10.09.2020

I-90 Allston Interchange

Riverfront Analysis + Design Exploration

cbt | Perkins&Will

Acknowledgements

This study was a collaborative effort by CBT and Perkins&Will to synthesize stakeholder concerns, and analyze the environmental and climate change impacts along the diverse riverfront edge conditions. The process involved stakeholder input from a diverse group of advocacy, neighborhood and community groups. Charles River Conservancy, Charles River Watershed Association, Conservation Law Foundation, and A Better City provided critical input, data and support in developing a series of strategies that outlines a regenerative approach to creating a resilient riverfront.

We thank our stakeholders for their valuable input, advocacy and support.

- Allston Civic Association
- Boston Cyclists Union
- Boston Society for Architecture
- Charles River Conservancy
- Conservation Law Foundation
- A Better City
- Livable Streets
- MassBike
- Walk Boston
- Weston & Sampson
- Allston Brighton Community Development Corporation
- Allston Village Main Streets
- Boston Society of Landscape Architects
- Charles River Watershed Association
- 495/MetroWest Corridor Partnership

Building on years of great advocacy…

BSA Beacon Yards Charette | Sep 2014

A Better City At-Grade | Dec 2014
(see attached), renderings by NBBJ (early 2018)

Beacon Yards: DeNovo Urbanism | Dec 2014
By Northeastern School of Architecture / Tim Love

Elevated Grand Junction by Ari Ofsevit | Jul 2015

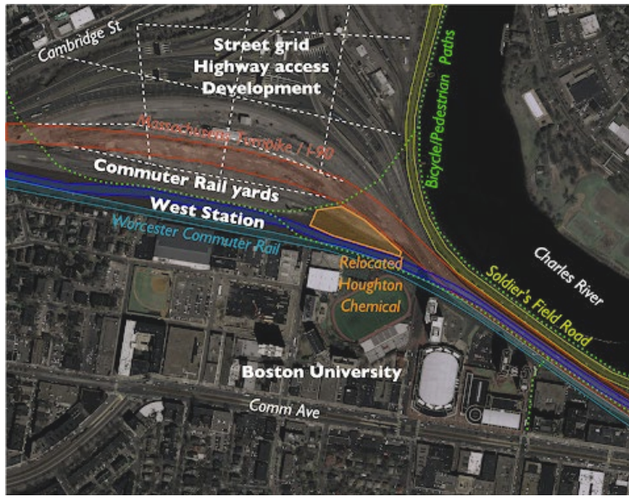
I90 Allston Placemaking Study | Dec 2015 - Oct 2016
By The Cecil Group/Harriman with Nelson Nygaard and Stantec
(funded by MassDOT with oversight by MassDOT/Harvard/BPDA)

River Remarkable Work Group | starting in 2016
John Shields, Skip Burck, Frank M. Costantino, etc

Unchoke the Throat design | Feb 2018
work by Sasaki for WalkBoston and Charles River Conservancy

BSA Allston Esplanade charette | Apr 2019

Riverfront Analysis + Design Exploration | Sep 2020
By CBT / Perkins + Will



Goals

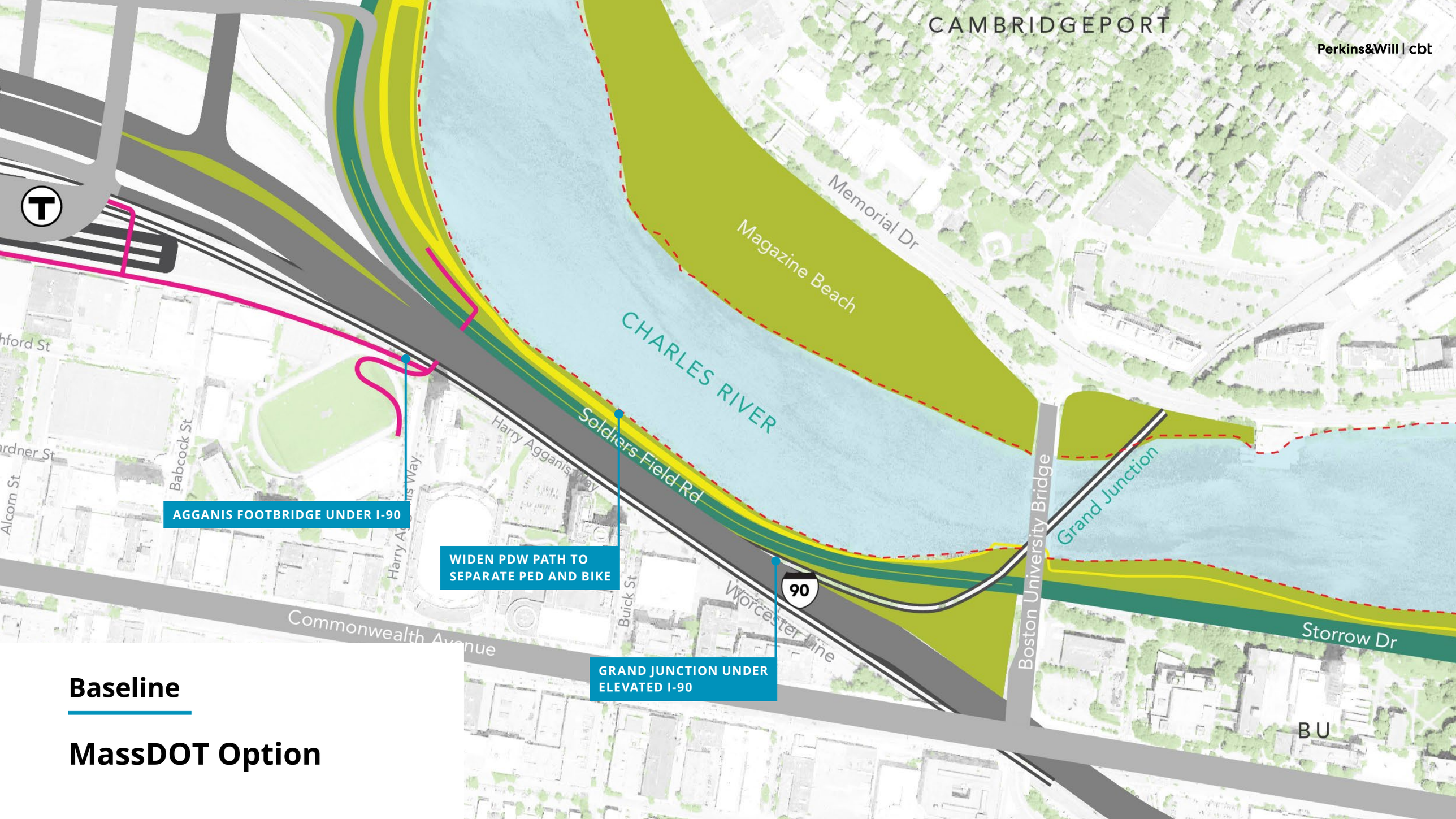
Establish a cohesive, pragmatic and variable strategy that responds to challenge along the length of the corridor

Effectively connect PDW to the urban system and neighborhoods
BU Bridge/Aggannis/ Grand Junction/ Cambridge - N/Harvard Street

Balance the transportation needs with multiple variables including pedestrian, bicycles, river users, ecology and aquatic life

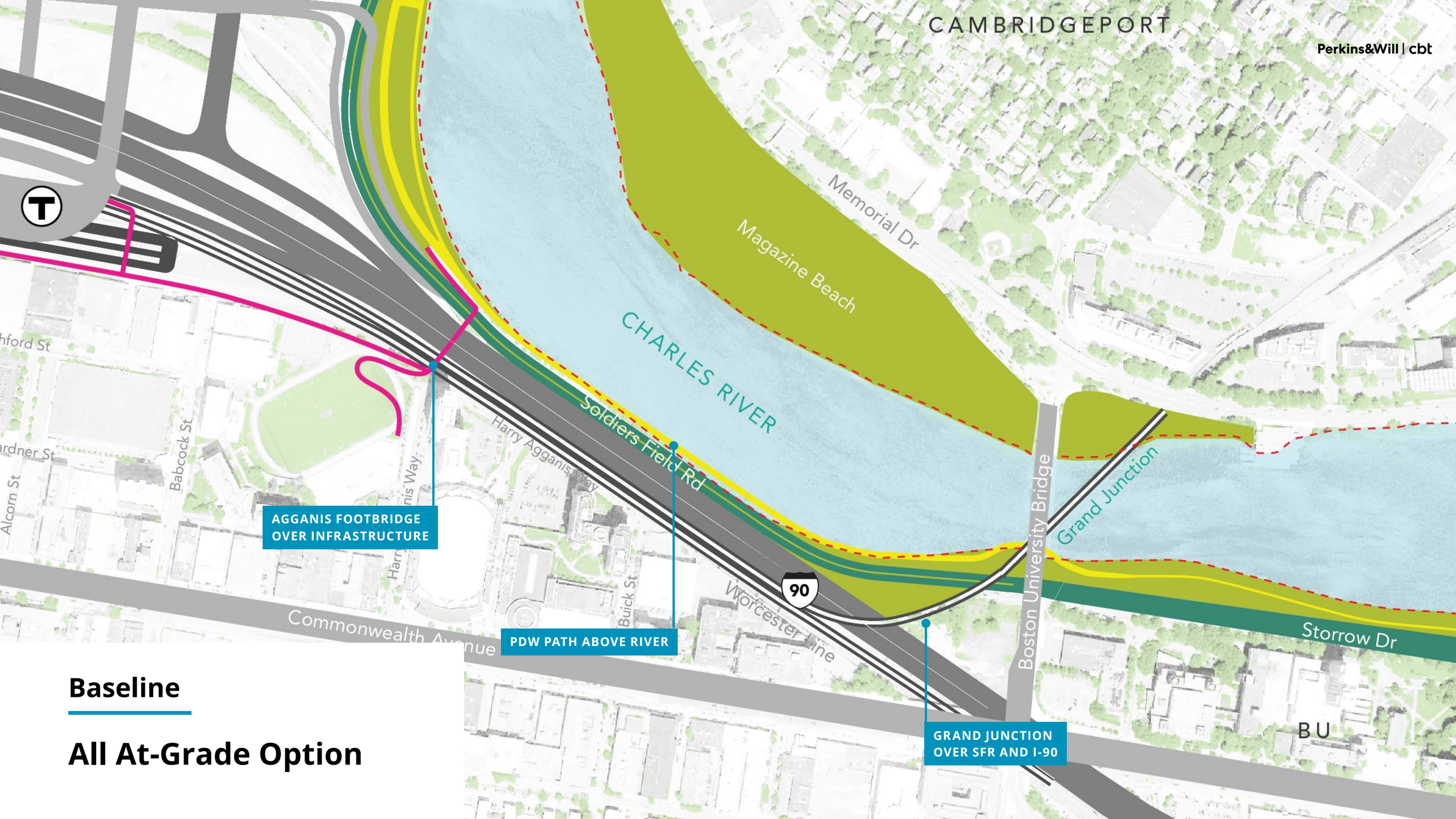
Baseline for this study

MassDOT Option + **All At-grade Option**



Baseline

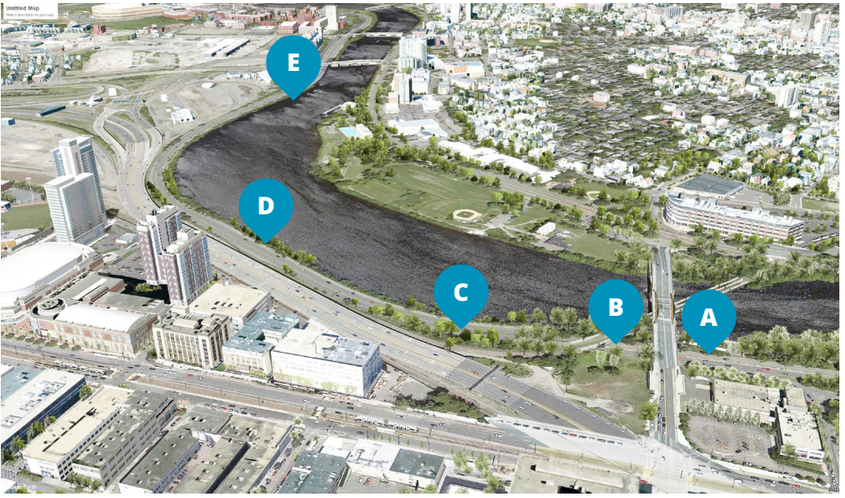
MassDOT Option



Baseline

All At-Grade Option

Existing Conditions

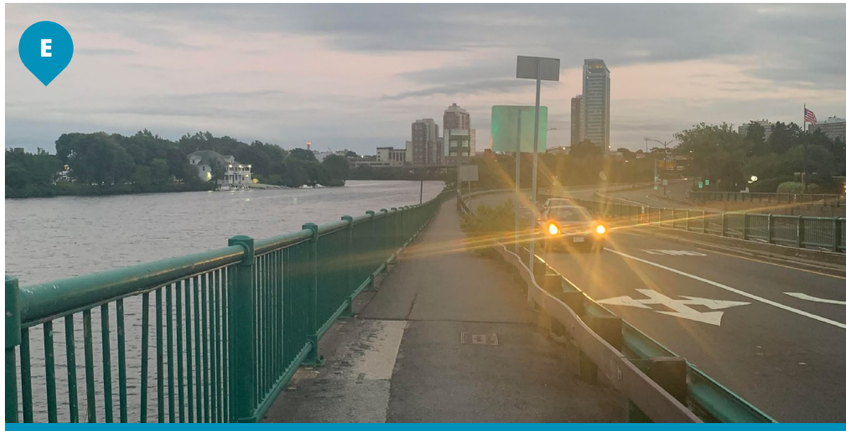


Disconnected from the city
Bike and ped cannot connect back to the city through BU Bridge

Multi-model Transportation
BU Bridge, Grand Junction and the PDW path stack up each other

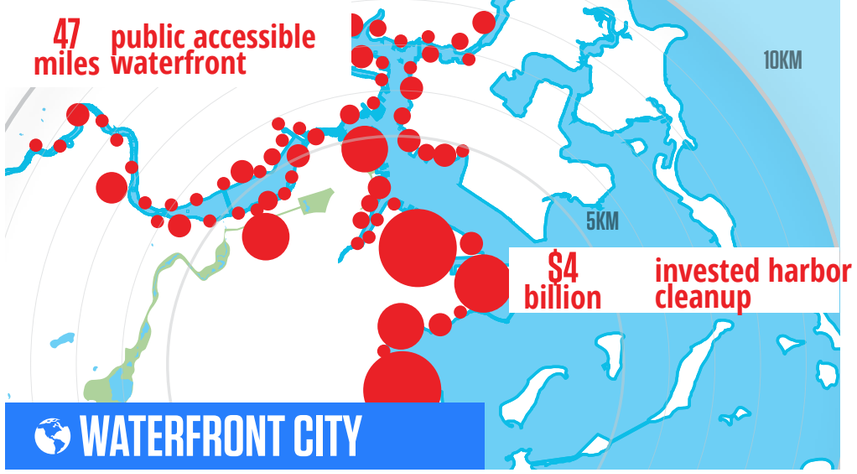
PDW Path Adjacent to SFR
Narrow path (no separation of peds and cyclists) with inadequate buffer from the road

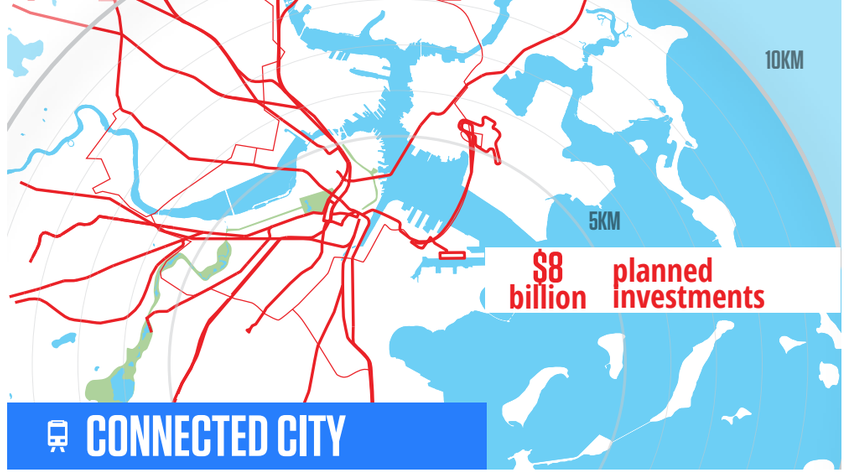
Lookout
There are scattered lookout where people can stop

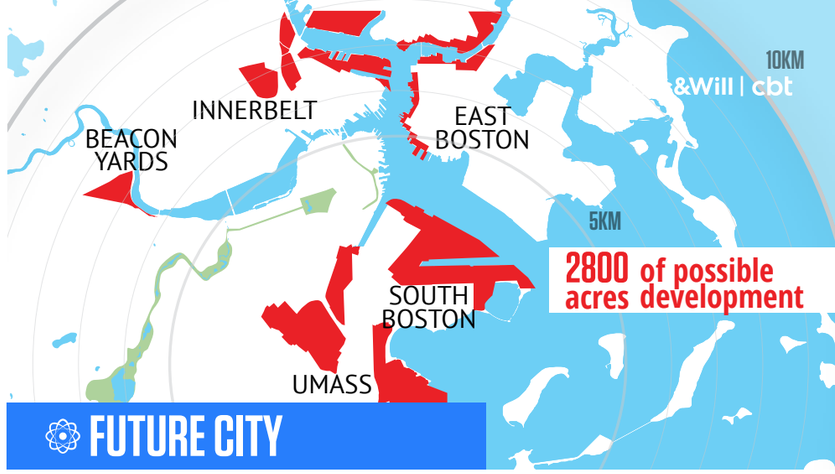


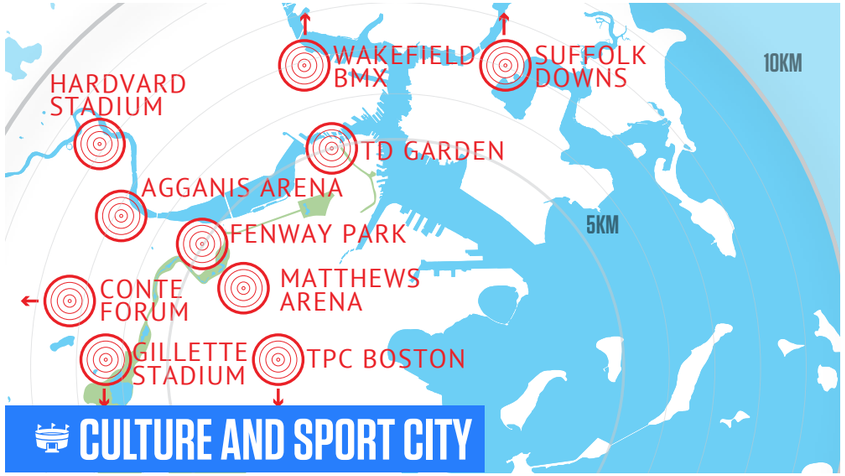
Hard Edge Close to Western Ave
River edge becomes quay walls as it gets closer to Western Ave

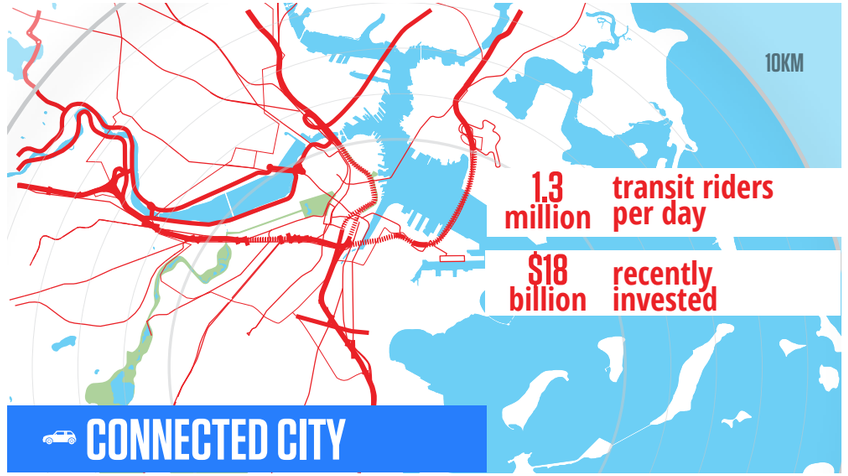
Nature of Opportunity

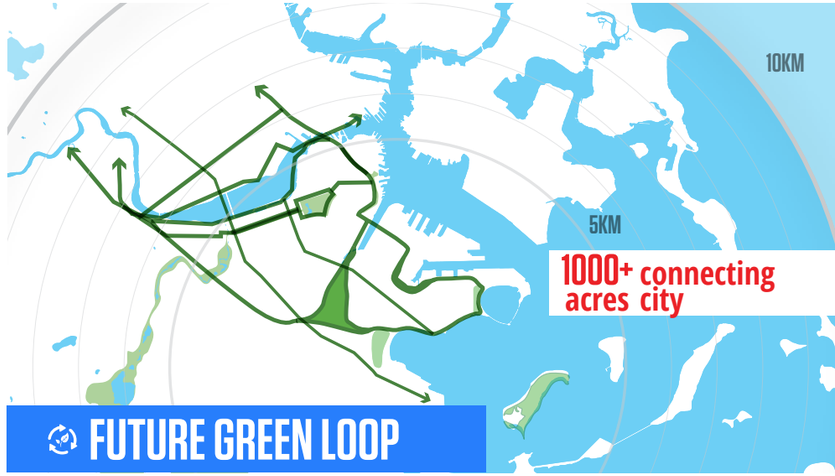

47 miles public accessible waterfront
10KM
5KM
$4 billion invested harbor cleanup
WATERFRONT CITY

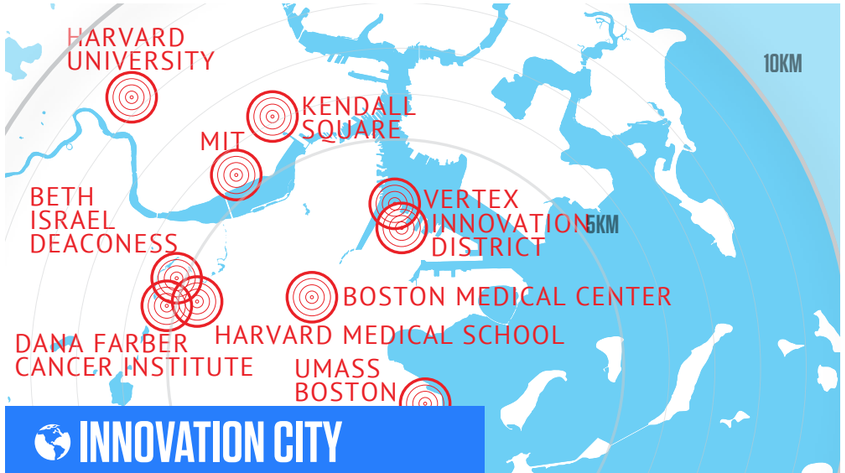

10KM
5KM
$8 billion planned investments
CONNECTED CITY

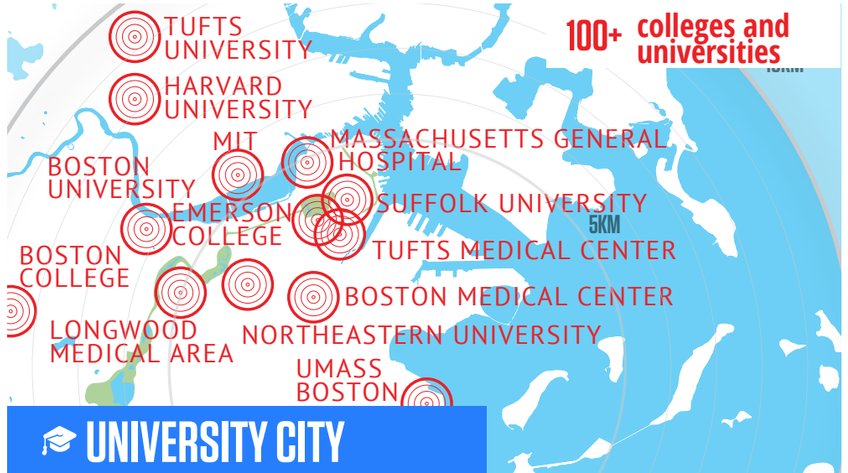

INNERBELT
BEACON YARDS
EAST BOSTON
SOUTH BOSTON
UMASS
10KM
5KM
2800 of possible acres development
FUTURE CITY

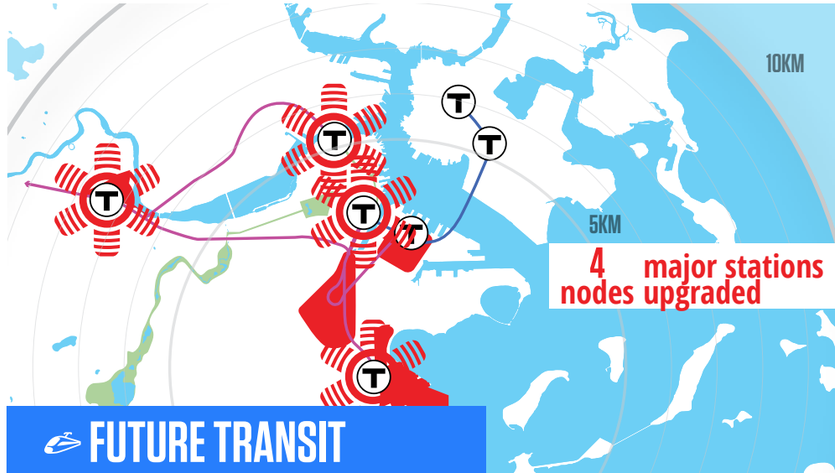

WAKEFIELD BMX
SUFFOLK DOWNS
HARDVARD STADIUM
TD GARDEN
AGGANIS ARENA
FENWAY PARK
CONTE FORUM
MATTHEWS ARENA
GILLETTE STADIUM
TPC BOSTON
10KM
5KM
CULTURE AND SPORT CITY


10KM
5KM
1.3 million transit riders per day
$18 billion recently invested
CONNECTED CITY


10KM
5KM
1000+ connecting acres city
FUTURE GREEN LOOP


HARVARD UNIVERSITY
KENDALL SQUARE
MIT
BETH ISRAEL DEACONESS
VERTEX INNOVATION DISTRICT
BOSTON MEDICAL CENTER
HARVARD MEDICAL SCHOOL
DANA FARBER CANCER INSTITUTE
UMASS BOSTON
10KM
5KM
INNOVATION CITY


TUFTS UNIVERSITY
HARVARD UNIVERSITY
MIT
BOSTON UNIVERSITY
MASSACHUSETTS GENERAL HOSPITAL
EMERSON COLLEGE
SUFFOLK UNIVERSITY
TUFTS MEDICAL CENTER
BOSTON COLLEGE
BOSTON MEDICAL CENTER
LONGWOOD MEDICAL AREA
NORTHEASTERN UNIVERSITY
UMASS BOSTON
100+ colleges and universities
5KM
UNIVERSITY CITY

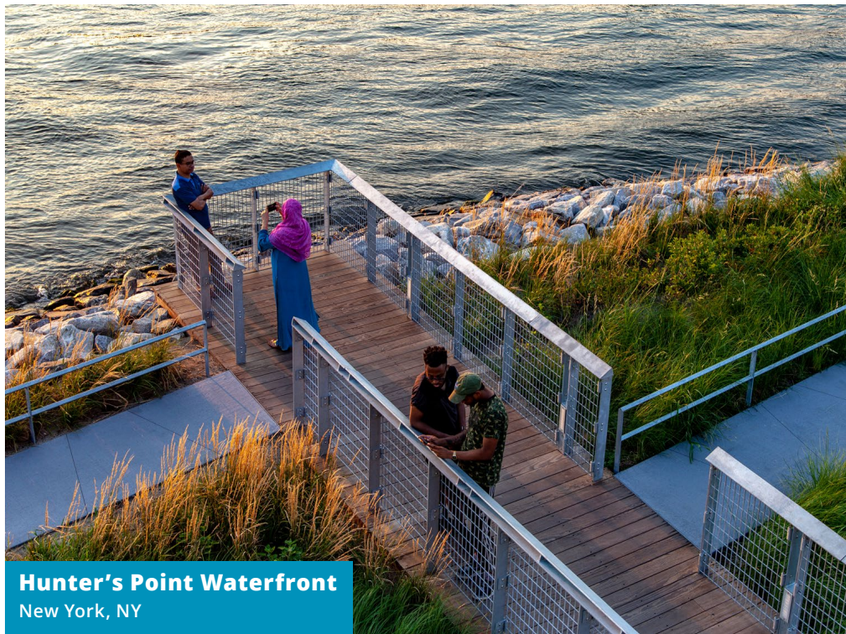

10KM
5KM
4 major stations nodes upgraded
FUTURE TRANSIT

Complete the challenging link along Charles River

Restore the Rivers's Edge Ecology

Hunter's Point Waterfront
New York, NY

Infra-space 1
Boston, MA



Hunter's Point Waterfront
New York, NY

Connect to the City

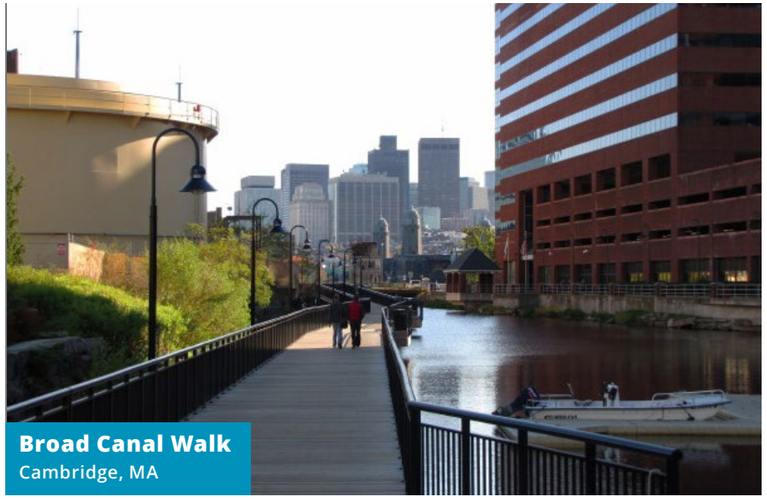
Charlesgate
Boston, MA

Charlesgate
Boston, MA

Seattle Waterfront
Seattle, WA

Build 21st Century Infrastructure

Liberty Bridge
Greenville, SC



Broad Canal Walk
Cambridge, MA

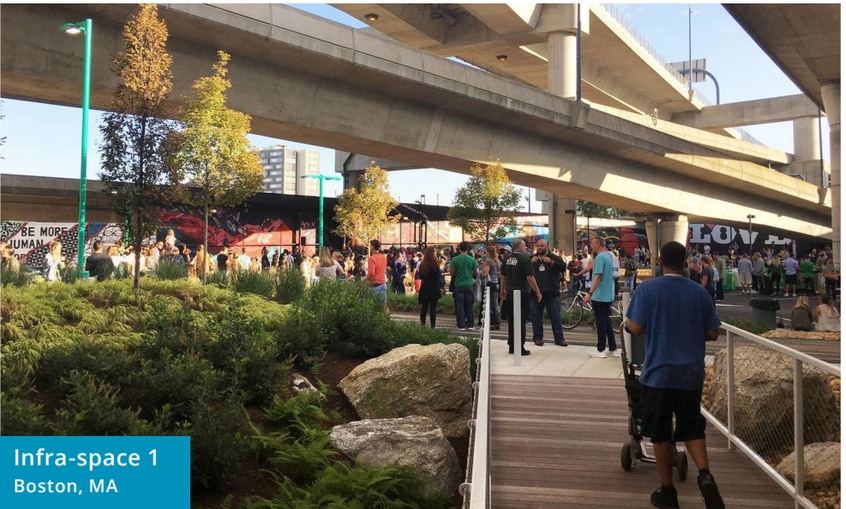
Lakefront Trail
Chicago, IL

East Bank Esplanade
Portland, OR

East River Greenway Proposal
New York, NY

Transportation and Ecology can co-exist

Seattle Waterfront
Seattle, WA



Infra-space 1
Boston, MA

Restoring River's Edge Ecology

Analysis

- Evaluate existing natural systems
- Challenges of existing infrastructure systems
- Impacts of climate change
- Diverse edge conditions

Strategies

- Tool kit of natural strategies
- Case studies

Exploration

- Framework of guiding principles
- Propose natural strategies for diverse edge conditions
- Framework for connectivity
- Establish ecosystems that promote biodiversity and enhance ecology

Analysis

Plans

- Understand environmental issues and evaluate existing natural systems
- Challenges and opportunities to enhance ecology and establish aquatic habitat
- Understand the limitations and challenges of existing infrastructure
- Evaluate the impact of climate change
- Analyze the diverse edge conditions and experential qualities

Analysis

Bathymetry

Challenges + Opportunities

- Identify shallow areas in the river bed to establish aquatic habitats
- Understand natural topography and drainage patterns
- Identify areas with steep slopes that casuse erosion and sedimentation in the river bed

Isobaths (f)

1 3 6 9 12 15

Analysis

Topography

Challenges + Opportunities

- Identify ideal locations to propose BMPS to mitigate stormwater and flooding issues
- The low-lying areas of Allston Landing and the Enterprise Research Campus are vulnerable to flooding
- Identify areas that are vulnerable to

flooding and projected flod elevations

Elevation (f)

0 6 12 18 24 30 36 42

Analysis

Infrastructure

Challenges + Opportunities

- Improve overall water quality to support aquatic habitat & biodiversity
- Collect and treat discharge from CSO and remove pollutants prior to entering the Charles River
- Introduce BMPS to treat stormwater runoff from roadways and reduce pollution discharge into the river

Key

- BWSC Outfalls
- CSO Outfalls
- DCR Outfalls
- Monitoring Station
- Sub-watersheds
- Underground Culverts
- Pollution + Sediment

Analysis

1% Annual Flooding

Challenges + Opportunities

- Limited storage capacity to capture and treat 1”-5” storm events
- Inland flood issues anticipated due to climate change impacts
- Address the impacts of climate change and make the river resilient by increasing flood storage along riverbanks

2070 0.1% Inundation Depth

- 0.5 - 1 ft
- 1 - 2 ft
- 2 - 3 ft
- 3 - 4 ft
- 4 - 5 ft
- 5 - 10 ft
- Stormwater Flooding

Analysis

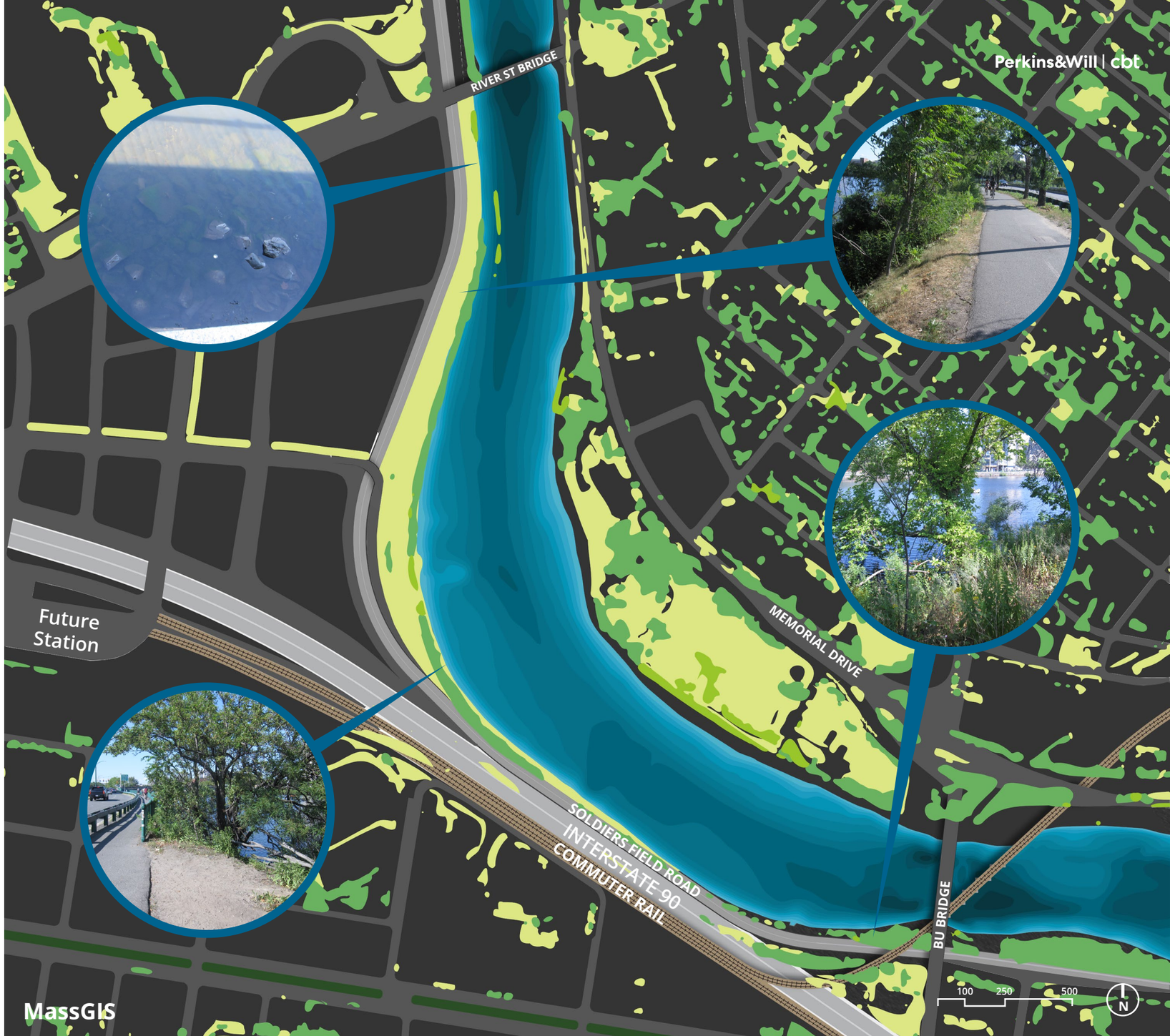
Ecology & Habitat

Challenges + Opportunities

- Limited width for trees and shrubs that prevent erosion along steep slopes
- Invasive and nuisance species such as Japanese knotweed that do not enable biodiversity
- Historically important fish habitat has been drastically reduced
- Richness of species is constrained by compacted, barren soils
- Promote a stable tree canopy to provide shade and mitigate the heat island effect

Key

- Developed Open Space
- Tree Cover
- Shrub Cover



Analysis

Surface Temperature

Challenges + Opportunities

- Roadways immediately adjacent to river intensify the heat island effect
- Additional pavement, hardscape, and buildings developed for Allston Landing will exacerbate temperatures
- Higher river temperatures can stress the ecosystem, resulting in toxic algal blooms and fish die-off

Modeled Air Temperature (°F)

July / August 2019

87 88 89 90 91 92 93 94 95 +95

Analysis

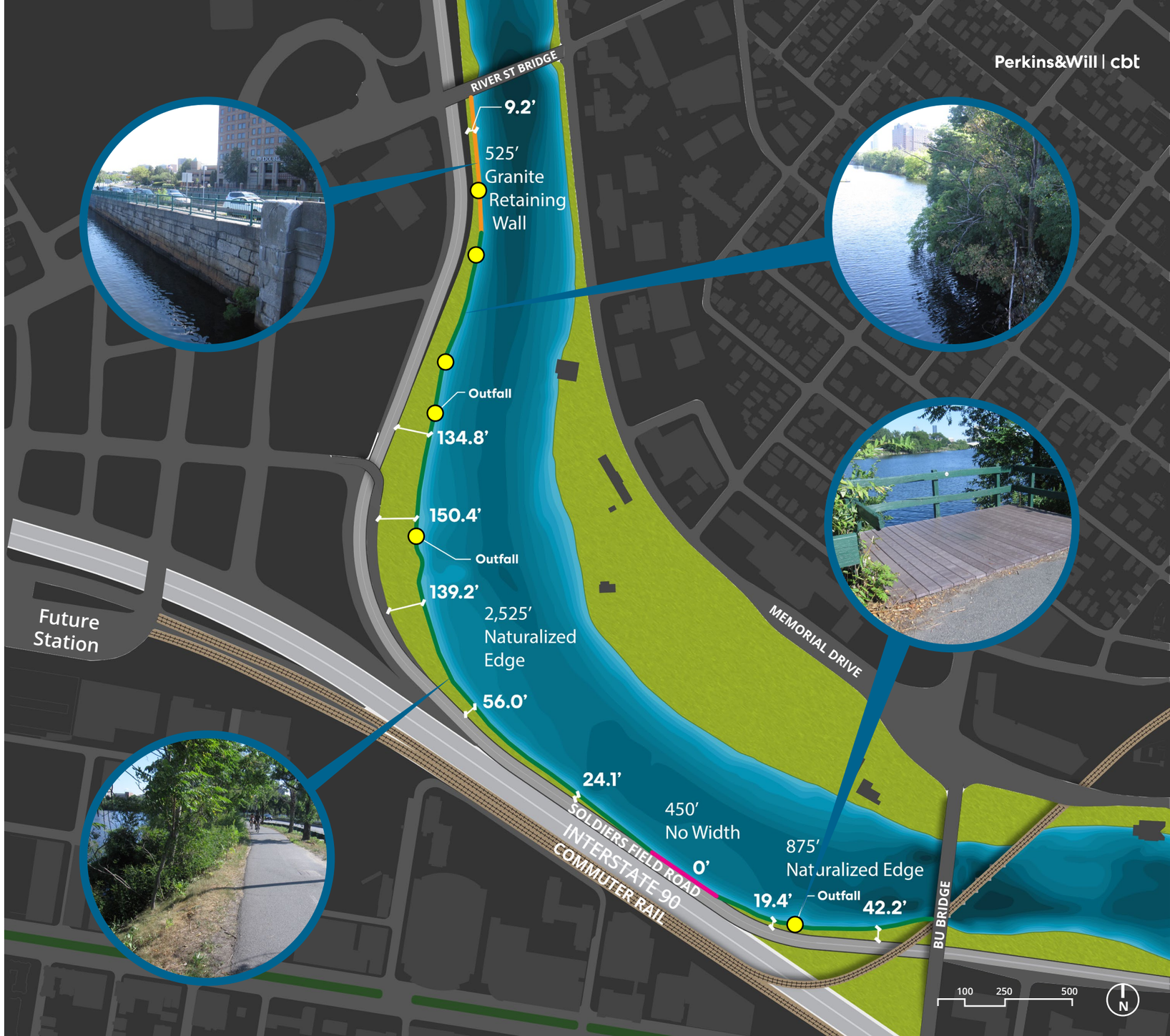
Edge Conditions

Challenges + Opportunities

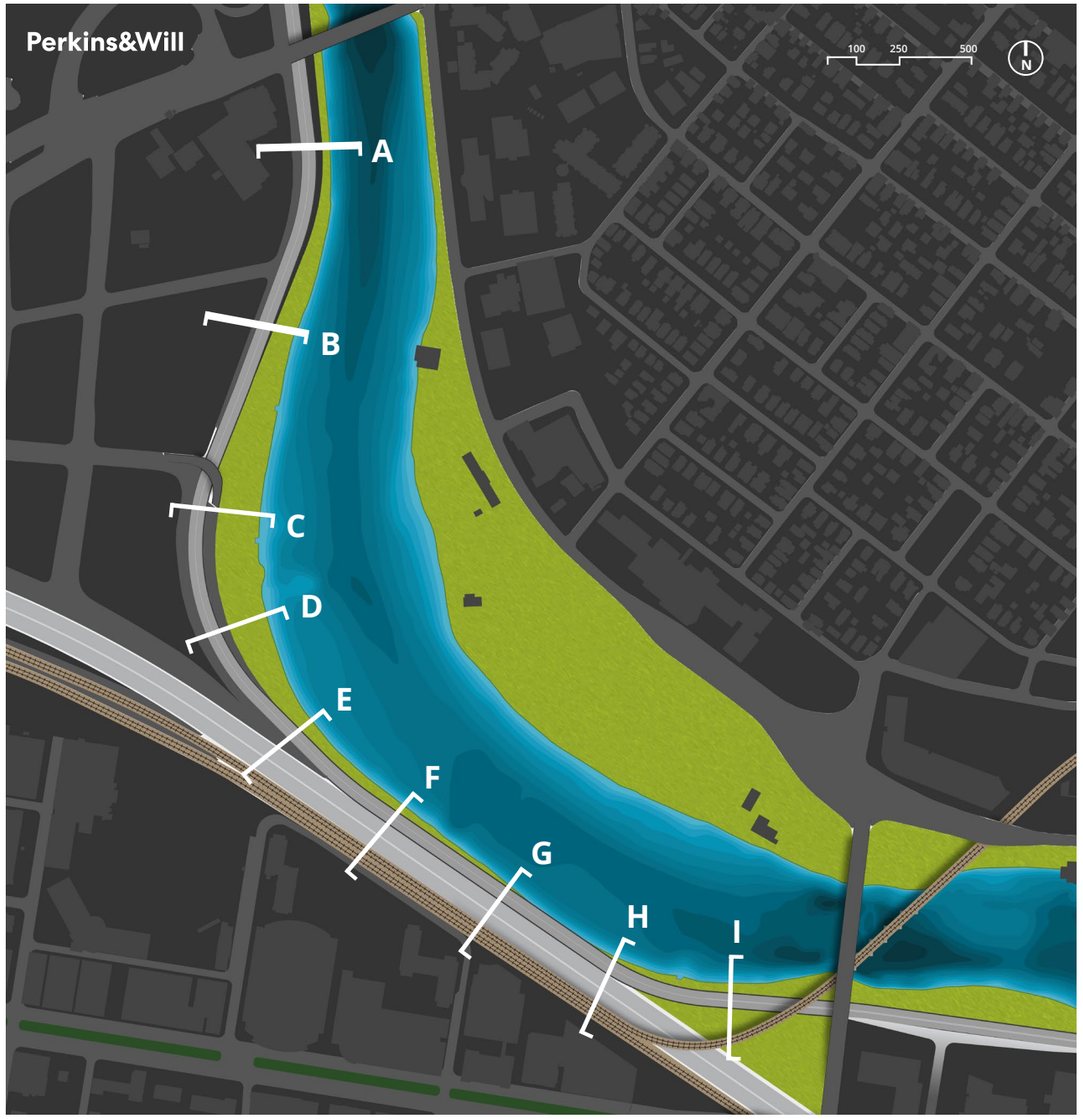
- Significant erosion issues along rip rap edge, mixed in with asphalt pavement
- Steep riverbanks & lack of plants with strong roots increase erosion issues
- Limited width to incorporate multi-modal pathways and stormwater treatment strategies
- High volumes of untreated pollution discharge directly into the river bed

Key

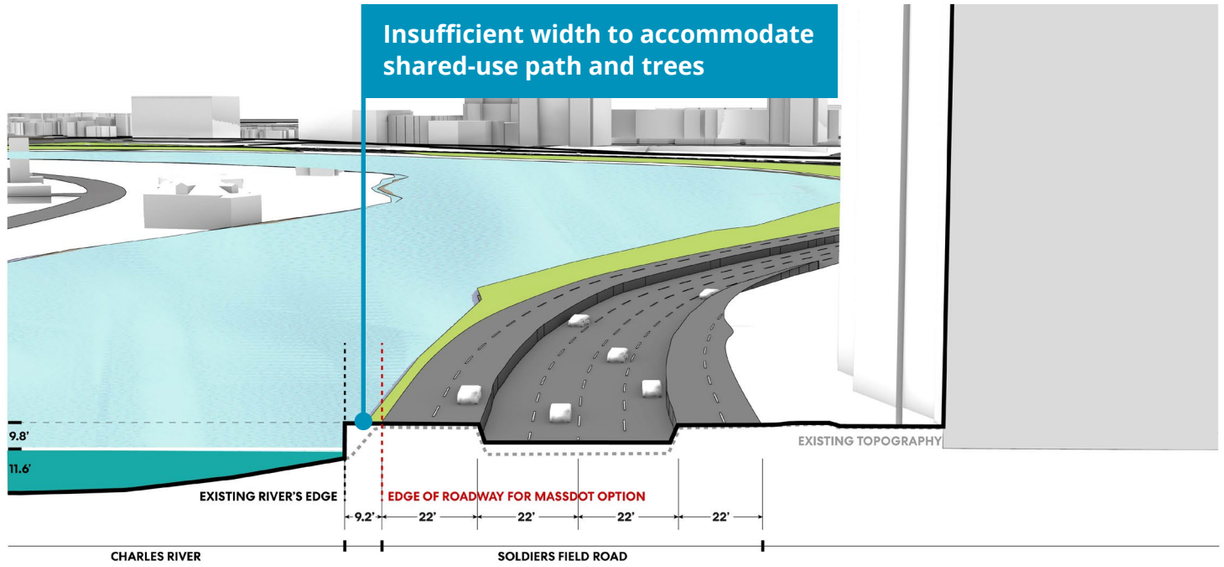
- Granite Retaining Wall
- Eroded Naturalized Edge
- Road Immediately Adjacent
- BSWC Outfalls



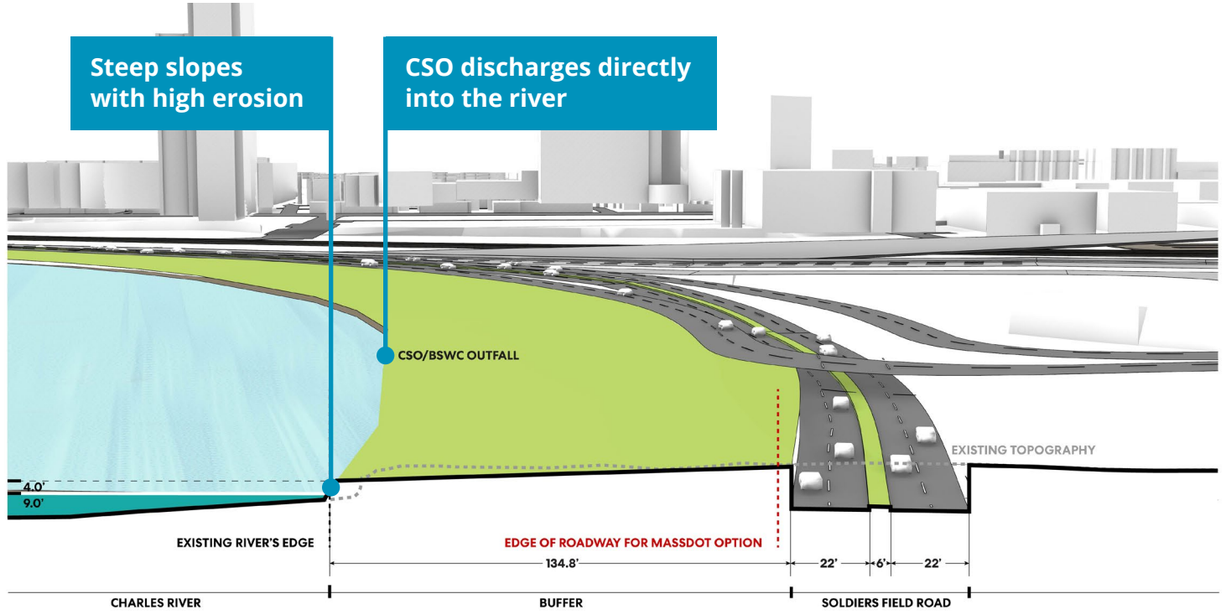
Analysis



Plan

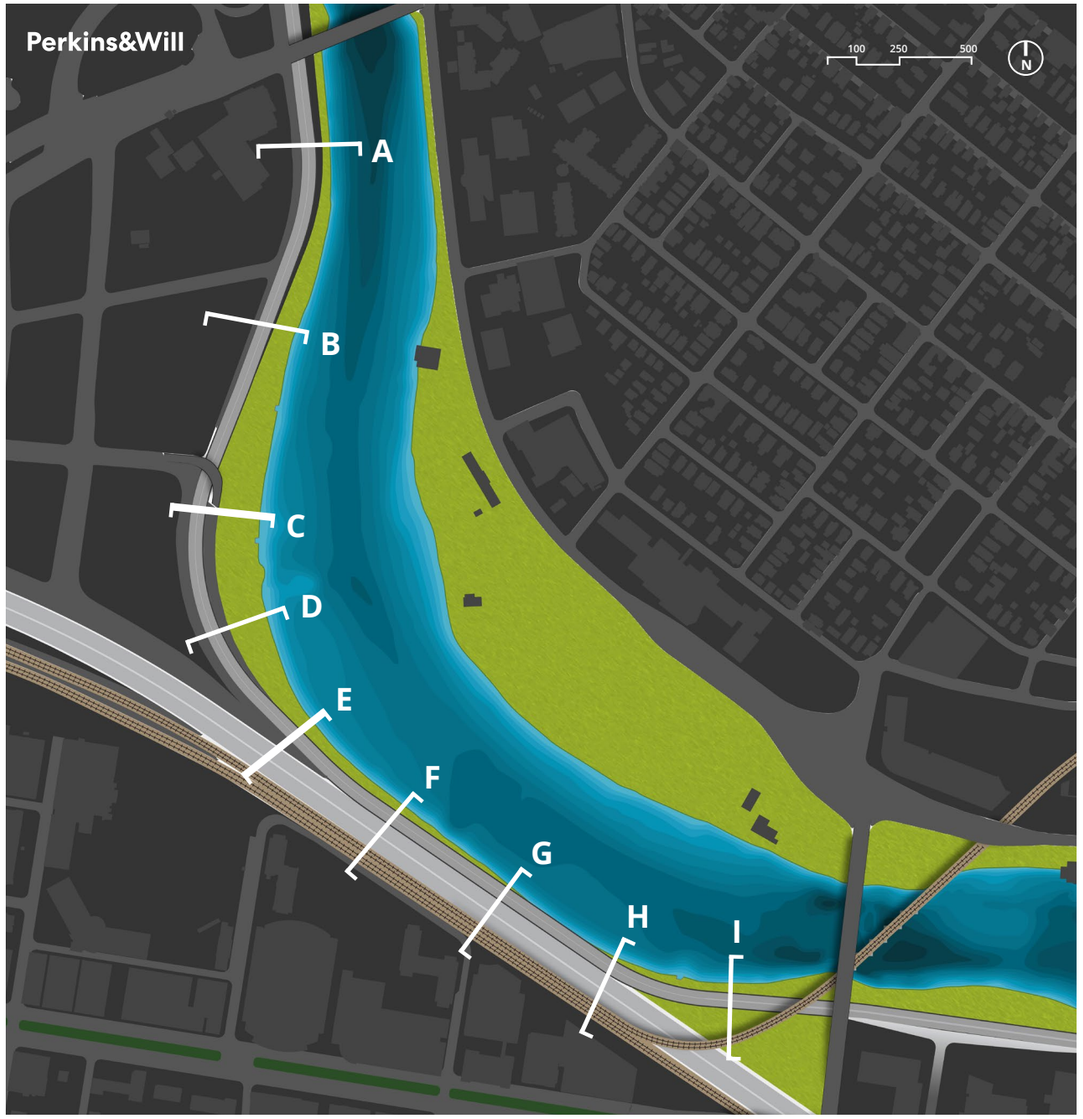


Section A

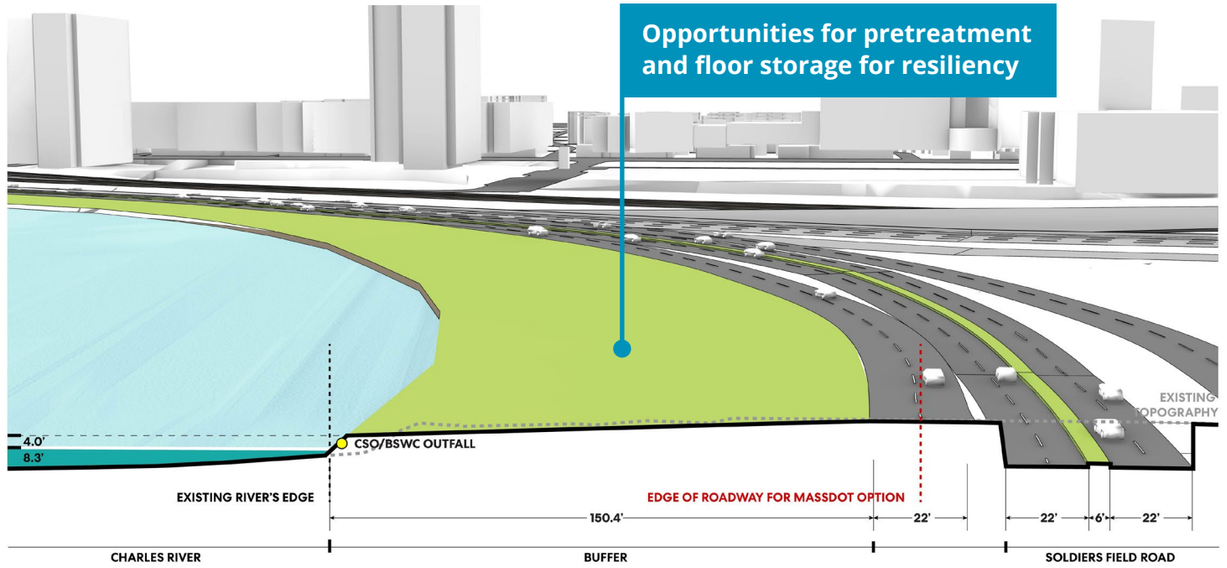


Section B

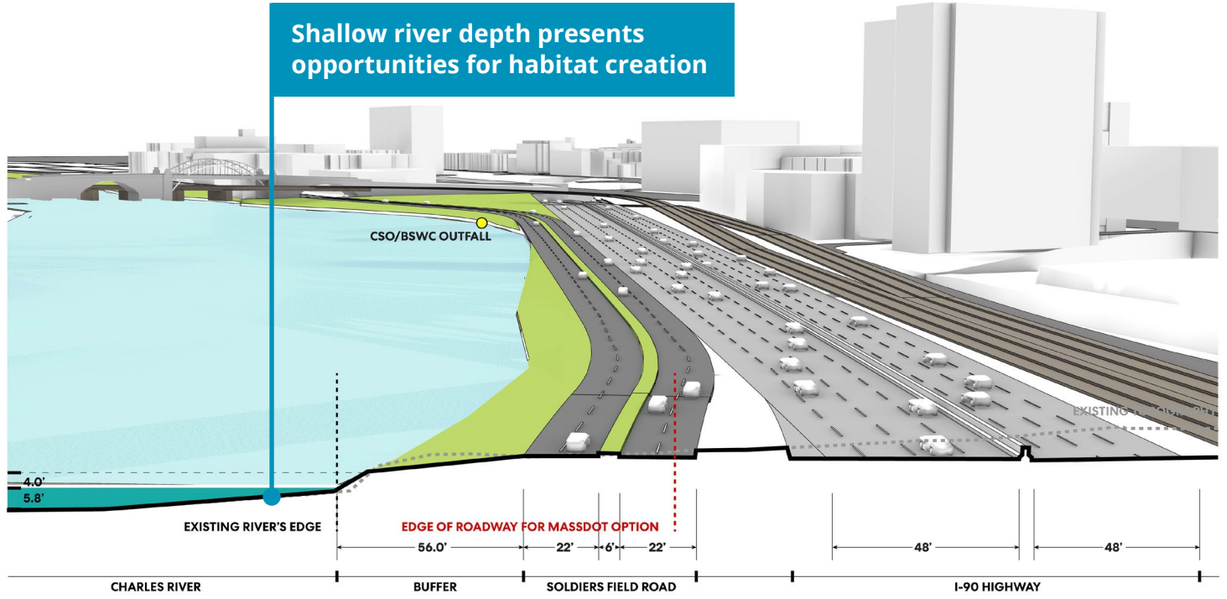
Analysis



Plan

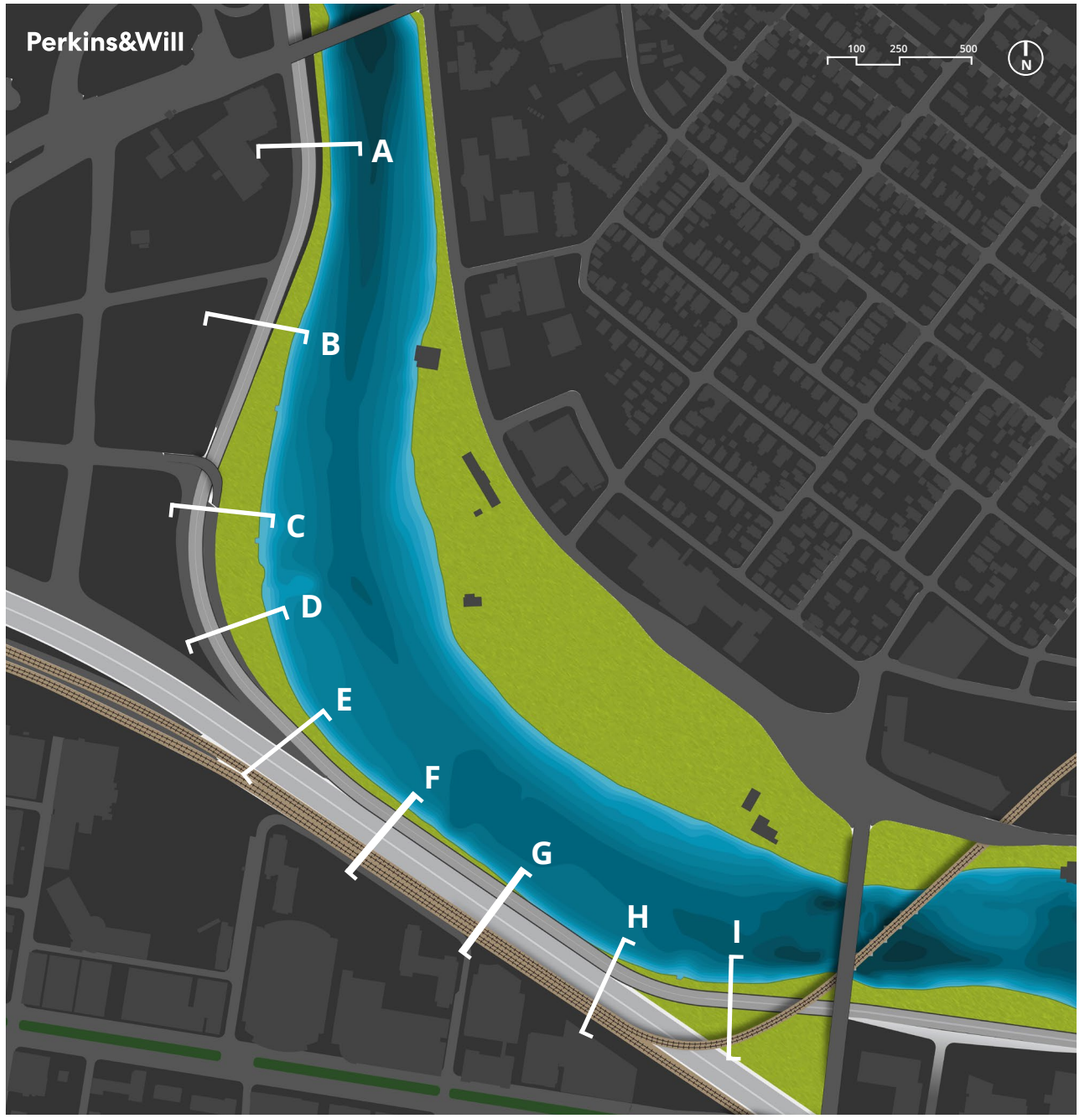


Section C

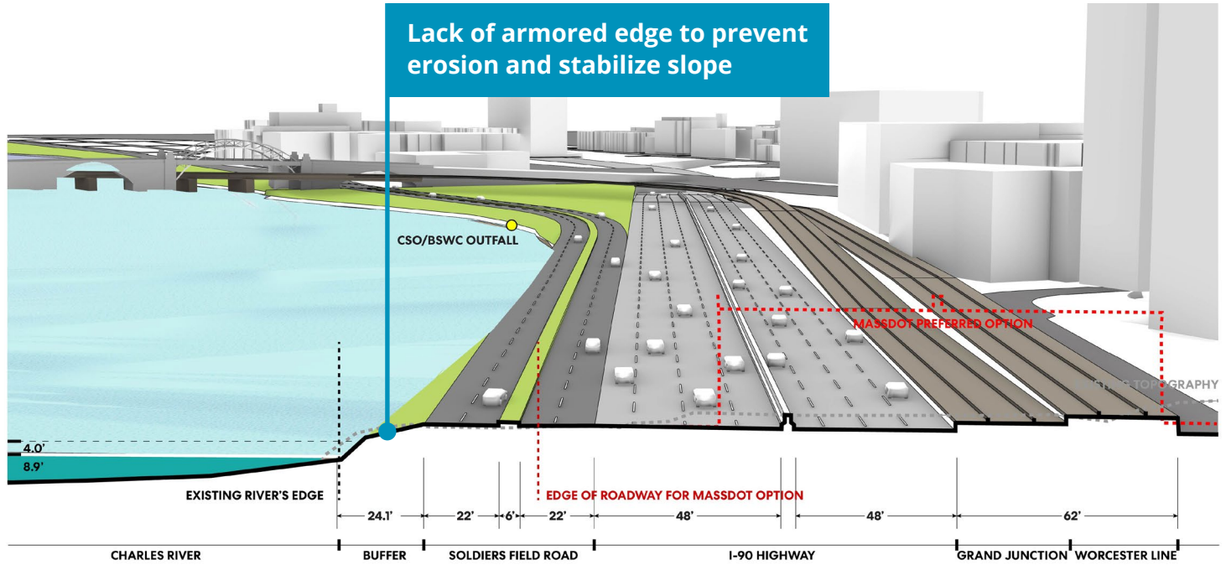


Section E

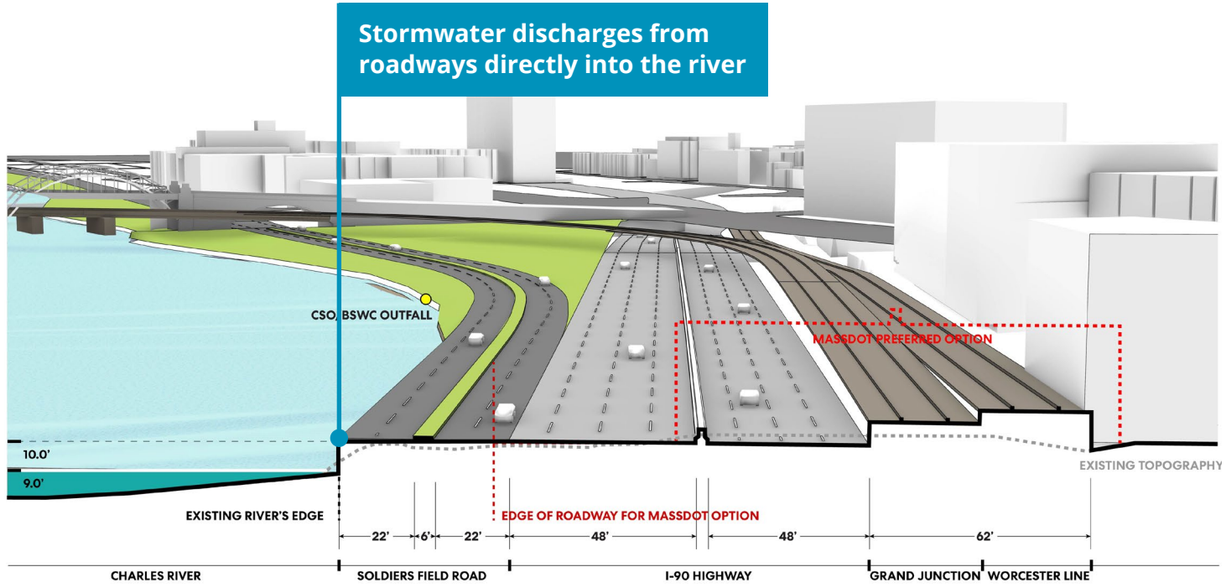
Analysis



Plan

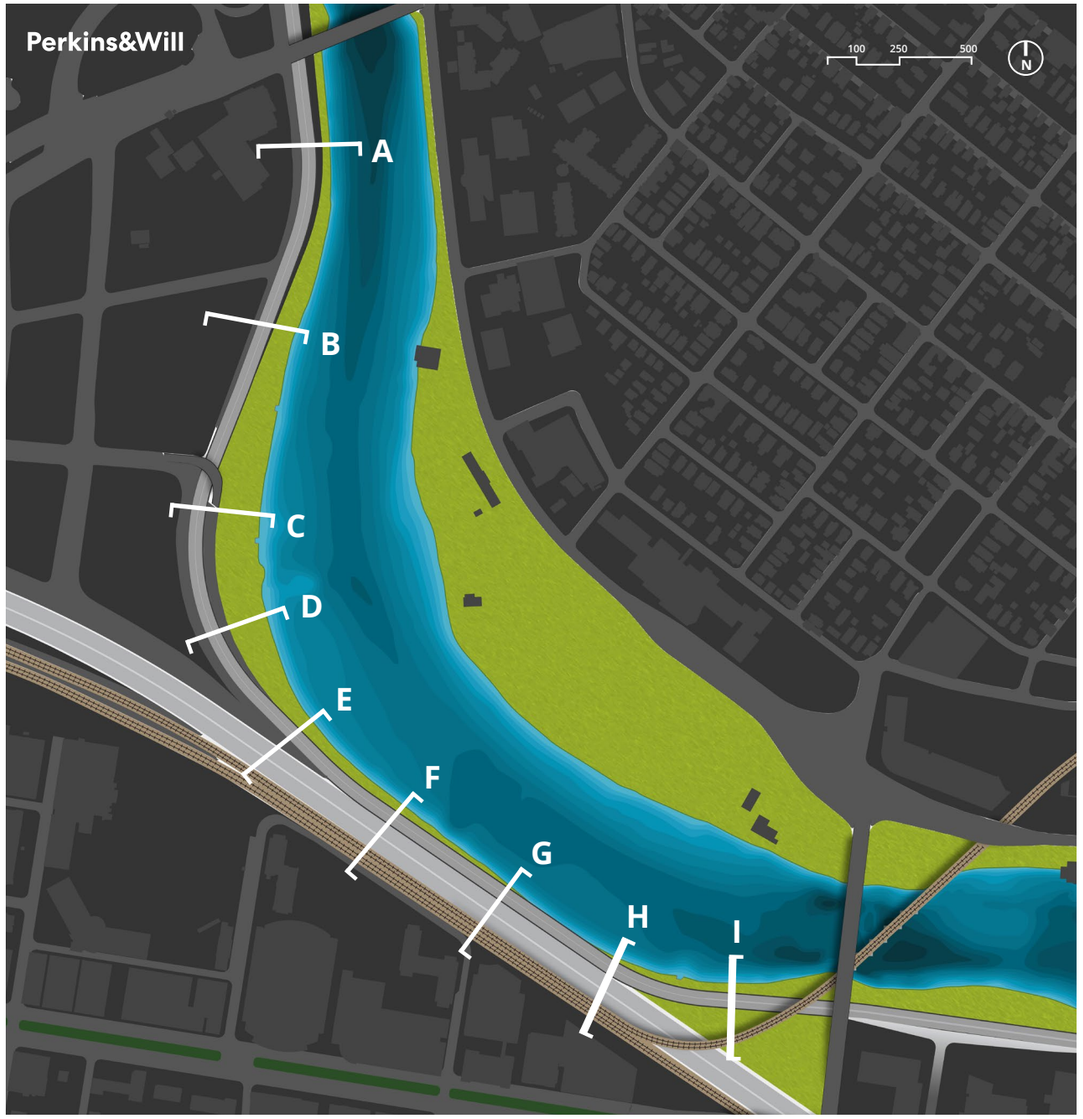


Section F

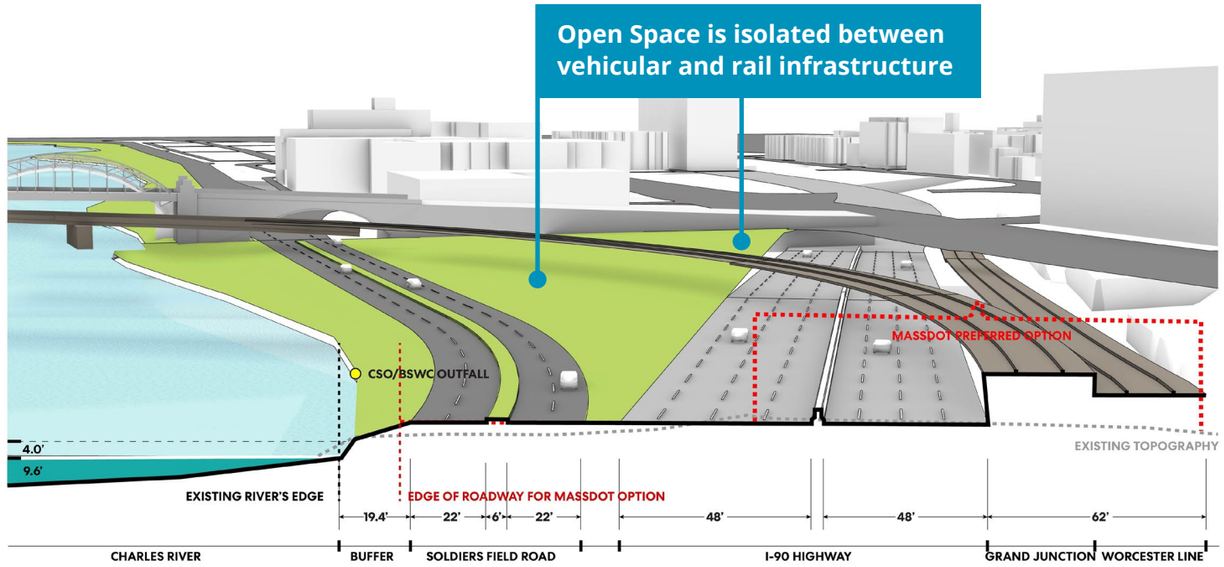


Section G

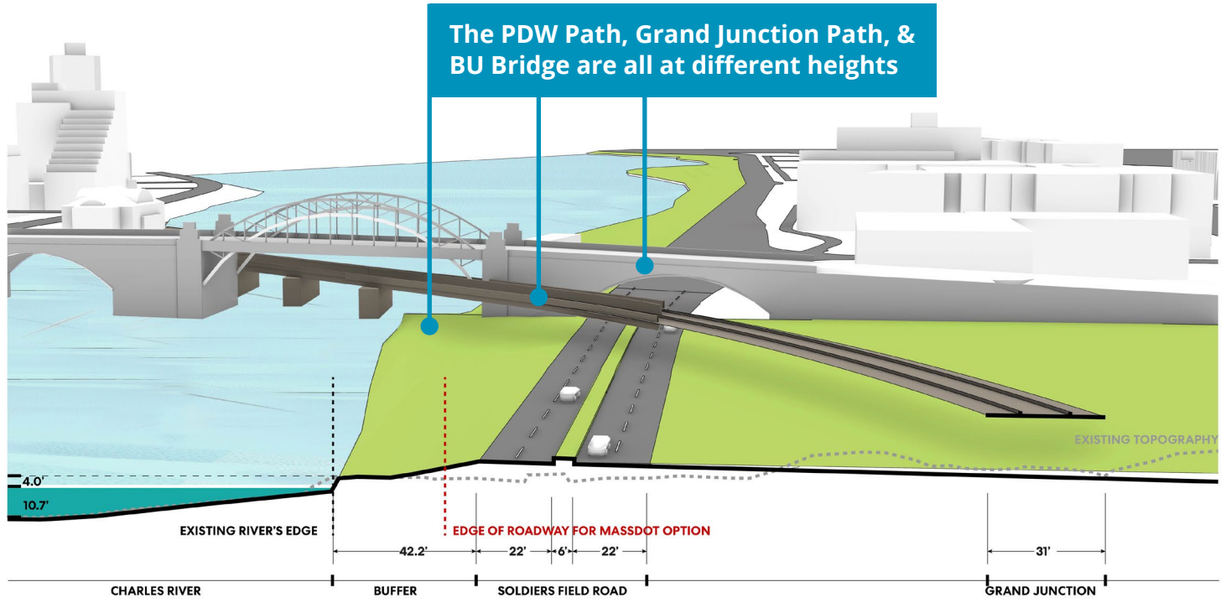
Analysis



Plan



SECTION H



SECTION I

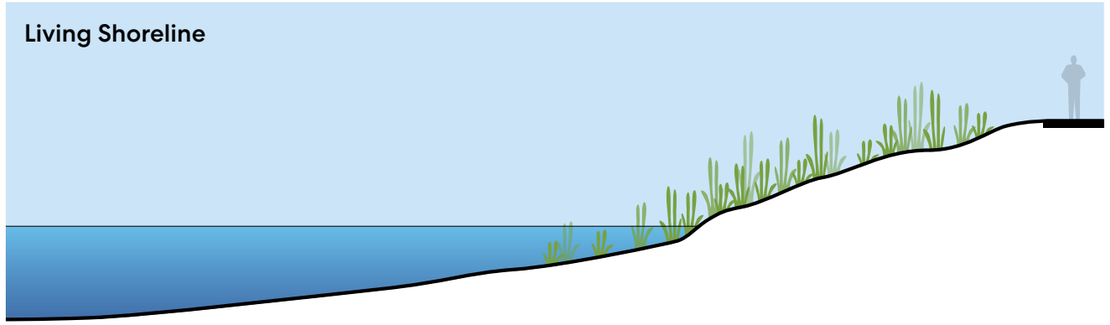
Strategies

Tool Kit

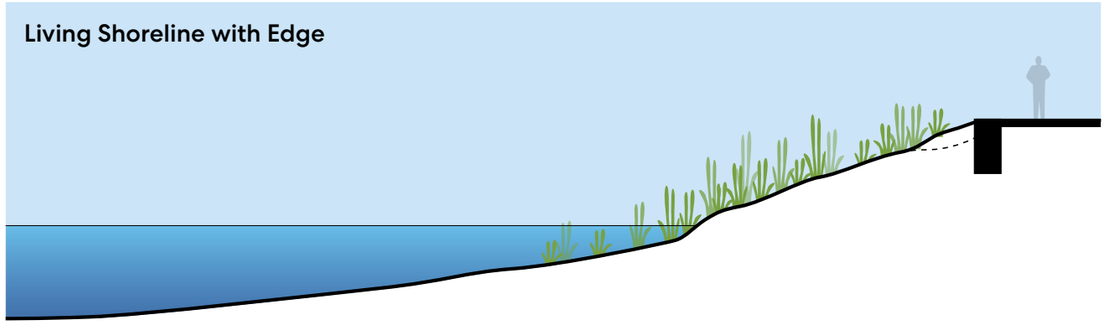
- Create a toolkit of landscape strategies to create a living shoreline
- Understand the comparative benefits and impacts of each intervention
- Draw upon knowledge gained from preexisting examples and precedents

Naturalized Edges

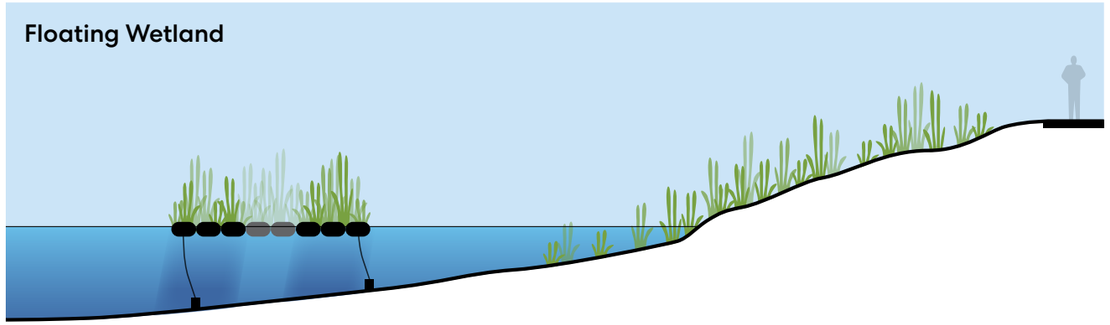
Living Shoreline



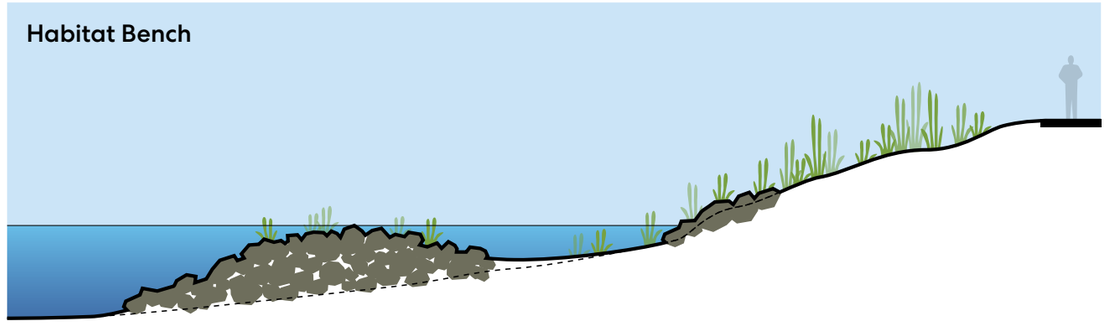
Living Shoreline with Edge



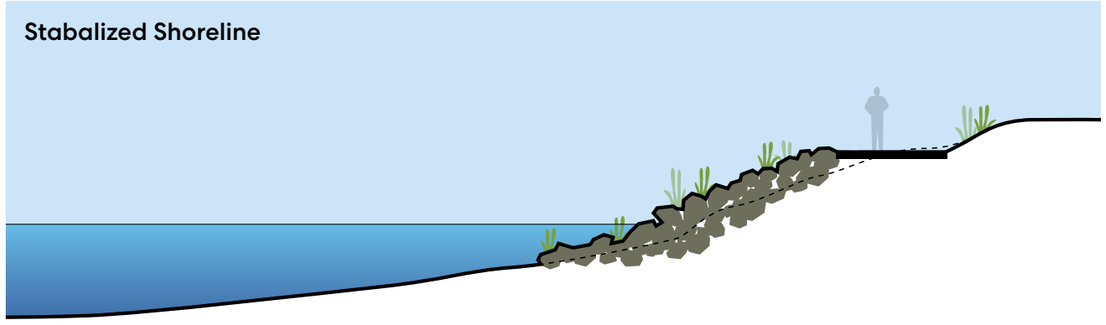
Floating Wetland



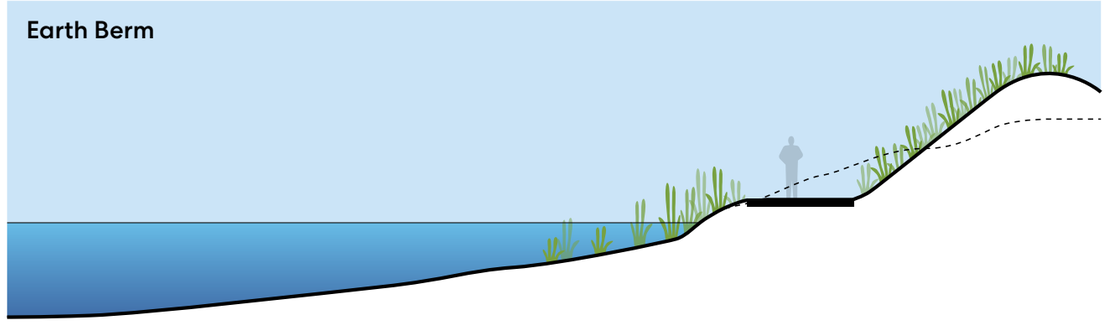
Habitat Bench



Stabalized Shoreline

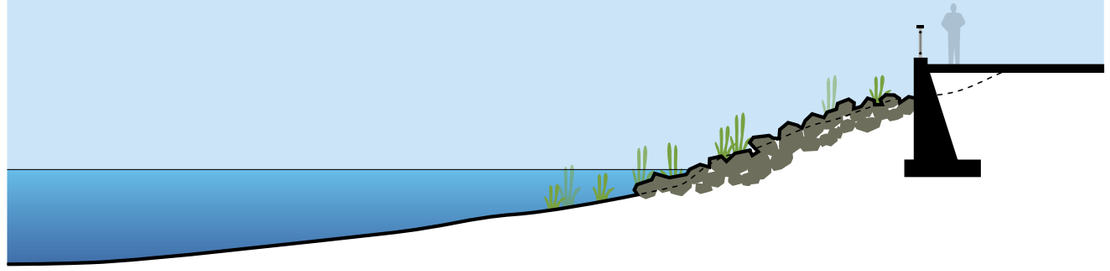


Earth Berm

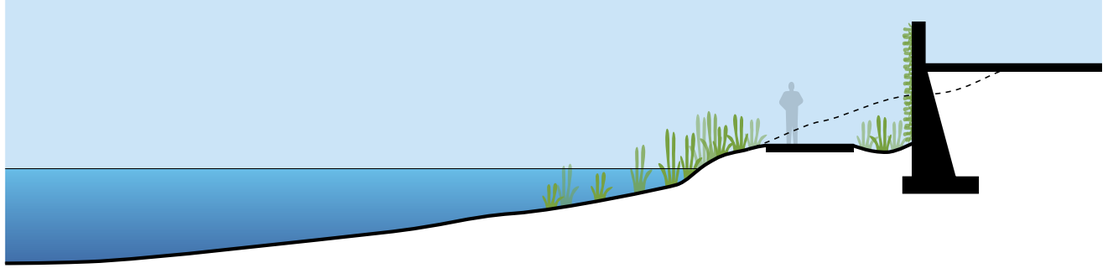


Constructed Edges

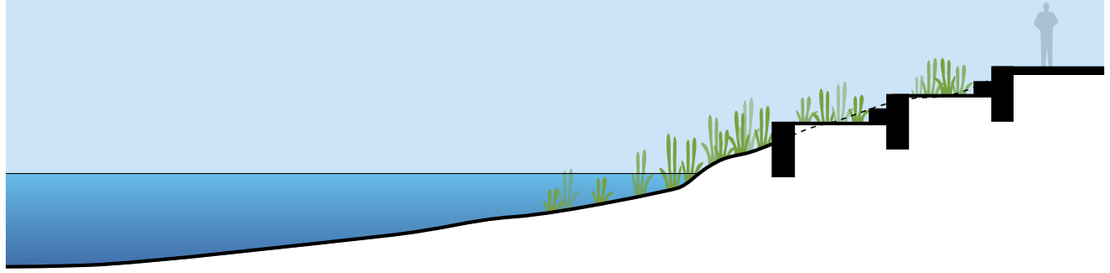
Retaining Wall with Stabilization



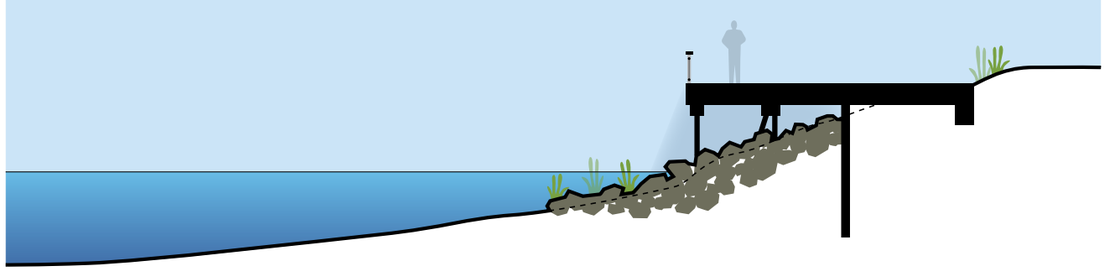
Green Retaining Wall



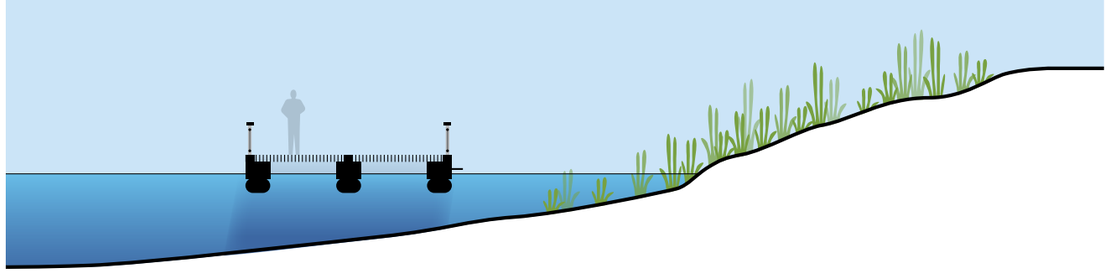
Planted Steps



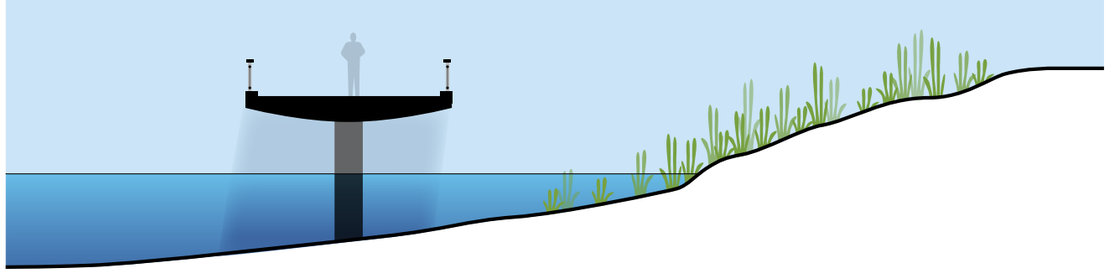
Cantilevered Boardwalk



Floating Boardwalk



Suspended Boardwalk



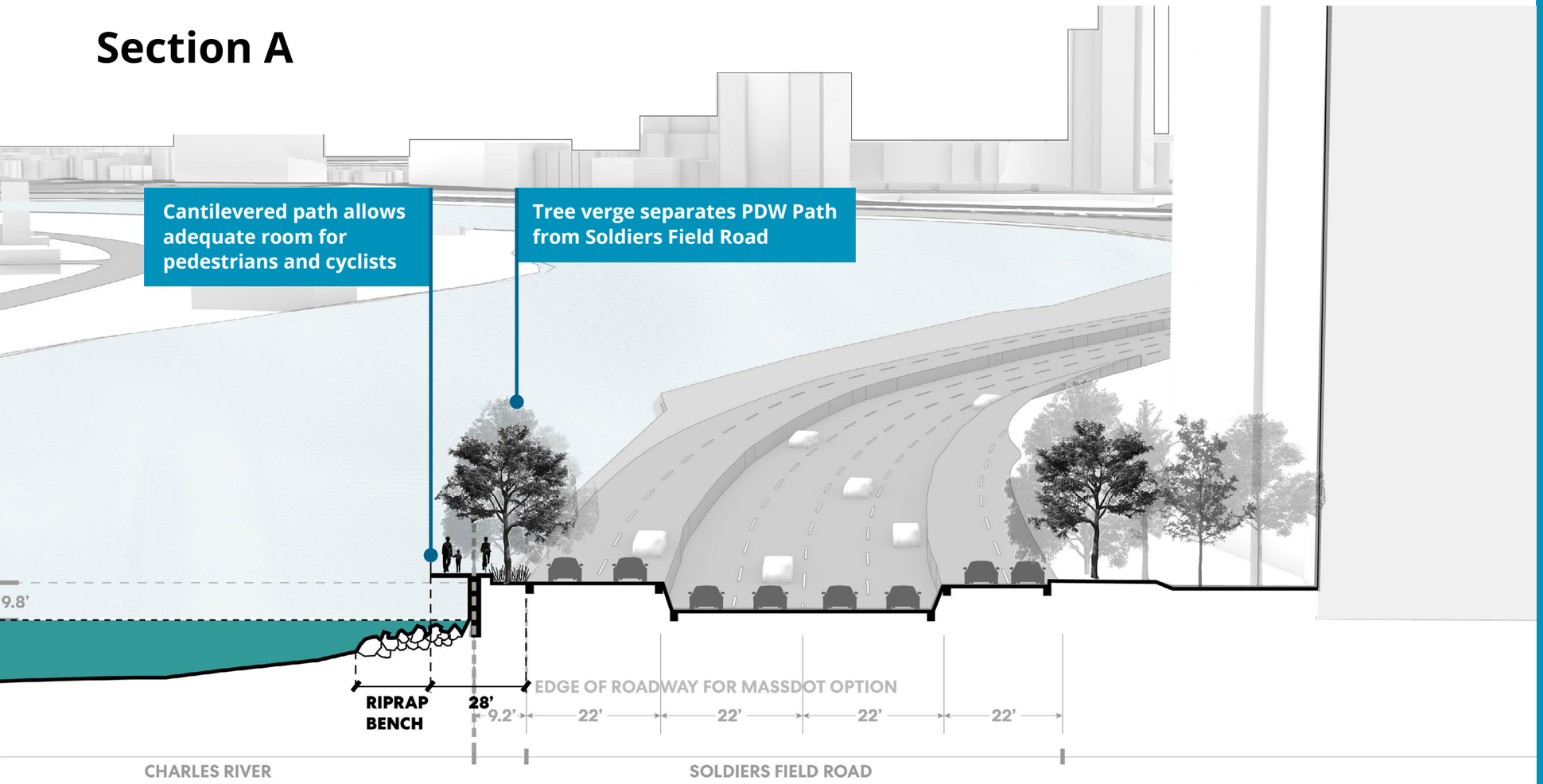
Exploration

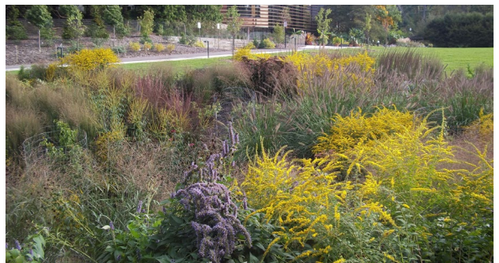
Sections

- Propose a series of landscape systems that mitigate the impacts of pollution discharge and improve environmental conditions
- Address the impacts of climate change to create a resilient riverfront
- Re-imagine the river’s edge as a natural living shoreline of rich and diverse ecosystems
- Introduce robust circulation systems and open spaces connecting surrounding communities to the riverfront

Exploration

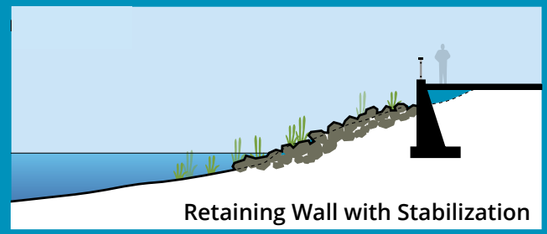
Section A

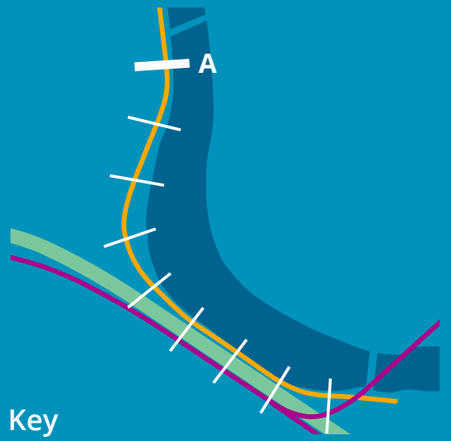




Strategies

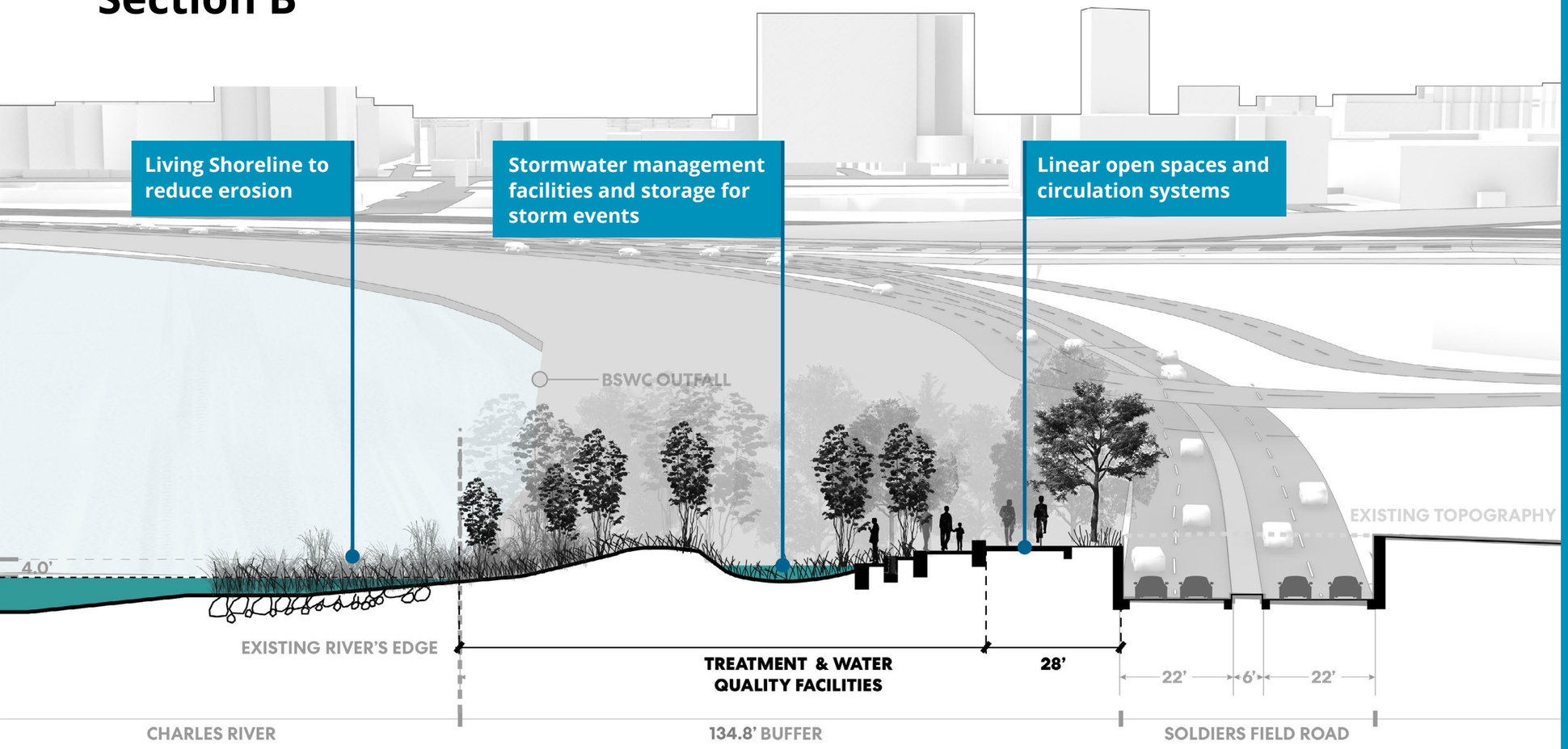
Perkins&Will | cbt

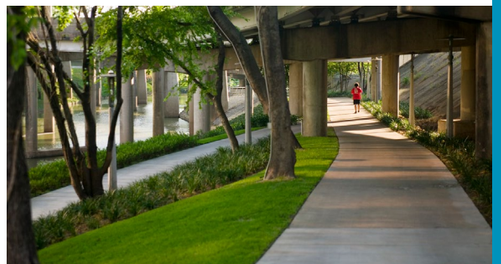




Exploration

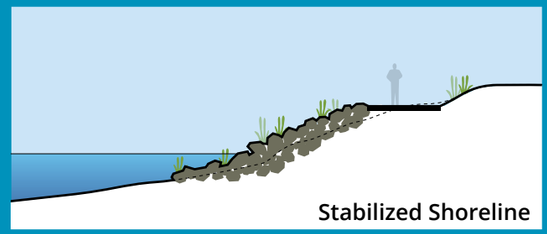
Section B



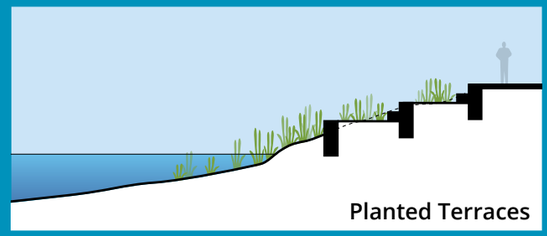


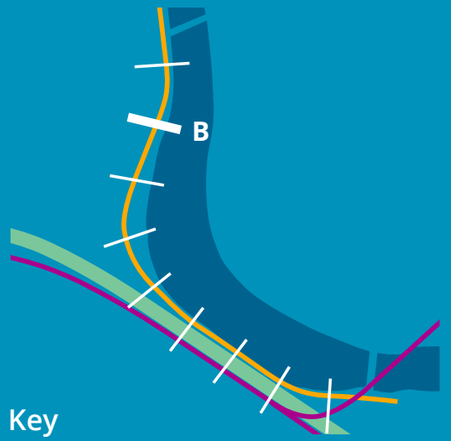
Strategies

Perkins&Will | cbt



+

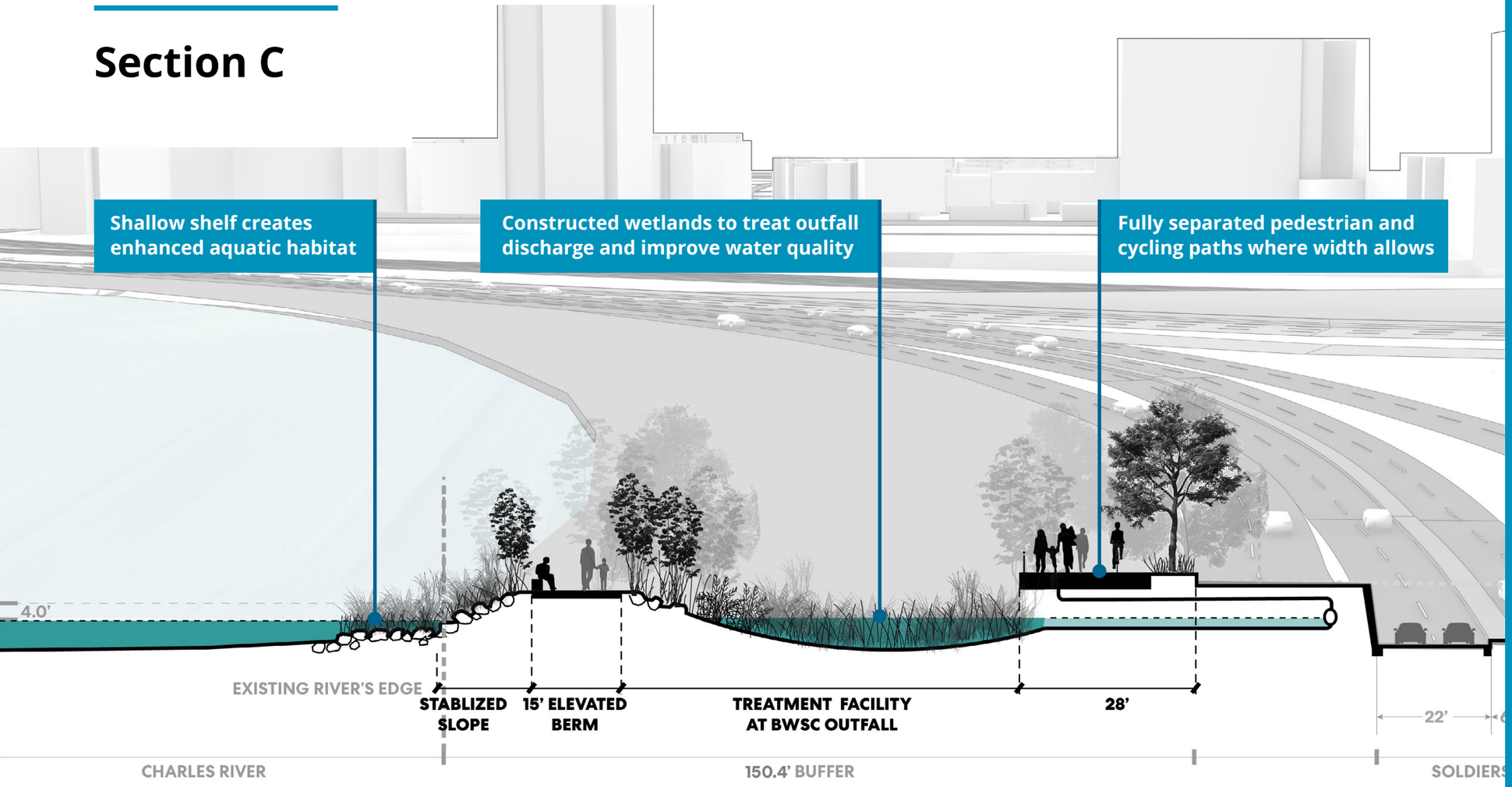


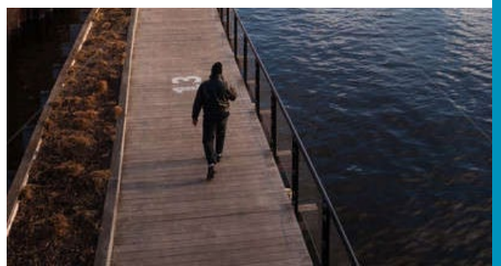


Key

Exploration

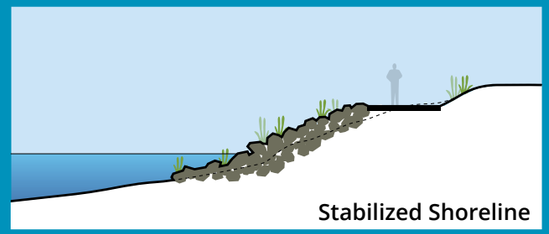
Section C



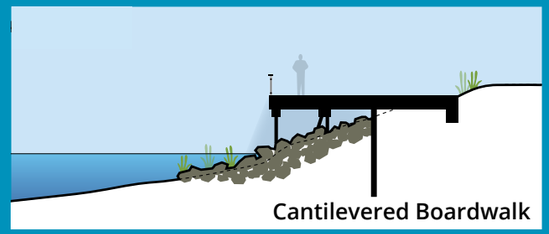


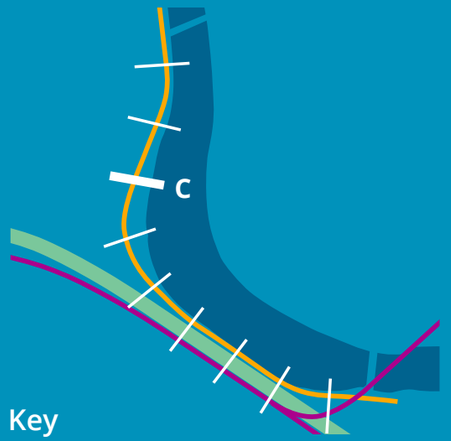
Strategies

Perkins&Will | cbt



+

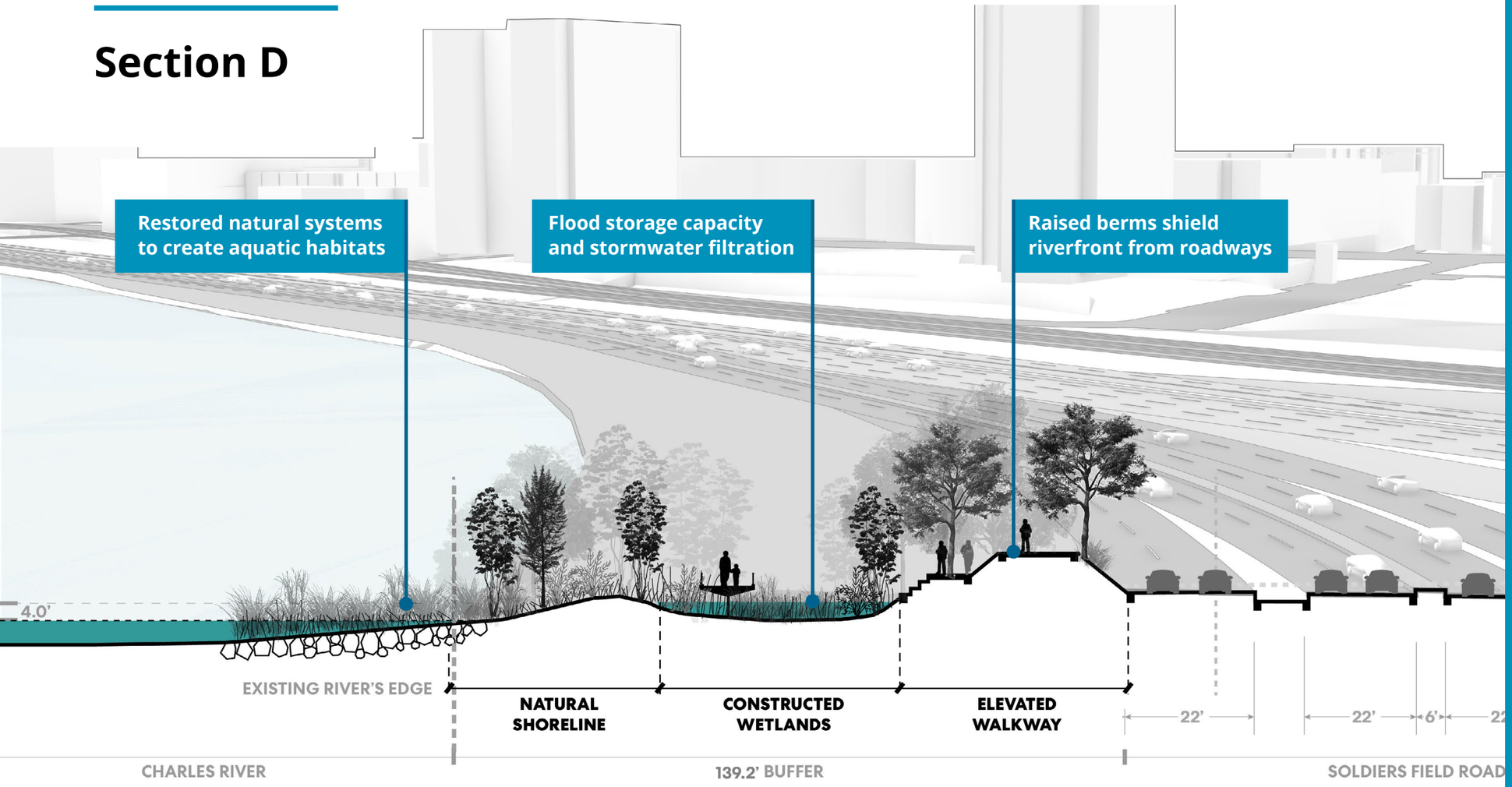




Key

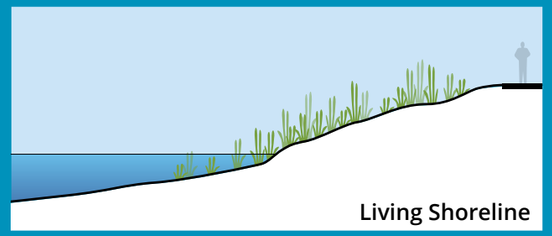
Exploration

Section D

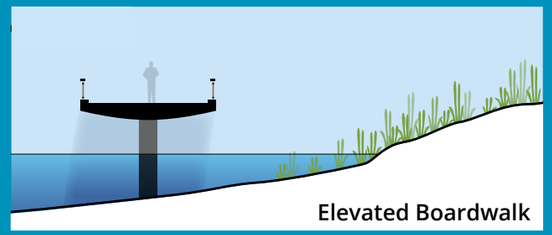


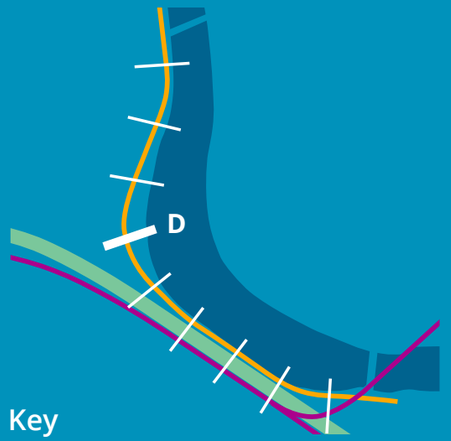
Strategies

Perkins&Will | cbt



+

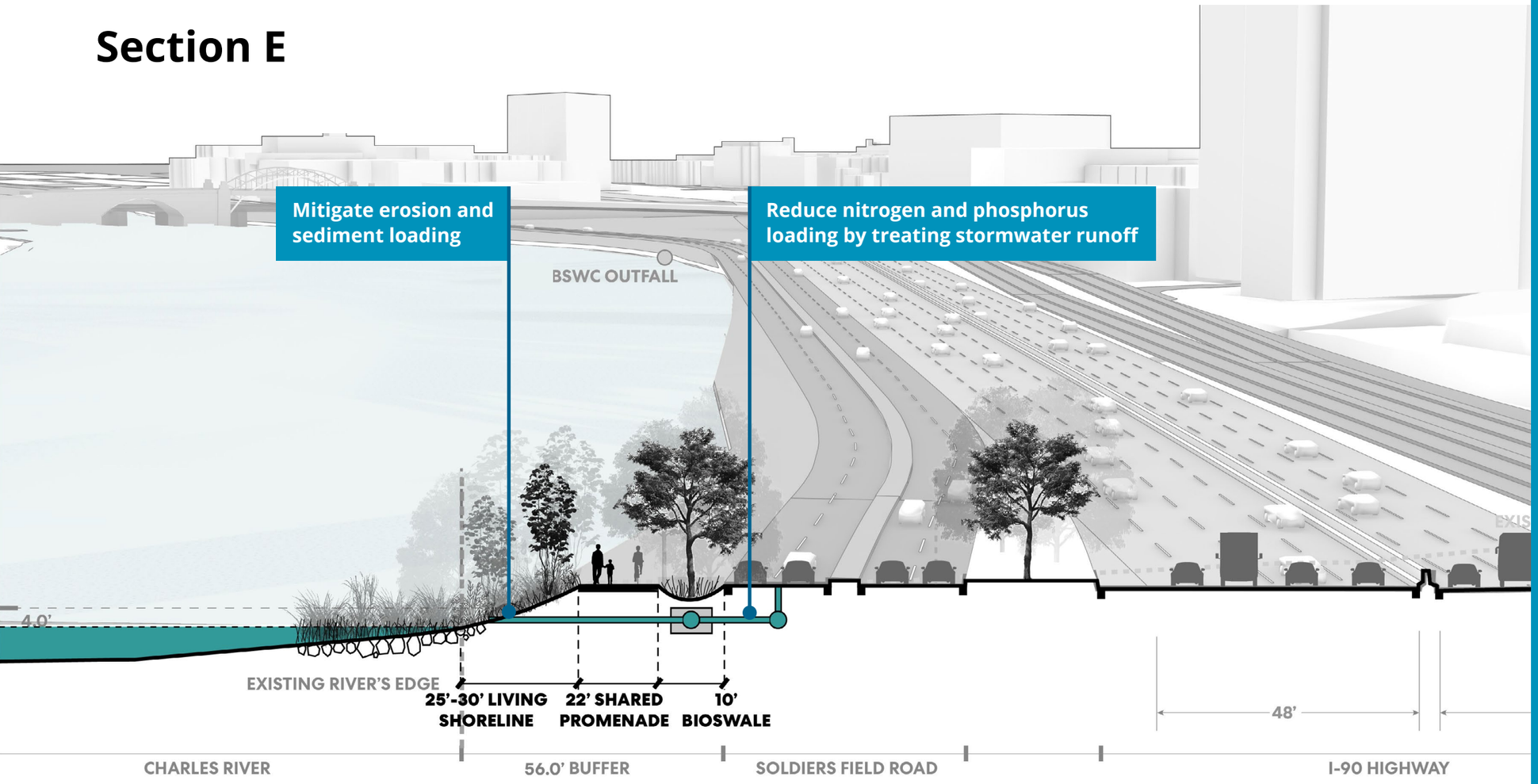


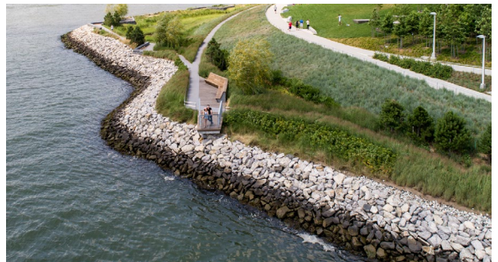


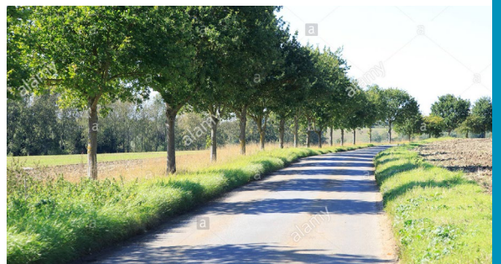
Key

Exploration

Section E

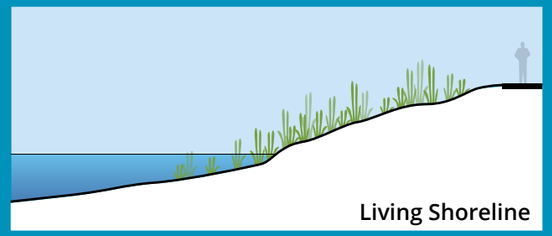




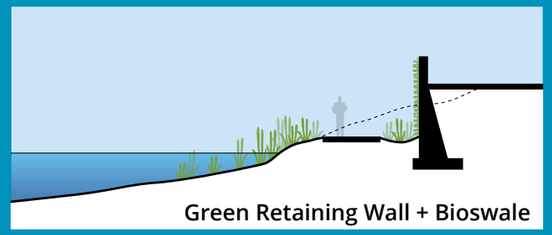


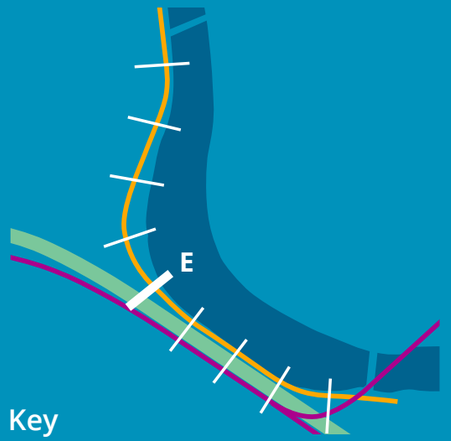
Strategies

Perkins&Will | cbt



+

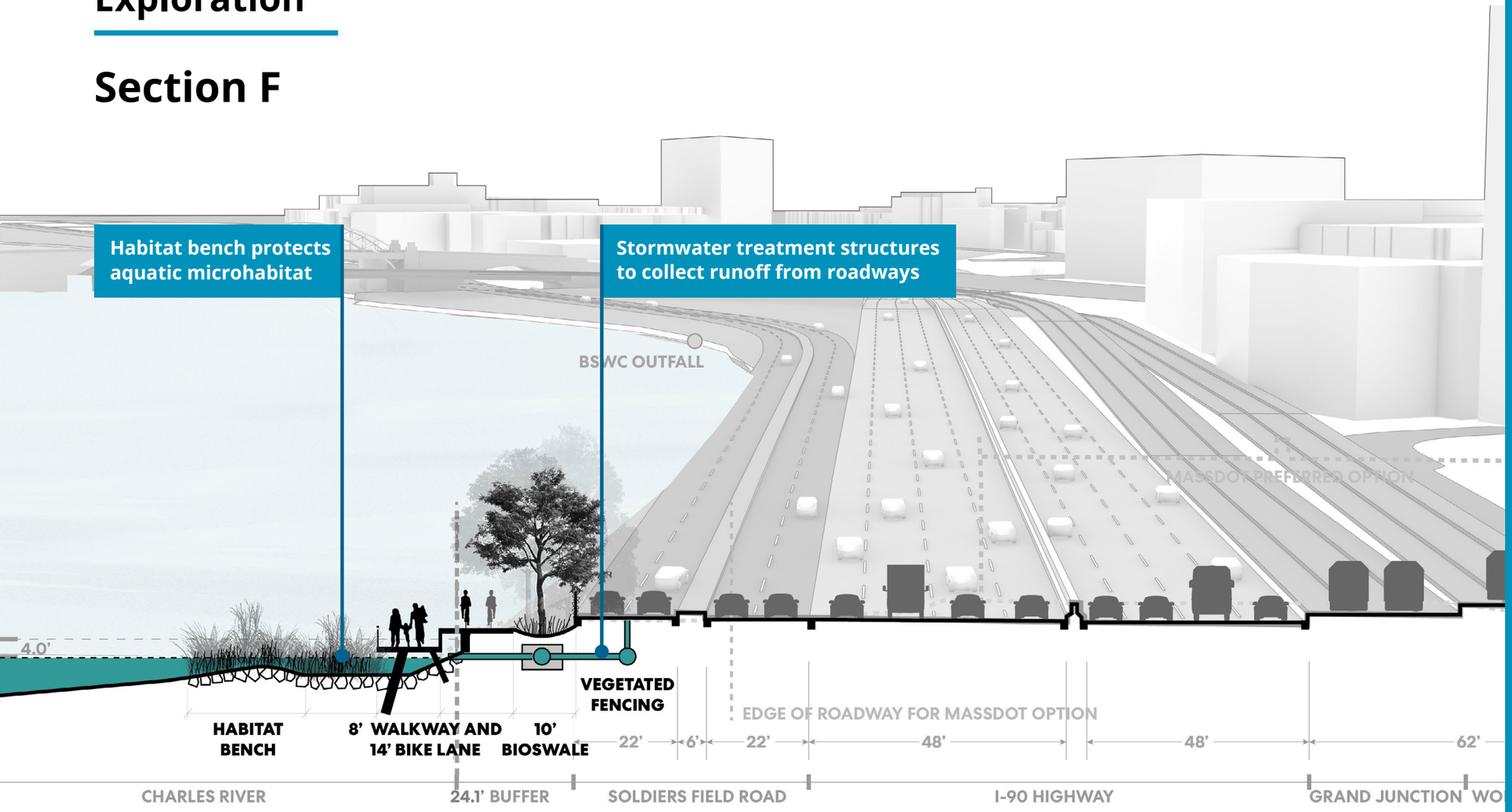


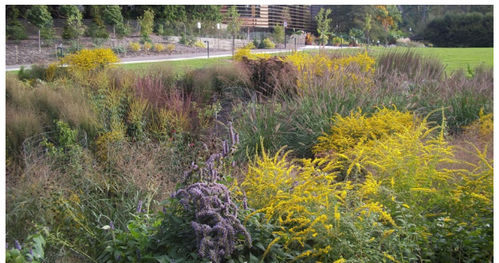


Key

Exploration

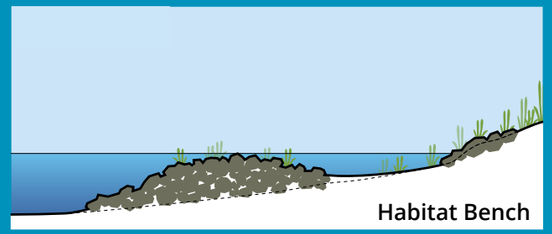
Section F



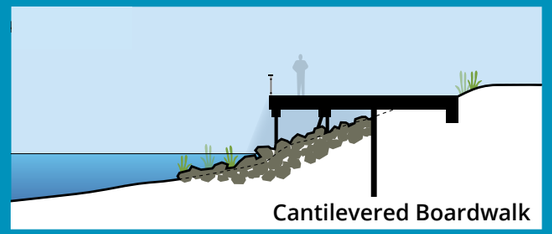


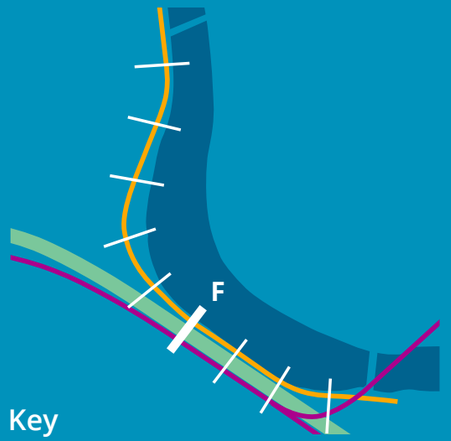
Strategies

Perkins&Will | cbt



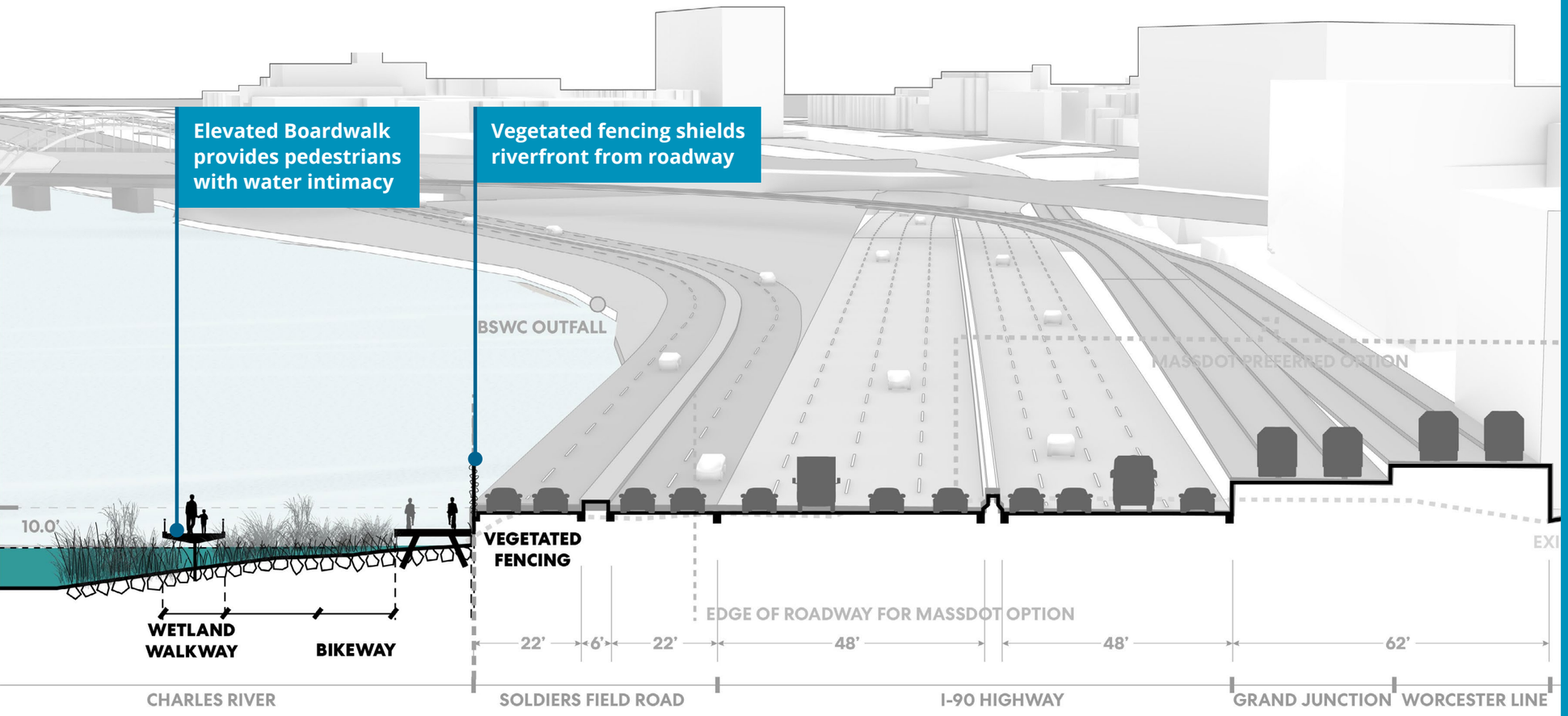
+

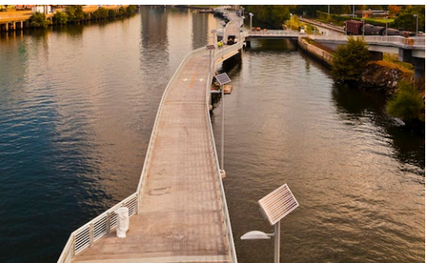


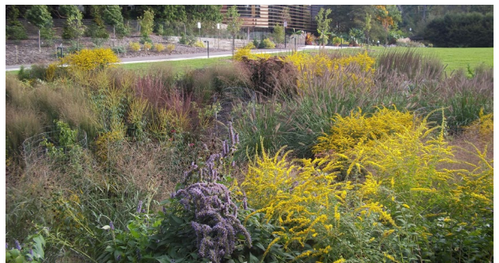


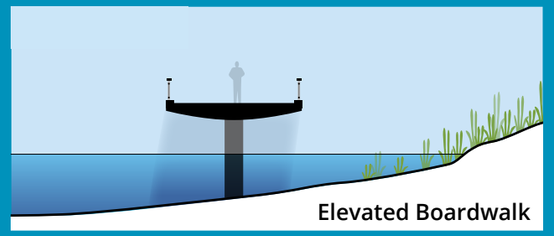
Key

Section G

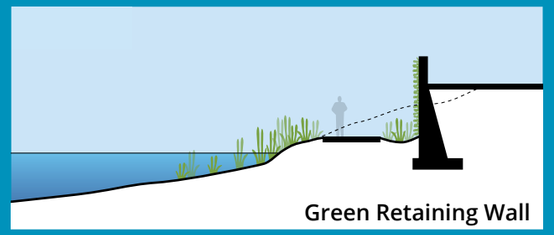


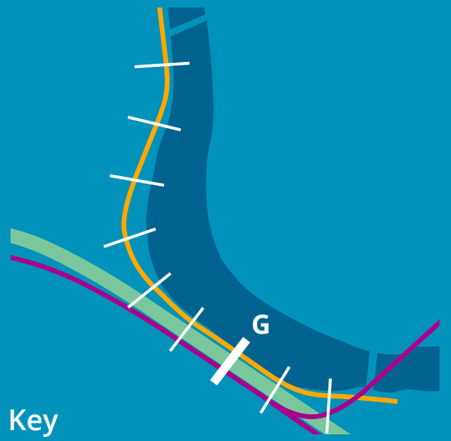






+

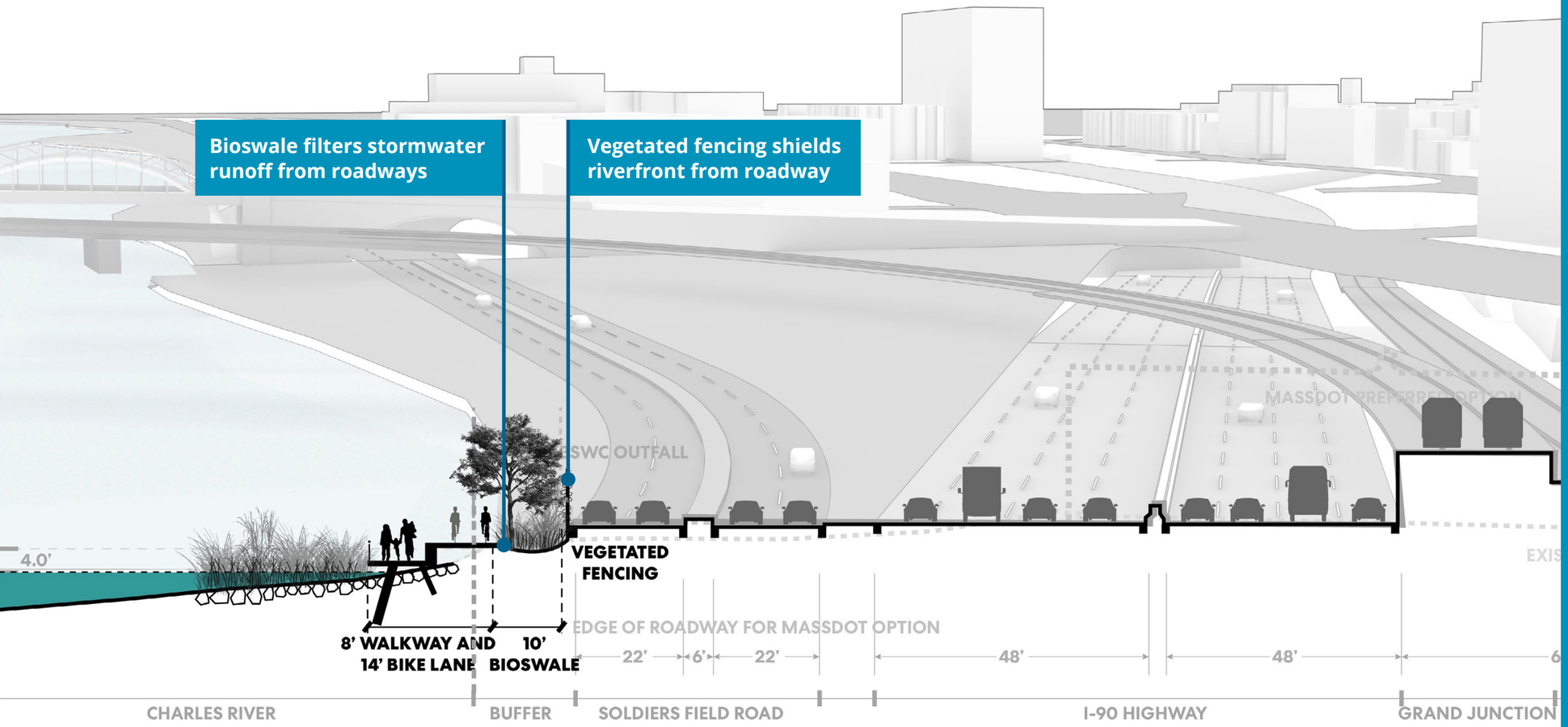




Key

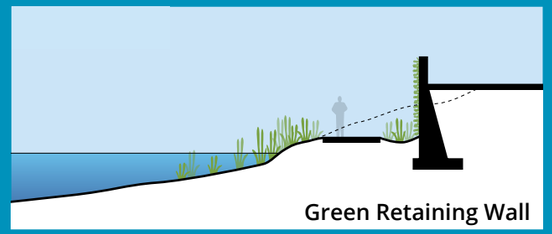
Exploration

Section H

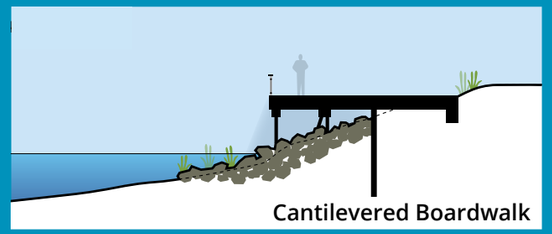


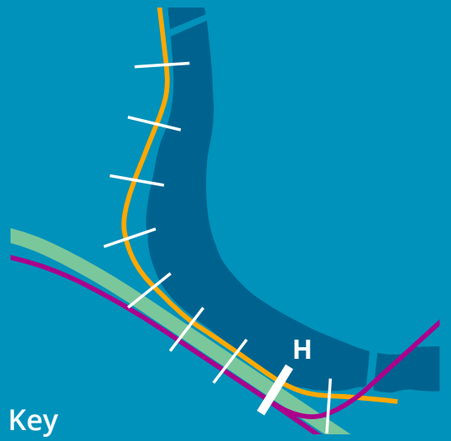
Strategies

Perkins&Will | cbt



+

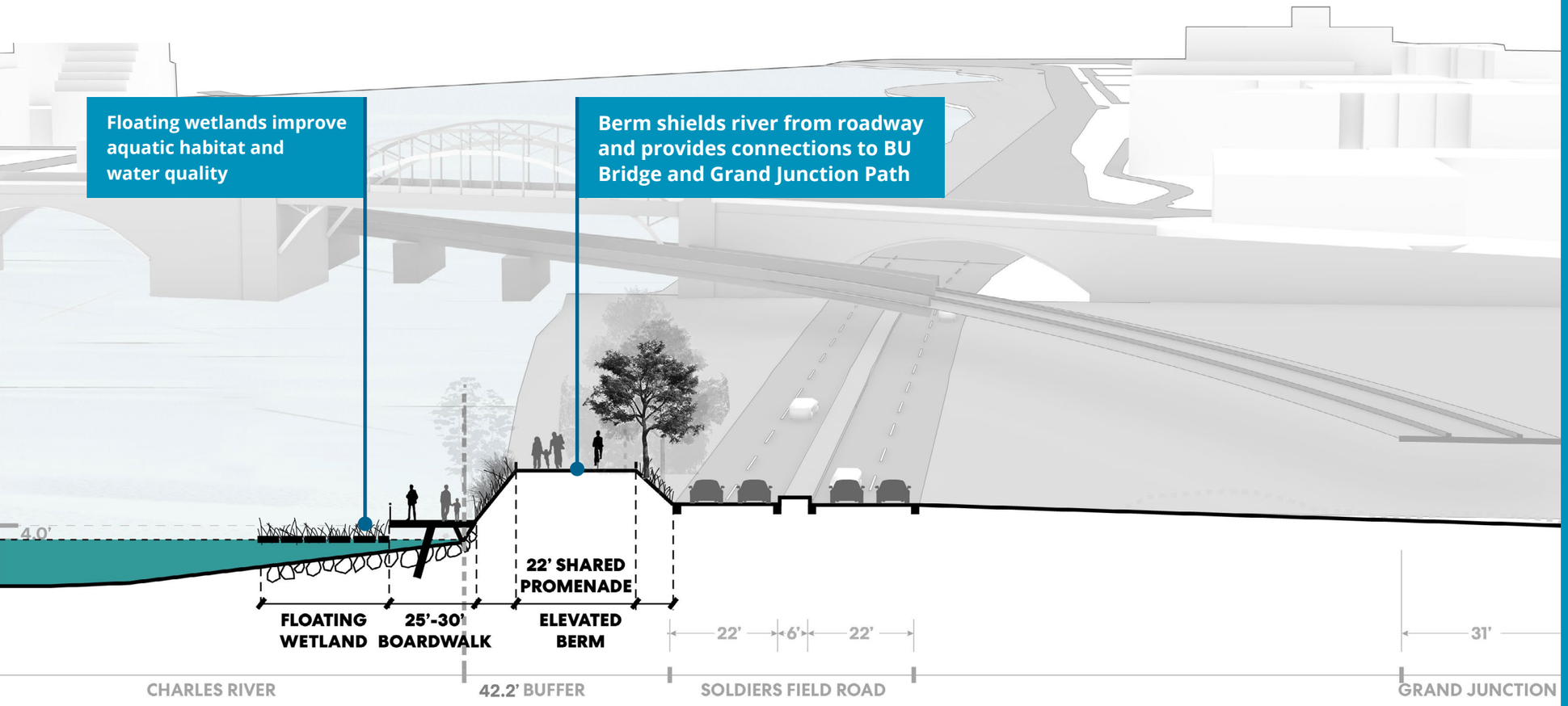




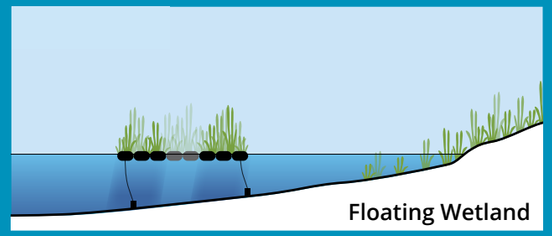
Key

Exploration

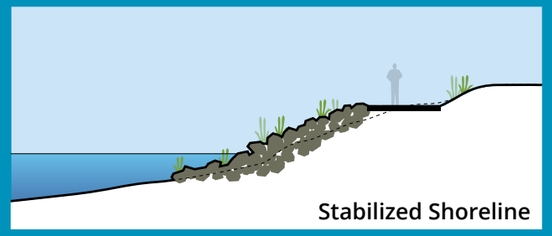
Section I

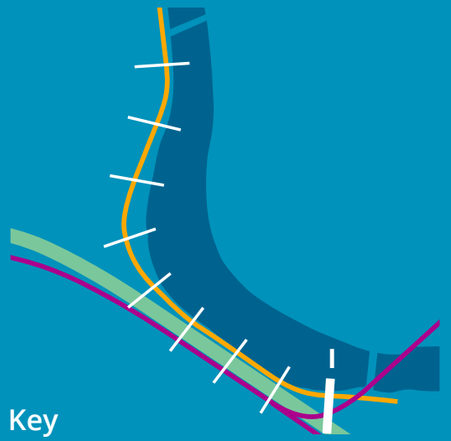


Perkins&Will | cbt



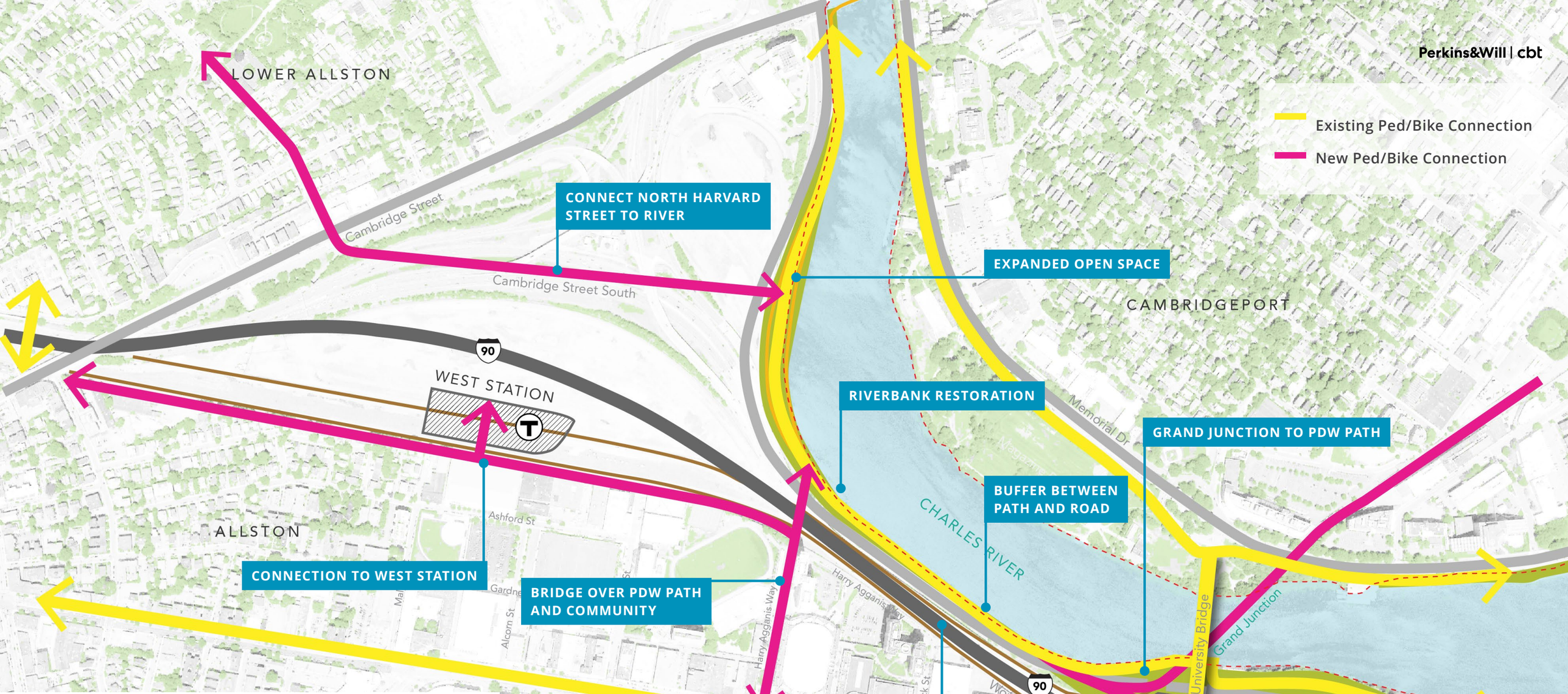
+





Key

Connectivity Framework



Framework

Design Considerations

Framework

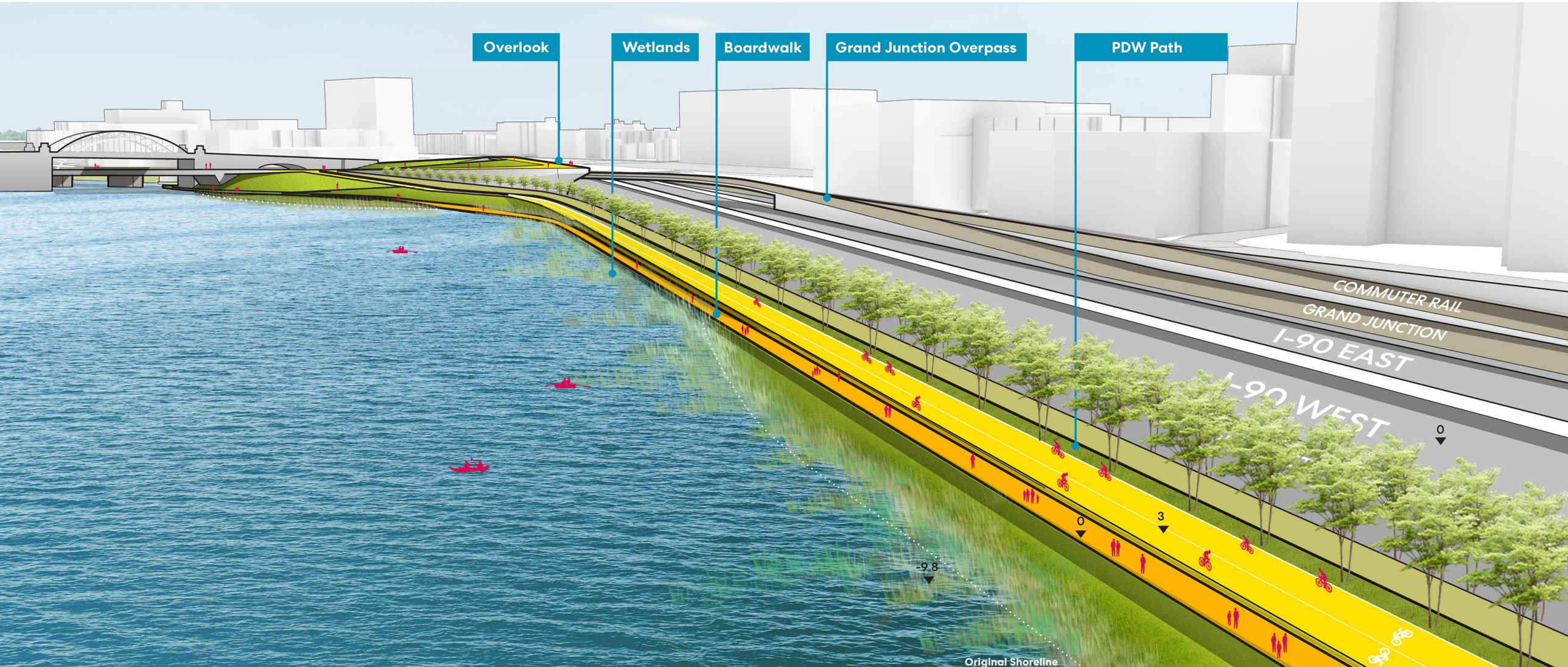
Existing Riverfront

Framework

Proposed Riverfront

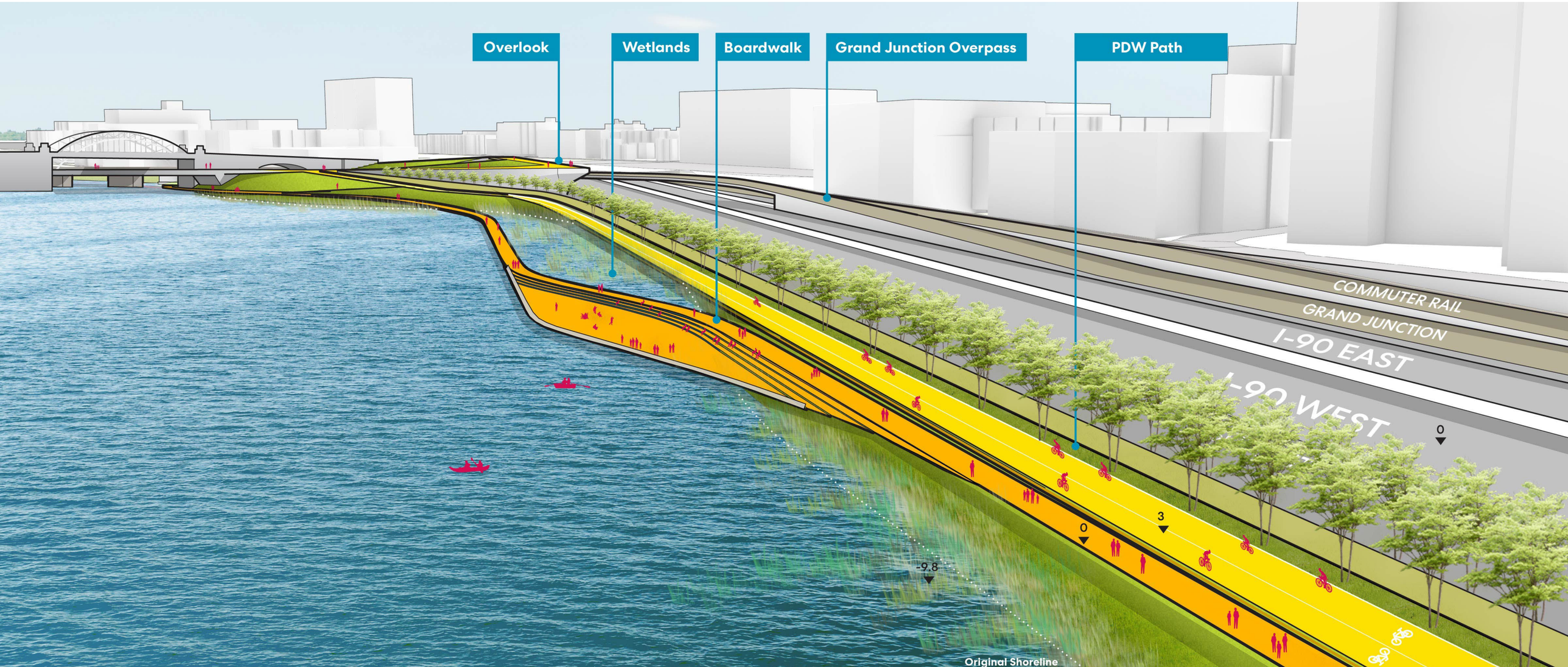
BU Bridge Open Space

Throat Condition | Alternative 1A

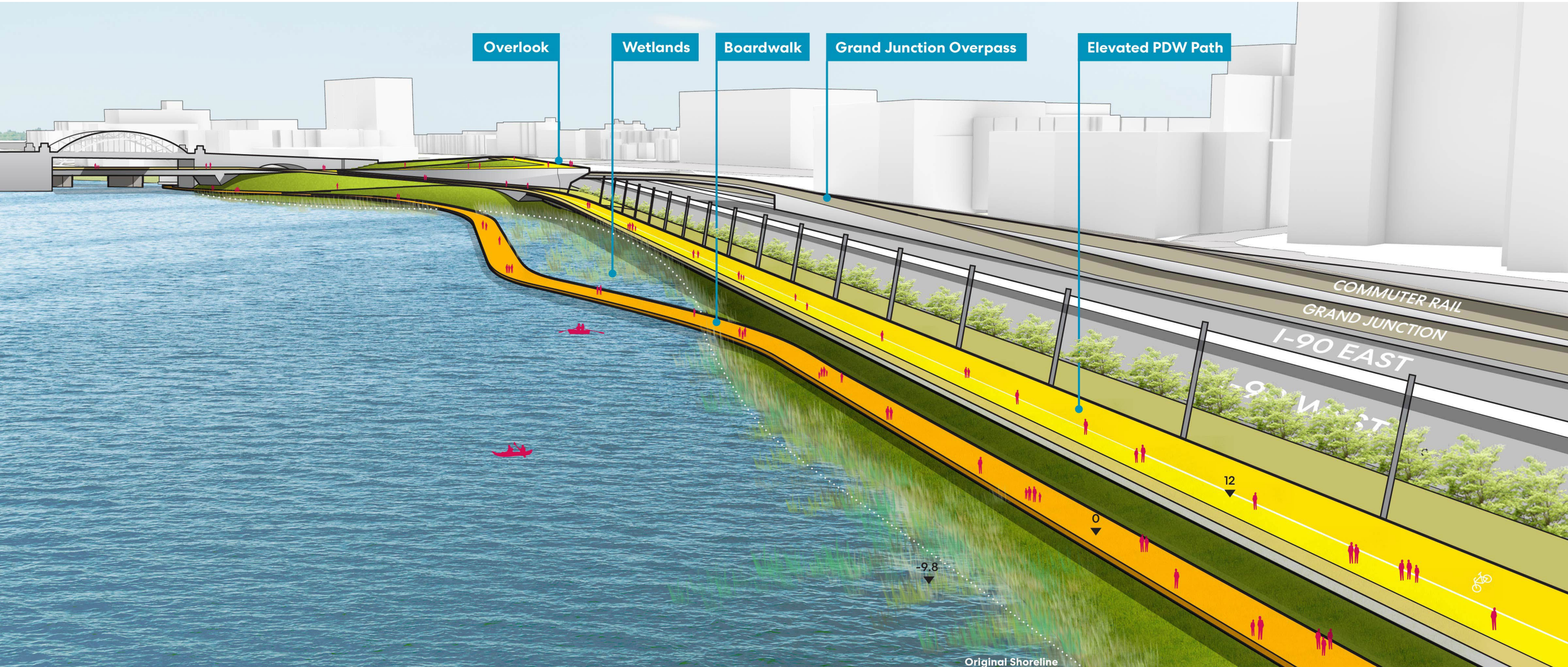


Throat Condition | Alternative 1A

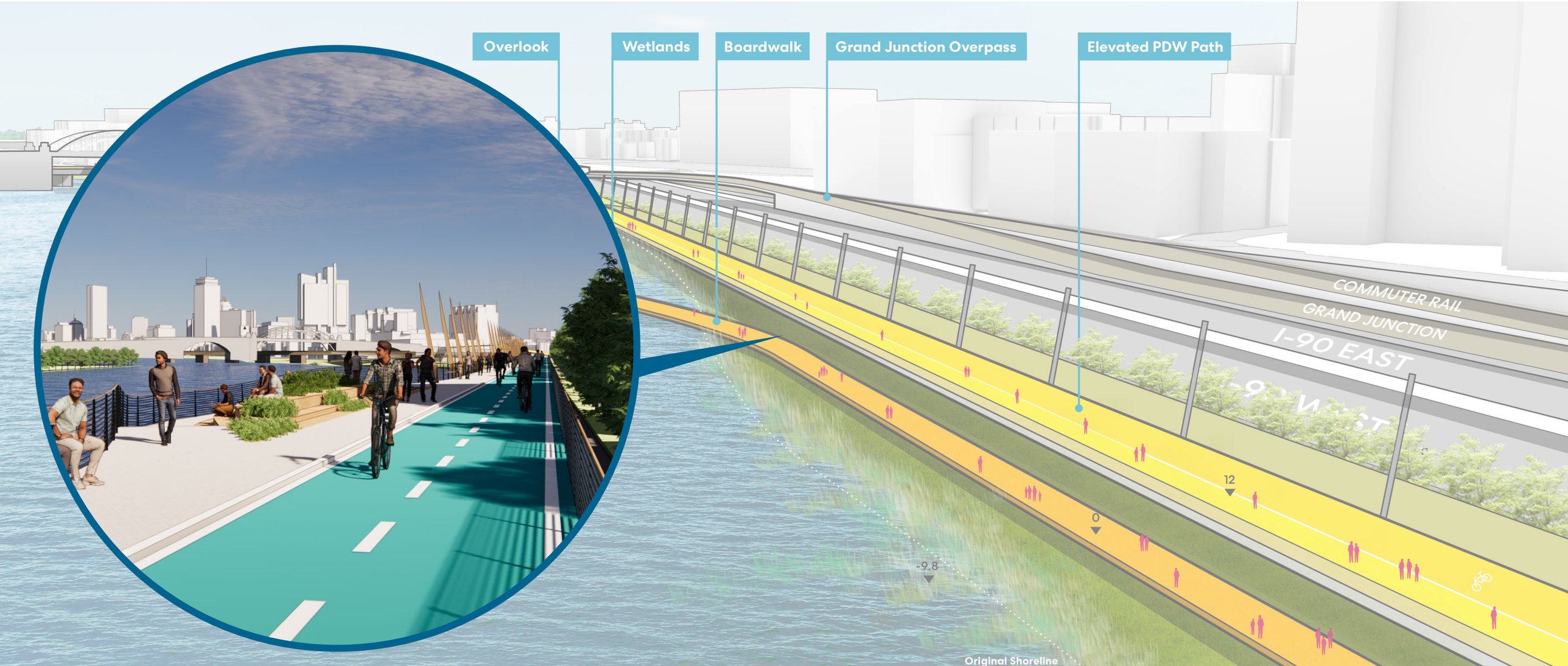
Throat Condition | Alternative 1B



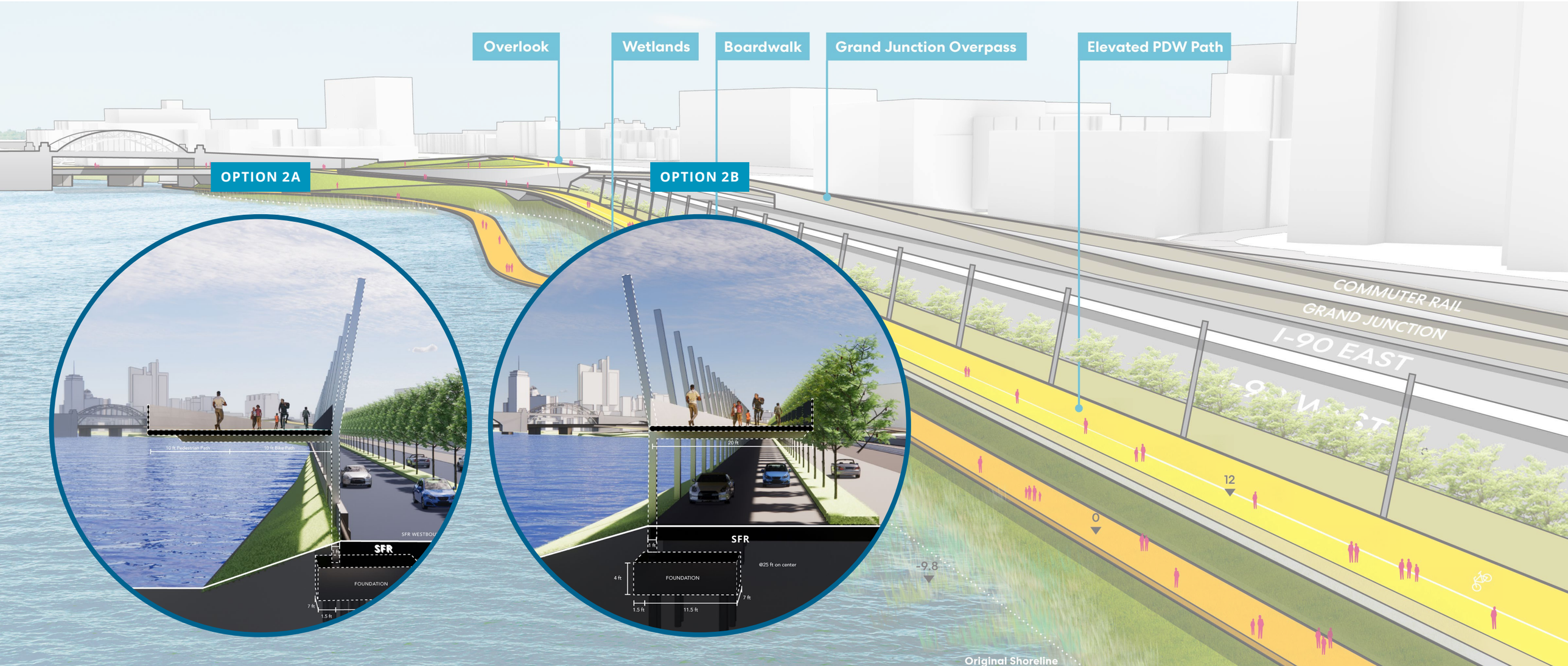
Throat Condition | Alternative 2



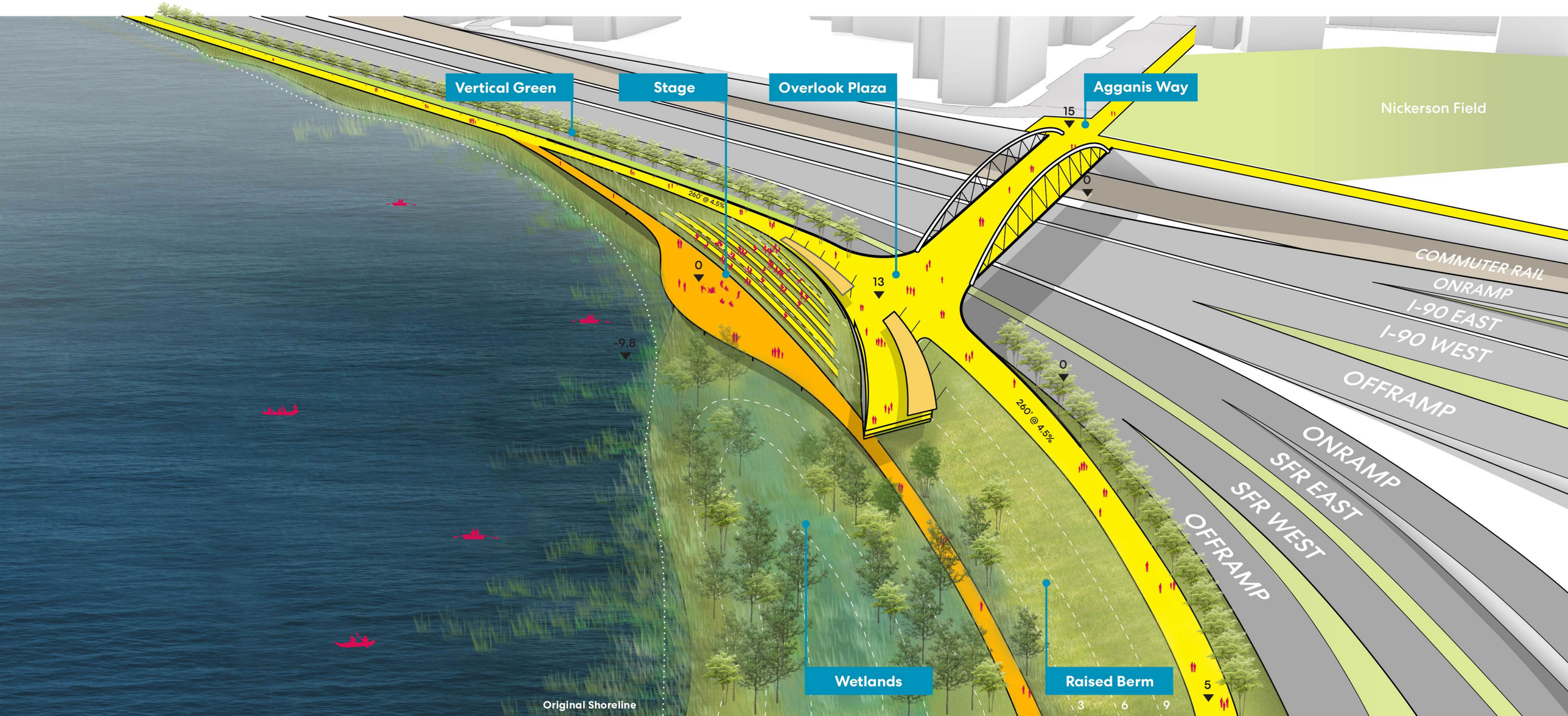
Throat Condition | Alternative 2



Throat Condition | Alternative 2



Agganis Connection



Agganis Connection | MASSDOT Option

Agganis Connection | All At-Grade Option

Next Steps

- **Transparency in process:** put all the variables, constraints, details on the table
- **Trans-disciplinary approach:** Instead of a siloed approach, holistic approach of a systems approach for a shared benefit
- **Ownership:** Amongst all stakeholders, City agencies have the opportunity to champion and create a unifying platform
- **Advocacy and Funding:** Allocating a committee and funds to support stakeholder groups to participate in the planning process