure:

- Lowers the temperature of air around plants
- Reduces plant rate of growth
- Causes moisture loss from plant leaves during dry weather
- Increases the damaging effects of frost during cold periods
- Wind is strongest in coastal areas because there is a greater wind speed off of the ocean

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SITE ANALYSIS: Soil

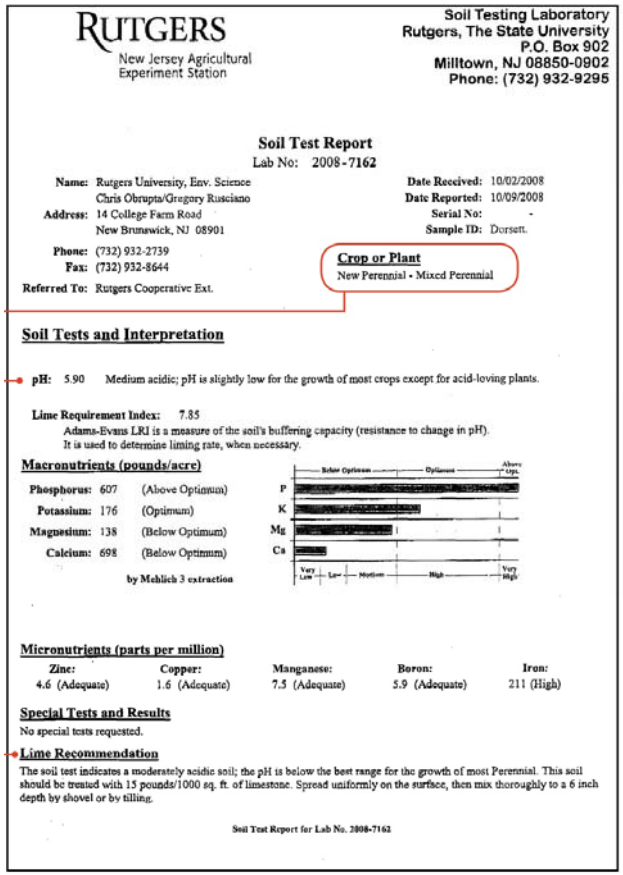
Soil Texture:

- Soil texture determines the soil's ability to infiltrate water
- Sandy soils have the fastest infiltration; clayey soils have the slowest
- Sandy loam soil is the ideal texture for a rain garden as it retains nutrients and water while still allowing for adequate infiltration
- The results of the infiltration test will determine if soil texture amendments (coarse sand, compost) are needed to improve infiltration rates

SITE ANALYSIS: Soil

Soil Quality:

- Soil quality determines the soils nutrient capacity
- The results of the pH test will determine what, if any, soil quality amendments will improve growing conditions for plants
- Common soil quality amendments include: gypsum, lime, fertilizer, or other organic matter



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Soil Testing Laboratory
Rutgers, The State University
P.O. Box 902
Milltown, NJ 08850-0902
Phone: (732) 932-9295

Soil Test Report
Lab No: 2008-7162

Name: Rutgers University, Env. Science
Chris Obrupta/Gregory Rusciano
Address: 14 College Farm Road
New Brunswick, NJ 08901
Phone: (732) 932-2739
Fax: (732) 932-8644
Referred To: Rutgers Cooperative Ext.

Date Received: 10/02/2008
Date Reported: 10/09/2008
Serial No: -
Sample ID: Dorsett

Crop or Plant
New Perennial - Mixed Perennial

Soil Tests and Interpretation

pH: 5.90 Medium acidic; pH is slightly low for the growth of most crops except for acid-loving plants.

Lime Requirement Index: 7.85
Adams-Evans LRI is a measure of the soil's buffering capacity (resistance to change in pH). It is used to determine liming rate, when necessary.

Macronutrients (pounds/acre)

Phosphorus:	607	(Above Optimum)
Potassium:	176	(Optimum)
Magnesium:	138	(Below Optimum)
Calcium:	698	(Below Optimum)

by Mehlich 3 extraction

Micronutrients (parts per million)

Zinc:	Copper:	Manganese:	Boron:	Iron:
4.6 (Adequate)	1.6 (Adequate)	7.5 (Adequate)	5.9 (Adequate)	211 (High)

Special Tests and Results
No special tests requested.

Lime Recommendation
The soil test indicates a moderately acidic soil; the pH is below the best range for the growth of most Perennial. This soil should be treated with 15 pounds/1000 sq. ft. of limestone. Spread uniformly on the surface, then mix thoroughly to a 6 inch depth by shovel or by tilling.

Soil Test Report for Lab No. 2008-7162

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SITE ANALYSIS: Space Constraints

Horizontal:

- Square footage limitations

Vertical:

- Utilites?
- Existing Canopy?

SITE ANALYSIS: Rain Garden Size

Plant Spacing:

Spacing	Plants per ft²
12″ on center	4.00
18″ on center	1.00
24″ on center	.25
30″ on center	.16
3′ on center	.11
5′ on center	.04

Rain Garden Area (ft²) x Spacing (plants/ ft²)= Number of Plants Needed

PLANTING DESIGN

Considerations:

- Native Species
- Tolerance of both wet + dry conditions
- Mature size of plants
- Aesthetics (layering, clustering, unity)
- Value for wildlife

PLANTING DESIGN: Native Plants

What is a native plant species?

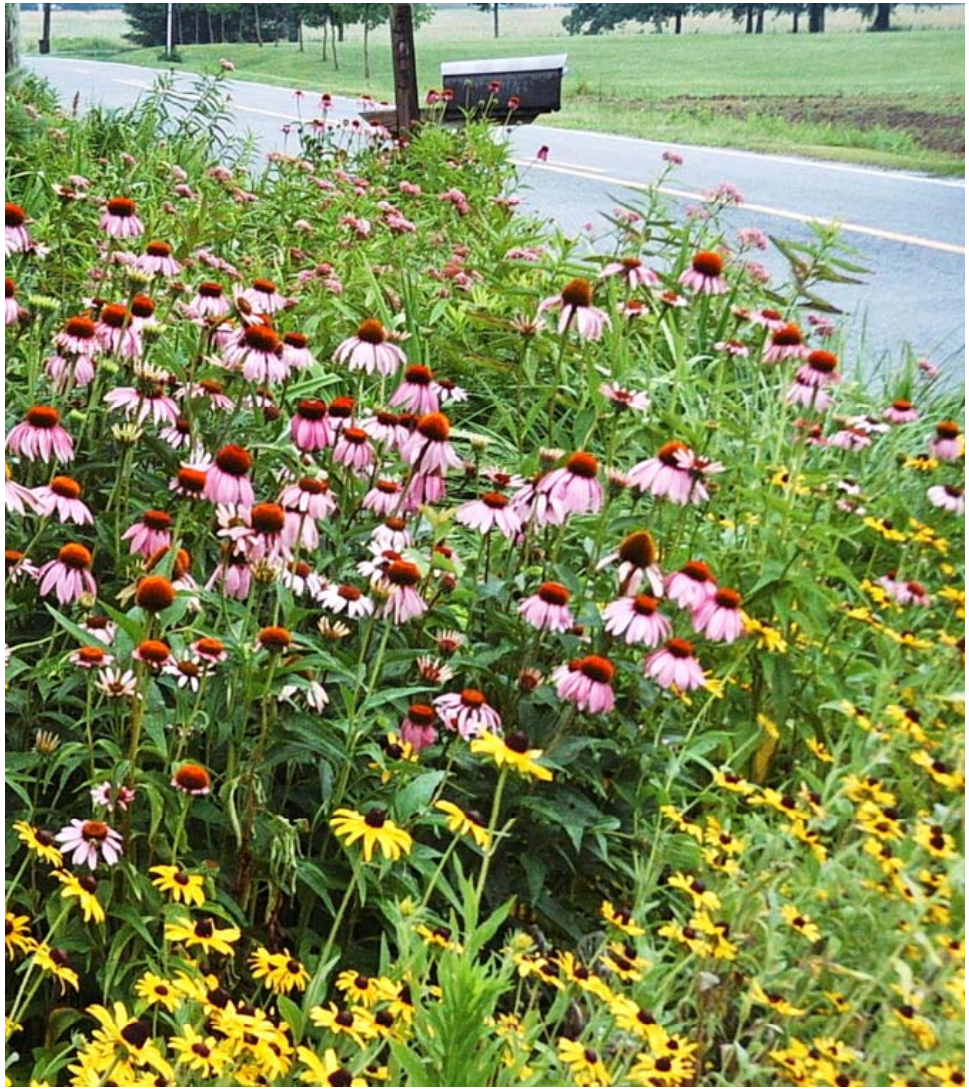
- Native species means, with respect to a particular ecosystem, a species that, other than as a result of an introduction, historically occurred or currently occurs in that ecosystem.

-NJ Native Plant Society

PLANTING DESIGN: Native Plants

NATIVE PLANTS:

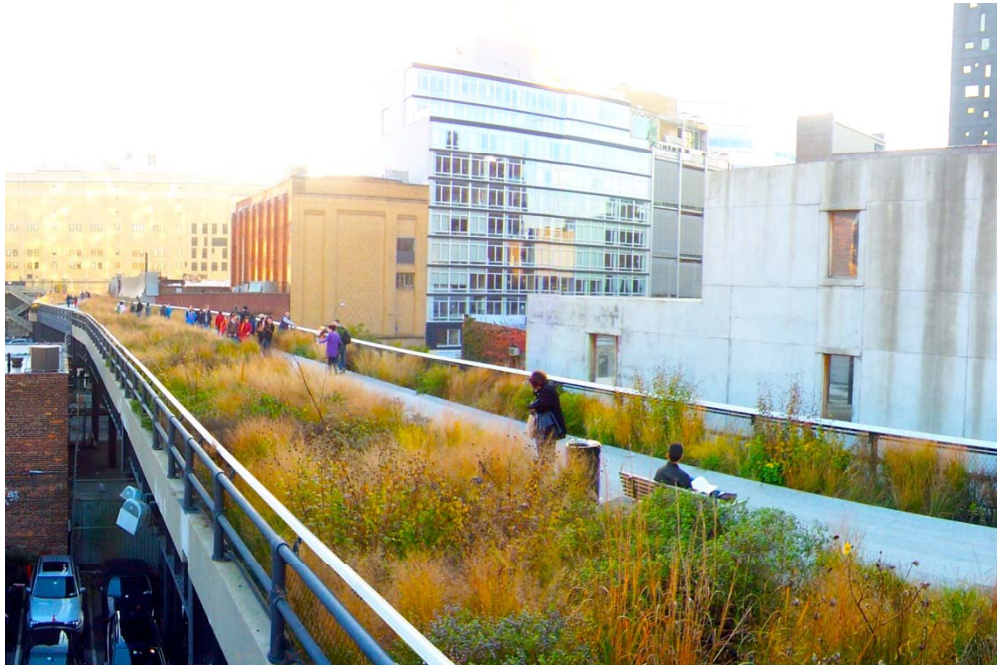
- Provide habitat areas
- Adapted to local conditions
  (soil, temperature, weather)
- Attract other natives
  (migratory birds, beneficial insects and butterflies)
- Reduce the need for irrigation
- Reduce the need for maintenance
- Reduce the use of fertilizer
- Reduce the use of pesticides
- Absorb water more efficiently than turf-style grasses

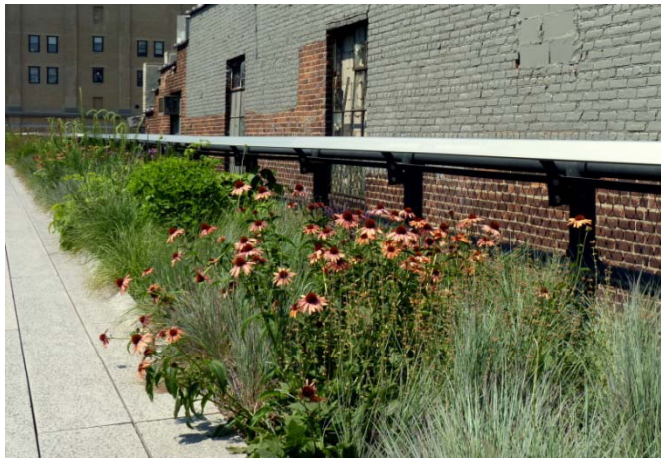


PLANTING DESIGN: Native Plants

The Highline, NYC

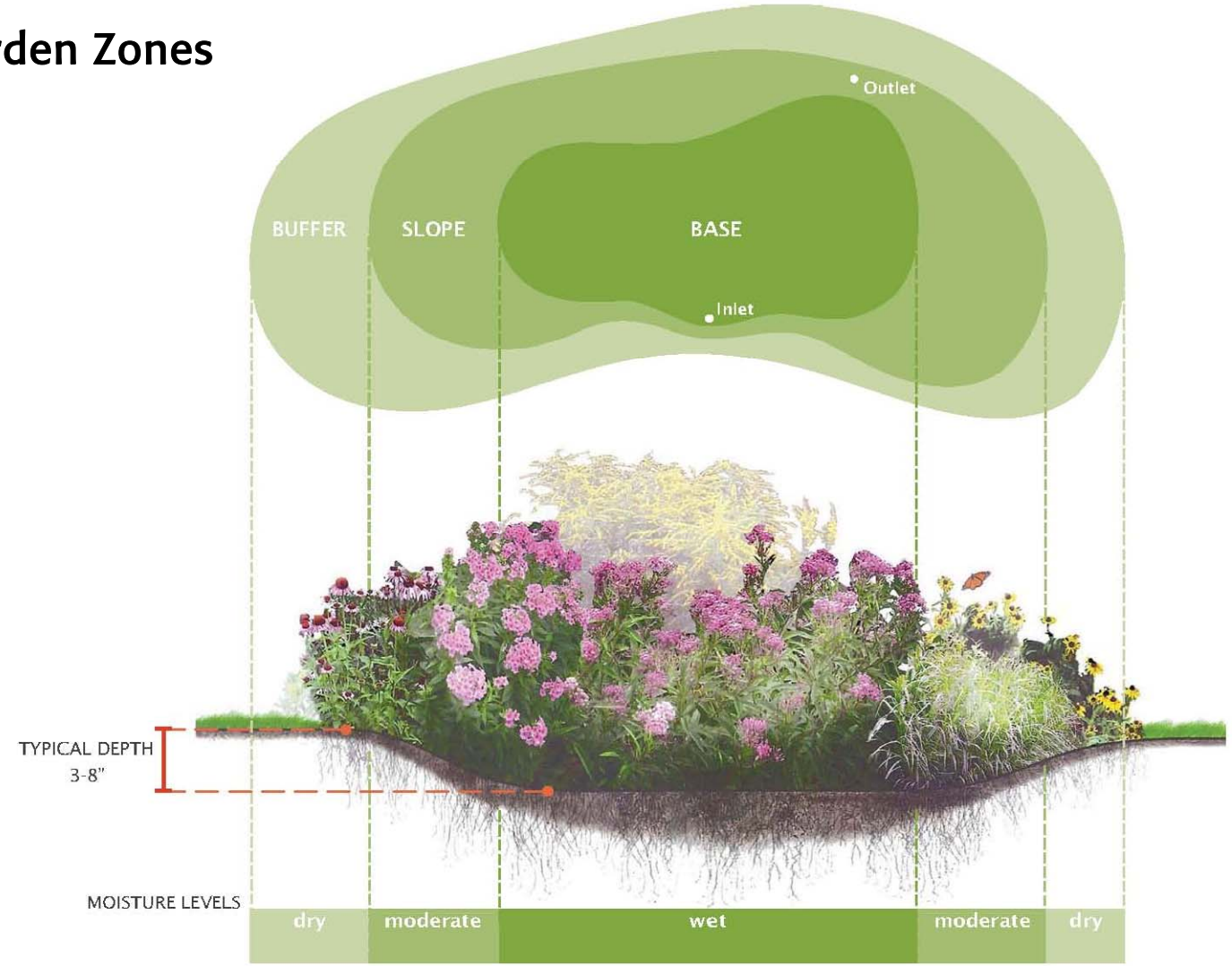
- James Corner Field Operations
  Landscape Architect
- Piet Oudolf
  Planting Designer





PLANTING DESIGN: Wet + Dry Conditions

Rain Garden Zones



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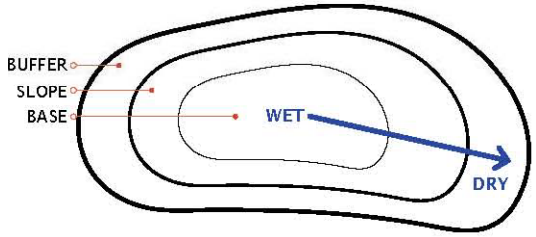
PLANTING DESIGN: Wet + Dry Conditions

Rain Garden Zones



GRASSES AND GROUNDCOVERS

BASE

- **Bluejoint Grass** *(Calamagrostis canadensis)*
- **Sedges** *(Carex spp.)*
- **Fowl Mannagrass** *(Glyceria striata)*
- **Soft Rush** *(Juncus effusus)*

SLOPE

- **Big Bluestem** *(Andropogon gerardii)*
- **Switchgrass** *(Panicum virgatum)*
- **Virginia Wild-rye** *(Elymus virginicus)*
- **Wood Grass** *(Sorghastrum nutans)*

BUFFER

- **Bearberry** *(Arctostaphylos uva-ursi)*
- **Broomsedge** *(Andropogon spp.)*
- **Indiangrass** *(Sorghastrum nutans)*
- **Little Bluestem** *(Schizachyrium scoparium)*
- **Panic Grass** *(Panicum virgatum)*
- **Switchgrass** *(Panicum virgatum)*
- **Deer Tongue** *(Dichanthelium clandestinum)*

WILDFLOWERS AND FERNS

BASE

- **Blue Lobelia** *(Lobelia siphilitica)*
- **Blueflag Iris** *(Iris virginica shrevei)*
- **Boneset** *(Eupatorium maculatum)*
- **Cardinal Flower** *(Lobelia cardinalis)*
- **Seaside Goldenrod** *(Solidago sempervirens)*
- **Marsh Marigold** *(Calthus palustris)*
- **Monkey Flower** *(Mimilus ringens)*
- **Rose-mallow** *(Hibiscus moscheutos)*
- **Royal Fern** *(Osmunda regalis)*
- **Swamp Milkweed** *(Asclepias incarnata)*
- **Turtlehead** *(Chelone glabra)*

SLOPE

- **Blazing Star** *(Liatris spicata)*
- **Cinnamon Fern** *(Osmunda cinnamomea)*
- **Columbine** *(Aquilegia spp.)*
- **Coreopsis** *(Coreopsis)*
- **Ironweed** *(Vernonia noveboracensis)*
- **Joe-pye Weed** *(Eupatorium spp.)*
- **New England Aster** *(Aster novae-angliae)*
- **New York Aster** *(Aster novi-belgii)*
- **Sensitive Fern** *(Onoclea Sensibilis)*

BUFFER

- **Black-eyed Susan** *(Rudbeckia laciniata)*
- **Butterfly Weed (Milkweed)** *(Asclepias tuberosa)*
- **Purple Coneflower** *(Echinacea purpurea)*
- **Wild Indigo** *(Baptista tinctoria)*
- **Wild Bergamont** *(Monarda didyma)*

TREES AND SHRUBS

BASE

- **Buttonbush** *(Cephalanthus occidentalis)*
- **Cranberrybush Viburnum** *(Viburnum trilobum)*
- **Green Ash** *(Fraxinus pennsylvanica)*
- **River Birch** *(Betula nigra)*
- **Silky Dogwood** *(Cornus amomum)*
- **Swamp White Oak** *(Quercus bicolor)*

SLOPE

- **Green Ash** *(Fraxinus pennsylvanica)*
- **Red Maple** *(Acer rubrum)*
- **Red-twig Dogwood** *(Cornus sericea)*
- **River Birch** *(Betula nigra)*
- **Serviceberry** *(Amelanchier canadensis)*
- **Sweetpepperbush** *(Clethera alnifolia)*
- **Sweetbay Magnolia** *(Magnolia virginiana)*
- **Winterberry Holly** *(Ilex verticillata)*

BUFFER

- **American Holly** *(Ilex opaca)*
- **Arrowwood Viburnum** *(Viburnum dentatum)*
- **Bayberry** *(Myrica pensylvanica)*
- **Hackberry** *(Celtis occidentalis)*
- **Lowbush Blueberry** *(Vaccinium angustifolium)*
- **Red Bud** *(Cercis canadensis)*
- **Red Oak** *(Quercus falcata)*
- **White Oak** *(Quercus alba)*
- **Witchhazel** *(Hamamelis virginiana)*

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PLANTING DESIGN: Mature Size of Plants

At time of installation

Springfield Township Municipal Annex Building
Springfield, NJ

First growing season

Second growing season

Third growing season

Fourth growing season

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PLANTING DESIGN: Aesthetics

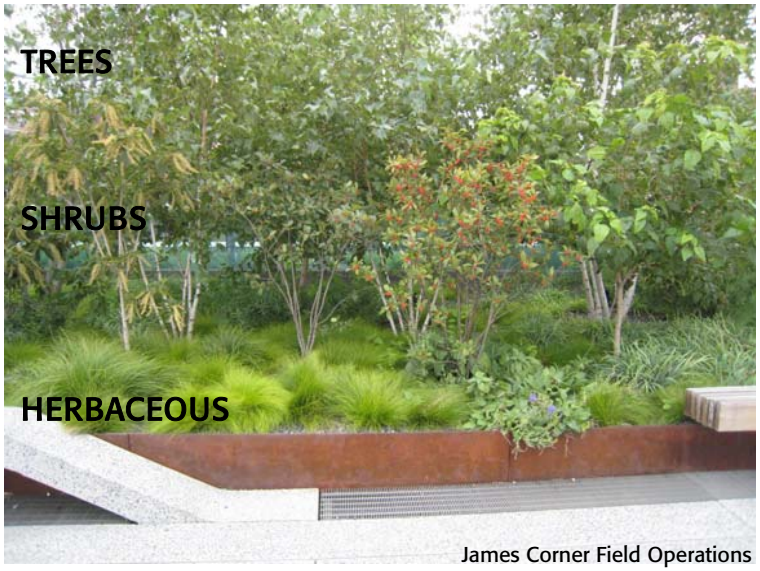
Aesthetic Considerations

- Plant Layering
- Plant Massing
- Unity + Repetition
- Maintaining Balance
- Accents + Focal Points
- Keep it Simple

PLANTING DESIGN: Aesthetics

Layering Plantings

- Mimic natural conditions
- Create depth by planting larger plants behind smaller plants
- Develop structure for the intended design
- Be sure to plant the right size plants in the right place – consider proportions

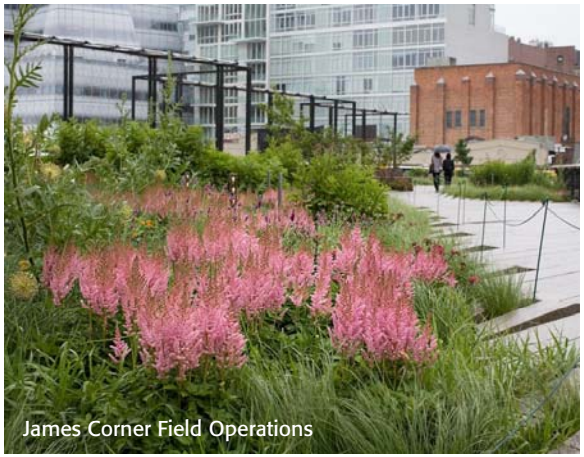


PLANTING DESIGN: Aesthetics

Massing Plantings

- Plant in groups to provide visual impact
- Direct viewers eye toward desirable view
- Direct viewers eye away from undesirable view
- Massing several of the same species together minimizes impact of individual plant die-off


James Corner Field Operations


James Corner Field Operations

PLANTING DESIGN: Aesthetics

Unity + Repetition

- Complement existing landscape plantings and features
- Respect architecture, spaces, and community aesthetics
- Consistency in plant character provides unity
- Build on a selected theme to provide repetition

USEPA. 2009. Green Infrastructure Case Studies

PLANT SELECTION

Similar Colors, Different Forms

James Corner Field Operations/Piet Oudolf

PLANT SELECTION

Similar Forms, Different Colors

PLANTING PALETTE

Choose plant species based upon:

- **Suitability to Site**
  - well adapted to existing conditions (native plants!)
- **Mature Plant Size**
  - proximity to buildings + utility lines
  - pruning and shaping
- **Seasonal Interest**
  - flowers
  - fall color
  - winter interest
- **Beneficial to Wildlife**
  - flowers for butterflies + insects
  - fruits for song birds

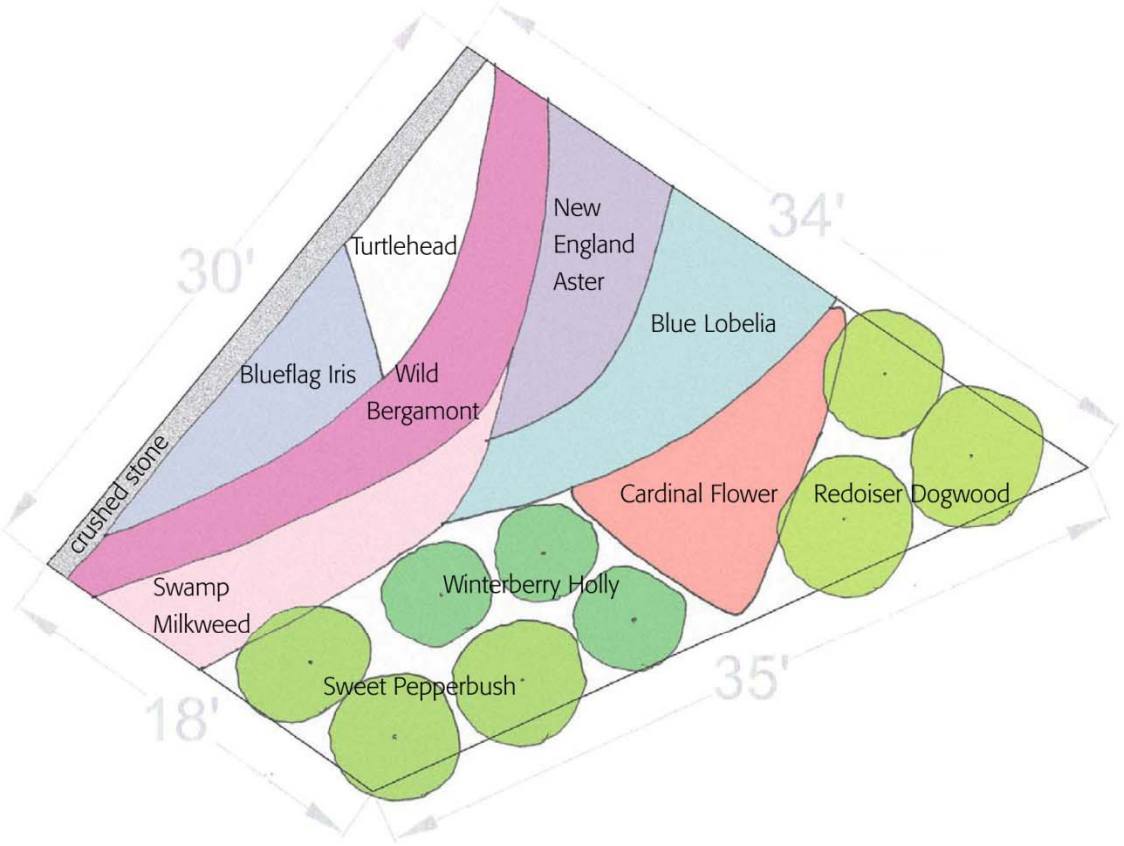
RAIN GARDEN DESIGN

Keep it Simple!

- Focus on only one or two themes
- Consider seasonal changes
- Consider long-term maintenance needs
- Plan for succession and maturity
- Thoroughly investigate existing site conditions

WORCESTER YOUTH CENTER RAIN GARDEN

Planting Plan



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