DRD ___
Return to: MLD ___

New York State Office of Parks, Recreation and Historic Preservation
Western District-Niagara Frontier Region
Niagara Reservation State Park, PO Box 1132, Niagara Falls, New York 14303-0132

716-278-1770
FAX: 716-278-1744
TDD: 716-278-1749

Bernadette Castro
Commissioner

Edward J. Rutkowski
Assistant Deputy
Commissioner

February 8, 2005

Mr. Martin Doster, P.E.
Regional Hazardous Waste Remediation Engineer
NYSDEC
270 Michigan Avenue
Buffalo, NY 14203

Dear Mr. Doster:

Re: Buffalo Small Boat Harbor
Site Assessment Report/Deep Subsurface Soils

Attached for your information is an additional field investigation and site-assessment report for subsurface soils at the site of the proposed Buffalo Harbor State Park (currently the NFTA Small Boat Harbor). The area which is the subject of this and previous investigations is proposed for recreational/playground development. This report was prepared by Watts Engineers.

If you have any questions regarding this matter I can be reached at 716-278-1712 or 628-4098.

Sincerely,

Albert J. Nihill

Albert J. Nihill, RLA
Capital Facilities Manager – Western District

AJN/clk
Attachment – Stated Report
cc: Rolfe Steck – w/o

PHASE II
FIELD INVESTIGATION AND
SITE ASSESSMENT REPORT
OF THE DEEP SUBSURFACE SOILS

AT

GALLAGHER BEACH
PROPOSED LAKE ERIE STATE PARK
BUFFALO, NEW YORK

PREPARED FOR:

WENDEL DUCHSCHERER
95 JOHN MUIR DRIVE
SUITE 100
BUFFALO, NEW YORK 14228-1163

JANUARY 2005

PREPARED BY:

WATTS ENGINEERING AND ARCHITECTURE, P.C.
3826 MAIN STREET
BUFFALO, NEW YORK 14226

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

APPENDICES

1.0 PROJECT PURPOSE AND SCOPE

The Phase II Field Investigation of the deep subsurface soils representing historical dredge spoils was performed by Watts Engineering and Architecture, P.C., (Watts Engineers) at the request of Wendel-Duchscherer on behalf of the New York State Office of Parks, Recreation, and Historic Preservation (NYSOPRHP). This report is the third report performed by Watts Engineers for Gallagher Beach, the proposed Lake Erie State Park. This soil investigation was conducted to investigate and characterize deep sub-surface soils within the proposed park, specifically the dredge spoils. Earlier test pits concluded that dredge spoils were present across the site at a depth of approximately five to eight feet below ground surface. The area investigated for this report included the greenspace that will function as the main recreational area for the proposed park.

The proposed park is located in an area of historical fill activities and contains materials such as slag and cinder, brick and masonry, metal scrap, Buffalo River and Buffalo Harbor dredge spoils, and soil believed to have been excavated from across the City of Buffalo to facilitate construction/redevelopment at former industrial sites. This investigation was performed to determine if elevated compound concentrations were present in sub-surface soils that could be a potential environmental concern with the proposal to have this area serve as a playground and park for the public.

2.0 SOIL/FILL IDENTIFICATION, CHARACTERIZATION, AND SAMPLE COLLECTION

The field investigation was conducted on Monday, December 20, 2004. The investigation involved the collection of three (3) soil samples from two locations at the site. The sample locations were determined by NYSOPRHP personnel in consultation with Watts Engineers. One location was within the northwest quadrant of the greenspace. The second location was within the southeast quadrant.

Please refer to **Figure 2-1** which provides a sample location map that identifies each of the sampling locations superimposed on top of an aerial photograph of the project site. Samples locations were referenced in the field with the use of a personal global positioning system unit and should be accurate to within several yards.

The samples were recovered utilizing a track-mounted drilling rig. The boreholes were advanced to a depth of 24 to 30 feet below ground surface using 2 3/4-inch hollow stem augers with continuous 2-inch split spoon sampling. The returned soil profiles from each location were logged and examined for volatile vapors using a MiniRAE 2000™ photoionization detector (PID), olfactory and visual indications of contamination and presence of dredge spoils.

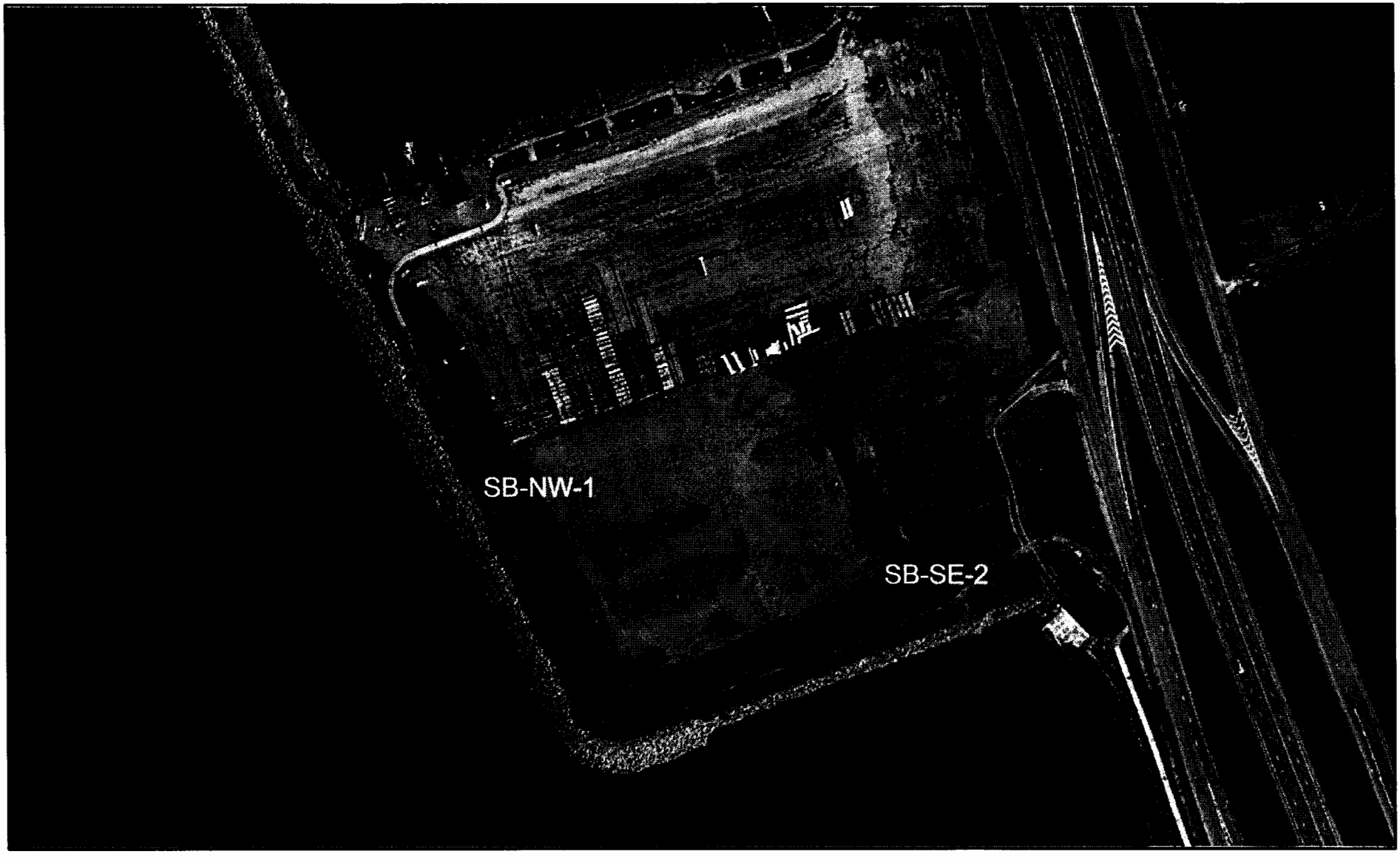
Two of the three soil samples were collected from the upper portion of the dredged soils from each boring. The first sample (SB-NW-1) was collected at a depth of 6 to 11.5 feet below existing ground surface. The second sample (SB-SE-2) was collected at a depth of 4 to 10 feet below existing ground surface. The third composite sample from the two boreholes (Deep Comp-3) was collected to represent deep dredge sediment sample conditions. This sample was collected from a depth of 14 to 20 feet. All samples were collected by Watts Engineers personnel using pre-cleaned hand tools such as stainless steel or teflon scoops.

2.1 Evaluation of Sub-surface Soils

The immediate surface soils (approximately the upper 4 to 6 feet) within the site are composed of brown to reddish-brown silts and silty clays. The surface soils have been re-worked and graded recently in preparation of the proposed plans to construct a park and recreation area. Fill composed primarily of brick, slag, small concrete, and stone with some wood is commonly intermixed with these soils. Sub-surface soils (approximately greater than 6 feet below ground surface) within the site are composed of dark grey to black silts, silty clays, and sands. Organic material (wood, stems, reeds, etc.) was commonly intermixed within the sub-surface soils. An organic odor and sheen was typically noted throughout the sub-surface strata.

2.2 Sample Collection Summary

Soil samples were collected directly from each location. Samples were designated based on a combination of their origin and depth (when more than one sample was collected from the same location). Pertinent information was recorded on a chain-of custody form. The samples were then packaged, placed on ice and hand-delivered Severn-Trent Laboratories (STL), Inc., located in Amherst, New York.



0m 50m 100m 150m 200m 250m

WATTS ENGINEERS

Figure 2-1
Sample Location Map

Gallagher Beach
Proposed Erie State Park
Buffalo, New York

Scale in meters

January 2005

3.0 LABORATORY ANALYSIS AND RESULTS

This section presents a summary of the analytical data for the soil/fill samples collected during the field investigation. Three (3) samples were analyzed for the following parameters:

- Target Compound List (TCL) Volatile Organics via EPA SW-846 Method 8260
- Target Compound List (TCL) Semi-Volatile Organics via EPA SW-846 Method 8270
- Target Compound List (TCL) Pesticides/PCBs via EPA SW-846 Method 8081/8082
- Target Analyte List (TAL) Inorganics plus Cyanide via EPA SW-846 Method 8463/9012

A copy of the chain-of-custody form and analytical results received from Severn Trent Laboratories is found in **Appendix A.**

Watts Engineers has summarized the laboratory results in **Tables 3-1, 3-2, 3-3, 3-4, 3-5 and 3-6.** These tables also contain New York State Department of Environmental Conservation (NYSDEC) recommended soil cleanup objectives so a comparison of the results can be made to applicable regulatory guidance values.

Table 3-1 summarizes the TCL volatile organic analytical results for the three samples. Acetone, benzene, chlorobenzene, 1,2-dichlorobenzene, 1,2,4-trichlorobenze, 1,3-dichlorobenzene, 1,4-dichlorobenzene, ethylbenzene, 2-hexanone, methycylohexane, methylene chloride, and xylenes were detected in the samples. Of these compounds, benzene, chlorobenzene, 1,2-dichlorobenzene, 1,2,4-trichlorobenze, 1,3-dichlorobenzene, 1,4-dichlorobenzene, ethylbenzene and xylenes were detected in concentrations above NYSDEC recommended cleanup objectives. All of these compounds were detected in the deep composite sample. Chlorobenzene and benzene were detected in sample SB-SE-2. None were detected above recommended cleanup levels in sample SB-NW-1.

Table 3-2 summaries the TCL semi-volatile organic analytical results for the three samples. While semi-volatile compounds were detected including phenanthrene, fluoranthene, 1,4-dichlorobenzene, 1,2,4-trichlorobenzene, 2-methylnapthalene and pyrene, none of the samples were detected at elevated concentrations exceeding NYSDEC recommended cleanup objectives. Furthermore, detections were restricted to the deep sediment sample.

Table 3-3 summarizes the TCL pesticide results for the three soil samples collected for laboratory analysis. While pesticides including 4,4-DDT, 4,4-DDE, dieldrin, delta-BHC, endrin and endrin aldahyde were detected, none were identified in any of the samples at concentrations above the NYSDEC recommended soil cleanup objectives.

Table 3-4 summarizes the TCL PCB results for the three soil samples collected for laboratory analysis. PCBs were detected in all three samples, however, none had concentrations above the NYSDEC recommended soil cleanup objective for subsurface soils.

Table 3-5 summarizes the TAL inorganic (metal) results for the three samples. Several inorganic compounds were detected at concentrations either above normal soil background levels or NYSDEC recommended soil cleanup objectives. Inorganics detected at elevated levels included arsenic, beryllium, cadmium, chromium, copper, iron, magnesium, mercury, nickel, and zinc. The

concentration of both chromium and lead found in samples SB-SE-2 and Deep Comp-3 could mathematically exceed Resources Conservation and Recovery Act (RCRA) limits as defined under the Toxicity Characteristic Leaching Procedure (TCLP). Exceeding the TCLP regulatory level would classify soils removed from these locations as a RCRA hazardous waste and force appropriate material handling and disposal requirements. Additional testing would be required to confirm this possibility.

Table 3-6 summarizes the total recoverable cyanide results for the three samples. Total cyanide was detected at a low concentration in one sample.

TABLE 3-1
VOLATILE ORGANIC COMPOUNDS IN SOIL SAMPLES
GALLAGHER BEACH - ANALYTICAL DATA SUMMARY
ROUND III

	Soil Concentration (µg/kg - ppb)			
Compound	**Sample Y213312-SB-NW-1**	**Sample Y213312-SB-SE-2**	**Sample Y213312-Deep Comp-3**	**NYSDEC Recommended Soil Cleanup Objectives[1] (µg/kg - ppb)**
Sample Date	12/20/04	12/20/04	12/20/04	
Sample Depths (in)	6-11.5	4-10	14-20	
Acetone	66	ND	ND	200
Benzene	ND	400J	1,400J	60
Bromodichloromethane	ND	ND	ND	N/A
Bromoform	ND	ND	ND	N/A
Bromomethane	ND	ND	ND	N/A
2-Butanone	17J	ND	ND	300
Carbon Disulfide	ND	ND	ND	2,700
Carbon Tetrachloride	ND	ND	ND	600
Chlorobenzene	120	22,000	92,000	1,700
Chloromethane	ND	ND	ND	N/A
Chloroethane	ND	ND	ND	1,900
Chloroform	ND	ND	ND	300
Cyclohexane	ND	ND	ND	N/A
Dibromochloromethane	ND	ND	ND	N/A
1,1-Dichloroethane	ND	ND	ND	200
1,1,2-Trichloro-1,2,2,-trifluorethane	ND	ND	ND	6,000
1,2-Dibromo-3-chloropropane	ND	ND	ND	N/A
1,2-Dibromethane	ND	ND	ND	N/A
1,2-Dichlorobenzene	2J	ND	10,000	7,900
1,2-Dichloroethane	ND	ND	ND	100
1,1-Dichloroethene	ND	ND	ND	400
1,2-Dichloroethene (cis)	ND	ND	ND	250
1,2-Dichloroethene (trans)	ND	ND	ND	300
1,2-Dichloropropane	ND	ND	ND	300
1,2,4-Trichlorobenzene	ND	240J	20,000	3,400
1,3-Dichlorobenzene	3J	ND	5,300	1,600
1,3-Dichloropropene (cis)	ND	ND	ND	300
1,3-Dichloropropene (trans)	ND	ND	ND	300

TABLE 3-1
VOLATILE ORGANIC COMPOUNDS IN SOIL SAMPLES
GALLAGHER BEACH - ANALYTICAL DATA SUMMARY
ROUND III

	Soil Concentration (µg/kg - ppb)			
Compound	**Sample Y213312-SB-NW-1**	**Sample Y213312-SB-SE-2**	**Sample Y213312-Deep Comp-3**	**NYSDEC Recommended Soil Cleanup Objectives[1] (µg/kg - ppb)**
1,4-Dichlorobenzene	13	1,500	42,000	8,500
Dichlorodifluoromethane	ND	ND	ND	N/A
Ethylbenzene	ND	ND	4,600	5,500
2-Hexanone	ND	ND	ND	N/A
Isopropylbenzene	ND	ND	ND	5,000
Methyl Acetate	ND	ND	ND	N/A
Methyl Tert Butyl Ether	ND	ND	ND	120
Methycyclohexane	1J	2,500	9,600	N/A
Methylene Chloride	9B	ND	ND	100
4-Methyl-2-Pentanone	ND	ND	ND	10
Tetrachloroethene	ND	ND	ND	1,400
1,1,1-Trichlorethane	ND	ND	ND	800
1,1,2-Trichloroethane	ND	ND	ND	N/A
1,1,2,2-Tetrachloroethane	ND	ND	ND	600
Styrene	ND	ND	ND	N/A
Toluene	ND	ND	ND	1,500
Trichloroethene	ND	ND	ND	700
Trichlorofluoromethane	ND	ND	ND	N/A
Vinyl Acetate	ND	ND	ND	N/A
Vinyl Chloride	ND	ND	ND	200
Xylenes	ND	ND	5,200J	1,200

NOTES:
ND = None Detected
N/A = Not Available
MDL = Method detection Limit
J = Estimated Value (below Laboratory Quantitation Limit)
B = Compound detected in associated blank as well as the sample.

[1] NYSDEC Technical and Administrative Guidance Memorandum HWR-94-4046, revised January 24, 1994. As per TAGM 4046; Total volatiles <10,000 ppb, total semi-volatiles <500,000 ppb, and individual semi-volatiles <50,000 ppb.

Exceeds NYSDEC recommended soil cleanup objective.

TABLE 3-2
SEMI-VOLATILE ORGANIC COMPOUNDS
GALLAGHER BEACH - ANALYTICAL DATA SUMMARY
ROUND III

Compound	Soil Concentration (µg/kg - ppb)			NYSDEC Recommended Soil Cleanup Objectives[2] (µg/kg - ppb)
	Sample Y213312-SB-NW-1	Sample Y213312-SB-SE-2	Sample Y213312-Deep Comp-3	
Sample Date	12/20/04	12/20/04	12/20/04	
Sample Depths (in)	6-11.4	4-10	14-20	
Phenol	ND	ND	ND	30 or MDL
Bis(2-Chloroethyl) ether	ND	ND	ND	N/A
2-Chlorophenol	ND	ND	ND	800
1,3-Dichlorobenzene	ND	ND	ND	1,600
1,4-Dichlorobenzene	ND	ND	3,200J	8,500
1,2-Dichlorobenzene	ND	ND	ND	7,900
2-Methylphenol	ND	ND	ND	100 or MDL
2,2'-Oxybis (1-chloropropane)	ND	ND	ND	N/A
4-Methylphenol	ND	ND	ND	900
n-Nitrosodi-n-propylamine	ND	ND	ND	N/A
Hexachloroethane	ND	ND	ND	N/A
Nitrobenzene	ND	ND	ND	200 or MDL
Isophorone	ND	ND	ND	4,400
2-Nitrophenol	ND	ND	ND	330 or MDL
2,4-Dimethylphenol	ND	ND	ND	N/A
bis (2-Chloroethoxy) methane	ND	ND	ND	N/A
2,4-Dichlorophenol	ND	ND	ND	400
1,2,4-Trichlorobenzene	ND	ND	2,200J	3,400
Naphthalene	ND	ND	ND	13,000
4-Chloroaniline	ND	ND	ND	220 or MDL
Hexachlorobutadiene	ND	ND	ND	N/A
4-Chloro-3-methylphenol	ND	ND	ND	240 or MDL
2-Methylnaphthalene	ND	ND	1,300J	36,400
Hexachlorocyclopentadiene	ND	ND	ND	N/A
2,4,6-Trichlorophenol	ND	ND	ND	N/A
2,4,5-Trichlorophenol	ND	ND	ND	100
2-Chloronaphthalene	ND	ND	ND	N/A
2-Nitroaniline	ND	ND	ND	430 or MDL
Dimethylphthalate	ND	ND	ND	2,000

TABLE 3-2
SEMI-VOLATILE ORGANIC COMPOUNDS
GALLAGHER BEACH - ANALYTICAL DATA SUMMARY
ROUND III

Compound	Soil Concentration (µg/kg - ppb)			
	Sample Y213312-SB-NW-1	Sample Y213312-SB-SE-2	Sample Y213312-Deep Comp-3	NYSDEC Recommended Soil Cleanup Objectives[2] (µg/kg - ppb)
Acenaphthylene	ND	ND	ND	41,000
2,6-Dinitrotoluene	ND	ND	ND	1,000
3-Nitroaniline	ND	ND	ND	500 or MDL
Acenaphthene	ND	ND	ND	50,000
2,4-Dinitrophenol	ND	ND	ND	200 or MDL
4-Nitrophenol	ND	ND	ND	100 or MDL
Dibenzofuran	ND	ND	ND	6,200
2,4-Dinitrotoluene	ND	ND	ND	N/A
Diethylphthalate	ND	ND	ND	7,100
4-Chlorophenylphenylether	ND	ND	ND	N/A
Fluorene	ND	ND	ND	50,000
4-Nitroaniline	ND	ND	ND	N/A
2-Methyl-4,6-dinitrophenol	ND	ND	ND	N/A
n-Nitrosodiphenylamine	ND	ND	ND	N/A
4-Bromophenylphenylether	ND	ND	ND	N/A
Hexachlorobenzene	ND	ND	ND	410
Pentachlorophenol	ND	ND	ND	1,000 or MDL
Phenanthrene	ND	ND	2,900J	50,000
Anthracene	ND	ND	ND	50,000
Di-n-butyl phthalate	ND	ND	ND	8,100
Fluoranthene	ND	ND	1,900J	50,000
Pyrene	ND	ND	1,800J	50,000
Butylbenzylphthalate	ND	ND	ND	50,000
3,3'-Dichlorobenzidine	ND	ND	ND	N/A
Benzo(a)Anthracene	ND	ND	ND	224 or MDL
Chrysene	ND	ND	ND	400
bis (2-Ethylhexyl) phthalate	ND	ND	ND	50,000
Di-n-octyl phthalate	ND	ND	ND	8,100
Benzo(b) fluoranthene	ND	ND	ND	1,100
Benzo(k) fluoranthene	ND	ND	ND	1,100
Benzo(a) pyrene	ND	ND	ND	61 or MDL
Benzoic acid	ND	ND	ND	2,700

TABLE 3-2
SEMI-VOLATILE ORGANIC COMPOUNDS
GALLAGHER BEACH - ANALYTICAL DATA SUMMARY
ROUND III

Compound	Soil Concentration (µg/kg - ppb)			
	Sample Y213312-SB-NW-1	Sample Y213312-SB-SE-2	Sample Y213312-Deep Comp-3	NYSDEC Recommended Soil Cleanup Objectives[2] (µg/kg - ppb)
Benzyl alcohol	ND	ND	ND	N/A
Indeno(1,2,3-cd) pyrene	ND	ND	ND	3,200
Dibenzo(a,h) anthracene	ND	ND	ND	14 or MDL
Benzo(ghi) perylene	ND	ND	ND	50,000

NOTES
ND = None Detected
N/A = Not Available
MDL = Method Detection Limit
J = Estimated Value (below Laboratory Quantitation Limit)
na = Not Applicable
[1] NYSDEC Technical and Administrative Guidance Memorandum HWR-94-4046, revised January 24, 1994. As per TAGM 4046; total volatiles <10,000 ppb, total semi-volatiles <500,000 ppb, and individual semi-volatiles <50,000 ppb.

[ ] Exceeds NYSDEC recommended soil cleanup objective.

TABLE 3-3
PESTICIDE COMPOUNDS IN SOIL SAMPLES
GALLAGHER BEACH - ANALYTICAL DATA SUMMARY
ROUND III

Compound	Soil Concentration (µg/kg - dry (ppb))			NYSDEC Recommended Soil Cleanup Objectives[2] (µg/kg - ppb)
	Sample Y213312-SB-NW-1	Sample Y213312-SB-SE-2	Sample Y213312-Deep Comp-3	
Sample Date	12/20/04	12/20/04	12/20/04	
Sample Depths (in)	6-11.5	4-10	14-20	
4,4 - DDT	23	ND	ND	2,100
4,4 - DDD	ND	ND	ND	2,900
4,4 - DDE	ND	ND	75J	2,100
Aldrin	ND	ND	ND	41
Chlordane	ND	ND	ND	540
Dieldrin	ND	14J	ND	44
alpha-BHC	ND	ND	ND	110
beta-BHC	ND	ND	ND	200
delta-BHC	ND	ND	230	300
gamma-BHC (Lindane)	ND	ND	ND	60
Endrin	5.7J	8.4J	77J	100
Endrin aldehyde	ND	ND	150	N/A
Endrin ketone	ND	ND	ND	N/A
Endosulfan Sulfate	ND	ND	ND	1,000
Endosulfan I	ND	ND	ND	900
Endosulfan II	ND	ND	ND	900
Heptachlor	ND	ND	ND	100
Heptachlor epoxide	ND	ND	ND	20
Methoxychlor	ND	ND	ND	N/A
Toxaphene	ND	ND	ND	N/A

NOTES:
ND = None Detected
N/A = Not Available
MDL = Method Detection Limit
J = Estimated Value (below Laboratory Quantitation Limit)
na = Not Applicable
[1] NYSDEC Technical and Administrative Guidance Memorandum HWR-94-4046, revised April, 1995. As per TAGM 4046; total pesticides <10,000 ppb.

☐ Exceeds NYSDEC recommended soil cleanup objective.

TABLE 3-4
PCB COMPOUNDS IN SOIL SAMPLES
GALLAGHER BEACH - ANALYTICAL DATA SUMMARY
ROUND III

Compound	Soil Concentration (µg/kg - dry (ppb))			NYSDEC Recommended Soil Cleanup Objectives[2] (µg/kg - ppb)
	Sample Y213312-SB-NW-1	Sample Y213312-SB-SE-2	Sample Y213312-Deep Comp-3	
Sample Date	12/20/04	12/20/04	12/20/04	
Sample Depths (in)	6-11.5	4-10	14-20	
PCBs				
Aroclor 1260	57	170	170J	1000 (surface) 10,000 (subsurface)
Aroclor 1254	160	540	860	1000 (surface) 10,000 (subsurface)
Aroclor 1221	ND	ND	ND	1000 (surface) 10,000 (subsurface)
Aroclor 1232	ND	ND	ND	1000 (surface) 10,000 (subsurface)
Aroclor 1248	280	940	2,300	1000 (surface) 10,000 (subsurface)
Aroclor 1016	ND	ND	ND	1000 (surface) 10,000 (subsurface)
Aroclor 1242	ND	ND	ND	1000 (surface) 10,000 (subsurface)

NOTES:
If a compound was not detected the space was left blank in the table.
ND = None Detected
N/A = Not Available
MDL = Method Detection Limit
J = Estimated Value (below Laboratory Quantitation Limit)
na = Not Applicable

[1] NYSDEC Technical and Administrative Guidance Memorandum HWR-94-4046, revised April, 1995. As per TAGM 4046.

☐ Exceeds NYSDEC recommended soil cleanup objective.

TABLE 3-5
TARGET ANALYTE LIST INORGANICS (METALS) IN SOIL SAMPLES
GALLAGHER BEACH - ANALYTICAL DATA SUMMARY
ROUND III

Parameter	Soil Concentration (mg/kg - dry [ppm])			NYSDEC Guidance Values (ppm)	
	Sample Y213312-SB-NW-1	Sample Y213312-SB-SE-2	Sample Y213312-Deep Comp-3	Eastern USA/NYS Background[1]	Recommended Soil Cleanup Objectives[1] (mg/kg - ppm)
Sample Date	12/20/04	12/20/04	12/20/04		
Sample Depths	6-11.5	4-10	14-20		
Aluminum	4,500	13,600	5,880	33,000	SB
Antimony	ND	ND	ND	N/A	SB
Arsenic	7.6	36.3	51.1	3-12	7.5 or SB
Barium	43.0	115	64.3	15-600	300 or SB
Beryllium	ND	0.71	0.57	0-1.75	0.16 or SB
Cadmium	ND	5.1	2.7	0.1-1	1 or SB
Calcium	16,800	26,400	18,800	130-35,000	SB
Chromium	20.5	175	168	1.5-40	10
Cobalt	5.2	13.0	8.8	2.5-60	30 or SB
Copper	37.3	180	158	1-50	25 or SB
Iron	13,100	37,400	91,500	2000-550,000	2000 or SB
Lead	66.5	306	310	200-500[2]	SB
Magnesium	4,140	9,820	5,500	100-5000	SB
Manganese	252	648	1,300	50-5000	SB
Mercury	0.078	2.0	2.2	0.001-0.2	0.1
Nickel	17.1	42.8	61.5	0.5-25	13 or SB
Potassium	758	1,540	732	8500-43000	SB
Selenium	ND	ND	ND	0.1-3.9	2 or SB
Silver	ND	0.89	0.85	N/A	SB
Sodium	ND	ND	ND	6000-8000	SB
Thallium	ND	ND	ND	N/A	SB
Vanadium	9.1	24.6	19.7	1-300	150 or SB
Zinc	94.2	620	1,080	9-50	20 or SB

NOTES
N/A = Not Available
ND = None Detected
SB = Site Background
na = Not Applicable

[1] NYSDEC Technical and Administrative Guidance Memorandum HDW-94-4046, Revised April, 1995.
[2] Background levels for lead vary widely. Average levels in undeveloped, rural areas may range from 4-61 ppm. Average background levels in metropolitan or suburban areas or near highways are much higher and typically range from 200-500 ppm. Source is NYSDEC TAGM HWR 94-4046.

Exceeds NYSDEC recommended soil cleanup objective.

TABLE 3-6
WET CHEMISTRY ANALYSIS INCLUDING TOTAL RECOVERABLE CYANIDE IN SOIL SAMPLES GALLAGHER BEACH - ANALYTICAL DATA SUMMARY ROUND III

	Soil Concentration (µg/kg - dry (ppb))			
Compound	**Sample Y213312-SB-NW-1**	**Sample Y213312-SB-SE-2**	**Sample Y213312-Deep Comp-3**	**NYSDEC Recommended Soil Cleanup Objectives[2] (µg/kg - ppb)**
Sample Date	12/20/04	12/20/04	12/20/04	
Sample Depths (in)	6-11.5	4-10	14-20	
Cyanide (total)	ND	ND	2.5	N/A

NOTES

N/A = Not Available
ND = None Detected
SB = Site Background
na = Not Applicable

[1] NYSDEC Technical and Administrative Guidance Memorandum HDW-94-4046, Revised April, 1995.
[2] Background levels for lead vary widely. Average levels in undeveloped, rural areas may range from 4-61 ppm. Average background levels in metropolitan or suburban areas or near highways are much higher and typically range from 200-500 ppm. Source is NYSDEC TAGM HWR 94-4046.

Exceeds NYSDEC recommended soil cleanup objective.

4.0 ASSESSMENT OF ENVIRONMENTAL SITE CONDITIONS

Various contaminants were detected in the soil samples collected for laboratory analysis. The largest number of compounds detected and their greatest concentration, especially with regards to volatile, PCB and inorganic parameters are associated with the deepest sediments found at this parcel. Compounds detected above NYSDEC recommended cleanup objectives include several volatile organics and a variety of inorganics. All other compounds (e.g., pesticides, PCBs and semi-volatile organics) were detected at concentrations below NYSDEC recommended soil cleanup objectives.

These compounds are likely attributed to the mixed dredge spoils representing outfall conditions from historical industrial operations in the vicinity of the Buffalo River and Harbor area.

5.0 RECOMMENDATIONS

The contamination found at this site during all three rounds of investigations is consistent with soil intermixed with fill from former manufacturing sites that have had a long history of industrial use (i.e., brownfield sites). Deeper soils appear to represent dredge materials collected by the Army Corps of Engineers from the Buffalo Harbor and Buffalo River and deposited into this former diked containment area. Watts Engineers continues to recommend that the NYSDEC and NYSDOH be consulted to determine if the contaminant concentrations detected at this site are a potential concern for the intended use of the property as a park.

Recently, the NYSDEC has revised their position with regards to vapor intrusion that results from the release and migration of volatile organic compounds and their associated vapors. This investigation identified a large number and greater concentration of volatile organic compounds than the two previous investigations. This may be anticipated based on the depth from which the samples were collected. The NYSDEC may recommend that confirmatory vapor intrusion sampling be conducted for any building constructed on this parcel to confirm vapors are not migrating through the concrete slab and impacting the breathing zone within the proposed facility. This concern should be discussed and reviewed in a meeting with the NYSDEC.

Any workers involved with subsurface excavation, trenching, and future utility installation, should take precautions if their work involves handling these fill materials. Precautions would include wearing gloves to prevent direct dermal contact, keeping the fill moist or wet to minimize the generation of dust and particulates, and abstaining from any activities that would increase the likelihood of hand to mouth transfer (i.e., eating, drinking, smoking) while working within these fill materials.

Any excess materials should be staged for sampling and characterization with regards to disposal. Analysis is recommended to include both the total concentrations of TAL and TCL analytes examined in this investigation as well as TCLP testing to confirm that the materials are not considered hazardous waste under RCRA. The surficial fill materials should be able to be re-used on-site but not as clean soils in active recreational areas. Fill from depths greater than 6+/- feet and characterized by their dark gray-black color appear to represent more contaminated dredge spoils. If excavated, these materials will likely require disposal in an off-site landfill and may be considered hazardous if they fail regulatory toxicity levels under RCRA.

NYSOPRHP should be aware that purchase of this site will involve the transfer of property with identified soil contamination. While low level contamination would classify many of the soils as a solid waste, it is possible that certain locations (especially at depth) contain compounds of concern and pockets of contamination at a concentration that would characterize the material as a hazardous waste/hazardous substance under Resource Recreation and Recovery Act or Toxic Substance Control Act regulations. Purchase of this property should be made with the understanding that the sale will include a transfer of environmental liability associated with the site and therefore, we recommend that this process include review and approval by NYSOPRHP legal council.