GZA
GeoEnvironmental, Inc.

Engineers and
Scientists

June 14, 2012
File No. 05.0043654.00-C

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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.

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.

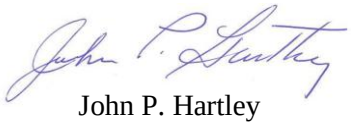
We appreciate the Department's timely review of our February 13, 2012 submittal. The electrical substation upgrade project is currently scheduled to commence in early August 2012. As we have discussed previously, the earthwork associated with this upgrade project will take place over an approximate eight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



John P. Hartley
Consultant/Reviewer

James J. Clark, P.E.
Principal

MSK/JJC:tja

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

TABLE 3

TABLE 3
SUMMARY OF SOIL TPH, PAH, PCB ANALYTICAL RESULTS
Substation Sampling
Former Tidewater Facility
Pawtucket, Rhode Island

		Units	RIDEM GB Leachability Criteria	RIDEM Industrial/ Commercial DEC	RIDEM UCL	Sub-1 18 in Soil 1112136-01 12/5/2011	Sub-2 18 in Soil 1112136-02 12/5/2011	Sub-3 24 in Soil 1112136-03 12/5/2011	Sub-4 0-3 in Solid 1112136-12 12/5/2011	Sub-4 3-6 in Soil 1112387-01 12/5/2011	Sub-4 20 in Soil 1112136-04 12/5/2011	Sub-5 0-3 in Solid 1112136-13 12/5/2011	Sub-5 3-6 in Soil 1112387-02 12/5/2011	Sub-5 20 in Soil 1112136-05 12/5/2011	Sub-6 0-3 in Soil 1112136-14 12/5/2011	Sub-6 20 in Soil 1112136-06 12/5/2011	Sub-7 0-3 in Soil 1112136-15 12/5/2011	Sub-7 12 in Soil 1112136-07 12/5/2011
Mod. EPA 8100	TOTAL PETROLEUM HYDROCARBON																	
	Hydrocarbon Content	mg/kg	2,500	2,500	30,000	**374**	**137**	**863**			**3270**			**51.1**		**125**		<37.7
EPA 6010B	METALS																	
	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																	
	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 ANALYTES																	
	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 BIPHENYLS																	
	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

TABLE 3
SUMMARY OF SOIL TPH, PAH, PCB ANALYTICAL RESULTS
Substation Sampling
Former Tidewater Facility
Pawtucket, Rhode Island

		Units	RIDEM GB Leachability Criteria	RIDEM Industrial/ Commercial DEC	RIDEM UCL	Sub-8 0-3 in Solid 1112136-16 12/5/2011	Sub-8 3-6 in Soil 1112387-03 12/5/2011	Sub-8 12 in Soil 1112136-08 12/5/2011	Sub-9 0-3 in Solid 1112136-17 12/5/2011	Sub-9 3-6 in Soil 1112387-04 12/5/2011	Sub-9 12 in Soil 1112136-09 12/5/2011	Blind Duplicate 12 in Soil 1112136-10 12/5/2011	Sub-10 18 in Soil 1205430-1 5/24/2012	Sub-11 18 in Soil 1205430-2 5/24/2012	Sub-12 18 in Soil 1205430-3 5/24/2012	Sub-13 12 in Soil 1205430-4 5/24/2012	Sub-14 20 in Soil 1205430-5 5/24/2012	Sub-15 20 in Soil 1205430-6 5/24/2012
Mod. EPA 8100	TOTAL PETROLEUM HYDROCARBON																	
	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**						
	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 ANALYTES																	
	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 BIPHENYLS																	
	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						
	Aroclor 1248	mg/kg	10	10	10,000	<0.0534	<0.0572	<0.0607	<0.0529	<0.0584	<0.0604	<0.0572						
	Aroclor 1254	mg/kg	10	10	10,000	<0.0534	<0.0572	<0.0607	<0.0529	<0.0584	<0.0604	<0.0572						
	Aroclor 1260	mg/kg	10	10	10,000	<0.0534	**0.0991**	<0.0607	<0.0529	<0.0584	<0.0604	**0.0935**						
	Aroclor 1262	mg/kg	10	10	10,000	<0.0534	<0.0572	<0.0607	<0.0529	<0.0584	<0.0604	<0.0572						
	Aroclor 1268	mg/kg	10	10	10,000	<0.0534	<0.0572	<0.0607	<0.0529	<0.0584	<0.0604	<0.0572						

Notes
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Blank spaces indicates that the specific consistuent was not sampled for.
Gray shaded cells indicates the concentration exceeds the RIDEM Method 1
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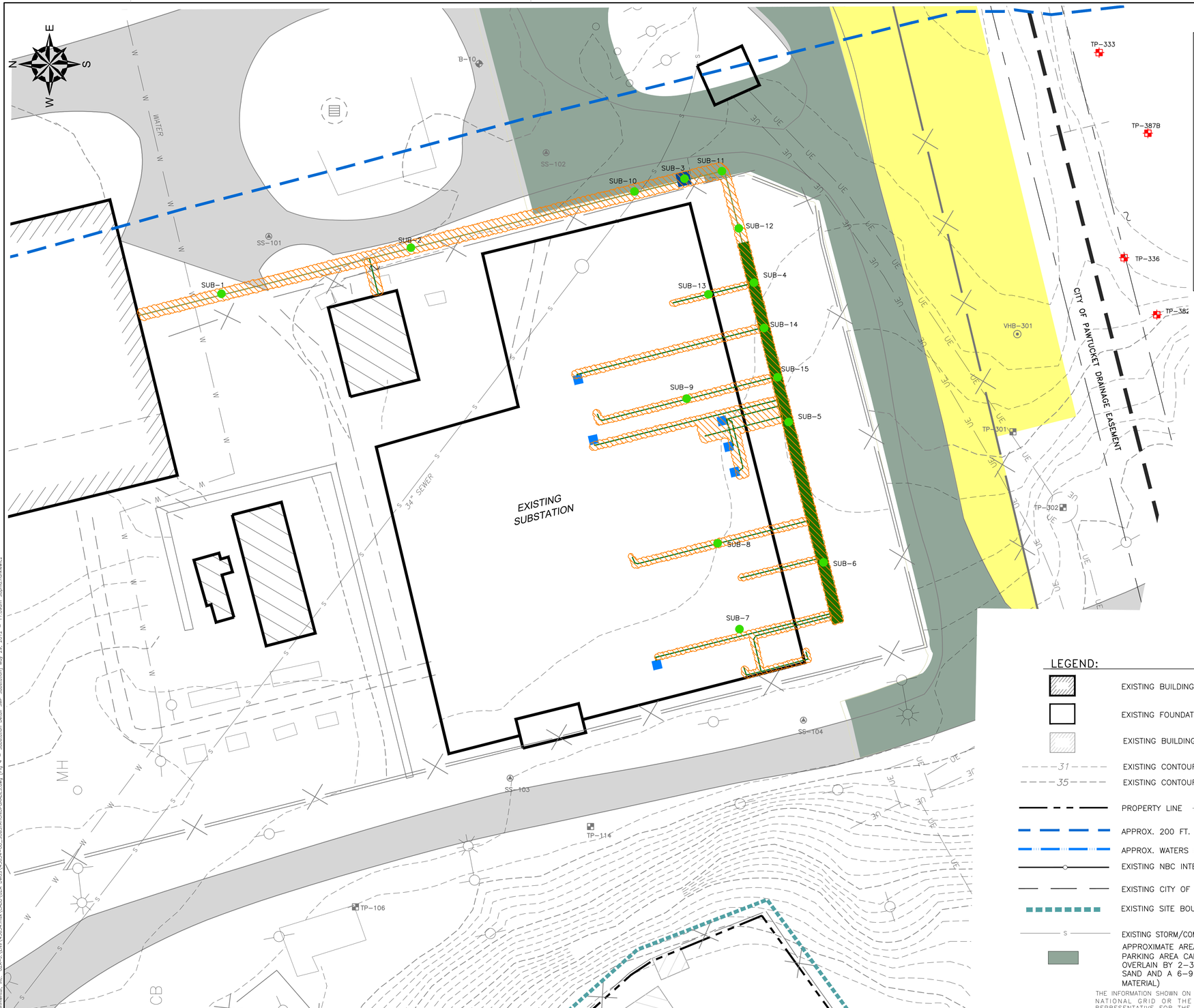
Detection limits highlighted in *blue and in italics* exceed the RIDEM Method 1 Criteria.
Concentrations **bolded and underlined** exceed the RIDEM Method 1 GB Leachability Criteria.
A concentration with a bold border exceeds the Upper Concentration Limit.
=Indicates Sampling Location is within the Fenced Substation Area
=Indicates Sampling Location is outside of Fenced Substation Area
Blind Duplicate sample collected from SUB-8

FIGURE 4



SUBSTATION ACTIVITIES LEGEND:

- PROPOSED ELECTRICAL EQUIPMENT
- PROPOSED HANDHOLE EXCAVATION DEPTH = 48"
- PROPOSED CONDUIT EXCAVATION DEPTH = 24"
- PROPOSED DUCT BANK EXCAVATION DEPTH = 36"
- PROPOSED TRENWA TRENCH EXCAVATION DEPTH = 40"
- SUB-1 PRE-CHARACTERIZATION SOIL SAMPLING LOCATION
- PROPOSED SOIL EXCAVATIONS

SAMPLE LEGEND

SS-9	ATLANTIC SURFACE SOIL SAMPLE LOCATION
TSED-6	ATLANTIC SEDIMENT SAMPLE LOCATION
W-BVE SS-3	WESTON/BLACKSTONE VALLEY ELECTRIC SEDIMENT SAMPLE LOCATION
RIDEM SS-3	RIDEM SURFACE SOIL SAMPLE LOCATION
B-109/ MW-109	MONITORING WELL/BORING (VHB) SURVEYED
TP-3A	ATLANTIC TEST PIT LOCATION
W-BVE	WESTON/BLACKSTONE VALLEY ELECTRIC TEST PIT LOCATION
GZA TP-8	GZA/VALLEY GAS TEST PIT LOCATION
TB-15	ATLANTIC SOIL BORING LOCATION
MW-3	ATLANTIC MONITORING WELL LOCATION
M&E MW-1	METCALF & EDDY MONITORING WELL LOCATION
VHB-400	VHB SURFACE SOIL SAMPLE LOCATION NON-SURVEYED
TP-204	VHB TEST PIT (2006)
GZ-01	GZA TEST PIT (2009)
TB-300	GZA TEST BORING LOCATION (2010)
MW-320 S/D	GZA MONITORING WELL LOCATION (2010)
TP-306	GZA TEST PIT LOCATION (2010)
SS-100	GZA SURFACE SOIL SAMPLE LOCATION (2010)
SC31	ARCADIS SEDIMENT SAMPLE LOCATION (2008)
PIPE-1-061610	GZA RESIDUAL MATERIAL SAMPLE (2010)

GENERAL NOTES:

1. EXISTING CONDITIONS BASE MAP DEVELOPED FROM THE FOLLOWING:
   - ELECTRONIC FILES FROM GEI CONSULTANTS, INC. (FORMERLY AES) ENTITLED "HISTORIC STRUCTURES AND SAMPLE LOCATIONS", ORIGINAL SCALE 1"=80', DATED JULY 1999
   - ELECTRONIC FILES FROM VANASSE HANGEN BRUSTLIN, INC. ENTITLED "SOIL BORING, TEST PIT AND MONITOR WELL LOCATIONS", SCALE: 1"=60', UNDATED
   - ELECTRONIC FILES FROM WELSH ASSOCIATES LAND SURVEYORS, INC. ENTITLED "TOPOGRAPHIC SURVEY (AS-BUILT), FORMER TIDEWATER FACILITY, DEMOLITION OF GAS HOLDERS NOS. 7 & 8", DATED DECEMBER 17, 2010
   - ON-SITE INVESTIGATIONS AND SURVEYS BY GZA PERSONNEL DURING VARIOUS SITE VISITS DURING 2009 AND 2010.
2. PROPERTY LINES AND LOT INFORMATION ESTABLISHED FROM INFORMATION PROVIDED ON A DRAWING ENTITLED "PERIMETER SURVEY OF LAND AT THE TIDEWATER FORMER MGP SITE IN PAWTUCKET, RHODE ISLAND FOR ATLANTIC ENVIRONMENTAL SERVICES INC." DEVELOPED BY LOUIS FEDERICI AND ASSOCIATES AND AN AUTO CAD FILE ENTITLED "MAX READ FIELD TRACK EXPANSION 2007" PROVIDED BY THE CITY OF PAWTUCKET.
3. HORIZONTAL DATUM IS BASED ON NAD 1983 FROM BASE MAPPING PROVIDED BY GEI CONSULTANTS, INC.
4. VERTICAL DATUM IS BASED ON NGVD 1929 (MSL) FROM BASE MAPPING PROVIDED BY GEI CONSULTANTS, INC.
5. REFERENCE SEWER DATA FROM SCANNED IMAGE PROVIDED BY THE CITY OF PAWTUCKET, RHODE ISLAND, ENTITLED "STUDY OF SEWERAGE FACILITIES" BY WATERMAN ENGINEERING CO. & ANDERSON NICHOLS CO. DATED NOV. 1975, ORIGINAL SCALE 1"=400' & SCANNED IMAGES OF HISTORIC PLAN & PROFILE DRAWINGS PROVIDED BY THE CITY OF PAWTUCKET, RHODE ISLAND.
6. SITE UTILITIES TAKEN FROM 1984 SANBORN MAP AND HISTORIC FIGURES PROVIDED BY NATIONAL GRID. ALL UTILITY LOCATIONS ARE APPROXIMATE AND SHOWN FOR REFERENCE ONLY.
7. PROPOSED CONDUIT, HANDHOLES, TRENCHES AND CCTV LOCATIONS AND EXCAVATIONS DEVELOPED FROM PLAN PROVIDED BY TRC, INC., ENTITLED "PAWTUCKET 1 SUBSTATION NO. 107, PAWTUCKET, RHODE ISLAND, 115KV BUS STRUCTURE CONDUIT PLAN," DATED 09/30/2011, ORIGINAL SCALE 1"=8', DRAWING NO. H-90869-4A, REV A.

LEGEND:

- EXISTING BUILDINGS ON-SITE
- EXISTING FOUNDATION/PAD ON-SITE
- EXISTING BUILDINGS/STRUCTURES OFF-SITE
- EXISTING CONTOUR (MINOR 1 FOOT INTERVAL)
- EXISTING CONTOUR (MAJOR 5 FOOT INTERVAL)
- PROPERTY LINE — W — EXISTING WATER LINE
- APPROX. 200 FT. JURISDICTION LIMIT
- APPROX. WATERS EDGE
- EXISTING NBC INTERCEPTOR SANITARY SEWER
- EXISTING CITY OF PAWTUCKET STORM DRAIN
- EXISTING SITE BOUNDARY
- S — EXISTING STORM/COMBINED SAN. SEWER OVERFLOW
- APPROXIMATE AREA OF ROADWAY AND PARKING AREA CAP (20 MIL GEOMEMBRANE OVERLAIN BY 2-3-INCHES OF BEDDING SAND AND A 6-9 INCH LIFT OF PROCESSED MATERIAL)
- UE — EXISTING UNDERGROUND ELECTRIC CABLE IN CONDUIT
- EXISTING UNDERGROUND ELECTRIC MH/STRUCTURE
- EXISTING RETAINING WALLS
- EXISTING FENCE
- EXISTING ACCESS ROAD
- EXISTING CATCH BASIN LOCATIONS
- APPROXIMATE AREA OF LOW LYING CAP (20 MIL GEOMEMBRANE OVERLAIN BY 3-INCHES OF BEDDING SAND AND A 3-INCH LIFT OF TRAP ROCK)

0 7.5 15 30 45
GRAPHIC SCALE IN FEET

NO.	ISSUE/DESCRIPTION	BY	DATE

FORMER TIDEWATER FACILITY

PAWTUCKET, RHODE ISLAND

SAMPLING PLAN AND PROPOSED EXCAVATIONS
PAWTUCKET NO.1 SUBSTATION

PREPARED BY:
GZA GeoEnvironmental, Inc.
Engineers and Scientists
530 BROADWAY
PROVIDENCE, RHODE ISLAND 02909
(401) 421-4140

PREPARED FOR: NATIONAL GRID

PROJ MGR: MSK	REVIEWED BY: WF	CHECKED BY: MSK	FIGURE 4
DESIGNED BY: WF	DRAWN BY: CRD	SCALE: 1"=15'	
DATE: MAY 2012	PROJECT NO.: 43654.00	REVISION NO.: 0	SHEET NO. 4 OF 4

EXCAVATION EMISSIONS CALCULATIONS

Excavation Emissions Modeling

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

Site-Specific		
Emitting Surface Area	1.2	(m^2)
TOC of Soil	0.005	(g OC/g soil)
Time to Excavate Volume of Soil	360	(s)
Excavation Rate	1.03E-03	(m^3/s)
Volume of Soil Moved	0.5	(cy)
Volume of Soil Moved	0.4	(m^3)

Site-Specific		
Surface Area of TRENWA Excavation	339	(ft^2)
TRENWA Excavation Depth	3.33	(ft)
Surface Area of Conduits running to TRENWA Excavation	660	(ft^2)
Conduits running to TRENWA Excavation Depth	2	(ft^2)
Surface Area of Handhole Excavation	15	(ft^2)
Handhole Excavation Depth	4	(ft)
Surface Area of Duct Bank Excavation	589.5	(ft^2)
Duct Bank Excavation Depth	3	(ft)
Bottom of Excavation Surface Area (6 min Segment)	0.5	(m^2)
Pile Surface Area (6 min Segment)	0.7	(m^2)

Constants			
Typical Bulk Density	1.5	(g/cm^3)	
R	8.21E-05	(m^3*atm/K/mol)	
R	8.31E-03	(kJ/K/mol)	
R	62,361	(mm Hg*cm^3/mol/K)	
Soil Gas to Atmosphere Exchange Constant (Wet Soils)	0.1	(%/100)	
Air-Filled Porosity (Wet or Compacted Soils)	0.35		
Total Porosity	0.625	Eklund 1997 Default	
Gas-Phase Mass Transfer Coefficient	0.15	cm/s	Eklund 1997 Default
Time since Start of Excavation of Soil of Interest	60	s	Eklund 1997 Default
Time Period Excavated Soil are Emitting Contaminants	0.1	(hr)	Eklund 1997 Default

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 (lb)
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]	0.0669	12.7	1.93E-07	3.03E-03	2.72E-03	8.23E-05	1.90E-07	1,000
o-Xylene	0.0345	6.5	7.98E-08	2.42E-03	6.75E-03	4.24E-05	1.19E-07	
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 GEOENVIRONMENTAL INC.
530 BROADWAY, PROVIDENCE, RHODE ISLAND
GEOTECH/GEOHYDROLOGICAL CONSULTANTS
HYDROLOGICAL BORING LOG

PROJECT	REPORT OF BORING NO.	SUB-1
National Grid	SHEET	1 of 1
Former Tidewater Facility	FILE NO.	43654.00
Pawtucket, Rhode Island	CHKD BY	MSK

BORING CO.	Clean Harbors	BORING LOCATION	See Exploration Location Plan		
FOREMAN	R. Smith	GROUND SURFACE ELEV.		DATUM	
GZA ENGINEER	Sophia Narkiewicz	DATE START	12/5/11	DATE END	12/5/11

GROUNDWATER READINGS

DATE	TIME	WATER	CASING	STABILIZATION TIME

CASING SIZE: OTHER: Hand Augers

DPTH (FT)	CASING BLOWS	SAMPLE NO	SAMPLE PEN/REC	SAMPLE DEPTH (FT)	SAMPLE BLOWS/6"	SAMPLE DESCRIPTION BURMISTER CLASSIFICATION	STRATUM DESCRIPTION	EQUIPMENT INSTALLED	FIELD TESTING	R K
		S-1		0-3"		S-1: Fine to medium SAND, black (10YR, 2/1),		No Equipment Installed	ND	1
		S-2		3"-7.5"		little Silt, trace Gravel			ND	2
		S-3		7.5"-1'		S-2: Very pale brown, (10YR, 7/2), fine to			ND	3
						medium SAND, trace Silt, trace Gravel				4
1						S-3: Very dark brown, (10YR, 3/3), fine to				5
		S-4		1-2.5		medium SAND, little Gravel, trace Silt	FILL		ND	
						S-4: Brown, (10YR, 4/3), fine to medium SAND,				
						little Silt, little Gravel, trace Brick				
2										
		S-5		2.5-3		S-5: Grayish brown, (10YR, 5/2), fine to				
						medium SAND, little Gravel, trace Silt, trace				
						Slag			ND	
3										
						End of Exploration at ± 3 feet				
4										
5										
6										
7										

REMARKS:

1. 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
2. No groundwater encountered
3. All depths are feet below ground surface (bgs) unless otherwise noted.
4. Samples collected for PCBs, PAHs, VOCs, TPH, As, Pb, TOC at 18" (1.5ft) bgs.
5. Composite samples collected for PCBs at 3", 6", 9" and 12" bgs.

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 GEOENVIRONMENTAL INC.
530 BROADWAY, PROVIDENCE, RHODE ISLAND
GEOTECH/GEOHYDROLOGICAL CONSULTANTS
HYDROLOGICAL BORING LOG

PROJECT	REPORT OF BORING NO.	SUB-2
National Grid	SHEET	1 of 1
Former Tidewater Facility	FILE NO.	43654.00
Pawtucket, Rhode Island	CHKD BY	MSK

BORING CO.	Clean Harbors	BORING LOCATION	See Exploration Location Plan		
FOREMAN	R. Smith	GROUND SURFACE ELEV.		DATUM	
GZA ENGINEER	Sophia Narkiewicz	DATE START	12/5/11	DATE END	12/5/11

GROUNDWATER READINGS

DATE	TIME	WATER	CASING	STABILIZATION TIME

CASING SIZE: OTHER: Hand Augers

DPTH (FT)	CASING BLOWS	SAMPLE NO	SAMPLE PEN/REC	SAMPLE DEPTH (FT)	SAMPLE BLOWS/6"	SAMPLE DESCRIPTION BURMISTER CLASSIFICATION	STRATUM DESCRIPTION	EQUIPMENT INSTALLED	FIELD TESTING	R K
		S-1		0-1.25		S-1: Dark brown, (10YR, 3/3), fine to medium		No Equipment Installed	ND	1
						SAND, little Silt, trace Gravel				2
										3
										4
1										5
		S-2		1.25-1.75		S-2: Dark yellowish brown, (10YR, 4/4), fine to			ND	
						medium SAND, little (+) Silt, trace Gravel, trace	FILL			
						Slag				
		S-3		1.75-2		S-3: Gray, (10YR, 6/1), fine to medium SAND,			ND	
2						little Silt, trace Gravel, very slight blue				
		S-4		2-2.75		staining, slight Sulfur-like odor			ND	
						S-4: Yellowish brown, (10YR, 5/6), fine to				
						medium SAND, little (+) Silt, trace Gravel				
3		S-5		2.75-3		S-5: Gray, (10YR, 6/1), fine to medium SAND,			ND	
						some Silt, trace Gravel, Moist				
						End of Exploration at ± 3 feet				
4										
5										
6										
7										

REMARKS:

1. 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
2. No groundwater encountered
3. All depths are feet below ground surface (bgs) unless otherwise noted.
4. Samples collected for PCBs, PAHs, VOCs, TPH, As, Pb, TOC at 18" (1.5ft) bgs.
5. Composite samples collected for PCBs at 3", 6", 9" and 12" bgs.

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 GEOENVIRONMENTAL INC.
530 BROADWAY, PROVIDENCE, RHODE ISLAND
GEOTECH/GEOHYDROLOGICAL CONSULTANTS
HYDROLOGICAL BORING LOG

PROJECT	REPORT OF BORING NO.	SUB-3
National Grid	SHEET	1 of 1
Former Tidewater Facility	FILE NO.	43654.00
Pawtucket, Rhode Island	CHKD BY	MSK

BORING CO.	Clean Harbors	BORING LOCATION	See Exploration Location Plan		
FOREMAN	R. Smith	GROUND SURFACE ELEV.		DATUM	
GZA ENGINEER	Sophia Narkiewicz	DATE START	12/5/11	DATE END	12/5/11

GROUNDWATER READINGS

DATE	TIME	WATER	CASING	STABILIZATION TIME

CASING SIZE: OTHER: Hand Augers

DPTH (FT)	CASING BLOWS	SAMPLE NO	SAMPLE PEN/REC	SAMPLE DEPTH (FT)	SAMPLE BLOWS/6"	SAMPLE DESCRIPTION BURMISTER CLASSIFICATION	STRATUM DESCRIPTION	EQUIPMENT INSTALLED	FIELD TESTING	RK
		S-1		0-1		S-1: Grayish brown, (10YR, 5/2), fine to coarse		No Equipment Installed	ND	1
						SAND, little Gravel, trace Silt				2
							IMPORTED FILL			3
										4
1										5
		S-2		1-2.25		S-2: Very dark brown, (7.5YR, 2.5/1), fine to			ND	
						medium SAND, little Gravel, little Silt				
2										
		S-3		2.5-3.5		S-3: Brown, (10YR, 4/3), fine to medium SAND,			ND	
						trace Gravel, trace Silt				
3							FILL			
		S-4		3.5-3.75		S-4" Very dark brown, (7.5YR, 3.5/1), fine to			ND	
						medium SAND, little Gravel, trace Silt				
4		S-5		3.75-4		S-5: Brown, (10YR, 4/3), fine to medium SND,				
						little Gravel, trace Silt			ND	
						End of Exploration at ± 4 feet				
5										
6										
7										

REMARKS:

1. 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
2. No groundwater encountered
3. All depths are feet below ground surface (bgs) unless otherwise noted.
4. Samples collected for PCBs, PAHs, VOCs, TPH, As, Pb, TOC at 18" (1.5ft) bgs.
5. Geotextile fabric present at approximately 12" bgs.

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 GEOENVIRONMENTAL INC.
530 BROADWAY, PROVIDENCE, RHODE ISLAND
GEOTECH/GEOHYDROLOGICAL CONSULTANTS
HYDROLOGICAL BORING LOG

PROJECT	REPORT OF BORING NO.	SUB-4
National Grid	SHEET	1 of 1
Former Tidewater Facility	FILE NO.	43654.00
Pawtucket, Rhode Island	CHKD BY	MSK

BORING CO.	Clean Harbors	BORING LOCATION	See Exploration Location Plan		
FOREMAN	R. Smith	GROUND SURFACE ELEV.		DATUM	
GZA ENGINEER	Sophia Narkiewicz	DATE START	12/5/11	DATE END	12/5/11

GROUNDWATER READINGS				
DATE	TIME	WATER	CASING	STABILIZATION TIME

CASING SIZE: OTHER: Hand Augers

DPTH (FT)	CASING BLOWS	SAMPLE NO	SAMPLE PEN/REC	SAMPLE DEPTH (FT)	SAMPLE BLOWS/6"	SAMPLE DESCRIPTION BURMISTER CLASSIFICATION	STRATUM DESCRIPTION	EQUIPMENT INSTALLED	FIELD TESTING	RK
		S-1		0-2.5"		S-1: Gray, (10YR, 6/1), GRAVEL, trace Sand,	GRAVEL	No Equipment Installed	ND	1
		S-2		2.5"-3'		trace Silt				2
						S-2: Dark brown, (10YR, 3/3), fine to medium				3
						SAND, little Gravel, little Silt, trace Slag, trace				4
1						Coal				5
									ND	
2							FILL			
3										
		S-3		3-3.5		S-3: Very dark gray, (10YR, 3/1) fine to coarse			ND	
						SAND, little Gravel, trace Silt, trace Slag, trace				
						Coal				
						End of Exploration at ± 3.5 feet				
4										
5										
6										
7										

REMARKS:

1. 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
2. No groundwater encountered
3. All depths are feet below ground surface (bgs) unless otherwise noted.
4. Samples collected for PCBs, PAHs, VOCs, TPH, As, Pb, TOC at 18" (1.5ft) bgs.
5. Composite samples collected for PCBs at 3", 6", 9" and 12" bgs.

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 GEOENVIRONMENTAL INC.
530 BROADWAY, PROVIDENCE, RHODE ISLAND
GEOTECH/GEOHYDROLOGICAL CONSULTANTS
HYDROLOGICAL BORING LOG

PROJECT	REPORT OF BORING NO.	SUB-5
National Grid	SHEET	1 of 1
Former Tidewater Facility	FILE NO.	43654.00
Pawtucket, Rhode Island	CHKD BY	MSK

BORING CO.	Clean Harbors	BORING LOCATION	See Exploration Location Plan		
FOREMAN	R. Smith	GROUND SURFACE ELEV.		DATUM	
GZA ENGINEER	Sophia Narkiewicz	DATE START	12/5/11	DATE END	12/5/11

GROUNDWATER READINGS				
DATE	TIME	WATER	CASING	STABILIZATION TIME

CASING SIZE: OTHER: Hand Augers

DPTH (FT)	CASING BLOWS	SAMPLE NO	SAMPLE PEN/REC	SAMPLE DEPTH (FT)	SAMPLE BLOWS/6"	SAMPLE DESCRIPTION BURMISTER CLASSIFICATION	STRATUM DESCRIPTION	EQUIPMENT INSTALLED	FIELD TESTING	RK
		S-1		0-2"		S-1: Gray, (10YR, 6/1), GRAVEL, trace Sand,	GRAVEL	No Equipment Installed	ND	1
		S-2		2"-0.75'		trace Silt			ND	2
						S-2: Dark brown, (10YR, 3/3), fine to coarse				3
						SAND, little (+) Gravel, trace Silt, trace Coal,				4
1		S-3		0.75"-1'		trace Slag			ND	5
		S-4		1-3.25		S-3: Light gray, (10YR, 7/1), fine to coarse			ND	
						SAND, little Silt, trace Gravel, trace Glass, trace				
						Slag, trace Coal				
						S-4: Dark brown, (10YR, 3/3), fine to coarse				
2						SAND, trace Gravel, trace Silt, trace Slag, trace	FILL			
						Wood Chips				
3										
		S-5		3.25-3.5		S-5: Yellowish red, (5YR, 5/8), fine to coarse			ND	
						SAND, little Silt, trace Gravel, trace Slag, trace				
						Coal, trace Wood Chips				
4						End of Exploration at ± 3.5 feet				
5										
6										
7										

REMARKS:

1. 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
2. No groundwater encountered
3. All depths are feet below ground surface (bgs) unless otherwise noted.
4. Samples collected for PCBs, PAHs, VOCs, TPH, As, Pb, TOC at 18" (1.5ft) bgs.
5. Composite samples collected for PCBs at 3", 6", 9" and 12" bgs.

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 GEOENVIRONMENTAL INC.
530 BROADWAY, PROVIDENCE, RHODE ISLAND
GEOTECH/GEOHYDROLOGICAL CONSULTANTS
HYDROLOGICAL BORING LOG

PROJECT	National Grid
	Former Tidewater Facility
	Pawtucket, Rhode Island
REPORT OF BORING NO.	SUB-6
SHEET	1 of 1
FILE NO.	43654.00
CHKD BY	MSK

BORING CO.	Clean Harbors	BORING LOCATION	See Exploration Location Plan
FOREMAN	R. Smith	GROUND SURFACE ELEV.	DATUM
GZA ENGINEER	Sophia Narkiewicz	DATE START 12/5/11	DATE END 12/5/11

GROUNDWATER READINGS

DATE	TIME	WATER	CASING	STABILIZATION TIME

CASING SIZE: OTHER: Hand Augers

DPTH (FT)	CASING BLOWS	SAMPLE NO	SAMPLE PEN/REC	SAMPLE DEPTH (FT)	SAMPLE BLOWS/6"	SAMPLE DESCRIPTION BURMISTER CLASSIFICATION	STRATUM DESCRIPTION	EQUIPMENT INSTALLED	FIELD TESTING	R K
		S-1		0-2.5		S-1: Brown, (10YR, 4/3) to black (10YR, 2/1), fine		No Equipment Installed	ND	1
						to coarse SAND, little Gravel, trace Silt, trace				2
						Clinker (red-yellow 7.5YR, 5/8)				3
										4
1										5
							FILL			
2										
		S-2		2.5-3		S-2: Yellowish brown, (10YR, 5/6), fine to			ND	
						coarse SAND, trace Gravel, trace Silt, trace				
3						Coal, trace Wood Chips, trace Metal Chips				
		S-3		3-3.5		S-3: Dark Brown, (10YR, 2/2), fine to medium			ND	
						SAND, some Coal, trace Gravel, trace Silt				
						End of Exploration at ± 3.5 feet				
4										
5										
6										
7										

REMARKS:

1. 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
2. No groundwater encountered
3. All depths are feet below ground surface (bgs) unless otherwise noted.
4. Samples collected for PCBs, PAHs, VOCs, TPH, As, Pb, TOC at 18" (1.5ft) bgs.
5. Composite samples collected for PCBs at 3", 6", 9" and 12" bgs.

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 GEOENVIRONMENTAL INC.
530 BROADWAY, PROVIDENCE, RHODE ISLAND
GEOTECH/GEOHYDROLOGICAL CONSULTANTS
HYDROLOGICAL BORING LOG

PROJECT	REPORT OF BORING NO.	SUB-7
National Grid	SHEET	1 of 1
Former Tidewater Facility	FILE NO.	43654.00
Pawtucket, Rhode Island	CHKD BY	MSK

BORING CO.	Clean Harbors	BORING LOCATION	See Exploration Location Plan		
FOREMAN	R. Smith	GROUND SURFACE ELEV.		DATUM	
GZA ENGINEER	Sophia Narkiewicz	DATE START	12/5/11	DATE END	12/5/11

GROUNDWATER READINGS

DATE	TIME	WATER	CASING	STABILIZATION TIME

CASING SIZE: OTHER: Hand Augers

DPTH (FT)	CASING BLOWS	SAMPLE NO	SAMPLE PEN/REC	SAMPLE DEPTH (FT)	SAMPLE BLOWS/6"	SAMPLE DESCRIPTION BURMISTER CLASSIFICATION	STRATUM DESCRIPTION	EQUIPMENT INSTALLED	FIELD TESTING	R K
		S-1		0-3"		S-1: Black, (10YR, 2/1), fine to medium SAND,	Gravel	No Equipment Installed	ND	1
		S-2		3"-2'		trace (+) Silt, little Gravel			ND	2
						S-2: Yellowish brown, (10YR, 3/4), fine to				3
						medium SAND, little rounded Gravel, trace Silt				4
1							FILL			5
										6
2						End of Exploration at ± 2 feet				
3										
4										
5										
6										
7										

REMARKS:

1. 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
2. No groundwater encountered
3. All depths are feet below ground surface (bgs) unless otherwise noted.
4. Samples collected for PCBs, PAHs, VOCs, TPH, As, Pb, TOC at 18" (1.5ft) bgs.
5. Less than 1/2" of Gravel on top.
6. Composite samples collected for PCBs at 3", 6", 9" and 12" bgs.

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 GEOENVIRONMENTAL INC.
530 BROADWAY, PROVIDENCE, RHODE ISLAND
GEOTECH/GEOHYDROLOGICAL CONSULTANTS
HYDROLOGICAL BORING LOG

PROJECT	National Grid
	Former Tidewater Facility
	Pawtucket, Rhode Island
REPORT OF BORING NO.	SUB-8
SHEET	1 of 1
FILE NO.	43654.00
CHKD BY	MSK

BORING CO.	Clean Harbors	BORING LOCATION	See Exploration Location Plan
FOREMAN	R. Smith	GROUND SURFACE ELEV.	DATUM
GZA ENGINEER	Sophia Narkiewicz	DATE START 12/5/11	DATE END 12/5/11

GROUNDWATER READINGS

DATE	TIME	WATER	CASING	STABILIZATION TIME

CASING SIZE: OTHER: Hand Augers

DPTH (FT)	CASING BLOWS	SAMPLE NO	SAMPLE PEN/REC	SAMPLE DEPTH (FT)	SAMPLE BLOWS/6"	SAMPLE DESCRIPTION BURMISTER CLASSIFICATION	STRATUM DESCRIPTION	EQUIPMENT INSTALLED	FIELD TESTING	R K
		S-1		0-3"		S-1: Gray, (10YR, 6/1), GRAVEL, trace Sand,	GRAVEL	No Equipment Installed	ND	1
		S-2		3"-2'		trace Silt			ND	2
						S-2: Black, (10YR, 2/1), fine to coarse SAND,				3
						trace (+) Silt, trace (+) gravel, trace Slag, trace				4
1						Brick	FILL			5
2						End of Exploration at ± 2 feet				
3										
4										
5										
6										
7										

REMARKS:

1. 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
2. No groundwater encountered
3. All depths are feet below ground surface (bgs) unless otherwise noted.
4. Samples collected for PCBs, PAHs, VOCs, TPH, As, Pb, TOC at 18" (1.5ft) bgs.
5. Composite samples collected for PCBs at 3", 6", 9" and 12" bgs.

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 GEOENVIRONMENTAL INC.
530 BROADWAY, PROVIDENCE, RHODE ISLAND
GEOTECH/GEOHYDROLOGICAL CONSULTANTS
HYDROLOGICAL BORING LOG

PROJECT	REPORT OF BORING NO.	SUB-9
National Grid	SHEET	1 of 1
Former Tidewater Facility	FILE NO.	43654.00
Pawtucket, Rhode Island	CHKD BY	MSK

BORING CO.	Clean Harbors	BORING LOCATION	See Exploration Location Plan		
FOREMAN	R. Smith	GROUND SURFACE ELEV.		DATUM	
GZA ENGINEER	Sophia Narkiewicz	DATE START	12/5/11	DATE END	12/5/11

GROUNDWATER READINGS

DATE	TIME	WATER	CASING	STABILIZATION TIME

CASING SIZE: OTHER: Hand Augers

DPTH (FT)	CASING BLOWS	SAMPLE NO	SAMPLE PEN/REC	SAMPLE DEPTH (FT)	SAMPLE BLOWS/6"	SAMPLE DESCRIPTION BURMISTER CLASSIFICATION	STRATUM DESCRIPTION	EQUIPMENT INSTALLED	FIELD TESTING	R K
		S-1		0-2"		S-1: Gray, (10YR, 6/1), GRAVEL, trace Silt, trace	GRAVEL	No Equipment Installed	ND	1
		S-2		2"-2'		Sand			ND	2
						S-2: Dark brown, (10YR, 3/3), fine to coarse				3
						SAND, trace (+) Silt, trace (+) Gravel, trace				4
1						Slag, trace (-) Brick				5
							FILL			
2										
						End of Exploration at ± 2 feet				
3										
4										
5										
6										
7										

REMARKS:

1. 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
2. No groundwater encountered
3. All depths are feet below ground surface (bgs) unless otherwise noted.
4. Samples collected for PCBs, PAHs, VOCs, TPH, As, Pb, TOC at 18" (1.5ft) bgs.
5. Composite samples collected for PCBs at 3", 6", 9" and 12" bgs.

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 GEOENVIRONMENTAL INC.
530 BROADWAY, PROVIDENCE, RHODE ISLAND
GEOTECH/GEOHYDROLOGICAL CONSULTANTS
HYDROLOGICAL BORING LOG

PROJECT	REPORT OF BORING NO.	SUB-10
National Grid	SHEET	1 of 1
Former Tidewater Facility	FILE NO.	43654.00
Pawtucket, Rhode Island	CHKD BY	MSK

BORING CO.	Clean Harbors	BORING LOCATION	See Exploration Location Plan		
FOREMAN	KH/SH	GROUND SURFACE ELEV.		DATUM	
GZA ENGINEER	Sophia Narkiewicz	DATE START	5/24/12	DATE END	5/24/12

SAMPLER: UNLESS OTHERWISE NOTED, SAMPLER CONSISTS OF A 2" SPLIT SPOON DRIVEN USING A 140 lb. HAMMER FALLING 30 IN

CASING: UNLESS OTHERWISE NOTED, CASING DRIVEN USING A 300 LB HAMMER FALLING 24 IN.

CASING SIZE: OTHER: 3 3/4" HSA

GROUNDWATER READINGS

DATE	TIME	WATER	CASING	STABILIZATION TIME

DPTH (FT)	CASING BLOWS	SAMPLE NO	SAMPLE PEN/REC	SAMPLE DEPTH (FT)	SAMPLE BLOWS/6"	SAMPLE DESCRIPTION BURMISTER CLASSIFICATION	STRATUM DESCRIPTION	EQUIPMENT INSTALLED	FIELD TESTING	RK
		S-1		0-9"		S-1: Dark gray (10YR, 4/1), fine to coarse SAND, some Gravel, trace fine, Dry	Imported Fill	No Equipment Installed	ND	1
		S-2		9"-1.75'		S-2: Dark brown (10YR, 2/1), fine to coarse SAND, some Gravel, trace Silt, trace Ash, Dry			ND	4
1		S-3		1.75-3		S-3: Dark brown (10YR, 2/1), fine to coarse SAND, little Gravel, trace (+) Slag, trace Silt, trace Ash, Dry	Fill		ND	
2										
3						End of Exploration at ± 3 feet				
4										
5										
6										
7										

REMARKS:

1. 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
2. Collected sample for TPH and Naphthalene at 1.5' bgs.
3. No groundwater encountered.
4. All depths are feet below ground surface (bgs) unless otherwise noted.
5. Geotextile fabric present at 0.75' bgs.

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 GEOENVIRONMENTAL INC.
530 BROADWAY, PROVIDENCE, RHODE ISLAND
GEOTECH/GEOHYDROLOGICAL CONSULTANTS
HYDROLOGICAL BORING LOG

PROJECT	REPORT OF BORING NO.	SUB-11
National Grid	SHEET	1 of 1
Former Tidewater Facility	FILE NO.	43654.00
Pawtucket, Rhode Island	CHKD BY	MSK

BORING CO.	Clean Harbors	BORING LOCATION	See Exploration Location Plan		
FOREMAN	KH/SH	GROUND SURFACE ELEV.		DATUM	
GZA ENGINEER	Sophia Narkiewicz	DATE START	5/24/12	DATE END	5/24/12

SAMPLER: UNLESS OTHERWISE NOTED, SAMPLER CONSISTS OF A 2" SPLIT SPOON DRIVEN USING A 140 lb. HAMMER FALLING 30 IN

CASING: UNLESS OTHERWISE NOTED, CASING DRIVEN USING A 300 LB HAMMER FALLING 24 IN.

CASING SIZE: OTHER: 3 3/4" HSA

GROUNDWATER READINGS

DATE	TIME	WATER	CASING	STABILIZATION TIME

DPTH (FT)	CASING BLOWS	SAMPLE NO	SAMPLE PEN/REC	SAMPLE DEPTH (FT)	SAMPLE BLOWS/6"	SAMPLE DESCRIPTION BURMISTER CLASSIFICATION	STRATUM DESCRIPTION	EQUIPMENT INSTALLED	FIELD TESTING	RK
		S-1		0-9"		S-1: Dark gray (10YR, 4/1), fine to coarse SAND, some Gravel, trace Silt, Dry	Imported Fill	No Equipment Installed	ND	1
		S-2		9"-1.25'		S-2: Dark brown (10YR, 3/3), fine to coarse SAND, some Gravel, trace (+) Slag, trace Ash, trace Silt, Dry			ND	4
1		S-3		1.25-2.25		S-3: Black (10YR, 2/1), fine to coarse SAND, little Gravel, trace (+) Slag, trace Ash, trace Silt, Dry	Fill		ND	
2		S-4		2.25-2.75		S-4: Dark greenish gray (5G/3), fine to coarse SAND, some Ash, some (-) Gravel, trace Slag, trace Silt, slight purifier waste-like odor, little blue staining, Dry			ND	
3		S-5		2.75-3		S-5: Dark grayish brown (10YR, 4/2), fine to coarse SAND, little Gravel, trace Silt, Dry			ND	
4						End of Exploration at ± 3 feet				
5										
6										
7										

REMARKS:

1. 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
2. Collected sample for TPH and Naphthalene at 1.5' bgs.
3. No groundwater encountered.
4. All depths are feet below ground surface (bgs) unless otherwise noted.
5. Geotextile fabric present at 0.75' bgs.

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 GEOENVIRONMENTAL INC.
530 BROADWAY, PROVIDENCE, RHODE ISLAND
GEOTECH/GEOHYDROLOGICAL CONSULTANTS
HYDROLOGICAL BORING LOG

PROJECT	National Grid / Former Tidewater Facility / Pawtucket, Rhode Island
REPORT OF BORING NO.	SUB-12
SHEET	1 of 1
FILE NO.	43654.00
CHKD BY	MSK

BORING CO.	Clean Harbors	BORING LOCATION	See Exploration Location Plan
FOREMAN	KH/SH	GROUND SURFACE ELEV.	DATUM
GZA ENGINEER	Sophia Narkiewicz	DATE START 5/24/12	DATE END 5/24/12

SAMPLER: UNLESS OTHERWISE NOTED, SAMPLER CONSISTS OF A 2" SPLIT SPOON DRIVEN USING A 140 lb. HAMMER FALLING 30 IN

CASING: UNLESS OTHERWISE NOTED, CASING DRIVEN USING A 300 LB HAMMER FALLING 24 IN.

CASING SIZE: OTHER: 3 3/4" HSA

GROUNDWATER READINGS

DATE	TIME	WATER	CASING	STABILIZATION TIME

DPTH (FT)	CASING BLOWS	SAMPLE NO	PEN/REC	DEPTH (FT)	BLOWS/6"	SAMPLE DESCRIPTION BURMISTER CLASSIFICATION	STRATUM DESCRIPTION	EQUIPMENT INSTALLED	FIELD TESTING	R K
		S-1		0-3"		S-1: Gray (10YR, 4/1), GRAVEL	GRAVEL	No Equipment Installed	ND	1
		S-2		3"-2'		S-2: Brown (10YR, 3.3), fine to coarse SAND,			ND	2
						little Gravel, trace Silt, trace Brick, trace Slag,				3
						trace glass, trace (-) Ash, Dry				4
1										
							Fill			
2		S-3		2-3		S-3: Dark gray (10YR, 4/2), fine to coarse			ND	
						SAND, little Gravel, little Slag, trace Silt, trace				
						Wood Chips, slight purifier waste-like odor, slight				
						blue staining, Dry				
3										
						End of Exploration at ± 3 feet				
4										
5										
6										
7										

REMARKS:

1. 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
2. Collected sample for TPH and Naphthalene at 1.5' 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 GEOENVIRONMENTAL INC.
530 BROADWAY, PROVIDENCE, RHODE ISLAND
GEOTECH/GEOHYDROLOGICAL CONSULTANTS
HYDROLOGICAL BORING LOG

PROJECT	REPORT OF BORING NO.	SUB-13
National Grid	SHEET	1 of 1
Former Tidewater Facility	FILE NO.	43654.00
Pawtucket, Rhode Island	CHKD BY	MSK

BORING CO.	Clean Harbors	BORING LOCATION	See Exploration Location Plan		
FOREMAN	KH/SH	GROUND SURFACE ELEV.		DATUM	
GZA ENGINEER	Sophia Narkiewicz	DATE START	5/24/12	DATE END	5/24/12

SAMPLER: UNLESS OTHERWISE NOTED, SAMPLER CONSISTS OF A 2" SPLIT SPOON DRIVEN USING A 140 lb. HAMMER FALLING 30 IN

CASING: UNLESS OTHERWISE NOTED, CASING DRIVEN USING A 300 LB HAMMER FALLING 24 IN.

CASING SIZE: OTHER: 3 3/4" HSA

GROUNDWATER READINGS

DATE	TIME	WATER	CASING	STABILIZATION TIME

DPTH (FT)	CASING BLOWS	SAMPLE NO	SAMPLE PEN/REC	SAMPLE DEPTH (FT)	SAMPLE BLOWS/6"	SAMPLE DESCRIPTION BURMISTER CLASSIFICATION	STRATUM DESCRIPTION	EQUIPMENT INSTALLED	FIELD TESTING	RK
		S-1		0-2"		S-1: Gray (10YR, 4/1), GRAVEL	GRAVEL	No Equipment Installed	ND	1
		S-2		2"-2'		S-2: Dark brown (10YR, 2/2) fine to medium			ND	2
						SAND, some Gravel, trace Silt, trace Brick,				3
						trace Slag, trace (-) Ash, Dry	Fill			4
1										
2						End of Exploration at ± 2 feet				
3										
4										
5										
6										
7										

REMARKS:

1. 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
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 GEOENVIRONMENTAL INC.
530 BROADWAY, PROVIDENCE, RHODE ISLAND
GEOTECH/GEOHYDROLOGICAL CONSULTANTS
HYDROLOGICAL BORING LOG

PROJECT	National Grid Former Tidewater Facility Pawtucket, Rhode Island
REPORT OF BORING NO.	SUB-14
SHEET	1 of 1
FILE NO.	43654.00
CHKD BY	MSK

BORING CO.	Clean Harbors	BORING LOCATION	See Exploration Location Plan
FOREMAN	KH/SH	GROUND SURFACE ELEV.	DATUM
GZA ENGINEER	Sophia Narkiewicz	DATE START 5/24/12	DATE END 5/24/12

SAMPLER: UNLESS OTHERWISE NOTED, SAMPLER CONSISTS OF A 2" SPLIT SPOON DRIVEN USING A 140 lb. HAMMER FALLING 30 IN

CASING: UNLESS OTHERWISE NOTED, CASING DRIVEN USING A 300 LB HAMMER FALLING 24 IN.

CASING SIZE: OTHER: 3 3/4" HSA

GROUNDWATER READINGS

DATE	TIME	WATER	CASING	STABILIZATION TIME

DPTH (FT)	CASING BLOWS	SAMPLE NO	SAMPLE PEN/REC	SAMPLE DEPTH (FT)	SAMPLE BLOWS/6"	SAMPLE DESCRIPTION BURMISTER CLASSIFICATION	STRATUM DESCRIPTION	EQUIPMENT INSTALLED	FIELD TESTING	R K
		S-1		0-2"		S-1: Gray (10YR, 4/1), GRAVEL	GRAVEL	No Equipment Installed	ND	1
		S-2		2"-0.75'		S-2: Dark brown (10YR, 3/2), fine to medium			ND	2
						SAND, little Ash, little (-) Gravel, trace Silt,				3
		S-3		0.75-1.25		Dry			ND	4
1						S-3: Gray (10YR, 5/1), fine to medium SAND,				
		S-4		1.25-2		little Ash, some Gravel, trace Slag, trace Silt,			ND	
						Dry				
						S-4: Dark brown (10YR, 3/2), fine to medium	Fill			
						SAND, trace Ash, trace Slag, trace Gravel,				
2		S-5		2-3		trace Glass, trace Silt, Dry			ND	
						S-5: Yellow brown (10YR, 5/6) fine to medium				
						SAND, little Gravel, 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 of Exploration at ± 3.5 feet				
4										
5										
6										
7										

REMARKS:

1. 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
2. Collected sample for TPH and Naphthalene at 20" (1.67') 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 GEOENVIRONMENTAL INC.
530 BROADWAY, PROVIDENCE, RHODE ISLAND
GEOTECH/GEOHYDROLOGICAL CONSULTANTS
HYDROLOGICAL BORING LOG

PROJECT	National Grid / Former Tidewater Facility / Pawtucket, Rhode Island
REPORT OF BORING NO.	SUB-15
SHEET	1 of 1
FILE NO.	43654.00
CHKD BY	MSK

BORING CO.	Clean Harbors	BORING LOCATION	See Exploration Location Plan
FOREMAN	KH/SH	GROUND SURFACE ELEV.	DATUM
GZA ENGINEER	Sophia Narkiewicz	DATE START 5/24/12	DATE END 5/24/12

SAMPLER: UNLESS OTHERWISE NOTED, SAMPLER CONSISTS OF A 2" SPLIT SPOON DRIVEN USING A 140 lb. HAMMER FALLING 30 IN

CASING: UNLESS OTHERWISE NOTED, CASING DRIVEN USING A 300 LB HAMMER FALLING 24 IN.

CASING SIZE: OTHER: 3 3/4" HSA

GROUNDWATER READINGS

DATE	TIME	WATER	CASING	STABILIZATION TIME

DPTH (FT)	CASING BLOWS	SAMPLE NO	SAMPLE PEN/REC	SAMPLE DEPTH (FT)	SAMPLE BLOWS/6"	SAMPLE DESCRIPTION BURMISTER CLASSIFICATION	STRATUM DESCRIPTION	EQUIPMENT INSTALLED	FIELD TESTING	RK
		S-1		0-2"		S-1: Gray (10YR, 4/1), GRAVEL	GRAVEL	No Equipment Installed	ND	1
		S-2		2"-0.5'		S-2: Black (10YR, 2/1), fine to medium SAND,			ND	2
						some Gravel, trace (+) 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 Ash, trace brick, trace Gravel,				
		S-4		1-3		trace Silt, Dry			ND	
						S-4: Dark brown (10YR, 3/3), fine to medium				
						SAND, little Gravel, trace (+) Slag, trace Brick,	Fill			
						trace Ash, trace Silt, Dry				
2										
3		S-5		3-3.5		S-5: Strong brown (10YR, 4/6), fine to medium			ND	
						SAND, little Gravel, trace (+) Slag, trace Brick,				
						trace Silt, trace Ash, Dry				
						End of Exploration at ± 3.5 feet				
4										
5										
6										
7										

REMARKS:

1. 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
2. Collected sample for TPH and Naphthalene at 20" (1.67') 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.