FINAL SUPPLEMENTAL ENVIRONMENTAL IMPACT STATEMENT FOR THE CROTON WATER TREATMENT PLANT

9. MITIGATION OF POTENTIAL IMPACTS

9.3. HARLEM RIVER SITE

9.3.1. Introduction

NYCDEP endeavors to avoid the potential for significant environmental impacts as part of its construction plans and design for a proposed project. For example, vibration prevention/monitoring program would be implemented during construction. Similarly, to the extent possible, noise barriers and paving of interior construction roadways and dust suppression techniques are incorporated in construction plans to eliminate air and noise quality nuisances. Stormwater management both during construction and operations would be provided to prevent the release of particulate material to the nearby Harlem River. The historic University Heights Bridge, on the southern boundary of the proposed site, would be protected from direct impact. The heavy granite architectural character of the Bridge, its ramps, and abutments, would be used in the design of facades and plant roadways around the site. Finally, contractors would be required to utilize barges for the transport of bulk materials in order to avoid adding significant numbers of trucks onto the local road network and the Major Deegan Expressway, which are already congested and constrained.

This section details mitigation measures that would minimize or avoid potentially significant impacts. The project impact sections for several impact categories concluded that neither the proposed construction nor operational activities would result in significant impacts. These parameters are not discussed in this section and include: Land Use, Zoning, Open Space and Waterfront Revitalization, Visual Character, Community Facilities, Neighborhood Character, Socioeconomic Conditions, Air Quality, Water Resources, Historic and Archaeological Resources, Infrastructure and Energy, EMF/ELF, and Solid Waste. The potential for impacts on these parameters are described in the appropriate construction and project impact sections.

9.3.2. Traffic Mitigation

The need for potential traffic improvements for the Harlem River Site was reviewed under Section 7.9.3, Traffic and Transportation, Potential Impacts. The potential traffic improvements for the Harlem River Site are described below.

Traffic. The main access routes to the Harlem River Site would be the Major Deegan Expressway (I-87) and West Fordham Road. The analysis of the traffic conditions in the Construction Year indicated that capacity deficiencies would occur in the future without and with the proposed project at three intersections along these roads. In order to maximize capacity of these intersections, and to mitigate the potential impacts of the construction traffic and the Future With the Project traffic, the following mitigations measures are recommended to be part of the project at the Harlem River Site. Each of these intersection mitigation plans would be based upon the potential construction impacts that would occur during peak construction periods.

It should be noted that the following proposed mitigation plans contemplate the re-apportioning of the "green light time" for critical approaches at different intersections in the study area. This measure is intended to improve the overall intersection LOS and delay in certain intersection. These plans will improve the LOS and reduce delays back to the Future Without the Project conditions. However, in some cases these improvements might actually worsen other approaches to the same intersection i.e., increases delay or worsen LOS, but overall would improve the intersection conditions and LOS.

1. *West Fordham Road at the Major Deegan Expressway (I-87) Southbound Ramps:* Optimize signal timing. This intersection would operate at LOS D in both the AM and PM peak hours. During both the AM and PM peak hours, the signal optimization traffic improvement proposed as mitigation would not reduce all of the individual lane group construction traffic delays below those considered to be significant adverse impacts in accordance with CEQR criteria. Additional intersection geometric improvements have not been proposed due to the constraints at this location. Therefore, potential traffic impacts at this intersection during construction would be unmitigatable.

2. *West Fordham Road at the Major Deegan Expressway (I-87) Northbound Ramps:* Optimize signal timing. The overall intersection would operate at LOS C in both the AM and PM peak hour. During both the AM and PM peak hours, the signal optimization traffic improvement would not reduce all of the individual lane group construction traffic delays below those considered to be significant adverse impacts in accordance with CEQR criteria. Therefore, the potential significant adverse impact at this intersection would remain unmitigated.

3. *West Fordham Road at Sedgwick Avenue:* Optimizing signal timing and adding a northbound left turn lane would result in the intersection operating at LOS D in the AM and PM peak hours with reduced delay. On-street parking would need to be removed along the northbound approach to accommodate the additional lane. The construction traffic would necessitate signal optimization at the start of construction as described below. Construction traffic volume levels would not reach the levels necessitating the northbound left turn lane until 2009 with duration of a little more than one year. The removal of valuable on-street parking in this area to install a turn lane is not justified for the short duration of the peak construction generated traffic. The optimizing of the signal timing would be performed. This would mitigate a portion of the impact, but would not mitigate the full impact. Therefore, a portion of the significant adverse impact at this intersection would remain unmitigated.

The traffic improvements primarily call for optimizing signal timings to reduce the potential increase in delay created by construction traffic volumes. Since the construction volume peaks are anticipated to arrive before and after the AM and PM peak hours respectively, the optimum signal timings utilized are approximate. It is standard that traffic counts be performed at these locations after construction begins to provide actual traffic patterns to document and justify the modification to signal timings. The potential traffic improvements would be developed in accordance with NYSDOT and NYCDOT design guidelines. In addition, the potential traffic improvement designs would need to undergo review by the NYSDOT, NYCDOT, and/or other roadway jurisdictional bodies prior to being implemented. Should the potential mitigation measures proposed (i.e., the optimization of signal timing) to reduce project-related delays not be reasonable because of the increase in delay at other approaches, or because the construction period impacts would be short-term and temporary, not warranting signal timing changes, these traffic improvements would be modified.

Table 9.3-1 shows the comparison of LOS results for these intersections for the Future Without the Project, the Construction Year, and the same year with the mitigation measures.

TABLE 9.3-1. 2009 TRAFFIC CONDITIONS WITH PROPOSED MITIGATION MEASURES

SIGNALIZED INTERSECTIONS	LANE GROUP	FUTURE WITHOUT THE PROJECT						POTENTIAL CONSTRUCTION IMPACTS						PROPOSED MITIGATION MEASURES					
		WEEKDAY AM PEAK HOUR			WEEKDAY PM PEAK HOUR			WEEKDAY AM PEAK HOUR			WEEKDAY PM PEAK HOUR			WEEKDAY AM PEAK HOUR			WEEKDAY PM PEAK HOUR		
		V/C RATIO	DELAY (SEC/VEH)	LOS	V/C RATIO	DELAY (SEC/VEH)	LOS	V/C RATIO	DELAY (SEC/VEH)	LOS	V/C RATIO	DELAY (SEC/VEH)	LOS	V/C RATIO	DELAY (SEC/VEH)	LOS	V/C RATIO	DELAY (SEC/VEH)	LOS
W. Fordham Road (E-W) at I-87 SB Off Ramp	EB – TR	0.87	33.7	C	0.90	41.6	D	0.88	34.4	C	0.96	50.4	D	0.88	37.0	D	0.93	43.4	D
	WB – L	0.72	38.4	D	0.72	47.4	D	0.72	38.5	D	0.78	51.5	D	0.76	46.4	D	0.86	61.2	E
	WB – LT	0.71	14.6	B	0.69	14.4	B	0.75	15.6	B	0.72	15.5	B	0.77	18.4	C	0.73	26.0	C
	SB – LT	0.92	56.9	E	0.83	58.6	E	0.98	67.6	E	0.83	58.6	E	0.90	55.0	E	0.80	78.4	E
	SB – R	1.12	114.7	F	1.06	109.0	F	1.14	117.6	F	1.07	111.5	F	1.05	90.9	F	1.04	99.5	F
	Intersection		**41.0**	**D**		**41.6**	**D**		**43.7**	**D**		**45.9**	**D**		**40.9**	**D**		**42.9**	**D**
W. Fordham Road (E-W) at I-87 NB Off Ramp	EB – L	0.87	47.2	D	1.15	123.8	F	0.90	53.1	D	1.26	169.0	F	0.85	49.7	D	1.00	79.5	E
	EB – T	0.52	10.9	B	0.50	15.6	B	0.53	10.9	B	0.52	15.8	B	0.54	12.8	B	0.47	10.8	B
	WB – T	0.59	20.0	B	0.54	24.4	C	0.61	20.2	C	0.56	24.6	C	0.69	27.5	C	0.60	27.3	C
	WB – R	0.41	18.8	B	0.27	21.0	C	0.41	18.8	B	0.31	21.6	C	0.47	25.4	C	0.33	23.8	C
	NB – L	0.76	41.0	D	0.60	37.9	D	0.83	46.4	D	0.61	38.2	D	0.77	42.8	D	0.80	55.7	E
	NB – TR	0.80	43.4	D	0.59	37.6	D	0.86	49.0	D	0.59	37.6	D	0.80	44.3	D	0.78	53.8	D
	Intersection		**23.5**	**C**		**34.2**	**C**		**25.5**	**C**		**39.5**	**D**		**27.9**	**C**		**33.0**	**C**
W. Fordham Road at Sedgwick Avenue (N-S)	EB – L	1.05	97.3	F	0.95	61.4	E	1.19	147.8	F	0.99	70.3	E	1.08	96.7	F	0.93	62.2	E
	EB – TR	0.52	13.5	B	0.59	19.9	B	0.54	13.8	B	0.60	20.2	C	0.56	15.3	B	0.61	20.9	C
	WB – LT	0.70	23.4	C	0.81	37.0	D	0.77	26.0	C	0.82	37.7	D	0.92	42.3	D	0.88	45.3	D
	WB – R	0.32	17.5	B	0.33	25.0	C	0.35	17.9	B	0.33	25.0	C	0.40	23.5	C	0.35	28.1	C
	NB – LTR	1.10	109.2	F	0.96	72.2	E	1.10	109.2	F	1.13	122.5	F	---	---	---	---	---	---
	NB – L	---	---	---	---	---	---	---	---	---	---	---	---	0.57	37.8	D	0.63	40.9	D
	NB – TR	---	---	---	---	---	---	---	---	---	---	---	---	0.34	26.0	C	0.32	27.0	C
	SB – LT	0.56	26.9	C	0.46	29.6	C	0.56	26.9	C	0.48	30.1	C	0.65	31.7	C	0.54	30.9	C
	SB – R	0.79	39.4	D	0.82	46.9	D	0.81	40.8	D	0.88	52.5	D	0.83	44.7	D	0.86	49.6	D
	Intersection		**37.0**	**D**		**36.9**	**D**		**42.4**	**D**		**44.3**	**D**		**36.4**	**D**		**49.6**	**D**

ABBREVIATIONS:

EB-Eastbound, WB-Westbound, NB-Northbound, SB-Southbound

L-Left, T-Through, R-Right, E-W: East-West Roadway, N-S: North-South Roadway

V/C Ratio - Volume to Capacity Ratio

SEC/VEH - Seconds per Vehicle

LOS - Level of Service

9.3.3. Noise Mitigation

No significant stationary noise impacts were anticipated as a result of future normal operations at the Harlem River Site. Construction-generated noise level increases that exceed the 3-5 dBA noise increase threshold that defines significant adverse noise level impacts, would be experienced at noise sensitive receptors in the vicinity of the proposed project at the Harlem River Site. The receptors that may be affected would be the proposed Fordham Landing Apartments, a residence at the intersection of Sedgwick and Bailey Avenues, and the Fordham Oval Apartment Complex located on Bailey Avenue. These noise level increases would be temporary in nature, lasting for less than a year, and therefore would not constitute a significant impact. For each noise-sensitive receptor, predicted project-induced noise levels for the peak construction-noise year (2006) were compared to the predicted future baseline noise levels for 2006.

9.3.3.1. Mobile Source Noise

No noise contributions are anticipated from mobile sources as a result of operation or construction at the Harlem River Site. The results of the potential operations and construction impacts analysis of the proposed plant are presented in Section 7.10, Noise. Attenuation measures were not required along noise sensitive route segments.

9.3.3.2. Stationary Source Noise

The proposed project-related increases in noise levels resulting from the construction activity at the Harlem River Site would be temporary. Only two sensitive receptors would experience increased noise levels, and the noise levels would be only marginally higher than the CEQR threshold. Therefore, it is not intended at this time to implement noise attenuation measures at this site. These noise impacts during construction would be unattenuated.

The following section presents measures to attenuate increased noise levels at local sensitive receptors should they be implemented. Table 9.3-2 presents information regarding the sensitive receptors.

TABLE 9.3-2. DESCRIPTION OF STATIONARY SOURCE SENSITIVE RECEPTORS NEAR HARLEM RIVER SITE

Receptor Name	Description of Receptor
HRS-S1	Fordham Landing apartment complex (proposed)
HRS-S2	Fordham Landing Park
HRS-S3	Private residence, Sedgwick and Bailey
HRS-S4	Fordham Oval apartment complex
HRS-S5	High-rise apartment complex on Bailey Avenue

Construction activities would produce noise levels that temporarily exceed the 3-5 dBA increase threshold at HRS-S1, HRS-S3, and HRS-S4. These noise levels were anticipated only during weekday construction hours (7:00 AM – 6:00 PM).

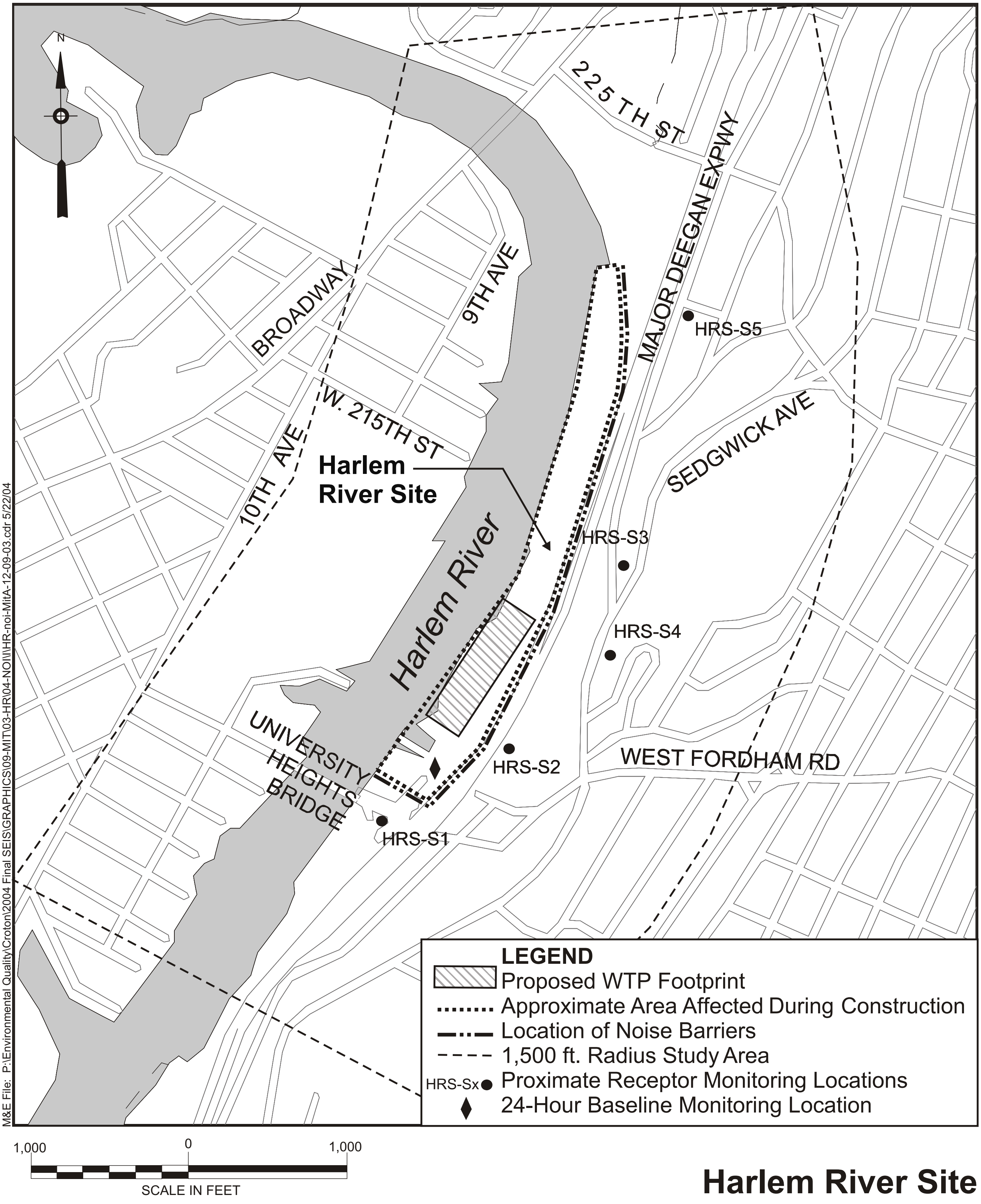
An analysis was performed to determine what equipment used at which time was responsible for producing the greatest incremental change in noise levels. The maximum noise levels from construction activities would occur during the early phases of the construction period (from May 2006 until November 2007). This period corresponds with earth excavation and removal, and foundation laying activities at the site. Equipment most responsible for the increased noise levels would be the rock drills, pile drivers, and the large volume of excavators and trucks that would be on site during that eighteen-month period.

Noise attenuation systems that would attenuate the raised noise levels from construction activities at sensitive receptors neighboring the site were identified. Noise barriers facing the sensitive receptors could be installed at fixed locations along the eastern and southern boundary of the construction site. Noise barriers placed in a fixed location were designed because they satisfy the attenuation requirements and because they would not restrict the movement of on-site workers and equipment during construction.

The exact amount of sound transmission loss from a barrier is a function of its height, thickness, material of construction, and precise location with respect to the noise source and noise sensitive receptor. The barriers would extend along the lengths of the eastern and southern boundaries (see Figure 9.3-1). The barriers would act as an acoustical curtain enclosure, effectively shielding receptors from noise emanating from construction equipment. A barrier approximately 20 feet in height would minimize the noise reaching sensitive receptors due to absorption and diffraction (i.e. bending of the sound waves over the top of the barrier). This type of noise barrier could be capable of a minimum of approximately 13 dBA of sound transmission loss (again, depending on the variables noted above)

The greatest predicted incremental change in noise levels would be 1.8 dBA above the CEQR threshold at Receptor HRS-S3. The noise barrier would be capable of attenuating 13 dBA of noise; therefore it would be sufficient to attenuate the potential noise impacts of 1.8 dBA resulting from construction activities.

Table 9.3-3 shows the anticipated noise levels at impacted sensitive receptors with and without attenuation measures. With the noise barriers in place, construction-related noise would be attenuated, and the noise levels at the receptors would be the same as that anticipated for the Future Without the Project for 2006.



Harlem River Site
Stationary Noise Source
Potential Noise Barrier Configuration

TABLE 9.3-3. NOISE LEVELS AT SENSITIVE RECEPTORS BEFORE AND AFTER MITIGATION ATTENUATION AT HARLEM RIVER SITE

Proximate Receptor	Monitoring Period	Future Without the Project Noise Level (2006)	Total Noise Level Without Attenuation (2006)	Incremental Change Above CEQR Without Attenuation	Attenuation Due to Noise Barrier	Incremental Change With Attenuation	Total Noise Levels During Construction With Attenuation (2006)
HRS-S1	10-11 am	65.4	68.5	**0.2**	13	0	65.4
	3-5 pm	69.6	71.2	0	13	0	69.6
HRS-S2	10-11 am	66.3	68.2	0	13	0	66.3
	3-5 pm	70.8	71.6	0	13	0	70.8
HRS-S3	10-11 am	68.9	72.7	**0.9**	13	0	68.9
	3-5 pm	67.4	72.1	**1.8**	13	0	67.4
HRS-S4	10-11 am	68.3	71.3	**0.1**	13	0	68.3
	3-5 pm	67.1	70.8	**0.8**	13	0	67.1
HRS-S5	10-11 am	72.1	72.3	0	13	0	72.1
	3-5 pm	73.3	73.5	0	13	0	73.3

9.3.4. Hazardous Materials Mitigation

9.3.4.1. Hazardous Materials Disturbed During Construction

Based on sampling efforts performed for this Final SEIS, data are available identifying potential contaminants of concern at the Harlem River Site. Volatile and semi-volatile organic compounds (VOCs, SVOCs) related to gasoline and diesel range total petroleum hydrocarbons (TPH) were detected in the soil and groundwater at different locations at the site. The data also indicated that selected metals were found in the soil at concentrations that could be considered higher than normal background levels for the eastern United States. Based on information derived from regulatory reports (see Section 7.13, Hazardous Materials), PCB residues in soil may be present at a localized portion of the site. In addition, sediment in the river adjacent to the Site was found to contain semi-volatile organic compounds as well as elevated concentrations of selected metals. Although the concentrations of the environmental contaminants present in the soil, groundwater, and sediment at the Harlem River Site do not pose an imminent public health hazard, the potential for significant adverse impacts from the existing hazardous material exists. Specialized management of these materials during construction is necessary to mitigate the potential for significant adverse impacts on public health and safety of construction workers and adjacent site occupants both during construction and operation of the proposed project.

As a mitigating measure, a site-specific Construction Contamination Management Plan (CCMP) would be prepared which contains a detailed Sampling and Analysis Plan (SAP). The SAP would be implemented to more precisely delineate the zone(s) of potential contamination (ZOPC) in areas where construction activities that would disturb the soil, groundwater, or river sediment are planned. Results derived from the application of the SAP would provide the specific types of data needed to make appropriate and cost-effective waste management decisions (e.g., treatment, stabilization, off-site disposal, health and safety). The CCMP would be developed in conjunction with Local, State, and Federal agencies and would address all applicable or relevant and appropriate requirements.

The CCMP would also describe the requirements for handling, management, treatment, and disposal of contaminated materials encountered during construction. Since proposed actions at the Harlem River Site would involve excavation below the groundwater table, tunneling, and the construction of shafts and subsurface chambers, the CCMP would address management of groundwater contamination, if present, including containment, treatment, and discharge options. The CCMP would include contingencies to address unanticipated hazardous materials discovered during construction activities such as drums, underground tanks, waste debris, and related types of contaminated media.

The CCMP would identify requirements for Health and Safety Plans (HASPs) to be developed by each construction contractor and approved by NYCDEP prior to the commencement of work at the site. The HASPs would comply with 29 CFR §1910.120 and would include health and safety requirements related to site-specific environmental conditions. Worker safety issues related to construction activities and general public protection would be included in the plans.

The general approach to the mitigation of soil, groundwater, and surface water contaminants potentially encountered at the site includes the following:

Potential petroleum contaminated soil would be handled in accordance with applicable Local, State (e.g., New York State Petroleum-Contaminated Soil Guidance Policy) and Federal (RCRA Hazardous Waste) requirements and would include guidance to dispose of wastes properly and protect groundwater, human health and the environment. The goal at each petroleum release site would be to remove the petroleum product from the soil in an efficient and safe manner. When removal of petroleum products and residues from the soil is not possible, practical, or cost effective, the objective would be to remediate by removal or disposal of contaminated materials, or by engineering controls such as a vapor barrier.

Soils suspected of being contaminated would be excavated and stockpiled on impermeable barriers (e.g., polyethylene sheeting), tested, and removed for off-site site disposal at an appropriately licensed facility. Depending on the quantities and locations of contaminated soils, other mitigation technologies may be used, such as soil vapor extraction for volatile organic compounds (VOCs) or stabilization/capping for metal contamination. Capping would involve reusing soil on-site and covering it with at least 1-2 feet of clean soil or other impermeable capping material (e.g., paving).

Construction documents and the CCMP would include methods to be implemented should petroleum contamination (e.g., fuel oil, diesel, gasoline), tanks, or bulk storage containers be encountered during construction. Tanks or other containers would be closed and removed in accordance with State and Local regulations, along with the associated piping, contaminated soil, and separate-phase petroleum. The steps to be followed include removing any remaining product and contaminated water and evacuating vapors from the inside of the tank. Each tank or container would be decontaminated, removed from the ground, and rendered unusable (e.g., cut into pieces) for subsequent off-site disposal. Vents and piping (e.g., fill, supply, return) would be removed in conjunction with the tanks. Soil around each tank would be sampled to identify contamination, and any soil exceeding predetermined criteria (e.g., regulatory thresholds, action levels, cleanup criteria) would be excavated and removed by a certified hauler to an appropriate disposal facility. Once contaminated soil has been excavated, additional soil samples would be collected from the sides and bottom of the excavated area to confirm that all contaminated soil has been removed. Essentially, the same procedure would be followed if only contaminated soil was found but the source could not be located or had previously been removed. Regulatory data indicates that several closed in-place underground storage tanks may be encountered during construction activities.

At locations on the Harlem River Site where construction requires extensive building renovation, removal of equipment and internal structures, or demolition, a pre-construction survey of each structure would be conducted to delineate Asbestos Containing Materials (ACM) in structures where ACM is known or suspected to be present. Based on the findings, ACM would be removed in accordance with all Local, State, and Federal regulations as well as NYCDEP procedures. Similarly, the condition of Lead-Based Paint (LBP), PCB- and mercury- containing devices would also be assessed. If LBP, PCB, or mercury residues were suspected to be present on surfaces or materials to be removed from the structure, the debris would be tested to confirm appropriate disposal methods. If LBP, PCB, or mercury devices were present in areas, which would remain in the structure, the condition of these materials would be assessed and the hazardous materials would either be removed (i.e., abated) or managed in-place (e.g., encapsulated) to minimize future exposure risks.

The management and mitigation of contaminated groundwater would include monitoring and, if necessary, treatment of water removed during dewatering operations. Low permeability barriers (e.g., slurry walls) may also be used to control contaminated groundwater from entering a construction area. NYSDEC dewatering permits (6 NYCRR §602) for the operation of wells to withdraw water would be obtained prior to construction activities, where required. NYSDEC or local permits for the discharge of construction-related water to sanitary, storm sewer, or surface water bodies would be obtained, where required.

Specialized management procedures (NYSDOH, Dredge Material Assessment and Management Guidance) would be applied to sediment removed from the river (e.g., hydraulic or mechanical dredging, drilling). In addition, extraction of dredged spoils from the river would require mitigation to prevent the suspension of sediment particles in the water column and potential aquatic toxicity (NYSDEC, Technical Guidance for Screening Contaminated Sediments). Based on the potential presence of hazardous materials from the ubiquitous fill material at the site and the historical land uses, the CCMP would include a detailed sediment sampling plan and appropriate remediation measures to be implemented for the protection of public health and safety both during and after construction ensuring full mitigation of this potential adverse and significant impact. NYCDEP's Office of Environmental Planning and Assessment would be responsible for ensuring the review and approval of the hazardous materials mitigation program in accordance with all Federal, State, and Local regulations.

9.3.5. Natural Resources Mitigation

Potentially significant impacts from the construction and operation of the proposed plant at the Harlem River Site include the construction of a permanent bulkhead structure that would result in filling approximately 63,000 square feet (approximately 1.5 acres) of the Harlem River between the existing riprap shoreline and the mapped pier and bulkhead line. Although the site is heavily disturbed, industrialized, and offers limited habitat value, mitigation has been planned to fully compensate for the loss of vegetation and tidal wetlands onsite. The site is adjacent to water considered to be essential fish habitat area by the National Marine Fishery Service. The concept planned for this mitigation would include 1.8 acres of wetland mitigation onsite and an additional 1.2 acres offsite to provide enhanced habitat for the aquatic and riparian wildlife at a mitigation ratio of 2:1.

9.3.5.1. Wetland and Fisheries Mitigation

Figure 9.3-2 shows a concept for the areas proposed for potential public access and wetland mitigation after the construction of the proposed water treatment plant. The area to the south of the proposed plant footprint would expand and improve the habitat of the existing cove. The northern margin of this cove would be planted with tidal wetland vegetation as described below. Although the habitat would be improved, this existing wetland area would not be counted as part of the mitigation area since it already is mapped as wetlands.

The area to the north of the proposed plant could be developed for both passive and active recreational use. Much of the shoreline of this area would be excavated and converted into created tidal wetlands by revising the existing grades. Additional area to compensate for the filling of tidal wetlands is being considered north of the project site in the area of Spuyten Duyvil to produce a total wetland creation to loss ratio of approximately 2:1, as detailed below.

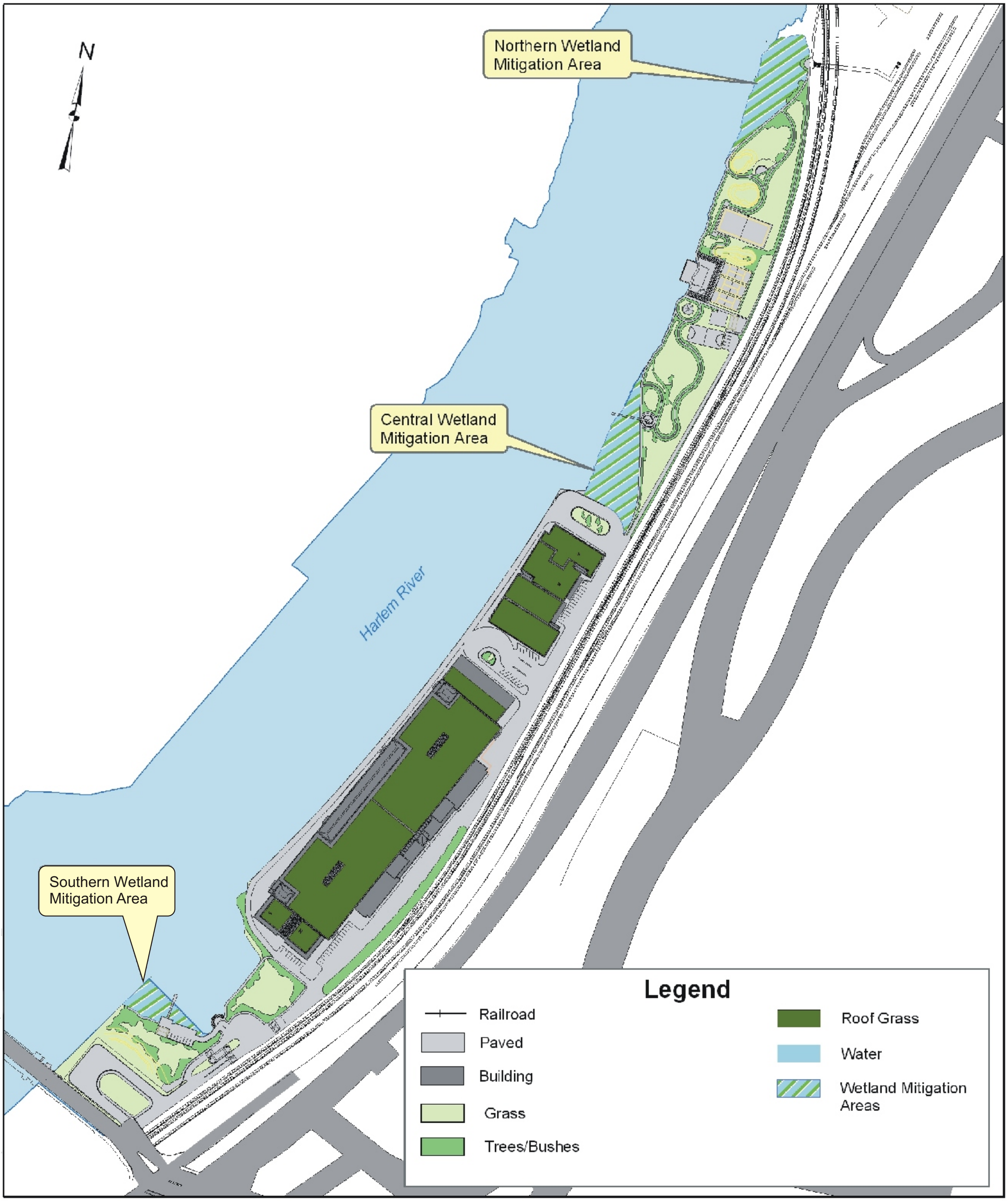
9.3.5.2. Wetland Mitigation Area Functions and Values

The proposed Harlem River wetland mitigation area is designed to mitigate for the loss of approximately 1.5 acres of a New York State Department of Environmental Conservation designated tidal wetland habitat. To mitigate for this loss, three onsite wetland creation areas totaling 1.8 acres and an offsite area of 1.2 acres would be designed to provide a total of approximately 3.0 acres of salt shrub, high salt marsh, brackish sub-tidal aquatic bed, and estuarine riprap wetland habitat (Figure 9.3-2). Functions and values of each of the wetland zones are discussed below. The onsite area available for wetland mitigation is limited so that sufficient area is also available to improve public open space.

Efforts would be undertaken to prevent any additional impacts from the construction of the created wetland areas. Early in the construction phase, the entire project site would be fenced and concrete jersey barriers would be placed to demarcate the limits of construction along the Metro North railroad tracks. A silt fence and double row of hay bales would be installed outside the construction boundary to assist in erosion and sedimentation control. These protective measures would remain in place until the construction is complete.

9.3.5.3. Estuarine Rip-Rap Zone

The proposed estuarine riprap would consist of staggered linear piles of large stones and boulders located on the western periphery of each of the three mitigation areas adjacent to the main channel of the Harlem River. The function of the estuarine riprap zone would be two-fold. The primary function would be to reduce and deflect wave energy away from the brackish sub-tidal aquatic bed and high salt marsh zones landward of the riprap, since tidal forces and wakes from boat traffic are likely to be too erosive for establishment of vegetation along this portion of the Harlem River. A secondary function of the estuarine riprap would be to provide boulder and cobble habitat for aquatic organisms. Since the top of the estuarine riprap would rise above the high tide elevation, portions of the riprap would be exposed for several hours each day, effectively creating horizons of recruitment and usage by various aquatic organisms. Crustaceans such as barnacles and crabs, bivalves such as Eastern oysters and blue mussels, and other invertebrates, are likely to use this habitat. Juveniles and some adult fish species are likely to hide and feed among the riprap. Rockweeds (*Fucus* spp.) may also establish in this zone, creating additional habitat and sources of food for other aquatic organisms. (See NYCDEP/DWQC Guidelines in Appendix F for a suitable wetland seed mix that may be used to establish this wetland area.)



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Conceptual Plan for Wetland Mitigation Areas Harlem River Site

Figure 9.3-2

9.3.5.4. Brackish Sub-Tidal Aquatic Bed

The brackish sub-tidal aquatic bed zone is designed to provide a small open water area between the estuarine riprap and the high salt marsh habitat. This zone would remain inundated at depths of 1 to 1.5 feet during low tide. The function of a permanently inundated area behind the riprap would be to provide habitat for fish and other aquatic organisms that use the high salt marsh during incoming tides so that the organisms do not have to vacate the wetland system during low tide. Several species of fish are known to graze directly on widgeongrass, and the leaf blades provide habitat for some algal species. Dense stands of the plant provide cover for many aquatic organisms. (See NYCDEP/DWQC Guidelines in Appendix F for a suitable wetland seed mix that may be used to establish of this wetland area.)

The benefits of the mitigation plan would include the restoration of native vegetation and habitat for fish and waterfowl. Additional aesthetic improvements to the area would compliment the proposed walkway and open space area to be created by the project.

9.3.5.5. High Salt Marsh

High salt marsh would require grading on the site. The high salt marsh zone would be located in the upper one-half to one-third of the tidal cycle, so this zone would experience periods of inundation and exposure. High salt marsh would normally be exposed, but inundated during spring high tides as this area naturally develops from created low grades. Nearly two-thirds of all fish and shellfish on the East Coast spend at least a part of their life cycle in a salt marsh as free-swimming larvae.[1] During periods of high tide, most of the high salt marsh would be inundated and would provide fish and other organisms with dense cover for protection and feeding. High salt marsh provides valuable nesting material for a variety of bird species such as the Northern harrier, clapper rail, common tern, oystercatcher, and sparrows. Great Blue herons and snowy egrets can be found feeding within the high salt marsh. Saltmarsh cordgrass (*Spartina alterniflora*) is the host plant and over-wintering site of the inter-tidal plant hopper insect (*Prokelisia marginata*), one of the most abundant herbivores of the Atlantic salt marshes.[2] (See NYCDEP/DWQC Guidelines in Appendix F for a suitable wetland seed mix that may be used to establish this wetland area.)

Tidal creeks are proposed within the high salt marsh with their outflow into the brackish sub-tidal aquatic bed zone. The function of the tidal creeks, which are essentially gently meandering narrow stream channels, would be to expedite water and nutrient flow within the brackish sub-tidal aquatic bed zone (both incoming and outgoing), particularly to the upper reaches of the high salt marsh zone. Tidal creeks would also serve to export organic detritus from the high salt marsh that would serve as food for organisms in other parts of the estuarine system. Once plant species are established along these creeks, exposed root masses of high salt marsh vegetation are often valuable habitat for mussels and juvenile fish.

[1] Redington, C.B. 1994. Redington Field Guides to Biological Interactions – Plants in Wetlands. Kendall/Hunt Publishing Company. Dubuque. 394 pp.
[2] Redington, 1994.

9.3.5.6. Salt Shrub Zone

The primary function of the salt shrub zone is to provide toe-of-slope stabilization between the wetland mitigation area and the adjacent upland area of the site, as well as provide habitat for wildlife species. Woody shrubs would provide year-round cover and perching opportunities for passerine bird species likely to frequent the area. The salt shrub zone would also provide a buffer between the adjacent upland and the high salt marsh. The buffer would serve to reduce nutrients and sediments reaching the high salt marsh during stormwater runoff events. (See NYCDEP/DWQC Guidelines in Appendix F for a suitable upland seed mix that may be used to establish of this buffer zone.)

9.3.5.7. Essential Fish Habitat

Section 7.14, Natural Resources, describes the potential impacts to Essential Fish Habitat along the Harlem River. Although the existing riprap shoreline is not good fish habitat, and the alteration of the shoreline does not represent a significant impact the proposed tidal wetland mitigation would improve the habitat for fish. Table 9.3-4 shows the potential fish species that could colonize the wetland habitats described above. Note that all of the species listed in Table 9.3-4 could make use of the proposed mitigation wetland areas as juveniles or adults. This mitigation would represent an improvement upon the existing conditions and more than compensate for the loss of habitat in the open river channel brought about by the proposed filling to the pier head and bulkhead line.

TABLE 9.3-4. LIFE STAGES LIKELY TO OCCUR IN THE HARLEM RIVER STUDY AREA; DESIGNATED BY ESSENTIAL FISH HABITAT CRITERIA

Species	**Eggs**	**Larvae**	**Juveniles**	**Adults**	**Spawning Adults**
Red hake *(Urophycis chuss)*	X	√	X	X	X
Winter flounder *(Pleuronectes americanus)*	√	√	√	√	√
Windowpane flounder *(Scopthalmus aquosus)*	√	√	√	√	√
Atlantic sea herring *(Clupea harengus)*	X	√	X	X	X
Bluefish *(Pomatomus saltatrix)*	X	X	√	√	X
Summer flounder *(Paralicthys dentatus)*	X	X	√	√	X
Spanish mackerel *(Scomberomorus maculatus)*	X	X	√	X	X

√ = life stage is likely to occur in the Harlem River Study Area
X = life stage is unlikely to occur in the Harlem River Study Area

9.3.6. Public Health Mitigation

In response to public concerns about the potential for construction activities to increase movement of nuisance rodents, NYCDEP has developed a rodent control and monitoring plan that would be implemented at this site if it is selected for the water treatment plant. An active program would be instituted to control the existing population, prevent the opening of conduits for rodents to and from the site, and a hygiene program during construction to prevent the creation of new food sources. This type of program has been proven to be successful on other large construction sites (e.g. “the Big Dig” in Boston) where very extensive tunneling and deep excavation occurred.