Engineers and Scientists

June 14, 2012 File No. 05.0043654.00-C

Ms. Barbara Morin Rhode Island Department of Environmental Management (RIDEM) Office of Air Resources 235 Promenade Street Providence, Rhode Island 02908

Re: Response to Comments *Evaluation of Applicability of Air Pollution Control Regulation No. 9 – Substation Upgrade Earthwork Activities* Former Tidewater Facility Pawtucket, Rhode Island

Dear Ms. Morin:

On behalf of the Narragansett Electric Company d/b/a National Grid (National Grid), GZA GeoEnvironmental, Inc. (GZA) has prepared this response letter to the Office of Air Resources (OAR) comment letter dated March 7, 2012 regarding the Department's review of GZA's February 13, 2012 Regulation No. 9 applicability evaluation for the proposed substation upgrade earthwork activities at the Tidewater Site. For ease of reference, the Department's comments are provided below, followed by GZA's responses in *italics*.

• Considering the spatial extent of the proposed excavation, it is not clear that an adequate number of samples were taken. Please provide support for the appropriateness and adequacy of the spacing and locations of sampling sites.

Given the limited volume of excavation proposed for the electrical substation earthwork, the number of samples collected was adequate and appropriate to characterize soil conditions. As presented in the February 2012 submittal, it is estimated that approximately 160 cubic yards (CY) of soil will be displaced during the proposed earthwork activities for the electrical substation upgrades. Originally 9 soil characterization samples were collected over this volume, equating to approximately one sample per every 20 CY. In May 2012, GZA collected an additional 6 soil samples in the vicinity of SUB-3 and SUB-4 which results in one sample for every 12 CY. The sample locations were also selected to be spatially representative of the excavated soil based on our current understanding of the proposed earthwork.

The levels of certain pollutants reported in some of the samples are considerably higher than in others, indicating the possible presence of hotspots in the vicinity of those sample locations. For instance, the hydrocarbon level reported for the Sub-4 sample is above the I/C criterion and is nearly four times higher than the reported level at the next highest site. Similarly, the reported Method 920 naphthalene level at Sub-3 is considerably higher than at other locations (level at Sub-4 cannot be determined because of a high detection level at that site). Additional samples should be taken in the vicinity of sample sites with reported elevations to determine whether higher levels are present in the areas around those sites.



530 Broadway Providence Rhode Island 02909 401-421-4140 FAX 401-751-8613 http://www.gza.com



As indicated above, in May 2012, GZA collected additional samples from 6 supplemental locations within the proposed trench alignment in the vicinity of existing sample locations SUB-3 and SUB-4. The sample locations were collected on an approximate 15 foot interval along the proposed trench alignment, as shown on the attached Figure 4 (SUB-10 through SUB-15). Soil borings at each location were conducted similar to the December 2011 soil borings. Boring logs were prepared to include field observations, soil classification, evidence of impacts and PID field screening. Soil samples at each location were collected at the proposed mid-depth of excavation for analytical testing. Per our discussions prior to this sampling event, laboratory analysis included TPH via EPA Method 8100M and naphthalene via EPA Method 8270C.

Results are presented in the attached Table. TPH was detected in all 6 samples collected, with detected values ranging from 163 mg/kg to 1,010 mg/kg in SUB-11 and SUB-10, respectively. Naphthalene, via EPA Method 8270C, was detected in only one sample, SUB-10, at a concentration of 0.867 mg/kg. All other samples were non-detect (ND) for naphthalene, with detection limits at approximately 0.35 mg/kg. GZA believes that the elevated values of TPH and naphthalene detected during the December 2011 sampling have been delineated within the limits of the proposed excavation with these supplemental analyses.

The supplemental soil results were incorporated into the February 2012 air emission model. The updated excavation emission calculations, which are included as an attachment, indicate that the naphthalene emissions that are expected as part of the proposed excavations are still significantly below the RIDEM Annual Minimum Quantities.

• The maximum sampling depth was 24 inches. OAR would like to see the results of deeper samples, given that the project plan calls for excavation to a depth of 48 inches around Sub-3; 36 inches in the duct bank connecting Sub-1, Sub-2 and Sub-3; and 40 inches in the TRENWA trench (Sub-4, Sub-5 and Sub-6).

For each sample location, soil borings were extended to the full depth of proposed excavation. A GZA representative was on-site to document soil conditions at each location and collect soil samples for field screening and analytical testing. Results of the field screening were non-detect. Based on these field observations, samples were collected at the mid-depth of the proposed excavation. This sampling protocol is consistent with our approach during the natural gas regulator station air emission model. Copies of the boring logs for locations SUB-1 through SUB-15 are attached for your reference.

• OAR is concerned about the lack of agreement between the reported levels of hydrocarbons, metals and PAH in the primary and blind duplicate samples taken at Sub-9. Note that VOC results at that site were largely non-detects. Without more information, it is impossible to determine the reason for those discrepancies (e.g. a lack of sample homogeneity or variability in the analyses). Any information that GZA can provide that would shed light on these discrepancies would add confidence to the results.



As indicated in Tables 1 and 2 of the February 13, 2012 submittal, the blind duplicate samples were collected at sample location SUB-8, not SUB-9. Comparison of the results between the blind duplicate and SUB-8 were generally consistent.

Based on our phone conversation on March 9, 2012, GZA understands that the OAR does not have any comments regarding the proposed modifications to the Air Quality Monitoring Program (AQMP) presented in the February 2012 submittal. Furthermore, we understand that with the results of the additional soil samples described above and their general concurrence with previous soil sampling results that the Department agrees that an air permit would not be required.

We appreciate the Department's timely review of our February 13, 2012 submittal. The electrical substation upgrade project is currently scheduled to commence in early August 2012. As we have discussed previously, the earthwork associated with this upgrade project will take place over an approximate eight week period during the expected four month reconstruction project.

Please feel free to contact either of the undersigned or Michele Leone at 781-907-3651 should you have any questions.

Very truly yours,

GZA GEOENVIRONMENTAL, INC.

Margaret S. Kilpatrick, P.E. Senior Project Manager

and, Clark

James J. Clark, P.E. Principal

MSK/JJC:tja

Jup P. Santhey

John P. Hartley Consultant/Reviewer

- Attachments: Table 3 Summary of Soil TPH, PAH and PCB Analytical Results Figure 4 – Sampling Plan and Proposed Excavations Excavation Emission Calculations Soil Boring Logs
- cc: Joseph Martella, RIDEM Michele Leone, National Grid

J:\ENV\43654.msk\Corresp\Response to OAR Comments Ltr 3.7.12\43654 00 Response to OAR Comment Ltr 6.14.12 Final.docx

TABLE 3

TABLE 3 SUMMARY OF SOIL TPH, PAH, PCB ANALYTICAL RESULTS

Substation Sampling

Former Tidewater Facility

Pawtucket, Rhode Island

			RIDEM	RIDEM		Sub-1	Sub-2	Sub-3	Sub-4	Sub-4	Sub-4	Sub-5	Sub-5	Sub-5	Sub-6	Sub-6	Sub-7	Sub-7
		Units	GB	Industrial/	RIDEM	18 in	18 in	24 in	0-3 in	3-6 in	20 in	0-3 in	3-6 in	20 in	0-3 in	20 in	0-3 in	12 in
		Cinto	Leachability	Commercial	UCL	Soil	Soil	Soil	Solid	Soil	Soil	Solid	Soil	Soil	Soil	Soil	Soil	Soil
			Criteria	DEC		1112136-01	1112136-02	1112136-03	1112136-12	1112387-01	1112136-04	1112136-13	1112387-02	1112136-05	1112136-14	1112136-06	1112136-15	1112136-07
Mod EPA 8100	TOTAL PETROLEUM HYDROC	APBON	1			12/5/2011	12/5/2011	12/5/2011	12/5/2011	12/5/2011	12/5/2011	12/5/2011	12/5/2011	12/5/2011	12/5/2011	12/5/2011	12/5/2011	12/5/2011
MOU. EFA 8100	Hydrocarbon Content	mg/kg	2 500	2 500	30,000	374	137	863			3270		[51.1		125		<37.7
EPA 6010B	METALS	iiig/ kg	2,500	2,500	50,000	5/4	157	005			5210			51.1		125		<51.1
LIN OUTOD	Arsenic	mg/kg	NE	7	10.000	3.7	4.3	3	[[7.6			<3.0		28.4		<2.5
	Lead	mg/kg	NE	500	10,000	119	24.6	66.6			210			95.4		119		27
EPA 8270	PAHS BY GCMS			200	10,000	>		0010		I		1		,				
	2-Methylnaphthalene	mg/kg	NE	10.000	10.000	< 0.345	<0.402	1.85			<4.06			< 0.394		< 0.416		< 0.342
	Acenaphthene	mg/kg	NE	10,000	10.000	< 0.345	<0.402	<1.78			<4.06			< 0.394		< 0.416		< 0.342
	Acenaphthylene	mg/kg	NE	10,000	10.000	1.08	<0.402	3.95			4.31			< 0.394		< 0.416		< 0.342
	Anthracene	mg/kg	NE	10.000	10.000	0.517	<0.402	2.32			<4.06			< 0.394		< 0.416		< 0.342
	Benzo [a] Anthracene	mg/kg	NE	7.8	10.000	2.5	2.62	8.7			5.1			< 0.394		0.797		< 0.342
	Benzo [a] Pyrene	mg/kg	NE	0.8	10,000	4.65	4.36	9.49			4.86			< 0.197		0.712		0.271
	Benzo [b] Fluoranthene	mg/kg	NE	7.8	10,000	5.89	5.75	16.7			10.8			< 0.394		2.15		< 0.342
	Benzo [g,h,i] Perylene	mg/kg	NE	10,000	10,000	0.98	3.07	<1.78			<4.06			< 0.394		0.816		< 0.342
	Benzo [k] Fluoranthene	mg/kg	NE	78	10,000	5.36	4.36	10			7.62			< 0.394		1.08		< 0.342
	Chrysene	mg/kg	NE	780,000	10,000	2.54	2.63	11			6.36			0.241		1.22		0.195
	Dibenzo [a,h] Anthracene	mg/kg	NE	0.8	10,000	0.26	< 0.201	<0.891			<2.03			< 0.197		< 0.209		< 0.172
	Fluoranthene	mg/kg	NE	10,000	10,000	3.14	3.37	12.2			8.57			< 0.394		0.905		< 0.342
	Fluorene	mg/kg	NE	10,000	10,000	< 0.345	< 0.402	<1.78			<4.06			< 0.394		< 0.416		< 0.342
	Indeno [1,2,3-cd] Pyrene	mg/kg	NE	7.8	10,000	0.896	2.39	2.02			<4.06			< 0.394		0.679		< 0.342
	Naphthalene	mg/kg	NE	10,000	10,000	0.632	0.672	4.6			<4.06			< 0.394		< 0.416		< 0.342
	Phenanthrene	mg/kg	NE	10,000	10,000	1.04	0.915	7.61			4.28			< 0.394		0.446		< 0.342
	Pyrene	mg/kg	NE	10,000	10,000	3.95	3.52	13.2			8.96			< 0.394		0.898		< 0.342
SW-846 9010A	SUBCONTRACTED ANALYTE	Ś								•								
	Total Cyanide	mg/kg	NE	10,000	10,000	15.9	57	12.6			74.8			3		41.5		<1.02
	Total Organic Carbon	mg/kg	NE	NE	NE	31600	27100	70900			119000			69900		35900		11700
EPA 8082	POLYCHLORINATED BIPHEN	YLS																
	Aroclor 1016	mg/kg	10	10	10,000	< 0.0558	< 0.0598	< 0.0573	< 0.0513	< 0.0549	< 0.0594	< 0.0534	< 0.0624	< 0.0614	< 0.0589	< 0.0652	< 0.0523	< 0.0516
	Aroclor 1221	mg/kg	10	10	10,000	< 0.0558	< 0.0598	< 0.0573	< 0.0513	< 0.0549	< 0.0594	< 0.0534	< 0.0624	< 0.0614	< 0.0589	< 0.0652	< 0.0523	< 0.0516
	Aroclor 1232	mg/kg	10	10	10,000	< 0.0558	< 0.0598	< 0.0573	< 0.0513	< 0.0549	< 0.0594	< 0.0534	< 0.0624	< 0.0614	< 0.0589	< 0.0652	< 0.0523	< 0.0516
	Aroclor 1242	mg/kg	10	10	10,000	< 0.0558	< 0.0598	< 0.0573	< 0.0513	< 0.0549	< 0.0594	< 0.0534	< 0.0624	< 0.0614	< 0.0589	< 0.0652	< 0.0523	< 0.0516
	Aroclor 1248	mg/kg	10	10	10,000	< 0.0558	< 0.0598	< 0.0573	< 0.0513	< 0.0549	< 0.0594	< 0.0534	< 0.0624	< 0.0614	< 0.0589	< 0.0652	< 0.0523	< 0.0516
	Aroclor 1254	mg/kg	10	10	10,000	< 0.0558	< 0.0598	< 0.0573	< 0.0513	< 0.0549	< 0.0594	< 0.0534	< 0.0624	< 0.0614	< 0.0589	< 0.0652	0.366	< 0.0516
	Aroclor 1260	mg/kg	10	10	10,000	0.605	< 0.0598	< 0.0573	< 0.0513	< 0.0549	< 0.0594	< 0.0534	< 0.0624	< 0.0614	< 0.0589	< 0.0652	< 0.0523	< 0.0516
	Aroclor 1262	mg/kg	10	10	10,000	< 0.0558	< 0.0598	< 0.0573	< 0.0513	< 0.0549	< 0.0594	< 0.0534	< 0.0624	< 0.0614	< 0.0589	< 0.0652	< 0.0523	< 0.0516
	Aroclor 1268	mg/kg	10	10	10,000	< 0.0558	< 0.0598	< 0.0573	< 0.0513	< 0.0549	< 0.0594	< 0.0534	< 0.0624	< 0.0614	< 0.0589	< 0.0652	< 0.0523	< 0.0516

Notes

NE = Not Established

Blank spaces indicates that the specific consistuent was not sampled for.

Gray shaded cells indicates the concentration exceeds the RIDEM Method 1

Industrial/Commercial Direct Exposure Criteria (I/C-DEC).

Detection limits highlighted in *blue and in italics* exceed the RIDEM Method 1 Criteria.

Concentrations **bolded and underlined** exceed the RIDEM Method 1 GB Leachability Criteria.

A concentration with a bold border exceeds the Upper Concentration Limit.

=Indicates Sampling Location is within the Fenced Substation Area

=Indicates Sampling Location is outside of Fenced Substation Area

Blind Duplicate sample collected from SUB-8

GZA File No. 05.000043654.00 5/29/2012

TABLE 3 SUMMARY OF SOIL TPH, PAH, PCB ANALYTICAL RESULTS

Substation Sampling

Former Tidewater Facility

Pawtucket, Rhode Island

			RIDEM	RIDEM		Sub-8	Sub-8	Sub-8	Sub-9	Sub-9	Sub-9	Blind Duplicate	Sub-10	Sub-11	Sub-12	Sub-13	Sub-14	Sub-15
		Unita	GB	Industrial/	RIDEM	0-3 in	3-6 in	12 in	0-3 in	3-6 in	12 in	12 in	18 in	18 in	18 in	12 in	20 in	20 in
		Units	Leachability	Commercial	UCL	Solid	Soil	Soil	Solid	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
			Criteria	DEC		1112136-16	1112387-03	1112136-08	1112136-17	1112387-04	1112136-09	1112136-10	1205430-1	1205430-2	1205430-3	1205430-4	1205430-5	1205430-6
						12/5/2011	12/5/2011	12/5/2011	12/5/2011	12/5/2011	12/5/2011	12/5/2011	5/24/2012	5/24/2012	5/24/2012	5/24/2012	5/24/2012	5/24/2012
Mod. EPA 8100	TOTAL PETROLEUM HYDR	OCARBON	•	•				-	-	•								
	Hydrocarbon Content	mg/kg	2,500	2,500	30,000			210			86.5	360	1010	163	284	556	708	257
EPA 6010B	METALS																	
	Arsenic	mg/kg	NE	7	10,000			4.9			<2.8	4.6						
	Lead	mg/kg	NE	500	10,000			270			58.8	113						
EPA 8270	PAHS BY GCMS																	
	2-Methylnaphthalene	mg/kg	NE	10,000	10,000			< 0.399			< 0.391	< 0.391						
	Acenaphthene	mg/kg	NE	10,000	10,000			< 0.399			< 0.391	< 0.391						
	Acenaphthylene	mg/kg	NE	10,000	10,000			0.763			0.451	1.01						
	Anthracene	mg/kg	NE	10,000	10,000			< 0.399			0.797	< 0.391						
	Benzo [a] Anthracene	mg/kg	NE	7.8	10,000			1.71			2.58	2.59						
	Benzo [a] Pyrene	mg/kg	NE	0.8	10,000			1.98			2.24	2.93						
	Benzo [b] Fluoranthene	mg/kg	NE	7.8	10,000			3.39			4.54	7.08						
	Benzo [g,h,i] Perylene	mg/kg	NE	10,000	10,000			0.627			1.55	0.798						
	Benzo [k] Fluoranthene	mg/kg	NE	78	10,000			2.11			2.45	4.09						
	Chrysene	mg/kg	NE	780,000	10,000			2.08			3.08	3.13						
	Dibenzo [a,h] Anthracene	mg/kg	NE	0.8	10,000			< 0.200			< 0.196	< 0.196						
	Fluoranthene	mg/kg	NE	10,000	10,000			2.05			4.74	2.85						
	Fluorene	mg/kg	NE	10,000	10,000			< 0.399			< 0.391	< 0.391						
	Indeno [1,2,3-cd] Pyrene	mg/kg	NE	7.8	10,000			0.717			1.4	0.725					i l	
	Naphthalene	mg/kg	NE	10,000	10,000			< 0.399			< 0.391	0.424	0.867	< 0.349	< 0.342	< 0.347	< 0.352	< 0.349
	Phenanthrene	mg/kg	NE	10,000	10,000			0.918			3.29	1.03						
	Pyrene	mg/kg	NE	10,000	10,000			2.35			4.54	3.27						
SW-846 9010A	SUBCONTRACTED ANALY	TES	•	•						•								
	Total Cyanide	mg/kg	NE	10,000	10,000			275			29.3	177						
	Total Organic Carbon	mg/kg	NE	NE	NE			82200			29000	51000						
EPA 8082	POLYCHLORINATED BIPHE	ENYLS			•						•	•						
	Aroclor 1016	mg/kg	10	10	10,000	< 0.0534	< 0.0572	< 0.0607	< 0.0529	< 0.0584	< 0.0604	< 0.0572						
	Aroclor 1221	mg/kg	10	10	10,000	< 0.0534	< 0.0572	< 0.0607	< 0.0529	< 0.0584	< 0.0604	< 0.0572						
	Aroclor 1232	mg/kg	10	10	10,000	< 0.0534	< 0.0572	< 0.0607	< 0.0529	< 0.0584	< 0.0604	< 0.0572						
	Aroclor 1242	mg/kg	10	10	10,000	< 0.0534	< 0.0572	< 0.0607	< 0.0529	< 0.0584	< 0.0604	< 0.0572					i l	
	Aroclor 1248	mg/kg	10	10	10,000	< 0.0534	< 0.0572	< 0.0607	< 0.0529	< 0.0584	< 0.0604	< 0.0572					i t	
	Aroclor 1254	mg/kg	10	10	10,000	< 0.0534	< 0.0572	< 0.0607	< 0.0529	< 0.0584	< 0.0604	< 0.0572					i t	
	Aroclor 1260	mg/kg	10	10	10,000	< 0.0534	0.0991	< 0.0607	< 0.0529	< 0.0584	< 0.0604	0.0935					í l	
	Aroclor 1262	mg/kg	10	10	10,000	< 0.0534	< 0.0572	< 0.0607	< 0.0529	< 0.0584	< 0.0604	< 0.0572					í l	
	Aroclor 1268	mg/kg	10	10	10,000	< 0.0534	< 0.0572	< 0.0607	< 0.0529	< 0.0584	< 0.0604	< 0.0572					í l	

Notes

NE = Not Established

Blank spaces indicates that the specific consistuent was not sampled for.

Gray shaded cells indicates the concentration exceeds the RIDEM Method 1

Industrial/Commercial Direct Exposure Criteria (I/C-DEC).

Detection limits highlighted in *blue and in italics* exceed the RIDEM Method 1 Criteria.

Concentrations **bolded and underlined** exceed the RIDEM Method 1 GB Leachability Criteria.

A concentration with a bold border exceeds the Upper Concentration Limit.

=Indicates Sampling Location is within the Fenced Substation Area

=Indicates Sampling Location is outside of Fenced Substation Area

Blind Duplicate sample collected from SUB-8

GZA File No. 05.000043654.00 5/29/2012

FIGURE 4



		SAMPLE LEGEND
	SS-9	ATLANTIC SURFACE SOIL SAMPLE LOCATION
	► TSED-6	ATLANTIC SEDIMENT SAMPLE LOCATION
UBSTATION ACTIVITIES LEGEND:	W-BVE SS-3	SEDIMENT SAMPLE LOCATION
PROPOSED ELECTRICAL EQUIPMENT	■ RIDEM SS-3	RIDEM SURFACE SOIL SAMPLE LOCATION
PROPOSED HANDHOLE	● ^{B-109/} MW-109	MONITORING WELL/BORING (VHB) SURVEYED
$EXCAVATION DEPTH = 48^{\circ}$	TP-3A	ATLANTIC TEST PIT LOCATION
PROPOSED CONDUIT EXCAVATION DEPTH = 24"	W-BVE	WESTON/BLACKSTONE VALLEY ELECTRIC TEST PIT LOCATION
PROPOSED DUCT BANK FXCAVATION DEPTH = .36"	GZA TP-8	GZA/VALLEY GAS TEST PIT LOCATION
PROPOSED TRENWA TRENCH	⊕ ТВ—15	ATLANTIC SOIL BORING LOCATION
EXCAVATION DEPTH = 40"	⊕ MW-3	ATLANTIC MONITORING WELL LOCATION
UB-1 PRE-CHARACTERIZATION SOIL	⊕ M&E MW−1	METCALF & EDDY MONITORING WELL LOCATION
SAIVIT LING LOCATION	♦ VHB-400	VHB SURFACE SOIL SAMPLE LOCATION NON-SURVEYED
CULT	TP-204	VHB TEST PIT (2006)
PROPOSED SOIL EXCAVATIONS		GZA TEST PIT (2009)
ull P	тв−300	GZA TEST BORING LOCATION (2010)
	↔ MW-320 S/D	GZA MONITORING WELL LOCATION (2010)
	+	GZA TEST PIT LOCATION (2010)
	S S-100	GZA SURFACE SOIL SAMPLE LOCATION (2010)
	O SC31	ARCADIS SEDIMENT SAMPLE LOCATION (2008)
RAL NUTES:		GZA RESIDUAL MATERIAL SAMPLE (2010)
 STING CONDITIONS BASE MAP DEVELOPED FROM TH ELECTRONIC FILES FROM GEI CONSULTANTS, AND SAMPLE LOCATIONS", ORIGINAL SCALE 1 ELECTRONIC FILES FROM VANASSE HANGEN E MONITOR WELL LOCATIONS", SCALE: 1"=60', ELECTRONIC FILES FROM WELSH ASSOCIATES (AS-BUILT), FORMER TIDEWATER FACILITY, DE DECEMBER 17, 2010 ON-SITE INVESTIGATIONS AND SURVEYS BY 0 2009 AND 2010. 	IE FOLLOWING: INC. (FORMERL' "=80', DATED J BRUSTLIN, INC. UNDATED LAND SURVEYC MOLITION OF G/ GZA PERSONNEL	Y AES) ENTITLED "HISTORIC STRUCTURES JULY 1999 ENTITLED "SOIL BORING, TEST PIT AND DRS, INC. ENTITLED "TOPOGRAPHIC SURVEY AS HOLDERS NOS. 7 & 8", DATED DURING VARIOUS SITE VISITS DURING
DPERTY LINES AND LOT INFORMATION ESTABLISHED RIMETER SURVEY OF LAND AT THE TIDEWATER FOR ANTIC ENVIRONMENTAL SERVICES INC." DEVELOPED E ENTITLED "MAX READ FIELD TRACK EXPANSION 24	FROM INFORMA MER MGP SITE BY LOUIS FEDE 007" PROVIDED	TION PROVIDED ON A DRAWING ENTITLED IN PAWTUCKET, RHODE ISLAND FOR ERICI AND ASSOCIATES AND AN AUTO CAD BY THE CITY OF PAWTUCKET.
RIZONTAL DATUM IS BASED ON NAD 1983 FROM B	ASE MAPPING P	PROVIDED BY GEI CONSULTANTS, INC.
RTICAL DATUM IS BASED ON NGVD 1929 (MSL) FRO	OM BASE MAPPI	ING PROVIDED BY GEI CONSULTANTS, INC.
FERENCE SEWER DATA FROM SCANNED IMAGE PROV FITLED "STUDY OF SEWERAGE FACILITIES" BY WATER V. 1975, ORIGINAL SCALE 1"=400' & SCANNED IM/ THE CITY OF PAWTUCKET, RHODE ISLAND.	VIDED BY THE C MAN ENGINEERI AGES OF HISTOI	CITY OF PAWTUCKET, RHODE ISLAND, NG CO. & ANDERSON NICHOLS CO. DATED RIC PLAN & PROFILE DRAWINGS PROVIDED
E UTILITIES TAKEN FROM 1984 SANBORN MAP AND LITY LOCATIONS ARE APPROXIMATE AND SHOWN FO	HISTORIC FIGU R REFERENCE (RES PROVIDED BY NATIONAL GRID. ALL DNLY.
OPOSED CONDUIT, HANDHOLES, TRENCHES AND CC ⁻ OVIDED BY TRC, INC., ENTITLED "PAWTUCKET 1 SUE S STRUCTURE CONDUIT PLAN," DATED 09/30/2011 / A.	TV LOCATIONS A BSTATION NO. 1 , ORIGINAL SCA	ND EXCAVATIONS DEVELOPED FROM PLAN 07, PAWTUCKET, RHODE ISLAND, 115KV LE 1"=8', DRAWING NO. H–90869–4A,

<u>u.</u>							
	EXISTING BUILDINGS ON-SITE		UE	EXISTING UNDER	RGROUND ELECTRIC CABLE	IN CONDUIT	
	EXISTING FOUNDATION/PAD ON-SITE			EXISTING UND	PERGROUND ELECTRIC N	IH/STRUCTU	RE
	EXISTING BUILDINGS/STRUCTURES OFF-SITE			– EXISTING RETA	NINING WALLS		
	EXISTING CONTOUR (MINOR 1 FOOT INTERVAL)		×	EXISTING FENC	CE EX	STING ACCE	SS ROAD
	EXISTING CONTOUR (MAJOR 5 FOOT INTERVAL) PROPERTY LINE W EXISTING WAT	ER LINE		APPROXIMATE MIL GEOMEMBR OF BEDDING S	AREA OF LOW LYING RANE OVERLAIN BY 3– SAND AND A 3–INCH L	CAP (20 NCHES IFT OF	
_	APPROX. 200 FT. JURISDICTION LIMIT			TRAP ROCK)			
	APPROX. WATERS EDGE						
	EXISTING NBC INTERCEPTOR SANITARY SEWER	NO.		ISSUE/DESCR	RIPTION	BY	DATE
	EXISTING CITY OF PAWTUCKET STORM DRAIN		F	ORMER TIDEV	VATER FACILIT	Ý	
	EXISTING SITE BOUNDARY			PAWTUCKET.	RHODE ISLAND		
	EXISTING STORM/COMBINED SAN. SEWER OVERFLOW		SAMPLI				s
	APPROXIMATE AREA OF ROADWAY AND PARKING AREA CAP (20 MIL GEOMEMBRANE OVERLAIN BY 2-3-INCHES OF BEDDING			PAWTUCKET N	O.1 SUBSTATION		J
	SAND AND A 6-9 INCH LIFT OF PROCESSED	PREPARED	BY:		PREPARED FOR:		
THE IN NATIO REPRE	MATERIAL) FORMATION SHOWN ON THE DRAWING IS SOLELY FOR USE BY NAL GRID OR THE NATIONAL GRID'S DESIGNATED SENTATIVE FOR THE SPECIFIC PROJECT AND LOCATION	GZ	530 BROADU PROVIDENC (401) 421-414	s and Scientists VAY E, RHODE ISLAND 02909 40	NATION	AL GRID	
TRANSF USE A	TERRED, REUSED, COPIED, OR ALTERED IN ANY MANNER FOR T ANY OTHER LOCATION OR FOR ANY OTHER PURPOSE	PROJ MGR:	MSK	REVIEWED BY: WF	CHECKED BY: MSK	FIGUR	E
WITHOU ANY TI	T THE PRIOR WRITTEN CONSENT OF GZA AND NATIONAL GRID. RANSFER, REUSE, OR MODIFICATION TO THE DRAWING BY	DESIGNED E	BY: WF	DRAWN BY: CRD	SCALE: 1"=15'		1
OTHERS AND N WITHOU	S, WITHOUT THE PRIOR WRITTEN EXPRESS CONSENT OF GZA ATIONAL GRID, WILL BE AT THE USER'S SOLE RISK AND JT ANY RISK OR LIABILITY TO GZA AND NATIONAL GRID.	DATE MA`	Y 2012	PROJECT NO. 43654.00	REVISION NO. 0	SHEET NO.	4 OF 4

EXCAVATION EMISSIONS CALCULATIONS

Excavation Emissions Modeling

Assumptio	ns	
Assumed Average MW		
of NAPL	250	(g/mol)
Assumed NAPL		
Temperature	15	(°C)
Assumed Time to Excavate Areas	32	(hr)

=		
	fic	Site-Speci
2 (m²)	1.2	Emitting Surface Area
(g OC/g soi	0.005	TOC of Soil
) (s)	360	Time to Excavate Volume of Soil
8 (m ³ /s)	1.03E-03	Excavation Rate
i (cy)	0.5	Volume of Soil Moved
(m ³)	0.4	Volume of Soil Moved





Analyte	Average Measured Concentration in Soil (ug/g)	Calculated Concentration in NAPL ² (mg/kg)	Partial Pressure ³ (atm)	Equilibrium Coefficient	Effective Diffusivity in Air (cm ² /s)	Total Excavation Emissions Potential ⁴ (lb)	Total Excavation Emissions (lb)	RIDEM Annual Minimum Quantity (Ib)
Naphthalene	0.6128	116.1	2.54E-09	5.24E-06	4.58E-03	7.54E-04	1.61E-08	3
Benzene	0.0306	5.8	1.51E-06	3.81E-02	7.23E-03	3.76E-05	6.15E-07	10
Toluene	0.0409	7.7	3.94E-07	8.77E-03	6.75E-03	5.03E-05	3.17E-07	3,000
m&p-Xylene ¹ o-Xylene	0.0669	12.7 6.5	1.93E-07 7.98E-08	3.03E-03 2.42E-03	2.72E-03 6.75E-03	8.23E-05 4.24E-05	1.90E-07 1.19E-07	1,000
Carbon Tetrachloride	0.0366	6.9	1.07E-06	4.44E-02	4.91E-03	4.51E-05	7.11E-07	8
Chloroform	0.0357	6.8	2.39E-06	7.87E-02	8.07E-03	4.40E-05	1.20E-06	20
Methylene Chloride	0.0473	9.0	5.23E-06	9.27E-02	7.84E-03	5.82E-05	1.75E-06	200
Tetrachloroethene	0.3330	63.1	1.43E-06	7.04E-03	5.59E-03	4.10E-04	2.10E-06	20
Trichloroethylene	0.0365	6.9	8.02E-07	2.85E-02	6.13E-03	4.48E-05	5.74E-07	50

Notes:

1. All constants for m&p-xylene are the average of the individual constants for m-xylene and p-xylene.

2. Concentration in NAPL is calculated by dividing the Concentration in Soil by the total organic carbon in the soil.

3. The Partial Pressure was calculated using Raoult's Law.

4. If the calculated Total Excavation Emissions exceeds the Total Excavation Emissions Potential, the Total Excavation Emissions Potential was used as the Total Excavation Emissions.

5. Only detected analytes with RIDEM minimum quanitity values are shown.

6. The average naphthalene concentration that was used for the model was calculated by using the maximum detected value between Method 8260B and Method 8270C for each sample or the minimum reporting limit if neither were detected for SUB-1 to SUB-9. The average naphthalene concentration that was used for the model was calculated by using the maximum detected value by Method 8270C for each sample or the minimum reporting limit if it was not detected for SUB-10 to SUB-15.

7. Concentration units are in ug/g, which is equal to ppm.

8. MW = molecular weight; atm = atmosphere; kJ = kilojoules; mol = moles; NAPL = non-aqueous phase liquid; ppm = parts per million; mm Hg = millimeter mercury; cm = centimeter; m = meter; g = gram; ug = microgram; ft = feet, lb = pound; s = second; yr = year; hr = hour; < = less than the reporting limit; TOC = total organic carbon.

9. Yellow Highlighting indicates model inputs.

10. Blue Highlighting indicates the calculated Excavation Emissions Rate exceeds the Total Excavation Emissions Rate Potential.

11. Red Highlighting indicates the Emissions Rate exceeds the Rhode Island Department of Environmental Management (RIDEM) Minimum Quantity.

SOIL BORING LOGS

GZA G	ZA GEOENVIRONMENTAL INC. 30 BROADWAY, PROVIDENCE, RHODE ISLAND EOTECH/GEOHYDROLOGICAL CONSULTANTS						PROJECT REPORT OF BORING N National Grid SHE						
530 BF	ROADW	Y, PR	OVIDENCE	, RHODE ISL	AND			National Grid			SHEET	1 of 1	
GEOT	ECH/GE	OHYDI	ROLOGICA	L CONSULTA	NTS		For	mer Tidewater Fa	acility		FILE NO	. 43654.0	0
HYDR	OLOGIC	AL BO	RING LOG				Pav	wtucket, Rhode Is	land		CHKD BY	MSK	
BORING	GCO.		Clean Harbor	rs		_	BO	RING LOCATION	1	See Explora	tion Location Plan		
FOREM	AN		R. Smith			_	GROUND	SURFACE ELEV.			DATUM		_
GZA EN	GINEER		Sophia Narki	ewicz		_		DATE START	12/5/11	D	DATE END	12/5/11	-
									GROUNDWA	ER READING	GS		
							DATE	TIME	WATER	CASING	STABILIZ	ATION TIME	
CASING	SIZE:			OTHER: Hand	Augers								
(ET)		NO			BI OW/S/6"	BURM	IMPLE DESCRIP		DESCRIPT			TESTING	ĸ
(1 1)	DEGWO	S-1	TEN/REO	0-3"	DEOW0/0	S-1: Fine to me	dium SAND black	(10YR 2/1)	DEGOR	No F		ND	1
		6.2		2" 7 5"		little Silt trace (Group	(1011(, <u>2</u>)1),				ND	2
		0.0		3-7.5									2
		5-3		7.5"-1"		S-2: Very pale b	prown, (10YR, 7/2), fine to				ND	3
						medium SAND,	trace Silt, trace G	Bravel					4
1 _						S-3: Very dark b	orown, (10YR, 3/3), fine to					5
		S-4		1-2.5		medium SAND,	little Gravel, trace	e Silt	FILL			ND	
						S-4: Brown, (10	YR, 4/3), fine to m	nedium SAND,					
						little Silt, little G	ravel, trace Brick						
2													
		S-5		2.5-3		S-5: Gravish bro	own, (10YR, 5/2),	fine to					
						medium SAND	little Gravel trace	e Silt_trace					
						Slag						ND	
						olag						ND	
						1							
3 _						End	of Evoloration at	2 fact					+
						End	or Exploration at s	E S leet					
						-							
						-							
4 _						_							
						_							
						4							
5													
						1							
6													
						1							
7	7					1							
REMAR	KS:												_
1	Soil san	ples scr	eened with a 1	0.6 eV MiniRAE	photoinionizati	on detector (PID).	PID values repre	esent meter respon	nse in parts per m	illion/volume a	air (ppmv)		
	relative	o benze	ne in air and a	bove background	d readings. All s	amples are photo	o documented. NE	D=Not Detected					
2	No grou	ndwater	encountered	d ourfood (has)	Inlana otherwise	a notod							
3	Samples	s are te	et below groun	iu surrace (bgs) t AHs VOC.e TPH		e noted. at 18" (1 5ft) bos							
5	<u>Compos</u>	ite samp	bles collected f	or PCBs at 3", 6	' <u>, 9" and 1</u> 2" bg	s							
NOTES		1) STRA		INES REPRESE		MATE BOUNDAR		IL TYPES; TRAN	SITIONS MAY BE				
		MAY OC	CUR DUE TO	OTHER FACTO	DRS THAN TH	DSE PRESENT A	T THE TIME MEA	ASUREMENTS W	ERE MADE.	GIGONDWA			
GZA											BORING NO.	SUB-1	

GZA G	ZA GEOENVIRONMENTAL INC. 30 BROADWAY, PROVIDENCE, RHODE ISLAND EOTECH/GEOHYDROLOGICAL CONSULTANTS								REPORT OF BORING NO. SUB-2 SHEET 1 of 1					
530 B	ROADW	AY, PR	OVIDENCE	, RHODE ISL	AND			National Grid				SHEET	1 of 1	
GEOT	ECH/GE	OHYDI	ROLOGICAI	L CONSULTA	ANTS		For	mer Tidewater Fa	acility			FILE NO.	43654.0	0
HYDR	OLOGIC	AL BO	RING LOG				Par	wtucket, Rhode Is	land			CHKD BY	MSK	
BORING	G CO.		Clean Harbor	ſS		_	BO	RING LOCATION		See Exp	loration	n Location Plan		
FOREN	IAN		R. Smith			_	GROUND	SURFACE ELEV.			0	DATUM		_
GZA EN	IGINEER		Sophia Narki	ewicz		_		DATE START	12/5/11		DAT		12/5/11	-
									GROUNDWAT	TER READ	DINGS			
							DATE	TIME	WATER	CASING	G	STABILIZA	ATION TIME	
	SIZE:			OTHER: Hand	Augers	54			CTD ATU	N4				п
(FT)	BLOWS	NO	PEN/REC		BLOW/S/6"	BURM	INFLE DESCRIP		DESCRIPT		-	INSTALLED	TESTING	ĸ
(/	DECITO	S-1	TENINEO	0-1 25	BEOWOR	S-1: Dark brown	(10YR 3/3) fine	e to medium	DEGORAT		No Equ	ipment Installed	ND	1
		0.		0 1120		SAND little Silt	trace Gravel							2
						SAND, IIIIe Sill,	liace Glavel							2
						-								3
						-								4
1						-								5
		S-2		1.25-1.75		S-2: Dark yellov	vish brown, (10YF	R, 4/4), fine to					ND	
						medium SAND,	little (+) Silt, trace	e Gravel, trace	FILL					
						Slag								
		S-3		1.75-2		S-3: Gray, (10Y	R, 6/1), fine to me	edium SAND,					ND	
2						little Silt. trace C	Gravel, verv slight	blue						
-		S-4		2-2.75		staining, slight S	Sulfur-like odor						ND	
						S-4: Yellowish h	nown (10YR 5/6) fine to						
						medium SAND,		e Glavei						
						1								
3		S-5		2.75-3		S-5: Gray, (10Y	R, 6/1), fine to me	edium SAND,					ND	
						some Silt, trace	Gravel, Moist						<u> </u>	+
						End	of Exploration at :	± 3 feet						
						-								
						_								
4														
						1								
5														
						-								
						-								
						-								
6 _						-								
						_								
						_								
7	7													
REMAR	KS:													
1	. Soil san	ples scr	eened with a 1	0.6 eV MiniRAE	photoinionizati	on detector (PID).	PID values repre	esent meter respor	nse in parts per m	illion/volu	me air i	(ppmv)		
	relative	o benze	ne in air and al	bove backgroun	d readings. All	samples are photo	o documented. NE	D=Not Detected						
	. ino grou 3. All denti	iuwater is are fei	encounterea	d surface (hos)	unless otherwis	e noted.								
4	I. Samples	collecte	d for PCBs, P	AHs, VOCs, TPI	H, As, Pb, TOC	at 18" (1.5ft) bgs.								
5	5 Compos	ite samp	les collected f	or PCBs at 3", 6	", 9" and 12" bg	IS.								
NOTES	:	1) STRA 2) WATI	ER LEVEL REA	INES REPRES	ENT APPROXII BEEN MADE A	MATE BOUNDAR T TIMES AND UN	Y BETWEEN SO	IL TYPES; TRAN NS STATED; FLU	SITIONS MAY BE	GRADUA GROUND	AL. DWATE	R TABLE		
a=-		MAY OC	CUR DUE TO	OTHER FACTO	ORS THAN TH	OSE PRESENT A	T THE TIME MEA	ASUREMENTS W	ERE MADE.			DODING	0115.0	
IGZA .												BURING NO.	SUB-2	

GZA G	EOENV		IENTAL INC	C.				PROJECT		F	REPOR	T OF BORING NO.	SUB-3	3
530 BI		AY, PR		E, RHODE ISL				National Grid		-		SHEET	1 of 1	00
				LCONSULT	1113		For	mer Hdewater Fa	land			FILE NO.	43654.0 MSK	JU
DODU							1 4				1 11			_
FOREM	ΔN		Clean Harbo	rs		-	GROUND	RING LOCATION	. <u></u>	See Exp	Dioratio	n Location Plan		-
GZA EN	GINEER		Sophia Narki	iewicz		-	GROOND	DATE START	12/5/11		DAT		12/5/11	-
-	-							-	GROUNDWAT	FR RFA	DINGS			
							DATE	TIME	WATER	CASIN	G	STABILIZ	ATION TIME	
											-	_	-	
CASING	SIZE:			OTHER: Hand	Augers									
DPTH	CASING			SAMPLE	2	SA	MPLE DESCRIP	FION	STRATU	M	I	EQUIPMENT	FIELD	R
(FT)	BLOWS	NO	PEN/REC	DEPTH (FT)	BLOWS/6"	BURM	ISTER CLASSIFI	CATION	DESCRIPT	ION		INSTALLED	TESTING	ĸκ
		S-1		0-1		S-1: Grayish bro	own, (10YR, 5/2),	fine to coarse			No Equ	uipment Installed	ND	1
						SAND, little Gra	vel, trace Silt							2
									IMPORTED	FILL				3
														4
1														5
· -		6.2		1 2 25		S 2: Voru dark h	TOWN (7 EVP 2 F	(1) find to						Ŭ
		5-2		1-2.25									ND	
						medium SAND,	little Gravel, little	Slit						
						_								
2														
		S-3		2.5-3.5		S-3: Brown. (10	YR. 4/3). fine to m	edium SAND.					ND	
						trace Gravel tra	ace Silt	,						
2									50.1					
3 _						-			FILL					
						-								
		S-4		3.5-3.75		S-4" Very dark b	orown, (7.5YR, 3.	5/1), fine to					ND	
						medium SAND,	little Gravel, trace	e Silt						
4		S-5		3.75-4		S-5: Brown, (10	YR, 4/3), fine to m	nedium SND,						
						little Gravel, trad	ce Silt						ND	
						End	of Exploration at ±	± 4 feet						
F						-								
5 -														
						-								
						-								
						-								
6						4								
7	7													
	,													
REMAR 1 2 3 4 5 NOTES	 Soil samples screened with a 10.6 eV MiniRAE photoinionizati relative to benzene in air and above background readings. All No groundwater encountered All depths are feet below ground surface (bgs) unless otherwis Samples collected for PCBs, PAHs, VOCs, TPH, As, Pb, TOC Geotextile fabric present at approximately 12" bgs. 						PID values represented NE	sent meter responses of the second se	INSE IN PARTS PER M	GRADU	ume air	(ppmv)		
NOTES		2) WATI	ER LEVEL RE	ADINGS HAVE	BEEN MADE A	T TIMES AND UN	IDER CONDITIO	NS STATED; FLU	ICTUATIONS OF	GROUNE	DWATE	R TABLE		
674		MAY OC	CUR DUE TO	OTHER FACTO	ORS THAN THO	DSE PRESENT A	T THE TIME MEA	SUREMENTS W	ERE MADE.			POPING NO	SUD 2	
GZA												DUKING NU.	3UB-3	

GZA G	EOENV			C.				PROJECT		REF	PORT OF BORING NO.	SUB-4	1
530 BH		4Y, PR 04VDI					For	National Grid	oility	4	SHEET	1 of 1	00
HYDR		AL BO	RINGLOGICA				FOI	vtucket Rhode Is	land	1	CHKD BY	43654.0 MSK	0
DODING			Clear Llarks				10			Cas Fueles			
FOREM	AN		R Smith	15		_	GROUND	SURFACE ELEV	·	See Exploi	DATLIM		
GZA EN	GINEER		Sophia Nark	iewicz		_	CITCOLLE	DATE START	12/5/11		DATE END	12/5/11	-
							Γ		GROUNDWA		NGS		
							DATE	TIME	WATER	CASING	STABILIZA	ATION TIME	
CASING	SIZE:			OTHER: Hand	Augers								
DPTH	CASING			SAMPLE		SA	MPLE DESCRIP	ΓΙΟΝ	STRATU	М	EQUIPMENT	FIELD	R
(FT)	BLOWS	NO	PEN/REC	DEPTH (FT)	BLOWS/6"	BURM	ISTER CLASSIFI		DESCRIPT	ION		TESTING	K
		5-1		0-2.5		S-1: Gray, (101	R, 6/1), GRAVEL	trace Sand,	GRAVE		b Equipment Installed	ND	
		5-2		2.5"-3		trace Slit	(2
						S-2: Dark brown	n, (10YR, 3/3), fine	e to medium					3
						SAND, little Gra	vel, little Silt, trac	e Slag, trace					4
1						Coal							5
						-							
						4							
												ND	
						_							
2									FILL				
3													
		S-3		3-3.5		S-3 [.] Verv dark o	uray (10YR 3/1)	ine to coarse				ND	
		00		0 0.0		SAND little Gra	vel trace Silt tra	ne Slag trace				110	
						Cool		oc olag, trace					
						End o	f Exploration at +	3.5 feet					+
								0.01001					
4 -						-							
						-							
						-							
						-							
						-							
5 _						-							
						4							
					ļ	-							
					ļ	-							
						-							
6						-							
					ļ								
					ļ								
7	7												
RЕМАК 1 2 3 4	 KS: Soil san relative No grou All depth Samples 	nples scr to benze ndwater is are fee s collecte	reened with a ne in air and a encountered et below grour ed for PCBs, P	10.6 eV MiniRAE above backgroun nd surface (bgs) r PAHs, VOCs, TPI	photoinionizati d readings. All s unless otherwise H, As, Pb, TOC	on detector (PID). samples are photo e noted. at 18" (1.5ft) bgs.	PID values represented. NE	sent meter respo D=Not Detected	nse in parts per m	illion/volume	e air (ppmv)		
5 NOTES:	Compos	ite samp 1) STRA		for PCBs at 3", 6 LINES REPRES	", 9" and 12" bg ENT APPROXII	S. MATE BOUNDAR	Y BETWEEN SO	IL TYPES; TRAN	SITIONS MAY BE	GRADUAL			
		∠) wa⊺i MAY OC	ER LEVEL RE COUR DUE TO	ADINGS HAVE	BEEN MADE A	I TIMES AND UN	T THE TIME MEA	NS STATED; FLU SUREMENTS W	ERE MADE.	GROUNDW			
GZA											BORING NO.	SUB-4	

GZA G	EOENV	RONN	IENTAL IN	C.				PROJECT		R	EPOR	T OF BORING NO.	SUB-5	,
530 BF	ROADW	AY, PR	OVIDENCE	, RHODE IS	LAND			National Grid				SHEET	1 of 1	
GEOT	ECH/GE			L CONSULT	ANTS		For	mer Tidewater Fa	cility	_		FILE NO.	43654.0	10
HYDR	JLOGIC	AL BO	RING LOG				Pav	vtucket, Rhode Is	land			CHKD BY	MSK	
BORING	CO.		Clean Harbo	ors		_	BO	RING LOCATION		See Exp	loratior	n Location Plan		_
FOREM	AN		R. Smith			_	GROUND	SURFACE ELEV.]			-
GZA EN	GINEER		Sophia Nark	IEWICZ			1	DATE START	12/5/11		DAI	E END	12/5/11	
							DATE	TIME	GROUNDWAT		DINGS			
							DATE	TIME	WATER	CASING	و	STABILIZA	ATION TIME	
CARING														
DPTH	SIZE: CASING			SAMPLE	a Augers	SA	MPLE DESCRIP		STRATU	м	F		FIELD	R
(FT)	BLOWS	NO	PEN/REC	DEPTH (FT)	BLOWS/6"	BURM	ISTER CLASSIFI	CATION	DESCRIPT				TESTING	к
		S-1		0-2"		S-1: Gray, (10YI	R, 6/1), GRAVEL,	trace Sand,	GRAVEI	1	No Equ	ipment Installed	ND	1
		S-2		2"-0 75'		trace Silt							ND	2
						S-2: Dark brown	(10VR 3/3) find	to coarse						3
						SAND little (1)	Crovel trees Silt	trace Cool						1
		0.0		0.75% 41			Glavel, trace Silt,	trace Coal,					ND	4
· · ·		5-3		0.75 -1		trace Slag							ND	5
		S-4		1-3.25		S-3: Light gray,	(10YR, 7/1), fine 1	o coarse					ND	
						SAND, little Silt,	trace Gravel, tra	ce Glass, trace						
						Slag, trace Coal								
						S-4: Dark brown	n, (10YR, 3/3), fine	e to coarse						
2						SAND, trace Gra	avel, trace Silt, tra	ace Slag, trace	FILL					
						Wood Chips								
2														
3 _						-								
		S-5		3.25-3.5		S-5: Yellowish re	ed, (5YR, 5/8), fin	e to coarse					ND	
						SAND, little Silt,	trace Gravel, tra	ce Slag, trace						+
				-		Coal, trace Woo	od Chips		4					
4						End o	f Exploration at ±	3.5 feet						
5														
_														
						-								
6				+		-								
						-								
						-								
						_								
						-								
7	7					_								
L														
REMAR	KS:													
1	Soil san	ples sci	eened with a '	10.6 eV MiniRAI	E photoinionizat	ion detector (PID).	PID values repre	sent meter respor	nse in parts per m	illion/volur	me air	(ppmv)		ļ
2	No grou	ndwater	encountered	above backyroui	iu reaulitys. All	samples are prote	documented. NL	ENOI Delected						ļ
3	 All depths are feet below ground surface (bgs) unless otherwise no 													
4	Samples	collecte	ed for PCBs, P	AHs, VOCs, TP	PH, As, Pb, TOC	at 18" (1.5ft) bgs.								
5	Compos	ite samp		for PCBs at 3", (6", 9" and 12" bo						A1			
NULES:		2) WAT	ER LEVEL RE	ADINGS HAVE	BEEN MADE A	T TIMES AND UN	IDER CONDITIO	NS STATED; FLU	CTUATIONS OF	GROUND	¬∟. WATE	R TABLE		
G7A		MAY OC	CUR DUE TO	O OTHER FACT	ORS THAN TH	OSE PRESENT A	T THE TIME MEA	SUREMENTS W	ERE MADE.			BORING NO	SUB-5	
												20.000		

GZA G							PROJECT National Grid			R	REPOR	T OF BORING NO.	SUB-6	;
GEOT	ECH/GE	OHYDI					For	National Grid	cility			SHEET FILE NO	43654.0	0
HYDR	OLOGIC	AL BO	RING LOG	2001100217			Pav	vtucket, Rhode Isl	and			CHKD BY	MSK	
BORING	200		Clean Harbo	re			BO			See Evo	loratio	n Location Plan		
FOREM	AN		R. Smith	10		-	GROUND	SURFACE ELEV.				DATUM		-
GZA EN	GINEER		Sophia Narki	iewicz				DATE START	12/5/11		DAT		12/5/11	_
									GROUNDWAT	ER REAL	DINGS			
							DATE	TIME	WATER	CASIN	G	STABILIZA	TION TIME	
CASING	SIZE:			OTHER: Hand	Augers	1							•	
DPTH	CASING		1	SAMPLE	1	SA	MPLE DESCRIP	FION	STRATU	М	I	EQUIPMENT	FIELD	R
(FT)	BLOWS	NO	PEN/REC	DEPTH (FT)	BLOWS/6"	BURM	IISTER CLASSIFI	CATION	DESCRIPT	ION		INSTALLED	TESTING	K
		S-1		0-2.5		S-1: Brown, (10	YR, 4/3) to black	10YR, 2/1), fine			No Equ	upment Installed	ND	1
				4		to coarse SAND), little Gravel, trad	e Silt, trace						2
						Clinker (red-yell	ow 7.5YR, 5/8)							3
														4
1														5
				1					FILL					
2														
				1										
						_								
	S-2 2.5-3 S-2:						orown, (10YR, 5/6), fine to					ND	
	coarse S/						race Gravel, trace	Silt, trace						
3						Coal, trace Woo	od Chips, trace Me	etal Chips						
		S-3		3-3.5		S-3: Dark Brown	n, (10YR, 2/2), fin	e to medium					ND	
						SAND, some Co	oal, trace Gravel,	trace Silt						
						End o	f Exploration at \pm	3.5 feet						
4														
5														
5														
1				1		-								
1						-								
				ļ		-								
6						-								
1						-								
1														
1														
7														
REMAR 1 2 3 4	KS: Soil san relative No grou All depth Samples	iples scr to benze ndwater is are fe	eened with a 1 ne in air and a encountered et below groun ed for PCBs, P.	10.6 eV MiniRAE above background ad surface (bgs) u AHs, VOCs, TPF	photoinionizati d readings. All s unless otherwise I, As, Pb, TOC	on detector (PID). samples are photo e noted. at 18" (1.5ft) bgs.	PID values repre	sent meter respon	se in parts per m	illion/volu	ıme air	(ppmv)		
5	Compos	ite samp		for PCBs at 3", 6	', 9" and 12" bg	S. MATE BOUNDAD	Y BETWEEN SO			GRADI	AI			
NULES		2) WAT	ER LEVEL RE	ADINGS HAVE	BEEN MADE A	T TIMES AND UN	IDER CONDITIO	NS STATED; FLU	CTUATIONS OF	GROUNE		R TABLE		
GZA		MAY OC	CUR DUE TO	JUTHER FACTO	JKS THAN THO	JSE PRESENT A	T THE TIME MEA	SUKEMENTS WI	ERE MADÉ.			BORING NO.	SUB-6	

GZA G	EOENV		ENTAL INC).			PROJECT				REPOR	T OF BORING NO.	SUB-7	
530 BF		AY, PR			AND		For	National Grid	oility	-		SHEET	1 of 1	0
HYDR							Pol	wucket Rhode Is	land			CHKD BY	43054.0 MSK	0
							1 4				1		WOR	_
BORING	S CO.		Clean Harbor	S		-	GROUND			See Exp	oloratioi r	n Location Plan		-
GZA EN	GINEER		Sophia Narki	ewicz		-	GROOND	DATE START	12/5/11		DAT		12/5/11	-
						-			GROUNDWA	TER REA	DINGS			
							DATE	TIME	WATER	CASIN	G	STABILIZ	TION TIME	
CASING	SIZE:			OTHER: Hand	Augers	•								
DPTH	CASING			SAMPLE		SA	MPLE DESCRIP	ΓΙΟΝ	STRATU	М	E	EQUIPMENT	FIELD	R
(FT)	BLOWS	NO	PEN/REC	DEPTH (FT)	BLOWS/6"	BURM	ISTER CLASSIFI	CATION	DESCRIPT	ION		INSTALLED	TESTING	К
		S-1		0-3"		S-1: Black, (10Y	'R, 2/1), fine to m	edium SAND,	Gravel		No Equ	ipment Installed	ND	1
		S-2		3"-2'		trace (+) Silt, litt	le Gravel						ND	2
						S-2: Yellowish b	orown, (10YR, 3/4), fine to						3
						medium SAND,	little rounded Gra	vel, trace Silt						4
1									FILL					5
														6
						1								
2														
<u> </u>						End	of Exploration at -	- 2 feet						+
						End		21000						
						4								
						-								
3						4								
						_								
4														
						1								
						1								
-														
5 -														
						-								
						-								
						4								
						-								
6 -						-								
7						1								
REMAR 1 2 3 4 5 6 NOTES	KS: Soil san relative No grou All depti Samples Less tha Compos	nples scr to benze ndwater is are fee collecte n 1/2" of te sampl 1) STRA 2) WAT	eened with a 1 ne in air and al encountered et below groun d for PCBs, P/ Gravel on top es collected for TIFICATION L	0.6 eV MiniRAE bove background d surface (bgs) t AHs, VOCs, TPH or PCBs at 3", 6" INES REPRESS	photoinionizatio d readings. All s inless otherwise I, As, Pb, TOC : <u>9" and 12" bgs</u> ENT APPROXIM	on detector (PID). amples are photo e noted. at 18" (1.5ft) bgs.	PID values represented NE	Sent meter respon D=Not Detected	SITIONS MAY BE	GRADU	AL.			
		∠) WATE MAY OC	CUR DUE TO	OTHER FACTO	DRS THAN THO	SE PRESENT A	T THE TIME MEA	SUREMENTS W	ERE MADE.	GROUN	UVVAIE			
GZA												BORING NO.	SUB-7	

GZA G	ROADW.	IRONN		C. 5. RHODE ISI	AND			PROJECT National Grid		REF	PORT OF BORING NO. SHEET	SUB-8	3
GEOT	ECH/GE	OHYD	ROLOGICA	L CONSULT/	ANTS		For	mer Tidewater Fa	cility	1	FILE NO.	43654.0	00
HYDR	OLOGIC	AL BO	RING LOG				Pav	wtucket, Rhode Is	land	1	CHKD BY	MSK	
BORING	G CO.		Clean Harbo	rs			во	RING LOCATION		See Explor	ration Location Plan		
FOREM	AN		R. Smith			_	GROUND	SURFACE ELEV.			DATUM		_
GZA EN	IGINEER		Sophia Narki	iewicz		_		DATE START	12/5/11		DATE END	12/5/11	_
									GROUNDWAT	FER READIN	NGS		
							DATE	TIME	WATER	CASING	STABILIZA	ATION TIME	
									1				
	CASING			SAMPLE	Augers	SA			STRATU	м	FOLIIPMENT	FIELD	R
(FT)	BLOWS	NO	PEN/REC	DEPTH (FT)	BLOWS/6"	BURM	ISTER CLASSIFI	CATION	DESCRIPT	ION	INSTALLED	TESTING	ĸ
		S-1		0-3"		S-1: Gray, (10Y	R, 6/1), GRAVEL,	trace Sand,	GRAVE	_ No	Equipment Installed	ND	1
		S-2		3"-2'		trace Silt						ND	2
						S-2: Black, (10Y	'R, 2/1), fine to co	arse SAND,					3
						trace (+) Silt, tra	ace (+) gravel, trad	ce Slag, trace					4
1						Brick	(,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		FILL				5
-						Direct							ľ
						1							
						-							
						-							
						-							
2 _							<u></u>						-
						End	of Exploration at ±	⊧ 2 feet					
						4							
						-							
						4							
3						_							
4													
						1							
5						1							
						1							
						1							
_	\vdash		1	1	1	-							
6						-							
						-							
	\vdash			ł		-							
						-							
	7					-							
7	\vdash					-							
	Ke.			I									
	Soil san	ples sci	eened with a f	10.6 eV MiniRAF	photoinionizati	on detector (PID)	PID values repre	sent meter respo	nse in parts per m	illion/volume	e air (ppmv)		
	relative	to benze	ne in air and a	bove backgroun	d readings. All	samples are photo	documented. NE	D=Not Detected					
2	No grou	ndwater	encountered	-									
3	All depth	is are fe	et below grour	nd surface (bgs)	unless otherwis	e noted.							
4	. Samples	ite com	ed for PCBs, P	AHs, VOCs, TPI	H, As, Pb, TOC	at 18" (1.5ft) bgs.							
NOTES	Compos	1) STRA	TIFICATION I	LINES REPRES		S. MATE BOUNDAR	Y BETWEEN SO	IL TYPES; TRAN	SITIONS MAY BE	GRADUAL	·		
		2) WAT MAY OC	ER LEVEL RE	ADINGS HAVE	BEEN MADE A	T TIMES AND UN DSE PRESENT A	IDER CONDITIOI T THE TIME MF#	NS STATED; FLU ASUREMENTS W	CTUATIONS OF ERE MADE.	GROUNDW	ATER TABLE		
GZA											BORING NO.	SUB-8	

GZA G	BEOENV	RONN	IENTAL IN	C.			PROJECT				PORT OF BORING NO.	SUB-9	,
530 BI	ROADW	AY, PR	OVIDENCE	, RHODE ISI	LAND			National Grid			SHEET	1 of 1	
GEOT	ECH/GE		ROLOGICA	L CONSULT	ANTS		For	mer Tidewater Fa	cility		FILE NO.	43654.0	10
HYDR	OLOGIC	AL BO	RING LOG				Pav	vtucket, Rhode Isl	and		CHKD BY	MSK	
BORING	G CO.		Clean Harbo	ors		_	BO	RING LOCATION		See Explora	ation Location Plan		_
FOREM	AN		R. Smith			_	GROUND	SURFACE ELEV.			DATUM		-
GZA EN	IGINEER		Sophia Nark	iewicz		_		DATE START	12/5/11		DATE END	12/5/11	
									GROUNDWAT	ER READIN	IGS		
							DATE	TIME	WATER	CASING	STABILIZA	ATION TIME	
	SIZE:			SAMPLE	Augers	84			STRATI	м		EIEL D	P
(FT)	BLOWS	NO	PEN/REC	DEPTH (ET)	BLOWS/6"	BURM	ISTER CLASSIE		DESCRIPT		INSTALLED	TESTING	ĸ
()		S-1		0-2"		S-1: Grav. (10Y	R. 6/1). GRAVEL.	trace Silt. trace	GRAVEL	No	Equipment Installed	ND	1
		S-2		2"-2'		Sand	, ,, - ,	,	-			ND	2
		02				S 2: Dark brown	(10VP 2/2) find	to coorco				ne -	2
						3-2. Dark biowi	, (101K, 3/3), iiie						
						SAND, trace (+)	Slit, trace (+) Gra	avel, trace					4
1 -						Slag, trace (-) B	rick						5
						_			FILL				
						_							
2													
						End	of Exploration at ±	2 feet					Τ
							-						
						-							
						-							
3						_							
						-							
						_							
4													
						-							
-						-							
5 -						-							
						-							
	\vdash					-							
						4							
	\square					4							
6						4							
						7							
7						7							
						1							
REMAR 1 2 3 4	KS: Soil san relative No grou All depti	aples scr to benze ndwater as are fe s collecte	eened with a ne in air and a encountered et below grour ed for PCBs, P	10.6 eV MiniRAE above backgroun nd surface (bgs) PAHs, VOCs, TPI	E photoinionizat Id readings. All unless otherwis H, As, Pb, TOC	ion detector (PID). samples are photo e noted. at 18" (1.5ft) bgs.	PID values repre	sent meter respon	ase in parts per m	illion/volume	e air (ppmv)		
NOTES	: Compos	1) STRA				NATE BOUNDAR		IL TYPES; TRANS	SITIONS MAY BE	GRADUAL.			
		MAY OC	CUR DUE TO	OTHER FACT	ORS THAN TH	OSE PRESENT A	T THE TIME MEA	SUREMENTS WI	ERE MADE.				
GZA											BORING NO.	SUB-9	

GZA G								PROJECT			EPOR	T OF BORING NO.	SUB-10	5
530 BF	ROADW	AY, PRO	OVIDENCE	, RHODE ISL	AND			National Grid				SHEET	1 of 1	
GEOT	ECH/GE	OHYDF	ROLOGICAI		NTS		For	mer Tidewater Fa	cility			FILE NO.	43654.0)0
HYDR	OLOGIC	AL BOF	RING LOG				Pav	vtucket, Rhode Isl	and			CHKD BY	MSK	
BORING	GCO.		Clean Harbor	S		-	BOI	RING LOCATION		See Exp	loration	n Location Plan		_
FOREM	AN		KH/SH			-	GROUND	SURFACE ELEV.]			-
GZA EN	GINEER		Sophia Narki	ewicz		-	1	DATE START	5/24/12		DAT		5/24/12	
SAMPLE	R: UNLE	SS OTH	ERWISE NOT	ED, SAMPLER	CONSISTS OF				GROUNDWAT	ER REAL	DINGS			
A 2" SPI	LIT SPOO	N DRIVE	N USING A 14	10 lb. HAMMER	FALLING 30 IN		DATE	TIME	WATER	CASING	G	STABILIZA	ATION TIME	
CASING	: UNLES	S OTHER	RWISE NOTEI	D, CASING DRI	/EN USING									
A 300 LE	B HAMME	r fallin	NG 24 IN.											
	SIZE:			OTHER: 3 3/4"	HSA	SA			STRATI	4				Ть
(FT)	BLOWS	NO	PEN/REC	DEPTH (ET)	BLOWS/6"	BURM	ISTER CLASSIE		DESCRIPT	ON	l		TESTING	ĸ
/	220110	S-1	1 210/120	0-9"	820110/0	S-1: Dark grav (10YR, 4/1), fine to	coarse SAND.	DECON		Νο Εαι	upment Installed	ND	1
						some Gravel tra	ce fine Dry	,	Imported F					2
						Some Glavel, the	ice lille, Diy		imported i					2
														3
		S-2		9"-1.75'		S-2: Dark brown	(10YR, 2/1), fine	to coarse					ND	4
1						SAND, some Gr	avel, trace Silt, tra	ace Ash, Dry						5
		S-3		1 75-3		S-3 [.] Dark brown	(10YR 2/1) fine	to coarse					ND	
2		00				SAND little Gra	(10111, <u>1</u> , 1), 1110	trace Silt	Fill					
						SAND, IIIIe Gla		, trace ont,	1 111					
						trace Ash, Dry								
						-								
						-								
3						E : 1 of E := 1 for at : 2 foot								
						End of Exploration at ± 3 feet								
						1								
						1								
						1								
4						1								
						-								
						4								
						-								
5														
						1								
						1								
e						1								
° –						1								
						4								
7														
REMAR 1 2 3 4 5	KS: Soil san relative Collecte No grou All deptl Geotext	nples scre to benzer d sample ndwater e ns are fee le fabric	eened with a 1 he in air and al for TPH and encountered. et below groun present at 0.7	0.6 eV MiniRAE bove background Naphthalene at 1 d surface (bgs) u 5' bos.	photoinionizatic d readings. All s .5' bgs. Inless otherwise	on detector (PID). amples are photo e noted.	PID values repre documented. ND	sent meter respor =Not Detected	ise in parts per m	illion/volu	me air	(ppmv)		
NOTES:		1) STRA		INES REPRESE			Y BETWEEN SO	L TYPES; TRANS	SITIONS MAY BE	GRADUA				
		2) WATE MAY OC	K LEVEL RE	OTHER FACTO	SEEN MADE AT	SE PRESENT A	DER CONDITION T THE TIME MEA	NS STATED; FLU	ERE MADE.	GROUND	JWATE	RIABLE		
GZA		-										BORING NO.	SUB-10	

GZA G	ZA GEOENVIRONMENTAL INC. 30 BROADWAY, PROVIDENCE, RHODE ISLAND							PROJECT		REPO	ORT OF BORING NO.	SUB-11	1
530 BF		Y, PR		, RHODE ISL				National Grid	- 114 -		SHEET	1 of 1	
					IN 1 5		For	mer Lidewater Fa	cility		FILE NO.	43654.0 MSK	0
							Tav		anu	0.5.1		WOR	
FOREM	ANI		Clean Harbor	S		-	GROUND			See Explora	TION LOCATION PIAN		-
GZA EN	GINEER		Sophia Narkie	ewicz		•		DATE START	5/24/12	C	ATE END	5/24/12	-
SAMPLE	R: UNLE	SS OTH	ERWISE NOT	ED, SAMPLER (CONSISTS OF				GROUNDWAT		GS		-
A 2" SPL	IT SPOO	N DRIVE	N USING A 14	10 lb. HAMMER	FALLING 30 IN		DATE	TIME	WATER	CASING	STABILIZA	ATION TIME	
CASING	: UNLES	OTHER	WISE NOTE	D, CASING DRI	/EN USING								
A 300 LE	В НАММЕ		IG 24 IN.										
CASING	SIZE:			OTHER: 3 3/4"	HSA							1	_
DPTH		NO				SA	MPLE DESCRIPT		STRATU	M		FIELD	R
(ГТ)	BLUW5	NU S-1	PEIN/REC	0-9"	BLUW 3/0	S-1: Dark gray (10VR 4/1) fine to		DESCRIPT	ION No F		ND	1
		01		00		some Gravel tra	no rit, 4, 1), into t		Imported F			ne i	2
						Some Oravel, az	dec ont, Dry		Imported I				2
		6.2		0" 1 25'		S 2: Dark brown	(10VP 2/2) fina	to coorco					1
1		3-2		9-1.25		SAND some Cr	(101R, 3/3), line					ND	4
' -						trace Silt Dru	aver, irace (+) Sla	iy, iiace ASN,					5
		6.2		1 05 0 05		C 2: Plack (10)/	D 2/1) find to acc					ND	
		5-3		1.25-2.25		S-3: Black (101)	(x, 2/1), time to coa	arse SAND,				ND	
						little Gravel, trac	e (+) Slag, trace	ASN, trace					
						Silt, Dry							
2 _													
		S-4		2.25-2.75		S-4: Dark greeni	ish gray (5G/3), fi	ne to coarse				ND	
						SAND, some As	h, some (-) Grave	el, trace Slag,					
		S-5		2.75-3		trace Silt, slight	purifier waste-like	odor, little				ND	
3						blue staining, Dr	У						+
						S-5: Dark grayis	sh brown (10YR, 4	1/2), fine to					
						coarse SAND, li	ttle Gravel, trace	Silt, Dry					
						End o	of Exploration at ±	: 3 feet					
4													
5													
6													
7													
													Ц
REMAR	KS: Soil san	nles sor	anad with a 1	0.6 eV/MiniPAE	nhotoinionizatio	n detector (PID)		cont motor recoor	se in parts per m	illion/volume :	air (ppmy)		
''	relative	o benzer	ne in air and al	bove background	readings. All s	amples are photo	documented. ND	=Not Detected	pano per III		~ (PP111)		
2.	Collecte	d sample	for TPH and I	Naphthalene at 1	.5' bgs.	. , , , ,							
3.	No grou	ndwater e	encountered.										
4.	All dept	is are fee	et below groun	d surface (bgs) ι 5' bas	Inless otherwise	e noted.							
5. NOTES:	Geotext	1) STRA	TIFICATION L	INES REPRESE		ATE BOUNDAR	Y BETWEEN SO	L TYPES; TRANS	SITIONS MAY BE	GRADUAL.			
		2) WATE MAY OC	:R LEVEL RE/ CUR DUE TO	ADINGS HAVE E OTHER FACTO	BEEN MADE AT	TIMES AND UN SE PRESENT A	IDER CONDITION T THE TIME MEA	NS STATED; FLU	ERE MADE.	GROUNDWA	IER TABLE		
GZA		_	-								BORING NO.	SUB-11	

GZA G	A GEOENVIRONMENTAL INC. BROADWAY, PROVIDENCE, RHODE ISLAND						PROJECT National Grid			REF	PORT OF BORING NO.	SUB-12	2
GEOT	ECH/GE	OHYDF	ROLOGICAI		NTS		For	mer Tidewater Fa	cility		FILE NO.	43654.0	0
HYDR	OLOGIC	AL BOF	RING LOG				Pav	wtucket, Rhode Isl	and		CHKD BY	MSK	
BORING	G CO.		Clean Harbor	S		-	BO	RING LOCATION		See Explor	ation Location Plan		
FOREM	AN		KH/SH			-	GROUND	SURFACE ELEV.			DATUM		-
GZA EN	GINEER		Sophia Narki	ewicz			1	DATE START	5/24/12		DATE END	5/24/12	
SAMPL	ER: UNLE		ERWISE NOT	ED, SAMPLER (10 Ib HAMMER	CONSISTS OF		DATE	TIME	GROUNDWAT	CASING	NGS STABILIZA		
CASING		SOTHER	WISE NOTEI		/FN USING		DATE		WALER	0,101110			
A 300 L	B HAMME	R FALLIN	NG 24 IN.										
CASING	SIZE:			OTHER: 3 3/4"	HSA								
DPTH	CASING		0511/050	SAMPLE		SA	MPLE DESCRIP	FION	STRATU	N	EQUIPMENT	FIELD	R
(FT)	BLOWS	NU S-1	PEN/REC	DEPTH (FT)	BLOWS/6"	BURM		CATION	GRAVE	ION		ND	1
		S-2		3"-2'		S-2: Brown (10)	(R 3.3) fine to co		ORAVEL			ND	2
		0-2		5-2		little Gravel trac	se Silt trace Brick	trace Slag				ND	2
						trace glass trac	e (-) Ash Dry	, ildoo olag,					4
1						liuoo gluoo, liuo							
· -									Fill				
2		S-3		2-3		S-3: Dark grav (10YR 4/2) fine to	COARSE				ND	
		00		20		SAND. little Gra	vel. little Slag. tra	ce Silt. trace					
						Wood Chips, sli	aht purifier waste	like odor. slight					
						blue staining. Dr	9p						
							,						
3						Find of Exploration at ± 3 feet							
						End of Exploration at ± 3 feet							
						1							
4													
5													
1													
1													
1													
6						-							
1													
1						-							
						-							
						4							
7						-							
REMAR	KS [.]												1
1	Soil san	ples scre	eened with a 1	0.6 eV MiniRAE	photoinionizatio	on detector (PID).	PID values repre	sent meter respor	nse in parts per m	illion/volume	e air (ppmv)		
	relative	o benzer	ne in air and a	bove background	d readings. All s	amples are photo	o documented. NE	-Not Detected					
2	Collecte	d sample	for TPH and	Naphthalene at 1	.5' bgs.								
4	All Dept	ns are fe	et below grour	nd surface (bqs)	unless otherwis	e noted.							
NOTES		4) OTO ::								0040/14/			
NUTES		1) STRA 2) WATE	R LEVEL REA	ADINGS HAVE E	BEEN MADE AT		T BEIWEEN SO	IL TYPES; TRANS	CTUATIONS MAY BE	GROUNDW	ATER TABLE		
GZA		MAY OC	CUR DUE TO	OTHER FACTO	ORS THAN THC	ISE PRESENT A	T THE TIME MEA	SUREMENTS W	ERE MADE.		BORING NO.	SUB-12	

BIOLOGIAL BORNELISATION Presentational ready Presen	GZA G	EOENV							PROJECT		REP	ORT OF BORING NO.	SUB-13	3
HYDROLOCOLAL BORIN LLOC Paradata, Risponta Inderova, Bergoria Lucason Para Delice OF MEM PORPIAGO Commission MERINA IDA Segmenta Inderova, Delice	GEOT	ECH/GE	OHYDF	ROLOGICA	L CONSULTA			For	mer Tidewater Fa	cility		FILE NO.	43654.0	0
SERIAL COL Date Hadron REPRESIDE LOD TOM See Representation Plan. OPERAVA Versity Details Details Details C21 A REMIRER Versity Details Details Details Details C22 A REMIRER Versity Note Details Details <t< td=""><td>HYDR</td><td>OLOGIC</td><td>AL BOF</td><td>RING LOG</td><td></td><td></td><td></td><td>Pav</td><td>vtucket, Rhode Is</td><td>land</td><td></td><td>CHKD BY</td><td>MSK</td><td></td></t<>	HYDR	OLOGIC	AL BOF	RING LOG				Pav	vtucket, Rhode Is	land		CHKD BY	MSK	
DENCLM NEISE ORIONE Deletion: DATE DATE <thdate< th=""> <thdate< th=""> <thdate< th=""></thdate<></thdate<></thdate<>	BORING	G CO.		Clean Harbor	ſS			BOI	RING LOCATION		See Explora	ation Location Plan		_
Calk Biological Control Table Status All Biological Control Table Status C	FOREM	AN		KH/SH			-	GROUND	SURFACE ELEV.				= 0.440	-
Advise Difference and Differenc	GZA EN	GINEER	00.071	Sophia Narki					DATE START	5/24/12			5/24/12	-
CASHC UNLYSIS OTHERWISK PATTER CASING DRIVENUSMS CASING UNLYSIS CASING UNLYS	A 2" SPI	ER: UNLE	N DRIVE	ERWISE NOT N USING A 14	ED, SAMPLER (40 lb. HAMMER	FALLING 30 IN		DATE	TIME	WATER	CASING	GS STABILIZA		
A VOL 18 HUMBER FALLING 2 NI. Image: State 1 S	CASING	: UNLES	S OTHER	WISE NOTEI	D. CASING DRIV	EN USING								
CASHES SIZE OTHER, 3 (H) HBA Image: Control of the con	A 300 LI	B HAMME	R FALLIN	IG 24 IN.	,									
DPTHE CARNO SAMULE SAMULE DESCRIPTION STATUM EQUIRMENT PIELO N 1 8.0 PERLINE 8.00/36 0.00/26 PIELO NO	CASING	SIZE:			OTHER: 3 3/4"	HSA	1						1	-
11/7 Exclose the decision of the product of the pro			NO			PLOW/S/6"	SA	MPLE DESCRIPT					FIELD	R
B2 2/2/2 B2 Dark book (10%, 22) fac to modul BAND, same Greek, tack: Bi, tack: Bid, tack: B	(F1)	BLOWS	S-1	FEN/REC	0-2"	BLOWS/0	S-1: Grav (10YF	R. 4/1). GRAVEL	CATION	GRAVEL	No	Equipment Installed	ND	1
Image:			S-2		2"-2'		S-2: Dark brown	(10YR, 2/2) fine	to medium			- 1- 1	ND	2
Image: Sing trace () Ask, Dy Fil 4 Image: Sing trang trace () Ask, Dy Fil <tr< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td>SAND, some Gr</td><td>avel. trace Silt. tra</td><td>ace Brick.</td><td></td><td></td><td></td><td></td><td>3</td></tr<>							SAND, some Gr	avel. trace Silt. tra	ace Brick.					3
Control of Exploration at ±2 feet Control of Exploration							trace Slag, trace	e (-) Ash. Drv	,	Fill				4
a a a a	1													
Image: Control of the second state	-													
Control of the second second second (PD) PD values represent meter response in parts per million/volume air (pmm) in table befores million and table before millio														
P I														
2 Image: Control of the sequence														
A End of Exploration at a 2 feet 3 A 4 A 4 A 4 A 5 A 6 A 7 A 8 A 9 A 1 A	2													
A A A A 3 A A A 4 A A A 5 A A A 6 A A A 7 A A A 8 A A A 9 A A A 10 A A A 11 A A A <td< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td>End</td><td>of Exploration at ±</td><td>2 feet</td><td></td><td></td><td></td><td></td><td></td></td<>							End	of Exploration at ±	2 feet					
3 Image: Control of the state of the							1							
3 Image: Contract of the system of the s							1							
3 Image: Contract of the source of the s							1							
REMARKS: 1 Collected sample for TPH and haptiveleme at 1 tops. 3 Not groundwater encountered. 1 Site for the second subce background surface (bgs) unless otherwise noted. NOTES: 1) STRATIFICATION LINES REPRESENT APPROXIMATE BOUNDARY BETWEEN SOIL TYPES; TRANSITIONS MAY BE GRADUAL. 2) WATER LEVER READINGS HAVE BEEN MADE AT TIMES AND UNDER CONDITIONS STATED; FLUCTUATIONS MAY BE GRADUAL. 2) WATER LEVER READINGS HAVE BEEN MADE AT TIMES AND UNDER CONDITIONS STATED; FLUCTUATIONS MAY BE GRADUAL. 2) WATER LEVER READINGS HAVE BEEN MADE AT TIMES AND UNDER CONDITIONS STATED; FLUCTUATIONS MAY BE GRADUAL. 2) WATER LEVER READINGS HAVE BEEN MADE AT TIMES AND UNDER CONDITIONS STATED; FLUCTUATIONS MAY BE GRADUAL. 2) WATER LEVER READINGS HAVE BEEN MADE AT TIMES AND UNDER CONDITIONS STATED; FLUCTUATIONS MAY BE GRADUAL. 2) WATER LEVER READINGS HAVE BEEN MADE AT TIMES AND UNDER CONDITIONS STATED; FLUCTUATIONS MAY BE GRADUAL. 2) WATER LEVER READINGS HAVE BEEN MADE AT TIMES AND UNDER CONDITIONS STATED; FLUCTUATIONS MAY BE GRADUAL. 2) WATER LEVER READINGS HAVE BEEN MADE AT TIMES AND UNDER CONDITIONS STATED; FLUCTUATIONS MAY BE GRADUAL. 2) WATER LEVER READINGS HAVE BEEN MADE AT TIMES AND UNDER CONDITIONS STATED; FLUCTUATIONS MAY BE GRADUAL. 2) WATER LEVER READINGS HAVE BEEN MADE AT TIMES AND UNDER CONDITIONS STATED; FLUCTUATIONS MAY BE GRADUAL. 2) WATER LEVER READINGS HAVE BEEN MADE AT TIMES AND UNDER CONDITIONS STATED; FLUCTUATIONS MAY BE GRADUAL. 2) WATER LEVER READINGS HAVE BEEN MADE AT TIMES AND UNDER CONDITIONS STATED; FLUCTUATIONS MAY BE GRADUAL. 2) WATER LEVER READINGS HAVE BEEN MADE AT TIMES AND UNDER CONDITIONS STATED; FLUCTUATIONS MAY BE GRADUAL. 3) MARCH LEVER READINGS HAVE BEEN MADE AT TIMES AND UNDER CONDITIONS STATED; FLUCTUATIONS MAY BE GRADUAL. 3) MARCH LEVER READINGS HAVE BEEN M	3													
A Image: Constraint of the second state							1							
A I														
4 Image: Control of the set of														
A Image: Constraint of the set														
REMARKS: 1 1 1	4													
s s														
6 0														
6 Image: Constraint of the second														
5 Image: Constraint of the second														
6 Image: Construction of the second structure of the sec	5													
a a														
6 Image: Constraint of the second state														
6 Image: Control of the second se							-							
6 Image: Control of the second se							-							
7 Image: Control of the second state of	6													
7 Image: Control of the state of the														
7 Image: Constraint of the second														
7 Image: Constraint of the second														
Image: Construction of the construc	_					ļ	-							
REMARKS:	7													
 Soil samples screened with a 10.6 eV MiniRAE photoinionization detector (PID). PID values represent meter response in parts per million/volume air (ppmv) relative to benzene in air and above background readings. All samples are photo documented. ND=Not Detected Collected sample for TPH and Naphthalene at 1' bgs. No groundwater encountered. All depths are feet below ground surface (bgs) unless otherwise noted. NOTES: STRATIFICATION LINES REPRESENT APPROXIMATE BOUNDARY BETWEEN SOIL TYPES; TRANSITIONS MAY BE GRADUAL. WATER LEVEL READINGS HAVE BEEN MADE AT TIMES AND UNDER CONDITIONS STATED; FLUCTUATIONS OF GROUNDWATER TABLE MAY OCCUR DUE TO OTHER FACTORS THAN THOSE PRESENT AT THE TIME MEASUREMENTS WERE MADE. 	REMAR	KS:		L	1	L	1			I	1		1	1
relative to benzene in air and above background readings. All samples are photo documented. ND=Not Detected 2. Collected sample for TPH and Naphthalene at 1' bgs. 3. No groundwater encountered. 4. All depths are feet below ground surface (bgs) unless otherwise noted. NOTES: 1) STRATIFICATION LINES REPRESENT APPROXIMATE BOUNDARY BETWEEN SOIL TYPES; TRANSITIONS MAY BE GRADUAL. 2) WATER LEVEL READINGS HAVE BEEN MADE AT TIMES AND UNDER CONDITIONS STATED; FLUCTUATIONS OF GROUNDWATER TABLE MAY OCCUR DUE TO OTHER FACTORS THAN THOSE PRESENT AT THE TIME MEASUREMENTS WERE MADE. GZA BORING NO. SUB-13	1	Soil san	ples scre	eened with a 1	0.6 eV MiniRAE	photoinionizatio	on detector (PID).	PID values repre	sent meter respor	nse in parts per m	illion/volume	air (ppmv)		
2. Collected sample for LPH and Naphthalene at 1 bgs. 3. No groundwater encountered. 4. All depths are feet below ground surface (bgs) unless otherwise noted. 1) STRATIFICATION LINES REPRESENT APPROXIMATE BOUNDARY BETWEEN SOIL TYPES; TRANSITIONS MAY BE GRADUAL. 2) WATER LEVEL READINGS HAVE BEEN MADE AT TIMES AND UNDER CONDITIONS STATED; FLUCTUATIONS OF GROUNDWATER TABLE MAY OCCUR DUE TO OTHER FACTORS THAN THOSE PRESENT AT THE TIME MEASUREMENTS WERE MADE. GZA BORING NO. SUB-13		relative	to benzer	ne in air and a	bove background	l readings. All s	amples are photo	o documented. ND	Not Detected					
All depths are feet below ground surface (bgs) unless otherwise noted. All depths are feet below ground surface (bgs) unless otherwise noted. OTES: 1) STRATIFICATION LINES REPRESENT APPROXIMATE BOUNDARY BETWEEN SOIL TYPES; TRANSITIONS MAY BE GRADUAL. 2) WATER LEVEL READINGS HAVE BEEN MADE AT TIMES AND UNDER CONDITIONS STATED; FLUCTUATIONS OF GROUNDWATER TABLE MAY OCCUR DUE TO OTHER FACTORS THAN THOSE PRESENT AT THE TIME MEASUREMENTS WERE MADE. BORING NO. SUB-13	2	No arou	u sample ndwater (encountered	ivaprithalene at 1	ogs.								
NOTES: 1) STRATIFICATION LINES REPRESENT APPROXIMATE BOUNDARY BETWEEN SOIL TYPES; TRANSITIONS MAY BE GRADUAL. 2) WATER LEVEL READINGS HAVE BEEN MADE AT TIMES AND UNDER CONDITIONS STATED; FLUCTUATIONS OF GROUNDWATER TABLE MAY OCCUR DUE TO OTHER FACTORS THAN THOSE PRESENT AT THE TIME MEASUREMENTS WERE MADE. GZA BORING NO. SUB-13	4	All dept	ns are fee	t below groun	d surface (bgs) ι	Inless otherwise	e noted.							
CONTROL OF THE SECTION OF THE S	NOTES								TVDEC. TDANG		CRADUA			
GZA BORING NO. SUB-13	NOTES:		2) WATE	R LEVEL REA	ADINGS HAVE E	BEEN MADE AT	TIMES AND UN	IDER CONDITION	IS STATED; FLU	CTUATIONS OF	GROUNDW/	ATER TABLE		
	GZA					NKS THAN THC	DE PRESENTA		SUREMENTS W	EKE MADE.		BORING NO.	SUB-13	

GZA G	A GEOENVIRONMENTAL INC. BROADWAY, PROVIDENCE, RHODE ISLAND						PROJECT National Grid			R	REPOR	T OF BORING NO.	SUB-14	ļ
GEOT	ECH/GE	OHYDI	ROLOGICA	L CONSULTA			For	mer Tidewater Fa	acility			FILE NO.	43654.0	0
HYDR	OLOGIC	AL BO	RING LOG				Pav	vtucket, Rhode Is	land			CHKD BY	MSK	
BORING	GCO.		Clean Harbo	rs			BO	RING LOCATION		See Exp	loratio	n Location Plan		
FOREM	AN		KH/SH			-	GROUND	SURFACE ELEV.			[DATUM		_
GZA EN	GINEER		Sophia Narki	ewicz		-		DATE START	5/24/12		DAT		5/24/12	-
SAMPLI	ER: UNLE		ERWISE NOT	ED, SAMPLER	CONSISTS OF		DATE	TIME	GROUNDWAT		DINGS	STADIL 17		
							DATE	TIVIE	WATER	CASIN	9	STABILIZA		
A 300 L		R FALLI	NG 24 IN.	D, CASING DRI	EN USING									
CASING	SIZE:			OTHER: 3 3/4'	HSA								-	
DPTH	CASING			SAMPLE	1	SA	MPLE DESCRIP	ΓΙΟΝ	STRATU	М	E	EQUIPMENT	FIELD	R
(FT)	BLOWS	NO	PEN/REC	DEPTH (FT)	BLOWS/6"	BURM	ISTER CLASSIFI	CATION	DESCRIPT	ION		INSTALLED	TESTING	K
		5-1		0-2		S-1: Gray (101F	(40)(D 2/2) first		GRAVEI	-	NO EQU	Ipment Installed	ND	
		5-2		2 -0.75		SAND little Ach	(101 K, 3/2), 100						ND	2
		6.2		0.75.1.25		Dry	, illie (-) Glavel,	iace Sill,						3
1		0-0		0.75-1.25		S-3: Grav (10VE	2 5/1) fine to me	ium SAND					ND	-
		S-4		1 25-2		little Ash some	Gravel trace Sla	trace Silt					ND	
		0.				Drv		g, 11000 Ont,						
						S-4: Dark brown	(10YR, 3/2), fine	to medium	Fill					
						SAND trace As	h trace Slag trac	e Gravel						
2		S-5		2-3		trace Glass trac	ri, trace olag, trac	e olavel,					ND	
		00		20		S-5: Yellow brow	wn (10YR, 5/6) fin	e to medium						
						SAND. little Gra	vel. trace Silt. Dry							
3		S-6		3-3.5		S-6: Dark brown (10YR, 3/2), fine to medium							ND	
						SAND, little Gravel, trace Silt, trace Slag, Dry								
						End o	f Exploration at ±	3.5 feet						
4														
						-								
						-								
5														
						-								
1						4								
						4								1
6 _						4								
1	<u> </u>		<u> </u>			4								
						1								1
7														
'						1								
REMAR 1 2 3 4	KS: Soil san relative Collecte No grou All depti	aples scr to benze d sample ndwater ns are fee	eened with a 1 ne in air and a e for TPH and encountered. et below groun	0.6 eV MiniRAE bove background Naphthalene at 2 nd surface (bgs) o	photoinionizatio d readings. All s 20" (1.67') bgs. unless otherwise	on detector (PID). amples are photo e noted.	PID values repre	sent meter respo =Not Detected	nse in parts per m	illion/volu	ıme air	(ppmv)		
NOTES	:	1) STRA 2) WATE		LINES REPRESE	ENT APPROXIN BEEN MADE AT	ATE BOUNDAR	Y BETWEEN SO	IL TYPES; TRAN	SITIONS MAY BE	GRADU GROUNE	AL. DWATE	R TABLE		
GZA					ITAN IHC	JE FRESENI A		SUREMENTS W	ERE MADE.			BORING NO.	SUB-14	

GZA G	A GEOENVIRONMENTAL INC.						PROJECT				EPOR	T OF BORING NO.	SUB-15	5
530 BF	ROADW	AY, PR	OVIDENCE	, RHODE ISL	AND			National Grid				SHEET	1 of 1	
GEOT	CH/GE			L CONSULTA	NIS		For	mer Tidewater Fa	acility			FILE NO.	43654.0)0
HIDK	JLUGIC		KING LOG				Pa	vtucket, Rhode Is	land			CHKD BY	MSK	
BORING	CO.		Clean Harbor	S		-	BO	RING LOCATION	l	See Exp	loratior	Location Plan		-
FOREM			KH/SH Sophia Narki	owicz		-	GROUND	SURFACE ELEV.	5/24/12		ן דעם		5/24/12	-
								DATE START					5/24/12	
A 2" SPI			N LISING A 14	10 IN HAMMER	FALLING 30 IN		DATE	TIME	WATER		G G	STABIL 174		
							BATE		W/ TER	0/10/11	0	OT ABILIE		
				D, CASING DRI	ENUSING									
CASING	SIZE:		10 24 IN.	OTHER: 3 3/4"	HSA									
DPTH	CASING			SAMPLE		SA	MPLE DESCRIP	ION	STRATU	M	E	QUIPMENT	FIELD	R
(FT)	BLOWS	NO	PEN/REC	DEPTH (FT)	BLOWS/6"	BURM	ISTER CLASSIFI	CATION	DESCRIPT	ION		INSTALLED	TESTING	к
		S-1		0-2"		S-1: Gray (10YR	R, 4/1), GRAVEL		GRAVEL	I	No Equ	ipment Installed	ND	1
		S-2		2"-0.5'		S-2: Black (10Y	R, 2/1), fine to me	dium SAND,					ND	2
						some Gravel, tra	ace (+) Ash, trace	Silt, Dry						3
		S-3		0.5-1		S-3: Pale brown	(10YR, 6/5), fine	to medium					ND	4
1						SAND, some As	h, trace brick, tra	ce Gravel,						
		S-4		1-3		trace Silt. Drv							ND	
		-		-		S-4: Dark brown	(10YR 3/3) fine	to medium						
						SAND little Gra	vel trace (+) Slac	trace Brick	Fill					
						SAND, IIIIe Gla		, trace blick,	1					
						trace Ash, trace	Silt, Dry							
2 _						-								
						4								
						-								
3														
		S-5		3-3.5		S-5: Strong brown (10YR, 4/6), fine to medium							ND	
						SAND, little Gra	vel, trace (+) Slag	, trace Brick,						
						trace Silt, trace	Ash. Drv							
						End of	f Exploration at ±	3.5 feet						
4						1								
· -						1								
						1								
						1								
						1								
						-								
5						4								
						4								
					ļ									
						4								
6														
]								
						1								
7						1								
<i>'</i>					l	1								
REMAR 1 2 3 4	KS: Soil san relative Collecte No grou All deptl	nples scre to benzer d sample ndwater e ns are fee	eened with a 1 he in air and al for TPH and I encountered. et below groun	0.6 eV MiniRAE bove background Naphthalene at 2 d surface (bgs) (photoinionizatio I readings. All s 20" (1.67') bgs. Inless otherwise	on detector (PID). amples are photo e noted.	PID values repre	sent meter responses to the second	nse in parts per m	illion/volu	me air	(ppmv)		
NOTES:		1) STRA 2) WATE	R LEVEL RE	INES REPRESE ADINGS HAVE E	INT APPROXIN	TATE BOUNDAR	Y BETWEEN SO DER CONDITIO	L TYPES; TRAN NS STATED; FLU	SITIONS MAY BE	GRADUA GROUND	AL. DWATE	R TABLE		
		MAY OC	CUR DUE TO	OTHER FACTO	ORS THAN THC	SE PRESENT A	T THE TIME MEA	SUREMENTS W	ERE MADE.			DODUCT	0.15	
GZA												BORING NO.	SUB-15	