

# HABITAT RESTORATION AND WATER QUALITY IMPROVEMENT

## Two Environmental Benefit Projects within the Long Island Sound Watershed



David Kvinge, AICP, ASLA, CFM  
Director of Environmental Planning

# Major Drainage Basins

NAME	SQ. MILES
Croton River	183
Pocantico and Saw Mill Rivers	67
Coastal LI Sound	65
Bronx River	48
Inland LI Sound	45
Peekskill and Haverstraw Bay	43

[GIS Interactive Mapper](#)



# Coastal Long Island Sound Watershed

14 municipalities,  
LISWIC

Mamaroneck River  
Sheldrake River  
Blind Brook  
Hutchinson River

Largely dense suburban  
and urban development,  
transportation systems

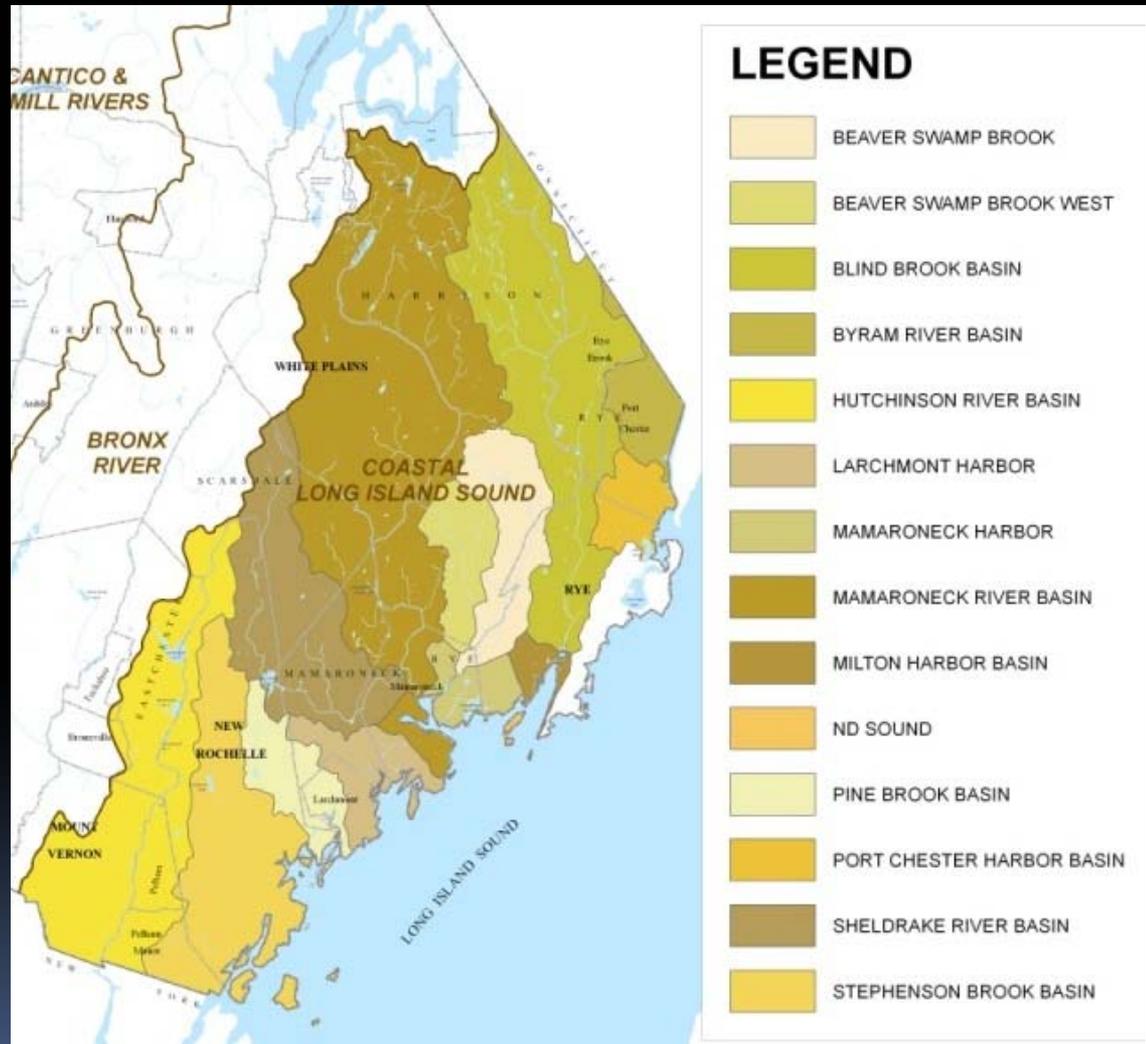


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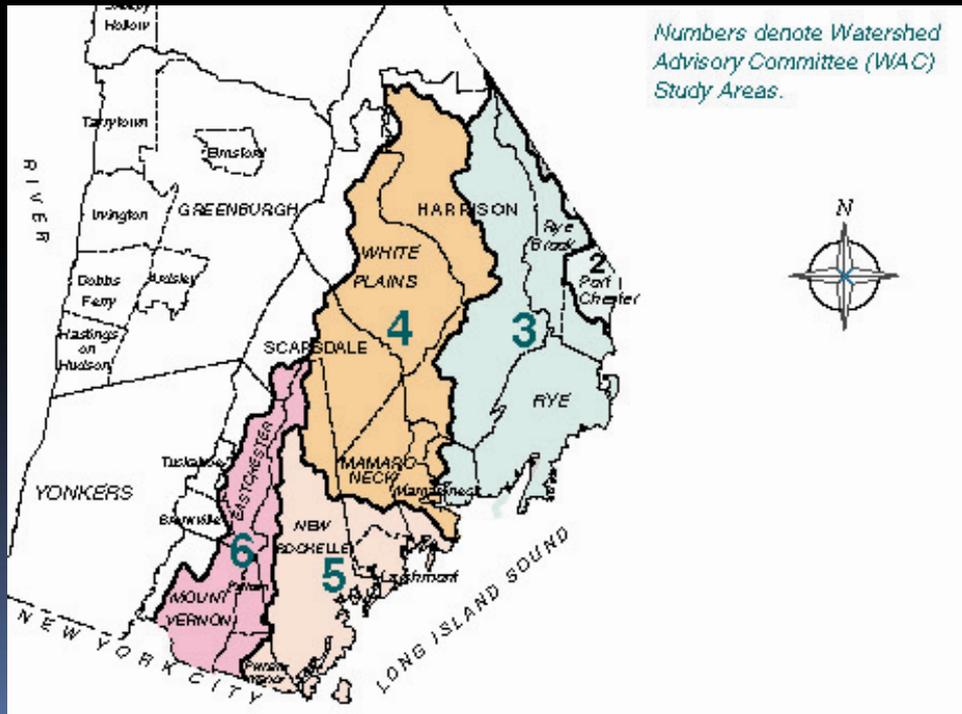
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# Watershed Planning

The County has expertise in working with watershed municipalities to develop watershed plans with specific recommendations for action. This makes it easier to obtain grant funding for project implementation.



Westchester  
gov.com

Andrew J. Spano, Westchester County Executive

### Controlling Polluted Stormwater

A Management Plan for the Sheldrake and Mamaroneck Rivers and Mamaroneck Harbor

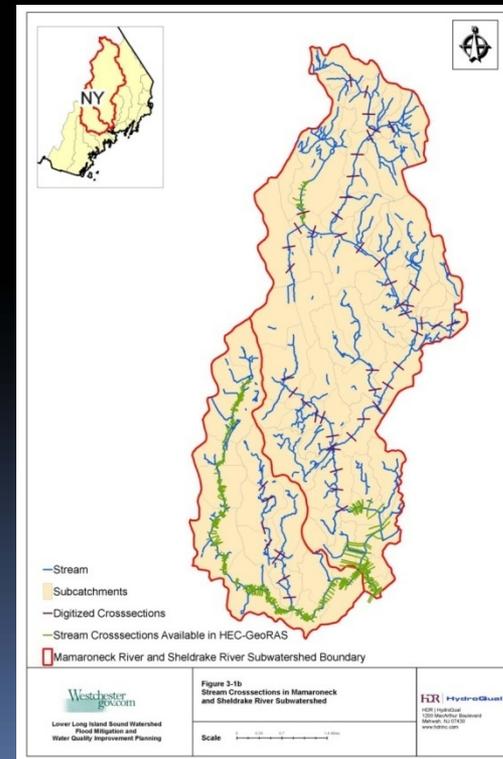
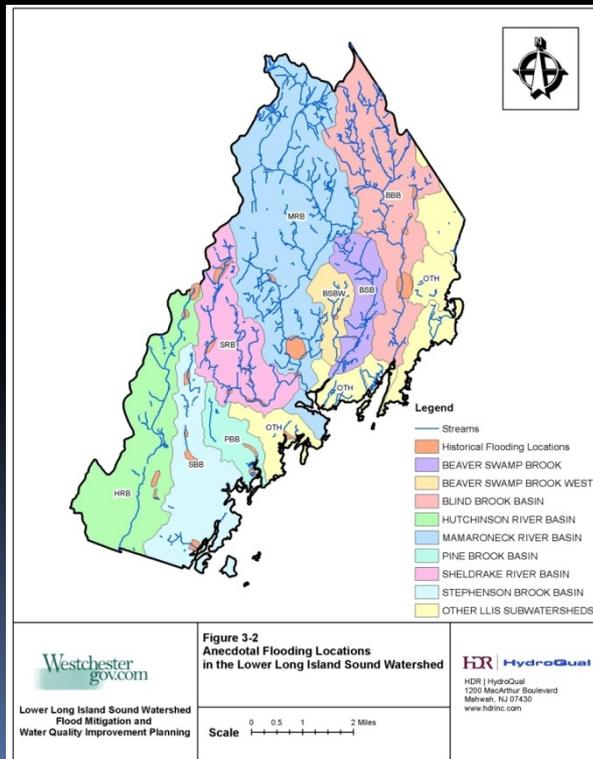
PREPARED BY  
**WATERSHED ADVISORY COMMITTEE 4**

**JANUARY 2001**

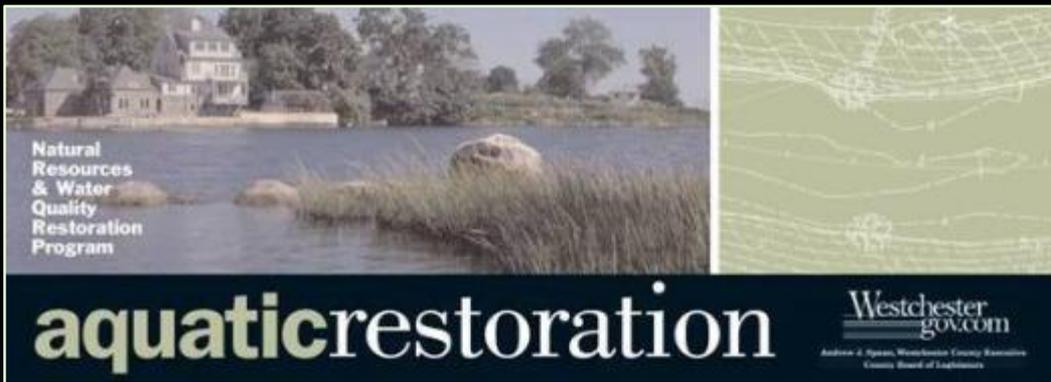
Department of Planning  
Joyce M. Lannert, AICP, Commissioner

# Stormwater Management Modeling Tool Prepared By HDR/HydroQual

HDR/HydroQual Report (09/30/10) at:  
[environment.westchestergov.com/images/stories/qrtly/LLISoundWatershedReport.pdf](http://environment.westchestergov.com/images/stories/qrtly/LLISoundWatershedReport.pdf)



# Westchester County Stormwater Retrofit Program



Natural Resources & Water Quality Restoration Program

**aquaticrestoration**

Westchester gov.com

Andrew A. Spina, Westchester County Executive  
County Board of Legislators

In partnership with County Soil and Water Conservation District



### SOIL RESTORATION



Improve the structural integrity of degraded soils. In other words, restore the soil's ability to absorb and filter pollutants. This is done by adding organic matter to the soil, such as compost, mulch, and cover crops. These practices help to improve soil structure and increase its ability to hold water and nutrients.

### WATER RESTORATION



Improve the flow of water through a system. This is done by creating artificial wetlands, ponds, and other water features. These features help to slow down water flow, allowing it to infiltrate the ground and recharge aquifers. They also help to filter out pollutants and improve water quality.

### IMPROVE YOUR WETLAND & WATERSHED BUFFER

Ever try to find a house with a view of a beautiful stream or lake? If not, you're missing out. A well-maintained watershed buffer can help to improve water quality and protect your property. This is done by planting native plants and trees along the water's edge. These plants help to filter out pollutants and improve water quality. They also help to stabilize the soil and prevent erosion.

### RECONSTRUCTING EXISTING



Reconstructing existing sites involves removing old structures and replacing them with new, more sustainable ones. This is done by using recycled materials and incorporating green building practices. These practices help to reduce the environmental impact of construction and improve the overall quality of the built environment.

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### WATER RESTORATION



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### SHORELAND BUFFER



The Shoreland Buffer gives the Monticello River of Columbia Park in Monticello Village. Increasing rates of stormwater runoff have increased the risk of erosion along the river. By planting native plants and trees along the water's edge, the project helped to stabilize the soil and prevent erosion. It also helped to filter out pollutants and improve water quality. The project improved the aesthetics of the river and added to the overall beauty of the park.

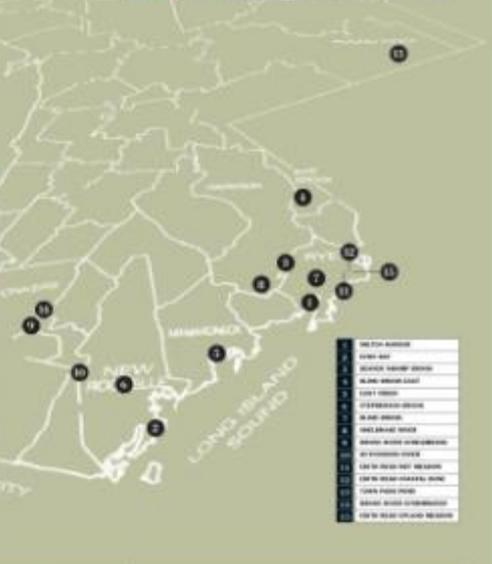
### What is Habitat Restoration?

Habitat restoration is the process of restoring a natural area to its original state. This is done by removing invasive species and replanting native plants and animals. Habitat restoration helps to improve biodiversity and protect endangered species. It also helps to improve water quality and reduce the risk of flooding.

### IMPROVE PLANTS OF WATERSHED BUFFER



DO YOU KNOW? Native plants are better suited to the local climate and soil conditions. They are also more resistant to pests and diseases. Planting native plants along the water's edge helps to improve water quality and protect the watershed. Native plants also provide habitat for native wildlife and improve the overall aesthetics of the area.



NO. OF PROJECTS	NO. OF ACRES
1	100
2	200
3	300
4	400
5	500
6	600
7	700
8	800
9	900
10	1000
11	1100
12	1200
13	1300
14	1400
15	1500

For more information about Westchester County Aquatic Restoration Program, contact Robert D'Amico at (914) 995-1111 or rdamico@westchestergov.com. Please also visit our website at www.westchestergov.com/aquaticrestoration.

The Westchester County Department of Planning and Soil and Water Conservation District is proud to be a part of the following photo restoration to the Aquatic Restoration Program: U.S. Environmental Protection Agency, New York State Department of Environmental Conservation and State, and U.S. Environmental Protection Agency.

Image: Peter Wilke, www.westchestergov.com

# Manursing Lake



# Manursing Lake

**Recommendation to Restore Lake: Intermunicipal Watershed Management Plan for Long Island Sound Study Area 3 (1998)**

**Feasibility Study: Save the Sound (2003)**

**Preliminary Restoration Plan: U.S. Army Corps of Engineers (ACOE) (2004)**

**WCDP Sends Partnership Letter to ACOE (2005)**

**WCDP Awarded Grants for Project from NYSDEC and NFWF (2007)**

**Environmental Benefit Project (Consent Order) (2008/2009)**

# Manursing Lake

## **Project Funding:**

**\$190,000 Grant (National Fish and Wildlife Foundation)**

**\$400,000 Grant (New York Department of Environmental Conservation)**

**\$500,000 (Westchester County Capital Funding)**

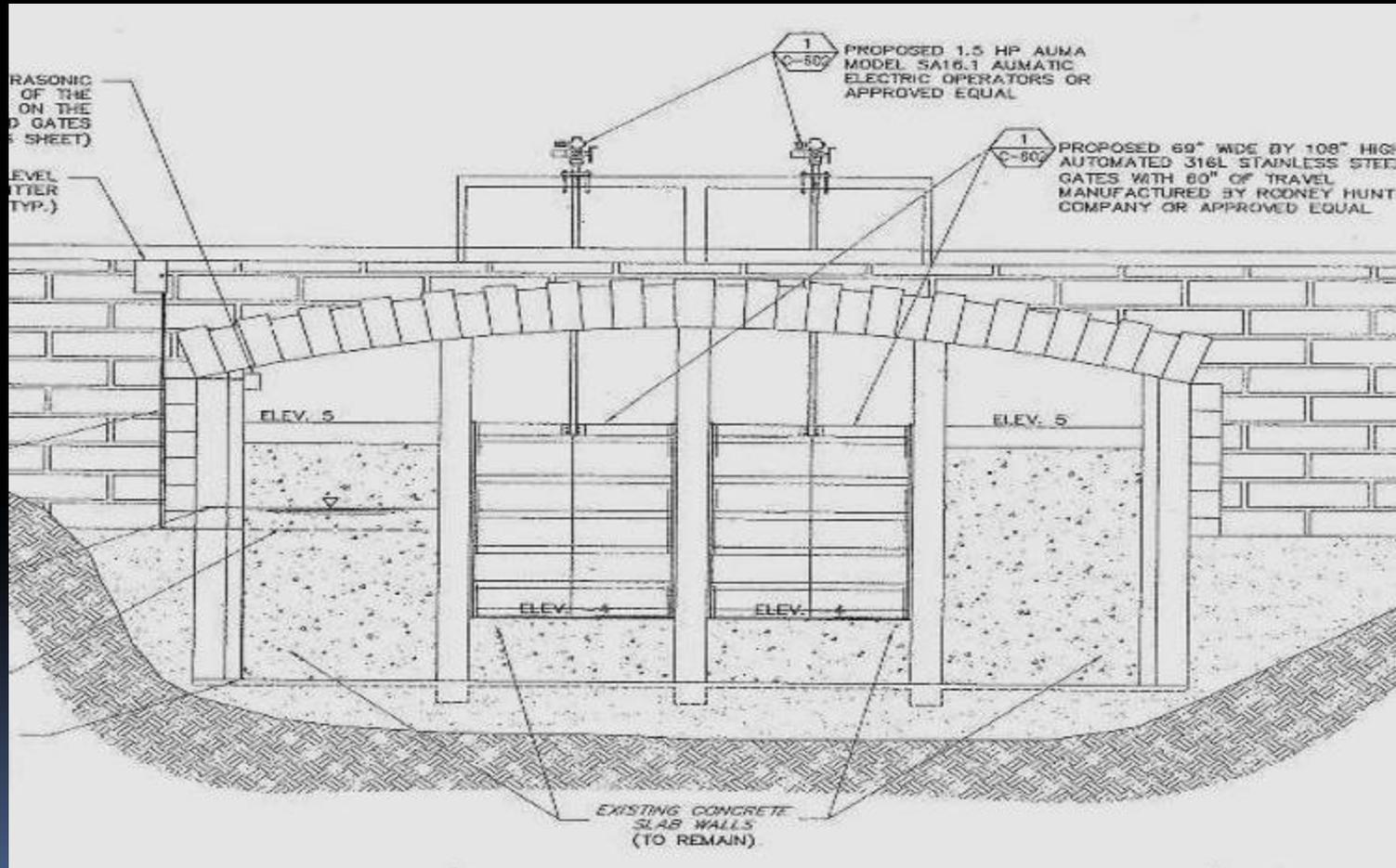
**\$300,000 (Westchester County Capital Funding, Consent Order)**

# Manursing Lake

## Phases:

- 1. Replacement of Manually Operated Tide Gate with Automatically Operated Tide Gate to Control Tidal Flow and Lake Water Elevation (Completed October 2009)**
- 2. Restoration and Creation of Tidal Wetlands (Low and High Salt Marsh), Tidal Creek, and Coastal Buffer (Completed summer 2010)**

# Manursing Lake Automatic Tide Gate



# Manursing Lake Automatic Tide Gate

DURING  
CONSTRUCTION

Coffer dam,  
replacement of  
manual tide gate  
with automatic gate



# Manursing Lake Automatic Tide Gate



# Manursing Lake Automatic Tide Gate





# Manursing Lake Tidal Marsh Restoration

## BEFORE

Degraded tidal  
zone, erosion,  
dominated by  
invasive reed



# Manursing Lake Tidal Marsh Restoration

DURING  
CONSTRUCTION

Silt boom, coir logs  
and mats, invasive  
plant removal,  
regrading



# Manursing Lake Tidal Marsh Restoration

## DURING CONSTRUCTION

Silt boom, coir logs  
and mats, invasive  
plant removal,  
regrading



# Manursing Lake Tidal Marsh Restoration

## DURING CONSTRUCTION

Sand base, plugs,  
goose fencing and  
waterfowl flagging



# Manursing Lake Tidal Marsh Restoration

DURING  
CONSTRUCTION

Sand base, plugs,  
goose fencing and  
waterfowl flagging



# Manursing Lake Tidal Marsh Restoration

## AFTER CONSTRUCTION

Increased tidal  
flushing, tidal  
grasses establish,  
greater diversity of  
aquatic organisms



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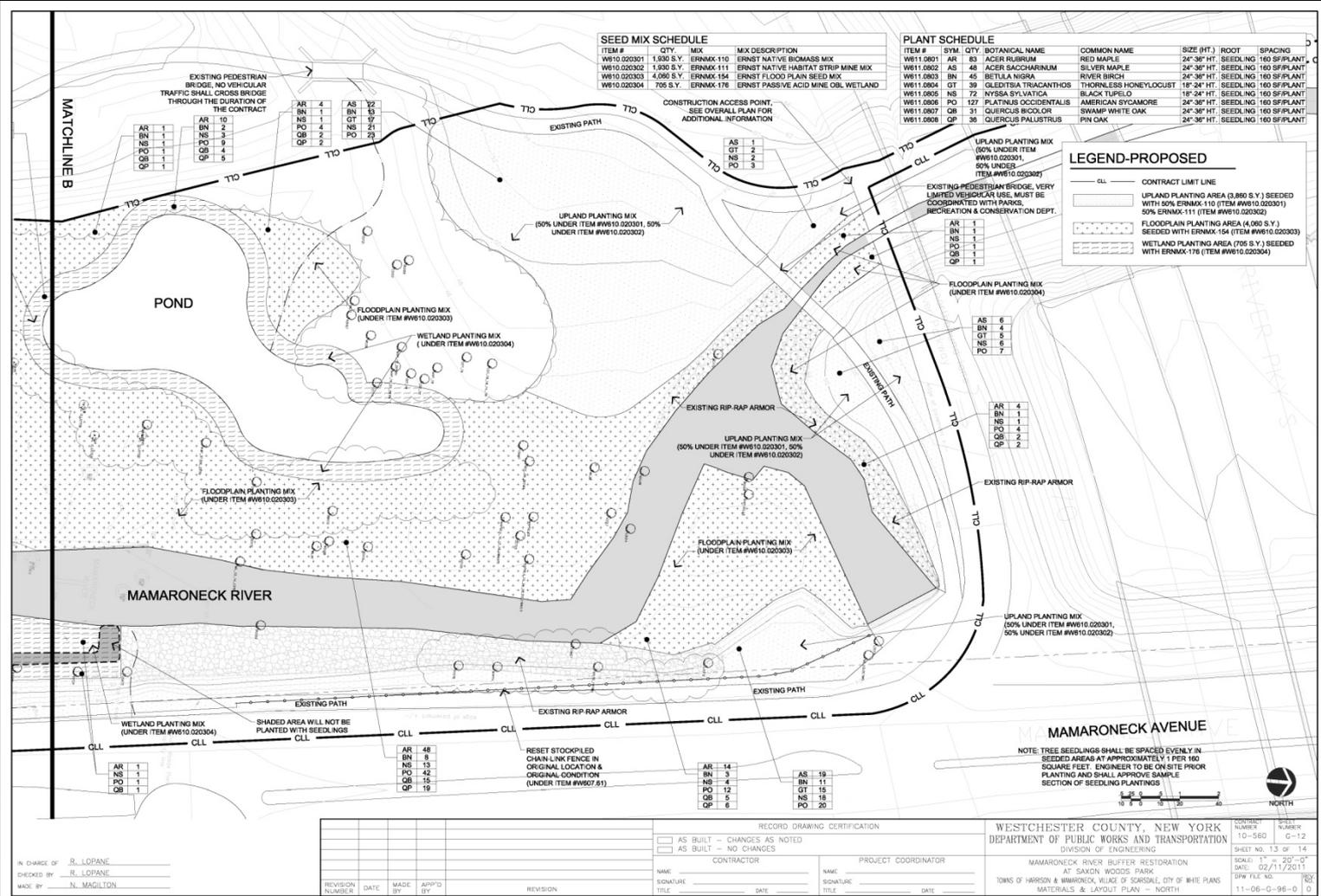
# Manursing Lake Tidal Marsh Restoration



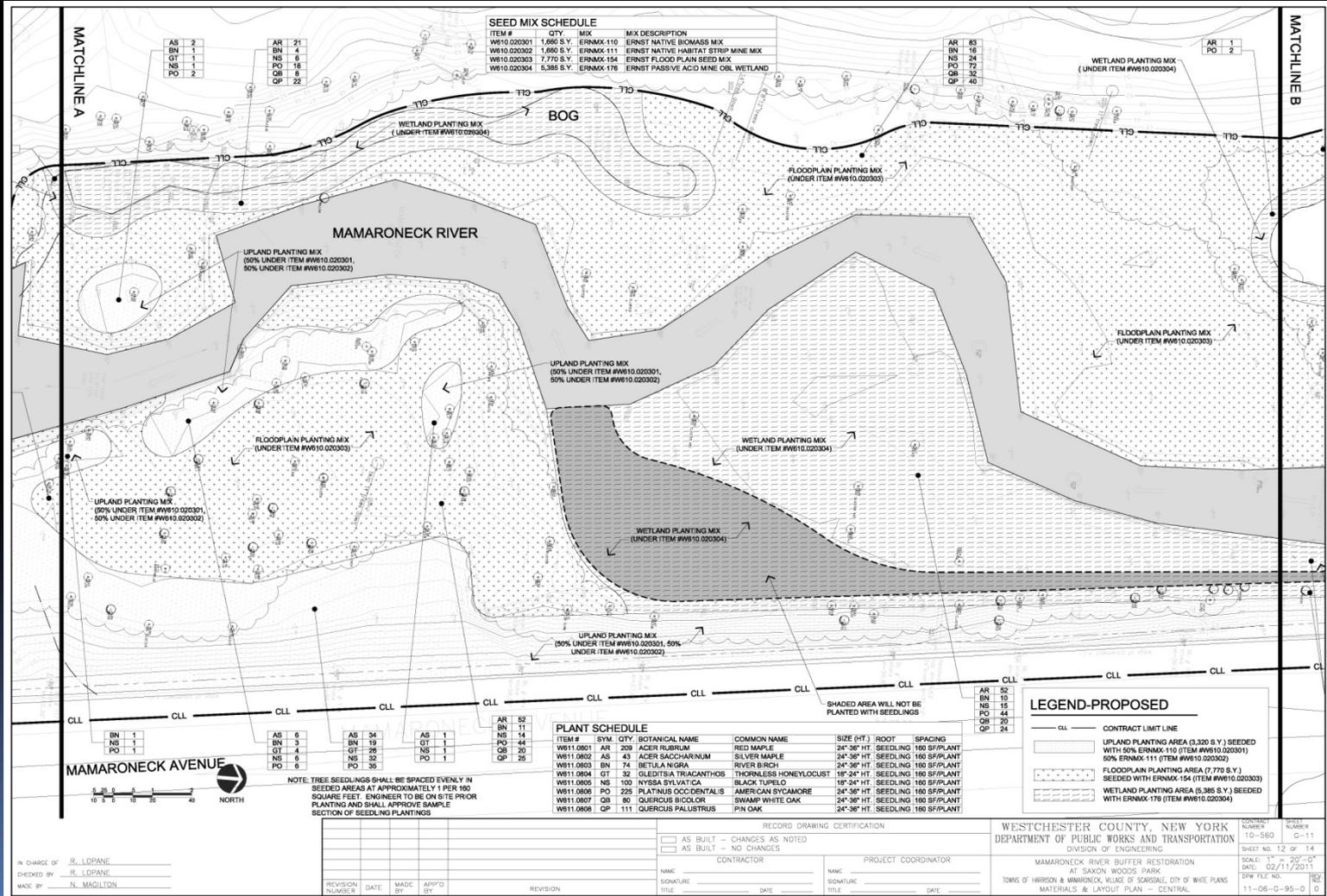
# Mamaroneck River at Saxon Woods



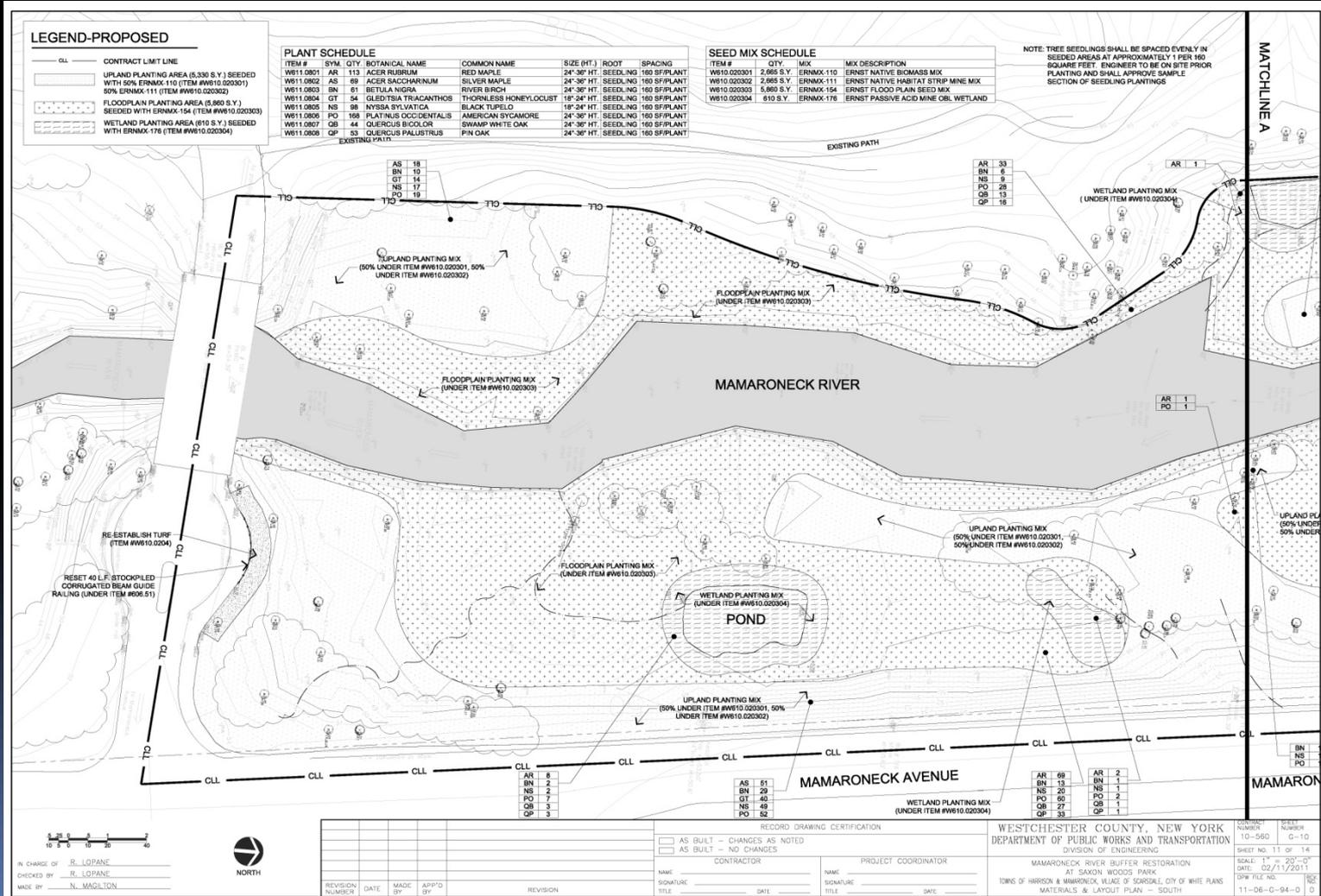
# Mamaroneck River at Saxon Woods – Planting Plan



# Mamaroneck River at Saxon Woods – Planting Plan



# Mamaroneck River at Saxon Woods – Planting Plan



# Mamaroneck River at Saxon Woods – Invasive Plants



# Mamaroneck River at Saxon Woods – Invasive Plants



# Mamaroneck River at Saxon Woods – Streambank Erosion



# Mamaroneck River at Saxon Woods – Invasive Plant Removal



# Mamaroneck River at Saxon Woods – Invasive Plant Removal



# Mamaroneck River at Saxon Woods – Invasive Plant Removal



# Mamaroneck River at Saxon Woods – Invasive Plant Removal



# Mamaroneck River at Saxon Woods – Fine Grading



# Mamaroneck River at Saxon Woods – Hydroseeding





# Mamaroneck River at Saxon Woods – Replanting



# Mamaroneck River at Saxon Woods – Replanting, Bank Armor





# Mamaroneck River at Saxon Woods – Replanting, Bank Armor



# Mamaroneck River at Saxon Woods – After



# Mamaroneck River at Saxon Woods – After



# Mamaroneck River at Saxon Woods – After



# Mamaroneck River at Saxon Woods – After



# Educational Signage

The County promotes the projects, methods and techniques used through its website and educational signage at the sites (sample signage shown below).

## aquatic restoration

### AQUATIC BUFFER RESTORATION



#### What is an aquatic buffer?

Aquatic buffers are vegetated strips alongside a stream, pond, lake or wetland. They provide a transition between water resources and adjoining land uses and help filter pollutants from entering the water.

#### What are the functions of aquatic buffers?

- ▲ Water Quality Protection
- ▲ Groundwater Recharge and Protection
- ▲ Flood Control
- ▲ Streambank Stabilization
- ▲ Wildlife Habitat
- ▲ Stream Temperature Moderation
- ▲ Source of Organic Matter
- ▲ Recreation and Aesthetics

#### When does your stream buffer need restoration?



With little vegetation and steep banks, this area will be subject to erosion. Eroded sediment is a big source of pollution for streams and ponds.



Mowing right to the edge of the stream without an aquatic buffer allows fertilizers, pesticides and grass clippings to get into the water.

#### What materials do you use to restore a stream buffer?



Coir fiber (made from coconuts) is used to help prevent soil erosion and hold in moisture for the new plants. At left is a coir mat used to stabilize a streambank and at right is a coir "log" along the pond edge.

#### What plants should you use?



Native plants should be chosen including trees, shrubs, and herbaceous species. Some examples include black-eyed susan, cardinal flower and buttonbush (pictured above).

#### How do you restore an aquatic buffer?



Different phases of restoring an aquatic buffer are shown above such as re-grading the streambank and planting the buffer through a coir mat.

#### How do you find out more?

Contact your local Soil and Water Conservation District ([www.westchestergov.com/waterquality](http://www.westchestergov.com/waterquality)) or the USDA-Natural Resources Conservation Service ([www.nrcs.usda.gov](http://www.nrcs.usda.gov)).

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## aquatic restoration

### THE SALT MARSH: A DYNAMIC ECOSYSTEM



#### What are salt marshes?

Salt marshes are transitional areas between land and water that occur along the shores of estuaries (where fresh water from rivers meets salt water from the ocean) like Long Island Sound.

#### Why are salt marshes important?

Salt marshes are one of the most biologically productive ecosystems on earth, comparable to tropical rain forests and coral reefs. Salt marshes are essential habitat for marine life and birds found in and around Long

Island Sound, including many of the fish and shellfish that support commercial and recreational fishing. These are just some of the reasons these wetlands should be protected and restored.



Photo Credit: S. Marziani



Photo Credit: US Fish and Wildlife Service

#### Functions of a salt marsh

Many species depend on salt marsh habitats for different purposes:

**Nursery** Many fish and shellfish as well as beneficial insects and birds, lay their eggs in salt marshes, since marshes are calmer than open water, have good hiding places, and have lots of food and nutrients for their young.

**Fast Food Restaurant** Many small animals live in salt marshes including snails, shrimp, insects, and fiddler crabs. Many migratory birds feed on these high protein critters, when traveling through the area. Just as we might stop at a fast food restaurant on the highway, birds see the marsh as a fast food pit stop. Once the birds have had their fill, they continue on their long flight.

**Nesting** Several species of migrant and resident bird populations nest in and around marshes. Species that utilize the area depend on the low marsh and open water for food.



Photo Credit: NOAA



Photo Credit: S. Marziani

#### Additional functions

A salt marsh provides many other important benefits including:

- Improving water quality by absorbing excess nutrients and other pollutants that originate from surrounding land uses. As rainfall runs off the land (called stormwater runoff) into Long Island Sound, the salt marsh catches sediment and filters pollutants.
- Protecting shorelines against erosion by stabilizing the soil and absorbing the energy of waves during coastal storms.
- Providing recreational opportunities for fishing, boating, and bird-watching.
- Providing educational opportunities to learn about the environment and observe it firsthand.



Photo Credit: From The City of New York



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[www.westchestergov.com/  
restoration](http://www.westchestergov.com/restoration)



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