EAST SIDE COASTAL RESILIENCY:
INTEGRATING BROWNFIELD REMEDIATION & CLIMATE-ADAPTIVE INFRASTRUCTURE

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NYC EDC

NYC Mayor's Office of Climate and Environmental Justice

NYC Parks

NEW YORK CITY DOT

NYC Environmental Protection

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AKRF | KSE

The AKRF-KSE JV

BIG

one

MNLA

Superstorm Sandy by the Numbers

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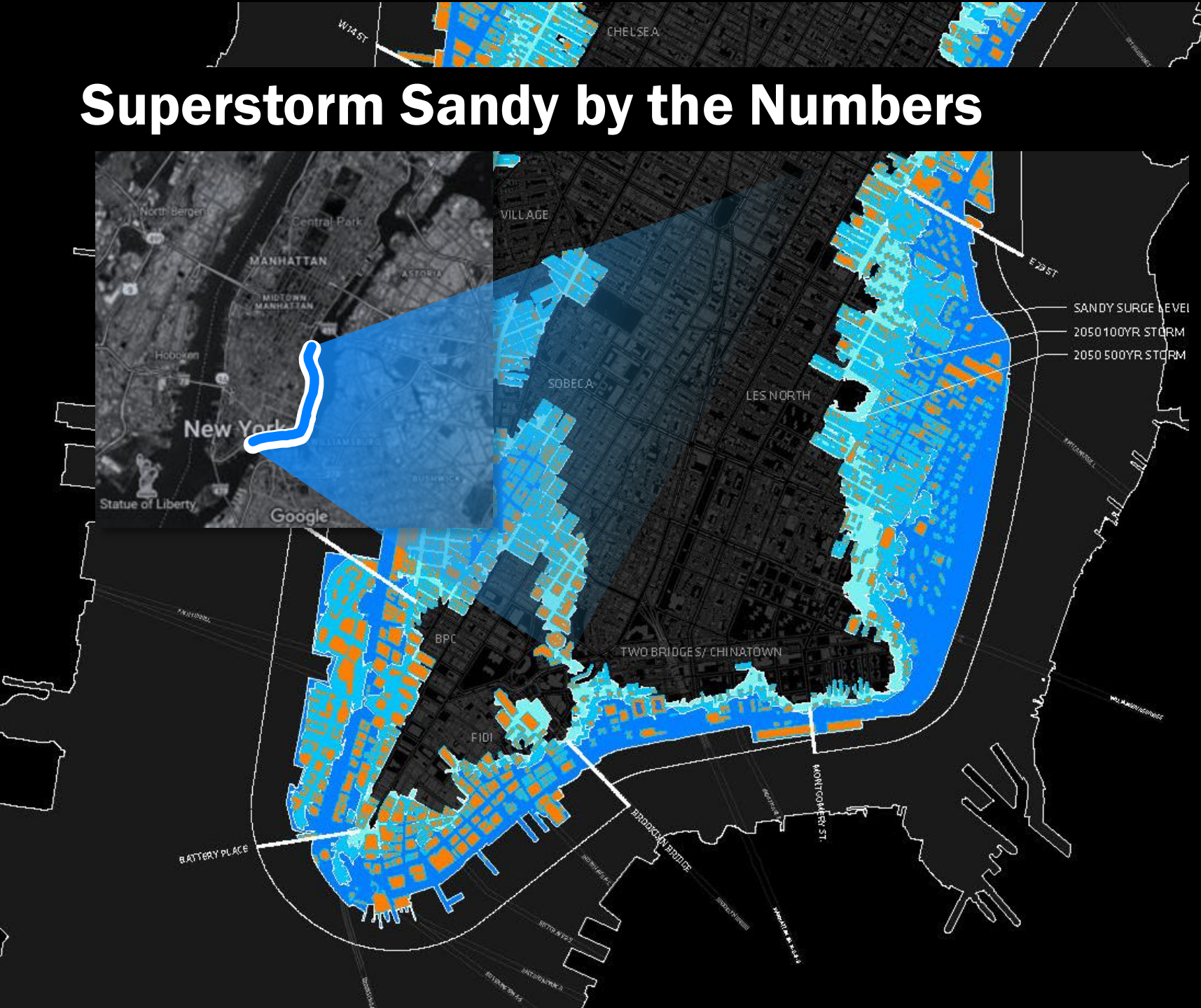
NYC DDC



In Manhattan:

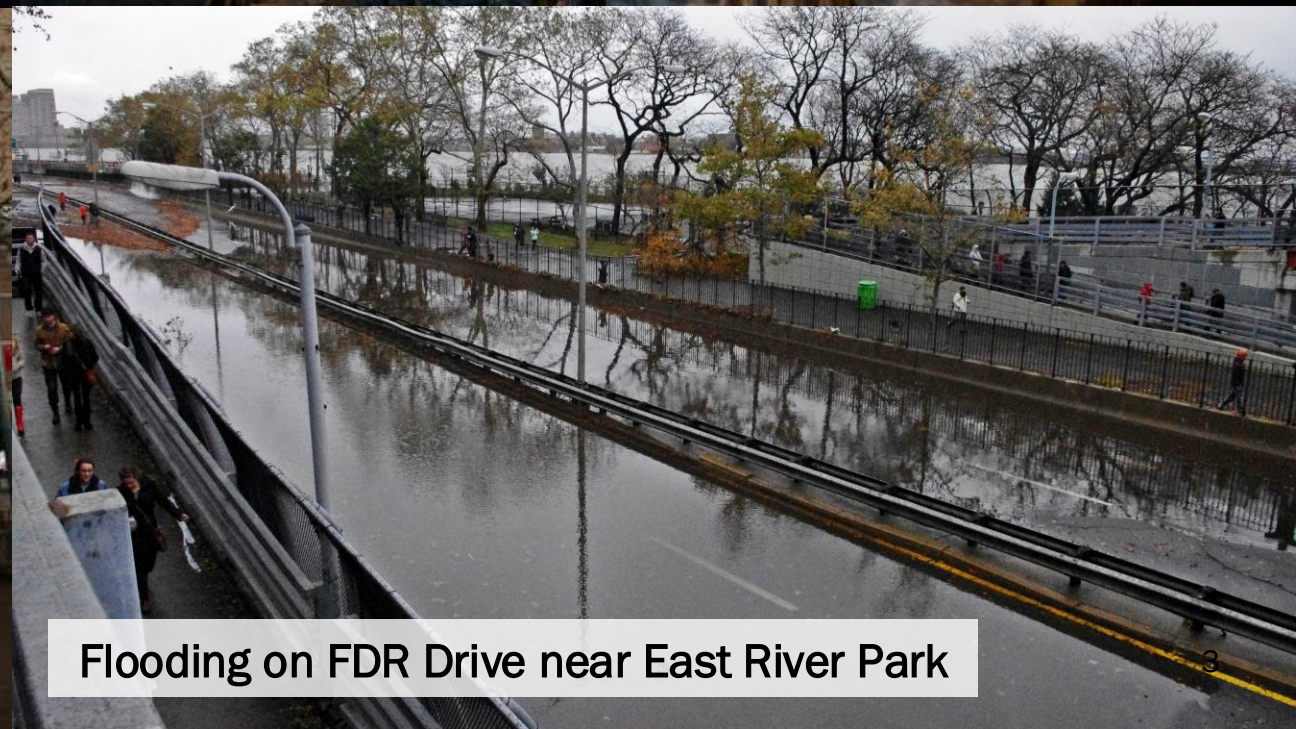
- **80 mph** winds
- **13.7-foot height** of record tidal surge
- **375,000 New Yorkers** ordered to evacuate
- **Multiple fatalities**
- **600,000 Households** without power
- **$10bn-$20bn estimated cost** of the storm
- **150,000 impacted residents**
- FEMA approved plan & protection will **remove classification as a flood zone**
- Significant **FEMA flood insurance saving** to residents

Superstorm Sandy (2012)
Unprepared for Storm Surge

Flooding at Brooklyn-Battery Tunnel entrance

Flooding at Ground Zero

Construction site sinks near South Street Seaport



Flooding on FDR Drive near East River Park

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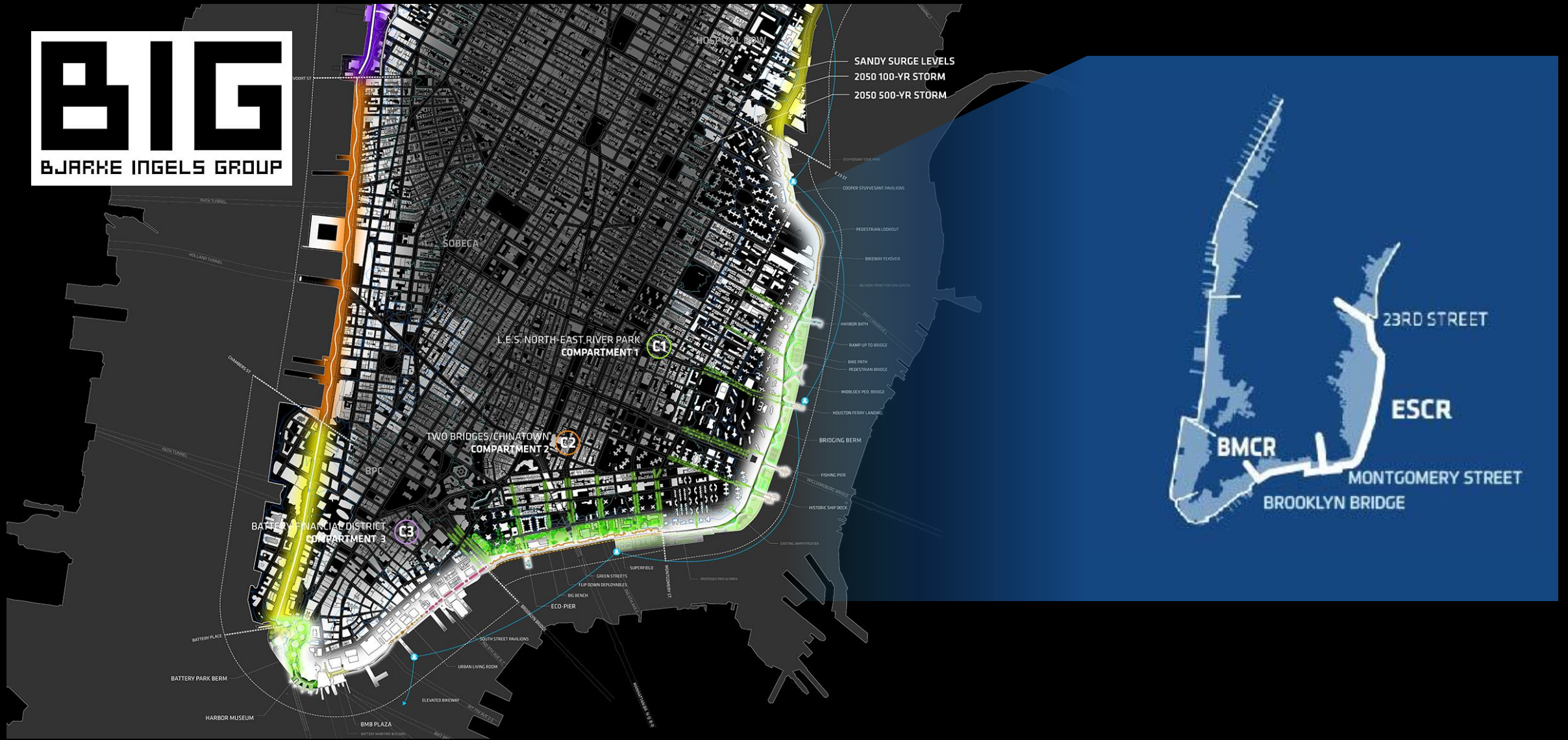
2013-2014 U.S. Department of Housing and Urban Development (HUD)

Rebuild by Design Competition

BIG BJARKE INGELS GROUP

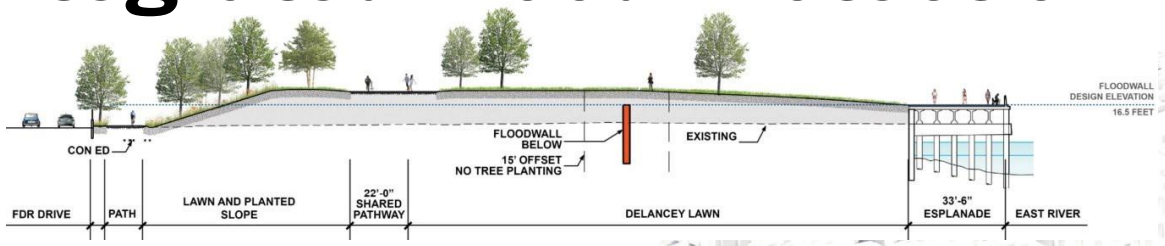


Lower East Side Neighborhood

Demographics:

- High walkability, dense urban neighborhood known for tenement-style buildings, nightlife, and local restaurants
- ~150,000 full-time residents
- ~25% below the federal poverty line
- Diverse mix of racial & ethnic identities
- 28,000 NYCHA residents
- Known for historical communities of German, Irish, Jewish, Italian, & Chinese immigrants

Climate-Adaptive Infrastructure: Integrated Flood Protection

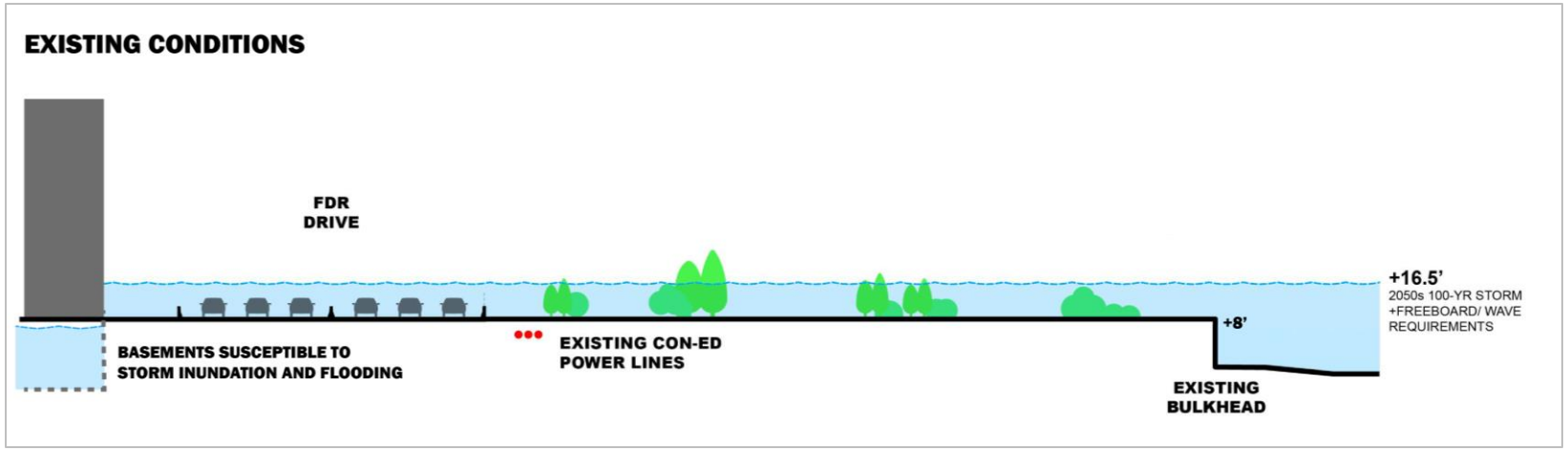


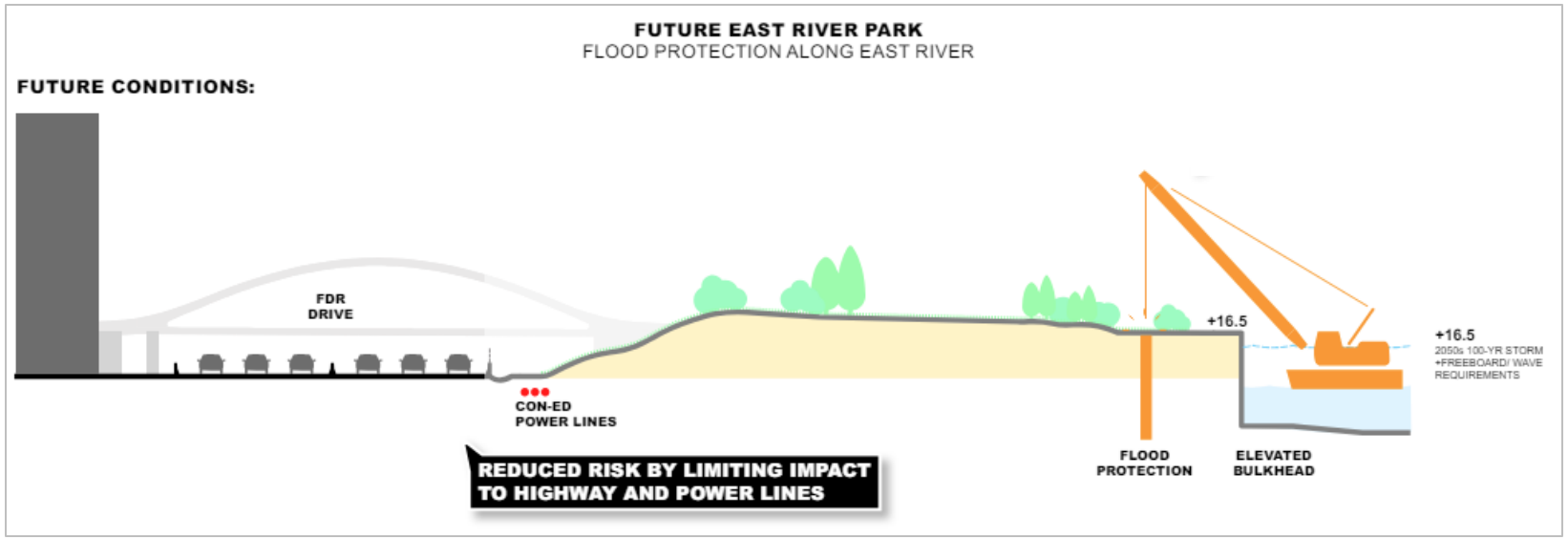
The elements of ESCR's **INTEGRATED flood protection**:

1. **Floodwalls & Floodgates**
2. **Raised Parkland**
3. **Interior drainage improvements**
   (throughout project area)

PA1 | Park Elevation

To minimize walls that impede access and obstruct views from the park, it was decided to elevate the vast majority of the park 8-9 feet





Flood Protection Construction Methods

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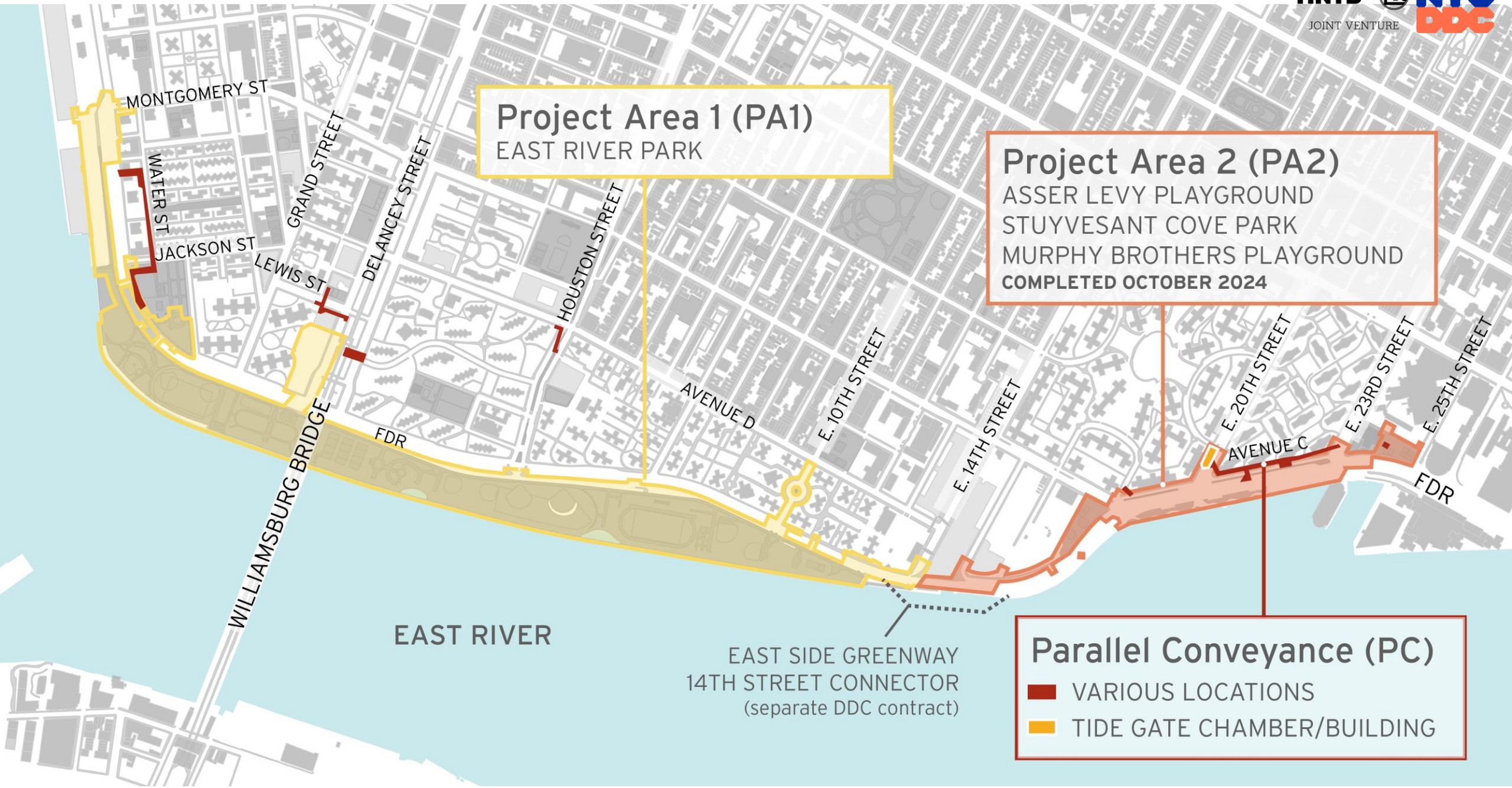
- Floodwalls
- Floodgates
- Inland Fill/Levee
- Sub-Grade Wall/Seepage Barrier
- Stone Columns
- Rigid Inclusions
- Wick Drains
- Jet Grout
- Sewer Capacity Improvements
- Flood Resilient Park Infrastructure
- Utility Relocation
- Utility Stiffening

Flood Protection Construction Methods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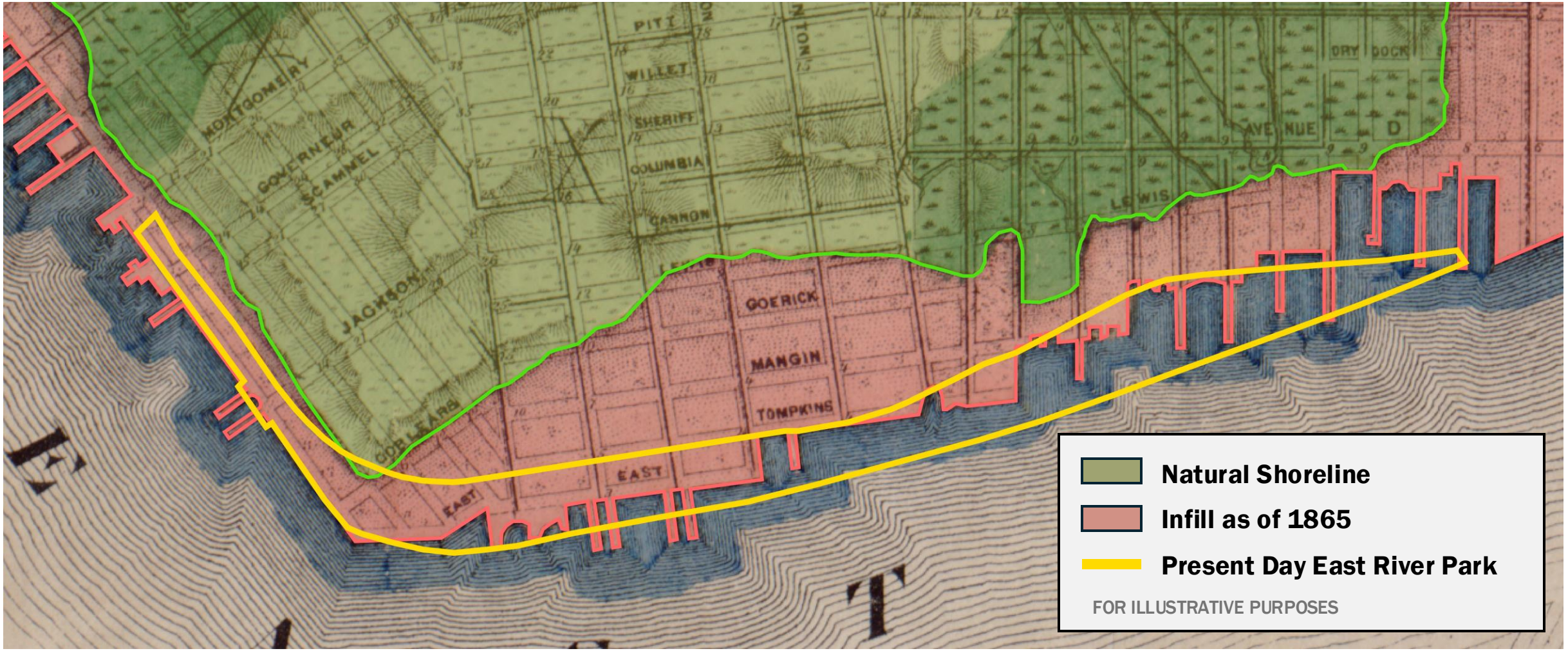
NYC DDC
Project Area 1 (PA1)
EAST RIVER PARK
Project Area 2 (PA2)
ASSER LEVY PLAYGROUND
STUYVESANT COVE PARK
MURPHY BROTHERS PLAYGROUND
COMPLETED OCTOBER 2024
MONTGOMERY ST
WATER ST
JACKSON ST
LEWIS ST
GRAND STREET
DELANCEY STREET
HOUSTON STREET
AVENUE D
E. 10TH STREET
E. 14TH STREET
E. 20TH STREET
E. 23RD STREET
E. 25TH STREET
AVENUE C
FDR
FDR
WILLIAMSBURG BRIDGE
EAST RIVER
EAST SIDE GREENWAY
14TH STREET CONNECTOR
(separate DDC contract)
Parallel Conveyance (PC)
VARIOUS LOCATIONS
TIDE GATE CHAMBER/BUILDING

PA1 | Site Context



Base map: Egbert L. Viele's Topographical Atlas of the City of New York (1865)

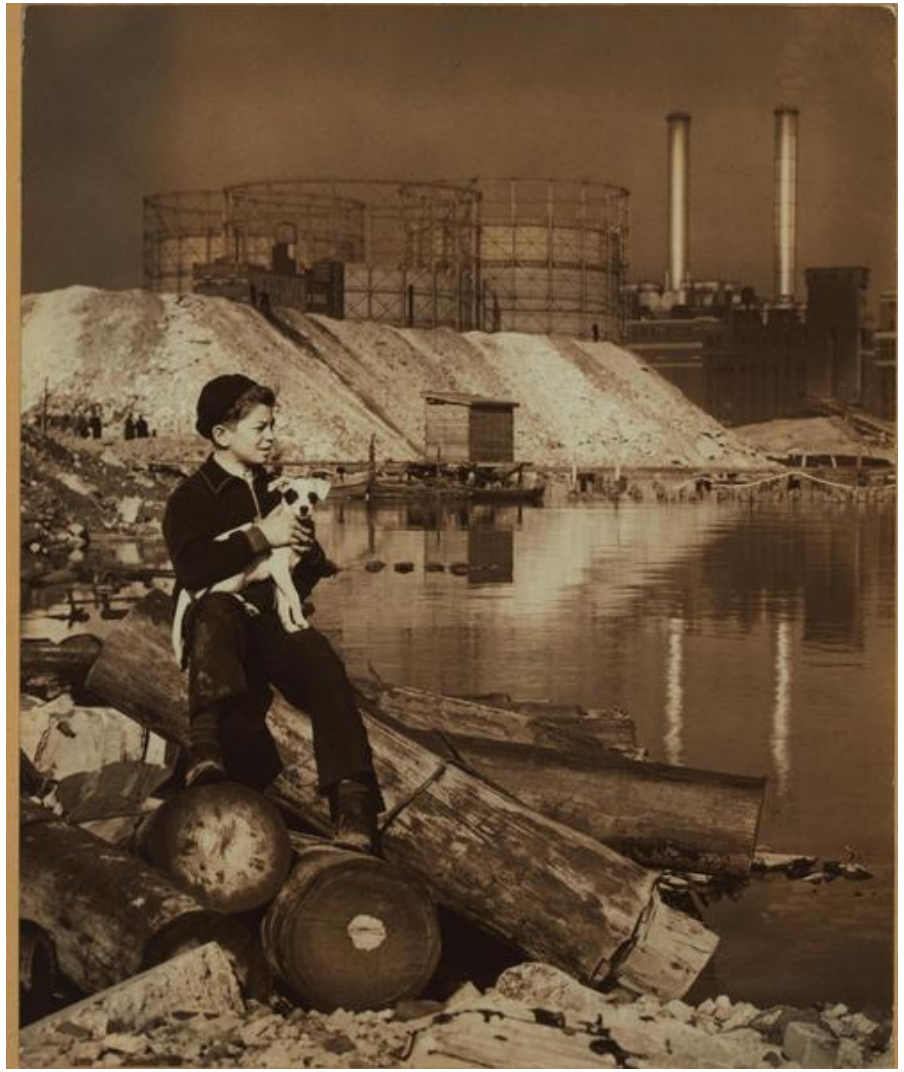
PA1 | Site Context

Construction of FDR Drive and East River Park infill – 1937

Completed FDR Drive and East River Park – Around 1940

PA1 | Site Context

Community swimming in East River near E. 10th Street – 1933



Construction of East River Drive near E. 4th Street, note manufactured gas holders – 1938

Courtesy of The New York Public Library. www.nypl.org

PA1 | Site Context

Piers and buildings on East River shoreline prior to demolition and fill for East River Park – 1937

Bulkheads and pier stumps during demolition for East River Park and East River Drive – 1937

Bulkheads and pier stumps during demolition and fill for East River Park and East River Drive – 1937

Courtesy of The New York Public Library. www.nypl.org

Brownfield Management Concerns

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- Stormwater Management
- Waterfront Management
- Air Quality
- Regulated Building Materials
- Urban/Historic Fill
- Hazardous Materials
- Manufactured Gas Plant Contamination

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Stormwater Management

- Permitting:
  - NYCDEP 5-Acre Variance & Construction Permit
- Field Implementation:
  - Daily SWPPP Checklist
  - SWPPP Inspectors full-time on-site
  - Inspections:
    - 2x weekly inspections by contractor's representative
    - Bi-weekly inspections performed by client
    - Periodic inspections by regulatory agencies
- Reporting:
  - Bi-weekly deviation reports submitted to client
  - Monthly construction lookahead provided to NYCDEP

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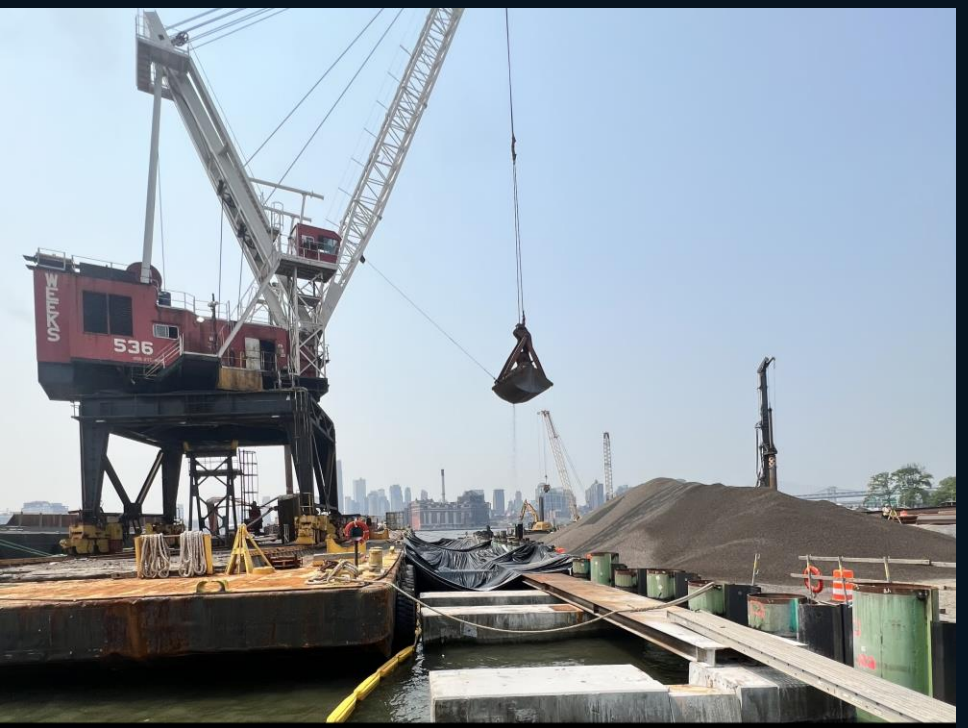
Waterfront Management



- Permitting:
  - USACE/NYSDEC Permitting
    - Tidal Wetlands/Water Quality Certification/Excavation & Fill in Navigable Waters permits
    - NOAA/USFWS Approvals
- Special Concerns:
  - Moratorium on in-water work from January to May for Winter Flounder spawning
  - East River busy, complex commercial waterway
- Field Implementation:
  - Cofferdams/Embayment excavations
  - Turbidity Curtains

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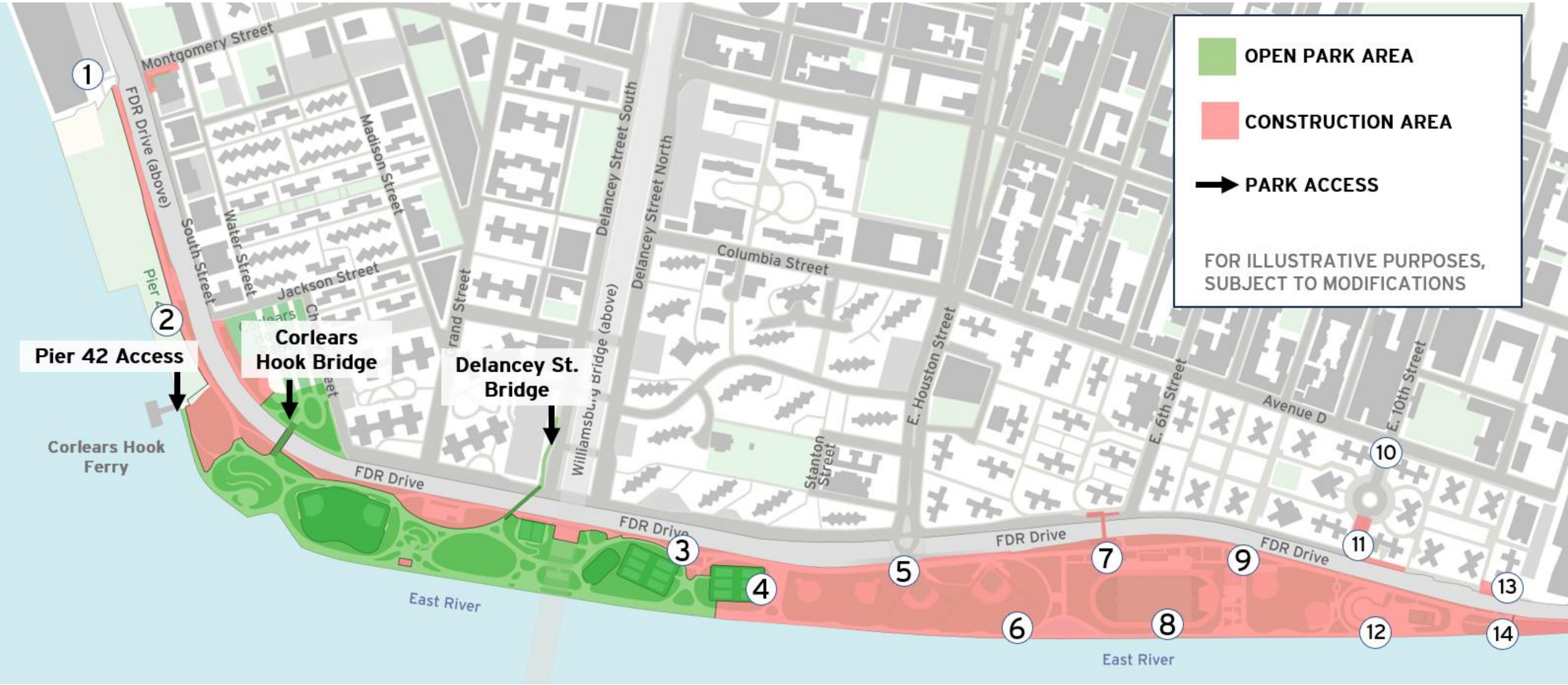
Air Quality

- Air Quality Monitoring Network:
  - Up to 14 stations along work zone permitter
  - Real-time monitoring of PM2.5 and PM10
  - Stations adjusted based on construction phasing
- Air Quality Concerns:
  - Construction operations/July 4th fireworks/Wildfires
  - Work zone bound to the East by FDR
    - ~150,000 vehicles daily
- Special Considerations:
  - Monitoring of sensitive receptors (NYCHA housing, schools)

Air Quality Monitoring Locations



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Regulated Building Materials

- Abated and waste removed from site:
  - Asbestos-Containing Material:
    - Historic buildings
    - Utility wrapping
    - Areas of soil impacted by improper paint removal
  - Lead-Based Paint:
    - Historic buildings
    - Bridges and overpasses
  - Universal Waste:
    - Lightbulbs, thermostats, and light fixture ballast

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Urban/Historic Fill and Construction & Demolition Debris

- Progressive in-filling of the East River shoreline
  - Generations of shoreline expansion from 1700s to 1950s
- Contains soil, rock, concrete, metal, bricks, tires, piers, timber
  - Any material available used for land reclamation
- Elevated concentrations of SVOCs and metals
  - Products of incomplete combustion and industrial metals
- Unsuitable for use as backfill for resiliency construction
  - Replaced with acceptable fill materials
- 400,000 tons excavated and sent for off-site disposal to date
  - 12,000 truck and barge loads to 8 facilities throughout NY/NJ/PA

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Hazardous Waste

- Generations of industrial waste used as backfill
  - Lead smeltery formerly located within work zone
- Lead hazardous waste above USEPA and NYSDEC thresholds
  - Encountered throughout the work zone
- Unsuitable for use as backfill for resiliency construction
  - Replaced in acceptable fill materials
- Special Procedures:
  - Localized air monitoring and other special handling procedures required during all disturbance and handling activities
- 1,750 tons excavated and sent for off-site disposal to date
  - 72 truck and barge loads to facility in NJ

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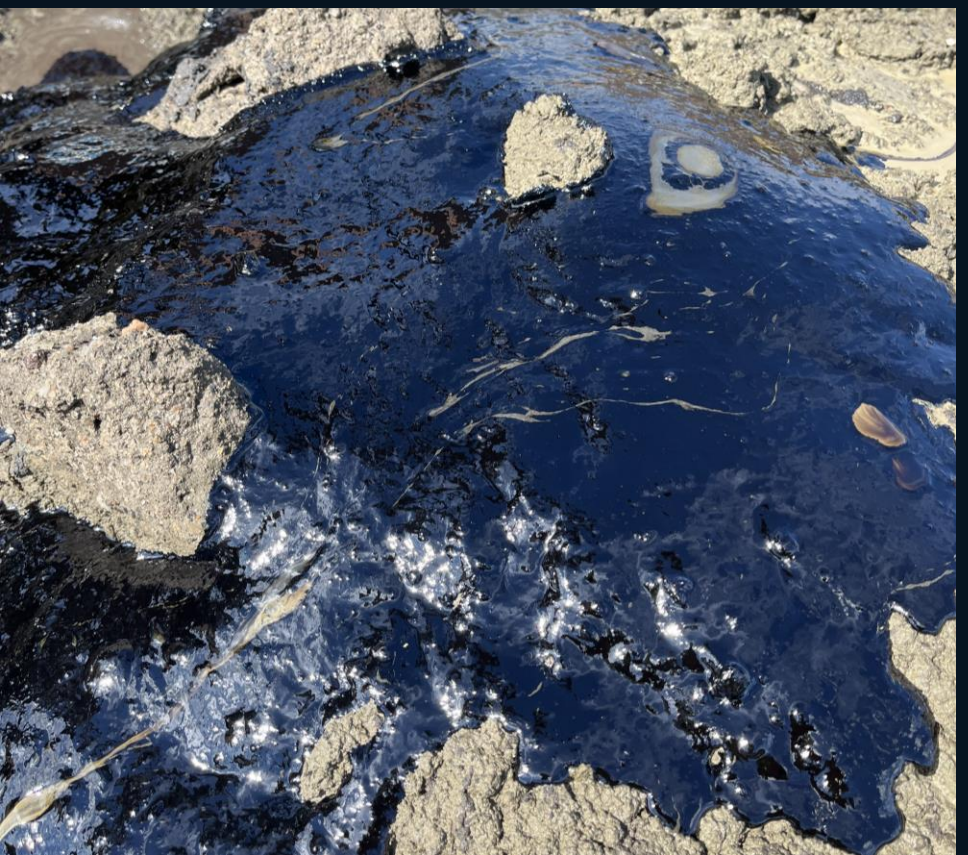
Manufactured Gas Plant Contamination



- Product of historic energy generation
  - Residual contamination impact work zone and East River sediments
- Contains high concentrations VOCs, SVOCs, and metals
  - DNAPL followed preferential pathways downgradient
  - High volatile; characteristic odor of naphthalene (railroad ties)
- Highly managed by NYSDEC
  - Consent Order between NYS for NYC for mitigation
  - ConEd historic generator; cost recovery agreement for mitigation
- Permanent mitigation include cut-off wall and recovery wells
  - Network of ~20 wells to ~60 ft bgs and ~1,200 ft of cut-off wall
- 3,500 tons excavated and sent for off-site disposal to date
  - 130 truck loads to facility in NJ

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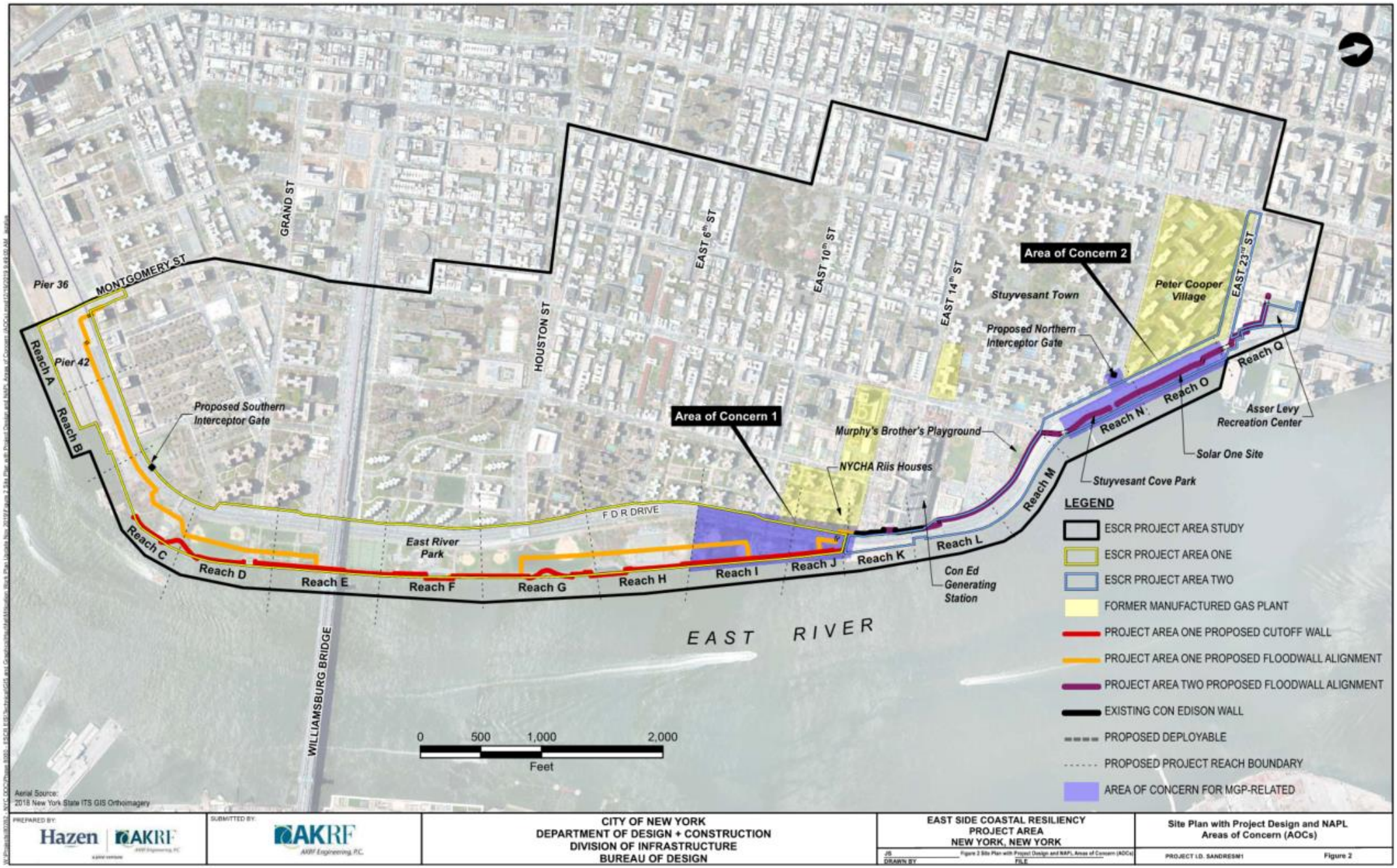

PREPARED BY: Hazen | AKRF

SUBMITTED BY: AKRF Engineering, P.C.

CITY OF NEW YORK
DEPARTMENT OF DESIGN + CONSTRUCTION
DIVISION OF INFRASTRUCTURE
BUREAU OF DESIGN

EAST SIDE COASTAL RESILIENCY
PROJECT AREA
NEW YORK, NEW YORK

JS — Figure 2 Site Plan with Project Design and NAPL Areas of Concern (AOCs)
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Site Plan with Project Design and NAPL Areas of Concern (AOCs)

PROJECT I.D. SANDRESM1 — Figure 2

NYC DDC

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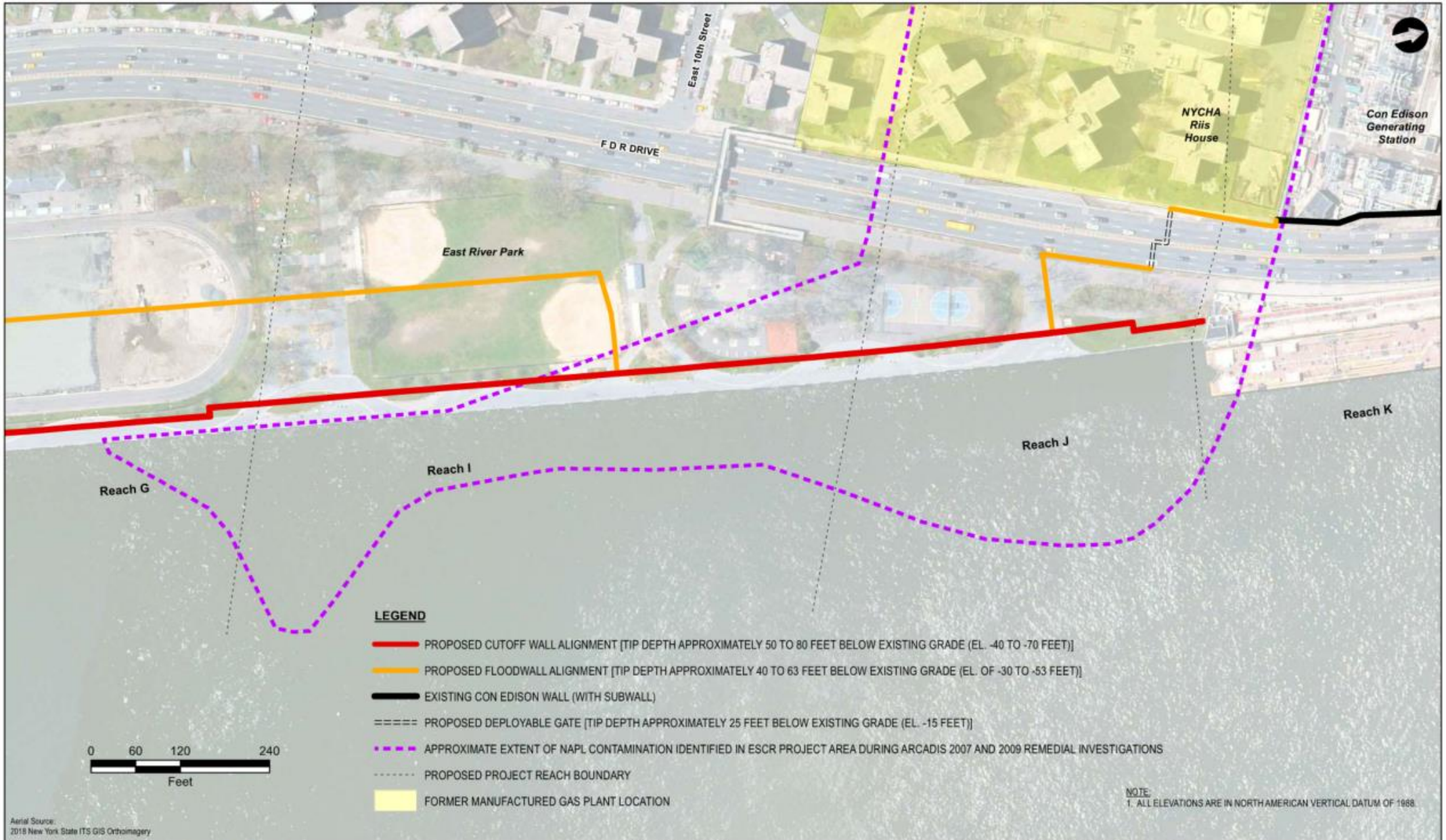

PREPARED BY: Hazen | AKRF

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EAST SIDE COASTAL RESILIENCY
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JS DRAWN BY | Figure 3A AOC 1 NAPL Extent FILE

AOC:1 NAPL Extent

PROJECT I.D. SANDRESM1 | DATE: 2/20/2020 | Figure 3A

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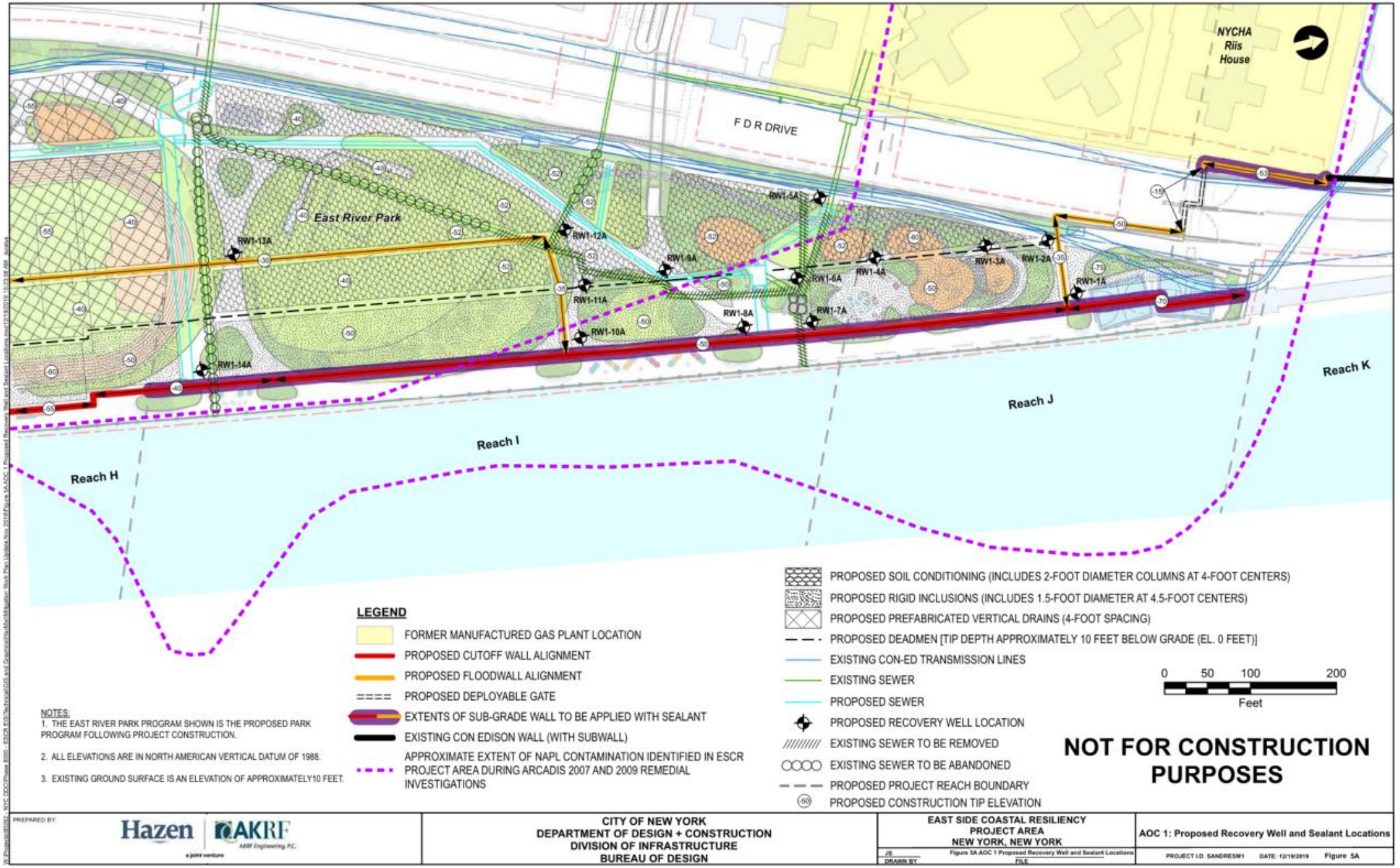

CONCLUSIONS

- Complex waterfront linear construction designed to create more resilient coastline
- Stakeholders range from NYCHA residents to federal government
- Waterfront work zone containing multitudes of special considerations
- ESCR brownfield concerns included:
  - Stormwater and waterfront management
  - Regulated building materials
  - Historic/urban fill and hazardous materials
  - MGP contamination mitigation
- Schedule impacts minimized with coordination with design and construction teams
- Coastal resiliency and brownfield management not a binary choice


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Questions?

Thank you.