INNOVATION THRU GREEN INFRASTRUCTURE
GREEN INFRASTRUCTURE - COMPLETE STREETS

ENVIRONMENTAL, ECOLOGICAL, SOCIAL AND ECONOMIC BENEFITS

WESTERN AVENUE, CAMBRIDGE, MA
BOSTON ARCHITECTURAL COLLEGE
GREEN ALLEY
BOSTON, MA
Combined Sewer Overflow

Stormwater flows to a Combined Sewer System, overflowing to the Charles River during large storm events.
Centerpiece of BAC’s Urban Sustainability Initiative
Alley #444 Today
Stormwater System

• Direct stormwater into the ground vs. piping into combined sewer system

• Direct 10,700 SF of roof runoff to drywell and a gravel-filled drainage layer beneath the alley and into the ground

• Absorb rainwater through 4,000 SF permeable pavement on the alley surface
Porous Paving System Designs

Porous Pavers

Porous Asphalt
Porous Paving Design

Sub-base & Underdrain
Porous Paving
Environmental Benefits - Pollutant Removal

- Spreadsheet Tool for Estimating Pollutant Load
- Developed by EPA to estimate pollutant loading
- Calculates nutrient and sediment loads based on land use and rainfall data

<table>
<thead>
<tr>
<th>STEPL Analysis Combined Total</th>
<th>Nitrogen Load (lb/year)</th>
<th>Phosphorous Load (lb/year)</th>
<th>Sediment Load (tons/year)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Existing Conditions</strong></td>
<td>6.06</td>
<td>0.79</td>
<td>0.1323</td>
</tr>
<tr>
<td><strong>Proposed Conditions</strong></td>
<td>1.84</td>
<td>0.27</td>
<td>0.022</td>
</tr>
<tr>
<td><strong>Amount Removed</strong></td>
<td>4.22</td>
<td>0.52</td>
<td>0.1103</td>
</tr>
<tr>
<td><strong>Percent Reduction</strong></td>
<td>70%</td>
<td>66%</td>
<td>83%</td>
</tr>
</tbody>
</table>
Environmental Benefits – Storm Water Management

Estimated Storm water Runoff Mitigation - reducing flow to combined sewer

<table>
<thead>
<tr>
<th>Storm Event</th>
<th>1-inch</th>
<th>2-year</th>
<th>10-year</th>
<th>25-year</th>
<th>100-year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Existing</td>
<td>0.41</td>
<td>1.42</td>
<td>2.05</td>
<td>2.46</td>
<td>2.96</td>
</tr>
<tr>
<td>Proposed</td>
<td>0.00</td>
<td>1.00</td>
<td>1.71</td>
<td>2.11</td>
<td>2.51</td>
</tr>
<tr>
<td>% Change</td>
<td>-100.00%</td>
<td>-29.58%</td>
<td>-16.59%</td>
<td>-14.23%</td>
<td>-15.20%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Storm Event</th>
<th>1-inch</th>
<th>2-year</th>
<th>10-year</th>
<th>25-year</th>
<th>100-year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Existing</td>
<td>0.028</td>
<td>0.105</td>
<td>0.153</td>
<td>0.184</td>
<td>0.222</td>
</tr>
<tr>
<td>Proposed</td>
<td>0.000</td>
<td>0.026</td>
<td>0.052</td>
<td>0.07</td>
<td>0.094</td>
</tr>
<tr>
<td>% Change</td>
<td>-100.00%</td>
<td>-75.24%</td>
<td>-66.01%</td>
<td>-61.96%</td>
<td>-57.66%</td>
</tr>
</tbody>
</table>
Prior City Hall Plaza
Project Site
Physical Constraints:
Green Line Station & Tunnels Below

- Green Line Station & Tunnels Below
- City Hall
- Parking Garage
- Proposed Headhouse
- Green Line Tunnels
- Blue Line Tunnel Below Green Line
- Abandoned Tunnel
- GL Platform Below
- Emergency Egress at Surface
- City Hall Parking Garage
Proposed Headhouse Project Limits Emergency Egress - Only Headhouse
Environmental Benefits

- Invest in Impactful Healthy Tree Planting Infrastructure
- Reduce Heat Island Effect through Tree Canopy
- Reduce Impervious Surface with Permeable Pavers
- Increase Groundwater Infiltration through Stormwater Capture and Redirected Roof Runoff
- Decrease Stormwater Runoff
Reduced roadway width

New gateway for the Modernist John F. Kennedy Federal Building

Tree planting in an open jointed permeable paving system captures and infiltrates stormwater runoff

Tree bosque's in permeable paving provide shaded gathering spaces and reduce the heat island effect

New MBTA Headhouse - roof rainwater is captured to supplement irrigation of the tree bosques

Sloped walks replace existing stairs providing accessible routes on City Hall Plaza
SOUTH STREET LANDING P3 DEVELOPMENT, PROVIDENCE, RI
Questions ?