The City of New York

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DIAL 311 Government Information and Services for NYC

October 1, 2008

Hon. Michael R. Bloomberg
Mayor
The City of New York
City Hall
New York, NY 10007

Re: Jamaica Bay Watershed Protection Plan: One Year Progress Report

Dear Mayor Bloomberg:

The New York City Department of Environmental Protection (NYCDEP) is pleased to provide the first update to the Jamaica Bay Watershed Protection Plan. The original report, issued on October 1, 2007, is available at: http://www.nyc.gov/html/dep/html/dep_projects/jamaica_bay.shtml.

NYCDEP was entrusted under Local Law 71 of 2005 to assess the technical, legal, environmental and economical feasibility of various management strategies. These strategies were developed to help protect and enhance the ecosystems of Jamaica Bay. The plan is an evolving one and adaptive management principles will be utilized in providing regular updates and progress reports. The Jamaica Bay Watershed Protection Plan is a multi-year, multi-agency and multi-faceted comprehensive plan. No single public agency or group has the authority, mission or financial capability to carry out all the strategies that NYCDEP called out in the watershed protection plan. In order to be most successful, the plan needs the buy-in and financial support of many agencies at various levels of government as well as environmental stakeholder groups. Addressing the many issues in the plan is a long-term commitment and NYCDEP's update will provide progress reports on many strategies in the plan including those that address these three major issues, for which additional context is provided below:

- Marsh island loss
- Public use, enjoyment and access
- Water quality

Marsh Island Loss

Jamaica Bay is one of the largest coastal wetland ecosystems in New York State. As such, in addition to the preservation, enhancement and protection of these valuable and highly productive biological systems, there is tremendous value in preserving the integrity of its marsh islands and perimeter wetland areas for flood and storm surge protection of area residents. Currently, there is an alarming rate of salt marsh island loss occurring within Jamaica Bay. While

there isn't any one definitive cause, most will agree that something must be done to determine the causes and eventual solutions that will prevent and slow the rate of this loss. To help this process along, NYCDEP's Watershed Protection Plan includes several restoration and research strategies to better inform the scientific community and area practitioners as we work together to develop consensus of the issues.

Public Use, Enjoyment and Access

In addition to the spectacular and breathtaking natural beauty of the renowned national and international birding location that is Jamaica Bay, the importance of Jamaica Bay also makes it a valuable resource for humans as well. Jamaica Bay is a component of the National Park Service, and is part of the Gateway National Recreation Area. Jamaica Bay is a unique local attraction and although situated within a highly urbanized setting, it is widely used by wildlife and it provides a location for quiet and reflective interludes from busy urban life. However, local area residents and the greater human population of our City do not utilize it fully. NYCDEP's Watershed Protection Plan includes strategies to promote public access and education about Jamaica Bay.

Water Quality

Another critical component of the Jamaica Bay Watershed Protection Plan is water quality. The NYCDEP is concurrently addressing effluent quality from wastewater treatment plants and combined sewer overflows (CSO). The New York State Department of Environmental Conservation and NYCDEP are working on plans that will improve water quality and ecological habitat. To this end, there are a number of parallel planning documents in place that address these issues. These include the watershed/ waterbody plans for CSO abatement, NYCDEP's White Paper, *Jamaica Bay: An integrated Solution* June 19, 2008, and the New York City's Office of Long Term Planning and Sustainability's October 1, 2008 -Stormwater Management Plan. Information generated from these planning documents is useful in the development of a coordinated and effective strategy.

Accomplishments

Certainly, confronting the many challenges in Jamaica Bay requires prioritization and financial planning. Many agencies are involved in the regulatory, planning and financial decision-making process. While not all strategies can be addressed in the short term, in the past year significant progress has been made on many fronts to improve and protect Jamaica Bay. The NYCDEP is proud of the following accomplishments about which more details may be found in the enclosed documents.

In May 2008, the NYCDEP completed Phase I of a drainage plan for southeastern Queens. The plan includes the construction of the sanitary and storm sewers underway in Warnerville and Meadowmere section of Queens, sewer construction in and around the Jewel Streets section of east New York and in the Rockaways. Springfield Lake near the headwater of Jamaica Bay will be incorporated into a modified Bluebelt design, which will promote increased storm water collection and attenuation.

NYCDEP has installed three boat pump-out facilities within Jamaica Bay with the assistance of New York State and federal grants. The number of boat pump out facilities is commensurate with the amount of boats that use Jamaica Bay. In combination with these facilities and the mobile boat pump out facilities operated by the New York/New Jersey Baykeeper we can work with New York State's Department of Environmental Conservation to declare Jamaica Bay "a No Discharge Zone" to boaters.

Construction of the Paerdegat Basin CSO detention tank has advanced and the new facility will soon be on-line to limit the overflows of combined sewers into this tributary, which will greatly improve its water quality. In addition, a green roof was installed in spring 2008 and will reduce the amount of runoff from the facility.

The Office of Long-Term Planning and Sustainability has diligently completed a draft storm water management plan to review best management practices (BMPs) that could improve storm water capture rates and potentially reduce CSOs where holding tanks weren't considered cost effective in Jamaica Bay. The City is considering code changes to increase the amount of on-site detention that is required to slow the rate of release to our sewers, which are overwhelmed during certain storm events. Further, inspired by PlaNYC, New York City agencies will plant one million new trees over the next ten years and additional Green Streets, which will improve Jamaica Bay and provide additional aesthetic and habitat resource opportunities within the watershed.

NYCDEP will pilot BMPs to expand the universe of technologies and applications for storm water management for CSO control and non-point source control in separately sewered areas. NYCDEP launched a rain barrel give-away program to increase storm water awareness and management and will begin several innovative stormwater capture pilot technologies with the Gaia Institute.

NYCDEP and numerous agencies including New York State Department of Environmental Conservation, the Army Corp of Engineers, the National Park Service and the Port Authority of New York and New Jersey joined together to review opportunities for clean sand material to be used for additional marsh island restoration. The agencies began a work plan and agreed to seek federal authorization and funding for additional marsh island restoration in Jamaica Bay.

Scientific research is not only critical to protecting and preserving Jamaica Bay, it also provides additional insight to help develop appropriate strategies for enhancing the ecological integrity of Jamaica Bay. Marsh island loss seems to be attributable to many factors and clarification of the role of these will help us assign scarce financial resources to effective solutions. Furthermore, research on water quality parameters corresponding ecosystem response indicators and the role of chemical, physical and biological factors will improve and support policy-making in this complex and naturally variable ecosystem. A myriad of federal, state and city government agencies, non-governmental organizations, academic institutions, and private interest groups are working to preserve and enhance the unique natural resources of Jamaica

Bay. However, in order to bring about an effective strategy for improving water quality and ecological conditions within Jamaica Bay, a focused coordinated effort among all interested parties is essential to moving forward in the development of additional areas of research that can help improve the ecological integrity of the Bay.

To help foster this coordination, on June 27, 2008 NYCDEP sponsored a scientific symposium on important issues confronting the Bay. The symposium provided a platform for researchers, agencies and other environmental stakeholder groups to convene and discuss current issues affecting Jamaica Bay and other coastal ecosystems. Presentations and discussion focused on the physical, biological, chemical and anthropogenic changes that have occurred over time and have played a significant role in the current ecological status of the Bay. This symposium was an important first step in highlighting a broader scientific research perspective of the issues confronting the Bay.

As a follow-up to the June 27, 2008 symposium, NYCDEP, in coordination with the National Park Service will sponsor another symposium on October 28, 2008 at the United States Customs House in lower Manhattan and on October 29, 2008 at Kingsborough Community College in Brooklyn. While the symposium agenda has not been finalized, scientists and researchers have been invited to discuss past and present issues confronting Jamaica Bay and other regional waterbodies.

Enclosed you will find an updated status report on the many strategies that were included in our original October 1, 2007 plan. We trust that this document will reflect our shared commitment to the protection and enhancement of the unique resources of Jamaica Bay. In closing, we wish to thank our many partners and sister agencies for their diligent work on this important collaborative effort, and we wish to acknowledge the individual agencies' work and progress as well. We must continue to work together to improve the environmental conditions of Jamaica and its watershed.

Sincerely,

Emily Lloyd

C: Hon. Christine Quinn; Doug Adamo; Brad Sewell; Dan Mundy; Manuel Caughman; Larry Swanson; Len Houston; Christopher Zeppie; Marie Salerno; Jim Tripp

Jamaica Bay Watershed Protection Plan Update

1. WATER QUALITY

Status report attached

Reduce Nitrogen Loading to the Tributaries and Jamaica Bay

	Implementation Strategy	Description	Schedule	Revised Schedule	Estimated NYCDEP Cost	Funded?	Agency	Status/Comment
Nitrogen Reduction & Other	*Carbon Addition*	Propose Level 2+ Advanced Basic BNR with carbon at the 26th Ward WPCP and Level 2 Advanced Basic BNR at the Jamaica WPCP.	TBD	Negotiations ongoing with NYSDEC. NYCDEP developed a White Paper, Jamaica Bay: An Integrated Solution.	26th Ward WPCP: $61 million and Jamaica WPCP: $52 million	Partial	DEP	See attached status report. 26th Ward chemical facilities funding has not yet been indentified. NYCDEP developed a White Paper, Jamaica Bay: An Integrated Solution. Provides the framework for a holistic strategy for improving water quality and habitat of Jamaica Bay.
	Interim Carbon Addition	To implement nitrogen reductions in the near term; construct interim carbon addition facilities at 26th Ward WPCP and ship Jamaica WPCP centrate to interim facility for processing.	36-40 months	TBD	TBD	TBD	DEP	See attached status report.
	Minimize Centrate Processing from other WPCPs in Jamaica Bay	NYCDEP will continue its efforts to minimize transshipment of sludge for processing in Jamaica Bay.	Ongoing	NYCDEP continues to limit shipments.	NA	NA	DEP	See attached status report. Upgrade will accommodate daily transshipments instead of a few times a week to ensure all Jamaica sludge is treated via the Separate Centrate Treatment facility at 26th Ward.
	Algal and Sea Lettuce Harvesting Pilot Study	Harvest excess algae and sea lettuce to reduce nitrogen and produce biodiesel fuels.	Design anticipated to begin Summer 2009.	Contracting process underway for initiation in early 2009.	$387,000	Y	DEP	See revised schedule information.
	Algal Turf Scrubbers Pilot Study	Remove nutrients and contaminants through benthic organisms, bacteria and phytoplankton.	Design anticipated to begin Summer 2009.	Contracting process underway for initiation in early 2009.	$350,000	Y	DEP	See revised schedule information.
	Oyster Reef Pilot Study	Provide clearer water, improved fisheries habitat through reintroduction of oyster reef.	Design anticipated to begin Summer 2008.	Contracting process underway for initiation in early 2009.	$600,000	Y	DEP	See revised schedule information.
	Reintroduction of Eel Grass (Zostera marina) Pilot Study	Fish habitat/Decreased wetland erosion loss.	Design anticipated to begin Summer 2008.	Contracting process underway for initiation in early 2009.	$350,000	Y	DEP	See revised schedule information.
	Ribbed Mussel Pilot Study	Improve water quality and increase fish habitat.	Design anticipated to begin Summer 2008.	Contracting process underway for initiation in early 2009.	$300,000	Y	DEP	See revised schedule information.

Reduce CSO and Other Discharges to Improve Pathogen and DO levels

	Implementation Strategy	Description	Schedule	Revised Schedule	Estimated NYCDEP Cost	Funded?	Agency	Status/Comment
Sewer System Maintenance	*Expanded Sewer Cleaning Program*	Clean sewers programmatically; increase amount of cleaning per year, cycling through every 10-14 years.	Pilot project 2007; annual program to clean 7% of sewers.	5% of sewers in the 26th Ward Drainage area were cleaned. Sewer maintenance budget subject to funding availability.	$2.7 million (in 2008 dollars) annually plus new personnel and vehicles ($876,500) . Budget constraints may impact implementation.	Partial	DEP	See attached status report.
	26th Ward/Fresh Creek Sewer Cleaning	Clean sediment from selected sewers in 26th Ward.	Final design in 2007. Project scheduled to be completed in 2010.	Cleaning has begun and expected completion is June 2010.	Funding slightly more than $4 million.	Y	DEP	Notice to Proceed issued December 2007; contractor mobilization is in process. Cleaning will remove up to 16,500 tons of debris from combined sewers.
	Expanded Interceptor Inspection and Maintenance	Inspection program to determine cleaning and maintenance needs throughout the City. Pilot project in fall to inspect E Rockaway interceptor.	Pilot studies in 2008; Citywide inspection completed in 2010.	Pilot completed; Citywide inspection to be initiated.	$17,000 for pilot; $3 million over next 1-2 years.	Y	DEP	See attached status report.

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	Implementation Strategy	Description	Schedule	Revised Schedule	Estimated NYCDEP Cost	Funded?	Agency	Status/Comment
Sewer & Treatment Facility Infrastructure Improvements	*26th Ward 50 MGD Expansion*	Increase wet weather capacity from 170 MGD to 220 MGD.	Final design in 2010. Project scheduled to be completed in 2015.	Modification to schedule pending.	$467 million	Partial	DEP	See revised schedule information.
	Paerdegat CSO Detention	50 MGD facility to capture CSOs.	Construction to be completed in 2012.	Tank to be online at end of 2009; construction to be completed by May 2011.	$318 million	Y	DEP	See revised schedule information.
	Inflow/Infiltration Study with Corrective Measures	Identify and resolve sewer system anomalies.	TBD	NA	$2 million/yr for engineering and $5 million/yr for corrective measures	N	DEP	Study not funded.
	Regulators in Bergen Basin	Automation for#2; enlarge #3 orifice; new 48" siphon under Belt Parkway.	Regulator #2 construction to begin in 2007. Remainder TBD.	Construction for Regulator #2 began in 2007; projected completion 2010.	$14 million for Citywide Contract	Partial	DEP	See revised schedule information. Regulators and new siphon sewer are currently proposed to be constructed between 2015 and 2017. DEP is working on expediting the project for completion in 2015.
	Complete Storm Sewer Build out in Rockaways	Approximately 2,500 acres remain for storm sewer construction in the Rockaways	Ongoing	Drainage plans are being developed; five projects have been initiated.	$500 million	Partial	DEP	See revised schedule information. The current five projects will address 371.8 acres.
	Implementation Strategy	**Description**	**Schedule**	**Revised Schedule**	**Estimated NYCDEP Cost**	**Funded?**	**Agency**	**Status/Comment**
New Sanitary and Storm Sewers	*Southeast Queens Drainage Plan*	Sewer modifications to convert existing system to a mainly separated system with High Level Storm Sewers in the Laurelton area.	The first stage of the Drainage Plan completed by Jan 2008. Then cost and project timeline will be developed.	The first stage of the Drainage Plan completed in May 08; total cost and project timeline in development. The first three projects are currently under development.	TBD	Partial	DEP, DDC	See revised schedule information. Approximately 25 projects in the Laurelton Area comprise the first phase of the Drainage Plan. The Drainage Plan was amended to incorporate changes from Jamaica Rezoning.
	Warnerville / Meadowmere Sewer Project	Sanitary sewers, pump station and force main to deliver sewage to Jamaica WPCP.	Under construction; to be completed in 2009.	Modification to schedule pending.	$30 million	Y	DEP	67% construction completion; see revised schedule information.
	Jewel Streets Storm and Sanitary Sewers	Install storm and sanitary sewers.	In design	Joint NYCDEP and NYCDOT project is funded for FY 2013. Currently In Design by DDC.	$26 million	Y	DEP, DOT, DDC	See revised schedule information.
	Implementation Strategy	**Description**	**Schedule**	**Revised Schedule**	**Estimated NYCDEP Cost**	**Funded?**	**Agency**	**Status/Comment**
Boat Pumpouts	*Install a Third Boat Pumpout Facility at Rockaway WPCP and Seek a No Discharge Designation for Jamaica Bay*	Reduce wastewater discharges from recreational boats directly into Bay, and will initiate proceedings to create a No Discharge Zone (NDZ) for Jamaica Bay.	Operational for 2008 boating season. Proceeding for NDZ TBD.	Installed late summer 2008 and operational for latter half of 2008 boating season. DEP is pursuing NDZ with NYSDEC.	$52,000	Y	DEP	See attached status report. Funding for NDZ designation has not been secured.

Jamaica Bay Watershed Protection Plan Update

Increase DO Levels to Improve Ecological Productivity

	Implementation Strategy	Description	Schedule	Revised Schedule	Estimated NYCDEP Cost	Funded?	Agency	Status/Comment
Remove CSO Sediment Mounds	*Dredge and Recontour Hendrix Creek*	To address CSO mounds, DO and ecological goals.	Final Design complete. Dredging schedule TBD.	Permit application submitted to NYSDEC and public notice was issued July 2008. Dredging to begin 12 months after permit approval.	$15.7 million	Partial	DEP	See revised schedule information.
	Pursue Dredging of Paerdegat Basin, Fresh Creek, Bergen Basin and Thurston Basin	To address CSO mounds, DO and ecological goals.	TBD	RFP for planning and design scheduled TBD.	$203 million for aeration and dredging	Partial	DEP	See revised schedule information.
	Support Army Corps ecological restoration projects in Paerdegat Basin and Fresh Creek	To address DO and ecological goals.	TBD	NA	NA	NA	USACE	See revised schedule information.
	Implementation Strategy	**Description**	**Schedule**	**Revised Schedule**	**Estimated NYCDEP Cost**	**Funded?**	**Agency**	**Status/Comment**
Dissolved Oxygen	*Pursue Aerators at Fresh Creek, Bergen Basin and Thurston Basin.*	Add oxygen to improve dissolved oxygen levels.	Design from 2015 to 2017. Construction from 2018 to 2021.	NA	$112.3 million	N	DEP	Pending NYS DEC comments.
	Investigate Potential for Future Aeration in other CSO and Non-CSO Tributaries	Determine the need and efficacy of in-stream aeration for other creeks in Jamaica Bay.	TBD	NA	TBD	N	DEP	No change.
	Implementation Strategy	**Description**	**Schedule**	**Revised Schedule**	**Estimated NYCDEP Cost**	**Funded?**	**Agency**	**Status/Comment**
	Enhanced Scientific Monitoring Program	Develop enhanced water quality and ecological monitoring program. Coordinate monitoring among various entities.	Announce enhanced monitoring program Oct 2008.	Draft plan to be developed by 2009; will need multi-agency coordination over the next year.	Substantial funding required.	N	DEP with other agencies/ research institutions.	See status report.

Jamaica Bay Watershed Protection Plan Update

2. RESTORATION ECOLOGY

Restoration Ecology	Implementation Strategy	Description	Schedule	Revised Schedule	Estimated NYCDEP Cost	Funded?	Agency	Status/Comment
Salt Marsh Restoration	*Establish Salt Marsh Island Wetlands Priority Restoration Review Board*	Board would review restoration logistics and begin to establish a priority list of wetland restorations.	Review Board to be initiated in November 2007.	Committee formed November 2007 and met November 11, 2007, December 4, 2007, February 8, 2008 and next meeting is scheduled for week of October 13, 2008.	NA	NA	Multi-agency	See attached status report.
	Marsh Island Wave Attenuator Pilot	Install prefabricated attenuators to reduce wetland erosion loss.	Design anticipated to begin Summer 2009.	Part of contract to be initiated in early 2009.	$576,000	Y	DEP	See revised schedule information.
	Marsh Island Restoration	Elders Point and Yellow Bar.	Summer 2008 - Elders Point	Elder Point start date TBD	$3 million from DEP - cost sharing from others.	Y (NYCDEP portion)	USACE, DEC, DEP	See revised schedule information. Contract delays have held up this project. Federal Funds also must be procured. DEP has allocated $4.2 million for its portion.
	Implementation Strategy	**Description**	**Schedule**	**Revised Schedule**	**Estimated NYCDEP Cost**	**Funded?**	**Agency**	**Status/Comment**
Land Acquisition and Restoration Along Periphery of Bay	*Complete Restoration of Penn Avenue Landfill and Fountain Avenue Landfill*	Ecological restoration of remediated inactive hazardus wastes sites.	Landfills currently in construction and will be completed in 2008;	Landfill restoration completed by fall 2008.	$20 million for upland restoration components.	Y	DEP	See attached status report
	Paerdegat Basin Restoration	Stormwater to be directed into the restoration area to create wetlands and reduce polluants; improve water quality.	In design stage, expected to be completed in 2008	Design completed in 2008.	Approximately $10 million	N	DEP	Funding for Paerdegat restoration construction pending.
	Transfer HPD Properties in the Edgemere Section of Queens to Parks	Continue to transfer 10 acres of land; design and implement restoration project.	Transfer to occur shortly. Restoration efforts TBD.	HPD and DPR are discussing transfer options.	None.	N	DEP, HPD, DPR	Land committed for restoration and stormwater projects; restoration under negotiation with DEC.
	Pursue Acquisition and Restoration Efforts in Vacant Areas	Determine status of subject properties; design and implement stormwater BMPs or restoration.	Field verify sites, place holds on property within 6 mos. Restoration TBD.	DEP met with DCAS and put holds on sutiable property.	TBD	N	Multi-agency	See attached status report.
	Acquire Seagirt Avenue Properties in Rockaway, Queens	Leverage funds from multiple agencies to acquire lands.	TBD	NA	NA	NA	Multi-agency	No change.
	Update and Inventory Dune and Beach and Other Habitats	Update inventory of existing habitats and coverage using GIS.	Begin inventory update in 2008; approximately 1 year to complete.	Awarded Environmental Protection Fund grant in June 2008; project expected to begin in Fall 2008 when funding is in place.	$400,000	Y	DEP, NYS Governor's Environmental Protection Fund	See revised schedule information. DEP has committed to 50/50 match with grant funding awarded by State.
	Continue Beach Clean Up Efforts	NYCDEP sponsored clean-ups and plantings; extend trash collection beyond Labor Day.	Ongoing spring and fall shoreline cleanups	On going.	Use of existing DEP staff and equipment.	Y	DEP, DPR, NPS	See attached status report.
	Reduce the Extent of Invasive Vegetation	Promote the importance of invasive species management.	Ongoing	Awarded Environmental Protection Fund grant in June 2008; project expected to begin in Fall 2008 when funding is in place.	TBD	TBD	DEP, NYS Governor's Environmental Protection Fund	See revised schedule information. DEP has committed to 50/50 match with grant funding awarded by State.
	Determine RTE Restoration Priorities and Targets	Determine RTE Restoration Priorities and Targets in coordinate with relevant stakeholders.	Establish priorities species by October 2008.	Awarded Environmental Protection Fund grant in June 2008; project expected to begin in Fall 2008 when funding is in place.	NA	NA	DEP, NYS Governor's Environmental Protection Fund	See revised schedule information. DEP has committed to 50/50 match with grant funding awarded by State.

Jamaica Bay Watershed Protection Plan Update

3. STORMWATER MANAGEMENT THROUGH SOUND LAND USE

On-Site BMPs for New and Existing Development

	Implementation Strategy	Description	Schedule	Revised Schedule	Estimated NYCDEP Cost	Funded?	Agency	Status/Comment
Pilot and Demonstration Projects	*Green Roof / Blue Roof Pilot Study*	Monitor effectiveness of blue roof vs. green roof on two existing commercial buildings. Compare results between blue and green roofs.	Design anticipated to begin late 2007.	Contract awarded and design to begin October 2008, installation in 2009, and monitoring and reporting to be completed in 2011.	$240,000	Y	DEP	See revised schedule information.
	Rain Barrel Give-away Pilot Study	Distribute 1,000 rain barrels to homeowners.	Design anticipated to begin Summer 2008.	250 rain barrels distributed as of July 2008; Contracting process underway for initiation for remaining program in early 2009.	$138,000	Y	DEP	See attached status report.
	Parking Lot Pilot Study	Two 1.5 acre parking lots retrofitted to comply with new DCP zoning regulations.	Design anticipated to begin late 2007.	Contract awarded and design to begin October 2008, installation in 2009, and monitoring and reporting to be completed in 2011.	$290,000 for design/construction; Plus monitoring costs	Y	DEP	See revised schedule information.
	NYCHA or HPD Pilot Study	Retrofit an existing NYCHA or HPD property with infiltration and detention BMPs.	Design anticipated to begin Summer 2009.	Contracting process underway for initiation in early 2009.	$352,500 for design/construction; Plus monitoring costs	Y	DEP, NYCHA	See revised schedule information.
	Evaluate Rooftop Detention	Promote on new construction; assess existing large rooftops.	Begin in late 2007.	NA	$40,000 (see also cost sharing below)	Y	DEP & SWCD	See attached status report.
	Porous Pavement on DEP Property	Install and monitor pervious pavement on DEP facility parking lots and other areas.	Design anticipated to begin Summer 2008.	Contracting process underway for initiation in early 2009.	$352,500 for design/construction; Plus monitoring costs	Y	DEP	See revised schedule information.
	Implementation Strategy	**Description**	**Schedule**	**Revised Schedule**	**Estimated NYCDEP Cost**	**Funded?**	**Agency**	**Status/Comment**
Economic Incentives	*Stormwater Rate Structure Study*	Evaluate alternative water, sewer, and stormwater rate structures and potential credit programs for BMPs.	Anticipated to begin in early 2008.	Study began in July 2008 and will be completed in June 2009.	TBD	Anticipated shortly	DEP	See attached status report.
	Incentive Programs	Being investigated under the Mayor's Interagency Task Force	Mayor's Interagency Task Force Report anticipated to be completed in Fall 2008.	NA	NA	NA	Mayor's Office	State Legislature recently approved a green roof tax abatement program for the City; Bill # A11226 will officially be written as law in Fall 2008. Additional information about incentive programs will be included in Mayor's Office's Sustainable Stormwater Management Plan, per Local Law 5 (public review draft to be completed October 2008).
	Cost-Sharing Program Investigations	Develop potential framework for design/build services incentive program.	Begin in late 2008.	NA	$40,000	Y	DEP & SWCD	Status report pending.
	Water Conservation Program	60 MGD savings through low flow fixture rebates and cost sharing.	2008-2012	Program to be initiated in 2009.	$186 million	Partial	DEP	Software is under development for applications processing. Program will be initiated in 2009. Funding available only for first phase; other funding is deferred.

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	Implementation Strategy	Description	Schedule	Revised Schedule	Estimated NYCDEP Cost	Funded?	Agency	Status/Comment
Regulatory and Design Changes	*Zoning Code Parking Lot Design Requirements*	Add landscaping and bioretention components to commercial and community facility parking lots over 6,000 sf or 18 spaces.	Text change certified on June 18, 2007. Currently in approval process.	Parking lot text amendment adopted on November 28, 2007.	NA	NA	DCP with DEP and DPR	Completed; see revised schedule information.
	Code Review	Review Sewer Code and make recommendations for potential revisions to facilitate BMP installation.	Anticipated to begin Summer 2008.	Task force formed in March 2008;contracting process underway for initiation in early 2009.	NA	NA	DEP	See attached status report.
	BMP Design Manual	Create companion guidance document to sewer code revisions specific to NYC conditions.	Anticipated to begin Summer 2008.	Contracting process underway for initiation in early 2009.	NA	Y	DEP	See revised schedule information.
	CEQR Technical Manual Revision	Revise CEQR Technical Manual to include a specific section to address proposed developments in Jamaica Bay.	End of FY 2008	Revisions anticipated to be completed by December 2009.	NA	NA	DEP/OEC	See revised schedule information. Revisions to the natural resources and infrastructure sections are under development to include Jamaica Bay specific information.
	Monitor Benefits of BMP Implementation	Develop indicators to track effects of BMP installations throughout the City over time.	To begin once various BMP pilot contracts begin.	NA	TBD	TBD	DEP & Mayor's Office	See attached status report.
	Zoning Code Pervious Surfaces Requirements	Potential front yard pervious requirements in R1-R5 zoning districts.	Fall 2007	Yards text amendment adopted on April 30, 2008.	NA	NA	DCP	Completed; see revised schedule information.
Off-Site BMPs on Streets, Sidewalks, Highway Right-of-Ways, and Vacant Lands								
	Implementation Strategy	**Description**	**Schedule**	**Revised Schedule**	**Estimated NYCDEP Cost**	**Funded?**	**Agency**	**Status/Comment**
Pilot and Demonstration Projects	*Belt Parkway Bridges Demonstration Project*	Attenuate and reduce the direct stormwater discharge through BMPs.	In design	Design completed in 2008; construction scheduled to begin 2010, and completed in 2014.	$300,000 for design (DEP); $1.5 million for construction (DOT)	Y	DOT; DEP	See revised schedule. Innovative bioinfiltration swale with diversion piping provides water quality volume treatment; can safely convey the 10 year storm.
	Streetside Infiltration Swales Pilot Study	Install three swales on six sites to capture runoff from a roadway.	Design anticipated to begin late 2007.	Contract awarded and design to begin October 2008, installation in 2009, and monitoring and reporting to be completed in 2011.	$510,000 for design/construction; Plus monitoring costs	Y	DEP	See revised schedule information.
	Constructed Wetlands Pilot Study	Construct wetland to capture runoff from a roadway.	Design anticipated to begin late 2007.	Contract awarded and design to begin October 2008, installation in 2009, and monitoring and reporting to be completed in 2011.	$510,000 for design/construction; Plus monitoring costs	Y	DEP	See revised schedule information.
	Tree Pit Pilot Study	Install five enhanced tree pits with stormwater subsurface cistern.	Design anticipated to begin late 2007.	Contract awarded and design to begin October 2008, installation in 2009, and monitoring and reporting to be completed in 2011.	$112,500 for design/construction; Plus monitoring costs	Y	DEP	See revised schedule information.
	Vacant Parcels Pilot Study	Implement stormwater parks on additional publicly-owned vacant parcels to capture stormwater runoff.	TBD based on Constructed Wetlands Pilot Study.	NA	TBD	N	DEP	No change.

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	Implementation Strategy	Description	Schedule	Revised Schedule	Estimated NYCDEP Cost	Funded?	Agency	Status/Comment
Regulatory	*Zoning Code Review - Street Trees*	Potential requirement for new developments/enlargements to provide street trees.	Fall 2007	Street trees text amendment adopted on April 30, 2008.	NA	NA	DCP	Completed; see revised schedule information.
	Implementation Strategy	**Description**	**Schedule**	**Revised Schedule**	**Estimated NYCDEP Cost**	**Funded?**	**Agency**	**Status/Comment**
Open Space and Greening Projects	*PlaNYC Street Tree Planting*	Street tree planting throughout the city including Jamaica Bay watershed.	23,000 trees planted annually citywide.	Plant 15,000 street trees annually citywide by December 2009.	NA	NA	DPR, DEP, & Mayor's Office	From PlaNYC, the City launched the MilliontreesNYC Initiative with New York Restoration Project, and planted “tree one” on October 9 2007. Planted nearly 100,000 trees to date, the majority of which are newly planted street trees, and initiated an aggressive strategy of full-block planting. DEP tree planting accounts for 13% of trees planted.
	PlaNYC Greenstreets Initiative	Fourteen new Greenstreets within Jamaica Bay watershed.	Fall 2007; 3,000 new Greenstreets citywide by 2017.	Complete 240 greenstreets citywide by December 2009.	NA	Mayor Bloomberg’s PlaNYC 2030 committed $15 million for new Greenstreets from 2007 through 2017. PlaNYC also provides $14.5 million for additional 60 maintenance staff for operation/ maintenance of the sites.	DPR & Mayor's Office	DPR built 17 new Green Streets in the Jamaica Bay Watershed between last Fall and this past Spring: 12 in Queens and 5 in Brooklyn.
	East New York Community Forestry Management Plan	Increase street tree stocking level in East New York.	Plant 850 trees in Brooklyn CB 5 over next 10 years through PlaNYC Street Tree Initiative.	Ongoing	NA	NA	DPR & Mayor's Office	Since publishing the Greening East New York report in June 2007, Parks has planted 1,427 trees in the neighborhood and sponsored one tree stewardship workshop.
	Baisley Pond Park Project	Using stormwater BMPs, storm sewers will route stormwater into Baisley Pond.	Slated for construction in 2010.	NA	$3-4 million (estimated)	Y	DEP, DOT	No change.
	Springfield Park Project	Using stormwater BMPs, storm sewers will route stormwater into Springfield Lake.	In Design; construction is slated to begin in FY 2011.	NA	$15 million (estimated)	Y	DEP, DOT	No change; ongoing discussions with DPR about green streets in median.

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4. PUBLIC EDUCATION AND OUTREACH

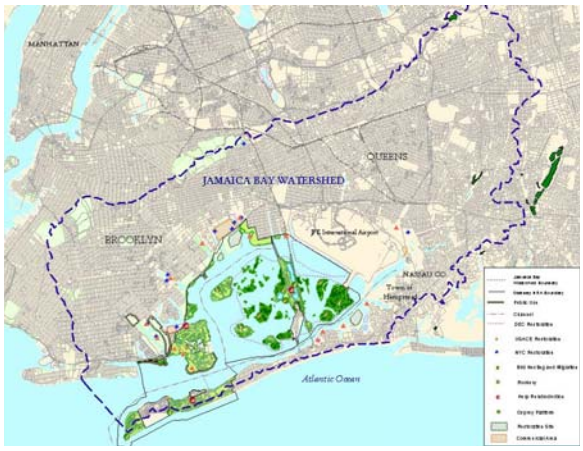
Public Education and Outreach								
	Implementation Strategy	Description	Schedule	Revised Schedule	Estimated NYCDEP Cost	Funded?	Agency	Status/Comment
Raise Awareness	*Enhance Jamaica Bay-related Educational Curriculum*	Educational Resource Directory	Prototype to be completed late 2007.	To be printed for distribution late 2008.	$6,000	Y	DEP, NYCSWCD	See revised schedule information.
	Organize "State of the Bay" Scientific Symposium	Coordinate/guide scientific investigations and report scientific findings. Inform Plan updates.	First symposium Summer 2008.	First symposium was held on June 27, 2008. Second symposium scheduled for October 28-29, 2008.	$30,000	Y	DEP, NYCSWCD	Status report pending.
	Create a targeted campaign for developers, residents, and business owners to protect Jamaica Bay	Brochure on importance of the Bay, human activities in watershed, and pollutant reducing practices.	Brochure to be completed in late 2007.	To be printed for distribution late 2008.	$6,000	Y	DEP, NYCSWCD	See revised schedule information.

5. PUBLIC USE AND ENJOYMENT

Public Use and Enjoyment								
	Implementation Strategy	Description	Schedule	Revised Schedule	Estimated NYCDEP Cost	Funded?	Agency	Status/Comment
Public Access	*Rockaway /Gateway Greenway*	Establish an approximately 20-mile continuous greenway loop around the Bay.	Some portions are complete or nearing completion, others are to be determined.	Construction of the Shore Parkway Greenway, a 2.8-mile stretch between Pennsylvania Ave and 84th St., is now anticipated to be completed during 2008.	NA	NA	DOT, DPR	Required local match was secured for the Shore Parkway Greenway, a 1.9-mile stretch between 84th St. and JFK Airport.
	Laurelton and Cross Island Parkway Greenways	Establish a 22-mile path through parkland; link between Brooklyn/Queens Greenway and Jamaica Bay waterfront.	Phase I was completed in 2006; Phase II is pending additional funding	NA	NA	NA	DOT, DPR	No change.
	Southern Parkway Path and Conduit Boulevard	Establish a greenway to connect Brooklyn/Queens Greenway system to Jamaica Bay waterfront.	TBD	NA	NA	NA	DOT, DPR	EDC to implement segment along Springfield Blvd and 147th Avenue as part of Springfield Gardens Street Reconstruction project. The balance of the project is currently unfunded.
	Far Rockaway North Shore Greenway	Establish a greenway to connect Far Rockaway with Rockaway Gateway Greenway	In process with current HUD development.	NA	NA	NA	HUD	No change.
	Floyd Bennett Field/Gateway National Recreation Area	Capital projects within Gateway National Recreation Area.	TBD	NA	NA	NA	NPS	No change.
	Brooklyn/Queens Greenway -Eastern Parkway Extension	Greenway improvement including landscaping, multi-use paths, bike racks, pedestrian ramps, traffic signals, etc.	Design underway; to be completed in June 2010.	NA	NA	NA	DOT, DPR, DCP	No change.

6. IMPLEMENTATION AND COORDINATION

Implementation and Coordination								
	Implementation Strategy	**Description**	**Schedule**	**Revised Schedule**	**Estimated NYCDEP Cost**	**Funded?**	**Agency**	**Status/Comment**
Plan Implementation	*Jamaica Bay Water Quality and Ecological Restoration Steering Committee*	Under Harbor Estuary Program organizational structure.	TBD	NA	NA	N	Multi-agency	Focusing on Jamaica Bay for this initiative will conflict with HEP's mission to address harbor-wide issues and constrain their ability to fund the committee.
	BMP Implementation through Mayor's Office Interagency BMP Task Force	Mayor's BMP Task Force to coordinate BMP implementation strategies.	Ongoing	Ongoing	NA	NA	Multi-agency	Mayor's Office's Sustainable Stormwater Management Plan will include information and findings from BMP Task Force. Per Local Law 5, the public review draft to be completed October 2008.
	Education Steering Committee	Continue committee's efforts to implement education and outreach strategies.	Ongoing	Ongoing	$75,000	Partial	DEP, NYCSWCD	Committee continues to meet to discuss the Jamaica Bay Education Resource Directory; the next meeting is scheduled for Fall 2008.
	Monitor and Review Changes to the Watershed	Track new development, BMP implementation, and overall growth in the watershed in coordination with other agencies.	Ongoing	Ongoing	TBD	N	DEP/OEC/ NYS DEC	Status report pending.



Jamaica Bay Watershed Protection Plan Update

New York City Department of Environmental Protection
Emily Lloyd, Commissioner
October 1, 2008

www.nyc.gov/dep

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Category 1 – Water Quality

The focus of Category 1 – Water Quality – is to improve water quality and aquatic habitat in Jamaica Bay through infrastructure improvements and upgrades, environmentally-friendly, ecologically-sustainable practices, and innovative techniques. Over the past year, NYCDEP has completed contract documents or started studies in preparation for pilot-scale water quality and habitat benefit projects. We have also recently completed a third boat pump-out facility at the Rockaway Water Pollution Control Plan. This is an important step towards designating Jamaica Bay as a No Discharge Zone.

As described below, NYCDEP has made significant progress with several key initiatives related to water quality. For additional detailed information, please see the attached Status Reports to learn more about these individual projects.

- NYCDEP has continued discussions with the New York State Department of Environmental Conservation (NYSDEC) to evaluate appropriate nitrogen reductions, which might have effective water quality benefits for improved habitat and restoration opportunities for Jamaica Bay.
- NYCDEP's Bureau of Wastewater Treatment evaluated the potential of using the existing BNR building for interim supplemental carbon addition.
- NYCDEP has continued to minimize transshipment of centrate to WPCPs within the Jamaica Bay watershed. In 2007, transshipments of sludge from outside the watershed to 26th Ward WPCP decreased from 2006 transhipments.
- In 2008, NYCDEP completed pilots for the programmatic cleaning of 79,000 linear feet of sewer lines and 3,572 linear feet of interceptors. The contractor for additional sewer cleaning in the 26th Ward WPCP drainage area has started its mobilization.
- In summer 2008, NYCDEP installed its third boat pump-out station in Jamaica Bay at the Rockaway Water Pollution Control Plant. In combination with the mobile boat pump out unit operated by the New York New Jersey Baykeeper, Jamaica Bay is now a couple of steps closer to a No Discharge Zone designation.
- On June 27, 2008 NYCDEP sponsored a scientific symposium at Queens College for researchers, agencies and other environmental stakeholder groups to discuss current issues and research affecting Jamaica Bay and other coastal ecosystems.
- As follow-up to the June 27, 2008 symposium, NYCDEP, in coordination with the National Park Service will sponsor another symposium on October 28, 2008 at the United States Customs House in lower Manhattan and on October 29, 2008 at Kingsborough Community College in Brooklyn.

Along with the strategies highlighted above, NYCDEP has started sewer improvement projects that cover over 350 acres of storm sewers in the Rockaways. The Drainage Plan for Southeast Queens was signed by Commissioner Lloyd in May 2008 and design work has started on three projects of the drainage plan. NYCDEP has continued the process to recontour Hendrix Creek, and other tributaries to the bay. The CSO Retention Tank in Paerdegat Basin is expected to be online in 2009 with all construction complete in 2011.

A number of water quality strategies fall under the purview of an upcoming NYCDEP contract: Ecological and Best Management Practices (BMP) Planning to Address Combined Sewer Overflows (BMP Contract). The contracting process is underway for initiation in early 2009. Various pilot studies to attenuate stormwater runoff and utilize biological systems to reduce nitrogen and restore habitat are included as part of this contract to improve water quality.

With the progress made to date and plans to continue work to improve water quality in Jamaica Bay, NYCDEP is actively refining the development of these strategies.

Management Strategy: Reduce Nitrogen Loading to the Tributaries and Jamaica Bay (Nitrogen Reduction and Other)

Implementation Strategy: Carbon Addition
Initial Description: NYCDEP proposed carbon addition at the 26th Ward to reduce nitrogen loadings during ongoing LTCP negotiations with NYS DEC (see White Paper).
Revised Description: Propose Level 2+ Advanced Basic BNR with carbon at the 26th Ward WPCP and Level 2 Advanced Basic BNR at the Jamaica WPCP.
Schedule: TBD
Revised schedule: Negotiations ongoing with NYSDEC. NYCDEP developed a White Paper, *Jamaica Bay: An Integrated Solution*.
Estimated Cost: 26th Ward WPCP: $61 million and Jamaica WPCP: $52 million
Funded: Partial
Agency: DEP

Status Report:

Water quality in Jamaica Bay is generally very good. Seasonally, dissolved oxygen is depleted during mid August through September and typically limited to bottom waters, the backwaters of the bay and its tributaries. In addition, algal blooms occasionally occur. As a result, water quality is sometimes not in attainment with NYSDEC's water quality standards for dissolved oxygen (DO). To date, most technical discussions have focused exclusively on the relationship between nitrogen loadings from NYCDEP's four water pollution control plants and dissolved oxygen levels in the Bay. Narrowly focusing on DO or nitrogen control strategies doesn't encompass or address the full range of natural conditions or anthropogenic (human-caused) impacts constraining ecological functioning in the Bay. Solutions that will achieve the goal of substantially improving the overall health of Jamaica Bay require a broader water quality context.

Therefore, over the last year, NYCDEP has been in discussions with the New York State Department of Environmental Conservation (NYSDEC) to evaluate appropriate nitrogen reductions, which might have effective water quality benefits for improved habitat and restoration opportunities for Jamaica Bay. These discussions are ongoing with NYSDEC and have not been finalized, to help move the discussion forward, NYCDEP developed a White Paper, *Jamaica Bay: An Integrated Solution*, submitted to NYSDEC on June 19, 2008. NYCDEP suggests a multi-faceted integrated strategy to address the most pressing issues and concerns.

Also, to help promote scientific inquiry and analysis of wetland losses and potential factors contributing to the loss, NYCDEP convened a Workshop at Queens College on June 27, 2008. This workshop brought together a team of scientists, including several members of the original Jamaica Bay Blue Ribbon Panel, to present past and current research issues concerning Jamaica Bay. Jamaica Bay environmental stakeholder groups and regulatory agencies joined the discussions.

During the last year, NYCDEP also continued its monitoring and modeling efforts of Jamaica Bay. To help develop a better sense of the influence on water quality from each

of the WPCPs, NYCDEP assigned a "trading ratio" in the models to each WPCP in order to evaluate the actual impact of nitrogen reductions on specific areas of the Bay. The "trading ratios" reflect the negative effect of one pound of nitrogen from each WPCP on dissolved oxygen levels in these designated areas. For example, to have the same effect on reducing surface nitrogen in Grassy Bay, it would be necessary to remove two pounds of nitrogen at the 26th Ward, 2.9 pounds at the Rockaway WPCP, and 26.9 pounds at the Coney island WPCP, for every pound of nitrogen at the Jamaica WPCP. The higher the "trading ratio" value indicates a lower influence and a less likely cost effective management strategy to improve water quality. Conversely, a lower "trading ratio" value indicates a potentially more effective strategy to yield significant water quality improvements. A summary of these "trading ratios is shown below.

WPCP	**Contribution by Concentration**				**Calculated Trading Ratio (lb/lb)**			
	Rockaway Inlet	Beach Channel	North Channel	Grassy Bay	Rockaway Inlet	Beach Channel	North Channel	Grassy Bay
Coney Island	25%	3%	3%	2%	1.0	12.9	17.1	26.9
Rockaway	25%	34%	18%	18%	1.0	1.1	2.7	2.9
26th Ward	25%	26%	48%	27%	1.0	1.5	1.0	2.0
Jamaica	25%	38%	32%	53%	1.0	1.0	1.5	1.0

Using these model results, NYCDEP has calculated the effectiveness of multiple BNR technologies at the four WPCPs. A total of twenty separate combinations of technology were evaluated. Based on the extensive modeling analysis of alternate scenarios, water quality conditions throughout many areas of the Bay are improved. However, due to the influences of the substantial physical changes that have occurred within Jamaica Bay over the last 100-years, does not ensure that water quality standards (i.e., DO) are achieved 100% of the time in the interior locations of the Bay, including, Grassy Bay and Grass Hassock Channel.

In the White Paper, NYCDEP evaluated WPCP upgrades for the 26th Ward WPCP that includes a Level 2+ Biological Nutrient Reduction (BNR) and a demonstration pilot of Thermo Energy's "Centrate Ammonia Recovery Process", which is a physical chemical process that removes ammonia from the centrate stream via a zinc ion exchange process. If successful, this may be used as a dedicated centrate treatment process in lieu of the existing aeration tank #3 biological centrate treatment processes. The Jamaica WPCP was evaluated for upgrades to Level 2 BNR treatment. These improvements would reduce the size and severity of dissolved oxygen-impaired areas in Jamaica Bay, as well as reduce chlorophyll-a and unionized ammonia concentrations. Perhaps the greatest benefit of this advanced technology is the anticipated waster quality improvements. This technology would also minimize algal blooms, improve aesthetic qualities and increase the potential for more diverse habitats (e.g., eelgrass and oysters) to be restored in targeted areas of the Bay. In addition to physical space constraints of these sites, this level of nitrogen treatment is may be the most advantageous because it is achieved quickly since it does not require major capital construction. It is also an effective level of

treatment which reduces nitrogen to nearly comparable levels of the more intensive construction treatment efforts.

Currently, all of the WPCPs except the Coney Island facility are undergoing additional upgrades and stabilization work to help improve efficiency and overall reliability.

Ongoing and Planned Upgrade Work for Jamaica WPCP

Contract	Scope of Work
Phase 1	Main sewage pump station, solids handling, primary settling tanks and chlorine contact tanks
Phase 2	Aeration Tanks, final settling tanks, and solids handling
CO-JA-2G-06	Change Order to allow for process air modifications compatible with future BNR upgrades
Phase 2A	New emergency engine generator and minor odor control enhancements
Phase 3	New 50 mgd expansion of main sewage pump station and primary settling tanks, which are contingent on negotiations with DEC pending detailed sewer analysis

Ongoing and Planned Upgrade Work for 26th Ward WPCP

Contract	Scope of Work
12	Step Feed BNR upgrade and stabilization work on final settling tanks, disinfection systems, and main sewage pumps
13	Emergency Engine Generators
20	50 mgd expansion of Primary Settling Tanks
21	Upgrades to the solids handling facilities and personnel facility
22	Construction of new raw sewage pumping station, new electrical substation, and new boiler building
23	Construction of disinfection tank to manage additional 50 mgd of wet weather flow
24	Potential construction of UV system to achieve future Total Residual Chlorine (TRC) limits of 0.45 mg/l

Management Strategy: Reduce Nitrogen Loading to the Tributaries and Jamaica Bay (Nitrogen Reduction and Other)

Implementation Strategy: Interim Carbon Addition
Description: To implement nitrogen reductions in the near term, construct interim carbon addition facility at 26th Ward WPCP and ship Jamaica WPCP centrate to interim facility for processing.
Initial Schedule: Approximately 36 to 40 months
Revised Schedule: Approximately TBD
Estimated Cost: TBD
Funded: TBD
Agency: DEP

Status Report:

To help implement additional interim nitrogen removal carbon capabilities at the 26th Ward WPCP, NYCDEP's Bureau of Wastewater Treatment is currently evaluating the potential of using the existing BNR building for interim supplemental carbon addition. Concerns have been raised about the structural integrity and remaining useful life of the BNR building; additional investigations are necessary to determine if a new building is required. Given this, the very limited effectiveness and the eventual more permanent facilities proposed, this strategy requires further scrutiny and appears less likely.

In addition, the current extensive construction at the 26th Ward plant and the limited available space make it difficult to have a limited carbon treatment facility in place. The schedule for ongoing mandated construction is a priority. While not achieving the nitrogen reduction capability of a permanent carbon facility, could bring about further limited reductions of nitrogen being discharged to Jamaica Bay.

The 26th Ward plant is currently being upgraded for Level 2 BNR. There is still significant stabilization and mandate required work planned at the 26th Ward and it is difficult to phase in additional projects. This must be considered before implementing an interim carbon facility.

Management Strategy: Reduce Nitrogen Loading to the Tributaries and Jamaica Bay (Nitrogen Reduction and Other)

Implementation Strategy: Minimize Centrate Processing from other WPCPs in Jamaica Bay

Description: NYCDEP will continue its efforts to minimize transshipment of sludge for processing in Jamaica Bay.
Schedule: Ongoing
Revised Schedule: NYCDEP continues to limit shipments.
Estimated Cost: NA
Funded: NA
Agency: DEP

Status Report:

NYCDEP transports sludge from the 14 WPCPs generating sludge to the 8 WPCPs that contain sludge dewatering equipment. Sludge shipment and dewatering schedules are flexible and highly variable. When and where sludge shipments are made is dictated by a number of factors including:

- Availability and location of sludge vessels
- Availability of sludge dewatering capacity at the WPCPs
- Environmental pressures to reduce effluent nitrogen loadings to both the Upper East River and Jamaica Bay; and
- Sludge treatment limitations associated with WPCP construction activities.

The following table shows the destination of Vessel –Shipped sludge from various WPCPs outside of Jamaica Bay during 2007:

Vessel-Shipped Sludge to the 26th Ward from Outside of Jamaica Bay by Boat

Month	North River		Newtown Creek		Owls Head		Port Richmond		Total
	# of boats	Volume	# of boats	Volume	# of boats	Volume	# of boats	Volume	
	#	1000 ft^3	#	1000 ft^3	#	1000 ft^3	#	1000 ft^3	
January									0
February									0
March					1	62.64			1
April					1	69.6			1
May									0
June			3	154.28	1	37.12			4
July			1	46.15					1
August					1	61.07			1
September			3	204.74	3	174.71	1	66.12	7
October	1	26.72	3	200.85	1	54.52			5
November					1	70.18			1
December					3	183.86			3
Annual Total	1	26.72	10	606.02	12	713.71	1	66.12	24

The total volume of sludge material processed at the 26th Ward Centrate Facility has been decreasing since 2004 and is currently at 2,735,200 cubic feet down from a high of 13,576,600 cubic feet in 2004. A summary of all (including Rockaway WPCP) sludge deliveries are shown below:

	Rockaway	**Owls Head**	**Newtown Creek**	**Port Richmond**	**North River**	**Red Hook**	**Total**
	Volume in 1000 ft^3						
2004	1432	10173	232	1560	179	0	13576
2005	2273	3099	573	467	0	83	6495
2006	2125	955	287	427	141	0	3935
2007	1322.7	713.7	606	66.1	26.7	0	2735.2

In addition, as can be seen from this summary, substantial reductions of sludge deliveries from WPCPs outside of Jamaica Bay, particularly from the Owls Head WPCP have also been substantially reduced since 2004 and can be summarized as follows:

2004 total cubic feet of sludge = 12,140,000
2005 total cubic feet of sludge = 4,220,000
2006 total cubic feet of sludge = 1,810,000
2007 total cubic feet of sludge = 1,412,500

The following incremental reductions in sludge deliveries can also be drawn from the data:

Incremental reduction from 2004 to 2005 = 52.1%
Incremental reduction from 2005 to 2006 = 39.4%
Incremental reduction from 2006 to 2007 = 30.5%
Incremental reduction from 2004 to 2007 = 79.8%

Consistent with the Nitrogen Consent Order, NYCDEP has made a best effort to limit the sludge from the Owls Head WPCP to the 26th Ward WPCP. As previously stated in the 2007 Jamaica Bay Watershed Protection Plan, sludge from the Bowery Bay and Tallman Island WPCPs is mandated to be transshipped to a visitor WPCP effective July 1, 2009 through the end of Phase 1 construction at each facility. However, NYCDEP will continue to make best efforts to limit the volume of sludge from WPCPs outside of Jamaica Bay to the 26th Ward Centrate Facility.

Management Strategy: Reduce CSO and Other Discharges to Improve Pathogens and DO Levels (Sewer System Maintenance)

Implementation Strategy: Expanded Sewer Cleaning Program
Description: Clean sewers programmatically; increase amount of cleaning per year, cycling through every 10-14 years.
Schedule: Pilot project 2007; annual program to clean 7% of sewers.
Revised Schedule: 5% of sewers in the 26th Ward Drainage area were cleaned. Sewer maintenance budget subject to funding availability.
Estimated NYCDEP Cost: $2.7 million annually (in 2008 dollars) plus new personnel and vehicles ($876,500). Budget constraints may impact implementation.
Funded: Partial
Agency: DEP

Status Report:

Programmatic cleaning and maintenance would maintain optimum working capacity for sanitary and storm sewers. The pilot project for an Expanded Sewer Cleaning Program was undertaken between October 11, 2007 and May 2, 2008 in the 26th Ward Drainage Area. NYCDEP cleaned and televised approximately 79,000 linear feet of sewers that were less than 24" in diameter, accounting for approximately 5% of the sewers in the drainage area. The sewers that were cleaned were mainly in the Brownsville area; however, some sewer lines were also cleaned east of Weeksville and south of Ocean Hill. The pilot cost approximately $415,000.

The pilot removed debris from the sewer system and was considered a success by the Department. NYCDEP will develop a plan for repairs and cleaning based on the conditions found during the pilot. The Expanded Sewer Cleaning Program has been initially funded at $2.7 million for fiscal year 2009, however budget constraints may impact implementation.

Management Strategy: Reduce CSO and Other Discharges to Improve Pathogen and DO Levels (Sewer System Maintenance)

Implementation Strategy: Expand Interceptor Inspection and Maintenance
Description: Inspection program to determine cleaning and maintenance needs throughout the city. Pilot project in fall to inspect E. Rockaway interceptor.
Schedule: Pilot project 2008; Citywide inspection completed in 2010.
Revised Schedule: Pilot completed; citywide inspection initiated.
Estimated NYCDEP Cost: $17,000 for pilot at Rockaway; $3 million over next 1-2 years
Funded: Yes
Agency: DEP

Status Report:

Programmatic cleaning and maintenance may increase efficiency and the working capacity for interceptors. The field inspection work for the Rockaway East Interceptor pilot was completed on June 17th, 2008. The interceptor runs from Regulator B88 to the Rockaway WPCP. Closed Circuit Television and Sonar were used to determine the degree of debris accumulation and structural integrity of the pipes. The final report on the condition of the interceptors is still being prepared by the contractor; however, NYCDEP's preliminary analysis of the raw data indicated that the pipe contained about 105 cubic yards of sediment from the 3,572 linear feet inspected.

The inspection also determined that the pipe had some degradation. The pipe degradation was mainly due to hydrogen sulfide impact on the surface. These defects consisted mainly of loss of pipe, to the extent that the reinforcement steel was protruding from the surface. However, the integrity of the pipe is still acceptable.

Based on the positive inspection results, NYCDEP will develop a cleaning and maintenance plan to address the level of debris and structural integrity issues found at each interceptor.

Management Strategy: Reduce CSO and Other Discharges to Improve Pathogen and DO Levels (Boat Pumps)

Implementation Strategy: Install a Third Boat Pump out Facility at Rockaway WPCP and Seek No Discharge Designation for Jamaica Bay.
Description: Reduce wastewater discharges from recreational boats directly into Jamaica Bay, and initiate proceedings to create a No Discharge Zone (NDZ).
Schedule: Operational for 2008 boating season. Processing NDZ TBD
Revised Schedule: Installed late summer 2008 and operational for latter half of 2008 boating season. Pursuing NDZ with NYSDEC.
Estimated NYCDEP Cost: $ 52,000
Funded: Yes, NDZ funding has not been secured.
Agency: DEP

Status Report:

Designating Jamaica Bay as a No Discharge Zone (NDZ).

Section 312 of the Clean Water Act (CWA), grants the United States Environmental Protection Agency (EPA) and individual states the authority to designate a waterbody (or a portion of a waterbody) as a No Discharge Zone (NDZ). According to the CWA, states can establish a NDZ to enhance water quality protections if EPA determines that adequate facilities for the safe and sanitary removal and treatment of sewage from watercraft are reasonably available. Additionally, a state can apply for EPA to declare a NDZ in "special waters" or those waters where enhanced environmental protections are required, regardless of the availability of adequate sewage removal and treatment facilities. NYCDEP and New York State Department of Environmental Conservation (NYSDEC) agree to pursue this designation under the current regulations. We will continue to hold discussions with NYSDEC to advance this important designation.

Paerdegat Basin Pump-Out.

This past summer, NYCDEP has installed its third boat pump-out station in Jamaica Bay. Based on an assessment of the regulations, these facilities in combination with the mobile pump out unit operated by the New York New Jersey Baykeeper will likely enable Jamaica Bay to be eligible for a NDZ designation by the State. Given the unique ecological resources of Jamaica Bay, NYCDEP also believes that the Bay qualifies as a NDZ under the "special waters" clause.

Currently, there are three land based boat pump-outs located on Jamaica Bay and one mobile unit. These include the following:

1) Hudson River Yacht Club/Paerdegat Basin - Avenue U and Bergen Avenue;

2) Coney Island WPCP;

3) Rockaway WPCP; and

4) NY/NJ Baykeeper's 24-foot sewage-pump out vessel provides a free service to boat owners docked or anchored in Jamaica Bay from April through October. (The mobile boat pump-out unit does fall under EPA's NDZ requirements and is considered a fourth location).

Paerdegat Basin Boat Pump-Out 1.

Under federal regulations, a NDZ can only be established when there is an adequate number of pump-outs to drain sewage from boats' holding tanks. The federal standard calls for a minimum of one pumpout for every 300–600 boats in a no discharge zone. Based on a review of Department of Motor Vehicle boat registrations, site visits to marinas and reviewing high resolution ortho-imagery, NYCDEP has determined there are approximately 1200 to 1500 that utilize Jamaica Bay throughout the boating seasons. This number may include a significant number of transient vessels to ensure that adequate facilities are available, and not only permanently moored boats in Jamaica Bay. Under federal guidelines, NYCDEP provides a boat pumpout per every 500 boats which meets the NDZ requirements of one pumpout per every 300 – 600 boats.

NYCDEP will continue to investigate additional boat pump-out locations and work with NYSDEC to pursue a NDZ designation for Jamaica Bay.

Management Strategy: Increase DO Levels to Improve Ecological Productivity

Implementation Strategy: Enhanced Scientific Monitoring Program
Description: Develop an enhanced water quality and ecological monitoring program. Coordinate monitoring among various entities.
Schedule: Announce enhanced monitoring program by October 2008.
Revised Schedule: Draft plan to be developed by 2009; needs multi-agency coordination over the next year.
Estimated Cost: Substantial funding required.
Funded: No
Agency: NYCDEP with other agencies/research institutions.

Status Report:

NYCDEP has been collecting water quality data in New York Harbor since 1909. These data are utilized by regulators, scientists, educators and citizens to assess impacts, trends and improvements in the water quality of New York Harbor. Harbor water quality has improved dramatically since the initial surveys. Infrastructure improvements and the capture and treatment of virtually all dry-weather sewage are the primary reasons for this improvement. During the last decade, water quality in NY harbor has improved to the point that the waters are now utilized for recreation and commerce throughout the year. Still, there remain areas within the harbor that are impaired and additional information is needed to determine the actual ecological impairment.

NYCDEP maintains nine Harbor Survey water quality monitoring stations within Jamaica Bay. To further these efforts within Jamaica Bay, NYCDEP started in April 2008 to develop a preliminary "Jamaica Bay Comprehensive Monitoring Plan." The plan attempts to summarize existing Jamaica Bay monitoring activities by NYCDEP, other government agencies, academic institutions and other environmental stakeholder groups. In addition, through future coordination with other environmental stakeholder groups and a review of other monitoring programs, the plan will also identify additional beneficial monitoring elements (e.g., monitoring gaps) when compared to other estuaries. For example, phytoplankton and zooplankton are presently the dominant primary producers in the Bay and are the base of the food chain for many higher trophic levels. These groups are extremely important from the standpoint of monitoring water quality since they are typically the first groups to respond to changes in nutrient conditions.

Other "Monitoring Gaps" may include the following:

- Updated atmospheric deposition rates compared to 1995-1996.
- Groundwater flow rates and nutrient loading
- Greater Bathymetry detail
- Fish sampling
- Current meters
- Tributaries and center of the bay sampling
- Phytoplankton and zooplankton species enumeration
- Sediment sampling

- Upland watershed monitoring and development changes
- Standardized protocols and collection methods
- Future submerged aquatic vegetation
- Future oyster restoration
- Existing wetland monitoring (interior and perimeter)

It is important to note that an integrated monitoring plan requires substantial effort, funding and cooperation of many different stakeholder groups. It is also important to note that this is an adaptive management monitoring plan that will be informed through concurrent research efforts and is not static. The monitoring plan will adapt to future needs as a better understanding of the bay is developed and conditions in the bay improve. While there is significant monitoring by many groups on the bay, a significant coordination of the data from these efforts has not been aggressively undertaken. A fairly extensive list of past and ongoing research on Jamaica Bay is maintained by the Jamaica Bay Research and Management Information Network (JBRMIN). However, a more aggressive coordination of these efforts and data sharing would provide a valuable resource for area practitioners. This is an enormous and important first step in not only providing a broad perspective of the monitoring efforts but also provides a glimpse into duplicative efforts and in some cases, the identification of data gaps that are invaluable in the understanding of the ecological and physical dynamics of Jamaica Bay.

While many monitoring programs in Jamaica Bay have been of short duration, there are some agencies that are conducting continuous long term monitoring. These include the monitoring of: water quality, water pollution control plant (WPCP) effluent, salt marshes, benthic communities, sediments, groundwater discharges, fisheries, stormwater, and wildlife studies. In addition to the extensive monitoring of NYCDEP, long-term monitoring programs are also conducted by:

- National Park Service (NPS)
- United States Environmental Protection Agency (USEPA)
- United States Geological Survey (USGS)
- New York State Department of Environmental Conservation (NYSDEC)

The preliminary monitoring plan has identified the various monitoring elements of these efforts by agency, their collection frequency and spatial distribution within the bay. While some of the monitoring data is independent and does not have an influence on other data collection efforts, there is an overlap of monitoring elements. Given limited staff and funding resources, avoiding duplication may enable the monitoring of additional elements that would help fill some of the existing data gaps.

In order to understand Jamaica Bay as a whole, it is essential to understand the individual natural components and processes of the bay and an assessment of the various inputs into the bay, including their magnitude and origin. In addition to existing programs to reduce inputs (e.g., WPCP upgrades, CSO controls, landfill closure, PlaNYC and the citywide Stormwater Plan), the fate of these inputs must also be determined as they travel through the bay – for example, are they broken down, rendered biologically unavailable or are

they flushed from the bay. All together, this is an enormous task; however, taken piece by piece in a coordinated and phased program, a scientific understanding of these interactions becomes clearer and enables the development of sound public policy to correctly address these issues for the long-term. Therefore, an understanding of how the various components of the ecosystem are interacting will help inform the monitoring program structure. Ultimately, the goal of the monitoring plan is to assess the improvements/changes in Jamaica Bay on water quality and overall ecological health.

In addition to identifying additional monitoring efforts, a coordinated collaborative effort between academic and public agency research efforts is necessary to develop a comprehensive sampling program and identify data gaps and issues that require further analysis. NYCDEP is aggressively pursuing outreach to local and regional researchers to develop research proposals that will help inform the refinement of this monitoring plan.

In addition, similar to the Wetlands Priority Restoration Review Board (see Status Report on page 18) formed to evaluate salt marsh island restoration priorities, NYCDEP will convene a task group of various agencies and applicable academic institutions to coordinate current monitoring elements and develop a more coordinated and focused monitoring plan. NYCDEP will begin to convene the group in November 2008 and continue to meet through mid 2009. As currently envisioned, the plan is divided into six sections:

- Physical Characteristics
- Loading Sources
- Water Quality
- Sediment Quality
- Biology
- Watershed Characteristics

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Category 2 – Restoration Ecology

The focus of Category 2 – Restoration Ecology – is to implement complex restoration projects that help to improve the ecological integrity and wildlife habitat of Jamaica Bay and its watershed. In June 2008, NYCDEP was awarded an Environmental Protection Fund grant from New York State Department of Environmental Conservation to create a Jamaica Bay Watershed Ecological Atlas. This grant will support efforts for several of the strategies in this category including the creation of a GIS database of existing and potential locations for the ecological restoration of woodland, grassland, coastal shrubland communities and potential habitat extirpated, rare or threatened species.

NYCDEP has made significant progress with several key initiatives related to restoration ecology since the Jamaica Bay Watershed Protection Plan was released. This progress is described below with additional detailed information in the attached Status Reports.

- NYCDEP developed a Wetlands Restoration Priority Review Board consisting of local government managers to review the current state of each salt marsh and prioritize restoration initiatives accordingly. Three meetings have been held to date, November 9, 2007 at Baruch College, December 4, 2007 at the offices of the USACOE and February 8, 2008 at NYCDEP. The next meeting of the group is tentatively scheduled for the week of October 13, 2008.
- The largest ecological restoration ever undertaken in New York City is nearing completion at the Pennsylvania and Fountain Landfills. Initial planting started at the Pennsylvania Landfill in spring 2006 and was completed in fall 2007. The final planting of these highly innovative restorations will take place during fall 2008 at Fountain Landfill. In all, approximately 30,000 indigenous trees and shrubs will have been planted.
- NYCDEP reviewed existing vacant parcels owned by the Department of Citywide Administrative Services (DCAS). The Geographic Information System (GIS) review provided a list of 82 potential lots; 36 in the 26th Ward water pollution control plant (WPCP) sewershed and 46 in the Jamaica WPCP sewershed. Based upon this review of parcels, NYCDEP embarked on a detailed site investigation of these parcels in early summer 2008 that reduced potentially suitable lots to approximately 58 parcels.
- On April 12, 2008, NYCDEP, NYCDPR and others, coordinated with the Rockaway Waterfront Alliance to host the annual Earth Day Rockaway 2008 environmental awareness event at the Beach 29th Street Boardwalk in Far Rockaway. NYCDEP also provided plant materials and staff on March 8, 2008 for plantings in preparation of Earth Day activities. On April 25th and

26th, NYCDEP in coordination with the American Littoral Society conducted a Plum Beach Cleanup / Planting Project. On May 10, 2008, NYCDEP collaborated with the Department of Parks and Recreation (NYCDPR), volunteers from P.S. 38, St. Claire's School, the Rosedale Civic Association, Friends of Gateway, and the office of New York City Council Member James Sanders, Jr. to conduct the Twin Ponds Stream Clean-Up Day.

A number of restoration ecology strategies fall under the purview of an upcoming NYCDEP contract: Ecological and Best Management Practices (BMP) Planning to Address Combined Sewer Overflows (BMP Contract). The contracting process is underway for initiation in early 2009. Various pilot studies to restore oyster habitat, eelgrass beds and other biological systems for habitat improvements will be completed as part of this contract.

Management Strategy: Restoration Ecology (Salt Marsh Restoration)

Implementation Strategy: Establish Salt Marsh Island Wetlands Priority Restoration Review Board
Description: Board would review restoration logistics and begin to establish a priority list of wetland restorations.
Schedule: Review Board to be initiated in November 2007.
Revised Schedule: Committee formed November 2007 and met November 11, 2007, December 4, 2007, February 8, 2008 and next meeting is scheduled for week of October 13, 2008
Estimated NYCDEP Cost: NA
Funded: NA
Agency: Multi-agency

Status Report:

The enormous complexity involved in prioritizing wetland restoration sites is a daunting task. Points to consider include the following: various agency mandates and projects, funding sources and priority needs, access to the islands, securing clean material, and evaluating probabilities for long-term stability, monitoring and maintenance.

Therefore, NYCDEP has developed a Wetlands Restoration Priority Review Board consisting of local government managers to review the current state of each salt marsh and prioritize restoration initiatives accordingly. The Review Board has been exploring alternative restoration methods for the existing marshes, in order to allow NYCDEP and other stakeholders to cost-effectively attenuate marshland loss before it becomes ecologically critical or irreversible. The first meeting was held November 9, 2007 at Baruch College. Agencies that were represented include the following:

- New York City Department of Environmental Protection (NYCDEP)
- National Park Service (NPS)
- New York City Department of Parks and Recreation (NYCDPR)
- New York State Department of Environmental Conservation (NYSDEC)
- United States Army Corp of Engineers (USACOE)
- United States Environmental Protection Agency (USEPA)
- National Oceanic and Atmospheric Administration (NOAA)
- Port Authority NJ/NY (PANJ/NY).

The focus of this first meeting was to discuss agency expectations, anticipated levels of support, technical issues, and goals and objectives. This first meeting also reviewed and refined existing criteria to improve and streamline the decision-making process with respect to prioritizing wetland restorations.

For example, a review of past prioritization criteria that was used in the Jamaica Bay Marsh Islands, Draft Integrated Ecosystem Restoration Report, revealed that too many criteria were used and this did not allow for clear marsh island locations to emerge for potential restoration. Therefore, it was determined that new criteria for wetland restoration should focus on the following (in no particular order):

- Construction Access
- Resiliency of Wetland
- Rate of Loss
- Sediment Availability and Ease of Application
- Cost

A second meeting was held on December 4, 2007 at the offices of the U.S. Army Corp of Engineers at 26 Federal Plaza to continue further discussions from the previous meeting and also focus on determining the "historic" restoration year as the benchmark for restoration efforts, the setting of realistic overall restoration goals, securing sufficient sediment, and funding opportunities (e.g., Jamaica Bay Damages Account, Jamaica Bay Ecosystem Restoration Project, Dissolved Oxygen Grants, etc.). At this meeting, it was agreed that the restoration footprint of future restored salt marsh islands should be restored to the original 1974 wetland footprint. However, as restoration costs can exceed $450,000 per acre, alternative restoration methods such as "sand islands" and larger on center planting densities (e.g., 18" on center to 24" on center) must also be considered and recommended to be implemented in future restoration projects (possibly the restoration of Yellow Bar) for actual testing and evaluation.

To evaluate the potential for suitable marsh building sediments for wetland restoration, a separate dredge material sub-committee meeting of government stakeholders was held on February 8, 2008 at the offices of NYCDEP. The group identified two potential sources for sediment required for restoration projects: Ambrose Channel and Rockaway Inlet dredging. The former is more time-sensitive, but NYCDEP is working with the group to identify the logistics for obtaining high-quality sediment from both sources. The opportunity to use this high-quality dredge material requires fast paced action. A key step is the appropriations for USACE funding to allow for federal cost sharing of these restoration programs. Other cost sharing partners such as the NPS, the PANJ/NY and the NYSDEC are desirable for an aggressive marsh island restoration and protection program. The next meeting of the group is being scheduled for the week of October 13, 2008.

NYCDEP will continue to work with local government managers to secure appropriate and clean material from Ambrose Channel and Rockaway Inlet. We have requested the assistance of the New York State Department of Environmental Conservation in helping to secure this important and valuable restoration resource.

Management Strategy: Restoration Ecology (Land Acquisition and Restoration Along Periphery of Bay)

Implementation Strategy: Completion of Pennsylvania and Fountain Landfills
Description: Ecological restoration of remediated inactive hazardous waste sites.
Schedule: Landfills currently in construction and will be completed in 2008.
Revised Schedule: Restoration completed by fall 2008.
Estimated NYCDEP Cost: Additional $20M for upland restoration components.
Funded: Yes
Agency: DEP

Status Report:

The largest ecological restoration ever undertaken in New York City is nearing completion. Initial planting started at the Pennsylvania Landfill in spring 2006 and was completed in fall 2007. The final planting of these highly innovative restorations will take place during fall 2008 at Fountain Landfill. In all, approximately 30,000 trees and shrubs will have been planted. Although not mandated by the closure of these inactive hazardous waste sites, NYCDEP took a pro-active lead stewardship role in the development and protection of important fragile ecosystems once common to the New York City region and in particular around the upland periphery of Jamaica Bay. The completion of these restorations represents nearly 10-years of design and construction that involved intense coordination of NYCDEP, NYSDEC and local community representatives. It is a model of how government and local citizens can work together to bring about substantial improvements to the ecology of the Bay and to their local environment.

Over the last several years, NYCDEP and local community representatives have sponsored of the restoration "progress tours" to many area residents and local elected officials. This year's tour was held on July 15th and was perhaps the most successful tour to date. In the beginning, it was difficult for some to visualize the plans that were put on paper nearly 10-years earlier, but seeing the restoration develop over the years has been truly remarkable to many. The restoration of the site had been transformed from just a concept to something that all could touch and see – the birth of the forest was occurring before their very eyes. Of particular note is the development of the only Atlantic White Cedar wetland restoration in New York City. The planting of the woody vegetation (i.e., trees and shrubs) was completed during the summer of 2008. Additional understory plants (e.g., herbaceous) will be added over the years as the canopy of this unique wetland community develops and proper environmental conditions are established. The large light pink flowers blooming on the *Rhododendron viscosum* (Swamp Azalea) in June and July will truly be a remarkable site.

As the planting phase comes to a close, we will begin to enter the monitoring and maintenance phases. A maintenance and monitoring plan is being implemented that includes "cutting edge" technology to track the growth of installed plant material as well as the colonization of additional valuable new plant species. Each plant is mapped and tracked with a Global Positioning System and monitored through a Geographic Information System (GIS). Considerable data about each plant (e.g., planting date, size at

installation, nursery source, and provenance) has been input to a Monitoring Software package specifically tailored for this project and recorded through the use of a hand held scanning device with a bar code information tag placed on each plant. This information will be extremely valuable in tracking the growth and progress of the restoration through time. In addition, soil placement and soil agricultural quality were carefully tracked and mapped to monitor the changes of soil development as the vegetation matures. Because of the early stages of the restoration, new soil placement and the use of smaller and younger vegetation, the site represents a significant scientific research resource and NYCDEP will continue to develop and adapt the monitoring and maintenance requirements as the data is analyzed.

Management Strategy: Restoration Ecology (Land Acquisition and Restoration Along Periphery of Bay)

Implementation Strategy: Pursue Acquisition and Restoration Efforts in Vacant Areas
Description: Determine status of subject properties; design and implement stormwater BMPs or restoration.
Schedule: Field verify sites, place holds on property within 6 months. Restoration TBD.
Revised Schedule: DEP met with DCAS and put holds on sutiable property.
Estimated NYCDEP Cost: TBD
Funded: No
Agency: Mulit-agency

Status Report:

NYCDEP reviewed existing vacant parcels owned by the Department of Citywide Administrative Services (DCAS). The parcels were selected from an inventory of publicly-owned vacant parcels in the Jamaica Bay watershed using 2007 Primary Land Use Tax Plot Output data or PLUTO. PLUTO is the most recent comprehensive land use data available from the Department of City Planning (NYCDCP). The scope of the analysis was widened to include individual parcels and clusters of parcels of 4,000 square feet and greater for further assessment. Lots smaller than 4,000 square feet but contiguous with one another were considered under this review.

The Geographic Information System (GIS) review provided a list of 82 potential lots; 36 in the 26th Ward wastewater treatment plant (WWTP) sewershed and 46 in the Jamaica WWTP sewershed. Based upon this preliminary review of parcels, NYCDEP then embarked on detailed site investigation of these parcels in early summer 2008. Their proximity to existing open space and/or their ability to function as good candidates for stormwater best management sites was a key factor during this field investigation.

These field investigations revealed that approximately 29% of the parcels were not vacant resulting in a refined list of 30 lots remaining in the 26th Ward WWTP and 28 lots remaining in the Jamaica WWTP. A status of these properties was then requested from DCAS to determine ownership or agency jurisdiction of each subject lot. The DCAS information confirmed many field observations and also provided more accurate ownership and status information including where other agencies had holds, for instance when the parcel was located in the bed of a street, or was privately-owned, etc. NYCDEP has now begun the process of contacting other agencies with holds and jurisdiction on the properties to discuss their current plans and the possibility of incorporating important stormwater management features and provide important green urban spaces, while not compromising the existing plans the agency may have on these properties. We have already received positive feedback, including the identification of additional properties to be investigated, thereby increasing the total number of parcels. In addition, costs are being calculated for acquisition costs of beneficial adjacent privately-owned vacant sites that fall in particular clusters of parcels.

Management Strategy: Restoration Ecology (Land Acquisition and Restoration Along Periphery of Bay)

Implementation Strategy: Continue Beach Clean Up Efforts
Description: NYCDEP sponsored shoreline clean-ups and restoration plantings; extend trash collection beyond Labor Day
Schedule: Ongoing spring and fall shoreline clean-ups
Revised Schedule: On going
Estimated NYCDEP Cost: Use of existing staff and equipment
Funded: Yes
Agency: DEP, DPR, NPS

Status Report:

Rockaway Waterfront Alliance Shoreline Clean-up and Restoration Days

Beach 30th Planting – April 12, 2008

On April 12, 2008, NYCDEP, Department of Parks and Recreation (NYCDPR) and others, coordinated with the Rockaway Waterfront Alliance to host the annual Earth Day Rockaway 2008 environmental awareness event at the Beach 29th Street Boardwalk in Far Rockaway. The event taught skills in horticulture, environmental stewardship and an understanding of the native shoreline habitat to many community members. Through community efforts the Alliance aims to transform neglected areas to beautiful natural landscapes. Students from nearby schools and area residents came to the shoreline to partake in this event. Numerous local organizations hosted free environmental education programs and activities along the beach. Prior to the event, NYCDEP provided plant materials and staff on March 8 and April 12, 2008 in preparation of Earth Day. Over the past four years, NYCDEP has donated $5,000 in plant materials/supplies and staff towards the Rockaway restoration effort.

Plumb Beach Shoreline Clean-up and Restoration

The American Littoral Society in coordination with NYCDEP conducted a Plum Beach Cleanup / Planting Project on Friday, April 25 and Saturday April 26, 2008.

Volunteers from various corporations and governmental agencies took part in the project. On Friday, volunteers focused on beach cleanup, debris removal and staging plant locations. Saturday, approximately close to two hundred volunteers helped clean the beach and plant seedlings.

Volunteers were put into groups of ten with NYCDEP personnel acting as team leaders. NYCDEP delivered two 20-cubic-yard garbage containers and collected a total of 60 cubic yards of trash and debris. Recyclable items were separated from garbage and collected in clear plastic bags; the recyclable items were further categorized as no-deposit containers and deposit containers. Volunteers collected approximately 40 bags of recyclables.

Volunteers Planting on April 26, 2008

To help prevent beach erosion and continue beautifying Plumb Beach, NYCDEP provided the following plant species: 200 Panicum Virgatum, 150 Solidago Sempervirens, 15 Prunus Maritima and 15 Pinus Rigida.

NYCDEP will continue to sponsor and assist shoreline clean-ups and restoration plantings in Jamaica Bay. NYCDEP is currently planning a mid-fall clean-up with the American Littoral Society on the shoreline along Four Sparrow Marsh in Brooklyn.

Twin Ponds Clean-up

Volunteers Planting on April 26, 2008

On May 10, 2008, NYCDEP collaborated with NYCDPR, volunteers from P.S. 38, St. Claire's School, the Rosedale Civic Association, Friends of Gateway, and the office of New York City Council Member James Sanders, Jr. to conduct the Twin Ponds Stream Clean-Up Day. The Twin Ponds are located along Brookville Blvd. between 132nd and 133rd Avenues. NYCDEP provided 600 plants of various species. The plants were planted along the pond and some remaining plants were planted in Springfield Park. NYCDEP currently has a capital project to improve drainage in the Twin Ponds area.

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Category 3 – Stormwater Management through Sound Land Use

The focus of Category 3 – Stormwater Management through Sound Land Use – is to retain or detain stormwater at its source in order to minimize untreated discharges to Jamaica Bay. Over the past year, NYCDEP has been able to progress many of the initiatives in this category since the Jamaica Bay Watershed Protection Plan was released. NYCDEP has been working with other municipalities around the United States to share beneficial experiences and lessons learned.

NYCDEP has made significant progress with several key initiatives related to stormwater best management practices. In addition to the Jamaica Bay plan, NYCDEP supported the development of the Mayor's Office of Long-Term Planning and Sustainability to create a city-wide sustainable stormwater management plan to be released for public review on October 1, 2008.

See the following Status Reports for the individual projects to learn more about Jamaica Bay stormwater management initiatives.

- The Rain Barrel Giveaway Pilot Study distributed 250 rain barrels to homeowners in southeast Queens. The program was met with great enthusiasm from the community. As part of the pilot, NYCDEP will evaluate homeowner acceptance.
- NYCDEP convened a BMP Code Review Task Force with members from NYCDEP, Department of Buildings (NYCDOB), Law Department and Mayor's Office of Long-Term Planning and Sustainability. The Task Force met regularly over the past year and developed recommendations for stormwater requirements that would apply to new developments.
- NYCDEP continued analyzing the efficacy of rooftop detention to reduce stormwater flow in the Jamaica Bay watershed and expanded the analysis for citywide applicability and benefits.
- NYCDEP, on behalf of the New York City Water Board, is managing a Rate Structure Study that will evaluate alternative stormwater and water conservation rate structures, among other alternative rate structures. A contractor was selected and work began in July 2008.

NYCDEP has also advanced strategies along with other city agencies to increase stormwater capture and minimize impervious surface area. For example, stormwater BMPs on the Belt Parkway Bridges have been designed with Department of Transportation (NYCDOT) and construction is slated to begin in 2010. Also, NYCDEP is working with NYCDOT, Department of Parks and Recreation (NYCDPR), and NYC Economic Development Corporation to treat stormwater in Springfield Lake area and redefine Springfield Boulevard south of the Belt Parkway. In addition, NYCDPR has built 17 new Green Streets in the Jamaica Bay Watershed between Fall 2007 and Spring 2008, 12 in Queens and 5

in Brooklyn. Where suitable, sites are designed to actively redirect stormwater runoff into the planting bed, for on-site storage and irrigation of plants. NYCDPR employs gently sloping sidewalks, trench drains, curb cuts, bioswales, deep excavation, and crushed bluestone storage reservoirs to accomplish this goal.

A number of stormwater strategies are included in the upcoming NYCDEP BMP contract. As mentioned in Category 2 – Restoration Ecology, the contracting process is underway for initiation in early 2009. Various water quality, ecological restoration, and stormwater BMP pilots, a BMP design manual, and other support for implementing the Jamaica Bay Watershed Protection Plan are included as part of this contract. In addition, a separate contract was awarded to the Gaia Institute to construct, monitor, and evaluate several stormwater BMP pilots to be installed in 2009.

As NYCDEP continues to move forward with these strategies, collaboration with the community and other city agencies will remain key elements in helping reduce untreated discharges into Jamaica Bay. NYCDEP sees great potential from these initiatives with an actively engaged watershed community.

Management Strategy: On-Site BMPs for New and Existing Development (Pilot and Demonstration Projects)

Implementation Strategy: Rain Barrel Give-away Pilot Study
Description: Distribute 1,000 rain barrels to homeowners.
Schedule: Design anticipated to begin Summer 2008.
Revised Schedule: 250 rain barrels distributed as of July 2008; Contracting process underway for initiation of remaining program in early 2009.
Estimated NYCDEP Cost: $138,000
Funded: Yes
Agency: DEP

Status Report:

NYCDEP kicked off a pilot for its Rain Barrel Giveaway Program in spring 2008. The program was well-received by the community and approximately one thousand homeowners contacted NYCDEP to learn more about the program. The pilot is based in two Community Boards in Southeast Queens: Community Boards 12 and 13. As part of the outreach for the program, NYCDEP attended meetings for neighborhood civic associations and Community Boards and sent a mailing to single-family homeowners in the area.

Rain Barrel Delivery, June 2008

Rain Barrel Delivery, June 2008

To provide installation support, NYCDEP hosted three installation trainings with 40-60 attendees. During the trainings, NYCDEP and Soil and Water Conservation District personnel showed potential participants how to connect the diverter to their downspout and connect the diverter to the rain barrel. Also discussed during the training were maintenance and winterizing tips. To support participating homeowners and others interested in the Rain Barrel Program, NYCDEP dedicated a page on its website to explain the program components and guide homeowners who want to purchase their own rain barrel.

The 250 rain barrels were delivered by the beginning of July, 2008. In October, NYCDEP will continue site visits to see how residents connected the rain barrel to the downspout and talk with residents about their experience. NYCDEP will also send a survey to all residents to evaluate the acceptance and use of the barrel. If homeowner evaluation results are positive, NYCDEP is expecting to expand the program in spring 2009. For the future program, interested homeowners will be directed to an easy-to-fill-out form on the website to indicate their interest.

Management Strategy: On-Site BMPs for New and Existing Development (Pilot and Demonstration Projects)

Implementation Strategy: Evaluate Rooftop Detention
Description: Promote on new construction; assess existing large rooftops.
Schedule: Begin in late 2007.
Revised Schedule: Ongoing.
Estimated NYCDEP Cost: $40,000 (also see Cost Sharing Program information in Update matrix)
Funded: Yes
Agency: DEP, SWCD

Status Report:

Rooftop detention, or *blue roofs*, represent a low cost stormwater BMP at just $5 per square foot over the cost of a regular roof replacement. Therefore, NYCDEP undertook a series of steps to further research existing rooftop detention installations including discussions with staff at the Department of Buildings (NYCDOB) and industry representatives such as engineers and controlled flow manufacturers to determine existing barriers and feasibility of widespread installations. As a result, NYCDEP has determined the following:

- Blue roofs require no additional land area and are therefore well-suited to high density areas where land is limited.
- Rooftop detention is an approved practice under existing NYC's Construction and Sewer Connection Codes.
- Existing buildings are designed to bear the weight of 30 psf. One inch of water per square foot of rooftop equals approximately 5 pounds per square foot (psf). Before installation, a structural integrity assessment would need to be completed to ensure buildings have the weight bearing capacity discussed above.
- Pilots will further evaluate blue roof effectiveness for various roof pitches.
- Installation and maintenance is easy and similar to regular roofs.
- Blue roof construction requires the installation of a secondary waterproofing membrane and must be constructed in accordance with NYC Construction Codes.
- Blue roofs extend the life of the roof through the secondary membrane.

NYCDEP has begun work on several initiatives to promote the advantages and installation of blue roofs including:

- A brochure is under development to describe rooftop detention benefits, design considerations and case studies to promote blue roofs among developers, architects, engineers and plumbers and to alleviate concerns about leaks and overall effectiveness.
- Based on the above information, NYCDEP's BMP Code Review Task Force is developing regulatory revisions to implement a stormwater performance standard for new development and encourage rooftop detention to meet this standard. See the attached Status Report on page 35 for more information about NYCDEP's BMP Code Review Task Force.

- NYCDEP awarded a contract to the Gaia Institute to conduct a comparative study of green and blue roofs that would involve monitoring of blue and green roofs on two existing commercial buildings. Design will begin in Fall 2008 with installation scheduled for Spring 2009.
- NYCDEP is in the process of hiring a consultant to pilot blue roofs on two existing publicly-owned rooftops of approximately 10,000 square feet each.

Management Strategy: On-Site BMPs for New and Existing Development (Economic Incentives)

Implementation Strategy: Stormwater Rate Structure Study
Description: Evaluate alternative water, sewer, and stormwater rate structures and potential credit programs for stormwater BMPs.
Initial Schedule: Anticipated to begin in early 2008
Revised Schedule: Study began in July 2008 and will be completed in June 2009
Estimated Cost: TBD
Funded: Anticipated shortly
Agency: DEP

Status Report:

In June 2008, the Water Board issued an RFP for a study to evaluate Expenditures, Revenue Sources, and Alternative Water, Wastewater and Stormwater Rate Structures. Booz Allen Hamilton (with subcontractors Amawalk Consulting, Camp Dresser McKee, and Municipal & Financial Services Group) was the selected proposer. Work started in July 2008. The study is expected to take 12 months.

The Study will explore alternative practices and structures that would be most appropriate for New York City and achieve maximum benefits for residents, businesses, and NYCDEP capital and operational budgetary needs. The Study will evaluate alternative rate structures that could maximize revenues to address the rising costs of water, wastewater, and stormwater system infrastructure and maintenance, while reflecting ratepayer water use and wastewater and stormwater generation.

The evaluation of stormwater rate structures is a component of the overall comprehensive study. Stormwater rates establish a separate pricing structure for stormwater discharges which reflects the stormwater generation characteristics of specific land uses. Stormwater rates are currently assessed by municipalities across the country to achieve local and regional goals of paying for and reducing stormwater generation. New York City is being faced with a number of issues that warrent the consideration of stormwater rates.

- Costs are projected to continue increasing associated with infrastructure requirements to meet more stringent regulatory standards.
- The effects of more intense precipitation events and flooding and increased demand on the system from more impervious surfaces. Flood mitigation programs are being identified and will need to be implemented.
- Currently an average of 29 billion gallons of combined sewer overflows discharge to New York City waters each year. Water quality goals imposed by federal and state governments on pollution in our waterways will require additional stormwater management.
- Although critical to NYCDEP's mission, certain sewer work is deferred when necessary to meet the agency's numerous regulatory mandates. This will place more

strains on the system as sewers age and are subjected to more development pressures from rezonings and population growth.

Stormwater management has evolved significantly in recent years from its original function as conveyance to a key component of an integrated urban water resource system that includes both quantity and quality considerations. It places a growing demand on NYCDEP's budget.

The study will assess a variety of stormwater rate structures. A primary goal is the more equitable distribution of rates and fees for our customers. A number of variables such as imperviousness, land area, and property classifications can define these rate structures. The study will survey municipal water, wastewater, and stormwater utilities with stormwater rate structures. Based on the results of the survey, a number of stormwater rate structures will be analyzed with respect to impacts on ratepayers and revenues over the agency's 2-year, 10-year, and other budget plan scenarios. Customer classes will be identified based on stormwater generation characteristics and other considerations. Regulatory, administrative, and enforcement requirements associated with the different rate structures will also be evaluated.

The study will also review credit programs being implemented by other stormwater utilities to incentivize the installation of stormwater best management practices and water conservation measures. Potential costs of such a program will be evaluated.

Management Strategy: On-Site LIDs for New and Existing Development (Economic Incentives)

Implementation Strategy: Cost-Sharing Program Investigations
Description: Develop potential framework for design/build services incentive program.
Schedule: Begin in late 2008.
Revised Schedule: NA.
Estimated NYCDEP Cost: $40,000
Funded: Y
Agency: DEP/SWCD

Status Report:

There are numerous incentive programs to encourage stormwater management on private property around the country. NYCDEP has been investigating and evaluating several examples including Washington D.C.'s recently implemented cost-sharing incentive program with the Natural Resources Conservation Service (NRCS).

Washington DC used Section 319 to create a cost-sharing program which is backed by a partnership between the DDOE and NRCS. The grant program offers design/build *services* to property owners (single and multi-family residences are not eligible) rather than cash awards, enabling unincorporated or for-profit entities to participate and allowing flexibility in program administration. For properties greater than 5,000 square feet, which are required to file a stormwater control plan, the program subsidizes the cost of LID installation in excess of conventional practices (what is minimally required by law).

NRCS, with its decades of experience managing small scale, lot-level conservation practices, administers the contracting process. The program relies on pre-qualified contractors with experience installing LID practices. Permits and insurance are handled by the contractors, minimizing the burden on the property owners. The property owners are required to sign a covenant of maintenance at the completion of the project. DDOE and NRCS set up a steering committee consisting of local agencies (equivalent to city and state agencies), not-for-profit environmental organizations and USEPA staff to develop project selection criteria and evaluate property owners' proposals.

On July 21, staff from NYCDEP, NYC SWCD and the Mayor's Office of Long-Term Planning and Sustainability visited Washington, D.C. to meet with agency staff from the Watershed Protection Division - Office of Policy and Sustainability at DDOE, District Department of Transportation, Office of Property Management and NRCS. The visit provided NYCDEP an opportunity to learn about Washington, DC's stormwater management programs.

Participation by the NRCS is a critical part of the success of the Washington DC program. For potential funding, the SWCD under contract to NYCDEP has begun to explore the Clean Water Act Section 319, Clean Water State Revolving Fund, Coastal Zone Management Section 6217, and NYS Environmental Protection Fund.

Additional research on other city's cost-sharing programs is ongoing and NYCDEP will continue the development of a cost-sharing program in New York City (see the attached Status Report on page 31 on the Rate Structure Study for more information on a credit program evaluation.)

Management Strategy: On-Site BMPs for New and Existing Development (Regulatory and Design Changes)

Implementation Strategy: Code Review
Description: Review Sewer Code and make recommendations for potential revisions to facilitate BMP installation.
Initial Schedule: Anticipated to begin summer 2008
Revised Schedule: BMP Code Review Task Force was initiated in March 2008; contracting process underway for initiation in early 2009.
Estimated Cost: N/A
Funded: N/A
Agency: DEP

Status Report:

Early in the year, NYCDEP convened the BMP Code Review Task Force and held a series of regularly scheduled meetings. The objective of the Task Force is to review specific sections of the City's construction and sewer codes, determine whether current rules and regulations impede the installation of BMPs on development lots and identify potential revisions needed to encourage BMPs citywide. The Task Force was comprised of staff from NYCDEP, Mayor's Office of Long-Term Planning and Sustainability, Department of Buildings (NYCDOB), and Law Department.

Relevant sewer and construction codes reviewed by the Task Force included the Administrative Code Title 24–Environmental Protection and Utilities, Title 27–Building Code, and Title 28–Construction Codes (effective July 2008), and Chapter 25, Rules Governing the Connection to the Sewer System, in Title 15 of the Rules of the City of New York. Current codes and regulations are focused on ensuring that development prevents flooding on adjacent properties, and streets and sidewalks and avoids standing water due to associated health concerns. Detention or sewer upgrades are required where sewer capacity is limited in the area of a new or expanded development. However, current codes and regulations do not routinely require or promote the use of stormwater detention and infiltration BMPs for the purpose of minimizing combined sewer overflows (CSOs) or water quality impacts in surrounding waterbodies.

To identify potential regulatory changes, the Task Force reviewed the stormwater regulations from other municipalities such as Chicago, Philadelphia, Seattle, and Portland. Specifically, the Task Force looked to other municipalities' codes to inform a review of infiltration/volume controls, detention/rate controls, direct drainage to waterbodies, development thresholds, and operation and maintenance plans.

Using the different municipalities' requirements as case studies, the Task Force performed a series of calculations to determine the impacts of adopting similar requirements in New York City. Several development prototypes for different lot sizes and zoning districts were developed to illustrate the volumes of stormwater that would be

captured, infiltrated or detained onsite for different design storm events and with varying release rates.

Based on these exercises, the Task Force believes that a slow release rate could feasibly be achieved by new developments located in areas serviced by combined sewers or separate sewers. The following requirements were also recommended by the Task Force:

- Design Storm: 10-year storm event
- Draindown time shall not exceed 24 hours after storm event has passed.
- Design requirements for subsurface beds include: underdrains and overflow devices, filter fabric, catch basins; minimum 3-foot depth to groundwater.
- Rooftop detention, a low cost control measure, should be encouraged. Design requirements for rooftop detention shall be in accordance with Construction Code specifications with a maximum ponding depth of 3 inches and tamperproof design.
- Direct discharge, with stormwater pollution prevention plans, for properties along waterfront.
- Rainwater harvesting requirement for developments with certain size landscaped areas.

The codes and/or regulations are being developed and will require a public review period.

Management Strategy: On-Site BMPs for New and Existing Development (Regulatory and Design Changes)

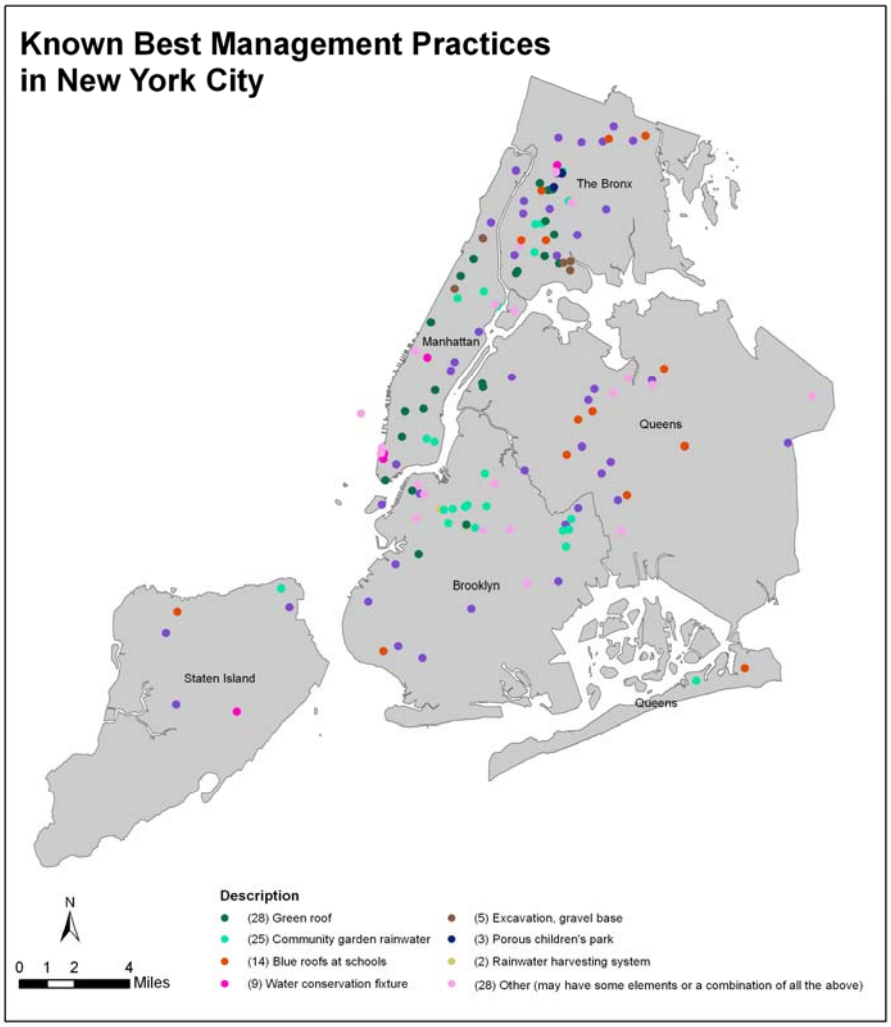
Implementation Strategy: Monitor Benefits of BMP Implementation
Description: Develop indicators to track effects of BMP installations throughout the City over time.
Schedule: To begin once various BMP pilot contracts begin.
Revised Schedule: NA
Estimated NYCDEP Cost: TBD
Funded: TBD
Agency: DEP & Mayor's Office

Status Report:

Using existing data from the *Low Impact Development Systems In the New York Metro Area*, a spreadsheet of Best Management Practice (BMP) locations compiled by many citywide environmental stakeholder groups as a starting point, NYCDEP is currently in the process of collecting additional data on these various BMPs identified on the map below. In addition, on July 3, 2008 the Mayor's Office of Long Term Planning and Sustainability (OLTPS) has implemented a citywide BMP registry that encourages individuals to supply information on-line of known BMP locations so that a complete inventory of existing BMP sites can be developed. The BMP registry site is located at the following web address:
http://www.nyc.gov/html/planyc2030/html/plan/bmp_questionnaire.shtml

The additional data collection on the existing BMP locations includes, but is not limited to the following information:

- What is the condition and function of existing BMP or LID site?.
- What type of monitoring is taking place and is there sharing of this data?
- What is the cost of the monitoring?
- What was the cost of the initial installation?
- What equipment is used for monitoring?
- How long has monitoring occurred and what entity is doing the monitoring?
- Can sites that are still functional but not currently monitored be retrofitted for monitoring?



In addition, NYCDEP has initiatied the contracting process to support the Department's sustainable approach to addressing water quality and ecological concerns in the City's waterways. The Contract will implement a number of strategies related to ecological restoration and low impact land use to address combined sewer overflows (CSOs), storm sewer discharges, and other water quality and ecological issues.

This contract will pilot promising ecological restoration measures and stormwater best management practices (BMPs), review potential regulatory mechanisms to facilitate BMP implementation, and evaluate water quality benefits. The contract will also create a design manual to assist private and public development in the implementation of stormwater BMPs. The purpose of the pilot studies is to address the uncertainties associated with these technologies within the New York City climate and environmental conditions, including; soil composition, depth to the high water table, and depth to

bedrock, freezing conditions, connections with existing sewer infrastructure, cost-effectiveness, and maintenance requirements. Along with addressing uncertainties, these pilots shall also assess water quality benefits and provide case studies to guide future development practices.

NYCDEP has also issued a contract to the Gaia Institute to design, construct and monitor various types of stormwater BMP's specifically within the Jamaica Bay Watershed. These include Streetside Infiltration Swales, Enhanced Tree Pit Catchments, Green and Blue Roofs and parking lot stormwater conveyance to a constructed wetland system. The design work will begin in fall 2008 and construction of several of the BMP's will begin in spring 2009. These BMP's will be monitored for a period of three years.

The NYCDEP Monitoring Plan for all Pilot Projects provides for the following:

a. General data requirements for Monitoring Plan includes but not limited to:

i) Meteorological conditions from nearby certified weather locations and actual precipitation data and stormwater flow data.
ii) Estimated evapo-transpiration rates of various plant species utilizing meteorological conditions data from nearby certified weather station.
iii) Weather conditions (precipitation, cloud cover, wind, temperature, etc.)
iv) Incidental wildlife observations will be noted.
v) Summary of subwatershed characteristics and estimated flow volume rates.
vi) Estimated and actual soil infiltration rates
vii) Percent volume capture with respect to drainage area total.

b. Estimate of pollutant and sediment load reduction

i) To test the performance of the monitoring array, quantities of water will be delivered at measured rates to the swale systems during days with no precipitation. This will test the response of the shallow sampling wells, gypsum block resistors and tensiometer probes. This battery of test results will then the used as a baseline predictor for the behavior of the swale system during design storms in specific size classes.

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Category 4 – Public Education and Outreach

The Public Education and Outreach Chapter of the Jamaica Bay Watershed Protection Plan described the direct connections between public awareness and environmental stewardship. NYCDEP implemented several strategies over the past year to raise awareness among both youth and adults, and complement the efforts of many existing education and outreach organizations serving Jamaica Bay. NYCDEP has been working with the Jamaica Bay Watershed Education Coordinating Committee and other environmental education programs to finalize the Jamaica Bay Educational Resource Directory. The intended use of the Resource Directory is to coordinate and centralize Jamaica Bay-related curriculum for K-12 educators and assist the Coordinating Committee to identify gaps, if any, in educational programs focused on the Bay. The Directory is funded and will be printed for distribution in late 2008.

In addition, NYCDEP has developed a brochure to inform residents, business owners and developers about Jamaica Bay's unique assets and ways to protect the Bay through on-site stormwater management techniques, wise use of household chemicals, water conservation, and energy conservation measures. It has been funded and is scheduled to be printed for distribution in late 2008.

A "State of the Bay" Scientific Symposium has been funded and scheduled for October 28th and 29th, 2008, and will help guide further scientific investigations and reporting on scientific findings, as well as inform Plan updates. Jamaica Bay is ideal for such a symposium as it is currently the epicenter of research and scientific investigations for major academic institutions throughout New York City and Long Island, as well as other state, federal, and city agencies. The attached Status Report provides additional information about the symposium and other academic and scientific research efforts of the past year.

Management Strategy: Public Education and Outreach

Implementation Strategy: Organize "State of the Bay" Scientific Symposium
Description: Coordinate/guide scientific investigations and report scientific findings. Inform Plan updates.
Schedule: First symposium Summer 2008
Revised Schedule: First symposium was held on June 27, 2008 Second symposium October 28-29, 2008
Estimated NYCDEP Cost: $30,000
Funded: Yes
Agency: DEP

Status Report:

A myriad of federal, state and city government agencies, non-governmental organizations, academic institutions, and private interest groups are working to preserve and enhance the unique natural resources of Jamaica Bay. However, in order to bring about an effective strategy for improving water quality and ecological conditions within Jamaica Bay, a focused coordinated effort among all interested parties is essential to moving forward in the development of additional areas of research that can shed additional insight to help improve the ecological integrity of the Bay.

To help foster this coordination, on June 27, 2008 NYCDEP sponsored a scientific symposium on important issues confronting the Bay. The symposium provided a platform for researchers, agencies and other environmental stakeholder groups to convene and discuss current issues affecting Jamaica Bay and other coastal ecosystems. Presentations and discussion focused on the physical, biological, chemical and anthropogenic changes that have occurred over time and have played a significant role in the current ecological status of the Bay. This symposium was an important first step in highlighting a broader scientific research perspective of the issues confronting the Bay. The goal of this symposium was to provide the catalyst to promote additional coordinated research and data collection efforts of the various environmental stakeholder groups.

A follow-up to the June 27, 2008 symposium, NYCDEP, in coordination with the National Park Service will sponsor another symposium on October 28, 2008 at the United States Customs House in lower Manhattan and on October 29, 2008 at Kingsborough Community College in Brooklyn. While the symposium agenda has not been finalized, scientists and researchers have been invited to discuss past and present issues confronting Jamaica Bay and other regional waterbodies. It is anticipated that the following areas will be covered:

- Jamaica Bay Watershed Plan and Pilot Projects – an update of implementation strategies and pilot projects; and
- Discussions on water quality issues, sediment movement, wetland restoration and nutrient cycling

It is important to keep an open dialogue with the scientific community and all environmental stakeholder groups in the development of adaptive management efforts that will enhance the ecology of the Bay through sound scientific reasoning. To help with this process, on October 29th, members from the Chesapeake Bay Foundation will describe the formation of their organization and the collaboration that brought together various environmental stakeholder groups within the Chesapeake Bay watershed.

In addition to hearing the latest scientific research, the goal of these symposiums is to help identify research data gaps that would enable a greater understanding of the complex biological issues facing the Bay. In the future, NYCDEP will continue to hold similar workshops to keep the scientific community, government agencies and environmental stakeholder groups actively engaged in developing a consensus approach toward improving water quality and the habitat of Jamaica Bay.

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Category 5 – Public Use and Enjoyment

Ensuring and enhancing public access, recreation, and enjoyment opportunities which do not harm sensitive areas was a key goal of the plan and continues to be for several City agencies. The New York City Department of Transportation (NYCDOT) and Department of Parks and Recreation (NYCDPR) have developed several plans to improve access to the Bay through open space, greenway and roadway construction plans. Significant progress has been made toward the implementation of the Rockaway/Gateway Greenway, a 20-mile continuous greenway loop around the Bay. One section, the Shore Parkway Greenway, is a 2.8 mile stretch between Pennsylvania Ave and 84th Street currently in construction which is scheduled to be completed in 2008. A required local match in funds was secured for this segment and an additional 1.9 mile stretch between 84th Street and JFK Airport.

The Southern Parkway Path and Conduit Boulevard project would also connect the Brooklyn/Queens Greenway to Jamaica Bay. As part of the larger Springfield Gardens sewer and street reconstruction project, NYCDOT, with the support of NYCDEP and The New York City Economic Development Corporation (NYCEDC), will implement a bikepath and streetscape improvements along Springfield Boulvard. from South Conduit Ave to 147th Avenue. However, funding has yet to be secured for this segment of the project and anticipated construction schedule has yet to be determined.

As a part of broader planning efforts to connect the upper watershed communities to the Jamaica Bay waterfront and other natural areas, the Brooklyn/Queens Greenway and Eastern Parkway Extension project includes the portion that runs through the watershed and entails improving landscaping, multi-use paths, bike racks, pedestrian ramps, and traffic signals for example. The segment known as "Eastern Parkway Extension: Brooklyn Queens Greenway" between Eastern Parkway at Buffalo Avenue and Highland Park is still under design and is anticipated for construction completion in June 2010.

Also related to planning for upper watershed connections to the Bay, NYCDOT has begun plans for creating greenway connections to upland communities on both sides of Paerdegat Basin and on the west side of Fresh Creek as part of construction/maintenance of the respective bridges. NYCDOT is in the early stages of the planning process and these segments will not show up on the NYC greenway map as planned routes until 2010.

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Category 6 – Implementation and Coordination

There are many interests, private, public, and non-profit, working to restore and protect the unique resources of Jamaica Bay. As outlined in the Jamaica Bay Watershed Protection Plan, the aggressive agenda of the Plan can be accomplished only through cooperation and partnerships.

Ongoing collaborative efforts such as the Jamaica Bay Water Quality and Ecological Steering Committee, the Mayor's Office BMP Interagency Task Force, and the Education Steering Committee are already making progress. The Ecological Steering Committee is made up of a multi-agency team and is in ongoing discussions with the National Parks of New York Harbor Conservancy to establish a permanent Jamaica Bay collaborative. The Mayor's Office's Sustainable Stormwater Management Plan will include findings and information from BMP Interagency Task Force meetings held throughout 2007-2008 and four public outreach meetings held by the Task Force since the implementation of PlaNYC 2030. Per Local Law 5, the public review draft of the Sustainable Stormwater Management Plan is to be completed by October 2008. In addition, several Task Force representatives participated in the subsequent BMP Code Review Task Force to review existing limitations and potential opportunities for BMP construction in applicable NYC codes and regulations. Lastly, the Education Coordinating Committee continues to meet to review and comment on drafts of the Jamaica Bay Education Resource Directory to be published for distribution in late 2008.

In addition, the Plan intends to monitor and review changes to the watershed by tracking development, BMP implementation, and overall growth in coordination with other agencies. NYCDEP is currently working directly with NYC Department of Buildings to follow new development and major alteration data to track growth and trends, and the Office of Environmental Coordination (OEC) by following CEQR projects within the watershed.

New York State's Department of Environmental Conservation is working to track their permits by coding them onto a geographic information system (GIS). These data will allow interpretation and analysis of trends which may be used by the involved agencies for planning purposes. NYCDEP has also worked with other agencies such as NYC Department of Transportation, NYC Housing and Preservation Department, and NYC Economic Development Corporation on specific projects within the watershed to foster awareness of issues and special concerns related to the water quality and ecological restoration goals of the JBWPP. See attached Status Report for more information.

Management Strategy: Implementation and Coordination Strategy (Plan Implementation)

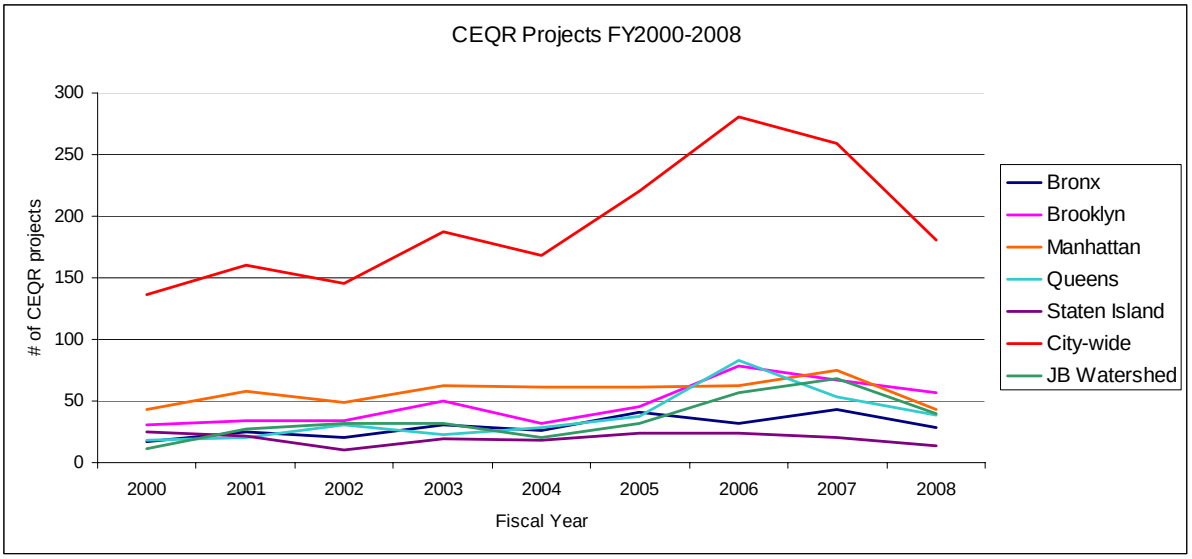
Implementation Strategy: Monitor and Review Changes to the Watershed
Description: Track new development, BMP implementation, and overall growth in the watershed in coordination with other agencies.
Schedule: Ongoing
Revised Schedule: Ongoing.
Estimated NYCDEP Cost: TBD
Funded: N
Agency: DEP/OEC/NYSDEC

Status Report:

As part of the implementation and coordination goals of the plan, NYCDEP is actively monitoring and reviewing growth and changes in the watershed. Over the past year, NYCDEP has reached out to various State and local agencies to compile development data for the Jamaica Bay watershed and has participated in numerous environmental reviews as an interested agency per the City Environmental Quality Review (CEQR) process.

The compilation of development data allows NYCDEP to focus infrastructure reviews in areas of high-growth and utilize a watershed approach toward improving the water quality and ecological integrity of surrounding waterbodies. Data compiled over the past year included area wide rezoning studies or proposed rezoning actions initiated by the New York City Department of City Planning (DCP), building permits issued by the New York City Department of Buildings (DOB), and wetland permits issued by the New York State Department of Environmental Conservation.

In addition, NYCDEP is actively working with OEC to track and monitor CEQR projects in the watershed. Based on an analysis of CEQR projects from FY2000-2008, we can see that publicly sponsored developments and rezonings in the watershed generally followed the same pattern for development citywide which showed peaks in FY2006 and FY2007, see chart below. In the FY2008, 22% of CEQR projects in the city occurred in the watershed. These comprised 47% of the projects in Brooklyn and 33% of the projects in Queens. The actual land area that is tributary to Jamaica Bay is 47,000 acres, or 24%, of the city's area (195,000 acres according to NYCDCP). Therefore the CEQR projects in FY2008 in the watershed are of a proportionate amount to the in relation to the city as a whole.



Source: NYC Office of Environmental Coordination

More analyses of other city department data for a comparison to private development patterns will be undertaken, in addition to quantitative information such as population density increases and land use changes.

DEP has reviewed 40 proposed actions under CEQR review within the watershed between October 2007 and October 2008. In many of them, NYCDEP has provided comments and recommendations for stormwater management, ecological restoration and water quality improvement strategies to increase awareness of the strategies included in the Jamaica Bay Watershed Protection Plan by other agencies with jurisdiction or development projects in the watershed. Below are a few examples of proposed projects reviewed by NYCDEP and recommendations consistent with the Jamaica Bay Watershed Protection Plan implemented as a result. The below proposed actions and others reviewed by NYCDEP are illustrated in the attached map.

Gateway Estates (Phase II)

NYC Housing Preservation and Development, Gateway Center Properties Phase II, LLC, and Nehemiah Housing Development Fund Co., are proposing the modification and continued development of a previously approved mixed use plan. This includes the expansion of an existing shopping center in the 227-acre Fresh Creek Urban Renewal Area in Spring Creek, Brooklyn. The proposed development consists of 2,385 units of affordable housing units, a 630,000 square foot shopping center, up to 68,000 square feet of local retail space, a new high school, 46,000 square feet of community and public facility uses, and 36.5 acres of parkland. The proposed project would use existing separate storm sewers that discharge directly to Jamaica Bay.

The infrastructure chapter of the Final Environmental Impact Statement (FEIS) will describe the project's stormwater management goals and will identify water quality requirements for stormwater drainage pursuant to NYSDEC requirements as well as NYCDEP's stormwater management strategies identified in the Jamaica Bay Watershed Watershed Protection Plan. The residential and retail parking lots will comply with the

Design Regulations for Commercial and Community Facility Parking Lots Text Amendment, including vegetated swales along the perimeter of the site. There will also be subsurface bed detention systems and water quality controls onsite. NYCDEP has held meetings on the design of these stormwater BMPs and recommended modification. Final designs have not yet been submitted. The retail site of the Gateway Center will include a number of stormwater BMPS, such as vegetated swales throughout the parking lot, rain gardens, and mechanical treatment units; and temporary on-site stormwater storage to comply with NYCDEP's stormwater discharge rate control requirements and NYSDEC's State Pollutant Discharge Elimination System (SPDES) requirements. Due to projected increase in stormwater runoff from the projected full buildout of the Fresh Creek Urban Renewal Area, an on-site stormwater management plan to be developed for the area within the shopping center would also include BMPs such as vegetated swales, rain gardens, on site storage, catch basins fitted with hydrodynamic devices to remove oil and grit, pollutants, sediments, and floatables.

Mill Basin

The Mill Basin Project is a commercial development consisting of improvements to the existing retail store and construction of a 2-story auto dealership (110,302 sq ft) including 290 parking spaces and storage of 206 cars on the roof. The Mill Basin shoreline property was found to be contaminated and needing remediation for semi-volatile organic compounds and metals in the soil, and volatile organic compounds and metals were found in the groundwater. NYCDEP also found that the development would result in an increase in the amount of impervious surfaces in the Jamaica Bay watershed and requested that the project take measures to reduce direct stormwater runoff into Jamaica Bay. These measures would be consistent with the Jamaica Bay Watershed Protection Plan and the Mayor's Interagency Best Management Practices (BMPs) Task Force, as well as the Design Regulations for Commercial and Community Facility Parking Lots Text Amendment adopted by the City Planning Commission on October 31, 2007.

Beach 80th St Marina

The Beach 80th Street project consists of the development of a public marina on the west side of Beach 80th Street at the Barbadoes Basin in Arverne, Queens. The project site is 6.2 acres and undeveloped. The proposed project will consist of 40,000 square feet of commercial space which will include marine-influenced restaurant and shops; a floating dock system with the capacity of 30 slips for approximately 25 boats; a boardwalk along the waterfront edge; a restored wetland preserves accessible by the public via trails from the marina; and associated on-site parking for over 100 cars with a shuttle bus drop-off.

The proposed development will implement several BMPs including pervious pavers on a boat ramp to be used by canoes and kayaks that would allow stormwater to infiltrate into the soils onsite. The developer will also collect all on-site runoff by using leaching chambers, infiltrations systems, and a ponding area. The project will comply with the Design Regulations for Commercial and Community Facility Parking Lots Text Amendment. In addition, the project is required to prepare a Stormwater Pollution Prevention Plan (SWPPP) per NYSDEC which will outline the post-construction stormwater management BMPs.

Jamaica Rezoning

As a result of the Jamaica Rezoning adopted on September 10, 2007, increased development activity and density in the Downtown Jamaica area is expected. Since the rezoning, DEP has been reviewing sites with E designations in the rezoned area as they are developed (see attached map). E designations are assigned, pursuant to Zoning Resolution Section 11-15, to tax lots which may be developed based on a change in zoning where potential hazardous materials contamination, noise or air quality impacts must be addressed to avoid significant impacts. Prior to development, the property owner must submit to NYCDEP documentation (which may include a hazardous materials investigation, remediation plan, noise attenuation plan or fuel and emissions data) to demonstrate that the proposed development would satisfactorily address the concerns identified during the environmental review for the rezoning. The E designation is designed to ensure that any development must address environmental conditions as long as the potential for impacts exist, and a developer cannot get a DOB permit until DEP requirements are satisfied.

Finally, DEP has undertaken an initiative to collect data and track BMP installation citywide; for more information about this effort see the attached Status Report on page 37.

CEQR Projects in Jamaica Bay Watershed Reviewed by NYCDEP