Sediment Sampling and Analysis Reports

Norton Basin, Little Bay, Grass Hassock Channel, and The Raunt

Submitted to:

The Port Authority of New York and New Jersey

New York State Department of Environmental Conservation

Submitted by:

Barry A. Vittor & Associates, Inc.
Kingston, NY

CAPE Environmental, Inc.
Atlanta, GA

CAPE
ENVIRONMENTAL

August 13, 2002

Mr. David J. Yozzo
Barry A. Vittor & Associates, Inc.
668 Aaron Court, Bldg. 6
Willow Park Office Complex
Kingston, NY 12401

RE: **Sediment Sampling and Analysis Report, Norton Basin/Little Bay Restoration Project Rockaway, NY**

Dear Mr. Yozzo:

Please find presented below an evaluation of the analytical results for sediment samples collected from Norton Basin, Little Bay and the reference sample locations. Additional information regarding field sampling methodology, laboratory analysis, and sediment descriptions are also included.

Evaluation of Sample Results

The analytical results of the sediment samples collected from Norton Basin, Little Bay and the two reference locations are summarized in the tables in **Attachment 1**. A summary of the evaluation of the results is provided below:

- No analytes of the following analytical groups were detected above reporting limits in any of the samples: pesticides, PCBs, dioxins, furans, cyanide, coliform, nitrate, and nitrite.

- The following TAL Metals were detected above the New York Deparment of Environmental Conservation Technical and Administrative Guidance Memorandum Soil Cleanup Objectives (NY DEC TAGM SCOs): arsenic, cadmium, chromium, copper, iron, nickel, zinc, and mercury.

- Acetone, carbon disulfide, 2-butanone, and ethylbenzene were VOCs detected in sediment samples. Only acetone and 2-butanone exceeded the NY DEC TAGM SCOs. Acetone and 2-butanone are common laboratory contaminants.

- Bis(2-ethylhexyl)phthalate was the only SVOC detected. It was not detected above the NY DEC TAGM SCOs.

- Total organic carbon in the samples ranged from 19,000 milligrams per kilogram (mg/kg) (detected in samples from the reference location, R-1) to 110,000 mg/kg.

- Soils from both the Norton Basin and Little Bay restoration areas are predominantly silty, with small amounts (generally less than 10 percent) of fine to medium sands. Atterburg limit results indicated plasticity indexes ranging from non-plastic to 60, with a geometric mean value of 9.

Field Activities and Sampling Summary

Cape Environmental Management, Inc. (CAPE) mobilized to the site on May 22, 2002 and met with Marco Cianciola of your company and Eric Steele of CR Environmental (Falmouth, Massachusetts), who provided the boat. Mr. Cianciola identified the surveyed and marked sample locations included in the scope of work. Sediement samples were collected in the following areas: Broad Channel, Grass Hassock Channel, Norton Basin, and Little Bay. A site location map and a sample location map are included as Figure 1 and Figure 2, respectively, in **Attachment 2**.

Sediment samples were collected from the boat using a modified Van Veen sampler constructed of stainless steel. The sampler was mounted to a stainless steel frame and was raised and lowered using a motorized wench. Prior to sample collection, the sampler was decontaminated using a Liquinox® solution rinse followed by a tap water rinse, an isopropyl alcohol rinse, another tap water rinse, and finally a analyte-free water rinse. Sediments collected by the sampler at each location were transferred into a decontaminated stainless steel bowl. The portion of the sample collected for volatile organic compound analysis was collected immediately into three Encore® sample containers and one laboratory-supplied, laboratory-cleaned 4-ounce glass container. The remainder of the sample was mixed thoroughly and distributed into laboratory-supplied, laboratory-cleaned containers. Samples were collected from ten stations, and three samples were collected from each station for a total of thirty routine samples. Surgical latex gloves were worn during all sampling activities and new gloves were donned prior to each sample collection. All samples were carefully packed and shipped overnight via courier to Severn Trent Laboratories, Inc., located in Savannah, Georgia.

Sample Identification

The sediment samples were designated as follows:

NB-SED-01

Where:
NB = Norton Basin/Little Bay Project
SED = Sediment sample
01 = Sample number

Information related to the soil samples is presented below:

Sample ID#	Sample Location	Sample Description
NB-SED-01	Reference location R-1	Black sandy silt with very fine sand, strong hydrogen sulfide odor
NB-SED-02	Reference location R-1	Black sandy silt with very fine sand, strong hydrogen sulfide odor
NB-SED-03	Reference location R-1	Black sandy silt with very fine sand, strong hydrogen sulfide odor
NB-SED-04	Reference location GH-1	Black sandy silt with very fine sand
NB-SED-05	Reference location	Black sandy silt with very fine sand

	GH-1	
NB-SED-06	Reference location GH-1	Black sandy silt with very fine sand
NB-SED-07	Norton Basin, location NB-5	Dark brown to black, clay and some fine sand
NB-SED-08	Norton Basin, location NB-5	Dark brown to black, clay and some fine sand
NB-SED-09	Norton Basin, location NB-5	Dark brown to black, clay and some fine sand
NB-SED-10	Little Bay, location LB-1	Black silt with consistency of pudding. Strong hydrogen sulfide odor.
NB-SED-11	Little Bay, location LB-1	Black silt with consistency of pudding. Strong hydrogen sulfide odor.
NB-SED-12	Little Bay, location LB-1	Black silt with consistency of pudding. Strong hydrogen sulfide odor.
NB-SED-13	Little Bay, location LB-2	Black silt with consistency of pudding. Strong hydrogen sulfide odor.
NB-SED-14	Little Bay, location LB-2	Black silt with consistency of pudding. Strong hydrogen sulfide odor.
NB-SED-15	Little Bay, location LB-2	Black silt with consistency of pudding. Strong hydrogen sulfide odor.
NB-SED-16	Little Bay, location LB-3	Black silt with consistency of pudding. Strong hydrogen sulfide odor.
NB-SED-17	Little Bay, location LB-3	Black silt with consistency of pudding. Strong hydrogen sulfide odor.
NB-SED-18	Little Bay, location LB-3	Black silt with consistency of pudding. Strong hydrogen sulfide odor.
NB-SED-19	Norton Basin, location NB-4	Black silt with fine sand, some cohesiveness. Slight hydrogen sulfide odor.
NB-SED-20	Norton Basin, location NB-4	Black silt with fine sand, some cohesiveness. Slight hydrogen sulfide odor.
NB-SED-21	Norton Basin, location NB-4	Black silt with fine sand, some cohesiveness. Slight hydrogen sulfide odor.
NB-SED-22	Norton Basin, location NB-3	Black silt with fine sand, some cohesiveness. Slight hydrogen sulfide odor.
NB-SED-23	Norton Basin, location NB-3	Black silt with fine sand, some cohesiveness. Slight hydrogen sulfide odor.
NB-SED-24	Norton Basin, location NB-3	Black silt with fine sand, some cohesiveness. Slight hydrogen sulfide odor.
NB-SED-25	Norton Basin, location NB-2	Black silt with fine sand, some cohesiveness. Slight hydrogen sulfide odor.
NB-SED-26	Norton Basin,	Black silt with fine sand, some cohesiveness.

	location NB-2	Slight hydrogen sulfide odor.
NB-SED-27	Norton Basin, location NB-2	Black silt with fine sand, some cohesiveness. Slight hydrogen sulfide odor.
NB-SED-28	Norton Basin, location NB-1	Black silt with fine sand, some cohesiveness. Strong hydrogen sulfide odor.
NB-SED-29	Norton Basin, location NB-1	Black silt with fine sand, some cohesiveness. Strong hydrogen sulfide odor.
NB-SED-30	Norton Basin, location NB-1	Black silt with fine sand, some cohesiveness. Strong hydrogen sulfide odor.

Laboratory Analysis

STL Savannah Laboratories, Inc. in Savannah, Georgia analyzed the sediment samples. The sediment samples were analyzed for Target Compound List (TCL) volatile organic compounds (VOCs) by Environmental Protection Agency (EPA) Method 8260B, TCL semivolatile organic compounds (SVOCs) by EPA Method 8270, TCL chlorinated pesticides by EPA Method 8081, polychlorinated biphenyls (PCB's) by EPA Method 8082, dioxins and furans by EPA Method 8280, Target Analyte List (TAL) Metals by EPA Method 6010, mercury (Hg) by EPA Method 7471, cyanide by EPA Method 9012A, nitrate and nitrite by EPA Method CE-81-1, and total coliform by EPA Method 9221B. Laboratory analytical results are summarized in tables 1 through 6. The tables are included as **Attachment 2**. The laboratory data packages are provided in **Attachment 3.**

At the request of Barry Vittor and Associates, Inc., the sediment samples were also analyzed for physical parameters, including Particle Size Distribution (Sieve Analysis) by ASTM D-422, porosity by ASTM D5084, bulk density by ASTM 2937, Atterburg Limits (liquid limit, plastic limit, and plasticity index) by ASTM D4318, total organic carbon by EPA Method 9060, and acid-volatile sulfide by EPA Method 68-03-3534. Particle Size Distribution, porosity and Atterburg Limit tests were performed by STL Burlington located in Burlington, Vermont. The laboratory analytical reports for the physical parameters are provided in **Attachment 3**.

If you have any questions regarding this report please feel free to contact me at (610) 594-8606 or John Thomas at (770) 908-7200.

Sincerely,

Cape Environmental Management, Inc.

David L. Fortune
Project Engineer

cc: J. Thomas, CAPE

Attachments

Attachment 1
Tables of Laboratory Analytical Results

TABLE 1
NORTON BASIN RESTORATION PROJECT
LABORATORY ANALYTICAL RESULTS FOR VOLATILE ORGANIC COMPOUNDS (VOCs)

DATE:	5/22/2002	5/22/2002	5/22/2002	5/22/2002	5/22/2002	5/22/2002	5/22/2002	5/22/2002	5/22/2002	5/22/2002	5/22/2002	5/22/2002	5/22/2002	5/23/2002	5/23/2002	5/23/2002	5/23/2002	5/23/2002	5/23/2002	5/23/2002
STATION ID:	Station R-1 (Reference Location)							Station GS-1 (Reference Location)			Station NB-5			Station LB-1				Station LB-2		
SAMPLE ID:	NB-SED01	NB-SED01	NB-SED01D	NB-SED01D	NB-SED02	NB-SED02	NB-SED03	NB-SED04	NB-SED05	NB-SED06	NB-SED07	NB-SED08	NB-SED09	NB-SED10	NB-SED11	NB-SED11-D	NB-SED12	NB-SED13	NB-SED14	NB-SED15
Volatiles by GC/MS (8260) (µg/kg)																				
benzoic acid	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
1,2-dichlorobenzene	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
1,3-dichlorobenzene	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
1,4-dichlorobenzene	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
113 Freon	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
chloromethane	<21	<840	<24	<910	<26	<1000	<29	<74	<65	<72	<33	<49	<61	<160	<160	<170	<190	<160	<190	<210
bromomethane (methyl bromide)	<21	<840	<24	<910	<26	<1000	<29	<74	<65	<72	<33	<49	<61	<160	<160	<170	<190	<160	<190	<210
vinyl chloride	<21	<840	<24	<910	<26	<1000	<29	< 74	<65	<72	<33	<49	<61	<160	<160	<170	<190	<160	<190	<210
chloroethane	<21	<840	<24	<910	<26	<1000	<29	<74	<65	<72	<33	<49	<61	<160	<160	<170	<190	<160	<190	<210
methylene chloride (dichloromethane)	<11	<420	<12	<450	<13	<500	<14	<37	<32	<36	<16	<25	<30	<81	<78	<87	<95	<81	<96	<100
acetone	*2700*	<4200	*3700*	<4500	*3200*	<5000	2500	2500	1900	2500	1000	680	1200	5400	2700	2600	15000	3700	6700	3700
carbon disulfide	25	<420	13	<450	68	<500	20	170	130	180	20	84	94	340	170	240	800	620	270	360
1,1-dichloroethene	<11	<420	<12	<450	<13	<500	<14	<37	<32	<36	<16	<25	<30	<81	<78	<87	<95	<81	<96	<100
1,1-dichloroethane	<11	<420	<12	<450	<13	<500	<14	<37	<32	<36	<16	<25	<30	<81	<78	<87	<95	<81	<96	<100
cis/trans-1,2-dichlororethene	<11	<420	<12	<450	<13	<500	<14	<37	<32	<36	<16	<25	<30	<81	<78	<87	<95	<81	<96	<100
chloroform	<11	<420	<12	<450	<13	<500	<14	<37	<32	<36	<16	<25	<30	<81	<78	<87	<95	<81	<96	<100
1,2-dichloroethane	<11	<420	<12	<450	<13	<500	<14	<37	<32	<36	<16	<25	<30	<81	<78	<87	<95	<81	<96	<100
2-butanone (MEK)	<54	<2100	<61	<2300	81	<2500	190	350	420	330	<82	130	<150	690	<390	<440	2600	740	650	<520
1,1,1-trichloroethane	<11	<420	<12	<450	<13	<500	<14	<37	<32	<36	<16	<25	<30	<81	<78	<87	<95	<81	<96	<100
carbon tetrachloride	<11	<420	<12	<450	<13	<500	<14	<37	<32	<36	<16	<25	<30	<81	<78	<87	<95	<81	<96	<100
bromodichloromethane	<11	<420	<12	<450	<13	<500	<14	<37	<32	<36	<16	<25	<30	<81	<78	<87	<95	<81	<96	<100
1,1,2,2-tetrachloroethane	<11	<420	<12	<450	<13	<500	<14	<37	<32	<36	<16	<25	<30	<81	<78	<87	<95	<81	<96	<100
1,2-dichloropropane	<11	<420	<12	<450	<13	<500	<14	<37	<32	<36	<16	<25	<30	<81	<78	<87	<95	<81	<96	<100
trans-1,3-dichloropropene	<11	<420	<12	<450	<13	<500	<14	<37	<32	<36	<16	<25	<30	<81	<78	<87	<95	<81	<96	<100
trichloroethene	<11	<420	<12	<450	<13	<500	<14	<37	<32	<36	<16	<25	<30	<81	<78	<87	<95	<81	<96	<100
dibromochloromethane	<11	<420	<12	<450	<13	<500	<14	<37	<32	<36	<16	<25	<30	<81	<78	<87	<95	<81	<96	<100
1,1,2-trichloroethane	<11	<420	<12	<450	<13	<500	<14	<37	<32	<36	<16	<25	<30	<81	<78	<87	<95	<81	<96	<100
benzene	<11	<420	<12	<450	<13	<500	<14	<37	<32	<36	<16	<25	<30	<81	<78	<87	<95	<81	<96	<100
cis-1,3-dichloropropene	<11	<420	<12	<450	<13	<500	<14	<37	<32	<36	<16	<25	<30	<81	<78	<87	<95	<81	<96	<100
bromoform	<11	<420	<12	<450	<13	<500	<14	<37	<32	<36	<16	<25	<30	<81	<78	<87	<95	<81	<96	<100
2-hexanone	<54	<2100	<61	<2300	<65	<2500	<72	<190	<160	<180	<82	<120	<150	<400	<390	<440	<470	<400	<480	<520
4-methyl-2-pentanone (MIBK)	<54	<2100	<61	<2300	<65	<2500	<72	<190	<160	<180	<82	<120	<150	<400	<390	<440	<470	<400	<480	<520
tetrachloroethene	<11	<420	<12	<450	<13	<500	<14	<37	<32	<36	<16	<25	<30	<81	<78	<87	<95	<81	<96	<100
toluene	<11	<420	<12	<450	<13	<500	<14	<37	<32	<36	<16	<25	<30	<81	<78	<87	<95	<81	<96	<100
chlorobenzene	<11	<420	<12	<450	<13	<500	<14	<37	<32	<36	<16	<25	<30	<81	<78	<87	<95	<81	<96	<100
ethylbenzene	<11	<420	<12	<450	<13	<500	<14	<37	<32	<36	<16	<25	<30	<81	<78	<87	<95	<81	<96	110
styrene	<11	<420	<12	<450	<13	<500	<14	<37	<32	<36	<16	<25	<30	<81	<78	<87	<95	<81	<96	<100
xylenes	<21	<840	<24	<910	<26	<1000	<29	<74	<65	<72	<33	<49	<61	<160	<160	<170	<190	<160	<190	<210

Notes:

ug/kg = micrograms per kilogram.

GC/MS = gas chromatography/mass spectroscopy.

T = greater than NY DEC TAGM 4046 Cleanup Level.

NY DEC TAGM = State of New York Department of Environmental Conservation Technical and Administrative Guidance Memorandum.

<x = Below reporting limit of x.

Results shown in italics are estimated results due to the result being outside of the calibration limit of the instrument.

NR = not reported.

TABLE 1
NORTON BASIN RESTORATION PROJECT
LABORATORY ANALYTICAL RESULTS FOR VOLATILE ORGANIC COMPOUNDS (VOCs)

DATE:	5/23/2002	5/23/2002	5/23/2002	5/23/2002	5/23/2002	5/23/2002	5/23/2002	5/23/2002	5/23/2002	5/23/2002	5/23/2002	5/24/2002	5/24/2002	5/24/2002	5/24/2002	5/24/2002	5/24/2002
STATION ID:	Station LB-3				Station NB-4			Station NB-3				Station NB-2			Station NB-1		
SAMPLE ID:	NB-SED16	NB-SED16	NB-SED17	NB-SED18	NB-SED19	NB-SED20	NB-SED21	NB-SED22	NB-SED22-D	NB-SED23	NB-SED24	NB-SED25	NB-SED26	NB-SED27	NB-SED28	NB-SED29	NB-SED30
Volatiles by GC/MS (8260) (µg/kg)																	
benzoic acid	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
1,2-dichlorobenzene	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
1,3-dichlorobenzene	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
1,4-dichlorobenzene	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
113 Freon	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
chloromethane	<220	<4000	<220	<250	<66	<45	<87	<120	<130	<140	<110	<73	<60	<74	<130	<150	<100
bromomethane (methyl bromide)	<220	<4000	<220	<250	<66	<45	<87	<120	<130	<140	<110	<73	<60	<74	<130	<150	<100
vinyl chloride	<220	<4000	<220	<250	<66	<45	<87	<120	<130	<140	<110	<73	<60	<74	<130	<150	<100
chloroethane	<220	<4000	<220	<250	<66	<45	<87	<120	<130	<140	<110	<73	<60	<74	<130	<150	<100
methylene chloride (dichloromethane)	<110	<2000	<110	<120	<33	<22	<43	<58	<66	<71	<57	<37	<30	<37	<64	<74	<51
acetone	*30000*	<20000	4700	4700	4000	1100	2400	9600	6400	7900	2600	2200	1400	1800	3600	9800	2000
carbon disulfide	1000	<2000	820	520	92	99	120	180	860	330	240	220	58	160	250	1300	80
1,1-dichloroethene	<110	<2000	<110	<120	<33	<22	<43	<58	<66	<71	<57	<37	<30	<37	<64	<74	<51
1,1-dichloroethane	<110	<2000	<110	<120	<33	<22	<43	<58	<66	<71	<57	<37	<30	<37	<64	<74	<51
cis/trans-1,2-dichlororethene	<110	<2000	<110	<120	<33	<22	<43	<58	<66	<71	<57	<37	<30	<37	<64	<74	<51
chloroform	<110	<2000	<110	<120	<33	<22	<43	<58	<66	<71	<57	<37	<30	<37	<64	<74	<51
1,2-dichloroethane	<110	<2000	<110	<120	<33	<22	<43	<58	<66	<71	<57	<37	<30	<37	<64	<74	<51
2-butanone (MEK)	2300	<10000	1000	790	170	230	<220	<290	1200	620	330	360	<150	420	440	2800	<250
1,1,1-trichloroethane	<110	<2000	<110	<120	<33	<22	<43	<58	<66	<71	<57	<37	<30	<37	<64	<74	<51
carbon tetrachloride	<110	<2000	<110	<120	<33	<22	<43	<58	<66	<71	<57	<37	<30	<37	<64	<74	<51
bromodichloromethane	<110	<2000	<110	<120	<33	<22	<43	<58	<66	<71	<57	<37	<30	<37	<64	<74	<51
1,1,2,2-tetrachloroethane	<110	<2000	<110	<120	<33	<22	<43	<58	<66	<71	<57	<37	<30	<37	<64	<74	<51
1,2-dichloropropane	<110	<2000	<110	<120	<33	<22	<43	<58	<66	<71	<57	<37	<30	<37	<64	<74	<51
trans-1,3-dichloropropene	<110	<2000	<110	<120	<33	<22	<43	<58	<66	<71	<57	<37	<30	<37	<64	<74	<51
trichloroethene	<110	<2000	<110	<120	<33	<22	<43	<58	<66	<71	<57	<37	<30	<37	<64	<74	<51
dibromochloromethane	<110	<2000	<110	<120	<33	<22	<43	<58	<66	<71	<57	<37	<30	<37	<64	<74	<51
1,1,2-trichloroethane	<110	<2000	<110	<120	<33	<22	<43	<58	<66	<71	<57	<37	<30	<37	<64	<74	<51
benzene	<110	<2000	<110	<120	<33	<22	<43	<58	<66	<71	<57	<37	<30	<37	<64	<74	<51
cis-1,3-dichloropropene	<110	<2000	<110	<120	<33	<22	<43	<58	<66	<71	<57	<37	<30	<37	<64	<74	<51
bromoform	<110	<2000	<110	<120	<33	<22	<43	<58	<66	<71	<57	<37	<30	<37	<64	<74	<51
2-hexanone	<540	<10000	<560	<620	<160	<110	<220	<290	<330	<360	<290	<180	<150	<190	<320	<370	<250
4-methyl-2-pentanone (MIBK)	<540	<10000	<560	<620	<160	<110	<220	<290	<330	<360	<290	<180	<150	<190	<320	<370	<250
tetrachloroethene	<110	<2000	<110	<120	<33	<22	<43	<58	<66	<71	<57	<37	<30	<37	<64	<74	<51
toluene	<110	<2000	<110	<120	<33	<22	<43	<58	<66	<71	<57	<37	<30	<37	<64	<74	<51
chlorobenzene	<110	<2000	<110	<120	<33	<22	<43	<58	<66	<71	<57	<37	<30	<37	<64	<74	<51
ethylbenzene	<110	<2000	130	<120	<33	<22	<43	<58	<66	<71	<57	<37	<30	<37	<64	<74	<51
styrene	<110	<2000	<110	<120	<33	<22	<43	<58	<66	<71	<57	<37	<30	<37	<64	<74	<51
xylenes	<220	<4000	<220	<250	<66	<45	<87	<120	<130	<140	<110	<73	<60	<74	<130	<150	<100

Notes:

µg/kg = micrograms per kilogram.

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TABLE 2
NORTON BASIN RESTORATION PROJECT
LABORATORY ANALYTICAL RESULTS OF SEMIVOLATILE ORGANIC COMPOUNDS

DATE:	5/22/2002	5/22/2002	5/22/2002	5/22/2002	5/22/2002	5/22/2002	5/22/2002	5/22/2002	5/22/2002	5/22/2002	5/22/2002	5/22/2002	5/22/2002	5/23/2002	5/23/2002	5/23/2002	5/23/2002	5/23/2002	5/23/2002	5/23/2002
STATION ID:	Station R-1 (Reference Location)							Station GS-1 (Reference Location)			Station NB-5			Station LB-1				Station LB-2		
SAMPLE ID:	NB-SED01	NB-SED01	NB-SED01D	NB-SED01D	NB-SED02	NB-SED02	NB-SED03	NB-SED04	NB-SED05	NB-SED06	NB-SED07	NB-SED08	NB-SED09	NB-SED10	NB-SED11	NB-SED11-D	NB-SED12	NB-SED13	NB-SED14	NB-SED15
TCL Semivolatiles (8270) (µg/kg)																				
acenaphthene	<620	--	<660	--	<670	--	<800	<1600	<1400	<1400	<870	<1100	<1300	<3000	<3000	<3000	<3000	<3300	<3700	<3300
acenaphthylene	<620	--	<660	--	<670	--	<800	<1600	<1400	<1400	<870	<1100	<1300	<3000	<3000	<3000	<3000	<3300	<3700	<3300
aniline	NR	--	NR	--	NR	--	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
anthracene	<620	--	<660	--	<670	--	<800	<1600	<1400	<1400	<870	<1100	<1300	<3000	<3000	<3000	<3000	<3300	<3700	<3300
benzo(a)anthracene	<620	--	<660	--	<670	--	<800	<1600	<1400	<1400	<870	<1100	<1300	<3000	<3000	<3000	<3000	<3300	<3700	<3300
benzo(a)pyrene	<620	--	<660	--	<670	--	<800	<1600	<1400	<1400	<870	<1100	<1300	<3000	<3000	<3000	<3000	<3300	<3700	<3300
benzo(b)perylene	<620	--	<660	--	<670	--	<800	<1600	<1400	<1400	<870	<1100	<1300	<3000	<3000	<3000	<3000	<3300	<3700	<3300
benzo(k)fluoranthene	<620	--	<660	--	<670	--	<800	<1600	<1400	<1400	<870	<1100	<1300	<3000	<3000	<3000	<3000	<3300	<3700	<3300
bis(2-ethylhexyl)phthalate	<620	--	<660	--	<670	--	2700	<1600	1800	<1400	<870	<1100	<1300	<3000	<3000	<3000	<3000	<3300	<3700	<3300
butylbenzylphthalate	<620	--	<660	--	<670	--	<800	<1600	<1400	<1400	<870	<1100	<1300	<3000	<3000	<3000	<3000	<3300	<3700	<3300
chrysene	<620	--	<660	--	<670	--	<800	<1600	<1400	<1400	<870	<1100	<1300	<3000	<3000	<3000	<3000	<3300	<3700	<3300
4-chloroaniline	<1200	--	<1300	--	<1300	--	<1600	<3100	<2800	<2900	<1700	<2300	<2600	<6000	<6000	<6000	<6000	<6600	<7300	<6600
4-chloro-3-methylphenol	<620	--	<660	--	<670	--	<800	<1600	<1400	<1400	<870	<1100	<1300	<3000	<3000	<3000	<3000	<3300	<3700	<3300
2-chlorophenol	<620	--	<660	--	<670	--	<800	<1600	<1400	<1400	<870	<1100	<1300	<3000	<3000	<3000	<3000	<3300	<3700	<3300
dibenzofuran	<620	--	<660	--	<670	--	<800	<1600	<1400	<1400	<870	<1100	<1300	<3000	<3000	<3000	<3000	<3300	<3700	<3300
dibenzo(a,h)anthracene	<620	--	<660	--	<670	--	<800	<1600	<1400	<1400	<870	<1100	<1300	<3000	<3000	<3000	<3000	<3300	<3700	<3300
3,3'-dichlorobenzidine	<1200	--	<1200	--	<1300	--	<1600	<3100	<2800	<2900	<1700	<2300	<2600	<6000	<6000	<6000	<6000	<6600	<7300	<6600
2,4-dichlorophenol	<620	--	<660	--	<670	--	<800	<1600	<1400	<1400	<870	<1100	<1300	<3000	<3000	<3000	<3000	<3300	<3700	<3300
2,4-dinitrophenol	<3200	--	<3400	--	<3500	--	<4100	<8100	<7100	<7400	<4500	<5900	<6800	<15000	<15000	<15000	<15000	<17000	<19000	<17000
2,6-dinitrotoluene	<620	--	<660	--	<670	--	<800	<1600	<1400	<1400	<870	<1100	<1300	<3000	<3000	<3000	<3000	<3300	<3700	<3300
diethylphthalate	<620	--	<660	--	<670	--	<800	<1600	<1400	<1400	<870	<1100	<1300	<3000	<3000	<3000	<3000	<3300	<3700	<3300
dimethylphthalate	<620	--	<660	--	<670	--	<800	<1600	<1400	<1400	<870	<1100	<1300	<3000	<3000	<3000	<3000	<3300	<3700	<3300
di-n-butyl phthalate	<620	--	<660	--	<670	--	<800	<1600	<1400	<1400	<870	<1100	<1300	<3000	<3000	<3000	<3000	<3300	<3700	<3300
di-n-octyl-phthalate	<620	--	<660	--	<670	--	<800	<1600	<1400	<1400	<870	<1100	<1300	<3000	<3000	<3000	<3000	<3300	<3700	<3300
fluoranthene	<620	--	<660	--	<670	--	<800	<1600	<1400	<1400	<870	<1100	<1300	<3000	<3000	<3000	<3000	<3300	<3700	<3300
fluorene	<620	--	<660	--	<670	--	<800	<1600	<1400	<1400	<870	<1100	<1300	<3000	<3000	<3000	<3000	<3300	<3700	<3300
hexachlorobenzene	<620	--	<660	--	<670	--	<800	<1600	<1400	<1400	<870	<1100	<1300	<3000	<3000	<3000	<3000	<3300	<3700	<3300
indeno(1,2,3-cd)pyrene	<620	--	<660	--	<670	--	<800	<1600	<1400	<1400	<870	<1100	<1300	<3000	<3000	<3000	<3000	<3300	<3700	<3300
isophorone	<620	--	<660	--	<670	--	<800	<1600	<1400	<1400	<870	<1100	<1300	<3000	<3000	<3000	<3000	<3300	<3700	<3300
2-methylnaphthalene	<620	--	<660	--	<670	--	<800	<1600	<1400	<1400	<870	<1100	<1300	<3000	<3000	<3000	<3000	<3300	<3700	<3300
2-methylphenol	<620	--	<660	--	<670	--	<800	<1600	<1400	<1400	<870	<1100	<1300	<3000	<3000	<3000	<3000	<3300	<3700	<3300
4-methylphenol	<620	--	<660	--	<670	--	<800	<1600	<1400	<1400	<870	<1100	<1300	<3000	<3000	<3000	<3000	<3300	<3700	<3300
naphthalene	<620	--	<660	--	<670	--	<800	<1600	<1400	<1400	<870	<1100	<1300	<3000	<3000	<3000	<3000	<3300	<3700	<3300
nitrobenzene	<620	--	<660	--	<670	--	<800	<1600	<1400	<1400	<870	<1100	<1300	<3000	<3000	<3000	<3000	<3300	<3700	<3300
2-nitroaniline	<3200	--	<3400	--	<3500	--	<4100	<8100	<7100	<7400	<4500	<5900	<6800	<15000	<15000	<15000	<15000	<17000	<19000	<17000
2-nitrophenol	<620	--	<660	--	<670	--	<800	<1600	<1400	<1400	<870	<1100	<1300	<3000	<3000	<3000	<3000	<3300	<3700	<3300
4-nitrophenol	<3200	--	<3400	--	<3500	--	<4100	<8100	<7100	<7400	<4500	<5900	<6800	<15000	<15000	<15000	<15000	<17000	<19000	<17000
3-nitroaniline	<3200	--	<3400	--	<3500	--	<4100	<8100	<7100	<7400	<4500	<5900	<6800	<15000	<15000	<15000	<15000	<17000	<19000	<17000
pentachlorophenol	<3200	--	<3400	--	<3500	--	<4100	<8100	<7100	<7400	<4500	<5900	<6800	<15000	<15000	<15000	<15000	<17000	<19000	<17000
phenanthrene	<620	--	<660	--	<670	--	<800	<1600	<1400	<1400	<870	<1100	<1300	<3000	<3000	<3000	<3000	<3300	<3700	<3300
phenol	<620	--	<660	--	<670	--	<800	<1600	<1400	<1400	<870	<1100	<1300	<3000	<3000	<3000	<3000	<3300	<3700	<3300
pyrene	<620	--	<660	--	<670	--	<800	<1600	<1400	<1400	<870	<1100	<1300	<3000	<3000	<3000	<3000	<3300	<3700	<3300
2,4,5-trichlorophenol	<620	--	<660	--	<670	--	<800	<1600	<1400	<1400	<870	<1100	<1300	<3000	<3000	<3000	<3000	<3300	<3700	<3300

Notes:

µg/kg = micrograms per kilogram.

GC/MS = gas chromatography/mass spectroscopy.

<x = Below reporting limit of x.

NR = not reported.

TABLE 2
NORTON BASIN RESTORATION PROJECT
LABORATORY ANALYTICAL RESULTS OF SEMIVOLATILE ORGANIC COMPOUNDS

DATE:	5/23/2002	5/23/2002	5/23/2002	5/23/2002	5/23/2002	5/23/2002	5/23/2002	5/23/2002	5/23/2002	5/23/2002	5/23/2002	5/24/2002	5/24/2002	5/24/2002	5/24/2002	5/24/2002	5/24/2002
STATION ID:	Station LB-3				Station NB-4			Station NB-3				Station NB-2			Station NB-1		
SAMPLE ID:	NB-SED16	NB-SED16	NB-SED17	NB-SED18	NB-SED19	NB-SED20	NB-SED21	NB-SED22	NB-SED22-D	NB-SED23	NB-SED24	NB-SED25	NB-SED26	NB-SED27	NB-SED28	NB-SED29	NB-SED30
TCL Semivolatiles (8270) (µg/kg)																	
acenaphthene	<3300	--	<4100	<4100	<1400	<1200	<1800	<2400	<2500	<2500	<2200	<1500	<1200	<1600	<2400	<2500	<1900
acenaphthylene	<3300	--	<4100	<4100	<1400	<1200	<1800	<2400	<2500	<2500	<2200	<1500	<1200	<1600	<2400	<2500	<1900
aniline	NR	--	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
anthracene	<3300	--	<4100	<4100	<1400	<1200	<1800	<2400	<2500	<2500	<2200	<1500	<1200	<1600	<2400	<2500	<1900
benzo(a)anthracene	<3300	--	<4100	<4100	<1400	<1200	<1800	<2400	<2500	<2500	<2200	<1500	<1200	<1600	<2400	<2500	<1900
benzo(a)pyrene	<3300	--	<4100	<4100	<1400	<1200	<1800	<2400	<2500	<2500	<2200	<1500	<1200	<1600	<2400	<2500	<1900
benzo(b)perylene	<3300	--	<4100	<4100	<1400	<1200	<1800	<2400	<2500	<2500	<2200	<1500	<1200	<1600	<2400	<2500	<1900
benzo(k)fluoranthene	<3300	--	<4100	<4100	<1400	<1200	<1800	<2400	<2500	<2500	<2200	<1500	<1200	<1600	<2400	<2500	<1900
bis(2-ethylhexyl)phthalate	<3300	--	<4100	<4100	<1400	<1200	<1800	<2400	<2500	<2500	<2200	<1500	<1200	<1600	<2400	<2500	<1900
butylbenzylphthalate	<3300	--	<4100	<4100	<1400	<1200	<1800	<2400	<2500	<2500	<2200	<1500	<1200	<1600	<2400	<2500	<1900
chrysene	<3300	--	<4100	<4100	<1400	<1200	<1800	<2400	<2500	<2500	<2200	<1500	<1200	<1600	<2400	<2500	<1900
4-chloroaniline	<6600	--	<8200	<8200	<2900	<2400	<3700	<4700	<5100	<5100	<4400	<3000	<2400	<3100	<4700	<5100	<3900
4-chloro-3-methylphenol	<3300	--	<4100	<4100	<1400	<1200	<1800	<2400	<2500	<2500	<2200	<1500	<1200	<1600	<2400	<2500	<1900
2-chlorophenol	<3300	--	<4100	<4100	<1400	<1200	<1800	<2400	<2500	<2500	<2200	<1500	<1200	<1600	<2400	<2500	<1900
dibenzofuran	<3300	--	<4100	<4100	<1400	<1200	<1800	<2400	<2500	<2500	<2200	<1500	<1200	<1600	<2400	<2500	<1900
dibenzo(a,h)anthracene	<3300	--	<4100	<4100	<1400	<1200	<1800	<2400	<2500	<2500	<2200	<1500	<1200	<1600	<2400	<2500	<1900
3,3'-dichlorobenzidine	<6600	--	<8200	<8200	<2900	<2400	<3700	<4700	<5100	<5100	<4400	<3000	<2400	<3100	<4700	<5100	<3900
2,4-dichlorophenol	<3300	--	<4100	<4100	<1400	<1200	<1800	<2400	<2500	<2500	<2200	<1500	<1200	<1600	<2400	<2500	<1900
2,4-dinitrophenol	<17000	--	<21000	<21000	<7400	<6100	<9400	<12000	<13000	<13000	<11000	<7700	<6100	<8100	<12000	<13000	<10000
2,6-dinitrotoluene	<3300	--	<4100	<4100	<1400	<1200	<1800	<2400	<2500	<2500	<2200	<1500	<1200	<1600	<2400	<2500	<1900
diethylphthalate	<3300	--	<4100	<4100	<1400	<1200	<1800	<2400	<2500	<2500	<2200	<1500	<1200	<1600	<2400	<2500	<1900
dimethylphthalate	<3300	--	<4100	<4100	<1400	<1200	<1800	<2400	<2500	<2500	<2200	<1500	<1200	<1600	<2400	<2500	<1900
di-n-butyl phthalate	<3300	--	<4100	<4100	<1400	<1200	<1800	<2400	<2500	<2500	<2200	<1500	<1200	<1600	<2400	<2500	<1900
di-n-octyl-phthalate	<3300	--	<4100	<4100	<1400	<1200	<1800	<2400	<2500	<2500	<2200	<1500	<1200	<1600	<2400	<2500	<1900
fluoranthene	<3300	--	<4100	<4100	<1400	<1200	<1800	<2400	<2500	<2500	<2200	<1500	<1200	<1600	<2400	<2500	<1900
fluorene	<3300	--	<4100	<4100	<1400	<1200	<1800	<2400	<2500	<2500	<2200	<1500	<1200	<1600	<2400	<2500	<1900
hexachlorobenzene	<3300	--	<4100	<4100	<1400	<1200	<1800	<2400	<2500	<2500	<2200	<1500	<1200	<1600	<2400	<2500	<1900
indeno(1,2,3-cd)pyrene	<3300	--	<4100	<4100	<1400	<1200	<1800	<2400	<2500	<2500	<2200	<1500	<1200	<1600	<2400	<2500	<1900
isophorone	<3300	--	<4100	<4100	<1400	<1200	<1800	<2400	<2500	<2500	<2200	<1500	<1200	<1600	<2400	<2500	<1900
2-methylnaphthalene	<3300	--	<4100	<4100	<1400	<1200	<1800	<2400	<2500	<2500	<2200	<1500	<1200	<1600	<2400	<2500	<1900
2-methylphenol	<3300	--	<4100	<4100	<1400	<1200	<1800	<2400	<2500	<2500	<2200	<1500	<1200	<1600	<2400	<2500	<1900
4-methylphenol	<3300	--	<4100	<4100	<1400	<1200	<1800	<2400	<2500	<2500	<2200	<1500	<1200	<1600	<2400	<2500	<1900
naphthalene	<3300	--	<4100	<4100	<1400	<1200	<1800	<2400	<2500	<2500	<2200	<1500	<1200	<1600	<2400	<2500	<1900
nitrobenzene	<3300	--	<4100	<4100	<1400	<1200	<1800	<2400	<2500	<2500	<2200	<1500	<1200	<1600	<2400	<2500	<1900
2-nitroaniline	<17000	--	<21000	<21000	<7400	<6100	<9400	<12000	<13000	<13000	<11000	<7700	<6100	<8100	<12000	<13000	<10000
2-nitrophenol	<3300	--	<4100	<4100	<1400	<1200	<1800	<2400	<2500	<2500	<2200	<1500	<1200	<1600	<2400	<2500	<1900
4-nitrophenol	<17000	--	<21000	<21000	<7400	<6100	<9400	<12000	<13000	<13000	<11000	<7700	<6100	<8100	<12000	<13000	<10000
3-nitroaniline	<17000	--	<21000	<21000	<7400	<6100	<9400	<12000	<13000	<13000	<11000	<7700	<6100	<8100	<12000	<13000	<10000
pentachlorophenol	<17000	--	<21000	<21000	<7400	<6100	<9400	<12000	<13000	<13000	<11000	<7700	<6100	<8100	<12000	<13000	<10000
phenanthrene	<3300	--	<4100	<4100	<1400	<1200	<1800	<2400	<2500	<2500	<2200	<1500	<1200	<1600	<2400	<2500	<1900
phenol	<3300	--	<4100	<4100	<1400	<1200	<1800	<2400	<2500	<2500	<2200	<1500	<1200	<1600	<2400	<2500	<1900
pyrene	<3300	--	<4100	<4100	<1400	<1200	<1800	<2400	<2500	<2500	<2200	<1500	<1200	<1600	<2400	<2500	<1900
2,4,5-trichlorophenol	<3300	--	<4100	<4100	<1400	<1200	<1800	<2400	<2500	<2500	<2200	<1500	<1200	<1600	<2400	<2500	<1900

Notes:

µg/kg = micrograms per kilogram.

GC/MS = gas chromatography/mass spectroscopy.

<x = Below reporting limit of x.

NR = not reported.

TABLE 3
NORTON BASIN RESTORATION PROJECT
LABORATORY ANALYTICAL RESULTS FOR RCRA METALS

DATE:	5/22/2002	5/22/2002	5/22/2002	5/22/2002	5/22/2002	5/22/2002	5/22/2002	5/22/2002	5/22/2002	5/22/2002	5/23/2002	5/23/2002	5/23/2002	5/23/2002	5/23/2002	5/23/2002	5/23/2002
STATION ID:	Station R-1 (Reference Location)				Station GS-1 (Reference Location)			Station NB-5			Station LB-1				Station LB-2		
SAMPLE ID:	NB-SED01	NB-SED01D	NB-SED02	NB-SED03	NB-SED04	NB-SED05	NB-SED06	NB-SED07	NB-SED08	NB-SED09	NB-SED10	NB-SED11	NB-SED11-D	NB-SED12	NB-SED13	NB-SED14	NB-SED15
TAL Metals (6010) (mg/kg)																	
aluminum	4100	980	4600	5100	11000	11000	12000	5200	5100	5700	9900	9500	15000	16000	9100	10000	8800
antimony	<3.4	<4.0	<3.7	<4.9	<8.7	<7.6	<7.2	<4.8	<6.9	<7.3	<14	<17	<17	<17	<20	<20	<15
arsenic	4.1	<2.0	3.5	5.3	T 11	T 9.9	T 9.7	4.9	4.6	3.7	T 11	<8.3	T 15	T 12	T 11	T 16	<7.7
barium	19	4.5	21	24	50	50	52	24	27	24	93	86	130	140	92	100	93
beryllium	<0.69	<0.80	<0.74	<0.98	<1.7	<1.5	<1.4	<0.96	<1.4	<1.5	<2.8	<3.3	<3.3	<3.3	<4.0	<4.0	<3.1
cadmium	<0.86	<1.0	<0.93	<1.2	<2.2	<1.9	<1.8	<1.2	<1.7	<1.8	<3.5	<4.1	T 4.2	T 4.4	<5.0	<5.1	<3.8
calcium	2400	560	2700	6500	6800	7900	6500	2500	3300	3600	10000	11000	16000	16000	11000	13000	11000
chromium	T 23	5.4	T 26	T 28	T 57	T 58	T 60	T 24	T 23	T 26	T 50	T 44	T 68	T 74	T 40	T 48	T 39
cobalt	2.9	<2.0	3.2	3.7	7.2	7.6	7.6	3.8	3.5	4.1	8.3	<8.3	10	11	<10	<10	<7.7
copper	T 27	6.5	T 30	T 34	T 80	T 88	T 88	T 40	T 44	T 49	T 160	T 160	T 260	T 260	T 140	T 140	T 130
iron	T 10000	T 2500	T 11000	T 13000	T 30000	T 28000	T 29000	T 14000	T 14000	T 16000	T 39000	T 37000	T 56000	T 58000	T 34000	T 40000	T 33000
lead	33	7.9	36	41	86	85	89	48	48	53	220	220	330	360	180	190	180
magnesium	3000	710	3400	4100	9700	9200	9300	4000	5200	5700	14000	14000	22000	23000	15000	17000	14000
manganese	95	23	110	130	280	250	260	130	100	110	190	180	270	290	180	200	170
nickel	9.4	<8.0	11	12	T 25	T 28	T 25	11	<14	<15	T 30	<33	T 41	T 47	<40	<40	<31
potassium	1400	340	1600	1900	4400	4100	4300	1900	2400	2500	5800	5600	8900	9200	6000	6500	5800
selenium	<1.7	<2.0	<1.9	<2.4	<4.3	<3.8	<3.6	<2.4	<3.4	<3.6	<7.0	<8.3	<8.3	<8.3	<10	<10	<7.7
silver	<1.7	<2.0	<1.9	<2.4	<4.3	<3.8	<3.6	<2.4	<3.4	<3.6	<7.0	<8.3	<8.3	<8.3	<10	<10	<7.7
sodium	7600	1800	8800	12000	34000	29000	30000	13000	22000	24000	75000	70000	110000	110000	78000	90000	75000
thallium	<1.7	<2.0	<1.9	<2.4	<4.3	<3.8	<3.6	<2.4	<3.4	<3.6	<7.0	<8.3	<8.3	<8.3	<10	<10	<7.7
vanadium	16	3.6	18	20	45	44	46	24	24	26	62	56	87	91	49	57	48
zinc	T 82	T 21	T 87	T 99	T 190	T 210	T 210	T 110	T 120	T 130	T 470	T 460	T 710	T 720	T 380	T 430	T 380
Mercury (7471) (mg/kg)	T 0.29	T 0.49	T 0.35	T 0.28	T 0.62	T 0.62	T 0.59	T 0.21	T 0.21	T 0.18	T 0.53	T 0.52	T 0.67	T 0.52	T 0.5	T 0.22	T 0.37

DATE:	5/23/2002	5/23/2002	5/23/2002	5/23/2002	5/23/2002	5/23/2002	5/23/2002	5/23/2002	5/23/2002	5/23/2002	5/24/2002	5/24/2002	5/24/2002	5/24/2002	5/24/2002	5/24/2002
STATION ID:	Station LB-3			Station NB-4			Station NB-3				Station NB-2			Station NB-1		
SAMPLE ID:	NB-SED16	NB-SED17	NB-SED18	NB-SED19	NB-SED20	NB-SED21	NB-SED22	NB-SED22-D	NB-SED23	NB-SED24	NB-SED25	NB-SED26	NB-SED27	NB-SED28	NB-SED29	NB-SED30
TAL Metals (6010) (mg/kg)																
aluminum	8500	11000	10000	13000	7800	T 120000	11000	13000	13000	11000	10000	10000	10000	10000	10000	10000
antimony	<20	<23	<23	<7.2	<7.1	<10	<14	<14	<15	<8.9	<8.3	<6.5	<8.7	<13	<15	<11
arsenic	<10	<11	<11	T 12	T 8.5	T 9.3	<7.1	7.1	T 11	T 9.3	T 11	T 14	T 14	T 10	T 11	T 11
barium	140	180	130	62	41	59	53	63	65	53	50	51	56	53	50	56
beryllium	<4.0	<4.5	<4.5	<1.4	<1.4	<2.0	<2.9	<2.8	<3.1	<1.8	<1.7	<1.3	<1.7	<2.6	<3.1	<2.1
cadmium	<5.0	<5.7	<5.7	T 2.6	<1.8	<2.5	<3.5	<3.5	<3.8	<2.2	<2.1	T 2.2	<2.2	<3.2	<3.8	<2.7
calcium	12000	14000	12000	4600	4300	6200	6700	7700	8100	6800	4700	5000	4700	7600	7600	5100
chromium	T 37	T 49	T 44	T 58	T 41	T 55	T 47	T 56	T 58	T 48	T 47	T 55	T 52	T 45	T 44	T 47
cobalt	<10	<11	<11	8.9	5.8	8.9	<7.1	8.8	8.8	7.6	7.5	7.2	8.1	6.8	<7.7	7.1
copper	T 130	T 170	T 160	T 130	T 76	T 110	T 100	T 120	T 120	T 100	T 96	T 110	T 110	T 96	T 94	T 110
iron	T 33000	T 42000	T 39000	T 35000	T 23000	T 35000	T 31000	T 37000	T 39000	T 33000	T 30000	T 29000	T 34000	T 32000	T 30000	T 31000
lead	170	210	200	150	110	140	120	140	150	120	120	140	140	120	120	140
magnesium	14000	19000	16000	9200	6400	11000	12000	13000	13000	11000	8900	7500	9400	12000	12000	9700
manganese	170	220	180	280	200	260	220	270	270	230	230	250	250	210	210	240
nickel	<40	<45	<45	T 31	T 20	T 28	<29	T 28	<31	T 25	T 24	T 29	T 28	<26	<31	25
potassium	5700	7400	6500	4600	3100	5100	5200	6100	6200	5100	4100	3700	4400	5000	5200	4300
selenium	<7.7	<11	<11	<3.6	<3.6	<5.1	<7.1	<7.0	<7.7	<4.4	<4.1	<3.2	<4.3	<6.5	<7.7	<5.3
silver	<7.7	<11	<11	<3.6	<3.6	<5.1	<7.1	<7.0	<7.7	<4.4	<4.1	<3.2	<4.3	<6.5	<7.7	<5.3
sodium	78000	100000	90000	29000	23000	40000	56000	59000	61000	48000	33000	24000	35000	53000	61000	41000
thallium	<7.7	<11	<11	<3.6	<3.6	<5.1	<7.1	<7.0	<7.7	<4.4	<4.1	<3.2	<4.3	<6.5	<7.7	<5.3
vanadium	44	57	54	62	37	57	47	57	59	49	53	52	59	48	46	54
zinc	T 390	T 480	T 470	T 340	T 200	T 320	T 280	T 330	T 340	T 280	T 270	T 280	T 310	T 290	T 280	T 310
Mercury (7471) (mg/kg)	T 0.46	T 0.56	T 0.53	T 0.56	T 0.46	T 0.44	T 0.43	T 0.42	T 0.42	T 0.43	T 0.44	T 0.54	T 0.46	T 0.36	T 0.36	T 0.46

Notes:

mg/kg = milligrams per kilogram.

T = greater than NY DEC TAGM 4046 Cleanup Level.

NY DEC TAGM = State of New York Department of Environmental Conservation Technical and Administrative Guidance Memorandum.

<x = Below reporting limit of x.

TABLE 4
NORTON BASIN RESTORATION PROJECT
LABORATORY ANALYTICAL RESULTS OF PESTICIDES, PCBs, DIOXINS AND FURANS

DATE:	5/22/2002	5/22/2002	5/22/2002	5/22/2002	5/22/2002	5/22/2002	5/22/2002	5/22/2002	5/22/2002	5/22/2002	5/22/2002	5/22/2002	5/22/2002	5/23/2002	5/23/2002	5/23/2002	5/23/2002	5/23/2002	5/23/2002	5/23/2002
STATION ID:	Station R-1 (Reference Location)							Station GS-1 (Reference Location)			Station NB-5			Station LB-1				Station LB-2		
SAMPLE ID:	NB-SED01	NB-SED01	NB-SED01D	NB-SED01D	NB-SED02	NB-SED02	NB-SED03	NB-SED04	NB-SED05	NB-SED06	NB-SED07	NB-SED08	NB-SED09	NB-SED10	NB-SED11	NB-SED11-D	NB-SED12	NB-SED13	NB-SED14	NB-SED15
TCL Pesticides (8081) (µg/kg)																				
aldrin	<16	--	<17	--	<35	--	<21	<81	<71	<74	<45	<59	<68	<150	<150	<150	<150	<170	<190	<170
alpha-BHC	<16	--	<17	--	<35	--	<21	<81	<71	<74	<45	<59	<68	<150	<150	<150	<150	<170	<190	<170
beta-BHC	<16	--	<17	--	<35	--	<21	<81	<71	<74	<45	<59	<68	<150	<150	<150	<150	<170	<190	<170
delta-BHC	<16	--	<17	--	<35	--	<21	<81	<71	<74	<45	<59	<68	<150	<150	<150	<150	<170	<190	<170
chlordane	<16	--	<17	--	<35	--	<21	<81	<71	<74	<45	<59	<68	<150	<150	<150	<150	<170	<190	<170
2,4-D	NR	--	NR	--	NR	--	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
4,4'-DDD	<31	--	<33	--	<67	--	<40	<160	<140	<140	<87	<110	<130	<300	<300	<300	<300	<330	<370	<330
4,4'-DDE	<31	--	<33	--	<67	--	<40	<160	<140	<140	<87	<110	<130	<300	<300	<300	<300	<330	<370	<330
4,4'-DDT	<31	--	<33	--	<67	--	<40	<160	<140	<140	<87	<110	<130	<300	<300	<300	<300	<330	<370	<330
dieldrin	<31	--	<33	--	<67	--	<40	<160	<140	<140	<87	<110	<130	<300	<300	<300	<300	<330	<370	<330
endosulfan I	<16	--	<17	--	<35	--	<21	<81	<71	<74	<45	<59	<68	<150	<150	<150	<150	<170	<190	<170
endosulfan II	<31	--	<33	--	<67	--	<40	<160	<140	<140	<87	<110	<130	<300	<300	<300	<300	<330	<370	<330
endosulfan sulfate	<31	--	<33	--	<67	--	<40	<160	<140	<140	<87	<110	<130	<300	<300	<300	<300	<330	<370	<330
endrin	<31	--	<33	--	<67	--	<40	<160	<140	<140	<87	<110	<130	<300	<300	<300	<300	<330	<370	<330
endrin keytone	<31	--	<33	--	<67	--	<40	<160	<140	<140	<87	<110	<130	<300	<300	<300	<300	<330	<370	<330
gamma-BHC (lindane)	<16	--	<17	--	<35	--	<21	<81	<71	<74	<45	<59	<68	<150	<150	<150	<150	<170	<190	<170
gamma-chlordane	<16	--	<17	--	<35	--	<21	<81	<71	<74	<45	<59	<68	<150	<150	<150	<150	<170	<190	<170
heptachlor	<16	--	<17	--	<35	--	<21	<81	<71	<74	<45	<59	<68	<150	<150	<150	<150	<170	<190	<170
heptachlor epoxide	<16	--	<17	--	<35	--	<21	<81	<71	<74	<45	<59	<68	<150	<150	<150	<150	<170	<190	<170
methoxychlor	<160	--	<170	--	<350	--	<210	<810	<710	<740	<450	<590	<680	<1500	<1500	<1500	<1500	<1700	<1900	<1700
parathion	NR	--	NR	--	NR	--	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
silvex	NR	--	NR	--	NR	--	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
2,4,5-T	NR	--	NR	--	NR	--	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
PCBs (8082) (µg/kg)																				
Arochlor-1016	<310	--	<330	--	<670	--	<400	<1600	<1400	<1400	<870	<1100	<1300	<3000	<3000	<3000	<3000	<3300	<3700	<3300
Arochlor-1221	<630	--	<670	--	<1400	--	<820	<3200	<2800	<2900	<1800	<2300	<2700	<6100	<6100	<6100	<6100	<6700	<7400	<6700
Arochlor-1232	<310	--	<330	--	<670	--	<400	<1600	<1400	<1400	<870	<1100	<1300	<3000	<3000	<3000	<3000	<3300	<3700	<3300
Arochlor-1242	<310	--	<330	--	<670	--	<400	<1600	<1400	<1400	<870	<1100	<1300	<3000	<3000	<3000	<3000	<3300	<3700	<3300
Arochlor-1248	<310	--	<330	--	<670	--	<400	<1600	<1400	<1400	<870	<1100	<1300	<3000	<3000	<3000	<3000	<3300	<3700	<3300
Arochlor-1254	<310	--	<330	--	<670	--	<400	<1600	<1400	<1400	<870	<1100	<1300	<3000	<3000	<3000	<3000	<3300	<3700	<3300
Arochlor-1260	<310	--	<330	--	<670	--	<400	<1600	<1400	<1400	<870	<1100	<1300	<3000	<3000	<3000	<3000	<3300	<3700	<3300
Dioxins/Furans (8280) (µg/kg)																				
dibenzo-P-dioxins (PCDD)	<0.94	--	<1.0	--	<1.0	--	<1.2	<2.4	<2.1	<2.2	<1.3	<1.7	<2.0	<4.5	<4.5	<4.5	<4.5	<5.0	<5.6	<5.0
2,3,7,8-TCDD	<0.94	--	<1.0	--	<1.0	--	<1.2	<2.4	<2.1	<2.2	<1.3	<1.7	<2.0	<4.5	<4.5	<4.5	<4.5	<5.0	<5.6	<5.0
polychlorinated dibenzo-furans (PCDF)	<0.94	--	<1.0	--	<1.0	--	<1.2	<2.4	<2.1	<2.2	<1.3	<1.7	<2.0	<4.5	<4.5	<4.5	<4.5	<5.0	<5.6	<5.0

DATE:	5/23/2002	5/23/2002	5/23/2002	5/23/2002	5/23/2002	5/23/2002	5/23/2002	5/23/2002	5/23/2002	5/23/2002	5/23/2002	5/24/2002	5/24/2002	5/24/2002	5/24/2002	5/24/2002	5/24/2002
STATION ID:	Station LB-3				Station NB-4			Station NB-3				Station NB-2			Station NB-1		
SAMPLE ID:	NB-SED16	NB-SED16	NB-SED17	NB-SED18	NB-SED19	NB-SED20	NB-SED21	NB-SED22	NB-SED22-D	NB-SED23	NB-SED24	NB-SED25	NB-SED26	NB-SED27	NB-SED28	NB-SED29	NB-SED30
TCL Pesticides (8081) (µg/kg)																	
aldrin	<170	--	<210	<210	<74	<61	<94	<120	<130	<130	<110	<77	<61	<81	<120	<130	<100
alpha-BHC	<170	--	<210	<210	<74	<61	<94	<120	<130	<130	<110	<77	<61	<81	<120	<130	<100
beta-BHC	<170	--	<210	<210	<74	<61	<94	<120	<130	<130	<110	<77	<61	<81	<120	<130	<100
delta-BHC	<170	--	<210	<210	<74	<61	<94	<120	<130	<130	<110	<77	<61	<81	<120	<130	<100
chlordane	<170	--	<210	<210	<74	<61	<94	<120	<130	<130	<110	<77	<61	<81	<120	<130	<100
2,4-D	NR	--	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
4,4'-DDD	<330	--	<410	<410	<140	<120	<180	<240	<250	<220	<300	<150	<120	<160	<240	<250	<190
4,4'-DDE	<330	--	<410	<410	<140	<120	<180	<240	<250	<220	<300	<150	<120	<160	<240	<250	<190
4,4'-DDT	<330	--	<410	<410	<140	<120	<180	<240	<250	<220	<300	<150	<120	<160	<240	<250	<190
dieldrin	<330	--	<410	<410	<140	<120	<180	<240	<250	<220	<300	<150	<120	<160	<240	<250	<190
endosulfan I	<170	--	<210	<210	<74	<61	<94	<120	<130	<130	<110	<77	<61	<81	<120	<130	<100
endosulfan II	<330	--	<410	<410	<140	<120	<180	<240	<250	<220	<300	<150	<120	<160	<240	<250	<190
endosulfan sulfate	<330	--	<410	<410	<140	<120	<180	<240	<250	<220	<300	<150	<120	<160	<240	<250	<190
endrin	<330	--	<410	<410	<140	<120	<180	<240	<250	<220	<300	<150	<120	<160	<240	<250	<190
endrin keytone	<330	--	<410	<410	<140	<120	<180	<240	<250	<220	<300	<150	<120	<160	<240	<250	<190
gamma-BHC (lindane)	<170	--	<210	<210	<74	<61	<94	<120	<130	<130	<110	<77	<61	<81	<120	<130	<100
gamma-chlordane	<170	--	<210	<210	<74	<61	<94	<120	<130	<130	<110	<77	<61	<81	<120	<130	<100
heptachlor	<170	--	<210	<210	<74	<61	<94	<120	<130	<130	<110	<77	<61	<81	<120	<130	<100
heptachlor epoxide	<170	--	<210	<210	<74	<61	<94	<120	<130	<130	<110	<77	<61	<81	<120	<130	<100
methoxychlor	<1700	--	<2100	<2100	<740	<610	<940	<1200	<1300	<1300	<1100	<770	<610	<810	<1200	<1300	<1000
parathion	NR	--	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
silvex	NR	--	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
2,4,5-T	NR	--	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
PCBs (8082) (µg/kg)																	
Arochlor-1016	<3300	--	<4100	<4100	<1400	<1200	<1800	<2400	<2500	<2500	<2200	<1500	<1200	<1600	<2400	<2500	<1900
Arochlor-1221	<6700	--	<8400	<8400	<2900	<2400	<3700	<4800	<5200	<5200	<4500	<3000	<2400	<3200	<4800	<5200	<3900
Arochlor-1232	<3300	--	<4100	<4100	<1400	<1200	<1800	<2400	<2500	<2500	<2200	<1500	<1200	<1600	<2400	<2500	<1900
Arochlor-1242	<3300	--	<4100	<4100	<1400	<1200	<1800	<2400	<2500	<2500	<2200	<1500	<1200	<1600	<2400	<2500	<1900
Arochlor-1248	<3300	--	<4100	<4100	<1400	<1200	<1800	<2400	<2500	<2500	<2200	<1500	<1200	<1600	<2400	<2500	<1900
Arochlor-1254	<3300	--	<4100	<4100	<1400	<1200	<1800	<2400	<2500	<2500	<2200	<1500	<1200	<1600	<2400	<2500	<1900
Arochlor-1260	<3300	--	<4100	<4100	<1400	<1200	<1800	<2400	<2500	<2500	<2200	<1500	<1200	<1600	<2400	<2500	<1900
Dioxins/Furans (8280) (µg/kg)																	
dibenzo-P-dioxins (PCDD)	<5.0	--	<6.2	<6.2	<2.2	<1.8	<2.8	<3.6	<3.8	<3.8	<3.3	<2.3	<1.8	<2.4	<3.6	<3.8	<2.9
2,3,7,8-TCDD	<5.0	--	<6.2	<6.2	<2.2	<1.8	<2.8	<3.6	<3.8	<3.8	<3.3	<2.3	<1.8	<2.4	<3.6	<3.8	<2.9
polychlorinated dibenzo-furans (PCDF)	<5.0	--	<6.2	<6.2	<2.2	<1.8	<2.8	<3.6	<3.8	<3.8	<3.3	<2.3	<1.8	<2.4	<3.6	<3.8	<2.9

Notes: µg/kg = micrograms per kilogram.
<x = below reporting limit of x.
-- = not analyzed.
NR = not reported.

TABLE 6
NORTON BASIN RESTORATION PROJECT
LABORATORY RESULTS OF PHYSICAL PARAMETERS

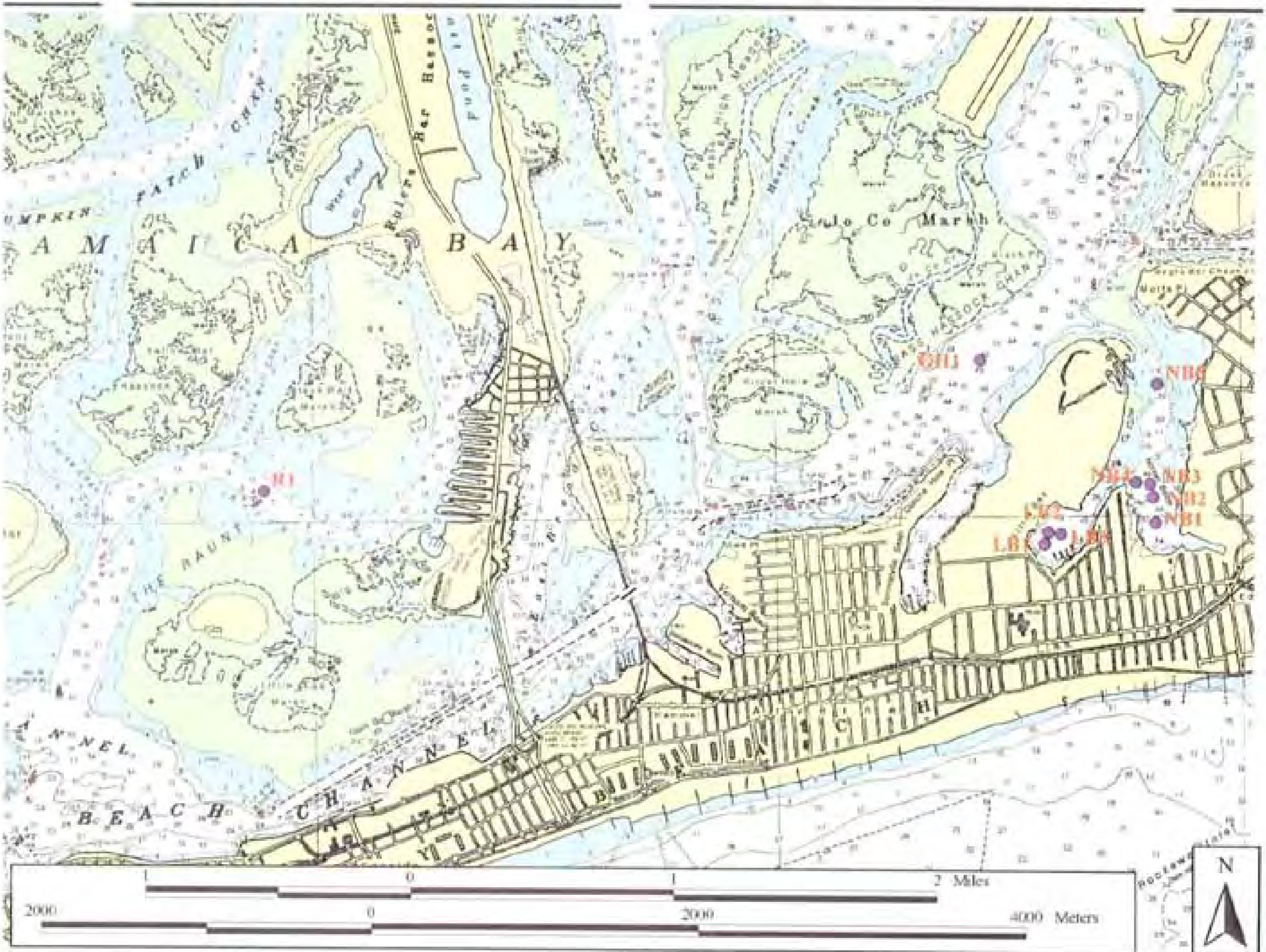
Location ID	R-1	GH-1	LB-1	LB-2	NB-3	NB-2	NB-1	R-1	R-1	R-1	R-1	GH-1	GH-1
Sample ID	R-1 (Shelby)	GH-1 (Shelby)	LB-1 (Shelby)	LB-2 (Shelby)	NB-3 (Shelby)	NB-2 (Shelby)	NB-1 (Shelby)	NB-SED-01	NB-SED-01D	NB-SED-02	NB-SED-03	NB-SED-04	NB-SED-05
Date	22-May-02	22-May-02	23-May-02	23-May-02	23-May-02	23-May-02	23-May-02	22-May-02	22-May-02	22-May-02	22-May-02	22-May-02	22-May-02
Sieve Analysis													
%Clay	7.30	22.50	15.90	22.20	34.10	38.00	26.60	NR	NR	NR	NR	NR	NR
%Cobbles	--	--	--	--	--	--	--	NR	NR	NR	NR	NR	NR
%Gravel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NR	NR	NR	NR	NR	NR
%Sand	70.50	24.90	8.10	7.80	8.80	5.30	5.90	NR	NR	NR	NR	NR	NR
%Silt	22.20	52.60	76.00	70.00	57.10	56.70	67.50	NR	NR	NR	NR	NR	NR
Percent Solids	77.4	31.8	17.7	17.1	18.4	29.1	19	NR	NR	NR	NR	NR	NR
Specific Gravity	2.65	2.27	2.16	2.23	2.14	2.22	2.37	NR	NR	NR	NR	NR	NR
Bulk Density (g/cm^3)	1.39	0.38	0.20	0.25	0.24	0.34	0.20	NR	NR	NR	NR	NR	NR
Porosity (%)	47.41	83.44	90.78	88.77	88.57	84.84	91.38	NR	NR	NR	NR	NR	NR
Atteburg Limits													
Liquid Limit	NR	NR	NR	NR	NR	NR	NR	--	--	--	--	86	93
Plastic Limit	NR	NR	NR	NR	NR	NR	NR	--	--	--	--	71	53
Plasticity Index	NR	NR	NR	NR	NR	NR	NR	Non-plastic	Non-plastic	Non-plastic	Non-plastic	15	40

Location ID	GH-1	NB-5	NB-5	NB-5	LB-1	LB-1	LB-1	LB-1	LB-2	LB-2	LB-2	LB-3	LB-3
Sample ID	NB-SED-06	NB-SED-07	NB-SED-08	NB-SED-09	NB-SED-10	NB-SED-11	NB-SED-11D	NB-SED-12	NB-SED-13	NB-SED-14	NB-SED-15	NB-SED-16	NB-SED-17
Date	22-May-02	22-May-02	22-May-02	22-May-02	23-May-02	23-May-02	23-May-02	23-May-02	23-May-02	23-May-02	23-May-02	23-May-02	23-May-02
Sieve Analysis													
%Clay	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
%Cobbles	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
%Gravel	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
%Sand	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
%Silt	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Percent Solids	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Specific Gravity	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Atteburg Limits													
Liquid Limit	93	--	--	69	--	84	--	--	--	82	--	--	95
Plastic Limit	54	--	--	45	--	54	--	--	--	57	--	--	67
Plasticity Index	38	Non-plastic	Non-plastic	24	Non-plastic	30	Non-plastic	Non-plastic	Non-plastic	25	Non-plastic	Non-plastic	29

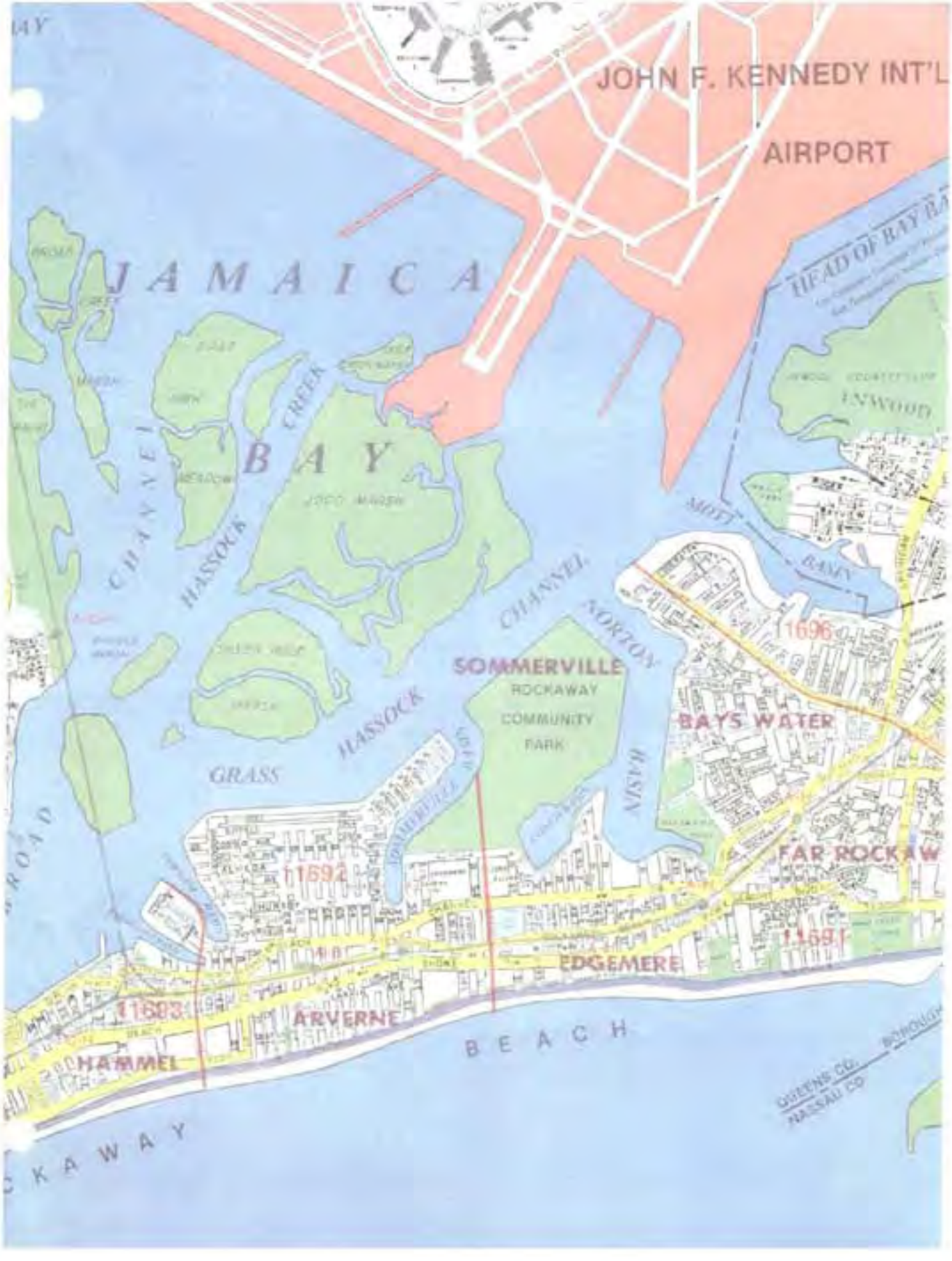
Location ID	LB-3	NB-4	NB-4	NB-4	NB-3	NB-3	NB-3	NB-3	NB-2	NB-2	NB-2	NB-1	NB-1	NB-1
Sample ID	NB-SED-18	NB-SED-19	NB-SED-20	NB-SED-21	NB-SED-22	NB-SED-22D	NB-SED-23	NB-SED-24	NB-SED-25	NB-SED-26	NB-SED-27	NB-SED-28	NB-SED-29	NB-SED-30
Date	23-May-02	23-May-02	23-May-02	23-May-02	23-May-02	23-May-02	23-May-02	23-May-02	24-May-02	24-May-02	24-May-02	24-May-02	24-May-02	24-May-02
Sieve Analysis														
%Clay	NR	NR	NR	NR	NR	NR	NR	NR	13.70	13.30	13.30	25.60	31.90	21.60
%Cobbles	NR	NR	NR	NR	NR	NR	NR	NR	--	--	--	--	--	--
%Gravel	NR	NR	NR	NR	NR	NR	NR	NR	0.00	0.00	0.00	0.00	0.00	0.00
%Sand	NR	NR	NR	NR	NR	NR	NR	NR	26.50	4.60	4.60	11.50	10.90	23.00
%Silt	NR	NR	NR	NR	NR	NR	NR	NR	59.80	82.10	82.10	62.90	55.40	55.40
Percent Solids	NR	NR	NR	NR	NR	NR	NR	NR	22.5	28.7	23.9	14.0	13.7	17.5
Specific Gravity	NR	NR	NR	NR	NR	NR	NR	NR	2.65	2.65	2.65	2.65	2.65	2.65
Atteburg Limits														
Liquid Limit	122	83	66	92	115	86	92	89	85	79	80	99	95	78
Plastic Limit	61	49	47	53	64	62	61	64	57	48	50	80	60	50
Plasticity Index	60	34	19	40	51	24	31	25	28	31	30	20	35	28

Notes: NR = Not reported.
-- = No data.

Attachment 2
Figures



A M A I C A   B A Y
Jo Co Marsh
B E A C H   C H A N N E L
R1
NB8
NB4
NB3
NB2
NB1
LB2
1   0   1   2 Miles
2000   0   2000   4000 Meters
N


JOHN F. KENNEDY INT'L
AIRPORT
JAMAICA
BAY
HASSOCK
CHANNEL
CREEK
HEAD OF BAY
INWOOD
MOTT
BASIN
CHANNEL
NORTON
SOMMERVILLE
ROCKAWAY
COMMUNITY
PARK
BAYS WATER
11696
GRASS
HASSOCK
BASIN
FAR ROCKAW
11692
11691
EDGEMERE
11693
ARVERNE
HAMMEL
BEACH
QUEENS CO.
NASSAU CO