# **INNOVATION THRU GREEN INFRASTRUCTURE**

ACEC/MA Private Sector Comm Meeting – December 15, 2020



# **GREEN INFRASTRUCTURE - COMPLETE STREETS**

# ENVIRONMENTAL, ECOLOGICAL, SOCIAL AND ECONOMIC BENEFITS

# WESTERN AVENUE, CAMBRIDGE, MA









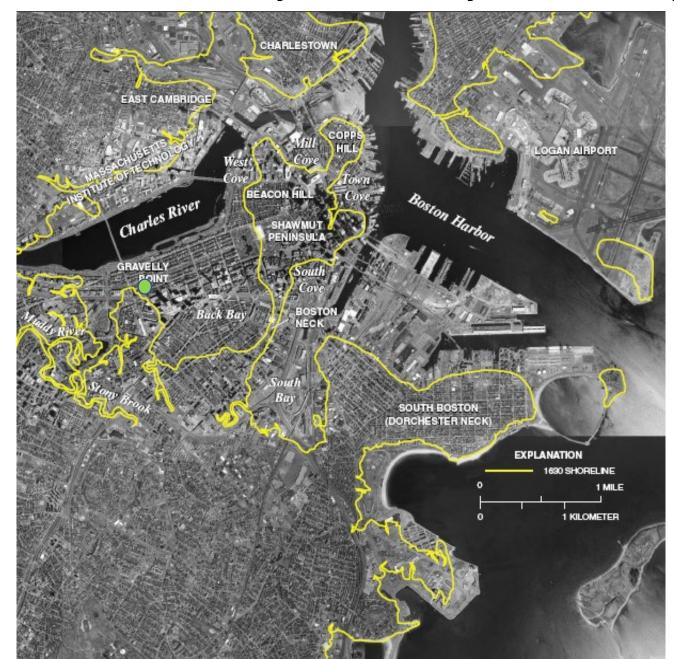




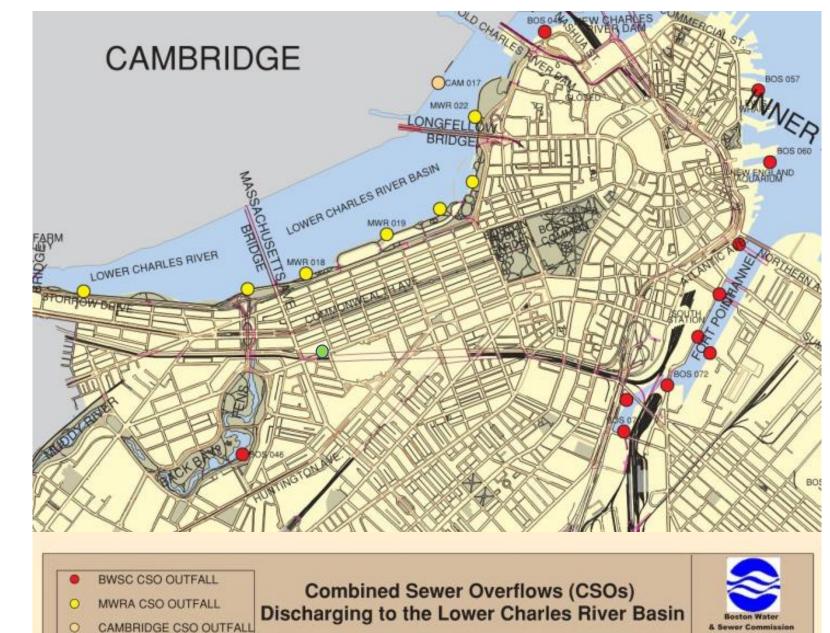
# BOSTON ARCHITECTURAL COLLEGE GREEN ALLEY BOSTON, MA



## Boston & Back Bay Yesterday and Today



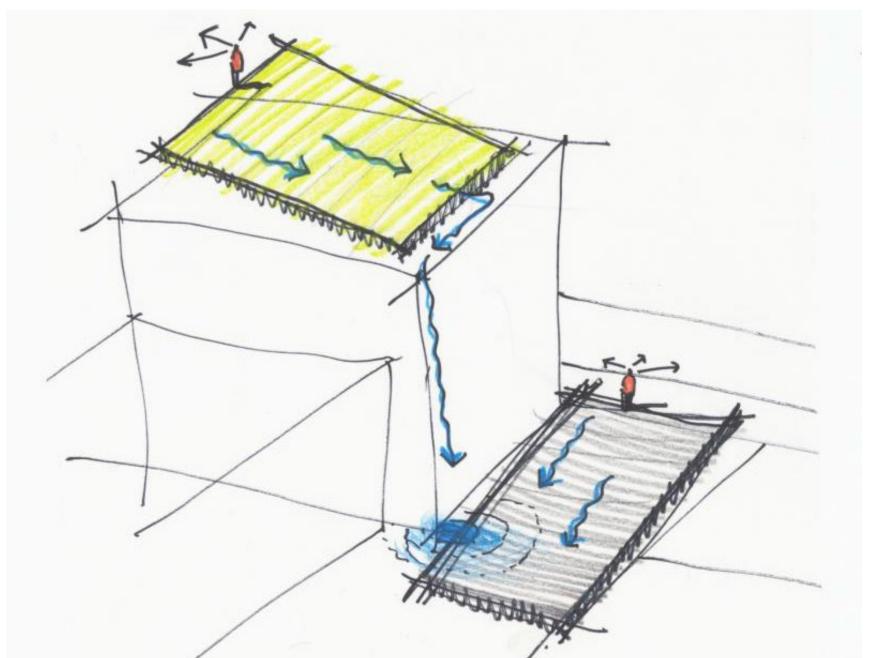
#### **Combined Sewer Overflow**



980 Harrison Avenue Boston, MA 02119

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 Before



## 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

#### 361,400 gallons annual amount of rainfall

annual amount of rainfall coveyed to groundwater recharge from greenroof and green alley

83% reduction annual rainfall runoff conveyed to storm drain

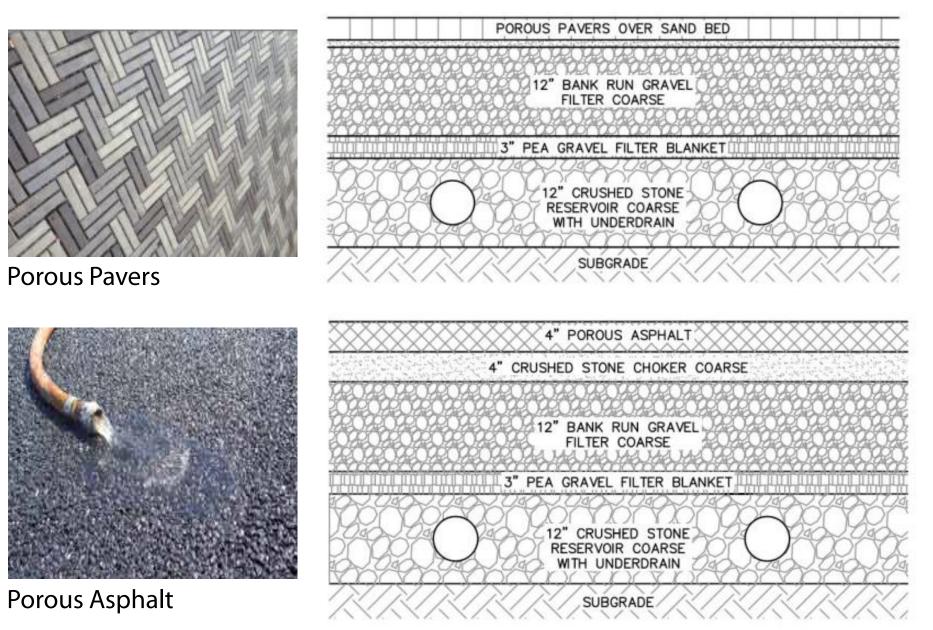
ROOF DRAIN

2" COMBINED

PERMEABLE PAVE SETTING BED

O" ACRUSHED

#### Porous Paving System Designs



## Porous Paving Design

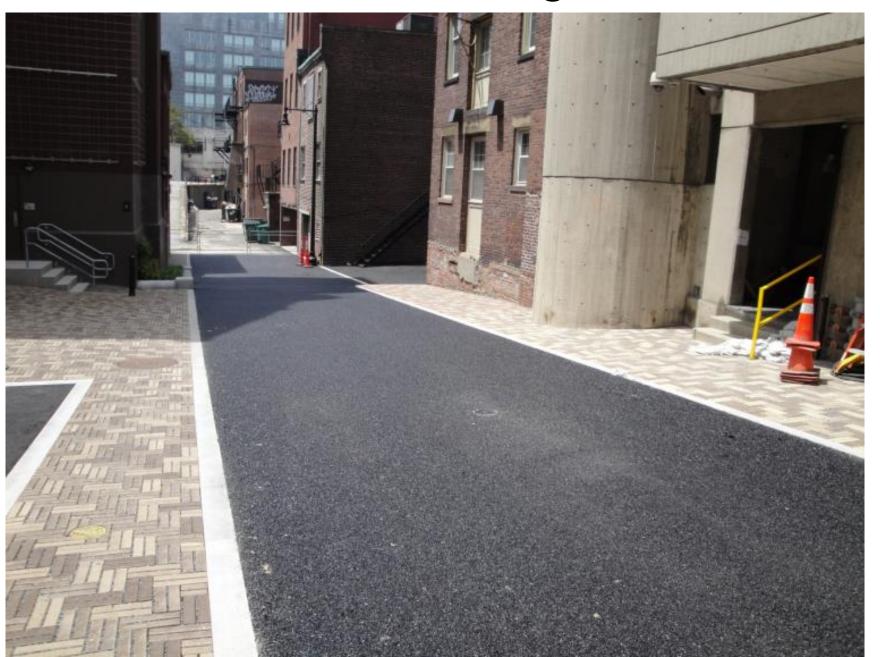


Sub-base & Underdrain





# **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

STEPL Analysis Combined Total						
	Nitrogen Load (lb/year)	Phosphorous Load (lb/year)	Sediment Load (tons/year)			
Existing Conditions	6.06	0.79	0.1323			
Proposed Conditions	1.84	0.27	0.022			
Amount Removed	4.22	0.52	0.1103			
Percent Reduction	70%	66%	83%			

#### Environmental Benefits – Storm Water Management

Estimated Storm water Runoff Mitigation - reducing flow to combined sewer

Runoff Rates (cfs)						
Storm Event	1-inch	2-year	10-year	25-year	100-year	
Existing	0.41	1.42	2.05	2.46	2.96	
Proposed	0.00	1.00	1.71	2.11	2.51	
% Change	-100.00%	-29.58%	-16.59%	-14.23%	-15.20%	
Runoff Volumes (acre-feet)						
Storm Event	1-inch	2-year	10-year	25-year	100-year	
Existing	0.028	0.105	0.153	0.184	0.222	
Proposed	0.000	0.026	0.052	0.07	0.094	
% Change	-100.00%	-75.24%	-66.01%	-61.96%	-57.66%	

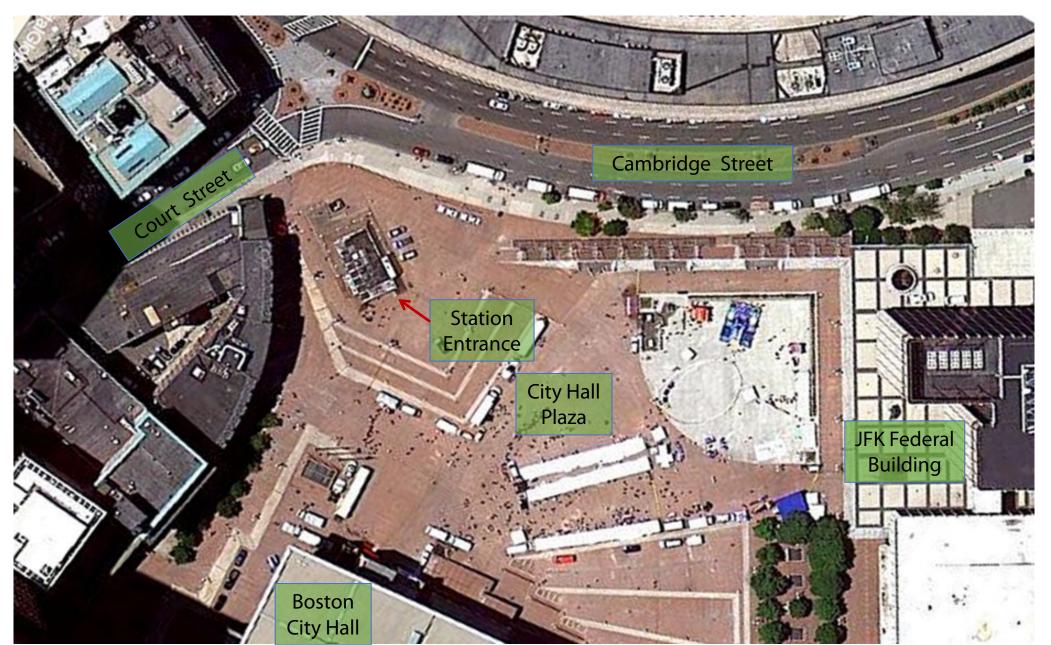
# MBTA GOVERNMENT CENTER PLAZA BOSTON, MA

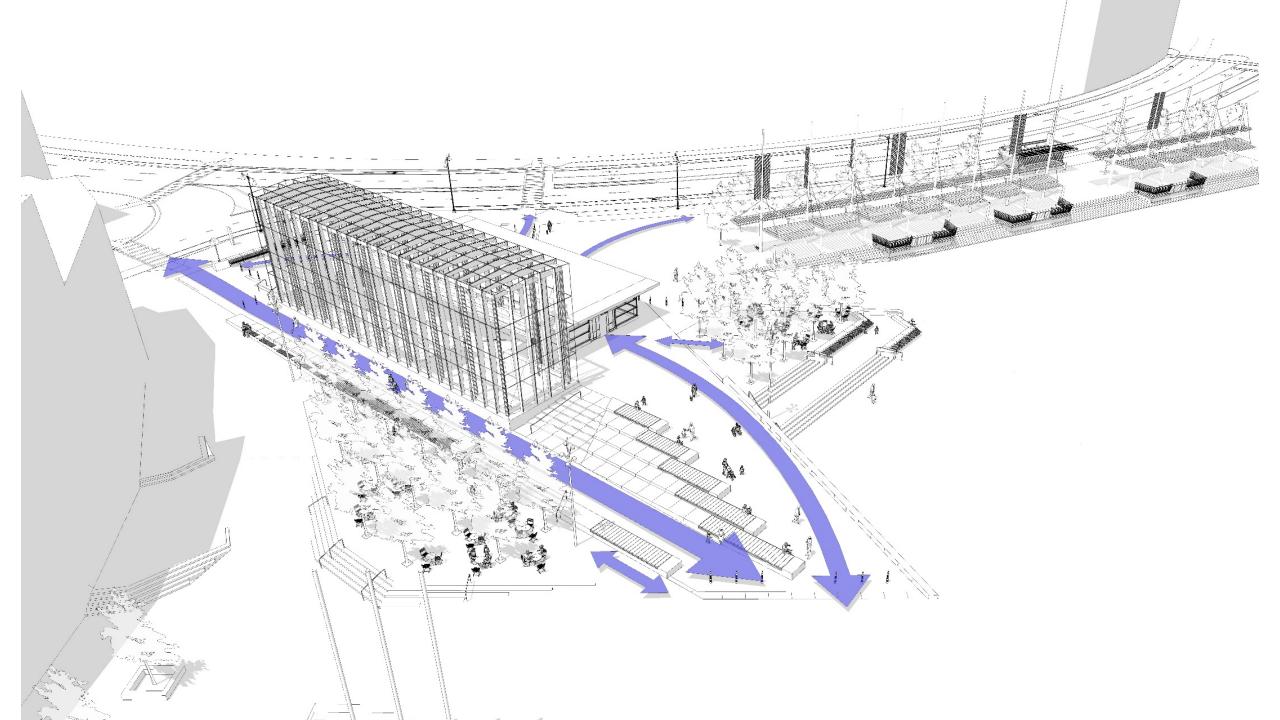


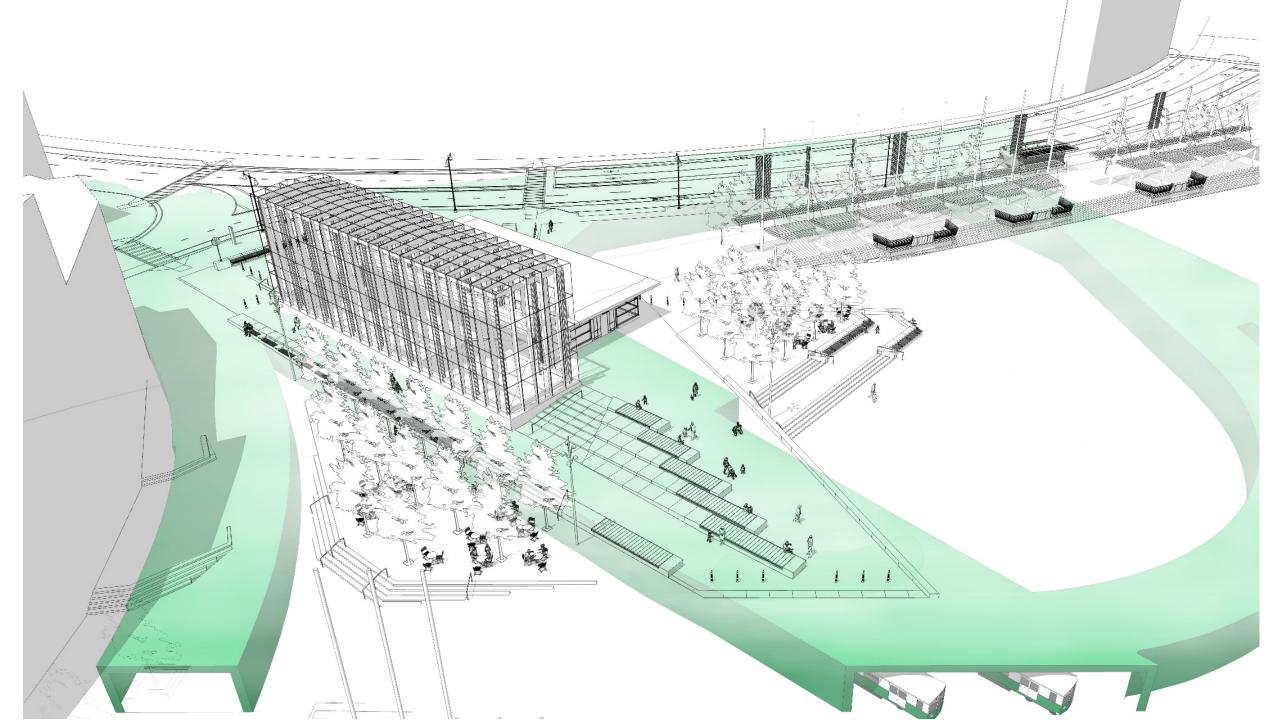
## Prior City Hall Plaza

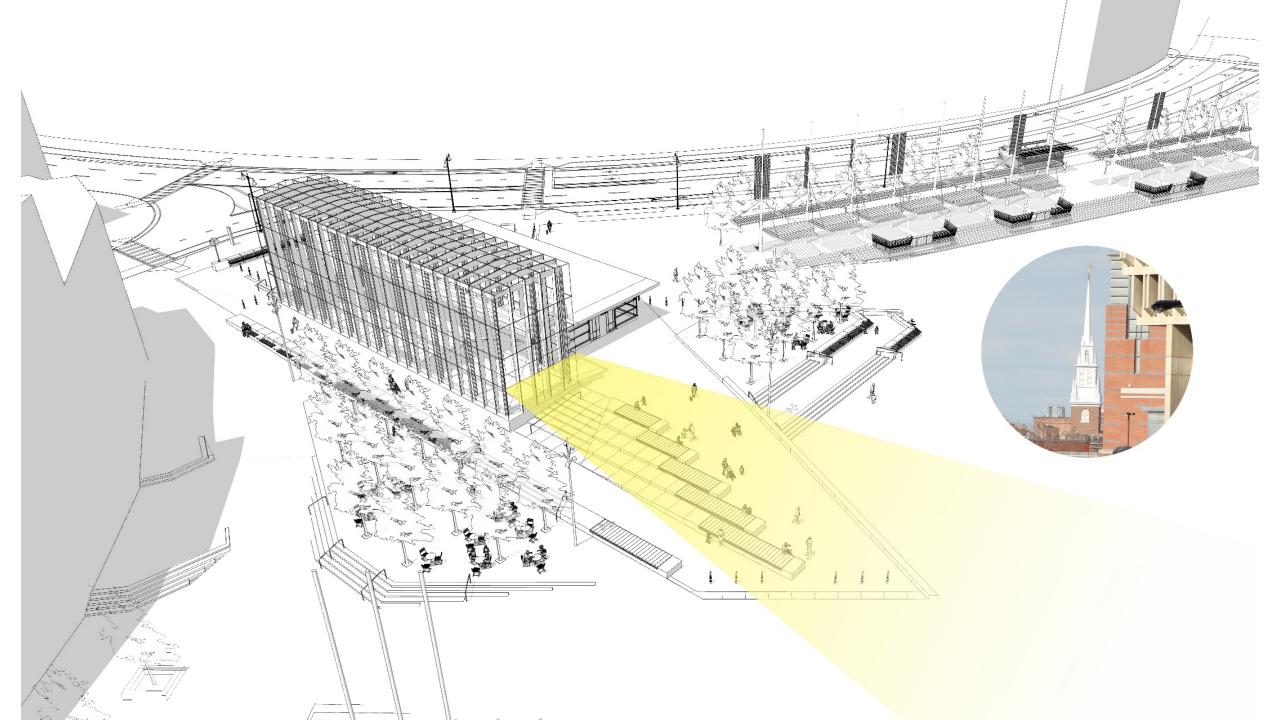


## **Project Site**

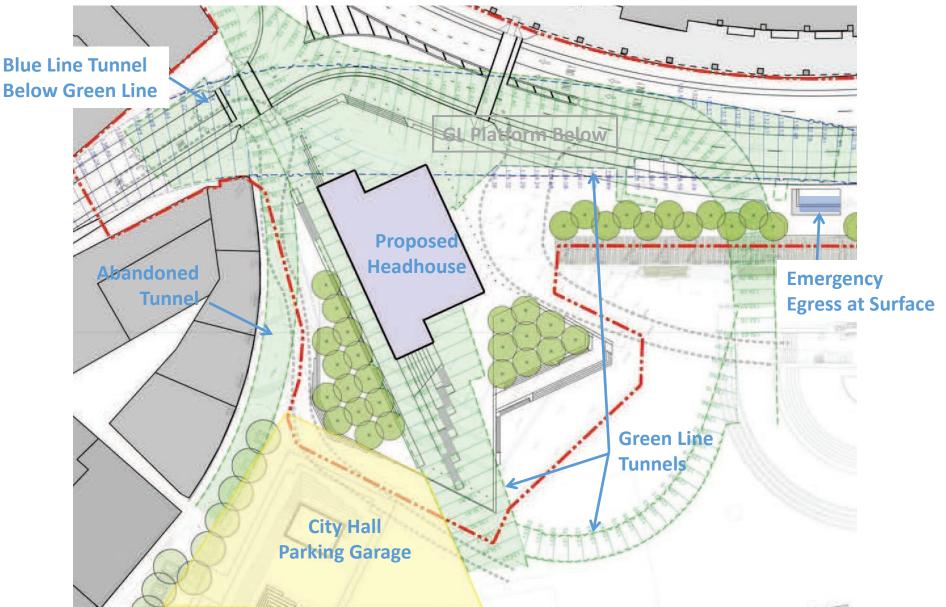




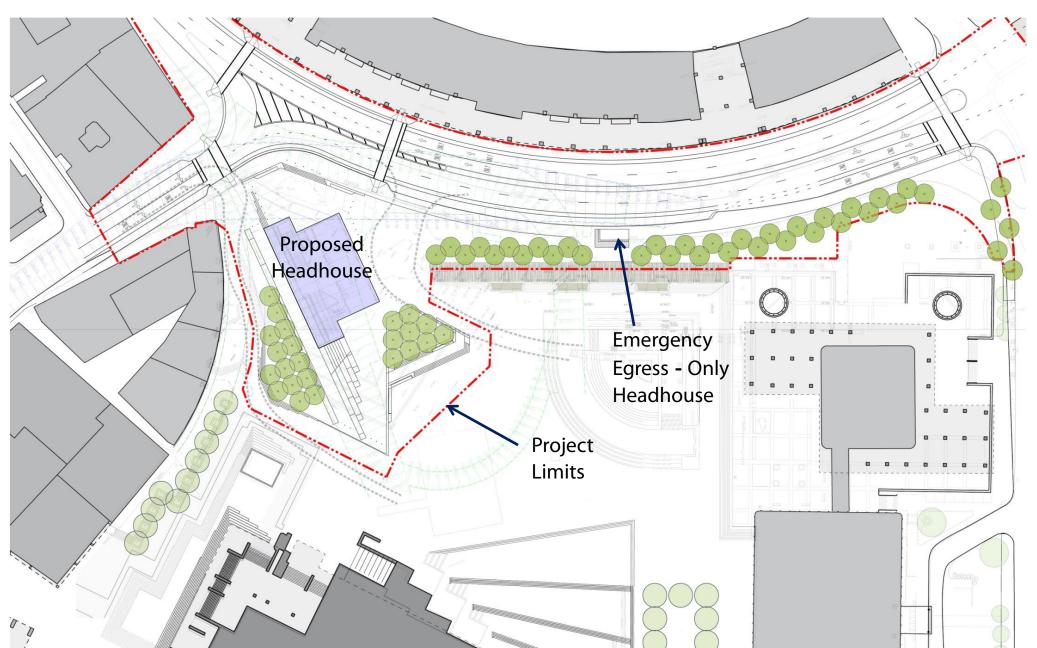




#### Physical Constraints: Green Line Station & Tunnels Below



#### Site Plan



#### **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 -----

TREE BOSQUE'S IN PERMEABLE PAVING PROVIDE SHADED GATHERING SPACES AND REDUCE THE HEAT ISLAND EFFECT

UNDER STREET STREETS

TRADUCT.

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







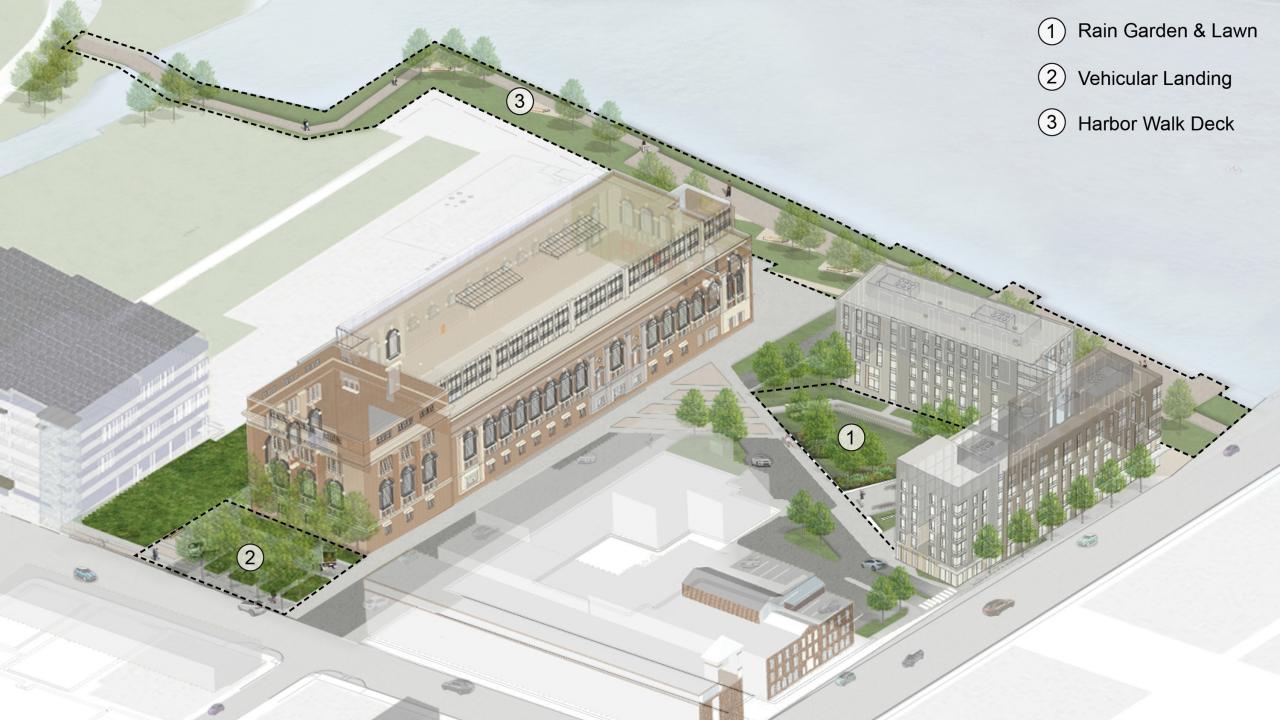




# SOUTH STREET LANDING P3 DEVELOPMENT, PROVIDENCE, RI



















# **Questions** ?

