US Army Corps of Engineers®

New York District
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New York, N.Y. 10278
ATTN: CENAN-OP-ST

Public Notice

In replying refer to:
Public Notice:
Bronx River, New York

Published: 23-May-2024
Expires: 22-Jun-2024

MAINTENANCE DREDGING OF
BRONX RIVER, NEW YORK
FEDERAL NAVIGATION PROJECT

TO WHOM IT MAY CONCERN:

The New York District, U.S. Army Corps of Engineers, pursuant to Section 10 of the Rivers and Harbors Act of 1899, Section 404 (33 U.S.C. 1344) of the Federal Water Pollution Control Act (amended in 1977 and commonly referred to as the Clean Water Act), and Section 103 (U.S.C. 1413, 86 Statute 1052) or Marine Protection, Research and Sanctuaries Act (MPRSA) of 1972 (commonly referred to as the Ocean Dumping Act), proposes to perform maintenance dredging of the Bronx River, New York, Federal Navigation Project (see Figure No. 1) with subsequent placement of the dredged material for environmental remediation purposes at the Historic Area Remediation Site (HARS, see Figure No. 2A and 2B).

ACTIVITY: Maintenance dredging of the Bronx River, New York, Federal Navigation Project, with placement of the dredged material at the HARS for the purpose of remediation.

WATERWAY: Bronx River Channel, New York, Federal Navigation Project

LOCATION: Bronx County, New York

The Bronx River, New York, Federal Navigation Project was authorized by the River and Harbors Act of 1913 (P.L. 62-429)

The proposed activity is the to dredge the shoal areas located in the Bronx River Channel (Figure 1). Approximately 200,000 cubic yards (CY) of material will be removed from a project depth of -10 feet plus 1 foot overdepth Mean Lower Low Water (MLLW).

A detailed description of the proposed activities is enclosed to assist in your review. This activity is being evaluated to determine that the proposed placement of dredged material will not unreasonably degrade or endanger human health, welfare or amenities, or the marine environment, ecological systems, or economic potentialities. On

September 26, 2000, the United States Environmental Protection Agency (USEPA) and Corps of Engineers signed a Memorandum of Agreement (MOA) outlining the steps to be taken to ensure that remediation of the HARS continues in a manner appropriately protective of human health and the aquatic environment. In making the determination, the criteria established by the Environmental Protection Agency (EPA) will be applied, including the interim change to one matrix value for PCB's as described in the MOA. In addition, based upon an evaluation of the potential effect which the failure to utilize this ocean site will have on navigation, economic and industrial development, and foreign and domestic commerce of the United States, an independent determination will be made of the need to place the dredged material in ocean waters, other possible methods of disposal, and other appropriate locations.

The U.S. Army Corps of Engineers, New York District, is soliciting comments from the public; federal, state and local agencies and officials; Indian tribes; and other interested parties in order to consider and evaluate the impacts of this proposed activity. Comments are used to assess impacts on navigation, water quality, endangered species, historic resources, wetlands, scenic and recreational values, and other public interest factors. Comments are used in the preparation of an Environmental Assessment pursuant to the National Environmental Policy Act and to determine the need for a public hearing.

DUE TO CURRENT LOCAL CONDITIONS, AND TO ENSURE ALL COMMENTS REGARDING THIS ACTIVITY ARE RECEIVED, ALL COMMENTS SHOULD BE EMAILED TO DIVYESH.G.PATEL@USACE.ARMY.MIL BEFORE THE EXPIRATION DATE OF THIS NOTICE. Otherwise, it will be presumed that there are no objections to the activity.

Any person who has an interest which may be affected by the placement of this dredged material may request a public hearing. The request must be submitted in writing to the District engineer within the comment period of this notice and must clearly set forth the interest which may be affected and the manner in which the interest may be affected by the activity. It should be noted that information submitted by mail is considered just as carefully in the process and carries the same weight as that furnished at a public hearing.

No known archaeological, scientific, pre-historical or historical data are expected to be lost by work accomplished under the required dredging.

Pursuant to Section 307 of the Coastal Zone Management Act of 1972 as amended [16 USC 1456(c)], for activities conducted or supported by a federal agency in a state which has a federally approved Coastal Zone Management (CZM) program, the Corps must submit a determination that the proposed project is consistent with the State CZM program to the maximum extent practicable. This activity is subject to review by the New York State Department of State for its consistency with the enforceable policies of the New York State Coastal Management Program. The New York District of the U.S. Army Corps of Engineers has determined that the proposed activities are consistent to the

maximum extent practicable within the applicable policies of the New York State CZM program. A copy of this determination will be provided to the New York State Department of State, Office of Coastal, Local Government and Community Sustainability. Additional information regarding the Corps of Engineers' consistency determination may be obtained by contacting the New York State Department of State, Office of Coastal, Local Government and Community Sustainability, Attn: Consistency Review Unit, One Commerce Plaza, 99 Washington Avenue – Suite 1010, Albany, New York 12231.

The proposed project was reviewed based upon the "Biological Assessment for the Closure of the Mud Dump Site and Designation of the Historic Area Remediation Site (HARS) in the New York Bight and Apex", (USEPA, 1997). Based upon this review, and a review of the latest public listing of threatened and endangered species, it has been preliminarily determined that the proposed activity for which authorization is sought herein, is not likely to adversely affect any federally threatened or endangered species (humpback whales, finback whales, right whales, loggerhead turtles, leatherback turtles, green turtles, and Kemp's Ridley turtles) or their critical habitat pursuant to Section 7 of the Endangered Species Act (16 USC 1531).

The proposed HARS placements will not result in Remediation Material being placed within 0.27 nautical miles of any identified wrecks, as indicated in the National Register of Historic Places. Other than wrecks, there are no known sites eligible for or included in the Register within the project area. No known archaeological, scientific, prehistorical or historical data are expected to be lost by work accomplished under the required dredging.

Reviews of the activity pursuant to Section 404 of the Clean Water Act will include application of the guidelines announced by the Administrator, U.S. Environmental Protection Agency, under authority of Section 404(b) of the Clean Water Act. The Corps has obtained a water quality certificate from the New York State Department of Environmental Conservation prior to commencement of any work in accordance with Section 401 of the Clean Water Act.

In compliance with Section 305(b)(2) of the Magnuson-Stevens Fishery Conservation and Management Act (1996 amendments), an Essential Fish Habitat Assessment will be prepared and submitted to the National Marine Fisheries Service for review and comment.

The proposed work is being coordinated with the following Federal, State and local agencies:

- U.S. Environmental Protection Agency
- U.S. Department of the Interior, Fish and Wildlife Service
- U.S. Department of Commerce, National Marine Fisheries Service
- U.S. Coast Guard, First District
- New York State Department of Environmental Conservation
- New York State Department of State
- New York City Department of City Planning

DESCRIPTION OF PLANNED ACTION:

The New York District, U.S. Army Corps of Engineers proposes to perform maintenance dredging of the Bronx River New York Federal Navigation Project. The Bronx River Channel was last dredged in 1991, with the removal of approximately 64,000 CY of material, to a depth of -10 feet MLLW. The dredged material was placed at the former Mud Dump Site in the Atlantic Ocean.

The proposed maintenance dredging would involve the removal of approximately 200,000 CY of material, to a project depth of -10 feet plus one (1) foot overdepth MLLW, with placement at the HARS. Maintenance dredging of the Bronx River Channel will be accomplished by a mechanical dredge with an environmental clamshell bucket, or similar. The entire channel will not require maintenance dredging; only the area, as shown on the attached Figure 1, will require dredging.

The purpose of the proposed work is to alleviate the effects of shoaling, thereby assuring safe navigation and facilitating economical use of the Bronx River Channel by commercial interests. The material has been tested and meets the criteria for remediation material at the HARS. The dredged material would be used as such by placing it over degraded sediments within the HARS. The proposed dredged material would be transported by bottom dumping vessels to the placement site.

This public notice serves to announce the government's intent and identifies the proposed location for placement of approximately 200,000 CY of material. The dredging and placement at the HARS for this project is anticipated to occur in the Fall/Winter of 2024.

ENVIRONMENTAL IMPACT STATEMENT:

The material to be placed at the HARS is dredged material that will be removed from the Bronx River, New York, Federal Navigation Project. The material is being evaluated to meet the regulatory testing criteria of 40 CFR Sections 227.6 and 227.27 and the requirements of the rule establishing the HARS in Section 228.15(d)(6). It has been determined that maintenance dredging of Bronx River, New York, Federal Navigation Project, with placement of the dredged material at the HARS is not likely to have significant adverse environmental impact on water quality, marine resources, fish, wildlife, endangered species, recreation, aesthetics and flood protection of the area.

An update of the EA and a 404(b) evaluation as required by the Clean Water Act 40 CFR 230 will be prepared prior to the implementation of the proposed work.

PLACEMENT SITE:

The dredged material from this project is proposed to be placed at the HARS (see next section: Introduction to the HARS) using the bottom dumping process. Based upon review of the latest published version of the National Register of Historic Places, two

wrecks, believed to be the HLW Lew and the ORMOND, were found in Remediation Area Number 1. As noted in the designation of the HARS, Remediation Material would not be allowed to be placed within 0.27 nautical miles of the identified wrecks or other wrecks that might be found.

INTRODUCTION TO THE HARS:

In 1972, the Congress of the United States enacted the Marine Protection Research and Sanctuaries ACT (MPRSA) to address and control the dumping of materials into the ocean waters. Title I of the Act authorizes the US Environmental Protection Agency (USEPA) and the US Army Corps of Engineers (USACE) to regulate dumping in ocean waters. USEPA and USACE share responsibility for MPRSA permitting and ocean disposal site management. USEPA regulations implementing MPRSA can be found in 40 CFR Sections 220 through 229. With few exceptions, MPRSA prohibits the transportation of material from the United States for the purpose of ocean dumping except as may be authorized by a permit issued MPRSA. The MPRSA divides permitting responsibility between USEPA and USACE. Under Section 102 of the MMPRSA, USEPA has responsibility for issuing permits for all materials other than dredged material. Under Section 103 of MPRSA, the Secretary of the Army has the responsibility for issuing permits for dredged material. Determination to issue MPRSA permits for dredged material are subject to USEPA concurrence.

In the fall of 1997, the USEPA de-designated and terminated the use of the New York Bight Dredged Material Disposal Site (commonly known as the Mud Dump Site or MDS). The MDS has been designated in 1984 for the disposal of up to 100 million cubic yards of dredged material from navigation channels and other port facilities within the Port of New York and New Jersey. Simultaneous with the closure of the MDS, the site and surrounding areas that had been used historically as disposal sites for dredged material were redesigned as the HARS in 40 CFR Sections 228.15 (d)(6), (see 62 Fed. Reg. 46142 (August 29, 1997); 62 Fed. Reg. 26267 (May 13, 1997)). The HARS will be managed to reduce impacts of historical disposal activates at the site to acceptable levels in accordance with 40 CFR Sections 228.11 (c). The need to remediate the HARS is supported by the presence of toxic effects, dioxin bioaccumulation exceeding Category 1 levels (a definition of which appears in an evaluation memorandum reviewing the results of the testing) in worm tissue, as well as TCDD/PCB contamination in area lobster stocks. Individual elements of those data do not establish sediments within the study as imminent hazards to the New York Bight Apex Ecosystem, living resources, or human health; however, the collective evidence presents cause for concern, and justifies the need to remediation. Further information on the condition the study area and surveys performed may be found in the Supplemental Environmental Impact Assessment (SEIS) [USEPA, 1997].

The HARS designation identifies an area in and around the MDS which has exhibited the potential for adverse ecological impacts (see Figure No. 2A: HARS Location Map A and Figure No. 2B: HARS Location Map B). The HARS will be remediated with dredged material that meets current Category 1 Standards and will not cause significant

undesirable effects including through bioaccumulation. This dredged material is referred to as “Material for Remediation” or “Remediation Material.”

As of the end of April 2024, dredged materials from one hundred fifty-one (151) different completed and ongoing Department of the Army (DA) permitted and federal dredging projects in the Port of New York and New Jersey have been dredged and placed as Remediation Material in the ocean at the Historic Area Remediation Site (HARS) since the closure of the Mud Dump Site and designation of the HARS in September 1997. This represents approximately 86 million cubic yards of Remediation Material.

The HARS, which includes the 2.2 square nautical mile area of the MDS, is approximately 15.7 nautical square mile area located approximately 3.5 nautical miles east of Highlands, New Jersey and 7.7 nautical miles south of Rockaway, New York. The MDS is located approximately 5.3 nautical miles east of Highlands, New Jersey and 9.6 nautical miles south of Rockaway, New York. When determined by bathymetry that capping is complete, the USEPA will take any necessary rulemaking to de-designate the HARS. The HARS includes the following three areas:

Priority Remediation Area (PRA): A 9.0 square nautical mile area to be remediated with at least 1 meter of Remediation Material. Then PRA encompasses the area of degraded sediments as described in greater detail in the SEIS.

Buffer Zone: An approximately 5.7 square nautical mile area (0.27 nautical mile wide band around the PRA) in which no placement of the Material for Remediation will be allowed, but which may receive Material for Remediation that incidentally spreads out of the PRA.

No Discharge Zone: An approximately 1.0 square nautical mile area in which no placement or incidental spread of Material for Remediation is allowed.

To improve management and monitoring of placement activities at the HARS, electronic monitoring equipment will be onboard any barges carrying Remediation Material to the HARS. This equipment records vessel positions throughout the duration of each trip to the HARS and during remediation operations. To improve communication reliability between tugs and scows, a prescribed formal communication procedure has been put in place (copies of the procedure are available upon request).

Additional information concerning the HARS can be obtained from Mr. Mark Reiss of the USEPA, Chief, Dredging, Sediments and Oceans Section, US Environmental Protection Agency, Region 2, at (212) 637-3799.

HARS SUITABILITY TESTING:

In the past years, USEPA and USACE have been refining the approach to the technical review and scientific and regulatory analysis of dredging projects proposed for the HARS. A testing evaluation process was developed, which established a basic framework for assessing results of tissue analysis from bioaccumulation testing of dredged material proposed for ocean placement. The framework defines a standard

approach for assessing each analyte (an item to be analyzed for as part of the testing), in relation to regulatory standards and human health and environmental risk factors, to facilitate decisions in accordance with the Marine Protection, Research, and Sanctuaries Act of 1972. USEPA and USACE utilize this testing evaluation process for identifying Category 1 dredged material in determining suitability of dredged sediments as remediation material at the HARS. The testing results for the proposed dredging sediments in the Bronx River, New York Federal Navigation Project has been submitted to USEPA for HARS suitability review. The Testing Evaluation Memorandum for this project may be obtained by contacting Mr. Mark Reiss, Chief, Dredging, Sediments and Oceans Section, US Environmental Protection Agency, Region 2, at (212) 637-3799.

Sediment Grain Size Analysis

The proposed maintenance dredging area has been characterized by twenty-eight (28) sediment core samples taken to -10 feet MLLW plus 1 foot allowable overdepth. The 11 samples in Reach 1 and the 17 samples in Reach 2 were then combined into composite reach samples which were subjected to physical, chemical, and biological testing. Based upon an analysis of the Reach 1 and Reach 2 sediment samples, the grain size characteristics of the proposed dredged material are:

REACH 1: 0.3% GRAVEL, 7.7% SAND, 70.0% SILT, 22.0% CLAY

REACH 2: 10.9% GRAVEL, 10.7% SAND, 61.4% SILT, 17.0% CLAY

Results of the chemical and biological testing are summarized below.

Evaluation of the Liquid Phase: Chemistry

Under the requirements of 40 CFR Sections 227.6(c)(1) and 227.27(a), chemical analysis was conducted on project area site water and elutriate. Results of this evaluation are summarized in Table 1. Please note in reading Table 1 that detection limits have been listed for only those constituents which the laboratory reported as not-detected (ND) (this reporting convention was similarly applied in reporting the results of bioaccumulation potential testing discussed below). If the constituents were detected above the detection limit, the measured value would appear.

Expected concentrations of chemical constituents in the water column following ocean placement, after allowing for initial mixing, were calculated using the Automated Dredging and Disposal Alternatives Management System (ADDAMS). ADDAMS is a mixing model developed by USACE Waterways Experiment Station (WES) and described in the joint USEPA/USACE implementation manual entitled "Ecological Evaluation of Proposed Discharge of Dredged Material Into Ocean Water" (commonly referred to as the National “Green Book”). The material can be considered suitable for ocean disposal only if the concentration of the Suspended Particulate Phase (SPP) of the dredged material, after allowance for initial mixing, will not exceed the Limiting Permissible Concentration (LPC) beyond the boundaries of the disposal site within the

first four hours following dumping or at any point in the marine environment after the first four hours. The ADDAMS Model predicted that applicable marine water quality criteria for listed constituents were not exceeded after allowance for initial mixing (40 CFR 227.29(a)). Results of the analyses indicate that the LPC will be met for the proposed dredged material from the project area.

BIOASSAYS:

In accordance with 40 CFR Part 227 of the Ocean Dumping Regulations, bioassays were performed to assess the toxicities of the solid phase, liquid phase, and suspended particulate phase of the proposed dredged material from the proposed project area.

Evaluation of the Liquid Phase

Liquid phase bioassays, run as part of the suspended particulate phase on three appropriate sensitive marine organisms: a crustacean (mysid shrimp, *Americamysis bahia*), finfish (*Menidia beryllin*a), and the planktonic larvae of a bivalve (the Mediterranean mussel, *Mytilus galloprovincialis*), show that after initial mixing (as determined under 40 CFR Sections 227.29(a)(2)) the liquid phase of the material would not exceed a toxicity threshold of 0.01 of a concentration shown to be acutely toxic to appropriate sensitive marine organisms. Accordingly, it is concluded that the liquid phase of the material would be in compliance with 40 CFR Sections 227.6(c)(1) and 227.27(a).

Evaluation of the Suspended Particulate Phase

The suspended particulate phase of the material was evaluated for compliance with 40 CFR Sections 227.6(c)(2) and 227.27(b). Bioassay testing of the suspended particulate phase of the material has been conducted using three appropriate sensitive marine organisms: inland silversides (*Menidia beryllina*), a crustacean (mysid shrimp, *Americamysis bahia*), and the planktonic larvae of a bivalve (Mediterranean mussel, *Mytilus galloprovincialis*). Median lethal concentrations (LC_{50}), which are concentrations of suspended particulate phase resulting in 50% mortality, were determined for all three test species. In addition, the median effective concentration (EC_{50}), based on normal larval development to the D-cell stage, was determined for the bivalve larvae of *Mytilus galloprovincialis*. The Limiting Permissible Concentration (LPC) was then calculated as 0.01 of the LC_{50} or EC_{50} of the most sensitive organism. The LPC was calculated as 0.171 for Reach 1 and 0.225 for Reach 2 based on the EC_{50} of *Mytilus galloprovincialis*.

This information shows that when placed at the HARS and after initial mixing (as determined under 40 CFR Sections 227.29(a)(2)), the suspended particulate phase of this material would not exceed a toxicity threshold of 0.01 of a concentration shown to be acutely toxic in the laboratory bioassays and, thus, would not result in significant mortality. Moreover, after placement, the suspended particulate phase would only exist in the environment for a short time, which indicates the suspended particulate phase of the project material would not cause significant undesirable effects, including the

possibility of danger associated with bioaccumulation, since these impacts require long duration exposures (see USEPA, 1994). Accordingly, it is concluded that the suspended phase of the material would be in compliance with 40 CFR Sections 227.6(c)(2) and 227.27(b). The results of bioassay tests conducted on proposed dredged sediments from the project area are presented in Table 2 of this public notice.

Evaluation of the Solid Phase

The solid phase tests the whole test sediment before it has undergone processing that might alter its chemical or toxicological properties. The solid phase was evaluated for compliance with 40 CFR Sections 227.6(c)(3) and 227.27(b). This evaluation was made using the results of two specific types of evaluations on the solid phase of the material – one focusing on the acute (10-day) toxicity of the material, and the other focusing on the potential for the material to cause significant adverse effects due to bioaccumulation. Both types of tests used appropriate sensitive benthic marine organisms according to procedures approved by USEPA and the USACE. The following sections address the results of those tests and further analyze compliance with the regulatory criteria of 40 CFR Sections 227.6(c)(3) and 227.27(b), and 228.15 and with USEPA Region 2/USACE New York District guidance.

1. Toxicity:

Ten-day toxicity tests were conducted on proposed project dredged material using a filter feeding mysid shrimp (*Americamysis bahia*) and a deposit feeding, burrowing amphipod (*Ampelisca abdita*), which are appropriate sensitive benthic marine organisms. The results from the proposed project material are then compared to results for the same organisms that are exposed to reference sediments. The reference sediment represents existing background conditions in the vicinity of the HARS, removed from the influence of any placement operations. These organisms are good predictors of adverse effects to benthic marine communities (see USEPA, 1996). The toxicity of project sediments was not statistically greater than reference sediments for either mysids or for amphipods, and the difference between percent survivals in test and reference sediments was less than 10% for mysid shrimp and less than 20% for amphipods.

These results show that the solid phase of the material would not cause significant mortality and meets the solid phase toxicity criteria of Sections 227.6 and 227.27. The results of the 10-day toxicity test are summarized in Table 2.

2. Bioaccumulation:

Bioaccumulation tests for the sediment were conducted on the solid phase of the project material for contaminants of concern using two appropriate sensitive benthic marine organisms: a burrowing, deposit-feeding polychaete, Alitta (*Nereis) virens*, and a filter-feeding bivalve, *Macoma nasuta*. These species are considered to be good representatives of the phylogenetically diverse base of the marine food chain.

Contaminants of concern were identified for the regional testing manual from the NY/NJ Harbor Estuary Program Toxics Characterization report (Squibb, et al. 1991).

Table 3 of this notice addresses the bioaccumulation of contaminants of concern. Additional information on more rigorous evaluations conducted on individual contaminants may be found in the Testing Evaluation Memo for this project. Table 3 indicates that some contaminants bioaccumulated above reference in the clam and/or worm. All constituents identified in worm and clam tissue were compared to existing Food and Drug Administration (FDA) action levels for poisonous or deleterious substances in fish and shellfish for human food, regional disposal criteria, background concentrations and risk-based criteria provided by USEPA Region 2. The testing memo further evaluates these contaminants, and concludes that any contaminant that exceeded reference did not exceed any existing regional matrix or dioxin value. Several contaminants which did not have matrix values did exceed background levels, but in no case did any contaminant accumulate to toxicologically important concentrations even when very conservative assumptions were used in the analysis. Any contaminants that exhibited bioaccumulation test results above referenced were all below the acceptable human health risk range and acceptable aquatic effects range, again using conservative approaches and analyses. The determination is that the combined results of the toxicity and bioaccumulation tests indicate that the material meets the criteria of 40 CFR Sections 227.6(c)(3) and 227.27(b), and 228.15(d)(6)(v)(A) of the Regulations, and that the material is suitable for placement at the HARS.

CONCLUSIONS:

Based upon the results of testing of the sediments proposed for dredging in the Bronx River, New York, Federal Navigation Project, USACE and USEPA have determined that the material is Category 1, meeting the criteria for ocean placement as described in 40 CFR parts 227.6, 227.27, and 228.15, and is Remediation Material as defined under the USEPA, Region 2/USACE, New York District, guidance. The specific test results and technical analysis of the data underlying this conclusion are described in the joint USACE, New York District/USEPA, Region 2 memorandum, as previously mentioned.

Placement of this material at the HARS will serve to reduce impacts at the HARS to acceptable levels and improve benthic conditions. Sediments in the HARS have been found to be acutely toxic to sensitive benthic marine organisms in laboratory tests. Project dredged material used in laboratory acute toxicity tests with the same species was determined not to be toxic. Placement of project material over existing toxic sediments would serve to remediate those areas for toxicity. In addition, by covering the existing sediments in the site with this project material, surface dwelling organisms will be exposed to sediments exhibiting Category 1 qualities, whereas the existing sediments exceed these levels.

ALTERNATIVES TO HARS PLACEMENT:

As to ocean placement of dredged material, the Ocean Dumping Regulations [Title 40 CFR Sections 227.16(b)] state that "...alternative methods of disposal are practicable when they are available at reasonable incremental cost and energy expenditures which need not be competitive with the costs of ocean dumping, taking into account the environmental impacts associated with the use of alternatives to ocean dumping...." The U.S. Army Corps of Engineers, New York District has evaluated the regional practicability of potential disposal alternatives in the September 1999 Draft Implementation Report for the "Dredged Material Management Plan for the Port of New York and New Jersey". The Recommended Plan within the report addresses both the long and short-term dredged material placement options in two specific timeframes, heretofore referred to as the 2010 Plan and the 2040 Plan respectively.

The 2010 Plan relies heavily on the creation, remediation, and restoration of a variety of existing degraded or impacted habitats in the region with material that would be considered unsuitable for HARS restoration. The remaining material is treated and stabilized, as needed, and then applied to remediate degraded and potentially polluting areas such as brownfields, landfills, and abandoned strip mines. The 2040 Plan relies heavily upon the use of land remediation and decontamination methods for the management of HARS unsuitable material. Similar to the 2010 Plan, maximum use of all practicable alternatives to the HARS is envisioned.

Many of dredged material management options presented in the 2010 Plan are not presently permitted and/or under construction at this time and, therefore, considered unavailable for the purposes of this project. Other options are not available at reasonable incremental costs, which leaves the HARS placement as the preferred alternative.

For more information on the New York District Corps of Engineers programs, visit our website at http://www.nan.usace.army.mil.

It is requested that you communicate the foregoing information concerning the proposed work to any persons known by you to be interested and who did not receive a copy of this notice.

If you have any questions concerning this notice, you may contact Mr. Divyesh Patel, the Project Manager, by phone at (917) 790-8582 or by email at Divyesh.G.Patel@usace.army.mil.

Questions about the HARS can be addressed to Mr. Mark Reiss, Chief, Dredging, Sediments and Oceans Section, US Environmental Protection Agency, Region 2, at (212) 637-3799.

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Michael J. Oseback
Chief, Operations Support Branch

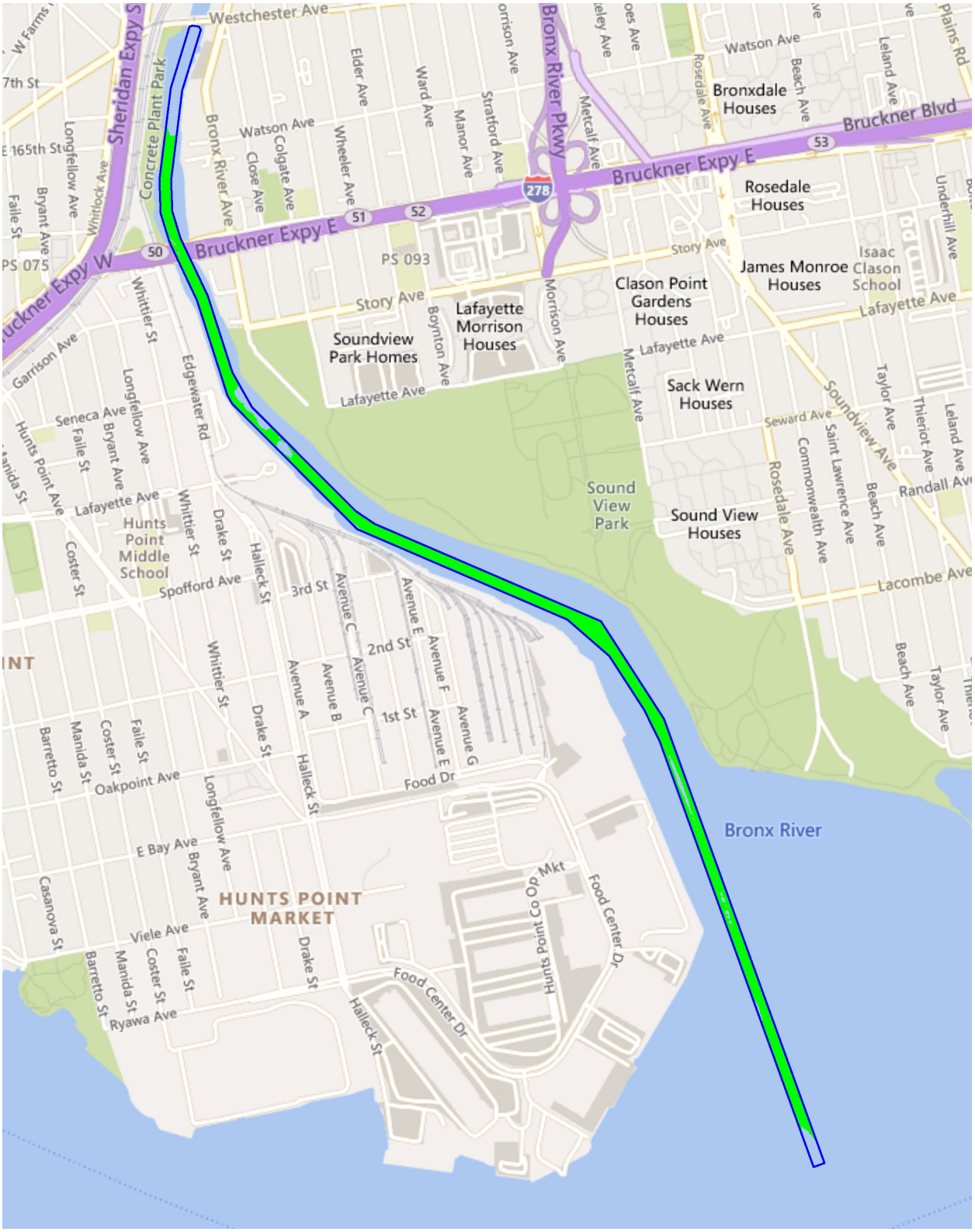

Figure 1: Proposed Dredging Area in Bronx River, New York

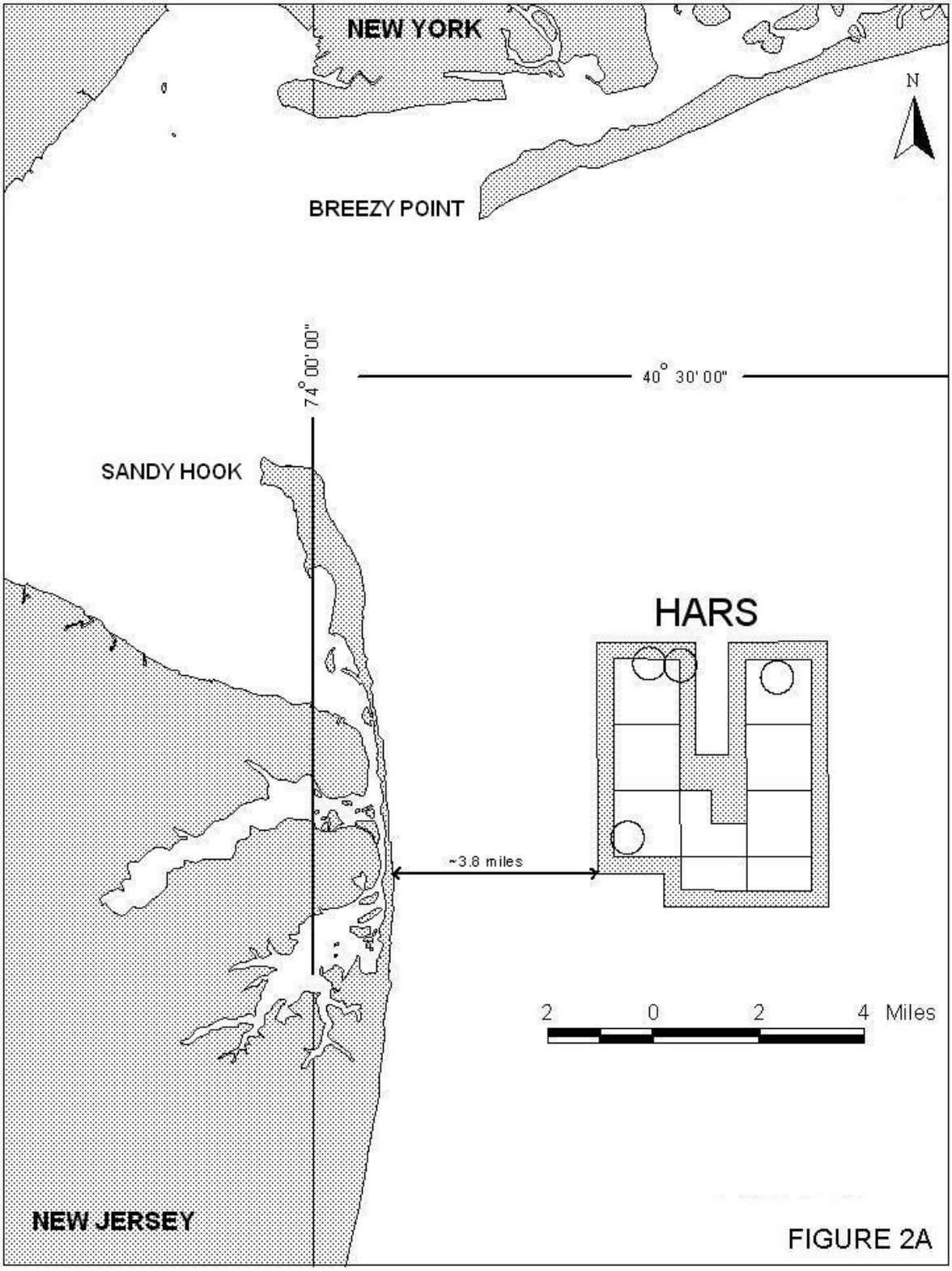

Figure 2A: HARS Location Map

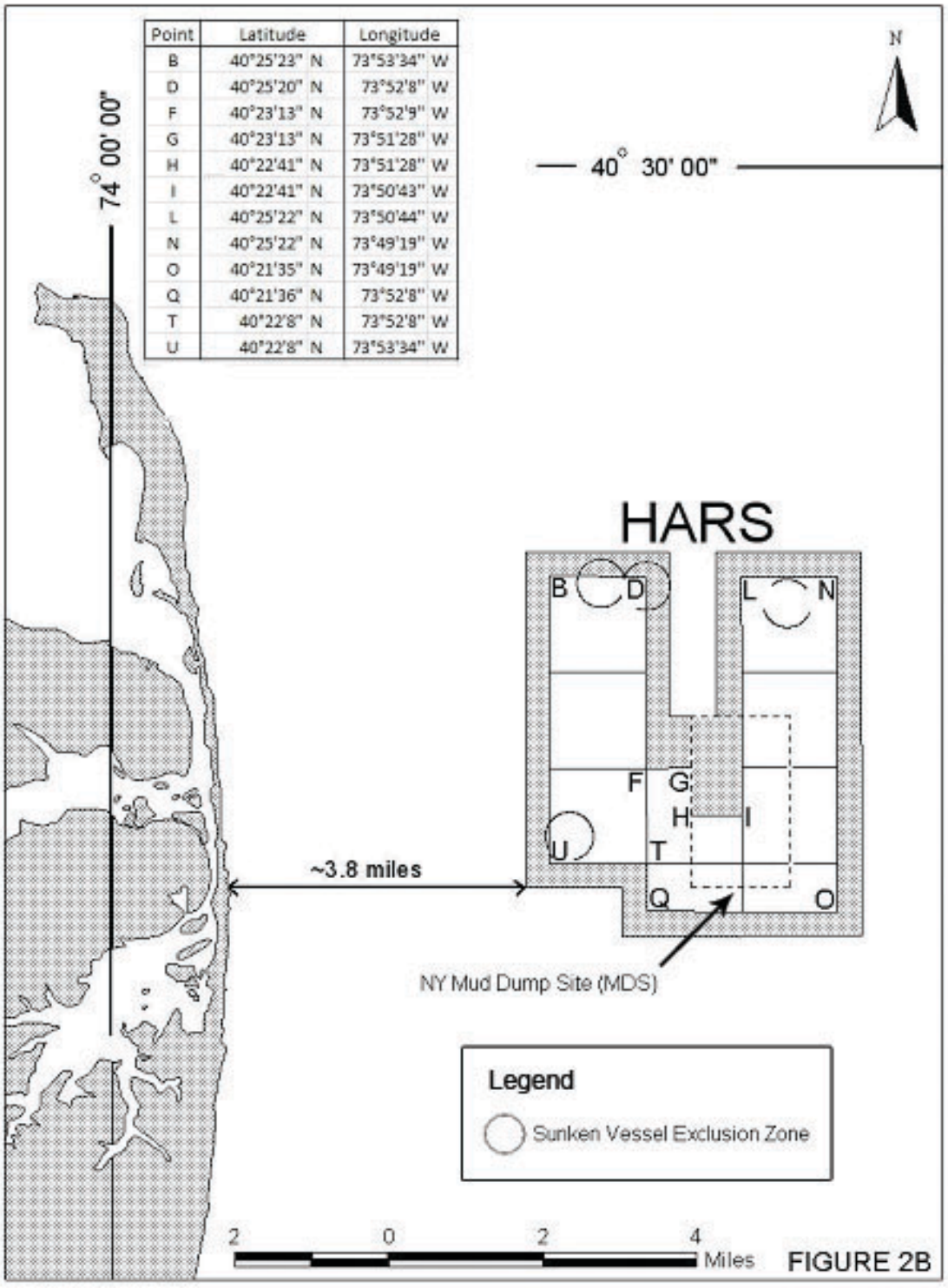

Figure 2B: HARS Location Map

TABLE 1. RESULTS OF CHEMICAL ANALYSIS OF SITE WATER AND ELUTRIATE

Bronx River Reach 1

	SITE WATER		ELUTRIATE	
CONSTITUENTS	**DETECTION LIMITS**	**CONCENTRATION**	**DETECTION LIMITS**	**CONCENTRATION**
Metals	**ppb (ug/L)**	**ppb (ug/L)**	**ppb (ug/L)**	**ppb (ug/L)**
Ag	0.600	ND		0.226
Cd	1.00	ND	1.00	ND
Cr	4.00	ND		4.25
Cu		1.92		8.32
Hg	0.200	ND	0.200	ND
Ni	10.0	ND	10.0	ND
Pb	10.0	ND	10.0	ND
Zn		4.51		13.0
Pesticides	**pptr (ng/L)**	**pptr (ng/L)**	**pptr (ng/L)**	**pptr (ng/L)**
Aldrin	0.531	ND	0.531	ND
a-Chlordane	0.442	ND		0.606
trans Nonachlor	0.436	ND	0.436	ND
Dieldrin	0.544	ND	0.544	ND
4,4'-DDT	0.633	ND	0.633	ND
2,4'-DDT	0.795	ND	0.795	ND
4,4'-DDD	0.531	ND		0.422
2,4'-DDD	0.582	ND	0.582	ND
4,4'-DDE	0.445	ND		0.376
2,4'-DDE	0.557	ND	0.557	ND
Total DDT		**ND**		**2.08**
Endosulfan I	0.531	ND	0.531	ND
Endosulfan II	0.525	ND	0.525	ND
Endosulfan sulfate	0.439	ND	0.439	ND
Heptachlor	0.534	ND	0.534	ND
Heptachlor epoxide	0.442	ND	0.442	ND
Industrial Chemicals	**pptr (ng/L)**	**pptr (ng/L)**	**pptr (ng/L)**	**pptr (ng/L)**
PCB 8	0.572	ND	0.572	ND
PCB 18	0.366	ND	0.366	ND
PCB 28	0.423	ND	0.423	ND
PCB 44	0.534	ND	0.534	ND
PCB 49	0.391	ND	0.391	ND
PCB 52	0.499	ND	0.499	ND
PCB 66	0.601	ND		0.853
PCB 87	0.461	ND	0.461	ND
PCB 101	0.388	ND		1.28
PCB 105	0.598	ND		0.805
PCB 118	0.576	ND		0.605
PCB 128	0.417	ND	0.417	ND
PCB 138	0.493	ND		2.22
PCB 153	0.493	ND		0.937
PCB 170	0.452	ND	0.452	ND
PCB 180	0.458	ND	0.458	ND
PCB 183	0.410	ND		1.48
PCB 184	0.576	ND	0.576	ND
PCB 187	0.423	ND		0.429
PCB 195	0.429	ND	0.429	ND
PCB 206	0.464	ND	0.464	ND
PCB 209	0.445	ND	0.445	ND
Total PCB		**ND**		**23.7**

ND = Not detected
For values reported as ND, one-half of the detection limit is used in the calculation of Total DDT and Total PCB

Total DDT = sum of 2,4'- and 4,4'-DDD, DDE, and DDT
(If all DDT metabolites are ND, the total is reported as ND)

Total PCB = sum of congeners reported x 2
(If all PCB congeners are ND, the total is reported as ND)

ppb = parts per billion
ug/L = micrograms per liter
pptr = parts per trillion
ng/L = nanograms per liter

TABLE 1. RESULTS OF CHEMICAL ANALYSIS OF SITE WATER AND ELUTRIATE

Bronx River Reach 2

	SITE WATER		ELUTRIATE	
CONSTITUENTS	**DETECTION LIMITS**	**CONCENTRATION**	**DETECTION LIMITS**	**CONCENTRATION**
Metals	**ppb (ug/L)**	**ppb (ug/L)**	**ppb (ug/L)**	**ppb (ug/L)**
Ag	0.600	ND		0.107
Cd	1.00	ND	1.00	ND
Cr	4.00	ND		4.07
Cu		2.24		6.61
Hg	0.200	ND	0.200	ND
Ni	10.0	ND	10.0	ND
Pb	10.0	ND		10.0
Zn		4.91		14.2
Pesticides	**pptr (ng/L)**	**pptr (ng/L)**	**pptr (ng/L)**	**pptr (ng/L)**
Aldrin	0.531	ND	0.531	ND
a-Chlordane	0.442	ND		1.58
trans Nonachlor	0.436	ND		0.830
Dieldrin	0.544	ND		0.669
4,4'-DDT		2.11		0.499
2,4'-DDT	0.795	ND	0.795	ND
4,4'-DDD		1.01		0.907
2,4'-DDD	0.582	ND	0.582	ND
4,4'-DDE	0.445	ND		0.650
2,4'-DDE	0.557	ND	0.557	ND
Total DDT		**4.31**		**3.02**
Endosulfan I	0.531	ND	0.531	ND
Endosulfan II	0.525	ND	0.525	ND
Endosulfan sulfate	0.439	ND	0.439	ND
Heptachlor	0.534	ND	0.534	ND
Heptachlor epoxide	0.442	ND	0.442	ND
Industrial Chemicals	**pptr (ng/L)**	**pptr (ng/L)**	**pptr (ng/L)**	**pptr (ng/L)**
PCB 8	0.572	ND	0.572	ND
PCB 18	0.366	ND	0.366	ND
PCB 28	0.423	ND	0.423	ND
PCB 44	0.534	ND	0.534	ND
PCB 49	0.391	ND	0.391	ND
PCB 52	0.499	ND	0.499	ND
PCB 66	0.601	ND	0.601	ND
PCB 87	0.461	ND		1.13
PCB 101	0.388	ND		1.92
PCB 105	0.598	ND		0.889
PCB 118		2.71		0.503
PCB 128	0.417	ND	0.417	ND
PCB 138	0.493	ND		1.27
PCB 153	0.493	ND		1.04
PCB 170	0.452	ND		1.34
PCB 180	0.458	ND		0.508
PCB 183	0.410	ND	0.410	ND
PCB 184	0.576	ND	0.576	ND
PCB 187	0.423	ND	0.423	ND
PCB 195	0.429	ND	0.429	ND
PCB 206	0.464	ND	0.464	ND
PCB 209	0.445	ND	0.445	ND
Total PCB		**15.3**		**23.8**

ND = Not detected
For values reported as ND, one-half of the detection limit is used in the calculation of Total DDT and Total PCB

Total DDT = sum of 2,4'- and 4,4'-DDD, DDE, and DDT
(If all DDT metabolites are ND, the total is reported as ND)

Total PCB = sum of congeners reported x 2
(If all PCB congeners are ND, the total is reported as ND)

ppb = parts per billion
ug/L = micrograms per liter
pptr = parts per trillion
ng/L = nanograms per liter

TABLE 2 TOXICITY TEST RESULTS
Bronx River Reach 1

Suspended Particulate Phase

Test Species	Test Duration	LC_{50}/EC_{50}	LPC (a)
Menidia beryllina	96 hours	**(b)** 69.4%	0.694
Americamysis bahia	96 hours	**(b)** 70.7%	0.707
Mytilus galloprovincialis **(larval survival)**	48 hours	**(b)** 52.3%	0.523
Mytilus galloprovincialis **(larval normal develop.)**	48 hours	**(c)** 17.1%	0.171

(a) Limiting Permissible Concentration (LPC) is the LC_{50} or EC_{50} multiplied by 0.01

(b) Median Lethal Concentration (LC_{50}) resulting in 50% mortatlity at test termination

(c) Median Effective Concentration (EC_{50}) based on normal development to the D-cell, prodissoconch 1 stage

Whole Sediment (10 days)

Test Species	% Survival Reference	% Survival Test	% Difference Reference - Test	Is difference statistically significant? (a=0.05)
Ampelisca abdita	89%	86%	3%	No
Americamysis bahia	99%	98%	1%	No

TABLE 2 TOXICITY TEST RESULTS
Bronx River Reach 2

Suspended Particulate Phase

Test Species	Test Duration	LC_{50}/EC_{50}	LPC (a)
Menidia beryllina	96 hours	**(b)** 74.2%	0.742
Americamysis bahia	96 hours	**(b)** >100%	>1.00
Mytilus galloprovincialis **(larval survival)**	48 hours	**(b)** 89.4%	0.894
Mytilus galloprovincialis **(larval normal develop.)**	48 hours	**(c)** 22.5%	0.225

(a) Limiting Permissible Concentration (LPC) is the LC_{50} or EC_{50} multiplied by 0.01

(b) Median Lethal Concentration (LC_{50}) resulting in 50% mortatlity at test termination

(c) Median Effective Concentration (EC_{50}) based on normal development to the D-cell, prodissoconch 1 stage

Whole Sediment (10 days)

Test Species	% Survival Reference	% Survival Test	% Difference Reference - Test	Is difference statistically significant? (a=0.05)
Ampelisca abdita	89%	87%	2%	No
Americamysis bahia	99%	99%	0%	No

TABLE 3. 28 DAY BIOACCUMULATION TEST RESULTS: CHEMICAL ANALYSIS OF TISSUE
Wet weight concentrations
Bronx River Reach 1

CONSTITUENTS	*Macoma nasuta*				*Alitta (nereis) virens*			
	REFERENCE		TEST		REFERENCE		TEST	
	DETECTION LIMITS	CONCENTRATION	DETECTION LIMITS	CONCENTRATION	DETECTION LIMITS	CONCENTRATION	DETECTION LIMITS	CONCENTRATION
Metals	ppm (mg/kg)	ppm (mg/kg)	ppm (mg/kg)	ppm (mg/kg)	ppm (mg/kg)	ppm (mg/kg)	ppm (mg/kg)	ppm (mg/kg)
Ag		0.052		0.069		0.022		0.021
As		5.24		4.91		2.81		1.98
Cd		0.048		0.054	0.025	ND	0.025	ND
Cr		0.538		0.346		0.097		0.073
Cu		1.78		* 2.29		1.38		1.15
Hg	0.010	ND	0.010	ND		0.027		0.018
Ni		0.583		0.420		0.182		0.174
Pb		0.182		* 0.806		0.064		* 0.102
Zn		18.5		18.3		10.2		37.7
Pesticides	ppb (ug/kg)	ppb (ug/kg)	ppb (ug/kg)	ppb (ug/kg)	ppb (ug/kg)	ppb (ug/kg)	ppb (ug/kg)	ppb (ug/kg)
Aldrin	0.014	ND	0.014	ND		0.02	0.014	ND
a-Chlordane		0.035		* 0.253		0.035		* 0.318
trans Nonachlor	0.014	ND		* 0.054		0.127		* 0.278
Dieldrin		0.012		* 0.201		0.057		* 0.316
4,4'-DDT	0.012	ND	0.013	ND		0.029		0.018
2,4'-DDT	0.017	ND	0.017	ND		0.057	0.017	ND
4,4'-DDD		0.064		* 0.296		0.076		* 0.299
2,4'-DDD	0.017	ND		* 0.109		0.074		* 0.137
4,4'-DDE		0.299		* 1.48		0.065		* 0.469
2,4'-DDE	0.009	ND	0.009	ND	0.009	ND	0.009	ND
Total DDT		**0.418**		* **1.92**		**0.310**		* **0.949**
Endosulfan I	0.015	ND	0.016	ND	0.015	ND	0.015	ND
Endosulfan II	0.017	ND		* 0.187		0.069		0.182
Endosulfan sulfate	0.012	ND		* 0.185		0.117		0.225
Heptachlor	0.011	ND	0.011	ND		0.017	0.011	ND
Heptachlor epoxide	0.017	ND	0.017	ND		0.019	0.017	ND
Industrial Chemicals	ppb (ug/kg)	ppb (ug/kg)	ppb (ug/kg)	ppb (ug/kg)	ppb (ug/kg)	ppb (ug/kg)	ppb (ug/kg)	ppb (ug/kg)
PCB 8	0.030	ND		* 0.194	0.030	ND		* 0.897
PCB 18	0.014	ND		* 0.311	0.014	ND		* 0.672
PCB 28		0.063		* 1.18		0.095		* 0.970
PCB 44		0.063		* 0.572		0.049		* 0.631
PCB 49		0.026		* 1.04		0.049		* 0.949
PCB 52		0.070		* 1.20		0.102		* 1.57
PCB 66		0.132		* 1.04		0.094		* 0.741
PCB 87		0.014		* 0.506		0.088		* 0.289
PCB 101		0.122		* 1.42		0.269		* 1.57
PCB 105	0.012	ND		* 0.310		0.061		* 0.227
PCB 118		0.083		* 0.845		0.091		* 0.606
PCB 128	0.015	ND		* 0.129		0.111		* 0.226
PCB 138		0.110		* 0.902		0.695		* 1.49
PCB 153		0.077		* 1.24		1.05		* 1.95
PCB 170		0.029		* 0.435		0.239		* 0.412
PCB 180		0.040		* 0.326		0.455		* 0.746
PCB 183		0.019		* 0.151		0.240		* 0.336
PCB 184	0.024	ND	0.025	ND	0.024	ND	0.024	ND
PCB 187		0.064		* 0.348		0.541		* 0.779
PCB 195	0.009	ND		* 0.060		0.232		0.188
PCB 206	0.009	ND		* 0.043		0.344		0.281
PCB 209	0.017	ND		* 0.040		0.321		0.267
Total PCB		**2.08**		* **24.7**		**10.4**		* **31.7**
1,4-Dichlorobenzene		0.366		* 0.577		0.268		0.285

TABLE 3. (Continued)

CONSTITUENTS	*Macoma nasuta*				*Alitta (nereis) virens*			
	REFERENCE		TEST		REFERENCE		TEST	
	DETECTION LIMITS	CONCENTRATION	DETECTION LIMITS	CONCENTRATION	DETECTION LIMITS	CONCENTRATION	DETECTION LIMITS	CONCENTRATION
PAH's	ppb (ug/kg)	ppb (ug/kg)	ppb (ug/kg)	ppb (ug/kg)	ppb (ug/kg)	ppb (ug/kg)	ppb (ug/kg)	ppb (ug/kg)
Naphthalene		0.805		* 2.03		0.637		0.626
Acenaphthylene		0.116		* 2.07		0.139		* 0.672
Acenaphthene		0.100		* 2.77	0.059	ND		* 2.10
Fluorene		0.210		* 2.16	0.053	ND		0.137
Phenanthrene		1.57		* 19.7		0.822		* 2.67
Anthracene		0.235		* 11.4	0.059	ND		* 0.795
Fluoranthene		2.30		* 81.5		0.579		* 22.7
Pyrene		2.12		* 142		0.336		* 43.5
Benzo(a)anthracene		0.534		* 43.2		0.071		* 3.03
Chrysene		0.973		* 52.6		0.216		* 13.0
Benzo(b)fluoranthene		0.768		* 30.8	0.059	ND		* 2.57
Benzo(k)fluoranthene		0.761		* 27.8	0.048	ND		* 3.25
Benzo(a)pyrene		0.653		* 36.0	0.116	ND		* 3.01
Indeno(1,2,3-cd)pyrene		0.375		* 9.92	0.053	ND		* 0.683
Dibenzo(a,h)antracene		0.106		* 3.01	0.047	ND		* 0.271
Benzo(g,h,i)perylene		0.422		* 11.9	0.059	ND		* 1.08
Total PAH's		**12.1**		* **479**		**3.35**		* **100**
Dioxins	pptr(ng/kg)	pptr(ng/kg)	pptr(ng/kg)	pptr(ng/kg)	pptr(ng/kg)	pptr(ng/kg)	pptr(ng/kg)	pptr(ng/kg)
2378 TCDD	0.108	ND	0.124	ND	0.101	ND	0.101	ND
12378 PeCDD	0.170	ND	0.204	ND	0.162	ND	0.131	ND
123478 HxCDD	0.214	ND	0.304	ND	0.197	ND	0.168	ND
123678 HxCDD	0.212	ND	0.293	ND	0.194	ND	0.159	ND
123789 HxCDD	0.213	ND	0.298	ND	0.196	ND	0.164	ND
1234678 HpCDD	0.430	ND		* 1.09		1.06		0.62
1234789 OCDD		1.47		* 7.93		6.20		2.93
2378 TCDF		0.315		* 0.658		1.53		0.959
12378 PeCDF	0.153	ND	0.204	ND	0.142	ND	0.139	ND
23478 PeCDF	0.135	ND	0.187	* ND	0.145	ND	0.128	ND
123478 HxCDF	0.134	ND	0.188	ND	0.109	ND	0.098	ND
123678 HxCDF	0.135	ND	0.186	ND	0.107	ND	0.098	ND
234678 HxCDF	0.145	ND	0.197	ND	0.115	ND	0.102	ND
123789 HxCDF	0.207	ND	0.282	ND	0.173	ND	0.160	ND
1234678 HpCDF	0.26	ND		0.505		0.383		0.326
1234789 HpCDF	0.342	ND	0.315	ND	0.213	ND	0.176	ND
12346789 OCDF	0.969	ND	0.884	ND	0.644	ND	0.637	ND

ND = Not detected
Concentrations shown are the mean of 5 replicate analyses in wet weight.
For values reported as ND (not detected), one-half of the detection limit is used in the calculation of the mean concentration.
* = Statistically significant at the 95% confidence level.

Total PAH = Sum of all PAH's.
(If all PAHs are ND, the total is reported as ND)

Total DDT = sum of 2,4'- and 4,4'-DDD, DDE, and DDT
(If all DDT metabolites are ND, the total is reported as ND)

Total PCB = 2(x), where x = sum of PCB congeners
(If all PCB congeners are ND, the total is reported as ND)

TABLE 3. 28 DAY BIOACCUMULATION TEST RESULTS: CHEMICAL ANALYSIS OF TISSUE
Wet weight concentrations
Bronx River Reach 2

CONSTITUENTS	*Macoma nasuta*				*Alitta (nereis) virens*			
	REFERENCE		TEST		REFERENCE		TEST	
	DETECTION LIMITS	CONCENTRATION	DETECTION LIMITS	CONCENTRATION	DETECTION LIMITS	CONCENTRATION	DETECTION LIMITS	CONCENTRATION
Metals	ppm (mg/kg)	ppm (mg/kg)	ppm (mg/kg)	ppm (mg/kg)	ppm (mg/kg)	ppm (mg/kg)	ppm (mg/kg)	ppm (mg/kg)
Ag		0.052		0.076		0.022		0.016
As		5.24		5.52		2.81		1.95
Cd		0.048		0.060	0.025	ND	0.025	ND
Cr		0.538		0.465		0.097		0.054
Cu		1.78		* 2.34		1.38		1.04
Hg	0.010	ND	0.010	ND		0.027		0.012
Ni		0.583		0.566		0.182		0.137
Pb		0.182		* 0.977		0.064		* 0.087
Zn		18.5		* 25.6		10.2		10.3
Pesticides	ppb (ug/kg)	ppb (ug/kg)	ppb (ug/kg)	ppb (ug/kg)	ppb (ug/kg)	ppb (ug/kg)	ppb (ug/kg)	ppb (ug/kg)
Aldrin	0.014	ND	0.014	ND		0.018		* 0.170
a-Chlordane		0.035		* 1.56		0.035		* 3.23
trans Nonachlor	0.014	ND		* 0.616		0.127		* 2.22
Dieldrin		0.012		* 0.847		0.057		* 1.57
4,4'-DDT	0.012	ND	0.012	ND		0.029	0.012	ND
2,4'-DDT	0.017	ND	0.017	ND		0.057	0.017	ND
4,4'-DDD		0.064		* 0.847		0.076		* 1.33
2,4'-DDD	0.017	ND		* 0.210		0.074		* 0.415
4,4'-DDE		0.299		* 1.38		0.065		* 0.922
2,4'-DDE	0.009	ND	0.009	ND	0.009	ND	0.009	ND
Total DDT		**0.418**		* **2.48**		**0.310**		* **2.71**
Endosulfan I	0.015	ND	0.015	ND	0.015	ND	0.015	ND
Endosulfan II	0.017	ND		* 0.133		0.069		* 0.233
Endosulfan sulfate	0.012	ND		* 0.223		0.117		* 0.464
Heptachlor	0.011	ND	0.011	ND		0.017	0.048	ND
Heptachlor epoxide	0.017	ND	0.017	ND		0.019		* 0.038
Industrial Chemicals	ppb (ug/kg)	ppb (ug/kg)	ppb (ug/kg)	ppb (ug/kg)	ppb (ug/kg)	ppb (ug/kg)	ppb (ug/kg)	ppb (ug/kg)
PCB 8	0.030	ND		* 0.292	0.030	ND		* 0.603
PCB 18	0.014	ND		* 0.458	0.014	ND		* 1.04
PCB 28		0.063		* 1.13		0.095		* 1.32
PCB 44		0.063		* 0.710		0.049		* 1.10
PCB 49		0.026		* 0.778		0.049		* 1.05
PCB 52		0.070		* 1.20		0.102		* 2.13
PCB 66		0.132		* 0.697		0.094		* 0.925
PCB 87		0.014		* 0.245		0.088		* 0.478
PCB 101		0.122		* 0.964		0.269		* 1.65
PCB 105	0.012	ND		* 0.226		0.061		* 0.302
PCB 118		0.083		* 0.591		0.091		* 0.776
PCB 128	0.015	ND		* 0.077		0.111		* 0.326
PCB 138		0.110		* 0.747		0.695		* 2.03
PCB 153		0.077		* 1.04		1.05		* 2.62
PCB 170		0.029		* 0.469		0.239		* 0.550
PCB 180		0.040		* 0.338		0.455		* 1.12
PCB 183		0.019		* 0.146		0.240		* 0.484
PCB 184	0.024	ND	0.024	ND	0.024	ND	0.024	ND
PCB 187		0.064		* 0.275		0.541		* 0.865
PCB 195	0.009	ND		* 0.037		0.232		0.188
PCB 206	0.009	ND		* 0.037		0.344		0.231
PCB 209	0.017	ND		0.017		0.321		0.222
Total PCB		**2.08**		* **21.0**		**10.4**		* **40.1**
1,4-Dichlorobenzene		0.366		* 0.480		0.268		0.297

TABLE 3. (Continued)

CONSTITUENTS	*Macoma nasuta*				*Alitta (nereis) virens*			
	REFERENCE		TEST		REFERENCE		TEST	
	DETECTION LIMITS	CONCENTRATION	DETECTION LIMITS	CONCENTRATION	DETECTION LIMITS	CONCENTRATION	DETECTION LIMITS	CONCENTRATION
PAH's	ppb (ug/kg)	ppb (ug/kg)	ppb (ug/kg)	ppb (ug/kg)	ppb (ug/kg)	ppb (ug/kg)	ppb (ug/kg)	ppb (ug/kg)
Naphthalene		0.805		* 1.11		0.637		0.652
Acenaphthylene		0.116		* 0.643		0.139		* 0.326
Acenaphthene		0.100		* 1.78	0.059	ND		* 2.84
Fluorene		0.210		* 2.17	0.053	ND		* 0.872
Phenanthrene		1.57		* 13.2		0.822		* 2.97
Anthracene		0.235		* 5.34	0.059	ND		* 0.605
Fluoranthene		2.30		* 86.3		0.579		* 30.7
Pyrene		2.12		* 96.8		0.336		* 32.3
Benzo(a)anthracene		0.534		* 22.3		0.071		* 2.31
Chrysene		0.973		* 35.7		0.216		* 13.3
Benzo(b)fluoranthene		0.768		* 25.1	0.059	ND		* 2.72
Benzo(k)fluoranthene		0.761		* 19.7	0.048	ND		* 3.17
Benzo(a)pyrene		0.653		* 17.4	0.116	ND		* 2.40
Indeno(1,2,3-cd)pyrene		0.375		* 7.23	0.053	ND		* 0.783
Dibenzo(a,h)antracene		0.106		* 1.75	0.047	ND		* 0.296
Benzo(g,h,i)perylene		0.422		* 8.26	0.059	ND		* 1.39
Total PAH's		**12.1**		* **345**		**3.35**		* **97.6**
Dioxins	pptr(ng/kg)	pptr(ng/kg)	pptr(ng/kg)	pptr(ng/kg)	pptr(ng/kg)	pptr(ng/kg)	pptr(ng/kg)	pptr(ng/kg)
2378 TCDD	0.108	ND	0.115	ND	0.101	ND	0.114	ND
12378 PeCDD	0.170	ND	0.175	ND	0.162	ND	0.137	ND
123478 HxCDD	0.214	ND	0.241	ND	0.197	ND	0.162	ND
123678 HxCDD	0.212	ND	0.233	ND	0.194	ND	0.154	ND
123789 HxCDD	0.213	ND	0.237	ND	0.196	ND	0.158	ND
1234678 HpCDD	0.430	ND		* 2.02		1.06		0.737
1234789 OCDD		1.47		* 13.3		6.20		4.26
2378 TCDF		0.315		0.306		1.53		0.783
12378 PeCDF	0.153	ND	0.150	ND	0.142	ND	0.135	ND
23478 PeCDF	0.135	ND	0.140	ND	0.145	ND		0.191
123478 HxCDF	0.134	ND	0.143	ND	0.109	ND	0.095	ND
123678 HxCDF	0.135	ND	0.146	ND	0.107	ND	0.096	ND
234678 HxCDF	0.145	ND	0.147	ND	0.115	ND	0.102	ND
123789 HxCDF	0.207	ND	0.214	ND	0.173	ND	0.155	ND
1234678 HpCDF	0.260	ND		* 0.554		0.383		0.297
1234789 HpCDF	0.342	ND	0.252	ND	0.213	ND	0.213	ND
12346789 OCDF	0.969	ND		0.837	0.644	ND	0.612	ND

ND = Not detected
Concentrations shown are the mean of 5 replicate analyses in wet weight.
For values reported as ND (not detected), one-half of the detection limit is used in the calculation of the mean concentration.
* = Statistically significant at the 95% confidence level.

Total PAH = Sum of all PAH's.
(If all PAHs are ND, the total is reported as ND)

Total DDT = sum of 2,4'- and 4,4'-DDD, DDE, and DDT
(If all DDT metabolites are ND, the total is reported as ND)

Total PCB = 2(x), where x = sum of PCB congeners
(If all PCB congeners are ND, the total is reported as ND)