PDC
PRELIMINARY
REVIEW

RED HOOK COASTAL RESILIENCY (RHCR)

PUBLIC DESIGN COMMISSION PRESENTATION

FOR PRESENTATION PURPOSES ONLY

Eric Adams
Mayor

Thomas Foley
Commissioner

Mayor's Office of Climate & Environmental Justice

NEW YORK CITY DOT

NYC Environmental Protection

NYC EDC

AUGUST 8, 2022

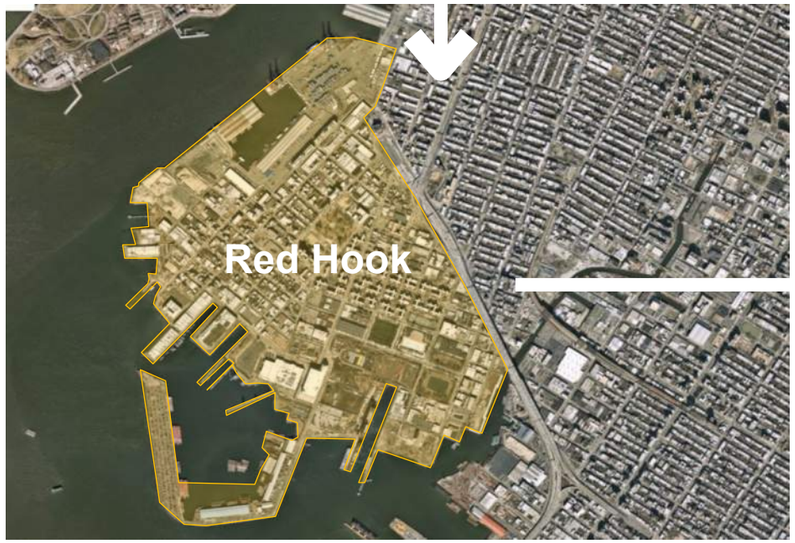
GOALS

- Maintain a passive Flood Protection System (FPS) at elevation 8-ft
- Deployable features are activated to achieve an FPS at elevation 10-ft
- Minimal impacts to pedestrian, bike, and vehicle circulation
- Maintain neighborhood connectivity and access to active waterfront
- Enhance and incorporate the Brooklyn Waterfront Greenway

PROJECT LOCATION

City

1 MI

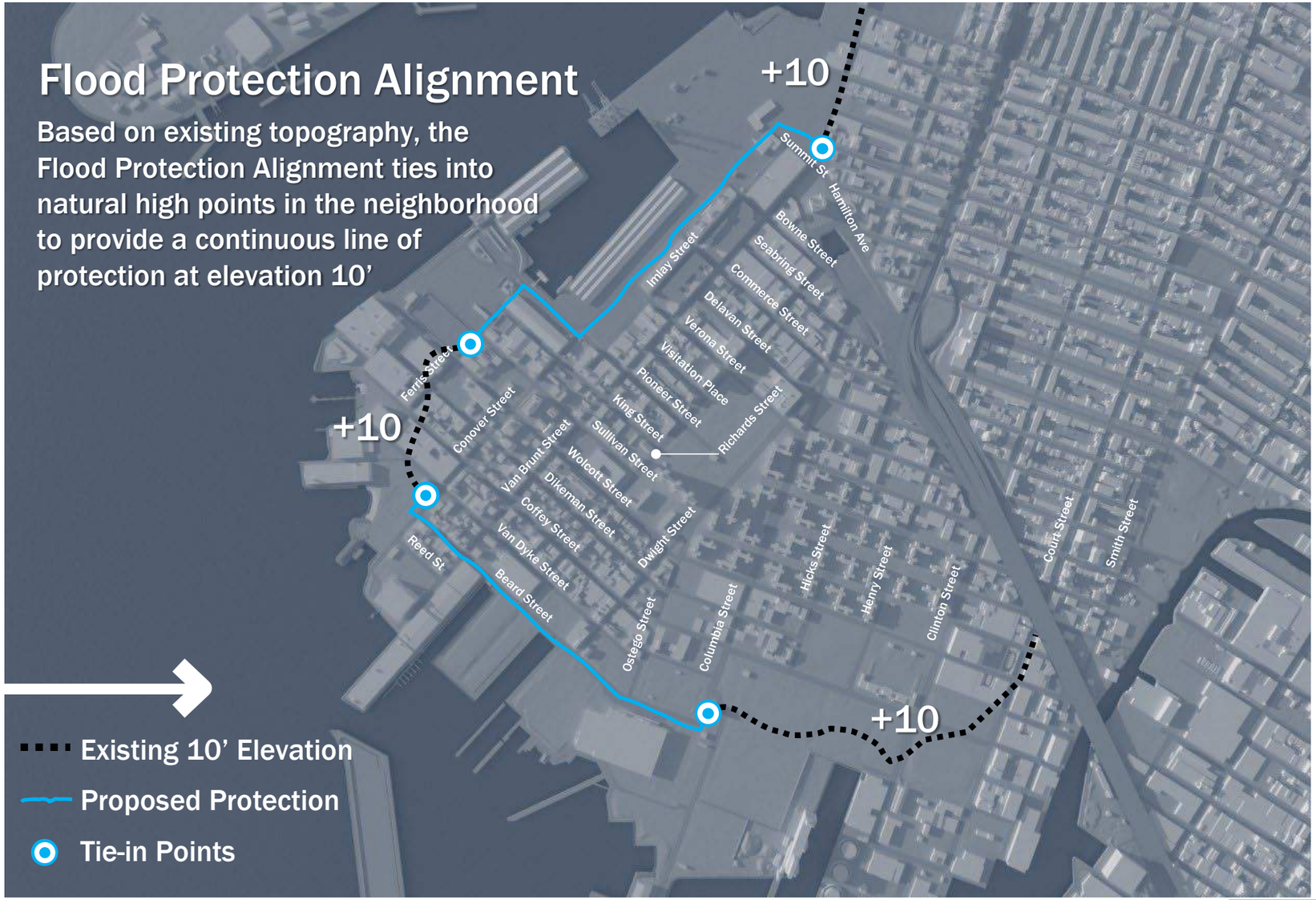


Neighborhood

1000 FT

Flood Protection Alignment

Based on existing topography, the Flood Protection Alignment ties into natural high points in the neighborhood to provide a continuous line of protection at elevation 10’



Site

200 FT

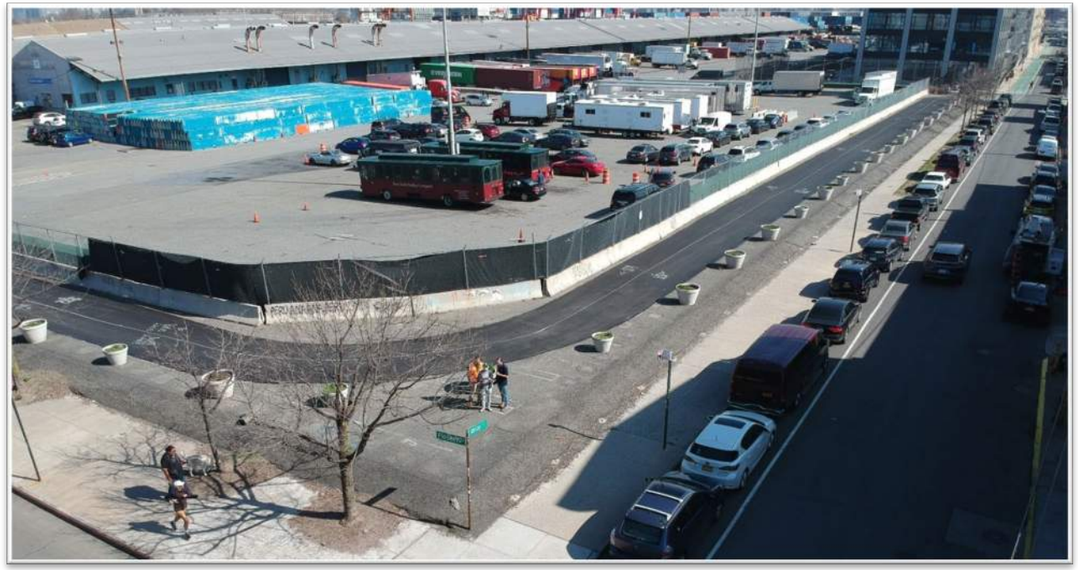
EXISTING CONDITIONS

1 – Looking West on Summit Street From Hamilton Avenue

2 – Looking South down Imlay Street

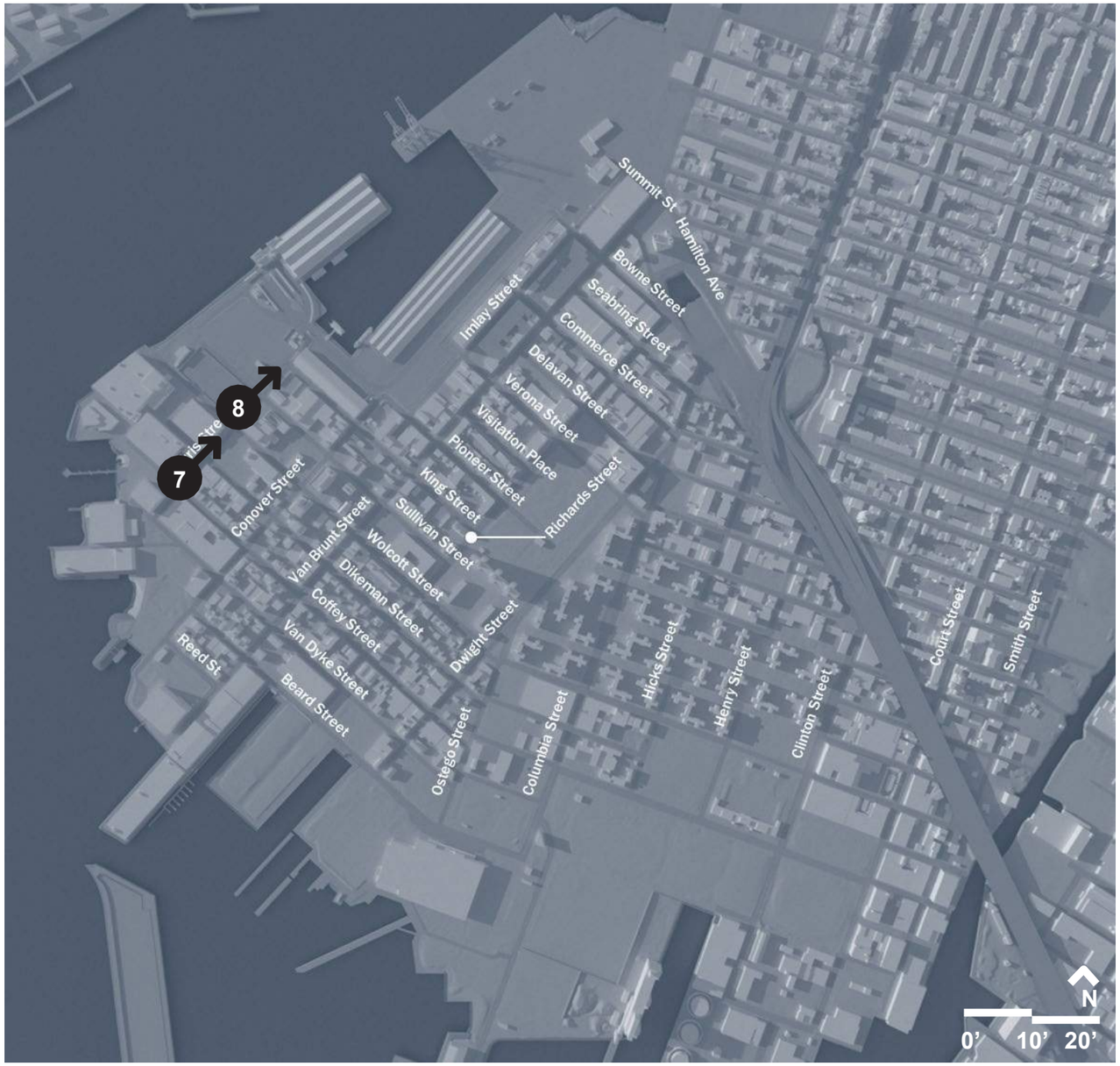
3 – Within Port Authority Terminal looking southeast

4 – Looking West on Bowne Street from Imlay Street



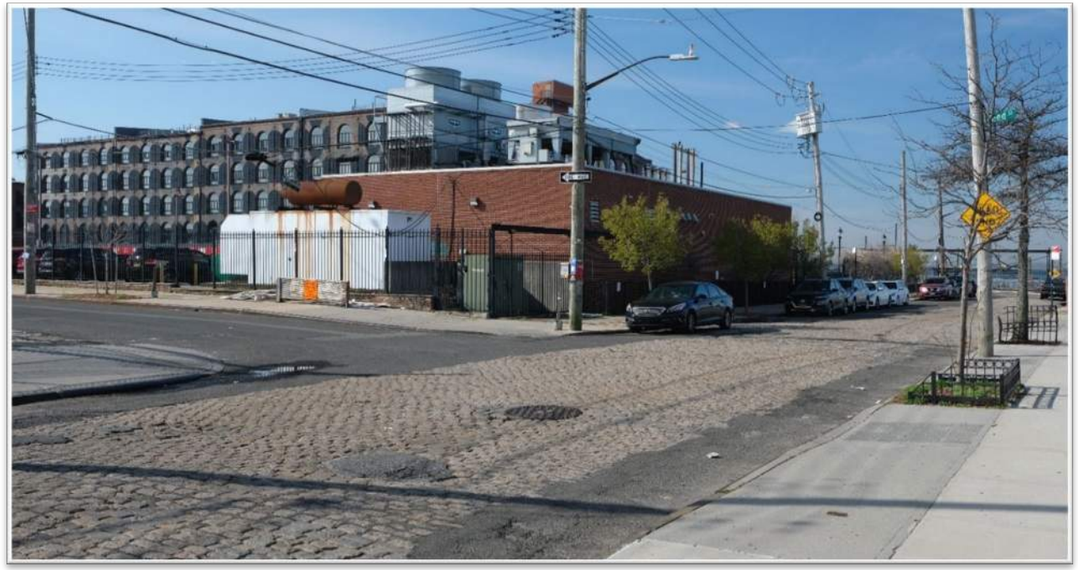
5 – Looking Northwest on Imlay Street from Pioneer Street

6 – Looking East on Pioneer Street from Imlay Street

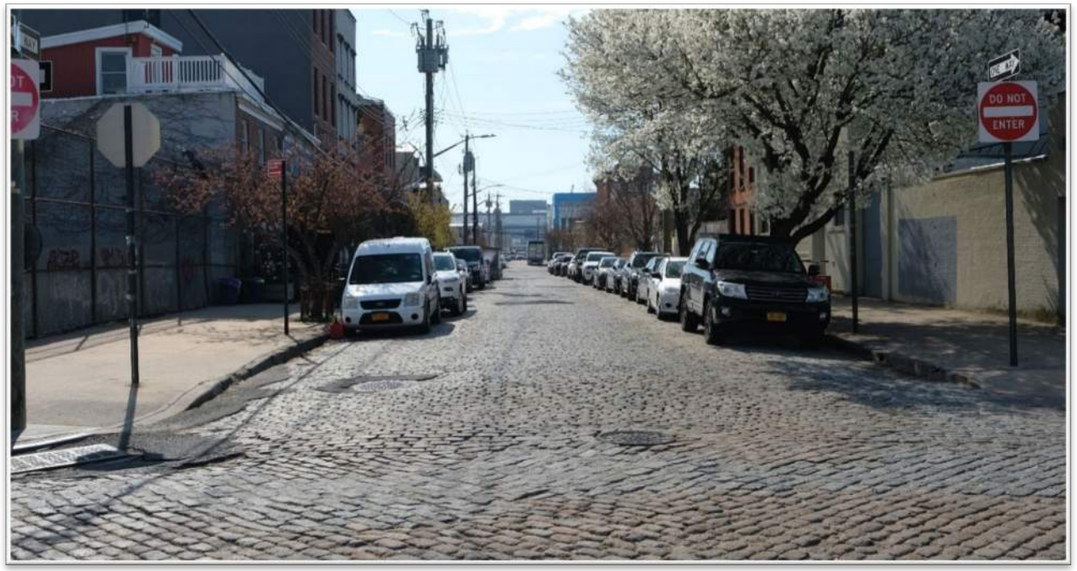


7 – Looking Northwest on Imlay Street from Pioneer Street

8 – Looking East on Pioneer Street from Imlay Street



9 – Looking South at Reed Street from Conover Street



10 – Looking East on Beard Street from Conover Street

11 – Looking South at on Van Brunt Street from Beard Street

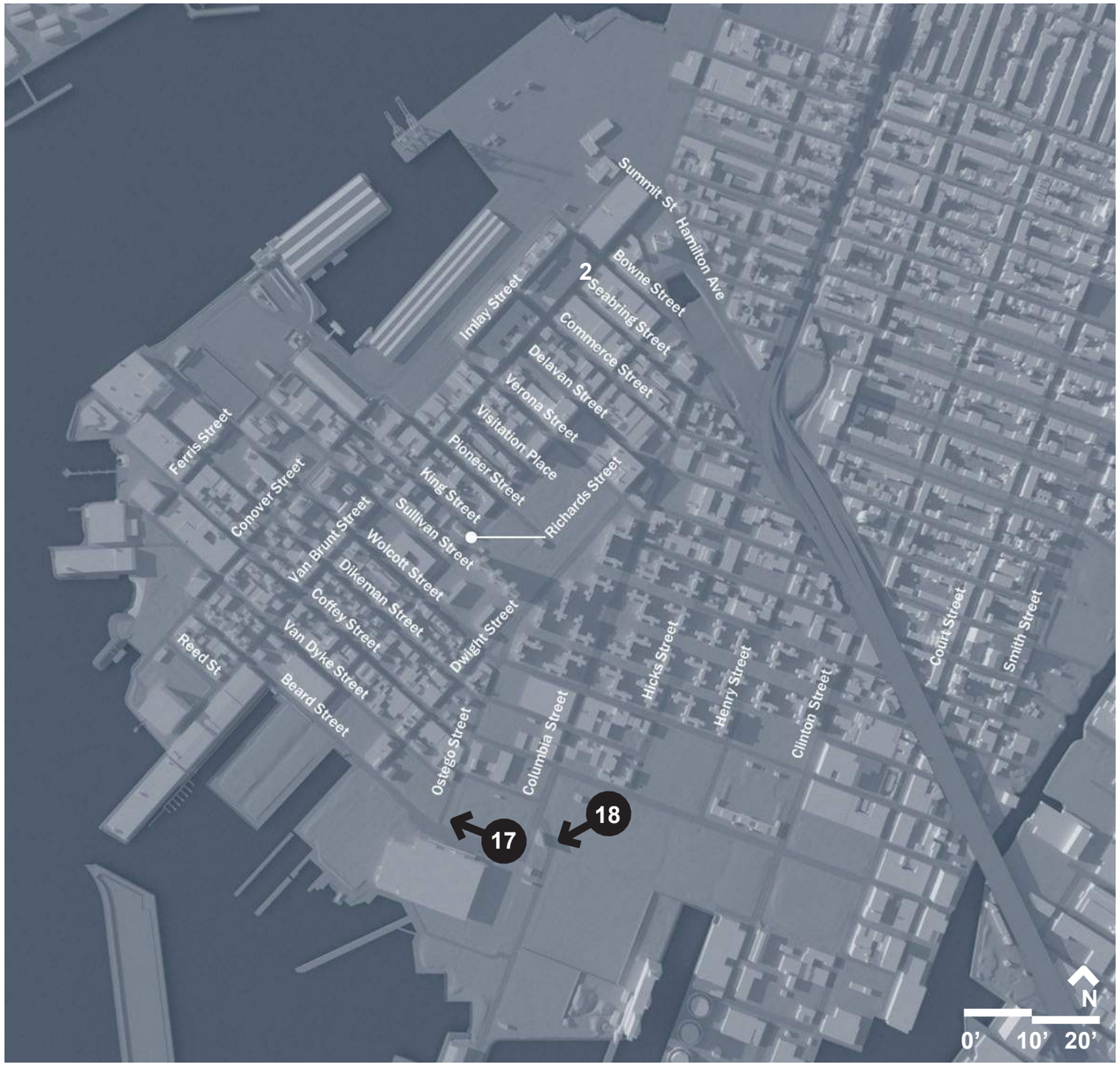
12 – Looking East on Beard Street from Van Brunt Street

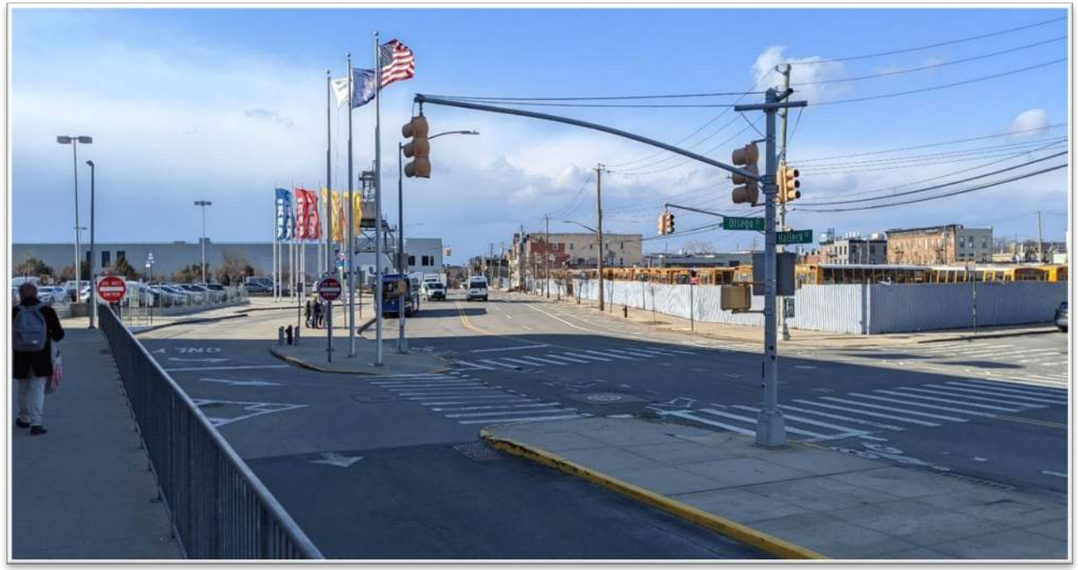
12 – Looking South at Pier from Beard Street

13 – Looking south at Ikea Park from Beard Street

14 – Looking East at street level on Beard Street

15 – Looking East on Halleck Street in front of ikea





17 – Looking West on Halleck Street in front of Ikea

18 – Looking Southwest at Todd Triangle

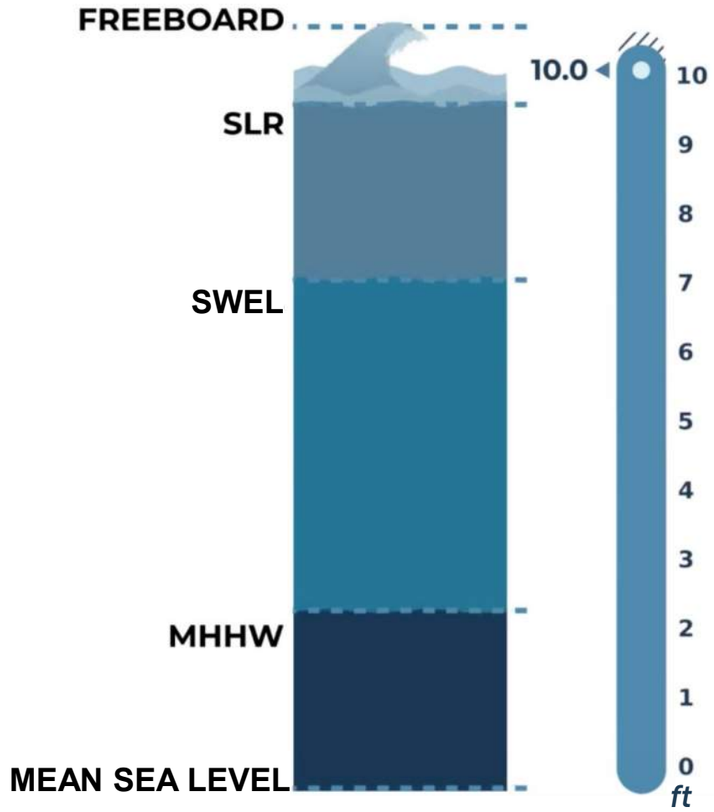
VISUALIZING THE ISSUE


Red Hook Flooding
Existing Conditions
Elev. 10-ft

THE SCIENCE BEHIND THE SOLUTION

Optimizing The Project's Design Flood Elevation (DFE)

DFE is the total elevation adopted to provide flood risk reduction



ELEVATIONS:

Freeboard. The additional structure height needed above the DFE to protect against wave overtopping during a flood event

Sea Level Rise (SLR). The change in elevation of the sea level over time, (i.e., increase in Stillwater Elevation).

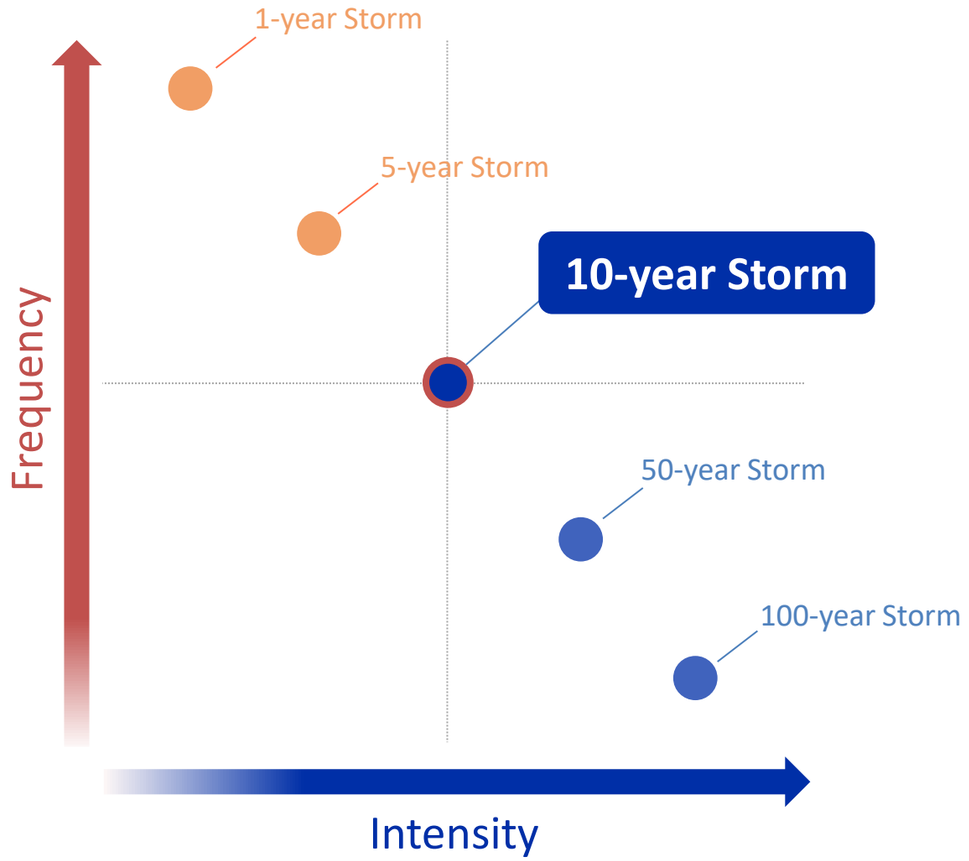
Still Water Elevation Level (SWEL). The projected elevation of floodwaters in the absence of waves.

Mean Higher High Water (MHHW). The average of the highest Tide recording from each tidal day. For NYC this is recorded by the NOAA station at the Battery in Lower Manhattan.

Mean Sea Level. Average height of the sea between high and low tide.

Frequency of Different Coastal Storms

The project's 10-ft level of protection is equivalent to a 10-year coastal storm, which is a frequent and intense storm



1-year Storm
a sea level that has 100% chance of occurring every year

5-year Storm
a sea level that has 20% chance of occurring every year

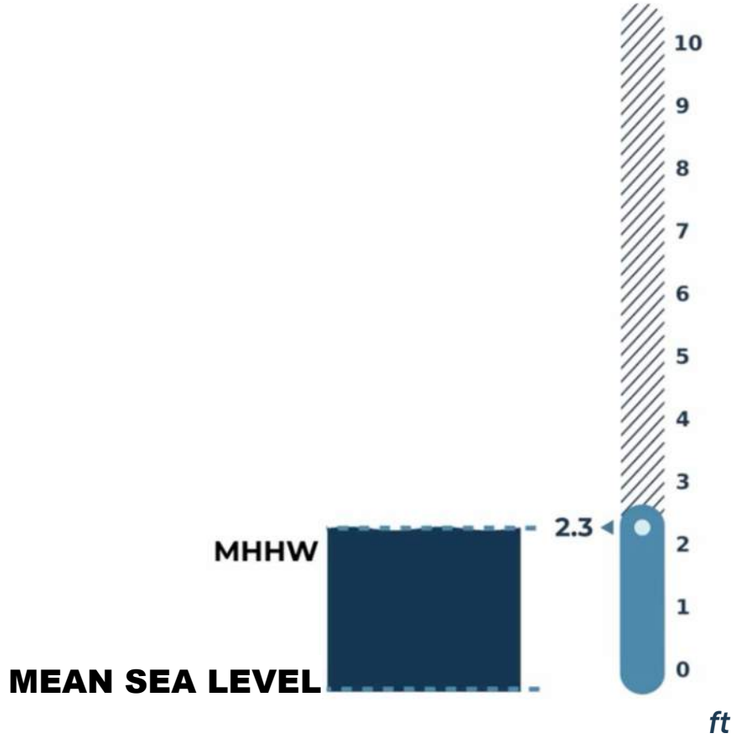
10-year Storm
a sea level that has **10% chance** of occurring every year

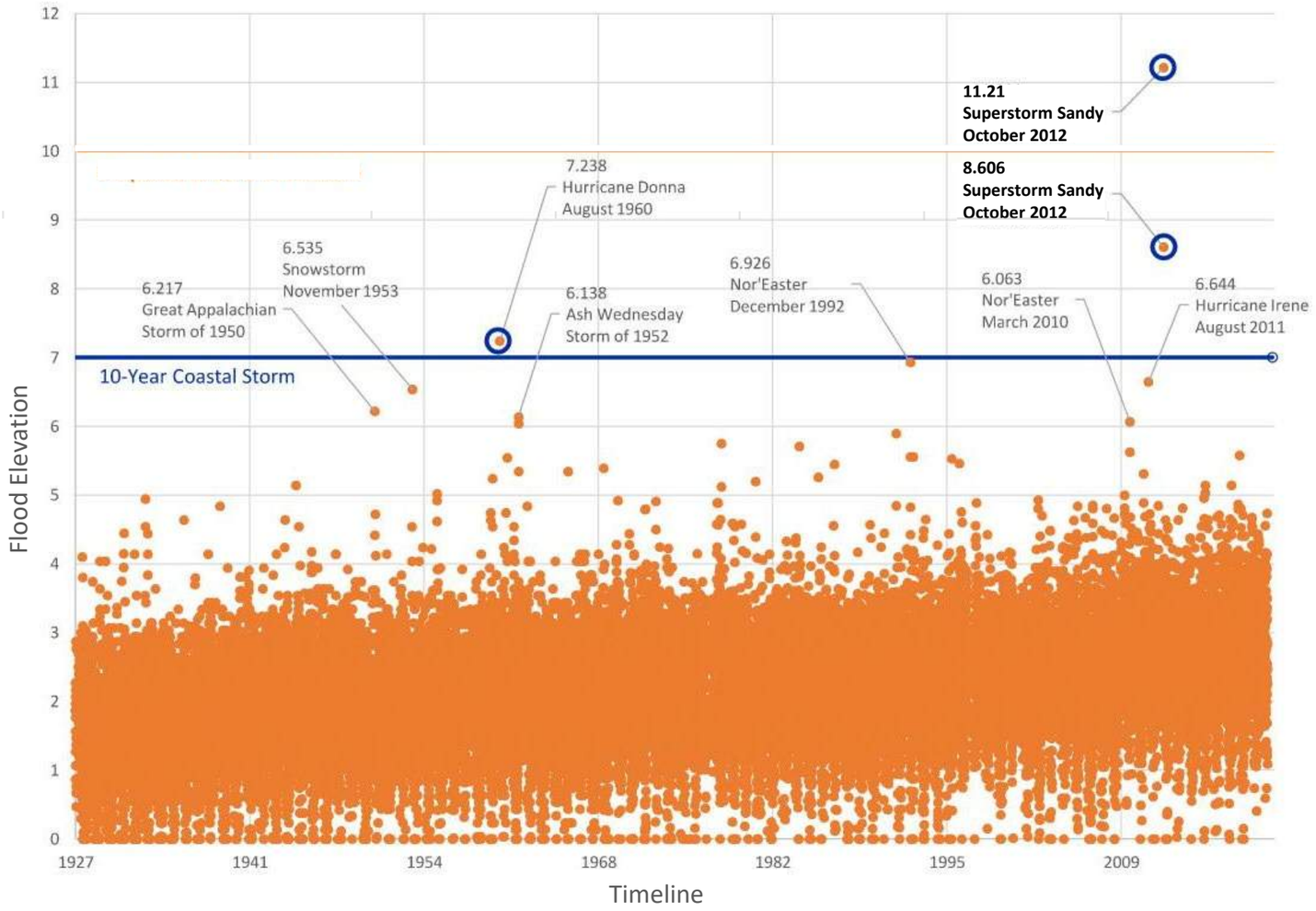
50-year Storm
a sea level that has 2% chance of occurring every year

100-year Storm
a sea level that has 1% chance of occurring every year

Optimizing The Project's Design Flood Elevation (DFE)

Almost every storm in Red Hook has been under 7-ft elevation

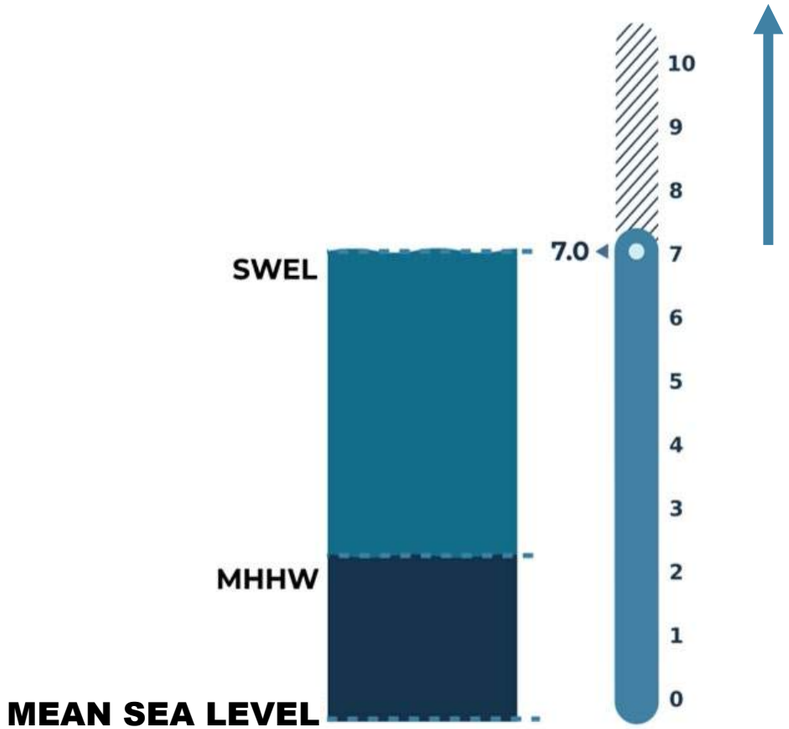




Tide Elevation Data from 1927 – 2020, from the National Oceanic and Atmospheric Administration (NOAA)

Optimizing The Project's Design Flood Elevation (DFE)

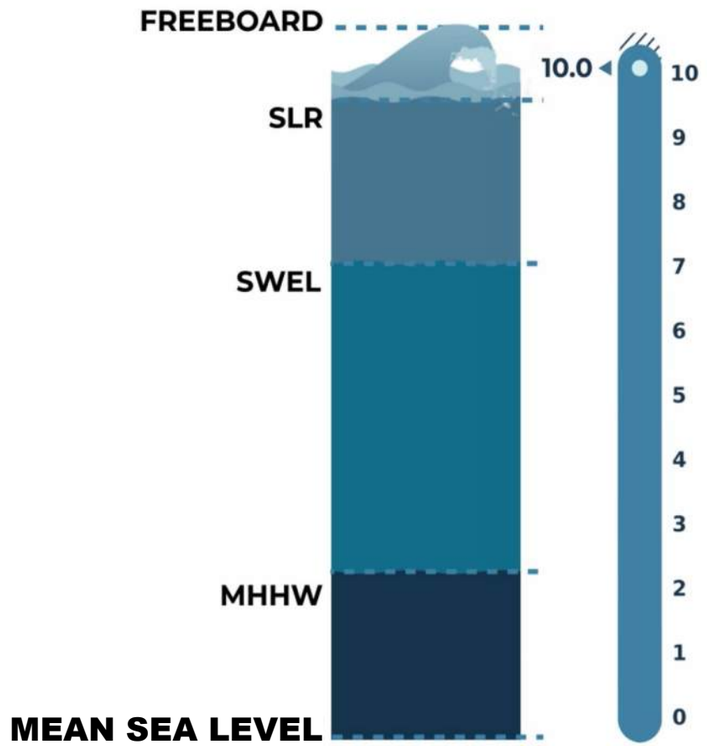
This project incorporates the highest estimate of Sea Level Rise at 30-inches, to protect against the most frequent storm now and into the future

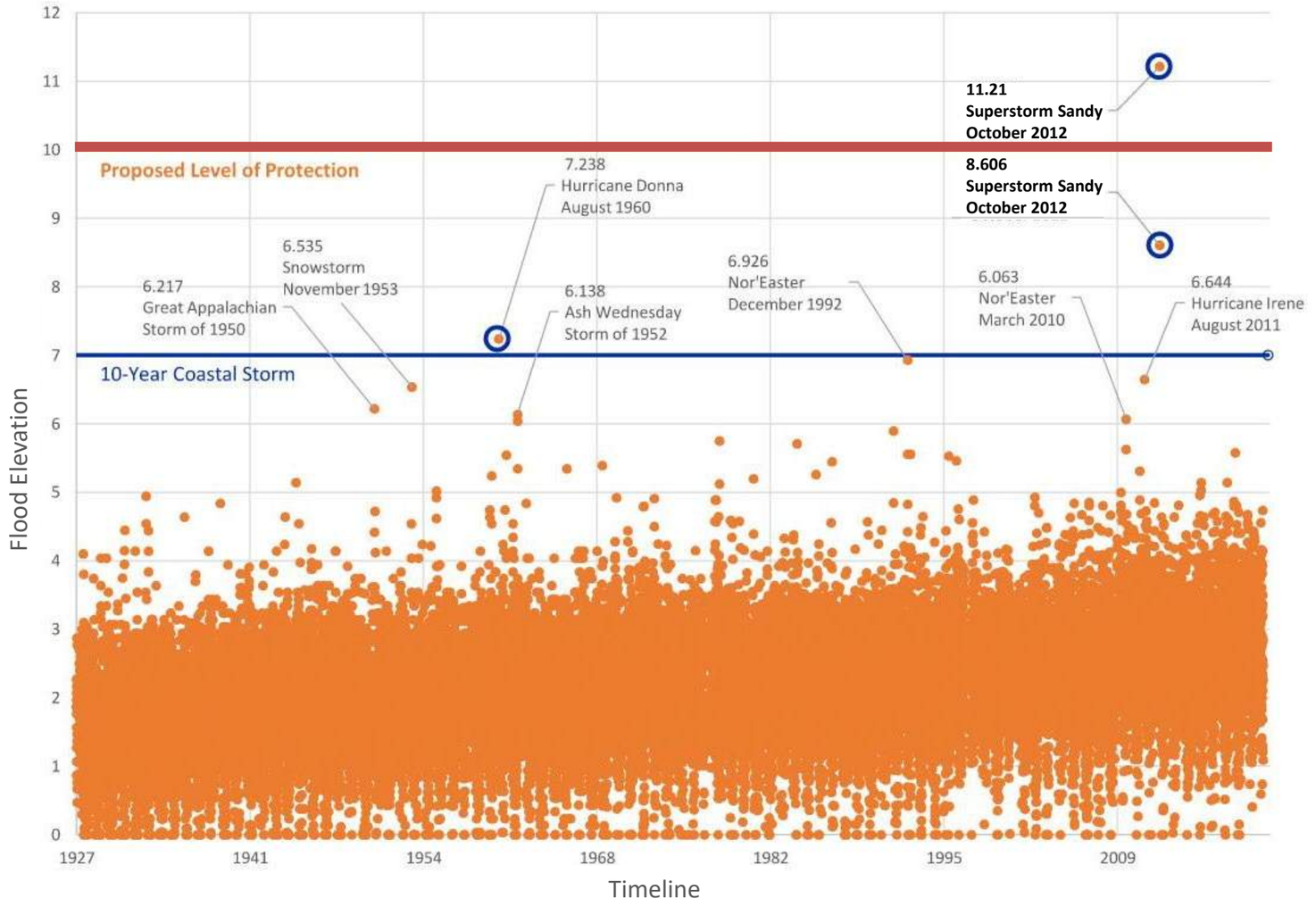


- NYC Panel of Climate Change (NYCPCC) has established Sea Level Rise (SLR) Projections based on 24 Global Climate Models
- Sea Level Rise NYC has averaged 0.15 in/year in recent years
- Current Sea Level Rise Projections from the NYCPCC for the 2050s, ranges from **min 8-inches to max 30-inches**

Optimizing The Project's Design Flood Elevation (DFE)

With a 10-ft level of protection, this project is protecting against the most frequent storms now and into the future



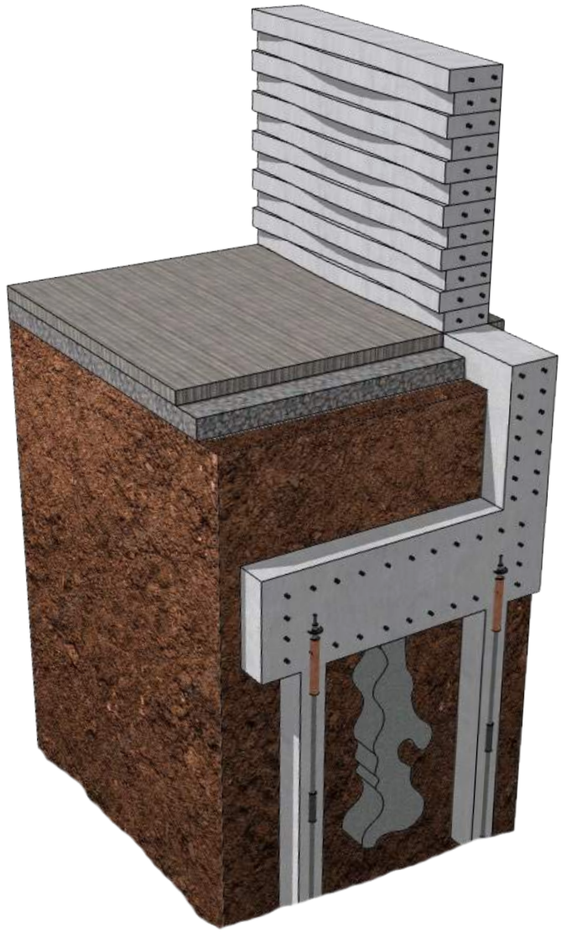


Tide Elevation Data from 1927 – 2020, from the National Oceanic and Atmospheric Administration (NOAA)

RESILIENCY ELEMENTS

Design

- Consistent with City's Coastal Resiliency projects – ex. ESCR, BMCR
- Walls continue below grade approx. 4-feet
- Walls are supported on pile foundations
- Seepage barriers extend below wall footings
- Every 6-inches of the flood wall is represented by a banded pattern
- Wall heights will be published at wall ends
- Pattern spacing is consistent for all walls



Design

- ESCR Flood Wall during Construction

Wall foundation at Stuyvesant Cove Park, July 2021

Design

- ESCR Flood Wall during Construction

Wall foundation and formwork at Stuyvesant Cove Park, July 2021

Design

- ESCR Flood Wall during Construction

Rebar and formwork for floodwall at Stuyvesant Cove Park, July 2021

Design

- ESCR Flood Wall during Construction

Rebar and formwork for floodwall at Stuyvesant Cove Park, July 2021

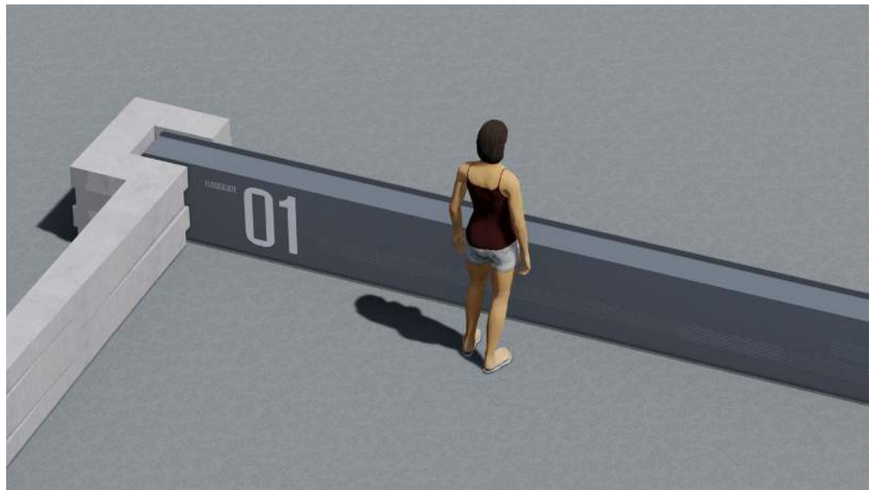
Design

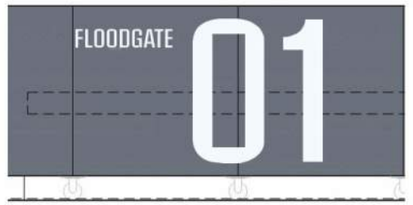
- ESCR Flood Wall during Construction

First section of completed floodwall at Stuyvesant Cove Park, July 2021

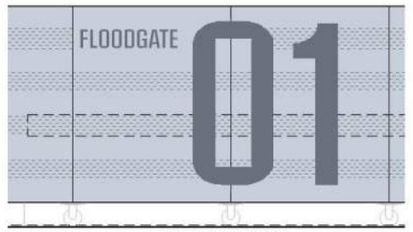
Design

- Consistent with City's Coastal Resiliency projects – ex. ESCR, BMCR
- Grey painted steel
- Rounded corners to complement walls
- Extend banding from walls through gates
- Incorporate gate numbering





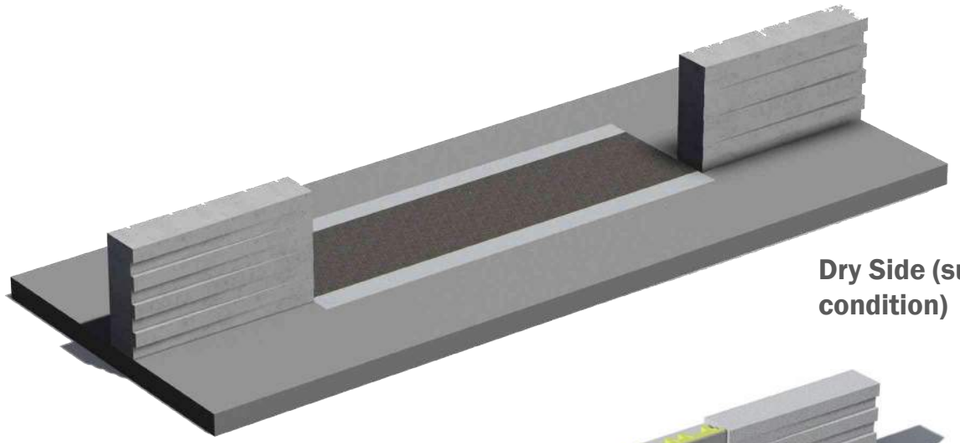
TEXT + LABELING
MUNSEL GREY PAINT (TYP)



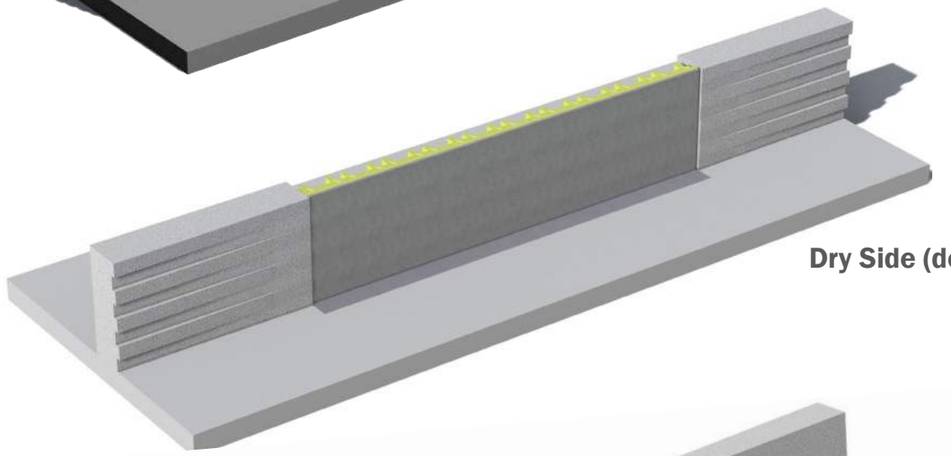
TEXT + LABELING
GW GREY PAINT (ASSER LEVY)

Design

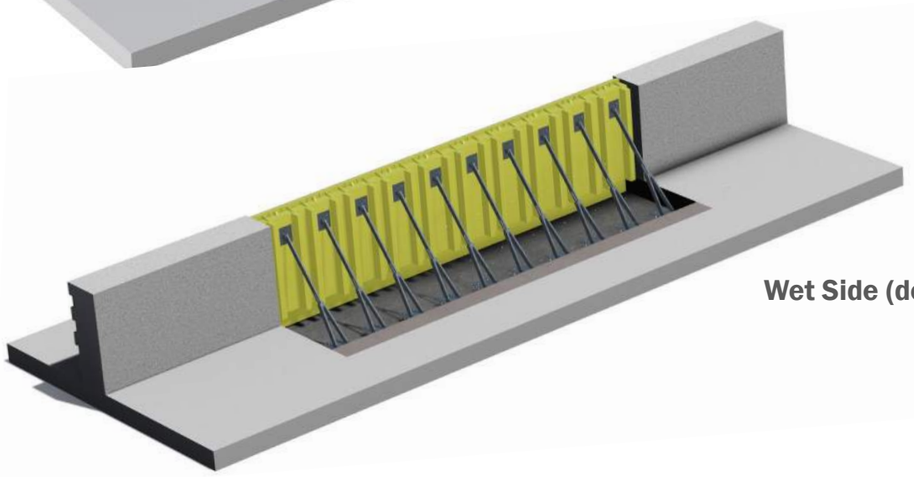
- Consistent with City's Coastal Resiliency projects – ex. ESCR, BMCR
- Alloy aluminum with stainless steel components
- 50-year life expectancy
- Hydraulically deployed or manual
- 1-1/2" thick dark grey grouted architectural finish to differentiate from sidewalk



Dry Side (sunny day condition)



Dry Side (deployed)

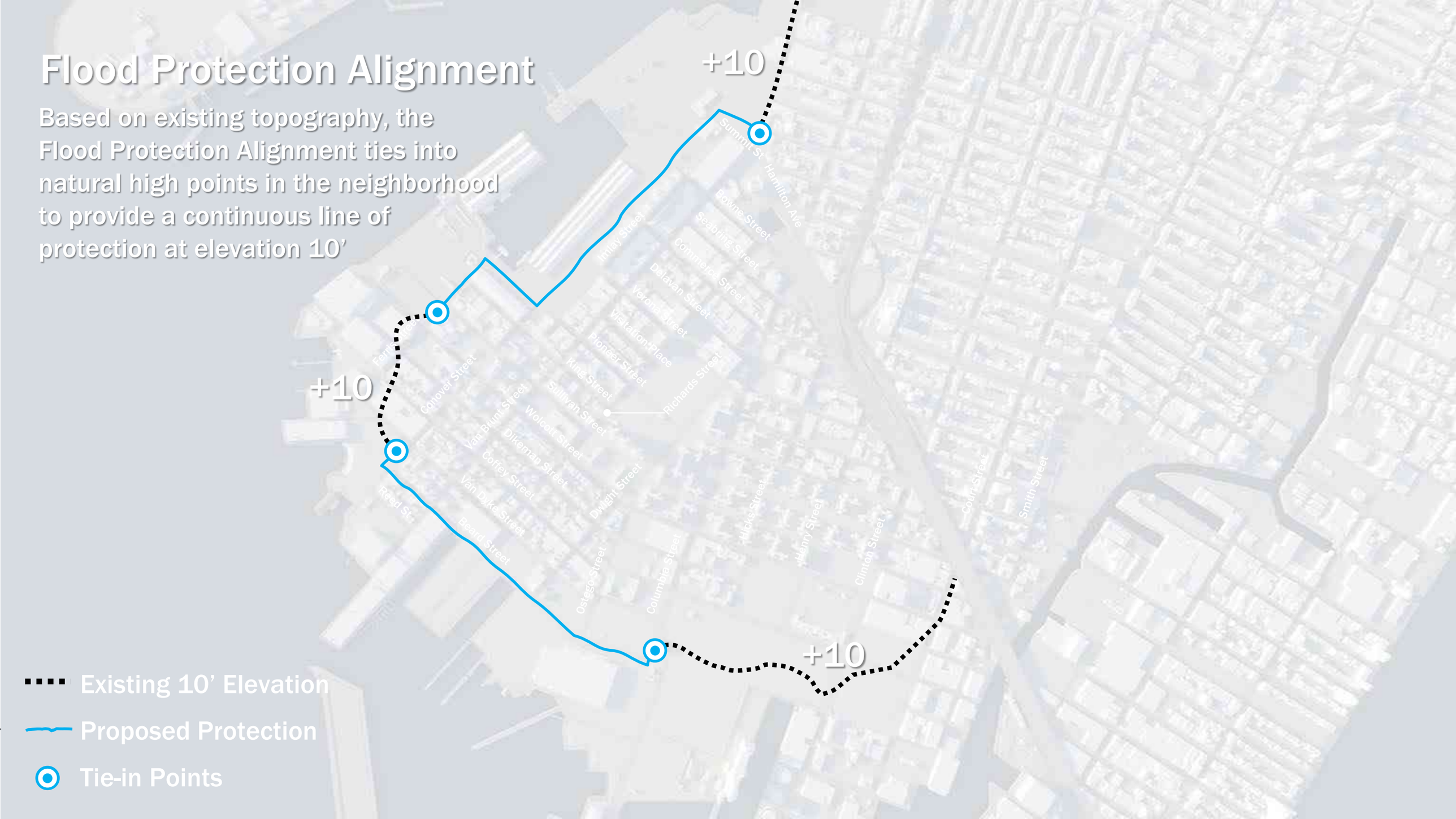


Wet Side (deployed)

PRELIMINARY DESIGN

Flood Protection Alignment

Based on existing topography, the Flood Protection Alignment ties into natural high points in the neighborhood to provide a continuous line of protection at elevation 10’

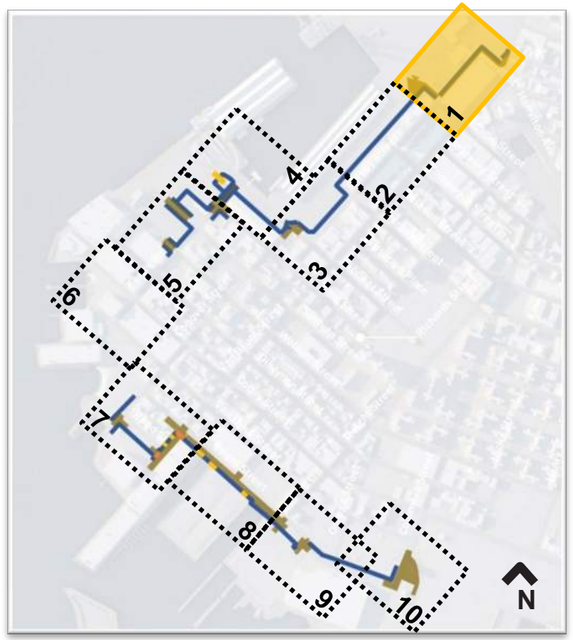


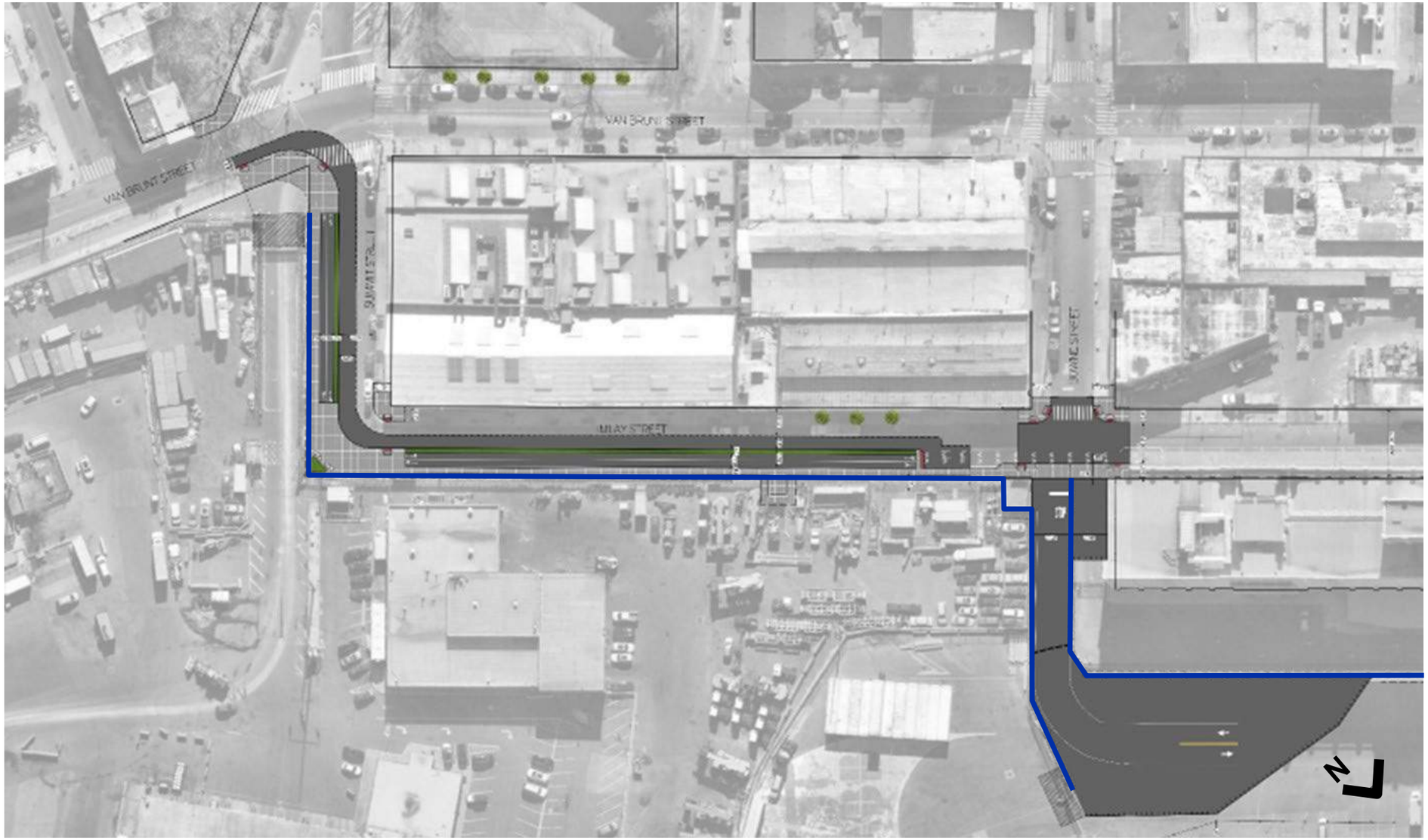
Existing 10’ Elevation

Proposed Protection

Tie-in Points

Plan 1 of 10 Summit Street to Bowne Street
EXISTING CONDITIONS

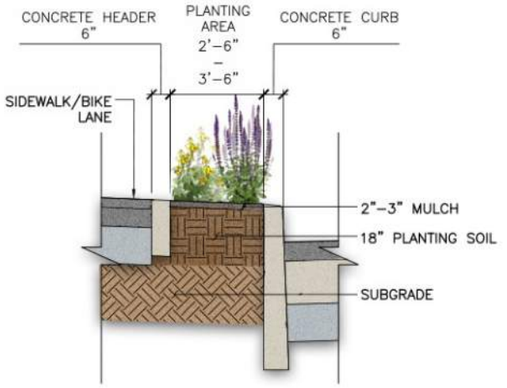




Plan 1 of 10 Summit Street to Bowne Street
PROPOSED CONDITIONS

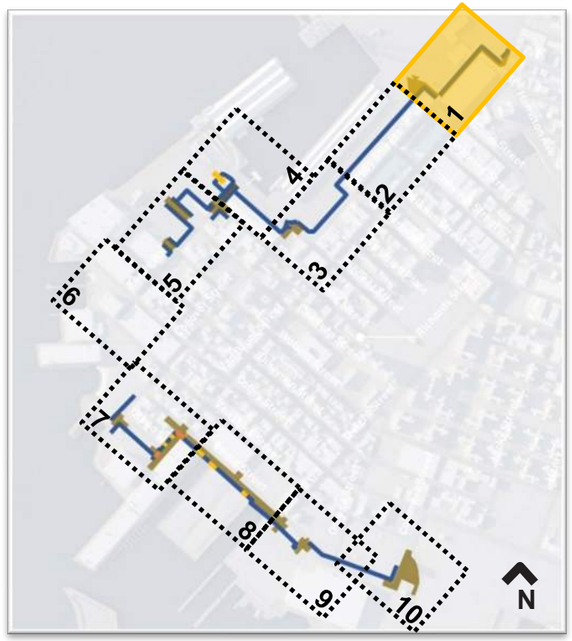
LEGEND

- Floodwall
- Green Strip
- Roadway Improvements
- Sidewalk Improvements



PLANTING TYPE A & B

Note: Refer to slide 76 for Planting Details

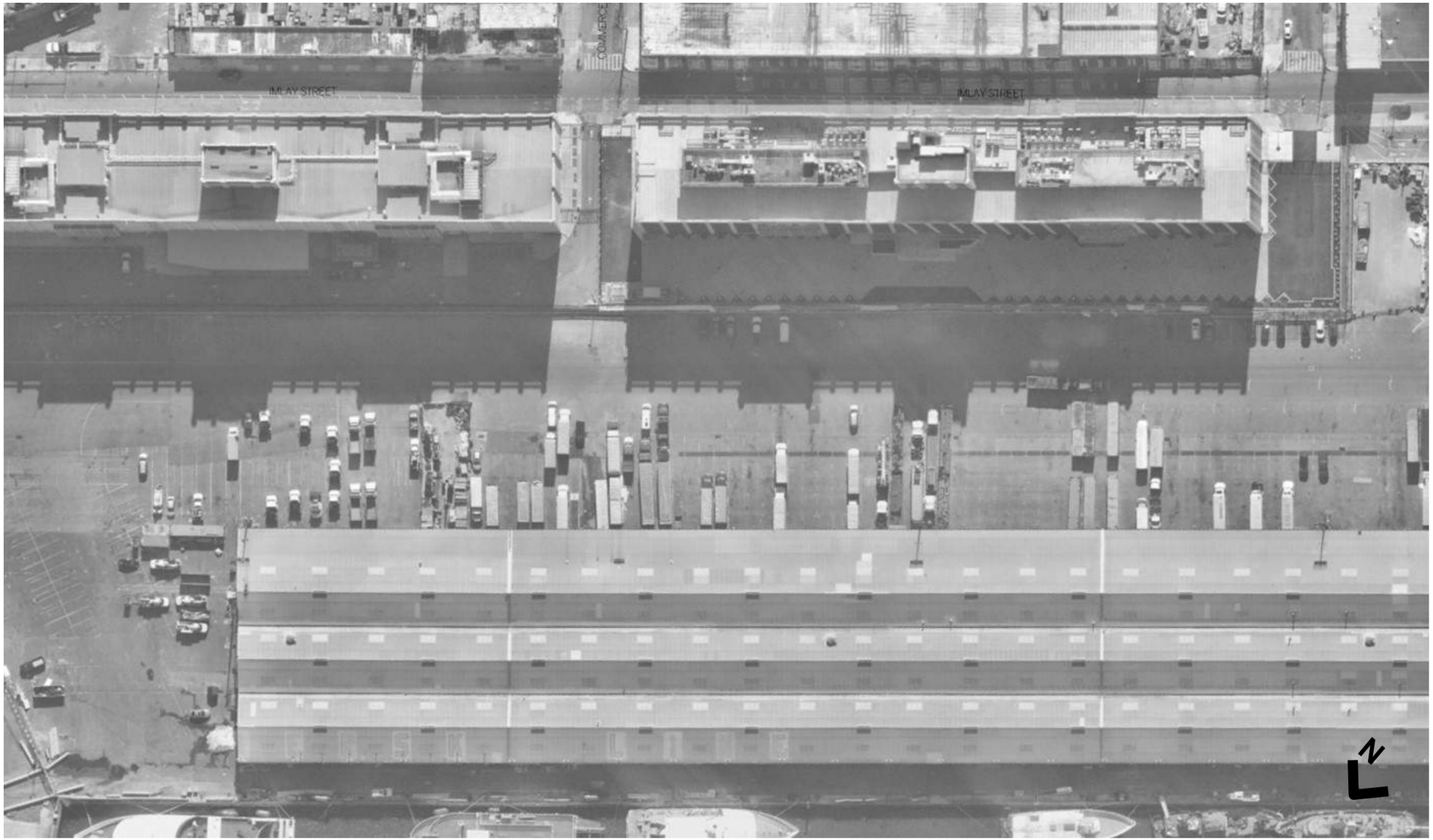


Summit, Imlay and Van Brunt Street

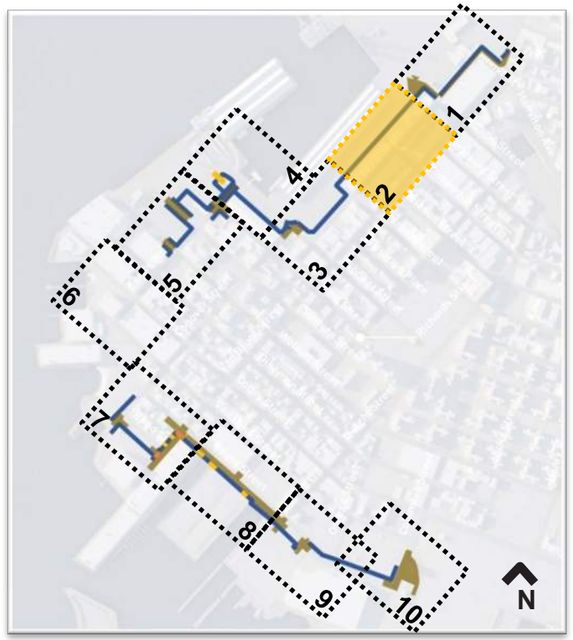
Imlay Street and Bowne Street

NEW RAMP TO BROOKLYN CRUISE TERMINAL

NEW FLOOD PROTECTION WALL



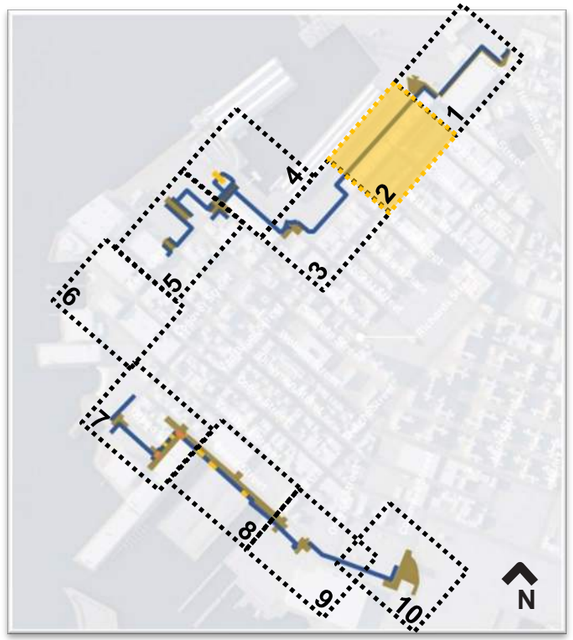
Plan 2 of 10 Bowne Street to Verona Street within the Port Authority Property
EXISTING CONDITIONS

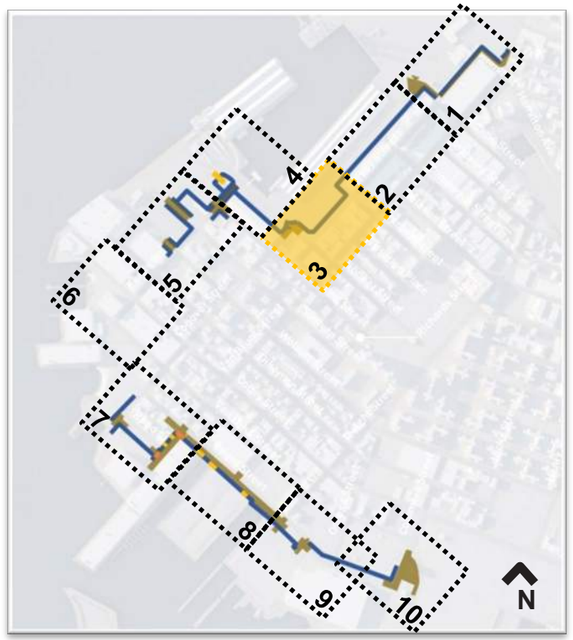


Plan 2 of 10 Bowne Street to Verona Street within the Port Authority Property
PROPOSED CONDITIONS

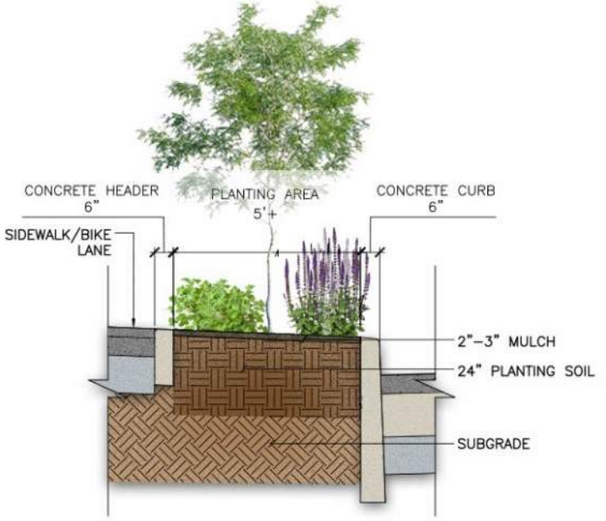
LEGEND

- Floodwall
- Green Strip
- Roadway Improvements
- Sidewalk Improvements



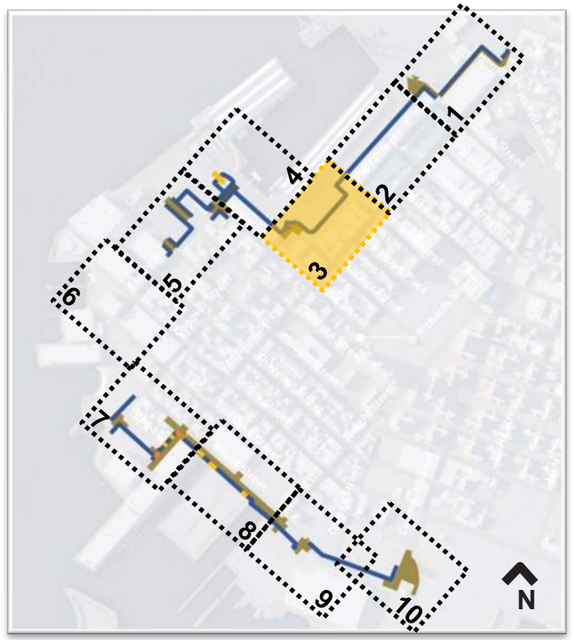


Plan 3 of 10 Verona Street to Pioneer Street
EXISTING CONDITIONS



PLANTING TYPE C

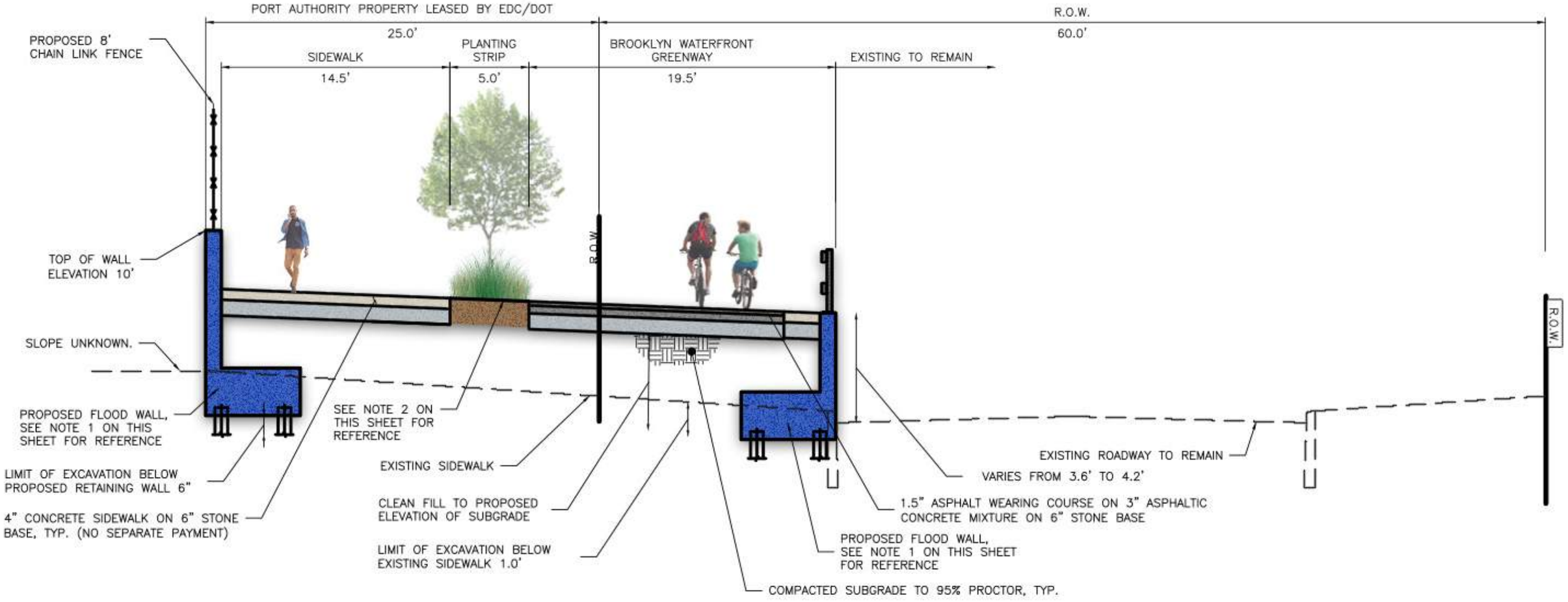
Note: Refer to slide 76 for Planting Details



Plan 3 of 10 Verona Street to Pioneer Street
PROPOSED CONDITIONS

LEGEND

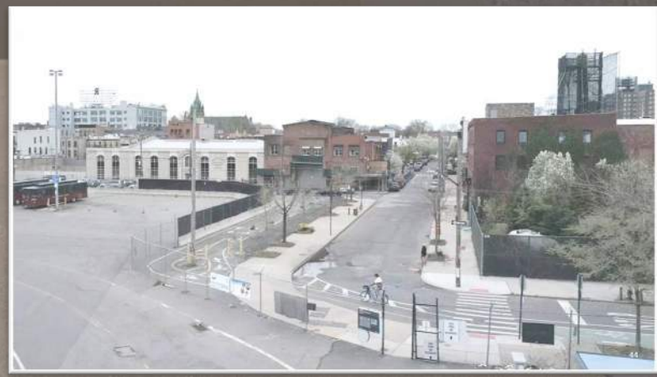
- Floodwall
- Green Strip
- Roadway Improvements
- Sidewalk Improvements

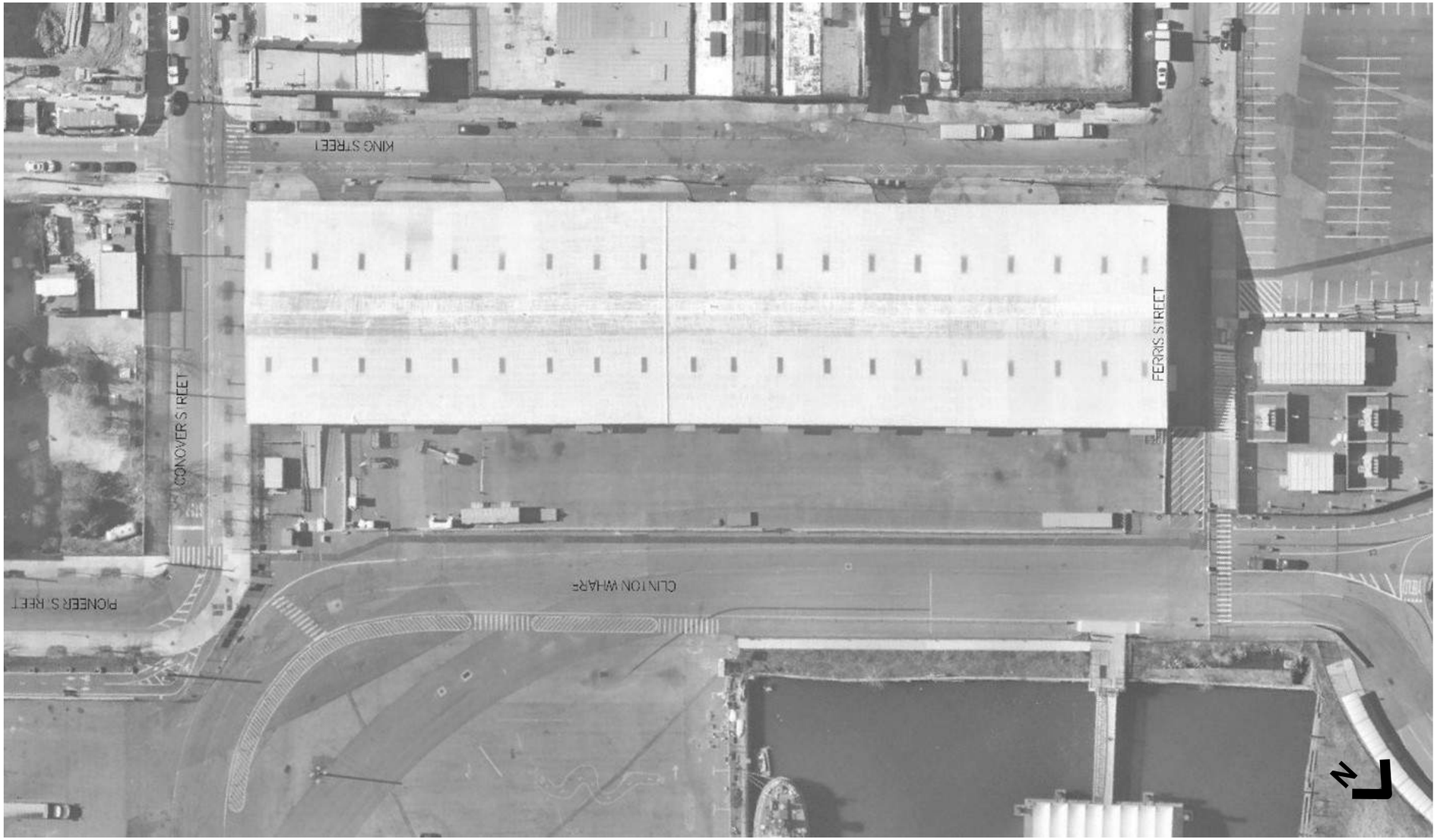


PIONEER STREET TYPICAL SECTION A–A

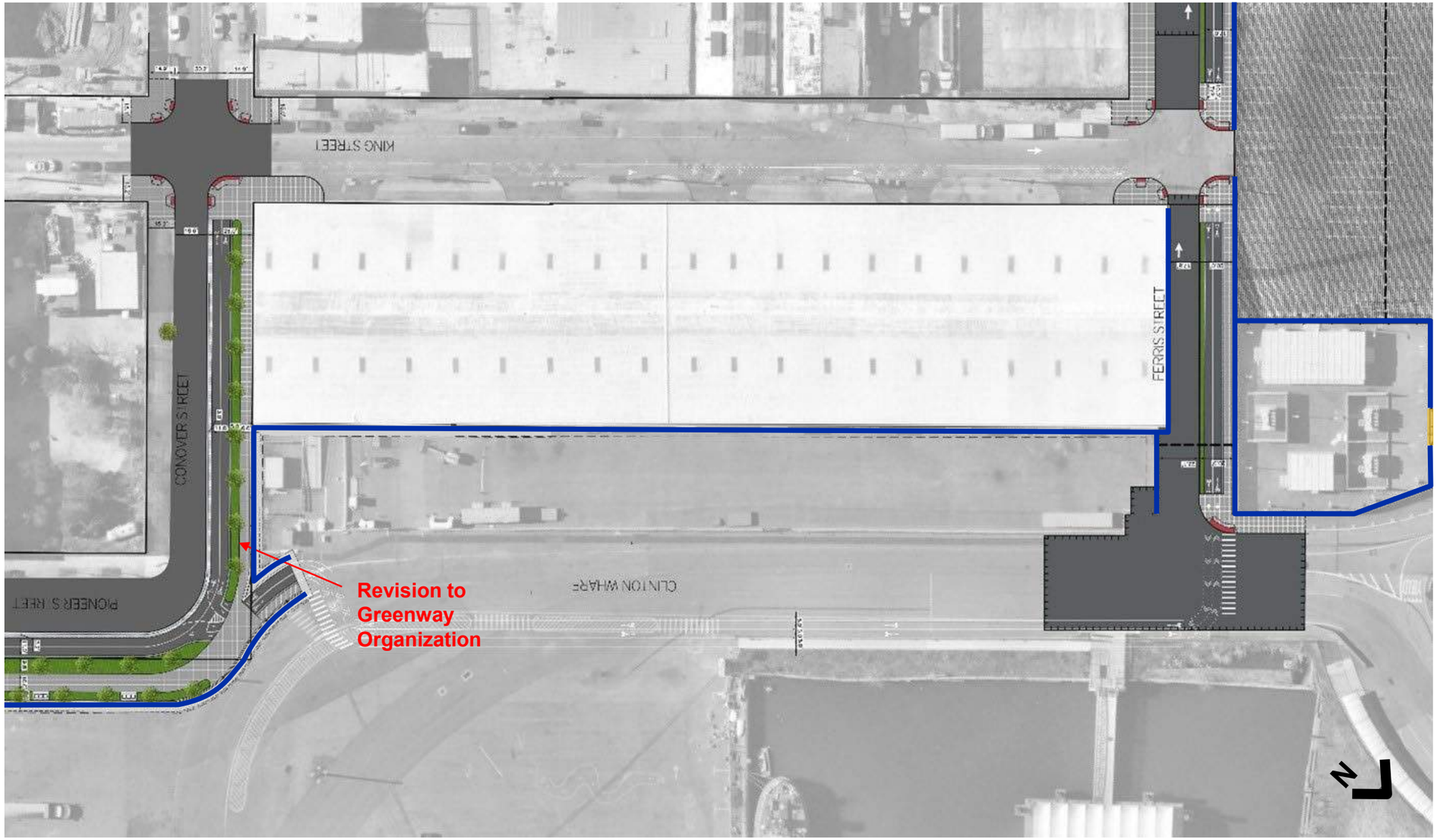
Imlay Street and Bowne Street

Pioneer and Conover Streets





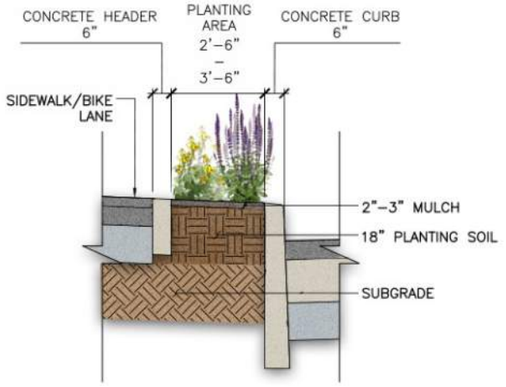
Plan 4 of 10 Pioneer Street to Ferris Street thru Clinton Wharf
EXISTING CONDITIONS



Plan 4 of 10 Pioneer Street to Ferris Street thru Clinton Wharf
PROPOSED CONDITIONS

LEGEND

- Floodwall
- Green Strip
- Roadway Improvements
- Sidewalk Improvements



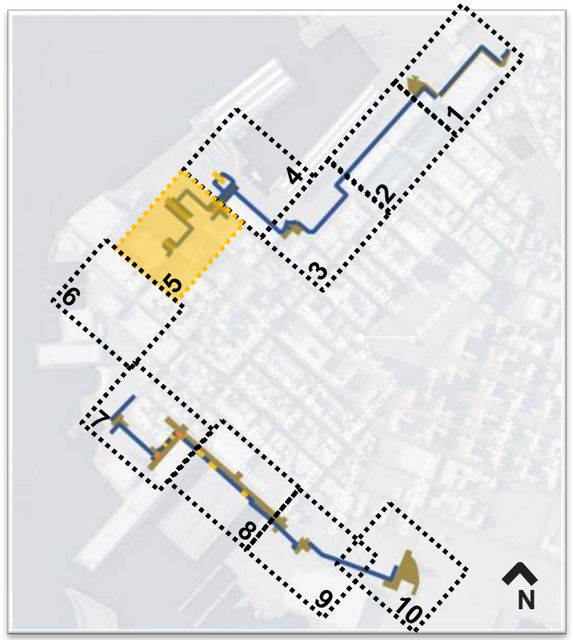
PLANTING TYPE A & B

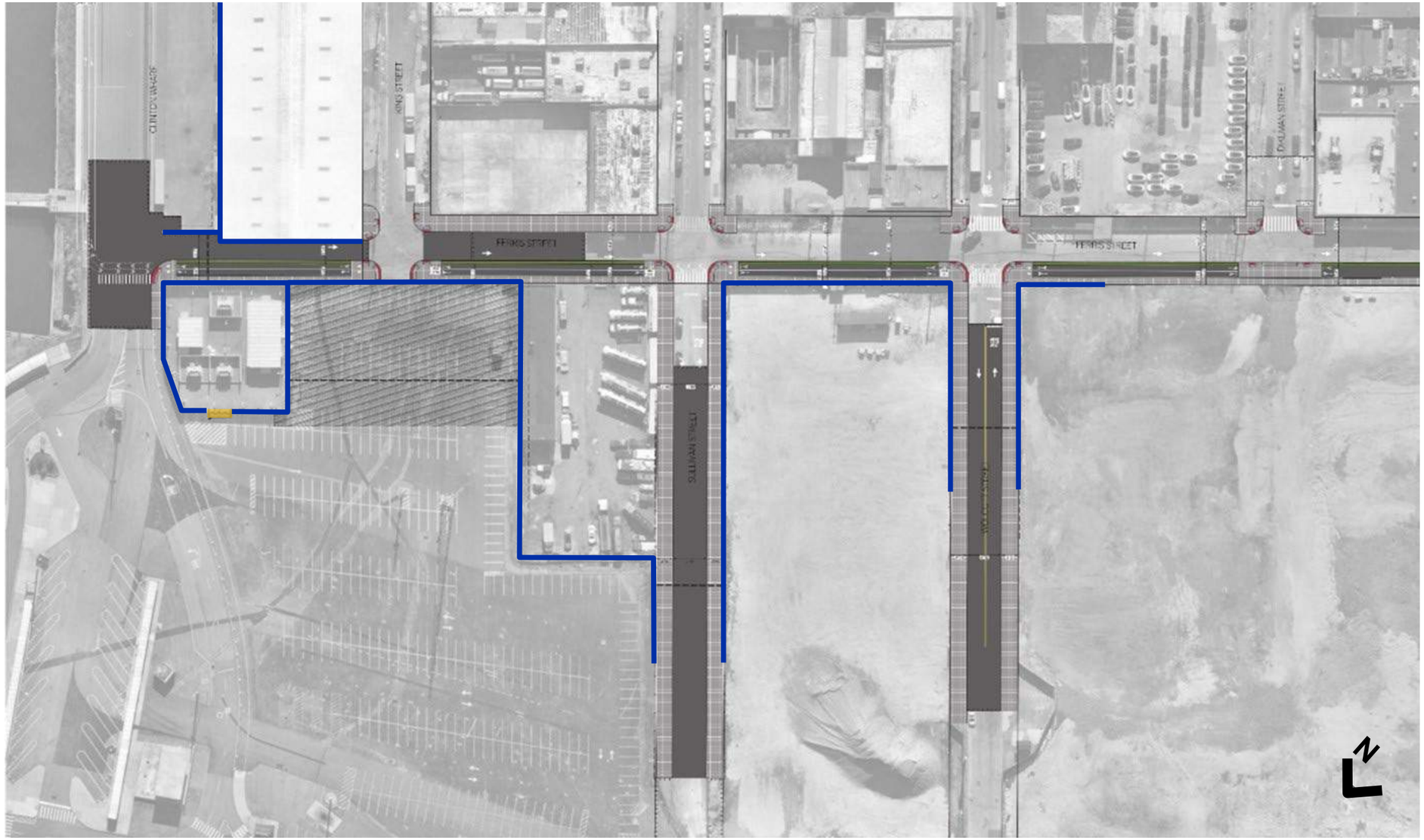
Clinton Wharf and Ferris Street

COMMUNITY PRIORITIES ACHIEVED

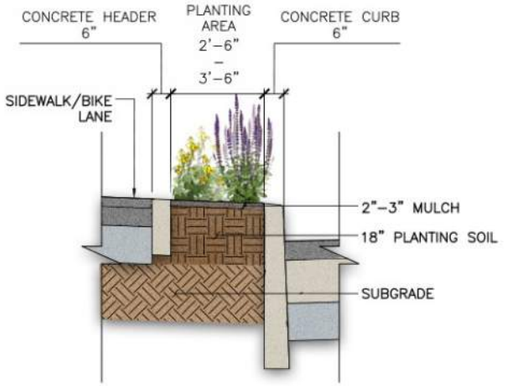
- Maintain Waterfront Access
- Preserve Neighborhood Character
- Neighborhood-wide Coordination
- Enhance Community Preparedness

Plan 5 of 10 Ferris Street from Clinton Wharf to Sullivan Street
EXISTING CONDITIONS



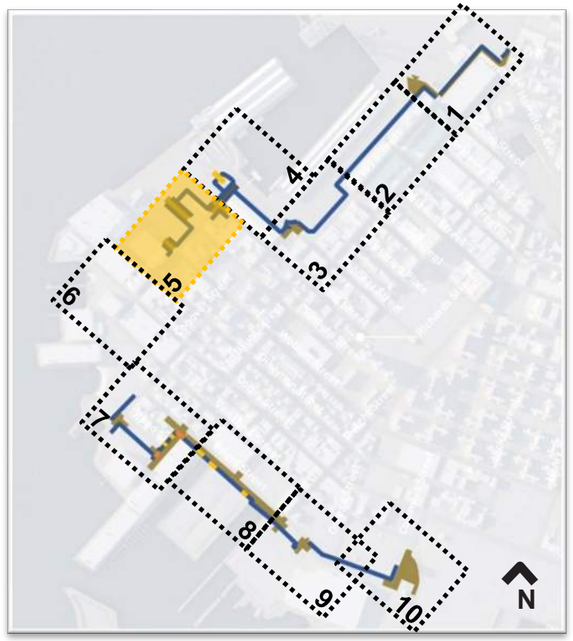


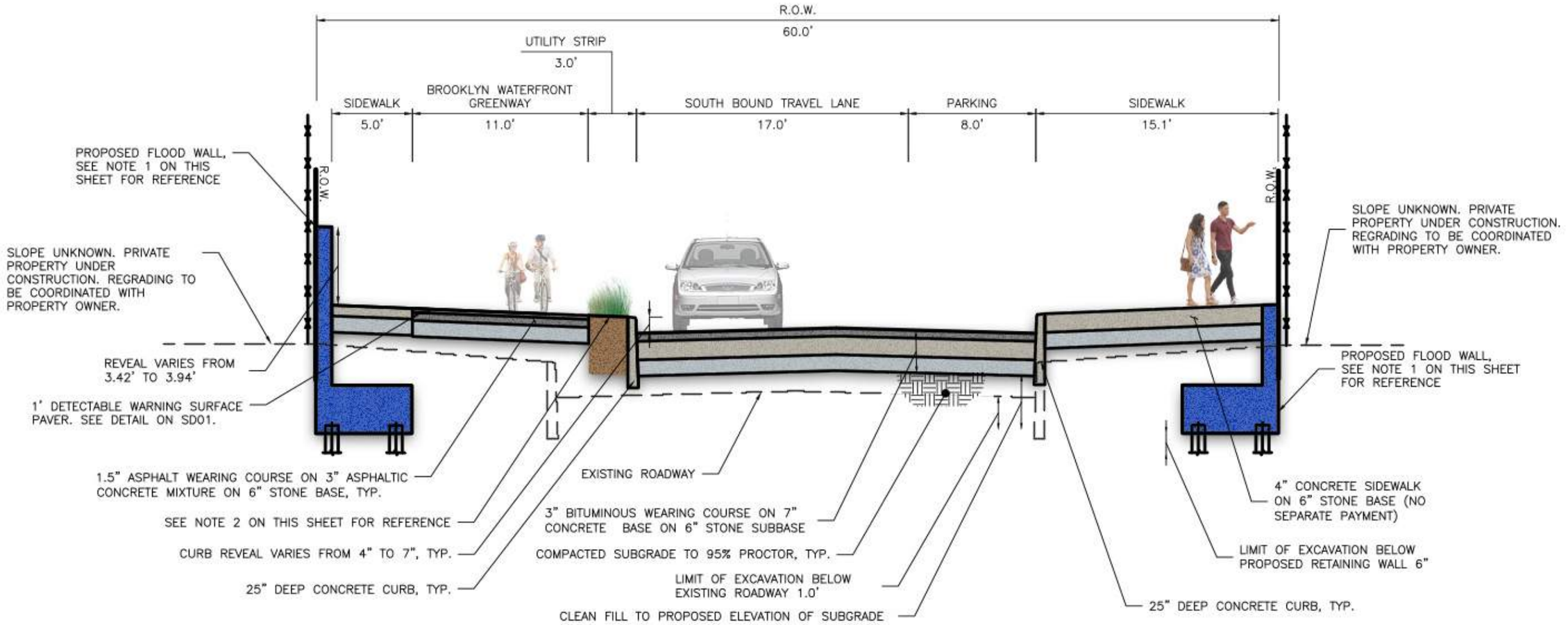
Plan 5 of 10 Ferris Street from Clinton Wharf to Sullivan Street
PROPOSED CONDITIONS



PLANTING TYPE A & B

Note: Refer to slide 76 for Planting Details



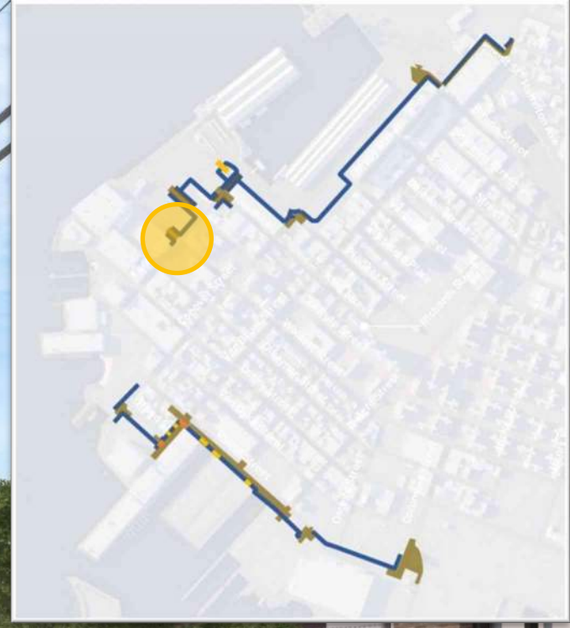


FERRIS STREET TYPICAL SECTION

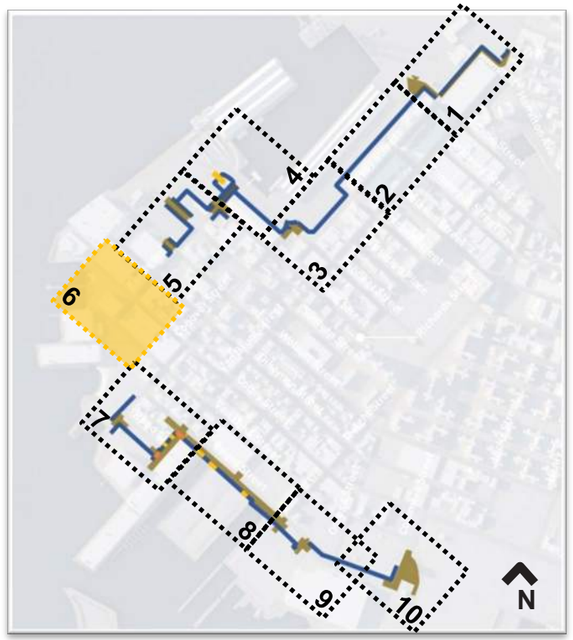
Ferris Street

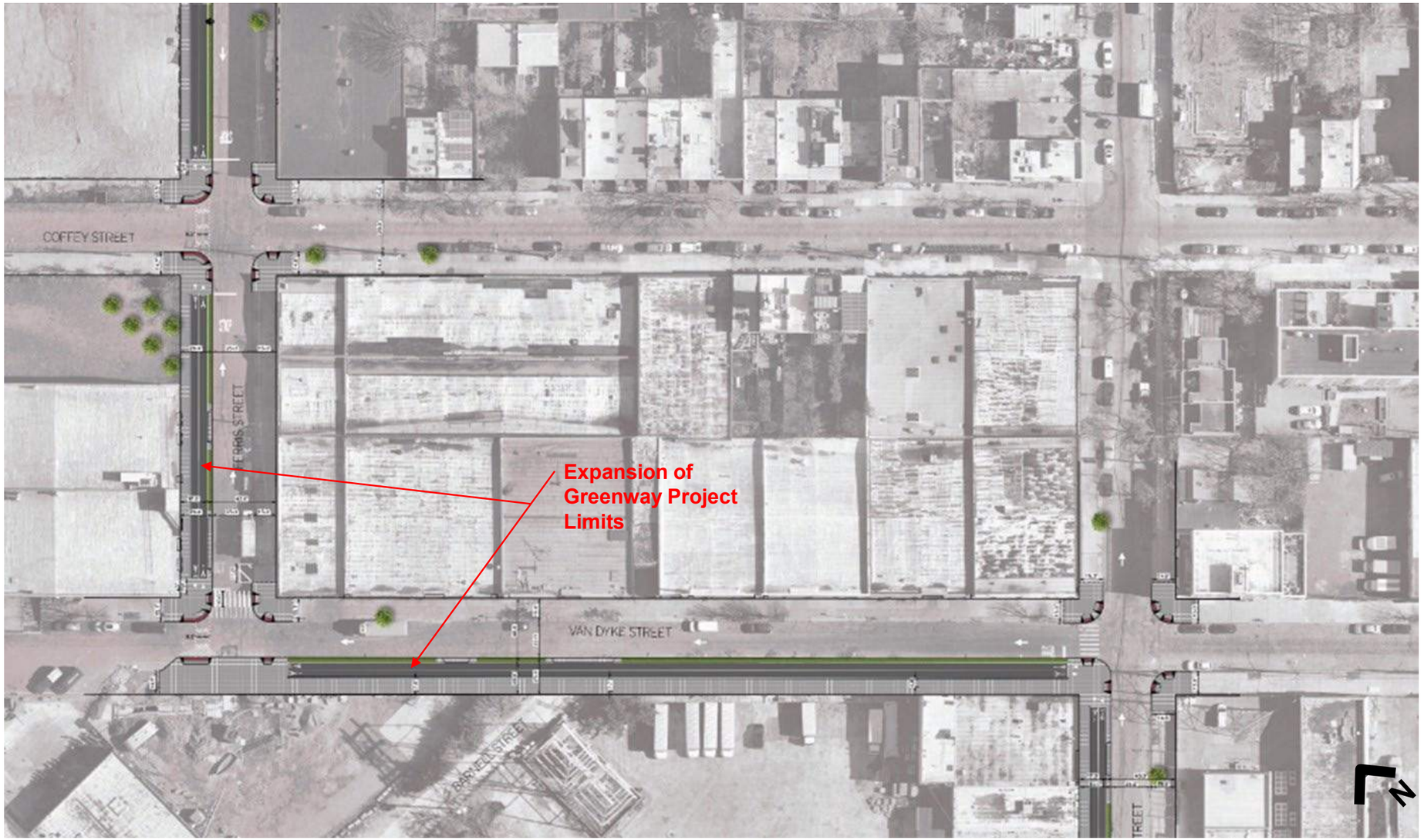
FLOOD WALL
AGAINST BUILDING

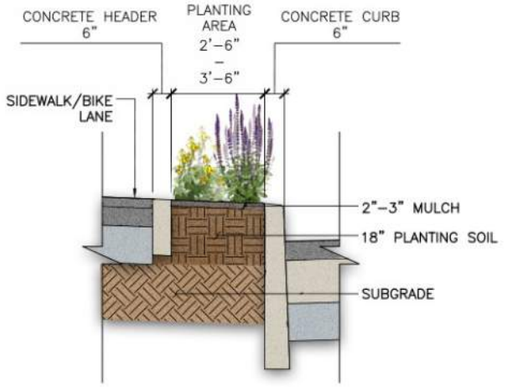
BROOKLYN
WATERFRONT
GREENWAY



Plan 6 of 10 Ferris / Van Dyke / Conover and Beard Streets
EXISTING CONDITIONS

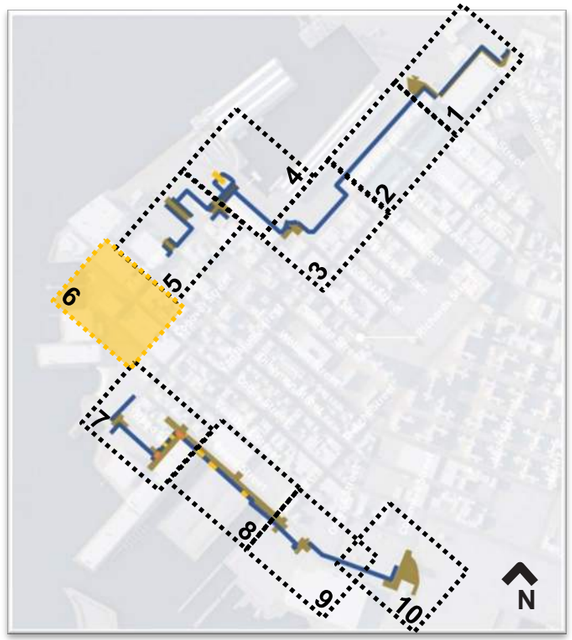






PLANTING TYPE A & B

Note: Refer to slide 76 for Planting Details

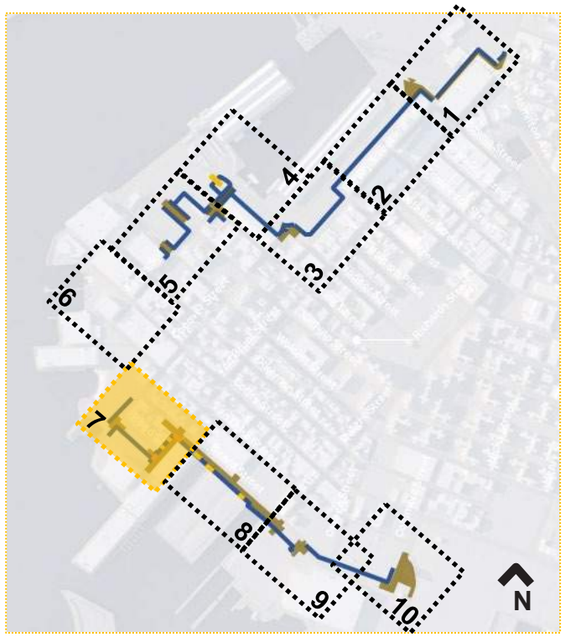


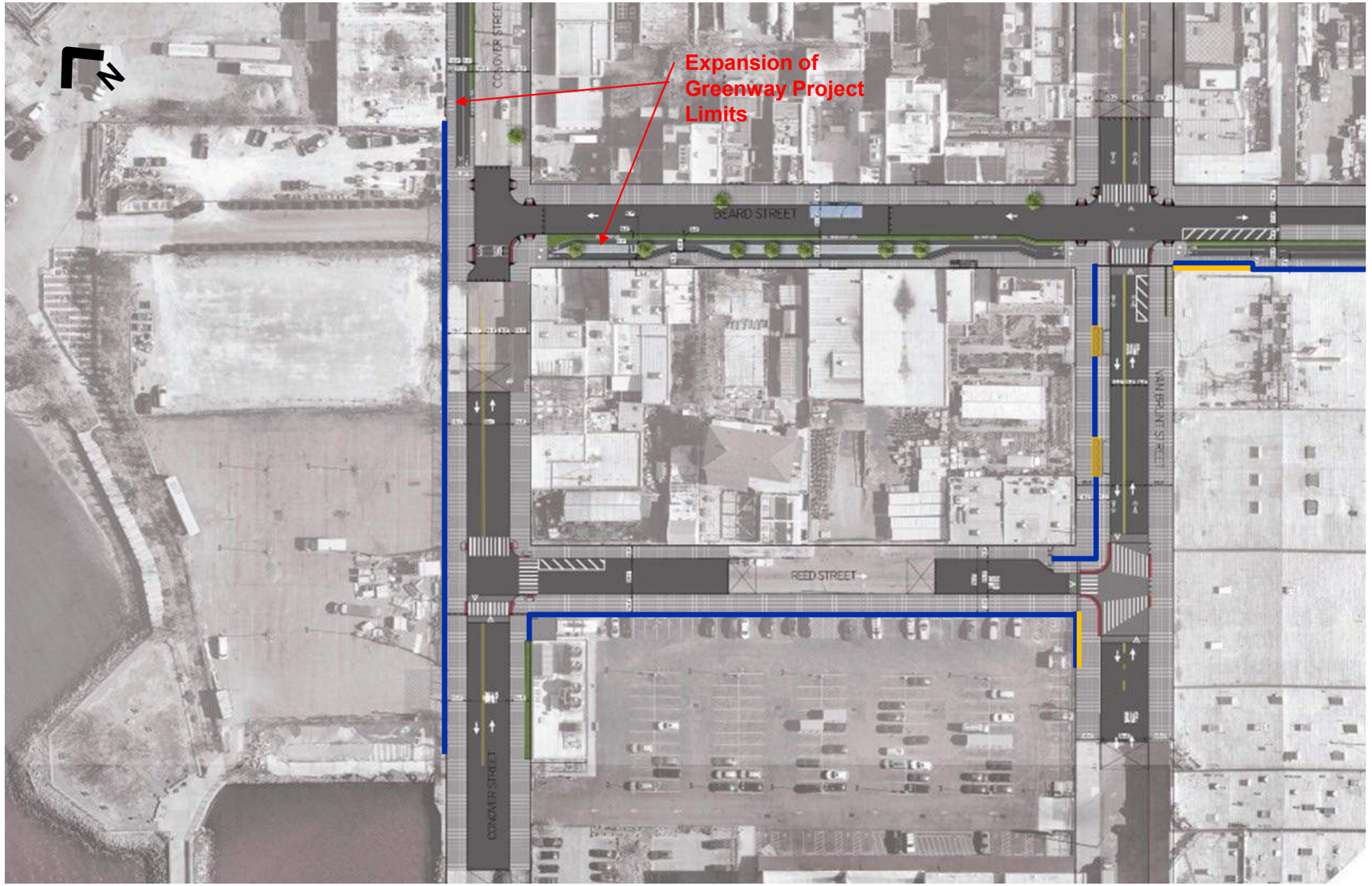
Plan 6 of 10 Ferris / Van Dyke / Conover and Beard Streets
PROPOSED CONDITIONS

LEGEND

- Floodwall
- Green Strip
- Roadway Improvements
- Sidewalk Improvements

Plan 7 of 10 Reed Street between Conover and Van Brunt Street
EXISTING CONDITIONS

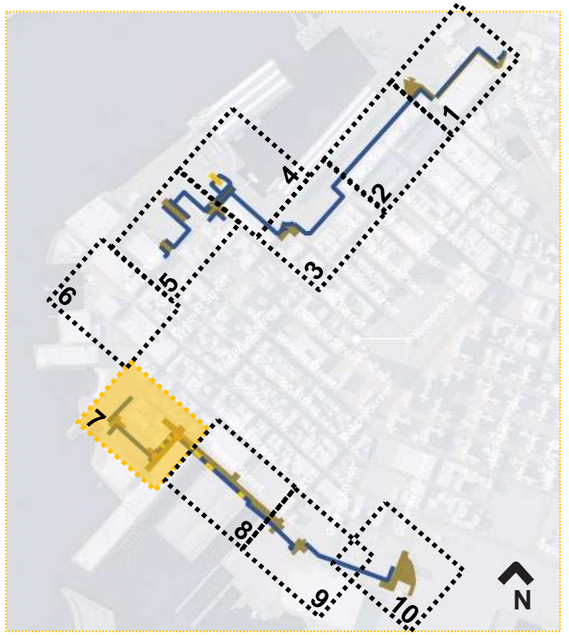


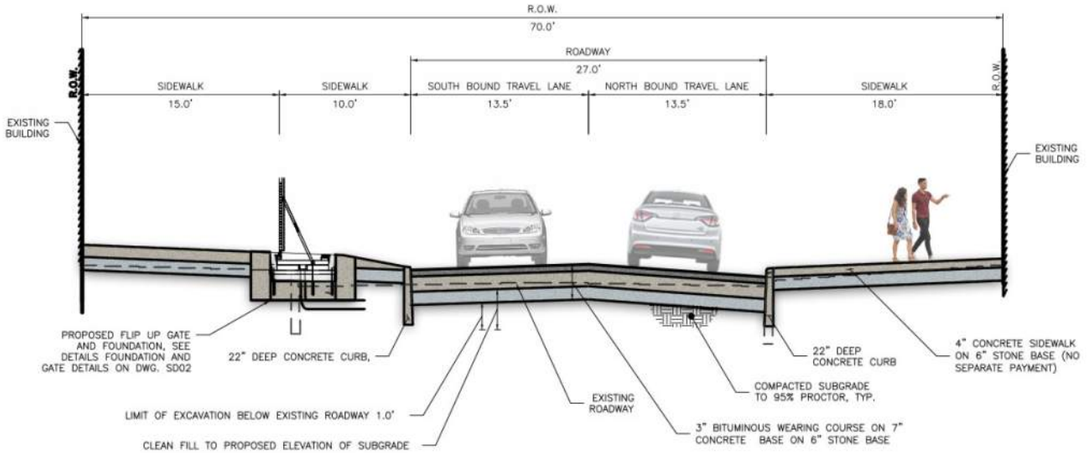


Plan 7 of 10 Reed Street between Conover and Van Brunt Street
PROPOSED CONDITIONS

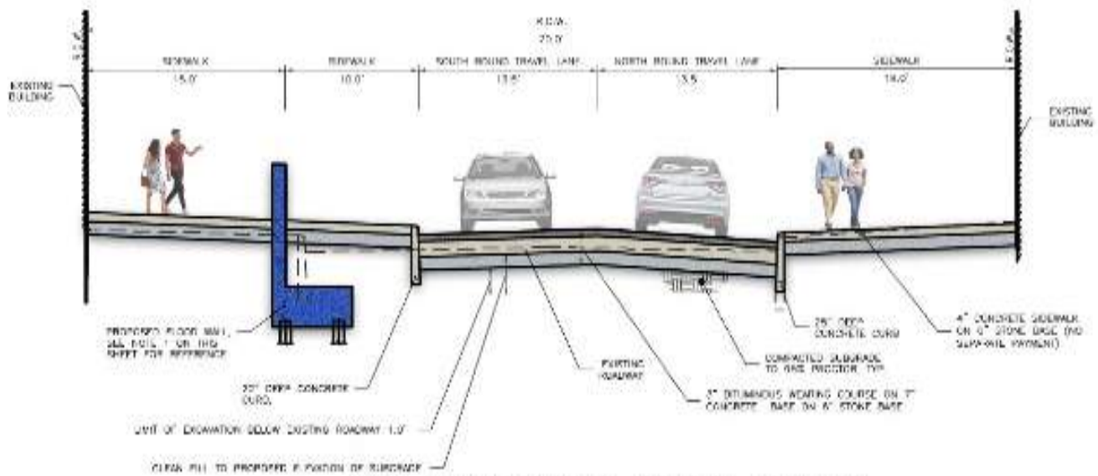
LEGEND

- Floodwall
- Green Strip
- Roadway Improvements
- Sidewalk Improvements



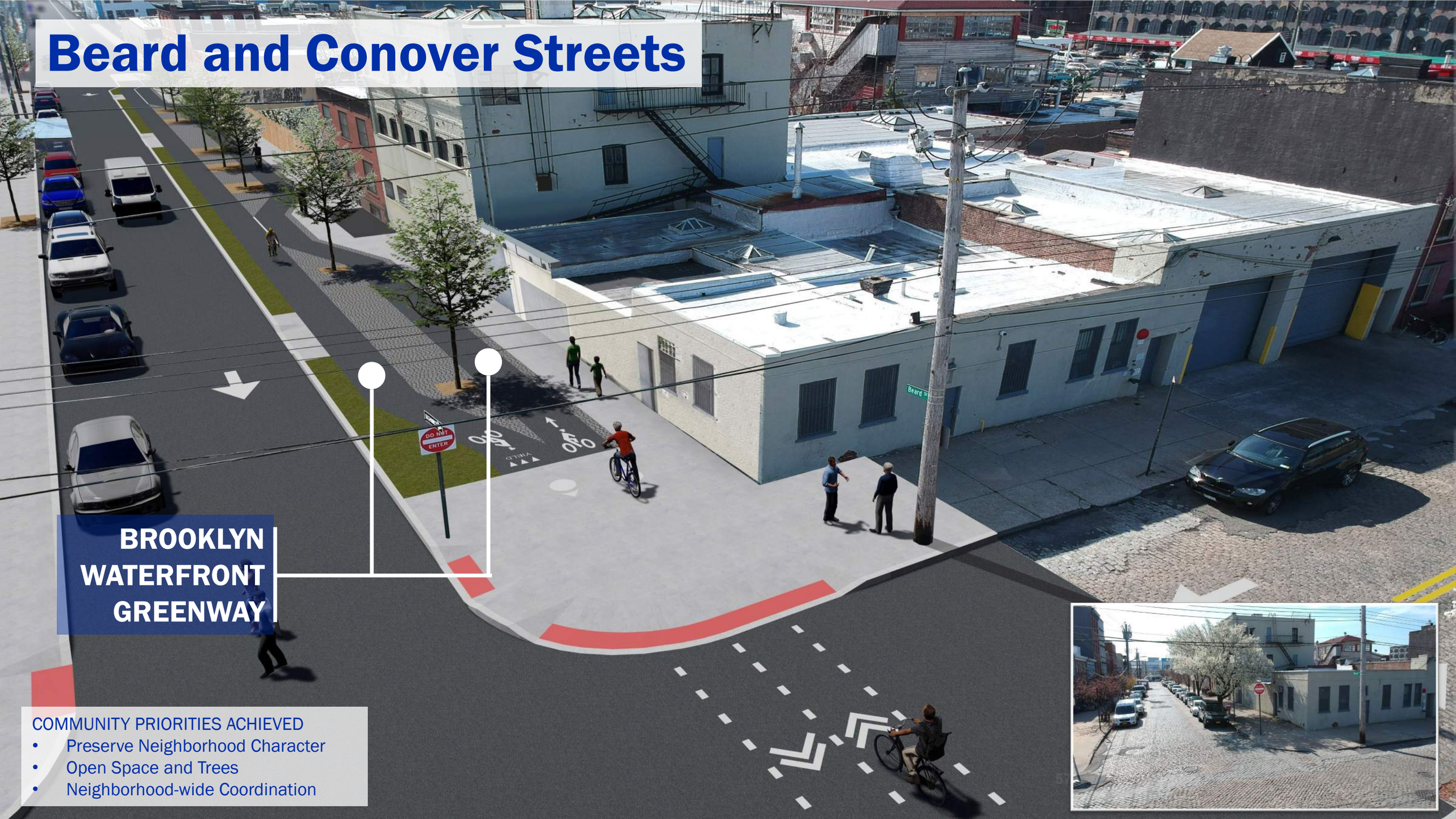


VAN BRUNT STREET TYPICAL SECTION



VAN BRUNT STREET TYPICAL SECTION

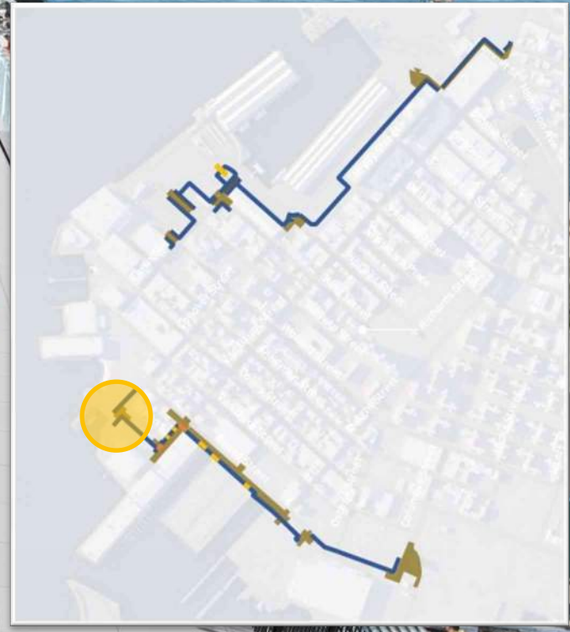
Beard and Conover Streets



COMMUNITY PRIORITIES ACHIEVED

- Preserve Neighborhood Character
- Open Space and Trees
- Neighborhood-wide Coordination

Reed and Conover Streets



FLOOD WALL

RAISED CROSSWALK

FLOOD WALL

COMMUNITY PRIORITIES ACHIEVED

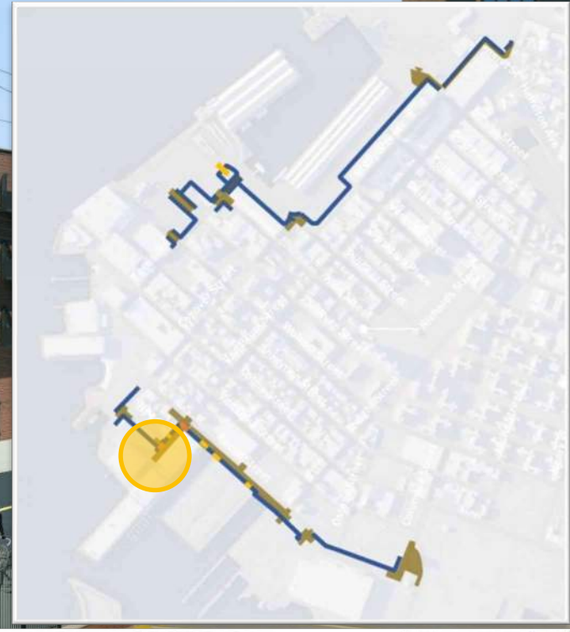
- Maintain Waterfront Access
- Preserve Neighborhood Character
- Neighborhood-wide Coordination
- Enhance Community Preparedness

Van Brunt and Reed Streets

FLOOD WALL

SLIDING GATE

RAISED INTERSECTION



COMMUNITY PRIORITIES ACHIEVED

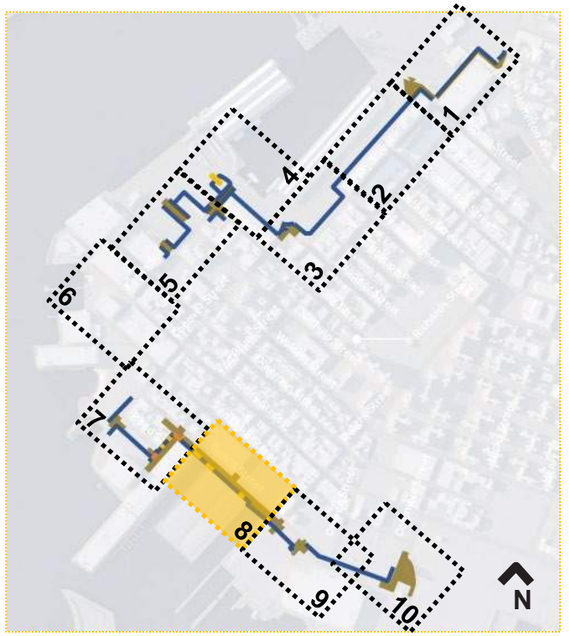
- Maintain Waterfront Access
- Preserve Neighborhood Character
- Neighborhood-wide Coordination
- Enhance Community Preparedness

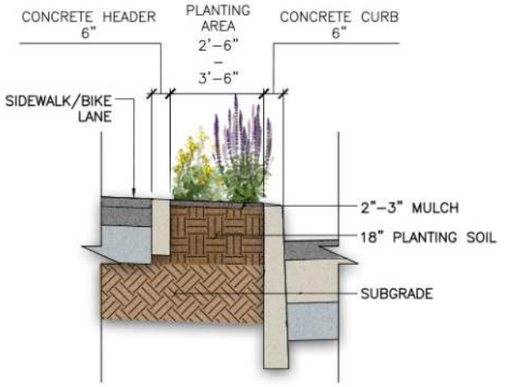
Van Brunt and Reed Streets

Beard and Van Brunt Streets

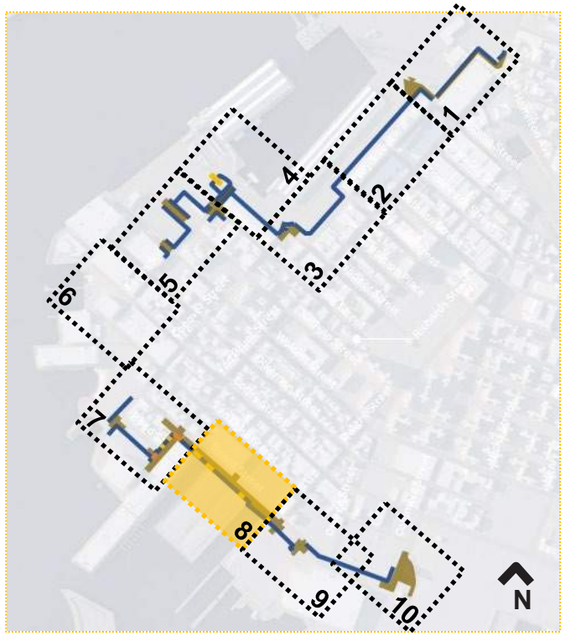
Beard and Van Brunt Streets

Plan 8 of 10 Beard Street
EXISTING CONDITIONS





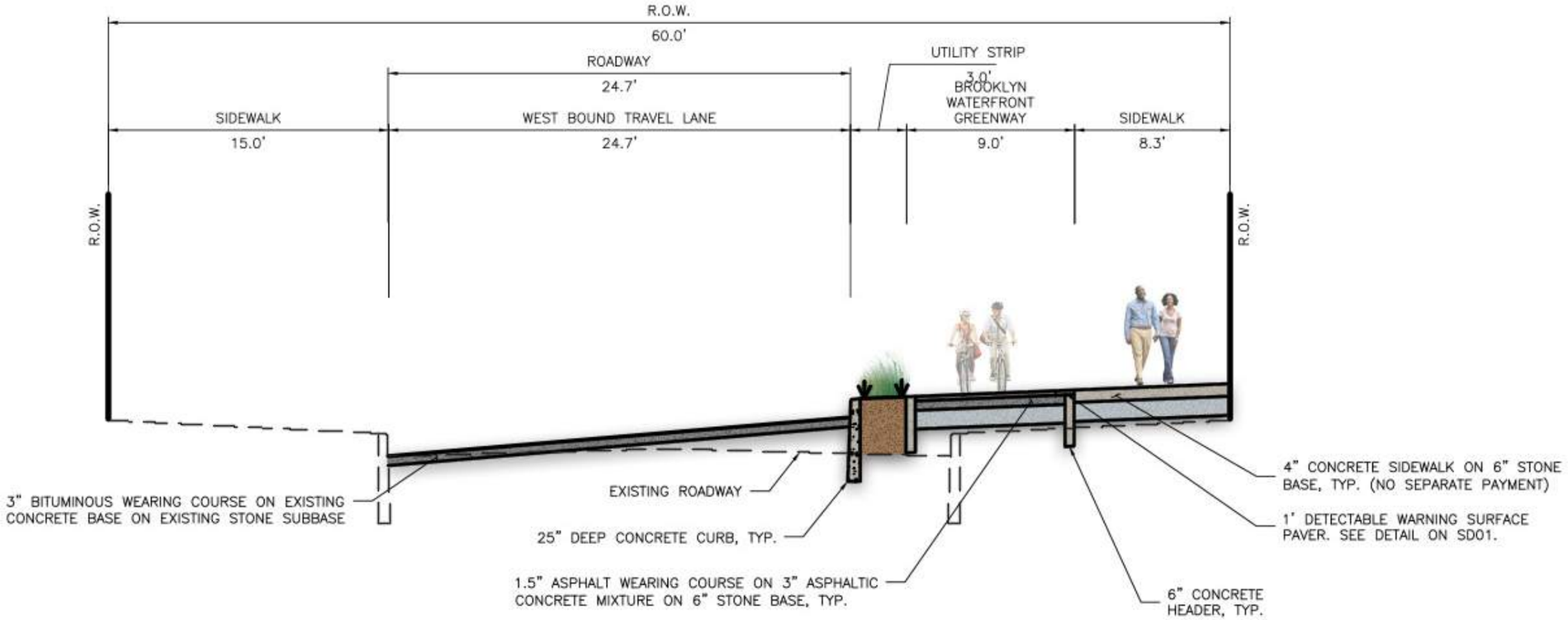
PLANTING TYPE A & B



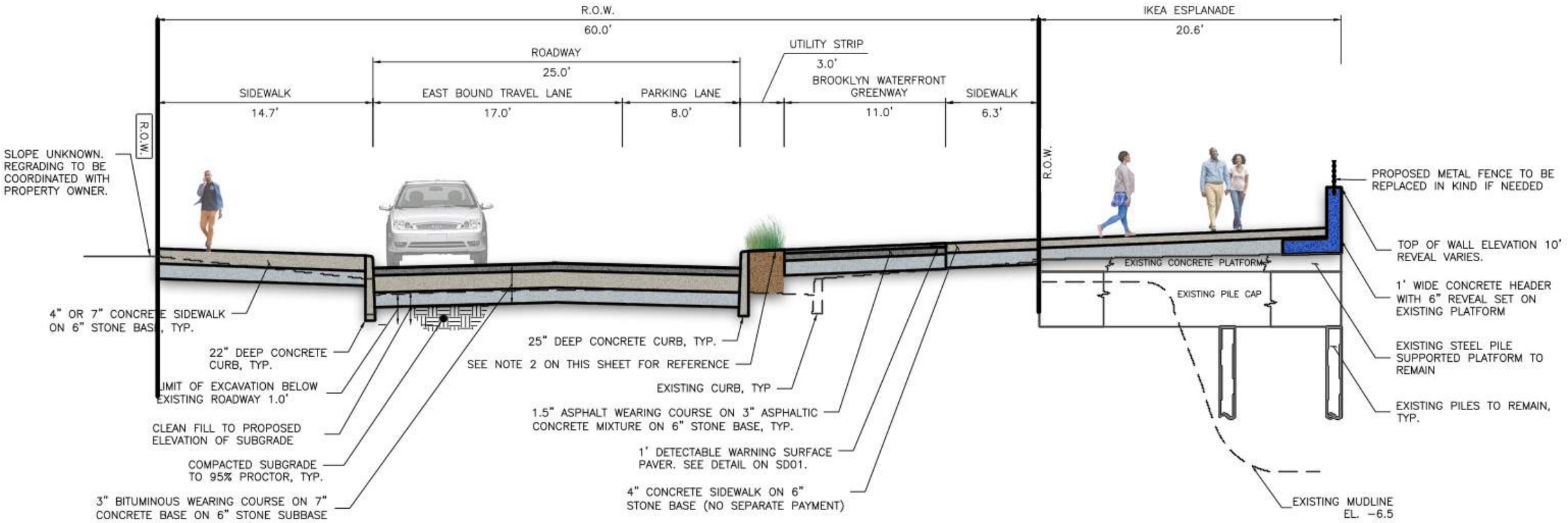
Plan 8 of 10 Beard Street
PROPOSED CONDITIONS

LEGEND

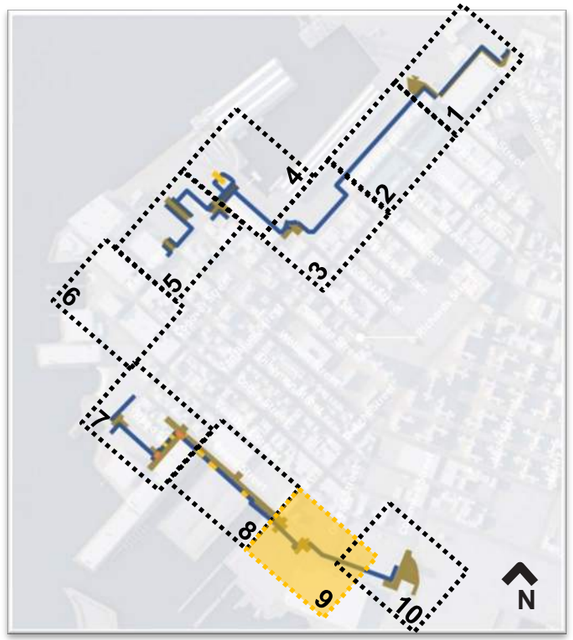
- Floodwall
- Green Strip
- Roadway Improvements
- Sidewalk Improvements



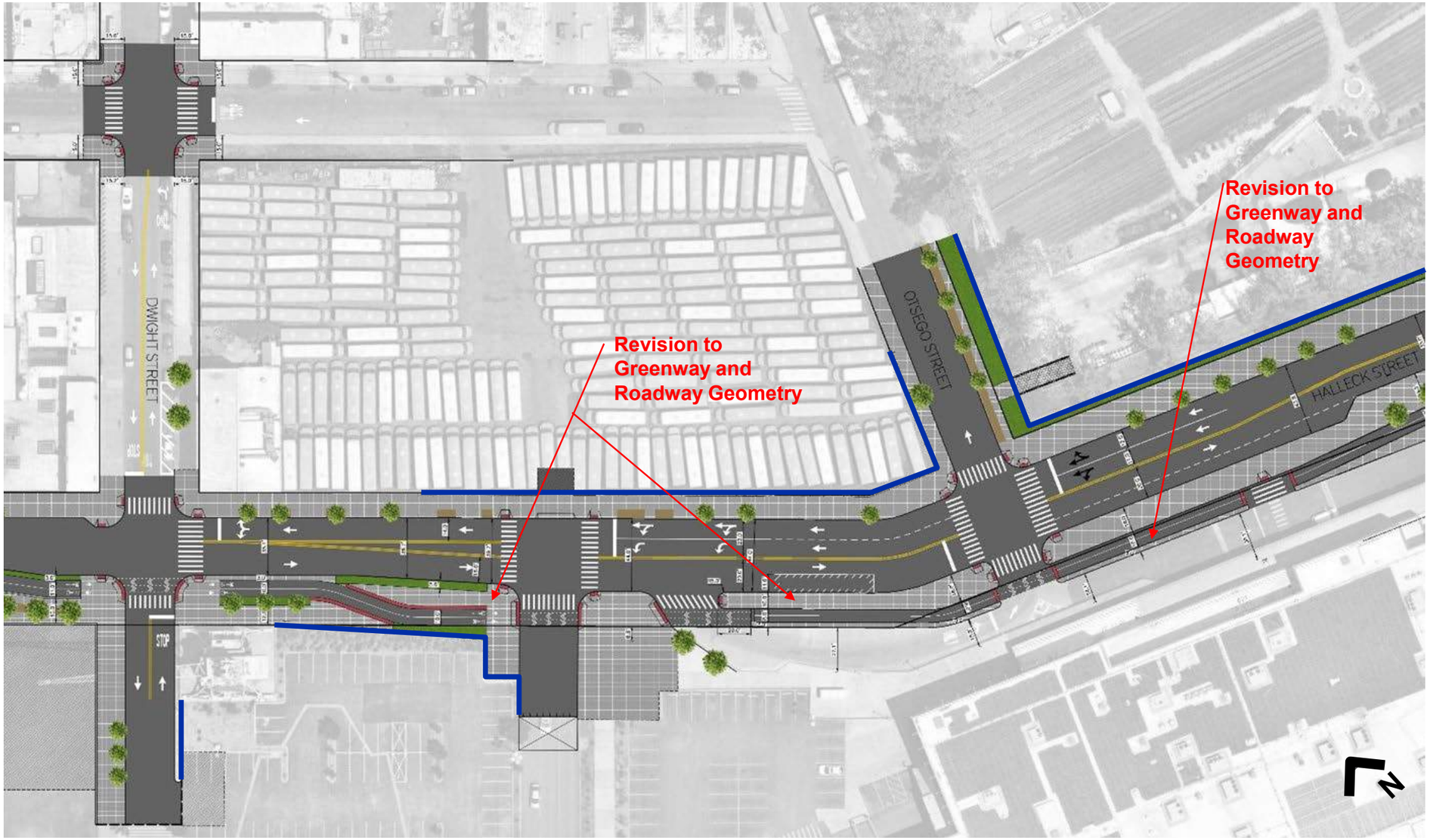
BEARD STREET TYPICAL SECTION

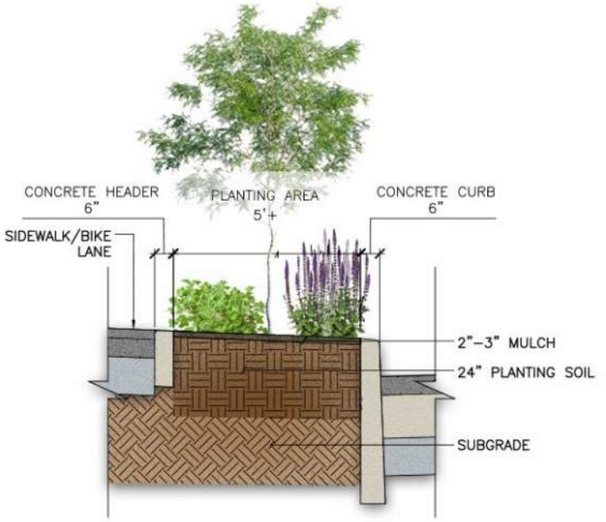


BEARD STREET TYPICAL SECTION



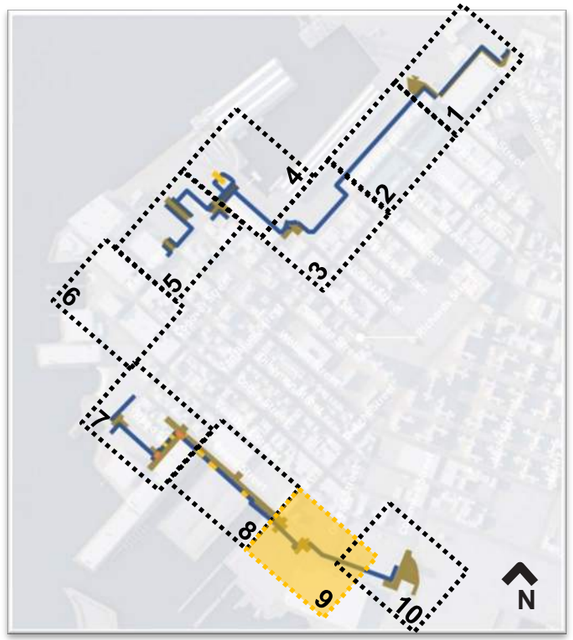
Plan 9 of 10 Beard Street / Ikea Park
EXISTING CONDITIONS





PLANTING TYPE C

Note: Refer to slide 76 for Planting Details



LEGEND

- Floodwall
- Green Strip
- Roadway Improvements
- Sidewalk Improvements

Plan 9 of 10 Beard Street / Ikea Park
PROPOSED CONDITIONS

Beard Street At Ikea Park

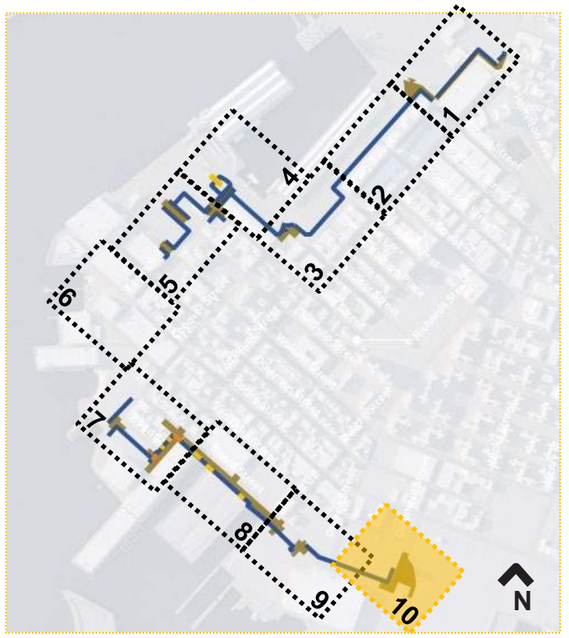
Draft Rendering

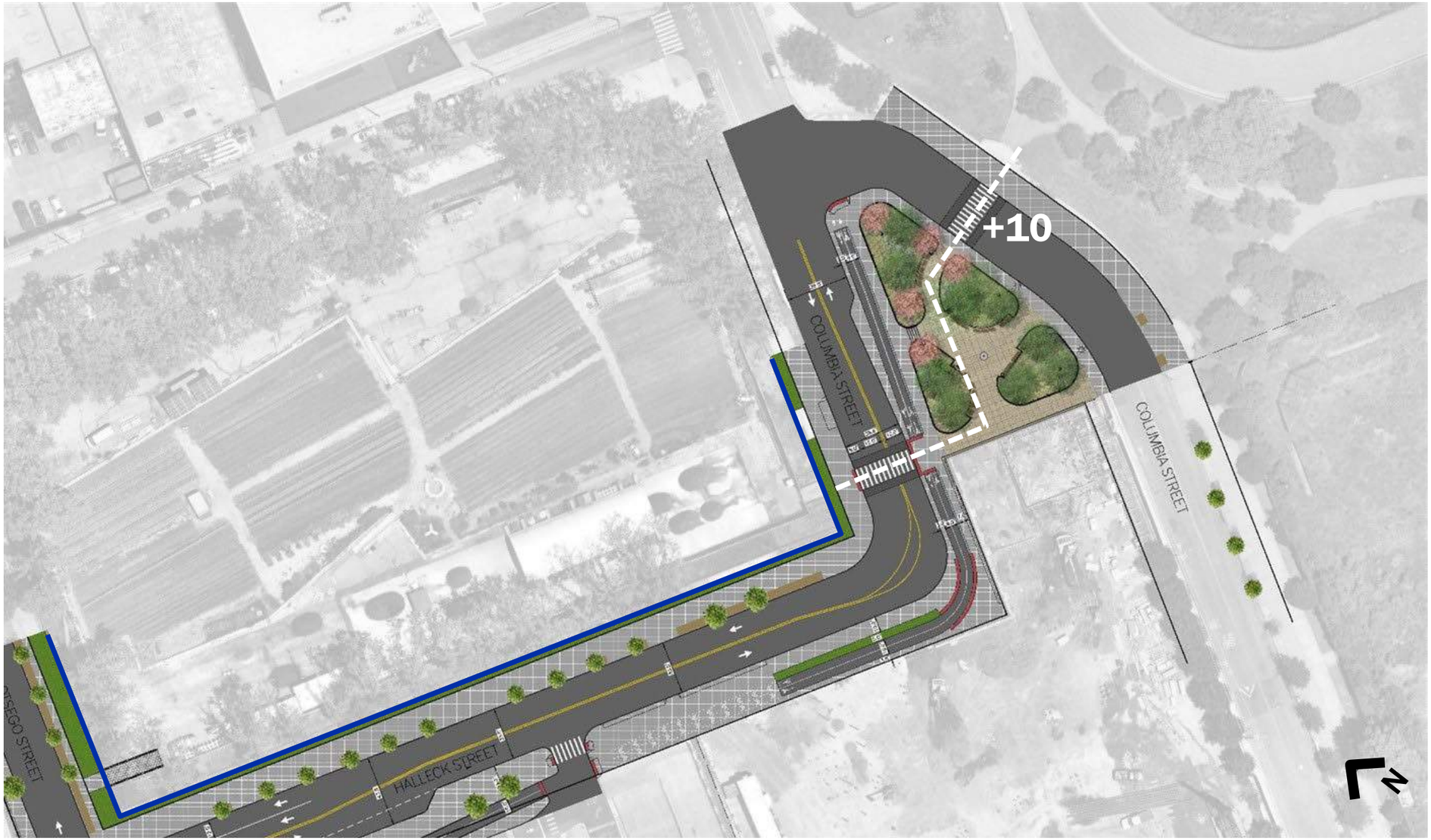
RAISED PIER

FLOOD WALL

+10

Plan 10 of 10 Halleck and Columbia Streets at Todd Triangle
EXISTING CONDITIONS

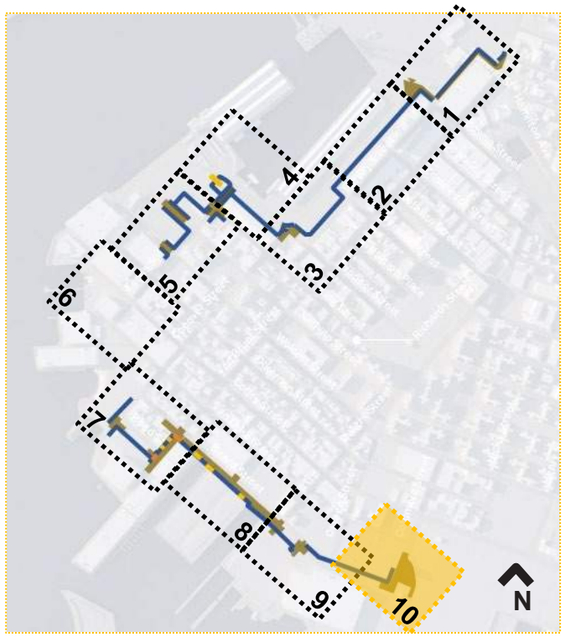




Plan 10 of 10 Halleck and Columbia Streets at Todd Triangle
PROPOSED CONDITIONS

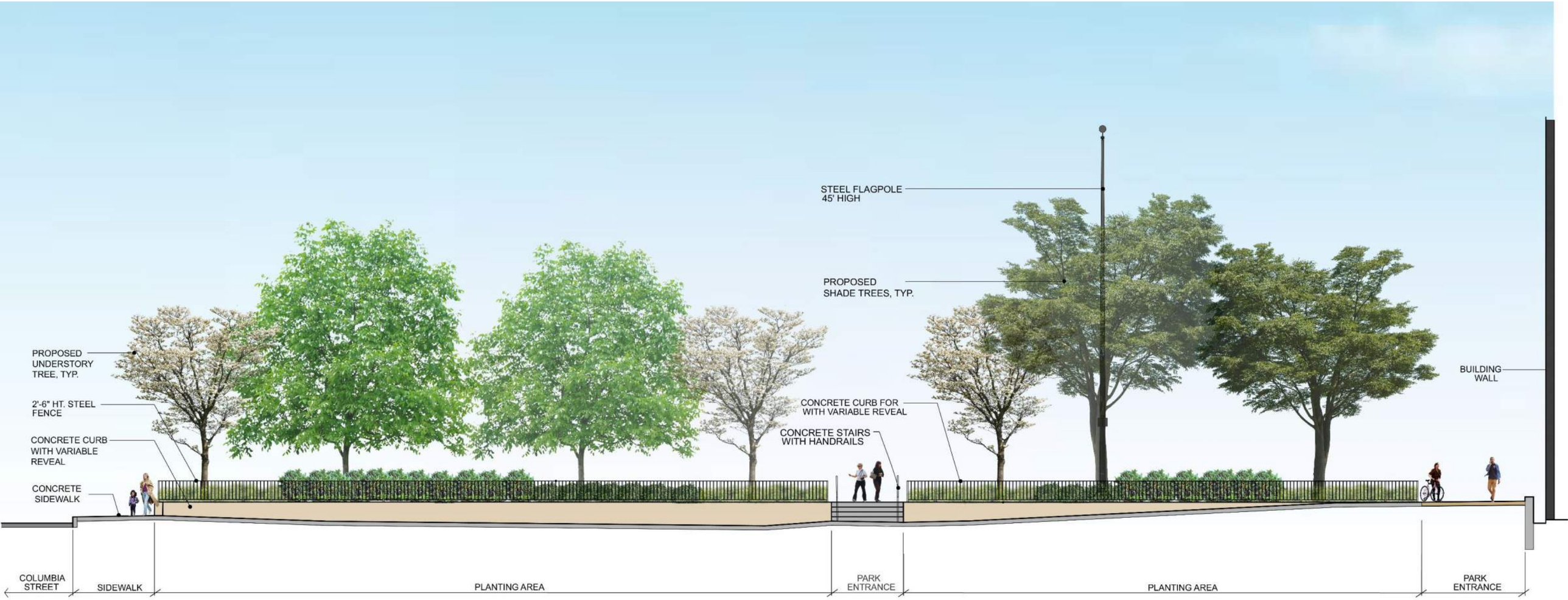
LEGEND

- Floodwall
- Green Strip
- Roadway Improvements
- Sidewalk Improvements



Todd Triangle (Columbia Street)


PROPOSED PEDESTRIAN RAMP
CONCRETE SIDEWALK
REDHOOK FARM
CATCH BASIN
4'–0" BENCH, 1939 WORLDS FAIR WITH BACK AND ARMRESTS,TYP.
LOW RAIL ON CONCRETE CURB, TYP.
EXPOSED AGGREGATE CONCRETE PAVEMENT
CONCRETE STAIR WITH HANDRAIL
PROPOSED FLAGPOLE
RPZ AND WATER METER
GROUND HYDRANT,TYP.
DRINKING FOUNTAIN TYPE 'E', (HI–LO)
10' CONTOUR
RAISED X– WALK SPEED HUMP
KNEE WALL
COLUMBIA STREET WEST
A
A'
B
B'
10' FT
GOLDMAN SACHS/DH FACILITY
RAISED X– WALK SPEED HUMP
LIGHT POLE 1964 WORLDS FAIR LUMINAIRES, TYP.
REDHOOK PARK
EXISTING TREE
COLUMBIA STREET EAST
PLANTING BEDS WITH PROPOSED TREES AND SHRUBS, TYP.
TRANSPLANTED TREE
8'–0" BENCH, 1939 WORLDS FAIR WITH BACK AND ARMRESTS,TYP.
PUBLIC SPACE RECEPTACLE BIN
N
0
12
24
48
SCALE: 1"=24'


STEEL FLAGPOLE
45' HIGH
PROPOSED
SHADE TREES, TYP.
PROPOSED
UNDERSTORY
TREE, TYP.
2'-6" HT. STEEL
FENCE
CONCRETE CURB
WITH VARIABLE
REVEAL
CONCRETE
SIDEWALK
CONCRETE CURB FOR
WITH VARIABLE REVEAL
CONCRETE STAIRS
WITH HANDRAILS
BUILDING
WALL
COLUMBIA
STREET
SIDEWALK
PLANTING AREA
PARK
ENTRANCE
PLANTING AREA
PARK
ENTRANCE


PROPOSED SHADE TREE, TYP.
PROPOSED UNDERSTORY TREE, TYP.
CONCRETE STAIRS WITH HANDRAILS
CONCRETE CURB WITH VARIABLE REVEAL
TRASH RECEPTACLE
2'-6" HT. STEEL FENCE
CONCRETE SIDEWALK
COLUMBIA STREET WEST
BIKE PATH
SIDEWALK
PARK ENTRANCE
TODD'S TRIANGLE CENTRAL PLAZA
PLANTING AREA
SIDEWALK
COLUMBIA STREET EAST

PLANTNG PALETE

Quercus imbracraua

Quercus macrocarpa

Quercus phellos

Ulmus parviflora

Celtis occidentalis

Crataegus crus-galli

Styphnolobium japonicum

Gleditsia triacanthos var. inermis

Taxodium distichum

Aronia arbutifolia

Aronia melanocarpa

Aronia arbutifolia ‘brilliantissima’

Ceanothus americanus

Cornus sericea ‘Kelsey’s Dwarf’

Hypericum calycinum

Ilex glabra ‘Shamrock’

Morella pensylvanica

Rhus aromatica ‘Gro Low’

Rosa virginiana

Achillia millefolium ‘Paprika’

Aesclepias incarnata

Aesclepias tuberosa

Amsonia ‘Blue Ice’

Aster cordifolius

Aster lateriflorus ‘Lady in Black’

Echinacea ‘Cheyenne Spirit’

Eupatorium dubium ‘Little Joe’

Eupatorium rugosum ‘Chocolate’

Heliopsis helianthoides ‘Summer nights’

Iris versicolor

Nepeta ‘Walkers Low’

Pycnamthemum muticum

Rudbeckia laciniata

Salvia nemorosa ‘Caradonna’

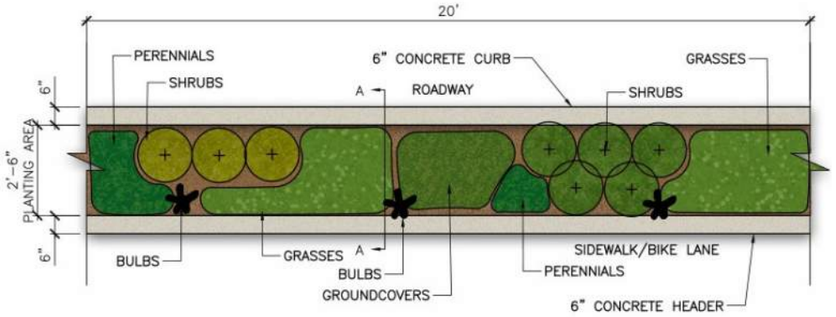
Solidaga caesia

Solidago sempervirens

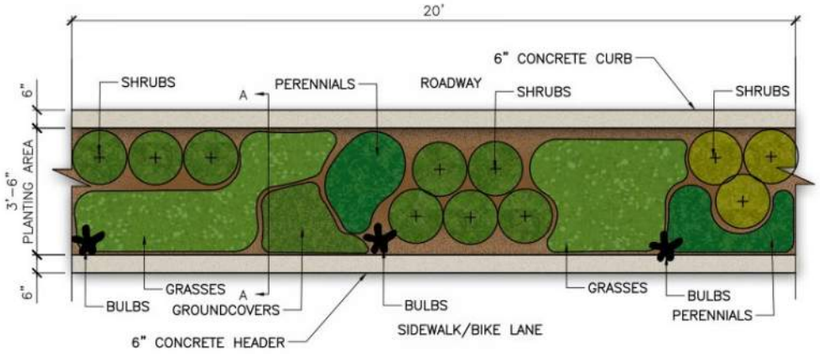
Veronica spicata ‘Glory’
Royal Candles

Eupatorium hyssopifolium

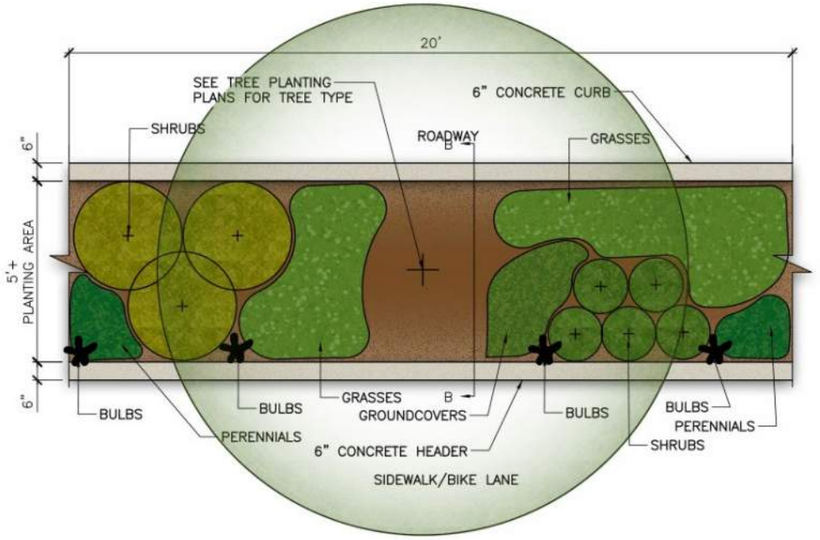
Narcissus ‘Dutch Master’



PLANTING TYPE A DETAIL

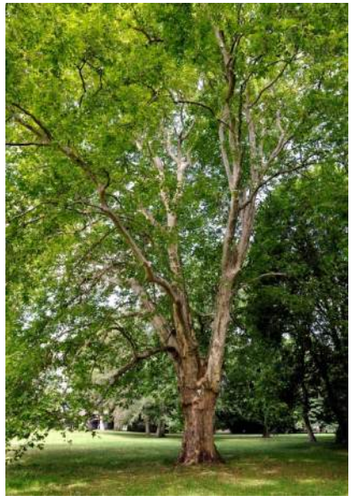


PLANTING TYPE B DETAIL



PLANTING TYPE C DETAIL

Cornus florida



Platanus x acerifolia

Zelkova carpinifolia

Zelkova serrata

Cornus alba

Diervilla lonicera

Rhus aromatica

Rosa virginiana

Ilex glabra “Shamrock”

Itea virginica

MATERIALS AND SITE FURNISHINGS

NYC Parks Standard CityBench

Granite Block Seating

NYC DOT Standard DOT Bike Rack

Salvaged Cobble Paving

ADA Compliant Cobble Paving

World's Fair Lamp Post and Lamp

NYC Parks Standard Flagpole

NYC Parks Standard Public Space Receptacles

NYC Parks Standard 1939 World's Fair Bench

NYC Parks Standard 2'-6" Steel Fence

NYC Parks Standard Water Fountain Type E, (Hi-Lo)

NEIGHBOORHOOD WIDE CHANGES

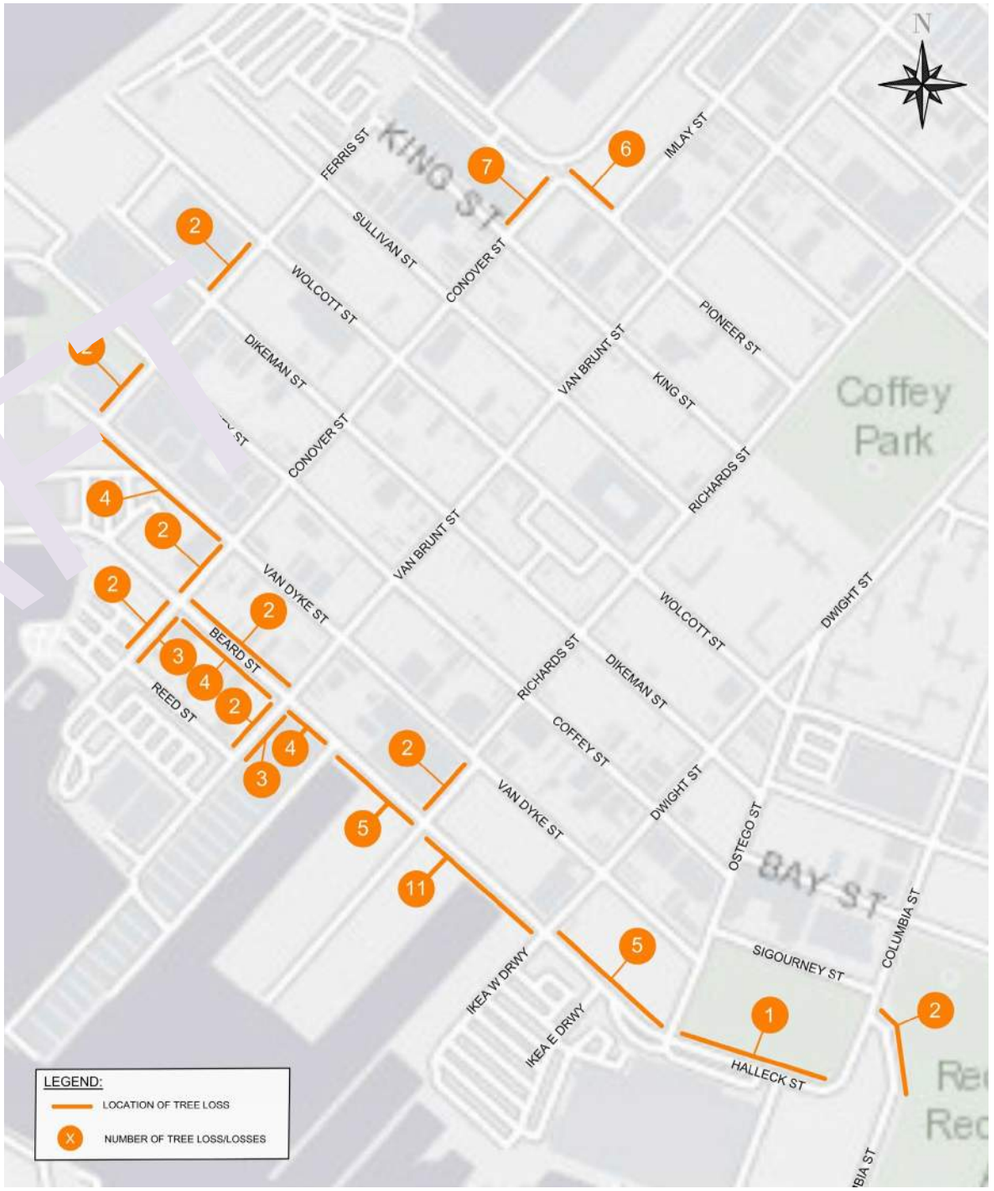
This project seeks to preserve trees unless there is unavoidable impacts due to the installation of floodwall foundations and the Brooklyn Waterfront Greenway (BWG). The project team will look for opportunities to plant new trees in the neighborhood to reduce tree loss as much as possible.

Existing Trees

Anticipated number of impacted trees is 69 *(tbd)*, due to: floodwall foundation, pedestrian access, BWG, and existing tree health

Proposed Planting Plans

DDC is in coordination with NYC Parks to develop a planting plan that meets tree replacement requirements



This project seeks to preserve parking spots as much as possible, however there are unavoidable impacts due to the installation of the Brooklyn Waterfront Greenway (BWG) and floodwall that could lead to parking loss:

Curbside Parking with Street Cleaning Regulations

- Total of 70 spots will be removed

Curbside Parking without Current Regulations

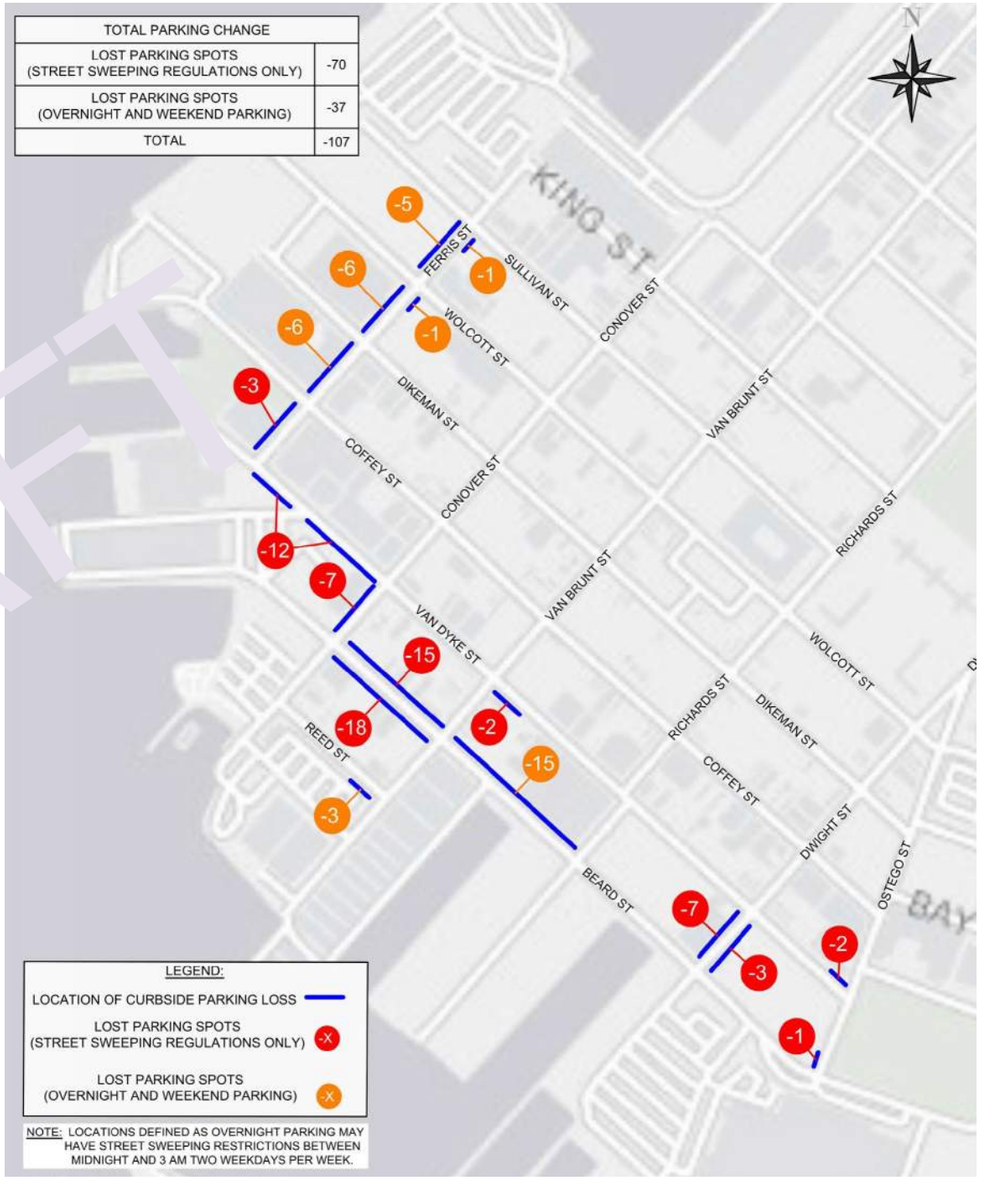
- Total of 37 spots will be removed

Reason for Parking Loss

Majority of Parking Loss is due to the inclusion of the Brooklyn Waterfront Greenway

Utilization Study Completed

- Peak Utilization: 67-71%
- Loss of spots is not anticipated to result in a Parking Shortfall
- 80% Parking Loss is not within Residential Areas
- Excess On-Street Parking Capacity
- Accounts for Development / Zoning Requirements



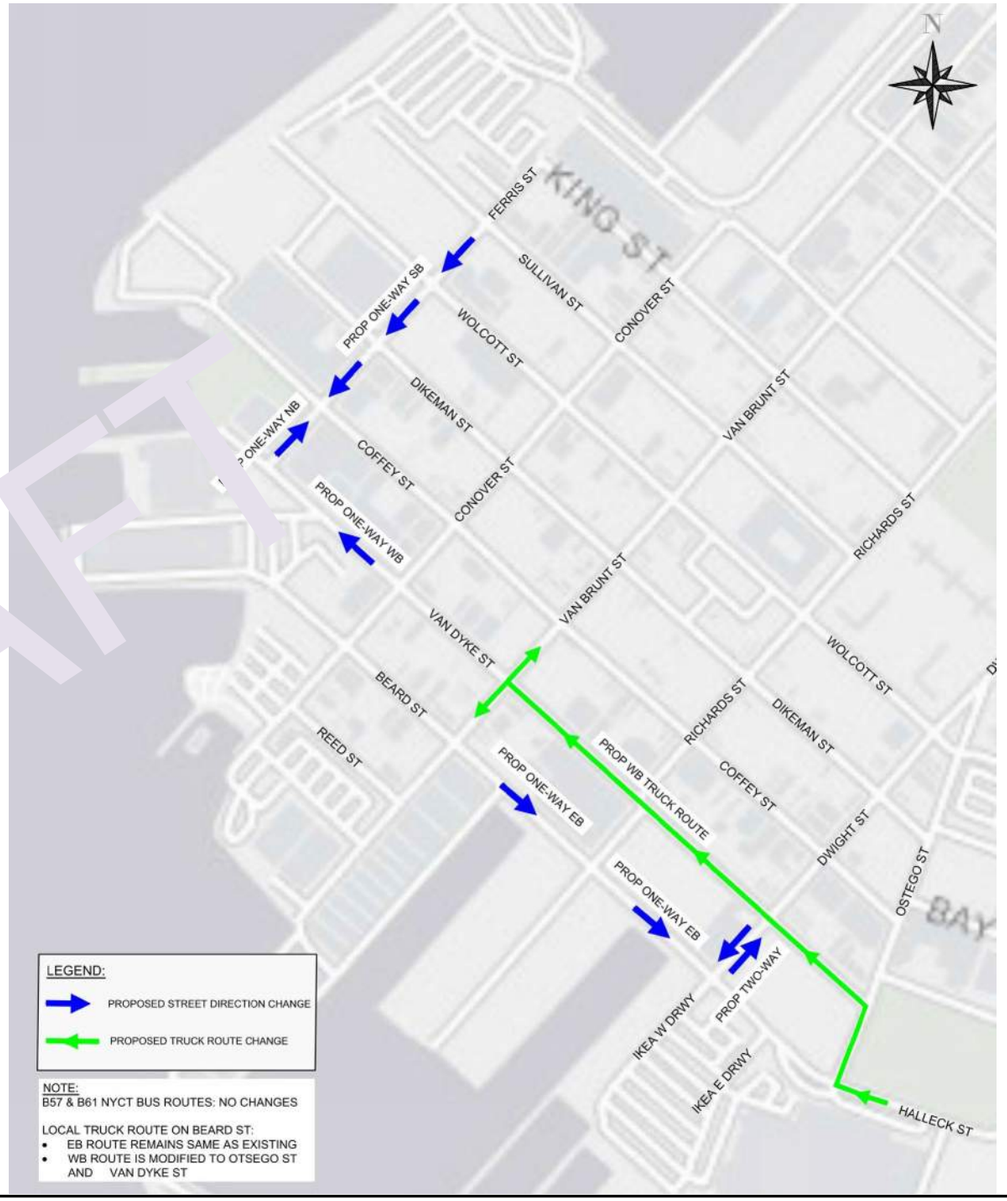
As part of this project, some street directions and traffic flow in some areas will be reorganized to improve efficiency, diversify truck traffic, and to allow the implementation of the Brooklyn Waterfront Greenway (BWG):

Ferris Street

Convert Ferris Street to one-way South-Bound (Sullivan to Coffey St.)
Convert Ferris Street to one-way North-Bound (Van Dyke to Coffey St.)
This creates a one-way pair between Ferris St. and Conover St.

Van Dyke

Convert Beard Street to one-way EB (Van Brunt to Dwight Streets)
This creates a one-way pair between Beard St. and Van Dyke St.



APPENDIX