



Louis Berger



**New York City
Overcomes
Ecosystem
Restoration
Challenges in Current
Economic Landscape
by constructing its
first mitigation bank
as a means to restore
degraded urban
wetlands**

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Economic Development
Corporation**

Mitigation and Restoration Strategies For Habitat and Ecological Sustainability (MARSHES) Initiative



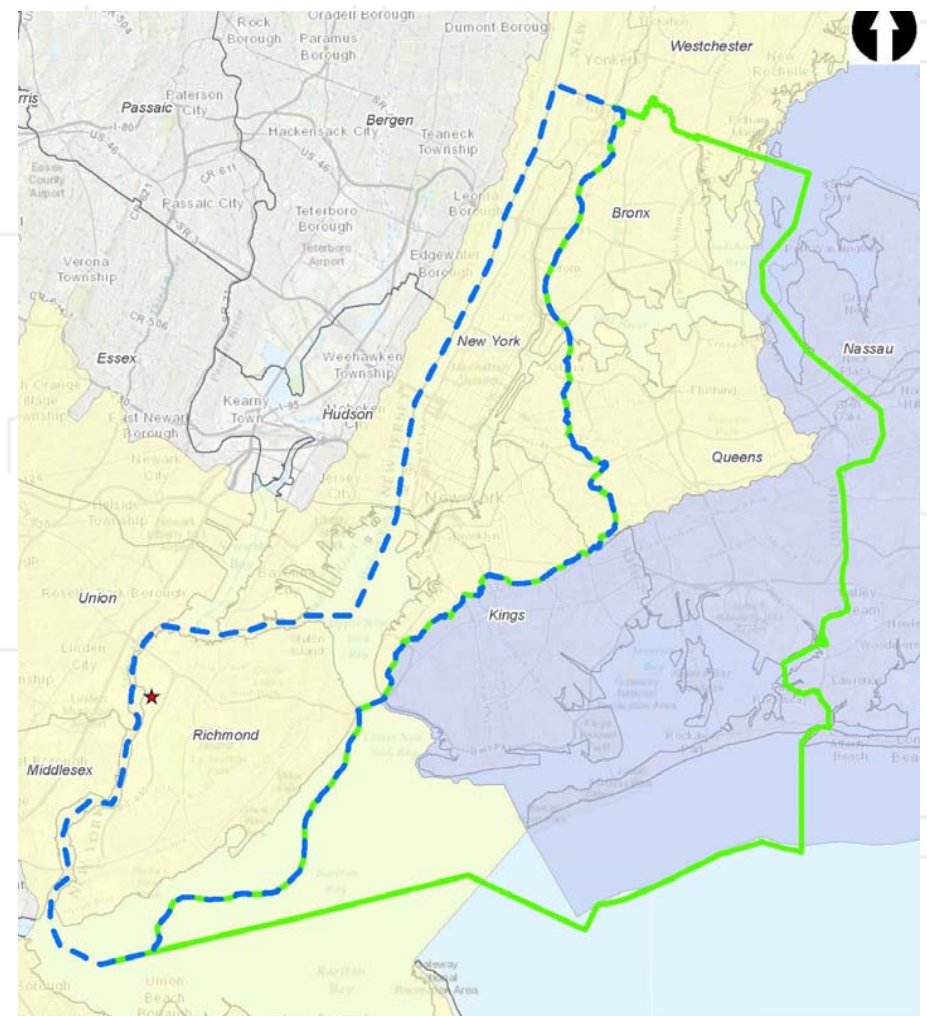
- **Saw Mill Creek Pilot Wetland Mitigation Bank** located on city-owned land on Staten Island which serves primary and secondary service area
 - Comprised of previously filled and degraded urban wetlands and upland buffers
 - Adjacent to Saw Mill Creek, a tidal tributary of Arthur Kill
 - Restoration Goals
 - Remove urban fill
 - Improve tidal hydrology exchange
 - Reestablish native plant species
 - Control invasive plant species
 - Minimize contamination risks
 - Increase fish and wildlife habitat
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Mitigation Bank Service Area

Primary Service Area Portion of Lower Hudson River Basin (HUC06) 020301 within NYC (includes portions of HUC08 subbasins: Lower Hudson River and Sandy Hook-Staten Island)

Secondary Service Area Portion of Long Island Basin (HUC06) 020302 within NYC (includes portions of HUC08 subbasins: Bronx River, Long Island Sound, Northern Long Island and Southern Long Island) and Raritan Bay-Lower Bay Deep

- US EPA & Army Corps of Engineers prioritized mitigation banking
- NYC to join NJ and CT (Tri-State Area) Mitigation credits generation





MARSHEs Project Stakeholders

City Agencies

**Mayor's Office: Project
Coordination**

EDC: Project Sponsor

DPR: Site Jurisdiction

DEP: Wetland Expertise

DCP: Waterfront Planning

Technical Advisory Committee

- **Metropolitan Waterfront Alliance**
- **Trust for Public Lands**
- **RPA**
- **S.I. Borough President**
- **NRDC**
- **EDF**
- **Hudson River Foundation**
- **NYCEJA**
- **NYC Audubon**
- **NYCIF/Columbia**

- **League of Conservation Voters**
- **REBNY**
- **SIEDC**

Interagency Review Team

- **Army Corps of Engineers**
- **NYSDEC**
- **USEPA**
- **National Marine Fisheries**
- **US Fish & Wildlife**
- **NYS DOS**



Project Overview

- Site selected because of interest from regulators
- Historically tidal marsh, which was significantly altered through filling, ditching and dumping
- Site identified in *Comprehensive Restoration Plan for the New York-New Jersey Harbor Estuary* developed by Corps, Port Authority, and other federal, state and local agencies
- Mitigation Plan includes
 - Wetland Restoration (Re-establishment) ~7 acres
 - Wetland Restoration (Rehabilitation) ~17 acres
 - Wetland Enhancement -35 acres
 - Buffer Rehabilitation ~ 9.5 acres



Restoration Plan: Remove Debris and Excavate

- Proposed restoration requires significant excavation due to historic filling
- Up to 10 feet of fill in some areas
- Louis Berger as Construction contract administrator
- Full-time Construction management provided by LiRo Engineers
- Galvin Bros hired as construction contractor

Phase I Environmental Site Assessment (ESA) – 2013

- No releases observed
- Recognized Environmental Conditions (RECs)
 - Nonindigenous Fill Material
 - Widespread Dumping
 - Potential Impacts to Site by Off-Site Sources
 - Suspected Pesticide Application during early and mid-20th century to reduce mosquito populations
- Phase I ESA indicated that an area-wide site screening plan be implemented



2013 Site Screening & Results

- ~50 samples analyzed for Target Compound List (TCL)+30, TAL metals, TOC, grain size, pH
- Borings confirm fill material placed in wetlands and uplands
- Fill includes brick, glass, concrete, metal, coal porcelain, fabric, wood
- Contaminants include metals, PCBs, pesticides, VOCs and SVOCs
- Concentrations tend to decrease with depth
- Site contaminants of ecological concern could potentially impact fish and wildlife resources under existing conditions

2014 Supplemental Sampling Required by Agencies

NYCEDC advanced additional soil/sediment borings

- Re-occupied previous boring locations
 - Collected additional samples for toxicity characteristic leaching procedure (TCLP) lead from 2 locations which exhibited high levels of lead
 - Collected samples from different interval depths, corresponding to top 6-inch interval of soil below final cut depth
- Collected additional samples to increase sample frequency
- Analyzed dioxin/furan in two samples from one location as Arthur Kill is connected to Passaic River
- Provided information needed to generate lithologic cross sections



Summary of 2014 Sampling Results

Environmental Conditions:

- Contaminants include metals, PCBs, VOCs and SVOCs/PAHs
- In most locations, contaminant concentrations decrease with depth
- TCLP data did not exceed federal RCRA hazardous waste level
- Dioxin and Furans are below human health action level of 1,000 ppt and NYSDEC Sediment Guidance Value of 0.5 ppt (ecological criteria)
- Contaminants are typical of urban historic fill

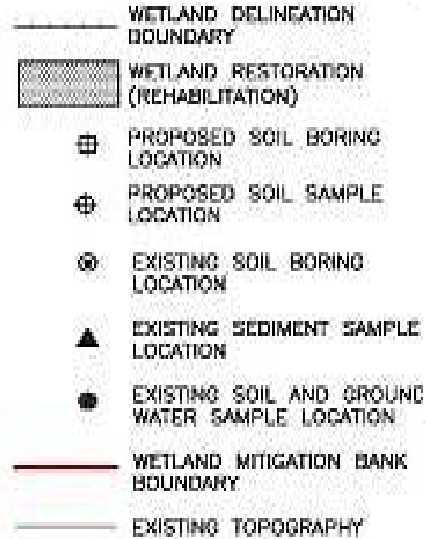
Actions:

- Proposed restoration will remove contaminated soils and debris
- In most wetland restoration locations, exposed soils will not contain contaminants of ecological concern
- In limited areas, contaminants present at depth - soil will be over-excavated and 2 feet of clean sand placed
- Waste characterization analysis being performed during construction to classify the materials for disposal method/destination

Restoration Plan

Approx. Cut Volume Quantities

Northern: 26,490 cy
Central: 10,669 cy
Southern: 4,740 cy
Total Cut: 41,899 cy





Debris Removal

As of June 2018

TIRES

- 18 – 30 CY Containers
- 6 – 10-Wheelers
- 3 – Trailers

Debris

- 29 – 30 CY Containers
- 6 – Trailers
- Total volume of **1,403 CY** disposed in upland disposal facility

Restoration Plan: Construct Tidal Channels and Marsh Plain and Replant with Native Plants



Project Performance Measures

- Project performance measured by criteria developed by state and federal agencies on Interagency Review Team (IRT)
- Set forth in Mitigation Banking Instrument (MBI) and special conditions of regulatory permits including
 - Pre-construction characterization of biota
 - Characterization of post-grading sediment concentrations
 - Post-construction monitoring of sediments and biota
- Additional sampling based on agency concerns that wildlife attracted to the “clean” marshes could be exposed to contaminants that may accumulate over time from other sources



Biota Characterization

- 2017 pre-construction biota sampling to determine baseline tissue residue concentrations (whole body composites) within site and reference area
 - mummichogs
 - fiddler crabs
 - wolf spiders
 - long jawed spiders
 - amphipods
- Post-construction tissue sampling will be conducted during monitoring program to determine tissue residue concentrations in these species, and caged ribbed mussels, within site and reference site
- Tissue samples analyzed for TAL Metals, Mercury, Organochlorine Pesticides, PCB Congeners, PCDD/F Congeners, and lipids
- Pre-construction baseline will be compared to post-construction tissue sampling results to assess impacts to wildlife in newly established/enhanced marshes

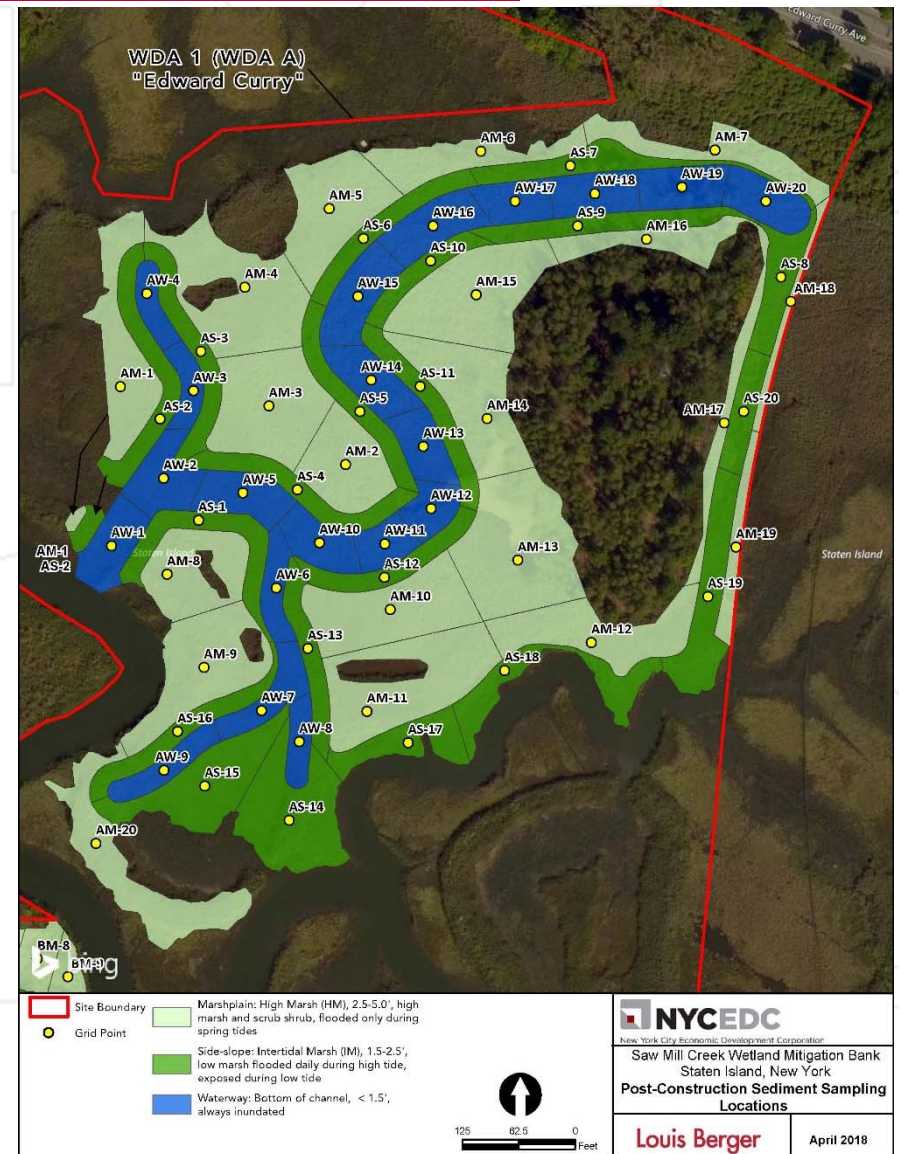


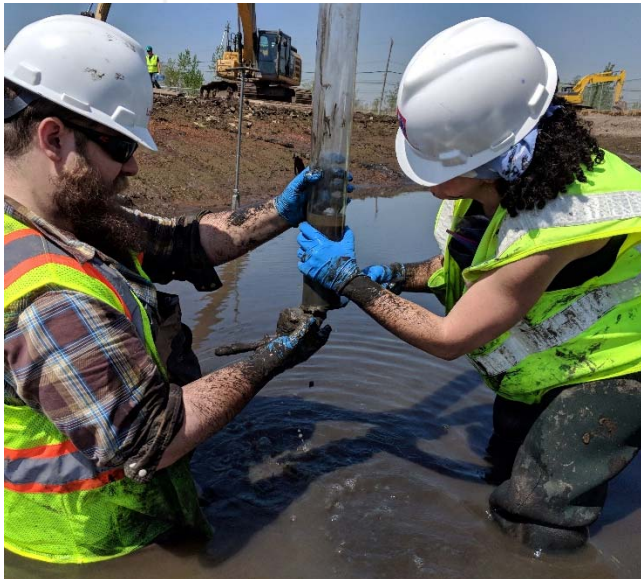
Post-grading & post-construction monitoring

- Developed Incremental Sampling Methodology (ISM) in collaboration with USFWS before project let out to bid.
- Collected sediment composite samples to determine sediment concentrations in exposed sediments after proposed grade establishment.
- Sediment sampling will be repeated during monitoring program, with post-grading sediment sampling results providing baseline for comparison
- Chemical analyses of sediments include
 - TAL Metals
 - Mercury
 - Polychlorinated Biphenyl (PCB) Aroclors and Congeners
 - Organochlorine Pesticides
 - Polychlorodibenzodioxin/furan (PCDD/F) congeners

Post Grading Sediment Characterization

- Sediment sampling in three Wetland Disturbance Areas (WDAs)
- Grab samples were collected from different Decision Units, blended and subsampled
- Each WDA has three Decision Units (waterway, side-slope, and marshes) x 3 ISM sample replicates = 9
- Each ISM sample consists of 20 discrete locations
- All samples from 0-15 cm surface sediment





Sediment Field Sampling Photos

Sample collection at low tide

- Tough field conditions
- Working long days collecting samples
- Coordination with construction activities
- Sample management for composite samples
- Approval for planting areas turnaround for results
- Planting window limits

Pre-Construction Conditions and Proposed Restoration





Excavation during construction

Contractor at work

- Trees clearing and Debris separation prior to start of excavation
- Use of amphibious and long reach excavators
- Archeological testing prior to proposed channel excavation
- GPS controlled equipment doing marsh grading and excavation



Removal of Debris and Invasives

Work prior to grading and material disposal

- Installation of composite crane mat road for material disposal truck access
- Removal & separation of tires prior to disposal
- Use of specialized equipment for material separation in use
- Phragmites clearing and debris collection



Grading and clean sand placement

Proposed Grading Design implementation in field

- Overexcavation area identified as part of initial investigations
- Channel & marsh grading verification using conventional surveying methods
- Clean sand placement in areas prior to planting
- Tidal flushing and final grade approval before marsh planting

Marsh plant delivery and installation

Planting crew at work



- Marsh plant delivery from nursery (Pinelands & County Gardens)
- Plant transport using new graded channels
- Low & high marsh plant installation at low tides
- Low and high marsh Plantings inundated by tide based on grades

Herbivory Fence Installation for protection against wildlife

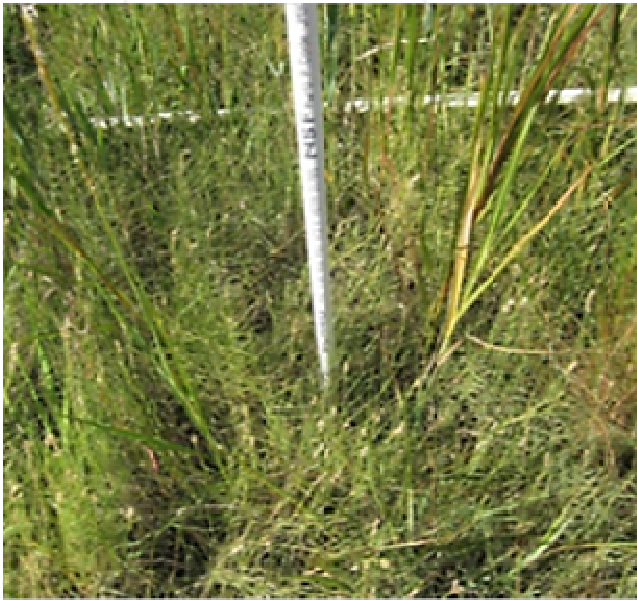




Agency Site visits

Walkthroughs during construction

- NYCEDC providing construction update
- GOSR visit June 29, 2018
- NYSDEC & USFWS site visit June 26, 2018
- TAC site visit March 9th 2018 (harsh winter)
- Excited to see yellow iron doing the work
- Positive response from permitting agencies



Monitoring, Maintenance, and Stewardship

- Bank has an active monitoring & maintenance period
- Maintenance funds will be used for control of invasive species; fence and gates maintenance; trash & debris removal; conduct monitoring inspections and replanting if needed
- Specific performance measures established in Mitigation Banking Instrument
- Annual monitoring reports required
- Bank included long-term protection of Site
- Portion of revenues will be set aside for long-term stewardship



SUMMARY

- After Superstorm Sandy, NYC faced billions in infrastructure damage and challenging task on how to rebuild with greater resiliency
- NYC expects Saw Mill Creek Pilot Wetland Mitigation Bank, first ever approved in NYC, will facilitate:
 - larger wetland restoration projects in City's ecologically sensitive coastal areas
 - directing more public and private funds for restoration of damaged ecosystems
Improving sediment and plant ecology
 - Improving City's resiliency to climate-related disturbances by absorbing coastal flooding
 - Applying lessons learned to other degraded habitats

Questions?

building **strong** neighborhoods

Saw Mill Creek Mitigation Banking Pilot

The Saw Mill Creek Wetland Mitigation Banking Pilot project will improve the ecosystem and wildlife habitat. It will establish NYC's first wetland mitigation bank.



NYCEDC



**Empire State
Development**



**Department
of State**

Bill de Blasio
Mayor

James Patchett
President & CEO
NYCEDC

Mitchell J. Silver
Commissioner
New York City Department of Parks & Recreation

OTHER FUNDERS
Empire State Development

New York State Department of State
(Environmental Protection Fund - Local Waterfront
Revitalization Program Grant)

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CONSTRUCTION MANAGER/RESIDENT ENGINEER
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CONTRACTOR
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