Stormwater Mitigation in the Western Millers River Watershed and Low Impact Development (LID)

Friday, September 18, 2015

Franklin County LID Field Trip

Briefing Book

Franklin County LID Field Trip Itinerary:
- Greenfield—Transit Center Curbless Island
- Greenfield—Olive St. Sidewalk Rain Garden
- Greenfield—High School Rain Gardens
- Greenfield—Chapman & Davis Parking Lot
- Deerfield—Deerfield Academy Green Roof
- Turners Falls—Unity Park Rain Gardens
- Orange—Riverfront Park

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Greenfield—Transit Center Curbless Island
Greenfield—Olive St. Sidewalk Rain Garden

BEFORE

DURING

AFTER
Rain Garden (Infiltration Basin) - Typical Landscape Section

Not to Scale
Rain Garden "A" and "B" Plant List

<table>
<thead>
<tr>
<th>CITY</th>
<th>PER BUSH</th>
<th>LAST NAME</th>
<th>COMMON NAME</th>
<th>SIZE</th>
<th>NOTES</th>
</tr>
</thead>
<tbody>
<tr>
<td>30</td>
<td>Arctium lappa</td>
<td>Orange Dandelion</td>
<td>5&quot; pot</td>
<td>orange</td>
<td></td>
</tr>
<tr>
<td>30</td>
<td>Canna indica</td>
<td>Orange Canna</td>
<td>5&quot; pot</td>
<td>orange</td>
<td></td>
</tr>
<tr>
<td>30</td>
<td>Coreopsis x 'Daisy Dreamer'</td>
<td>Daisy Canna</td>
<td>5&quot; pot</td>
<td>pale-yellow</td>
<td></td>
</tr>
<tr>
<td>30</td>
<td>Iris x 'Merton's Mark'</td>
<td>Siberian Iris</td>
<td>5&quot; pot</td>
<td>purple</td>
<td></td>
</tr>
<tr>
<td>30</td>
<td>Leucanthemum x 'Vanity'</td>
<td>White Shasta Daisy</td>
<td>5&quot; pot</td>
<td>white</td>
<td></td>
</tr>
<tr>
<td>30</td>
<td>Lysimachia nummularia</td>
<td>Orange Saxifrage</td>
<td>5&quot; pot</td>
<td>orange</td>
<td></td>
</tr>
<tr>
<td>30</td>
<td>Prostanthera 'Pink Snapdragon'</td>
<td>Pink Sage</td>
<td>5&quot; pot</td>
<td>bright pink</td>
<td></td>
</tr>
<tr>
<td>30</td>
<td>Salvia greggii</td>
<td>Desert Sage</td>
<td>5&quot; pot</td>
<td>green</td>
<td></td>
</tr>
</tbody>
</table>

Note: Rain Garden Perennials to be planted in clumps of 9 plants.

Planting Notes

1. All nursery stock shall comply with the latest standards of the American Nursery & Landscape Association with regard to grading and quality.

2. All plants shall conform to the measurements specified, except that plants larger than those specified may be used if approved by the Landscape Architect.

3. All plants shall be nursery grown in accordance with good horticultural practices and shall be grown under climate conditions similar to those in the project locality for at least two years.

4. Balled and burlapped plants (BAB) shall be moved with the root system as solid units; root balls shall be tightly wrapped with burlap. Container-grown plants shall not be removed from container prior to the time of installation; root system shall be tightly set in container.

5. Planting soil mix shall consist of seven (7) parts loam and one (1) part peat moss by volume, with a pH value of 5.5 to 6.5.
Greenfield—Chapman & Davis Parking Lot

BEFORE

DURING

AFTER
CHAPMAN LOT BIOSWALE CONSTRUCTION DETAILS

BIOSWALE ELEMENTS

1. Curb step placed to allow at least 10-inch openings, allowing water flowing down the paved slope to enter the bioswale filtration area.
2. Dense, planted herbaceous vegetation with deep root systems slows and filters runoff after storm events.
3. Forebay: a landscaped rain garden that absorbs rainwater, allowing stormwater to infiltrate into the ground.
4. A perforated drain pipe channels water to the municipal drain system.
5. Small dam blocks water from flowing out of the bioswale during large storm events.
6. A raised storm drain prevents flooding during storm events by taking in stormwater overflow when soils become full.

STORM DRAIN DETAIL

7. Drains planted in the bioswale provide shade for parked cars, help to stabilize the soil, and filter water with extensive root systems.
8. Concrete footings provide a stable foundation for the future solar array system.

TREE PLANTING DETAIL

9. Trees planted in 10" bioswales as part of the first phase of the Chapman Lot installation.
CHAPMAN STREET PARKING LOT

Located one block north of Main Street, this sloping, two-acre expanse of exposed asphalt is slated for upcoming renovation. Relying more than helpful, a re-design has the potential to greatly improve the lot’s attractiveness, usability, and contributions to environmental health.

DRAINAGE & SLOPES
- Slopes range from 2% to 7%.
- Stormwater drains to the buried Maple Brook and then the Green River with no filtration.
- A retaining wall marks the northern border of the property.

IMPLICATIONS
- Steep slopes in the northern half of the lot present a challenge to accessibility and a potential hazard in winter.
- Nutated water may affect water quality in the river.
- The high retaining wall could constrain potential grading changes and infiltration.

VEGETATION & SHADE
- Two trees at the northern end cast no shade on the property.
- Two maple trees cast a small amount of shade on the lot but are in poor health.
- The lot does not meet current town requirements of one tree per ten parking spaces.

IMPLICATIONS
- Parking lot offers little protection from the sun and contributes to urban heat island effect.
- If the amount of parking stays the same, ten trees more slow snow melt, are required to comply with town regulations.
- Increasing shade could improve ecological health and pedestrian comfort.

ACCESS & CIRCULATION
- Two entrances off Chapman and Davis Streets.
- Parking lot is used as a cut through between the two streets.
- No clear pedestrian path within parking lot.

IMPLICATIONS
- Cars cutting through lot at speed potentially dangerous to pedestrians.
In addition to classrooms, labs, a planetarium, and a 225-seat Socratic lecture hall, the building contains a three-story Science Commons. This dynamic, multi-use space features a map of the stars and a skylight whose shape was inspired by an analemma, a curve that represents the movement of celestial bodies.

Mediating a steep grade change, the building has brick walls that appear to fold into the site’s existing contour lines. Green roofs and terraces further integrate the architecture into the landscape. A low-energy mechanical system and a high-performance building envelope helped the project earn LEED® Gold certification.

*Photos courtesy SOM*
Awards

- 2005 Bronze Medal: Buildings over 10,000 Square Feet Miami Architectural Bienal
- 2005 Design Award: ProjectAIA - New York City Chapter
- 2002 American Architecture Award - Chicago Athenaeum
Turners Falls—Unity Park Rain Gardens

Polluted storm water runoff, which can contain oil, grease, metals and sediment, poses a serious threat to our ponds, streams, and rivers. LID is an innovative approach to managing storm water that uses a variety of small-scale landscape features to keep and treat stormwater on site. A guiding principal of LID is that, once pollutants are removed, stormwater is a resource, not a nuisance.

On Unity Park these landscape features were designed not only to be pleasing to the eye, but also to manage stormwater runoff by:

- Keeping stormwater on site
- Removing pollutants from stormwater
- Recharging the groundwater

Another benefit is the use of native plants for wildlife habitat. Below and right you can find LID technique used at Unity Park.

How is Unity Park helping to protect the Connecticut River?

With the use of Low Impact Development (LID) Technique
Orange—Riverfront Park

B E F O R E

A F T E R
More than a Riverfront Park...
This recreation area is helping to protect and restore the Millers River

How? With the use of Low Impact Development (LID) techniques

- Bioretention Swales
- Rain Gardens
- Rain Barrels
- Cisterns
- Porous Pavement
- Gravel Driveway
- Lawn Rings

Pitted stormwater runoff, which can contain oil, grease, metals and sediment, poses a serious threat to our plants, streams, and rivers. LID is an innovative approach to managing stormwater that uses a variety of small-scale landscape features to keep and treat stormwater on-site. A guiding principle of LID is that, once pollutants are removed, stormwater is a resource, not a nuisance.

At first glance, the LID techniques installed at Riverfront Park may appear to be serving only one function—to enhance the appearance of the site. However, these landscape features were designed not only to be pleasing to the eye, but also to manage stormwater runoff by:

- Keeping stormwater on-site
- Removing pollutants from stormwater
- Recharging the groundwater

The LID features also provide other benefits such as:

- Native plants for wildlife habitat
- A supply of water for lawn and garden irrigation

The LID techniques used at Riverfront Park are shown in the plan below and the photographs to the right.