CHEMICAL ANALYSIS
OF A MARINE SEDIMENT:

City of Rockland Fish Pier,
Rockland Harbor, Rockland, ME
Application Number NAE-2015-1695

Prepared For:

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EnviroSystems, Inc. Sample Delivery Group Reference 26993

Study Specific Reference 26993-202 and 26993-203

LABORATORY STANDARDS STATEMENT

This study was performed by EnviroSystems, Incorporated at its facility in Hampton, New Hampshire. EnviroSystems' laboratory is accredited by the State of New Hampshire under the National Environmental Laboratory Accreditation (NELAC) program. Additionally, ESI is accredited under the Department of Defense (DoD) ELAP program, ISO/IEC 17025:2005, Certificate Number L2340. All testing conducted by EnviroSystems as part of this program was compliant with NELAC guidelines and standards. Additionally, this study was conducted in accordance with guidelines presented in the 2004 version of the New England District's Regional Implementation Manual (RIM) for Evaluation of Dredged Material Proposed for Disposal In New England Waters. Any deviations from specific elements of the RIM are detailed in the Protocol Deviation Section of this Report.

For EnviroSystems, Inc. March 15, 2016

Kenneth A. Simon
Technical Director

Date

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1.0 SAMPLE COLLECTION, PRESERVATION AND STORAGE

Sediment samples for chemical and physical analysis were provided by Eco- Analysts, Inc. from locations specified within the project work plan. Samples were received under chain of custody in sample containers appropriate for the specified analysis. Upon arrival at the laboratory, all samples received an internal sample control number and were logged into the project sample control system. Samples were placed in a secure sample holding location and stored at a temperature of 4±2°C until analysis.

2.0 ANALYSIS

Sample analysis was carried out following methods and protocol specified in the project Sample Analysis Plan by EnviroSystems, Inc. at its Hampton, NH facility. Review of the data report document showed that all sample holding times were met, unless otherwise qualified, that the analytical methods used in the analysis were appropriate for the parameter and sample matrix and met New England District Regional Implementation Manual requirements. Review of supporting quality assurance data documented that, ecept where qualified, all data collected meet all of the requirements of NELAC, for all NELAC accredited parameters.

3.0 RESULTS

Analytical methods used in the analysis of sediment samples were analyzed using protocol recommended in Tables 2 and 3 of the New England District RIM document with appropriate updates related to current methods. Trace metals were evaluated using EPA Method 6020, Inductively Coupled Plasma - Mass Spectrometry (ICP-MS), mercury was evaluated using EPA Method 245.7, Cold Vapor Atomic Fluorescence Spectrometry. PCB Congeners and PAH compounds were analyzed by EPA Method 8270C - SIM. Pesticides were analyzed by EPA Method 8081B. In cases where dilution of the sample extract was required the final reporting limit remained above the RIM document specified limits and did not result in artificial “Non Detects.”

A review of QC data documented one incidence where the Standard Reference Material % R was above acceptable limits. There were two incidences where the %RR exceeded the acceptable limit in laboratory duplicates and two incidences where matrix spike recoveries were above the acceptable limit.

A full copy of the analytical report is included in the following data appendix

TABLE OF CONTENTS

Report Element	Number of Pages	Page Number
Sediment Analysis		
Trace Metals and Total Organic Carbon Analysis	2	5
PCB Congener Analysis	2	7
PAH Analysis	2	9
Pesticide Analysis	2	11
QC Support		
Trace Metals and Total Organic Carbon QC Support	12	13
PCB Congener QC Support	6	25
PAH QC Support	6	31
Pesticide QC Support	6	37
New England District Quality Control Summary Tables	6	43
Sample Support Documents		
COC, Sample Receipt Record	2	49
Grain Size Report	10	51
Total Pages	60	

Report No: 26993 SDG:
Project: Rockland Fish Pier

Sample ID: Composite 1
Matrix: Solid
Sampled: 02/10/16 0930

Parameter		Result		Quant Limit	Units	Date Prepared	Date of Analysis	INIT/Method/Reference
Total solids	26993-202	75		0.1	%	02/10/16 1115	02/10/16 1115	JH /160.3 EPA 600/4/79/020
Organic Carbon Rep 1	26993-202	1.28		0.51	%	02/18/16 1005	02/22/16 0830	AC /SW846 9060
Organic Carbon Rep 2	26993-202	1.07		0.51	%	02/18/16 1005	02/22/16 0830	AC /SW846 9060
Arsenic, total	26993-202	6.6		0.2	ug/g dry wt	02/25/16 1000	02/26/16	JLH/SW846 3rd Ed. 6020
Cadmium, total	26993-202	0.16		0.05	ug/g dry wt	02/25/16 1000	02/26/16	JLH/SW846 3rd Ed. 6020
Chromium, total	26993-202	24		0.2	ug/g dry wt	02/25/16 1000	02/26/16	JLH/SW846 3rd Ed. 6020
Copper, total	26993-202	34	J6,J7	0.05	ug/g dry wt	02/25/16 1000	02/26/16	JLH/SW846 3rd Ed. 6020
Lead, total	26993-202	22	J8	0.05	ug/g dry wt	02/25/16 1000	02/26/16	JLH/SW846 3rd Ed. 6020
Mercury, total	26993-202	0.022		0.02	ug/g dry wt	02/29/16 1100	02/29/16 1400	AC /EPA 245.7
Nickel, total	26993-202	17		0.2	ug/g dry wt	02/25/16 1000	02/26/16	JLH/SW846 3rd Ed. 6020
Zinc, total	26993-202	73	J6	0.2	ug/g dry wt	02/25/16 1000	02/26/16	JLH/SW846 3rd Ed. 6020

Notes:

J6 = Estimate, MS %R above limit.

J7 = Estimate, MSD %RR above limit.

J8 = Estimate, Dup %RR above limit.

Report No: 26993 SDG:
Project: Rockland Fish Pier

Sample ID: Composite 2
Matrix: Solid
Sampled: 02/10/16 1000

Parameter		Result		Quant Limit	Units	Date Prepared	Date of Analysis	INIT/Method/Reference
Total solids	26993-203	49.3		0.1	%	02/10/16 1115	02/10/16 1115	JH /160.3 EPA 600/4/79/020
Organic Carbon Rep 1	26993-203	2.95	J6	0.5	%	02/18/16 1005	02/22/16 0830	AC /SW846 9060
Organic Carbon Rep 2	26993-203	2.8		0.5	%	02/18/16 1005	02/22/16 0830	AC /SW846 9060
Arsenic, total	26993-203	13		0.2	ug/g dry wt	02/25/16 1000	02/26/16	JLH/SW846 3rd Ed. 6020
Cadmium, total	26993-203	1.4		0.05	ug/g dry wt	02/25/16 1000	02/26/16	JLH/SW846 3rd Ed. 6020
Chromium, total	26993-203	46		0.2	ug/g dry wt	02/25/16 1000	02/26/16	JLH/SW846 3rd Ed. 6020
Copper, total	26993-203	95		0.05	ug/g dry wt	02/25/16 1000	02/26/16	JLH/SW846 3rd Ed. 6020
Lead, total	26993-203	140		0.05	ug/g dry wt	02/25/16 1000	02/26/16	JLH/SW846 3rd Ed. 6020
Mercury, total	26993-203	0.81		0.1	ug/g dry wt	02/29/16 1100	02/29/16 1400	AC /EPA 245.7
Nickel, total	26993-203	25		0.2	ug/g dry wt	02/25/16 1000	02/26/16	JLH/SW846 3rd Ed. 6020
Zinc, total	26993-203	330		0.2	ug/g dry wt	02/25/16 1000	02/26/16	JLH/SW846 3rd Ed. 6020

Notes:

J6 = Estimate, MS %R above limit.

PCB Congeners in Sediment
SW 846 8082/EPA 680 modified

Lab Number:	26993-202
Sample Designation:	Composite 1
Date Sampled:	02/10/16
Date Extracted:	02/10/16
Date Analyzed:	02/13/16
Matrix:	Solid
Moisture (%):	25
Sample Amount (g):	26
Final Volume (mL)	1.0
Dilution Factor:	1

Congener Number	PCB Congener	Concentration (ug/Kg)	Qualifier
8	2,4'-dichlorobiphenyl	0.1	U
18	2,2',5-trichlorobiphenyl	0.1	U
28	2,4,4'-trichlorobiphenyl	0.3	
44	2,2',3,5'-tetrachlorobiphenyl	4.6	
49	2,2',4,5'-tetrachlorobiphenyl	2.7	
52	2,2',5,5'-tetrachlorobiphenyl	15	
66	2,3',4,4'-tetrachlorobiphenyl	2.4	
77	3,3',4,4'-tetrachlorobiphenyl	0.1	U
87	2,2',3,4,5'-pentachlorobiphenyl	17	
101	2,2',4,5,5'-pentachlorobiphenyl	37	
105	2,3,3',4,4'-pentachlorobiphenyl	9.7	
118	2,3',4,4',5-pentachlorobiphenyl	28	
126	3,3',4,4',5-pentachlorobiphenyl	0.1	U
128	2,2',3,3',4,4'-hexachlorobiphenyl	6.0	
138	2,2',3,4,4',5'-hexachlorobiphenyl	28	
153	2,2',4,4',5,5'-hexachlorobiphenyl	18	
156	2,3,3',4,4',5-hexachlorobiphenyl		
169	3,3',4,4',5,5'-hexachlorobiphenyl		
170	2,2',3,3',4,4',5-heptachlorobiphenyl	2.7	
180	2,2',3,4,4',5,5'-heptachlorobiphenyl	3.0	
183	2,2',3,4,4',5',6-heptachlorobiphenyl	1.0	
184	2,2',3,4,4',6,6'-heptachlorobiphenyl	0.1	U
187	2,2',3,4',5,5',6-heptachlorobiphenyl	1.4	
195	2,2',3,3',4,4',5,6-octachlorobiphenyl	0.2	
206	2,2',3,3',4,4',5,5',6-nonachlorobiphenyl	0.4	
209	2,2',3,3',4,4',5,5',6,6'-decachlorobiphenyl	0.2	

Surrogate Standard	Recovery (%)	Advisory Limits (%)
PCB 198	70	30 - 150

U = Not detected at value reported

PCB Congeners in Sediment
SW 846 8082/EPA 680 modified

Lab Number:	26993-203
Sample Designation:	Composite 2
Date Sampled:	02/10/16
Date Extracted:	02/10/16
Date Analyzed:	02/13/16
Matrix:	Solid
Moisture (%):	51
Sample Amount (g):	42
Final Volume (mL)	1.0
Dilution Factor:	1

Congener Number	PCB Congener	Concentration (ug/Kg)	Qualifier
8	2,4'-dichlorobiphenyl	0.1	U
18	2,2',5-trichlorobiphenyl	0.1	U
28	2,4,4'-trichlorobiphenyl	0.1	U
44	2,2',3,5'-tetrachlorobiphenyl	0.1	U
49	2,2',4,5'-tetrachlorobiphenyl	0.1	U
52	2,2',5,5'-tetrachlorobiphenyl	0.8	
66	2,3',4,4'-tetrachlorobiphenyl	0.1	U
77	3,3',4,4'-tetrachlorobiphenyl	0.1	U
87	2,2',3,4,5'-pentachlorobiphenyl	1.3	
101	2,2',4,5,5'-pentachlorobiphenyl	3.4	
105	2,3,3',4,4'-pentachlorobiphenyl	1.5	
118	2,3',4,4',5-pentachlorobiphenyl	3.2	
126	3,3',4,4',5-pentachlorobiphenyl	0.1	U
128	2,2',3,3',4,4'-hexachlorobiphenyl	0.9	
138	2,2',3,4,4',5'-hexachlorobiphenyl	4.2	
153	2,2',4,4',5,5'-hexachlorobiphenyl	3.8	
156	2,3,3',4,4',5-hexachlorobiphenyl		
169	3,3',4,4',5,5'-hexachlorobiphenyl		
170	2,2',3,3',4,4',5-heptachlorobiphenyl	2.2	
180	2,2',3,4,4',5,5'-heptachlorobiphenyl	3.5	
183	2,2',3,4,4',5',6-heptachlorobiphenyl	0.9	
184	2,2',3,4,4',6,6'-heptachlorobiphenyl	0.1	U
187	2,2',3,4',5,5',6-heptachlorobiphenyl	1.8	
195	2,2',3,3',4,4',5,6-octachlorobiphenyl	0.3	
206	2,2',3,3',4,4',5,5',6-nonachlorobiphenyl	0.9	
209	2,2',3,3',4,4',5,5',6,6'-decachlorobiphenyl	1.2	

Surrogate Standard	Recovery (%)	Advisory Limits (%)
PCB 198	74	30 - 150

U = Not detected at value reported

Polynuclear Aromatic Hydrocarbons in Sediment
SW 846 8270/EPA 680 modified

Lab Number:	26993-202
Sample Designation:	Composite 1
Date Sampled:	02/10/16 0930
Date Extracted:	02/10/16 1000
Date Analyzed:	02/11/16
Matrix:	Solid
Moisture (%):	25
Sample Amount (g):	26
Final Volume (mL)	1.00
Dilution Factor:	1

Compound	Concentration (ug/Kg)	Qualifier
naphthalene	14	
acenaphthylene	25	
acenaphthene	27	
fluorene	46	
phenanthrene	750	
anthracene	130	
fluoranthene	1500	
pyrene	1000	
benzo[a]anthracene	570	
chrysene	640	
benzo[b]fluoranthene	470	
benzo[k]fluoranthene	530	
benzo[a]pyrene	470	
indeno[1,2,3-cd]pyrene	290	
dibenz[a,h]anthracene	57	
benzo[g,h,i]perylene	290	

Surrogate Standards	Recovery (%)	Advisory Limits (%)
2-fluorobiphenyl	56	30 - 150
o-terphenyl	75	30 - 150

Polynuclear Aromatic Hydrocarbons in Sediment
SW 846 8270/EPA 680 modified

Lab Number:	26993-203
Sample Designation:	Composite 2
Date Sampled:	02/10/16 1000
Date Extracted:	02/10/16 1000
Date Analyzed:	02/11/16
Matrix:	Solid
Moisture (%):	51
Sample Amount (g):	42
Final Volume (mL)	1.00
Dilution Factor:	1

Compound	Concentration (ug/Kg)	Qualifier
naphthalene	99	
acenaphthylene	100	
acenaphthene	140	
fluorene	220	
phenanthrene	2400	
anthracene	490	
fluoranthene	3500	
pyrene	2700	
benzo[a]anthracene	1500	
chrysene	1400	
benzo[b]fluoranthene	1200	
benzo[k]fluoranthene	1200	
benzo[a]pyrene	1100	
indeno[1,2,3-cd]pyrene	670	
dibenz[a,h]anthracene	160	
benzo[g,h,i]perylene	630	

Surrogate Standards	Recovery (%)	Advisory Limits (%)
2-fluorobiphenyl	41	30 - 150
o-terphenyl	67	30 - 150

Pesticides in Sediment
SW 846 8081B

Lab Number:	26993-202
Sample Designation:	Composite 1
Date Sampled:	02/10/16 0930
Date Extracted:	02/10/16 1000
Date Analyzed:	03/04/16
Matrix:	Solid
Moisture (%):	25
Sample Amount (g):	26
Final Volume (mL)	1.0
Dilution Factor:	2

Analyte	Concentration (ug/Kg)	Qualifier
aldrin	0.2	U
gamma-chlordane (cis)	2	T
alpha-chlordane (trans)	0.2	U
cis-nonachlor	1.1	T, J3
trans-nonachlor	0.21	T,J
oxychlordane	0.2	U
4,4'-DDT	7	T
4,4'-DDE	3.8	T
4,4'-DDD	0.4	U
alpha-BHC	0.2	U
dieldrin	0.7	T,J
endosulfan I	0.82	T
endosulfan II	0.5	T
endrin	0.41	T,J
heptachlor	0.2	U
heptachlor epoxide	0.2	U
hexachlorobenzene	0.2	U
gamma-BHC (lindane)	0.2	U
methoxychlor	2	U
toxaphene	10	U

Surrogate Standard	Recovery (%)	Advisory Limits (%)
tetrachloro-m-xylene	62	30 - 150
decachlorobiphenyl	53	30 - 150

U = Not detected at indicated level.
T = Concentrations of target analytes were too low for GCMS confirmation. Compound identification is tentative.
J = Initial calibration verification acceptable. Closing calibration verification for trans- nonachlor was 70% and 54% for dieldrin and endrin. Acceptance limits are 85-115%.

Pesticides in Sediment
SW 846 8081B

Lab Number:	26993-203
Sample Designation:	Composite 2
Date Sampled:	02/10/16 1000
Date Extracted:	02/10/16 1000
Date Analyzed:	03/04/16
Matrix:	Solid
Moisture (%):	51
Sample Amount (g):	42
Final Volume (mL)	1.0
Dilution Factor:	2

Analyte	Concentration (ug/Kg)	Qualifier
aldrin	1.9	T
gamma-chlordane (cis)	1.2	T
alpha-chlordane (trans)	1.7	T
cis-nonachlor	0.2	U
trans-nonachlor	0.2	U
oxychlordane	0.2	U
4,4'-DDT	5	T
4,4'-DDE	3.6	T
4,4'-DDD	0.76	T
alpha-BHC	0.2	U
dieldrin	0.66	T,J
endosulfan I	1.9	T
endosulfan II	0.4	U
endrin	0.4	U
heptachlor	0.31	T
heptachlor epoxide	0.2	U
hexachlorobenzene	0.2	U
gamma-BHC (lindane)	14	T
methoxychlor	2	U
toxaphene	10	U

Surrogate Standard	Recovery (%)	Advisory Limits (%)
tetrachloro-m-xylene	54	30 - 150
decachlorobiphenyl	69	30 - 150

U = Not detected at indicated level.
T = Concentrations of target analytes were too low for GCMS confirmation. Compound identification is tentative.
J = Initial calibration verification acceptable. Closing calibration verification for dieldrin was 54%. Acceptance limits are 85-115%.

Quality Control Summary

Parameter: Arsenic, total
Project: Rockland Fish Pier
Matrix: Solid
QC Batch No: 441S

Pertains to samples:

Lab ID	Sample ID	Lab ID	Sample ID
26993-202	Composite 1		
26993-203	Composite 2		

	Control Limit +/-	Preparation Blank Result ug/g dry wt	Q		M
PB441S	0.02	0.02	U		Pass

LABORATORY CONTROL SAMPLE RECOVERY

ID	Control Limit %	Lab Control Sample Result ug/g dry wt	True Value ug/g dry wt	%R	Lab Control Dup Sample Result ug/g dry wt	True Value ug/g dry wt	%R	
LCS	85-115	24.3	25	97	24.9	25	100	Pass
SRM	70-130	16.8	18.9	89				Pass

DUPLICATE ANALYSIS

ID	Control Limit %	Duplicate Result ug/g dry wt	Q	Sample Result ug/g dry wt	Q	RPD	Q	
26993-202	20	5.75		6.59		14		Pass

SPIKE SAMPLE ANALYSIS

ID	Control Limit %	Spiked Sample Result ug/g dry wt	Spike Added ug/g dry wt	Sample Result ug/g dry wt	Q	%R	Q	
26993-202S	80-120	29.5	25.1	6.59		91		Pass
26993-202SD	80-120	29.3	24.7	6.59		92		Pass

Quality Control Summary

Parameter: Cadmium, total
Project: Rockland Fish Pier
Matrix: Solid
QC Batch No: 441S

Pertains to samples:

Lab ID	Sample ID	Lab ID	Sample ID
26993-202	Composite 1		
26993-203	Composite 2		

	Control Limit +/-	Preparation Blank Result ug/g dry wt	Q		M
PB441S	0.005	0.005	U		Pass

LABORATORY CONTROL SAMPLE RECOVERY

ID	Control Limit %	Lab Control Sample Result ug/g dry wt	True Value ug/g dry wt	%R	Lab Control Dup Sample Result ug/g dry wt	True Value ug/g dry wt	%R	
LCS	85-115	12.0	12.5	96	12.4	12.5	99	Pass
SRM	70-130	8.21	8.8	93				Pass

DUPLICATE ANALYSIS

ID	Control Limit %	Duplicate Result ug/g dry wt	Q	Sample Result ug/g dry wt	Q	RPD	Q	
26993-202	20	0.11		0.16		NC		Pass

SPIKE SAMPLE ANALYSIS

ID	Control Limit %	Spiked Sample Result ug/g dry wt	Spike Added ug/g dry wt	Sample Result ug/g dry wt	Q	%R	Q	
26993-202S	80-120	12.4	12.5	0.16		98		Pass
26993-202SD	80-120	12.7	12.3	0.16		102		Pass

Quality Control Summary

Parameter: Copper, total
Project: Rockland Fish Pier
Matrix: Solid
QC Batch No: 441S

Pertains to samples:

Lab ID	Sample ID	Lab ID	Sample ID
26993-202	Composite 1		
26993-203	Composite 2		

	Control Limit +/-	Preparation Blank Result ug/g dry wt	Q		M
PB441S	0.005	0.005	U		Pass

LABORATORY CONTROL SAMPLE RECOVERY

ID	Control Limit %	Lab Control Sample Result ug/g dry wt	True Value ug/g dry wt	%R	Lab Control Dup Sample Result ug/g dry wt	True Value ug/g dry wt	%R	
LCS	85-115	24.9	25	100	24.9	25	100	Pass
SRM	70-130	349	380	92				Pass

DUPLICATE ANALYSIS

ID	Control Limit %	Duplicate Result ug/g dry wt	Q	Sample Result ug/g dry wt	Q	RPD	Q	
26993-202	20	35.4		33.6		5		Pass

SPIKE SAMPLE ANALYSIS

ID	Control Limit %	Spiked Sample Result ug/g dry wt	Spike Added ug/g dry wt	Sample Result ug/g dry wt	Q	%R	Q	
26993-202S	80-120	58.2	25.1	33.6		98		Pass
26993-202SD	80-120	71.0	24.7	33.6		151	J6	High

J6 = MS %R above limit

Quality Control Summary

Parameter: Chromium, total
Project: Rockland Fish Pier
Matrix: Solid
QC Batch No: 441S

Pertains to samples:

Lab ID	Sample ID	Lab ID	Sample ID
26993-202	Composite 1		
26993-203	Composite 2		

	Control Limit +/-	Preparation Blank Result ug/g dry wt	Q		M
PB441S	0.02	0.22	B		High

LABORATORY CONTROL SAMPLE RECOVERY

ID	Control Limit %	Lab Control Sample Result ug/g dry wt	True Value ug/g dry wt	%R	Lab Control Dup Sample Result ug/g dry wt	True Value ug/g dry wt	%R	
LCS	85-115	19.8	20	99	19.8	20	99	Pass
SRM	70-130	192	266	72				Pass

DUPLICATE ANALYSIS

ID	Control Limit %	Duplicate Result ug/g dry wt	Q	Sample Result ug/g dry wt	Q	RPD	Q	
26993-202	20	25.9		24.3		6		Pass

SPIKE SAMPLE ANALYSIS

ID	Control Limit %	Spiked Sample Result ug/g dry wt	Spike Added ug/g dry wt	Sample Result ug/g dry wt	Q	%R	Q	
26993-202S	80-120	47.4	20.0	24.3		115		Pass
26993-202SD	80-120	44.8	19.8	24.3		104		Pass

B = Analyte found in laboratory blank at level indicated.

Quality Control Summary

Parameter: Lead, total
Project: Rockland Fish Pier
Matrix: Solid
QC Batch No: 441S

Pertains to samples:

Lab ID	Sample ID	Lab ID	Sample ID
26993-202	Composite 1		
26993-203	Composite 2		

	Control Limit +/-	Preparation Blank Result ug/g dry wt	Q		M
PB441S	0.005	0.005	U		Pass

LABORATORY CONTROL SAMPLE RECOVERY

ID	Control Limit %	Lab Control Sample Result ug/g dry wt	True Value ug/g dry wt	%R	Lab Control Dup Sample Result ug/g dry wt	True Value ug/g dry wt	%R	
LCS	85-115	23.7	25.000	95	23.9	25.000	96	Pass
SRM	70-130	303.0	330.0	92				Pass

DUPLICATE ANALYSIS

ID	Control Limit %	Duplicate Result ug/g dry wt	Q	Sample Result ug/g dry wt	Q	RPD	Q	
26993-202	20	14.7		22.0		40	J8	High

SPIKE SAMPLE ANALYSIS

ID	Control Limit %	Spiked Sample Result ug/g dry wt	Spike Added ug/g dry wt	Sample Result ug/g dry wt	Q	%R	Q	
26993-202S	80-120	43.6	25.1	22.0		86		Pass
26993-202SD	80-120	43.9	24.7	22.0		89		Pass

J8 = Duplicate RPD above limit.

Quality Control Summary

Parameter: Mercury, total
Project: Rockland Fish Pier
Matrix: Solid
QC Batch No: 132S

Pertains to samples:

Lab ID	Sample ID	Lab ID	Sample ID
26993-202	Composite 1		
26993-203	Composite 2		

	Control Limit +/-	Preparation Blank Result ug/g	Q		M
PB132S	0.01	0.01	U		Pass

LABORATORY CONTROL SAMPLE RECOVERY

ID	Control Limit %	Lab Control Sample Result ug/g	True Value ug/g	%R	Lab Control Dup Sample Result ug/g	True Value ug/g	%R	
LCS	85-115	1.47	1.600	92	1.49	1.600	93	Pass
SRM	70-130	3.17	3.4	93				Pass

DUPLICATE ANALYSIS

ID	Control Limit %	Duplicate Result ug/g dry wt	Q	Sample Result ug/g dry wt	Q	RPD	Q	
26993-202	20	0.022		0.022		NC		Pass

SPIKE SAMPLE ANALYSIS

ID	Control Limit %	Spiked Sample Result ug/g dry wt	Spike Added ug/g dry wt	Sample Result ug/g dry wt	Q	%R	Q	
26993-202S	80-120	1.59	1.60	0.022		98		Pass
26993-202SD	80-120	1.54	1.58	0.022		96		Pass

Quality Control Summary

Parameter: Nickel, total
Project: Rockland Fish Pier
Matrix: Solid
QC Batch No: 441S

Pertains to samples:

Lab ID	Sample ID	Lab ID	Sample ID
26993-202	Composite 1		
26993-203	Composite 2		

	Control Limit +/-	Preparation Blank Result ug/g dry wt	Q		M
PB441S	0.02	0.02	U		Pass

LABORATORY CONTROL SAMPLE RECOVERY

ID	Control Limit %	Lab Control Sample Result ug/g dry wt	True Value ug/g dry wt	%R	Lab Control Dup Sample Result ug/g dry wt	True Value ug/g dry wt	%R	
LCS	85-115	50.3	50	101	49.8	50	100	Pass
SRM	70-130	59.0	76.1	78				Pass

DUPLICATE ANALYSIS

ID	Control Limit %	Duplicate Result ug/g dry wt	Q	Sample Result ug/g dry wt	Q	RPD	Q	
26993-202	20	14.5		17.0		16		Pass

SPIKE SAMPLE ANALYSIS

ID	Control Limit %	Spiked Sample Result ug/g dry wt	Spike Added ug/g dry wt	Sample Result ug/g dry wt	Q	%R	Q	
26993-202S	80-120	65.3	50.1	17.0		96		Pass
26993-202SD	80-120	66.5	49.4	17.0		100		Pass

Quality Control Summary

Parameter: Zinc, total
Project: Rockland Fish Pier
Matrix: Solid
QC Batch No: 441S

Pertains to samples:

Lab ID	Sample ID	Lab ID	Sample ID
26993-202	Composite 1		
26993-203	Composite 2		

	Control Limit +/-	Preparation Blank Result ug/g dry wt	Q		M
PB441S	0.02	0.02	U		Pass

LABORATORY CONTROL SAMPLE RECOVERY

ID	Control Limit %	Lab Control Sample Result ug/g dry wt	True Value ug/g dry wt	%R	Lab Control Dup Sample Result ug/g dry wt	True Value ug/g dry wt	%R	
LCS	85-115	52.7	50	105	52.7	50	105	Pass
SRM	70-130	560	656	85				Pass

DUPLICATE ANALYSIS

ID	Control Limit %	Duplicate Result ug/g dry wt	Q	Sample Result ug/g dry wt	Q	RPD	Q	
26993-202	20	72.5		73.4		1		Pass

SPIKE SAMPLE ANALYSIS

ID	Control Limit %	Spiked Sample Result ug/g dry wt	Spike Added ug/g dry wt	Sample Result ug/g dry wt	Q	%R	Q	
26993-202S	80-120	129	50.1	73.4		111		Pass
26993-202SD	80-120	138	49.4	73.4		131	J6	High

J6 = MS %R above limit

Metals by ICPMS and Mercury by CVAF
EPA 200.8 SW846 6020 and EPA 245.7

Lab Number: MDL2015
Sample Designatio Solid
Date Analyzed: 03/15/15
Date Analyzed: 02/04/15 Mercury
Matrix: Solid
Sample Amount (g) 1
Final Volume (mL) 50

	True Value ug/g	Rep 1 ug/g	Rep 2 ug/g	Rep 3 ug/g	Rep 4 ug/g	Rep 5 ug/g	Rep 6 ug/g	Rep 7 ug/g	RL ug/g	MDL ug/g
Aluminum, total	0.5	0.544	0.481	0.449	0.364	0.291	0.491	0.468	0.25	0.3
Antimony, total	0.01	0.00955	0.0101	0.00945	0.01	0.0102	0.0099	0.00945	0.10	0.001
Arsenic, total	0.025	0.0222	0.0272	0.029	0.0229	0.0245	0.027	0.0261	0.10	0.007
Barium, total	0.2	0.193	0.193	0.191	0.2	0.205	0.193	0.195	0.10	0.015
Beryllium, total	0.005	0.00495	0.00565	0.0051	0.00505	0.00495	0.00495	0.00505	0.10	0.001
Boron, total	0.05	0.034	0.0343	0.0364	0.0338	0.0311	0.0329	0.0315	0.25	0.005
Cadmium, total	0.0125	0.013	0.0124	0.0129	0.0126	0.0129	0.0123	0.0125	0.10	0.001
Calcium, total	0.5	0.5	0.55	0.4	0.55	0.55	0.55	0.45	0.10	0.18
Chromium, total	0.02	0.0188	0.0198	0.0191	0.0198	0.0192	0.0198	0.0191	0.10	0.0012
Cobalt, total	0.05	0.0478	0.0481	0.0476	0.0465	0.0472	0.0464	0.0472	0.10	0.0019
Copper, total	0.025	0.0237	0.0244	0.0244	0.0237	0.0243	0.0234	0.0236	0.10	0.0012
Iron, total	0.25	0.271	0.266	0.272	0.168	0.149	0.201	0.194	0.25	0.15
Lead, total	0.025	0.0245	0.0244	0.0242	0.0246	0.0249	0.0242	0.0242	0.10	0.001
Magnesium, total	0.5	0.5	0.45	0.45	0.35	0.3	0.5	0.55	0.25	0.3
Manganese, total	0.05	0.0468	0.0464	0.0478	0.0467	0.0463	0.0486	0.0482	0.10	0.003
Mercury, total	0.025	0.0273	0.0264	0.0272	0.0266	0.0268	0.027	0.0277	0.01	0.002
Molybdenum, total	0.05	0.0536	0.0512	0.0521	0.0441	0.0434	0.0334	0.0321	0.10	0.03
Nickel, total	0.05	0.0476	0.0491	0.0476	0.0467	0.0482	0.0483	0.0469	0.10	0.003
Potassium, total	1.25	1.3	1.35	1.45	1.15	1.15	1.3	1.3	0.10	0.3
Selenium, total	0.025	0.0267	0.0269	0.026	0.0245	0.0261	0.0282	0.0283	0.10	0.004
Silver, total	0.025	0.0236	0.0248	0.0248	0.0248	0.0252	0.0241	0.0246	0.10	0.0016
Sodium, total	1.25	1.15	1.1	1.25	1	0.95	1.1	1.15	0.25	0.3
Strontium, total	0.01	0.0099	0.00995	0.00975	0.00975	0.01	0.0099	0.0098	0.10	0.001
Thallium, total	0.025	0.0195	0.0196	0.0196	0.019	0.0191	0.0182	0.0175	0.10	0.003
Tin, total	0.01	0.0088	0.00835	0.00835	0.0093	0.00915	0.00885	0.0091	0.10	0.0011
Vanadium, total	0.05	0.0484	0.0476	0.0483	0.0479	0.0477	0.0489	0.0483	0.10	0.0013
Zinc, total	0.05	0.0496	0.0527	0.0519	0.0522	0.0491	0.0504	0.0495	0.10	0.005

Quality Control Summary

Parameter: Organic carbon Rep 1
Project: Rockland Fish Pier
Matrix: Solid
QC Batch No: 462S

Pertains to samples:

Lab ID	Sample ID	Lab ID	Sample ID
26993-202	Composite 1		
26993-203	Composite 2		

	Control Limit +/-	Preparation Blank Result %	Q		M
PB462S	0.1	0.1	U		Pass

LABORATORY CONTROL SAMPLE RECOVERY

ID	Control Limit %	Lab Control Sample Result %	True Value %	%R	Lab Control Dup Sample Result %	True Value %	%R	
LCS	85-115	0.86	1	86	0.95	1	95	Pass
SRM	70-130	3.81	4.4	87				Pass

DUPLICATE ANALYSIS

ID	Control Limit %	Duplicate Result %	Q	Sample Result %	Q	RPD	Q	
26993-203	20	2.32		2.95		24		High

SPIKE SAMPLE ANALYSIS

ID	Control Limit %	Spiked Sample Result %	Spike Added %	Sample Result %	Q	%R	Q	
26993-203S	80-120	4.18	1.08	2.95		114		Pass
26993-203SD	80-120	4.65	1.08	2.95		162	J6	High

J6 = MS %R above limit

Quality Control Summary

Parameter: Organic carbon Rep 2
Project: Rockland Fish Pier
Matrix: Solid
QC Batch No: 462S

Pertains to samples:

Lab ID	Sample ID	Lab ID	Sample ID
26993-202	Composite 1		
26993-203	Composite 2		

	Control Limit +/-	Preparation Blank Result %	Q		M
PB462S	0.1	0.1	U		Pass

LABORATORY CONTROL SAMPLE RECOVERY

ID	Control Limit %	Lab Control Sample Result %	True Value %	%R	Lab Control Dup Sample Result %	True Value %	%R	
LCS	85-115	0.86	1	86	0.90	1	90	Pass
SRM	70-130	4.11	4.4	93				Pass

DUPLICATE ANALYSIS

ID	Control Limit %	Duplicate Result %	Q	Sample Result %	Q	RPD	Q	
26993-203	20	2.82		2.80		1		Pass

SPIKE SAMPLE ANALYSIS

ID	Control Limit %	Spiked Sample Result %	Spike Added %	Sample Result %	Q	%R	Q	
26993-203S	80-120	3.98	1.09	2.80		108		Pass
26993-203SD	80-120	4.17	1.10	2.80		124		Pass

Wet Chemistry
SW846 9060
Total Organic Carbon in Sediment

Lab Number:	MDLS 2015
Sample Designation:	Sediment
Date Sampled:	01/22/15
Date Analyzed:	01/22/15
Matrix:	Sediment
Moisture:	NA
Sample Amount (mL):	NA
Final Volume (mL)	NA
Dilution Factor:	1

	True Value % Dry Wt	Replicate 1 % Dry Wt	Replicate 2 % Dry Wt	Replicate 3 % Dry Wt	Replicate 4 % Dry Wt	Replicate 5 % Dry Wt	Replicate 6 % Dry Wt	Replicate 7 % Dry Wt	Std Dev % Dry Wt	MDL % Dry Wt
Total Organic Carbon	0.1	0.08	0.06	0.06	0.06	0.08	0.04	0.12	0.02	0.07

Lab Number:	PB921S
Sample Designation:	Laboratory Blank PB921S
Date Sampled:	02/10/16
Date Extracted:	02/10/16
Date Analyzed:	02/12/16
Matrix:	Solid
Sample Amount (g):	20
Final Volume (mL)	1.00
Dilution Factor:	1

Congener Number	PCB Congener	Concentration (ug/Kg)	Qualifier
8	2,4'-dichlorobiphenyl	0.1	U
18	2,2',5-trichlorobiphenyl	0.1	U
28	2,4,4'-trichlorobiphenyl	0.1	U
44	2,2',3,5'-tetrachlorobiphenyl	0.1	U
49	2,2',4,5'-tetrachlorobiphenyl	0.1	U
52	2,2',5,5'-tetrachlorobiphenyl	0.1	U
66	2,3',4,4'-tetrachlorobiphenyl	0.1	U
77	3,3',4,4'-tetrachlorobiphenyl	0.1	U
87	2,2',3,4,5'-pentachlorobiphenyl	0.1	U
101	2,2',4,5,5'-pentachlorobiphenyl	0.1	U
105	2,3,3',4,4'-pentachlorobiphenyl	0.1	U
118	2,3',4,4',5-pentachlorobiphenyl	0.1	U
126	3,3',4,4',5-pentachlorobiphenyl	0.1	U
128	2,2',3,3',4,4'-hexachlorobiphenyl	0.1	U
138	2,2',3,4,4',5'-hexachlorobiphenyl	0.1	U
153	2,2',4,4',5,5'-hexachlorobiphenyl	0.1	U
156	2,3,3',4,4',5-hexachlorobiphenyl		
169	3,3',4,4',5,5'-hexachlorobiphenyl		
170	2,2',3,3',4,4',5-heptachlorobiphenyl	0.1	U
180	2,2',3,4,4',5,5'-heptachlorobiphenyl	0.1	U
183	2,2',3,4,4',5',6-heptachlorobiphenyl	0.1	U
184	2,2',3,4,4',6,6'-heptachlorobiphenyl	0.1	U
187	2,2',3,4',5,5',6-heptachlorobiphenyl	0.1	U
195	2,2',3,3',4,4',5,6-octachlorobiphenyl	0.1	U
206	2,2',3,3',4,4',5,5',6-nonachlorobiphenyl	0.1	U
209	2,2',3,3',4,4',5,5',6,6'-decachlorobiphenyl	0.1	U

Surrogate Standards	Recovery (%)	Advisory Limits (%)
PCB 198	86	30 - 150

U = Not detected at indicated level.

Lab Number:	LCS921S / LCSD921S
Sample Designation:	Laboratory Control Sample Duplicate
Date Sampled:	02/10/16
Date Extracted:	02/10/16
Date Analyzed:	02/12/16
Matrix:	Solid
Sample Amount (g):	20
Final Volume (mL)	1.00
Dilution Factor:	1

Congener Number	PCB Congener	LCS Concentratior (ug/Kg)	Recovery (%)	Recovery Limit (%)	LCSD Concentration (ug/Kg)	Recovery (%)	Recovery Limit (%)	Relative Difference (%)	RPD Limit (%)
8	2,4'-dichlorobiphenyl	6.65	66	30 - 150	8.1	81	30 - 150	20	30
18	2,2',5-trichlorobiphenyl	6.6	66	30 - 150	7.9	79	30 - 150	18	30
28	2,4,4'-trichlorobiphenyl	6.77	68	30 - 150	8.4	84	30 - 150	22	30
44	2,2',3,5'-tetrachlorobiphenyl	7.15	71	30 - 150	8.7	87	30 - 150	20	30
49	2,2',4,5'-tetrachlorobiphenyl	7.08	71	30 - 150	9.1	91	30 - 150	25	30
52	2,2',5,5'-tetrachlorobiphenyl	6.75	68	30 - 150	8.6	86	30 - 150	24	30
66	2,3',4,4'-tetrachlorobiphenyl	7.97	80	30 - 150	9.3	93	30 - 150	16	30
77	3,3',4,4'-tetrachlorobiphenyl	8.97	90	30 - 150	10	102	30 - 150	13	30
87	2,2',3,4,5'-pentachlorobiphenyl	8.14	81	30 - 150	9.8	98	30 - 150	18	30
101	2,2',4,5,5'-pentachlorobiphenyl	7.49	75	30 - 150	9	90	30 - 150	19	30
105	2,3,3',4,4'-pentachlorobiphenyl	8.33	83	30 - 150	9.8	98	30 - 150	16	30
118	2,3',4,4',5-pentachlorobiphenyl	8.49	85	30 - 150	9.8	98	30 - 150	14	30
126	3,3',4,4',5-pentachlorobiphenyl	8.22	82	30 - 150	10	101	30 - 150	20	30
128	2,2',3,3',4,4'-hexachlorobiphenyl	7.69	77	30 - 150	9.2	92	30 - 150	18	30
138	2,2',3,4,4',5'-hexachlorobiphenyl	7.46	75	30 - 150	9.2	92	30 - 150	21	30
153	2,2',4,4',5,5'-hexachlorobiphenyl	7.86	79	30 - 150	9.4	94	30 - 150	18	30
156	2,3,3',4,4',5-hexachlorobiphenyl			30 - 150			30 - 150		30
169	3,3',4,4',5,5'-hexachlorobiphenyl			30 - 150			30 - 150		30
170	2,2',3,3',4,4',5-heptachlorobiphenyl	8.42	84	30 - 150	10	101	30 - 150	18	30
180	2,2',3,4,4',5,5'-heptachlorobiphenyl	8	80	30 - 150	9.5	95	30 - 150	17	30
183	2,2',3,4,4',5',6-heptachlorobiphenyl	7.89	79	30 - 150	9.5	95	30 - 150	18	30
184	2,2',3,4,4',6,6'-heptachlorobiphenyl	7.59	76	30 - 150	9.1	91	30 - 150	18	30
187	2,2',3,4',5,5',6-heptachlorobiphenyl	7.66	77	30 - 150	9	90	30 - 150	17	30
195	2,2',3,3',4,4',5,6-octachlorobiphenyl	8.02	80	30 - 150	9.5	95	30 - 150	17	30
206	2,2',3,3',4,4',5,5',6-nonachlorobiphenyl	8.38	84	30 - 150	10	100	30 - 150	17	30
209	2,2',3,3',4,4',5,5',6,6'-decachlorobiphen	8.03	80	30 - 150	9.9	99	30 - 150	21	30

	Surrogate Standard	Recovery (%)	Advisory Limits (%)	Recovery (%)	Advisory Limits (%)
198	2,2',3,3',4,5,5',6-octachlorobiphenyl	78	30 - 150	94	30 - 150

ESI

PCB Congeners in Sediment
SW 846 8082/EPA 680 modified

Lab Number:	26884-100D
Sample Designation:	Site Composite (Laboratory Duplicate)
Date Sampled:	02/10/16
Date Extracted:	02/10/16
Date Analyzed:	02/12/16
Matrix:	Solid
Moisture (%):	26
Sample Amount (g):	29.00
Final Volume (mL)	1.00
Dilution Factor:	1

Congener Number	PCB Congener	Duplicate Result (ug/Kg)	Duplicate Qualifier	Sample Result (ug/Kg)	Sample Qualifier	Relative Difference (%)	Limit (%)	Qualifier
8	2,4'-dichlorobiphenyl	0.057		0.06		NC	30	
18	2,2',5-trichlorobiphenyl	0.047	U	0.047	U	NC	30	
28	2,4,4'-trichlorobiphenyl	0.049		0.047	U	NC	30	
44	2,2',3,5'-tetrachlorobiphenyl	0.17		0.16		NC	30	
49	2,2',4,5'-tetrachlorobiphenyl	0.17		0.16		NC	30	
52	2,2',5,5'-tetrachlorobiphenyl	0.32		0.31		5	30	
66	2,3',4,4'-tetrachlorobiphenyl	0.047	U	0.047	U	NC	30	
77	3,3',4,4'-tetrachlorobiphenyl	0.047	U	0.047	U	NC	30	
87	2,2',3,4,5'-pentachlorobiphenyl	0.19		0.2		NC	30	
101	2,2',4,5,5'-pentachlorobiphenyl	0.43		0.43		0	30	
105	2,3,3',4,4'-pentachlorobiphenyl	0.18		0.18		NC	30	
118	2,3',4,4',5-pentachlorobiphenyl	0.4		0.36		9	30	
126	3,3',4,4',5-pentachlorobiphenyl	0.047	U	0.047	U	NC	30	
128	2,2',3,3',4,4'-hexachlorobiphenyl	0.11		0.12		NC	30	
138	2,2',3,4,4',5'-hexachlorobiphenyl	0.63		0.65		4	30	
153	2,2',4,4',5,5'-hexachlorobiphenyl	0.5		0.72		36	30	J8
156	2,3,3',4,4',5-hexachlorobiphenyl						30	
169	3,3',4,4',5,5'-hexachlorobiphenyl						30	
170	2,2',3,3',4,4',5-heptachlorobiphenyl	0.13		0.26		NC	30	
180	2,2',3,4,4',5,5'-heptachlorobiphenyl	0.29		0.81		96	30	J8
183	2,2',3,4,4',5',6-heptachlorobiphenyl	0.09		0.21		NC	30	
184	2,2',3,4,4',6,6'-heptachlorobiphenyl	0.047	U	0.047	U	NC	30	
187	2,2',3,4',5,5',6-heptachlorobiphenyl	0.2		0.56		NC	30	
195	2,2',3,3',4,4',5,6-octachlorobiphenyl	0.066		0.069		NC	30	
206	2,2',3,3',4,4',5,5',6-nonachlorobiphenyl	0.047	U	0.1		NC	30	
209	2,2',3,3',4,4',5,5',6,6'-decachlorobipheny	0.056		0.047	U	NC	30	

Surrogate Standard	Recovery (%)	Recovery (%)	Advisory Limits (%)
PCB 198	89	83	30 - 150

U = Not detected at reporting limit.
NC = Not calculated due to one or more values less than five times the reporting limit.
J8 = Estimate. Dup %RR above limit.

Lab Number:	26884-100MSD
Sample Designation:	Site Composite (Matrix Spike Duplicate)
Date Sampled:	02/10/16
Date Extracted:	02/10/16
Date Analyzed:	02/12/16
Matrix:	Solid
Sample Amount (g):	29.00
Final Volume (mL)	1.00
Dilution Factor:	1.00

Congener Number	PCB Congener	Sample Result (ug/Kg)	Amount Added (ug/Kg)	MS Result (ug/Kg)	Recovery (%)	Recovery Limit (%)	MSD Result (ug/Kg)	Recovery (%)	Recovery Limit (%)	Relative Difference (%)	RPD Limit (%)
8	2,4'-dichlorobiphenyl	0.06	9	7.8	83	30 - 150	8.4	89	30 - 150	7	30
18	2,2',5-trichlorobiphenyl	ND	9	7.9	85	30 - 150	7.8	84	30 - 150	2	30
28	2,4,4'-trichlorobiphenyl	ND	9	8.4	90	30 - 150	8.5	91	30 - 150	2	30
44	2,2',3,5'-tetrachlorobiphenyl	0.16	9	8.7	92	30 - 150	8.3	88	30 - 150	5	30
49	2,2',4,5'-tetrachlorobiphenyl	0.16	9	8.9	94	30 - 150	8.3	88	30 - 150	7	30
52	2,2',5,5'-tetrachlorobiphenyl	0.31	9	9	93	30 - 150	8.4	86	30 - 150	7	30
66	2,3',4,4'-tetrachlorobiphenyl	ND	9	9.2	98	30 - 150	9	97	30 - 150	2	30
77	3,3',4,4'-tetrachlorobiphenyl	ND	9	9.8	105	30 - 150	9.4	101	30 - 150	4	30
87	2,2',3,4,5'-pentachlorobiphenyl	0.2	9	9.6	101	30 - 150	8.9	93	30 - 150	8	30
101	2,2',4,5,5'-pentachlorobiphenyl	0.43	9	8.8	90	30 - 150	8.7	89	30 - 150	1	30
105	2,3,3',4,4'-pentachlorobiphenyl	0.18	9	9.2	97	30 - 150	9.1	96	30 - 150	1	30
118	2,3',4,4',5-pentachlorobiphenyl	0.36	9	9.8	102	30 - 150	9.2	94	30 - 150	7	30
126	3,3',4,4',5-pentachlorobiphenyl	ND	9	9.8	105	30 - 150	9.6	103	30 - 150	2	30
128	2,2',3,3',4,4'-hexachlorobiphenyl	0.12	9	8.9	94	30 - 150	8.6	91	30 - 150	3	30
138	2,2',3,4,4',5'-hexachlorobiphenyl	0.65	9	9.1	90	30 - 150	9	90	30 - 150	0	30
153	2,2',4,4',5,5'-hexachlorobiphenyl	0.72	9	9.1	90	30 - 150	8.8	87	30 - 150	3	30
156	2,3,3',4,4',5-hexachlorobiphenyl	NA	NA								
169	3,3',4,4',5,5'-hexachlorobiphenyl	NA	NA								
170	2,2',3,3',4,4',5-heptachlorobiphenyl	0.26	9	9.3	97	30 - 150	9.2	96	30 - 150	1	30
180	2,2',3,4,4',5,5'-heptachlorobiphenyl	0.81	9	8.8	85	30 - 150	8.4	81	30 - 150	4	30
183	2,2',3,4,4',5',6-heptachlorobiphenyl	0.21	9	8.5	89	30 - 150	8.5	89	30 - 150	0	30
184	2,2',3,4,4',6,6'-heptachlorobiphenyl	ND	9	9.2	99	30 - 150	8.2	88	30 - 150	12	30
187	2,2',3,4',5,5',6-heptachlorobiphenyl	0.56	9	8.9	90	30 - 150	8.5	85	30 - 150	5	30
195	2,2',3,3',4,4',5,6-octachlorobiphenyl	0.069	9	8.5	91	30 - 150	8.4	90	30 - 150	1	30
206	2,2',3,3',4,4',5,5',6-nonachlorobiphenyl	0.1	9	8.8	93	30 - 150	8.5	90	30 - 150	3	30
209	2,2',3,3',4,4',5,5',6,6'-decachlorobipheny	ND	9	9	97	30 - 150	8.5	91	30 - 150	6	30

Surrogate Standard	MS Recovery (%)	Advisory Limits (%)	MSD Recovery (%)	Advisory Limits (%)
PCB 198	88	30 - 150	87	30 - 150

ND = Not detected
NA = Not added or evaluated

Lab Number:	SRM921S
Sample Designation:	Standard Reference Material NIST 1944
Date Sampled:	02/10/16
Date Extracted:	02/10/16
Date Analyzed:	02/12/16
Matrix:	Solid
Sample Amount (g):	1.00
Final Volume (mL)	1.00
Dilution Factor:	2

Congener Number	PCB Congener	Result (ug/Kg)	True Value (ug/Kg)	Recovery (%)	Limit (%)
8	2,4'-dichlorobiphenyl	22	22	97	30 - 150
18	2,2',5-trichlorobiphenyl	53	51	104	30 - 150
28	2,4,4'-trichlorobiphenyl	75	81	93	30 - 150
44	2,2',3,5'-tetrachlorobiphenyl	54	60	90	30 - 150
49	2,2',4,5'-tetrachlorobiphenyl	60	53	113	30 - 150
52	2,2',5,5'-tetrachlorobiphenyl	75	79	94	30 - 150
66	2,3',4,4'-tetrachlorobiphenyl	64	72	88	30 - 150
77	3,3',4,4'-tetrachlorobiphenyl	ND	NA	NA	30 - 150
87	2,2',3,4,5'-pentachlorobiphenyl	31	30	104	30 - 150
101	2,2',4,5,5'-pentachlorobiphenyl	73	73	100	30 - 150
105	2,3,3',4,4'-pentachlorobiphenyl	24	25	97	30 - 150
118	2,3',4,4',5-pentachlorobiphenyl	60	58	104	30 - 150
126	3,3',4,4',5-pentachlorobiphenyl	ND	NA	NA	30 - 150
128	2,2',3,3',4,4'-hexachlorobiphenyl	10	8.5	118	30 - 150
138	2,2',3,4,4',5'-hexachlorobiphenyl	62	62	99	30 - 150
153	2,2',4,4',5,5'-hexachlorobiphenyl	62	74	83	30 - 150
156	2,3,3',4,4',5-hexachlorobiphenyl				30 - 150
169	3,3',4,4',5,5'-hexachlorobiphenyl				30 - 150
170	2,2',3,3',4,4',5-heptachlorobiphenyl	23	23	102	30 - 150
180	2,2',3,4,4',5,5'-heptachlorobiphenyl	38	44	85	30 - 150
183	2,2',3,4,4',5',6-heptachlorobiphenyl	10	12	84	30 - 150
184	2,2',3,4,4',6,6'-heptachlorobiphenyl	ND	NA	NA	30 - 150
187	2,2',3,4',5,5',6-heptachlorobiphenyl	23	25	90	30 - 150
195	2,2',3,3',4,4',5,6-octachlorobiphenyl	4	3.8	77	30 - 150
206	2,2',3,3',4,4',5,5',6-nonachlorobiphenyl	8.7	9.2	94	30 - 150
209	2,2',3,3',4,4',5,5',6,6'-decachlorobiphenyl	7.3	6.8	107	30 - 150

Surrogate Standard	Recovery (%)	Advisory Limits (%)
PCB 198	99	30 - 150

ND = Not detected
NA = Not added or evaluated

PCB Congeners in Solid Matrix
SW 846 8082/EPA 680 modified

Method Detection Limt Study	MDL 2016 Solid
Sample Designation:	MDL Solid Matrix
Date Sampled:	01/27/16
Date Extracted:	01/27/16
Date Analyzed:	02/19/16
Matrix:	Solid
Sample Amount (g):	20.00
Final Volume (mL)	1
Dilution Factor:	1

Congener Number	PCB Congener	True Value (ug/Kg)	Replicate 1 (ug/Kg)	Replicate 2 (ug/Kg)	Replicate 3 (ug/Kg)	Replicate 4 (ug/Kg)	Replicate 5 (ug/Kg)	Replicate 6 (ug/Kg)	Replicate 7 (ug/Kg)	Calcd MDL (ug/Kg)
8	2,4'-Dichlorobiphenyl	0.1	0.09	0.09	0.11	0.10	0.10	0.11	0.11	0.03
18	2,2',5-Trichlorobiphenyl	0.1	0.11	0.11	0.09	0.10	0.10	0.08	0.10	0.03
28	2,4,4'-Trichlorobiphenyl	0.1	0.10	0.10	0.08	0.10	0.10	0.09	0.09	0.03
52	2,2',5,5'-Tetrachlorobiphenyl	0.1	0.10	0.10	0.11	0.09	0.10	0.10	0.10	0.02
49	2,2',4,5'-Tetrachlorobiphenyl	0.1	0.09	0.09	0.10	0.09	0.10	0.09	0.08	0.02
44	2,2',3,5'-Tetrachlorobiphenyl	0.1	0.10	0.10	0.09	0.09	0.09	0.09	0.10	0.01
66	2,3',4,4'-Tetrachlorobiphenyl	0.1	0.09	0.09	0.10	0.10	0.09	0.09	0.09	0.01
101	2,2',4,5,5'-Pentachlorobiphenyl	0.1	0.10	0.10	0.10	0.11	0.11	0.10	0.10	0.01
87	2,2',3,4,5'-Pentachlorobiphenyl	0.1	0.10	0.10	0.12	0.11	0.11	0.10	0.11	0.01
77	3,3',4,4'-Tetrachlorobiphenyl	0.1	0.10	0.10	0.11	0.10	0.10	0.09	0.09	0.02
118	2,3',4,4',5-Pentachlorobiphenyl	0.1	0.11	0.11	0.11	0.10	0.10	0.12	0.12	0.02
184	2,2',3,4,4',6,6'-Heptachlorobiphenyl	0.1	0.10	0.10	0.11	0.11	0.09	0.11	0.10	0.02
153	2,2',4,4',5,5'-Hexachlorobiphenyl	0.1	0.11	0.11	0.12	0.11	0.11	0.11	0.11	0.01
105	2,3,3',4,4'-Pentachlorobiphenyl	0.1	0.12	0.12	0.10	0.11	0.10	0.11	0.11	0.02
138	2,2',3,4,4',5'-Hexachlorobiphenyl	0.1	0.12	0.12	0.11	0.11	0.11	0.11	0.11	0.01
126	3,3',4,4',5-Pentachlorobiphenyl	0.1	0.16	0.16	0.20	0.19	0.17	0.17	0.17	0.05
187	2,2',3,4',5,5',6-Heptachlorobiphenyl	0.1	0.10	0.10	0.09	0.09	0.10	0.10	0.11	0.02
183	2,2',3,4,4',5',6-Heptachlorobiphenyl	0.1	0.11	0.11	0.11	0.11	0.11	0.12	0.11	0.01
128	2,2',3,3',4,4'-Hexachlorobiphenyl	0.1	0.11	0.11	0.10	0.11	0.11	0.11	0.11	0.01
180	2,2',3,4,4',5,5'-Heptachlorobiphenyl	0.1	0.10	0.10	0.10	0.10	0.11	0.10	0.11	0.01
170	2,2',3,3',4,4',5-Heptachlorobiphenyl	0.1	0.10	0.10	0.11	0.11	0.12	0.10	0.09	0.02
195	2,2',3,3',4,4',5,6-Octachlorobiphenyl	0.1	0.10	0.10	0.11	0.10	0.11	0.11	0.10	0.02
206	2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl	0.1	0.12	0.12	0.12	0.11	0.13	0.13	0.12	0.02
209	Decachlorobiphenyl	0.1	0.12	0.12	0.13	0.12	0.12	0.12	0.12	0.01

Surrogate Standard	Recovery (%)	Recovery (%)	Recovery (%)	Recovery (%)	Recovery (%)	Recovery (%)	Recovery (%)
PCB 198	103	103	104	106	105	106	104

Lab Number:	PB921S
Sample Designation:	Laboratory Blank
Date Sampled:	02/10/16 0900
Date Extracted:	02/10/16 0900
Date Analyzed:	02/11/16
Matrix:	Solid
Sample Amount (g):	20.00
Final Volume (mL)	1.00
Dilution Factor:	1

Compound	Concentration (ug/Kg)	Qualifier
naphthalene	10	U
acenaphthylene	10	U
acenaphthene	10	U
fluorene	10	U
phenanthrene	10	U
anthracene	10	U
fluoranthene	10	U
pyrene	10	U
benzo[a]anthracene	10	U
chrysene	10	U
benzo[b]fluoranthene	10	U
benzo[k]fluoranthene	10	U
benzo[a]pyrene	10	U
indeno[1,2,3-cd]pyrene	10	U
dibenz[a,h]anthracene	10	U
benzo[g,h,i]perylene	10	U

Surrogate Standard	Recovery (%)	Advisory Limits (%)
2-fluorobiphenyl	69	30 - 150
o-terphenyl	90	30 - 150

U = Not detected at indicated level.

Polynuclear Aromatic Hydrocarbons in Sediment
SW 846 8270/EPA 680 modified

Lab Number:	LCS921S / LCSD921S
Sample Designation:	Laboratory Control Sample Duplicate
Date Sampled:	02/10/16 0900
Date Extracted:	02/10/16 0900
Date Analyzed:	02/11/16
Matrix:	Solid
Sample Amount (g):	20.00
Final Volume (mL)	1.00
Dilution Factor:	1

Compound	True Value (ug/Kg)	LCS Result (ug/Kg)	Recovery (%)	Recovery Limit (%)	LCSD Result (ug/Kg)	Recovery (%)	Recovery Limit (%)	Relative Difference (%)	RPD Limit (%)
naphthalene	50	34	67	30 - 150	39	78	30 - 150	15	30
acenaphthylene	50	30	59	30 - 150	37	73	30 - 150	21	30
acenaphthene	50	33	66	30 - 150	39	78	30 - 150	16	30
fluorene	50	34	69	30 - 150	40	80	30 - 150	15	30
phenanthrene	50	40	80	30 - 150	48	95	30 - 150	18	30
anthracene	50	46	92	30 - 150	53	105	30 - 150	14	30
fluoranthene	50	47	94	30 - 150	50	100	30 - 150	6	30
pyrene	50	39	78	30 - 150	39	79	30 - 150	0	30
benzo[a]anthracene	50	42	84	30 - 150	48	95	30 - 150	13	30
chrysene	50	50	99	30 - 150	47	95	30 - 150	5	30
benzo[b]fluoranthene	50	39	77	30 - 150	39	78	30 - 150	1	30
benzo[k]fluoranthene	50	55	110	30 - 150	54	109	30 - 150	1	30
benzo[a]pyrene	50	45	89	30 - 150	45	90	30 - 150	1	30
indeno[1,2,3-cd]pyrene	50	41	83	30 - 150	44	88	30 - 150	6	30
dibenz[a,h]anthracene	50	43	86	30 - 150	45	90	30 - 150	4	30
benzo[g,h,i]perylene	50	44	89	30 - 150	46	93	30 - 150	5	30

Surrogate Standards	Recovery (%)	Advisory Limits (%)	Recovery (%)	Advisory Limits (%)
2-fluorobiphenyl	53	30 - 150	60	30 - 150
o-terphenyl	71	30 - 150	74	30 - 150

ESI

Lab Number:	26884-100D
Sample Designation:	Site Composite (Laboratory Duplicate)
Date Sampled:	01/13/16
Date Extracted:	02/10/16 0900
Date Analyzed:	02/11/16
Matrix:	Solid
Sample Amount (g):	29
Final Volume (mL)	1.00
Dilution Factor:	1

Compound	Duplicate Concentration (ug/Kg)	Duplicate Qualifier	Sample Concentration (ug/Kg)	Sample Qualifier	Relative Difference (%)	Limit (%)	Qualifier
naphthalene	9	U	9	U	NC	30	
acenaphthylene	9	U	9	U	NC	30	
acenaphthene	9	U	9	U	NC	30	
fluorene	9	U	9	U	NC	30	
phenanthrene	38	B	29	B	NC	30	
anthracene	9		9		NC	30	
fluoranthene	62		54		13	30	
pyrene	68		54		22	30	
benzo[a]anthracene	25		21		NC	30	
chrysene	31		32		NC	30	
benzo[b]fluoranthene	20		25		NC	30	
benzo[k]fluoranthene	22		18		NC	30	
benzo[a]pyrene			16		NC	30	
indeno[1,2,3-cd]pyrene	13		11		NC	30	
dibenz[a,h]anthracene	9	U	9	U	NC	30	
benzo[g,h,i]perylene	14		12		NC	30	

Surrogate Standard	Recovery (%)	Recovery (%)	Advisory Limits (%)
2-fluorobiphenyl	65	66	30 - 150
o-terphenyl	91	86	30 - 150

U = Not detected.
NC = Not calculated due to one or both values less than five times the reporting limit.
B = Analyte observed in the laboratory blank below the reporting limit.

Lab Number:	26884-100MSD
Sample Designation:	Site Composite (Matrix Spike Duplicate)
Date Sampled:	02/10/16 0900
Date Extracted:	02/10/16 0900
Date Analyzed:	02/11/16
Matrix:	Solid
Sample Amount (g):	29.00
Final Volume (mL)	1
Dilution Factor:	1

Compound	Sample Result (ug/Kg)	Amount Added (ug/Kg)	MS Result (ug/Kg)	Recovery (%)	Recovery Limit (%)	MSD Result (ug/Kg)	Recovery (%)	Recovery Limit (%)	Relative Difference (%)	RPD Limit (%)
naphthalene	U	47	39	80	30 - 150	40	83	30 - 150	3	30
acenaphthylene	U	47	45	90	30 - 150	46	92	30 - 150	3	30
acenaphthene	U	47	41	84	30 - 150	42	86	30 - 150	1	30
fluorene	U	47	47	93	30 - 150	49	97	30 - 150	4	30
phenanthrene	29 B	47	66	81	30 - 150	69	86	30 - 150	4	30
anthracene	9	47	46	81	30 - 150	54	97	30 - 150	15	30
fluoranthene	54	47	90	78	30 - 150	92	82	30 - 150	2	30
pyrene	54	47	101	99	30 - 150	100	99	30 - 150	0	30
benzo[a]anthracene	21	47	65	96	30 - 150	65	95	30 - 150	1	30
chrysene	32	47	71	82	30 - 150	66	72	30 - 150	7	30
benzo[b]fluoranthene	25	47	62	80	30 - 150	61	77	30 - 150	2	30
benzo[k]fluoranthene	18	47	61	91	30 - 150	60	89	30 - 150	2	30
benzo[a]pyrene	16	47	58	90	30 - 150	54	81	30 - 150	8	30
indeno[1,2,3-cd]pyrene	11	47	53	90	30 - 150	51	85	30 - 150	4	30
dibenz[a,h]anthracene	U	47	46	94	30 - 150	45	92	30 - 150	2	30
benzo[g,h,i]perylene	12	47	52	86	30 - 150	48	78	30 - 150	7	30

Surrogate Standard	Recovery (%)	Advisory Limits (%)	Recovery (%)	Advisory Limits (%)
2-fluorobiphenyl	71	30 - 150	68	30 - 150
o-terphenyl	90	30 - 150	89	30 - 150

U = Not detected
B = Analyte observed in the laboratory blank below the reporting limit.

Lab Number:	SRM921S
Sample Designation:	Standard Reference Material NIST 1944
Date Sampled:	02/10/16 0900
Date Extracted:	02/10/16 0900
Date Analyzed:	03/08/10
Matrix:	Solid
Sample Amount (g):	1.00
Final Volume (mL)	1.00
Dilution Factor:	2

Compound	Result (ug/Kg)	True Value (ug/Kg)	Recovery (%)	Limit (%)
naphthalene	1200	1650	70	30 - 150
acenaphthylene	960	NA	NA	30 - 150
acenaphthene	370	570	65	30 - 150
fluorene	460	850	54	30 - 150
phenanthrene	5200	5270	99	30 - 150
anthracene	890	NA	NA	30 - 150
fluoranthene	8800	8920	99	30 - 150
pyrene	8200	9700	85	30 - 150
benzo[a]anthracene	3900	4720	84	30 - 150
chrysene	4600	4860	96	30 - 150
benzo[b]fluoranthene	2900	3870	74	30 - 150
benzo[k]fluoranthene	2700	2300	119	30 - 150
benzo[a]pyrene	2800	4300	64	30 - 150
indeno[1,2,3-cd]pyrene	2000	2780	70	30 - 150
dibenz[a,h]anthracene	490	424	115	30 - 150
benzo[g,h,i]perylene	2200	2840	76	30 - 150

Surrogate Standard	Recovery (%)	Advisory Limits (%)
2-fluorobiphenyl	87	30 - 150
o-terphenyl	114	30 - 150

NA = Not added or evaluated

Polynuclear Aromatic Hydrocarbons in Solids
SW 846 8270/EPA 680 modified

Lab Number:	26993
Sample Designation:	Method Detection Limit Study
Date Sampled:	04/06/15
Date Extracted:	04/06/15
Date Analyzed:	05/12/15
Matrix:	Solid
Sample Amount (g):	10.00
Final Volume (mL)	1.00
Dilution Factor:	1

	Rep 1 ug/Kg	Rep 2 ug/Kg	Rep 3 ug/Kg	Rep 4 ug/Kg	Rep 5 ug/Kg	Rep 6 ug/Kg	Rep 7 ug/Kg	Calculated MDL ug/Kg
naphthalene	10.7	13.2	16.3	NA	15.0	15.0	15.2	5.8
acenaphthylene	8.9	12.0	13.2	9.5	13.7	12.5	13.1	5.5
acenaphthene	9.8	13.4	14.9	10.5	15.3	14.1	13.9	6.3
fluorene	11.3	15.0	15.9	14.4	16.7	14.9	15.7	5.1
phenanthrene	21.2	26.1	26.4	28.4	27.7	26.9	26.6	6.8
anthracene	8.1	11.5	10.6	14.3	14.7	10.8	10.9	6.7
fluoranthene	12.3	16.8	16.8	19.2	18.0	17.1	17.4	6.3
pyrene	12.7	15.1	18.8	19.0	18.1	17.3	17.9	6.7
benzo[a]anthracene	9.4	10.5	12.6	14.9	12.4	12.0	12.2	5.1
chrysene	12.6	14.4	12.9	19.2	17.0	12.1	12.7	7.8
benzo[b]fluoranthene	9.4	13.5	14.1	15.2	14.4	12.4	13.8	5.6
benzo[k]fluoranthene	9.6	13.6	12.5	15.7	15.0	13.8	14.3	5.8
benzo[a]pyrene	10.2	12.6	13.0	16.6	15.4	9.2	10.2	8.2
indeno[1,2,3-cd]pyrene	8.7	12.0	12.0	14.6	14.1	10.9	10.8	5.9
dibenz[a,h]anthracene	8.7	10.3	9.4	12.6	11.1	9.2	10.8	3.9
benzo[g,h,i]perylene	9.8	13.0	11.6	14.6	14.2	10.7	12.2	5.2

Pesticides in Sediment
SW 846 8081B

Lab Number:	PB922S
Sample Designation:	Laboratory Blank
Date Sampled:	02/10/16 0900
Date Extracted:	02/10/16 0900
Date Analyzed:	02/11/16
Matrix:	Solid
Moisture (%):	NA
Sample Amount (g):	20.00
Final Volume (mL)	1.00
Dilution Factor:	1

Analyte	Concentration (ug/Kg)	Qualifier
aldrin	0.1	U
gamma-chlordane (cis)	0.1	U
alpha-chlordane (trans)	0.1	U
cis-nonachlor	0.1	U
trans-nonachlor	0.1	U
oxychlordane	0.1	U
4,4'-DDT	0.2	U
4,4'-DDE	0.2	U
4,4'-DDD	0.2	U
alpha-BHC	0.1	U
dieldrin	0.2	U
endosulfan I	0.1	U
endosulfan II	0.2	U
endrin	0.2	U
heptachlor	0.1	U
heptachlor epoxide	0.1	U
hexachlorobenzene	0.1	U
gamma-BHC (lindane)	0.1	U
methoxychlor	1	U
toxaphene	5	U

Surrogate Standard	Recovery (%)	Advisory Limits (%)
tetrachloro-m-xylene	60	30 - 150
decachlorobiphenyl	84	30 - 150

U = Not detected at indicated level.

Pesticides in Sediment
SW 846 8081B

Lab Number:	LCSD922S
Sample Designation:	Laboratory Control Sample Duplicate
Date Sampled:	02/10/16 0900
Date Extracted:	02/10/16 0900
Date Analyzed:	02/11/16
Matrix:	Solid
Moisture:	NA
Sample Amount (g):	20
Final Volume (mL)	1
Dilution Factor:	1

Analyte	LCS True Value (ug/Kg)	LCS Found (ug/Kg)	LCS Recovery (%)	LCSD True Value (ug/Kg)	LCSD Found (ug/Kg)	LCSD Recovery (%)	Relative Difference (%)
aldrin	1	0.711	71	1	0.779	78	9
gamma-chlordane	1	0.787	79	1	0.696	70	12
alpha-chlordane	1	0.749	75	1	0.722	72	4
cis-nonachlor	1	0.849	85	1	0.883	88	4
trans-nonachlor	1	0.851	85	1	0.96	96	12
oxychlordane	1	0.782	78	1	0.871	87	11
4,4'-DDT	2	1.76	88	2	1.9	95	7
4,4'-DDE	2	1.68	84	2	1.72	86	3
4,4'-DDD	2	1.81	91	2	1.7	85	7
alpha-BHC	1	0.685	68	1	0.721	72	5
dieldrin	2	1.79	89	2	1.82	91	1
endosulfan I	1	0.788	79	1	0.771	77	2
endosulfan II	2	1.51	75	2	1.72	86	14
endrin	2	1.91	95	2	1.97	99	3
heptachlor	1	0.95	95	1	1.07	107	12
heptachlor epoxide	1	1.15	115	1	1.08	108	7
hexachlorobenzene	1	0.697	70	1	0.713	71	2
gamma-BHC (lindane)	1	0.631	63	1	0.734	73	15
methoxychlor	10	9.65	97	10	9.69	97	0

Surrogate Standard	Recovery (%)	Recovery (%)	Advisory Limits (%)
tetrachloro-m-xylene	70	94	30 - 150
decachlorobiphenyl	113	109	30 - 150

Pesticides in Sediment
SW 846 8081B

Lab Number:	26884-100
Sample Designation:	Site Composite (Laboratory Duplicate)
Date Sampled:	01/13/16 0940
Date Extracted:	02/10/16 0900
Date Analyzed:	02/11/16
Matrix:	Solid
Moisture (%):	26
Sample Amount (g):	29
Final Volume (mL)	1
Dilution Factor:	1

Analyte	Sample Concentration (ug/Kg)	Qualifier	Duplicate Concentration (ug/Kg)	Qualifier	Relative Difference (%)	Limit (%)
aldrin	0.138	T	0.125	T	9	30
gamma-chlordane (cis)	0.093	U	0.093	U	NC	30
alpha-chlordane (trans)	0.093	U	0.112	T	NC	30
cis-nonachlor	0.093	U	0.093	U	NC	30
trans-nonachlor	0.356	T	0.259	T	NC	30
oxychlordane	0.093	U	0.093	U	NC	30
4,4'-DDT	0.431	P	0.366	T	16	30
4,4'-DDE	0.443	P	0.428	T	3	30
4,4'-DDD	0.19	U	0.19	U	NC	30
alpha-BHC	0.093	U	0.093	U	NC	30
dieldrin	0.243	T	0.219	T	11	30
endosulfan I	0.093	U	0.093	U	NC	30
endosulfan II	0.19	U	0.19	U	NC	30
endrin	0.19	U	0.19	U	NC	30
heptachlor	0.093	U	0.093	U	NC	30
heptachlor epoxide	0.093	U	0.093	U	NC	30
hexachlorobenzene	0.093	U	0.093	U	NC	30
gamma-BHC (lindane)	0.093	U	0.093	U	NC	30
methoxychlor	0.93	U	0.93	U	NC	30
toxaphene	4.7	U	4.7	U	NC	30

Surrogate Standard	Sample Recovery (%)	Duplicate Recovery (%)	Advisory Limits (%)
tetrachloro-m-xylene	56	59	30 - 150
decachlorobiphenyl	61	60	30 - 150

U = Not detected at indicated level.
NC = Not calculated due to one or both values less than five times quantitation limit.
T = Concentrations of target analytes were too low for GCMS confirmation. Compound identification is tentative.
P = Presence of analyte confirmed by GC-MS.

Pesticides in Sediment
SW 846 8081B

Lab Number:	26884-100MSD
Sample Designation:	Site Composite (Matrix Spike Duplicate)
Date Sampled:	01/13/16 0940
Date Extracted:	02/10/16 0900
Date Analyzed:	02/11/16
Matrix:	Solid
Moisture (%):	26
Sample Amount (g):	29
Final Volume (mL)	1
Dilution Factor:	1

Compound	Sample Result (ug/Kg)	Amount Added (ug/Kg)	MS Result (ug/Kg)	Recovery (%)	Recovery Limit (%)	MSD Result (ug/Kg)	Recovery (%)	Recovery Limit (%)	Relative Difference (%)	RPD Limit (%)	Qual
aldrin	0.14	0.9	0.67	57	30-150	0.6	49	30-150	11	30	
gamma-chlordane (cis)	ND	0.9	0.61	65	30-150	0.58	62	30-150	5	30	
alpha-chlordane (trans)	ND	0.9	0.67	72	30-150	0.63	67	30-150	7	30	
cis-nonachlor	ND	0.9	0.63	68	30-150	0.6	65	30-150	4	30	
trans-nonachlor	0.36	0.9	0.68	35	30-150	0.65	31	30-150	5	30	
oxychlordane	ND	0.9	0.64	69	30-150	0.52	55	30-150	22	30	
4,4'-DDT	0.43	1.9	1.4	53	30-150	1.4	50	30-150	4	30	
4,4'-DDE	0.44	1.9	1.6	62	30-150	1.6	61	30-150	1	30	
4,4'-DDD	ND	1.9	1.1	61	30-150	1.1	60	30-150	1	30	
alpha-BHC	ND	0.9	0.55	59	30-150	0.5	53	30-150	10	30	
dieldrin	0.24	1.9	1.4	62	30-150	1.3	59	30-150	4	30	
endosulfan I	ND	0.9	0.63	68	30-150	0.61	65	30-150	4	30	
endosulfan II	ND	1.9	1.1	59	30-150	0.98	53	30-150	12	30	
endrin	ND	1.9	1.4	76	30-150	1.4	75	30-150	1	30	
heptachlor	ND	0.9	0.4	43	30-150	0.4	43	30-150	1	30	
heptachlor epoxide	ND	0.9	0.52	56	30-150	0.48	52	30-150	7	30	
hexachlorobenzene	ND	0.9	0.63	67	30-150	0.57	61	30-150	9	30	
gamma-BHC (lindane)	ND	0.9	0.59	64	30-150	0.54	58	30-150	9	30	
methoxychlor	ND	9.3	7	75	30-150	6.9	74	30-150	1	30	
toxaphene	ND	NA	NA	NA	30-150	NA	NA	30-150	NA	30	

Surrogate Standard	Recovery (%)	Recovery (%)	Advisory Limits (%)
tetrachloro-m-xylene	79	66	30 - 150
decachlorobiphenyl	73	72	30 - 150

Notes:

ND = Not detected above reporting limit.
NA = Compound not added or evaluated.

Pesticides in Sediment
SW 846 8081B

Lab Number:	SRM922S
Sample Designation:	Standard Reference Material NIST 1944
Date Sampled:	02/10/16 0930
Date Extracted:	02/10/16 0930
Date Analyzed:	02/13/16
Matrix:	Solid
Moisture (%):	0
Sample Amount (g):	1.00
Final Volume (mL)	1.00
Dilution Factor:	1

Anayte	Concentration (ug/Kg)	True Value (ug/Kg)	Recovery (%)	Limit (%)	Qual
aldrin	NA	NA	NA	30-150	
gamma-chlordane	NA	NA	NA	30-150	
alpha-chlordane	22.1	16.51	134	30-150	
cis-nonachlor	15.9	3.7	431	30-150	J3
trans-nonachlor	9.42	8.2	115	30-150	
oxychlordane	NA	NA	NA	30-150	
4,4'-DDT	136	119	114	30-150	
4,4'-DDE	87	86	101	30-150	
4,4'-DDD	68.9	108	64	30-150	
alpha-BHC	2.02	2	101	30-150	
dieldrin	NA	NA	NA	30-150	
endosulfan I	NA	NA	NA	30-150	
endosulfan II	NA	NA	NA	30-150	
endrin	NA	NA	NA	30-150	
heptachlor	NA	NA	NA	30-150	
heptachlor epoxide	NA	NA	NA	30-150	
hexachlorobenzene	3.94	6.03	65	30-150	
gamma-BHC (Lindane)	NA	NA	NA	30-150	
methoxychlor	NA	NA	NA	30-150	
toxaphene	NA	NA	NA	30-150	

Surrogate Standard	Recovery (%)	Advisory Limits (%)
tetrachloro-m-xylene	66	30 - 150
decachlorobiphenyl	52	30 - 150

NA = No reference value available
J3 = SRM %R above limit.

Lab Number:	MDLS2015
Sample Designation:	Sediment
Date Sampled:	02/11/15
Date Extracted:	02/11/15
Date Analyzed:	02/19/15
Matrix:	Solid
Moisture:	0 %
Sample Amount (g):	10.00
Final Volume (mL)	1
Dilution Factor:	1

Compound	True Value (ug/Kg)	Replicate 1 (ug/Kg)	Replicate 2 (ug/Kg)	Replicate 3 (ug/Kg)	Replicate 4 (ug/Kg)	Replicate 5 (ug/Kg)	Replicate 6 (ug/Kg)	Replicate 7 (ug/Kg)	MDL
hexachlorobenzene	0.2	0.18	0.19	0.19	0.19	0.19	0.19	0.18	0.013
alpha-BHC	0.2	0.12	0.11	0.12	0.13	0.12	0.11	0.12	0.019
gamma-BHC (lindane)	0.2	0.13	0.14	0.14	0.15	0.15	0.14	0.15	0.023
beta-BHC	0.2	0.17	0.21	0.22	0.20	0.26	0.15	0.20	0.102
delta-BHC	0.2	0.13	0.17	0.12	0.14	0.12	0.13	0.14	0.052
heptachlor	0.2	0.16	0.17	0.18	0.20	0.14	0.16	0.16	0.051
aldrin	0.2	0.13	0.14	0.13	0.13	0.13	0.15	0.14	0.024
oxychlordane	0.2	0.15	0.16	0.15	0.16	0.16	0.16	0.17	0.023
chlorpyrifos	0.2	0.19	0.21	0.20	0.22	0.18	0.18	0.21	0.046
heptachlor epoxide	0.2	0.15	0.16	0.17	0.17	0.16	0.16	0.14	0.033
gamma-chlordane (cis)	0.2	0.18	0.19	0.19	0.20	0.18	0.18	0.18	0.018
trans-nonachlor	0.2	0.16	0.17	0.14	0.18	0.16	0.15	0.16	0.037
alpha-chlordane (trans)	0.2	0.16	0.15	0.16	0.19	0.16	0.16	0.17	0.036
endosulfan I	0.2	0.17	0.19	0.16	0.18	0.17	0.17	0.17	0.022
4,4'-DDE	0.4	0.30	0.33	0.31	0.31	0.30	0.29	0.32	0.037
dieldrin	0.4	0.28	0.32	0.31	0.33	0.28	0.30	0.27	0.063
endrin	0.4	0.30	0.31	0.31	0.31	0.31	0.31	0.30	0.012
cis-nonachlor	0.2	0.14	0.14	0.14	0.14	0.14	0.13	0.14	0.010
4,4'-DDD	0.4	0.28	0.29	0.29	0.29	0.29	0.29	0.28	0.013
endosulfan II	0.4	0.28	0.30	0.30	0.30	0.28	0.29	0.29	0.023
toxaphene	100	88.5	90	90.7	90.2	89.2	90	91.00	2.5
4,4'-DDT	0.4	0.28	0.28	0.30	0.31	0.29	0.30	0.29	0.031
endrin aldehyde	0.4	0.27	0.32	0.32	0.35	0.29	0.32	0.31	0.075
endosulfan sulfate	0.4	0.28	0.31	0.32	0.31	0.28	0.31	0.31	0.040
methoxychlor	2	1.73	1.90	1.93	1.90	1.84	1.86	1.79	0.203
endrin ketone	0.4	0.29	0.30	0.31	0.30	0.29	0.30	0.31	0.021

Table II-1: Completeness Checklist

Quality Assurance/Quality Control Questions	Yes/No? Comments?
1. Was the report signed by the responsible applicant approved representative?	Yes
2. Were the methods for sampling, chemical and biological testing described in the Sampling and Analysis Plan (SAP) and the Laboratory QA Plan (LQAP) followed?	Yes
3. If not, were deviations documented?	NA
4. Was the SAP approved by the New England District?	Yes
5. Did the applicant use a laboratory with a LQAP on file at the New England District?	Yes
6. Did the samples adequately represent the physical/chemical variability in the dredging area?	Yes
7. Were the correct stations sampled (include the precision of the navigation method used)?	Yes
8. Were the preservation and storage requirements in Chapter 8 of the EPA/Corps QA/QC Manual (EPA/USACE 1995) and EPA (2001d) followed?	Yes
9. Were the samples properly labeled?	Yes
10. Were all the requested data included?	Yes
11. Were the reporting limits met?	Yes
12. Were the chain-of-custody forms properly processed?	Yes
13. Were the method blanks run and were the concentration below the acceptance criteria?	Yes
14. Was the MDL study performed on each matrix (with this data submission) or within the last 12 months?	No, Pesticides and Metals MDLs just over 12 months.
15. Were the SRM/CRM analyses within acceptance criteria?	Yes, with 1 noted exception.
16. Were the matrix spike/matrix spike duplicates run at the required frequency and was the percent recovery/RPD within the acceptance criteria?	Yes, with one noted exception for TOC and one for metals.
17. Were the duplicate samples analyzed and were the RPDs within the required acceptance criteria?	Yes, with two noted exceptions for PCBs and one for metals.
18. For each analytical fraction of organic compounds, were recoveries for the internal standard within the acceptance criteria?	Yes
19. Were surrogate recoveries within the required acceptance criteria?	Yes
20. Were corrective action forms provided for all non-conforming data?	Yes
21. Were all the species-specific test conditions in Appendix V met?	NA
22. Were the test-specific age requirements met for each test species?	NA
23. Was the bulk physical/chemical testing performed on the sediments/composites that were biologically tested?	NA
24. Were the mortality acceptance criteria met for the water column and sediment toxicity tests?	NA
25. Were the test performance requirements in Table 11.3 of EPA (1994a) met?	NA

Table II-2: Quality Control Summary for Analyses of Polyaromatic Hydrocarbons (PAHs) and other base-neutrals in Sedimen

Method Reference Number: 8270C

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Initial Calibration	Must be performed prior to the analysis of any QC sample or field sample (<20 % RSD for each compound)	Yes		Retained at lab
Calculation of Method Detection Limits (MDLs)	For each matrix, analyzed once per 12 month period (see Section 5.2 for MDL procedure)	Yes		In data package
Calibration Verification (Second Source)	Once, after initial calibration (80 to 120% recovery of each compound)	Yes		Retained at lab
Continuing Calibration	At the beginning of every 12 hour shift (≤ 15 % D)	Yes		Retained at lab
Standard Reference Materials	Within the limits provided by vendor	Yes		In data package
Method Blank	No target analytes > RL	Yes		In data package
Matrix Spike/Matrix Spike Duplicate (MS/MSD)	One set (MS/MSD) per group of field samples. Must contain all target analytes. (Recovery Limits 30 to 150%; RPD <30%)	Yes		In data package
Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 30%)	Yes		In data package
Surrogate Recoveries	Calculate % recovery (30 to 150% recovery)	Yes		In data package
Internal Standard Areas	Within 50 to 200% of internal standards in continuing calibration check	Yes		In data package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Table II-3: Quality Control Summary for Analyses of Pesticides in Sediment, Tissue and Water Matrices

Method Reference Number: 8081B

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Initial Calibration	Must be performed prior to the analysis of any QC sample or field sample (< 20 % RSD for each compound)	Yes		Retained at lab
Calculation of Method Detection Limits (MDLs)	For each matrix, analyzed once per 12 month period (see Section 5.2 for MDL procedure)	No	Analyzed just over 12 months ago.	In data package
Calibration Verification (Second Source)	Once, after initial calibration (80 to 120% recovery of each compound)	Yes		Retained at lab
Continuing Calibration	Every 20 injections (≤ 15 % D)	Yes		Retained at lab
Standard Reference Materials	Within the limits provided by vendor	Yes		In data package
Method Blank	No target analytes > RL	Yes		In data package
Matrix Spike/Matrix Spike Duplicate (MS/MSD)	One set (MS/MSD) per group of field samples. Must contain all target analytes. (Recovery Limits 50 to 120%; RPD <30%)	Yes		In data package
Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 30%)	Yes		In data package
Surrogate Recoveries	Calculate % recovery (30 to 150% recovery)	Yes		In data package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Table II-4: Quality Control Summary for Analyses of Polychorinated Biphenyls (PCB congeners) in Sediment, Tissue and Water Matrices

Method Reference Number: 8082A

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Initial Calibration	Must be performed prior to the analysis of any QC sample or field sample (<20 % RSD for each compound)	Yes		Retained at lab
Calculation of Method Detection Limits (MDLs)	For each matrix, analyzed once per 12 month period (see Section 5.2 for MDL procedure)	Yes		In data package
Calibration Verification (Second Source)	Once, after initial calibration. (80 to 120% recovery of each compound)	Yes		Retained at lab
Continuing Calibration	Every 20 injections (± 15 % D)	Yes		Retained at lab
Standard Reference Materials	Within the limits provided by vendor	Yes		In data package
Method Blank	No target analytes > RL	Yes		In data package
Matrix Spike/Matrix Spike Duplicate (MS/MSD)	One set (MS/MSD) per group of field samples. Must contain all target analytes. (Recovery Limits 30 to 150%; RPD <30%)	Yes		In data package
Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 30%)	No	% RR above limit for PCB 153 and PCB 180	In data package
Surrogate Recoveries	Calculate % recovery (30 to 150% recovery)	Yes		In data package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Table II-5: Quality Control Summary for Analyses of Metals in Sediments, Tissue and Water Matrices

Method Reference Numbers: Various Reference Numbers

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Linear Range Determination for ICP	Performed Quarterly	Yes		Retained at lab
Initial Calibration for AA, Hg	Performed Daily (Correlation Coefficient ≥0.995)	Yes		In data package
Calculation of Method Detection Limits (MDLs)	For each matrix, analyzed once per 12 month period (see Section 5.2 for MDL procedure)	No	Hg MDL analyzed just over 12 months ago.	In data package
Initial Calibration Verification/ Continuing Calibration Verification	Hg: 80 to 120% recovery Other metals: 90 to 110% recovery	Yes		Retained at lab
Initial Calibration Blank/ Continuing Calibration Blank	No target analytes > Instrument Detection Limit (IDL)	Yes		Retained at lab
Standard Reference Materials	Within the limits provided by vendor	Yes		In data package
Method Blank	No target analytes > RL	Yes		In data package
Sample Spike/ Sample Duplicate	One set per group of field samples. Must contain all target analytes. Recovery Limits (75 to 125%; RPD < 20% or < 35%)	No	Zinc % R above limit.	In data package
Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 30%)	No	Lead % RR above limit.	In data package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Table II-7: Quality Control Summary for Analyses of Sediment Grain Size and Total Organic Carbon

Method Reference Numbers:

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Grain Size: Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 25%)	Yes		Retained at lab
Total Organic Carbon: Standard Reference Materials	Within the limits provided by vendor	Yes		In data package
Total Organic Carbon: Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 30%)	Yes		In data package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

SAMPLE RECEIPT AND CONDITION DOCUMENTATION

STUDY NO:	26993		
SDG No:			
Project:	Rockland Fish Pier		
Delivered via:	**CLIENT**		
Date and Time Received:	01/21/16 1130	Date and TIme Logged into Lab:	01/21/16 1352
Received By:	RAM	Logged into Lab by:	BP
Air bill / Way bill:	No	Air bill included in folder if received?	NA
Cooler on ice/packs:	YES	Custody Seals present?	NA
Cooler Blank Temp (C) at arrival:	4.2	Custody Seals intact?	NA
Number of COC Pages:	1		
COC Serial Number(s):	1932		
COC Complete:	YES	Does the info on the COC match the samples?	Yes
Sampled Date:	Yes	Were samples received within holding time?	Yes
Field ID complete:	Yes	Were all samples properly labeled?	Yes
Sampled Time:	Yes	Were proper sample containers used?	Yes
Analysis request:	Yes	Were samples received intact? (none broken or leaking)	Yes
COC Signed and dated:	Yes	Were sample volumes sufficient for requested analysis?	Yes
Were all samples received?	Yes	Were VOC vials free of headspace?	NA
Client notification/authorization:	Not required	pH Test strip ID number:	_____

Field ID	Lab ID	Mx	Analysis Requested	Bottle	Req'd Pres'n	Verified Pres'n
R1	26993-001	S	Subsample: grain size	1X2 G	4C	
R2	26993-002	S	Subsample: grain size	1X2 G	4C	
R3	26993-003	S	Subsample: grain size	1X2 G	4C	
R4	26993-004	S	Subsample: grain size	1X2 G	4C	
R5	26993-005	S	Subsample: grain size	1X2 G	4C	

Notes and qualifications:

ESI
EnviroSystems, Inc.
1 Lafayette Road
Hampton, N.H. 03843
Voice: 603-926-3345
FAX: 603-923-3521

ESI Job No: 26993

CHAIN OF CUSTODY DOCUMENTATION

Client: ECO-ANALYSTS, INC	Contact:	Project Name: Rockland Fish Pier	Page of
Report to: Bud Brown	Address: PO BOX 224 Bath, ME	Project Number: 207-837-2442	
Invoice to: EA	Address: 04530	Project Manager: Bud Brown	
Voice:	Fax:	email:	P.O. No: Quote No:

Protocol: RCRA SDWA NPDES USCOE Other

Lab Number (assigned by lab)	Your Field ID: (must agree with container)	Date Sampled	Time Sampled	Sampled By	Grab or com-posit (G/C)	Container Size (ml.)	Container Type (P/G/T)	Field Preser-vation	Matrix S=Solid W=Water	Filter N=Not needed F=Done in field L=Lab to do	Analyses Requested\ Special Instructions:
-001	R1	1/20	1400	TAF	G	2 gallon	P	0°F	S	n	
-002	R2	1/20	1410	TAF	↓	↓	↓	↓	↓	↓	
-003	R3	1/20	1420	TAF	↓	↓	↓	↓	↓	↓	
-004	R4	1/20	1430	TAF	↓	↓	↓	↓	↓	↓	
-005	R5	1/20	1440	TAF	↓	↓	↓	↓	↓	↓	

Relinquished By: Tim Forrester	Date: 1/21	Time: 11:30	Received By: Date: Time:
Relinquished By:	Date:	Time:	Received at Lab By: [illegible] Date: 01/21/16 Time: 1130

Comments: 4.2°C @ arrival
samples frozen

Sample Delivery Group No: Page of

No: № 1932

Rockland Fish Pier Bulk Sediment Analysis
Application Number NAE-2015-1695

GeoTesting EXPRESS

Technologies to manage risk for infrastructure

Boston
Atlanta
Chicago
Los Angeles
New York
www.geotesting.com

Transmittal

TO:

Rene'e McIsaac

EnviroSystems, Inc.

PO Box 778, 1 Lafayette Road

Hampton, NH 03843

DATE: 2/5/2016	GTX NO: 304293
RE: 26993Gz	

COPIES	DATE	DESCRIPTION
	2/5/2016	**January 2016 Laboratory Test Report**

REMARKS:

SIGNED:

Ethan Marro, Assistant Laboratory Manager

CC:

APPROVED BY:

Joe Tomei, Laboratory Manager

GeoTesting
EXPRESS

Technologies to manage risk for infrastructure

Boston
Atlanta
Chicago
Los Angeles
New York
www.geotesting.com

February 5, 2016

Rene'e McIsaac
EnviroSystems, Inc.
PO Box 778, 1 Lafayette Road
Hampton, NH 03843

RE: 26993Gz, (GTX-304293)

Dear Rene'e:

Enclosed are the test results you requested for the above referenced project. GeoTesting Express, Inc. (GTX) received five samples from you on 1/22/2016. These samples were labeled as follows:

26993-001
26993-002
26993-003
26993-004
26993-005

GTX performed the following test on each of these samples:

ASTM D422 - Grain Size Analysis - Sieve Only

A copy of your test request is attached.

The results presented in this report apply only to the items tested. This report shall not be reproduced except in full, without written approval from GeoTesting Express. The remainder of these samples will be retained for a period of sixty (60) days and will then be discarded unless otherwise notified by you. Please call me if you have any questions or require additional information. Thank you for allowing GeoTesting Express the opportunity of providing you with testing services. We look forward to working with you again in the future.

Respectfully yours,

Ethan Marro
Assistant Laboratory Manager

GeoTesting Express, Inc. | 125 Nagog Park | Acton, MA 01720 | Toll Free 800 434 1062 | Fax 978 635 0266

GeoTesting
EXPRESS

Technologies to manage risk for infrastructure

Boston
Atlanta
Chicago
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www.geotesting.com

Geotechnical Test Report 2/5/2016

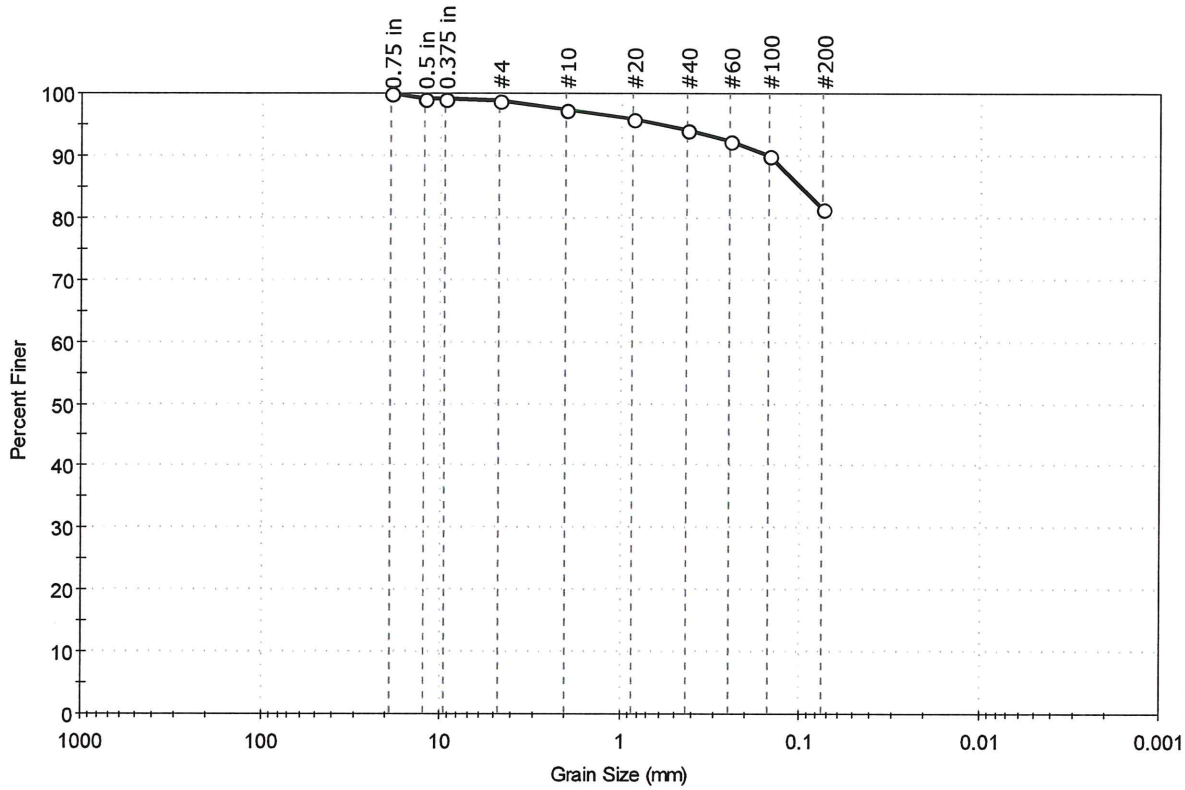
GTX-304293
26993Gz

Prepared for:

EnviroSystems, Inc.

Client:	EnviroSystems, Inc.				
Project:	26993Gz				
Location:	---			Project No:	GTX-304293
Boring ID:	---	Sample Type:	jar	Tested By:	jbr
Sample ID:	26993-001	Test Date:	01/28/16	Checked By:	emm
Depth :	---	Test Id:	361885		
Test Comment:	---				
Visual Description:	Moist, gray silt with sand				
Sample Comment:	---				

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	1.0	17.4	81.6

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
0.75 in	19.00	100		
0.5 in	12.50	99		
0.375 in	9.50	99		
#4	4.75	99		
#10	2.00	97		
#20	0.85	96		
#40	0.42	94		
#60	0.25	92		
#100	0.15	90		
#200	0.075	82		

Coefficients

D_{85} = 0.1001 mm D_{30} = N/A
D_{60} = N/A D_{15} = N/A
D_{50} = N/A D_{10} = N/A
C_u = N/A C_c = N/A

Classification

ASTM N/A

AASHTO Silty Soils (A-4 (0))

Sample/Test Description

Sand/Gravel Particle Shape : ---

Sand/Gravel Hardness : ---

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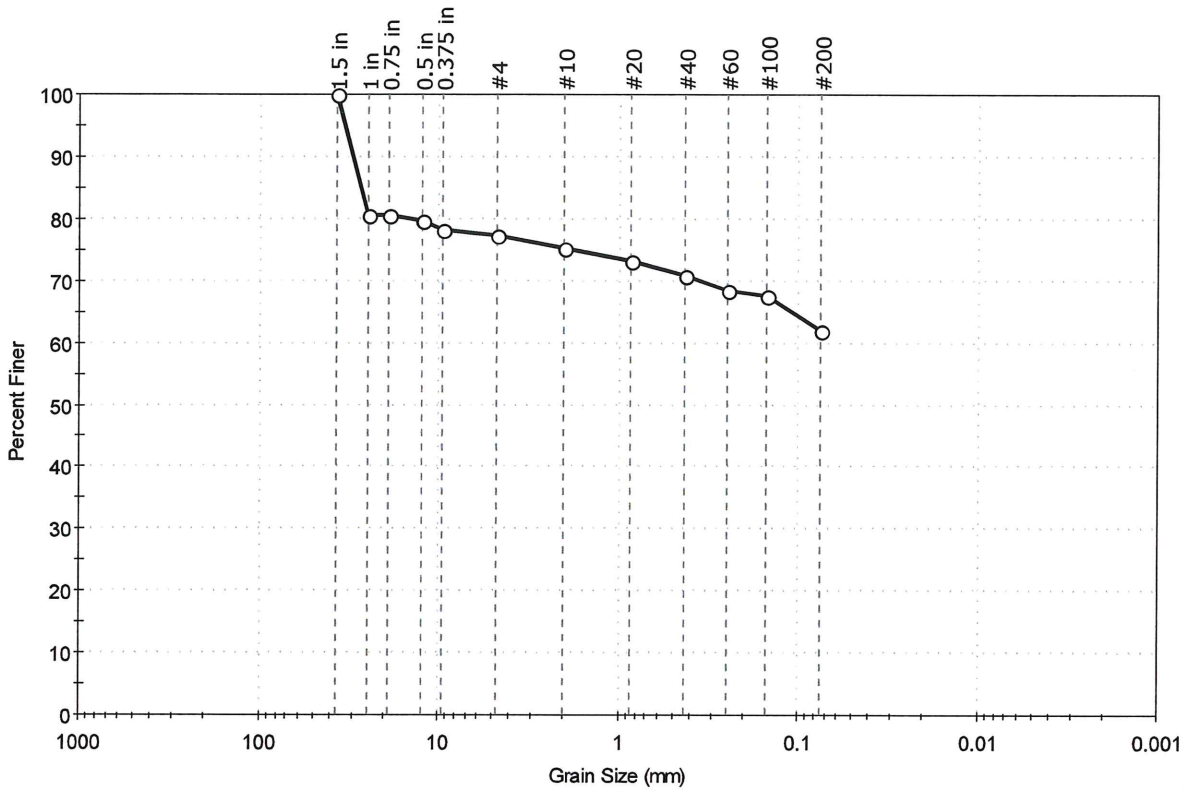
Client:	EnviroSystems, Inc.				
Project:	26993Gz				
Location:	---			Project No:	GTX-304293
Boring ID:	---	Sample Type:	jar	Tested By:	jbr
Sample ID:	26993-002	Test Date:	01/28/16	Checked By:	emm
Depth :	---	Test Id:	361886		
Test Comment:	---				
Visual Description:	Moist, black gravelly silt with sand				
Sample Comment:	---				

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
–	22.6	15.4	62.0

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
1.5 in	37.50	100		
1 in	25.00	81		
0.75 in	19.00	81		
0.5 in	12.50	80		
0.375 in	9.50	78		
#4	4.75	77		
#10	2.00	75		
#20	0.85	73		
#40	0.42	71		
#60	0.25	69		
#100	0.15	68		
#200	0.075	62		

Coefficients

D_{85} = 27.4080 mm D_{30} = N/A
D_{60} = N/A D_{15} = N/A
D_{50} = N/A D_{10} = N/A
C_u = N/A C_c = N/A

Classification

ASTM N/A

AASHTO Silty Soils (A-4 (0))

Sample/Test Description

Sand/Gravel Particle Shape : ANGULAR

Sand/Gravel Hardness : HARD

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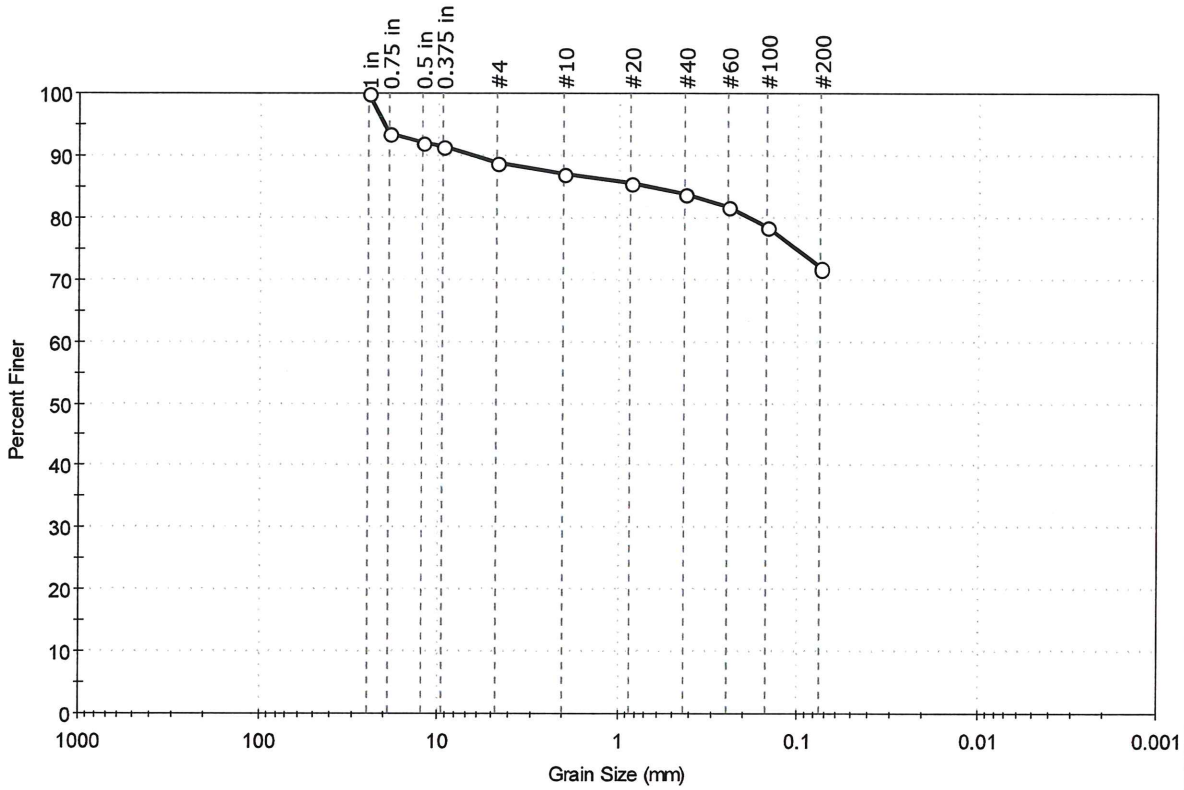
Client:	EnviroSystems, Inc.				
Project:	26993Gz				
Location:	---			Project No:	GTX-304293
Boring ID:	---	Sample Type:	jar	Tested By:	jbr
Sample ID:	26993-003	Test Date:	01/28/16	Checked By:	emm
Depth :	---	Test Id:	361887		
Test Comment:	---				
Visual Description:	Moist, gray silt with sand				
Sample Comment:	---				

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
–	11.1	17.2	71.7

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
1 in	25.00	100		
0.75 in	19.00	94		
0.5 in	12.50	92		
0.375 in	9.50	91		
#4	4.75	89		
#10	2.00	87		
#20	0.85	85		
#40	0.42	84		
#60	0.25	82		
#100	0.15	79		
#200	0.075	72		
#200	0.075	72		

Coefficients

D_{85} = 0.7054 mm	D_{30} = N/A
D_{60} = N/A	D_{15} = N/A
D_{50} = N/A	D_{10} = N/A
C_u = N/A	C_c = N/A

Classification

ASTM N/A

AASHTO Silty Soils (A-4 (0))

Sample/Test Description

Sand/Gravel Particle Shape : ANGULAR

Sand/Gravel Hardness : HARD

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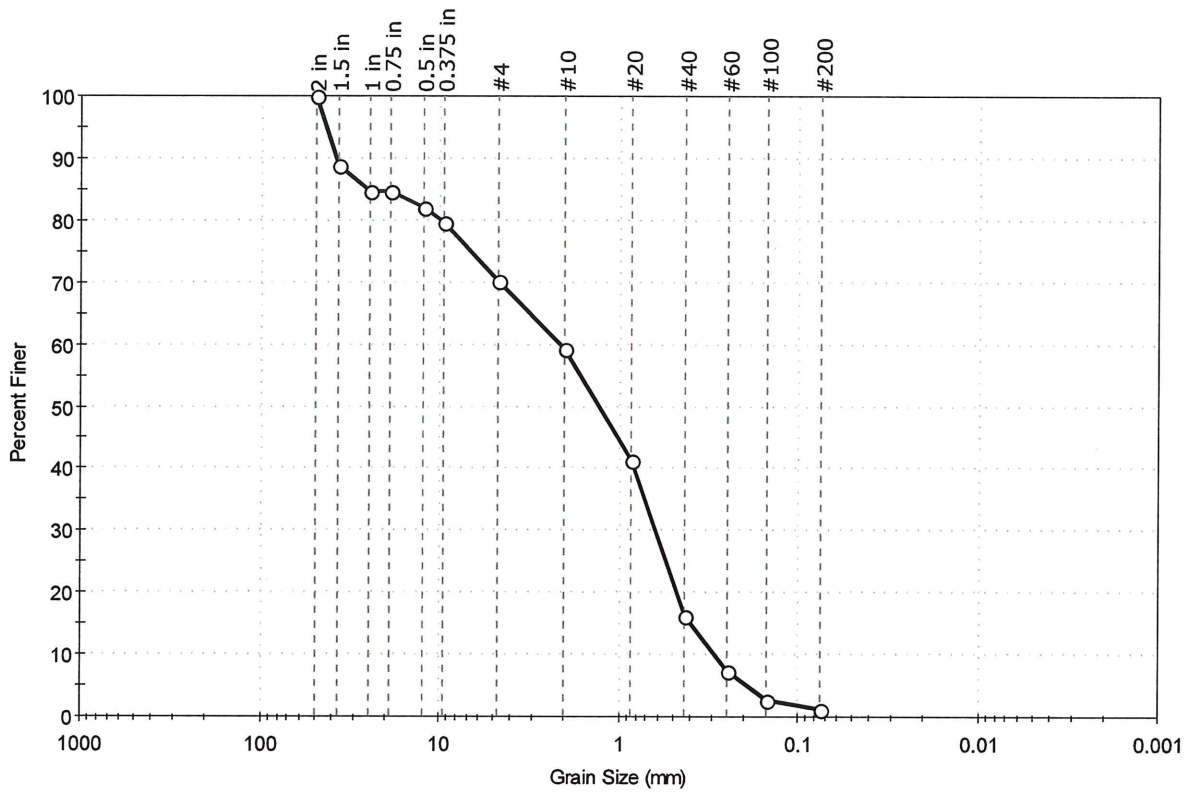
Client:	EnviroSystems, Inc.				
Project:	26993Gz				
Location:	---			Project No:	GTX-304293
Boring ID:	---	Sample Type:	jar	Tested By:	jbr
Sample ID:	26993-004	Test Date:	02/01/16	Checked By:	emm
Depth :	---	Test Id:	361888		
Test Comment:	---				
Visual Description:	Moist, brown sand with gravel				
Sample Comment:	---				

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
–	29.8	69.1	1.1

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
2 in	50.00	100		
1.5 in	37.50	89		
1 in	25.00	85		
0.75 in	19.00	85		
0.5 in	12.50	82		
0.375 in	9.50	80		
#4	4.75	70		
#10	2.00	59		
#20	0.85	41		
#40	0.42	16		
#60	0.25	7		
#100	0.15	3		
#200	0.075	1.1		

Coefficients

D_{85} = 25.8866 mm D_{30} = 0.6209 mm
D_{60} = 2.1170 mm D_{15} = 0.3928 mm
D_{50} = 1.2850 mm D_{10} = 0.2923 mm
C_u = 7.243 C_c = 0.623

Classification

ASTM Poorly graded sand with gravel (SP)

AASHTO Stone Fragments, Gravel and Sand (A-1-b (1))

Sample/Test Description

Sand/Gravel Particle Shape : ANGULAR

Sand/Gravel Hardness : HARD

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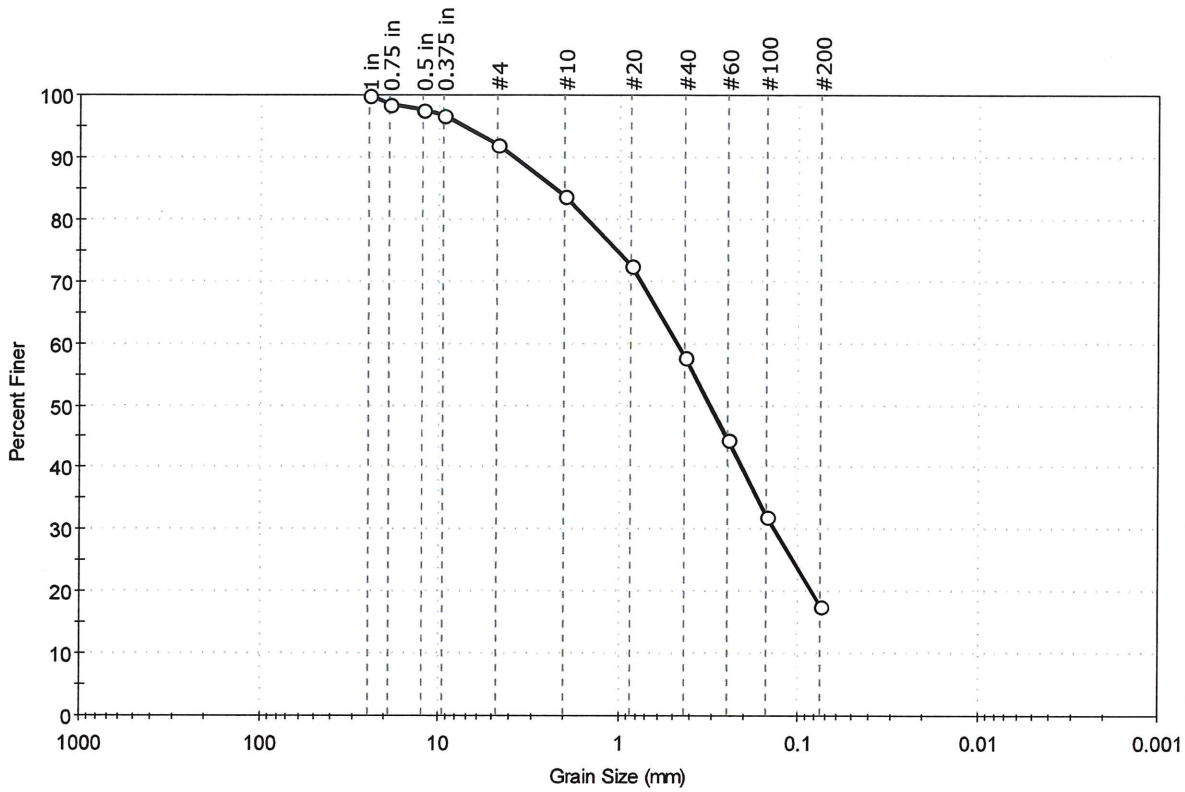
Client:	EnviroSystems, Inc.				
Project:	26993Gz				
Location:	---			Project No:	GTX-304293
Boring ID:	---	Sample Type:	jar	Tested By:	jbr
Sample ID:	26993-005	Test Date:	01/29/16	Checked By:	emm
Depth :	---	Test Id:	361889		
Test Comment:	---				
Visual Description:	Moist, black silty sand				
Sample Comment:	---				

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
–	7.9	74.5	17.6

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
1 in	25.00	100		
0.75 in	19.00	98		
0.5 in	12.50	98		
0.375 in	9.50	97		
#4	4.75	92		
#10	2.00	84		
#20	0.85	72		
#40	0.42	58		
#60	0.25	45		
#100	0.15	32		
#200	0.075	18		

Coefficients

D_{85} = 2.2543 mm D_{30} = 0.1362 mm
D_{60} = 0.4737 mm D_{15} = N/A
D_{50} = 0.3119 mm D_{10} = N/A
C_u = N/A C_c = N/A

Classification

ASTM N/A

AASHTO Silty Gravel and Sand (A-2-4 (0))

Sample/Test Description

Sand/Gravel Particle Shape : ANGULAR

Sand/Gravel Hardness : HARD

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ESI
EnviroSystems, Inc.
1 Lafayette Road
Hampton, N.H. 03843

Voice: 603-926-3345
FAX: 603-923-3521

ESI Job No:

CHAIN OF CUSTODY DOCUMENTATION

Client: EnviroSystems, Inc.	Contact: Renée McIsaac	Project Name: 26993 Gz	Page 1 of 1
Report to:	Address:	Project Number:	
Invoice to:	Address:	Project Manager:	
Voice: 603-926-3345 ext 212	Fax:	r.mcisaac@envirosystems.com email:	P.O. No: Quote No:

Protocol: RCRA SDWA NPDES USCOE Other

Lab Number (assigned by lab)	Your Field ID: (must agree with container)	Date Sampled	Time Sampled	Sampled By	Grab or composit (G/C)	Container Size (ml.)	Container Type (P/G/T)	Field Preservation	Matrix S=Solid W=Water	Filter N=Not needed F=Done in field L=Lab to do	Analyses Requested\ Special Instructions:
	26993-001	01/20/16	–	ESI	–	9oz	G	–	S	–	Grain Size Analysis NERIM Criteria (no hydrometer)
	26993-002										
	26993-003										
	26993-004										
	26993-005										

RAM 01/22/16

Relinquished By: [signature]	Date: 1/22/16 Time: 12:00	Received By: [signature]	Date: 1/22/16 Time: 12:00
Relinquished By:	Date: Time:	Received at Lab By:	Date: Time:

Comments:

No: № 1927

Sample Delivery Group No:	Page of

Rockland Fish Pier Bulk Sediment Analysis
Application Number NAE-2015-1695
Page 59 of 60

GeoTesting EXPRESS

WARRANTY and LIABILITY

GeoTesting Express (GTX) warrants that all tests it performs are run in general accordance with the specified test procedures and accepted industry practice. GTX will correct or repeat any test that does not comply with this warranty. GTX has no specific knowledge as to conditioning, origin, sampling procedure or intended use of the material.

GTX may report engineering parameters that require us to interpret the test data. Such parameters are determined using accepted engineering procedures. However, GTX does not warrant that these parameters accurately reflect the true engineering properties of the *in situ* material. Responsibility for interpretation and use of the test data and these parameters for engineering and/or construction purposes rests solely with the user and not with GTX or any of its employees.

GTX's liability will be limited to correcting or repeating a test which fails our warranty. GTX's liability for damages to the Purchaser of testing services for any cause whatsoever shall be limited to the amount GTX received for the testing services. GTX will not be liable for any damages, or for any lost benefits or other consequential damages resulting from the use of these test results, even if GTX has been advised of the possibility of such damages. GTX will not be responsible for any liability of the Purchaser to any third party.

Commonly Used Symbols

A	pore pressure parameter for $\Delta\sigma_1 - \Delta\sigma_3$
B	pore pressure parameter for $\Delta\sigma_3$
CAI	CERCHAR Abrasiveness Index
CIU	isotropically consolidated undrained triaxial shear test
CR	compression ratio for one dimensional consolidation
CSR	cyclic stress ratio
C_c	coefficient of curvature, $(D_{30})^2 / (D_{10} \times D_{60})$
C_u	coefficient of uniformity, D_{60}/D_{10}
C_c	compression index for one dimensional consolidation
C_α	coefficient of secondary compression
c_v	coefficient of consolidation
c	cohesion intercept for total stresses
c'	cohesion intercept for effective stresses
D	diameter of specimen
D	damping ratio
D_{10}	diameter at which 10% of soil is finer
D_{15}	diameter at which 15% of soil is finer
D_{30}	diameter at which 30% of soil is finer
D_{50}	diameter at which 50% of soil is finer
D_{60}	diameter at which 60% of soil is finer
D_{85}	diameter at which 85% of soil is finer
d_{50}	displacement for 50% consolidation
d_{90}	displacement for 90% consolidation
d_{100}	displacement for 100% consolidation
E	Young's modulus
e	void ratio
e_c	void ratio after consolidation
e_o	initial void ratio
G	shear modulus
G_s	specific gravity of soil particles
H	height of specimen
H_R	Rebound Hardness number
i	gradient
I_S	Uncorrected point load strength
$I_{S(50)}$	Size corrected point load strength index
H_A	Modified Taber Abrasion
H_T	Total hardness
K_o	lateral stress ratio for one dimensional strain
k	permeability
LI	Liquidity Index
m_v	coefficient of volume change
n	porosity
PI	plasticity index
P_c	preconsolidation pressure
p	$(\sigma_1 + \sigma_3) / 2$, $(\sigma_v + \sigma_h) / 2$
p'	$(\sigma'_1 + \sigma'_3) / 2$, $(\sigma'_v + \sigma'_h) / 2$
p'_c	p' at consolidation
Q	quantity of flow
q	$(\sigma_1 - \sigma_3) / 2$
q_f	q at failure
q_o, q_i	initial q
q_c	q at consolidation
S_r	Post cyclic undrained shear strength
T	temperature
t	time
U, UC	unconfined compression test
UU, Q	unconsolidated undrained triaxial test
u_a	pore gas pressure
u_e	excess pore water pressure
u, u_w	pore water pressure
V	total volume
V_g	volume of gas
V_s	volume of solids
V_s	shear wave velocity
V_v	volume of voids
V_w	volume of water
V_o	initial volume
v	velocity
W	total weight
W_s	weight of solids
W_w	weight of water
w	water content
w_c	water content at consolidation
w_f	final water content
w_l	liquid limit
w_n	natural water content
w_p	plastic limit
w_s	shrinkage limit
w_o, w_i	initial water content
α	slope of q_f versus p_f
α'	slope of q_f versus p_f'
γ_t	total unit weight
γ_d	dry unit weight
γ_s	unit weight of solids
γ_w	unit weight of water
ε	strain
ε_{vol}	volume strain
ε_h, ε_v	horizontal strain, vertical strain
μ	Poisson's ratio, also viscosity
σ	normal stress
σ'	effective normal stress
σ_c, σ'_c	consolidation stress in isotropic stress system
σ_h, σ'_h	horizontal normal stress
σ_v, σ'_v	vertical normal stress
σ'_{vc}	Effective vertical consolidation stress
σ_1	major principal stress
σ_2	intermediate principal stress
σ_3	minor principal stress
τ	shear stress
φ	friction angle based on total stresses
φ'	friction angle based on effective stresses
φ'_r	residual friction angle
φ_{ult}	φ for ultimate strength