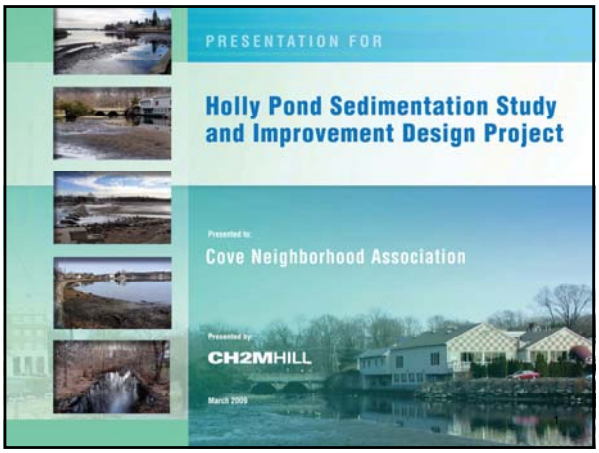
Presentation to the Cove Neighborhood Association, March 2009



Presentation Overview

- Introductions
- Project Scope of Work and Status
- Next Steps
- Discussion of Project Goals

2

Introductions

- **Erin Mosley**
  - CH2M HILL
  - Project Manager
- **Brian Gackstatter**
  - CH2M HILL
  - Client Service Manager for City of Stamford
- **Jeanette Brown**
  - Stamford Water Pollution Control Authority
  - Executive Director
- **Representative Carlo Leone**
  - Connecticut General Assembly

3

Long-term Project Goals

- **An Integrated Watershed & Sediment Management Solution for Holly Pond**
  - Improved River Function
  - Runoff Control
  - Erosion Control
  - Beneficial Uses for Dredged Material

4

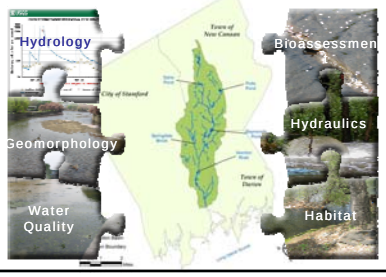
Project Understanding

- **Sediment Projects are Complex and Unique**
- **Commonalities with Other Successful Projects**
- **Aligned with Regulatory Objectives**
- **End-Use Driven**
- **Phased Watershed Approach**

5

Project Understanding

Watershed Approach



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Project Scope of Work

1. **Project Scoping and Chartering**
2. **Data Compilation**
   - Historical Documentation and Geographic Information System (GIS)
   - Tides, Flows, Sediment Sampling, etc.
   - Gap Analysis
3. **Field Investigations**
   - Pond Bathymetry, Sediment Sampling
   - River Water Quality, Flow, Depth, Erosion

7

Project Scope of Work

4. **Sediment and Watershed Characterization**
   - Data Analysis, Mathematical Modeling
5. **Alternatives Analysis**
   - Management Strategies for Restoration and Sustainability
6. **Basis of Design**
   - Pre-design Concepts and Cost Estimates
7. **Public Outreach**

8

Task 1 – Project Chartering

✓ **Complete**

- Scoping Meeting with CTDOT
- Coordination with CTDEP
- Current Funding Sources Confirmed

9

Task 2 – Data Compilation

✓ **Initial Compilation Complete**

- Preliminary Site Reconnaissance
- File Review, including GIS
- Gap Analysis
- Additional information incorporated as identified

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Task 3 – Field Investigations

✓ **Initial Field Work Complete**
Bathymetry completed in November

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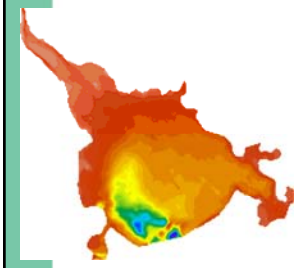
Task 3 – Field Investigations

Bathymetry Results



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Task 3 – Field Investigations

Sediment Sampling completed in December

13

Task 3 – Field Investigations

Sediment Samples

14

Task 3 – Field Investigations

Sediment Analysis Results

- **Polynuclear aromatic hydrocarbons (PAHs) exceed ecological and industrial fill screening criteria**
  - Common sources: asphalt, oil, gas
- **Chlordane was detected above ecological screening criteria**
  - Pesticide
- **Low level metals**
  - Common sources: erosion, industry

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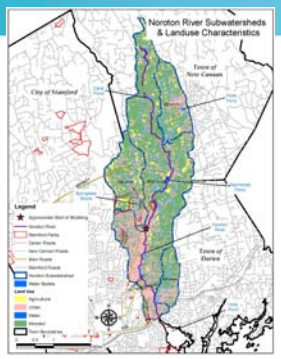
Task 3 – Field Investigations

Noroton River



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Task 3 – Field Investigations

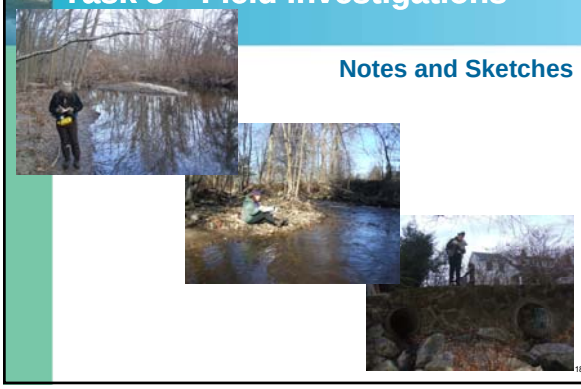
River Walk completed in December

Water Quality Sampling

17

Task 3 – Field Investigations

Notes and Sketches



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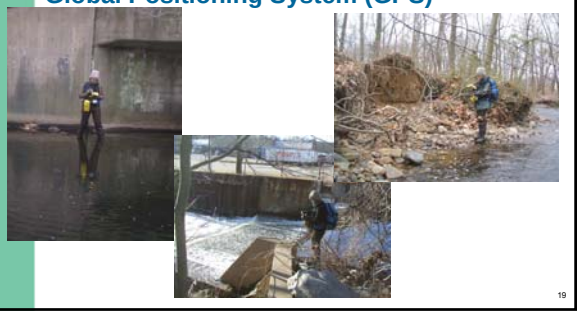
Task 3 – Field Investigations

Global Positioning System (GPS)



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Next Steps

- **Phased Approach**
- **Sediment Characterization, Alternatives Analysis, and Design of Improvement**
  - Met with CT DEP Today
  - Sediment removal action may include removal, sediment processing, dewatering, and water treatment/discharge
  - One construction season
- **Watershed Characterization, Alternatives Analysis, and Design of Improvements for the Long-term**

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Runoff and Erosion can be Sources of Sediment

21

Use Characterization Tools to Understand Sediment Transport

22

Thank you!

- **Questions**
- **Discussion of Project Goals**

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Displays for the Sustainable Stamford Expo, May 2009

Existing Conditions

Holly Pond Sedimentation Study and Improvement Design Project
Stamford and Darien, CT

CH2MHILL

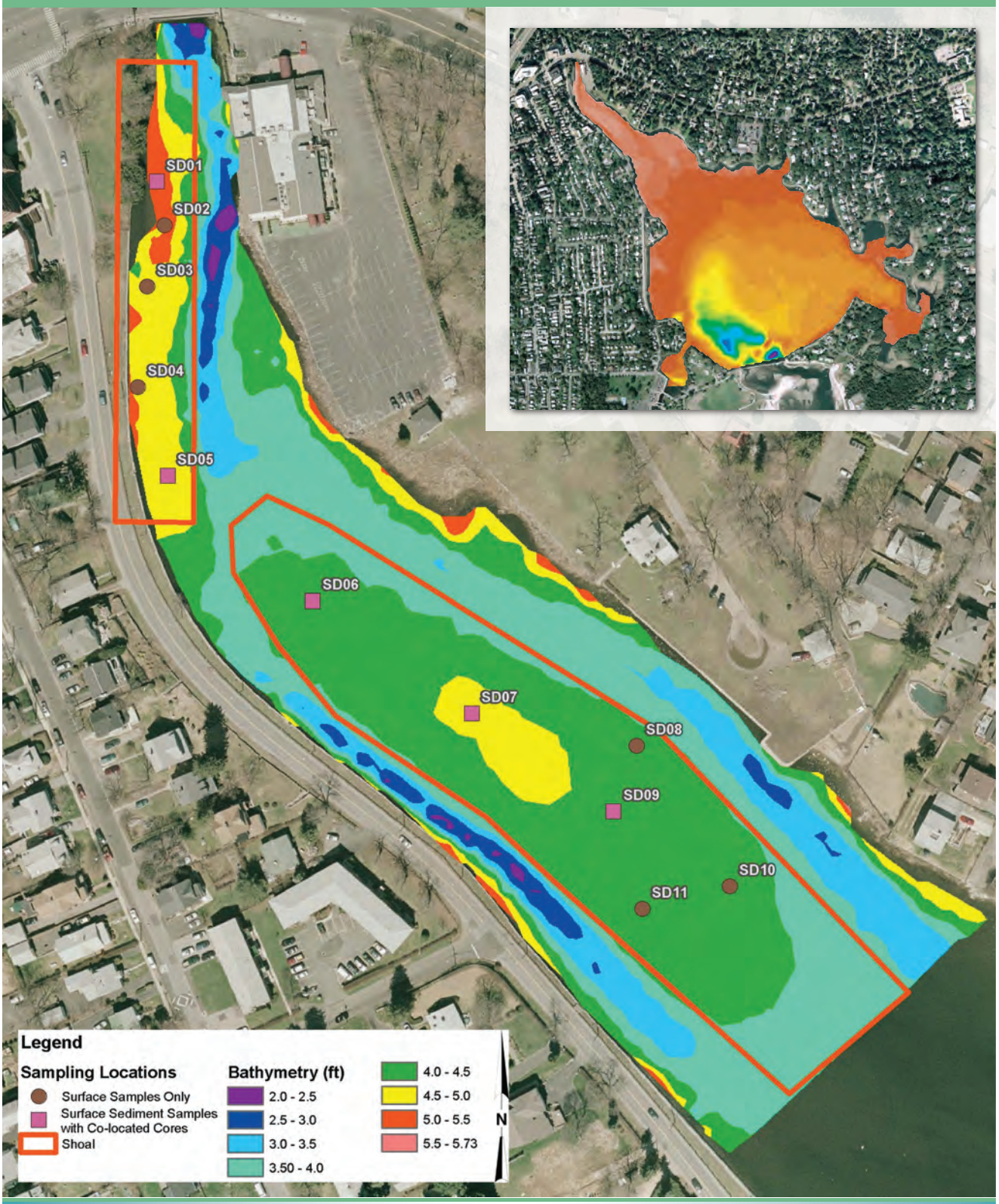
Field Work

Sediment Samples

Holly Pond Sedimentation Study and Improvement Design Project
Stamford and Darien, CT

CH2MHILL

Bathymetry Results



Holly Pond Sedimentation Study and Improvement Design Project

Stamford and Darien, CT

CH2MHILL

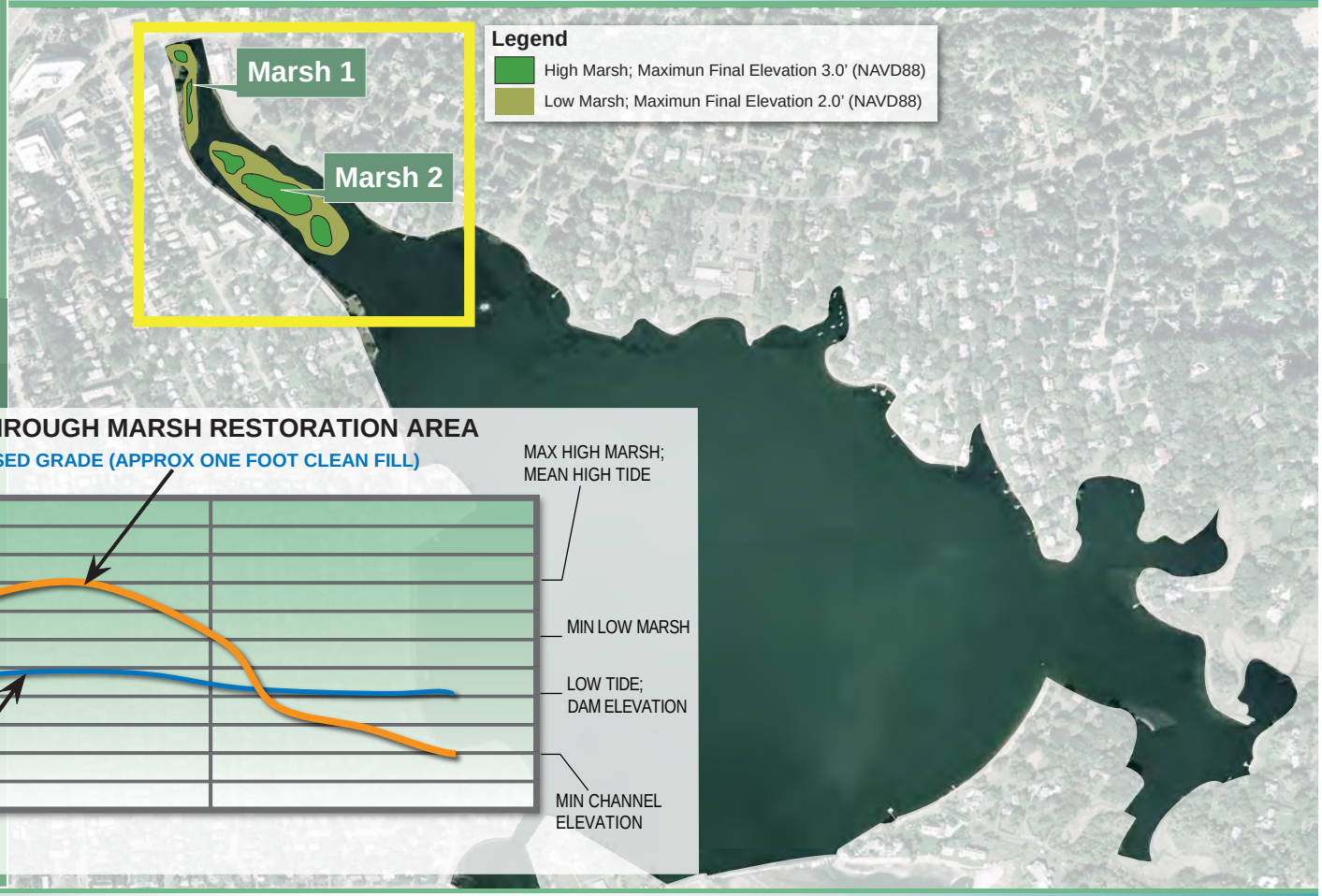
Conceptual Design

Plant Material List

Planting Zone	Plant Species
• High Marsh • Low Marsh	• Spartina alterniflora
Common Name	**Plant Spacing (ft)**
• Saltwater cordgrass	• 2-feet center
Approx. Planting Area (acres)	**Form**
• 5445 • 5445	• Cell • Cell

Total Plants: 18,115 *High Marsh*
Total Plants: 18,115 *Low Marsh*

Totals: 36,230



TYPICAL CROSS SECTION THROUGH MARSH RESTORATION AREA

Holly Pond Sedimentation Study and Improvement Design Project
Stamford and Darien, CT

CH2MHILL

W:\052200\01\3\WDC_SHP_Conceptual_Design

Fact Sheets prepared for Congressman
Jim Himes, October 2009

PROJECT SUMMARY

Holly Pond and the Noroton River discharge to Long Island Sound and are important natural resources to both the City of Stamford to the west and the Town of Darien to the east. The ongoing formation of a series of shoals (visible in the photos) at the head of Holly Pond where the Noroton River discharges has been a cause of concern in the community for many years. Sediments from bank erosion and runoff along the river are transported downstream, where they settle. These sediment deposits adversely affect hydraulics, aesthetics, aquatic habitat, and public health. Laboratory analyses of the sediments confirm pollution from pesticides, street runoff, and industry that affect the health of the pond.

Aerial photo of Holly Pond at low tide. Shoaling in the inlet is visible at top left.

Restoring the health of Holly Pond and the Noroton River will benefit residents and businesses in Stamford and Darien.

The Holly Pond and Noroton River watershed restoration will maximize the creation and maintenance of jobs through the implementation of specific projects and will improve the long-term economic conditions in the area. The project will:

- Create jobs through implementation of a tidal marsh restoration project and related watershed work.
- Improve the urban green space and aesthetics of Holly Pond to support recreational activity such as boating, angling, nature study, wildlife observation, walking, and picnicking.
- Improve property values around the pond and along the river.
- Improve business for the local restaurant adjacent to the pond.
- Provide critical habitat to support all life cycles of aquatic species.
- Reduce pollution of water and sediment.
- Address current flood risk and any impacts that might occur due to climate change.

The goal is to manage sedimentation of Holly Pond for the long-term in a sustainable and beneficial way.

Holly Pond and the Noroton River are listed on the 2006 List of Connecticut Water Bodies Not Meeting Water Quality Standards and do not support all designated uses. Restoration of Holly Pond will address current degradation, and watershed improvements will improve the long-term health of the river, the pond, and the sound.

Taking action now is the best investment for the communities.

Unmanaged, the sedimentation and pollution that are occurring in the Noroton River and Holly Pond will continue, and the condition of these natural resources will worsen. Aesthetics, property values, habitat, flood protection, public health protection, and other benefits will further decline.

Taking action now to restore the Holly Pond inlet and make improvements in the Noroton River watershed will improve the quality of life for residents in Stamford and Darien, protect public health, increase property values, benefit local business owners, and create opportunities for healthful outdoor recreation in a safe urban environment. The restoration will improve hydraulics, create vegetated wetlands, prevent smothering of species living on the pond bottom, and improve water quality for all species depending in the pond.

The project represents an opportunity for state and local leaders to demonstrate the benefits of multi-jurisdictional cooperation to optimize economic, environmental, and community outcomes.

PROJECT ELEMENTS

The Stamford Water Pollution Control Authority (SWPCA) has developed an approach to restoration that can be implemented in stages:

Phase 1 – Sedimentation Study

Phase 1, which is ongoing, includes several elements:

- Establish baseline data. This included review of historical data, development of a project library and geographic information system (GIS), and field work in the Noroton River and Holly Pond. Engineers, scientists, and surveyors have mapped and measured many characteristics of the river and the pond. The information will be used to evaluate and design future phases of work.
- Develop concepts for managing the shoals in the Holly Pond inlet.
- Begin public participation, including two community outreach programs and ongoing communication with interested residents and business owners.
- Design of an initial watershed improvement project to be implemented in Phase 2.

Phase 1 Cost: $485,000 - $500,000 (secured)

Phase 2 – Initial Watershed Improvement Implementation

Phase 2 is structured around funding available through a Connecticut Department of Transportation environmental enhancement funds. The project will implement sediment reduction and water quality improvements in a selected portion of the storm drain system in the Noroton River watershed.

Phase 2 Cost: $490,000 (secured)

Phase 3 – Final Design and Implementation of Holly Pond Improvements

Phase 3 will include design and construction to restore the Holly Pond inlet. Using the data compiled and collected in Phase 1, mathematical models will perform the calculations to understand how pollution and sediment sources in and around the Noroton River are impacting Holly Pond. These tools will allow us to understand the complexity of the system and to design the restoration, including:

Current conditions of the Holly Pond inlet at low tide, Rt. 1 bridge, and Giovanni's Restaurant.

- Source evaluation to identify historical and current sediment and pollution sources in the Noroton River watershed that have contributed to degraded conditions in Holly Pond.
- The role of the "dam" at the south end of Holly Pond in the formation of the shoal.
- The effect of climate change and rising sea levels on sediment transport and habitat.

While previous studies have focused on sediment removal only (aka "dredging"), the current design concept favors a combination of sediment removal and restoration of historic tidal marsh habitat. The concept includes grading and planting to create marsh habitat surrounded by open channels for river and tidal flows. This concept aligns with the Connecticut Department of Environmental Protection's (CTDEP's) successful long-term tidal marsh restoration program. Benefits to this innovative approach include:

- Minimizing costs associated with current and future handling and disposal of contaminated sediment to maintain an open channel.
- Habitat for birds, fish, shellfish, invertebrates, and other aquatic species.
- Increase in Connecticut's coastal wetlands as part of the Long Island Sound Estuary.
- Enhanced recreational opportunities.
- Improved property values.
- Adaptation to climate change and sea level rise.

PROJECT ELEMENTS, Page 2

The restoration will occur in stages over a 24-month period with up to five years following construction to monitor the wetland plantings and wildlife. The concept has received endorsement from: the Stamford legislative delegation including Rep. Carlo Leone, Sen. Andrew McDonald, and Rep. Gerald Fox; Stamford Mayor Dannel P. Malloy; Darien Selectwoman Evonne M. Klein; the Cove Island Wildlife Sanctuary; and adjacent business owner Gabriel Giovanni.

Phase 3 Cost: $5 - $10 million estimated

Phase 4 – Ongoing Watershed Improvements and Public Involvement

It is important to address the sources of sediment and pollution. The ability to control those sources will help to avoid costly restoration efforts in the future. The goal of Phase 4 is to identify watershed management approaches to sustain the ecological and aesthetic benefits begun in previous phases. In fact, these improvements can and should begin immediately and continue as funding becomes available.

Public involvement is important at this stage to help members of the community connect their behaviors, lifestyles, and activities to the health of the ecosystem. Working with stakeholders on the range of possibilities helps them grapple with the impacts of the alternatives and understand that tradeoffs will have to be made and differing opinions will have to be accommodated.

The recommendation and implementation of watershed improvement projects will occur over the long-term. An "adaptive implementation" approach will identify and design treatment processes that address pollutants of concern in the watershed. As improvements are implemented, monitoring and modeling are used to evaluate watershed-wide effects. The watershed management plan is adapted overtime as incremental improvements are made.

Current conditions in a section of the Noroton River

Watershed improvements can include:

- Volunteer programs such as stream clean-ups to engage the community.
- Catch basin labeling programs, i.e., "Don't Dump – Drains to Long Island Sound"
- Stream and channel restoration to reduce erosion
- Low impact development (LID) such as site design and stormwater controls that minimize and filter runoff.

Other projects that could be considered in Holly Pond are additional sediment removal or habitat restoration as well as modified operation of the dam to improve low tide flows and flushing of the pond. These alternatives are not considered feasible in the near future unless significant funding becomes available.

Phase 4 Cost: Individual projects can be sized from as small as $100,000 each to the millions, depending on the scope and goals. Cost and benefits to be evaluated as part of an adaptive implementation approach.

PROJECT BENEFITS

Jobs

Approximately 24,000 direct labor hours will be needed for the tidal marsh restoration in Holly Pond. This includes jobs in heavy and civil engineering construction; engineering services; nursery stock wholesalers; and remediation services. This estimate is a minimum based on direct labor expended on the project and does not include labor hours associated with providing materials, equipment, or other areas. It also does not include any of the other phases of work, which will also generate significant labor needs in similar categories.

The City's consultant, CH2M HILL, is dedicated to meeting Stamford's aggressive minority business participation program. CH2M HILL recognizes the importance of providing opportunities to minority, women, and small business enterprises and has a policy of mentoring them across a wide spectrum of projects and disciplines. As evidence of this commitment, CH2M HILL has been a participant in the USEPA Mentor-Protégé program since 1993 and has sponsored eight protégé firms located throughout the United States. CH2M HILL and its protégé firm, Wendy Lopez & Associates, a Hispanic, woman-owned business, were awarded the Nunn-Perry Award, which recognizes exceptionally successful mentor-protégé partnerships. In Stamford, CH2M HILL has a long history of successful partnerships with local firms.

Environment

The State of Connecticut's impaired waterbody list (303(d)) indicates that the Noroton River is partially impaired for aquatic life support in the region from the head of Holly Pond upstream for approximately 2.7 miles. Holly Pond has multiple impaired uses caused by varied sources including but not limited to stream bank and stream bed erosion, municipal point source discharges, urban runoff, and non-point source runoff that transports large amounts of sediment into Holly Pond.

The Holly Pond inlet restoration will restore approximately 8 acres of historic tidal marsh habitat. The restored inlet will effectively manage sediment and nutrients while providing critical aquatic habitat for feeding, breeding, and migration. Controlling sediment and pollution in the watershed will ensure that public health and the health of the river and pond are sustained for decades to come.

Working around tidal cycles for the Paradise Creek Wetland Remediation and Restoration, Portsmouth, VA.

Community

Watershed improvements are sustainable only if they accommodate the values of the stakeholders and promote the community's vision of its future. Integrating the technical work with a stakeholder process enables the project results to build on a platform of community goals, evaluation criteria, prioritized values, and weighted ranking of alternatives. Investments can be made with confidence of enduring results.

Benefits to the community from the work in Holly Pond and the Noroton River watershed include:

- Public amenities and urban green spaces.
- Angling opportunities through improved fish habitat.
- Nature and wildlife observation.
- Signage placed around restored areas for the dual purpose of public education and protection of sensitive areas.
- Enhanced property value near the pond.
- Improved business for Giovanni's Restaurant adjacent to the Holly Pond inlet.
- Employment opportunities.
- Protection of public health.

PROJECT TEAM

CH2M HILL has been working with the City of Stamford for more than 19 years, and has supported the City's efforts to deliver outstanding environmental and water pollution control services that contribute to the community. CH2M HILL and Stamford's work on previous SWPCA projects was recognized with several awards, including the U.S. Conference of Mayors Outstanding Achievement in Public-Private Partnership Award, as well as the American Council of Environmental Consultants (ACEC/CT) Grand Award for Engineering Excellence, the ACEC National Engineering Excellent Recognition Award and the American Academy of Environmental Engineering (AAEE) National Honor Award for Design.

The City has successfully implemented habitat restoration projects, including the 30-acre Wildlife Sanctuary at Cove Island Park. The site was restored including removal of debris, grading, capping, and seeding with native plantings. An all-volunteer Stewardship Committee was formed to assist City officials in maintaining the Sanctuary. To date, sightings of approximately 300 bird species, 100 different butterflies, and other rare native fauna have been recorded.

CH2M HILL's focus in sediment management, watershed characterization, and restoration has led to the successful completion of award-winning projects throughout the world that are in urban and suburban environments similar to the City of Stamford. A full-service delivery organization that provides engineering, planning, design, and construction services, CH2M HILL and its project team have the ability to complete every phase of this project. With accredited credentials in sediment management, water resources and environmental engineering, award-winning stream restoration and watershed management experience, previous work already performed to build upon for this project, and several hundred staff in the New England area, backed by a total complement of more than 25,000 professionals, we have the capacity to turn the vision for Holly Pond and the Noroton River into a reality.

On January 26, 2006, the U.S. Conference of Mayors recognized Stamford's partnership with CH2M HILL with its Outstanding Achievement in Public-Private Partnership Award. The award was presented to the Mayor Dannel Malloy and CH2M HILL's Project Manager Brian Gackstatter at the winter meeting in Washington, D.C. "We are honored to receive this award," Malloy said. "The Conference of Mayors award recognizes only the top public-private partnerships in the country, and to be included among these other success stories is a testament to both this project, and the relationship between the City and CH2M HILL."

SMRR_1054_4

"CH2M HILL has demonstrated that their firm has the depth and capabilities to provide turnkey remediation services required to deliver compliance, investigation, treatability studies, engineering design, and construction projects. They have provided qualified personnel appropriate to the task and have executed work safely and on schedule. In the past year CH2M HILL has completed nearly 9,000 field hours with no injuries. Most of these hours were associated with drilling and conventional construction. My experience with CH2M HILL has been very positive, they have met or exceeded my expectations and stand behind their commitments and work."

Client Project Manager
U.S. Army Corps of Engineers, Philadelphia District

Gray's Ferry Lower Schuykill River
Ecosystem Restoration

Summary prepared for the SWPCA Board,
November 2009

SEDIMENTATION STUDY UPDATE

The Stamford Water Pollution Control Authority (SWPCA) has developed an approach to restoration that can be implemented in stages. The Sedimentation Study, which began in November 2008 and is ongoing, has included several elements:

Establish Baseline Data

This element of the work included:

- Review of historical documents spanning more than 15 years.
- Development of a project library and geographic information system (GIS), including information from Darien and New Canaan as needed.
- Holly Pond field work, including: bathymetry, sediment and water sample and analysis, and biological assessment.
- Noroton River field work, including: stream assessment to identify potential sources of sediment, flow measurements, water quality sampling and analysis, and a digital terrain map.

The information is being used to evaluate and design future phases of work. Please see attached photos for more description of field work completed.

Holly Pond Improvements

At the conclusion of the field work, CH2M HILL developed a design concept for managing the shoals in the Holly Pond Inlet as part of a federal grant application. The work included a cost estimate as well as an evaluation of economic and environmental benefits.

The project team has worked closely with the Connecticut Department of Environmental Protection to assess the results of the field work. The sediment sampling of the shoals indicated the presence of polynuclear aromatic hydrocarbons (PAHs - common sources include asphalt, oil, and gas), chlordane (a pesticide), and metals (from erosion or industrial sources). This level of contamination makes beneficial use of dredged sediment unlikely. Therefore, CH2M HILL has focused on solutions that minimize the inconvenience and cost of sediment removal. The current design concept involves a combination of removal and restoration of tidal marsh habitat surrounded by open channels for river and tidal flows (see image attached).

Public Participation

CH2M HILL has engaged the public in the project as follows:

- Presentation at a Cove Neighborhood Association meeting.
- Display at Stamford's Sustainable Gardening Expo. In addition, CH2M HILL spoke on behalf of Jeanette Brown on the connections between Stamford's Stormwater Management Plan and stormwater practices on private properties.
- Development of project descriptions for inclusion on the City of Stamford web site.
- Ongoing communication with interested residents and business owners.

Funding Assistance

CH2M HILL has assisted with ongoing funding development activities through the federal grant application as well as meetings with State Representative Carlo Leone. Recently, we met with Rep. Leone and staff from Congressman Jim Himes office to discuss funding options for 2010.

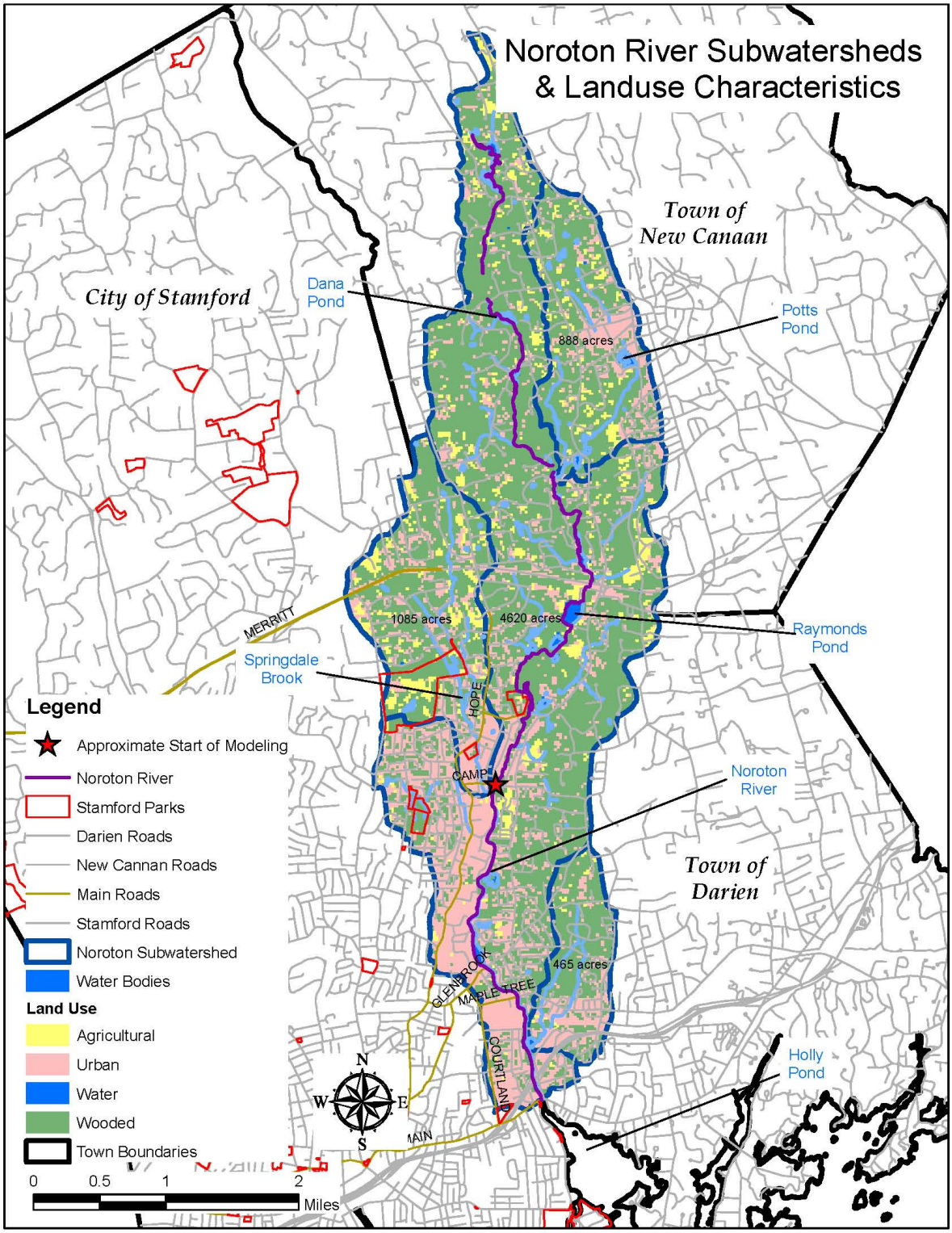
Watershed Improvements

The remaining work on the contract is focused on the design of an initial watershed improvement project to be implemented using Connecticut Department of Transportation environmental enhancement funding. Currently under consideration are various stormwater treatment options to remove sediment and pollutants from stormwater runoff before it drains to the Noroton River.

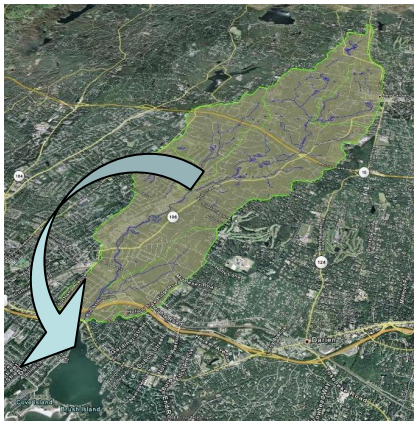
Next Steps

Urban river restoration is a process that takes place over many years and many projects. The initial watershed improvement project will be followed by additional watershed projects and the Holly Pond inlet restoration when funding is secured.

The formation of a supportive community group to help promote the importance of the Noroton River watershed would be a strong asset in moving the projects forward. The group could help to organize many volunteer activities that would connect the residents and business owners of Stamford, Darien, and New Canaan with this historic and environmentally important waterway. Such an organization is also of benefit when seeking funding.



The project is focused on the urban area of the watershed between Holly Pond and Camp Avenue.



The long-term goal of the project is to manage how watershed practices impact the pond.

The Holly Pond dam maintains a minimum pond level at low tide, but it also restricts natural flushing of sediment.

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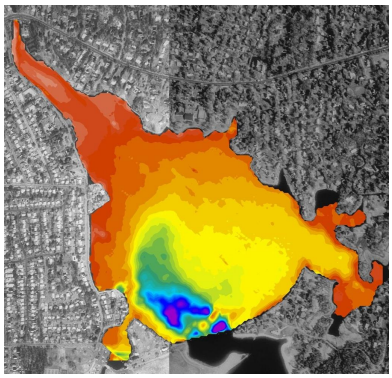

The November 2008 bathymetric survey indicates shallow areas in red and deep areas in purple.

Field staff collecting sediment cores from the shoal in the Holly Pond inlet.

CH2M HILL surveying river substrate material.

CH2M HILL making field notes of infrastructure features.

CH2M HILL taking water quality samples.

CH2M HILL recording GPS coordinates of erosion areas.

The design concept of tidal marsh restoration minimizes sediment removal and disposal while enhancing habitat and flows.