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SHORT TERM RESPONSE ACTION PLAN (STRAP) PROPOSED LIQUEFACTION PROJECT

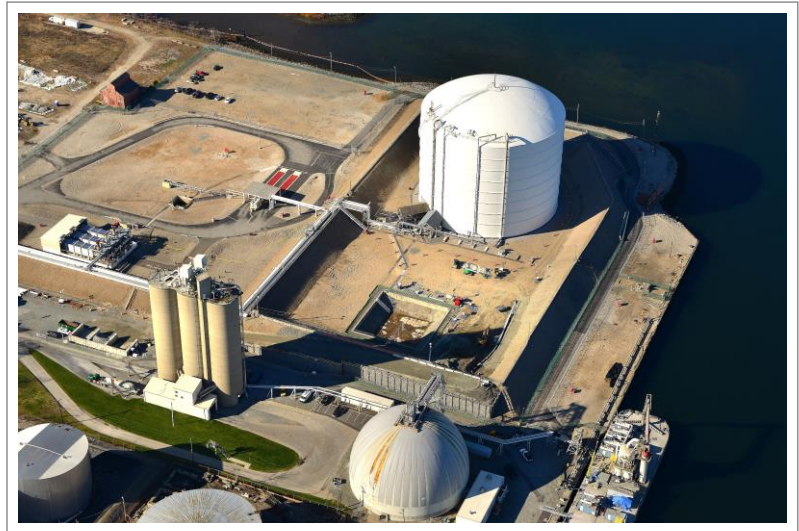
**121 Terminal Road / 642 Allens Avenue
Providence, Rhode Island**

May 12, 2017

GZA File No.: 03.0033554.60

RIDEM File No.: SR-28-1152

FERC Docket No.: CP16-121-000



PREPARED FOR:

Rhode Island Department of Environmental
Management (RIDEM)
Providence, Rhode Island

GZA GeoEnvironmental, Inc.

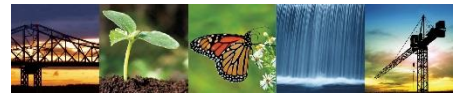
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May 12, 2017
File No. 03.00033554.60

Via E-Mail and U.S. Mail

Mr. Joseph Martella
Rhode Island Department of Environmental Management (RIDEM)
Office of Waste Management
235 Promenade Street
Providence, Rhode Island 02908

Re: Short Term Response Action Plan (STRAP)
Proposed Liquefaction Project
121 Terminal Road / 642 Allens Avenue
Providence, Rhode Island
RIDEM Case No. 98-004 / Site Remediation File No. SR-28-1152
FERC Docket No. CP16-121-000

Dear Mr. Martella:

On behalf of National Grid LNG, LLC (NGLNG), GZA GeoEnvironmental, Inc. (GZA) is pleased to present to the Rhode Island Department of Environmental Management (RIDEM) the attached *Short Term Response Action Plan* (STRAP).

This STRAP describes proposed soil and groundwater management activities associated with the construction of a proposed liquefaction plant to be constructed at the 121 Terminal Road / 642 Allens Avenue Site. In addition, this STRAP describes engineered caps to be re-installed in the area of the liquefaction plant.

Should you have any questions or comments regarding the information presented herein, please do not hesitate to contact the undersigned or Amy Willoughby at (781) 907-3644 or William Howard at (401) 784-7490.

Very truly yours,
GZA GEOENVIRONMENTAL, INC.

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MSK/tlb

Attachment: *STRAP Proposed Liquefaction Project*
cc: Amy Willoughby, National Grid
Bill Howard, National Grid



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1.0 INTRODUCTION

On behalf of National Grid LNG, LLC (NGLNG), GZA GeoEnvironmental, Inc. (GZA) is pleased to present to the Rhode Island Department of Environmental Management (RIDEM) this *Short Term Response Action Plan (STRAP)* for the former 121 Terminal Road / 642 Allens Avenue Manufactured Gas Plant (MGP) located in Providence, Rhode Island (herein referred to as the “Site”).¹ A Locus Map is presented on Figure 1, *Cover Sheet with Site Locus*. This *STRAP* describes soil and groundwater management activities associated with the construction of a proposed liquefaction plant to be built within the existing Liquefied Natural Gas (LNG) facility at the 121 Terminal Road / 642 Allens Avenue Site. In addition, this *STRAP* describes engineered caps to be installed in the area of the proposed liquefaction plant.

The limits of work are presented on Figure 2, *Overall Aerial Photograph* as the “Project Work Site” and the limits of soil and groundwater disturbance are presented as the “STRAP Area”. Only non-intrusive work (for example, above ground piping and conduit) is planned for the portion of the Project Work Site that is outside the STRAP Area. Figure 2 also depicts the location of existing buildings, roads, landscaped areas and approximate property boundaries based on tax map information at the Site.

This *STRAP* has been prepared to address applicable requirements of Section 6.00 – Emergency or Short Term Response, of the RIDEM Rules and Regulations for the Investigation and Remediation of Hazardous Materials Releases (Remediation Regulations).

Construction of the proposed liquefaction facility (referred to herein as the “Project”) is being permitted under the Federal Energy Regulatory Commission (FERC). Information pertaining to the Project (including all permitting and design documents), can be found on the FERC website known as eLibrary (<https://www.ferc.gov/docs-filing/elibrary.asp>). All information pertaining to the Project is located in Docket Numbers PF15-28-000 and CP16-121-000.

This *STRAP* is subject to the Limitations included in Appendix A.

The following figures were prepared to accompany this *STRAP* and to illustrate the scope of the Project:

- Figure 1 - *Cover Sheet with Site Locus*
- Figure 2 - *Overall Aerial Photograph*
- Figure 3 - *Exploration Location Plan*
- Figure 4 - *Completed Remedial Activities*
- Figure 5 - *Erosion and Sedimentation Control Plan*
- Figure 6 - *Proposed Final Conditions Plan*
- Figure 7 - *Capping Cross Sections*

¹ NGLNG does not waive any of its arguments concerning preemption or the inapplicability of the Remediation Regulations to its Project.



1.1 PROJECT OBJECTIVES

This STRAP has been prepared to establish soil and groundwater management procedures associated with ground disturbance activities during construction of the Project. In addition, this STRAP presents proposed engineered caps to be installed/reinstalled in the area of the Project. These activities will be performed within the STRAP Area shown on the attached Figures. Results of previous testing of soil and groundwater within the STRAP Area indicate impacts in excess of certain RIDEM Method 1 Criteria as defined in the Remediation Regulations. As described herein, activities proposed within the STRAP Area include limited clearing and grubbing, installing erosion and sedimentation controls, testing of and import of clean fill materials, grading and off-Site disposal/recycling of excess materials, management of excess soil and groundwater during earthwork activities for pile installations and utility installations (water, drainage, natural gas and both overhead and underground electric), installation of engineered caps and restoration activities (fencing and gate installation). All areas of soil and groundwater disturbance will be capped as described herein to mitigate direct exposure to underlying impacted soils consistent with RIDEM requirements. The installation of engineered caps includes stormwater management via a forebay and lined sand filter with discharge of stormwater to the Providence River. As described herein, no stormwater infiltration is proposed under this STRAP.

2.0 SITE BACKGROUND

The following sections present a summary of relevant background information for the Site, including relevant historical operations, regulatory history and the status of the RIDEM-listed Site.

2.1 SITE DESCRIPTION AND HISTORY

The Site is located at 642 Allens Avenue in the southeastern portion of the City of Providence, Rhode Island and is identified as Assessor’s Plat (A.P.) 56, Lots 5, 273, 316 and 317, and A.P. 101, Lot 1. The entirety of the Site is currently owned by the Narragansett Electric Company (TNEC) d/b/a National Grid (National Grid). NGLNG holds a lease on A.P. 56 Lot 316 and Holcim US, Inc. (Holcim) holds a lease on A.P. 56 Lot 273. The Site consists of approximately 42 acres with frontage on Allens Avenue to the west and bounded to the east by the Providence River. It is adjoined to the northwest by Motiva/Texaco, and to the south by Terminal Road, the former Sun Oil/Providence Port facility, and New England Bituminous Terminal Corporation. Currently, active natural gas regulation and distribution, gas construction storage, a compressed natural gas (CNG) fueling station, LNG storage and distribution, and cement storage and distribution activities are conducted at the 642 Allens Avenue property. The table below presents a summary of current Site use:

A.P.	Lot	Current Owner	Address	Current Use(s)
101	1	TNEC	642 Allens Avenue 670 Allens Avenue	Natural Gas Construction Storage Natural Gas Regulation and Distribution CNG Fueling Station
56	5	TNEC	642 Allens Avenue	Natural Gas Construction Storage Natural Gas Regulation and Distribution
56	273	TNEC	139 Terminal Road	Cement Storage and Distribution
56	316	TNEC	121 Terminal Road	LNG Facility
56	317	TNEC	121 Terminal Road	Access Road

The Site is generally level with gentle slopes towards the Providence River. Based on several rounds of investigations performed at the Site, subsurface conditions generally consists of urban fill underlain by organic silt, glacial outwash and glacial till. The depth to bedrock is generally more than 150 feet below ground surface (bgs). Groundwater is generally



encountered within the fill unit, is classified as GB or not suitable for drinking water use without treatment, and flows towards the tidally influenced Providence River.

A United States Army rifle range operated at the Site in the late 1800s, prior to the use of the Site as a MGP. From 1910 until 1954, a MGP operated at the Site producing coal gas, carbureted water gas, and high-BTU oil gas. MGP by-products were routinely managed through recovery, storage, recycling, reprocessing, and resale. Such by-products included coke, coal tar, ammonia, toluene, and benzene. B.P. Clapp operated an ammonia works at the 642 Allens Avenue property beginning in 1910, and managed the recycling and sale of ammonia by products. The United States Government operated a toluene facility at the Site for a short period of time during 1918. By 1954, coal gasification operations at the Site had ceased. From 1952 until the 1960s, a liquefied petroleum gas distribution plant operated on the Site. Gulf Oil had a facility at the Site to store kerosene from 1957 to 1971. The southeastern portion of the Site has been utilized for cement storage and distribution since 1961. Propane storage and distribution occurred at the Site from the 1960s to the 1980s for peak shaving purposes. The LNG storage and distribution facility has operated on the eastern and southeastern portions of the Site since the early 1970s.

2.2 RIDEM REGULATORY HISTORY

RIDEM issued a Letter of Responsibility (LOR) dated February 13th, 1998 to Providence Gas Company. The Site was listed as State Site #98-004 (RIDEM File No. SR-28-1152) following the issuance of the LOR.

The Site is listed with RIDEM due to certain soil and groundwater impacts at concentrations in excess of Method 1 standards as defined in the Remediation Regulations. Investigation activities have been conducted at the Site in several phases since 1994 and have been documented in several reports submitted to RIDEM. Constituents detected include, total petroleum hydrocarbons (TPH), cyanide, polynuclear aromatic hydrocarbons (PAHs), volatile organic compounds (VOCs), and certain inorganic compounds (primarily arsenic and lead). Sporadic observations of light non-aqueous phase liquids (LNAPL) have been made in certain Site monitoring wells. Additional information relative to investigation activities within the STRAP Area are presented in Section 4.0

Several remedial activities have been completed at the Site between 1995 and 2017 under the jurisdiction of RIDEM, including remedial activities in the STRAP Area. Additional information relative to remedial activities conducted in the STRAP Area is presented in Section 3.4. On September 6, 2016, RIDEM informed National Grid that the Department received a formal request for development of a Public Involvement Plan (PIP). GZA, on behalf of National Grid, submitted the PIP to RIDEM on October 28, 2016; a revised version of the PIP was submitted on May 4, 2017. Consistent with Rule 7.07E of the Remediation Regulations, the PIP was prepared to address relevant and applicable requirements of Rules 6.06 and 7.07 A, B, C and D of the Remediation Regulations. Per Rule 7.07 (Public Involvement), the PIP addresses the following primary elements: 1) Public Notice, 2) Fact Sheets and Enhanced Communication, 3) Community Meetings, and 4) Information Repositories. Further information relative to compliance with the PIP is presented in Section 7.0.

3.0 **PROJECT INFORMATION**

As described previously and as presented on Figure 2, *Overall Aerial Photograph*, the Project Work Site consists of approximately 9.21 acres on the eastern portion of the Site and is located on A.P. 56 Lots 5 and 316. Approximately half of the Project Work Site is utilized as an existing LNG storage and distribution facility and the other half of the Project Work Site is currently vacant. The STRAP Area (limits of soil and groundwater disturbance associated with the Project) is approximately 4.9 acres. Only non-intrusive work is planned for the portion of the Project Work Site that is outside the STRAP Area.



3.1 PROJECT DESCRIPTION

The proposed liquefaction Project schematic is illustrated on Figure 6, *Proposed Final Conditions Plan*.

Activities under this STRAP will include limited clearing and grubbing, installing erosion and sedimentation controls, testing of and import of clean fill materials, grading and off-Site disposal/recycling of excess materials, management of excess soil and groundwater during earthwork activities for pile installations and utility installations (water, drainage, natural gas and both overhead and underground electric), installation of engineered caps and restoration activities (fencing and gate installation). All areas of soil and groundwater disturbance will be capped as described herein to mitigate direct exposure to underlying impacted soils consistent with RIDEM requirements. The Project will result in the creation of additional impervious area in the STRAP Area. The stormwater runoff generated from the new impervious areas will be managed via a forebay and lined sand filter system designed in accordance with the *Rhode Island Stormwater Design and Installation Standards Manual (RISDISM)*. No infiltration into Site soils are proposed under this STRAP. A final outfall is proposed for discharge to the Providence River.

Note the majority of the Project Work Site will be raised approximately 9 to 11 feet above existing grade. Raising the area will help to protect the liquefaction facility from damage during storm events. All imported fill will be tested in accordance with the sampling requirements discussed in Section 6.4, below.

It is currently estimated that approximately 3,000 cubic yards (CY) of excess soil materials will be removed to facilitate installation of piles and utilities. The contractor may reuse Site soil materials, but will only do so under an engineered cap (described below in Section 6.1). All excess soil materials will be disposed/recycled off-Site at a NGLNG-approved facility.

The construction of the liquefaction facility will require the use of a temporary laydown area and construction access road. No earthwork activities are proposed in this temporary laydown area or construction access road. This area will not be capped as part of this work as the laydown area will be utilized for storage and parking only. The laydown area is located to the west of the Project Work Site. Crushed stone will be utilized to stabilize surfaces for storage and parking.

3.2 FORMER MGP STRUCTURES

The former propane house and other MGP foundation remnants (refer to Figure 3, *Exploration Location Plan*) are located within the Project Work Site. The proposed design assumes that the propane house will be demolished and remnant foundations will remain in place and will not be removed during construction.

3.3 SURFACE WATER

The Site is situated on the Providence River and a portion of the Project Work Site is located within the 100-year floodplain of the river. The Providence River is tidally influenced and discharges to the Atlantic Ocean via Narragansett Bay. The Providence River has been designated by the CRMC as Type 6 waters, Industrial Waterfronts and Commercial Navigation Channels. It is classified as SB1{a} waters by RIDEM. The SB1 portion of the classification is assigned to saline waters designated for primary and secondary contact recreational activities and wildlife habitat; suitable for aquacultural uses, navigation, and industrial cooling; and good aesthetic value. The designation assumes that primary contact recreational activities may be impacted due to pathogens from approved wastewater discharges, and the "{a}" indicates that it is a "partial use designation due to impacts from combined sewer overflows (CSOs)."

The Providence River is currently listed by the RIDEM Office of Water Resources on the *State of Rhode Island 2014 303(d) List of Impaired Waters*, dated May 2014. The 2014 303(d) list identifies water bodies within the state, which may not



currently meet Rhode Island Water Quality Standards and for which a Total Maximum Daily Load (TMDL) may be needed. TMDLs are water quality restoration plans that identify water quality goals, necessary pollutant reductions, sources, and implementation plans to achieve the required reductions. RIDEM identifies the segment of the Providence River adjacent to the Site as Water Body ID RI0007020E-01B and lists the impairments as low dissolved oxygen, nutrients, and pathogens.

3.4 PREVIOUSLY CONDUCTED REMEDIAL ACTIONS IN THE STRAP AREA

Remedial actions were performed in the STRAP Area between July and August 2002. Remedial actions consisted of excavation to expose structures for cleaning, soil excavation for disposal, backfill, and restoration activities (including the installation of engineered caps). These activities were summarized in the November 2002 *Remedial Action Closure Report* prepared by Vanasse Hangen Brustlin, Inc. (VHB) on behalf of the New England Gas Company (NEGC), which has been previously submitted to RIDEM. For additional details, refer to the November 2002 *Remedial Action Closure Report*. The locations of these structures are presented on Figure 3, *Exploration Location Plan* and a summary of remedial activities completed in the STRAP Area is presented on Figure 4, *Completed Remedial Activities*. Note that this summary focuses on remedial activities that were previously completed in the STRAP Area.

4.0 STRAP AREA INVESTIGATIONS

Soil and groundwater in the STRAP Area were impacted with petroleum hydrocarbons and/or other MGP-related constituents. Some of these impacts represent RIDEM Method 1 exceedances as defined in the Remediation Regulations. Based on visual and olfactory observations, field screening and analytical results, soil impacts appear to be primarily limited to the fill layer which is located above the contiguous organic silt layer. The majority of these exceedances are currently located below the existing remedial engineered caps installed in the STRAP Area discussed above in Section 3.4.²

The following provides a brief summary of the nature of the observed soil and groundwater impacts; additional details are provided further below:

- Soil Impacts:
 - Arsenic, lead, TPH, and several PAHs have been detected in soil at concentrations above the RIDEM Industrial/Commercial Exposure Criteria (I/C-DEC);
 - TPH, benzene, toluene, and ethylbenzene concentrations have been detected in soil above the RIDEM GB Leachability Criteria; and
 - TPH has been detected in soil at concentrations above the RIDEM Upper Concentration Limits (UCLs).
- Groundwater Impacts:
 - Dissolved phase benzene, ethylbenzene, naphthalene and toluene concentrations have been detected in groundwater above the RIDEM GB Groundwater Objectives;

² Approximately 60% of the STRAP Area was previously capped. Impacted soils (primarily urban fill-like impacts) do remain at the surface in areas that are currently uncapped. All areas that are included in the limits of proposed earthwork during construction of the liquefaction facility will be capped as part of this work.



- LNAPL is present on the water table; and
- While dissolved phase groundwater impacts were observed in wells screened in both the organic silt layer and the fill layer, LNAPLs have only been observed in wells screened in the fill layer.

One hundred and fifty-one (151) explorations were performed within the STRAP Area, to depths ranging from 6 to 174 feet below ground surface (bgs). These explorations are shown on Figure 3, *Exploration Location Plan*. Additional details are as follows:

- Forty-seven (47) explorations were performed for geotechnical purposes (PGC-1, PGC-6, PGC-10, B-20, B-21, B-22, B-24, B-25, B-27, B-40, B-41, B-50A, B-62, B-63, B-70A, B-71, B-72, B-73A, B-75, SWBL-1, SWBL-2, SWBL-3, SWBL-4, GZ-7A, GZ-7B, GZ-7C, GZ-7D, GZ-7E, GZ-8, GZ-203, GZ-204, GZ-204A, GZ-205, GZ-213, GZ-214, GZ-215, GZ-216, GZ-217, SB-01, SB-02, SB-04, SB-06, B-201, B-202, B-203, B-204 and B-205).
- Ten (10) test pits were completed for environmental characterization purposes (ETP-13, ETP-19, ETP-20, ETP-21, ETP-31, ETP-35, ETP-38, B07, B09 and TP-301).
- Twenty (20) test pits were performed for waste characterization purposes (TP-1, TP-2, TP-4, TP-6, TP-8, TP-9, TP-19, TP-25, TP-26, TP-27, TP-28, TP-29, TP-30, TP-31, TP-32, TP-33, TP-34, TP-35, TP-36 and TP-37).
- Five (5) recovery wells were installed (CHES RW-2, CHES RW-3, CHES RW-4, CHES RW-5 and RW-1).
- Sixty-two (62) explorations were performed for environmental characterization purposes (RCA-4, RCA-5, RCA-14, RCA-20, RCA-21, RCA-23, RCA-39, RCA-40, RCA-R6, RCA-R7, RCA-R10, RCA-R18, RCA-R19, A67, B02, B03, B04, B05, B06, B07, B08, B09, B10, B11, B12, B13, B14, B17, B18, B19, B20, B21, B22, B23, B24, B25, B27, B28, B35, B36, B42, B43, B44, B45, B46, B55, B56, B64, B65, B66, D32, D38, D57, D58, D59, D62, VHB-17, VHB-23, GZ-314S/D and GZ-315D).
- An intact former gasholder foundation is located in the western portion of the STRAP Area. The following seven (7) borings are located within this former gasholder foundation: RHB-1, RHB-2, RHB-3, RHB-4, RHB-5, RHB-6 and RCA-B11.

Available logs from both the geotechnical and environmental borings are attached as Appendix B. No analytical samples were collected from the geotechnical borings and information regarding visual and olfactory indicators of residuals is limited. The geotechnical borings ranged in depth from 31.5 to 174 feet bgs, while the environmental borings ranged in depth from 6 to 52 feet bgs. Sampling depths that are noted in the following discussion are from the original grades within the STRAP Area. As discussed above, portions of the STRAP Area have been remediated and capped and relative sampling depths are unknown.

The discussion of environmental impacts presented in the following sections pertains to material remaining within the STRAP Area following completion of the 2002 remedial activities. For additional details regarding the remedial activities, refer to the November 2002 *Remedial Action Closure Report*.

4.1 GEOLOGY

A review of boring and test pit logs in the STRAP Area indicates the presence of approximately 15 to 20 feet of fill underlain by organic silts (variable thickness of at least 12 to up to 83 feet), outwash deposits (also known herein as bearing sand; at least 60 feet in thickness) and glacial till (unknown thickness to bedrock). In general, the fill consists of sands and gravels with cinders, cinder ash, coke and coal fragments.



4.2 FIELD SCREENING AND OBSERVATIONS OF IMPACTED SOILS

A review of boring and test pit logs in the STRAP Area indicates the presence of approximately 15 to 20 feet of fill underlain by organic silts (variable thickness of at least 12 to up to 83 feet), outwash deposits (also known herein as bearing sand; at least 60 feet in thickness) and glacial till (unknown thickness to bedrock). In general, the fill consists of sands and gravels with cinders, cinder ash, coke and coal fragments.

Visual indicators of petroleum sheening, staining, saturation or odors were noted in the fill materials in the majority of the explorations performed across the area. These visual indications of petroleum impacts and odors were observed at various depths within the fill materials but were generally most significant coincident with the natural groundwater table (approximately 6 to 14 feet bgs). In addition to the petroleum impacts, visual indicators of MGP residuals (*i.e.*, blue/green/yellow/black staining) were noted in borings B56 (5-6 feet bgs), RHB-1 (1 to 3 feet bgs), RCA-39 (9-10 feet bgs) and TP-301 (5.5-13 feet bgs). "Asphaltic odors" were also noted in boring RCA-40 from 16 to 20 feet bgs. Total Volatile Organic Compounds (TVOCs) via field screening with a photoionization detector (PID) ranged from non-detect (ND) to approximately 1,700 ppmv. Generally, TVOC readings increased with depth until approximately 2 to 4 feet below the water table and decreased thereafter, consistent with visual observations. Very slight visual and olfactory indicators of impacts were noted in the top few feet of organic silt, decreasing with depth into the organic silt. Visual or olfactory indicators of impacts were not noted in the bearing sand or the glacial till layers.

Odors, petroleum or other indications of impact were generally not noted in explorations located south of the current driveway and the former Propane House (B14, B27, B28, B35, B36, B45, B46, B55, B56, B64, B65, B66, D32, D38, D57, D59, D62, ETP-21, ETP-31 and GZ-203) and in the area just northwest of the foam building (B-42, B-43, B-44, B-50A and SWBL-4).

Borings located within the former gasholder foundation (RHB-1, RHB-2, RHB-3, RHB-4, RHB-5, RHB-6 and RCA-B11) generally indicated odors increasing with depth to the base of the relieving platform (concrete pile cap section). "Dark yellow petroleum" was observed in RCA-B11 from 6 to 9.5 feet bgs. This was not detected in other borings within the former gasholder foundation.

Refusal and obstructions were noted in B-10 (6-6.5 feet bgs), GZ-7A (1.5 feet bgs), GZ-7B (7.5 feet bgs), GZ-7D (several obstructions less than 10 feet bgs), GZ-204 (8 feet bgs), GZ-215 (2 feet bgs), GZ-217 (6-9 feet bgs), SB-06 (10.5 feet bgs), RCA-21R1 (10.5 feet bgs), B47 (4-4.5 feet bgs) and VHB-17 (6 feet bgs). Borings located within the former gasholder foundation generally indicated 1 foot of concrete at the surface (pre-capping) and refusal at 9.5 feet bgs. It is likely that the timber pile relieving platform remains intact beneath the engineered cap placed within the former gasholder area. As shown on Figure 3, *Exploration Location Plan*, the STRAP Area was the location of many former MGP features and structures; the observed refusal and obstructions are likely associated with these former features.

One hundred and nine (109) of the one hundred and fifty-one (151) explorations were terminated in the fill unit, forty-two (42) of the explorations were advanced into the underlying organic silt and twenty-nine (29) of these forty-two (42) were advanced into the underlying bearing sands or deeper. Based on cross sections prepared by Weidlinger Associates, Inc. on behalf of Kiewit Engineering and Design Company (included in Appendix C), the organic silt layer appears to be continuous in the area closest to the Providence River. Cross Section A-A (in Appendix C) presents the geological stratum perpendicular to the Providence River, which shows thicknesses of up to 67 feet close to the Providence River (SB-06) and thicknesses of 5 feet proximate to the proposed foam building (B-25) in the central portion of the Project Work Site (approximately 350 feet to the southeast of the Providence River). Cross Section B-B (in Appendix C) presents the geological stratum parallel (approximately 225 feet to the southeast of the Providence River), which shows relatively continuous thicknesses of organic silt parallel to the Providence River of approximately 10 to 30 feet in thickness. Refer to



Site Piling Plan (Drawing Number 102761-B-00-0000-STR-SF-5800 rev A) (in Appendix C) which presents the location of proposed piles for the Project.³

Former MGP impacts are generally located throughout the fill and the upper 1 to 2 feet of the organic silt. As the majority of the proposed piles will be installed through the organic silt, a “smear” interface will likely occur at the pile/organic silt contact. Due to the physical properties of organic silt (low permeability and the affinity of organic compounds to adhere to organic soils), the significant thickness of the organic silt unit in this area (at least 12 to up to 83 feet) and lack of known downward seepage gradients⁴, downward migration of impacts more than a few feet during pile driving is not anticipated.

4.3 SOIL ANALYTICAL RESULTS

As indicated above, ninety-nine (99) environmental explorations were performed in the STRAP Area. From the majority of the borings, both a surface (within 2 feet of the ground surface) and a subsurface soil sample were collected and analyzed. A subsurface soil sample (collected from 2 feet below the water table) was collected from most of the test pits. As noted above, certain portions of the STRAP Area have been capped and therefore actual sampling depths from current grades are unknown. Analytical results presented herein and in the attached Tables 1 through 4 are divided into three categories: soil beneath an engineered cap (Table 1), soil within the former gasholder foundation beneath an engineered cap (Table 2), and uncapped soils (Tables 3 and 4).⁵

As indicated previously, soils removed as part of previous remedial activities have not been included in these data summaries. For more information, please refer to the November 2002 *Remedial Action Closure Report*.

4.3.1 Soils Beneath the Engineered Cap

Sixty (60) soil samples from below engineered caps were collected and analyzed for total petroleum hydrocarbons (TPH), semi-volatile organic compounds (SVOCs), VOCs, polychlorinated biphenyls (PCBs), pesticides and inorganic compounds. As indicated in Table 1, the compounds detected in excess of RIDEM Method 1 Criteria were Benzo [a] Pyrene (0.9 to 43.3 mg/kg), Dibenzo [a, h] Anthracene (0.36 to 7.8 mg/kg), Benzo [a] Anthracene (0.37 to 48 mg/kg), Benzo [b] Fluoranthene (0.37 to 57.6 mg/kg), Indeno [1,2,3-cd] Pyrene (0.72 to 27 mg/kg), TPH (281 to 41,000 mg/kg), TPH (diesel range) (777 to 21,000 mg/kg), arsenic (1.5 to 15 mg/kg), lead (3.7 to 895 mg/kg), ethylbenzene (0.01 to 97.3 mg/kg), styrene (0.041 to 77 mg/kg), and toluene (0.134 to 81 mg/kg). TPH was detected at elevated concentrations (more than 10,000 mg/kg) in RCA-20 (10-12 feet bgs), RCA-40 (8 to 10 feet bgs), ETP-19 (7-8 feet bgs), ETP-20 (4.5-6 feet bgs), TP-2, TP-3, TP-4, TP-6, TP-8, TP-26, TP-27, and B04 (2-4 feet bgs). Note, logs are not available for test pits TP-2, TP-3, TP-4, TP-6, TP-8, TP-26, or TP-27, therefore these sampling depths are unknown. The boring log for RCA-20 noted “oily” from 6-14 and 16-17 feet bgs with “petroleum odors” detected from 6-10 feet bgs. TPH was detected at a concentration 1,610 mg/kg from 16-17 feet bgs in RCA-20. The boring log for RCA-40 noted “dark yellow petroleum” from 8-10 feet bgs with

³ Note that this figure was provided by NGLNG and was prepared by their Contractor.

⁴ Two monitoring well couplets were located at the STRAP Area: MW-314S screened in the fill and MW-314D screened in the organic silt below and RCA-5 screened in the fill and MW-315D screened in the organic silt below. As shown in Table 5, *Summary of Groundwater and NAPL Measurements*, consistent groundwater elevation monitoring was performed at these couplets between 2014 and 2016, with groundwater elevation differences of less than 0.1 feet in each couplet, indicating that there are no significant seepage gradients.

⁵ As described in the Remediation Regulations, the Direct Exposure and Leachability Criteria apply throughout the vadose zone. While the Direct Exposure and Leachability Criteria apply to the vadose zone, certain subsurface soil samples were collected below the water table to define the nature and extent of impact. The data comparisons described below and summarized in the tables compare all soil data (vadose and saturated zone) to the I/C-DEC and GB Leachability criteria. In addition to the I/C-DEC and GB-Leachability, soil concentrations were compared to the numeric RIDEM UCL standards under Rule 8.07 of the Remediation Regulations.



“petroleum odor” from 10-12 feet bgs and “asphaltic odor” from 16-20 feet bgs. The test pit log for ETP-19 noted “oily” from 7-8 feet bgs with TVOC concentrations of up to 362 ppm. The test pit log for ETP-20 noted “slight petroleum odor” from 2-6 feet bgs with TVOC concentrations of up to 203 ppm. The boring log for B04 noted “...black petroleum staining ... petroleum odor” from 5-6 feet bgs. Elevated VOC impacts (ethylbenzene, toluene and styrene) were observed in TP-27 and TP-28. Table 1, *Soil Analytical Data (Existing Capped Portion of STRAP Area)*, presents the range of concentrations for each detected compound and the number of exceedances of RIDEM criteria along with analytical soil data collected from below areas capped.

4.3.2 Soils within the Former Gasholder Foundation Footprint

Twenty-seven (27) soil samples from within the former gasholder foundation were collected and analyzed for TPH, SVOCs, and VOCs. As shown on Figure 3, *Exploration Location Plan*, this former gasholder foundation is located beneath an engineered cap. The compounds detected in excess of RIDEM Method 1 Criteria were Benzo [a] Pyrene (0.23 to 96 mg/kg), TPH (110 to 27,400 mg/kg), benzene (0.001 to 31 mg/kg) and ethylbenzene (0.001 to 83 mg/kg). TPH was elevated (more than 10,000 mg/kg) in three samples RCA-B11 (3.5-5.5 and 7.5- 9.5 feet bgs) and RHB-4 (10-12 feet bgs) at concentrations of 27,400 mg/kg, 21,500 mg/kg, and 12,000 mg/kg, respectively. The boring log for RCA-B11 noted “dark yellow petroleum” from 6-9.5 feet bgs and “petroleum odor” from 10-12 feet bgs. The boring log for RHB-4 noted “slight odor” from 2-6, 8-9 and 10-10.5 feet bgs and “stronger odor” from 9-10 feet bgs. Table 2, *Soil Analytical Data, Collected from within the Former Gasholder Foundation*, presents the range of concentrations for each detected compound and the number of RIDEM criteria exceedances for soil and the analytical soil data collected within the former gasholder foundation.

4.3.3 Uncapped Soils (Surface and Subsurface Samples)

Twenty-six (26) surface soil samples (collected from 0 to 2 feet bgs) from uncapped areas were collected and analyzed for TPH, SVOCs, VOCs, PCBs, pesticides and inorganic compounds. The compounds that were detected in excess of RIDEM Method 1 Criteria Benzo [a] Pyrene (0.391 to 20 mg/kg), Dibenzo [a, h] Anthracene (0.54 to 4.4 mg/kg), Benzo [a] Anthracene (0.437 to 32 mg/kg), Benzo [b] Fluoranthene (0.42 to 26 mg/kg), Indeno [1,2,3-cd] Pyrene (0.72 to 10 mg/kg) and arsenic (1.5 to 14.5 mg/kg). As indicated in Table 3, *Surface Soil Analytical Data (Uncapped Portion of STRAP Area)*, exceedances of RIDEM’s I/C-DEC were detected in twelve (12) of the 26 samples analyzed, and occur in a widespread area within the uncapped portion of the STRAP Area. These exceedances are typical of urban fill impacts.

Thirty-five (35) subsurface soil samples from uncapped areas were collected and analyzed for TPH, SVOCs, VOCs, PCBs, pesticides and inorganic compounds. The compounds that were detected in excess of RIDEM Method 1 Criteria were Benzo [a] Pyrene (0.08 to 36 mg/kg), Dibenzo [a, h] Anthracene (1.1 to 5.6 mg/kg), Benzo [a] Anthracene (0.12 to 45 mg/kg), Benzo [b] Fluoranthene (0.09 to 44 mg/kg), Indeno [1,2,3-cd] Pyrene (0.71 to 20 mg/kg), TPH (526 to 15,390 mg/kg), benzene (0.17 to 18 mg/kg) and ethylbenzene (0.08 to 160 mg/kg). Elevated levels of VOCs were detected in B13 from 2-4 feet bgs. The boring log for this interval indicated “light petroleum odors” and TVOCs concentrations ranging from 2.8 to 156 ppm. Elevated TPH concentrations were detected in B03 from 2-4 feet bgs. The boring log for this interval indicated “petroleum odor” with TVOC concentrations of up to 164 ppm (at the water table, approximately 5 feet bgs). Elevated VOCs and TPH were detected in VHB-17 at 6 feet bgs. The boring log indicated “strong chemical odors”. Table 4, *Subsurface Soil Analytical Data (Uncapped Portion of STRAP Area)*, presents the range of concentrations for each detected compound and the number of exceedances of RIDEM criteria along with analytical subsurface soil data collected in the STRAP Area. These impacts are generally more isolated.



4.4 GROUNDWATER AND NAPL MEASUREMENTS

Currently, there is one (1) active monitoring well present in the STRAP Area (RCA-39). As indicated on Figure 3, this well is located proximate to the truck scale in the southeastern portion of the STRAP Area. There were an additional eleven (11) monitoring wells (RCA-4, RCA-5, RCA-14, RCA-20, RCA-21, RCA-40, GZ-204A, GZ-216, GZ-314S, GZ-314D and GZ-315D) and five (5) recovery wells (CHES RW-2, CHES RW-3, CHES RW-4, CHES RW-5 and RW-1) in the area. Nine (9) monitoring wells (RCA-5, RCA-14, RCA-20, RCA-40, GZ-204A, GZ-216, GZ-314S, GZ-314D and GZ-315D) and the five (5) recovery wells (CHES RW-2, CHES RW-3, CHES RW-4, CHES RW-5 and RW-1) were decommissioned during a Site-wide effort in the summer of 2016 in anticipation of upcoming facility projects and select wells will be re-installed after completion of the projects. RCA-4 and RCA-23 were noted as “destroyed” at some point during the 2002 remediation work. Two (2) grab groundwater samples were also collected from two borings (B05 and B22) during 2000. The only monitoring wells screened in the organic silt were GZ-314D and GZ-315D and the remainder of the wells located in the area were screened in the fill. Based on elevation data from these monitoring wells, groundwater is expected to be encountered approximately 6 to 14 feet bgs in the area. A summary of historical groundwater elevation data for monitoring wells within the STRAP Area is presented in Table 5, *Summary of Groundwater and NAPL Measurements (Monitoring Wells Located with STRAP Area)*. Groundwater is tidally influenced (0.5 to 3.5 fluctuations have been observed). LNAPL has been historically detected in the STRAP Area at thicknesses ranging from trace amounts to 3.58 feet, in wells RCA-4, RCA-21, RCA-39, RCA-40, CHES RW-2, CHES RW-3, CHES RW-4, CHES RW-5 and RW-1. Dense non-aqueous phase liquid (DNAPL) has not been detected in the area.

LNAPL was detected in RCA-21 at thicknesses ranging from 0.75 to 3.58 feet between 2011 and 2014. RCA-21 was not gauged between 2003 and 2011. RCA-21 was removed during an investigatory test pit effort and was then replaced with RW-1 to aid in the recovery of LNAPL in 2014. Following the 2014 installation of RW-1, LNAPL was detected at thicknesses ranging from trace and 0.02 feet. As indicated above, RW-1 was decommissioned in 2016. GZA gauged and recovered LNAPL from RCA-21 on a weekly basis for one month during 2012 and then monthly during 2012, 2013 and the first half of 2014. Initially, the thickness of LNAPL in RCA-21 was 2.79 feet. During monthly gauging and recovery, the thickness of LNAPL decreased to approximately 1 foot. The LNAPL thickness that was observed in RCA-21 is likely an isolated source based on surrounding well observations. LNAPL has been detected in other monitoring wells that are approximately within 100 feet of RCA-21 (CHES RW-4, CHES RW-5, and RCA-40), but in much lesser thicknesses (ranging from trace to 0.22 feet). NAPL has not been observed in MW-314S, MW-314D or MW-315D. Table 6, *Historic NAPL Thicknesses (Monitoring Wells Located within STRAP Area)*, presents a summary of historical NAPL thicknesses observed in monitoring wells within the area and Table 7, *Summary of LNAPL Gauging and Recovery – RCA-21 and RW-1*, presents a summary of LNAPL gauging and recovery activities for RCA-21 and RW-1.

4.5 GROUNDWATER ANALYTICAL RESULTS

Thirty-four (34) groundwater samples were collected in the STRAP Area between 1994 and 2016 and analyzed for VOCs, SVOCs, TPH and total cyanide. Naphthalene, benzene, ethylbenzene and/or toluene have been detected in excess of the RIDEM GB Groundwater Objectives in samples collected from RCA-4, RCA-21, B05, MW-314S, MW-314D and MW-315D. Benzene has been detected in excess of the RIDEM GB Upper Concentration Limit (UCL) in samples collected from RCA-4. Groundwater samples collected from RCA-5, RCA-14, RCA-20, RCA-39, RCA-40 and B22 had relatively low levels of detected VOCs and SVOCs with no elevated concentrations or exceedances of RIDEM criteria detected. Table 8, *Groundwater Data (Monitoring Wells Located within STRAP Area)*, presents the range of concentrations for each detected compound, the number of exceedances and the analytical data for groundwater samples collected within the area.



5.0 STRAP SPECIFIC - AIR EMISSION EVALUATION

Implementation of this Project will involve earthwork activities that require excavation and management including temporary stockpiling and off-Site disposal/recycling of certain impacted material. No earthwork is proposed outside the STRAP Area (as presented on Figure 6, *Proposed Final Conditions Plan*). GZA performed an evaluation of the potential volatile emissions associated with the proposed earthwork, including a determination related to the applicability of the RIDEM Air Pollution Control Permits (APC) (Regulation No. 9).

The applicability of Regulation No. 9 was evaluated based on potential volatile emissions calculations/modeling performed consistent with published United States Environmental Protection Agency (EPA) guidance. As described below, this evaluation is a two-step process; first a conservative estimate of emissions potential is calculated and used to evaluate the applicability of Regulation No. 9 (see Section 5.1). If the results indicate an emission potential above the minimum quantities presented in Regulation No. 9, the results are further evaluated using predictive modeling using EPA guidance (Section 5.2). This emissions modeling was developed for the specific earthwork activities to be performed during this effort. As described further herein and in Appendix D, the results of this modeling indicate that earthwork activities completed under this STRAP do not have the potential to increase emissions by greater than the minimum quantities specified in Appendix A of RIDEM APC Regulation No. 9, and, therefore, a minor source permit is not required for this activity.

5.1 EMISSIONS POTENTIALS

The emissions potential of a particular analyte was calculated by assuming all of the mass of the analyte volatilizes during the associated earthwork activities. This would represent the maximum amount of mass of the specific analyte in the volume of soil being excavated and managed on-Site. It is based on analyte concentration, soil volume disturbed, and typical bulk density. The predicted modeled emissions, described in the subsequent section, are generally lower than these calculated emissions potentials.

Planned excavation activities will consist of various pile installation activities (one hundred and ninety four (194) micropiles drilled to approximately 85 feet bgs, pre-drilling of eighty (80) slope stability piles to approximately 10 feet bgs and installation of a slope stability footing to 2 feet bgs) and various utility installations (stormwater management piping and systems, tie-in to existing natural gas line, tie-in to existing potable water supplies, and installation of various LNG lines and supports). It is anticipated that the pile installation will involvement management of approximately 410 CY of soil and the utility installation will involve management of approximately 2,578 CY of soil for a total of 2,988 CY. Locations and estimates describing these excavation activities were prepared by NGLNG (or their Contractor) and are included in the following figures included in Appendix D:

- Site Piling Plan (Drawing Number 102761-B-00-0000-STR-SF-5800 rev A)
- Plot Plan (Drawing Number 102761-B-00-0000-MEC-PP-1000 rev E)

To evaluate the excavation emissions potentials and modeled excavation emissions, GZA used data collected in the vicinity and at the depths of expected excavation associated with the above activities. The data used in the evaluation consisted of two-hundred and twenty-six (226) soil samples collected during site investigation activities conducted between 1994 and 2014 or collected as confirmatory samples during remedial activities in 2002. The data is presented in Table D-1 (in Appendix D) of the areas of pile installation and in Table D-2 (in Appendix D) of the areas of utility installation. The calculations only utilized soil samples collected at approximate depths from within areas with planned cuts (excavations).



Exploration locations in the STRAP Area are presented on Figure 3, *Exploration Location Plan* and confirmatory sampling locations are presented on figures included in the November 2002 *Remedial Action Closure Report*.

Using both the average and maximum concentrations for the potential calculation, GZA conservatively calculated the total emissions potential (in pounds (lbs)) for all the detected VOCs with minimum quantities included in Appendix A of RIDEM's APC Regulation No. 9. This calculation assumes all the mass of the VOCs in the associated soil is emitted, providing conservative upper bounds to potential excavation emissions. As indicated in Tables D-3 (pile installation areas), D-4 (utility installation areas) and D-5 (STRAP Emissions Potential Total) (in Appendix D), benzene and naphthalene have an excavation emissions potential exceeding the RIDEM annual minimum quantities (10 lbs/year and 3 lbs/year, respectively) based on both the average and maximum measured concentrations. Based on these calculations, benzene and naphthalene were further evaluated using emissions modeling consistent with published EPA guidance to estimate the predicted emissions that would be generated during the planned earthwork.

5.2 EMISSIONS MODELING

Based on the results of the emissions potentials calculations described above for the earthwork activities, predicted emissions related to benzene and naphthalene were calculated based on modeling. The predicted emissions modeling used the average concentration of benzene and naphthalene that was detected. Appendix D describes these emission modeling calculations, which were based on the following EPA guidance document:

- Eklund, et al. 1997. Air Emissions from the Treatment of Soils Contaminated with Petroleum Fuels and Other Substances. Prepared for U.S. Environmental Protection Agency Office of Air and Radiation and Office of Research and Development Washington, D.C. EPA-600/R-97-116. October.

The modeling results for the excavation activity are presented in Tables D-6 (pile installation areas) and D-7 (utility installation areas) (in Appendix D). GZA assumed that one re-handling event would occur for each of the earthwork activities when the excavated soil was loaded from stockpiles to trucks for subgrade backfilling on-Site or for off-Site disposal/recycling.

Table D-8 (STRAP Estimated Emissions Total) (in Appendix D) and the following presents a summary of the modeled predicted total excavation emissions for benzene and naphthalene (expressed in pounds) compared to RIDEM's Minimum Quantities (expressed in pounds/year) published in Regulation No. 9, Appendix A. As indicated below, the total modeled emissions for both benzene and naphthalene are both well below the RIDEM Annual Minimum Quantities.

Analyte	Total Modeled Excavation Emissions (lbs)	RIDEM Annual Minimum Quantity (lbs)
Benzene	0.61	10
Naphthalene	0.03	3

6.0 PROPOSED STRAP ACTIVITIES

As described previously, activities to be performed under this STRAP include limited clearing and grubbing, installing erosion and sedimentation controls, testing of and import of clean fill materials, grading and off-Site disposal/recycling of excess materials, management of excess soil and groundwater generated during earthwork activities for pile and utility installations (water, drainage, natural gas and electric), installation of engineered caps and restoration activities (fencing and gate installation). All areas of soil and groundwater disturbance will be capped as described herein to mitigate direct exposure to underlying impacted soils consistent with RIDEM requirements.



The stormwater runoff generated from the new impervious areas will be treated via a forebay and a lined sand filter system designed in accordance with the Rhode Island Stormwater Design and Installation Standards Manual (RISDISM). No infiltration into Site soils are proposed under this STRAP.

The following figures were prepared to illustrate the scope of the proposed STRAP:

- Figure 5 – *Erosion and Sedimentation Control Plan*;
- Figure 6 – *Proposed Final Conditions Plan*; and
- Figure 7 – *Capping Cross Sections*.

An environmental professional will be on-Site full time during earthwork activities to provide guidance regarding the management of potentially impacted soil and groundwater and ensure that all work is performed consistent with this STRAP.

All areas of expected soil and groundwater disturbance within the STRAP Area associated with the Project will be completed with an engineered cap to mitigate potential direct exposure to underlying impacted soils. Figure 6, *Proposed Final Conditions Plan* and Figure 7, *Capping Cross Sections* present the locations and cross sections the following engineered control caps:

- Asphalt Engineered Cap (approximately 41,088 SF – 0.94 acres): the engineered cap will consist of at least 4-inches of asphalt underlain by at least 6-inches of processed gravel, sand or other clean imported granular fill.
- Riprap Engineered Cap (approximately 5,351 SF – 0.12 acres): the engineered cap will consist of a non-woven geotextile overlain by at least 12-inches of imported Riprap.
- Concrete Engineered Cap (approximately 27,275 SF – 0.63 acres): the engineered cap will consist of a competent concrete surface consisting of at least 4-inches of concrete underlain by at least 6-inches of clean imported granular fill.
- Crushed Stone Engineered Cap (approximately 73,333 SF – 1.68 acres): the engineered cap will consist of at least 18-inches of imported granular fill and finished with 6-inches of imported 2-inch crushed stone.
- Sand Filter (approximately 3,270 SF – 0.08 acres): the sand filter will consist of a linear low density polyethylene (LLDPE) liner system, overlain by at least 12-inches of $\frac{3}{8}$ " peastone, overlain by a geotextile and finished with at least 18-inches of clean imported C-33 sand. As noted above, no infiltration is proposed under this STRAP.

6.1 EXCAVATED SOIL REUSE

The contractor may reuse Site soils generated during earthwork in the STRAP area, but will only do so under an engineered cap (described above). If observations of NAPL, buried containers, or unusual odors are made during the course of excavation, work in the subject areas will stop immediately. These materials will be segregated by the contractor and characterized (visual observations and TVOC headspace screening via a PID or equivalent) by the environmental professional. The contractor, with guidance from the environmental professional, will segregate any soil with free NAPL or unusual odors based on visual observations and TVOC headspace screening via a PID. Any soils which exhibit excessive visual or olfactory evidence of contamination will be segregated for off-Site disposal/recycling at a licensed facility approved by NGLNG. Should soils with evidence of NAPL be discovered during excavation, these materials and/or soils shall be



segregated for off-Site transport and disposal/recycling at a licensed facility approved by NGLNG. All soil disposal/recycling will be in accordance with Section 6.3. Soils excavated from the Site shall not be re-used at locations off-Site.

6.2 STORMWATER MANAGEMENT

As described previously, the engineered caps have been designed with an integral stormwater management/treatment system. As stipulated in the *Stormwater Regulations*, the amount of stormwater that must be treated is defined as the Water Quality Volume (WQv). The WQv is equivalent to 1 inch of runoff generated from the first 1.2 inches of rainfall over impervious areas (initial abstraction is assumed to account for the first 0.2 inches of rainfall). By using prescribed methods detailed in the *Stormwater Regulations*, the goal is to reduce 85% of total suspended solids, 60% of pathogens, and 30% of total nitrogen for discharges to saltwater or tidal systems.

Stormwater runoff generated from the proposed Site improvements will be collected by catchbasins installed at final grades. The WQv will be conveyed via piping and manholes to a system of several precast forebay structures and a lined sand filter located in the northern portion of the STRAP Area, as depicted on Figure 6, *Proposed Final Conditions Plan*. The lined sand filter will discharge through a new designed outfall into the Providence River. No infiltration is proposed under this STRAP.

6.3 SOIL DISPOSAL/RECYCLING

It is currently estimated that approximately 3,000 CY of existing Site soils will be removed to facilitate installation of piles and utilities as part of the Project. The contractor may reuse soil materials in the STRAP Area, but only do so under an engineered cap (described above in Section 6.1). All excess soil will be transported and disposed/recycled at an off-Site licensed receiving facility.

Soil disposal documentation for all excess soil will be maintained at the Site by the environmental professional. All excess soils will be shipped to a NGLNG approved disposal/recycling facility. Prior to off-Site disposal/recycling, representative samples will be collected from the stockpiled soil and analyzed based on the frequency and the parameters required by the selected disposal/recycling facility. The NGLNG Environmental contact will arrange for the disposal/recycling of all excess material and will sign as the generator of these materials on all waste profiles and shipping manifests.

Copies of all manifest(s) and/or Bills of Lading (BOLs) documenting the off-Site disposal/recycling of these materials will be included in the *Short Term Response Action Closure Report*.

6.4 IMPORT SAMPLING

Samples representative of any imported soil material (collected as composite samples from the source) will be tested for the analyte groups described below. Granular fill, riprap, bedding sand, C-33 sand and various sizes of crushed stone aggregate material is expected to be imported to the Site under this STRAP.

Analyte	EPA Test Method
Total Petroleum Hydrocarbons	8100M
Volatile Organic Compounds	8260
Semi-Volatile Organic Compounds	8270
Priority Pollutant Metals (PP-13)	6010 & 7471A

The frequency of sampling and testing will be:



- Full suite of analysis for up to 2,000 cubic yards, with an additional full suite for each subsequent 2,000 cubic yards of material; and
- Arsenic each 500 cubic yards of material.

All imported fill (including bedding sand and C-33 sand), with the exception of quarry run aggregate materials (i.e., riprap, washed crushed stone, etc.) will be sampled prior to delivery and placement, regardless of the source of the material. Prior to the import of any imported fill (included quarry run aggregate materials) to the Site, the Contractor performing the work will be required to provide a certification from the source that the fill is from a clean virgin source.

Laboratory samples will be analyzed and compared to RIDEM Method 1 Residential Direct Exposure Criteria (R-DEC). Soils not meeting these criteria will be rejected for use at the Site. The laboratory testing results of the approved soil source(s) will be provided to RIDEM as part of the *Short Term Response Action Closure Report*.

6.5 DEWATERING AND GROUNDWATER MANAGEMENT

We do not anticipate that significant excavation dewatering will be required during performance of this *STRAP*. Any necessary dewatering will likely be conducted during the installation of utilities. Any resulting groundwater will be containerized into fractionation tanks and disposed/recycled off-Site at a licensed disposal/recycling facility approved by NGLNG. Copies of all manifest(s) and/or BOLs documenting the off-Site transport and disposal/recycling will be included in the *Short Term Response Action Closure Report*.

6.6 REQUIRED AIR MONITORING AND CONTROLS

The air monitoring program for this *STRAP* was developed based on the results of the Estimated *STRAP* Emissions presented in Section 5.0, above. The air monitoring program for this *STRAP* is consistent with previous air monitoring programs used for similar size/scope projects performed at the Site.

6.6.1 Perimeter Air Monitoring

During all Project earthwork activities, real time perimeter air monitoring will be performed involving the use of the following hand held instrumentation.

- Portable Photoionization Detector (PID) MiniRAE – this instrument measures TVOCs with a detection limit of 0.1 parts per million (ppm) or 100 parts per billion (ppb). TVOC readings will be measured at the perimeter of the Project Work Site approximately every two hours during each day or more frequently depending on field conditions (at least four times a day).
- DustTRAK Dust Meter – this instrument uses infrared electromagnetic radiation to sense airborne particles less than 10 microns in size. The detection limit for this instrument is 1 microgram per cubic meter ($\mu\text{g}/\text{m}^3$). Similar to the PID, the readings from this hand-held instrument will be measured at the perimeter of the Project Work Site approximately every two hours during each day or more frequently depending on field conditions (at least four times a day).

Hand held portable field equipment was determined to be appropriate for the *STRAP*. In addition, the use of hand held field equipment allows field personnel to alter monitoring locations based on the activity being performed and changing wind directions.



Perimeter TVOCs and respirable dust (PM₁₀) monitoring will be performed during all earthwork activities. This monitoring will include both any observations of odors or visual dust as well as measurements of TVOCs and respirable dust using field instruments. The following table presents the real-time monitoring threshold levels for the perimeter work area locations.

Real Time Monitoring – Action Levels	
Compound	Perimeter
Total Volatile Organic Compounds (TVOC)	1 ppm
Respirable Particulate Dust (PM ₁₀)	150 µg/m ³

6.6.2 Dust Controls

Dust control measures will be employed to mitigate the potential for release of airborne particulate matter beyond the limits of the Site in accordance with RIDEM *Air Pollution Control Regulation No. 5, Fugitive Dust*. Methods of dust control will consist of sprinkling the ground surface with water and/or calcium chloride, covering of temporary stockpiles, mulching, or similar methods. If excessive dust generation occurs and cannot be reasonably controlled, the job shall be shut down by the environmental professional or NGLNG until appropriate engineering control measures are implemented by the contractor.

6.6.3 Odor Controls

Odor and organic vapor control measures will be employed to mitigate the potential for release of odors and organic vapors during the STRAP work. Methods of control will consist of backfilling excavations, covering stockpiles or excavations with 6-mil polyethylene sheeting, application of specially engineered foams or other methods. If excessive odors or TVOCs readings occur and cannot be reasonably controlled, the job shall be shut down by the environmental professional or NGLNG until appropriate engineering control measures are implemented by the contractor.

6.7 DECONTAMINATION PROTOCOL

Since heavy equipment/hand tools may remain onsite for several days, decontamination need not occur on a daily basis. At the conclusion of the construction activities, heavy equipment and tools will be decontaminated. At a minimum, soil will be brushed from the equipment and containerized prior to washing the equipment surfaces if needed. The containerized material will be sampled for disposal determination (as required) and then properly disposed/recycled at an off-Site licensed receiving facility. All liquid (water) will be containerized and sampled for disposal determination (as required), and then properly disposed at an off-Site facility.

Tracking pads will be installed in the vicinity of entrances to the Project Work Site to mitigate the transport of on-site soils beyond the limits of work. The tracking pads will consist of crushed stone. If sediment is tracked out of the Project Site, the sediment must be removed by sweeping, shoveling, or vacuuming by the end of the work day.

6.8 SOIL STOCKPILE MANAGEMENT REQUIREMENTS

Impacted excavated materials will be temporarily staged on two layers of minimum 6-mil polyethylene sheeting in working stockpiles or in water-tight containers proximate to the excavation area. At the end of each work day and to the extent practical during the workdays, working stockpiles and drilling spoils will be relocated to a central stockpile area and covered with a layer of polyethylene sheeting (or NGLNG or environmental professional approved equivalent) to control the generation of wind-blown dusts and potential migration of soils with stormwater runoff. Stockpile areas will be equipped with appropriate controls to limit the loss of the cover and protect against storm water erosion. These controls



will include the installation of Filtrexx Siltsoxx or equivalent surrounding the perimeter of the stockpiles and weighting the polyethylene cover with sand bags or concrete blocks. Stockpiles will be inspected daily by the environmental professional. Should tears or punctures be observed in either the polyethylene sheeting covering or underlying the piles, repairs shall be made immediately. Daily shutdown procedures shall include the covering and securing of all stockpiled material area with polyethylene sheeting and appropriately sized materials to secure the polyethylene sheeting in place.

Long-term soil, construction material and/or debris stockpile areas shall not be located on any coastal feature.

6.9 SEDIMENTATION AND EROSION CONTROLS REQUIREMENTS

Prior to the commencement of any Site work, staked Filtrexx Siltsoxx, silt sacks and construction entrances will be installed by the contractor to mitigate the potential migration of Site contaminants with stormwater run-off. The approximate layout of these sedimentation and erosion control devices is shown on Figure 5, *Erosion and Sedimentation Control Plan*.

6.10 BOOM MAINTENANCE

National Grid currently maintains a boom in the Providence River directly proximate to the proposed liquefaction work area. The boom consists of a combination of absorbent sections and hard plastic sections. The boom is inspected on an at least monthly basis. National Grid also currently conducts at least monthly inspections of the cove proximate to the proposed liquefaction work area for the presence of sheen / LNAPL on the surface of the Providence River.

NGLNG will also continue this boom maintenance and monitoring program during the *STRAP* activities. The environmental professional will inspect the boom on a daily basis during all work activities to ensure the boom is in good condition and to document any sheens proximate to the Project Work Site. If any deficiencies are noted in the boom or excessive sheen generation occurs and cannot be reasonably controlled by the boom, the boom configuration will be augmented, repaired or replaced as needed. The boom configuration is illustrated on Figure 2, *Overall Aerial*.

6.11 MONITORING WELL RE-INSTALLATION

After the Project is completed, select monitoring wells will be replaced/installed and the proposed post-development groundwater monitoring program will be implemented. We currently anticipate that three monitoring wells will be replaced (RCA-5R, RCA-40R and GZ-315DR). As the proposed post-development well installation and groundwater monitoring work is expected to be at least approximately three (3) years away, National Grid, will submit a *Site Investigation Work Plan (SIWP)* with final proposed locations to RIDEM for review and approval prior to performing this work. The SIWP will also include a summary of the proposed groundwater monitoring program, including sampling frequency and parameters.

6.12 REPORTING

Subsequent to completion of the activities described herein, a *Short Term Response Action (STRA) Completion Report* will be prepared in accordance with Rule 6.09 of the Remediation Regulations and submitted to RIDEM. The report will summarize field activities and document the completion of the work described herein.

7.0 **PUBLIC INVOLVEMENT PLAN (PIP) REQUIREMENTS**

A revised Public Involvement Plan (PIP) was submitted to RIDEM on May 4, 2017 and is publicly available on the 642 Allens Avenue website maintained by RIDEM (<http://www.dem.ri.gov/programs/wastemanagement/site->



[remediation/Providence-Gas-Co.php](#)). As described previously, the requirements of the PIP will be followed as part of these STRAP activities. For this STRAP, NGLNG will be responsible for all PIP activities.

NGLNG will carry out the following activities as part of this STRAP:

- Prior to STRAP implementation:
 - Prepare a STRAP. NGLNG has prepared this document for RIDEM review and approval describing proposed STRAP activities necessary to support earthwork associated with construction of the proposed liquefaction facility.
 - Host Public Meeting. NGLNG will host a public meeting to present the proposed STRAP activities. We currently anticipate this community meeting will be held at the Juanita Sanchez Educational Complex located at 182 Thurbers Avenue in Providence, Rhode Island (based on availability). Translation assistance will be provided for non-English speaking individuals, upon request. NGLNG will submit a written summary of the meeting to RIDEM in hard copy and electronic format within 20 days of the meeting. The meeting summary will include identification of the main issues of concern, document requests by the public and proposed responses. NGLNG tentatively anticipates that this public meeting will be held in mid-June; the final date will be circulated via the mailing list at least 2 weeks prior to the meeting. This notice will be provided in both English and Spanish.
- After completion of STRAP activities:
 - Prepare a Completion Notification. This notification will include a description of completed STRAP activities. The notification will include a translation header in multiple languages stating: “This is an important notice. Please have it translated.” The notification will be disseminated to the Site mailing list, websites and other information repositories. It is anticipated that this abutter notification will be distributed before submittal of the STRA Completion Report.
 - Prepare the STRA Completion Report. NGLNG will prepare a document to provide a summary of the STRAP consistent with the requirements of Rule 6.09 of the Remediation Regulations. NGLNG will submit this document to RIDEM no more than 30 days following the completion of STRAP activities. The Completion Report will be disseminated to the information repositories.

8.0 PROPOSED SCHEDULE

The schedule for implementation of the work described herein will depend on receipt of the STRAP Approval from RIDEM and receipt of other necessary permits and approvals. The Project is projected to begin in 2017 and continue through 2019. Earth disturbing activities are not expected to begin until early 2018.



TABLES

Table 1
Soil Analytical Data
(Existing Capped Portion of STRAP Area)
 STRAP - Liquefaction Project
 Providence, Rhode Island

	RIDEM Industrial Commercial Direct Exposure Criteria (I/C DEC)	RIDEM GB Leachability Criteria	RIDEM Upper Concentration Limit (UCL)	Sample Name: Date Collected: Sample Depth: Units	Number of Samples	Number of Detections	Number of Exceedances	Range Detected		RCA-4	RCA-5		RCA-20		RCA-21		RCA-40	ETP-19		
								Minimum	Maximum	September 1994	September 1994		October 1995		October 1995		April 1996	1996		
										8 - 10 FT	10 - 12 FT	14 - 16 FT	10 - 12 FT	16 - 17 FT	4 - 6 FT	8 - 10 FT	8 - 10 FT	2 FT	4-5 FT	7-8 FT
Semi-Volatile Organic Compounds (SVOCs)																				
4-Nitroaniline	NE	NE	10,000	mg/kg	49	1	0	11.7	11.7	11.7	ND	ND	ND	ND	ND	ND	NA	NA	NA	NA
m-Nitrosodiphenylamine	NE	NE	10,000	mg/kg	49	1	0	15.4	15.4	15.4	ND	ND	ND	ND	ND	ND	NA	NA	NA	NA
2-Methylnaphthalene	10,000	NE	10,000	mg/kg	56	31	0	0.42	349	ND	ND	37.8	46.4	31.6	31.5	25.8	320	18.7	46.3	64.2
Acenaphthene	10,000	NE	10,000	mg/kg	57	24	0	0.69	122	100	9.1	105	10.5	7.4	7.4	ND	122	4.9	13.4	ND
Acenaphthylene	10,000	NE	10,000	mg/kg	55	30	0	0.36	288	25.2	39.9	11.3	ND	ND	ND	8.4	288	14.8	18.9	45.1
Anthracene	10,000	NE	10,000	mg/kg	55	33	0	0.39	200	79.7	76.3	34.7	ND	ND	4.6	4.8	200	12.9	26.5	ND
Benzo [a] Anthracene	7.8	NE	10,000	mg/kg	55	35	16	0.37	48	28.5	32.2	12.2	ND	ND	2.2	3	ND	17.8	36.1	ND
Benzo [a] Pyrene	0.8	NE	10,000	mg/kg	55	30	30	0.9	43.3	14.8	14.4	8.1	ND	ND	1	0.9	ND	10.2	17.1	ND
Benzo [b] Fluoranthene	7.8	NE	10,000	mg/kg	55	34	14	0.37	57.6	21.2	24.7	6.5	ND	ND	2.2	1.9	ND	14.8	28.8	ND
Benzo [g,h,i] Perylene	10,000	NE	10,000	mg/kg	55	21	0	0.4	26	6	6	ND	ND	ND	0.4	ND	ND	3.9	5.1	ND
Benzo [k] Fluoranthene	78	NE	10,000	mg/kg	55	25	0	0.65	22.7	7.6	10.9	ND	ND	ND	1.3	0.9	ND	4.5	9	ND
Bis [2-Chloroethyl]ether	NE	NE	10,000	mg/kg	49	1	0	0.36	0.36	ND	ND	ND	ND	ND	ND	ND	NA	NA	NA	NA
Carbazole	NE	NE	10,000	mg/kg	49	5	0	0.44	13	ND	ND	ND	ND	ND	ND	ND	NA	NA	NA	NA
Chrysene	780	NE	10,000	mg/kg	55	33	0	0.42	42	24.4	30.4	11.2	ND	ND	1.6	2.2	ND	16.7	30.5	ND
Dibenzo [a,h] Anthracene	0.8	NE	10,000	mg/kg	57	9	8	0.36	7.8	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibenzofuran	10,000	NE	10,000	mg/kg	49	9	0	0.4	14	ND	ND	ND	6.1	ND	0.4	2.5	NA	NA	NA	NA
Fluoranthene	10,000	NE	10,000	mg/kg	57	38	0	0.52	84	65.4	64.4	23.6	ND	ND	3.8	5.4	ND	38.7	75.8	ND
Fluorene	10,000	NE	10,000	mg/kg	56	30	0	0.37	85.1	12.6	68.5	11.8	10.4	4.7	5.1	6.2	85.1	16.2	31.8	ND
Indeno [1,2,3-cd] Pyrene	7.8	NE	10,000	mg/kg	55	22	5	0.72	27	5	6.1	ND	ND	ND	ND	ND	ND	5.3	9.2	ND
Naphthalene	10,000	NE	10,000	mg/kg	56	35	0	0.38	365	172	ND	144	252	43.5	13.5	59.2	217	5.6	20.6	161
Phenanthrene	10,000	NE	10,000	mg/kg	57	47	0	0.37	170	169	169	106	17.8	ND	13.8	14.6	111	45.1	101	53.1
Pyrene	10,000	NE	10,000	mg/kg	57	43	0	0.4	132	126	132	55.3	ND	ND	4.2	5.3	41.9	50	72.9	ND
Total Petroleum Hydrocarbons (TPH)																				
TPH	2,500	2,500	30,000	mg/kg	49	24	17	281	41000	7690	NA	6250	14800	1510	4520	1170	41000	2710	4300	10600
TPH (gasoline range)	2,500	2,500	30,000	mg/kg	10	10	0	11.7	1120	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TPH (diesel range)	2,500	2,500	30,000	mg/kg	10	10	8	777	21000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Inorganics																				
Total Cyanide	10,000	NE	10,000	mg/kg	35	27	0	0.053	52.3	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Antimony	820	NE	10,000	mg/kg	14	8	0	0.33	8.7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Arsenic	7	NE	10,000	mg/kg	26	24	4	1.5	15	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Barium	10,000	NE	10,000	mg/kg	24	23	0	6.6	116	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Beryllium	1.5	NE	10,000	mg/kg	14	14	0	0.23	0.54	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cadmium	1,000	NE	10,000	mg/kg	25	12	0	0.037	3.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chromium	10,000	NE	10,000	mg/kg	25	24	0	0.9	19.2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Copper	10,000	NE	10,000	mg/kg	14	14	0	2.5	176	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Iron	NE	NE	10,000	mg/kg	32	32	0	4880	30200	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lead	500	NE	NE	mg/kg	25	25	1	3.7	895	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Mercury	610	NE	10,000	mg/kg	25	11	0	0.027	0.78	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nickel	10,000	NE	10,000	mg/kg	13	13	0	1.5	19.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Selenium	10,000	NE	10,000	mg/kg	25	8	0	1.14	14.7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Silver	10,000	NE	10,000	mg/kg	25	10	0	0.58	6.6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Zinc	10,000	NE	10,000	mg/kg	14	14	0	26.6	99.1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

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 Providence, Rhode Island

	RIDEM Industrial Commercial Direct Exposure Criteria (I/C DEC)	RIDEM GB Leachability Criteria	RIDEM Upper Concentration Limit (UCL)	Sample Name: Date Collected: Sample Depth: Units	Number of Samples	Number of Detections	Number of Exceedances	Range Detected		RCA-4	RCA-5		RCA-20		RCA-21		RCA-40	ETP-19		
								Minimum	Maximum	September 1994	September 1994		October 1995		October 1995		April 1996	1996		
										8 - 10 FT	10 - 12 FT	14 - 16 FT	10 - 12 FT	16 - 17 FT	4 - 6 FT	8 - 10 FT	8 - 10 FT	2 FT	4-5 FT	7-8 FT
Volatile Organic Compounds (VOCs)																				
1,2,4 Trimethylbenzene	NE	NE	10,000	mg/kg	52	16	0	0.0368	95.3	ND	ND	ND	50.7	ND	5.1	ND	NA	NA	NA	NA
1,3,5 Trimethylbenzene	NE	NE	10,000	mg/kg	52	15	0	0.031	30.2	ND	ND	ND	ND	ND	ND	ND	NA	NA	NA	NA
4-Isopropyltoluene	NE	NE	10,000	mg/kg	52	9	0	0.25	14.4	ND	ND	ND	ND	ND	ND	ND	NA	NA	NA	NA
Benzene	200	4.3	10,000	mg/kg	52	11	0	0.0477	2.95	ND	ND	0.96	ND	ND	ND	ND	NA	NA	NA	NA
Chloroform	940	NE	10,000	mg/kg	52	2	0	0.0112	0.0159	ND	ND	ND	ND	ND	ND	ND	NA	NA	NA	NA
Ethylbenzene	10,000	62	10,000	mg/kg	52	17	1	0.01	97.3	35.4	0.47	13	18.7	ND	ND	ND	NA	NA	NA	NA
Isopropylbenzene	10,000	NE	10,000	mg/kg	52	5	0	0.785	8.9	ND	ND	ND	ND	ND	ND	ND	NA	NA	NA	NA
Methylene Chloride	760	NE	10,000	mg/kg	52	7	0	0.007	28	28	ND	ND	ND	ND	ND	ND	NA	NA	NA	NA
Naphthalene	NE	NE	10,000	mg/kg	52	22	0	0.45	825	ND	ND	ND	309	20.5	18.6	383	NA	NA	NA	NA
n-Butylbenzene	NE	NE	10,000	mg/kg	52	3	0	1.45	3.24	ND	ND	ND	ND	ND	ND	ND	NA	NA	NA	NA
n-Propylbenzene	NE	NE	10,000	mg/kg	52	6	0	0.518	5.6	ND	ND	ND	ND	ND	ND	ND	NA	NA	NA	NA
sec-Butylbenzene	NE	NE	10,000	mg/kg	52	5	0	0.41	3	ND	ND	ND	ND	ND	ND	ND	NA	NA	NA	NA
Styrene	190	64	10,000	mg/kg	52	2	1	0.041	77	ND	ND	ND	ND	ND	ND	ND	NA	NA	NA	NA
tert-Butylbenzene	NE	NE	10,000	mg/kg	52	3	0	0.0574	0.16	ND	ND	ND	ND	ND	ND	ND	NA	NA	NA	NA
Total Xylenes	10,000	NE	10,000	mg/kg	52	17	0	0.139	165	53.4	0.8	22.7	ND	ND	ND	ND	NA	NA	NA	NA
Toulene	10,000	62	10,000	mg/kg	52	8	1	0.134	81	13.5	0.19	2.47	ND	ND	ND	ND	NA	NA	NA	NA
Pesticides and Poly-Chlorinated Biphenyls (PCBs)																				
4-DDT	NE	NE	10,000	mg/kg	12	1	0	0.089	0.089	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1242	10	10	10,000	mg/kg	45	3	0	0.57	7.9	NA	NA	NA	ND	NA	NA	ND	NA	NA	NA	NA
Aroclor-1248	10	10	10,000	mg/kg	45	3	0	0.08	0.4	NA	NA	NA	ND	NA	NA	ND	NA	NA	NA	NA
Delta-BHC	NE	NE	10,000	mg/kg	12	1	0	0.025	0.025	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Endrin	NE	NE	10,000	mg/kg	12	2	0	0.12	0.41	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Endosulfan (II)	NE	NE	10,000	mg/kg	12	1	0	0.0063	0.0063	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Endrin Ketone	NE	NE	10,000	mg/kg	14	2	0	0.0044	0.0076	NA	NA	NA	ND	NA	NA	ND	NA	NA	NA	NA
Endosulfan sulfate	NE	NE	10,000	mg/kg	14	1	0	0.026	0.026	NA	NA	NA	ND	NA	NA	ND	NA	NA	NA	NA
Gamma-BHC	NE	NE	10,000	mg/kg	12	1	0	0.0021	0.0021	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Heptachlor Epoxide	NE	NE	10,000	mg/kg	12	1	0	0.0023	0.0023	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes

Data is compared to RIDEM Method 1 Standards. Shaded results represent exceedances of standards and subject to Note 2 below.

Table only indicates the compounds that were detected, other compounds were submitted for analysis, but not detected.

Table only shows explorations with the Liquefaction Work Area

ND - Not Detected

NA - Not Analyzed

Sample depths noted here are from original grade. This table presents data that has since been capped with an engineered soil cap. As such, the final grades are unknown and as such the modified sampling depths are unknown. Collected confirmatory samples are not included on this table.

Note 1. Sample depth is unknown, but noted as 2 feet below the water table.

Note 2. While the Direct Exposure and Leachability Criteria apply to the vadose zone, certain subsurface soil samples were collected below the water table to define the nature and extent of impact. The data comparisons summarized in these tables compare all subsurface soil data (vadose and saturated zone) to the I/C-DEC, GB

Leachability criteria and GB Upper Concentration Limit (UCLs).

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(Existing Capped Portion of STRAP Area)
 STRAP - Liquefaction Project
 Providence, Rhode Island

	RIDEM Industrial Commercial Direct Exposure Criteria (I/C DEC)	RIDEM GB Leachability Criteria	RIDEM Upper Concentration Limit (UCL)	Sample Name: Date Collected: Sample Depth: Units	Number of Samples	Number of Detections	Number of Exceedances	Range Detected		ETP-20	ETP-35	ETP-38	RCA-R10	B04	B05	B06	B09	B10	B11	
								Minimum	Maximum	1996		1996	1996	1996	1/27/2000	1/27/2000	1/27/2000	1/27/2000	1/27/2000	1/27/2000
										2-4.5 FT	4.5-6 FT	6 FT	8.5 FT	0-2 FT	2 - 4 FT	2 - 4 FT	2 - 4 FT	2 - 4 FT	2 - 4 FT	2 - 4 FT
Semi-Volatile Organic Compounds (SVOCs)																				
4-Nitroaniline	NE	NE	10,000	mg/kg	49	1	0	11.7	11.7	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND
m-Nitrosodiphenylamine	NE	NE	10,000	mg/kg	49	1	0	15.4	15.4	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND
2-Methylnaphthalene	10,000	NE	10,000	mg/kg	56	31	0	0.42	349	35	156	NA	NA	NA	70	0.46	ND	NA	1.2	0.73
Acenaphthene	10,000	NE	10,000	mg/kg	57	24	0	0.69	122	8.8	ND	NA	NA	NA	ND	ND	ND	ND	ND	ND
Acenaphthylene	10,000	NE	10,000	mg/kg	55	30	0	0.36	288	10.7	67.4	NA	NA	NA	NA	ND	ND	NA	ND	ND
Anthracene	10,000	NE	10,000	mg/kg	55	33	0	0.39	200	6.2	58	NA	NA	NA	NA	ND	ND	NA	0.67	ND
Benzo [a] Anthracene	7.8	NE	10,000	mg/kg	55	35	16	0.37	48	7.7	ND	NA	NA	NA	NA	0.71	ND	NA	1.4	ND
Benzo [a] Pyrene	0.8	NE	10,000	mg/kg	55	30	30	0.9	43.3	ND	ND	NA	NA	NA	NA	ND	ND	NA	ND	ND
Benzo [b] Fluoranthene	7.8	NE	10,000	mg/kg	55	34	14	0.37	57.6	4.6	ND	NA	NA	NA	NA	0.79	ND	NA	1.5	ND
Benzo [g,h,i] Perylene	10,000	NE	10,000	mg/kg	55	21	0	0.4	26	ND	ND	NA	NA	NA	NA	ND	ND	NA	ND	ND
Benzo [k] Fluoranthene	78	NE	10,000	mg/kg	55	25	0	0.65	22.7	ND	ND	NA	NA	NA	NA	ND	ND	NA	0.65	ND
Bis [2-Chloroethyl]ether	NE	NE	10,000	mg/kg	49	1	0	0.36	0.36	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND
Carbazole	NE	NE	10,000	mg/kg	49	5	0	0.44	13	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND
Chrysene	780	NE	10,000	mg/kg	55	33	0	0.42	42	5.4	ND	NA	NA	NA	NA	0.5	ND	NA	1.7	ND
Dibenzo [a,h] Anthracene	0.8	NE	10,000	mg/kg	57	9	8	0.36	7.8	ND	ND	NA	NA	NA	ND	ND	ND	ND	ND	ND
Dibenzofuran	10,000	NE	10,000	mg/kg	49	9	0	0.4	14	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND
Fluoranthene	10,000	NE	10,000	mg/kg	57	38	0	0.52	84	9	3.9	NA	NA	NA	3	0.72	ND	0.57	ND	ND
Fluorene	10,000	NE	10,000	mg/kg	56	30	0	0.37	85.1	10.3	18.2	NA	NA	NA	6.6	ND	ND	NA	ND	ND
Indeno [1,2,3-cd] Pyrene	7.8	NE	10,000	mg/kg	55	22	5	0.72	27	ND	ND	NA	NA	NA	NA	ND	ND	NA	ND	ND
Naphthalene	10,000	NE	10,000	mg/kg	56	35	0	0.38	365	13	246	NA	NA	NA	220	0.55	ND	NA	3.1	0.8
Phenanthrene	10,000	NE	10,000	mg/kg	57	47	0	0.37	170	14.9	20.3	NA	NA	NA	12	0.63	0.37	0.97	2	1.1
Pyrene	10,000	NE	10,000	mg/kg	57	43	0	0.4	132	14.4	ND	NA	NA	NA	3.4	0.84	ND	0.63	2.8	0.55
Total Petroleum Hydrocarbons (TPH)																				
TPH	2,500	2,500	30,000	mg/kg	49	24	17	281	41000	2580	15900	3220	9580	281	12000	ND	ND	1800	ND	5900
TPH (gasoline range)	2,500	2,500	30,000	mg/kg	10	10	0	11.7	1120	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TPH (diesel range)	2,500	2,500	30,000	mg/kg	10	10	8	777	21000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Inorganics																				
Total Cyanide	10,000	NE	10,000	mg/kg	35	27	0	0.053	52.3	NA	NA	NA	NA	ND	0.32	1.5	1.8	0.71	2.6	6.3
Antimony	820	NE	10,000	mg/kg	14	8	0	0.33	8.7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Arsenic	7	NE	10,000	mg/kg	26	24	4	1.5	15	NA	NA	NA	NA	ND	NA	NA	NA	NA	NA	NA
Barium	10,000	NE	10,000	mg/kg	24	23	0	6.6	116	NA	NA	NA	NA	42	NA	NA	NA	NA	NA	NA
Beryllium	1.5	NE	10,000	mg/kg	14	14	0	0.23	0.54	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cadmium	1,000	NE	10,000	mg/kg	25	12	0	0.037	3.5	NA	NA	NA	NA	ND	NA	NA	NA	NA	NA	NA
Chromium	10,000	NE	10,000	mg/kg	25	24	0	0.9	19.2	NA	NA	NA	NA	ND	NA	NA	NA	NA	NA	NA
Copper	10,000	NE	10,000	mg/kg	14	14	0	2.5	176	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Iron	NE	NE	10,000	mg/kg	32	32	0	4880	30200	NA	NA	NA	NA	NA	9680	11400	14300	16400	26400	18900
Lead	500	NE	NE	mg/kg	25	25	1	3.7	895	NA	NA	NA	NA	117	NA	NA	NA	NA	NA	NA
Mercury	610	NE	10,000	mg/kg	25	11	0	0.027	0.78	NA	NA	NA	NA	ND	NA	NA	NA	NA	NA	NA
Nickel	10,000	NE	10,000	mg/kg	13	13	0	1.5	19.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Selenium	10,000	NE	10,000	mg/kg	25	8	0	1.14	14.7	NA	NA	NA	NA	ND	NA	NA	NA	NA	NA	NA
Silver	10,000	NE	10,000	mg/kg	25	10	0	0.58	6.6	NA	NA	NA	NA	ND	NA	NA	NA	NA	NA	NA
Zinc	10,000	NE	10,000	mg/kg	14	14	0	26.6	99.1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table 1
Soil Analytical Data
(Existing Capped Portion of STRAP Area)
 STRAP - Liquefaction Project
 Providence, Rhode Island

	RIDEM Industrial Commercial Direct Exposure Criteria (I/C DEC)	RIDEM GB Leachability Criteria	RIDEM Upper Concentration Limit (UCL)	Sample Name: Date Collected: Sample Depth: Units	Number of Samples	Number of Detections	Number of Exceedances	Range Detected		ETP-20	ETP-35	ETP-38	RCA-R10	B04	B05	B06	B09	B10	B11	
								Minimum	Maximum	1996		1996	1996	1996	1/27/2000	1/27/2000	1/27/2000	1/27/2000	1/27/2000	1/27/2000
										2-4.5 FT	4.5-6 FT	6 FT	8.5 FT	0-2 FT	2 - 4 FT	2 - 4 FT	2 - 4 FT	2 - 4 FT	2 - 4 FT	2 - 4 FT
Volatile Organic Compounds (VOCs)																				
1,2,4 Trimethylbenzene	NE	NE	10,000	mg/kg	52	16	0	0.0368	95.3	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	
1,3,5 Trimethylbenzene	NE	NE	10,000	mg/kg	52	15	0	0.031	30.2	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	
4-Isopropyltoluene	NE	NE	10,000	mg/kg	52	9	0	0.25	14.4	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	
Benzene	200	4.3	10,000	mg/kg	52	11	0	0.0477	2.95	NA	NA	NA	NA	ND	2.8	0.76	ND	ND	ND	0.41
Chloroform	940	NE	10,000	mg/kg	52	2	0	0.0112	0.0159	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	
Ethylbenzene	10,000	62	10,000	mg/kg	52	17	1	0.01	97.3	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	
Isopropylbenzene	10,000	NE	10,000	mg/kg	52	5	0	0.785	8.9	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	
Methylene Chloride	760	NE	10,000	mg/kg	52	7	0	0.007	28	NA	NA	NA	NA	0.007	ND	ND	ND	ND	ND	
Naphthalene	NE	NE	10,000	mg/kg	52	22	0	0.45	825	NA	NA	NA	NA	ND	300 E	ND	ND	ND	ND	3.8
n-Butylbenzene	NE	NE	10,000	mg/kg	52	3	0	1.45	3.24	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	
n-Propylbenzene	NE	NE	10,000	mg/kg	52	6	0	0.518	5.6	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	
sec-Butylbenzene	NE	NE	10,000	mg/kg	52	5	0	0.41	3	NA	NA	NA	NA	ND	1.3	ND	ND	ND	ND	0.41
Styrene	190	64	10,000	mg/kg	52	2	1	0.041	77	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	
tert-Butylbenzene	NE	NE	10,000	mg/kg	52	3	0	0.0574	0.16	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	
Total Xylenes	10,000	NE	10,000	mg/kg	52	17	0	0.139	165	NA	NA	NA	NA	ND	2.6	0.3	ND	ND	ND	
Toluene	10,000	62	10,000	mg/kg	52	8	1	0.134	81	NA	NA	NA	NA	ND	ND	0.41	ND	ND	ND	
Pesticides and Poly-Chlorinated Biphenyls (PCBs)																				
4-DDT	NE	NE	10,000	mg/kg	12	1	0	0.089	0.089	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1242	10	10	10,000	mg/kg	45	3	0	0.57	7.9	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	
Aroclor-1248	10	10	10,000	mg/kg	45	3	0	0.08	0.4	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	
Delta-BHC	NE	NE	10,000	mg/kg	12	1	0	0.025	0.025	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Endrin	NE	NE	10,000	mg/kg	12	2	0	0.12	0.41	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Endosulfan (II)	NE	NE	10,000	mg/kg	12	1	0	0.0063	0.0063	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Endrin Ketone	NE	NE	10,000	mg/kg	14	2	0	0.0044	0.0076	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Endosulfan sulfate	NE	NE	10,000	mg/kg	14	1	0	0.026	0.026	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Gamma-BHC	NE	NE	10,000	mg/kg	12	1	0	0.0021	0.0021	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Heptachlor Epoxide	NE	NE	10,000	mg/kg	12	1	0	0.0023	0.0023	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes

Data is compared to RIDEM Method 1 Standards. Shaded results represent exceedances of standards and subject to Note 2 below.

Table only indicates the compounds that were detected, other compounds were submitted for analysis, but not detected.

Table only shows explorations with the Liquefaction Work Area

ND - Not Detected

NA - Not Analyzed

Sample depths noted here are from original grade. This table presents data that has since been capped with an engineered soil cap. As such, the final grades are unknown and as such the modified sampling depths are unknown. Collected confirmatory samples are not included on this table.

Note 1. Sample depth is unknown, but noted as 2 feet below the water table.

Note 2. While the Direct Exposure and Leachability Criteria apply to the vadose zone, certain subsurface soil samples were collected below the water table to define the nature and extent of impact. The data comparisons summarized in these tables compare all subsurface soil data (vadose and saturated zone) to the I/C-DEC, GB

Leachability criteria and GB Upper Concentration Limit (UCLs).

Table 1
Soil Analytical Data
(Existing Capped Portion of STRAP Area)
 STRAP - Liquefaction Project
 Providence, Rhode Island

	RIDEM Industrial Commercial Direct Exposure Criteria (I/C DEC)	RIDEM GB Leachability Criteria	RIDEM Upper Concentration Limit (UCL)	Sample Name: Date Collected: Sample Depth: Units	Number of Samples	Number of Detections	Number of Exceedances	Range Detected		B14		B17		B18	B19	B20		B21		B22		B23	
								Minimum	Maximum	1/27/2000		1/31/2000		1/27/2000	1/27/2000	1/31/2000		1/31/2000		1/31/2000		1/31/2000	
										0-2 FT	2-4 FT	0 - 2 FT	4 - 6 FT	4 - 6 FT	2 - 4 FT	0 - 2 FT	4 - 6 FT	0 - 2 FT	4 - 6 FT	0 - 2 FT	4 - 6 FT	0 - 2 FT	4 - 6 FT
Semi-Volatile Organic Compounds (SVOCs)																							
4-Nitroaniline	NE	NE	10,000	mg/kg	49	1	0	11.7	11.7	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
m-Nitrosodiphenylamine	NE	NE	10,000	mg/kg	49	1	0	15.4	15.4	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Methylnaphthalene	10,000	NE	10,000	mg/kg	56	31	0	0.42	349	32	8.8	ND	ND	0.89	ND	ND	ND	3.8	ND	0.58	ND	ND	ND
Acenaphthene	10,000	NE	10,000	mg/kg	57	24	0	0.69	122	34	9.3	ND	ND	ND	ND	ND	1.5	ND	17	ND	ND	ND	ND
Acenaphthylene	10,000	NE	10,000	mg/kg	55	30	0	0.36	288	1.6	0.41	0.87	ND	2.7	0.73	1.7	ND	33	11	8.2	ND	ND	ND
Anthracene	10,000	NE	10,000	mg/kg	55	33	0	0.39	200	46	13	ND	ND	1.2	0.39	0.51	0.61	8.9	18	2.5	ND	ND	ND
Benzo [a] Anthracene	7.8	NE	10,000	mg/kg	55	35	16	0.37	48	48	11	2.7	ND	6.8	1.8	3	ND	21	10	15	ND	ND	ND
Benzo [a] Pyrene	0.8	NE	10,000	mg/kg	55	30	30	0.9	43.3	28	7.1	2.1	ND	5.2	1.5	2.6	ND	32	6.5	14	ND	ND	ND
Benzo [b] Fluoranthene	7.8	NE	10,000	mg/kg	55	34	14	0.37	57.6	33	7.9	3.6	ND	8.4	2.4	3.8	ND	50	5.1	16	ND	ND	ND
Benzo [g,h,i] Perylene	10,000	NE	10,000	mg/kg	55	21	0	0.4	26	12	2.5	ND	ND	3.5	1.2	1.6	ND	26	ND	6.9	ND	ND	ND
Benzo [k] Fluoranthene	78	NE	10,000	mg/kg	55	25	0	0.65	22.7	10	2.1	1.8	ND	2.7	0.93	1.7	ND	ND	2.5	6.5	ND	ND	ND
Bis [2-Chloroethyl]ether	NE	NE	10,000	mg/kg	49	1	0	0.36	0.36	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbazole	NE	NE	10,000	mg/kg	49	5	0	0.44	13	13	3.5	ND	ND	ND	ND	ND	ND	0.84	ND	ND	ND	ND	ND
Chrysene	780	NE	10,000	mg/kg	55	33	0	0.42	42	42	9.9	3.9	ND	7.3	2.2	3.6	ND	28	11	16	ND	ND	ND
Dibenzo [a,h] Anthracene	0.8	NE	10,000	mg/kg	57	9	8	0.36	7.8	5.6	0.81	ND	ND	ND	ND	ND	ND	7.8	ND	1.9	ND	ND	ND
Dibenzofuran	10,000	NE	10,000	mg/kg	49	9	0	0.4	14	14	4	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Fluoranthene	10,000	NE	10,000	mg/kg	57	38	0	0.52	84	84	20	2.8	ND	12	3.3	3.5	0.52	21	13	18	ND	ND	ND
Fluorene	10,000	NE	10,000	mg/kg	56	30	0	0.37	85.1	35	9.6	ND	ND	0.6	ND	ND	1.7	ND	34	ND	ND	ND	ND
Indeno [1,2,3-cd] Pyrene	7.8	NE	10,000	mg/kg	55	22	5	0.72	27	12	2.6	0.91	ND	3.2	1.1	1.6	ND	27	1.3	6.7	ND	ND	ND
Naphthalene	10,000	NE	10,000	mg/kg	56	35	0	0.38	365	32	9	ND	ND	1.4	0.84	ND	0.66	4.3	1.2	0.44	ND	ND	ND
Phenanthrene	10,000	NE	10,000	mg/kg	57	47	0	0.37	170	170	44	1.9	ND	8.1	1.9	1.9	3.1	8.5	49	4.1	ND	ND	ND
Pyrene	10,000	NE	10,000	mg/kg	57	43	0	0.4	132	95	23	7.3	ND	19	3.4	8	1.1	61	36	49	0.4	ND	ND
Total Petroleum Hydrocarbons (TPH)																							
TPH	2,500	2,500	30,000	mg/kg	49	24	17	281	41000	ND	1100	ND	ND	ND	ND	ND	ND	2800	2500	ND	ND	ND	ND
TPH (gasoline range)	2,500	2,500	30,000	mg/kg	10	10	0	11.7	1120	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TPH (diesel range)	2,500	2,500	30,000	mg/kg	10	10	8	777	21000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Inorganics																							
Total Cyanide	10,000	NE	10,000	mg/kg	35	27	0	0.053	52.3	0.2	0.053	2	0.059	2.2	0.37	0.6	0.24	10.7	0.095	0.97	0.15	0.16	0.099
Antimony	820	NE	10,000	mg/kg	14	8	0	0.33	8.7	ND	NA	8.1	NA	NA	NA	1.2	NA	1.5	NA	0.7	NA	0.65	NA
Arsenic	7	NE	10,000	mg/kg	26	24	4	1.5	15	4.6	NA	14.1	NA	NA	NA	6	NA	13.5	NA	5.2	ND	3	NA
Barium	10,000	NE	10,000	mg/kg	24	23	0	6.6	116	36.4	NA	116	NA	NA	NA	55.9	NA	28	NA	34.8	ND	15.7	NA
Beryllium	1.5	NE	10,000	mg/kg	14	14	0	0.23	0.54	0.37	NA	0.51	NA	NA	NA	0.4	NA	0.31	NA	0.3	NA	0.23	NA
Cadmium	1,000	NE	10,000	mg/kg	25	12	0	0.037	3.5	0.52	NA	3.5	NA	NA	NA	0.8	NA	1.4	NA	0.76	NA	1.8	NA
Chromium	10,000	NE	10,000	mg/kg	25	24	0	0.9	19.2	7.5	NA	19.2	NA	NA	NA	7.3	NA	11.1	NA	4.1	NA	10.6	NA
Copper	10,000	NE	10,000	mg/kg	14	14	0	2.5	176	28.3	NA	176	NA	NA	NA	35	NA	35.6	NA	13.8	NA	13.5	NA
Iron	NE	NE	10,000	mg/kg	32	32	0	4880	30200	13700	16500	30200	7910	15200	17800	6530	11800	14100	5370	7170	6760	16600	6840
Lead	500	NE	NE	mg/kg	25	25	1	3.7	895	192	NA	895	NA	NA	NA	176	NA	292	NA	76.7	NA	17	NA
Mercury	610	NE	10,000	mg/kg	25	11	0	0.027	0.78	0.18	NA	0.44	NA	NA	NA	0.085	NA	0.78	NA	0.12	NA	ND	NA
Nickel	10,000	NE	10,000	mg/kg	13	13	0	1.5	19.5	16.2	NA	19.5	NA	NA	NA	8.9	NA	12.6	NA	5.9	NA	11.6	NA
Selenium	10,000	NE	10,000	mg/kg	25	8	0	1.14	14.7	3.9	NA	ND	NA	NA	NA	ND	NA	ND	NA	ND	NA	ND	NA
Silver	10,000	NE	10,000	mg/kg	25	10	0	0.58	6.6	3.6	NA	6.6	NA	NA	NA	1.4	NA	2.7	NA	1.1	NA	2.8	NA
Zinc	10,000	NE	10,000	mg/kg	14	14	0	26.6	99.1	41.1	NA	99.1	NA	NA	NA	52.7	NA	34.7	NA	32.5	NA	46	NA

Table 1
Soil Analytical Data
(Existing Capped Portion of STRAP Area)
 STRAP - Liquefaction Project
 Providence, Rhode Island

	RIDEM Industrial Commercial Direct Exposure Criteria (I/C DEC)	RIDEM GB Leachability Criteria	RIDEM Upper Concentration Limit (UCL)	Sample Name: Date Collected: Sample Depth: Units	Number of Samples	Number of Detections	Number of Exceedances	Range Detected		B14		B17		B18	B19	B20		B21		B22		B23	
								Minimum	Maximum	1/27/2000		1/31/2000		1/27/2000	1/27/2000	1/31/2000		1/31/2000		1/31/2000		1/31/2000	
										0-2 FT	2-4 FT	0 - 2 FT	4 - 6 FT	4 - 6 FT	2 - 4 FT	0 - 2 FT	4 - 6 FT	0 - 2 FT	4 - 6 FT	0 - 2 FT	4 - 6 FT	0 - 2 FT	4 - 6 FT
Volatile Organic Compounds (VOCs)																							
1,2,4 Trimethylbenzene	NE	NE	10,000	mg/kg	52	16	0	0.0368	95.3	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.58	ND	ND	ND	ND
1,3,5 Trimethylbenzene	NE	NE	10,000	mg/kg	52	15	0	0.031	30.2	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.35	ND	ND	ND	ND
4-Isopropyltoluene	NE	NE	10,000	mg/kg	52	9	0	0.25	14.4	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.44	ND	ND	ND	ND
Benzene	200	4.3	10,000	mg/kg	52	11	0	0.0477	2.95	0.35	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroform	940	NE	10,000	mg/kg	52	2	0	0.0112	0.0159	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	10,000	62	10,000	mg/kg	52	17	1	0.01	97.3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Isopropylbenzene	10,000	NE	10,000	mg/kg	52	5	0	0.785	8.9	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Methylene Chloride	760	NE	10,000	mg/kg	52	7	0	0.007	28	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Naphthalene	NE	NE	10,000	mg/kg	52	22	0	0.45	825	16	ND	ND	ND	ND	ND	ND	ND	ND	3.3	ND	ND	ND	ND
n-Butylbenzene	NE	NE	10,000	mg/kg	52	3	0	1.45	3.24	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
n-Propylbenzene	NE	NE	10,000	mg/kg	52	6	0	0.518	5.6	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
sec-Butylbenzene	NE	NE	10,000	mg/kg	52	5	0	0.41	3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Styrene	190	64	10,000	mg/kg	52	2	1	0.041	77	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
tert-Butylbenzene	NE	NE	10,000	mg/kg	52	3	0	0.0574	0.16	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Total Xylenes	10,000	NE	10,000	mg/kg	52	17	0	0.139	165	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Toulene	10,000	62	10,000	mg/kg	52	8	1	0.134	81	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Pesticides and Poly-Chlorinated Biphenyls (PCBs)																							
4-DDT	NE	NE	10,000	mg/kg	12	1	0	0.089	0.089	ND	NA	ND	NA	NA	NA	ND	NA	ND	NA	0.089	NA	ND	NA
Aroclor-1242	10	10	10,000	mg/kg	45	3	0	0.57	7.9	ND	0.63	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Aroclor-1248	10	10	10,000	mg/kg	45	3	0	0.08	0.4	ND	ND	ND	ND	ND	0.4	ND	ND	ND	ND	ND	ND	ND	ND
Delta-BHC	NE	NE	10,000	mg/kg	12	1	0	0.025	0.025	ND	NA	ND	NA	NA	NA	ND	NA	ND	NA	ND	NA	ND	NA
Endrin	NE	NE	10,000	mg/kg	12	2	0	0.12	0.41	0.12	NA	ND	NA	NA	NA	0.41	NA	ND	NA	ND	NA	ND	NA
Endosulfan (II)	NE	NE	10,000	mg/kg	12	1	0	0.0063	0.0063	ND	NA	ND	NA	NA	NA	ND	NA	ND	NA	ND	NA	ND	NA
Endrin Ketone	NE	NE	10,000	mg/kg	14	2	0	0.0044	0.0076	ND	NA	ND	NA	NA	NA	ND	NA	ND	NA	ND	NA	ND	NA
Endosulfan sulfate	NE	NE	10,000	mg/kg	14	1	0	0.026	0.026	ND	NA	ND	NA	NA	NA	ND	NA	ND	NA	ND	NA	ND	NA
Gamma-BHC	NE	NE	10,000	mg/kg	12	1	0	0.0021	0.0021	ND	NA	ND	NA	NA	NA	ND	NA	ND	NA	ND	NA	ND	NA
Heptachlor Epoxide	NE	NE	10,000	mg/kg	12	1	0	0.0023	0.0023	ND	NA	ND	NA	NA	NA	ND	NA	ND	NA	ND	NA	ND	NA

Notes

Data is compared to RIDEM Method 1 Standards. Shaded results represent exceedances of standards and subject to Note 2 below.

Table only indicates the compounds that were detected, other compounds were submitted for analysis, but not detected.

Table only shows explorations with the Liquefaction Work Area

ND - Not Detected

NA - Not Analyzed

Sample depths noted here are from original grade. This table presents data that has since been capped with an engineered soil cap. As such, the final grades are unknown and as such the modified sampling depths are unknown. Collected confirmatory samples are not included on this table.

Note 1. Sample depth is unknown, but noted as 2 feet below the water table.

Note 2. While the Direct Exposure and Leachability Criteria apply to the vadose zone, certain subsurface soil samples were collected below the water table to define the nature and extent of impact. The data comparisons summarized in these tables compare all subsurface soil data (vadose and saturated zone) to the I/C-DEC, GB

Leachability criteria and GB Upper Concentration Limit (UCLs).

Table 1
Soil Analytical Data
(Existing Capped Portion of STRAP Area)
 STRAP - Liquefaction Project
 Providence, Rhode Island

	RIDEM Industrial Commercial Direct Exposure Criteria (I/C DEC)	RIDEM GB Leachability Criteria	RIDEM Upper Concentration Limit (UCL)	Sample Name: Date Collected: Sample Depth: Units	Number of Samples	Number of Detections	Number of Exceedances	Range Detected		B24		B25		B35		B55		D58		D59		TP-1	TP-2	
								Minimum	Maximum	2/1/2000		2/1/2000		2/22/2000		3/2/2000		12/8/1999		12/8/1999		5/20/2002	5/20/2002	
										0 -2 FT	6 - 8 FT	0 -2 FT	4 - 6 FT	0-2 FT	8-10 FT	0-2 FT	4-6 FT	0-2 FT	6-8 FT	0-2 FT	4-6 FT	Note 1	Note 1	
Semi-Volatile Organic Compounds (SVOCs)																								
4-Nitroaniline	NE	NE	10,000	mg/kg	49	1	0	11.7	11.7	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
m-Nitrosodiphenylamine	NE	NE	10,000	mg/kg	49	1	0	15.4	15.4	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Methylnaphthalene	10,000	NE	10,000	mg/kg	56	31	0	0.42	349	ND	1.1	0.42	1.9	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	12.9
Acenaphthene	10,000	NE	10,000	mg/kg	57	24	0	0.69	122	ND	ND	ND	ND	ND	ND	0.69	1.7	ND	ND	ND	ND	3.23	11.2	
Acenaphthylene	10,000	NE	10,000	mg/kg	55	30	0	0.36	288	ND	3.4	0.36	8.2	ND	0.47	ND	0.62	ND	ND	ND	ND	ND	ND	ND
Anthracene	10,000	NE	10,000	mg/kg	55	33	0	0.39	200	ND	1.3	ND	4.2	ND	0.5	ND	2	4.4	ND	ND	ND	ND	ND	6.27
Benzo [a] Anthracene	7.8	NE	10,000	mg/kg	55	35	16	0.37	48	1	4.9	1.3	16	0.37	1.7	ND	11	7	ND	ND	ND	ND	ND	3.3
Benzo [a] Pyrene	0.8	NE	10,000	mg/kg	55	30	30	0.9	43.3	1.2	6.2	1.3	27	ND	1.2	ND	12	3.4	ND	ND	ND	ND	ND	ND
Benzo [b] Fluoranthene	7.8	NE	10,000	mg/kg	55	34	14	0.37	57.6	1.4	6.5	1.9	25	0.37	1.6	ND	17	4.2	ND	ND	ND	ND	ND	ND
Benzo [g,h,i] Perylene	10,000	NE	10,000	mg/kg	55	21	0	0.4	26	0.75	4.4	0.79	23	ND	0.93	ND	7	1.2	ND	ND	ND	ND	ND	ND
Benzo [k] Fluoranthene	78	NE	10,000	mg/kg	55	25	0	0.65	22.7	0.81	2.6	0.85	11	ND	0.73	ND	5.8	2	ND	ND	ND	ND	ND	ND
Bis [2-Chloroethyl]ether	NE	NE	10,000	mg/kg	49	1	0	0.36	0.36	ND	0.36	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbazole	NE	NE	10,000	mg/kg	49	5	0	0.44	13	ND	ND	ND	ND	ND	ND	ND	1.8	0.44	ND	ND	ND	ND	ND	ND
Chrysene	780	NE	10,000	mg/kg	55	33	0	0.42	42	1.2	5.2	1.5	19	0.42	1.6	ND	15	7.2	ND	ND	ND	ND	ND	ND
Dibenzo [a,h] Anthracene	0.8	NE	10,000	mg/kg	57	9	8	0.36	7.8	ND	0.99	ND	3	ND	ND	ND	2	0.36	ND	ND	ND	ND	ND	ND
Dibenzofuran	10,000	NE	10,000	mg/kg	49	9	0	0.4	14	ND	ND	ND	ND	ND	ND	0.46	0.63	ND	ND	ND	ND	ND	ND	ND
Fluoranthene	10,000	NE	10,000	mg/kg	57	38	0	0.52	84	1.3	4.6	1.9	15	1.2	4.2	ND	24	15	ND	ND	ND	ND	ND	7.59
Fluorene	10,000	NE	10,000	mg/kg	56	30	0	0.37	85.1	ND	1	ND	ND	0.37	ND	0.68	2.1	ND	ND	ND	ND	ND	ND	8.25
Indeno [1,2,3-cd] Pyrene	7.8	NE	10,000	mg/kg	55	22	5	0.72	27	0.72	4.1	0.79	17	ND	1	ND	7.6	1.4	ND	ND	ND	ND	ND	ND
Naphthalene	10,000	NE	10,000	mg/kg	56	35	0	0.38	365	ND	1.3	0.5	2.5	ND	0.38	ND	ND	ND	ND	ND	ND	ND	ND	ND
Phenanthrene	10,000	NE	10,000	mg/kg	57	47	0	0.37	170	0.79	5.1	1.7	12	1.2	3.5	ND	12	12	ND	ND	ND	7.42	19.5	
Pyrene	10,000	NE	10,000	mg/kg	57	43	0	0.4	132	2.7	20	3.4	70	0.69	3	ND	22	11	ND	ND	ND	4.19	11.2	
Total Petroleum Hydrocarbons (TPH)																								
TPH	2,500	2,500	30,000	mg/kg	49	24	17	281	41000	ND	ND	ND	ND	ND	ND	ND	ND	1500	ND	ND	ND	NA	NA	
TPH (gasoline range)	2,500	2,500	30,000	mg/kg	10	10	0	11.7	1120	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	128	77.8	
TPH (diesel range)	2,500	2,500	30,000	mg/kg	10	10	8	777	21000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	10000	11900	
Inorganics																								
Total Cyanide	10,000	NE	10,000	mg/kg	35	27	0	0.053	52.3	0.23	2.1	0.87	2.5	ND	0.47	ND	3.6	ND	ND	ND	ND	NA	NA	
Antimony	820	NE	10,000	mg/kg	14	8	0	0.33	8.7	0.33	NA	0.81	NA	ND	NA	ND	NA	ND	NA	ND	NA	NA	NA	
Arsenic	7	NE	10,000	mg/kg	26	24	4	1.5	15	2	NA	9.3	NA	1.9	NA	1.5	NA	5.1	NA	6.6	NA	3.62	2.93	
Barium	10,000	NE	10,000	mg/kg	24	23	0	6.6	116	12.9	NA	39.8	NA	8.3	NA	6.6	NA	17.6	NA	28.9	NA	31	28.3	
Beryllium	1.5	NE	10,000	mg/kg	14	14	0	0.23	0.54	0.27	NA	0.46	NA	0.3	NA	0.29	NA	0.48	NA	0.54	NA	NA	NA	
Cadmium	1,000	NE	10,000	mg/kg	25	12	0	0.037	3.5	0.49	NA	1.9	NA	0.1	NA	0.037	NA	1.4	NA	1.5	NA	ND	ND	
Chromium	10,000	NE	10,000	mg/kg	25	24	0	0.9	19.2	2.8	NA	13.6	NA	1.7	NA	0.9	NA	9.4	NA	12.5	NA	2.62	4.3	
Copper	10,000	NE	10,000	mg/kg	14	14	0	2.5	176	12.5	NA	22.4	NA	2.5	NA	2.5	NA	14.4	NA	19.5	NA	NA	NA	
Iron	NE	NE	10,000	mg/kg	32	32	0	4880	30200	5480	5660	21000	12900	5600	13300	4880	12800	15100	15000	18100	17400	NA	NA	
Lead	500	NE	NE	mg/kg	25	25	1	3.7	895	16.7	NA	87.4	NA	3.7	NA	3.8	NA	11.2	NA	35.5	NA	15.5	23.8	
Mercury	610	NE	10,000	mg/kg	25	11	0	0.027	0.78	0.027	NA	0.061	NA	ND	NA	ND	NA	ND	NA	0.027	NA	ND	ND	
Nickel	10,000	NE	10,000	mg/kg	13	13	0	1.5	19.5	4.2	NA	17.1	NA	NA	NA	1.5	NA	15.7	NA	18.4	NA	NA	NA	
Selenium	10,000	NE	10,000	mg/kg	25	8	0	1.14	14.7	ND	NA	ND	NA	ND	NA	ND	NA	12.3	NA	14.7	NA	1.61	ND	
Silver	10,000	NE	10,000	mg/kg	25	10	0	0.58	6.6	0.98	NA	2.9	NA	ND	NA	ND	NA	0.58	NA	0.87	NA	ND	ND	
Zinc	10,000	NE	10,000	mg/kg	14	14	0	26.6	99.1	26.6	NA	60	NA	30.4	NA	33.4	NA	57.7	NA	41.2	NA	NA	NA	

Table 1
Soil Analytical Data
(Existing Capped Portion of STRAP Area)
 STRAP - Liquefaction Project
 Providence, Rhode Island

	RIDEM Industrial Commercial Direct Exposure Criteria (I/C DEC)	RIDEM GB Leachability Criteria	RIDEM Upper Concentration Limit (UCL)	Sample Name: Date Collected: Sample Depth: Units	Number of Samples	Number of Detections	Number of Exceedances	Range Detected		B24		B25		B35		B55		D58		D59		TP-1	TP-2	
								Minimum	Maximum	2/1/2000		2/1/2000		2/22/2000		3/2/2000		12/8/1999		12/8/1999		5/20/2002	5/20/2002	
										0 -2 FT	6 - 8 FT	0 -2 FT	4 - 6 FT	0-2 FT	8-10 FT	0-2 FT	4-6 FT	0-2 FT	6-8 FT	0-2 FT	4-6 FT	Note 1	Note 1	
Volatile Organic Compounds (VOCs)																								
1,2,4 Trimethylbenzene	NE	NE	10,000	mg/kg	52	16	0	0.0368	95.3	ND	ND	ND	ND	ND	ND	ND	ND	ND	2.4	ND	ND	13.3	3.44	
1,3,5 Trimethylbenzene	NE	NE	10,000	mg/kg	52	15	0	0.031	30.2	ND	ND	ND	ND	ND	ND	ND	ND	0.033	0.82	0.031	ND	4.35	0.67	
4-Isopropyltoluene	NE	NE	10,000	mg/kg	52	9	0	0.25	14.4	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2	0.57	
Benzene	200	4.3	10,000	mg/kg	52	11	0	0.0477	2.95	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.57	ND	ND	ND	
Chloroform	940	NE	10,000	mg/kg	52	2	0	0.0112	0.0159	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Ethylbenzene	10,000	62	10,000	mg/kg	52	17	1	0.01	97.3	ND	ND	ND	ND	ND	ND	ND	ND	ND	4.1	0.21	ND	1.65	0.38	
Isopropylbenzene	10,000	NE	10,000	mg/kg	52	5	0	0.785	8.9	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Methylene Chloride	760	NE	10,000	mg/kg	52	7	0	0.007	28	ND	ND	ND	ND	ND	0.63	ND	ND	0.077	1.6	0.066	0.074	ND	ND	
Naphthalene	NE	NE	10,000	mg/kg	52	22	0	0.45	825	ND	0.45	ND	ND	ND	ND	ND	ND	ND	83	ND	ND	51	9.71	
n-Butylbenzene	NE	NE	10,000	mg/kg	52	3	0	1.45	3.24	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
n-Propylbenzene	NE	NE	10,000	mg/kg	52	6	0	0.518	5.6	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
sec-Butylbenzene	NE	NE	10,000	mg/kg	52	5	0	0.41	3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Styrene	190	64	10,000	mg/kg	52	2	1	0.041	77	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
tert-Butylbenzene	NE	NE	10,000	mg/kg	52	3	0	0.0574	0.16	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Total Xylenes	10,000	NE	10,000	mg/kg	52	17	0	0.139	165	ND	ND	ND	ND	ND	ND	ND	ND	ND	6.8	ND	ND	3.95	0.9	
Toulene	10,000	62	10,000	mg/kg	52	8	1	0.134	81	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Pesticides and Poly-Chlorinated Biphenyls (PCBs)																								
4-DDT	NE	NE	10,000	mg/kg	12	1	0	0.089	0.089	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	NA	NA	NA
Aroclor-1242	10	10	10,000	mg/kg	45	3	0	0.57	7.9	ND	ND	0.57	7.9	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Aroclor-1248	10	10	10,000	mg/kg	45	3	0	0.08	0.4	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Delta-BHC	NE	NE	10,000	mg/kg	12	1	0	0.025	0.025	ND	NA	0.025	NA	ND	NA	ND	NA	ND	NA	ND	NA	NA	NA	NA
Endrin	NE	NE	10,000	mg/kg	12	2	0	0.12	0.41	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	NA	NA	NA
Endosulfan (II)	NE	NE	10,000	mg/kg	12	1	0	0.0063	0.0063	ND	NA	ND	NA	ND	NA	ND	NA	0.0063	NA	ND	NA	NA	NA	NA
Endrin Ketone	NE	NE	10,000	mg/kg	14	2	0	0.0044	0.0076	ND	NA	ND	NA	ND	NA	ND	NA	0.0044	NA	0.0076	NA	NA	NA	NA
Endosulfan sulfate	NE	NE	10,000	mg/kg	14	1	0	0.026	0.026	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	0.026	NA	NA	NA	NA
Gamma-BHC	NE	NE	10,000	mg/kg	12	1	0	0.0021	0.0021	ND	NA	ND	NA	ND	NA	ND	NA	0.0021	NA	ND	NA	NA	NA	NA
Heptachlor Epoxide	NE	NE	10,000	mg/kg	12	1	0	0.0023	0.0023	ND	NA	ND	NA	ND	NA	ND	NA	0.0023	NA	ND	NA	NA	NA	NA

Notes

Data is compared to RIDEM Method 1 Standards. Shaded results represent exceedances of standards and subject to Note 2 below.

Table only indicates the compounds that were detected, other compounds were submitted for analysis, but not detected.

Table only shows explorations with the Liquefaction Work Area

ND - Not Detected

NA - Not Analyzed

Sample depths noted here are from original grade. This table presents data that has since been capped with an engineered soil cap. As such, the final grades are unknown and as such the modified sampling depths are unknown. Collected confirmatory samples are not included on this table.

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Note 2. While the Direct Exposure and Leachability Criteria apply to the vadose zone, certain subsurface soil samples were collected below the water table to define the nature and extent of impact. The data comparisons summarized in these tables compare all subsurface soil data (vadose and saturated zone) to the I/C-DEC, GB

Leachability criteria and GB Upper Concentration Limit (UCLs).

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 STRAP - Liquefaction Project
 Providence, Rhode Island

	RIDEM Industrial Commercial Direct Exposure Criteria (I/C DEC)	RIDEM GB Leachability Criteria	RIDEM Upper Concentration Limit (UCL)	Sample Name: Date Collected: Sample Depth: Units	Number of Samples	Number of Detections	Number of Exceedances	Range Detected		TP-4	TP-6	TP-8	TP-9	TP-19	TP-25	TP-26	TP-27	GZ-314D	GZ-315D
								Minimum	Maximum	5/20/2002	5/20/2002	5/20/2002	5/20/2002	5/20/2002	5/20/2002	5/20/2002	5/20/2002	05/27/2014	05/28/2014
										Note 1	Note 1	Note 1	Note 1	Note 1	Note 1	Note 1	Note 1	4 - 6 FT	4 - 6 FT
Semi-Volatile Organic Compounds (SVOCs)																			
4-Nitroaniline	NE	NE	10,000	mg/kg	49	1	0	11.7	11.7	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA
m-Nitrosodiphenylamine	NE	NE	10,000	mg/kg	49	1	0	15.4	15.4	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA
2-Methylnaphthalene	10,000	NE	10,000	mg/kg	56	31	0	0.42	349	ND	26.1	58.6	24.8	ND	ND	182	349	141	10.5
Acenaphthene	10,000	NE	10,000	mg/kg	57	24	0	0.69	122	ND	19.1	14.8	14.2	ND	ND	10.4	62.3	36.1	ND
Acenaphthylene	10,000	NE	10,000	mg/kg	55	30	0	0.36	288	ND	ND	23.9	4.95	ND	ND	40.4	27.4	8.01	55.2
Anthracene	10,000	NE	10,000	mg/kg	55	33	0	0.39	200	ND	11.2	20.6	14.5	ND	ND	12.5	38.5	25.9	15.2
Benzo [a] Anthracene	7.8	NE	10,000	mg/kg	55	35	16	0.37	48	ND	5.94	12.4	6.93	ND	ND	6.06	21.6	14.1	22.3
Benzo [a] Pyrene	0.8	NE	10,000	mg/kg	55	30	30	0.9	43.3	ND	4.29	10.7	5.61	ND	ND	5.05	18.3	10.7	43.3
Benzo [b] Fluoranthene	7.8	NE	10,000	mg/kg	55	34	14	0.37	57.6	ND	4.62	10.7	4.62	ND	ND	4.04	15.8	7.49	57.6
Benzo [g,h,i] Perylene	10,000	NE	10,000	mg/kg	55	21	0	0.4	26	ND	ND	ND	ND	ND	ND	ND	ND	2.95	20.1
Benzo [k] Fluoranthene	78	NE	10,000	mg/kg	55	25	0	0.65	22.7	ND	5.25	ND	ND	ND	ND	ND	ND	3.02	22.7
Bis [2-Chloroethyl]ether	NE	NE	10,000	mg/kg	49	1	0	0.36	0.36	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA
Carbazole	NE	NE	10,000	mg/kg	49	5	0	0.44	13	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA
Chrysene	780	NE	10,000	mg/kg	55	33	0	0.42	42	ND	ND	10.7	5.28	ND	ND	4.38	18.3	12.5	28
Dibenzo [a,h] Anthracene	0.8	NE	10,000	mg/kg	57	9	8	0.36	7.8	ND	ND	ND	ND	ND	ND	ND	ND	ND	6.37
Dibenzofuran	10,000	NE	10,000	mg/kg	49	9	0	0.4	14	ND	ND	ND	ND	ND	ND	6.4	13.3	NA	NA
Fluoranthene	10,000	NE	10,000	mg/kg	57	38	0	0.52	84	ND	12.9	26.4	14.5	ND	ND	12.1	38.2	27.7	26.9
Fluorene	10,000	NE	10,000	mg/kg	56	30	0	0.37	85.1	ND	16.5	25.6	17.2	ND	ND	18.2	49.8	24.6	6.32
Indeno [1,2,3-cd] Pyrene	7.8	NE	10,000	mg/kg	55	22	5	0.72	27	ND	ND	ND	ND	ND	ND	ND	ND	2.56	17.7
Naphthalene	10,000	NE	10,000	mg/kg	56	35	0	0.38	365	ND	13.2	31.4	10.6	ND	ND	108	365	127	17.2
Phenanthrene	10,000	NE	10,000	mg/kg	57	47	0	0.37	170	25.2	33	66	59.4	6.27	ND	40.4	158	106	21
Pyrene	10,000	NE	10,000	mg/kg	57	43	0	0.4	132	23.5	18.5	38	23.8	ND	ND	24.9	76.4	34.5	51.7
Total Petroleum Hydrocarbons (TPH)																			
TPH	2,500	2,500	30,000	mg/kg	49	24	17	281	41000	NA	NA	NA	NA	NA	NA	NA	NA	6920	6310
TPH (gasoline range)	2,500	2,500	30,000	mg/kg	10	10	0	11.7	1120	113	107	588	150	300	11.7	912	1120	NA	NA
TPH (diesel range)	2,500	2,500	30,000	mg/kg	10	10	8	777	21000	21000	11000	12200	5420	3410	777	2050	10600	NA	NA
Inorganics																			
Total Cyanide	10,000	NE	10,000	mg/kg	35	27	0	0.053	52.3	NA	NA	NA	NA	NA	NA	NA	NA	ND	52.3
Antimony	820	NE	10,000	mg/kg	14	8	0	0.33	8.7	NA	NA	NA	NA	NA	NA	NA	NA	ND	8.7
Arsenic	7	NE	10,000	mg/kg	26	24	4	1.5	15	3.54	6.48	4.76	4.22	4.57	2.38	2.92	3.74	3.8	15
Barium	10,000	NE	10,000	mg/kg	24	23	0	6.6	116	20.3	11.8	20.2	20.2	21	19	14.2	17.1	NA	NA
Beryllium	1.5	NE	10,000	mg/kg	14	14	0	0.23	0.54	NA	NA	NA	NA	NA	NA	NA	NA	0.54	0.35
Cadmium	1,000	NE	10,000	mg/kg	25	12	0	0.037	3.5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chromium	10,000	NE	10,000	mg/kg	25	24	0	0.9	19.2	3.54	8	10.7	11.1	10.5	8.51	6.82	8.27	7.7	8.7
Copper	10,000	NE	10,000	mg/kg	14	14	0	2.5	176	NA	NA	NA	NA	NA	NA	NA	NA	13.2	30.9
Iron	NE	NE	10,000	mg/kg	32	32	0	4880	30200	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lead	500	NE	NE	mg/kg	25	25	1	3.7	895	26	12.4	11	7.29	125	31.7	62	134	30.7	299
Mercury	610	NE	10,000	mg/kg	25	11	0	0.027	0.78	ND	ND	ND	ND	0.41	ND	ND	ND	0.047	0.451
Nickel	10,000	NE	10,000	mg/kg	13	13	0	1.5	19.5	NA	NA	NA	NA	NA	NA	NA	NA	7.2	11.3
Selenium	10,000	NE	10,000	mg/kg	25	8	0	1.14	14.7	1.38	1.14	2.29	1.34	ND	ND	ND	ND	ND	ND
Silver	10,000	NE	10,000	mg/kg	25	10	0	0.58	6.6	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Zinc	10,000	NE	10,000	mg/kg	14	14	0	26.6	99.1	NA	NA	NA	NA	NA	NA	NA	NA	28.7	46.4

Table 1
Soil Analytical Data
(Existing Capped Portion of STRAP Area)
 STRAP - Liquefaction Project
 Providence, Rhode Island

	RIDEM Industrial Commercial Direct Exposure Criteria (I/C DEC)	RIDEM GB Leachability Criteria	RIDEM Upper Concentration Limit (UCL)	Sample Name: Date Collected: Sample Depth: Units	Number of Samples	Number of Detections	Number of Exceedances	Range Detected		TP-4	TP-6	TP-8	TP-9	TP-19	TP-25	TP-26	TP-27	GZ-314D	GZ-315D
								Minimum	Maximum	5/20/2002	5/20/2002	5/20/2002	5/20/2002	5/20/2002	5/20/2002	5/20/2002	5/20/2002	05/27/2014	05/28/2014
										Note 1	Note 1	Note 1	Note 1	Note 1	Note 1	Note 1	Note 1	4 - 6 FT	4 - 6 FT
Volatile Organic Compounds (VOCs)																			
1,2,4 Trimethylbenzene	NE	NE	10,000	mg/kg	52	16	0	0.0368	95.3	3.08	5.9	47.2	9.5	0.14	11.4	68	95.3	13.3	0.0368
1,3,5 Trimethylbenzene	NE	NE	10,000	mg/kg	52	15	0	0.031	30.2	2.08	2.1	24	2.7	ND	5.1	27.8	30.2	2.36	0.0352
4-Isopropyltoluene	NE	NE	10,000	mg/kg	52	9	0	0.25	14.4	0.325	ND	4.15	ND	0.25	1.4	ND	14.4	1.5	ND
Benzene	200	4.3	10,000	mg/kg	52	11	0	0.0477	2.95	ND	ND	2.7	ND	ND	ND	2.95	2.6	1.97	0.0477
Chloroform	940	NE	10,000	mg/kg	52	2	0	0.0112	0.0159	ND	ND	ND	ND	ND	ND	ND	ND	0.0112	0.0159
Ethylbenzene	10,000	62	10,000	mg/kg	52	17	1	0.01	97.3	0.2	1.15	22.5	1.85	ND	4.6	37.6	97.3	5.98	0.01
Isopropylbenzene	10,000	NE	10,000	mg/kg	52	5	0	0.785	8.9	ND	ND	4.1	ND	0.785	1.2	ND	8.9	0.883	ND
Methylene Chloride	760	NE	10,000	mg/kg	52	7	0	0.007	28	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Naphthalene	NE	NE	10,000	mg/kg	52	22	0	0.45	825	3.97	23.7	779	123	4.06	25.2	825	760	120	0.868
n-Butylbenzene	NE	NE	10,000	mg/kg	52	3	0	1.45	3.24	ND	1.45	ND	ND	3.24	ND	ND	ND	2.61	ND
n-Propylbenzene	NE	NE	10,000	mg/kg	52	6	0	0.518	5.6	ND	ND	1.2	ND	1.97	1.15	2.3	5.6	0.518	ND
sec-Butylbenzene	NE	NE	10,000	mg/kg	52	5	0	0.41	3	ND	ND	ND	ND	1.47	ND	ND	3	0.469	ND
Styrene	190	64	10,000	mg/kg	52	2	1	0.041	77	ND	ND	ND	ND	ND	ND	77	ND	ND	0.041
tert-Butylbenzene	NE	NE	10,000	mg/kg	52	3	0	0.0574	0.16	0.16	ND	ND	ND	0.125	ND	ND	ND	0.0574	ND
Total Xylenes	10,000	NE	10,000	mg/kg	52	17	0	0.139	165	1.2	1.09	61.9	2.95	ND	7.4	165	107	2.67	0.139
Toluene	10,000	62	10,000	mg/kg	52	8	1	0.134	81	ND	ND	3.7	ND	ND	ND	81	ND	0.43	0.134
Pesticides and Poly-Chlorinated Biphenyls (PCBs)																			
4-DDT	NE	NE	10,000	mg/kg	12	1	0	0.089	0.089	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1242	10	10	10,000	mg/kg	45	3	0	0.57	7.9	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA
Aroclor-1248	10	10	10,000	mg/kg	45	3	0	0.08	0.4	ND	ND	ND	ND	0.08	ND	ND	ND	NA	NA
Delta-BHC	NE	NE	10,000	mg/kg	12	1	0	0.025	0.025	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Endrin	NE	NE	10,000	mg/kg	12	2	0	0.12	0.41	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Endosulfan (II)	NE	NE	10,000	mg/kg	12	1	0	0.0063	0.0063	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Endrin Ketone	NE	NE	10,000	mg/kg	14	2	0	0.0044	0.0076	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Endosulfan sulfate	NE	NE	10,000	mg/kg	14	1	0	0.026	0.026	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Gamma-BHC	NE	NE	10,000	mg/kg	12	1	0	0.0021	0.0021	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Heptachlor Epoxide	NE	NE	10,000	mg/kg	12	1	0	0.0023	0.0023	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes

Data is compared to RIDEM Method 1 Standards. Shaded results represent exceedances of standards and subject to Note 2 below.

Table only indicates the compounds that were detected, other compounds were submitted for analysis, but not detected.

Table only shows explorations with the Liquefaction Work Area

ND - Not Detected

NA - Not Analyzed

Sample depths noted here are from original grade. This table presents data that has since been capped with an engineered soil cap. As such, the final grades are unknown and as such the modified sampling depths are unknown. Collected confirmatory samples are not included on this table.

Note 1. Sample depth is unknown, but noted as 2 feet below the water table.

Note 2. While the Direct Exposure and Leachability Criteria apply to the vadose zone, certain subsurface soil samples were collected below the water table to define the nature and extent of impact. The data comparisons summarized in these tables compare all subsurface soil data (vadose and saturated zone) to the I/C-DEC, GB

Leachability criteria and GB Upper Concentration Limit (UCLs).

Table 2
Soil Analytical Data
Collected from within the Former Gasholder Foundation
 STRAP - Liquefaction
 Providence, Rhode Island

	RIDEM Industrial Commercial Direct Exposure Criteria (I/C DEC)	RIDEM GB Leachability Criteria	RIDEM Upper Concentration Limit (UCL)	Sample Name: Date Collected: Sample Depth: Units	Number of Samples	Number of Detections	Number of Exceedances	Range Detected		RCA-B11		RHB-1				RHB-2				RHB-3				
								Minimum	Maximum	October 1995		September 1998				September 1998				September 1998				
										3.5 - 5.5 FT	7.5 - 9.5 FT	1 - 2 FT	2 - 4 FT	4 - 6 FT	6 - 8 FT	8 - 10 FT	0 - 2 FT	2 - 4 FT	4 - 6 FT	6 - 8 FT	0 - 2 FT	2 - 4 FT	4 - 6 FT	6 - 8 FT
Semi-Volatile Organic Compounds (SVOCs)																								
2-Methylnaphthalene	10,000	NE	10,000	mg/kg	27	17	0	0.28	336	336	301	ND	ND	ND	0.28	ND	ND	ND	15	9.9	ND	ND	ND	8.6
Acenaphthene	10,000	NE	10,000	mg/kg	27	15	0	0.22	73.6	73.6	45.8	ND	ND	ND	ND	ND	ND	ND	5.3	3	ND	ND	ND	2
Acenaphthylene	10,000	NE	10,000	mg/kg	27	13	0	0.26	197	197	169	ND	ND	ND	ND	ND	ND	ND	0.72	0.62	ND	ND	ND	ND
Anthracene	10,000	NE	10,000	mg/kg	27	15	0	0.29	130	130	ND	ND	ND	ND	ND	ND	ND	ND	2.5	1.8	ND	ND	ND	0.69
Benzo [a] Anthracene	7.8	NE	10,000	mg/kg	27	12	0	0.27	6.2	ND	ND	ND	ND	ND	ND	ND	ND	ND	2.4	1.4	ND	ND	ND	0.28
Benzo [a] Pyrene	0.8	NE	10,000	mg/kg	27	11	5	0.23	96	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.8	96	ND	ND	ND	ND
Benzo [b] Fluoranthene	7.8	NE	10,000	mg/kg	27	10	0	0.21	3.5	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.1	0.76	ND	ND	ND	ND
Benzo [g,h,i] Perylene	10,000	NE	10,000	mg/kg	27	7	0	0.23	0.95	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.48	0.23	ND	ND	ND	ND
Benzo [k] Fluoranthene	78	NE	10,000	mg/kg	27	7	0	0.24	1.3	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.48	0.24	ND	ND	ND	ND
Chrysene	780	NE	10,000	mg/kg	27	14	0	0.22	22	ND	ND	0.22	ND	ND	22	ND	ND	ND	2.2	1.4	ND	ND	ND	0.26
Dibenzo [a,h] Anthracene	0.8	NE	10,000	mg/kg	27	4	0	0.087	0.3	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.14	0.087	ND	ND	ND	ND
Dibenzofuran	10,000	NE	10,000	mg/kg	25	13	0	0.22	9.1	NA	NA	ND	ND	ND	ND	ND	ND	ND	1.7	1	ND	ND	ND	0.48
Fluoranthene	10,000	NE	10,000	mg/kg	27	14	0	0.41	10	ND	ND	ND	ND	ND	ND	ND	ND	ND	2.2	1.5	ND	ND	ND	0.5
Fluorene	10,000	NE	10,000	mg/kg	27	15	0	0.36	42.4	38.1	42.4	ND	ND	ND	ND	ND	ND	ND	5.1	ND	ND	ND	ND	1.4
Indeno [1,2,3-cd] Pyrene	7.8	NE	10,000	mg/kg	27	7	0	0.21	0.82	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.45	0.23	ND	ND	ND	ND
Naphthalene	10,000	NE	10,000	mg/kg	27	17	0	0.22	559	559	511	0.22	ND	ND	0.25	0.32	ND	ND	ND	ND	ND	ND	ND	9.2
Phenanthrene	10,000	NE	10,000	mg/kg	27	18	0	0.25	104	104	86.6	ND	ND	ND	0.38	0.25	ND	ND	12	7.4	ND	ND	ND	3
Pyrene	10,000	NE	10,000	mg/kg	27	15	0	0.27	19	ND	ND	0.27	ND	ND	ND	ND	ND	ND	5.4	2.6	ND	ND	ND	0.73
Total Petroleum Hydrocarbons (TPH)																								
TPH	2,500	2,500	30,000	mg/kg	26	16	6	110	27400	27400	21500	ND	ND	ND	ND	ND	ND	NA	950	1500	ND	ND	ND	1100
Volatile Organic Compounds (VOCs)																								
Benzene	200	4.3	10,000	mg/kg	25	20	1	0.001	31	NA	NA	0.02	0.019	0.033	0.015	0.1	0.003	ND	ND	0.6	0.001	0.006	0.24	0.12
Ethylbenzene	10,000	62	10,000	mg/kg	25	20	2	0.001	83	NA	NA	0.004	0.003	ND	0.001	0.016	ND	0.0011	10	17	ND	ND	11	0.62
Total Xylenes	10,000	NE	10,000	mg/kg	25	20	0	0.005	150	NA	NA	0.018	0.012	ND	0.007	0.034	ND	ND	9.3	4.9	ND	0.005	9.2	0.51
Toulene	10,000	62	10,000	mg/kg	25	14	0	0.001	1	NA	NA	0.017	0.01	0.001	0.006	0.016	0.002	ND	ND	ND	ND	0.003	ND	ND

Notes

Data is compared to RIDEM Method 1 Standards. Shaded results represent exceedances of standards and subject to Note 2 below.

Table only indicates the compounds that were detected, other compounds were submitted for analysis, but not detected.

Table only shows explorations with the Liquefaction Work Area

ND - Not Detected

NA - Not Analyzed

Sample depths noted here are from original grade. This table presents data that has since been capped with an engineered soil cap. As such, the final grades are unknown and as such the modified sampling depths are unknown. Collected confirmatory samples are not included on this table.

Note 2. While the Direct Exposure and Leachability Criteria apply to the vadose zone, certain subsurface soil samples were collected below the water table to define the nature and extent of impact. The data comparisons summarized in these tables compare all subsurface soil data (vadose and saturated zone) to the I/C-DEC, GB Leachability criteria and GB Upper Concentration Limit (UCLs).

Table 2
Soil Analytical Data
Collected from within the Former Gasholder Foundation
 STRAP - Liquefaction
 Providence, Rhode Island

	RIDEM Industrial Commercial Direct Exposure Criteria (I/C DEC)	RIDEM GB Leachability Criteria	RIDEM Upper Concentration Limit (UCL)	Sample Name: Date Collected: Sample Depth: Units	Number of Samples	Number of Detections	Number of Exceedances	Range Detected		RHB-4				RHB-5				RHB-6			
								Minimum	Maximum	September 1998				September 1998				September 1998			
										2 - 4 FT	6 - 8 FT	8 - 10 FT	10 - 12 FT	2 - 4 FT	4 - 6 FT	6 - 8 FT	8 - 10 FT	1 - 3 FT	3 - 5 FT	5 - 7 FT	7 - 9 FT
Semi-Volatile Organic Compounds (SVOCs)																					
2-Methylnaphthalene	10,000	NE	10,000	mg/kg	27	17	0	0.28	336	3.3	0.87	33	220	19	250	17	14	ND	0.52	8.7	43
Acenaphthene	10,000	NE	10,000	mg/kg	27	15	0	0.22	73.6	0.22	0.3	3.4	24	1.1	13	4.1	2.8	ND	ND	1.5	4.2
Acenaphthylene	10,000	NE	10,000	mg/kg	27	13	0	0.26	197	1.1	0.41	1.3	5.5	1.6	0.65	1.6	1.5	ND	0.26	ND	ND
Anthracene	10,000	NE	10,000	mg/kg	27	15	0	0.29	130	0.6	0.37	2	12	1.3	6.1	2.2	1.8	ND	0.29	0.62	1.7
Benzo [a] Anthracene	7.8	NE	10,000	mg/kg	27	12	0	0.27	6.2	0.43	0.27	0.94	6.2	1.2	3.4	1.3	0.95	ND	ND	ND	0.58
Benzo [a] Pyrene	0.8	NE	10,000	mg/kg	27	11	5	0.23	96	0.31	0.23	0.72	4.7	0.73	2.4	0.98	0.71	ND	ND	ND	0.42
Benzo [b] Fluoranthene	7.8	NE	10,000	mg/kg	27	10	0	0.21	3.5	0.21	ND	0.51	3.5	0.64	2	0.81	0.59	ND	ND	ND	0.32
Benzo [g,h,i] Perylene	10,000	NE	10,000	mg/kg	27	7	0	0.23	0.95	ND	ND	0.24	0.95	0.23	0.65	0.28	ND	ND	ND	ND	ND
Benzo [k] Fluoranthene	78	NE	10,000	mg/kg	27	7	0	0.24	1.3	ND	ND	0.35	1.3	0.45	0.73	0.38	ND	ND	ND	ND	ND
Chrysene	780	NE	10,000	mg/kg	27	14	0	0.22	22	0.37	0.23	0.81	5.1	1.1	3	1.2	0.86	ND	ND	ND	0.51
Dibenzo [a,h] Anthracene	0.8	NE	10,000	mg/kg	27	4	0	0.087	0.3	ND	ND	ND	0.3	ND	0.26	ND	ND	ND	ND	ND	ND
Dibenzofuran	10,000	NE	10,000	mg/kg	25	13	0	0.22	9.1	0.22	0.24	1.8	9.1	0.71	8.2	1.9	1.5	ND	ND	0.77	2.3
Fluoranthene	10,000	NE	10,000	mg/kg	27	14	0	0.41	10	0.77	0.44	1.6	10	2.1	8.5	3	2.3	ND	0.41	0.45	1.6
Fluorene	10,000	NE	10,000	mg/kg	27	15	0	0.36	42.4	1	0.63	3.7	22	2.5	12	4.3	3.5	ND	0.36	1.5	4
Indeno [1,2,3-cd] Pyrene	7.8	NE	10,000	mg/kg	27	7	0	0.21	0.82	ND	ND	0.22	0.82	0.21	0.71	0.31	ND	ND	ND	ND	ND
Naphthalene	10,000	NE	10,000	mg/kg	27	17	0	0.22	559	2.6	0.79	32	280	14	390	17	14	ND	0.29	4.8	46
Phenanthrene	10,000	NE	10,000	mg/kg	27	18	0	0.25	104	3.2	2	9.9	58	8.8	36	8.8	7.6	ND	1.3	3	7.7
Pyrene	10,000	NE	10,000	mg/kg	27	15	0	0.27	19	1.3	0.84	3.4	19	3.6	6	3.1	2.3	ND	0.52	0.46	1.5
Total Petroleum Hydrocarbons (TPH)																					
TPH	2,500	2,500	30,000	mg/kg	26	16	6	110	27400	310	440	3000	12000	1000	8300	1600	2200	ND	110	850	2500
Volatile Organic Compounds (VOCs)																					
Benzene	200	4.3	10,000	mg/kg	25	20	1	0.001	31	0.005	0.005	31	2.7	0.03	ND	ND	0.21	ND	0.002	0.11	0.55
Ethylbenzene	10,000	62	10,000	mg/kg	25	20	2	0.001	83	0.027	0.018	83	79	0.43	14	0.49	0.81	ND	0.002	0.42	0.3
Total Xylenes	10,000	NE	10,000	mg/kg	25	20	0	0.005	150	0.26	0.035	130	150	0.48	23	0.44	0.64	ND	0.007	0.23	0.11
Toulene	10,000	62	10,000	mg/kg	25	14	0	0.001	1	0.018	0.002	0.71	1	ND	ND	ND	0.012	ND	0.001	0.019	ND

Notes

Data is compared to RIDEM Method 1 Standards. Shaded results represent exceedances of standards and subject to Note 2 below.

Table only indicates the compounds that were detected, other compounds were submitted for analysis, but not detected.

Table only shows explorations with the Liquefaction Work Area

ND - Not Detected

NA - Not Analyzed

Sample depths noted here are from original grade. This table presents data that has since been capped with an engineered soil cap. As such, the final grades are unknown and as such the modified sampling depths are unknown. Collected confirmatory samples are not included on this table.

Note 2. While the Direct Exposure and Leachability Criteria apply to the vadose zone, certain subsurface soil samples were collected below the water table to define the nature and extent of impact. The data comparisons summarized in these tables compare all subsurface soil data (vadose and saturated zone) to the I/C-DEC, GB

Leachability criteria and GB Upper Concentration Limit (UCLs).

Table 3
Surface Soil Analytical Data
(Uncapped Portion of STRAP Area)
 STRAP - Liquefaction Project
 Providence, Rhode Island

	RIDEM Industrial Commercial Direct Exposure Criteria (I/C DEC)	RIDEM GB Leachability Criteria	RIDEM Upper Concentration Limit (UCL)	Sample Name:	Number of Samples	Number of Detections	Number of Exceedances	Range Detected		RCA-R6	RCA-R7	RCA-R11	A67	B02	B03	B07	B08	B12	B13	B26	B27			
				Date Collected:				Minimum	Maximum	1996	1996	1996	2/25/2000	1/27/2000	1/27/2000	1/27/2000	1/27/2000	1/27/2000	1/27/2000	1/27/2000	1/27/2000	2/3/2000	2/22/2000	
				Sample Depth:						0-2 FT	0-2 FT	0-2 FT	0 - 2 FT	0-2 FT	0 - 2 FT	0 - 2 FT	0 - 2 FT	0 - 2 FT	0 - 2 FT	0 - 2 FT	0 - 2 FT	0 - 2 FT	0-2 FT	0-2 FT
				Units																				
Semi-Volatile Organic Compounds (SVOCs)																								
2-Methylnaphthalene	10,000	NE	10,000	mg/kg	26	5	0	0.39	9.6	ND	ND	ND	ND	ND	ND	ND	0.39	ND	2.5	ND	ND			
Acenaphthene	10,000	NE	10,000	mg/kg	26	3	0	1	14	ND	ND	ND	ND	ND	ND	ND	ND	ND	1	ND	ND			
Acenaphthylene	10,000	NE	10,000	mg/kg	26	10	0	0.46	3.4	ND	ND	ND	ND	ND	ND	ND	3.1	ND	3.1	1.4	ND			
Anthracene	10,000	NE	10,000	mg/kg	26	10	0	0.44	25	ND	ND	ND	ND	ND	ND	ND	1.2	ND	9	1.1	ND			
Benzo [a] Anthracene	7.8	NE	10,000	mg/kg	26	15	6	0.437	32	0.437	12.8	ND	ND	ND	ND	ND	7.6	ND	25	3.3	ND			
Benzo [a] Pyrene	0.8	NE	10,000	mg/kg	26	14	12	0.391	20	0.391	12.1	ND	ND	ND	ND	ND	6.6	ND	20	3.4	ND			
Benzo [b] Fluoranthene	7.8	NE	10,000	mg/kg	26	15	7	0.42	26	0.821	20.6	ND	ND	ND	ND	ND	8.7	ND	26	4.7	ND			
Benzo [g,h,i] Perylene	10,000	NE	10,000	mg/kg	26	11	0	0.7	10	ND	ND	ND	ND	ND	ND	ND	5.2	ND	10	2.4	ND			
Benzo [k] Fluoranthene	78	NE	10,000	mg/kg	26	12	0	0.32	7.8	ND	ND	ND	ND	ND	ND	ND	1.9	ND	7.8	1.6	ND			
Carbazole	NE	NE	10,000	mg/kg	26	5	0	0.4	5.9	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.5	ND	ND			
Chrysene	780	NE	10,000	mg/kg	26	16	0	0.39	27	0.492	12.6	ND	ND	ND	ND	ND	8	ND	19	2.9	ND			
Dibenzo [a,h] Anthracene	0.8	NE	10,000	mg/kg	26	9	6	0.54	4.4	ND	ND	ND	ND	ND	ND	ND	1.5	ND	3.4	0.72	ND			
Dibenzofuran	10,000	NE	10,000	mg/kg	26	4	0	0.78	7.1	ND	ND	ND	ND	ND	ND	ND	ND	ND	3	ND	ND			
Fluoranthene	10,000	NE	10,000	mg/kg	26	17	0	0.388	42	1.08	29.8	0.388	ND	ND	0.77	ND	9	ND	39	5.4	ND			
Fluorene	10,000	NE	10,000	mg/kg	26	5	0	0.49	15	ND	ND	ND	ND	ND	ND	ND	ND	ND	5	ND	ND			
Indeno [1,2,3-cd] Pyrene	7.8	NE	10,000	mg/kg	26	11	2	0.72	10	ND	ND	ND	ND	ND	ND	ND	4.4	ND	10	2.5	ND			
Naphthalene	10,000	NE	10,000	mg/kg	26	7	0	0.4	7.6	ND	ND	ND	ND	ND	0.68	ND	0.51	ND	3.4	ND	ND			
Phenanthrene	10,000	NE	10,000	mg/kg	26	15	0	0.761	66	0.761	23.7	ND	ND	ND	1.1	ND	4.3	ND	32	3.1	ND			
Pyrene	10,000	NE	10,000	mg/kg	26	18	0	0.464	59	0.771	21.5	0.464	ND	ND	1.6	ND	22	ND	33	4.9	ND			
Total Petroleum Hydrocarbons (TPH)																								
TPH	2,500	2,500	30,000	mg/kg	26	2	0	46	415	46	415	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND			
Inorganics																								
Cyanide	10,000	NE	10,000	mg/kg	26	20	0	0.083	1.4	ND	0.7	ND	ND	0.65	0.5	0.73	1.3	0.28	0.4	0.6	ND			
Antimony	820	NE	10,000	mg/kg	23	1	0	0.32	0.32	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND			
Arsenic	7	NE	10,000	mg/kg	26	23	4	1.5	14.5	ND	ND	ND	6.2	3.1	5.6	4.7	4	6.6	4.4	6.4	1.5			
Barium	10,000	NE	10,000	mg/kg	26	25	0	6.5	197	17	165	ND	13.8	27.5	19.1	21.9	197	16.7	36.8	37.4	6.5			
Beryllium	1.5	NE	10,000	mg/kg	23	23	0	0.29	0.8	NA	NA	NA	0.34	0.36	0.38	0.3	0.39	0.31	0.45	0.4	0.29			
Cadmium	1,000	NE	10,000	mg/kg	26	20	0	0.1	1.8	ND	ND	ND	ND	0.46	0.63	0.5	0.73	0.54	0.86	1.5	0.1			
Chromium	10,000	NE	10,000	mg/kg	26	24	0	1.1	52.1	ND	45	ND	5.3	10	10.5	7.6	52.1	9.5	11.2	10.8	1.8			
Copper	10,000	NE	10,000	mg/kg	23	23	0	1.5	49.3	NA	NA	NA	4.1	15.3	15.8	15.3	40.4	13.5	18.2	22.1	3.4			
Iron	NE	NE	NE	mg/kg	23	23	0	4930	18800	NA	NA	NA	11200	14500	16900	13600	16500	15500	18100	15500	5490			
Lead	500	NE	10,000	mg/kg	26	25	0	2.9	181	9	181	ND	7.7	33.4	176	115	117	14.5	58.5	57.5	6.9			
Mercury	610	NE	10,000	mg/kg	26	18	0	0.045	1.3	ND	1.3	ND	ND	0.09	0.35	ND	0.31	0.21	0.18	0.48	ND			
Nickel	10,000	NE	10,000	mg/kg	18	17	0	3.1	28.4	NA	NA	NA	5.2	7.5	13.5	8.2	28.4	13.1	15	19.8	NA			
Selenium	10,000	NE	10,000	mg/kg	26	13	0	0.4	10	ND	ND	ND	ND	2.2	4.7	3.5	4.5	3.6	4.4	ND	ND			
Silver	10,000	NE	10,000	mg/kg	26	13	0	0.22	4.5	ND	ND	ND	ND	1.4	2.8	1.2	2	2.7	4.5	2.6	ND			
Zinc	10,000	NE	10,000	mg/kg	23	23	0	23.8	274	NA	NA	NA	23.8	39.4	41	44.7	274	33.5	44.9	69.5	30.4			
Volatile Organic Compounds (VOCs)																								
1,2,4 Trimethylbenzene	NE	NE	10,000	mg/kg	26	1	0	0.022	0.022	ND	0.022	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND			
1,3,5 Trimethylbenzene	NE	NE	10,000	mg/kg	26	2	0	0.02	0.048	ND	0.02	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND			
Benzene	200	4.3	10,000	mg/kg	26	6	0	0.037	2.1	ND	ND	ND	ND	ND	ND	ND	ND	0.29	2.1	ND	ND			
Chloroform	940	NE	10,000	mg/kg	26	1	0	0.22	0.22	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.22	ND			
Ethylbenzene	10,000	62	10,000	mg/kg	26	2	0	0.1	1.1	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.1	ND	ND			
Methylene Chloride	760	NE	10,000	mg/kg	26	7	0	0.041	0.64	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND			
Naphthalene	NE	NE	10,000	mg/kg	26	3	0	0.034	1	ND	0.034	ND	ND	ND	ND	ND	ND	ND	1	0.57	ND			
Toluene	10,000	62	10,000	mg/kg	26	6	0	0.045	3.9	ND	ND	ND	ND	ND	ND	ND	ND	0.22	3.9	ND	ND			
Total Xylenes	10,000	NE	10,000	mg/kg	26	6	0	0.005	2.9	ND	ND	0.005	ND	0.18	ND	ND	ND	ND	2.9	ND	ND			

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 Providence, Rhode Island

	RIDEM Industrial Commercial Direct Exposure Criteria (I/C DEC)	RIDEM GB Leachability Criteria	RIDEM Upper Concentration Limit (UCL)	Sample Name:	Number of Samples	Number of Detections	Number of Exceedances	Range Detected		RCA-R6	RCA-R7	RCA-R11	A67	B02	B03	B07	B08	B12	B13	B26	B27		
				Date Collected:				Minimum	Maximum	1996	1996	1996	2/25/2000	1/27/2000	1/27/2000	1/27/2000	1/27/2000	1/27/2000	1/27/2000	1/27/2000	2/3/2000	2/22/2000	
				Sample Depth:						0-2 FT	0-2 FT	0-2 FT	0 - 2 FT	0-2 FT	0 - 2 FT	0 - 2 FT	0 - 2 FT	0 - 2 FT	0 - 2 FT	0 - 2 FT	0 - 2 FT	0-2 FT	0-2 FT
				Units																			
Pesticides and Poly-Chlorinated Biphenols (PCBs)																							
Aroclor-1248	10	10	10,000	mg/kg	26	1	0	0.492	0.492	ND	0.492	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		
Alpha-Chlordane	NE	NE	10,000	mg/kg	23	1	0	0.0032	0.0032	NA	NA	NA	ND	0.0032	ND	ND	ND	ND	ND	ND	ND		
4,4-DDE	NE	NE	10,000	mg/kg	23	1	0	0.11	0.11	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND		
Delta-BHC	NE	NE	10,000	mg/kg	23	1	0	0.021	0.021	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	0.021	ND		
Endrin	NE	NE	10,000	mg/kg	23	2	0	0.0053	0.13	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	0.13	ND		
Endrin Ketone	NE	NE	10,000	mg/kg	23	1	0	0.14	0.14	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND		
Heptachlor Epoxide	NE	NE	10,000	mg/kg	23	1	0	0.038	0.038	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND		

Notes

Data is compared to RIDEM Method 1 Standards. Shaded results represent exceedances of standards.

Table only indicates the compounds that were detected, other compounds were submitted for analysis, but not detected.

Table only shows explorations with the Liquefaction Work Area

ND - Not Detected

NA - Not Analyzed

Sample depths noted here are from original grade. This table presents data that has since been capped with an engineered soil cap. As such, the final grades are unknown and as such the modified sampling depths are unknown. Collected confirmatory samples are not included on this table.

As described in the Remediation Regulations, the Direct Exposure and Leachability Criteria apply throughout the vadose zone. All surface soil data collected at the Site were collected within the vadose zone and comparisons to applicable I/C-DEC, GB Leachability Criteria and GB Upper Concentration Limits (UCLs) are presented for each sample.

Table 3
Surface Soil Analytical Data
(Uncapped Portion of STRAP Area)
 STRAP - Liquefaction Project
 Providence, Rhode Island

	RIDEM Industrial Commercial Direct Exposure Criteria (I/C DEC)	RIDEM GB Leachability Criteria	RIDEM Upper Concentration Limit (UCL)	Sample Name:	Number of Samples	Number of Detections	Number of Exceedances	Range Detected		B28	B36	B42	B43	B44	B45	B46	B56	B64	B65	B66			
				Date Collected:				Minimum	Maximum	2/23/2000	2/22/2000	2/22/2000	2/22/2000	2/22/2000	2/22/2000	2/18/2000	2/18/2000	2/18/2000	2/18/2000	2/18/2000	2/18/2000	2/18/2000	2/18/2000
				Sample Depth:						0-2 FT	0-2 FT	0 - 2 FT	0 - 2 FT	0 - 2 FT	0 - 2 FT	0 - 2 FT	0 - 2 FT	0 - 2 FT	0-2 FT	0-2 FT	0-2 FT	0-2 FT	
				Units																			
Semi-Volatile Organic Compounds (SVOCs)																							
2-Methylnaphthalene	10,000	NE	10,000	mg/kg	26	5	0	0.39	9.6	ND	ND	1.8	ND	ND	ND	ND	0.84	ND	9.6	ND			
Acenaphthene	10,000	NE	10,000	mg/kg	26	3	0	1	14	ND	ND	ND	ND	ND	ND	ND	1.1	ND	14	ND			
Acenaphthylene	10,000	NE	10,000	mg/kg	26	10	0	0.46	3.4	ND	0.72	3.4	0.67	3	ND	ND	0.88	0.46	0.68	ND			
Anthracene	10,000	NE	10,000	mg/kg	26	10	0	0.44	25	ND	0.58	6.3	0.52	2.9	ND	ND	3.4	0.44	25	ND			
Benzo [a] Anthracene	7.8	NE	10,000	mg/kg	26	15	6	0.437	32	ND	3.1	11	2.4	10	ND	ND	8.7	2.4	32	1.1			
Benzo [a] Pyrene	0.8	NE	10,000	mg/kg	26	14	12	0.391	20	ND	2.9	7.4	1.9	9.5	ND	ND	6.7	1.9	20	0.96			
Benzo [b] Fluoranthene	7.8	NE	10,000	mg/kg	26	15	7	0.42	26	ND	3.9	9.9	3.3	14	ND	0.42	8.6	2.9	23	1.3			
Benzo [g,h,i] Perylene	10,000	NE	10,000	mg/kg	26	11	0	0.7	10	ND	2.1	3.7	1.5	4.9	ND	ND	3.8	1.7	10	0.7			
Benzo [k] Fluoranthene	78	NE	10,000	mg/kg	26	12	0	0.32	7.8	ND	1.6	3.3	1.2	5.1	ND	ND	3.8	1.3	6.4	0.5			
Carbazole	NE	NE	10,000	mg/kg	26	5	0	0.4	5.9	ND	ND	2.2	ND	0.4	ND	ND	0.98	ND	5.9	ND			
Chrysene	780	NE	10,000	mg/kg	26	16	0	0.39	27	ND	3.4	9.2	2.6	10	ND	0.39	7.5	2.5	27	1.1			
Dibenzo [a,h] Anthracene	0.8	NE	10,000	mg/kg	26	9	6	0.54	4.4	ND	0.54	1.6	0.66	2	ND	ND	1.4	ND	4.4	ND			
Dibenzofuran	10,000	NE	10,000	mg/kg	26	4	0	0.78	7.1	ND	ND	2.4	ND	ND	ND	ND	0.78	ND	7.1	ND			
Fluoranthene	10,000	NE	10,000	mg/kg	26	17	0	0.388	42	ND	6.3	22	ND	16	ND	0.47	18	3.3	42	2			
Fluorene	10,000	NE	10,000	mg/kg	26	5	0	0.49	15	ND	ND	3.6	ND	0.49	ND	ND	1.4	ND	15	ND			
Indeno [1,2,3-cd] Pyrene	7.8	NE	10,000	mg/kg	26	11	2	0.72	10	ND	2.4	4.9	1.8	5.6	ND	ND	4.3	1.7	10	0.72			
Naphthalene	10,000	NE	10,000	mg/kg	26	7	0	0.4	7.6	ND	ND	1.6	ND	0.4	ND	ND	1.5	ND	7.6	ND			
Phenanthrene	10,000	NE	10,000	mg/kg	26	15	0	0.761	66	ND	2.4	18	1.6	3.1	ND	ND	11	2	66	1.1			
Pyrene	10,000	NE	10,000	mg/kg	26	18	0	0.464	59	ND	4.7	12	3.1	15	ND	0.67	11	4.5	59	1.7			
Total Petroleum Hydrocarbons (TPH)																							
TPH	2,500	2,500	30,000	mg/kg	26	2	0	46	415	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND			
Inorganics																							
Cyanide	10,000	NE	10,000	mg/kg	26	20	0	0.083	1.4	0.13	0.93	0.61	0.45	0.96	ND	ND	0.5	0.58	0.42	1.4			
Antimony	820	NE	10,000	mg/kg	23	1	0	0.32	0.32	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND			
Arsenic	7	NE	10,000	mg/kg	26	23	4	1.5	14.5	2.1	13.8	5.4	7.6	5.6	1.6	3.1	8.4	5.9	6.5	4.2			
Barium	10,000	NE	10,000	mg/kg	26	25	0	6.5	197	9.4	37.6	37.7	34.7	33.5	8.8	21.8	124	40.3	31.5	85.7			
Beryllium	1.5	NE	10,000	mg/kg	23	23	0	0.29	0.8	0.42	0.4	0.34	0.55	0.49	0.3	0.33	0.64	0.41	0.4	0.4			
Cadmium	1,000	NE	10,000	mg/kg	26	20	0	0.1	1.8	0.2	0.23	0.27	0.46	0.24	0.1	ND	0.38	0.23	0.26	ND			
Chromium	10,000	NE	10,000	mg/kg	26	24	0	1.1	52.1	2.4	9.8	11.1	9.8	10.4	1.1	3.4	12.9	8.5	9	12.5			
Copper	10,000	NE	10,000	mg/kg	23	23	0	1.5	49.3	3.3	20.6	30	25.9	20.7	1.5	7.1	49.3	24.3	25.6	15.6			
Iron	NE	NE	NE	mg/kg	23	23	0	4930	18800	6000	14800	15500	18800	14200	4930	6690	18600	11200	13900	10000			
Lead	500	NE	10,000	mg/kg	26	25	0	2.9	181	4.7	57.9	96.2	37.3	58.6	2.9	22	164	72.2	53.2	38.8			
Mercury	610	NE	10,000	mg/kg	26	18	0	0.045	1.3	ND	1.3	0.049	0.045	0.11	ND	0.27	0.19	0.31	0.3	0.26			
Nickel	10,000	NE	10,000	mg/kg	18	17	0	3.1	28.4	3.1	NA	ND	NA	NA	NA	4.7	19.8	11.6	11	9.5			
Selenium	10,000	NE	10,000	mg/kg	26	13	0	0.4	10	0.4	0.59	0.82	0.53	ND	ND	ND	ND	0.41	ND	ND			
Silver	10,000	NE	10,000	mg/kg	26	13	0	0.22	4.5	ND	ND	0.53	0.22	ND	ND	ND	ND	ND	ND	1.7			
Zinc	10,000	NE	10,000	mg/kg	23	23	0	23.8	274	33.1	62.4	133	96.3	60.7	29.9	39.5	146	60	55.1	51.2			
Volatile Organic Compounds (VOCs)																							
1,2,4 Trimethylbenzene	NE	NE	10,000	mg/kg	26	1	0	0.022	0.022	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND			
1,3,5 Trimethylbenzene	NE	NE	10,000	mg/kg	26	2	0	0.02	0.048	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND			
Benzene	200	4.3	10,000	mg/kg	26	6	0	0.037	2.1	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.92	ND			
Chloroform	940	NE	10,000	mg/kg	26	1	0	0.22	0.22	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND			
Ethylbenzene	10,000	62	10,000	mg/kg	26	2	0	0.1	1.1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND			
Methylene Chloride	760	NE	10,000	mg/kg	26	7	0	0.041	0.64	ND	0.64	0.61	0.45	ND	0.49	ND	ND	ND	ND	ND			
Naphthalene	NE	NE	10,000	mg/kg	26	3	0	0.034	1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND			
Toluene	10,000	62	10,000	mg/kg	26	6	0	0.045	3.9	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.66	ND			
Total Xylenes	10,000	NE	10,000	mg/kg	26	6	0	0.005	2.9	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND			

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 Providence, Rhode Island

	RIDEM Industrial Commercial Direct Exposure Criteria (I/C DEC)	RIDEM GB Leachability Criteria	RIDEM Upper Concentration Limit (UCL)	Sample Name:	Number of Samples	Number of Detections	Number of Exceedances	Range Detected		B28	B36	B42	B43	B44	B45	B46	B56	B64	B65	B66				
				Date Collected:				Minimum	Maximum	2/23/2000	2/22/2000	2/22/2000	2/22/2000	2/22/2000	2/22/2000	2/18/2000	2/18/2000	2/18/2000	2/18/2000	2/18/2000	2/18/2000	2/18/2000	2/18/2000	2/18/2000
				Sample Depth:						0-2 FT	0-2 FT	0 - 2 FT	0 - 2 FT	0 - 2 FT	0 - 2 FT	0 - 2 FT	0 - 2 FT	0-2 FT	0-2 FT	0-2 FT	0-2 FT	0-2 FT		
				Units																				
Pesticides and Poly-Chlorinated Biphenols (PCBs)																								
Aroclor-1248	10	10	10,000	mg/kg	26	1	0	0.492	0.492	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND				
Alpha-Chlordane	NE	NE	10,000	mg/kg	23	1	0	0.0032	0.0032	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND				
4,4-DDE	NE	NE	10,000	mg/kg	23	1	0	0.11	0.11	ND	ND	ND	ND	ND	ND	ND	0.11	ND	ND	ND				
Delta-BHC	NE	NE	10,000	mg/kg	23	1	0	0.021	0.021	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND				
Endrin	NE	NE	10,000	mg/kg	23	2	0	0.0053	0.13	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND				
Endrin Ketone	NE	NE	10,000	mg/kg	23	1	0	0.14	0.14	ND	ND	ND	ND	ND	ND	ND	0.14	ND	ND	ND				
Heptachlor Epoxide	NE	NE	10,000	mg/kg	23	1	0	0.038	0.038	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.038	ND				

Notes

Data is compared to RIDEM Method 1 Standards. Shaded results represent exceedances of standards.

Table only indicates the compounds that were detected, other compounds were submitted for analysis, but not detected.

Table only shows explorations with the Liquefaction Work Area

ND - Not Detected

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Sample depths noted here are from original grade. This table presents data that has since been capped with an engineered soil cap. As such, the final grades are unknown and as such the modified sampling depths are unknown. Collected confirmatory samples are not included on this table.

As described in the Remediation Regulations, the Direct Exposure and Leachability Criteria apply throughout the vadose zone. All surface soil data collected at the Site were collected within the vadose zone and comparisons to applicable I/C-DEC, GB Leachability Criteria and GB Upper Concentration Limits (UCLs) are presented for each sample.

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 STRAP - Liquefaction Project
 Providence, Rhode Island

	RIDEM Industrial Commercial Direct Exposure Criteria (I/C DEC)	RIDEM GB Leachability Criteria	RIDEM Upper Concentration Limit (UCL)	Sample Name:	Number of Samples	Number of Detections	Number of Exceedances	Range Detected		D32	D38	D57
				Date Collected:				Minimum	Maximum	12/1/1999	12/3/1999	12/8/1999
				Sample Depth: Units						0-2 FT	0-2 FT	0-2 FT
Semi-Volatile Organic Compounds (SVOCs)												
2-Methylnaphthalene	10,000	NE	10,000	mg/kg	26	5	0	0.39	9.6	ND	ND	ND
Acenaphthene	10,000	NE	10,000	mg/kg	26	3	0	1	14	ND	ND	ND
Acenaphthylene	10,000	NE	10,000	mg/kg	26	10	0	0.46	3.4	ND	ND	ND
Anthracene	10,000	NE	10,000	mg/kg	26	10	0	0.44	25	ND	ND	ND
Benzo [a] Anthracene	7.8	NE	10,000	mg/kg	26	15	6	0.437	32	0.64	0.82	ND
Benzo [a] Pyrene	0.8	NE	10,000	mg/kg	26	14	12	0.391	20	0.45	ND	ND
Benzo [b] Fluoranthene	7.8	NE	10,000	mg/kg	26	15	7	0.42	26	0.64	ND	ND
Benzo [g,h,i] Perylene	10,000	NE	10,000	mg/kg	26	11	0	0.7	10	ND	ND	ND
Benzo [k] Fluoranthene	78	NE	10,000	mg/kg	26	12	0	0.32	7.8	0.32	ND	ND
Carbazole	NE	NE	10,000	mg/kg	26	5	0	0.4	5.9	ND	ND	ND
Chrysene	780	NE	10,000	mg/kg	26	16	0	0.39	27	0.41	0.87	ND
Dibenzo [a,h] Anthracene	0.8	NE	10,000	mg/kg	26	9	6	0.54	4.4	ND	ND	ND
Dibenzofuran	10,000	NE	10,000	mg/kg	26	4	0	0.78	7.1	ND	ND	ND
Fluoranthene	10,000	NE	10,000	mg/kg	26	17	0	0.388	42	0.58	1.9	ND
Fluorene	10,000	NE	10,000	mg/kg	26	5	0	0.49	15	ND	ND	ND
Indeno [1,2,3-cd] Pyrene	7.8	NE	10,000	mg/kg	26	11	2	0.72	10	ND	ND	ND
Naphthalene	10,000	NE	10,000	mg/kg	26	7	0	0.4	7.6	ND	ND	ND
Phenanthrene	10,000	NE	10,000	mg/kg	26	15	0	0.761	66	ND	1.1	ND
Pyrene	10,000	NE	10,000	mg/kg	26	18	0	0.464	59	0.54	0.59	ND
Total Petroleum Hydrocarbons (TPH)												
TPH	2,500	2,500	30,000	mg/kg	26	2	0	46	415	ND	ND	ND
Inorganics												
Cyanide	10,000	NE	10,000	mg/kg	26	20	0	0.083	1.4	0.44	0.16	0.083
Antimony	820	NE	10,000	mg/kg	23	1	0	0.32	0.32	ND	0.32	ND
Arsenic	7	NE	10,000	mg/kg	26	23	4	1.5	14.5	4.9	14.5	5.5
Barium	10,000	NE	10,000	mg/kg	26	25	0	6.5	197	24.2	44.3	16.8
Beryllium	1.5	NE	10,000	mg/kg	23	23	0	0.29	0.8	0.41	0.8	0.38
Cadmium	1,000	NE	10,000	mg/kg	26	20	0	0.1	1.8	1.7	1.8	1.2
Chromium	10,000	NE	10,000	mg/kg	26	24	0	1.1	52.1	7.9	9.9	9
Copper	10,000	NE	10,000	mg/kg	23	23	0	1.5	49.3	22.2	24.7	12.8
Iron	NE	NE	NE	mg/kg	23	23	0	4930	18800	15300	15300	14000
Lead	500	NE	10,000	mg/kg	26	25	0	2.9	181	70.2	49.2	30.6
Mercury	610	NE	10,000	mg/kg	26	18	0	0.045	1.3	0.16	0.072	ND
Nickel	10,000	NE	10,000	mg/kg	18	17	0	3.1	28.4	14.3	13	14.2
Selenium	10,000	NE	10,000	mg/kg	26	13	0	0.4	10	10	ND	7.5
Silver	10,000	NE	10,000	mg/kg	26	13	0	0.22	4.5	1.3	3.1	0.71
Zinc	10,000	NE	10,000	mg/kg	23	23	0	23.8	274	40.1	61.2	33.1
Volatile Organic Compounds (VOCs)												
1,2,4 Trimethylbenzene	NE	NE	10,000	mg/kg	26	1	0	0.022	0.022	ND	ND	ND
1,3,5 Trimethylbenzene	NE	NE	10,000	mg/kg	26	2	0	0.02	0.048	ND	ND	0.048
Benzene	200	4.3	10,000	mg/kg	26	6	0	0.037	2.1	0.13	0.037	0.14
Chloroform	940	NE	10,000	mg/kg	26	1	0	0.22	0.22	ND	ND	ND
Ethylbenzene	10,000	62	10,000	mg/kg	26	2	0	0.1	1.1	ND	ND	0.1
Methylene Chloride	760	NE	10,000	mg/kg	26	7	0	0.041	0.64	0.079	0.041	0.084
Naphthalene	NE	NE	10,000	mg/kg	26	3	0	0.034	1	ND	ND	ND
Toluene	10,000	62	10,000	mg/kg	26	6	0	0.045	3.9	0.16	0.045	0.21
Total Xylenes	10,000	NE	10,000	mg/kg	26	6	0	0.005	2.9	0.1	0.034	0.28

Table 3
Surface Soil Analytical Data
(Uncapped Portion of STRAP Area)
 STRAP - Liquefaction Project
 Providence, Rhode Island

	RIDEM Industrial Commercial Direct Exposure Criteria (I/C DEC)	RIDEM GB Leachability Criteria	RIDEM Upper Concentration Limit (UCL)	Sample Name:	Number of Samples	Number of Detections	Number of Exceedances	Range Detected		D32	D38	D57
				Date Collected:				Minimum	Maximum	12/1/1999	12/3/1999	12/8/1999
				Sample Depth:						0-2 FT	0-2 FT	0-2 FT
				Units								
Pesticides and Poly-Chlorinated Biphenols (PCBs)												
Aroclor-1248	10	10	10,000	mg/kg	26	1	0	0.492	0.492	ND	ND	ND
Alpha-Chlordane	NE	NE	10,000	mg/kg	23	1	0	0.0032	0.0032	ND	ND	ND
4,4-DDE	NE	NE	10,000	mg/kg	23	1	0	0.11	0.11	ND	ND	ND
Delta-BHC	NE	NE	10,000	mg/kg	23	1	0	0.021	0.021	ND	ND	ND
Endrin	NE	NE	10,000	mg/kg	23	2	0	0.0053	0.13	ND	0.0053	ND
Endrin Ketone	NE	NE	10,000	mg/kg	23	1	0	0.14	0.14	ND	ND	ND
Heptachlor Epoxide	NE	NE	10,000	mg/kg	23	1	0	0.038	0.038	ND	ND	ND

Notes

Data is compared to RIDEM Method 1 Standards. Shaded results represent exceedances of standards.

Table only indicates the compounds that were detected, other compounds were submitted for analysis, but not detected.

Table only shows explorations with the Liquefaction Work Area

ND - Not Detected

NA - Not Analyzed

Sample depths noted here are from original grade. This table presents data that has since been capped with an engineered soil cap. As such, the final grades are unknown and as such the modified sampling depths are unknown. Collected confirmatory samples are not included on this table.

As described in the Remediation Regulations, the Direct Exposure and Leachability Criteria apply throughout the vadose zone. All surface soil data collected at the Site were collected within the vadose zone and comparisons to applicable I/C-DEC, GB Leachability Criteria and GB Upper Concentration Limits (UCLs) are presented for each sample.

Table 4
Subsurface Soil Analytical Data
(Uncapped Portion of STRAP Area)
 STRAP - Liquefaction Project
 Providence, Rhode Island

	RIDEM Industrial Commercial Direct Exposure Criteria (I/C DEC)	RIDEM GB Leachability Criteria	RIDEM Upper Concentration Limit (UCL)	Sample Name:	Number of Samples	Number of Detections	Number of Exceedances	Range Detected		RCA-14		RCA-23		RCA-39		ETP-21	ETP-31	SWBL-4		A67	B02	B03	B07
				Date Collected:				1994		October 1995		April 1996		1996	1996	1995		2/25/2000	1/27/2000	1/27/2000	1/27/2000		
				Sample Depth:				6-8 FT	19-20 FT	4 - 6 FT	14 - 16 FT	8 - 10 FT	12 - 14 FT	8 FT	0-6 FT	6-8 FT	20-22 FT	4-6 FT	2-4 FT	2 - 4 FT	4 - 6 FT		
				Units				Minimum	Maximum														
Semi-Volatile Organic Compounds (SVOCs)																							
2-Methylnaphthalene	10,000	NE	10,000	mg/kg	31	13	0	0.44	110	ND	ND	21.2	3.9	ND	ND	ND	ND	NA	NA	5	0.84	68	NA
Acenaphthene	10,000	NE	10,000	mg/kg	30	14	0	0.42	70.9	12.7	ND	ND	0.8	7.2	3.4	ND	ND	NA	NA	6.4	NA	NA	NA
Acenaphthylene	10,000	NE	10,000	mg/kg	29	12	0	0.35	52.4	52.4	ND	ND	ND	8.2	1.1	ND	ND	NA	NA	1.8	NA	NA	NA
Anthracene	10,000	NE	10,000	mg/kg	29	14	0	0.43	27	16	ND	ND	ND	5.2	3.9	ND	ND	NA	NA	5.7	NA	NA	NA
Benzo [a] Anthracene	7.8	NE	10,000	mg/kg	29	14	4	0.12	45	4.9	ND	ND	ND	2.9	2.5	ND	ND	NA	NA	9	NA	NA	NA
Benzo [a] Pyrene	0.8	NE	10,000	mg/kg	29	14	12	0.08	36	0.5	ND	ND	ND	1.7	1.4	ND	ND	NA	NA	8.9	NA	NA	NA
Benzo [b] Fluoranthene	7.8	NE	10,000	mg/kg	29	14	5	0.09	44	1.7	ND	ND	ND	1.3	1.1	ND	ND	NA	NA	11	NA	NA	NA
Benzo [g,h,i] Perylene	10,000	NE	10,000	mg/kg	29	12	0	0.5	18	0.5	ND	ND	ND	0.5	ND	ND	ND	NA	NA	4.8	NA	NA	NA
Benzo [k] Fluoranthene	78	NE	10,000	mg/kg	29	10	0	0.7	11	1.3	ND	ND	ND	ND	ND	ND	ND	NA	NA	2.9	NA	NA	NA
Carbazole	NE	NE	10,000	mg/kg	26	6	0	0.46	6.4	ND	ND	ND	ND	NA	NA	ND	ND	NA	NA	1	NA	NA	NA
Chrysene	780	NE	10,000	mg/kg	29	14	0	0.15	42	1.8	ND	ND	ND	1.7	1.4	ND	ND	NA	NA	8.2	NA	NA	NA
Dibenzo [a,h] Anthracene	0.8	NE	10,000	mg/kg	29	6	6	1.1	5.6	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA	1.3	NA	NA	NA
Dibenzofuran	10,000	NE	10,000	mg/kg	26	9	0	0.37	7.5	0.7	ND	ND	0.5	NA	NA	ND	ND	NA	NA	2.5	NA	NA	NA
Fluoranthene	10,000	NE	10,000	mg/kg	30	15	0	0.33	74	3.9	ND	ND	ND	4.2	3.8	ND	ND	NA	NA	17	NA	NA	NA
Fluorene	10,000	NE	10,000	mg/kg	30	16	0	0.41	49.2	ND	ND	ND	0.7	2.5	1.4	ND	ND	NA	NA	7.4	NA	NA	NA
Indeno [1,2,3-cd] Pyrene	7.8	NE	10,000	mg/kg	29	10	1	0.71	20	0.8	ND	ND	ND	ND	ND	ND	ND	NA	NA	5.5	NA	NA	NA
Naphthalene	10,000	NE	10,000	mg/kg	31	19	0	0.36	1970	ND	ND	370	51.7	1	0.8	ND	ND	NA	NA	16	6.1	600	NA
Phenanthrene	10,000	NE	10,000	mg/kg	32	19	0	0.49	102	ND	ND	ND	1.7	14.5	10.6	ND	ND	NA	NA	23	NA	11	0.49
Pyrene	10,000	NE	10,000	mg/kg	30	16	0	0.25	68	3.1	ND	ND	ND	8.3	7.4	ND	ND	NA	NA	21	NA	NA	NA
Total Petroleum Hydrocarbons (TPH)																							
TPH	2,500	2,500	30,000	mg/kg	34	12	7	526	15390	ND	NA	7880	995	595	526	ND	ND	ND	ND	2400	ND	10000	3200
Inorganics																							
Barium	10,000	NE	10,000	mg/kg	2	2	0	21	27	NA	NA	NA	NA	NA	NA	27	21	NA	NA	NA	NA	NA	NA
Chromium	10,000	NE	10,000	mg/kg	2	1	0	6	6	NA	NA	NA	NA	NA	NA	6	ND	NA	NA	NA	NA	NA	NA
Cyanide	10,000	NE	10,000	mg/kg	23	18	0	0.07	6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	6	0.56	0.41	0.31
Iron	NE	NE	NE	mg/kg	23	23	0	6870	21800	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	10100	14700	12600	12700
Lead	500	NE	10,000	mg/kg	2	1	0	28	28	NA	NA	NA	NA	NA	NA	ND	28	NA	NA	NA	NA	NA	NA

Table 4
Subsurface Soil Analytical Data
(Uncapped Portion of STRAP Area)
 STRAP - Liquefaction Project
 Providence, Rhode Island

	RIDEM Industrial Commercial Direct Exposure Criteria (I/C DEC)	RIDEM GB Leachability Criteria	RIDEM Upper Concentration Limit (UCL)	Sample Name:	Number of Samples	Number of Detections	Number of Exceedances	Range Detected		RCA-14		RCA-23		RCA-39		ETP-21	ETP-31	SWBL-4		A67	B02	B03	B07
				Date Collected:				1994		October 1995		April 1996		1996	1996	1995		2/25/2000	1/27/2000	1/27/2000	1/27/2000		
				Sample Depth:				6-8 FT	19-20 FT	4 - 6 FT	14 - 16 FT	8 - 10 FT	12 - 14 FT	8 FT	0-6 FT	6-8 FT	20-22 FT	4-6 FT	2-4 FT	2 - 4 FT	4 - 6 FT		
				Units				Minimum	Maximum														
Volatiles Organic Compounds (VOCs)																							
1,2,3 Trichlorobenzene	NE	NE	10,000	mg/kg	32	1	0	0.007	0.007	ND	ND	ND	ND	ND	NA	0.007	ND	NA	NA	ND	ND	ND	ND
1,2,4 Trimethylbenzene	NE	NE	10,000	mg/kg	32	4	0	0.84	84.4	ND	ND	ND	8.1	ND	NA	ND	ND	NA	NA	0.84	ND	ND	ND
1,3,5 Trimethylbenzene	NE	NE	10,000	mg/kg	32	5	0	0.29	41.7	ND	ND	ND	ND	ND	NA	ND	ND	NA	NA	ND	ND	0.29	ND
4-Isopropyltoluene	NE	NE	10,000	mg/kg	32	4	0	0.09	3.8	ND	ND	ND	ND	ND	NA	ND	ND	NA	NA	ND	ND	ND	ND
Benzene	200	4.3	10,000	mg/kg	32	7	2	0.17	18	ND	ND	ND	ND	ND	NA	ND	ND	NA	NA	0.25	0.44	1.6	ND
Carbon Disulfide	NE	NE	10,000	mg/kg	32	1	0	0.004	0.004	ND	ND	ND	ND	ND	NA	ND	ND	NA	NA	ND	ND	ND	ND
Ethylbenzene	10,000	62	10,000	mg/kg	32	7	1	0.08	160	0.08	ND	ND	ND	ND	NA	ND	ND	NA	NA	0.43	ND	2	ND
Isopropylbenzene	10,000	NE	10,000	mg/kg	32	3	0	0.09	9.6	ND	ND	ND	ND	ND	NA	ND	ND	NA	NA	ND	ND	ND	ND
Methylene Chloride	760	NE	10,000	mg/kg	31	8	0	0.008	0.99	ND	ND	ND	ND	NA	NA	ND	0.008	NA	NA	ND	ND	ND	ND
n-Butylbenzene	NE	NE	10,000	mg/kg	32	2	0	0.25	5.4	ND	ND	ND	ND	ND	NA	ND	ND	NA	NA	ND	ND	ND	ND
n-Propylbenzene	NE	NE	10,000	mg/kg	32	2	0	0.17	5.1	ND	ND	ND	ND	ND	NA	ND	ND	NA	NA	ND	ND	ND	ND
Naphthalene	NE	NE	10,000	mg/kg	32	13	0	0.057	2195	ND	ND	500	133	ND	NA	0.057	ND	NA	NA	11	2.7	25	0.71
sec-Butylbenzene	NE	NE	10,000	mg/kg	32	2	0	0.26	1.8	ND	ND	ND	ND	ND	NA	ND	ND	NA	NA	ND	ND	ND	0.26
Styrene	190	64	10,000	mg/kg	32	2	0	0.24	1.55	0.24	ND	ND	ND	ND	NA	ND	ND	NA	NA	ND	ND	ND	ND
Toluene	10,000	62	10,000	mg/kg	32	7	0	0.04	6.4	ND	ND	ND	ND	ND	NA	ND	ND	NA	NA	0.4	0.91	0.19	ND
Total Xylenes	10,000	NE	10,000	mg/kg	32	8	0	0.42	112.9	1.3	ND	ND	ND	ND	NA	ND	ND	NA	NA	0.42	0.5	1.1	ND

Notes

Data is compared to RIDEM Method 1 Standards. Shaded results represent exceedances of standards and subject to Note 2 below.

Table only indicates the compounds that were detected, other compounds were submitted for analysis, but not detected.

Table only shows explorations with the Liquefaction Work Area

ND - Not Detected

NA - Not Analyzed

Sample depths noted here are from original grade. This table presents data that has since been capped with an engineered soil cap. As such, the final grades are unknown and as such the modified sampling depths are unknown. Collected confirmatory samples are not included on this table.

Note 2. While the Direct Exposure and Leachability Criteria apply to the vadose zone, certain subsurface soil samples were collected below the water table to define the nature and extent of impact. The data comparisons summarized in these tables compare all subsurface soil data (vadose and saturated zone) to the I/C-DEC, GB Leachability criteria and GB Upper Concentration Limit (UCLs).

Table 4
Subsurface Soil Analytical Data
(Uncapped Portion of STRAP Area)
 STRAP - Liquefaction Project
 Providence, Rhode Island

	RIDEM Industrial Commercial Direct Exposure Criteria (I/C DEC)	RIDEM GB Leachability Criteria	RIDEM Upper Concentration Limit (UCL)	Sample Name:	Number of Samples	Number of Detections	Number of Exceedances	Range Detected		B08	B12	B13	B26	B27	B28	B36	B42	B43	B44	B45				
				Date Collected:				Minimum	Maximum	1/27/2000	1/27/2000	1/27/2000	2/3/2000	2/22/2000	2/23/2000	2/22/2000	2/22/2000	2/22/2000	2/22/2000	2/22/2000	2/22/2000	2/22/2000	2/22/2000	2/22/2000
				Sample Depth:						4 - 6 FT	4 - 6 FT	2 - 4 FT	4-6 FT	4-6 FT	8-10 FT	4-6 FT	4-6 FT	4 - 6 FT	8 - 10 FT	4 - 6 FT				
				Units																				
Semi-Volatile Organic Compounds (SVOCs)																								
2-Methylnaphthalene	10,000	NE	10,000	mg/kg	31	13	0	0.44	110	NA	67	110	ND	ND	0.6	ND	2.1	ND	ND	1.1				
Acenaphthene	10,000	NE	10,000	mg/kg	30	14	0	0.42	70.9	1.6	5.1	15	0.6	ND	ND	ND	ND	ND	ND	0.42				
Acenaphthylene	10,000	NE	10,000	mg/kg	29	12	0	0.35	52.4	NA	ND	ND	0.35	ND	0.88	ND	ND	ND	1.9	2.6				
Anthracene	10,000	NE	10,000	mg/kg	29	14	0	0.43	27	NA	2.2	ND	1	ND	0.73	ND	0.47	ND	8.9	2.4				
Benzo [a] Anthracene	7.8	NE	10,000	mg/kg	29	14	4	0.12	45	NA	ND	ND	1.9	ND	2.3	ND	1.5	ND	6.7	8				
Benzo [a] Pyrene	0.8	NE	10,000	mg/kg	29	14	12	0.08	36	NA	ND	ND	1.7	ND	1.9	ND	1.3	ND	8.8	7.3				
Benzo [b] Fluoranthene	7.8	NE	10,000	mg/kg	29	14	5	0.09	44	NA	ND	ND	2.5	ND	2.5	ND	1.8	ND	5.8	8.6				
Benzo [g,h,i] Perylene	10,000	NE	10,000	mg/kg	29	12	0	0.5	18	NA	ND	ND	1.3	ND	1.1	ND	0.62	ND	3.2	4.4				
Benzo [k] Fluoranthene	78	NE	10,000	mg/kg	29	10	0	0.7	11	NA	ND	ND	0.7	ND	0.78	ND	0.7	ND	ND	2.9				
Carbazole	NE	NE	10,000	mg/kg	26	6	0	0.46	6.4	NA	ND	ND	0.46	ND	ND	ND	ND	ND	ND	1.4				
Chrysene	780	NE	10,000	mg/kg	29	14	0	0.15	42	NA	ND	ND	2	ND	2.6	ND	1.5	ND	8.8	7.3				
Dibenzo [a,h] Anthracene	0.8	NE	10,000	mg/kg	29	6	6	1.1	5.6	NA	ND	ND	ND	ND	ND	ND	ND	ND	1.4	1.2				
Dibenzofuran	10,000	NE	10,000	mg/kg	26	9	0	0.37	7.5	NA	5.2	ND	0.37	ND	ND	ND	0.77	ND	ND	ND				
Fluoranthene	10,000	NE	10,000	mg/kg	30	15	0	0.33	74	0.48	1.9	ND	4	ND	3.4	ND	ND	ND	12	13				
Fluorene	10,000	NE	10,000	mg/kg	30	16	0	0.41	49.2	1.2	5.4	8.6	0.72	ND	0.41	ND	1.9	ND	ND	1				
Indeno [1,2,3-cd] Pyrene	7.8	NE	10,000	mg/kg	29	10	1	0.71	20	NA	ND	ND	1.1	ND	1.1	ND	0.71	ND	5.5	4.6				
Naphthalene	10,000	NE	10,000	mg/kg	31	19	0	0.36	1970	NA	150	620	0.36	ND	2.6	ND	1.3	ND	0.66	1.4				
Phenanthrene	10,000	NE	10,000	mg/kg	32	19	0	0.49	102	3.1	12	19	4.2	ND	2	ND	3.2	ND	4.2	8.1				
Pyrene	10,000	NE	10,000	mg/kg	30	16	0	0.25	68	0.92	2.1	ND	3.8	ND	4	ND	1.4	ND	14	15				
Total Petroleum Hydrocarbons (TPH)																								
TPH	2,500	2,500	30,000	mg/kg	34	12	7	526	15390	ND	6800	7400	ND	ND	ND	ND	ND	ND	ND	ND				
Inorganics																								
Barium	10,000	NE	10,000	mg/kg	2	2	0	21	27	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA				
Chromium	10,000	NE	10,000	mg/kg	2	1	0	6	6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA				
Cyanide	10,000	NE	10,000	mg/kg	23	18	0	0.07	6	0.29	0.43	0.33	4.8	0.25	3.5	ND	0.62	ND	0.22	0.67				
Iron	NE	NE	NE	mg/kg	23	23	0	6870	21800	13600	10700	14300	11800	6870	9790	14700	8710	16800	8530	13100				
Lead	500	NE	10,000	mg/kg	2	1	0	28	28	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA				

Table 4
Subsurface Soil Analytical Data
(Uncapped Portion of STRAP Area)
 STRAP - Liquefaction Project
 Providence, Rhode Island

	RIDEM Industrial Commercial Direct Exposure Criteria (I/C DEC)	RIDEM GB Leachability Criteria	RIDEM Upper Concentration Limit (UCL)	Sample Name:	Number of Samples	Number of Detections	Number of Exceedances	Range Detected		B08	B12	B13	B26	B27	B28	B36	B42	B43	B44	B45			
				Date Collected:				Minimum	Maximum	1/27/2000	1/27/2000	1/27/2000	2/3/2000	2/22/2000	2/23/2000	2/22/2000	2/22/2000	2/22/2000	2/22/2000	2/22/2000	2/22/2000	2/22/2000	2/22/2000
				Sample Depth:						4 - 6 FT	4 - 6 FT	2 - 4 FT	4-6 FT	4-6 FT	8-10 FT	4-6 FT	4-6 FT	4 - 6 FT	8 - 10 FT	4 - 6 FT			
				Units																			
Volatiles Organic Compounds (VOCs)																							
1,2,3 Trichlorobenzene	NE	NE	10,000	mg/kg	32	1	0	0.007	0.007	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND			
1,2,4 Trimethylbenzene	NE	NE	10,000	mg/kg	32	4	0	0.84	84.4	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND			
1,3,5 Trimethylbenzene	NE	NE	10,000	mg/kg	32	5	0	0.29	41.7	ND	0.5	8.8	ND	ND	ND	ND	ND	ND	ND	ND			
4-Isopropyltoluene	NE	NE	10,000	mg/kg	32	4	0	0.09	3.8	ND	ND	3.8	ND	ND	ND	ND	ND	ND	ND	ND			
Benzene	200	4.3	10,000	mg/kg	32	7	2	0.17	18	ND	0.69	18	ND	ND	ND	ND	ND	ND	ND	ND			
Carbon Disulfide	NE	NE	10,000	mg/kg	32	1	0	0.004	0.004	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND			
Ethylbenzene	10,000	62	10,000	mg/kg	32	7	1	0.08	160	ND	2.1	160	ND	ND	ND	ND	ND	ND	ND	ND			
Isopropylbenzene	10,000	NE	10,000	mg/kg	32	3	0	0.09	9.6	ND	ND	9.6	ND	ND	ND	ND	ND	ND	ND	ND			
Methylene Chloride	760	NE	10,000	mg/kg	31	8	0	0.008	0.99	ND	ND	ND	ND	0.45	ND	0.44	0.99	0.61	ND	ND			
n-Butylbenzene	NE	NE	10,000	mg/kg	32	2	0	0.25	5.4	ND	ND	5.4	ND	ND	ND	ND	ND	ND	ND	ND			
n-Propylbenzene	NE	NE	10,000	mg/kg	32	2	0	0.17	5.1	ND	ND	5.1	ND	ND	ND	ND	ND	ND	ND	ND			
Naphthalene	NE	NE	10,000	mg/kg	32	13	0	0.057	2195	ND	34	500	ND	ND	ND	ND	ND	ND	ND	ND			
sec-Butylbenzene	NE	NE	10,000	mg/kg	32	2	0	0.26	1.8	ND	ND	1.8	ND	ND	ND	ND	ND	ND	ND	ND			
Styrene	190	64	10,000	mg/kg	32	2	0	0.24	1.55	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND			
Toluene	10,000	62	10,000	mg/kg	32	7	0	0.04	6.4	ND	ND	ND	ND	ND	0.4	ND	ND	ND	ND	ND			
Total Xylenes	10,000	NE	10,000	mg/kg	32	8	0	0.42	112.9	ND	0.45	35	ND	ND	ND	ND	ND	ND	ND	ND			

Notes

Data is compared to RIDEM Method 1 Standards. Shaded results represent exceedances of standards and subject to Note 2 below.

Table only indicates the compounds that were detected, other compounds were submitted for analysis, but not detected.

Table only shows explorations with the Liquefaction Work Area

ND - Not Detected

NA - Not Analyzed

Sample depths noted here are from original grade. This table presents data that has since been capped with an engineered soil cap. As such, the final grades are unknown and as such the modified sampling depths are unknown. Collected confirmatory samples are not included on this table.

Note 2. While the Direct Exposure and Leachability Criteria apply to the vadose zone, certain subsurface soil samples were collected below the water table to define the nature and extent of impact. The data comparisons summarized in these tables compare all subsurface soil data (vadose and saturated zone) to the I/C-DEC, GB Leachability criteria and GB Upper Concentration Limit (UCLs).

Table 4
Subsurface Soil Analytical Data
(Uncapped Portion of STRAP Area)
 STRAP - Liquefaction Project
 Providence, Rhode Island

	RIDEM Industrial Commercial Direct Exposure Criteria (I/C DEC)	RIDEM GB Leachability Criteria	RIDEM Upper Concentration Limit (UCL)	Sample Name:	Number of Samples	Number of Detections	Number of Exceedances	Range Detected		B46	B56	B64	B65	B66	D32	D38	D57	VHB-17	MHA-1
				Date Collected:				Minimum	Maximum	2/18/2000	2/18/2000	2/18/2000	2/18/2000	2/18/2000	12/1/1999	12/3/1999	12/8/1999	1/17/2002	1/28/2003
				Sample Depth:						4 - 6 FT	4-6 FT	2-4 FT	2-4 FT	4-6 FT	4-6 FT	6-8 FT	2-4 FT	6 FT	12 - 14 FT
				Units															
Semi-Volatile Organic Compounds (SVOCs)																			
2-Methylnaphthalene	10,000	NE	10,000	mg/kg	31	13	0	0.44	110	0.44	4.4	ND	6.7	ND	ND	ND	ND	ND	ND
Acenaphthene	10,000	NE	10,000	mg/kg	30	14	0	0.42	70.9	1.1	8.4	ND	10	ND	ND	ND	ND	70.9	ND
Acenaphthylene	10,000	NE	10,000	mg/kg	29	12	0	0.35	52.4	0.65	3	ND	ND	ND	ND	ND	ND	25.6	0.66
Anthracene	10,000	NE	10,000	mg/kg	29	14	0	0.43	27	3	27	ND	16	ND	ND	ND	ND	ND	0.43
Benzo [a] Anthracene	7.8	NE	10,000	mg/kg	29	14	4	0.12	45	5.7	45	ND	6	ND	ND	ND	ND	19.7	0.12
Benzo [a] Pyrene	0.8	NE	10,000	mg/kg	29	14	12	0.08	36	5	36	ND	10	ND	ND	ND	ND	17.8	0.08
Benzo [b] Fluoranthene	7.8	NE	10,000	mg/kg	29	14	5	0.09	44	6.3	44	ND	10	ND	ND	ND	ND	19.7	0.09
Benzo [g,h,i] Perylene	10,000	NE	10,000	mg/kg	29	12	0	0.5	18	3.7	18	ND	5.3	ND	ND	ND	ND	9.9	ND
Benzo [k] Fluoranthene	78	NE	10,000	mg/kg	29	10	0	0.7	11	1.8	11	ND	6	ND	ND	ND	ND	9.9	ND
Carbazole	NE	NE	10,000	mg/kg	26	6	0	0.46	6.4	1.8	6.4	ND	3.9	ND	ND	ND	ND	ND	NA
Chrysene	780	NE	10,000	mg/kg	29	14	0	0.15	42	5.8	42	ND	14	ND	ND	ND	ND	19.7	0.15
Dibenzo [a,h] Anthracene	0.8	NE	10,000	mg/kg	29	6	6	1.1	5.6	1.1	5.6	ND	2.3	ND	ND	ND	ND	ND	ND
Dibenzofuran	10,000	NE	10,000	mg/kg	26	9	0	0.37	7.5	0.91	7.5	ND	5.2	ND	ND	ND	ND	ND	NA
Fluoranthene	10,000	NE	10,000	mg/kg	30	15	0	0.33	74	15	74	ND	25	ND	ND	ND	ND	49.2	0.33
Fluorene	10,000	NE	10,000	mg/kg	30	16	0	0.41	49.2	1.6	12	ND	11	ND	ND	ND	ND	49.2	1.32
Indeno [1,2,3-cd] Pyrene	7.8	NE	10,000	mg/kg	29	10	1	0.71	20	4.1	20	ND	5.8	ND	ND	ND	ND	ND	ND
Naphthalene	10,000	NE	10,000	mg/kg	31	19	0	0.36	1970	0.78	7.8	ND	5.1	ND	ND	ND	ND	1970	79.2
Phenanthrene	10,000	NE	10,000	mg/kg	32	19	0	0.49	102	12	64	ND	46	ND	ND	ND	ND	102	1.78
Pyrene	10,000	NE	10,000	mg/kg	30	16	0	0.25	68	8.5	68	ND	32	ND	ND	ND	ND	41.4	0.25
Total Petroleum Hydrocarbons (TPH)																			
TPH	2,500	2,500	30,000	mg/kg	34	12	7	526	15390	ND	3100	ND	ND	ND	ND	ND	ND	15390	1451
Inorganics																			
Barium	10,000	NE	10,000	mg/kg	2	2	0	21	27	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chromium	10,000	NE	10,000	mg/kg	2	1	0	6	6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cyanide	10,000	NE	10,000	mg/kg	23	18	0	0.07	6	1.6	0.91	ND	ND	ND	0.07	0.092	0.6	NA	NA
Iron	NE	NE	NE	mg/kg	23	23	0	6870	21800	13300	21800	15100	16000	13300	14000	13800	15400	NA	NA
Lead	500	NE	10,000	mg/kg	2	1	0	28	28	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table 4
Subsurface Soil Analytical Data
(Uncapped Portion of STRAP Area)
 STRAP - Liquefaction Project
 Providence, Rhode Island

	RIDEM Industrial Commercial Direct Exposure Criteria (I/C DEC)	RIDEM GB Leachability Criteria	RIDEM Upper Concentration Limit (UCL)	Sample Name:	Number of Samples	Number of Detections	Number of Exceedances	Range Detected		B46	B56	B64	B65	B66	D32	D38	D57	VHB-17	MHA-1
				Date Collected:				Minimum	Maximum	2/18/2000	2/18/2000	2/18/2000	2/18/2000	2/18/2000	12/1/1999	12/3/1999	12/8/1999	1/17/2002	1/28/2003
				Sample Depth:						4 - 6 FT	4-6 FT	2-4 FT	2-4 FT	4-6 FT	4-6 FT	6-8 FT	2-4 FT	6 FT	12 - 14 FT
				Units															
Volatiles Organic Compounds (VOCs)																			
1,2,3 Trichlorobenzene	NE	NE	10,000	mg/kg	32	1	0	0.007	0.007	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4 Trimethylbenzene	NE	NE	10,000	mg/kg	32	4	0	0.84	84.4	ND	ND	ND	ND	ND	ND	ND	ND	84.4	4.08
1,3,5 Trimethylbenzene	NE	NE	10,000	mg/kg	32	5	0	0.29	41.7	ND	ND	ND	ND	ND	ND	ND	ND	41.7	2.38
4-Isopropyltoluene	NE	NE	10,000	mg/kg	32	4	0	0.09	3.8	ND	0.46	ND	ND	ND	ND	ND	ND	3.1	0.09
Benzene	200	4.3	10,000	mg/kg	32	7	2	0.17	18	ND	ND	ND	ND	ND	ND	ND	ND	6.2	0.17
Carbon Disulfide	NE	NE	10,000	mg/kg	32	1	0	0.004	0.004	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.004
Ethylbenzene	10,000	62	10,000	mg/kg	32	7	1	0.08	160	ND	ND	ND	ND	ND	ND	ND	ND	18.2	2.3
Isopropylbenzene	10,000	NE	10,000	mg/kg	32	3	0	0.09	9.6	ND	ND	ND	ND	ND	ND	ND	ND	5.5	0.09
Methylene Chloride	760	NE	10,000	mg/kg	31	8	0	0.008	0.99	ND	ND	ND	ND	ND	0.078	0.059	0.089	ND	ND
n-Butylbenzene	NE	NE	10,000	mg/kg	32	2	0	0.25	5.4	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.25
n-Propylbenzene	NE	NE	10,000	mg/kg	32	2	0	0.17	5.1	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.17
Naphthalene	NE	NE	10,000	mg/kg	32	13	0	0.057	2195	ND	2.8	ND	1	ND	ND	ND	ND	2195	61.2
sec-Butylbenzene	NE	NE	10,000	mg/kg	32	2	0	0.26	1.8	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Styrene	190	64	10,000	mg/kg	32	2	0	0.24	1.55	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.55
Toluene	10,000	62	10,000	mg/kg	32	7	0	0.04	6.4	ND	ND	ND	ND	ND	0.04	ND	ND	6.4	1.13
Total Xylenes	10,000	NE	10,000	mg/kg	32	8	0	0.42	112.9	ND	ND	ND	ND	ND	ND	ND	ND	112.9	8.13

Notes

Data is compared to RIDEM Method 1 Standards. Shaded results represent exceedances of standards and subject to Note 2 below.

Table only indicates the compounds that were detected, other compounds were submitted for analysis, but not detected.

Table only shows explorations with the Liquefaction Work Area

ND - Not Detected

NA - Not Analyzed

Sample depths noted here are from original grade. This table presents data that has since been capped with an engineered soil cap. As such, the final grades are unknown and as such the modified sampling depths are unknown. Collected confirmatory samples are not included on this table.

Note 2. While the Direct Exposure and Leachability Criteria apply to the vadose zone, certain subsurface soil samples were collected below the water table to define the nature and extent of impact. The data comparisons summarized in these tables compare all subsurface soil data (vadose and saturated zone) to the I/C-DEC, GB Leachability criteria and GB Upper Concentration Limit (UCLs).

Table 5
Summary of Groundwater and NAPL Measurements (Monitoring Wells located within STRAP Area)

STRAP - Liquefaction Project
 Providence, Rhode Island

Well ID	Surveyed Elevations			Well Installation Details							Range of LNAPL Observed (feet)	Range of DNAPL Observed (feet)	July 2011							August 2011							
	Top of Casing Elevation (Feet)	Top of PVC Elevation (Feet)	Grade Elevation (Feet)	Type of Well	Well Depth Modifier	Stratum	Date of Installation	Measured Well Depth (feet bgs)	Screened Interval (feet bgs)	Depth to LNAPL (ft)			Depth to Water (ft)	Depth to DNAPL (ft)	Total Well Depth (ft)	GW Elevation (feet)	LNAPL Thickness (feet)	DNAPL Thickness (feet)	Corrected Groundwater Elevation (feet)	Depth to LNAPL (ft)	Depth to Water (ft)	Depth to DNAPL (ft)	Total Well Depth (ft)	GW Elevation (feet)	LNAPL Thickness (feet)	DNAPL Thickness (feet)	Corrected Groundwater Elevation (feet)
VHB-23	12.98	12.80	11.37	Standpipe	Shallow	Fill	1/29/2003	16.37	6 - 16	trace - 0.05	NP	7.88	7.89	-	17.25	4.91	0.01	NP	4.91	8.50	8.55	-	17.25	4.25	0.05	NP	4.29
RCA-5	12.68	12.27	10.79	Standpipe	Shallow	Fill	9/7/1994	15.92	6 - 16	NP	NP	-	10.04	-	13.33	2.23	NP	NP	2.23	-	10.33	-	13.33	1.94	NP	NP	1.94
RCA-14	13.09	12.75	11.06	Standpipe	Shallow	Fill	9/12/1994	13.61	5 - 15	NP	NP	-	8.4	-	15.28	4.35	NP	NP	4.35	-	9.91	-	15.28	2.84	NP	NP	2.84
RCA-20	13.25	12.95	11.01	Standpipe	Shallow	Fill	10/18/1995	12.26	3.5 - 13.5	NP	NP	-	8.16	-	10.95	4.79	NP	NP	4.79	-	9.09	-	10.95	3.86	NP	NP	3.86
RCA-21	NS	13.72	10.48	Standpipe	Shallow	Fill	10/30/1995	11.39	4 - 14	0.91 - 3.58	NP	10.07	13.65	-	13.75	0.07	3.58	NP	3.11	10.72	13.66	-	13.75	0.06	2.94	NP	2.56
RCA-39	14.07	13.86	11.43	Standpipe	Shallow	Fill	5/3/1996	12.32	3 - 13	NP	NP	-	8.81	-	14.6	5.05	NP	NP	5.05	-	9.65	-	14.6	4.21	NP	NP	4.21
RCA-40	12.76	12.24	10.47	Standpipe	Shallow	Fill	5/3/1996	15.15	4 - 14	trace - 0.04	NP	-	10.01	-	16.75	2.23	NP	NP	2.23	-	10.37	-	16.75	1.87	NP	NP	1.87
CHES RW-2	14.27	14.27	11.09	Recovery Well	Shallow	Fill	2002	13.12	Unknown	trace	NP	-	9.85	-	16.24	4.42	NP	NP	4.42	-	10.41	-	10.24	3.86	NP	NP	3.86
CHES RW-3	14.30	14.30	11.24	Recovery Well	Shallow	Fill	2002	14.84	Unknown	trace	NP	-	11.35	-	17.9	2.95	NP	NP	2.95	-	12.25	-	17.9	2.05	NP	NP	2.05
CHES RW-4	13.08	13.08	9.09	Recovery Well	Shallow	Fill	2002	8.57	Unknown	trace - 0.03	NP	10.92	10.94	-	12.35	2.14	0.02	NP	2.16	11.27	11.3	-	12.35	1.78	0.03	NP	1.81
CHES RW-5	14.32	14.32	11.16	Recovery Well	Shallow	Fill	2002	11.34	Unknown	0.01	NP	-	11.6	-	13.8	2.72	NP	NP	2.72	-	11.9	-	13.8	2.42	NP	NP	2.42
GZ-204A	13.86	12.83	11.30	Standpipe	Shallow	Fill	4/12/2005	15.92	4 - 16	NP	NP	-	8.75	-	17.3	4.08	NP	NP	4.08	-	9.4	-	17.3	3.43	NP	NP	3.43
GZ-216	12.85	11.61	10.34	Standpipe	Shallow	Fill	5/17/2005	16.45	5 - 15	NP	NP	-	6.61	-	17.75	5.00	NP	NP	5.00	-	7.65	-	17.75	3.96	NP	NP	3.96
RW-1	14.18	14.18	11.84	Recovery Well	Shallow	Fill	6/17/2014	11.66	8 - 13	trace - 0.02	NP																
GZ-314S	14.35	14.19	11.13	Standpipe	Shallow	Fill	6/3/2014	18.88	4 - 19	NP	NP																
GZ-314D	14.24	14.11	11.22	Standpipe	Deep	Organic Silt	6/3/2014	34.11	24 - 34	NP	NP																
GZ-315D	13.06	12.93	10.17	Standpipe	Deep	Organic Silt	6/4/2014	30.29	20 - 30	NP	NP																

Notes
 Elevations are relative to NAVD88
 NP - Indicates No Product observed.
 NS - Not Surveyed
 Blanks indicate no measurement collected on that particular day.
 Potentiometric elevations for wells exhibiting LNAPL include 0.85 correction factor.

Table 5
Summary of Groundwater and NAPL Measurements (Monitoring Wells located within STRAP Area)

STRAP - Liquefaction Project
 Providence, Rhode Island

Well ID	Surveyed Elevations			Well Installation Details							Range of LNAPL Observed (feet)	Range of DNAPL Observed (feet)	February 2012							July 2012							
	Top of Casing Elevation (Feet)	Top of PVC Elevation (Feet)	Grade Elevation (Feet)	Type of Well	Well Depth Modifier	Stratum	Date of Installation	Measured Well Depth (feet bgs)	Screened Interval (feet bgs)	Depth to LNAPL (ft)			Depth to Water (ft)	Depth to DNAPL (ft)	Total Well Depth (ft)	GW Elevation (feet)	LNAPL Thickness (feet)	DNAPL Thickness (feet)	Corrected Groundwater Elevation (feet)	Depth to LNAPL (ft)	Depth to Water (ft)	Depth to DNAPL (ft)	Total Well Depth (ft)	GW Elevation (feet)	LNAPL Thickness (feet)	DNAPL Thickness (feet)	Corrected Groundwater Elevation (feet)
VHB-23	12.98	12.80	11.37	Standpipe	Shallow	Fill	1/29/2003	16.37	6 - 16	trace - 0.05	NP	trace	8.8	-	17.85	4.00	trace	NP	4.00	-	9.44	-	17.85	3.36	NP	NP	3.36
RCA-5	12.68	12.27	10.79	Standpipe	Shallow	Fill	9/7/1994	15.92	6 - 16	NP	NP	-	10.75	-	13.45	1.52	NP	NP	1.52	-	10.44	-	13.45	1.83	NP	NP	1.83
RCA-14	13.09	12.75	11.06	Standpipe	Shallow	Fill	9/12/1994	13.61	5 - 15	NP	NP	-	8.81	-	15.35	3.94	NP	NP	3.94	-	9.03	-	15.2	3.72	NP	NP	3.72
RCA-20	13.25	12.95	11.01	Standpipe	Shallow	Fill	10/18/1995	12.26	3.5 - 13.5	NP	NP	-	8.85	-	11.07	4.10	NP	NP	4.10	-	9.1	-	11.07	3.85	NP	NP	3.85
RCA-21	NS	13.72	10.48	Standpipe	Shallow	Fill	10/30/1995	11.39	4 - 14	0.91 - 3.58	NP	10.95	13.74	-	13.94	-0.02	2.79	NP	2.35	11.17	12.82	-	14.35	0.90	1.65	NP	2.30
RCA-39	14.07	13.86	11.43	Standpipe	Shallow	Fill	5/3/1996	12.32	3 - 13	NP	NP	-	9.45	-	14.7	4.41	NP	NP	4.41	-	9.85	-	14.65	4.01	NP	NP	4.01
RCA-40	12.76	12.24	10.47	Standpipe	Shallow	Fill	5/3/1996	15.15	4 - 14	trace - 0.04	NP	trace	10.78	-	16.9	1.46	trace	NP	1.46	trace	10.47	-	16.8	1.77	trace	NP	1.77
CHES RW-2	14.27	14.27	11.09	Recovery Well	Shallow	Fill	2002	13.12	Unknown	trace	NP	trace	10.24	-	10.35	4.03	trace	NP	4.03	-	10.57	-	10.61	3.70	NP	NP	3.70
CHES RW-3	14.30	14.30	11.24	Recovery Well	Shallow	Fill	2002	14.84	Unknown	trace	NP	-	12.35	-	18	1.95	NP	NP	1.95	-	12.31	-	17.92	1.99	NP	NP	1.99
CHES RW-4	13.08	13.08	9.09	Recovery Well	Shallow	Fill	2002	8.57	Unknown	trace - 0.03	NP	11.67	11.68	-	12.45	1.40	0.01	NP	1.41	trace	11.4	-	12.4	1.68	trace	NP	1.68
CHES RW-5	14.32	14.32	11.16	Recovery Well	Shallow	Fill	2002	11.34	Unknown	0.01	NP	-	12.3	-	13.8	2.02	NP	NP	2.02	-	12.08	-	13.8	2.24	NP	NP	2.24
GZ-204A	13.86	12.83	11.30	Standpipe	Shallow	Fill	4/12/2005	15.92	4 - 16	NP	NP	-	9.19	-	17.41	3.64	NP	NP	3.64	-	9.49	-	17.43	3.34	NP	NP	3.34
GZ-216	12.85	11.61	10.34	Standpipe	Shallow	Fill	5/17/2005	16.45	5 - 15	NP	NP	-	6.88	-	17.65	4.73	NP	NP	4.73	-	7.72	-	17.68	3.89	NP	NP	3.89
RW-1	14.18	14.18	11.84	Recovery Well	Shallow	Fill	6/17/2014	11.66	8 - 13	trace - 0.02	NP																
GZ-314S	14.35	14.19	11.13	Standpipe	Shallow	Fill	6/3/2014	18.88	4 - 19	NP	NP																
GZ-314D	14.24	14.11	11.22	Standpipe	Deep	Organic Silt	6/3/2014	34.11	24 - 34	NP	NP																
GZ-315D	13.06	12.93	10.17	Standpipe	Deep	Organic Silt	6/4/2014	30.29	20 - 30	NP	NP																

Notes

Elevations are relative to NAVD88

NP - Indicates No Product observed.

NS - Not Surveyed

Blanks indicate no measurement collected on that particular day.

Potentiometric elevations for wells exhibiting LNAPL include 0.85 correction factor.

Table 5
Summary of Groundwater and NAPL Measurements (Monitoring Wells located within STRAP Area)

STRAP - Liquefaction Project
 Providence, Rhode Island

Well ID	Surveyed Elevations			Well Installation Details							Range of LNAPL Observed (feet)	Range of DNAPL Observed (feet)	February 2013							November 2013							
	Top of Casing Elevation (Feet)	Top of PVC Elevation (Feet)	Grade Elevation (Feet)	Type of Well	Well Depth Modifier	Stratum	Date of Installation	Measured Well Depth (feet bgs)	Screened Interval (feet bgs)	Depth to LNAPL (ft)			Depth to Water (ft)	Depth to DNAPL (ft)	Total Well Depth (ft)	GW Elevation (feet)	LNAPL Thickness (feet)	DNAPL Thickness (feet)	Corrected Groundwater Elevation (feet)	Depth to LNAPL (ft)	Depth to Water (ft)	Depth to DNAPL (ft)	Total Well Depth (ft)	GW Elevation (feet)	LNAPL Thickness (feet)	DNAPL Thickness (feet)	Corrected Groundwater Elevation (feet)
VHB-23	12.98	12.80	11.37	Standpipe	Shallow	Fill	1/29/2003	16.37	6 - 16	trace - 0.05	NP	8.21	8.22	-	17.8	4.58	0.01	NP	4.58	-	9.86	-	17.3	2.94	NP	NP	2.94
RCA-5	12.68	12.27	10.79	Standpipe	Shallow	Fill	9/7/1994	15.92	6 - 16	NP	NP	-	10.59	-	13.55	1.68	NP	NP	1.68	-	10.77	-	13.45	1.50	NP	NP	1.50
RCA-14	13.09	12.75	11.06	Standpipe	Shallow	Fill	9/12/1994	13.61	5 - 15	NP	NP	-	8.71	-	15.3	4.04	NP	NP	4.04	-	9.76	-	15.35	2.99	NP	NP	2.99
RCA-20	13.25	12.95	11.01	Standpipe	Shallow	Fill	10/18/1995	12.26	3.5 - 13.5	NP	NP	-	8.83	-	14.35	4.12	NP	NP	4.12	-	10.27	-	11.03	2.68	NP	NP	2.68
RCA-21	NS	13.72	10.48	Standpipe	Shallow	Fill	10/30/1995	11.39	4 - 14	0.91 - 3.58	NP	11.41	12.85	-	14.35	0.87	1.44	NP	2.10	12.26	14.17	-	14.35	-0.45	1.91	NP	1.17
RCA-39	14.07	13.86	11.43	Standpipe	Shallow	Fill	5/3/1996	12.32	3 - 13	NP	NP	-	9.86	-	14.75	4.00	NP	NP	4.00	-	10.8	-	14.64	3.06	NP	NP	3.06
RCA-40	12.76	12.24	10.47	Standpipe	Shallow	Fill	5/3/1996	15.15	4 - 14	trace - 0.04	NP	trace	10.85	-	16.8	1.39	trace	NP	1.39	-	10.7	-	16.85	1.54	NP	NP	1.54
CHES RW-2	14.27	14.27	11.09	Recovery Well	Shallow	Fill	2002	13.12	Unknown	trace	NP	trace	10.42	-	16.3	3.85	trace	NP	3.85	-	11.22	-	16.2	3.05	NP	NP	3.05
CHES RW-3	14.30	14.30	11.24	Recovery Well	Shallow	Fill	2002	14.84	Unknown	trace	NP	-	12.71	-	17.9	1.59	NP	NP	1.59	-	12.8	-	17.92	1.50	NP	NP	1.50
CHES RW-4	13.08	13.08	9.09	Recovery Well	Shallow	Fill	2002	8.57	Unknown	trace - 0.03	NP	trace	11.77	-	12.5	1.31	trace	NP	1.31	11.60	11.61	-	12.4	1.47	0.01	NP	1.48
CHES RW-5	14.32	14.32	11.16	Recovery Well	Shallow	Fill	2002	11.34	Unknown	0.01	NP	-	12.4	-	13.8	1.92	NP	NP	1.92	-	12.25	-	13.7	2.07	NP	NP	2.07
GZ-204A	13.86	12.83	11.30	Standpipe	Shallow	Fill	4/12/2005	15.92	4 - 16	NP	NP	-	9.62	-	17.42	3.21	NP	NP	3.21	-	10.21	-	17.53	2.62	NP	NP	2.62
GZ-216	12.85	11.61	10.34	Standpipe	Shallow	Fill	5/17/2005	16.45	5 - 15	NP	NP	-	7.22	-	17.65	4.39	NP	NP	4.39	-	8.67	-	17.65	2.94	NP	NP	2.94
RW-1	14.18	14.18	11.84	Recovery Well	Shallow	Fill	6/17/2014	11.66	8 - 13	trace - 0.02	NP																
GZ-314S	14.35	14.19	11.13	Standpipe	Shallow	Fill	6/3/2014	18.88	4 - 19	NP	NP																
GZ-314D	14.24	14.11	11.22	Standpipe	Deep	Organic Silt	6/3/2014	34.11	24 - 34	NP	NP																
GZ-315D	13.06	12.93	10.17	Standpipe	Deep	Organic Silt	6/4/2014	30.29	20 - 30	NP	NP																

Notes

Elevations are relative to NAVD88

NP - Indicates No Product observed.

NS - Not Surveyed

Blanks indicate no measurement collected on that particular day.

Potentiometric elevations for wells exhibiting LNAPL include 0.85 correction factor.

Table 5
Summary of Groundwater and NAPL Measurements (Monitoring Wells located within STRAP Area)

STRAP - Liquefaction Project
 Providence, Rhode Island

Well ID	Surveyed Elevations			Well Installation Details							Range of LNAPL Observed (feet)	Range of DNAPL Observed (feet)	June 2014							July 2, 2014							
	Top of Casing Elevation (Feet)	Top of PVC Elevation (Feet)	Grade Elevation (Feet)	Type of Well	Well Depth Modifier	Stratum	Date of Installation	Measured Well Depth (feet bgs)	Screened Interval (feet bgs)	Depth to LNAPL (ft)			Depth to Water (ft)	Depth to DNAPL (ft)	Total Well Depth (ft)	GW Elevation (feet)	LNAPL Thickness (feet)	DNAPL Thickness (feet)	Corrected Groundwater Elevation (feet)	Depth to LNAPL (ft)	Depth to Water (ft)	Depth to DNAPL (ft)	Total Well Depth (ft)	GW Elevation (feet)	LNAPL Thickness (feet)	DNAPL Thickness (feet)	Corrected Groundwater Elevation (feet)
VHB-23	12.98	12.80	11.37	Standpipe	Shallow	Fill	1/29/2003	16.37	6 - 16	trace - 0.05	NP	9.22	9.25	-	17.8	3.55	0.03	NP	3.57								
RCA-5	12.68	12.27	10.79	Standpipe	Shallow	Fill	9/7/1994	15.92	6 - 16	NP	NP	-	10.39	-	17.4	1.88	NP	NP	1.88	-	10.55	-	17.25	1.72	NP	NP	1.72
RCA-14	13.09	12.75	11.06	Standpipe	Shallow	Fill	9/12/1994	13.61	5 - 15	NP	NP	-	8.42	-	15.3	4.33	NP	NP	4.33								
RCA-20	13.25	12.95	11.01	Standpipe	Shallow	Fill	10/18/1995	12.26	3.5 - 13.5	NP	NP	-	9.09	-	14.2	3.86	NP	NP	3.86								
RCA-21	NS	13.72	10.48	Standpipe	Shallow	Fill	10/30/1995	11.39	4 - 14	0.91 - 3.58	NP	11.04	11.95	-	14.63	1.77	0.91	NP	2.54	Well destroyed - replaced with RW-1							
RCA-39	14.07	13.86	11.43	Standpipe	Shallow	Fill	5/3/1996	12.32	3 - 13	NP	NP	-	9.42	-	14.75	4.44	NP	NP	4.44								
RCA-40	12.76	12.24	10.47	Standpipe	Shallow	Fill	5/3/1996	15.15	4 - 14	trace - 0.04	NP	-	10.4	-	16.92	1.84	NP	NP	1.84								
CHES RW-2	14.27	14.27	11.09	Recovery Well	Shallow	Fill	2002	13.12	Unknown	trace	NP	-	9.98	-	16.3	4.29	NP	NP	4.29								
CHES RW-3	14.30	14.30	11.24	Recovery Well	Shallow	Fill	2002	14.84	Unknown	trace	NP	-	11.98	-	17.9	2.32	NP	NP	2.32								
CHES RW-4	13.08	13.08	9.09	Recovery Well	Shallow	Fill	2002	8.57	Unknown	trace - 0.03	NP	Trace	11.33	-	12.56	1.75	NP	NP	1.75								
CHES RW-5	14.32	14.32	11.16	Recovery Well	Shallow	Fill	2002	11.34	Unknown	0.01	NP	-	12.59	-	14.5	1.73	NP	NP	1.73								
GZ-204A	13.86	12.83	11.30	Standpipe	Shallow	Fill	4/12/2005	15.92	4 - 16	NP	NP	-	9.27	-	17.44	3.56	NP	NP	3.56								
GZ-216	12.85	11.61	10.34	Standpipe	Shallow	Fill	5/17/2005	16.45	5 - 15	NP	NP	-	7.19	-	17.72	4.42	NP	NP	4.42								
RW-1	14.18	14.18	11.84	Recovery Well	Shallow	Fill	6/17/2014	11.66	8 - 13	trace - 0.02	NP									10.24	10.26	-	14	3.92	0.02	NP	3.94
GZ-314S	14.35	14.19	11.13	Standpipe	Shallow	Fill	6/3/2014	18.88	4 - 19	NP	NP	-	11.91	-	21.94	2.28	NP	NP	2.28	-	12.28	-	21.80	1.91	NP	NP	1.91
GZ-314D	14.24	14.11	11.22	Standpipe	Deep	Organic Silt	6/3/2014	34.11	24 - 34	NP	NP	-	11.83	-	37.00	2.28	NP	NP	2.28	-	12.18	-	37.00	1.93	NP	NP	1.93
GZ-315D	13.06	12.93	10.17	Standpipe	Deep	Organic Silt	6/4/2014	30.29	20 - 30	NP	NP	-	11.13	-	33.05	1.80	NP	NP	1.80	-	11.26	-	32.90	1.67	NP	NP	1.67

Notes
 Elevations are relative to NAVD88
 NP - Indicates No Product observed.
 NS - Not Surveyed
 Blanks indicate no measurement collected on that particular day.
 Potentiometric elevations for wells exhibiting LNAPL include 0.85 correction factor.

Table 5
Summary of Groundwater and NAPL Measurements (Monitoring Wells located within STRAP Area)

STRAP - Liquefaction Project
 Providence, Rhode Island

Well ID	Surveyed Elevations			Well Installation Details							Range of LNAPL Observed (feet)	Range of DNAPL Observed (feet)	July 23, 2014							October 2014							
	Top of Casing Elevation (Feet)	Top of PVC Elevation (Feet)	Grade Elevation (Feet)	Type of Well	Well Depth Modifier	Stratum	Date of Installation	Measured Well Depth (feet bgs)	Screened Interval (feet bgs)	Depth to LNAPL (ft)			Depth to Water (ft)	Depth to DNAPL (ft)	Total Well Depth (ft)	GW Elevation (feet)	LNAPL Thickness (feet)	DNAPL Thickness (feet)	Corrected Groundwater Elevation (feet)	Depth to LNAPL (ft)	Depth to Water (ft)	Depth to DNAPL (ft)	Total Well Depth (ft)	GW Elevation (feet)	LNAPL Thickness (feet)	DNAPL Thickness (feet)	Corrected Groundwater Elevation (feet)
VHB-23	12.98	12.80	11.37	Standpipe	Shallow	Fill	1/29/2003	16.37	6 - 16	trace - 0.05	NP							-	9.12	-	17.3	3.68	NP	NP	3.68		
RCA-5	12.68	12.27	10.79	Standpipe	Shallow	Fill	9/7/1994	15.92	6 - 16	NP	NP	-	10.68	-	17.35	1.59	NP	NP	1.59	-	10.67	-	17.42	1.60	NP	NP	1.60
RCA-14	13.09	12.75	11.06	Standpipe	Shallow	Fill	9/12/1994	13.61	5 - 15	NP	NP							-	8.84	-	15.25	3.91	NP	NP	3.91		
RCA-20	13.25	12.95	11.01	Standpipe	Shallow	Fill	10/18/1995	12.26	3.5 - 13.5	NP	NP							-	9.92	-	14.22	3.03	NP	NP	3.03		
RCA-21	NS	13.72	10.48	Standpipe	Shallow	Fill	10/30/1995	11.39	4 - 14	0.91 - 3.58	NP	Well destroyed - replaced with RW-1							Well destroyed - replaced with RW-1								
RCA-39	14.07	13.86	11.43	Standpipe	Shallow	Fill	5/3/1996	12.32	3 - 13	NP	NP							-	10.01	-	14.84	3.85	NP	NP	3.85		
RCA-40	12.76	12.24	10.47	Standpipe	Shallow	Fill	5/3/1996	15.15	4 - 14	trace - 0.04	NP							-	10.7	-	16.96	1.54	NP	NP	1.54		
CHES RW-2	14.27	14.27	11.09	Recovery Well	Shallow	Fill	2002	13.12	Unknown	trace	NP							-	10.34	-	18.3	3.93	NP	NP	3.93		
CHES RW-3	14.30	14.30	11.24	Recovery Well	Shallow	Fill	2002	14.84	Unknown	trace	NP							-	11.57	-	12.67	2.73	NP	NP	2.73		
CHES RW-4	13.08	13.08	9.09	Recovery Well	Shallow	Fill	2002	8.57	Unknown	trace - 0.03	NP	Trace	11.51	-	12.56	1.57	Trace	NP	12.56	Trace	10.71	-	12.55	2.37	Trace	NP	2.37
CHES RW-5	14.32	14.32	11.16	Recovery Well	Shallow	Fill	2002	11.34	Unknown	0.01	NP	-	10.68	-	17.35	3.64	NP	NP	3.64	-	12.8	-	14.4	1.52	NP	NP	1.52
GZ-204A	13.86	12.83	11.30	Standpipe	Shallow	Fill	4/12/2005	15.92	4 - 16	NP	NP							-	9.52	-	17.49	3.31	NP	NP	3.31		
GZ-216	12.85	11.61	10.34	Standpipe	Shallow	Fill	5/17/2005	16.45	5 - 15	NP	NP							-	8.05	-	17.62	3.56	NP	NP	3.56		
RW-1	14.18	14.18	11.84	Recovery Well	Shallow	Fill	6/17/2014	11.66	8 - 13	trace - 0.02	NP	Trace	10.46	-	14.02	3.72	Trace	NP	3.72	10.67	10.68	-	14	3.50	0.01	NP	3.51
GZ-314S	14.35	14.19	11.13	Standpipe	Shallow	Fill	6/3/2014	18.88	4 - 19	NP	NP	-	12.48	-	21.81	1.71	NP	NP	1.71	-	12.54	-	21.76	1.65	NP	NP	1.65
GZ-314D	14.24	14.11	11.22	Standpipe	Deep	Organic Silt	6/3/2014	34.11	24 - 34	NP	NP	-	12.48	-	36.95	1.63	NP	NP	1.63	-	12.43	-	36.93	1.68	NP	NP	1.68
GZ-315D	13.06	12.93	10.17	Standpipe	Deep	Organic Silt	6/4/2014	30.29	20 - 30	NP	NP	-	11.36	-	32.93	1.57	NP	NP	1.57	-	11.39	-	33.07	1.54	NP	NP	1.54

Notes

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NS - Not Surveyed

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Potentiometric elevations for wells exhibiting LNAPL include 0.85 correction factor.

Table 5
Summary of Groundwater and NAPL Measurements (Monitoring Wells located within STRAP Area)

STRAP - Liquefaction Project
 Providence, Rhode Island

Well ID	Surveyed Elevations			Well Installation Details								April 2015								October 2015							
	Top of Casing Elevation (Feet)	Top of PVC Elevation (Feet)	Grade Elevation (Feet)	Type of Well	Well Depth Modifier	Stratum	Date of Installation	Measured Well Depth (feet bgs)	Screened Interval (feet bgs)	Range of LNAPL Observed (feet)	Range of DNAPL Observed (feet)	Depth to LNAPL (ft)	Depth to Water (ft)	Depth to DNAPL (ft)	Total Well Depth (ft)	GW Elevation (feet)	LNAPL Thickness (feet)	DNAPL Thickness (feet)	Corrected Groundwater Elevation (feet)	Depth to LNAPL (ft)	Depth to Water (ft)	Depth to DNAPL (ft)	Total Well Depth (ft)	GW Elevation (feet)	LNAPL Thickness (feet)	DNAPL Thickness (feet)	Corrected Groundwater Elevation (feet)
VHB-23	12.98	12.80	11.37	Standpipe	Shallow	Fill	1/29/2003	16.37	6 - 16	trace - 0.05	NP	-	7.44	-	17.32	5.36	NP	NP	5.36	-	9.65	-	17.45	3.15	NP	NP	3.15
RCA-5	12.68	12.27	10.79	Standpipe	Shallow	Fill	9/7/1994	15.92	6 - 16	NP	NP	-	10.76	-	17.28	1.51	NP	NP	1.51	-	10.65	-	17.32	1.62	NP	NP	1.62
RCA-14	13.09	12.75	11.06	Standpipe	Shallow	Fill	9/12/1994	13.61	5 - 15	NP	NP	-	8.16	-	15.38	4.59	NP	NP	4.59	-	9.2	-	15.52	3.55	NP	NP	3.55
RCA-20	13.25	12.95	11.01	Standpipe	Shallow	Fill	10/18/1995	12.26	3.5 - 13.5	NP	NP	-	8.71	-	14	4.24	NP	NP	4.24	-	10.18	-	14.28	2.77	NP	NP	2.77
RCA-21	NS	13.72	10.48	Standpipe	Shallow	Fill	10/30/1995	11.39	4 - 14	0.91 - 3.58	NP	Well destroyed - replaced with RW-1															
RCA-39	14.07	13.86	11.43	Standpipe	Shallow	Fill	5/3/1996	12.32	3 - 13	NP	NP	-	9.23	-	14.6	4.63	NP	NP	4.63	-	10.45	-	14.82	3.41	NP	NP	3.41
RCA-40	12.76	12.24	10.47	Standpipe	Shallow	Fill	5/3/1996	15.15	4 - 14	trace - 0.04	NP	10.75	10.79	-	16.8	1.45	0.04	NP	1.48	trace	10.6	-	17.84	1.64	trace	NP	1.64
CHES RW-2	14.27	14.27	11.09	Recovery Well	Shallow	Fill	2002	13.12	Unknown	trace	NP	-	9.61	-	16.3	4.66	NP	NP	4.66	-	10.72	-	16.5	3.55	NP	NP	3.55
CHES RW-3	14.30	14.30	11.24	Recovery Well	Shallow	Fill	2002	14.84	Unknown	trace	NP	trace	12.38	-	17.85	1.92	trace	NP	1.92	-	12.68	-	18	1.62	NP	NP	1.62
CHES RW-4	13.08	13.08	9.09	Recovery Well	Shallow	Fill	2002	8.57	Unknown	trace - 0.03	NP	trace	11.62	-	12.4	1.46	trace	NP	1.46	-	11.35	-	12.44	1.73	NP	NP	1.73
CHES RW-5	14.32	14.32	11.16	Recovery Well	Shallow	Fill	2002	11.34	Unknown	0.01	NP	12.82	12.83	-	14.1	1.49	0.01	NP	1.50	-	12.69	-	14.34	1.63	NP	NP	1.63
GZ-204A	13.86	12.83	11.30	Standpipe	Shallow	Fill	4/12/2005	15.92	4 - 16	NP	NP	-	8.54	-	17.3	4.29	NP	NP	4.29	-	9.85	-	17.45	2.98	NP	NP	2.98
GZ-216	12.85	11.61	10.34	Standpipe	Shallow	Fill	5/17/2005	16.45	5 - 15	NP	NP	-	6.43	-	17.7	5.18	NP	NP	5.18	-	8.48	-	17.73	3.13	NP	NP	3.13
RW-1	14.18	14.18	11.84	Recovery Well	Shallow	Fill	6/17/2014	11.66	8 - 13	trace - 0.02	NP	trace	9.64	-	13.9	4.54	trace	NP	4.54	trace	11.14	-	14.14	3.04	trace	NP	3.04
GZ-314S	14.35	14.19	11.13	Standpipe	Shallow	Fill	6/3/2014	18.88	4 - 19	NP	NP	-	12.3	-	21.75	1.89	NP	NP	1.89	-	12.52	-	21.89	1.67	NP	NP	1.67
GZ-314D	14.24	14.11	11.22	Standpipe	Deep	Organic Silt	6/3/2014	34.11	24 - 34	NP	NP	-	12.2	-	37.00	1.91	NP	NP	1.91	-	12.47	-	37.00	1.64	NP	NP	1.64
GZ-315D	13.06	12.93	10.17	Standpipe	Deep	Organic Silt	6/4/2014	30.29	20 - 30	NP	NP	-	11.46	-	32.90	1.47	NP	NP	1.47	-	11.32	-	32.93	1.61	NP	NP	1.61

Notes

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Potentiometric elevations for wells exhibiting LNAPL include 0.85 correction factor.

Table 5
Summary of Groundwater and NAPL Measurements (Monitoring Wells located within STRAP Area)
 STRAP - Liquefaction Project
 Providence, Rhode Island

Well ID	Surveyed Elevations			Well Installation Details							Range of LNAPL Observed (feet)	Range of DNAPL Observed (feet)	May 2016						
	Top of Casing Elevation (Feet)	Top of PVC Elevation (Feet)	Grade Elevation (Feet)	Type of Well	Well Depth Modifier	Stratum	Date of Installation	Measured Well Depth (feet bgs)	Screened Interval (feet bgs)	Depth to LNAPL (ft)			Depth to Water (ft)	Depth to DNAPL (ft)	Total Well Depth (ft)	GW Elevation (feet)	LNAPL Thickness (feet)	DNAPL Thickness (feet)	Corrected Groundwater Elevation (feet)
VHB-23	12.98	12.80	11.37	Standpipe	Shallow	Fill	1/29/2003	16.37	6 - 16	trace - 0.05	NP	-	9.11	-	17.68	3.69	NP	NP	3.69
RCA-5	12.68	12.27	10.79	Standpipe	Shallow	Fill	9/7/1994	15.92	6 - 16	NP	NP	-	10.8	-	17.32	1.47	NP	NP	1.47
RCA-14	13.09	12.75	11.06	Standpipe	Shallow	Fill	9/12/1994	13.61	5 - 15	NP	NP	-	8.95	-	15.3	3.80	NP	NP	3.80
RCA-20	13.25	12.95	11.01	Standpipe	Shallow	Fill	10/18/1995	12.26	3.5 - 13.5	NP	NP	-	9.17	-	14	3.78	NP	NP	3.78
RCA-21	NS	13.72	10.48	Standpipe	Shallow	Fill	10/30/1995	11.39	4 - 14	0.91 - 3.58	NP	Well destroyed - replaced with RW-1							
RCA-39	14.07	13.86	11.43	Standpipe	Shallow	Fill	5/3/1996	12.32	3 - 13	NP	NP	-	9.65	-	14.55	4.21	NP	NP	4.21
RCA-40	12.76	12.24	10.47	Standpipe	Shallow	Fill	5/3/1996	15.15	4 - 14	trace - 0.04	NP	10.69	10.71	-	16.8	1.53	0.02	NP	1.55
CHES RW-2	14.27	14.27	11.09	Recovery Well	Shallow	Fill	2002	13.12	Unknown	trace	NP	-	10.34	-	16.32	3.93	NP	NP	3.93
CHES RW-3	14.30	14.30	11.24	Recovery Well	Shallow	Fill	2002	14.84	Unknown	trace	NP	-	11.62	-	12.35	2.68	NP	NP	2.68
CHES RW-4	13.08	13.08	9.09	Recovery Well	Shallow	Fill	2002	8.57	Unknown	trace - 0.03	NP	-	11.05	-	0.00	2.03	NP	NP	2.03
CHES RW-5	14.32	14.32	11.16	Recovery Well	Shallow	Fill	2002	11.34	Unknown	0.01	NP	-	12.77	-	14.1	1.55	NP	NP	1.55
GZ-204A	13.86	12.83	11.30	Standpipe	Shallow	Fill	4/12/2005	15.92	4 - 16	NP	NP	-	9.30	-	18.65	3.53	NP	NP	3.53
GZ-216	12.85	11.61	10.34	Standpipe	Shallow	Fill	5/17/2005	16.45	5 - 15	NP	NP	-	7.41	-	18.59	4.20	NP	NP	4.20
RW-1	14.18	14.18	11.84	Recovery Well	Shallow	Fill	6/17/2014	11.66	8 - 13	trace - 0.02	NP	trace	10.21	-	13.9	3.97	trace	NP	3.97
GZ-314S	14.35	14.19	11.13	Standpipe	Shallow	Fill	6/3/2014	18.88	4 - 19	NP	NP	-	11.98	-	21.75	2.21	NP	NP	2.21
GZ-314D	14.24	14.11	11.22	Standpipe	Deep	Organic Silt	6/3/2014	34.11	24 - 34	NP	NP	-	11.92	-	36.85	2.19	NP	NP	2.19
GZ-315D	13.06	12.93	10.17	Standpipe	Deep	Organic Silt	6/4/2014	30.29	20 - 30	NP	NP	-	11.45	-	32.8	1.48	NP	NP	1.48

Notes

Elevations are relative to NAVD88

NP - Indicates No Product observed.

NS - Not Surveyed

Blanks indicate no measurement collected on that particular day.

Potentiometric elevations for wells exhibiting LNAPL include 0.85 correction factor.

Table 6
Historic NAPL Thicknesses (Monitoring Wells located within the STRAP Area)
 STRAP - Liquefaction Project
 Providence, Rhode Island

Date	LNAPL Thickness (feet)																					
	11/12/01	06/20/02	09/12/02	10/08/02	10/22/02	11/15/02	12/07/02	12/24/02	01/08/03	02/03/03	02/11/03	02/28/03	Sept 2003	Sept 2005	Mar 2006	June 2006	July 2006	Oct. 2006	Dec 2006	Mar 2008	Dec. 2009	June 2010
VHB-23	NI	NI	NI	NG	NG	NG	NG	NG	NG	trace	NG	NG	trace	ND	0.05	ND	ND	ND	ND	0.01	NG	NG
RCA-4	0.17	NG	Dest	Dest	Dest	Dest	Dest	Dest	Dest	Dest	Dest	Dest	Dest	Dest	Dest	Dest	Dest	Dest	Dest	Dest	Dest	Dest
RCA-5	ND	NG	ND	NG	NG	NG	NG	NG	NG	NG	NG	NG	trace	trace	NG	NG	NG	NG	NG	NG	NG	NG
RCA-21	NG	NG	ND	NG	NG	NG	NG	NG	NG	NG	NG	NG	NG	NG	NG	NG	NG	NG	NG	NG	NG	NG
RCA-39	ND	NG	ND	NG	NG	NG	NG	NG	NG	NG	NG	NG	ND	trace	NG	NG	NG	NG	NG	NG	NG	NG
RCA-40	0.25	NG	0.01	NG	NG	NG	NG	NG	NG	NG	NG	NG	trace	trace	0.1	0.21	0.18	0.22	0.01	0.01	NG	NG
CHES RW-2	NI	NI	NI	ND	ND	ND	ND	ND	ND	NG	ND	ND	NG	ND	NG	NG	NG	NG	NG	trace	NG	NG
CHES RW-3	NI	NI	NI	ND	ND	ND	ND	ND	ND	NG	ND	ND	NG	ND	NG	NG	NG	NG	NG	NG	NG	NG
CHES RW-4	NI	NI	NI	0.03	0.02	0.09	0.08	0.05	0.03	NG	0.03	0.02	NG	2	ND	0.18	0.13	0.1	0.08	0.09	NG	NG
CHES RW-5	NI	NI	NI	0.05	0.04	0.12	0.09	0.06	0.05	NG	0.02	0.02	NG	0.5	0.1	ND	ND	0.01	ND	trace	NG	NG
RW-1	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI

Notes:

Gray shading indicates NAPL thickness of equal to or more than 0.01 feet

ND - Not Detected

Dest - Destroyed

NI - Not Installed Yet

trace - sheen or less than 0.01 feet

NG - Not Gauged

RCA-21 was destroyed in late June 2014 and replaced with RW-1

This table presents LNAPL thickness data for monitoring wells that have exhibited LNAPL thicknesses of at least trace amounts since 2001.

Table 6
Historic NAPL Thicknesses (Monitoring Wells located within the STRAP Area)
 STRAP - Liquefaction Project
 Providence, Rhode Island

Date	LNAPL Thickness (feet)													
	January 2011	July 2011	Aug 2011	Feb 2012	July 2012	Feb 2013	Nov 2013	June 2014	July 2, 2014	July 23, 2014	October 2014	April 2015	October 2015	May 2016
VHB-23	NG	0.01	0.05	trace	ND	0.01	ND	0.03	NG	NG	ND	ND	ND	ND
RCA-4	Dest	Dest	Dest	Dest	Dest	Dest	Dest	Dest	Dest	Dest	Dest	Dest	Dest	Dest
RCA-5	NG	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
RCA-21	NG	3.58	2.94	2.79	1.65	1.44	1.91	0.91	Dest	Dest	Dest	Dest	Dest	Dest
RCA-39	NG	ND	ND	ND	ND	ND	ND	ND	NG	NG	ND	ND	ND	ND
RCA-40	NG	ND	ND	trace	trace	trace	ND	ND	NG	NG	ND	0.04	trace	0.02
CHES RW-2	NG	ND	ND	trace	ND	trace	ND	ND	NG	NG	ND	ND	ND	ND
CHES RW-3	NG	ND	ND	ND	ND	ND	ND	ND	NG	NG	ND	trace	ND	ND
CHES RW-4	NG	0.02	0.03	0.01	trace	trace	0.01	ND	NG	trace	trace	trace	ND	ND
CHES RW-5	NG	ND	ND	ND	ND	ND	ND	ND	NG	ND	ND	0.01	ND	ND
RW-1	NI	NI	NI	NI	NI	NI	NI	NI	0.02	trace	0.01	trace	trace	trace

Notes:

Gray shading indicates NAPL thickness of equal to or more than 0.01 feet

ND - Not Detected

Dest - Destroyed

NI - Not Installed Yet

trace - sheen or less than 0.01 feet

NG - Not Gauged

RCA-21 was destroyed in late June 2014 and replaced with RW-1

This table presents LNAPL thickness data for monitoring wells that have exhibited LNAPL thicknesses of at least trace amounts since 2001.

Table 7
Summary of LNAPL Gauging and Recovery - RCA-21 and RW-1
 STRAP - Liquefaction Project
 Providence, Rhode Island

Well ID	Date	Gauging Time	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Estimated Volume Purged (gallons)	Tide Condition
RCA-21	7/1/2011	NR	10.07	13.65	3.58	NR	NR
	8/3/2011	NR	10.72	13.66	2.94	NR	NR
	2/3/2012	13:00	10.95	13.74	2.79	2.25 gal	Mid
	2/8/2012	14:30	10.93	13.28	2.35	2 gal	Low
	2/15/2012	11:20	11.28	12.75	1.47	1.25 gal	Low
	2/23/2012	13:13	11.56	12.6	1.04	0.75 gal	Low
	3/2/2012	13:45	11.77	12.52	0.75	1 gal	High
	3/9/2012	12:30	11.38	12.29	0.91	0.75 gal	Low to Mid
	4/13/2012	9:43	11.88	13.45	1.57	1.5 gal	Low to Mid
	5/16/2012	13:18	10.6	12	1.4	1 gal	Mid
	6/29/2012	9:16	10.7	12.55	1.85	1 gal	Low
	7/19/2012	9:21	11.17	12.82	1.65	1 gal	High
	8/24/2012	9:45	10.62	12.25	1.63	1.5 gal	Mid
	9/25/2012	13:24	10.85	12.33	1.48	2 gal	Mid
	10/31/2012	9:35	10.71	12.6	1.89	1.5 gal	High
	11/19/2012	13:45	10.87	12.55	1.68	0.75 gal	High to Mid
	12/20/2012	12:00	11.4	12.76	1.36	1 gal	High
	2/1/2013	11:30	11.41	12.85	1.44	1 gal	High
	2/26/2013	12:20	10.45	12.35	1.9	1 gal	Low
	3/25/2013	11:15	10.53	10.6	0.07	NR	Mid
	4/24/2013	10:30	11.09	12.43	1.34	1 gal	Mid
	5/31/2013	10:00	11.65	12.75	1.1	0.75 gal	Mid to Low
	6/25/2013	11:30	10.15	10.51	0.36	0.25 gal	Mid
	7/31/2013	7:00	10.9	12.77	1.87	1.25 gal	Mid
	8/28/2013	12:00	10.9	12.42	1.52	1.5 gal	Mid
	9/27/2013	11:00	10.83	12.25	1.42	1 gal	Mid
	10/30/2013	14:00	10.97	12.13	1.16	1 gal	Mid
	11/19/2013	10:30	12.26	14.17	1.91	1 gal	Low to Mid
	12/20/2013	10:45	11.45	12.72	1.27	1.25 gal	Mid to Low
	1/27/2014	10:00	10.98	12.32	1.34	1 gal	Low
2/25/2014	13:00	10.81	11.8	0.99	0.5 gal	Mid	
3/20/2014	9:00	11.08	11.7	0.62	0.5 gal	Mid to High	
4/29/2014	12:30	10.81	11.42	0.61	0.5 gal	Mid to Low	
5/22/2014	13:00	11.17	11.75	0.58	0.5 gal	Mid to High	
6/17/2014	Replaced RCA-21 with RW-1.						

Table 7
Summary of LNAPL Gauging and Recovery - RCA-21 and RW-1
 STRAP - Liquefaction Project
 Providence, Rhode Island

Well ID	Date	Gauging Time	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Estimated Volume Purged (gallons)	Tide Condition
RW-1	6/19/2014	9:35	10.30	10.30	trace	NR	Mid-Low
	7/24/2014	15:00	10.46	10.46	trace	NR	Mid
	8/28/2014	11:00	10.54	10.55	0.01	NR	High
	9/29/2014	11:15	11.06	11.06	trace	NR	High
	10/30/2014	12:00	10.67	10.68	0.01	NR	High
	11/13/2014	12:05	10.55	10.55	trace	NR	High
	12/12/2014	13:00	8.8	8.8	trace	NR	Mid
	1/29/2015	11:30	10.54	10.54	trace	NR	Mid
	2/25/2015	9:00	10.92	10.92	trace	NR	High
	3/23/2015	9:30	10.25	10.25	trace	NR	High
	4/9/2015	3:30	9.64	9.64	trace	NR	Mid
	5/22/2015	7:30	10.49	10.49	trace	NR	Low
	6/17/2015	3:00	10.92	10.92	trace	NR	Low
	7/17/2015	11:15	10.26	10.26	trace	NR	Mid
	8/28/2015	12:00	10.84	10.84	trace	NR	Low
	9/16/2015	9:30	11.16	11.16	trace	NR	Mid-High
	10/24/2015	9:00	11.02	11.02	trace	NR	High
	11/17/2015	12:00	11.47	11.47	trace	NR	High
	12/30/2015	11:30	10.19	10.19	trace	NR	High
	1/29/2016	8:30	9.87	9.87	trace	NR	High
2/22/2016	11:00	10.17	10.17	trace	NR	Low	
3/17/2016	8:00	9.67	9.67	trace	NR	Mid-Low	
4/28/2016	3:30	9.95	9.95	trace	NR	Mid-High	
5/18/2016	8:45	6.07	6.07	trace	NR	Mid	
6/10/2016	11:30	10.22	10.22	trace	NR	Mid-High	

Notes: NR = Not Recovered
 Volume purged was noted as a mixture of LNAPL and groundwater

Table 8
Groundwater Data (Monitoring Wells located within STRAP Area)
STRAP - Liquefaction Project
Providence, Rhode Island

	RIDEM Upper Concentration Limit (UCL)	RIDEM GB Groundwater Objectives	Units	Number of Samples	Number of Detects	Number of Exceedances	Range Detected		RCA-4		RCA-5					RCA-14		
									Screened Interval : 6 - 16 feet bgs		Screened Interval : 6 - 16 feet bgs					Screened Interval : 5 - 15 feet bgs		
									Screened in Fill		Screened in Fill					Screened in Fill		
									October 1994	March 1996	October 1994	March 1996	November 2001	June 2013	June 2014	October 1994	March 1996	November 2001
						Minimum	Maximum											
Volatile Organic Compounds (VOCs)																		
1,2,4-Trimethylbenzene	NE	NE	mg/L	32	20	0	0.002	0.338	ND	ND	ND	0.024	0.0051	ND	0.0039	ND	ND	0.002
1,3,5-Trimethylbenzene	NE	NE	mg/L	32	12	0	0.0019	0.102	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Isopropyltoluene	NE	NE	mg/L	32	10	0	0.0012	0.016	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Acetone	NE	NE	mg/L	32	4	0	0.0028	0.102	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzene	18	0.14	mg/L	34	25	12	0.0033	28.5	19.3	28.5	0.105	ND	0.0036	0.0038	0.008	0.066	ND	ND
Carbon Disulfide	NE	NE	mg/L	32	2	0	0.0023	0.0023	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chlorobenzene	3.2	56	mg/L	32	1	0	0.0003	0.0003	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	16	1.6	mg/L	34	25	4	0.0011	2.5	1.75	2.5	0.41	0.008	0.0151	0.0016	0.0094	0.026	ND	ND
Isopropylbenzene	NE	NE	mg/L	32	15	0	0.001	0.0794	ND	ND	ND	ND	ND	ND	0.0017	ND	ND	ND
Methylene Chloride	NE	NE	mg/L	32	4	0	0.006	1.5	1.5	ND	0.05	ND	ND	ND	ND	0.006	ND	ND
Naphthalene	NE	2.67	mg/L	34	25	11	0.0032	29.5	ND	7	ND	0.041	0.0339	ND	0.0199	ND	0.31	ND
n-Butylbenzene	NE	NE	mg/L	32	2	0	0.0027	0.014	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
n-Propylbenzene	NE	NE	mg/L	32	11	0	0.0027	0.0229	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
sec-Butylbenzene	NE	NE	mg/L	32	9	0	0.0008	0.0026	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Styrene	2.2	50	mg/L	32	2	0	0.0005	0.0032	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
tert-Butylbenzene	NE	NE	mg/L	32	2	0	0.0003	0.0003	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Toluene	21	1.7	mg/L	34	14	1	0.001	2.25	ND	2.25	ND	ND	ND	ND	ND	0.036	ND	ND
Xylenes (Total)	NE	NE	mg/L	34	22	0	0.0018	1.75	ND	1.75	0.395	0.006	0.0083	ND	0.0037	0.275	ND	ND
Semi-Volatile Organic Compounds (SVOCs)																		
2-Methylnaphthalene	NE	NE	mg/L	16	10	0	0.001	8.78	0.821	0.95	0.001	ND	ND	ND	NA	0.237	ND	ND
Acenaphthene	NE	NE	mg/L	16	6	0	0.0106	0.76	0.268	0.176	0.309	ND	0.024	0.0106	NA	ND	ND	ND
Acenaphthylene	NE	NE	mg/L	16	10	0	0.0127	2.9	0.022	0.127	0.183	ND	0.019	0.0127	NA	0.054	ND	ND
Anthracene	NE	NE	mg/L	16	6	0	0.0061	3.67	0.09	0.019	0.063	ND	ND	0.0061	NA	ND	ND	ND
Benzo [a] Anthracene	NE	NE	mg/L	16	5	0	0.0007	0.319	0.042	0.022	0.022	ND	ND	0.0007	NA	ND	ND	ND
Benzo [a] Pyrene	NE	NE	mg/L	16	3	0	0.0004	0.138	0.017	ND	ND	ND	ND	0.0004	NA	ND	ND	ND
Benzo [b] Fluoranthene	NE	NE	mg/L	16	4	0	0.0003	0.153	0.027	0.01	ND	ND	ND	0.0003	NA	ND	ND	ND
Benzo[k]fluoranthene	NE	NE	mg/L	16	1	0	0.0001	0.0001	ND	ND	ND	ND	ND	0.0001	NA	ND	ND	ND
Chrysene	NE	NE	mg/L	16	5	0	0.0006	0.229	0.038	0.012	0.022	ND	ND	0.0006	NA	ND	ND	ND
Fluoranthene	NE	NE	mg/L	16	6	0	0.0028	0.615	0.065	0.043	0.033	ND	ND	0.0028	NA	ND	ND	ND
Fluorene	NE	NE	mg/L	16	7	0	0.01	1.4	0.093	0.114	0.092	ND	0.033	0.0168	NA	ND	ND	ND
Indeno(1,2,3-cd)Pyrene	NE	NE	mg/L	16	1	0	0.0001	0.0001	ND	ND	ND	ND	ND	0.0001	NA	ND	ND	ND
Naphthalene	NE	2.67	mg/L	16	9	3	0.0005	23.5	1.37	3.5	1.1	ND	ND	0.0005	NA	1.29	ND	ND
Phenanthrene	NE	NE	mg/L	16	8	0	0.0217	3.54	0.358	0.209	0.264	ND	0.026	0.0217	NA	ND	ND	ND
Pyrene	NE	NE	mg/L	16	6	0	0.005	0.846	0.162	0.068	0.093	ND	ND	0.005	NA	ND	ND	ND
Total Petroleum Hydrocarbons (TPH)																		
TPH	NE	NE	mg/L	10	8	0	2.16	595	90	34.8	ND	NA	NA	2.16	NA	NA	ND	NA
Inorganics																		
Total Cyanide	NE	NE	mg/L	1	1	0	0.006	0.006	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes

Data is compared to RIDEM Method 1 Standards. Shaded results represent numerical exceedances of standards.

Table only indicates the compounds that were detected, other compounds were submitted for analysis, but not detected.

Table only shows sample collected from with the Liquefaction Work Area

ND - Not Detected

NA - Not Analyzed

Table 8
Groundwater Data (Monitoring Wells located within STRAP Area)
STRAP - Liquefaction Project
Providence, Rhode Island

	RIDEM Upper Concentration Limit (UCL)	RIDEM GB Groundwater Objectives	Units	Number of Samples	Number of Detects	Number of Exceedances	Range Detected		RCA-20			RCA-21	RCA-23	RCA-39					
									Screened Interval : 3 - 13 feet bgs			Screened Interval : 4 - 14 feet bgs		Screened Interval : 4 - 14 feet bgs		Screened Interval : 3 - 13 feet bgs			
									Screened in Fill			Screened in Fill		Screened in Fill		Screened in Fill			
									March 1996	September 2003	September 2005	March 1996		March 1996		March 1996	November 2001	September 2003	September 2005
		Minimum	Maximum																
Volatile Organic Compounds (VOCs)																			
1,2,4-Trimethylbenzene	NE	NE	mg/L	32	20	0	0.002	0.338	0.12	0.0241	ND	ND	0.3	ND	ND	ND	ND		
1,3,5-Trimethylbenzene	NE	NE	mg/L	32	12	0	0.0019	0.102	ND	ND	ND	ND	ND	ND	ND	ND	ND		
4-Isopropyltoluene	NE	NE	mg/L	32	10	0	0.0012	0.016	ND	ND	ND	ND	ND	ND	ND	ND	ND		
Acetone	NE	NE	mg/L	32	4	0	0.0028	0.102	ND	ND	ND	ND	ND	ND	ND	ND	ND		
Benzene	18	0.14	mg/L	34	25	12	0.0033	28.5	ND	0.0466	0.0033	ND	0.85	ND	ND	ND	ND		
Carbon Disulfide	NE	NE	mg/L	32	2	0	0.0023	0.0023	ND	ND	ND	ND	ND	ND	ND	ND	ND		
Chlorobenzene	3.2	56	mg/L	32	1	0	0.0003	0.0003	ND	ND	ND	ND	ND	ND	ND	ND	ND		
Ethylbenzene	16	1.6	mg/L	34	25	4	0.0011	2.5	0.055	0.0742	ND	ND	0.7	ND	ND	ND	ND		
Isopropylbenzene	NE	NE	mg/L	32	15	0	0.001	0.0794	ND	0.0104	0.001	ND	ND	ND	ND	ND	ND		
Methylene Chloride	NE	NE	mg/L	32	4	0	0.006	1.5	0.71	ND	ND	ND	ND	ND	ND	ND	ND		
Naphthalene	NE	2.67	mg/L	34	25	11	0.0032	29.5	ND	0.615	0.0032	29.5	7.05	0.015	ND	ND	ND		
n-Butylbenzene	NE	NE	mg/L	32	2	0	0.0027	0.014	ND	ND	ND	ND	ND	ND	ND	ND	ND		
n-Propylbenzene	NE	NE	mg/L	32	11	0	0.0027	0.0229	ND	0.00374	ND	ND	ND	ND	ND	ND	ND		
sec-Butylbenzene	NE	NE	mg/L	32	9	0	0.0008	0.0026	ND	0.00107	ND	ND	ND	ND	ND	ND	ND		
Styrene	2.2	50	mg/L	32	2	0	0.0005	0.0032	ND	ND	ND	ND	ND	ND	ND	ND	ND		
tert-Butylbenzene	NE	NE	mg/L	32	2	0	0.0003	0.0003	ND	ND	ND	ND	ND	ND	ND	ND	ND		
Toluene	21	1.7	mg/L	34	14	1	0.001	2.25	ND	0.001	ND	ND	ND	ND	ND	ND	ND		
Xylenes (Total)	NE	NE	mg/L	34	22	0	0.0018	1.75	ND	0.0187	0.0018	ND	ND	ND	ND	ND	ND		
Semi-Volatile Organic Compounds (SVOCs)																			
2-Methylnaphthalene	NE	NE	mg/L	16	10	0	0.001	8.78	0.149	NA	NA	8.78	0.35	0.015	ND	NA	NA		
Acenaphthene	NE	NE	mg/L	16	6	0	0.0106	0.76	ND	NA	NA	0.76	ND	ND	ND	NA	NA		
Acenaphthylene	NE	NE	mg/L	16	10	0	0.0127	2.9	0.24	NA	NA	2.9	0.039	ND	ND	NA	NA		
Anthracene	NE	NE	mg/L	16	6	0	0.0061	3.67	ND	NA	NA	3.67	0.034	ND	ND	NA	NA		
Benzo [a] Anthracene	NE	NE	mg/L	16	5	0	0.0007	0.319	ND	NA	NA	0.319	ND	ND	ND	NA	NA		
Benzo [a] Pyrene	NE	NE	mg/L	16	3	0	0.0004	0.138	ND	NA	NA	0.138	ND	ND	ND	NA	NA		
Benzo [b] Fluoranthene	NE	NE	mg/L	16	4	0	0.0003	0.153	ND	NA	NA	0.153	ND	ND	ND	NA	NA		
Benzo[k]fluoranthene	NE	NE	mg/L	16	1	0	0.0001	0.0001	ND	NA	NA	ND	ND	ND	ND	NA	NA		
Chrysene	NE	NE	mg/L	16	5	0	0.0006	0.229	ND	NA	NA	0.229	ND	ND	ND	NA	NA		
Fluoranthene	NE	NE	mg/L	16	6	0	0.0028	0.615	0.021	NA	NA	0.615	ND	ND	ND	NA	NA		
Fluorene	NE	NE	mg/L	16	7	0	0.01	1.4	ND	NA	NA	1.4	ND	0.01	ND	NA	NA		
Indeno(1,2,3-cd)Pyrene	NE	NE	mg/L	16	1	0	0.0001	0.0001	ND	NA	NA	ND	ND	ND	ND	NA	NA		
Naphthalene	NE	2.67	mg/L	16	9	3	0.0005	23.5	0.574	NA	NA	23.5	3.09	ND	ND	NA	NA		
Phenanthrene	NE	NE	mg/L	16	8	0	0.0217	3.54	0.07	NA	NA	3.54	0.034	ND	ND	NA	NA		
Pyrene	NE	NE	mg/L	16	6	0	0.005	0.846	0.011	NA	NA	0.846	ND	ND	ND	NA	NA		
Total Petroleum Hydrocarbons (TPH)																			
TPH	NE	NE	mg/L	10	8	0	2.16	595	67.1	NA	NA	595	19.3	2.3	NA	NA	NA		
Inorganics																			
Total Cyanide	NE	NE	mg/L	1	1	0	0.006	0.006	NA	NA	NA	NA	NA	NA	NA	NA	NA		

Notes

Data is compared to RIDEM Method 1 Standards. Shaded results represent numerical exceedances of standards.

Table only indicates the compounds that were detected, other compounds were submitted for analysis, but not detected.

Table only shows sample collected from with the Liquefaction Work Area

ND - Not Detected

NA - Not Analyzed

Table 8
Groundwater Data (Monitoring Wells located within STRAP Area)
 STRAP - Liquefaction Project
 Providence, Rhode Island

	RIDEM Upper Concentration Limit (UCL)	RIDEM GB Groundwater Objectives	Units	Number of Samples	Number of Detects	Number of Exceedances	Range Detected		RCA-40			B05	B22	VHB-23			MW-314S			
									Screened Interval : 4 - 14 feet bgs			Grab Sample	Grab Sample	Screened Interval : 6 - 16 feet bgs			Screened Interval : 4 - 19 feet bgs			
									Screened in Fill			Collected from Fill	Collected from Fill	Screened in Fill			Screened in Fill			
									March 1996	September 2003	September 2005	March 2000	March 2000	February 2003	September 2003	September 2005	June 2014	October 2015	May 2016	
		Minimum	Maximum																	
Volatile Organic Compounds (VOCs)																				
1,2,4-Trimethylbenzene	NE	NE	mg/L	32	20	0	0.002	0.338	0.076	0.0069	0.0322	NA	NA	0.178	0.242	0.309	0.247	0.258	0.338	
1,3,5-Trimethylbenzene	NE	NE	mg/L	32	12	0	0.0019	0.102	ND	0.00406	0.0019	NA	NA	0.102	0.00255	0.014	0.0667	0.049	0.0862	
4-Isopropyltoluene	NE	NE	mg/L	32	10	0	0.0012	0.016	ND	ND	0.0012	NA	NA	ND	0.00429	0.0048	0.0111	0.016	0.0141	
Acetone	NE	NE	mg/L	32	4	0	0.0028	0.102	ND	ND	0.102	NA	NA	ND	ND	0.0357	ND	ND	ND	
Benzene	18	0.14	mg/L	34	25	12	0.0033	28.5	0.09	0.0318	0.0306	0.17	0.012	0.142	0.0844	0.0448	7.27	7.67	4.83	
Carbon Disulfide	NE	NE	mg/L	32	2	0	0.0023	0.0023	ND	ND	ND	NA	NA	ND	ND	ND	ND	ND	ND	
Chlorobenzene	3.2	56	mg/L	32	1	0	0.0003	0.0003	ND	ND	ND	NA	NA	ND	ND	ND	ND	ND	0.0003	
Ethylbenzene	16	1.6	mg/L	34	25	4	0.0011	2.5	ND	0.0011	0.0097	0.089	0.031	1	1.26	1.03	1.57	2.37	1.83	
Isopropylbenzene	NE	NE	mg/L	32	15	0	0.001	0.0794	ND	0.00102	0.0025	NA	NA	0.0366	0.0532	0.0353	0.0579	0.052	0.0794	
Methylene Chloride	NE	NE	mg/L	32	4	0	0.006	1.5	ND	ND	ND	NA	NA	ND	ND	ND	ND	ND	ND	
Naphthalene	NE	2.67	mg/L	34	25	11	0.0032	29.5	0.38	0.00782	0.0205	0.73	0.51	3.18	2.7	2.56	5.37	4.44	6.41	
n-Butylbenzene	NE	NE	mg/L	32	2	0	0.0027	0.014	ND	ND	ND	NA	NA	ND	ND	ND	ND	ND	0.014	
n-Propylbenzene	NE	NE	mg/L	32	11	0	0.0027	0.0229	ND	ND	0.0027	NA	NA	0.0095	0.0154	0.0094	0.018	ND	0.0229	
sec-Butylbenzene	NE	NE	mg/L	32	9	0	0.0008	0.0026	ND	ND	0.0014	NA	NA	ND	ND	0.0014	0.0016	ND	0.0026	
Styrene	2.2	50	mg/L	32	2	0	0.0005	0.0032	ND	ND	ND	NA	NA	ND	ND	ND	ND	ND	0.0032	
tert-Butylbenzene	NE	NE	mg/L	32	2	0	0.0003	0.0003	ND	ND	ND	NA	NA	ND	ND	ND	ND	ND	ND	
Toluene	21	1.7	mg/L	34	14	1	0.001	2.25	ND	ND	ND	0.002	0.012	0.003	ND	0.0015	0.0368	0.052	0.043	
Xylenes (Total)	NE	NE	mg/L	34	22	0	0.0018	1.75	ND	0.00453	0.0065	0.03	0.079	0.826	0.0488	0.0767	0.412	0.772	0.681	
Semi-Volatile Organic Compounds (SVOCs)																				
2-Methylnaphthalene	NE	NE	mg/L	16	10	0	0.001	8.78	1.12	NA	NA	NA	NA	0.039	NA	NA	NA	NA	NA	
Acenaphthene	NE	NE	mg/L	16	6	0	0.0106	0.76	ND	NA	NA	NA	NA	ND	NA	NA	NA	NA	NA	
Acenaphthylene	NE	NE	mg/L	16	10	0	0.0127	2.9	1.23	NA	NA	NA	NA	ND	NA	NA	NA	NA	NA	
Anthracene	NE	NE	mg/L	16	6	0	0.0061	3.67	ND	NA	NA	NA	NA	ND	NA	NA	NA	NA	NA	
Benzo [a] Anthracene	NE	NE	mg/L	16	5	0	0.0007	0.319	ND	NA	NA	NA	NA	ND	NA	NA	NA	NA	NA	
Benzo [a] Pyrene	NE	NE	mg/L	16	3	0	0.0004	0.138	ND	NA	NA	NA	NA	ND	NA	NA	NA	NA	NA	
Benzo [b] Fluoranthene	NE	NE	mg/L	16	4	0	0.0003	0.153	ND	NA	NA	NA	NA	ND	NA	NA	NA	NA	NA	
Benzo[k]fluoranthene	NE	NE	mg/L	16	1	0	0.0001	0.0001	ND	NA	NA	NA	NA	ND	NA	NA	NA	NA	NA	
Chrysene	NE	NE	mg/L	16	5	0	0.0006	0.229	ND	NA	NA	NA	NA	ND	NA	NA	NA	NA	NA	
Fluoranthene	NE	NE	mg/L	16	6	0	0.0028	0.615	ND	NA	NA	NA	NA	ND	NA	NA	NA	NA	NA	
Fluorene	NE	NE	mg/L	16	7	0	0.01	1.4	ND	NA	NA	NA	NA	ND	NA	NA	NA	NA	NA	
Indeno(1,2,3-cd)Pyrene	NE	NE	mg/L	16	1	0	0.0001	0.0001	ND	NA	NA	NA	NA	ND	NA	NA	NA	NA	NA	
Naphthalene	NE	2.67	mg/L	16	9	3	0.0005	23.5	ND	NA	NA	NA	NA	0.25	NA	NA	NA	NA	NA	
Phenanthrene	NE	NE	mg/L	16	8	0	0.0217	3.54	ND	NA	NA	NA	NA	ND	NA	NA	NA	NA	NA	
Pyrene	NE	NE	mg/L	16	6	0	0.005	0.846	ND	NA	NA	NA	NA	ND	NA	NA	NA	NA	NA	
Total Petroleum Hydrocarbons (TPH)																				
TPH	NE	NE	mg/L	10	8	0	2.16	595	281	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
Inorganics																				
Total Cyanide	NE	NE	mg/L	1	1	0	0.006	0.006	NA	NA	NA	NA	NA	0.006	NA	NA	NA	NA	NA	

Notes

Data is compared to RIDEM Method 1 Standards. Shaded results represent numerical exceedances of standards.

Table only indicates the compounds that were detected, other compounds were submitted for analysis, but not detected.

Table only shows sample collected from with the Liquefaction Work Area

ND - Not Detected

NA - Not Analyzed

Table 8
Groundwater Data (Monitoring Wells located within STRAP Area)
STRAP - Liquefaction Project
Providence, Rhode Island

	RIDEM Upper Concentration Limit (UCL)	RIDEM GB Groundwater Objectives	Units	Number of Samples	Number of Detects	Number of Exceedances	Range Detected		MW-314D			MW-315D
									Screened Interval : 24 - 34 feet bgs			Screened Interval : 20 - 30 feet bgs
									Screened in Organic Silt			Screened in Organic Silt
									June 2014	October 2015	May 2016	June 2014
			Minimum	Maximum								
Volatile Organic Compounds (VOCs)												
1,2,4-Trimethylbenzene	NE	NE	mg/L	32	20	0	0.002	0.338	0.183	0.0825	0.12	0.2
1,3,5-Trimethylbenzene	NE	NE	mg/L	32	12	0	0.0019	0.102	0.0379	0.0218	0.0185	0.056
4-Isopropyltoluene	NE	NE	mg/L	32	10	0	0.0012	0.016	0.0083	0.0038	0.0035	0.0117
Acetone	NE	NE	mg/L	32	4	0	0.0028	0.102	ND	0.0028	0.0028	ND
Benzene	18	0.14	mg/L	34	25	12	0.0033	28.5	2.01	1.79	1.22	0.698
Carbon Disulfide	NE	NE	mg/L	32	2	0	0.0023	0.0023	ND	0.0023	0.0023	ND
Chlorobenzene	3.2	56	mg/L	32	1	0	0.0003	0.0003	ND	ND	ND	ND
Ethylbenzene	16	1.6	mg/L	34	25	4	0.0011	2.5	0.642	0.518	0.438	0.596
Isopropylbenzene	NE	NE	mg/L	32	15	0	0.001	0.0794	0.0448	0.0296	0.0253	0.055
Methylene Chloride	NE	NE	mg/L	32	4	0	0.006	1.5	ND	ND	ND	ND
Naphthalene	NE	2.67	mg/L	34	25	11	0.0032	29.5	3.43	2.99	2.52	3.89
n-Butylbenzene	NE	NE	mg/L	32	2	0	0.0027	0.014	ND	ND	0.0027	ND
n-Propylbenzene	NE	NE	mg/L	32	11	0	0.0027	0.0229	0.018	0.0092	0.0082	0.0164
sec-Butylbenzene	NE	NE	mg/L	32	9	0	0.0008	0.0026	0.002	0.0011	0.0008	0.0016
Styrene	2.2	50	mg/L	32	2	0	0.0005	0.0032	ND	0.0005	ND	ND
tert-Butylbenzene	NE	NE	mg/L	32	2	0	0.0003	0.0003	ND	0.0003	0.0003	ND
Toluene	21	1.7	mg/L	34	14	1	0.001	2.25	0.0147	0.0145	0.0086	0.0184
Xylenes (Total)	NE	NE	mg/L	34	22	0	0.0018	1.75	0.185	0.117	0.117	0.375
Semi-Volatile Organic Compounds (SVOCs)												
2-Methylnaphthalene	NE	NE	mg/L	16	10	0	0.001	8.78	NA	NA	NA	NA
Acenaphthene	NE	NE	mg/L	16	6	0	0.0106	0.76	NA	NA	NA	NA
Acenaphthylene	NE	NE	mg/L	16	10	0	0.0127	2.9	NA	NA	NA	NA
Anthracene	NE	NE	mg/L	16	6	0	0.0061	3.67	NA	NA	NA	NA
Benzo [a] Anthracene	NE	NE	mg/L	16	5	0	0.0007	0.319	NA	NA	NA	NA
Benzo [a] Pyrene	NE	NE	mg/L	16	3	0	0.0004	0.138	NA	NA	NA	NA
Benzo [b] Fluoranthene	NE	NE	mg/L	16	4	0	0.0003	0.153	NA	NA	NA	NA
Benzo[k]fluoranthene	NE	NE	mg/L	16	1	0	0.0001	0.0001	NA	NA	NA	NA
Chrysene	NE	NE	mg/L	16	5	0	0.0006	0.229	NA	NA	NA	NA
Fluoranthene	NE	NE	mg/L	16	6	0	0.0028	0.615	NA	NA	NA	NA
Fluorene	NE	NE	mg/L	16	7	0	0.01	1.4	NA	NA	NA	NA
Indeno(1,2,3-cd)Pyrene	NE	NE	mg/L	16	1	0	0.0001	0.0001	NA	NA	NA	NA
Naphthalene	NE	2.67	mg/L	16	9	3	0.0005	23.5	NA	NA	NA	NA
Phenanthrene	NE	NE	mg/L	16	8	0	0.0217	3.54	NA	NA	NA	NA
Pyrene	NE	NE	mg/L	16	6	0	0.005	0.846	NA	NA	NA	NA
Total Petroleum Hydrocarbons (TPH)												
TPH	NE	NE	mg/L	10	8	0	2.16	595	NA	NA	NA	NA
Inorganics												
Total Cyanide	NE	NE	mg/L	1	1	0	0.006	0.006	NA	NA	NA	NA

Notes

Data is compared to RIDEM Method 1 Standards. Shaded results represent numerical exceedances of standards.

Table only indicates the compounds that were detected, other compounds were submitted for analysis, but not detected.

Table only shows sample collected from with the Liquefaction Work Area

ND - Not Detected

NA - Not Analyzed



FIGURES

NATIONAL GRID PROPOSED LIQUEFACTION PLANT PROVIDENCE, RHODE ISLAND SHORT TERM RESPONSE ACTION PLAN (STRAP) MAY 2017

PREPARED FOR:

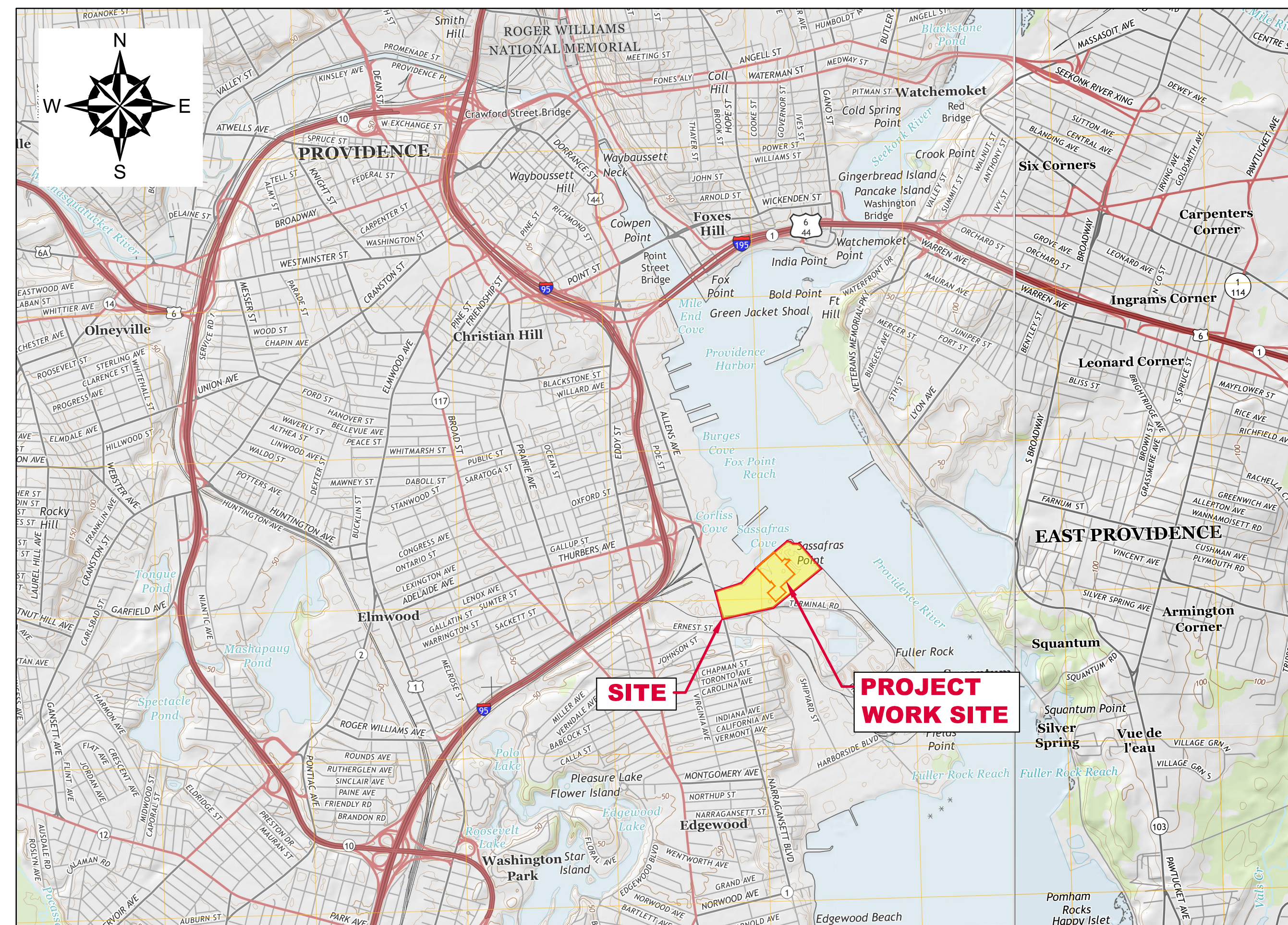


PREPARED BY:

GZA GEOENVIRONMENTAL, INC.
530 BROADWAY
PROVIDENCE, RHODE ISLAND 02909

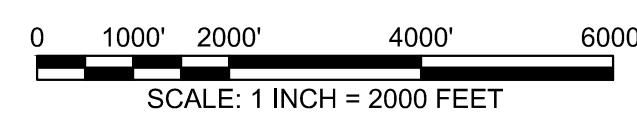
DESIGNED BY:

KIEWIT ENGINEERING AND DESIGN CO.
9401 RENNER BOULEVARD
LENEXA, KANSAS 66219



PROJECT LOCUS MAP

SOURCE: USGSSTORE.GOV



INDEX OF DRAWINGS	
SHEET #	SHEET TITLE
1	COVER SHEET WITH SITE LOCUS
2	OVERALL AERIAL PHOTOGRAPH
3	EXPLORATION LOCATION PLAN
4	COMPLETED REMEDIAL ACTIVITIES
5	EROSION AND SEDIMENTATION CONTROL PLAN
6	PROPOSED FINAL CONDITIONS PLAN
7	CAPPING CROSS SECTIONS

THE INFORMATION SHOWN ON THE DRAWING IS SOLELY FOR USE BY NATIONAL GRID OR THE NATIONAL GRID'S DESIGNATED REPRESENTATIVE FOR THE SPECIFIC PROJECT AND LOCATION IDENTIFIED ON THE DRAWING. THE DRAWING SHALL NOT BE TRANSFERRED, REUSED, COPIED, OR ALTERED IN ANY MANNER FOR USE AT ANY OTHER LOCATION OR FOR ANY OTHER PURPOSE WITHOUT THE PRIOR WRITTEN CONSENT OF GZA AND NATIONAL GRID. ANY TRANSFER, REUSE, OR MODIFICATION TO THE DRAWING BY OTHERS, WITHOUT THE PRIOR WRITTEN EXPRESS CONSENT OF GZA AND NATIONAL GRID, WILL BE AT THE USER'S SOLE RISK AND WITHOUT ANY RISK OR LIABILITY TO GZA AND NATIONAL GRID.



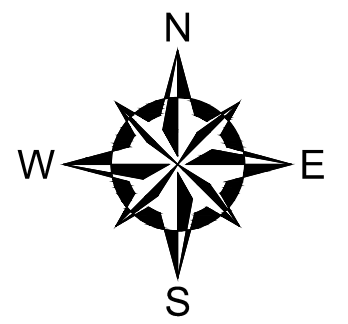
LEGEND:

- PROPERTY LINES
- 642 ALLENS AVENUE FORMER MGP SITE
- PROJECT WORK SITE
- STRAP AREA (LIMITS OF SOIL AND GROUNDWATER DISTURBANCE)

REFERENCE NOTES:

1. THIS MAP CONTAINS THE ESRI ARCGIS ONLINE BING MAPS AERIAL LAYER PACKAGE. IMAGE COURTESY OF USGS EARTHSTAR GEOGRAPHICS SIO © MICROSOFT CORPORATION 2015.
2. PARCEL AND STREET DATA PROVIDED BY THE CITY OF PROVIDENCE PLANNING AND DEVELOPMENT DEPARTMENT. PARCELS OF REAL ESTATE ASSESSED AS OF DECEMBER 31, 2012. GIS DATA ARE FOR PLANNING PURPOSES ONLY. THESE DATA DO NOT REPRESENT A LEGALLY RECORDED PLAN, DEED, SURVEY OR ENGINEERING SCHEMATIC AND ARE NOT INTENDED TO BE USED AS SUCH.
3. SITE BOUNDARIES ARE APPROXIMATE.

PROVIDENCE RIVER



THE INFORMATION SHOWN ON THE DRAWING IS SOLELY FOR USE BY NATIONAL GRID OR THE NATIONAL GRID'S DESIGNATED REPRESENTATIVE FOR THE SPECIFIC PROJECT AND LOCATION IDENTIFIED ON THE DRAWING. THE DRAWING SHALL NOT BE TRANSFERRED, REUSED, COPIED, OR ALTERED IN ANY MANNER FOR USE AT ANY OTHER LOCATION OR FOR ANY OTHER PURPOSE WITHOUT THE PRIOR WRITTEN CONSENT OF GZA AND NATIONAL GRID. ANY TRANSFER, REUSE, OR MODIFICATION TO THE DRAWING BY OTHERS, WITHOUT THE PRIOR WRITTEN EXPRESS CONSENT OF GZA AND NATIONAL GRID, WILL BE AT THE USER'S SOLE RISK AND WITHOUT ANY RISK OR LIABILITY TO GZA AND NATIONAL GRID.

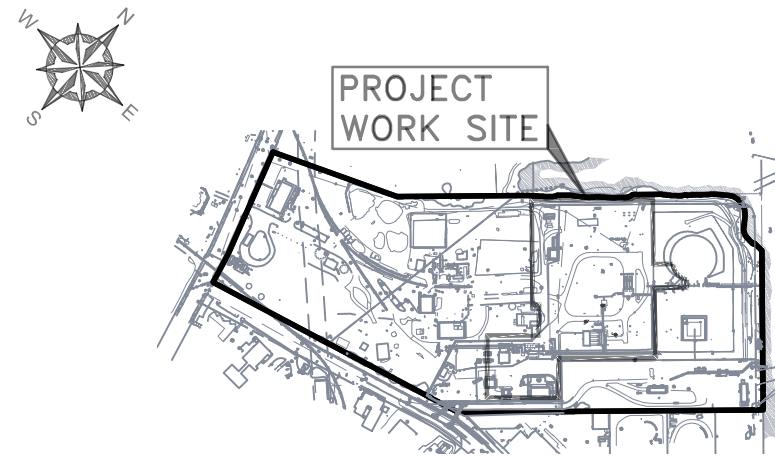
NATIONAL GRID PROPOSED LIQUEFACTION PLANT PROVIDENCE, RHODE ISLAND SHORT TERM RESPONSE ACTION PLAN (STRAP)

OVERALL AERIAL PHOTOGRAPH

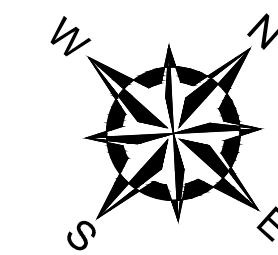
PREPARED BY:
GZA GeoEnvironmental, Inc.
 Engineers and Scientists
 www.gza.com

PREPARED FOR:

PRJ MGR: MSK	REVIEWED BY: TRG	CHECKED BY: SDN	DRAWING
DESIGNED BY: SDN	DRAWN BY: LTD	SCALE: AS NOTED	2
DATE: MAY, 2017	PROJECT NO. 33554.60	REVISION NO. 0	SHEET NO. 2 OF 7



KEY PLAN:
SCALE: 1"=800'



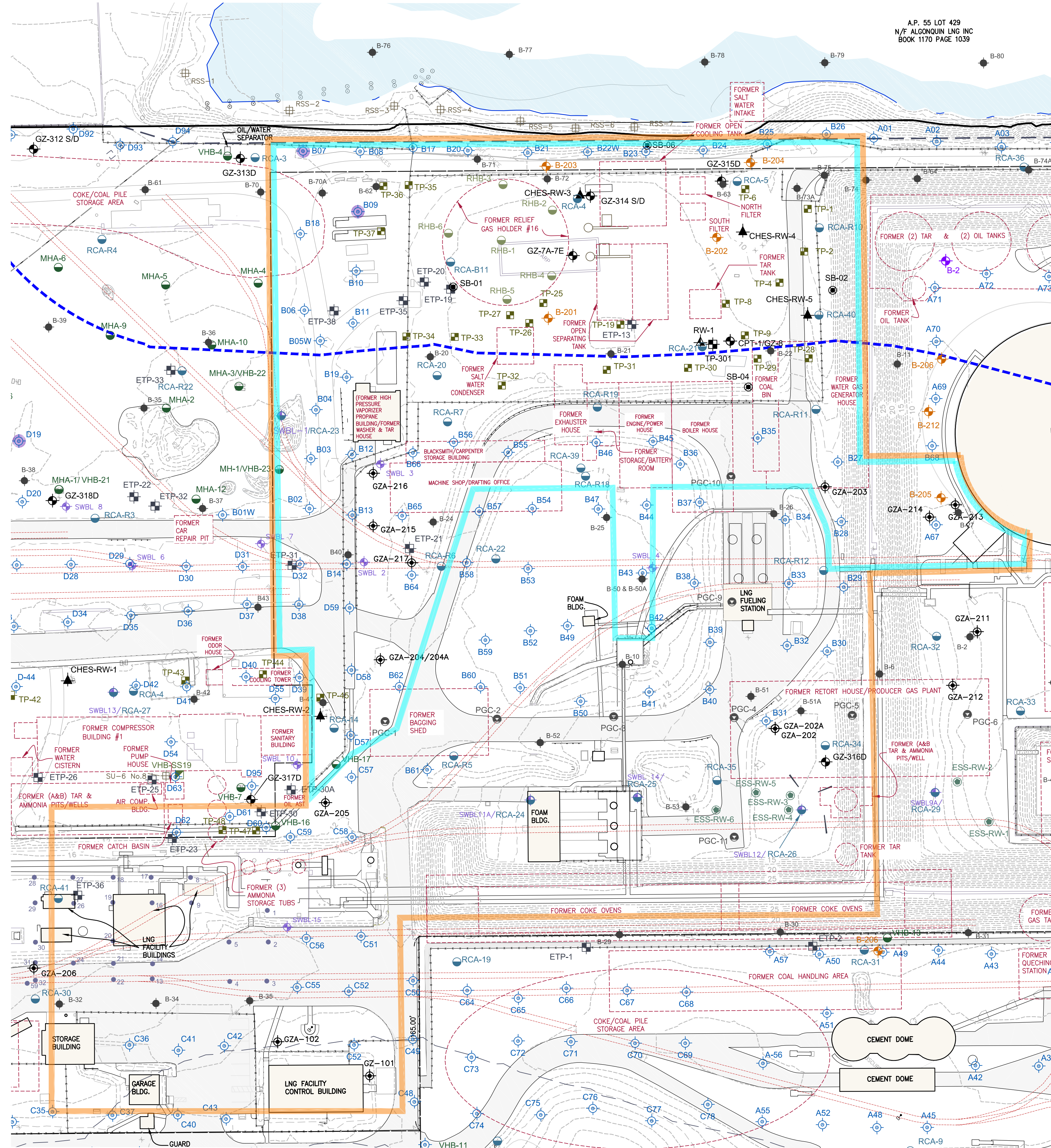
AP. 55 LOT 429
N/F ALGONQUIN LNG INC
BOOK 1170 PAGE 1039

EXPLORATION LEGEND:

- GZ-401 ● ENVIRONMENTAL BORING OBSERVED BY GZA IN 2015
- GZ-314 S/D ● ENVIRONMENTAL BORING OBSERVED BY GZA IN 2014
- VHB-7 ● ENVIRONMENTAL BORING OBSERVED BY VHB IN 2002 AND 2003
- F47 ● ENVIRONMENTAL BORING OBSERVED BY ESS IN 1999 AND 2000
- 1 ● ENVIRONMENTAL BORING OBSERVED BY ESS IN 1999
- RHB-1 ● ENVIRONMENTAL BORING OBSERVED BY ESS IN 1998
- RCA-40 ● ENVIRONMENTAL BORING OBSERVED BY RCA BETWEEN 1994-1996
- TP-301 ● ENVIRONMENTAL TEST PITS OBSERVED BY GZA IN 2014
- VHB TP-101 ● ENVIRONMENTAL TEST PITS OBSERVED BY VHB IN 2008
- TP-1 ● ENVIRONMENTAL TEST PITS OBSERVED BY VHB IN 2002
- B07 ● ENVIRONMENTAL TEST PIT OBSERVED BY ESS IN 1999 AND 2000
- ETP-4 ● ENVIRONMENTAL TEST PITS OBSERVED BY RCA IN 1995 AND 1996
- SS-301 ▲ SURFACE SOIL SAMPLE COLLECTED BY GZA IN 2014
- VHB-SS2 ▲ SURFACE SOIL SAMPLE COLLECTED BY VHB IN 2003
- SU-6 No.9 ▲ SURFACE SOIL SAMPLE COLLECTED BY RCA IN 1994 AND 1995
- RSS-1 ▲ SEDIMENT SAMPLE COLLECTED BY RCA IN 1994 AND 1995
- RW-1 ▲ RECOVERY WELL INSTALLED BY CHES OBSERVED BY GZA IN 2014
- CHES-RW-1 ▲ RECOVERY WELL INSTALLED BY CHES OBSERVED BY VHB IN 2002
- ESS-RW-1 ● RECOVERY WELL INSTALLED BY ESS IN 1999 AND 2000
- SB-01 ● GEOTECHNICAL BORING OBSERVED BY WEIDLINGER ASSOCIATES, INC. (WAI) IN 2015
- GZA-206 ● GEOTECHNICAL BORING OBSERVED BY GZA IN 2005
- GZ-1 ● GEOTECHNICAL BORING OBSERVED BY GZA IN 2004
- SWBL13 ● GEOTECHNICAL BORING OBSERVED BY SWEC IN 1995
- B-207 ● GEOTECHNICAL BORING PERFORMED FOR PROVIDENCE GAS COMPANY IN 1973
- B-25 ● GEOTECHNICAL BORING OBSERVED BY HALEY & ALDRICH IN 1971 AND 1972
- PGC-8 ● GEOTECHNICAL BORING PERFORMED FOR PROVIDENCE GAS COMPANY IN 1912
- B-201 ● GEOTECHNICAL BORINGS OBSERVED BY GOLDER ASSOCIATES IN 2016

LEGEND:

- PROPERTY LINE
- - - INTERIOR PROPERTY LINE
- PROJECT WORK SITE
- STRAP AREA (LIMITS OF SOIL AND GROUNDWATER DISTURBANCE)
- EXISTING BUILDING
- UTILITY POLE
- LIGHT POLE
- STEEL POST
- PILING
- EDGE OF WATER
- FENCE
- RAILROAD TRACKS
- - - EXISTING CONTOUR (MAJOR 5 FOOT INTERVAL)
- - - EXISTING CONTOUR (MINOR 1 FOOT INTERVAL)
- - - HISTORIC STRUCTURE OR FEATURE
- PAVEMENT
- CONCRETE PAD
- HYDRANT
- - - 200 FOOT CRMC SETBACK



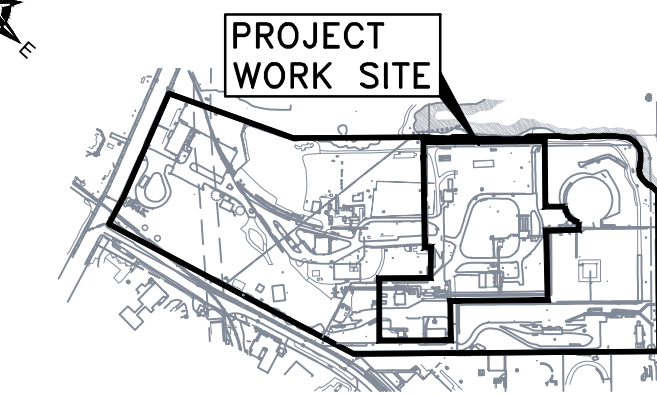
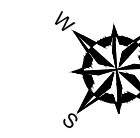
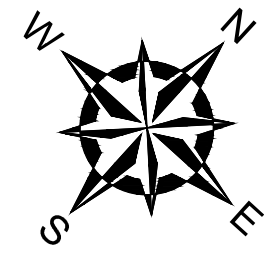
0 25 50 100 150
SCALE IN FEET 1" = 50'

GENERAL NOTES:

- 1) EXISTING CONDITIONS BASE MAP DEVELOPED FROM THE FOLLOWING:
 - ELECTRONIC CAD FILE "ACAD-7257PL.DWG" PROVIDED BY VANASSE HANGEN BRUSTLIN (VHB) ENTITLED "EXISTING CONDITIONS PLAN," PROJECT TITLE "NATIONAL GRID LNG TERMINAL ROAD LNG FACILITY" DATED MARCH 10, 2014, ORIGINAL SCALE 1" = 50', DRAWING NO. SV-1 THROUGH SV-3 AND AERIAL MAPPING BY WSP TRANSPORTATION AND INFRASTRUCTURE DATED JANUARY 15, 2014 PREPARED FOR NATIONAL GRID LAND SURVEYING DEPARTMENT, WALTHAM, MASSACHUSETTS AND CAD FILE NO. 09303023.052-1.DWG
 - ON-SITE INVESTIGATIONS AND SURVEYS BY GZA PERSONNEL DURING VARIOUS SITE VISITS BETWEEN 2011 AND 2016.
- 2) PROPERTY LINES AND LOT INFORMATION ESTABLISHED FROM INFORMATION PROVIDED ON A DRAWING ENTITLED "EXISTING CONDITIONS PLAN," PROJECT TITLE "NATIONAL GRID LNG TERMINAL ROAD LNG FACILITY" DATED MARCH 10, 2014, ORIGINAL SCALE 1" = 50', DRAWING NO. SV-1 THROUGH SV-3.
- 3) EXPLORATION LOCATION PLANS WERE DEVELOPED FROM THE FOLLOWING:
 - SITE PLANS PROVIDED BY RESOURCE CONTROLS ASSOCIATES (RCA) IN THE RIDEM-SUBMITTED JULY 5, 1994 "SITE CHARACTERIZATION PLAN" PREPARED ON BEHALF OF THE PROVIDENCE GAS COMPANY. PLANS PROVIDED BY NATIONAL GRID.
 - SITE PLANS PROVIDED BY RCA IN THE RIDEM-SUBMITTED JUNE 28, 1996 "PHASE IB FIELD CHARACTERIZATION INVESTIGATION PLAN" PREPARED ON BEHALF OF THE PROVIDENCE GAS COMPANY. PLANS PROVIDED BY NATIONAL GRID.
 - SITE PLANS PROVIDED BY ESS IN THE RIDEM-SUBMITTED OCTOBER 21, 1999 "SUBSURFACE INVESTIGATION AND PROPOSED ALGONQUIN GENERATOR CONSTRUCTION AREA" PREPARED ON BEHALF OF THE PROVIDENCE GAS COMPANY. PLANS PROVIDED BY NATIONAL GRID.
 - SITE PLANS PROVIDED BY VHB IN THE RIDEM-SUBMITTED NOVEMBER 2002 "REMEDIAL ACTION CLOSURE REPORT" PREPARED ON BEHALF OF THE NEW ENGLAND GAS COMPANY. PLANS PROVIDED BY NATIONAL GRID.
 - SITE PLANS PROVIDED BY VHB IN THE RIDEM-SUBMITTED APRIL 2003 "SITE INVESTIGATION REPORT" PREPARED ON BEHALF OF THE NEW ENGLAND GAS COMPANY. PLANS PROVIDED BY NATIONAL GRID.
 - SITE PLANS PROVIDED BY VHB IN THE RIDEM-SUBMITTED JANUARY 26, 2009 "OXIDE BOX INVESTIGATION TECHNICAL MEMORANDUM" PREPARED ON BEHALF OF NATIONAL GRID. PLANS PROVIDED BY NATIONAL GRID.
 - FIGURE 3 "EXPLORATION LOCATION PLAN" PREPARED BY GZA GEOENVIRONMENTAL, INC. (GZA) ON BEHALF OF CHICAGO BRIDGE AND IRON (CB&I) IN JULY 2005. PLANS PROVIDED BY NATIONAL GRID.
 - ELECTRONIC CAD FILE "ACAD-7257PL.DWG" PROVIDED BY VANASSE HANGEN BRUSTLIN (VHB) ENTITLED "EXISTING CONDITIONS PLAN," PROJECT TITLE "NATIONAL GRID LNG TERMINAL ROAD LNG FACILITY" DATED MARCH 10, 2014, ORIGINAL SCALE 1" = 50', DRAWING NO. SV-1 THROUGH SV-3 AND AERIAL MAPPING BY WSP TRANSPORTATION AND INFRASTRUCTURE DATED JANUARY 15, 2014 PREPARED FOR NATIONAL GRID LAND SURVEYING DEPARTMENT, WALTHAM, MASSACHUSETTS AND CAD FILE NO. 09303023.052-1.DWG. PLANS PROVIDED BY NATIONAL GRID.
 - FIGURE 2 "EXPLORATION LOCATION PLAN," DATED SEPTEMBER 18, 2015, BY WEIDLINGER ASSOCIATES, INC. (WEI) ON BEHALF OF KIEWIT CORPORATION (KIEWIT). PLAN PROVIDED BY NATIONAL GRID.
 - FIGURE 2 "EXPLORATION LOCATION PLAN," DATED MARCH 22, 2016, BY GOLDER ASSOCIATES, INC. PREPARED FOR CHI ENGINEERING AND PROVIDED BY NATIONAL GRID.
 - ON-SITE INVESTIGATIONS AND SURVEYS BY GZA PERSONNEL DURING VARIOUS SITE VISITS BETWEEN 2011 AND 2016.
- 4) THE LOCATION OF THE EXPLORATIONS AND MONITORING WELLS AT THE SITE WERE APPROXIMATELY DETERMINED AND HAVE BEEN ALIGNED AND ADJUSTED FOR THE "BEST FIT" AND THESE DATA SHOULD BE CONSIDERED ACCURATE ONLY TO THE DEGREE IMPLIED BY THE METHOD USED.
- 5) HORIZONTAL DATUM IS BASED ON NAD 1983 FROM BASE MAPPING PROVIDED BY VHB.
- 6) VERTICAL DATUM IS BASED ON NAVD 1988 FROM BASE MAPPING PROVIDED BY VHB.
- 7) APPROXIMATE HISTORICAL STRUCTURE/EQUIPMENT LOCATIONS AND DATES WERE OBTAINED FROM THE FOLLOWING SOURCES:
 - CERTIFIED SANBORN MAPS DATED: 1950, 1956, 1972, 1977 AND 1982
 - AERIAL ORTHOPHOTOGRAPHIC IMAGES OBTAINED FROM RIGIS: 1939, 1951, 1962, 1972, 1976, 1981, 1988, 1992, 1995, 1997, 2002, 2008
 - SITE PLANS PROVIDED BY RESOURCE CONTROLS ASSOCIATES (RCA) IN THE RIDEM-SUBMITTED JULY 5, 1994 "SITE CHARACTERIZATION PLAN" PREPARED ON BEHALF OF THE PROVIDENCE GAS COMPANY. PLANS PROVIDED BY NATIONAL GRID.
 - HISTORIC SITE PLAN "GENERAL PLAN OF WORKS, PROVIDENCE GAS COMPANY, SASSAFRAS POINT PLANT, PROVIDENCE, RHODE ISLAND," UNDATED. PLANS PROVIDED BY NATIONAL GRID.
- 10) THE SITE HAS BEEN THE LOCATION OF NUMEROUS REMEDIAL ACTIONS. THIS PLAN SET DOES NOT PRESENT THE LOCATIONS OF ANY CONFIRMATORY SAMPLES THAT HAVE BEEN COLLECTED AT THE SITE. THIS PLAN SET MAY INCLUDE LOCATIONS THAT HAVE BEEN FULLY EXCAVATED AND THE PRESENTED EXPLORATIONS MAY NOT BE TRUE TO CURRENT CONDITIONS.
- 11) THIS PLAN SET DOES NOT PRESENT THE LOCATIONS OF SAMPLES THAT WERE COLLECTED FOR GEOTECHNICAL PURPOSES ONLY. THIS INCLUDES CONE PENETROMETER TESTING SAMPLES AND TEST PITS CONDUCTED WITH NO SOIL DESCRIPTIONS OR ENVIRONMENTAL SAMPLES COLLECTED. HOWEVER, THE LOCATIONS OF KNOWN GEOTECHNICAL BORINGS (PRESENTED ON PLANS PROVIDED BY NATIONAL GRID) ARE SHOWN.

THE INFORMATION SHOWN ON THE DRAWING IS SOLELY FOR USE BY NATIONAL GRID OR THE NATIONAL GRID'S DESIGNATED REPRESENTATIVE FOR THE SPECIFIC PROJECT AND LOCATION IDENTIFIED ON THE DRAWING. THE DRAWING SHALL NOT BE TRANSFERRED, REUSED, COPIED, OR ALTERED IN ANY MANNER FOR USE AT ANY OTHER LOCATION OR FOR ANY OTHER PURPOSE WITHOUT THE PRIOR WRITTEN CONSENT OF GZA AND NATIONAL GRID. ANY TRANSFER, REUSE, OR MODIFICATION TO THE DRAWING BY OTHERS, WITHOUT THE PRIOR WRITTEN EXPRESS CONSENT OF GZA AND NATIONAL GRID, WILL BE AT THE USER'S SOLE RISK AND WITHOUT ANY RISK OR LIABILITY TO GZA AND NATIONAL GRID.

NATIONAL GRID PROPOSED LIQUEFACTION PLANT PROVIDENCE, RHODE ISLAND SHORT TERM RESPONSE ACTION PLAN (STRAP)			
EXPLORATION LOCATION PLAN			
PREPARED BY: GZA GeoEnvironmental, Inc. Engineers and Scientists www.gza.com	PREPARED FOR: 		
PROJ MGR: MSK	REVIEWED BY: TRG	CHECKED BY: SDN	DRAWING 3
DESIGNED BY: SDN	DRAWN BY: LDT	SCALE: AS NOTED	
DATE: MAY, 2017	PROJECT NO.: 33554.60	REVISION NO.: 0	SHEET NO. 3 OF 7



A.P. 55 LOT 429
N/F ALGONQUIN LNG INC
BOOK 1170 PAGE 1039

DOCUMENTED IN THE NOVEMBER 2002
REMEDIAL ACTION CLOSURE REPORT:
STRUCTURE EXCAVATION, SOIL
EXCAVATION AND BACKFILL ACTIVITIES

PIPE REMOVAL DOCUMENTED IN
THE JUNE 1996 SHORT TERM
RESPONSE MEASURE REPORT

DOCUMENTED IN THE NOVEMBER 2002
REMEDIAL ACTION CLOSURE REPORT:
STRUCTURE EXCAVATION, SOIL
EXCAVATION AND BACKFILL ACTIVITIES

DOCUMENTED IN THE NOVEMBER 2002
REMEDIAL ACTION CLOSURE REPORT:
STRUCTURE EXCAVATION, SOIL
EXCAVATION AND BACKFILL ACTIVITIES

ALGONQUIN GENERAL AREA SOIL
EXCAVATION AND CAPPING DOCUMENTED
IN 1999 SUBSURFACE INVESTIGATION AND
PROPOSED REMEDIATION

KEY PLAN:
SCALE: 1"=800'

LEGEND:

- PROPERTY LINE
- - - INTERIOR PROPERTY LINE
- - - 200 FOOT CRMC SETBACK
- PROJECT WORK SITE
- STRAP AREA (LIMITS OF SOIL AND GROUNDWATER DISTURBANCE)
- - - EDGE OF WATER
- STEEL POST
- - - FENCE
- RAILROAD TRACKS
- - - EXISTING CONTOUR (MAJOR 10 FOOT INTERVAL)
- - - EXISTING CONTOUR (MINOR 1 FOOT INTERVAL)

GENERAL NOTES:

- 1) EXISTING CONDITIONS BASE MAP DEVELOPED FROM THE FOLLOWING:
 - ELECTRONIC CAD FILE "ACAD-7257PL.DWG" PROVIDED BY VANASSE HANGEN BRUSTLIN (VHB) ENTITLED "EXISTING CONDITIONS PLAN," PROJECT TITLE "NATIONAL GRID LNG TERMINAL ROAD LNG FACILITY" DATED MARCH 10, 2014, ORIGINAL SCALE 1" = 50', DRAWING NO. SV-1 THROUGH SV-3 AND AERIAL MAPPING BY WSP TRANSPORTATION AND INFRASTRUCTURE DATED JANUARY 15, 2014 PREPARED FOR NATIONAL GRID LAND SURVEYING DEPARTMENT, WALTHAM, MASSACHUSETTS AND CAD FILE NO. 09303023.052-1.DWG
 - ON-SITE INVESTIGATIONS AND SURVEYS BY GZA PERSONNEL DURING VARIOUS SITE VISITS BETWEEN 2011 AND 2016.
- 2) PROPERTY LINES AND LOT INFORMATION ESTABLISHED FROM INFORMATION PROVIDED ON A DRAWING ENTITLED "EXISTING CONDITIONS PLAN," PROJECT TITLE "NATIONAL GRID LNG TERMINAL ROAD LNG FACILITY" DATED MARCH 10, 2014, ORIGINAL SCALE 1" = 50', DRAWING NO. SV-1 THROUGH SV-3.
- 3) HORIZONTAL DATUM IS BASED ON NAD 1983 FROM BASE MAPPING PROVIDED BY VHB.
- 4) VERTICAL DATUM IS BASED ON NAVD 1988 FROM BASE MAPPING PROVIDED BY VHB.



THE INFORMATION SHOWN ON THE DRAWING IS SOLELY FOR USE BY NATIONAL GRID OR THE NATIONAL GRID'S DESIGNATED REPRESENTATIVE FOR THE SPECIFIC PROJECT AND LOCATION IDENTIFIED ON THE DRAWING. THE DRAWING SHALL NOT BE TRANSFERRED, REUSED, COPIED, OR ALTERED IN ANY MANNER FOR USE AT ANY OTHER LOCATION OR FOR ANY OTHER PURPOSE WITHOUT THE PRIOR WRITTEN CONSENT OF GZA AND NATIONAL GRID. ANY TRANSFER, REUSE, OR MODIFICATION TO THE DRAWING BY OTHERS, WITHOUT THE PRIOR WRITTEN EXPRESS CONSENT OF GZA AND NATIONAL GRID, WILL BE AT THE USER'S SOLE RISK AND WITHOUT ANY RISK OR LIABILITY TO GZA AND NATIONAL GRID.

NATIONAL GRID PROPOSED LIQUEFACTION PLANT
PROVIDENCE, RHODE ISLAND
SHORT TERM RESPONSE ACTION PLAN (STRAP)

COMPLETED REMEDIAL ACTIVITIES

PREPARED BY: GZA GeoEnvironmental, Inc. Engineers and Scientists www.gza.com		PREPARED FOR: 	
PROJ MGR: MSK	REVIEWED BY: TRG	CHECKED BY: SDN	DRAWING 4 SHEET NO. 4 OF 7
DESIGNED BY: SDN	DRAWN BY: LDT	SCALE: AS NOTED	
DATE: MAY, 2017	PROJECT NO.: 33554.60	REVISION NO.: 0	

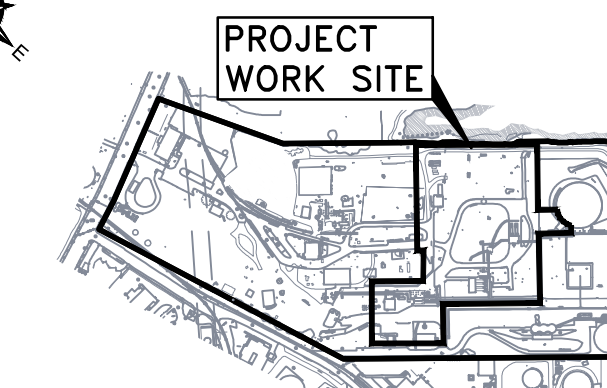
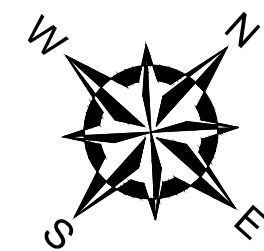
2017 - GZA GeoEnvironmental, Inc. GZA-VA-DMA-33554.60-MKA-T010005-CAD-DWG-UNLADUFACTION_FERC_33554.60_ENGINERED_CONTROL.DWG_COMPLETED_REMEDIAL_ACTIVITIES_MAY_8_2017_2:34 PM_USA_THERMALT

AREAS OF REMEDIATION

- AREAS CAPPED WITH APPROXIMATELY 18-20 INCHES OF CLEAN SAND, APPROXIMATELY 4-6 INCHES OF LOAM AND HYDROSEED
- AREAS CAPPED WITH APPROXIMATELY 2 FEET OF STONE DUST
- AREAS CAPPED WITH APPROXIMATELY 18-20 INCHES OF CLEAN SAND AND APPROXIMATELY 4-6 INCHES OF CRUSHED STONE
- AREAS REMEDIATED BY ESS, CLEAN SAND AND CRUSHED STONE CAP
- AREAS CAPPED WITH GEOTEXTILE AND APPROXIMATELY 24 INCHES OF RIP RAP
- AREAS WHERE REMEDIAL ACTIONS HAVE BEEN CONDUCTED

AREAS EQUIVALENT TO AN ENGINEERED CAP

- BUILDING/STRUCTURE
- PAVED AREAS
- CONTAINMENT DIKE
- CONCRETE PAD



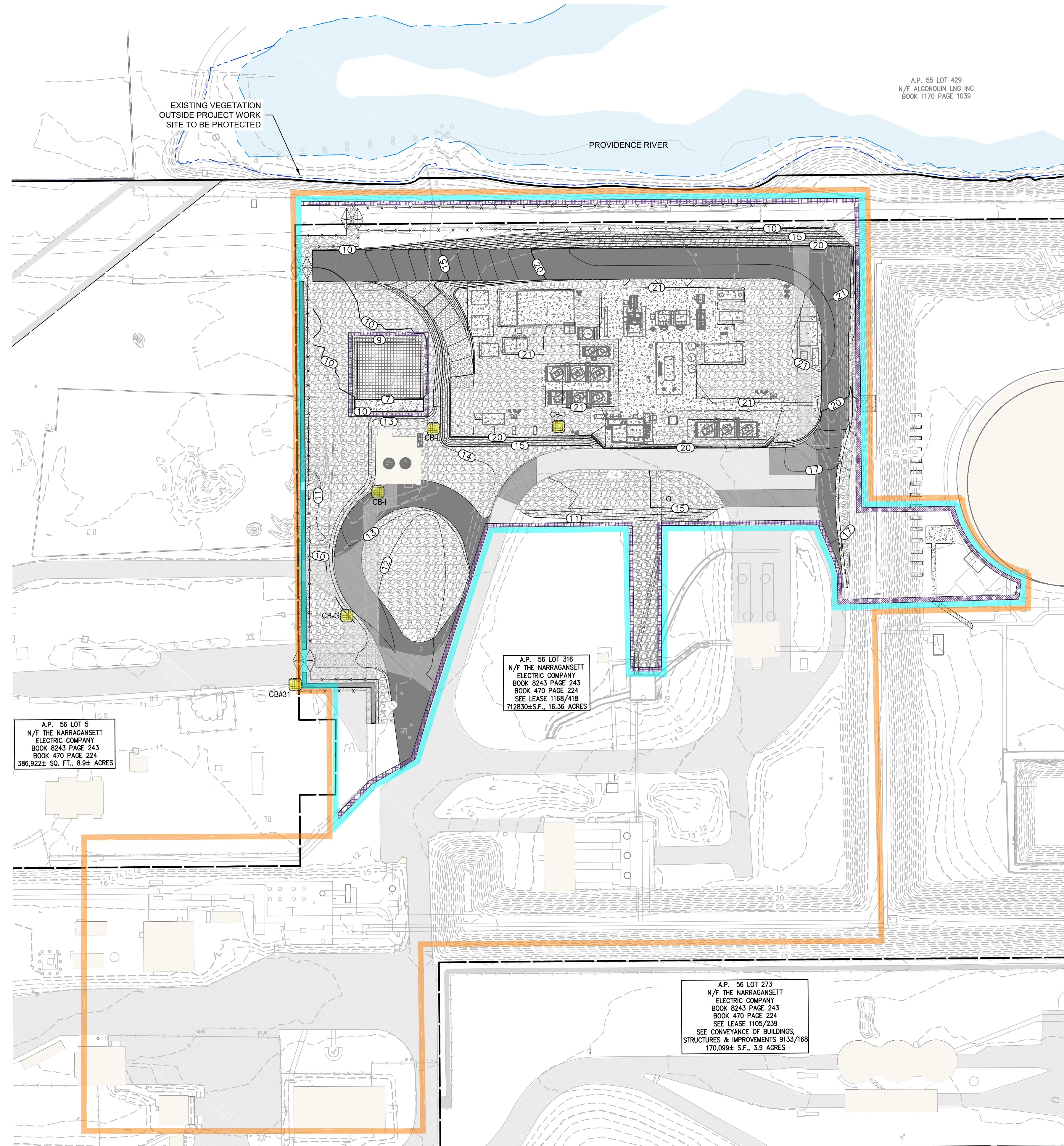
KEY PLAN:
SCALE: 1"=800'

LEGEND:

- EXISTING BUILDING
- EXISTING CONTOUR (MAJOR 5 FOOT INTERVAL)
- EXISTING CONTOUR (MINOR 1 FOOT INTERVAL)
- EXISTING PAVEMENT
- EASEMENT AREA
- UTILITY POLE
- LIGHT POLE
- HYDRANT
- PROPERTY LINES
- INTERIOR PROPERTY LINE
- PROJECT WORK SITE
- STRAP AREA (LIMITS OF SOIL AND GROUNDWATER DISTURBANCE)
- PROPOSED PERMANENT PAVEMENT
- PROPOSED CONTOUR (MAJOR 5 FOOT INTERVAL)
- PROPOSED CONTOUR (MINOR 1 FOOT INTERVAL)
- PROPOSED CRUSHED STONE
- FILTRIXX SOXX
- PROPOSED CONCRETE
- PROPOSED SAND FILTER
- CATCH BASIN FRAME AND GRATE
- CATCH BASIN TO BE PROTECTED WITH SILT SACK
- PROPOSED RIP RAP CAP

GENERAL NOTES:

- 1) BASE MAP DEVELOPED FROM THE FOLLOWING:
 - ELECTRONIC CAD FILE "ACAD-7257PL.DWG" PROVIDED BY VANASSE HANGEN BRUSTLIN (VHB) ENTITLED "EXISTING CONDITIONS PLAN," PROJECT TITLE "NATIONAL GRID LNG TERMINAL ROAD LNG FACILITY" DATED MARCH 10, 2014, ORIGINAL SCALE 1" = 50', DRAWING NO. SV-1 THROUGH SV-3 AND AERIAL MAPPING BY WSP TRANSPORTATION AND INFRASTRUCTURE DATED JANUARY 15, 2014 PREPARED FOR NATIONAL GRID LAND SURVEYING DEPARTMENT, WALTHAM, MASSACHUSETTS AND CAD FILE NO. 09303023.052-1.DWG. PLANS PROVIDED BY NATIONAL GRID.
 - DESCRIPTIONS PROVIDED IN THE CITY OF PROVIDENCE DEED BOOK (BK) 470 PAGES 224 - 229, BK 561 PAGES 326 - 328, BK 1111 PAGES 752 - 756 AND BK 5249 PAGES 219 - 322.
 - ELECTRONIC CAD FILE 14-152_SU1_REV2.DWG, TITLED "TOPOGRAPHIC SURVEY PLAN, PORTION OF A.P. 56 LOT 5" DATED OCTOBER 27, 2014 AND PROVIDED BY NATIONAL GRID.
 - ELECTRONIC CAD FILE 5153_COO.DWG, TITLED "EXISTING CONDITIONS PLAN" PREPARED BY PROCESS PIPELINE SERVICES, DATED DECEMBER 18, 2014 AND PROVIDED BY NATIONAL GRID.
 - ELECTRONIC CAD FILES PROVIDED BY KIEWIT
 1. "2007EXP_102761-CIV_SITE.DWG"
 2. "2007EXP_102761-CIV_LAYOUT.DWG"
 3. "102761_MEC_STR_BASE.DWG"
 4. "102761-SURVEY_SITE.DWG"
 5. "2007EXP_102761-CIV_STORM.DWG"
 6. "2007EXP_102761-CIV_SURFACING.DWG"
 7. "102761-CIV_GRADING.DWG"
 8. "POST DEVELOPMENT DRAINAGE MAP.DWG"
 - PDFS OF THE FOLLOWING DRAWINGS PROVIDED BY NATIONAL GRID
 1. "CATCH BASINS AND SANITARY SEWER SYSTEM" PREPARED BY PROVIDENCE GAS COMPANY, DATED SEPTEMBER 25, 1981.
 2. "PLAN SHOWING UNDERGROUND UTILITIES LNG FACILITY" DATED OCTOBER 6, 1983, "SUBSURFACE UTILITY ENGINEERING" PREPARED BY BAYSTATE SUBSURFACE INVESTIGATION, INC., DATED MAY 17, 2005.
- 2) HORIZONTAL DATUM IS BASED ON NAD 1983 FROM BASE MAPPING PROVIDED BY VHB.
- 3) VERTICAL DATUM IS BASED ON NAVD 1988 FROM BASE MAPPING PROVIDED BY VHB.
- 4) SELECT PRESENTED SITE UTILITIES WERE TAKEN FROM HISTORIC FIGURES PROVIDED BY NATIONAL GRID. ALL UTILITY LOCATIONS ARE APPROXIMATE AND HAVE BEEN ALIGNED AND ADJUSTED FOR THE "BEST FIT" AND THESE DATA SHOULD BE CONSIDERED ACCURATE ONLY TO THE DEGREE IMPLIED BY THE METHOD USED. UTILITIES ARE SHOWN FOR REFERENCE ONLY. OTHER LOCATIONS MAY EXIST.
- 5) ON-SITE INVESTIGATIONS AND SURVEYS BY GZA PERSONNEL DURING VARIOUS SITE VISITS BETWEEN 2011 AND 2016.
- 6) SITE BOUNDARIES ARE APPROXIMATE.
- 7) CONTRACTOR TO INSTALL CONSTRUCTION ENTRANCES PROXIMATE TO HAUL ROADS AND AS NEEDED.



A.P. 56 LOT 5
N/F THE NARRAGANSETT
ELECTRIC COMPANY
BOOK 8243 PAGE 243
BOOK 470 PAGE 224
386,922± SQ. FT., 8.9± ACRES

A.P. 56 LOT 316
N/F THE NARRAGANSETT
ELECTRIC COMPANY
BOOK 8243 PAGE 243
BOOK 470 PAGE 224
SEE LEASE 1168/418
712830± S.F., 16.36 ACRES

A.P. 56 LOT 273
N/F THE NARRAGANSETT
ELECTRIC COMPANY
BOOK 8243 PAGE 243
BOOK 470 PAGE 224
SEE LEASE 1105/239
SEE CONVEYANCE OF BUILDINGS,
STRUCTURES & IMPROVEMENTS 9133/168
170,099± S.F., 3.9 ACRES



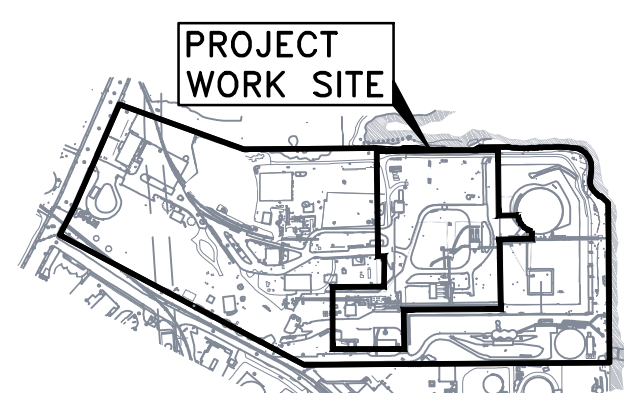
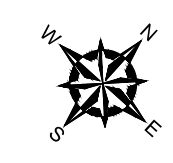
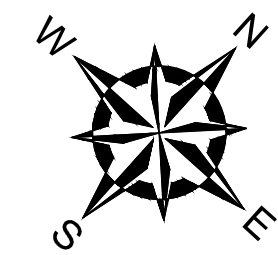
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NATIONAL GRID PROPOSED LIQUEFACTION PLANT
PROVIDENCE, RHODE ISLAND
SHORT TERM RESPONSE ACTION PLAN (STRAP)

EROSION AND SEDIMENTATION CONTROL PLAN

PREPARED BY: GZA GeoEnvironmental, Inc. Engineers and Scientists www.gza.com	PREPARED FOR: nationalgrid		
PROJ MGR: MSK	REVIEWED BY: TRG	CHECKED BY: SDN	DRAWING 5 SHEET NO. 5 OF 7
DESIGNED BY: SDN	DRAWN BY: LDT	SCALE: AS NOTED	
DATE: MAY, 2017	PROJECT NO.: 33554.60	REVISION NO.: 0	

2017 - GZA GeoEnvironmental, Inc. GZA-VA-DMA-33554-60-MSK-FIGURES-CAD-DWG-33554-60-CRMC PERMITTING-2-2-2016.DWG EROSION AND SEDIMENTATION CONTROL PLAN MAY 8, 2017 3:30 PM LISA THERIAULT



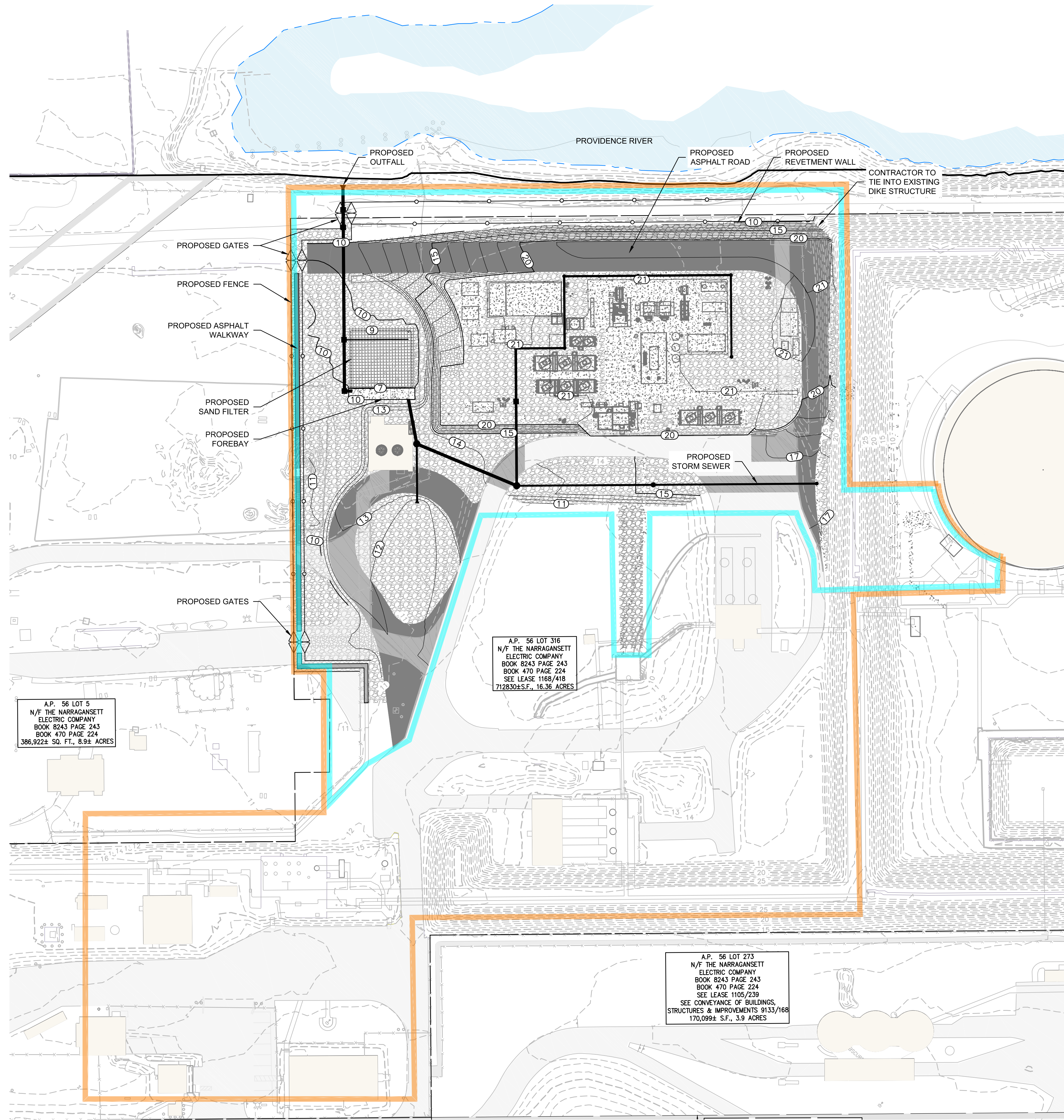
KEY PLAN:
SCALE: 1"=800'

LEGEND:

- EXISTING STRUCTURE
- EXISTING CONTOUR (MAJOR 5 FOOT INTERVAL)
- EXISTING CONTOUR (MINOR 1 FOOT INTERVAL)
- EXISTING PAVEMENT
- EASEMENT AREA
- UTILITY POLE
- LIGHT POLE
- HYDRANT
- PROPERTY LINES
- INTERIOR PROPERTY LINE
- PROPOSED CONTOUR (MAJOR 5 FOOT INTERVAL)
- PROPOSED CONTOUR (MINOR 1 FOOT INTERVAL)
- PROPOSED ASPHALT CAP
- PROPOSED CRUSHED STONE CAP
- PROPOSED CONCRETE CAP
- PROPOSED SAND FILTER
- PROJECT WORK SITE
- STRAP AREA (LIMITS OF SOIL AND GROUNDWATER DISTURBANCE)
- PROPOSED ROUND CATCH BASIN
- PROPOSED SQUARE CATCH BASIN
- PROPOSED RIP RAP CAP

GENERAL NOTES:

- 1) BASE MAP DEVELOPED FROM THE FOLLOWING:
 - ELECTRONIC CAD FILE "ACAD-7257PL.DWG" PROVIDED BY VANASSE HANGEN BRUSTLIN (VHB) ENTITLED "EXISTING CONDITIONS PLAN," PROJECT TITLE "NATIONAL GRID LNG TERMINAL ROAD LNG FACILITY" DATED MARCH 10, 2014, ORIGINAL SCALE 1" = 50', DRAWING NO. SV-1 THROUGH SV-3 AND AERIAL MAPPING BY WSP TRANSPORTATION AND INFRASTRUCTURE DATED JANUARY 15, 2014 PREPARED FOR NATIONAL GRID LAND SURVEYING DEPARTMENT, WALTHAM, MASSACHUSETTS AND CAD FILE NO. 09303023.052-1.DWG. PLANS PROVIDED BY NATIONAL GRID.
 - DESCRIPTIONS PROVIDED IN THE CITY OF PROVIDENCE DEED BOOK (BK) 470 PAGES 224 - 229, BK 561 PAGES 326 - 328, BK 1111 PAGES 752 - 756 AND BK 5249 PAGES 219 - 322.
 - ELECTRONIC CAD FILE 14-152_SU1_REV2.DWG, TITLED "TOPOGRAPHIC SURVEY PLAN, PORTION OF A.P. 56 LOT 5" DATED OCTOBER 27, 2014 AND PROVIDED BY NATIONAL GRID.
 - ELECTRONIC CAD FILE 5153_COO.DWG, TITLED "EXISTING CONDITIONS PLAN" PREPARED BY PROCESS PIPELINE SERVICES, DATED DECEMBER 18, 2014 AND PROVIDED BY NATIONAL GRID.
 - ELECTRONIC CAD FILES PROVIDED BY KIEWIT
 1. "2007EXP_102761-CIV_SITE.DWG"
 2. "2007EXP_102761-CIV_LAYDOWN.DWG"
 3. "102761_MEC_STR_BASE.DWG"
 4. "102761-SURVEY_SITE.DWG"
 5. "2007EXP_102761-CIV_STORM.DWG"
 6. "2007EXP-102761-CIV_SURFACING.DWG"
 7. "102761-CIV_GRADING.DWG"
 8. "POST DEVELOPMENT DRAINAGE MAP.DWG"
 - PDFS OF THE FOLLOWING DRAWINGS PROVIDED BY NATIONAL GRID
 1. "CATCH BASINS AND SANITARY SEWER SYSTEM" PREPARED BY PROVIDENCE GAS COMPANY, DATED SEPTEMBER 25, 1981.
 2. "PLAN SHOWING UNDERGROUND UTILITIES LNG FACILITY" DATED OCTOBER 6, 1983, "SUBSURFACE UTILITY ENGINEERING" PREPARED BY BAYSTATE SUBSURFACE INVESTIGATION, INC., DATED MAY 17, 2005.
- 2) HORIZONTAL DATUM IS BASED ON NAD 1983 FROM BASE MAPPING PROVIDED BY VHB.
- 3) VERTICAL DATUM IS BASED ON NAVD 1988 FROM BASE MAPPING PROVIDED BY VHB.
- 4) SELECT PRESENTED SITE UTILITIES WERE TAKEN FROM HISTORIC FIGURES PROVIDED BY NATIONAL GRID. ALL UTILITY LOCATIONS ARE APPROXIMATE AND HAVE BEEN ALIGNED AND ADJUSTED FOR THE "BEST FIT" AND THESE DATA SHOULD BE CONSIDERED ACCURATE ONLY TO THE DEGREE IMPLIED BY THE METHOD USED. UTILITIES ARE SHOWN FOR REFERENCE ONLY. OTHER LOCATIONS MAY EXIST.
- 5) ON-SITE INVESTIGATIONS AND SURVEYS BY GZA PERSONNEL DURING VARIOUS SITE VISITS BETWEEN 2011 AND 2016.
- 6) PARCEL DATA PROVIDED BY THE CITY OF PROVIDENCE PLANNING AND DEVELOPMENT DEPARTMENT. PARCELS OF REAL ESTATE ASSESSED AS OF DECEMBER 31, 2012. GIS DATA ARE FOR PLANNING PURPOSES ONLY. THESE DATA DO NOT REPRESENT A LEGALLY RECORDED PLAN, DEED, SURVEY OR ENGINEERING SCHEMATIC AND ARE NOT INTENDED TO BE USED AS SUCH.
- 7) SITE BOUNDARIES ARE APPROXIMATE.
- 8) DETAILS OF REMEDIAL CAPPING ARE PRESENTED ON FIGURE 7.



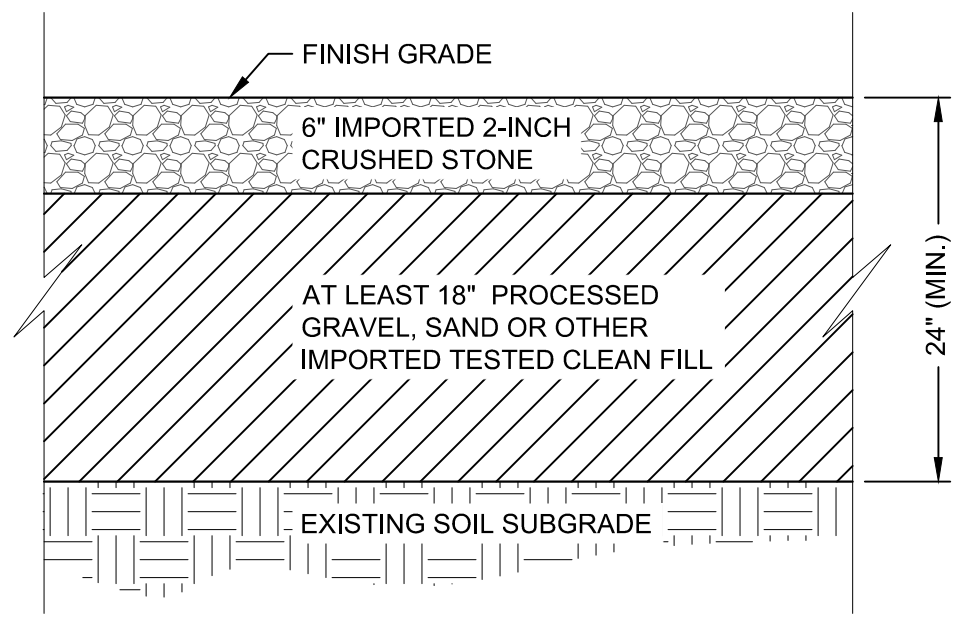
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NATIONAL GRID PROPOSED LIQUEFACTION PLANT
PROVIDENCE, RHODE ISLAND
SHORT TERM RESPONSE ACTION PLAN (STRAP)

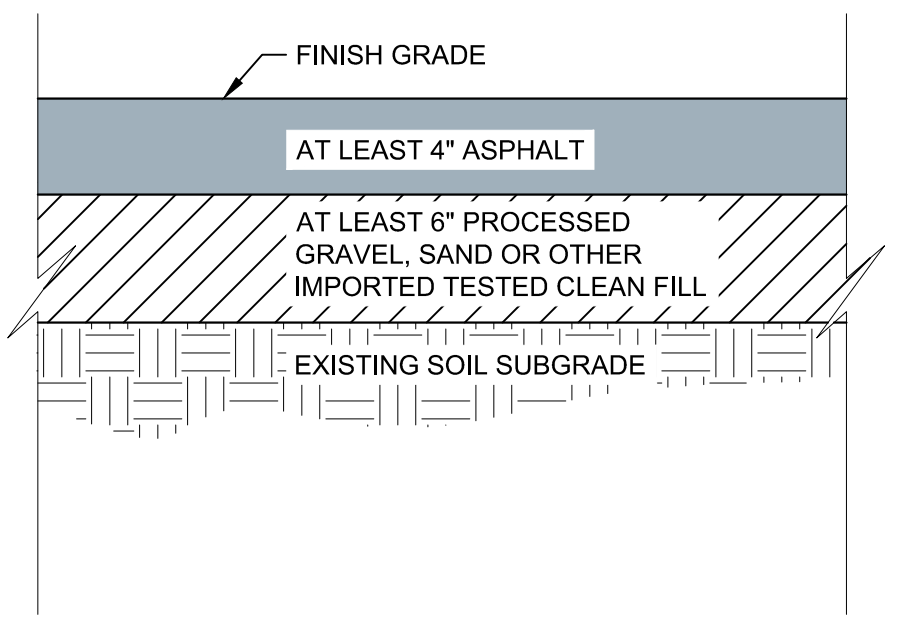
PROPOSED FINAL CONDITIONS PLAN

PREPARED BY: GZA GeoEnvironmental, Inc. Engineers and Scientists www.gza.com		PREPARED FOR: nationalgrid	
PROJ MGR: MSK	REVIEWED BY: TRG	CHECKED BY: SDN	DRAWING
DESIGNED BY: SDN	DRAWN BY: LDT	SCALE: AS NOTED	6
DATE: MAY, 2017	PROJECT NO.: 33554.60	REVISION NO.: 0	SHEET NO. 6 OF 7

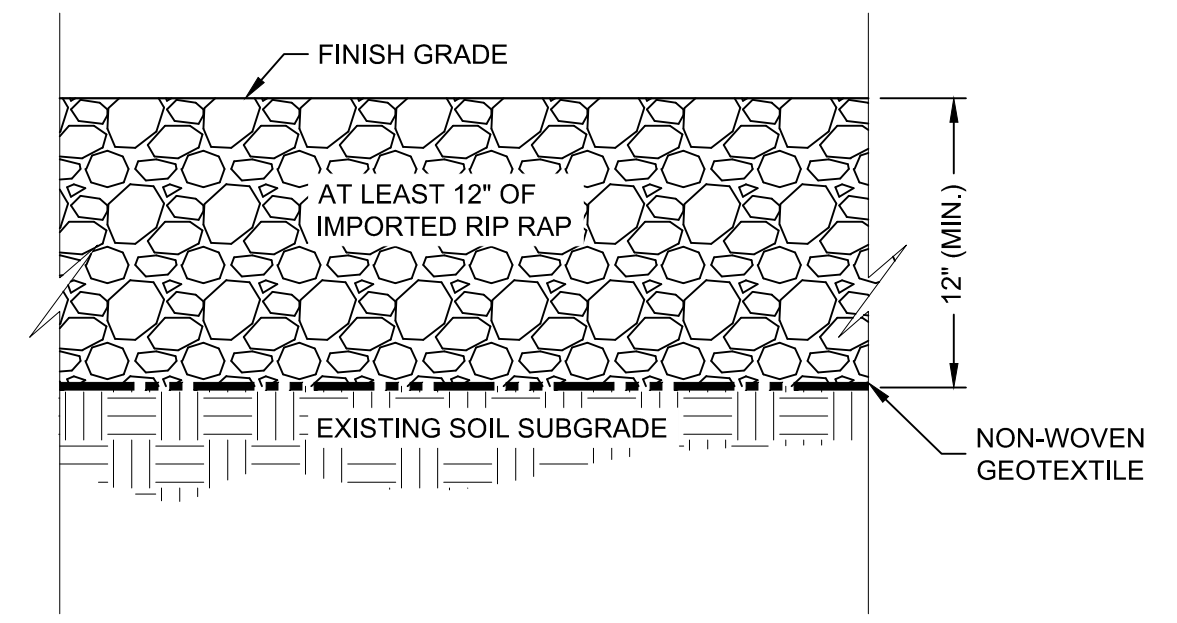
2017 - GZA GeoEnvironmental, Inc. GZA-VA-DMA-33554-60-MSK-FIGURES-CAD-DWG-33554-60-CRMC PERMITTING-2-2-2016.DWG PROPOSED FINAL CONDITIONS PLAN STRAP MAY 8, 2017 3:32 PM USA THERIAULT



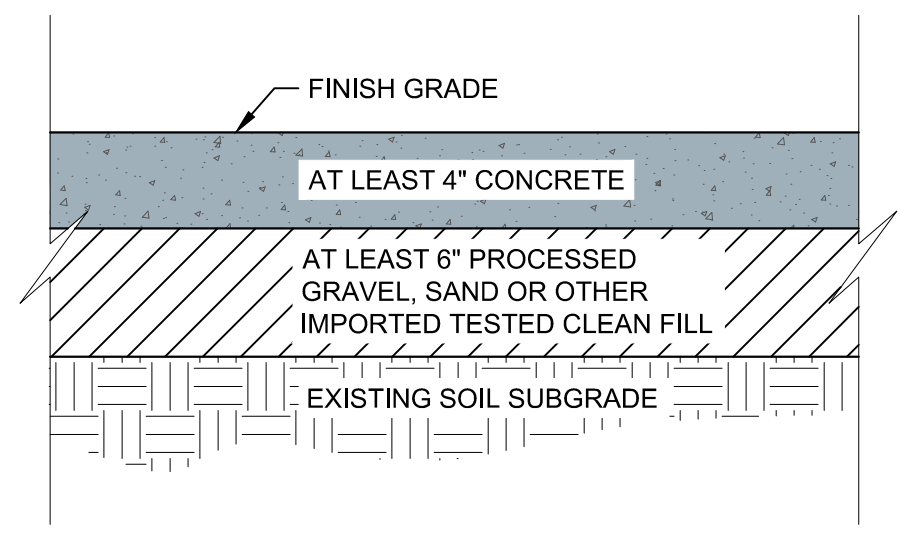
**CRUSHED STONE SOIL CAP DETAIL
(WITHOUT NON-WOVEN GEOTEXTILE)
NOT TO SCALE**



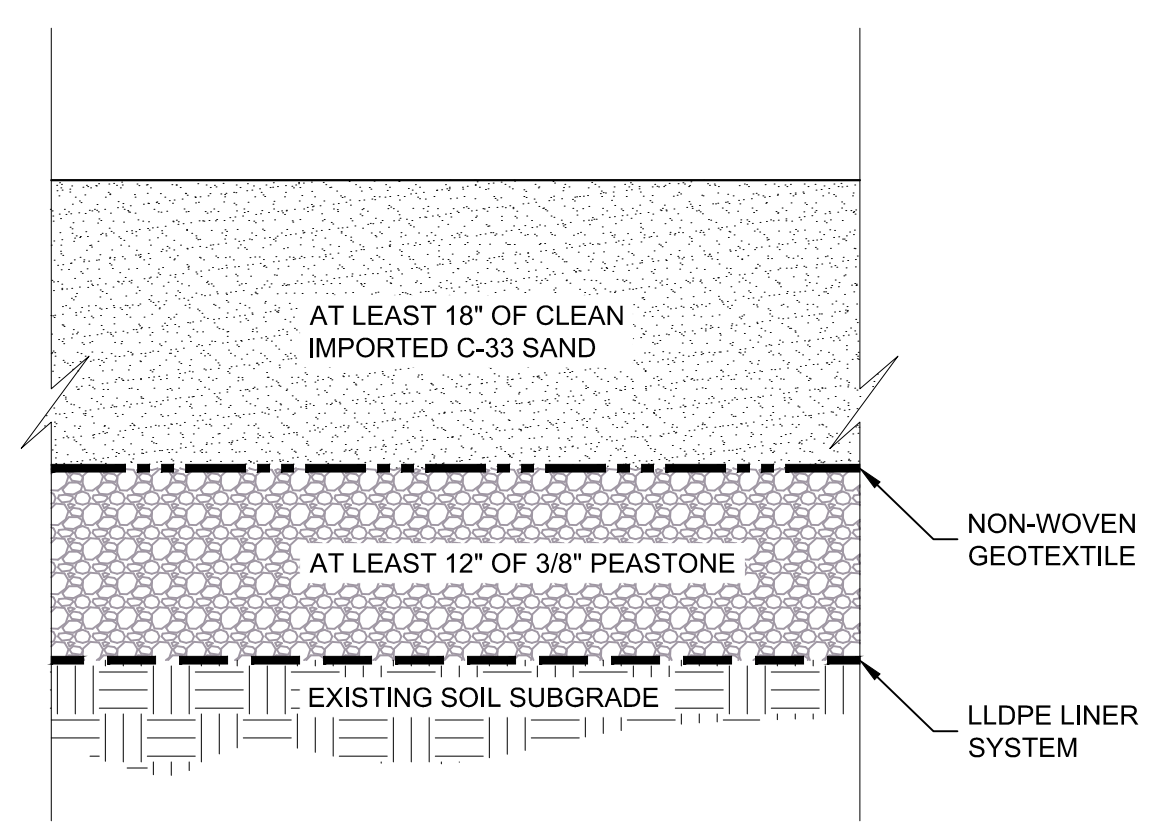
**ASPHALT CAP DETAIL
(NEW PAVING)
NOT TO SCALE**



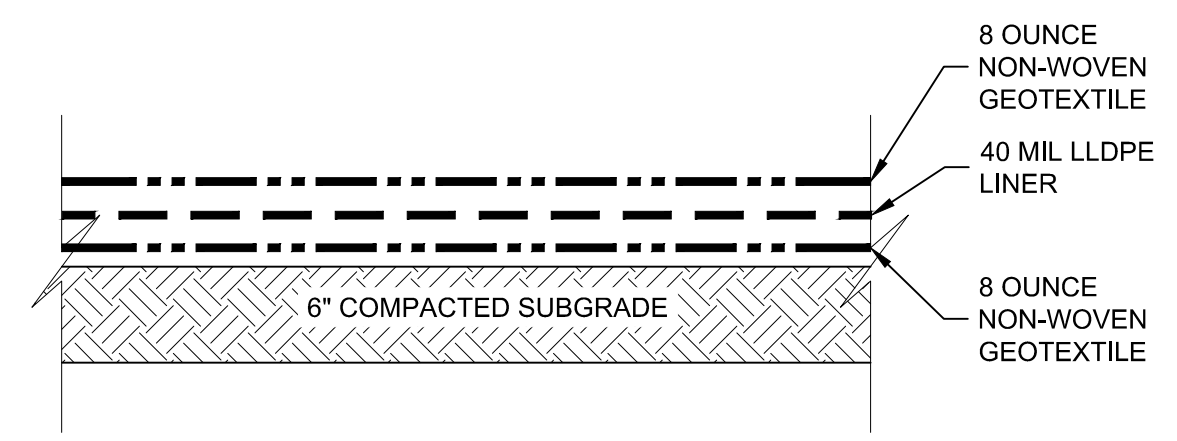
**RIP RAP CAP DETAIL
(WITH NON-WOVEN GEOTEXTILE)
NOT TO SCALE**



**CONCRETE CAP DETAIL
NOT TO SCALE**



**SAND FILTER DETAIL
NOT TO SCALE**



**SECTION - LLDPE LINER SYSTEM DETAIL
NOT TO SCALE**

NOTES:

1. SOIL REUSE (CALLED OUT AS EXISTING SOIL SUBGRADE IN THE DETAILS) SHALL BE SUBJECT TO GEOTECHNICAL SUITABILITY (AS DETERMINED BY THE CONTRACTOR) AS WELL AS OBSERVED ENVIRONMENTAL IMPACT (AS DETERMINED BY OWNER AS DESCRIBED IN STRAP).
2. CAPS OTHER THAN WHAT IS SHOWN HERE ARE SUBJECT TO APPROVAL BY OWNER AND RIDEM.
3. IMPORTED FILL MUST BE CERTIFIED AND/OR TESTED AND IS SUBJECT TO APPROVAL BY OWNER AS DESCRIBED IN STRAP.

2017 - GZA GeoEnvironmental, Inc. GZA-\\A\DATA\33554\60\PROJECTS\33554\APPROVED SOIL CAPS 2012 SMP_V2.DWG CAPPING CROSS SECTIONS STRAP MAY 8, 2017 3:36 PM USA THERIAULT

THE INFORMATION SHOWN ON THE DRAWING IS SOLELY FOR USE BY NATIONAL GRID OR THE NATIONAL GRID'S DESIGNATED REPRESENTATIVE FOR THE SPECIFIC PROJECT AND LOCATION IDENTIFIED ON THE DRAWING. THE DRAWING SHALL NOT BE TRANSFERRED, REUSED, COPIED, OR ALTERED IN ANY MANNER FOR USE AT ANY OTHER LOCATION OR FOR ANY OTHER PURPOSE WITHOUT THE PRIOR WRITTEN CONSENT OF GZA AND NATIONAL GRID. ANY TRANSFER, REUSE, OR MODIFICATION TO THE DRAWING BY OTHERS, WITHOUT THE PRIOR WRITTEN EXPRESS CONSENT OF GZA AND NATIONAL GRID, WILL BE AT THE USER'S SOLE RISK AND WITHOUT ANY RISK OR LIABILITY TO GZA AND NATIONAL GRID.

NATIONAL GRID PROPOSED LIQUEFACTION PLANT PROVIDENCE, RHODE ISLAND SHORT TERM RESPONSE ACTION PLAN (STRAP)			
CAPPING CROSS SECTIONS			
PREPARED BY:	GZA GeoEnvironmental, Inc. Engineers and Scientists www.gza.com		PREPARED FOR: nationalgrid
PROJ MGR: MSK	REVIEWED BY: TRG	CHECKED BY: SDN	DRAWING
DESIGNED BY: SDN	DRAWN BY: LDT	SCALE: AS NOTED	
DATE: MAY, 2017	PROJECT NO. 33554.60	REVISION NO. 0	7
			SHEET NO. 7 OF 7



APPENDIX A
LIMITATIONS

LIMITATIONS

1. This Short Term Response Action Plan (STRAP) has been prepared on behalf of and for the exclusive use of National Grid LNG, LLC (NGLNG), solely for use in documenting the work completed as described herein at the 121 Terminal Road / 642 Allens Avenue Former MGP ("Site") under the applicable provisions of the State of Rhode Island Department of Environmental Management Rules and Regulations for the Investigation and Remediation of Hazardous Material Releases (Remediation Regulations). This report and the findings contained herein shall not, in whole or in part, be disseminated or conveyed to any other party, nor used by any other party in whole or in part, without the prior written consent of GZA GeoEnvironmental, Inc.(GZA) or NGLNG.
2. GZA's work was performed in accordance with generally accepted practices of other consultants undertaking similar studies at the same time and in the same geographical area, and GZA observed that degree of care and skill generally exercised by other consultants under similar circumstances and conditions. GZA's findings and conclusions must be considered not as scientific certainties, but rather as our professional opinion concerning the significance of the limited data gathered during the course of the study. No other warranty, express or implied is made. Specifically, GZA does not and cannot represent that the Site contains no hazardous material, oil, or other latent condition beyond that observed by GZA during the work described herein.
3. The observations described in this report were made under the conditions stated therein. The conclusions presented in the report were based upon services performed and observations made by GZA.
4. In the event that NGLNG or others authorized to use this report obtain information on environmental or hazardous waste issues at the Site not contained in this report, such information shall be brought to GZA's attention forthwith. GZA will evaluate such information and, on the basis of this evaluation, may modify the conclusions stated in this report.
5. The conclusions and recommendations contained in this report are based in part upon the data obtained from environmental samples obtained from relatively widely spread subsurface explorations. The nature and extent of variations between these explorations may not become evident until further exploration. If variations or other latent conditions then appear evident, it will be necessary to reevaluate the conclusions and recommendations of this report.
6. The generalized soil profile described in the text is intended to convey trends in subsurface conditions. The boundaries between strata are approximate and idealized and have been developed by interpretations of widely spaced explorations and samples; actual soil transitions are probably more gradual. For specific information, refer to the boring logs.
7. In the event this work included the collection of water level data, these readings have been made in the test pits, borings and/or observation wells at times and under conditions stated on the exploration logs. These data have been reviewed and interpretations have been made in the text of this report. However, it must be noted that fluctuations in the level of the groundwater may occur due to variations in rainfall and other factors different from those prevailing at the time measurements were made.

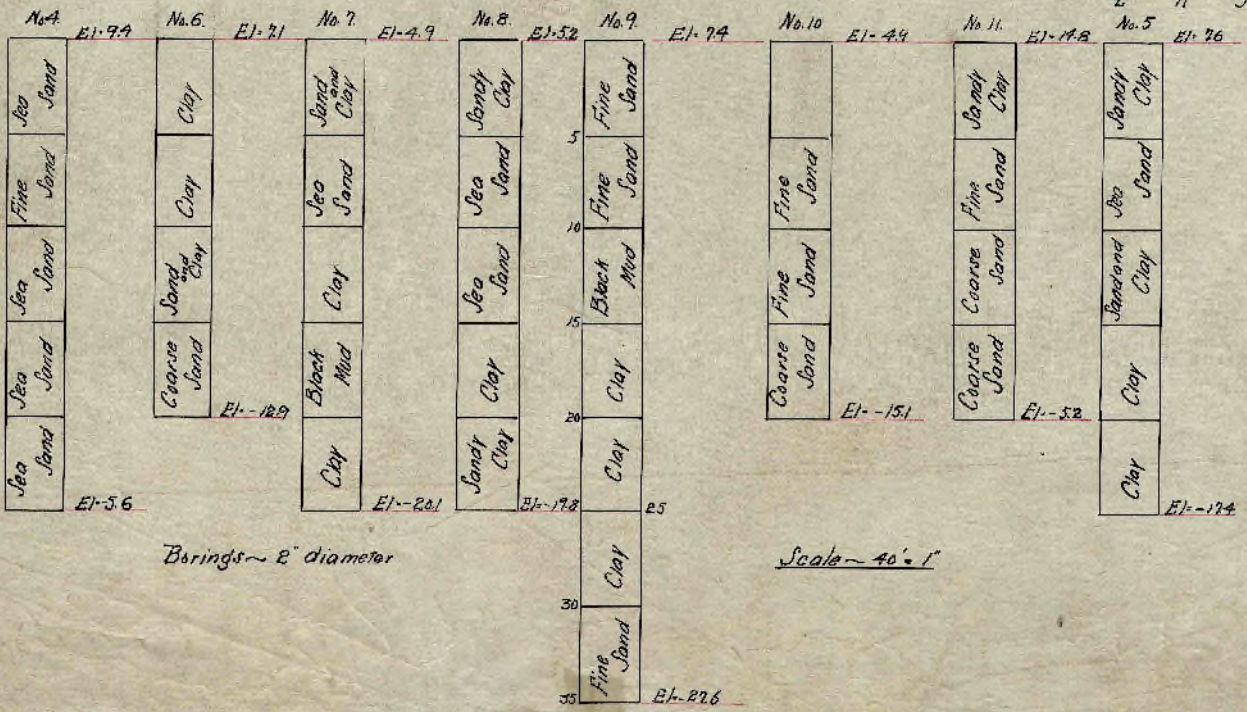
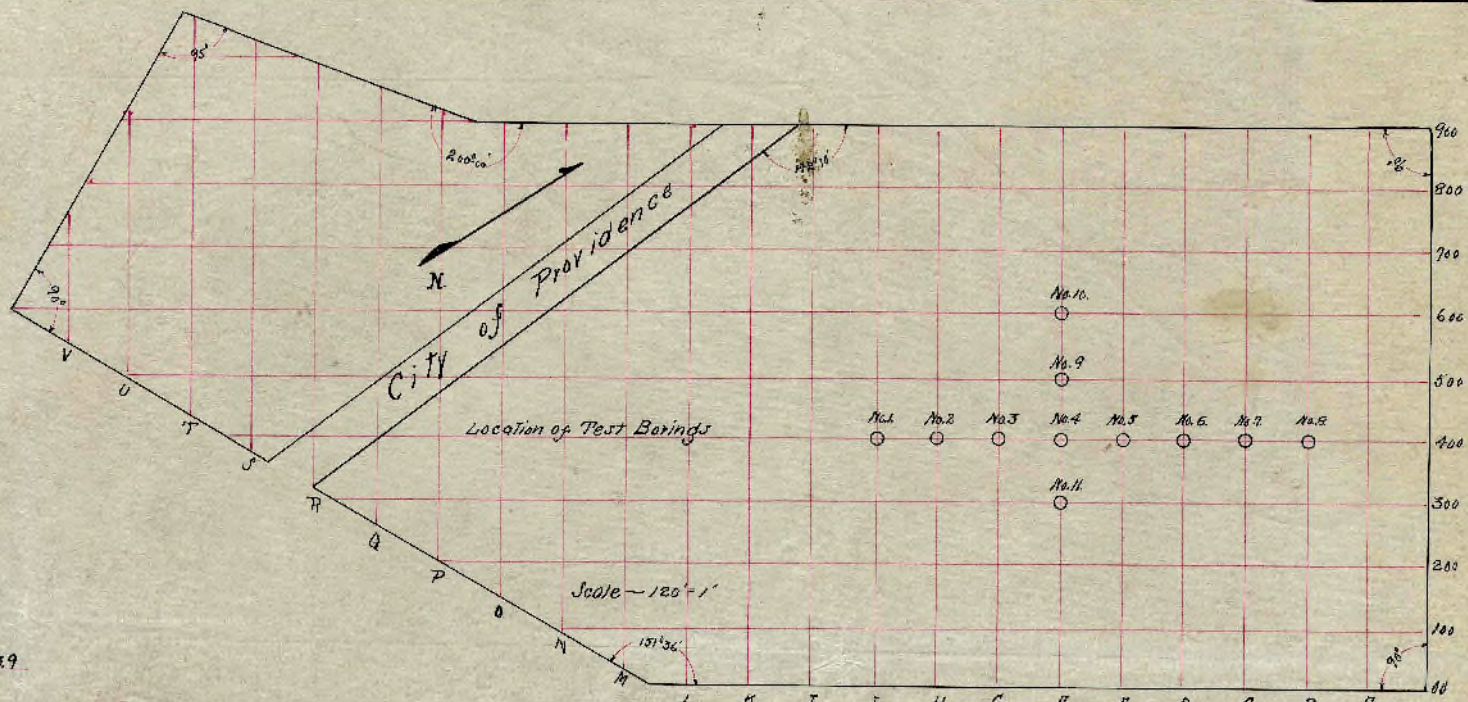
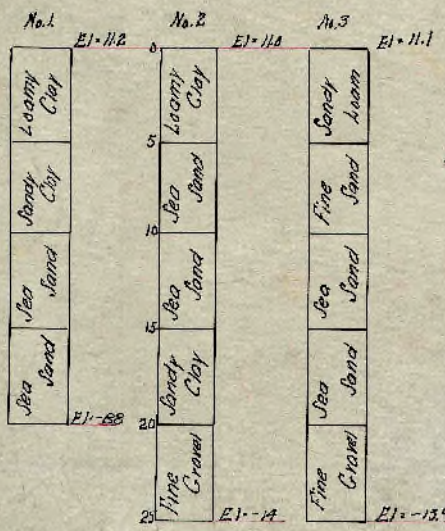
8. The conclusions contained in this report are based in part upon various types of chemical data and are contingent upon their validity. These data have been reviewed and interpretations made in the report. Moreover, it should be noted that variations in the types and concentrations of contaminants and variations in their flow paths may occur due to seasonal water table fluctuations, past disposal practices, the passage of time, and other factors. Should additional chemical data become available in the future, these data should be reviewed by GZA and the conclusions and recommendations presented herein modified accordingly.

J:\ENV\33554.60.msk\Work\STRAP\Appendix\Appendix A - Limitations\33554-60Limitations-Appendix A.docx



APPENDIX B

BORING AND TEST PIT LOGS



Borings ~ 8" diameter

Scale ~ 40' = 1"

Providence Gas Company
Sassafras Point
Test Borings under Sassafras Point Plat
Scale ~ 40' = 1" June 5, 1912.

American Drilling & Boring Co., Inc.

100 WATER STREET EAST PROVIDENCE, R. I.

TO Providence Gas Co.-Haley & Aldrich ADDRESS Cambridge, Mass.
 PROJECT NAME Tank Site LOCATION Providence, R.I.
 REPORT SENT TO Above PROJ. NO. _____
 SAMPLES SENT TO " OUR JOB NO. 71-297

SHEET 1 OF 3
 DATE _____
 HOLE NO. B-20
 LINE & STA. _____
 OFFSET _____
 SURF. ELEV. 9.00

GROUND WATER OBSERVATIONS		Rods - "AW" Type _____ Size I.D. <u>2 1/2"</u> Hammer Wt. <u>300#</u> Hammer Fall <u>24"</u>	CASING _____ SAMPLER <u>S/S</u> <u>1 3/8"</u> <u>140#</u> <u>30"</u>	CORE BAR _____ BIT _____	Date	Time
At <u>9'</u> after <u>48</u> Hours	START <u>7/22/71</u>				COMPLETE <u>7/23/71</u>	
At _____ after _____ Hours	TOTAL HRS. _____		BORING FOREMAN <u>A. D'Alfello</u>		INSPECTOR _____	
					SOILS ENGR. _____	

LOCATION OF BORING

DEPTH	Casing Blows per foot	Sample Depths From - To	Type of Sample	Blows per 6" on Sampler			Moisture Density or Consist.	Strata Change Elev.	SOIL IDENTIFICATION Remarks include color, gradation, Type of soil etc. Rock-color, type, condition, hardness, Drilling time, seams and etc.	SAMPLE			
				From 0-6	6-12	To 12-18				No.	Pen.	Re.	
10	4	0'-2'	D	6	7	7	Moist medium dense	16'0"	Gray-brown SILT & fine sand, cinder, ash, fuel odor noted, FILL	1	24"	7'	
	5			9									
	6												
	7												
	7												
	2	5'-7'	D	3	1	1	Moist soft			Black, ashes, cinders, coal, FILL	2	24"	9"
	1			2									
	2												
	3												
	7												
20	1	10'-12'	D	7	3	2	Wet soft		" & some organic silt	3	24"	11"	
	2			2									
	4												
	1												
	2												
	1	15'-16'	D	2	3		"			4	24"	12"	
	2	16'-17'	D	2	2		"						
	2												
	1												
	2												
30	1	20'-22'	D	2	3	2	Wet medium stiff			5	24"	12"	
	3			3									
	4												
	2												
	1												
	13	25'-27'	D	4	3	4	"	25'0"					
	10			3									
	26												
	28												
	36												
40	18	30'-32'	D	13	20	14	Wet dense		Gray medium to fine SAND, little fine to medium gravel & silt	7	24"	12"	
	23			20									
	21												
	18												
	19												
	24	35'-37'	D	20	17	20	"		Brown fine SAND, some fine gravel, little silt	8	24"	10"	
28			15										
26													
21													
17													

GROUND SURFACE TO 95' USED 2 1/2 "CASING: THEN S/S to 100'

Sample Type
 D=Dry C=Cored W=Washed
 UP=Undisturbed Piston
 TP=Test Pit A=Auger V=Vane Test
 UT=Undisturbed Thinwall

Proportions Used
 trace 0 to 10%
 little 10 to 20%
 some 20 to 35%
 and 35 to 50%

140lb Wt. x 30" fall on 2" O.D. Sampler
 Cohesionless Density Cohesive Consistency
 0-10 Loose 0-4 Soft 30+ Hard
 10-30 Med. Dense 4-8 M/Stiff
 30-50 Dense 8-15 Stiff
 50+ Very Dense 15-30 V-Stiff

SUMMARY:
 Earth Boring 100'
 Rock Coring _____
 Samples 20
HOLE NO. B-20

American Drilling & Boring Co., Inc.

100 WATER STREET EAST PROVIDENCE, R. I.

SHEET 2 OF 3
 DATE _____
 HOLE NO. B-20
 LINE & STA _____
 OFFSET _____
 SURF. ELEV. 9.00

TO same as 1 ADDRESS _____
 PROJECT NAME _____ LOCATION _____
 REPORT SENT TO _____ PROJ. NO. _____
 SAMPLES SENT TO _____ OUR JOB NO. _____

GROUND WATER OBSERVATIONS At <u>9'</u> after <u>48</u> Hours At _____ after _____ Hours	CASING _____ SAMPLER <u>same as 1</u> CORE BAR _____ Type _____ Size I. D. _____ Hammer Wt. _____ Hammer Fall _____	START <u>same as 1</u> COMPLETE _____ TOTAL HRS. _____ BORING FOREMAN _____ INSPECTOR _____ SOILS ENGR. _____	Date _____ Time _____
--	---	--	--------------------------

LOCATION OF BORING:

DEPTH	Casing Blows per foot	Sample Depths From - To	Type of Sample	Blows per 6" on Sampler			Moisture Density or Consist.	Strata Change Elev.	SOIL IDENTIFICATION Remarks include color, gradation, Type of soil etc. Rock-color, type, condition, hardness, Drilling time, seams and etc.	SAMPLE			
				From 0-6	6-12	To 12-18				No.	Pen.	Rec.	
50	16	40'-42'	D	8	15	17	medium dense	45'	- lost sample	--	24"	0'	
	15			13			dense						
	24												
	29												
	29									- lost water @45'			
50	7	45'-47'	D	6	10	11	Wet medium dense	51'0"	Brown medium to fine running SAND, trace fine gravel	9	24"	12'	
	12			16									
	22												
	28												
	30						"						
	25	50'-51'	D	7	11						10	12"	6"
	20	51'-52'	D	12	12		Wet very stiff				10A	12"	6"
60	20							60'0"	Gray SILT, trace clay				
	29												
	26	55'-57'	D	8	7	10	"				11	24"	12'
	26			10									
	28												
	30												
	37												
70	35	60'-62'	D	10	30	93	Wet very dense	73'0"	Gray fine SAND & silt layers	12	24"	12'	
	41			17									
	31												
	30												
	30												
	42	65'-67'	D	8	10	18	Wet dense				13	24"	12'
	33			17									
	33												
	29												
	37												
80	44	70'-72'	D	7	9	13	"	73'0"		14	24"	12'	
	41			19									
	40												
	52												
	62						Wet very dense						
	72	75'-77'	D	23	31	30				Gray fine SAND, little silt	15	24"	12'
	90			38									
107													
109													
133								Gray running fine to med. SAND					

GROUND SURFACE TO _____	USED _____	"CASING: THEN _____
Sample Type D=Dry C=Cored W=Washed UP=Undisturbed Piston TP=Test Pit A=Auger V=Vane Test UT=Undisturbed Thinwall	Proportions Used trace 0 to 10% little 10 to 20% some 20 to 35% and 35 to 50%	140lb Wt. x 30" fall on 2" O.D. Sampler Cohesionless Density 0-10 Loose 10-30 Med. Dense 30-50 Dense 50+ Very Dense
		Cohesive Consistency 0-4 Soft 30+ Hard 4-8 M/Stiff 8-15 Stiff 15-30 V-Stiff
TOWN PRESS - EAST PROV.		SUMMARY: Earth Boring _____ Rock Coring _____ Samples _____ HOLE NO. B-20

American Drilling & Boring Co., Inc.

100 WATER STREET EAST PROVIDENCE R. I.

SHEET 1 of 3
 DATE _____
 HOLE NO. B-21
 LINE & STA _____
 OFFSET _____
 SURF. ELEV. 9.00

TO Prov. Gas Co - Haley & Aldrich ADDRESS Cambridge, Mass.
 PROJECT NAME Prop. Tank LOCATION PROVIDENCE, R. I.
 REPORT SENT TO above PROJ NO. _____
 SAMPLES SENT TO " OUR JOB NO. 71-297

GROUND WATER OBSERVATIONS		RODS - "AW"	CASING	SAMPLER	CORE BAR	DATE	TIME
At <u>9'</u>	after <u>14</u> Hours	Type _____	_____	S/S	_____	START <u>7/27/71</u>	_____
Casing - <u>90'</u>		Size I.P. <u>2 1/2"</u>	<u>2 1/2"</u>	<u>1 3/8"</u>	_____	COMPLETE <u>7/28/71</u>	_____
At _____	after _____ Hours	Hammer Wt. <u>300#</u>	<u>300#</u>	<u>140#</u>	BIT	TOTAL HRS. _____	_____
		Hammer Fall <u>24"</u>	<u>24"</u>	<u>30"</u>	_____	BORING FOREMAN <u>A. D'Aiello</u>	_____
						INSPECTOR _____	_____
						SOILS ENGR. <u>D. Andrews</u>	_____

LOCATION OF BORING

DEPTH	Casing Blows per foot	Sample Depths From - To	Type of Sample	Blows per 6" on Sampler			Moisture Density or Consist.	Strata Change Elev.	SOIL IDENTIFICATION Remarks include color, gradation, Type of soil etc. Rock-color, type, condition, hardness, Drilling time, seams and etc.	SAMPLE		
				From 0-6	6-12	To 12-18				No.	Pen.	Rec.
10	4	0'-2'	D	6	7	7	Moist medium dense	10'	Brown fine SAND & fine gravel, trace cinders FILL	1	24"	12"
	6			6								
	6											
	6	5'-7'	D	7	9	6	"	10'	Brown-gray fine SAND & fine gravel, trace brick FILL (fuel odor noted)	2	24"	7"
	8			8								
	11											
	12											
	7	10'-12'	D	8	8	5	Wet medium dense	15'	Brown gray fine SAND & fine gravel (fuel odor noted) FILL	3	24"	15"
	8			7								
	11											
12												
20	1	15'-17'	D	1	2	2	Wet medium stiff	15'	Gray ORGANIC SILT, trace shells & fine sand	4	24"	12"
	2			3								
	1	20'-22'	D	1	2	1	Wet soft	15'	Gray ORGANIC SILT, some fine to medium sand	5	24"	12"
	2			2								
	3											
	4											
	6	25'-27'	D	1	1	2	"	15'	Gray ORGANIC SILT, some fine to medium sand	6	24"	12"
	7			1								
	8											
	8											
30	9	30'-32'	D	2	3	7	Wet V-stiff	31'6"	Gray fine to medium SAND, some fine gravel & org.silt	7	24"	12"
	13			16								
	21	35'-37'	D	8	15	15	Wet medium dense	34'	Gray medium to coarse running SAND	8	24"	12"
	32			14								
	39											
	36											
	21	35'-37'	D	8	15	15	Wet medium dense	38'	Gr-Br. fine to coarse SAND some fine gravel, trace silt			
	18			14								
	34											
	39											

GROUND SURFACE TO 90' USED 2 1/2 "CASING: THEN sampled

Sample Type
 D=Dry C=Cored W=Washed
 UP=Undisturbed Piston
 TP=Test Pit A=Auger V=Vane Test
 UT=Undisturbed Thinwall

Proportions Used
 trace 0 to 10%
 little 10 to 20%
 some 20 to 35%
 and 35 to 50%

140lb Wt. x 30" fall on 2" O.D. Sampler
 Cohesionless Density
 0-10 Loose
 10-30 Med. Dense
 30-50 Dense
 50+ Very Dense

SUMMARY:
 Earth Boring 95'6"
 Rock Coring _____
 Samples 18

HOLE NO. B-21

American Drilling & Boring Co., Inc.

100 WATER STREET EAST PROVIDENCE, R. I.

SHEET 2 OF 3
 DATE _____
 HOLE NO. B-21
 LINE & STA. _____
 OFFSET _____
 SURF. ELEV. _____

TO Same as #1 ADDRESS Same as #1
 PROJECT NAME _____ LOCATION _____
 REPORT SENT TO _____ PROJ. NO. _____
 SAMPLES SENT TO _____ OUR JOB NO. _____

GROUND WATER OBSERVATIONS At <u>Same as #1</u> after _____ Hours At _____ after _____ Hours	CASING _____ SAMPLER <u>Same as #1</u> CORE BAR _____ Type _____ Size I.D. _____ Hammer Wt. _____ Hammer Fall _____	Date _____ Time _____ START <u>Same as #1</u> COMPLETE _____ TOTAL HRS. _____ BORING FOREMAN _____ INSPECTOR _____ SOILS ENGR. _____
---	---	--

LOCATION OF BORING:

DEPTH	Casing Blows per foot	Sample Depths From-To	Type of Sample	Blows per 6" on Sampler			Moisture Density or Consist.	Strata Change Elev.	SOIL IDENTIFICATION Remarks include color, gradation, Type of soil etc. Rock-color, type, condition, hardness, Drilling time, seams and etc.	SAMPLE			
				From 0-6	To 6-12	To 12-18				No.	Pen	Ret.	
50	20	40'-42'	D	11	13	12	Wet dense	44'	Gray-brown fine to coarse SAND, some fine gravel, trace silt	9	24"	12	
	21			10									
	24												
	21												
	30												
50	14	45'-47'	D	9	10	12	Wet M. dense	64'	Running SAND (lost sample) Gray fine to coarse SAND, some fine gravel, trace silt		24"	10"	
	36			14									
	51												
	48												
	49												
60	38	50'-52'	D	9	18	12	"	64'	Gray-brown running SAND	10	24"	11	
	28			11									
	33												
	40												
	60												
60	36	55'-57'	D	16	31	50	Wet very dense	64'	Gray-medium to fine SAND & fine gravel, trace silt	11	24"	11	
	41			33									
	56												
	56												
	61												
70	36	60'-62'	D	7	12	14	Wet medium dense	64'	Gray-medium to fine SAND & fine gravel, trace silt	12	24"	12	
	33			15									
	49												
	40												
	39												
70	39	65'-67'	D	10	12	18	Wet dense	73'	Gray medium to coarse SAND some fine gravel (running)	13	24"	11	
	45			18									
	58												
	57												
	48												
80	42	70'-72'	D	10	20	18	Wet very dense	73'	Gray medium to coarse SAND some fine gravel (running)	14	24"	12	
	60			27									
	62												
	47												
	48												
80	47	75'-77'	D	5	8	10	Wet dense	73'	Gray medium to coarse SAND some fine gravel (running)	15	24"	11	
	38			15									
	46												
	47												
	51												

GROUND SURFACE TO _____ USED _____ "CASING: THEN _____	Sample Type D=Dry C=Cored W=Washed UP=Undisturbed Piston TP=Test Pit A=Auger V=Vane Test UT=Undisturbed Thinwall	Proportions Used trace 0 to 10% little 10 to 20% some 20 to 35% and 35 to 50%	140lb Wt. x 30" fall on 2" O.D. Sampler Cohesionless Density 0-10 Loose 10-30 Med. Dense 30-50 Dense 50+ Very Dense	Cohesive Consistency 0-4 Soft 30+ Hard 4-8 M/Stiff 8-15 Stiff 15-30 V-Stiff	SUMMARY: Earth Boring _____ Rock Coring _____ Samples _____ HOLE NO. B-21
--	--	---	--	---	--

American Drilling & Boring Co., Inc.

100 WATER STREET EAST PROVIDENCE, R. I.

SHEET 3 OF
 DATE
 HOLE NO. B-21
 LING & STA.
 OFFSET
 SURF. ELEV.

TO Same as #1 ADDRESS Same as #1
 PROJECT NAME LOCATION
 REPORT SENT TO PROJ. NO.
 SAMPLES SENT TO OUR JOB NO. 11-297

GROUND WATER OBSERVATIONS		CASING	SAMPLER	CORE BAR	Date	Time
At <u>Same as #1</u> after <u> </u> Hours	Type <u> </u>	Same as #1			START <u>Same as #1</u>	
At <u> </u> after <u> </u> Hours	Size I.D. <u> </u>				COMPLETE <u> </u>	
	Hammer Wt. <u> </u>			BIT	TOTAL HRS. <u> </u>	
	Hammer Fall <u> </u>				BORING FOREMAN <u> </u>	
					INSPECTOR <u> </u>	
					SOILS ENGR. <u> </u>	

LOCATION OF BORING

DEPTH	Casing Blows per foot	Sample Depths From - To	Type of Sample	Blows per 6" on Sampler			Moisture Density or Consist.	Strata Change Elev.	SOIL IDENTIFICATION Remarks include color, gradation, Type of soil etc. Rock-color, type, condition, hardness, Drilling time, seams and etc.	SAMPLE			
				From 0-6	6-12	To 12-18				No.	Pen	Rec.	
80	54	80'-82'	D	6	14	22	Wet dense	82'	Gray medium to coarse SAND some fine gravel (running)	16	24	12"	
	57			21									
	78												
	105												
	90												
85	57	85'-87'	D	8	10	15	Wet dense	89'	Gray fine SAND, little silt (running sand)	17	24	12"	
	81			21									
	92												
	111												
	121												
90		90'-92'	D	9	16	24	Wet very dense	96'6"	Gray-brown fine to medium SAND, trace silt	18	24	15"	
				29									
95		95'-96'6"	D**	12	18	22	Wet dense	Bottom of boring 96'6"			24"	0"	
100													

GROUND SURFACE TO <u> </u>	USED <u> </u> "CASING: THEN <u> </u>	140lb Wt. x 30" fall on 2" O.D. Sampler	
Sample Type	Proportions Used	Cohesionless Density	Cohesive Consistency
D=Dry C=Cored W=Washed	trace 0 to 10%	0-10 Loose	0-4 Soft 30+ Hard
UP=Undisturbed Piston	little 10 to 20%	10-30 Med. Dense	4-8 M/Stiff
TP=Test Pit A=Auger V=Vane Test	some 20 to 35%	30-50 Dense	8-15 Stiff
UT=Undisturbed Thinwall	and 35 to 50%	50+ Very Dense	15-30 V-Stiff
TOWN PRESS - EAST PROV.			SUMMARY: Earth Boring <u> </u> Rock Coring <u> </u> Samples <u> </u> HOLE NO. B-21

American Drilling & Boring Co., Inc.

100 WATER STREET, EAST PROVIDENCE, R. I.

to Providence Gas Co. - Haley & Aldrich ADDRESS Cambridge, Mass.
 PROJECT NAME Tank Site LOCATION Providence, R.I.
 REPORT SENT TO above PROJ. NO. _____
 SAMPLES SENT TO " OUR JOB NO. 71-297

SHEET 1 of 2
 DATE _____
 HOLE NO. B-22
 LINE & STA. _____
 OFFSET _____
 SURF. ELEV. 8.00

GROUND WATER OBSERVATIONS				CASING	SAMPLER	CORE BAR	Date	Time
At <u>9'2"</u>	after <u>1/2</u> Hours	Rods - "AW"	Type	<u>S/S</u>			START <u>7/26/71</u>	a.m.
<u>casing - 65'</u>		Size I.D.	<u>2 1/2"</u>	<u>1 3/8"</u>			COMPLETE <u>7/27/71</u>	p.m.
At <u>9'</u>	after <u>3/4</u> Hours	Hammer Wt.	<u>300#</u>	<u>140#</u>	BIT		TOTAL HRS. _____	
<u>Hole open</u>		Hammer Fall	<u>24"</u>	<u>30"</u>			BORING FOREMAN <u>A. D'Aiello</u>	
							INSPECTOR _____	
							SOILS ENGR. <u>D. Andrews</u>	

LOCATION OF BORING:

DEPTH	Casing Blows per foot	Sample Depths From - To	Type of Sample	Blows per 6" on Sampler			Moisture Density or Consist.	Strata Change Elev.	SOIL IDENTIFICATION Remarks include color, gradation, Type of soil etc. Rock-color, type, condition, hardness, Drilling time, seams and etc.	SAMPLE		
				From 0-6	6-12	To 12-18				No.	Pen	Rec.
	1	0'-2'	D	4	5	4	Moist loose		Black COAL & ash - FILL	1	24"	17'
	3			2								
	3											
	4											
	5											
	1	5'-7'	D	3	3	2	"		Brown fine SAND & coal FILL (fuel odor noted)	2	24"	9"
	2			3								
	12											
	3											
10	4											
	1	10'-12'	D	1	1	1	Wet loose		Brown fine SAND & fine gravel FILL (fuel odor noted)	3	24"	11"
	1			3								
	2											
	1											
	14							15'0"				
	1	15'-17'	D	1	2	2	Wet medium stiff		Black ORGANIC SILT, some fine sand, trace fine gravel	4	24"	9"
	1			3				18'0"				
	2											
	3											
20	4											
	3	20'-22'	D	2	2	3	Wet soft		Dark gray ORGANIC SILT & fine sand	5	24"	12"
	4			5								
	5							23'				
	14											
	18											
	18	25'-27'	D	4	5	8	Wet medium dense		Gray medium to coarse SAND, some fine to medium gravel little organic silt	6	24"	12"
	17			12								
	21											
	19											
30	12											
	9	30'-32'	D	6	4	3	Wet loose	31'		7	24"	10"
	11			4								
	12											
	12											
	13											
	13	35'-37'	D	1	2	2	Wet medium stiff		Dark gray ORGANIC SILT, trace shells	8	24"	12"
	14			3								
	15											
	17											
40	20											

GROUND SURFACE TO <u>70'</u>		USED <u>2 1/2</u> " CASING: THEN <u>S/S to 72'</u>	
Sample Type D=Dry C=Cored W=Washed UP=Undisturbed Piston TP=Test Pit A=Auger V=Vane Test UT=Undisturbed Thinwall	Proportions Used trace 0 to 10% little 10 to 20% some 20 to 35% and 35 to 50%	140lb Wt. x 30" fall on 2" O.D. Sampler Cohesionless Density 0-10 Loose 10-30 Med. Dense 30-50 Dense 50+ Very Dense	Cohesive Consistency 0-4 Soft 30+ Hard 4-8 M/Stiff 8-15 Stiff 15-30 V-Stiff
		SUMMARY: Earth Boring <u>72'</u> Rock Coring Samples <u>15</u>	
TOWN PRESS - EAST PROV.		HOLE NO. B-22	

American Drilling & Boring Co., Inc.

100 WATER STREET EAST PROVIDENCE, R. I.

SHEET 2 OF 2
 DATE _____
 HOLE NO. B-22
 LINE & STA _____
 OFFSET _____
 SURF. ELEV. _____

To Same as #1 ADDRESS Same as #1
 PROJECT NAME _____ LOCATION _____
 REPORT SENT TO _____ PROJ. NO. _____
 SAMPLES SENT TO _____ OUR JOB NO. _____

GROUND WATER OBSERVATIONS At <u>Same as #1</u> after _____ Hours At _____ after _____ Hours	CASING SAMPLER CORE BAR Type <u>Same as #1</u> Size I.D. _____ Hammer Wt. _____ Hammer Fall _____	Date <u>Same as #1</u> Time _____ START _____ COMPLETE _____ TOTAL HRS. _____ BORING FOREMAN _____ INSPECTOR _____ SOILS ENGR. _____
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LOCATION OF BORING:

DEPTH	Casing Blows per foot	Sample Depths From - To	Type of Sample	Blows per 6" on Sampler			Moisture Density or Consist.	Strata Change Elev.	SOIL IDENTIFICATION Remarks include color, gradation, Type of soil etc. Rock-color, type, condition, hardness, Drilling time, seams and etc.	SAMPLE		
				From 0-6	6-12	To 12-18				No.	Pen	Rec
50	26	40'-42'	D	2	3	3	Wet	42'	Dark gray ORGANIC SILT trace shells	9	24"	12'
	25			20			V-stiff					
	34											
	47											
	34						Wet dense	49'	Brown medium to fine SAND	10	24"	11'
	57	45'-47'	D	16	15	12						
	29			15								
	28											
	35											
	39						Wet medium dense	59'	Brown fine to coarse SAND, some fine to medium gravel & silt	11	24"	11'
21	50'-52'	D	18	17	15							
32			14									
39												
41												
48						Wet medium dense	59'	Brown fine to coarse SAND, some fine to medium gravel little silt	12	24"	11'	
40	55'-57'	D	7	12	13							
34			14									
49												
42												
60	47						Wet very dense	63'	Gray-brown fine to coarse SAND; some medium to fine gravel & silt	13	24"	10'
	56	60'-62'	D	19	28	30						
	64			24								
	43											
	39						Wet dense	67'	Brown medium to coarse running SAND, little fine gravel	14	24"	11'
	48											
39	65'-67'	D	11	22	24							
49			22									
52												
70	63							69'	Dk. gray F-M SAND, some silt & fine gravel			
	71							69'	Gray-brown fine to coarse SAND, little silt, trace fine gravel	15	24"	11'
		70'-72'	D	11	17	20	"	72'	Bottom of boring 72'			
75												

GROUND SURFACE TO 70' USED 2 1/2 "CASING: THEN S/S to 72'

Sample Type
 D=Dry C=Cored W=Washed
 UP=Undisturbed Piston
 TP=Test Pit A=Auger V=Vane Test
 UT=Undisturbed Thinwall

Proportions Used
 trace 0 to 10%
 little 10 to 20%
 some 20 to 35%
 and 35 to 50%

140lb Wt. x 30" fall on 2" O.D. Sampler
 Cohesionless Density
 0-10 Loose
 10-30 Med. Dense
 30-50 Dense
 50+ Very Dense

Cohesive Consistency
 0-4 Soft 30+ Hard
 4-8 M/Stiff
 8-15 Stiff
 15-30 V-Stiff

SUMMARY:
 Earth Boring 72
 Rock Coring _____
 Samples 15

HOLE NO. B-22

American Drilling & Boring Co., Inc.

100 WATER STREET EAST PROVIDENCE, R. I.

TO Prov. Gas Co.-Haley & Aldrich ADDRESS Cambridge, Mass.
 PROJECT NAME Prop. Tank LOCATION Providence, R.I.
 REPORT SENT TO above PROJ. NO. _____
 SAMPLES SENT TO " OUR JOB NO. 71-297

SHEET 1 OF 3
 DATE _____
 HOLE NO. B-24
 LINE & STA. _____
 OFFSET _____
 SURF. ELEV. 9.00

GROUND WATER OBSERVATIONS				Rods-"AW"	CASING	SAMPLER	CORE BAR	Date	Time
At <u>6'-7"</u>	after <u>1/6</u>	Hours	Type	<u>S/S</u>				START <u>7/26/71</u>	
At _____	after _____	Hours	Size I.D.	<u>2 1/2"</u>	<u>1 3/8"</u>			COMPLETE <u>7/28/71</u>	
			Hammer Wt.	<u>300#</u>	<u>140#</u>			TOTAL HRS. _____	
			Hammer Fall	<u>24"</u>	<u>30"</u>			BORING FOREMAN <u>A. Geros</u>	
								INSPECTOR <u>D. Andrews</u>	
								SOILS ENGR. <u>D. Andrews</u>	

LOCATION OF BORING:

DEPTH	Casing Blows per foot	Sample Depths From-To	Type of Sample	Blows per 6" on Sampler			Moisture Density or Consist.	Strata Change Elev.	SOIL IDENTIFICATION Remarks include color, gradation, Type of soil etc. Rock-color, type, condition, hardness, Drilling time, seams and etc.	SAMPLE				
				From 0-6	To 6-12	To 12-18				No.	Per	Ret.		
10	36	0'-2'	D	12	9	9	Dry medium dense	7'0"	Brown fine sand, cinders, brick, FILL	1	24"	8"		
	31			6										
	21													
	17													
	12													
	9	5'-7'	D	6	6	7	"					2	24"	10"
	7			4										
	1													
	1													
	1						Wet soft							
20	6	10'-12'	D	1	1	1	"	18'0"	Gray ORGANIC SILT	3	24"	8"		
	1													
	1													
	12													
	14													
	6	15'-17'	D	2	1	1	"					4	24"	9"
	2			1										
	2													
	12													
	19													
30	13	20'-22'	D	12	13	18	Wet dense	28'0"	Gray medium to coarse SAND & fine to medium gravel, little silt	5	24"	8"		
	20			13										
	21													
	19													
	17						Wet medium dense							
	16	25'-27'	D	10	10	11	"					6	24"	7"
	14			12										
	18													
	20													
	20						Wet very stiff							
40	13	30'-32'	D	8	12	14	"	38'0"	Gray-brown SILT	7	24"	10"		
	24			11										
	32													
	42													
	43													
	27	35'-37'	D	8	17	21	Wet hard					8	24"	10"
	41			20										
	47													
	60													
	63													

GROUND SURFACE TO _____ USED _____ CASING: THEN _____

Sample Type
 D=Dry C=Cored W=Washed
 UP=Undisturbed Piston
 TP=Test Pit A=Auger V=Vane Test
 UT=Undisturbed Thinwall

Proportions Used
 trace 0 to 10%
 little 10 to 20%
 some 20 to 35%
 and 35 to 50%

140lb Wt. x 30" fall on 2" O.D. Sampler
 Cohesionless Density
 0-10 Loose
 10-30 Med. Dense
 30-50 Dense
 50+ Very Dense

Cohesive Consistency
 0-4 Soft
 4-8 M/Stiff
 8-15 Stiff
 15-30 V-Stiff

SUMMARY:
 Earth Boring 83'
 Rock Coring _____
 Samples 18
 HOLE NO. B-24

American Drilling & Boring Co., Inc.

100 WATER STREET EAST PROVIDENCE, R. I.

SHEET 2 OF 3
 DATE _____
 HOLE NO. B-24
 LINE & STA. _____
 OFFSET _____
 SURF. ELEV. 9.0'

TO same as 1 ADDRESS _____
 PROJECT NAME _____ LOCATION _____
 REPORT SENT TO _____ PROJ. NO. _____
 SAMPLES SENT TO _____ OUR JOB NO. _____

GROUND WATER OBSERVATIONS			CASING	SAMPLER	CORE BAR.	Date	Time
At <u>6'7"</u>	after <u>1/6</u> Hours	Type _____	<u>same as 1</u>	<u>1</u>	_____	START _____	a.m.
At _____	after _____ Hours	Size I. D. _____	_____	_____	_____	COMPLETE <u>same as 1</u>	p.m.
			Hammer Wt. _____	_____	BIT _____	TOTAL HRS. _____	
			Hammer Fall _____	_____	_____	BORING FOREMAN _____	
					_____	INSPECTOR _____	
					_____	SOILS ENGR. _____	

LOCATION OF BORING:

DEPTH	Casing Blows per foot	Sample Depths From - To	Type of Sample	Blows per 6" on Sampler			Moisture Density or Consist.	Strata Change Elev.	SOIL IDENTIFICATION Remarks include color, gradation, Type of soil etc. Rock-color, type, condition, hardness, Drilling time, seams and etc.	SAMPLE		
				From 0-6	6-12	To 12-18				No.	Pen	Rec.
50	31	40'-42'	D	10	19	23	Moist hard	Gray SILT	9	24"	9"	
	46			24								
	66											
	77											
	76											
	55	45'-47'	D	14	16	18	"		10	24"	9"	
	66			30								
	104											
	138											
	158											
60	128	50'-52'	D	9	11	10	moist very stiff	TILL- gray fine SAND, some silt, little fine gravel	11	24"	10"	
				14								
		55'-57'	D	10	9	20	Moist hard		12	24"	9"	
				22								
70		60'-62'	D	8	10	12	"		13	24"	10"	
				38								
		65'-66'6"	D	18	35	44	"		14	18"	12"	
80		70'-72'	D	20	37	50	"		15	18"	9"	
		75'-77'	D	20	27	22	"		16	24"	8"	
				26								

GROUND SURFACE TO _____

USED _____ "CASING: THEN _____

Sample Type
 D=Dry C=Cored W=Washed
 UP=Undisturbed Piston
 TP=Test Pit A=Auger V=Vane Test
 UT=Undisturbed Thinwall

Proportions Used
 trace 0 to 10%
 little 10 to 20%
 some 20 to 35%
 and 35 to 50%

140lb Wt. x 30" fall on 2" O.D. Sampler
 Cohesionless Density
 0-10 Loose
 10-30 Med. Dense
 30-50 Dense
 50+ Very Dense

Cohesive Consistency
 0-4 Soft 30+ Hard
 4-8 M/Stiff
 8-15 Stiff
 15-30 V-Stiff

SUMMARY:
 Earth Boring _____
 Rock Coring _____
 Samples _____

HOLE NO. B-24

American Drilling & Boring Co., Inc.

100 WATER STREET EAST PROVIDENCE, R. I.

SHEET 3 OF 3
 DATE _____
 HOLE NO. B-24
 LINE & STA. _____
 OFFSET _____
 SURF. ELEV. 9.0'

TO same as 1 ADDRESS _____
 PROJECT NAME _____ LOCATION _____
 REPORT SENT TO _____ PROJ. NO. _____
 SAMPLES SENT TO _____ OUR JOB NO. _____

GROUND WATER OBSERVATIONS		CASING	SAMPLER	CORE BAR.	Date	Time
At _____	after _____ Hours	Type _____	<u>same as 1</u>	_____	START <u>same as 1</u>	a.m. _____
At _____	after _____ Hours	Size I.D. _____	_____	_____	COMPLETE _____	p.m. _____
		Hammer Wt. _____	_____	_____	TOTAL HRS. _____	
		Hammer Fall _____	_____	_____	BORING FOREMAN _____	
				BIT _____	INSPECTOR _____	
					SOILS ENGR. _____	

LOCATION OF BORING:

DEPTH	Casing Blows per foot	Sample Depths From - To	Type of Sample	Blows per 6" on Sampler			Moisture Density or Consist.	Strata Change Elev.	SOIL IDENTIFICATION Remarks include color, gradation, Type of soil etc. Rock-color, type, condition, hardness, Drilling time, seams and etc.	SAMPLE		
				From 0-6	To 6-12	To 12-18				No.	Pen	Rec
85		80'-81'6"	D-	32	130	28	Moist very dense		TILL-gray fine SAND, some silt, little fine gravel	17	18"	10"
		81'6"-83'	D	62	68	75		83'0"		18	18"	9"
									Bottom of boring 83'0"			
			D- denotes used 440# Wt on spoon sampler									

GROUND SURFACE TO _____ Sample Type D=Dry C=Cored W=Washed UP=Undisturbed Piston TP=Test Pit A=Auger V=Vane Test UT=Undisturbed Thinwall	USED _____ Proportions Used trace 0 to 10% little 10 to 20% some 20 to 35% and 35 to 50%	"CASING: THEN _____ 140lb Wt. x 30" fall on 2" O.D. Sampler Cohesionless Density 0-10 Loose 10-30 Med. Dense 30-50 Dense 50+ Very Dense	_____ Cohesive Consistency 0-4 Soft 30+ Hard 4-8 M/Stiff 8-15 Stiff 15-30 V-Stiff
			SUMMARY: Earth Boring _____ Rock Coring _____ Samples _____
			HOLE NO. B-24

American Drilling & Boring Co., Inc.

100 WATER STREET EAST PROVIDENCE, R. I.

TO Prov. Gas Co. - Malby & Aldrich ADDRESS Barbridge, Masa.
 PROJECT NAME Prop. Tank LOCATION Providence, R.I.
 REPORT SENT TO above PROJ NO _____
 SAMPLES SENT TO " OUR JOB NO 71-297

SHEET _____ OF _____
 DATE _____
 HOLE NO. B-25
 LINE & STA _____
 OFFSET _____
 SURF. ELEV. 9.00

GROUND WATER OBSERVATIONS At <u>7'3"</u> after <u>10</u> min. At _____ after _____ Hours	Rods - " <u>AW</u> " Type _____ Size I.D. <u>2 1/2"</u> Hammer Wt. <u>300#</u> Hammer Fall <u>24"</u>	CASING _____ SAMPLER <u>S/S</u> <u>1 3/8"</u> BIT _____	Date _____ Time _____ START <u>7/28/71</u> COMPLETE <u>7/28/71</u> TOTAL HRS. _____ BORING FOREMAN <u>Gones</u> INSPECTOR _____ SOILS ENGR. _____
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LOCATION OF BORING:

DEPTH	Casing Blows per foot	Sample Depths From - To	Type of Sample	Blows per 6" on Sampler			Moisture Density or Consist.	Strata Change Elev.	SOIL IDENTIFICATION Remarks include color, gradation, Type of soil etc. Rock-color, type, condition, hardness, Drilling time, seams and etc.	SAMPLE				
				From 0-6	6-12	To 12-18				No.	Pen	Re		
10	9	0'-2'	D	12	6	4	Dry loose	2'	Gray fine to medium SAND, gravel & coal FILL	1	24"	10		
	12			4										
	14													
	11													
20	10	5'-7'	D	40	19	15	Moist dense	10'	Brown fine to medium SAND little silt & fine gravel FILL	2	24"	10		
				21										
	1	10'-12'	D	3	3	5	Wet loose			20'	Gray fine SAND & silt, some fine to medium gravel FILL	3	24"	7"
	5			3										
14														
6														
30	7	15'-17'	D	7	9	8	"	20'	Gray ORGANIC SILT, little F-M sand & fine gravel	4	24"	9"		
	3			4										
	5													
	5													
40	11	20'-22'	D	4	4	3	Wet M.stiff	23'	Gray-brown fine to medium SAND & gravel, some silt	5	24"	7"		
	20			4										
	27													
	29													
40	14	25'-27'	D	12	14	21	Moist dense	37'6"	Gray-brown fine to medium SAND, some silt & fine gravel	6	24"	12		
	26			19										
	35													
	28													
40	32	30'-32'	D	40	24	14	"	37'6"	Lost sample	7	24"	9"		
	40			20										
	25													
	12													
40	22	35'-37'	D	20	21	28	"	37'6"	Gray-brown SILT, little fine sand	-	24"	0"		
	34			21										
	52	37'-33'6"	D	33	40	40	Moist hard			8	18"	10'		

GROUND SURFACE TO 45' USED 2 1/2" CASING: THEN sampled to 99'

Sample Type
 D=Dry C=Cored W=Washed
 UP=Undisturbed Piston
 TP=Test Pit A=Auger V=Vane Test
 UT=Undisturbed Thinwall

Proportions Used
 trace 0 to 10%
 little 10 to 20%
 some 20 to 35%
 and 35 to 50%

140lb Wt. x 30" fall on 2" O.D. Sampler
 Cohesionless Density
 0-10 Loose
 10-30 Med. Dense
 30-50 Dense
 50+ Very Dense
 Cohesive Consistency
 0-4 Soft
 4-8 M/Stiff
 8-15 Stiff
 15-30 V-Stiff

SUMMARY:
 Earth Boring 99'
 Rock Coring _____
 Samples 20

HOLE NO. B-25

American Drilling & Boring Co., Inc.

100 WATER STREET EAST PROVIDENCE R. I.

SHEET 2 of 3
 DATE _____
 HOLE NO. B-25
 LINE & STA. _____
 OFFSET _____
 SURF. ELEV. _____

TO Same as #1 ADDRESS Same as #1
 PROJECT NAME _____ LOCATION _____
 REPORT SENT TO _____ PROJ. NO. _____
 SAMPLES SENT TO _____ OUR JOB NO. 71-297

GROUND WATER OBSERVATIONS At <u>Same as #1</u> after _____ Hours At _____ after _____ Hours	CASING _____ SAMPLER _____ CORE BAR _____ Type <u>Same as #1</u> Size I. D. _____ Hammer Wt. _____ Hammer Fall _____	Date _____ Time _____ START <u>Same as #1</u> COMPLETE _____ TOTAL HRS. _____ BORING FOREMAN _____ INSPECTOR _____ SOILS ENGR. _____
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LOCATION OF BORING:

DEPTH	Casing Blows per foot	Sample Depths From - To	Type of Sample	Blows per 6" on Sampler			Moisture Density or Consist.	Strata Change Elev.	SOIL IDENTIFICATION Remarks include color, gradation, Type of soil etc. Rock-color, type, condition, hardness, Drilling time, seams and etc.	SAMPLE		
				From 0-6	6-12	To 12-18				No.	Pen	Rec.
40	32	40'-42'	D	14	23	25	Moist hard	Gray SILT, trace fine sand	9	18"	-	
	54			33								
	70											
	89											
	73											
50		45'-47'	D	14	33	29	"	Gray SILT	10	26"	14'	
				38								
		50'-52'	D	7	8	8	Moist stiff			11	24"	10'
				7								
60		55'-57'	D	13	18	22	Moist hard		12	24"	9"	
				27								
		60'-62'	D	13	14	20	"		13	24"	10'	
				23								
70		65'-67'	D	5	11	13	Moist very stiff		14	24"	9"	
				12								
		70'-72'	D	12	14	13	"		15	24"	10'	
				16								
80		75'-77'	D	12	14	20	Moist hard		16	24"	10'	
				31								

GROUND SURFACE TO _____ Sample Type _____ D=Dry C=Cored W=Washed UP=Undisturbed Piston TP=Test Pit A=Auger V=Vane Test UT=Undisturbed Thinwall	USED _____ Proportions Used trace 0 to 10% little 10 to 20% some 20 to 35% and 35 to 50%	"CASING: THEN _____ 140lb Wt. x 30" fall on 2" O.D. Sampler Cohesionless Density 0-10 Loose 10-30 Med. Dense 30-50 Dense 50+ Very Dense	SUMMARY: Earth Boring _____ Rock Coring _____ Samples _____
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HOLE NO **B-25**

American Drilling & Boring Co., Inc.

100 WATER STREET EAST PROVIDENCE, R. I.

SHEET 3 OF 3

DATE _____

HOLE NO. B-25

LINE & STA. _____

OFFSET _____

SURF. ELEV. _____

TO same as #1

ADDRESS same as #1

PROJECT NAME _____

LOCATION _____

REPORT SENT TO _____

PROJ. NO. _____

SAMPLES SENT TO _____

OUR JOB NO. _____

<p style="text-align: center;">GROUND WATER OBSERVATIONS</p> <p>At <u>same as #1</u> after _____ Hours</p> <p>At _____ after _____ Hours</p>	<p style="text-align: center;">CASING SAMPLER CORE BAR</p> <p>Type _____</p> <p>Size I D. _____</p> <p>Hammer Wt. _____</p> <p>Hammer Fall _____</p>	<p style="text-align: center;">Date _____ Time _____</p> <p>START <u>same as #1</u> a.m. p.m.</p> <p>COMPLETE _____</p> <p>TOTAL HRS _____</p> <p>BORING FOREMAN _____</p> <p>INSPECTOR _____</p> <p>SOILS ENGR. _____</p>
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LOCATION OF BORING:

DEPTH	Casing Blows per foot	Sample Depths From - To	Type of Sample	Blows per 6" on Sampler			Moisture Density or Consist.	Strata Change Elev.	SOIL IDENTIFICATION <small>Remarks include color, gradation, type of soil etc. Rock-color, type, condition, hardness, Drilling time, seams and etc.</small>	SAMPLE		
				From 0-6	To 6-12	To 12-18				No.	Pen	Rec.
90		80'-82'	D	7	11	14	Moist hard	85'	Gray SILT, trace fine sand	17	24"	13"
				26								
		85'-87'	D	152	83	70	Moist very dense	99'	Gray fine to medium SAND, some silt & fine to medium gravel TILL	18	24"	8"
				60								
		90'-92'	D	30	29	28	"		Gray fine to medium SAND, little silt, trace fine gravel TILL	19	24"	10"
100		95'-97'	D	40	24	14	Moist dense	99'	Lost sample TILL	-	24"	0"
				20								
		97'-99'	D	32	31	27	"			20	24"	10"
				19								
								Bottom of boring 99'				

GROUND SURFACE TO _____

USED _____

"CASING: THEN _____

Sample Type
 D=Dry C=Cored W=Washed
 UP=Undisturbed Piston
 TP=Test Pit A=Auger V=Vane Test
 UT=Undisturbed Thinwall

Proportions Used
 trace 0 to 10%
 little 10 to 20%
 some 20 to 35%
 and 35 to 50%

140 lb Wt. x 30" fall on 2" O.D. Sampler
 Cohesionless Density Cohesive Consistency
 0-10 Loose 0-4 Soft 30 + Hard
 10-30 Med. Dense 4-8 M/Stiff
 30-50 Dense 8-15 Stiff
 50 + Very Dense 15-30 V-Stiff

SUMMARY:
 Earth Boring _____
 Rock Coring _____
 Samples _____

HOLE NO. **B-25**

American Drilling & Boring Co., Inc.

100 WATER STREET EAST PROVIDENCE, R. I.

SHEET 1 OF 1
 DATE _____
 HOLE NO. B-27
 LINE & STA. _____
 OFFSET _____
 SURF. ELEV. 8.50'

TO Providence Gas Co. -Haley & Aldrich ADDRESS Cambridge, Mass.
 PROJECT NAME Tank Site LOCATION PROVIDENCE, RI
 REPORT SENT TO above PROJ. NO. _____
 COPIES SENT TO " OUR JOB NO. 71-297

GROUND WATER OBSERVATIONS				Rods-AW	CASING	SAMPLER	CORE BAR	Date	Time
<u>9'8"</u>	after <u>1/4</u> Hours			Type _____		<u>S/S</u>		START <u>7/26/71</u>	a.m.
<u>cas. @40'</u>				Size I.D. <u>2-1/2"</u>		<u>1-3/8"</u>		COMPLETE <u>7/27/71</u>	p.m.
<u>10'</u>	after <u>1/2</u> Hours			Hammer Wt. <u>300#</u>		<u>140#</u>		TOTAL HRS. _____	
<u>casing out</u>				Hammer Fall <u>24"</u>		<u>30"</u>	BIT	BORING FOREMAN <u>W. Manco</u>	
								INSPECTOR _____	
								SOILS ENGR. <u>D. Andrews</u>	

LOCATION OF BORING:

Casing Blows per foot	Sample Depths From - To	Type of Sample	Blows per 6" on Sampler			Moisture Density or Consist.	Strata Change Elev.	SOIL IDENTIFICATION Remarks include color, gradation, Type of soil etc. Rock-color, type, condition, hardness, Drilling time, seams and etc.	SAMPLE		
			From 0-6	6-12	To 12-18				No.	Pen	Rec.
3	0'-2'	D	14	12	12	dry	13'-0"	Brown SILT and coal-ash - FILL, some fine sand -lost sample @ 5' -pushing cobble- lost sample @ 7'	1	24"	21"
18			19			medium					
25						dense					
21											
31											
12	5'-7'	D	29	28	18	dry					
12			14			dense					
12	7'-9'	D	16	8	8						
11			5								
14						moist					
7	10'-12'	D	7	8	5	medium					
16			11			dense					
22											
9											
5	15'-17'	D	2	7	9	"	20'-0"	Dark gray ORGANIC SILT, Some fine to coarse sand	3	24"	21"
5			6								
6											
8											
6											
7	20'-22'	D	2	4	4	"	30'-0"	Brown fine to medium SAND, Little organic silt	4	24"	21"
9			7								
13											
13											
17											
15	25'-27'	D	6	8	8	"	30'-0"	Brown fineto coarse SAND, Some silt, little fine to coarse gravel	5	24"	20"
19			10								
23											
24											
22											
24	30'-32'	D	6	10	13	"	30'-0"	Brown fineto coarse SAND, Some silt, little fine to coarse gravel	6	24"	23"
28			15								
27											
30											
23											
20	35'-37'	D	10	12	18	moist	30'-0"	Brown fineto coarse SAND, Some silt, little fine to coarse gravel	7	24"	20"
22			14			dense					
25											
24											
24											

GROUND SURFACE TO 78' USED 2 1/2 "CASING: THEN S/S to 80'

Sample Type
 D=Dry C=Cored W=Washed
 JP=Undisturbed Piston
 TP=Test Pit A=Auger V=Vane Test
 JT=Undisturbed Thinwall

Proportions Used
 trace 0 to 10%
 little 10 to 20%
 some 20 to 35%
 and 35 to 50%

140lb Wt. x 30" fall on 2" O.D. Sampler
 Cohesionless Density Cohesive Consistency
 0-10 Loose 0-4 Soft 30+ Hard
 10-30 Med. Dense 4-8 M/Stiff
 30-50 Dense 8-15 Stiff
 50+ Very Dense 15-30 V-Stiff

SUMMARY:
 Earth Boring 80'
 Rock Coring --
 Samples 15
 HOLE NO. B-27

American Drilling & Boring Co., Inc.

100 WATER STREET EAST PROVIDENCE, R. I.

SHEET 2 OF 2

DATE _____

HOLE NO. B-27

LINE & STA. _____

OFFSET _____

SURF. ELEV. _____

TO same as 1
 PROJECT NAME _____
 REPORT SENT TO _____
 PLES SENT TO _____

ADDRESS _____
 LOCATION _____
 PROJ. NO. _____
 OUR JOB NO. _____

GROUND WATER OBSERVATIONS		CASING	SAMPLER	CORE BAR	Date		Time	
At _____	after _____ Hours	Type _____	_____	_____	START _____	_____	_____	_____
At _____	after _____ Hours	Size I.D. _____	_____	_____	COMPLETE _____	_____	_____	_____
		Hammer Wt. _____	_____	BIT _____	TOTAL HRS. _____	_____	_____	_____
		Hammer Fall _____	_____	_____	BORING FOREMAN _____	_____	_____	_____
					INSPECTOR _____	_____	_____	_____
					SOILS ENGR. _____	_____	_____	_____

LOCATION OF BORING:

DEPTH	Casing Blows per foot	Sample Depths From - To	Type of Sample	Blows per 6" on Sampler			Moisture Density or Consist.	Strata Change Elev.	SOIL IDENTIFICATION Remarks include color, gradation, Type of soil etc. Rock-color, type, condition, hardness, Drilling time, seams and etc.	SAMPLE			
				From 0-6	To 6-12	To 12-18				No.	Pen	Rec.	
40	28	40'-42'	D	11	15	19	moist dense	46'-0"	Brown fine to coarse SAND, Some silt, little fine to coarse gravel	8	24"	21"	
	29			19									
	37												
	44												
	43						moist very dense	46'-0"	Brown SILT and fine sand, Some fine gravel	9	24"	19"	
	35	45'-47'	D	11	14	31							
	58			62									
	60												
50	67						"	55'-0"	Gray SILT, trace fine sand	10	24"	20"	
	37	50'-52'	D	23	23	30							
	41			32									
	62												
	87							57'-0"	Gray fine SAND, little silt (Sand running up casing 9" @ 60' sample)	11	24"	21"	
	66	55'-57'	D	17	21	23	moist dense						
	71			20									
	92												
60	88						moist medium dense	72'-0"	Gray medium to fine SAND (Sand running up casing 3'7" at 65' sample)	12	24"	23"	
	44	60'-62'	D	3	4	8							
	52			13									
	58												
	72							80'-0"	Dark gray fine to coarse SAND, some silt and fine gravel, cemented TILL	13	24"	22"	
	100												
	69	65'-67'	D	7	18	18	moist dense						
	88			25									
70	125							80'-0"	Bottom of Boring 80'-0"	14	24"	23"	
	161												
	185												
	48	70'-72'	D	8	16	19	"						
	153			28				80'-0"	Bottom of Boring 80'-0"	15	24"	--	
	465												
	278	74'-76'	D**	48	67	31	moist very dense						
				44									
				D** denotes used 300# wt. on open end									
				A Rod sampler									
B		78-80'	D	35	37	48/66		80'-0"	Bottom of Boring 80'-0"	--	24"	0"	

GROUND SURFACE TO <u>78'</u>	USED <u>2 1/2</u> " CASING: THEN <u>lost sample bumping back</u>		
Sample Type	Proportions Used	140lb Wt. x 30" fall on 2" O.D. Sampler	SUMMARY:
D=Dry C=Cored W=Washed	trace 0 to 10%	Cohesionless Density	Earth Boring _____
UP=Undisturbed Piston	little 10 to 20%	0-10 Loose	Rock Coring _____
TP=Test Pit A=Auger V=Vane Test	some 20 to 35%	10-30 Med. Dense	Samples _____
UIT=Undisturbed Thinwall	and 35 to 50%	30-50 Dense	
		50+ Very Dense	
		0-4 Soft 30+ Hard	
		4-8 M/Stiff	
		8-15 Stiff	
		15-30 V-Stiff	
			HOLE NO. <u>B-27</u>

American Drilling & Boring Co., Inc.

100 WATER STREET EAST PROVIDENCE, R. I.

SHEET 1 OF 2
 DATE _____
 HOLE NO. 40
 LINE & STA. _____
 OFFSET _____
 SURF. ELEV. 8.7

TO Haley & Aldrich, Inc. ADDRESS Cambridge, Mass.
 PROJECT NAME Tank Site (Prov. Gas Co.) LOCATION Providence, R.I.
 REPORT SENT TO above PROJ. NO. 2663
 SAMPLES SENT TO " OUR JOB NO. 71-396

GROUND WATER OBSERVATIONS		Rods-"AW" Type _____ Size I.D. <u>4" & BX</u> Hammer Wt. <u>300#</u> Hammer Fall <u>24"</u>	CASING <u>4" & BX</u> SAMPLER <u>S/S</u> <u>1 3/8"</u> <u>140#</u> CORE BAR. _____ BIT <u>30"</u>	Date	Time
At <u>18'</u> after _____ Hours	At _____ after _____ Hours			START <u>10/14/71</u> o.m.	COMPLETE <u>10/15/71</u> p.m.
				TOTAL HRS. _____	
				BORING FOREMAN <u>R. Faria</u>	
				INSPECTOR _____	
				SOILS ENGR. _____	

LOCATION OF BORING: Sasafras Point

DEPTH	Casing Blows per foot	Sample Depths From - To	Type of Sample	Blows per 6" on Sampler			Moisture Density or Consist.	Strata Change Elev.	SOIL IDENTIFICATION Remarks include color, gradation, Type of soil etc. Rock-color, type, condition, hardness, Drilling time, seams and etc.	SAMPLE		
				From 0-6	6-12	To 12-18				No.	Pen	Rec
				Miscellaneous FILL								
5												
10							10'					
		10'-12'	D	6	5	3	Moist medium stiff		Gray SILT & fine SAND, FILL	1	24"	18
15								15'				
		15'-17'	D	5	3	2	Moist stiff		Gray ORGANIC SILT, some fine sand seams, trace of fine gravel	2	24"	20
20								20'				
		20'-22'	D	6	7	7	Moist medium dense		Dark gray medium to fine SAND, some fine to medium gravel, little silt	3	24"	21
25								25'				
		25'-27'	D	13	10	16	"			4	24"	20
30								30'				
		30'-32'	D	12	14	13	Moist medium dense		Brown silty coarse to fine SAND, little fine gravel	5	24"	18
35								35'				
		35'-37'	D	12	10	8	Moist stiff		Brown SILT, trace of fine sand	6	24"	20
40								37'6"				
		37'6"-39'6"	D	34	21	19	Moist dense		Brown fine to medium SAND, some medium to fine gravel, little silt	7	24"	18

GROUND SURFACE TO _____ USED _____ "CASING: THEN _____					
Sample Type	Proportions Used	140lb Wt. x 30" fall on 2" O.D. Sampler	SUMMARY:		
D=Dry C=Cored W=Washed	trace 0 to 10%	Cohesionless Density	Earth Boring <u>74</u>		
UP=Undisturbed Piston	little 10 to 20%	0-10 Loose	Rock Coring <u>14</u>		
TP=Test Pit A=Auger V=Vane Test	some 20 to 35%	10-30 Med Dense	Samples _____		
UT=Undisturbed Thinwall	and 35 to 50%	30-50 Dense	HOLE NO. <u>40</u>		
		50+ Very Dense			
		4-8 M/Stiff			
		8-15 Stiff			
		15-30 V-Stiff			

American Drilling & Boring Co., Inc.

100 WATER STREET EAST PROVIDENCE, R. I.

SHEET 2 OF 2

DATE _____

HOLE NO. 40

LINE & STA. _____

OFFSET _____

SURF. ELEV. _____

TO _____ ADDRESS _____
 PROJECT NAME _____ LOCATION _____
 REPORT SENT TO _____ PROJ. NO. _____
 SAMPLES SENT TO _____ OUR JOB NO. 71-396

<p style="text-align: center;">GROUND WATER OBSERVATIONS</p> <p>At _____ after _____ Hours</p> <p>At _____ after _____ Hours</p>	<p style="text-align: center;">CASING SAMPLER CORE BAR</p> <p>Type _____</p> <p>Size I.D. _____</p> <p>Hammer Wt. _____</p> <p>Hammer Fall _____</p>	<p style="text-align: center;">Date _____ Time _____</p> <p>START _____ g.f.</p> <p>COMPLETE _____ g.f.</p> <p>TOTAL HRS. _____ p.f.</p> <p>BORING FOREMAN _____</p> <p>INSPECTOR _____</p> <p>SOILS ENGR. _____</p>
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LOCATION OF BORING:

DEPTH	Casing Blows per foot	Sample Depths From - To	Type of Sample	Blows per 6" on Sampler			Moisture Density or Consist.	Strata Change Elev.	SOIL IDENTIFICATION Remarks include color, gradation, Type of soil etc. Rock-color, type, condition, hardness, Drilling time, seams and etc.	SAMPLE		
				From 0-6	To 6-12	To 12-18				No.	Pen	Re
		(Washed & Drove BX to 72')										
45		45'-47'	D	7	16	15	Moist dense		Gray medium to fine SAND, some fine gravel, little silt	8	24"	20'
				17								
50		50'-52'	D	13	15	16	Moist very stiff	50'	Brown SILT & fine to coarse SAND, trace of medium gravel	9	24"	19'
				14								
55		55'-57'	D	10	14	15	"			10	24"	20'
				15								
60		60'-62'	D	23	22	15	Moist hard		Brown SILT & fine Sand, little fine to medium gravel	11	24"	19'
				18								
65		65'-67'	D	22	27	30	Moist very dense	65'	Gray medium to fine SAND, little medium to fine gravel, little silt, sandy TILL	12	24"	20'
				30								
70		70'-72'	D	22	22	30	"			13	24"	22'
				30								
75		72'-74'	D	20	33	37		74'		14	24"	20'
				41					Bottom of Boring 74'0"			

GROUND SURFACE TO _____ USED _____ "CASING: THEN _____

Sample Type
 D=Dry C=Cored W=Washed
 UP=Undisturbed Piston
 TP=Test Pit A=Auger V=Vane Test
 UT=Undisturbed Thinwall

Proportions Used
 trace 0 to 10%
 little 10 to 20%
 some 20 to 35%
 and 35 to 50%

140lb Wt. x 30" fall on 2" O.D. Sampler
 Cohesionless Density Cohesive Consistency
 0-10 Loose 0-4 Soft 30 + Hard
 10-30 Med Dense 4-8 M/Stiff
 30-50 Dense 8-15 Stiff
 50+ Very Dense 15-30 V-Stiff

SUMMARY:
 Earth Boring _____
 Rock Coring _____
 Samples _____

HOLE NO. 40

American Drilling & Boring Co., Inc.

100 WATER STREET EAST PROVIDENCE, R. I.

TO Haley & Aldrich, Inc. ADDRESS Cambridge, Mass.
 PROJECT NAME Tank Site (Prov. Gas Co.) LOCATION Providence, R.I.
 REPORT SENT TO above PROJ. NO. 2663
 SAMPLES SENT TO " OUR JOB NO. 71-396

SHEET 1 OF 2
 DATE _____
 HOLE NO. 41
 LINE & STA. _____
 OFFSET _____
 SURF. ELEV. 9.2

GROUND WATER OBSERVATIONS At <u>8'3"</u> after _____ Hours Casing At _____ after _____ Hours	Rods - "AW" Type _____ Size I.D. <u>2 1/2"</u> Hammer Wt. <u>300#</u> Hammer Fall <u>24"</u>	CASING _____ <u>2 1/2"</u> <u>300#</u> <u>24"</u>	SAMPLER _____ <u>S/S</u> <u>1 3/8"</u> <u>140#</u> <u>30"</u>	CORE BAR. _____ _____ BIT	Date _____ Time _____ START <u>10/14/71</u> COMPLETE <u>10/15/71</u> TOTAL HRS. _____ BORING FOREMAN <u>A. Gomes</u> INSPECTOR _____ SOILS ENGR. _____
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LOCATION OF BORING: Sasafras Point

DEPTH	Casing Blows per foot	Sample Depths From - To	Type of Sample	Blows per 6" on Sampler			Moisture Density or Consist.	Strata Change Elev.	SOIL IDENTIFICATION Remarks include color, gradation, Type of soil etc. Rock-color, type, condition, hardness, Drilling time, seams and etc.	SAMPLE		
				From 0-6	To 6-12	To 12-18				No.	Pen	Ret
5		0'-2'	D	2	2	1	Moist loose	Gray brown fine to medium SAND, FILL	1	24'	10'	
				1								
10		5'-7'	D	4	4	1	"	10'	Brown fine to coarse SAND, trace of silt, FILL (oil odor noted)	2	24'	12'
				1								
15	4	10'-12'	D	6	5	7	Moist medium dense	16'	Brown fine SAND, trace of silt and fine gravel (Oil odor noted)	3	24'	9'
	13			8								
	14											
	10	15'-17'	D	8	8	13	Moist dense			4	24'	14'
20	11							29' 6"	Gray brown fine to coarse SAND and Silt, little fine to medium gravel, TILL			
	12											
	17											
	20	20'-22'	D	16	10	15	"			5	24'	9'
	23				19							
25	27							29' 6"	Gray brown fine to coarse SAND and Silt, little fine to medium gravel, TILL			
	32											
	20	25'-27'	D	12	12	18	"			6	24'	10'
	33				19							
30	40							29' 6"	Gray brown fine to coarse SAND and Silt, little fine to medium gravel, TILL			
	35											
	35	30'-32'	D	24	26	20	Moist dense			7	24'	6'
	54				23							
	68											
35	75							29' 6"	Gray brown fine to coarse SAND and Silt, little fine to medium gravel, TILL			
	60											
	37	35'-37'	D	21	24	20	Moist very dense			8	24'	8'
	45				31							
40	43							29' 6"	Gray brown fine to coarse SAND and Silt, little fine to medium gravel, TILL			
	40											
	39											

GROUND SURFACE TO _____ Sample Type D=Dry C=Cored W=Washed UP=Undisturbed Piston TP=Test Pit A=Auger V=Vane Test UT=Undisturbed Thinwall	USED _____ THEN _____ Proportions Used trace 0 to 10% little 10 to 20% some 20 to 35% and 35 to 50%	140 lb Wt. x 30" fall on 2" O.D. Sampler Cohesionless Density 0-10 Loose 10-30 Med. Dense 30-50 Dense 50+ Very Dense	Cohesive Consistency 0-4 Soft 30+ Hard 4-8 M/Stiff 8-15 Stiff 15-30 V-Stiff	SUMMARY: Earth Boring <u>52'</u> Rock Coring _____ Samples <u>11</u>	HOLE NO. <u>41</u>
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American Drilling & Boring Co., Inc.

100 WATER STREET EAST PROVIDENCE, R. I.

SHEET 2 OF 2

DATE _____

HOLE NO. 41

LINE & STA. _____

OFFSET _____

SURF. ELEV. _____

TO _____ ADDRESS _____
 PROJECT NAME _____ LOCATION _____
 REPORT SENT TO _____ PROJ. NO. _____
 SAMPLES SENT TO _____ OUR JOB NO. 71-396

GROUND WATER OBSERVATIONS			CASING	SAMPLER	CORE BAR.	Date	Time
At _____	after _____	Hours	Type _____	_____	_____	START _____	g.m
At _____	after _____	Hours	Size I.D. _____	_____	_____	COMPLETE _____	p.m
			Hammer Wt. _____	_____	BIT _____	TOTAL HRS. _____	g.m
			Hammer Fall _____	_____	_____	BORING FOREMAN _____	p.m
						INSPECTOR _____	
						SOILS ENGR. _____	

LOCATION OF BORING:

DEPTH	Casing Blows per foot	Sample Depths From - To	Type of Sample	Blows per 6" on Sampler			Moisture Density or Consist.	Strata Change Elev.	SOIL IDENTIFICATION Remarks include color, gradation, Type of soil etc. Rock-color, type, condition, hardness, Drilling time, seams and etc.	SAMPLE		
				From 0-6	6-12	To 12-18				No.	Pen	Rec
45	30	40'-42'	D	22	21	20	Moist dense	Gray brown fine to coarse SAND and Silt, little fine to medium gravel, TILL	9	24"	10"	
	35			21								
	50											
	85											
	58											
50	55	45'-47'	D	22	26	28	Moist very dense	Bottom of Boring 52'0"	10	24"	8"	
	60			30								
	62											
55	54											
	50	50'-52'	D	24	32	42	"		11	24"	-	
				36								

GROUND SURFACE TO _____	USED _____	"CASING: THEN _____	
Sample Type D=Dry C=Cored W=Washed UP=Undisturbed Piston TP=Test Pit A=Auger V=Vane test UT=Undisturbed Thinwall	Proportions Used trace 0 to 10% little 10 to 20% some 20 to 35% and 35 to 50%	140lb Wt. x 30" fall on 2" O.D. Sampler Cohesionless Density 0-10 Loose 10-30 Med Dense 30-50 Dense 50+ Very Dense	Cohesive Consistency 0-4 Soft 30+ Hard 4-8 M/Stiff 8-15 Stiff 15-30 V-Stiff
TOWN PRESS - EAST PROV			SUMMARY: Earth Boring _____ Rock Coring _____ Samples _____ HOLE NO. 41

American Drilling & Boring Co., Inc.

100 WATER STREET EAST PROVIDENCE, R. I.

TO Haley & Aldrich, Inc. ADDRESS Cambridge, Mass.
 PROJECT NAME Tank Site (Prov. Gas Co.) LOCATION Providence, R.I.
 REPORT SENT TO above PROJ. NO. 2663
 SAMPLES SENT TO " OUR JOB NO. 71-396

SHEET 1 OF 2
 DATE _____
 HOLE NO. 50-A
 LINE & STA. _____
 OFFSET _____
 SURF. ELEV. 8.9

GROUND WATER OBSERVATIONS				RODS - "AW" Type _____ Size I.D. <u>2 1/2"</u> Hammer Wt. <u>300#</u> Hammer Fall <u>24"</u>	CASING _____	SAMPLER <u>S/S</u> <u>1 3/8"</u> <u>140#</u> <u>30"</u>	CORE BAR _____	Date	Time	START <u>9/29/71</u> COMPLETE <u>9/30/71</u> TOTAL HRS. _____ BORING FOREMAN <u>A. Gomes</u> INSPECTOR _____ SOILS ENGR. _____	a.m.	p.m.
At <u>8'8"</u>	after _____	Hours										
At _____	after _____	Hours										

LOCATION OF BORING: Sassafras Point

DEPTH	Casing Blows per foot	Sample Depths From - To	Type of Sample	Blows per 6" on Sampler			Moisture Density or Consist.	Strata Change Elev.	SOIL IDENTIFICATION Remarks include color, gradation, Type of soil etc. Rock-color, type, condition, hardness, Drilling time, seams and etc.	SAMPLE		
				From 0-6	To 6-12	To 12-18				No.	Pen	Rec
5	2	0'-1'	D	2	5		D/loose	1'	Black COAL, CINDERS, FILL	1	12"	12'
	5	1'-2'	D	10	6		Moist medium dense		Brown fine to medium SAND and Silt, trace of fine to coarse gravel, FILL	1A	12"	12'
	10											
	15											
10	4	5'-6'6"	D	6	6	5	Wet medium dense			2	18"	10'
	9											
	9											
	3											
15	8								No Recovery	-	24"	0'
	4	10'-12'	D	10=	12"		"			3	24"	9'
	3			4=	12"							
	7	12'-14'	D	8	9	8						
20	4			5				15'				
	2	15'6"-17'	D	3	2	2	Wet soft		Gray brown ORGANIC SILT, trace of brown peat	4	18"	14'
	4							18'				
	6											
25	20											
	24								Missed Sample	-	24"	0'
	7	20'-22'	D	20=	12"		Wet medium dense		Gray fine to coarse SAND, some silt, little fine to medium gravel	5	24"	20'
	12			22=	12"							
30	11	25'-27'	D	4	8	8		27'				
	12			7								
	14											
	16											
35	24						Moist hard		Brown SILT, little very fine sand	6	24"	11'
	26	30'-32'	D	11	14	24		33'				
	35			13								
	47											
40	40											
	70											
	30	35'-37'	D	33	26	22	Moist very dense		Gray brown fine to coarse SAND & Gravel with some silt	7	24"	10'
	35			24								
	53											
	88											
	69											

GROUND SURFACE TO _____ USED _____ "CASING: THEN _____

Sample Type D=Dry C=Cored W=Washed UP=Undisturbed Piston TP=Test Pit A=Auger V=Vane Test UT=Undisturbed Thinwall	Proportions Used trace 0 to 10% little 10 to 20% some 20 to 35% and 35 to 50%	140lb Wt. x 30" fall on 2" O.D. Sampler Cohesionless Density Cohesive Consistency 0-10 Loose 0-4 Soft 30 + Hard 10-30 Med. Dense 4-8 M/Stiff 30-50 Dense 8-15 Stiff 50 + Very Dense 15-30 V-Stiff
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SUMMARY:
 Earth Boring 62'
 Rock Coring _____
 Samples 12
HOLE NO 50-A

American Drilling & Boring Co., Inc.

100 WATER STREET EAST PROVIDENCE, R. I.

SHEET 2 OF 2
 DATE _____
 HOLE NO. 50-A
 LINE & STA. _____
 OFFSET _____
 SURF. ELEV. _____

TO _____ ADDRESS _____
 PROJECT NAME _____ LOCATION _____
 REPORT SENT TO _____ PROJ. NO. _____
 SAMPLES SENT TO _____ OUR JOB NO. 71-396

<p>GROUND-WATER OBSERVATIONS</p> <p>At _____ after _____ Hours</p> <p>At _____ after _____ Hours</p>	<p>CASING _____</p> <p>SAMPLER _____</p> <p>CORE BAR _____</p> <p>Type _____</p> <p>Size I.D. _____</p> <p>Hammer Wt. _____</p> <p>Hammer Fall _____</p>	<p style="text-align: right;">Date _____ Time _____</p> <p>START _____ a.m.</p> <p>COMPLETE _____ p.m.</p> <p>TOTAL HRS. _____</p> <p>BORING FOREMAN _____</p> <p>INSPECTOR _____</p> <p>SOILS ENGR. _____</p>
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LOCATION OF BORING:

DEPTH	Casing Blows per foot	Sample Depths From - To	Type of Sample	Blows per 6" on Sampler			Moisture Density or Consist.	Strata Change Elev.	SOIL IDENTIFICATION Remarks include color, gradation, Type of soil etc. Rock-color, type, condition, hardness, Drilling time, seams and etc.	SAMPLE		
				From 0-6	To 6-12	To 12-18				No.	Pen.	Rec.
45	30	40'-42'	D	27	28	26	Moist very dense	Gray brown fine to coarse SAND & Gravel with some silt	8	24	10'	
	35			25								
	58											
	84											
50	24	45'-47'	D	20	30	24	"		9	24	11'	
	28			28								
	45											
	77											
55	126	50'-50'9"	D	48	110/3"		"		10	9"	--	
	253											
	200											
	65											
60	61	55'5"-57'6"	D	49	66	49	140# O.E.		11	24"	--	
				41								
65		60'-61'6"	D	49	43	68	140# O.E.	61'6"	12	18"	--	
		61'6"-62'	D	92					62'	Gray medium to fine SAND, little silt & gravel	12A	6"
								Bottom of Boring 62'0"				

<p>GROUND SURFACE TO _____</p> <p>Sample Type D=Dry C=Cored W=Washed UP=Undisturbed Piston TP=Test Pit A=Auger V=Vane Test UT=Undisturbed Thinwall</p>	<p>USED _____</p> <p>Proportions Used trace 0 to 10% little 10 to 20% some 20 to 35% and 35 to 50%</p>	<p>"CASING: THEN _____</p> <p>140lb Wt. x 30" fall on 2" O.D. Sampler Cohesionless Density 0-10 Loose 10-30 Med. Dense 30-50 Dense 50+ Very Dense</p>	<p>Cohesive Consistency 0-4 Soft 30+ Hard 4-8 M/Stiff 8-15 Stiff 15-30 V-Stiff</p>	<p>SUMMARY: Earth Boring _____ Rock Coring _____ Samples _____</p>
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American Drilling & Boring Co., Inc.

100 WATER STREET EAST PROVIDENCE, R. I.

SHEET 1 OF 3
 DATE 10/8/71
 HOLE NO. 62
 LINE & STA. _____
 OFFSET _____
 SURF. ELEV. 7.1'

TO Haley & Aldrich, Inc. ADDRESS Cambridge, Mass.
 PROJECT NAME Providence Gas Co. LOCATION Providence, R.I.
 REPORT SENT TO above PROJ. NO. _____
 SAMPLES SENT TO Taken at Site OUR JOB NO. 71-442

GROUND WATER OBSERVATIONS		CASING	SAMPLER	CORE BAR.	Date	Time
At <u>8'-9'</u>	after _____ Hours	Type <u>RODS - "AW"</u>	<u>S/S</u>	_____	START <u>11/8/71</u>	_____ a.m.
At _____	after _____ Hours	Size I.D. <u>4" H-2 1/2"</u>	<u>1 3/8"</u>	_____	COMPLETE <u>11/15/71</u>	_____ p.m.
		Hammer Wt. <u>300#</u>	<u>140#</u>	BIT	TOTAL HRS. _____	
		Hammer Fall <u>24"</u>	<u>30"</u>	_____	BORING FOREMAN <u>Gones</u>	
					INSPECTOR _____	
					SOILS ENGR. _____	

LOCATION OF BORING:

DEPTH	Casing Blows per foot	Sample Depths From - To	Type of Sample	Blows per 6" on Sampler			Moisture Density or Consist.	Strata Change Elev.	SOIL IDENTIFICATION Remarks include color, gradation, Type of soil etc. Rock-color, type, condition, hardness, Drilling time, seams and etc.	SAMPLE		
				From 0-6	To 6-12	To 12-18				No.	Pen	Rec
									Probed For Utilities From 0'-5'			
								5'				
12		5'-6'6"	D	4	5	5	Moist Loose		Black Cinders	1	18'	10'
17												
19												
21												
14												
19		10'-11'6"	D	12	10	8	" "		Fill	2	18'	
27												
25												
17												
17												
10		15'-16'6"	D	5	3	3	" "	16'6"	No Rec.			
5												
7		16'6"-18'	D	3	2	2			Organic Silt	3	18'	10'
11												
10		18'-20'										
18								20'6"	Tube 2" Shelby- 23" Rec.			
26									Tried Piston 21'-23', No Penetration			
26		21'-23'	D	10	8	8			Fine Med. Gravel, Sand, Trace Silt	4	24'	9"
24				7								
14												
41		25'-26'6"	D	18	17	8				5	18'	14'
38								27'				
19		26'6"-27'6"	D	11	3	3			Sandy Silt	6	18'	14'
18				3								
12												
40		30'-32'							Shelby Missed			
27												
31												
38		32'-34'	PUSHED						No. Rec.			
30												
		35'-36'6"	D	1	1	2			Soft Gr. Organic Silt	7	18'	12'
		38'-39'3"							Piston 16" Rec.			

GROUND SURFACE TO _____ USED _____ CASING: THEN _____

Sample Type
 D=Dry C=Cored W=Washed
 UP=Undisturbed Piston
 TP=Test Pit A=Auger V=Vane Test
 UT=Undisturbed Thinwall

Proportions Used
 trace 0 to 10%
 little 10 to 20%
 some 20 to 35%
 and 35 to 50%

140lb Wt. x 30" fall on 2" O.D. Sampler
 Cohesionless Density Cohesive Consistency
 0-10 Loose 0-4 Soft 30+ Hard
 10-30 Med. Dense 4-8 M/Stiff
 30-50 Dense 8-15 Stiff
 50+ Very Dense 15-30 V-Stiff

SUMMARY:
 Earth Boring 117
 Rock Coring _____
 Samples 22

HOLE NO.

American Drilling & Boring Co., Inc.

100 WATER STREET EAST PROVIDENCE, R. I.

SHEET 2 OF 3

TO _____ ADDRESS _____
 PROJECT NAME _____ LOCATION _____
 REPORT SENT TO _____ PROJ. NO. _____
 SAMPLES SENT TO _____ OUR JOB NO. 71-442

DATE _____
 HOLE NO. 62
 LINE & STA. _____
 OFFSET _____
 SURF. ELEV. _____

GROUND WATER OBSERVATIONS			CASING	SAMPLER	CORE BAR.	Date	Time
At _____	after _____	Hours	Type _____	_____	_____	START _____	_____ o.m.
At _____	after _____	Hours	Size I.D. _____	_____	_____	COMPLETE _____	_____ o.m.
			Hammer Wt. _____	_____	BIT _____	TOTAL HRS. _____	
			Hammer Fall _____	_____	_____	BORING FOREMAN _____	
						INSPECTOR _____	
						SOILS ENGR. _____	

LOCATION OF BORING:

DEPTH	Casing Blows per foot	Sample Depths From - To	Type of Sample	Blows per 6" on Sampler			Moisture Density or Consist.	Strata Change Elev.	SOIL IDENTIFICATION Remarks include color, gradation, Type of soil etc. Rock-color, type, condition, hardness, Drilling time, seams and etc.	SAMPLE		
				From 0-6	To 6-12	To 12-18				No.	Pen	Rec
		39'6"-41'	D	3	4	4	Soft Moist		Gr. Organic Silt, Tr. Peat Fibers	8	18"	14"
		43'-45'	HP					45'	3" Piston 22" Rec.			
		45'-46'6"	D	5	9	8	Moist Soft	48'	Med. Gr. Silt Sand, Trace Med. Sand, Tr. Org.	9	18"	14"
		50'-51'6"	D	8	10	13	Med. Dense		Silty Sand, Yellow Gray Mottled Clay Lenses	10	18"	17"
		55'-56'6"	D	18	14	12				11	18"	14"
		60'-61'6"	D	16	12	14				12	18"	16"
		65'-66'6"	D	22	24	28		67'6"		13	16"	11"
		70'-71'6"	D	13	20	14	Moist M.D.		Compact Gr. Silty, Fine Sand	14	18"	12"
		75'-76'6"	D	16	14	14		78'		15	18"	12"
							Moist Med. D.		2'5" Running Sand @ 80'			
									Med. Comp. Gr. Fine Sand			

Casing

GROUND SURFACE TO _____ USED _____ CASING: THEN _____

Sample Type
 D=Dry C=Cored W=Washed
 UP=Undisturbed Piston
 TP=Test Pit A=Auger V=Vane Test
 UT=Undisturbed Thinwall

Proportions Used
 trace 0 to 10%
 little 10 to 20%
 some 20 to 35%
 and 35 to 50%

140 lb Wt. x 30" fall on 2" O.D. Sampler
 Cohesionless Density
 0-10 Loose
 10-30 Med. Dense
 30-50 Dense
 50+ Very Dense

Cohesive Consistency
 0-4 Soft 30+ Hard
 4-8 M/Stiff
 8-15 Stiff
 15-30 V-Stiff

SUMMARY:
 Earth Boring _____
 Rock Coring _____
 Samples _____

HOLE NO. 62

American Drilling & Boring Co., Inc.

100 WATER STREET EAST PROVIDENCE, R. I.

SHEET 3 OF 3

DATE _____
 HOLE NO. 62
 LINE & STA. _____
 OFFSET _____
 SURF. ELEV. _____

TO _____ ADDRESS _____
 PROJECT NAME _____ LOCATION _____
 REPORT SENT TO _____ PROJ. NO. _____
 SAMPLES SENT TO _____ OUR JOB NO. 71-442

GROUND WATER OBSERVATIONS			CASING	SAMPLER	CORE BAR	Date	Time	
At _____	after _____	Hours _____	Type _____	_____	_____	START _____	_____	o.m.
At _____	after _____	Hours _____	Size I.D. _____	_____	_____	COMPLETE _____	_____	p.m.
			Hammer Wt. _____	_____	_____	TOTAL HRS. _____	_____	p.m.
			Hammer Fall _____	_____	_____	BORING FOREMAN _____	_____	
					BIT _____	INSPECTOR _____	_____	
						SOILS ENGR. _____	_____	

LOCATION OF BORING:

DEPTH	Casing Blows per foot	Sample Depths From-To	Type of Sample	Blows per 6" on Sampler			Moisture Density or Consist.	Strata Change Elev.	SOIL IDENTIFICATION Remarks include color, gradation, Type of soil etc. Rock-color, type, condition, hardness, Drilling time, seams and etc.	SAMPLE		
				From 0-6	To 6-12	To 12-18				No.	Pen	Rec
	38	80'-82'	D	6	7	12	Moist M.D.		Med. Comp. Gr. Fine Sand	16	24"	16"
	32			14								
	40											
	42											
	48											
	38	85'-87'	D	6	6	7				17	24"	15"
	42			6								
	48											
	53											
	68											
	60	90'-91'6"	D	6	8	10				18	18"	12"
	68											
	140											
	160											
	181											
	32	95'-97'	D	5	5	8				19	24"	14"
	61			9								
	68											
	96											
	124											
	126	100'-102'	D	19	12	11				20	24"	10"
	140			12								
	140							103'				
	151											
	103								Comp. Gr. Sand Trace Silt			
	64	105'-107'	D	20	18	20				21	24"	18"
	82			14								
	84											
	83											
	107											
	70	110'-112'	D	12	12	8				22	24"	16"
	86			7								
	94	115'-117'	D	20	20	21		117'	No Rec.			
	112			24					Bottom of Boring at 117'			
	80											

GROUND SURFACE TO 45'-0" 45' USED 115'-2" CASING: THEN _____

Sample Type
 D=Dry C=Cored W=Washed
 UP=Undisturbed Piston
 TP=Test Pit A=Auger V=Vane Test
 UT=Undisturbed Thinwall

Proportions Used
 trace 0 to 10%
 little 10 to 20%
 some 20 to 35%
 and 35 to 50%

140lb Wt. x 30" fall on 2" O.D. Sampler
 Cohesionless Density Cohesive Consistency
 0-10 Loose 0-4 Soft 30+ Hard
 10-30 Med. Dense 4-8 M/Stiff
 30-50 Dense 8-15 Stiff
 50+ Very Dense 15-30 V-Stiff

SUMMARY:
 Earth Boring 117'
 Rock Coring 0
 Samples 22

HOLE NO. 62

American Drilling & Boring Co., Inc.

100 WATER STREET EAST PROVIDENCE, R. I.

SHEET 1 OF 4
 DATE 11/8/71
 HOLE NO. 63
 LINE & STA. _____
 OFFSET _____
 SURF. ELEV. 7.1'

TO Haley & Aldrich, Inc. ADDRESS Cambridge, Mass.
 PROJECT NAME Providence Gas Co. LOCATION Providence, R.I.
 REPORT SENT TO above PROJ. NO. _____
 SAMPLES SENT TO Taken at Site OUR JOB NO. 71-442

<p style="text-align: center;">GROUND WATER OBSERVATIONS</p> At <u>8'</u> after <u>16</u> Hours <u>20'</u> Casing At _____ after _____ Hours	<p style="text-align: center;">CASING</p> Type <u>RODS-"AW"</u> Size I.D. <u>H+BWF</u> Hammer Wt. <u>300#</u> Hammer Fall <u>24"</u>	<p style="text-align: center;">SAMPLER</p> <u>S/S</u> <u>1 3/8"</u> <u>140#</u> <u>30"</u>	<p style="text-align: center;">CORE BAR.</p> _____ _____ BIT	<p style="text-align: center;">Date Time</p> START <u>11/8/71</u> _____ a.m. COMPLETE <u>11/12/71</u> _____ p.m. TOTAL HRS. _____ BORING FOREMAN <u>R. Andrews</u> INSPECTOR <u>R. Vargus</u> SOILS ENGR. _____
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LOCATION OF BORING:

DEPTH	Casing Blows per foot	Sample Depths From-To	Type of Sample	Blows per 6" on Sampler			Moisture Density or Consist.	Strolo Change Elev.	SOIL IDENTIFICATION Remarks include color, gradation, Type of soil etc. Rock-color, type, condition, hardness, Drilling time, seams and etc.	SAMPLE			
				From 0-6	6-12	To 12-18				No.	Pen	Rec	
4									Black Ash & Fine Sand, Fill				
6													
12													
16													
20													
12		5'-6'6"	D	7	8	8					1	18"	14"
14													
16													
16													
13													
10		10'-12'6"	D	4	3						2	30'6"	
14				2	3								
14				4									
15													
17													
16		15'-17'	D	10	8					3	24'	10"	
17				4	4								
8								17'6"					
6									Gray Org. Silt				
15		19'-20'6"	D	1	1	1	H-Flush Casing				4	18'	7"
12													
16		21'-22'8"	UP								1	20'	17"
16													
15		23'-24'6"	D	1	2	2					5	18"	18"
21											5	18'	7"
20													
19		26'-28'	UP								2	24'	23"
19													
20		28'-29'6"	D	PUSH						6	18'	17"	
23													
12		31'-33'	UP					30'		3	24'	24"	
11													
13		33'-34'6"	D	PUSH			BW-Flush Casing			7	18'	18"	
14													
14													
12													
10													
10													
8								39'6"					
17									Gray Fine to Med. Sand				

GROUND SURFACE TO 30'

USED H "CASING: THEN _____

Sample Type
 D=Dry C=Cored W=Washed
 UP=Undisturbed Piston
 TP=Test Pit A=Auger V=Vane Test
 UT=Undisturbed Thinwall

Proportions Used
 trace 0 to 10%
 little 10 to 20%
 some 20 to 35%
 and 35 to 50%

140lb Wt. x 30" fall on 2" O.D. Sampler
 Cohesionless Density
 0-10 Loose
 10-30 Med. Dense
 30-50 Dense
 50+ Very Dense

Cohesive Consistency
 0-4 Soft 30+ Hard
 4-8 M/Stiff
 8-15 Stiff
 15-30 V-Stiff

SUMMARY:
 Earth Boring 127
 Rock Coring _____
 Samples 25

HOLE NO. _____

American Drilling & Boring Co., Inc.

100 WATER STREET EAST PROVIDENCE, R. I.

SHEET 2 OF 4

DATE _____

HOLE NO. 63

LINE & STA. _____

OFFSET _____

SURF. ELEV. _____

TO _____ ADDRESS _____
 PROJECT NAME _____ LOCATION _____
 REPORT SENT TO _____ PROJ. NO. _____
 SAMPLES SENT TO _____ OUR JOB NO. 71-442

GROUND WATER OBSERVATIONS		CASING	SAMPLER	CORE BAR.	Date	Time
At _____	after _____ Hours	Type _____	_____	_____	START _____	a.m.
At _____	after _____ Hours	Size I.D. _____	_____	_____	COMPLETE _____	p.m.
		Hammer Wt. _____	_____	BIT _____	TOTAL HRS. _____	p.m.
		Hammer Fall _____	_____	_____	BORING FOREMAN _____	
					INSPECTOR _____	
					SOILS ENGR. _____	

LOCATION OF BORING:

DEPTH	Casing Blows per foot	Sample Depths From - To	Type of Sample	Blows per 6" on Sampler			Moisture Density or Consist.	Sirolo Change Elev.	SOIL IDENTIFICATION Remarks include color, gradation, Type of soil etc. Rock-color, type, condition, hardness, Drilling time, seams and etc.	SAMPLE		
				From 0-6	6-12	To 12-18				No.	Pen	Rec.
				12	40'-41'6" D	4				5	5	
13							Gray Silt					
8												
6							Flush					
6												
8	45'-46'6" D	1	1	1			50'		9	18'	10"	
10												
10							H Flush					
11												
10							55'					
47	50'-51'6" D	1	1	2	H				10	18'	18"	
31							UP-					
35	53'-55'	UP							4	24'	22"	
23												
20												
W	55'-56'6" D	1	1	1			59'		11	18'	11"	
A B					BW							
S W/					Flush							
H F												
I												
W	60'-61'6" D	1	1	2			60'	Brown Peaty Silt, Trace Fine to Med. Sand	12	18'	14"	
a B					BW							
s W/					FLUSH							
h F												
I												
1	65'-66'6" D	1	2	3			70'	Gray Brown Peaty Silt, 67' to 70' Wash Was Lite Gray	13	18'	13"	
4												
6												
10												
13												
21	70'-71'6" D	10	10	11			73'	Black Org. Silt	14	18'	14"	
19												
21												
27												
30												
16	75'-76'6" D	8	8	7			75'	Gray Fine to Coarse Sand, Some Fine Gravel, Trace Silt	15	18'	12"	
17												
17												
15												
19												

GROUND SURFACE TO _____ USED _____ "CASING: THEN _____

Sample Type D=Dry C=Cored W=Washed UP=Undisturbed Piston TP=Test Pit A=Auger V=Vane Test UT=Undisturbed Thinwall	Proportions Used trace 0 to 10% little 10 to 20% some 20 to 35% and 35 to 50%	140 lb Wt x 30" fall on 2" O.D. Sampler Cohesionless Density 0-10 Loose 10-30 Med. Dense 30-50 Dense 50+ Very Dense	Cohesive Consistency 0-4 Soft 30+ Hard 4-8 M/Stiff 8-15 Stiff 15-30 V-Stiff
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SUMMARY:
 Earth Boring _____
 Rock Coring _____
 Samples _____

HOLE NO _____

American Drilling & Boring Co., Inc.

100 WATER STREET EAST PROVIDENCE, R. I.

SHEET 3 OF 4

DATE _____

HOLE NO. 63

LINE & STA. _____

OFFSET _____

SURF. ELEV. _____

TO _____ ADDRESS _____

PROJECT NAME _____ LOCATION _____

REPORT SENT TO _____

SAMPLES SENT TO _____

PROJ. NO. _____

OUR JOB NO. 71-442

GROUND WATER OBSERVATIONS			CASING	SAMPLER	CORE BAR.	Date	Time
At _____	after _____	Hours	Type _____	_____	_____	START _____	a.m.
At _____	after _____	Hours	Size I.D. _____	_____	_____	COMPLETE _____	p.m.
			Hammer Wt. _____	_____	_____	TOTAL HRS. _____	
			Hammer Fall _____	_____	_____	BORING FOREMAN _____	
				_____	_____	INSPECTOR _____	
				_____	_____	SOILS ENGR. _____	

LOCATION OF BORING:

DEPTH	Casing Blows per foot	Sample Depths From-To	Type of Sample	Blows per 6" on Sampler			Moisture Density or Consist.	Stroto Change Elev.	SOIL IDENTIFICATION Remarks include color, gradation, Type of soil etc. Rock-color, type, condition, hardness, Drilling time, seams and etc.	SAMPLE		
				From 0-6	6-12	To 12-18				No.	Pen	Rec.
17		80'-81'6"	D	8	8	10			Gray Fine to Coarse Sand, Trace Silt, Fine Gravel	16	18"	12"
19												
23												
24												
27												
19		85'-86'6"	D	9	12	12				17	18"	10"
24												
29												
20												
24												
34		90'-92'	D	22	16			92'	Sand Ran Back 5' in Pipe	18	24"	8"
29				15	16							
30												
32									Gray Fine Sand, Some Silt			
41												
37		95'-97'	D	12	11					19	24"	12"
39				11	9							
43												
52												
51												
27		100'-102'	D	9	10					20	24"	16"
29				11	11							
30								103'				
41									Gray Fine Sand, Trace Silt			
42												
47		105'-107'	D	12	11					21	24"	5"
33				14	16							
41												
44												
49												
71		110'-112'	D	7	8				Missed Sample at 110'to112'			
63				8	8				Went Back Down Hole For			
95		112'-114'	D	12	11				Sampled-Sand, Ran Back 11'	22	24"	12"
103				12	14				in Casing			
115												
27		115'-117'	D	12	13				Gray Fine to Coarse Sand	23	24"	-
31				13	11							
50												
49												
48												

GROUND SURFACE TO _____ USED _____ CASING: THEN _____

Sample Type
 D=Dry C=Cored W=Washed
 UP=Undisturbed Piston
 TP=Test Pit A=Auger V=Vane Test
 UT=Undisturbed Thinwall

Proportions Used
 trace 0 to 10%
 little 10 to 20%
 some 20 to 35%
 and 35 to 50%

140lb Wt. x 30" fall on 2" O.D. Sampler
 Cohesiveness Density Cohesive Consistency
 0-10 Loose 0-4 Soft 30+ Hard
 10-30 Med. Dense 4-8 M/Stiff
 30-50 Dense 8-15 Stiff
 50+ Very Dense 15-30 V-Stiff

SUMMARY:
 Earth Boring _____
 Rock Coring _____
 Samples _____

HOLE NO
 63

American Drilling & Boring Co., Inc.

100 WATER STREET EAST PROVIDENCE, R. I.

SHEET 4 OF 4

DATE _____
HOLE NO. 63
LINE & STA. _____
OFFSET _____
SURF. ELEV. _____

TO _____ ADDRESS _____
PROJECT NAME _____ LOCATION _____
REPORT SENT TO _____ PROJ. NO. _____
SAMPLES SENT TO _____ OUR JOB NO. 71-442

Table with 6 columns: GROUND WATER OBSERVATIONS, CASING, SAMPLER, CORE BAR., Date, Time. Includes fields for At _____ after _____ Hours, Type, Size I.D., Hammer Wt., Hammer Fall, START, COMPLETE, TOTAL HRS., BORING FOREMAN, INSPECTOR, SOILS ENGR.

LOCATION OF BORING:

Main data table with columns: DEPTH, Casing Blows per foot, Sample Depths From-To, Type of Sample, Blows per 6" on Sampler (0-6, 6-12, 12-18), Moisture Density or Consist., Strata Change Elev., SOIL IDENTIFICATION, SAMPLE No. Pen Rec. Contains handwritten entries for depths 33-41 and 125-127.

Summary and legend section. Includes GROUND SURFACE TO _____ USED _____ CASING: THEN _____, Sample Type (D, UP, TP, UT), Proportions Used (trace to 50%), 140lb Wt. x 30" fall on 2" O.D. Sampler Cohesionless Density, Cohesive Consistency, and SUMMARY: Earth Boring, Rock Coring, Samples.

American Drilling & Boring Co., Inc.

100 WATER STREET EAST PROVIDENCE, R. I.

SHEET 1 OF 1
 DATE 1/3/72
 HOLE NO. 70A
 LINE & STA. _____
 OFFSET _____
 SURF. ELEV. 6.7

TO Haley & Aldrich, Inc. ADDRESS Cambridge, Mass.
 PROJECT NAME Providence Gas Co. LOCATION Providence, R.I.
 REPORT SENT TO above PROJ. NO. _____
 SAMPLES SENT TO " OUR JOB NO. 71-508

GROUND WATER OBSERVATIONS At <u>9'</u> after <u>0</u> Hours 1:00 1/3/72 At <u>20' Casing</u> after _____ Hours	Rods - "AW" Type <u>BW</u> Size I.D. <u>2 1/2"</u> Hammer Wt. <u>300#</u> Hammer Fall <u>24"</u>	CASING <u>BW</u> SAMPLER <u>S/S</u> Size I.D. <u>1 3/8"</u> Hammer Wt. <u>140#</u> Hammer Fall <u>30"</u>	CORE BAR. BIT	Date <u>1/3/72</u> Time _____ START <u>1/3/72</u> _____ a.m. COMPLETE <u>1/3/72</u> _____ p.m. TOTAL HRS. _____ BORING FOREMAN <u>Quagliaroli</u> INSPECTOR <u>R. Varnum</u> SOILS ENGR. _____
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LOCATION OF BORING:

DEPTH	Casing Blows per foot	Sample Depths From - To	Type of Sample	Blows per 6" on Sampler			Moisture Density or Consist.	Strata Change Elev.	SOIL IDENTIFICATION Remarks include color, gradation, Type of soil etc. Rock-color, type, condition, hardness, Drilling time, seams and etc.	SAMPLE			
				From 0-6	To 6-12	To 12-18				No.	Pen	Rec.	
4									Black Oily SAND, Silt, Gravel Cinders, Fill				
6													
6													
7													
9													
8													
10													
10													
8													
6													
4		10'-11'6"	D	4	1	2	Wet Loose	13'		1	18'	16'	
5										2	12'	10'	
4		12'-13'	D	2	1					2A	12'	9'	
3		13'-14'	D	1	2		Wet Loose	15'	Black PEAT & Oily Fine Sand				
3													
4		15'-16'6"	D	1	1	1	Wet Soft	17'	Black Gray Org. SILT	3	18'	17'	
5													
5		17'-19'	Push 2" Shelby						Gray Fine to Coarse SAND, Some Org. Silt & Fine to Med. Gravel	4	24"	9"	
7													
13								20'					
8		20'-21'6"	D	9	5	8	Wet M.D.		Black Gray Fine to Coarse Oily SAND, Some Fine to Coarse Gravel, & org. Silt	5	18'	14'	
14													
16													
19													
13								25'					
9		25'-26'6"	D	7	5	5	Wet Loose		Black Gray Oily Fine to Coarse SAND, Some Fine to Coarse Gravel, Org. Silt Possible Fill	6	18'	6'	
14													
16													
20													
22							M.D.						
		30'-31'6"	D	13	13	12	Wet	31'6"			7	18'	16'
									Bottom of Boring at 31'6"				
									NOTE: 17'-19' Push Shelby Sand & Gravel in Tube Put in Jar(S-4)				

GROUND SURFACE TO _____ Sample Type D=Dry C=Cored W=Washed UP=Undisturbed Piston TP=Test Pit A=Auger V=Vane Test UT=Undisturbed Thinwall	USED _____ Proportions Used trace 0 to 10% little 10 to 20% some 20 to 35% and 35 to 50%	"CASING: THEN _____ 140lb Wt. x 30" fall on 2" O.D. Sampler Cohesionless Density 0-10 Loose 10-30 Med. Dense 30-50 Dense 50+ Very Dense	_____ Cohesive Consistency 0-4 Soft 30+ Hard 4-8 M/Stiff 8-15 Stiff 15-30 V-Stiff	SUMMARY: Earth Boring <u>31'6</u> Rock Coring _____ Samples <u>7</u>
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HOLE NO. 70A

American Drilling & Boring Co., Inc.

100 WATER STREET EAST PROVIDENCE, R. I.

SHEET 1 OF 2
 DATE 12/29/71
 HOLE NO. 71
 LINE & STA. _____
 OFFSET _____
 SURF. ELEV. 6.6

TO Haley & Aldrich, Inc. ADDRESS Cambridge, Mass.
 PROJECT NAME Providence Gas Co. LOCATION Providence, R.I.
 REPORT SENT TO above PROJ. NO. _____
 SAMPLES SENT TO " OUR JOB NO. 71-508

GROUND WATER OBSERVATIONS At <u>18'7"</u> after <u>1/2</u> Hours At _____ after _____ Hours	Rods - "AW" CASING Type _____ Size I.D. <u>BW</u> Hammer Wt. <u>300#</u> Hammer Fall <u>24"</u>	SAMPLER <u>S/S</u> <u>1 3/8"</u> <u>140#</u> <u>30"</u>	CORE BAR. _____ BIT	Date <u>12/29/71</u> Time _____ a.m. Date <u>12/30/71</u> Time _____ p.m. START _____ COMPLETE _____ TOTAL HRS. _____ BORING FOREMAN <u>Gomes</u> INSPECTOR _____ SOILS ENGR. _____
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LOCATION OF BORING:

DEPTH	Casing Blows per foot	Sample Depths From - To	Type of Sample	Blows per 6" on Sampler			Moisture Density or Consist.	Strata Change Elev.	SOIL IDENTIFICATION Remarks include color, gradation, Type of soil etc. Rock-color, type, condition, hardness, Drilling time, seams and etc.	SAMPLE		
				From 0-6	6-12	12-18				No.	Pen	Rec.
1									Probed to 5' No Samples Required			
2												
5												
6												
9								5'				
4		5'-6'6"	D	2	3	1	Soft		Dark Brown Fine to Coarse SAND, Trace Fine Gravel, Cinders, Fill	1	18'7"	
4								8'				
12												
19												
11		10'-11'6"	D	12	23	11	Moist M.D.		Gray Fine Silty SAND, Little Fine Gravel, (Fuel Odor Noted) Fill	2	18'10"	
5												
7												
8												
8								14'				
6												
2		15'-16'6"	D	4	3	3	Moist Soft		Gray Fine Silty SAND, Trace Fine Gravel, Fill	3	18'11"	
7												
7												
6												
6								20'				
1		20'6"-22'6"							Org. S-1 20'6"-22'6" Pressed 24"-Rec 100%	SHELBY 2		
1								22'				
3		22'6"-24'6"							22'6"-24'6" Missed			
2												
1		24'6"-27'						24'6"				
1									S-2 24'6"-27' 100% Rec.			
1								27'				
2												
2									Org. Silt (Gray)			
1												
7		30'-31'6"	D	1	1	2	Moist Soft			4	18' -	
9												
6												
6												
17								35'				
14		35'-37'							S-3 35'-37' 100% Rec.			
15								37'				
15												
13												
14												

GROUND SURFACE TO _____ Sample Type D=Dry C=Cored W=Washed UP=Undisturbed Piston TP=Test Pit A=Auger V=Vane Test UT=Undisturbed Thinwall	USED _____ "CASING: THEN _____ Proportions Used trace 0 to 10% little 10 to 20% some 20 to 35% and 35 to 50%	140lb Wt. x 30" fall on 2" O.D. Sampler Cohesionless Density Cohesive Consistency 0-10 Loose 0-4 Soft 30+ Hard 10-30 Med. Dense 4-8 M/Stiff 30-50 Dense 8-15 Stiff 50+ Very Dense 15-30 V-Stiff	SUMMARY: Earth Boring <u>66'6"</u> Rock Coring _____ Samples <u>11</u> HOLE NO. _____
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American Drilling & Boring Co., Inc.

100 WATER STREET EAST PROVIDENCE, R. I.

SHEET 2 OF 2

DATE _____
 HOLE NO. 71
 LINE & STA. _____
 OFFSET _____
 SURF. ELEV. _____

TO _____ ADDRESS _____
 PROJECT NAME _____ LOCATION _____
 REPORT SENT TO _____ PROJ. NO. _____
 SAMPLES SENT TO _____ OUR JOB NO. 71-508

GROUND WATER OBSERVATIONS			CASING	SAMPLER	CORE BAR.	Date	Time
At _____	after _____	Hours	Type _____	_____	_____	START _____	a.m.
At _____	after _____	Hours	Size I.D. _____	_____	_____	COMPLETE _____	p.m.
			Hammer Wt. _____	_____	_____	TOTAL HRS. _____	
			Hammer Fall _____	_____	_____	BORING FOREMAN _____	
					BIT _____	INSPECTOR _____	
						SOILS ENGR. _____	

LOCATION OF BORING: _____

DEPTH	Casing Blows per foot	Sample Depths From - To	Type of Sample	Blows per 6" on Sampler			Moisture Density or Consist.	Strata Change Elev.	SOIL IDENTIFICATION Remarks include color, gradation, Type of soil etc. Rock-color, type, condition, hardness, Drilling time, seams and etc.	SAMPLE		
				From 0-6	6-12	To 12-18				No.	Pen	Rec.
17		40'-41'6"	D	1	1	3	Moist Soft		Gray Org. SILT	5	18'	9"
14												
15												
15												
13												
50		46'-46'9"						46'8"	Pressed 2½" Shebly 9" Rec. Put Sample in Jar	6	9"	9"
68												
28		46'9"-48'4"	D	4	6	6	Moist V.D.	49'	Black Silty Med. to Fine Sand, wood Fibrous	7	18'	-
26												
40												
60		50'-51'6"	D	16	31	26			Gray Brown Fine to Coarse SAND, Fine to Med. Gravel, Little Silt	8	18'	9"
75												
53												
43												
46												
57		55'-56'6"	D	16	12	10				9	18'	11"
31												
27												
26												
36												
60		60'-61'6"	D	26	21	19				10	18'	14"
40												
45												
40												
36												
		65'-66'6"	D	18	15	16		66'6"		11	18'	-
									Bottom of Boring at 66'6"			

GROUND SURFACE TO _____	USED _____	"CASING: THEN _____	
Sample Type D=Dry C=Cored W=Washed UP=Undisturbed Piston TP=Test Pit A=Auger V=Vane Test UT=Undisturbed Thinwall	Proportions Used trace 0 to 10% little 10 to 20% some 20 to 35% and 35 to 50%	140 lb Wt. x 30" fall on 2" O.D. Sampler Cohesionless Density 0-10 Loose 10-30 Med. Dense 30-50 Dense 50+ Very Dense	Cohesive Consistency 0-4 Soft 30+ Hard 4-8 M/Stiff 8-15 Stiff 15-30 V-Stiff
TOWN BRIDGE EAST BRIDGE			SUMMARY: Earth Boring _____ Rock Coring _____ Samples _____ HOLE NO. _____

American Drilling & Boring Co., Inc.

100 WATER STREET EAST PROVIDENCE, R. I.

TO Haley & Aldrich, Inc. ADDRESS Cambridge, Mass.
 PROJECT NAME Providence Gas Co. LOCATION Providence, R.I.
 REPORT SENT TO above PROJ. NO. _____
 SAMPLES SENT TO " OUR JOB NO. 71-508

SHEET 1 OF 3
 DATE 12/31/71
 HOLE NO. 72
 LINE & STA. _____
 OFFSET _____
 SURF. ELEV. 7.5

GROUND WATER OBSERVATIONS At <u>12'9"</u> after _____ Hours At _____ after _____ Hours	Rods-"AW" Type _____ Size I.D. <u>4"</u> Hammer Wt. <u>300#</u> Hammer Fall <u>24"</u>	CASING _____ SAMPLER <u>S/S</u> <u>1 3/8"</u> <u>140#</u> BIT _____ <u>30"</u>	CORE BAR. _____ _____ _____ _____	Date _____ Time _____ START <u>12/31/71</u> _____ o.m. COMPLETE <u>1/4/72</u> _____ p.m. TOTAL HRS. _____ BORING FOREMAN <u>Gomes</u> INSPECTOR <u>R. Varnum</u> SOILS ENGR. _____
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LOCATION OF BORING:

DEPTH	Casing Blows per foot	Sample Depths From - To	Type of Sample	Blows per 6" on Sampler			Moisture Density or Consist.	Strata Change Elev.	SOIL IDENTIFICATION Remarks include color, gradation, Type of soil etc. Rock-color, type, condition, hardness, Drilling time, seams and etc.	SAMPLE		
				From 0-6	6-12	To 12-18				No.	Pen	Rec.
				13								
19												
26												
33												
46												
66		5'-6'6"	D	2	2	1	Moist Loose		Dark Gray Fine to Coarse SAND & Gravel, Ashes, Cinders (Oil Soaked), Fill	1	18'	12"
53												
31												
19												
17												
29		10'-11'6"	D	4	4	7	" "			2	18'	9"
31												
30												
27												
30												
10		15'-16'6"	D	3	3	2	" "			3	18'	10"
28												
28												
18								18'6"				
10												
9		20'-21'6"	D	14	5	4	Moist Loose	2" S-1	Gray Org. SILT (No Rec. W/S/S) 22' - 24'6" - 30" Press Rec. 26"			
8												
8												
10												
0												
14								3" U.P.	-1 25' - 27' - 24" Press Rec. 21 1/2"			
23												
20												
14		27'-28'6"	D	1	1	2	Moist Soft	3" U.P.	Gray Org. SILT -2 31' - 33' - 24" Press Rec. 24"	4	18'	18"
16												
32												
35												
46												
29		33'-34'6"	D Press							5	18'	18"
21												
32												
35												
46												
29		38'-40'						2" S-2	38' - 40' - 24" Press 100% Rec.			
21												

GROUND SURFACE TO _____	USED _____	"CASING: THEN _____
Sample Type D=Dry C=Cored W=Washed UP=Undisturbed Piston TP=Test Pit A=Auger V=Vane Test UT=Undisturbed Thinwall	Proportions Used trace 0 to 10% little 10 to 20% some 20 to 35% and 35 to 50%	140lb Wt. x 30" fall on 2" O.D. Sampler Cohesionless Density Cohesive Consistency 0-10 Loose 0-4 Soft 30+ Hard 10-30 Med. Dense 4-8 M/Stiff 30-50 Dense 8-15 Stiff 50+ Very Dense 15-30 V-Stiff
		SUMMARY: Earth Boring <u>90'</u> Rock Coring _____ Samples <u>15</u>
		HOLE NO. _____

American Drilling & Boring Co., Inc.

100 WATER STREET EAST PROVIDENCE, R. I.

SHEET 2 OF 3

DATE _____
 HOLE NO. 72
 LINE & STA. _____
 OFFSET _____
 SURF. ELEV. _____

TO _____ ADDRESS _____
 PROJECT NAME _____ LOCATION _____
 REPORT SENT TO _____ PROJ. NO. _____
 SAMPLES SENT TO _____ OUR JOB NO. 71-508

GROUND WATER OBSERVATIONS			CASING	SAMPLER	CORE BAR.	Date	Time
At _____	after _____	Hours	Type _____	_____	_____	START _____	a.m.
At _____	after _____	Hours	Size I.D. _____	_____	_____	COMPLETE _____	p.m.
			Hammer Wt. _____	_____	BIT _____	TOTAL HRS. _____	
			Hammer Fall _____	_____	_____	BORING FOREMAN _____	
						INSPECTOR _____	
						SOILS ENGR. _____	

LOCATION OF BORING:

DEPTH	Casing Blows per foot	Sample Depths From - To	Type of Sample	Blows per 6" on Sampler			Moisture Density or Consist.	Strata Change Elev.	SOIL IDENTIFICATION Remarks include color, gradation, Type of soil etc. Rock-color, type, condition, hardness, Drilling time, seams and etc.	SAMPLE		
				From 0-6	To 6-12	To 12-18				No.	Pen	Rec.
2 1/2"	23	40'-41'5"	D	Press			Moist Soft		Gray Org. SILT & Shells	6	18	18"
	27											
	23											
	30											
	78											
4"	108	45'-47'	UP #3					3" 47'	Pressed 24" From 45' -47' 100% Rec.			
	124											
	134	47'-48'6"	D	2	5	5	Moist Stiff		Dark Gray Peaty Org. SILT, Trace Fine SAND	7	18	12"
	136											
	131											
2 1/2"	Red	50'-51'6"	D	5	8	8	Moist V. Stiff	S-3 53'	Press From 52'-53' No Rec.	8	18	13"
	Wash	52'-53'										
	18											
	22	53'-54'6"	D	18	24	29	Moist M.D.		Gray Fine to Coarse SAND, & Fine to Coarse Gravel, Some Silt	9	18	9"
	39											
2 1/2"	9							59'				
	11											
	13											
	13											
	12											
2 1/2"	13	60'-61'6"	D	9	11	13	Moist M.D.		Gray Fine to Coarse SAND, Little Fine Gravel, Trace Silt	10	18	-
	16											
	19											
	23							64'				
	6	64'-65'	D	2	1		Moist Loose	65'	Gray F-C SAND, & Org. Silt, Trace Fine Gravel	11	12	7"
2 1/2"	7							68'				
	6	65'-66'	D	1	1		Moist Soft		Dark Gray Org. SILT, Trace Peat	11A	12	9"
	5											
	5											
	5											
2 1/2"	17	69'-71'	D	18	18	19	Moist Dense	74'	Gray Fine to Med. SAND, & Silt, Trace Fine to Coarse Gravel	12	24	10"
	35											
	36											
	38											
	45											
2 1/2"	34	74'-75'6"	D	9	6	4	Moist Loose		Gray Fine to Coarse SAND, & Silt, Some Fine to Med. Gravel	13	18	9"
	33											
	39											
	39											
	45	79'-81'	D	24	24	21/26			No Rec.			

GROUND SURFACE TO _____ USED _____ "CASING: THEN _____

Sample Type
 D=Dry C=Cored W=Washed
 UP=Undisturbed Piston
 TP=Test Pit A=Auger V=Vone Test
 UT=Undisturbed Thinwall

Proportions Used
 trace 0 to 10%
 little 10 to 20%
 some 20 to 35%
 and 35 to 50%

140lb Wt. x 30" fall on 2" O.D. Sampler
 Cohesionless Density Cohesive Consistency
 0-10 Loose 0-4 Soft 30+ Hard
 10-30 Med. Dense 4-8 M/Stiff
 30-50 Dense 8-15 Stiff
 50+ Very Dense 15-30 V-Stiff

SUMMARY:
 Earth Boring _____
 Rock Coring _____
 Samples _____

HOLE NO. _____

American Drilling & Boring Co., Inc.

100 WATER STREET EAST PROVIDENCE, R. I.

SHEET 3 OF 3

DATE _____

HOLE NO. 72

LINE & STA. _____

OFFSET _____

SURF. ELEV. _____

TO _____ ADDRESS _____
 PROJECT NAME _____ LOCATION _____
 REPORT SENT TO _____ PROJ. NO. _____
 SAMPLES SENT TO _____ OUR JOB NO. 71-508

GROUND WATER OBSERVATIONS			CASING	SAMPLER	CORE BAR.	Date	Time
At _____	after _____	Hours	Type _____	_____	_____	START _____	_____
At _____	after _____	Hours	Size I.D. _____	_____	_____	COMPLETE _____	_____
			Hammer Wt. _____	_____	_____	TOTAL HRS. _____	_____
			Hammer Fall _____	_____	_____	BORING FOREMAN _____	_____
					BIT	INSPECTOR _____	_____
						SOILS ENGR. _____	_____

LOCATION OF BORING: _____

DEPTH	Casing Blows per foot	Sample Depths From - To	Type of Sample	Blows per 6" on Sampler			Moisture Density or Consist.	Strata Change Elev.	SOIL IDENTIFICATION Remarks include color, gradation, Type of soil etc. Rock-color, type, condition, hardness, Drilling time, seams and etc.	SAMPLE		
				From 0-6	6-12	To 12-18				No.	Pen	Rec
34							Moist N.D.	Gray Fine to Coarse SAND, & Silt, Some Fine to Coarse Gravel				
33												
39		81'-83'	D	20	23	26/28					14	24'
45												
32		85'-87'								- 24"	0"	
		87'-90'	D	19	38	30	" "	90'	Gray Fine to Coarse SAND, & Gravel, Little Silt	15	36'	-
				40	38	37			Bottom of Boring at 90'			

GROUND SURFACE TO _____	USED _____	"CASING: THEN _____	
Sample Type D=Dry C=Cored W=Washed UP=Undisturbed Piston TP=Test Pit A=Auger V=Vane Test UT=Undisturbed Thinwall	Proportions Used trace 0 to 10% little 10 to 20% some 20 to 35% and 35 to 50%	140 lb Wt. x 30" tall on 2" O.D. Sampler Cohesionless Density 0-10 Loose 10-30 Med. Dense 30-50 Dense 50+ Very Dense	Cohesive Consistency 0-4 Soft 30+ Hard 4-8 M/Stiff 8-15 Stiff 15-30 V-Stiff
			SUMMARY: Earth Boring _____ Rock Coring _____ Samples _____
			HOLE NO. _____

American Drilling & Boring Co., Inc.

100 WATER STREET EAST PROVIDENCE, R. I.

SHEET 1 OF 2
 DATE _____
 HOLE NO. 73-A
 LINE & STA. _____
 OFFSET _____
 SURF. ELEV. 7.0

To Haley & Aldrich, Inc. ADDRESS CAMBRIDGE, Mass.
 PROJECT NAME Providence Gas Co. LOCATION Providence, R.I.
 REPORT SENT TO above PROJ. NO. _____
 SAMPLES SENT TO " OUR JOB NO. 71-508

GROUND WATER OBSERVATIONS At <u>18'</u> after <u>0</u> Hours <u>12/31/71 - 9:00</u> At _____ after _____ Hours	Rods-"AW" CASING Type _____ Size I.D. <u>BW</u> Hammer Wt. <u>300#</u> Hammer Fall <u>24"</u>	SAMPLER <u>S/S</u> <u>1 3/8"</u> <u>140#</u> <u>30"</u>	CORE BAR. _____ BIT	Date _____ Time _____ START <u>12/29/71</u> _____ a./p. COMPLETE <u>12/29/71</u> _____ a./p. TOTAL HRS. _____ BORING FOREMAN <u>Quagliaroli</u> INSPECTOR <u>R. Varnum</u> SOILS ENGR. _____
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LOCATION OF BORING:

DEPTH	Casing Blows per foot	Sample Depths From - To	Type of Sample	Blows per 6" on Sampler			Moisture Density or Consist.	Strata Change Elev.	SOIL IDENTIFICATION Remarks include color, gradation, Type of soil etc. Rock-color, type, condition, hardness, Drilling time, seams and etc.	SAMPLE		
				From 0-6	To 6-12	To 12-18				No	Pen	Re
6									Brown Fine to Coarse SAND & GRAVEL(Fill)			
8												
11												
8												
9												
7												
10												
12												
13												
16												
18												
14												
15												
5												
7												
6		15'-15'6"	D	5			Loose	15'6"		1	6"	5"
4		15'6"-16'6"	D		2	2	Wet		Gray Org. SILT, Trace Shells Trace Fine SAND	1A	12'	1'
2		17'-19'	Press							UT-	124'	22'
2												
3		19'-21'	Press							UT-	224'	20'
3		21'-22'6"	D	4	2	2	Wet Soft			2	18'	16'
4												
6												
8												
9												
7												
7												
5												
4												
6								30'				
7		30'6"-22'6"	Press		2"	Shably			Gray Fine to Coarse SAND, Trace Silt, Little Fine Gravel, Little Silt	-	24'	0'
12		32'6"-34'6"	Press		2"	Shably				-	24'	0'
12												
14												
13		34'6"-36'	D	6	9	8	Wet M.D.			3	18'	15'
14												
16												
20												
21							Wet	39'	Gray Org. Silt, Trace Wood			
23		40'-41'6"	D	2	3	4	Loose		Mixed With The Sand	4	18'	14'

GROUND SURFACE TO _____ USED _____ "CASING: THEN _____

Sample Type D=Dry C=Cared W=Washed UP=Undisturbed Piston TP=Test Pit A=Auger V=Vane Test UT=Undisturbed Thinwall	Proportions Used trace 0 to 10% little 10 to 20% some 20 to 35% and 35 to 50%	140lb Wt. x 30" fall on 2" O.D. Sampler Cohesionless Density 0-10 Loose 10-30 Med. Dense 30-50 Dense 50+ Very Dense	Cohesive Consistency 0-4 Soft 30+ Hard 4-8 M/Stiff 8-15 Stiff 15-30 V-Stiff	SUMMARY: Earth Boring <u>71'</u> Rock Coring _____ Samples <u>8</u>
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HOLE NO. _____

American Drilling & Boring Co., Inc.

100 WATER STREET EAST PROVIDENCE, R. I.

SHEET 2 OF 2

DATE _____

HOLE NO. 73A

LINE & STA. _____

OFFSET _____

SURF. ELEV. _____

TO _____ ADDRESS _____
 PROJECT NAME _____ LOCATION _____
 REPORT SENT TO _____ PROJ. NO. 71-508
 SAMPLES SENT TO _____ OUR JOB NO. _____

<p style="text-align: center;">GROUND WATER OBSERVATIONS</p> <p>At _____ after _____ Hours</p> <p>At _____ after _____ Hours</p>	<p style="text-align: center;">CASING</p> <p>Type _____</p> <p>Size I.D. _____</p> <p>Hammer Wt. _____</p> <p>Hammer Fall _____</p>	<p style="text-align: center;">SAMPLER</p> <p>_____</p> <p>_____</p> <p>_____</p>	<p style="text-align: center;">CORE BAR</p> <p>_____</p> <p>_____</p> <p>BIT</p>		<p style="text-align: center;">Date Time</p> <p>START <u>12/29/71</u> _____ a.m. COMPLETE _____ p.m. TOTAL HRS. _____ BORING FOREMAN _____ INSPECTOR _____ SOILS ENGR. _____</p>
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LOCATION OF BORING:

DEPTH	Casing Blows per foot	Sample Depths From - To	Type of Sample	Blows per 6" on Sampler			Moisture Density or Consist.	Strata Change Elev.	SOIL IDENTIFICATION Remarks include color, gradation, Type of soil etc. Rock-color, type, condition, hardness, Drilling time, seams and etc.	SAMPLE		
				From 0-6	To 6-12	To 12-18				No.	Pen	Rec
16												
20		42'-43'9"	Press 2" Shelby					42'	Gray Org. SILT, Fibrous, TR. Wood, Mixed with F-C SAND	UT-321'	8"	
26									Gray Fine to Coarse SAND, Little Fine to Med. Gravel, Trace Silt			
30												
34												
29												
30												
36								48'				
40									Gray Brown Fine to Coarse SAND, Some Silt, Little Fine To Coarse Gravel, Note: Tube Taken at 42'-43'9"; Sand & Gravel, Put Rec. in Jar			
41												
16		50'-51'6"	D	7	8	10	Wet M.D.					
26												
33												
42												
44												
26												
24												
30												
33												
34												
22		60'-61'6"	D	17	9	10	Wet M.D.		Gray Brown Fine to Coarse SAND, Some Fine to Coarse Gravel, Little Silt Note: 65'-66'6" Recovery on Second Attempt	6	18'	13'
26												
30												
32												
35												
22		65'-66'6"	D	12	10	7	" "					
46												
59												
79												
93												
		70'-71'6"	D	16	12	10	" "	71'6"		8	18'	14'
									Bottom of Boring at 71'6"			

GROUND SURFACE TO _____

USED _____ "CASING: THEN _____

Sample Type
 D=Dry C=Cored W=Washed
 UP=Undisturbed Piston
 TP=Test Pit A=Auger V=Vane Test
 UT=Undisturbed Thinwall

Proportions Used
 trace 0 to 10%
 little 10 to 20%
 some 20 to 35%
 and 35 to 50%

140lb Wt. x 30" fall on 2" O.D. Sampler
 Cohesionless Density Cohesive Consistency
 0-10 Loose 0-4 Soft 30 + Hard
 10-30 Med. Dense 4-8 M/Stiff
 30-50 Dense 8-15 Stiff
 50 + Very Dense 15-30 V-Stiff

SUMMARY:
 Earth Boring _____
 Rock Coring _____
 Samples _____

HOLE NO. _____

Site: Fields Point, Providence, RI

Client: Algonquin LNG, Inc.

Coordinates: N 654.42 W 950.53

Groundwater Depth: 7 ft

Contractor: American Drilling

Logged by: R.T. DeConto

Date Start - Finish: 11/09/95 - 11/09/95

Ground Elevation: 9.704 ft

Total Depth Drilled: 52 ft

Rig Type: CME-75

Depth to Bedrock:

Driller: R. Leger

Methods:

Casing Used: None

Drilling Soil: 4.25" hollow-stem augers

Sampling Soil: Standard split-spoon sampler driven using a CME automatic SPT hammer

Drilling Rock: None

Comments: Groundwater depth as noted during drilling. WOR = Weight of Rods.

Elev (ft)	Depth (ft)	Sample		Blows or Recovery RQD	SPT N Value	USC Symbol	Sample Description
		Type	No.				
9.7	0					SP-SM	Posthole to 4'. FILL: Gravelly sand, mostly fine, 10-20% subangular to subrounded gravel to 2 1/2" (some coke), 5-10% nonplastic fines, moist, dark brown, hydrocarbon odor.
	5	S	1	2-3-2-2 (17.0")	5	SP-SM	S-1: Sand, fine to medium, mostly fine, 5-15% slightly plastic fines in pockets, light olive, some black staining, saturated with oil.
		S	2	3-4-8-15 (20.0")	12	SP-SM	S-2: Sand, fine to medium, mostly medium, 5-10% slightly plastic fines (mainly in 1-2" pockets), medium dense, mottled (light olive and black), saturated with oil, strong hydrocarbon odor.
		S	3	5-6-11-12 (18.0")	17	SP-SM	S-3: Similar to S-2, except 1 shell.
	10	S	4	5-7-8-9 (22.0")	15	SP-SM	S-4: Gravelly sand, coarse to fine, mostly medium to fine, 10-20% subrounded to rounded gravel to 1", 5-10% nonplastic fines, medium dense, wet, light olive with black mottling, hydrocarbon odor.
		S	5	4-6-8-8- (17.0")	14	SP	S-5: Sand, poorly graded, coarse to fine, mostly medium to fine, 5-15% subrounded gravel to 1 1/4", <10% nonplastic fines, medium dense, wet, olive gray, slight hydrocarbon odor.
	15	S	6	0-1-2-1 (9.0")	3	SP OL	S-6A (Top 4"): Similar to S-5. S-6B (Bot. 5"): Organic silt, moderately plastic, 5-10% fine to medium sand, soft, moist, brownish gray, hydrocarbon odor.
		S	7	0-1-1-1	2	OL	S-7: Similar to S-6B, except pockets of dark gray, medium to fine sand.
	20	U	1	PUSH (19.0")		OL	U-1: Organic silt, slightly plastic, 5-10% fine to medium sand, moist, dark olive, shells.
		S	8	0-1-1-1 (18.0")	2	OL	S-8: Organic silt, slightly plastic, 5-15% coarse to fine sand, mostly fine sand, very soft to soft, moist, brownish gray, trace organic fibers.

Legend/Notes

- Datum is NGVD 1929.
- ∇ indicates groundwater level.
- █ indicates location of samples.
- Blows = number of blows required to drive 2" O.D. sample spoon 6" or distance shown using 140 pound hammer falling 30".
- () = inches of sample recovery.
- Recovery = % rock core recovery.
- RQD = Rock Quality Designation.
- SPT N = Standard Penetration Test resistance to driving, blows/ft.
- USC = Unified Soil Classification system.
- * indicates use of 300 pound hammer.

Sample Type:

- S = Standard split-spoon
- U = Undisturbed tube

Approved
DRB

Date
04/05/96

Site: Fields Point, Providence, RI

Logged by: R.T. DeConto

Elev (ft)	depth (ft)	Sample		Blows or Recovery RQD	SPT N Value	USC Symbol	Sample Description
		Type	No.				
-15	25	S	9	WOR-1-2-1 (20.0")	3	OL	S-9: Organic silt, moderately plastic, <5% fine sand, soft, moist, dark grayish brown, trace shell fragments, flat piece of shale. Driller noted change in strata between at 28'-29'.
-20	30	S	10	20-17-7-10 (10.0")	24	SP-SM	S-10: Sand, medium to fine, mostly fine, <5% subrounded gravel to 3/8", 5-10% slightly plastic fines, medium dense, wet, light gray, yellow brown staining.
-25	35	S	11	5-6-7-8 (15.0")	13	ML	S-11: Silt, slightly plastic, <10% fine sand, stiff, moist to wet, tan with occasional yellow brown mottling.
-30	40	U	2	PUSH (16.0")		ML	U-2: Similar to S-11.
-30	40	S	12	12-7-5-6 (16.0")	12	ML	S-12: Similar to S-11.
-35	45	S	13	4-4-4-5 (14.0")	8	ML	S-13: Silt, slightly plastic, 10-15% fine sand (mostly in 1-3" lenses), medium stiff to stiff, wet, medium gray, light grayish green in more sandy lenses.
-40	50	S	14	4-4-5-6	9	ML	S-14: Similar to S-13.
BOTTOM OF BORING AT 52 FEET							
-45	55						
-50	60						

Note: See Sheet 1 for Boring Summary and Legend Information

Approved
DRB

Date
04/05/96

Site: Fields Point, Providence, RI

Client: Algonquin LNG, Inc.

Coordinates: N 529.20 W 882.80

Groundwater Depth: 10 ft

Contractor: American Drilling

Logged by: R.T. Deconto

Date Start - Finish: 10/24/95 - 10/24/95

Ground Elevation: 10.354 ft

Total Depth Drilled: 72 ft

Rig Type: CME-75

Depth to Bedrock:

Driller: R. Leger

Casing Used: None

Methods:

Drilling Soil: 4.25" hollow-stem augers

Sampling Soil: Standard split-spoon sampler driven using a CME automatic SPT hammer

Drilling Rock: None

Comments: Groundwater depth as noted during drilling.

Elev (ft)	Depth (ft)	Sample		Blows or Recovery RQD	SPT N Value	USC Symbol	Sample Description
		Type	No.				
10.4	0						Fill: Sandy gravel, well graded, gravel to 2". 20-30% fine to coarse sand, <10% nonplastic fines, dry, black, hydrocarbon odor.
		S	1	10-12-14-8	26	GW	S-1: No recovery.
	5	S	2	4-5-5-9	10	SM	S-2: Silty sand, <5% fine gravel, fine to coarse sand, mostly fine, 25-35% nonplastic to slightly plastic fines, loose to medium dense, damp, brown.
		S	3	8-5-3-4	8	SM	S-3: Similar to S-2, except 5-10% fine gravel, loose, mottled (light and dark brown).
		S	4	2-1-3-5 (18.0")	4	SM	S-4A (Top 6"): Silty sand, 5-10% subangular fine gravel, coarse to fine sand, mostly fine, 10-20% nonplastic to slightly plastic fines, very loose to loose, damp, tan with orange mottling.
	10	S	5	2-3-2-3	5	SP-SM	S-4B (Bot. 12"): Gravelly sand, 10-20% subrounded gravel to 1 1/2", fine to coarse sand mostly fine, 10-15% nonplastic fines, very loose to loose, wet, mottled (gray and light brown).
		S	6	4-4-7-7	11	SP-SM	S-5: Gravelly sand, 15-20% slightly rounded, fine gravel, coarse to fine sand, mostly medium to fine, 5-10% nonplastic fines, loose, wet, gray.
	15	S	7	5-5-2-1 (14.0")	7	SM	S-6: Sand, widely graded, coarse to fine, mostly medium to fine, 5-10% nonplastic fines, medium dense, wet, gray.
		S	8	3-3-4-6 (20.0")	7	SP-SM	S-7: Silty sand, mostly fine, <5% fine gravel to coarse sand, 20-30% nonplastic fines, loose, wet, medium gray; pockets of organic silt, moderately plastic, dark gray, hydrocarbon odor.
		S	9	4-6-7-9 (18.0")	13	SW-SM	S-8A (Top 14"): Sand, <5% rounded, fine gravel, coarse to fine sand, mostly medium to fine, 5-10% nonplastic fines, loose, wet, brown, slight hydrocarbon odor; pockets of organic silt, moderately plastic, dark gray.
	20	S	10	3-3-1-1 (8.0")	4	SW-SM	S-8B (Bot. 6"): Organic Silt, slightly to moderately plastic, <5% fine gravel, 5-10% coarse to fine sand, medium gray.
							S-9: Gravelly sand, widely graded, 10-15% rounded to subangular gravel to 1 1/4", coarse to fine sand, 5-15% nonplastic fines, medium, dense, wet, brownish gray, slight hydrocarbon odor.
							S-10: Similar to S-9, except very loose to loose.

Legend/Notes

- Datum is NGVD 1929.
- ∇ indicates groundwater level.
- ■ indicates location of samples.
- Blows = number of blows required to drive 2" O.D. sample spoon 6" or distance shown using 140 pound hammer falling 30".
- () = inches of sample recovery.
- Recovery = % rock core recovery.
- RQD = Rock Quality Designation.
- SPT N = Standard Penetration Test resistance to driving, blows/ft.
- USC = Unified Soil Classification system.
- * indicates use of 300 pound hammer.

Sample Type:
S = Standard split-spoon

Approved DRB	Date 04/05/96
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Site: Fields Point, Providence, RI

Logged by: R.T. Deconto

Elev (ft)	depth (ft)	Sample		Blows or Recovery RQD	SPT N Value	USC Symbol	Sample Description
		Type	No.				
-15	25	S	11	17-18-17-15	35	SW-SM	S-11: Gravelly sand, widely graded, 15-20% rounded fine gravel, 5-15% nonplastic fines. dense, wet, brownish gray; 2" rounded piece of gravel in spoon tip.
-20	30	S	12	17-21-22-19	43	GW-GM	S-12: Sandy gravel, widely graded, subrounded to max 1 1/4", 15-25% coarse to fine sand, 5-10% nonplastic fines, dense, wet, mottled (dark gray and tan).
-25	35	S	13	19-23-15-12 (13.0")	38	GW-GM ML	S-13A (Top 7"): Sandy gravel, widely graded, rounded to subrounded to 1 1/2" max., 20-30% coarse to fine sand, mostly coarse to medium, 5-10% nonplastic fines, dense, wet, black, organic odor; transitions quickly to silt. S-13B (Bot. 6"): Silt, nonplastic, <5% medium to fine sand, dense, light brown; pockets of sandy gravel, similar to S-13A.
-30	40	S	14	34-24-21-14	45		S-14: No recovery.
		S	15	7-8-8-15	16	SW-GW	S-15: Gravelly sand, well graded, 30-40% rounded gravel to 1 1/4", coarse to fine, <5% nonplastic fines, medium dense, wet, gray brown, hydrocarbon odor.
-35	45	S	16	4-5-11-17 (14.0")	16	SP SW-SM	S-16A (Top 6"): Sand, coarse to fine, mostly medium to fine, <5% nonplastic fines, medium dense, dark gray. S-16B (Bot. 8"): Gravelly sand, widely graded, 20-25% rounded gravel to 1", fine to coarse sand, 10-15% nonplastic fines, medium dense, wet, dark gray.
-40	50	S	17	8-12-11-12 (20.0")	23	SP-SM ML	S-17A (Top 9"): Sand, coarse to fine, mostly medium to fine, 5-15% nonplastic fines, medium dense, dark gray. S-17B (Bot. 11"): Silt, nonplastic, <5% fine to medium sand, medium dense, wet, light brown; 2" sand parting.
-45	55	S	18	8-11-9-20 (18.0")	20	SP ML	S-18A (Top 10"): Sand, poorly graded, coarse to fine, mostly medium to fine, <5% nonplastic fines, medium dense, wet, olive gray. S-18B (Bot. 8"): Silt, nonplastic, dense, light brown, in contact with black silty gravel (graphite shale).
-50	60	S	19	15-18-23-24 (17.0")	41	SW-SW GW-GM	S-19A (Top 11"): Gravelly sand, widely graded, 10-20% fine gravel, 5-15% nonplastic fines, dense, wet, olive gray. S-19B (Bot 6"): Sandy gravel, widely graded, subrounded to rounded to 1 1/2" max., 35-45% coarse to fine sand, 5-10% nonplastic fines, dense, wet, dark olive gray.

Note: See Sheet 1 for Boring Summary and Legend Information

Approved
DRB

Date
04/05/96

Site: **Fields Point, Providence, RI**

Logged by: **R.T. Deconto**

Elev (ft)	depth (ft)	Sample		Blows or Recovery RQD	SPT N Value	USC Symbol	Sample Description
		Type	No.				
-55	65	S	20	3-5-6-14 (16.0')	11	GW-GM SP	S-20A (Top 8"): Similar to S-19B, except 10-15% slightly plastic fines; grades into uniform, fine sand. S-20B (Bot. 8"): Sand, uniform, fine, 5-10% subrounded fine gravel, <5% medium to coarse sand, <5% nonplastic fines, loose, wet, medium gray, hydrocarbon odor. Note: Blow counts may not be reliable due to wash at top of sample.
-60	70	S	21	9-11-15- 12 (18.0')	26	SP ML	S-21A (Top 8"): Sand, poorly graded, coarse to fine, mostly medium to fine, <5% nonplastic fines, medium dense, wet, dark gray; grades into finer sand with gravel at bottom 2". S-21B (Bot. 10"): Silt, nonplastic, 5-10% fine sand, medium dense, wet, gray. BOTTOM OF BORING AT 72 FEET
-65	75						
-70	80						
-75	85						
-80	90						
-85	95						
-90	100						

Note: See Sheet 1 for Boring Summary and Legend Information

Approved
DRS

Date
04/05/96

Site: Fields Point, Providence, RI

Client: Algonquin LNG, Inc.

Coordinates: N 613.45 W 868.46

Groundwater Depth: 7 ft

Contractor: American Drilling

Logged by: R.T. DeConto

Date Start - Finish: 11/03/95 - 11/03/95

Ground Elevation: 9.95 ft

Total Depth Drilled: 72 ft

Rig Type: CME-75

Methods:

Drilling Soil: 4.25" hollow-stem augers

Sampling Soil: Standard split-spoon sampler driven using a CME automatic SPT hammer

Drilling Rock: None

Casing Used: None

Comments: Groundwater depth as noted during drilling. WOR = Weight of Rods.

Elev (ft)	Depth (ft)	Sample		Blows or Recovery RQD	SPT N Value	USC Symbol	Sample Description
		Type	No.				
9.9	0						Augered through asphalt to 2'.
		S	1	3-3-4-4 (24.0")	7	SP-SM	S-1A (Top 12"): Gravelly sand, 10-20% subangular to subrounded fine gravel, fine to coarse sand, mostly medium to fine, 5-10% nonplastic fines. loose, damp, mottled dark brown and reddish brown, damp, strong hydrocarbon odor. S-1B (Bot 8"): Sand, 5-10% fine gravel, mostly fine sand, 5-10% nonplastic fines; loose, moist, dark gray.
	5	S	2	2-3-4-5 (24.0")	7	SP-SM	S-2A (Top 8"): Similar to S-1A. S-2B (Bot. 16"): Similar to S-1B, except hydrocarbon odor.
		S	3	2-4-2-2 (15.0")	6	SM	S-3: Silty sand, 5-10% gravel to 1", mostly fine sand, <5% medium to coarse sand, 10-20% nonplastic to slightly plastic fines, loose, wet, dark gray, hydrocarbon odor.
		S	4	WOR/12-1-1 (5.0")	1	SM	S-4: Similar to S-3, strong hydrocarbon odor; sample very oily.
0	10	S	5	WOR-1-1 (24.0")	2	SM-ML	S-5: Silty sand, 5-10% subrounded fine gravel, coarse to fine sand, mostly fine, 35-45% nonplastic fines, very loose, wet, light olive, hydrocarbon odor.
		S	6	WOR/24 (24.0")	0	SP-SM	S-6: Sand, 5-10% fine gravel, coarse to fine sand, mostly medium to fine, 5-10% nonplastic fines, very loose, wet, brown gray.
		S	7	WOR-1-2-2 (4.0")	3	SM-ML	S-7: Similar to S-5.
	15	S	8	WOR-2-3-2 (24.0")	5	SW-SM ML	S-8A (Top 18"): Gravelly sand, widely graded, 20-30% subrounded gravel to 1 1/4", fine to coarse sand, 5-10% nonplastic fines, loose, wet, olive gray. S-8B (Bot. 6"): Silt, slightly plastic, <5% fine to medium sand, medium stiff, wet, dark olive.
		S	9	WOR-1-2-2 (18.0")	3	SW-SM OL	S-9A (Top 6"): Similar to S-8A, except 10-20% fine gravel, very loose, hydrocarbon odor. S-9B (Bot. 12"): Organic silt, slightly to moderately plastic, <5% fine to medium sand, soft, wet, dark olive, shell fragments.
-10	20	S	10	3-6-8-11 (9.0")	14	SM	S-10: Silty sand, 5-15% subrounded gravel to 1 1/4", coarse to fine sand mostly fine, 20-30% slightly plastic fines, medium dense, wet, olive gray, trace shells.

Legend/Notes

- Datum is NGVD 1929.
- ∇ indicates groundwater level.
- █ indicates location of samples.
- Blows = number of blows required to drive 2" O.D. sample spoon 6" or distance shown using 140 pound hammer falling 30".
- () = inches of sample recovery.
- Recovery = % rock core recovery.
- RQD = Rock Quality Designation.
- SPT N = Standard Penetration Test resistance to driving, blows/ft.
- USC = Unified Soil Classification system.
- * indicates use of 300 pound hammer.

Sample Type:

- S = Standard split-spoon
- U = Undisturbed tube

Approved
DRB

Date
04/05/96

Site: Fields Point, Providence, RI

Logged by: R.T. DeConto

Elev (ft)	depth (ft)	Sample		Blows or Recovery RQD	SPT N Value	USC Symbol	Sample Description
		Type	No.				
		S	11	3-8-3-11 (9.0")	11	SW-SM	S-11: Gravelly sand, widely graded, 15-25% subrounded gravel to 1 1/4", 5-15% nonplastic fines, medium dense, wet, medium gray, strong hydrocarbon odor.
-15	25	S	12	7-8-11-12 (13.0")	19	OL SW-SM	S-12A (Top 4"): Similar to S-9B, except 5-15% medium to fine sand, very stiff. S-12B (Bot. 9"): Gravelly sand, widely graded, 25-35% subrounded gravel 5-10% nonplastic fines, medium dense, wet, mottled (medium gray and light brown.)
		S	13	8-6-8-11 (13.0")	14	GW	S-13: Sandy gravel, widely graded, subangular to subrounded gravel to 1 1/2", 30-40% fine to coarse sand, 5-10% nonplastic fines (mainly in lenses), medium dense, wet, gray.
-20	30	S	14	18-26-28-13 (16.0")	54	SP SW	S-14A (Top 4"): Sand, poorly graded, <5% fine gravel, fine to coarse sand mostly medium, <5% nonplastic fines, brown gray. S-14B (Bot. 12"): Gravelly sand, widely graded, 15-25% subrounded to subangular gravel to 1 1/8", fine to coarse sand, 5-10% nonplastic fines (mainly in lenses), very dense, wet, medium olive, hydrocarbon odor and slight ammonia odor.
-25	35	S	15	13-10-13-17 (22.0")	23	SP-SM ML	S-15A (Top 8"): Gravelly sand, 10-20% subangular to subrounded gravel to 1 1/4", fine to coarse sand, mostly fine to medium, 5-15% slightly plastic fines, medium dense, wet, olive gray; pockets of slightly plastic silt. S-15B (Bot. 14"): Silt, nonplastic to slightly plastic, 5-10% fine sand, medium dense, wet, light brown.
-30	40	S	16	7-6-8-15 (19.0")	14	SP ML	S-16A (Top 5"): Sand, poorly graded, <10% gravel to 1", coarse to fine sand, mostly medium to fine, medium dense, wet, brown gray. S-16B (Bot. 14"): Similar to S-15B, except fine sand in interbeds, mottled (tan and light brown), slight odor.
-35	45	S	17	8-11-10-15	21	SP-SM ML	S-17A (Top 5"): Sand, <5% subrounded fine gravel, coarse to fine sand, mostly medium to fine, 5-15% nonplastic fines, medium dense, wet, gray brown; pockets of nonplastic to slightly plastic silt. S-17B (Bot. 13"): Silt, slightly plastic, 5-10% fine sand interbedded with silt, very stiff, wet, light gray olive and dark gray olive bands.
-40	50	S	18	10-9-6-11 (16.0")	15	SP-SM ML	S-18A (Top 2"): Similar to S-17A. S-18B (Bot. 14"): Similar to S-17B, except 5-15% fine sand, interbedded with silt.
-45	55	S	19	6-8-12-13 (17.0")	20	ML SP ML	S-19A (Top 7"): Similar to S-17B, except slightly plastic to nonplastic, 5-15% fine sand interbedded with silt. S-19B (Mid. 3"): Sand, poorly graded, fine to coarse, mostly medium, <5% nonplastic fines, medium dense, wet, light brown gray. S-19C (Bot. 7"): Similar to S-19A.
-50	60	S	20	19-18-25-30 (24.0")	43	ML-SM	S-20: Interlayered Sandy silt and Silty sand: Sandy silt, nonplastic, 25-45% fine sand, dense, wet, olive gray; and Silty sand, uniform, fine, 25-40% nonplastic fines, light olive gray.

Note: See Sheet 1 for Boring Summary and Legend Information

Approved
DRB

Date
04/05/96

Site: Fields Point, Providence, RI

Logged by: R.T. DeConto

Elev (ft)	depth (ft) †	Sample		Blows or Recovery RQD	SPT N Value	USC Symbol	Sample Description
		Type	No.				
-55	65	S	21	40-28-32-30	60	ML	S-21: Sandy silt, slightly plastic, 10-15% subangular gravel to 1", 30-40% fine sand, <5% medium to coarse sand, hard, wet, mottled (dark and light olive gray).
-60	70	S	22	19-21-24-27	45	SM	S-22: Silty sand, uniform, fine, 30-40% slightly plastic fines (mostly in layers), dense, wet, gray.
BOTTOM OF BORING AT 72 FEET							
-65	75						
-70	80						
-75	85						
-80	90						
-85	95						
-90	100						

Note: See Sheet 1 for Boring Summary and Legend Information

Approved
DRB

Date
04/05/96

Site: Fields Point, Providence, RI Client: Algonquin LNG, Inc. Coordinates: N 522.83 W 637.45 Groundwater Depth: Contractor: American Drilling	Logged by: R.T. DeConto Date Start - Finish: 10/23/95 - 10/23/95 Ground Elevation: 10.97 ft Total Depth Drilled: 52 ft Rig Type: CME-75 Driller: R. Leger Casing Used: None
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Methods:
 Drilling Soil: 4.25" hollow-stem augers
 Sampling Soil: Standard split-spoon sampler driven using a CME automatic SPT hammer
 Drilling Rock: None

Comments: Groundwater depth as noted during drilling. WOR = Weight of Rods.

Elev (ft)	Depth (ft)	Sample		Blows or Recovery RQD	SPT N Value	USC Symbol	Sample Description
		Type	No.				
11.0	0						Augered through FILL (subangular to subrounded gravel to 2") to 2'.
	10	S	1	4-3-2-3 (14.0")	5		S-1: Fill (gravel).
	5	S	2	2-3-6-3 (14.0")	9	SM	S-2: Silty sand. 10-15% fine gravel, coarse to fine sand, mostly fine. 25-35% slightly plastic fines, loose, damp, dark brown.
	5	S	3	5-4-3-5 (12.0")	7	SM	S-3: Similar to S-2, except 5-10% fine subangular to subrounded gravel, moist, light brown.
		S	4	2-2-2-4 (3.0")	4		S-4: No sample description recorded.
	10	S	5	WOR-1-2-5 (8.0")	3	SP-SM	S-5: Gravelly sand, 25-35% subrounded to subangular gravel to 1", coarse to fine sand, mostly medium to fine. 5-15% slightly plastic fines, very loose, saturated soupy, light brown.
	0	S	6	3-4-3-5	7		S-6: No description recorded.
	15	S	7	3-3-4-5 (24.0")	7	SP-SM	S-7A (Top 14"): Gravelly sand, 10-20% coarse to fine gravel, coarse to fine sand, mostly medium to fine. 5-10% nonplastic fines, loose, wet, brown.
	-5	S	8	2-1-2-4 (18.0")	3	ML	S-7B (Bot 10"): Sandy silt, nonplastic. <5% fine gravel, <5% medium to coarse sand, 20-35% fine sand, loose, wet, gray, trace shells. S-8: Similar to S-7B, except very loose.
	20	S	9	1-2-6-13 (14.0")	8	SW-SM	S-9: Gravelly sand, widely graded, 20-25% rounded gravel to 1 1/2", coarse to fine sand, 5-10% nonplastic fines, loose, wet, dark gray, hydrocarbon odor.
-10							

Legend/Notes

- Datum is NGVD 1929.
- indicates groundwater level.
- indicates location of samples.
- Blows = number of blows required to drive 2" O.D. sample spoon 6" or distance shown using 140 pound hammer falling 30".
- () = inches of sample recovery.
- Recovery = % rock core recovery.
- RQD = Rock Quality Designation.
- SPT N = Standard Penetration Test resistance to driving, blows/ft.
- USC = Unified Soil Classification system.
- * indicates use of 300 pound hammer.

Sample Type:
 S = Standard split-spoon
 U = Undisturbed tube

Approved DRB	Date 04/05/96
------------------------	------------------

Site: Fields Point, Providence, RI

Logged by: R.T. DeConto

Elev (ft)	depth (ft)	Sample		Blows or Recovery RQD	SPT N Value	USC Symbol	Sample Description
		Type	No.				
-15	25	S	10	5-6-8-12	14	SW-SM	S-10: Gravelly sand, widely graded, 15-25% subrounded fine gravel, 10-15% nonplastic fines, medium dense, wet, dark gray, hydrocarbon odor.
-20	30	S	11	7-8-10-14 (24.0")	18	SP	S-11: Sand, poorly graded, fine to coarse, mostly medium to fine, <10% nonplastic fines, medium dense, wet, dark gray, slight hydrocarbon odor.
-25	35	S	12	11-12-19-19 (24.0")	31	SP GW-GM	S-12A (Top 18"): Sand, poorly graded, <5% coarse sand, mostly fine to medium sand, <5% nonplastic fines, medium dense, wet, medium gray. S-12B (Bot. 6"): Sandy gravel, widely graded to 1 1/4" max., subrounded, 25-35% fine to coarse sand, 20-30% slightly plastic fines (mostly in lenses), dense, wet, gray.
-30	40	S	13	7-10-11-15 (24.0")	21	SP ML	S-13A (Top 8"): Sand, poorly graded, mostly medium to fine, <5% nonplastic fines, medium dense, wet, gray. S-13B (Bot. 16"): Silt, nonplastic to slightly plastic, medium dense, wet, light grayish brown.
-35	45	S	14	8-10-11-13 (18.0")	21	SP ML	S-14A (Top 6"): Similar to S-13A. S-14B (Bot. 12"): Similar to S-13B, except <5% medium to fine sand.
-40	50	S	15	5-10-15-28 (18.0")	25	SP SP-SM	S-15A (Top 4"): Similar to S-12A. S-15B (Mid. 4"): Similar to S-14B. S-15C (Bot. 10"): Gravelly sand, 15-25% subrounded fine gravel, coarse to fine sand, mostly fine, 15-20% nonplastic fines, medium dense, wet, tan with ironoxide staining.
BOTTOM OF BORING AT 52 FEET							
-45	55						
-50	60						

Note: See Sheet 1 for Boring Summary and Legend Information

Approved
DRB

Date
04/05/96

Destroyed As of
SEPT 2002

LNSG

RESOURCE CONTROLS					TEST BORING LOG						
PROJECT: Providence Gas Company PROJECT NO.: A2000 LOCATION: 642 Allens Avenue, Providence, R.I. DRILLING CO.: American Drilling, Inc. DRILLED BY: Jim Campbell INSPECTED BY: Daniel Lanier					BORING NO. RCA-4 PAGE 1 OF 1 DATE STARTED: 9/7/94 DATE FINISHED: 9/7/94 SURFACE ELEVATION:						
GROUNDWATER OBSERVATIONS <table border="1"> <tr> <th>DEPTH</th> <th>STABILIZATION TIME</th> </tr> <tr> <td></td> <td>N/A</td> </tr> </table>					DEPTH	STABILIZATION TIME		N/A	CASING SAMPLER TYPE: Split Spoon SIZE I.D.: 1-3/8" HAMMER WT.: 140 lbs. HAMMER FALL: 30 in.		
DEPTH	STABILIZATION TIME										
	N/A										
DEPTH (FT.)	SAMPLING DEPTH (FT.) FROM - TO	SAMPLE DATA			WELL DATA	STRATA CHANGE (FT.)	LITHOLOGY (DESCRIPTION OF MATERIALS) coarse GRAVEL, brick and debris	FIELD TEST DATA PID - 10.2 eV (ppm)			
	2	SS-1	NA	GRAB			dry, black, fine SAND, some medium sand (fill)	45.3			
5'	4-6	SS-1	55%	4-7-7-10		5.5	oily, black medium SAND and CLINKER damp, brown, fine SAND, little medium sand	225			
	6-8	SS-2	100%	13-17-17-18		7	oily, black, medium SAND and CLINKER	690			
10'	8-10	SS-3	10%	2-2-2-3			saturated, black, oily, med. SAND, some coarse	1,690			
	10-12	SS-4	20%				saturated, black, fine SAND, some silt	801			
	12-14	SS-5	70%	10-4-3-4			saturated, oily, black, med. SAND, little fine	1,292			
15'	14-16	SS-6	40%	1-2-2-3			saturated, black, med. SAND, trace silt	851			
	16-18	SS-7	45%	4-2-2-1			SAME, trace coarse sand				
20'	18-20	SS-8	100%	1-1-1-1		18.5	8A: SAME 8B: dark gray, CLAYEY, SILT interbedded with CLAYEY, SILT	591 129 492			
	20-22	SS-9	100%	weight of hammer							
	22-24	SS-10	100%	1-2-2-1							
25'	24-26	SS-11	100%	0-1-2-1			dark, gray, CLAYEY, SILT SAME, trace medium to finesand oil smear in spoon	205 117			
30'							Bottom of exploration at 26' 26' to 16' Grout				
GENERAL REMARKS: 10' 0.020" slot EFG screen 8-1/2" borehole 2'-10" standpipe #2 silica sand pack threaded bottom plug with 8" sump											

EOIPROV0003859

LNG

RESOURCE CONTROLS					TEST BORING LOG			
PROJECT: Providence Gas Company PROJECT NO.: A2000 LOCATION: 642 Allens Avenue, Providence, R.I. DRILLING CO.: American Drilling, Inc. DRILLED BY: Jim Campbell INSPECTED BY: Daniel Lanier					BORING NO. RCA-5 PAGE 1 OF 1 DATE STARTED: 9/7/94 DATE FINISHED: 9/7/94 SURFACE ELEVATION:			
GROUNDWATER OBSERVATIONS					CASING SAMPLER			
DEPTH		STABILIZATION TIME			TYPE: Split Spoon SIZE I.D.: 1-3/8" HAMMER WT.: 140 lbs. HAMMER FALL: 30 in.			
DEPTH (FT.)	SAMPLING DEPTH (FT.) FROM - TO	SAMPLE DATA			WELL DATA	STRATA CHANGE (FT.)	LITHOLOGY (DESCRIPTION OF MATERIALS) GRAVEL and DEBRIS	FIELD TEST DATA PID - 10.2 eV (ppm)
		ID	PERCENT RECOV.	BLOWS PER 6 INCHES				
5'	2	S-1	NA	GRAB		5	dry, black, medium to fine SAND, trace brick (fill)	16
	4-6	SS-1	40%	3-4-5-3			dry, black medium to fine SAND and ash fill	18
	6-8	SS-2	25%	4-3-3-3			moist, brown, medium to fine SAND trace coarse sand	19
10'	8-10	SS-3	20%	3-5-4-3		15	saturated, olive, medium to fine SAND, SAME silt	70
	10-12	SS-4	35%	1-2-1-16			saturated, medium to fine SAND and SILT trace coarse sand, oily	129
	12-14	SS-5	<5%	3-7-6-3			SAME, with trace gravel	77
15'	14-16	SS-6	100%	5-5-4-4		17.5	black, oily, fill with CLINKER	440
	16-18	SS-7	100%	4-2-3-3			dark olive, CLAYEY SILT	125
20'	18-20	SS-8	100%	1-1-2-1	SAME	121		
	Bottom of exploration at 20'							
25'								
30'								
GENERAL REMARKS:		10' 0.020"-slot EFG screen 8-1/2" borehole 2'-10" standpipe #2 silica sand pack threaded bottom plug with 8" sump						

EOIPROV0003860

N6

RESOURCE CONTROLS					TEST BORING LOG			
PROJECT: Providence Gas Company PROJECT NO.: A2000 LOCATION: 642 Aliens Avenue, Providence, R.I. DRILLING CO.: American Drilling, Inc. DRILLED BY: Jim Campbell INSPECTED BY: Daniel Lanier					BORING NO. RCA-14 PAGE 1 OF 1 DATE STARTED: 9/12/94 DATE FINISHED: 9/12/94 SURFACE ELEVATION:			
GROUNDWATER OBSERVATIONS								
DEPTH		STABILIZATION TIME						
		N/A						
					CASING		SAMPLER	
					TYPE:		Split Spoon	
					SIZE I.D.:		1-3/8"	
					HAMMER WT.:		140 lbs.	
					HAMMER FALL:		30 in.	
DEPTH (FT.)	SAMPLING DEPTH (FT.) FROM - TO	SAMPLE DATA			WELL DATA	STRATA CHANGE (FT.)	LITHOLOGY (DESCRIPTION OF MATERIALS) GRASS	FIELD TEST DATA PID - 10.2 eV (ppm)
		ID	PERCENT RECOV.	BLOWS PER 6 INCHES				
5'	0-1	S-1	GRAB	NA		dry, dark brown, medium to fine SAND (fill)		
	2-4	SS-1	80%	3-3-5-6			damp, brown, fine SAND, trace silt	9.6
	4-6	SS-2	75%	4-3-5-6			moist, olive, fine SAND, trace silt petroleum	13.1
10'	6-8	SS-3	85%	4-3-5-6		SAME, little silt	194	
	8-10	SS-4	90%	2-3-5-5		SAME, saturated (thin-wall brass liner)	199	
	10-12	SS-5	90%	2-5-6-6		SAME	28.4	
15'	12-14	SS-6	90%	2-3-6-7		SAME	28.7	
	14-16	SS-7	65%	3-3-4-4		SAME	71.1	
	16-18	SS-8	90%	6-6-5-5		SAME	24.2	
20'	18-20	SS-9	100%	3-6-11-10		A: black, medium SAND and fine SAND	234	
	20-22	SS-10	70%	4-4-6-9		B: olive, medium SAND and fine SAND	306	
	22-24	SS-11	90%	6-11-12-17	SAME	270		
25'					SAME	147		
30'					Bottom of exploration at 24'			
					24' to 15' Grout			
GENERAL REMARKS:		10' 0.020"-slot EFG screen 8-1/2" borehole HSA / boring #2 silica sand pack 2'-10" standpipe						

EOIPROV0003869

LNG

RESOURCE CONTROLS						TEST BORING LOG						
PROJECT: Providence Gas Company PROJECT NO.: A2000 048 LOCATION: 642 Allens Avenue, Providence, R.I. DRILLING CO.: American Drilling, Inc. DRILLED BY: Rick Leger INSPECTED BY: Daniel Lanier						BORING NO. RCA-20 PAGE 1 OF 1 DATE STARTED: 10/18/95 DATE FINISHED: 10/18/95 SURFACE ELEVATION:						
GROUNDWATER OBSERVATIONS <table border="1"> <tr> <th>DEPTH</th> <th>STABILIZATION TIME</th> </tr> <tr> <td></td> <td>N/A</td> </tr> </table>						DEPTH	STABILIZATION TIME		N/A	CASING SAMPLER TYPE: Split Spoon SIZE I.D.: 1-3/8" x 24" HAMMER WT.: 140 lbs. HAMMER FALL: 30 in.		
DEPTH	STABILIZATION TIME											
	N/A											
DEPTH (FT.)	SAMPLING DEPTH (FT.) FROM - TO	SAMPLE DATA			WELL DATA	STRATA CHANGE (FT.)	LITHOLOGY (DESCRIPTION OF MATERIALS)	FIELD TEST DATA PID - 10.2 eV (ppm)				
		ID	PERCENT RECOV.	BLOWS PER 6 INCHES								
5'	2'	S-1		Grab			gravel, bricks, wood, debris					
	2'-4'	SS-1		3-4			black, dry, coarse to med. SAND (fill)	12.9				
			50%	4-4			black, dry, coarse fill with coke, brick, fly ash	3.9				
	4'-6'	SS-2		3-4								
10'			50%	5-7		5.5'	moist, olive, med. to fine SAND, trace coarse	19.7				
	6'-8'	SS-3		1-1			saturated, black, oily fill, with med. SAND	179				
			45%	1-1			coal, cinders, petroleum odor	246				
	8'-10'	SS-4		2-3			sat., black, coarse granular FILL, petro odor	285				
15'				4-4		13.5'	est. black, coarse SAND, cinders, coke and ash, oily	249				
	10'-12'	SS-5		3-5			SAME	116				
				8-12			black, oily medium SAND, little coarse sand	178				
	12'-14'	SS-6		2-4			SAME					
20'				4-5	16.5'	black medium sand and olive SILT (interbedded)						
	14'-16'	SS-7		2-2		A: black, oily, sand FILL with coke, ash, etc.	91.5					
				1-1		B: olive SILT						
	16'-18'	SS-8		1-2		dark olive SILT with shells, trace fine sand						
25'						Bottom of exploration at 20'						
						Grout at 20' to 14'						
						13.5' to 3.5' 0.020"-slot EFG screen (2")						
						Filter pack 13' to 2.5'						
30'						3.5' to +2.5' solid EFG riser						
						Bentonite seal 2.5' to 2.0'						
						Standpipe						
GENERAL REMARKS:												

EOIPROV0003875

NOT MENTIONED
IN
VHB SIR

RESOURCE CONTROLS					TEST BORING LOG			
PROJECT: Providence Gas Company PROJECT NO.: A2000 048 LOCATION: 642 Allens Avenue, Providence, R.I. DRILLING CO.: American Drilling, Inc. DRILLED BY: Rick Leger INSPECTED BY: Daniel Lanier					BORING NO. RCA-21 PAGE 1 OF 1 DATE STARTED: 10/30/95 DATE FINISHED: 10/30/95 SURFACE ELEVATION:			
GROUNDWATER OBSERVATIONS								
DEPTH		STABILIZATION TIME						
		N/A						
					CASING SAMPLER			
					TYPE: Split Spoon SIZE I.D.: 1-3/8" x 24" HAMMER WT.: 140 lbs. HAMMER FALL: 30 in.			
DEPTH (FT.)	SAMPLING DEPTH (FT.) FROM - TO	SAMPLE DATA			WELL DATA	STRATA CHANGE (FT.)	LITHOLOGY (DESCRIPTION OF MATERIALS)	FIELD TEST DATA PID - 10.2 eV (ppm)
		ID	PERCENT RECOV.	BLOWS PER 6 INCHES				
	2'	S-1		Grab			Gravel & Debris	58.6
5'	4'-6'	SS-1	0%	3-2			No recovery (redrove 3" spoon)	142
	6'-8'	SS-2		5-4			moist, olive, coarse to med. SAND, little gravel	218
10'	8'-10'	SS-3	45%	5-5			wet, black, fine SAND, trace silt; petroleum odor	182
	10'-12'	SS-4		4-4			saturated, olive fine SAND, trace medium sand, coarse sand; petroleum odor	303
	12'-14'	SS-5	40%	5-8			coarse to medium SAND, little gravel	203
15'	14'-16'	SS-6	25%	3-7			yellow petroleum product	103
	16'-18'	SS-7	50%	8-8			olive, silty, coarse to medium SAND, little gravel	
	18'-20'	SS-8	45%	3-4		17.5'	petroleum	110
20'			100%	2-2		18.5'	olive, coarse to medium SAND, little silt, gravel	91.7
							A: black fine SAND, trace silt, oily	
							B: olive SILT, trace fine sand, organic matter	
25'							Bottom of exploration at 20'	
							20' to 15' bentonite plug	
							14' to 4' 0.020"-slot 2" EFG screen	
							15' to 3' filter pack	
							3' to 2' bentonite seal	
							4' to +2.5' solid EFG riser	
30'						Standpipe		
GENERAL REMARKS:								

EOIPROV0003877

RESOURCE CONTROLS					TEST BORING LOG																
PROJECT: Providence Gas Company PROJECT NO.: A2000 048 LOCATION: 642 Allens Avenue, Providence, R.I. DRILLING CO.: American Drilling, Inc. DRILLED BY: Rick Leger INSPECTED BY: Daniel Lanier					BORING NO. RCA-21R1 PAGE 1 OF 1 DATE STARTED: 10/18/95 DATE FINISHED: 10/18/95 SURFACE ELEVATION:																
GROUNDWATER OBSERVATIONS																					
<table border="1" style="width:100%; border-collapse: collapse;"> <tr> <th style="width: 20%;">DEPTH</th> <th>STABILIZATION TIME</th> </tr> <tr> <td></td> <td style="text-align: center;">N/A</td> </tr> </table>					DEPTH	STABILIZATION TIME		N/A	<table border="1" style="width:100%; border-collapse: collapse;"> <tr> <th style="width: 50%;">CASING</th> <th>SAMPLER</th> </tr> <tr> <td>TYPE:</td> <td>Split Spoon</td> </tr> <tr> <td>SIZE I.D.:</td> <td>1-3/8" x 24"</td> </tr> <tr> <td>HAMMER WT.:</td> <td>140 lbs.</td> </tr> <tr> <td>HAMMER FALL:</td> <td>30 in.</td> </tr> </table>			CASING	SAMPLER	TYPE:	Split Spoon	SIZE I.D.:	1-3/8" x 24"	HAMMER WT.:	140 lbs.	HAMMER FALL:	30 in.
DEPTH	STABILIZATION TIME																				
	N/A																				
CASING	SAMPLER																				
TYPE:	Split Spoon																				
SIZE I.D.:	1-3/8" x 24"																				
HAMMER WT.:	140 lbs.																				
HAMMER FALL:	30 in.																				
DEPTH (FT.)	SAMPLING DEPTH (FT.) FROM - TO	SAMPLE DATA			WELL DATA	STRATA CHANGE (FT.)	LITHOLOGY (DESCRIPTION OF MATERIALS)	FIELD TEST DATA PID - 10.2 eV (ppm)													
		ID	PERCENT RECOV.	BLOWS PER 6 INCHES																	
5'	2'	S-1		Grab	10.5	Gravel dry, tan, med. SAND, little coarse sand (fill) dry, coarse FILL with brick, ash, gravel SAME, moist (brick plug) poor recovery, wet (brick plug) SAME, saturated, brick plug saturated, black, medium SAND steel plates (2) in basket of spoon refusal at 10.5' NO WELL INSTALLED RCA-21 relocated 10/30/95, to north															
	2'-4'	SS-1		4-5																	
			60%	7-7																	
	4'-6'	SS-2		8-7																	
10'			25%	5-4																	
	6'-8'	SS-3		3-3																	
			0%	2-3																	
	8'-10'	SS-4		6-3																	
	10'-12'	SS-5	<10%	9-50/0																	
15'																					
20'																					
25'																					
30'																					
GENERAL REMARKS:																					

EOIPROV0003876

Well
DESTROYED
AS OF
11/2001

RESOURCE CONTROLS						TEST BORING LOG																				
PROJECT: Providence Gas Company PROJECT NO.: A2000 LOCATION: 642 Allens Avenue, Providence, R.I. DRILLING CO.: American Drilling Inc. DRILLED BY: Rick Leger INSPECTED BY: Daniel Lanier						BORING NO. RCA-23 / SWBL-1 PAGE 1 OF 2 DATE STARTED: 10/9/95 DATE FINISHED: 10/10/95 SURFACE ELEVATION:																				
GROUNDWATER OBSERVATIONS <table border="1"> <thead> <tr> <th>DEPTH</th> <th>STABILIZATION TIME</th> </tr> </thead> <tbody> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> </tbody> </table>						DEPTH	STABILIZATION TIME							<table border="1"> <thead> <tr> <th>CASING</th> <th>SAMPLER</th> </tr> </thead> <tbody> <tr> <td>TYPE:</td> <td>Split Spoon</td> </tr> <tr> <td>SIZE I.D.:</td> <td>1-3/8" x 24"</td> </tr> <tr> <td>HAMMER WT.:</td> <td>300 lbs. 140 lbs.</td> </tr> <tr> <td>HAMMER FALL:</td> <td>30 in. 30"</td> </tr> </tbody> </table>			CASING	SAMPLER	TYPE:	Split Spoon	SIZE I.D.:	1-3/8" x 24"	HAMMER WT.:	300 lbs. 140 lbs.	HAMMER FALL:	30 in. 30"
DEPTH	STABILIZATION TIME																									
CASING	SAMPLER																									
TYPE:	Split Spoon																									
SIZE I.D.:	1-3/8" x 24"																									
HAMMER WT.:	300 lbs. 140 lbs.																									
HAMMER FALL:	30 in. 30"																									
DEPTH (FT.)	SAMPLING DEPTH (FT.) FROM - TO	ID	PERCENT RECOV.	BLOWS PER 6 INCHES	CASING BLOWS PER FOOT	WELL DATA	STRATA CHANGE (FT.)	LITHOLOGY (DESCRIPTION OF MATERIALS)	FIELD TEST DATA PID - 10.2 eV (ppm)																	
5'	1'-2'	S-1	NA	GRAB				SAND/SAND-blasting material																		
	4'-6'	SS-1	95%	2-3				black, oily fine SAND, trace coarse sand	76.8																	
10'	6'-8'	SS-2	95%	2-2 3-4			7	saturated, black, fine SAND, some medium sand, lenses of olive silt, medium sand	66.9																	
	8'-10'	SS-3	95%	8-15 5-6				black, medium SAND and SILT, little coarse sand, petroleum odor	76.9																	
	10'-12'	SS-4	100%	11-12 5-6			11	dark gray, medium SAND and fine SAND, little coarse sand, petroleum odor	58.2																	
15'	12'-14'	SS-5	100%	4-6 8-8				SAME, trace coarse sand	64.7																	
	14'-16'	SS-6	30%	0-1 2-1			15.5	olive-gray, medium to fine SAND, little silt	65.8																	
20'	16'-18'	SS-7	100%	0-1 1-1				dark olive SILT, trace clay, shells, sand	33.2																	
	19'-21'	ST-1	-	Shelby Tube				SAME	-																	
25'	21'-23'	SS-8	50%	0-1 1-1				SAME, trace plant fibers	4.6																	
	25'-27'	SS-9	100%	0-1 2-1				SAME	2.5																	
30'	30'-32'	SS-10	25%	20-17 7-10			28.5	Drive - and - wash initiated silty medium SAND (from wash)																		
								olive, medium to fine SAND, little silt, trace coarse sand	7.8																	
35'	33'-35'	SS-11	80%	5-6 5-8			33	olive SILT, trace clay	7.6																	
								SAME	-																	
40'	38'-40'	ST-2	-	Shelby Tube				SAME	-																	
GENERAL REMARKS: type of boring : HAS/D&W																										

EOIPROV0003879

RESOURCE CONTROLS						TEST BORING LOG			
PROJECT: Providence Gas Company PROJECT NO.: A2000 LOCATION: 642 Allens Avenue, Providence, R.I. DRILLING CO.: American Drilling Inc. DRILLED BY: Rick Leger INSPECTED BY: Daniel Lanier						BORING NO. RCA-23 / SWBL-1 PAGE 2 OF 2 DATE STARTED: 10/9/95 DATE FINISHED: 10/10/95 SURFACE ELEVATION:			
GROUNDWATER OBSERVATIONS									
DEPTH		STABILIZATION TIME							
						CASING		SAMPLER	
						TYPE:		Split Spoon	
						SIZE I.D.:		3-3/4" 1-3/8" x 24"	
						HAMMER WT.:		300 lbs 140 lbs	
						HAMMER FALL:		30 in. 30 in.	
DEPTH (FT.)	SAMPLING DEPTH (FT.) FROM - TO	SAMPLE DATA			CASING BLOWS PER FOOT	WELL DATA	STRATA CHANGE (FT.)	LITHOLOGY (DESCRIPTION OF MATERIALS) GRASS	DATA PID - 10.2 eV (ppm)
		ID	PERCENT RECOV.	BLOWS PER 6 INCHES					
	40'-42'	SS-12	60%	13-7 5-6			olive SILT	7.9	
45'	45'-47'	SS-13	55%	4-4 4-5			gray SILT, trace fine sand	14.4	
50'									
	50'-52'	SS-14	70%	4-4 5-6				14.7	
55'							Bottom of exploration at 52' Grouted to surface Well installed adjacent (RCA-23)		
GENERAL REMARKS:									
type of boring: HSA/D&W									

EOIPROV0003880

LN 6



RESOURCE CONTROL ASSOCIATES, INC.

DRILLING LOG

PROJECT: Providence Gas
 PROJECT NO.: A2000
 LOCATION: 642 Allens Avenue Providence, RI
 DRILLING CO.: American Drilling
 DRILLED BY: Chris Stamos
 INSPECTED BY: Brian Koch

BORING NO. RCA-39
 PAGE 1 OF 1
 DATE STARTED: 5/3/96
 DATE FINISHED: 5/3/96
 SURFACE ELEVATION: Unknown

GROUNDWATER OBSERVATIONS

DEPTH	STABILIZATION TIME
6'	

TYPE: CASING HSA
 SIZE I.D.: 3-3/4"
 HAMMER WT.: 140 lbs.
 HAMMER FALL: 30 in.

DEPTH (FT.)	SAMPLING DEPTH (FT.) FROM - TO	SAMPLE DATA			WELL DATA	STRATA CHANGE (FT.)	LITHOLOGY (DESCRIPTION OF MATERIALS)	FIELD TEST DATA PID - 10.2 eV (ppm)
		ID	PERCENT RECOV.	BLOWS PER 6 INCHES				
5'	4'-6'	SS-1	35%	8-4-5-6		Dry, brown, fine-med. SAND, little gravel, trace silt	6.9	
10'	6'-8'	SS-2	50%	3-2-2-2		Wet, brown-olive, fine SAND, little silt, trace gravel	8.3	
	8'-10'	SS-3	35%	2-2-1-1	8'-9'	Same as SS-2	70.7	
	10'-12'	SS-4	30%	5-2-2-1	9'-10'	Green fine-medium SAND, little silt, trace clay and gravel Wet olive fine-coarse SAND, little silt, trace gravel (Petroleum odor) Wet olive gray fine SAND, some silt, trace gravel - strong petroleum odor - petrol shown	73.8	
15'	12'-14'	SS-5	80%	WOR-WOR-1-1		Wet olive fine SAND, some silt, trace gravel and clay (no odor)	120.0	
	14'-16'	SS-6	100%	1-1-1-3		Wet olive fine SAND, some silt, trace gravel and clay (no odor)	13.0	
	16'-18'	SS-7	100%	1-1-2-2		Same as SS-6	20	
20'	18'-20'	SS-8	100%	3-3-3-4	18'-19'	Same as SS-6	8	
					19'-20'	Wet charcoal gray orange SILT, some gravel, trace clay Bottom of exploration at 20'		
25'						Well Construction: 2" diameter SCH 80 High Density Polyethylene (HDP) 0.020" Slot Screen		
30'						Screen - 13'-3" # 1 Sand Pack - 13'-2" Bentonite - 2'-1" # 1 Sand Pack - 1'-0.5" Concrete to grade		
35'								
40'								

GENERAL REMARKS:

EOIPROV0003901

LN6



DRILLING LOG

PROJECT: Providence Gas
 PROJECT NO.: A2000
 LOCATION: 642 Allens Avenue
 Providence, RI
 DRILLING CO.: American Drilling
 DRILLED BY: Chris Stamos
 INSPECTED BY: Daniel Lanier

BORING NO. RCA-40
 PAGE 1 OF 1
 DATE STARTED: 5/3/96
 DATE FINISHED: 5/3/96
 SURFACE ELEVATION: Unknown

GROUNDWATER OBSERVATIONS

DEPTH	STABILIZATION TIME
6'	

TYPE: HSA
 SIZE LD.: 3-3/4"
 HAMMER WT.: 140 lbs.
 HAMMER FALL: 30 in.

DEPTH (FT.)	SAMPLING DEPTH (FT.) FROM - TO	SAMPLE DATA			WELL DATA	STRATA CHANGE (FT.)	LITHOLOGY (DESCRIPTION OF MATERIALS)	FIELD TEST DATA PID - 10.2 eV (ppm)
		ID	PERCENT RECOV.	BLOWS PER 6 INCHES				
						0.0'-0.8'	coarse SAND/GRAVEL	
						0.8'-3.0'	Dry, brown, SANDY fill	
5'	4'-6'	SS-1	60%	2-3-3-2	[Well Diagram]		Moist, black, SAND fill with slag and trace brick	58.1
	6'-8'	SS-2	20%	2-2-3-2			Saturated, black, SLAG, little sand	133.0
10'	8'-10'	SS-3	20%	3-5-6-7			Same as SS-2 with dark yellow petroleum	174.0
	10'-12'	SS-4	15%	2-1-1-1			Black slag and sand, trace brick, petroleum odor	179.0
	12'-14'	SS-5	-	1-3-3-3			No recovery	
15'	14'-16'	SS-6	0.6	2-2-2-3		15'	Black, coarse, sand and slag	190.0
	16'-18'	SS-7	0.85	4-7-9-9			Black, coarse-medium, SILTY SAND, trace shells, lenses of	98.4
	18'-20'	SS-8	0.8	5-8-9-13			Same as SS-6 with asphaltic odor	102
20'						Bottom of exploration at 20'		
25'								
30'						Well Construction: 2" diameter SCH 80 High Density Polyethylene (HDP) 0.020" Slot Screen		
						Screen - 14'-4'		
						# 1 Sand Pack - 14'-3'		
						Bentonite - 3'-2"		
						# 1 Sand Pack - 1'-0.5'		
						HDPE riser - 4'-2'		
35'						Bentonite plug - 18'-14'		
						Concrete to grade		
40'								

GENERAL REMARKS:

EOIPROV0003902



RESOURCE CONTROL ASSOCIATES, INC.

DRILLING LOG

PROJECT: Providence Gas
 PROJECT NO.: A2000
 LOCATION: 642 Allens Avenue
 Providence, RI
 DRILLING CO.: American Drilling
 DRILLED BY: Rick Leger
 INSPECTED BY: Dan Lanier

BORING NO. RCA-B-11
 PAGE 1 OF 1
 DATE STARTED: 3/1/96
 DATE FINISHED: 3/1/96
 SURFACE ELEVATION: Unknown

GROUNDWATER OBSERVATIONS

DEPTH	STABILIZATION TIME

TYPE: HISA
 SIZE I.D.: 3-3/4"
 HAMMER WT.: 140 lbs.
 HAMMER FALL: 30 in.

DEPTH (FT.)	SAMPLING DEPTH (FT.) FROM - TO	SAMPLE DATA			WELL DATA	STRATA CHANGE (FT.)	LITHOLOGY (DESCRIPTION OF MATERIALS)	FIELD TEST DATA PID - 10.2 eV (ppm)
		ID	PERCENT RECOV.	BLOWS PER 6 INCHES				
	0'-1'							
	1.5'-3.5'	SS-1	85%	7-7-14-29		1.5'	Rubble Concrete Dry, green-gray, coarse sandy fill	18.5
	3.5'-5.5'	SS-2	80%	16-28-32-9			Same as SS-1	269.0
5'	5.5'-7.5'	SS-3	25%	6-4-4-4		5'	Damp, olive mod. SAND, petroleum odor	232.0
	7.5'-9.5'	SS-4	10%	7-7-7-7		9.5'	Moist, olive, fine SAND, little med. sand, trace dark yellow petroleum Same, sat., some gravel, dark yellow petroleum	214.0
10'							Concrete	
							Bottom of exploration at 9.5'	
15'								
20'								
25'								
30'								
35'								
40'								

GENERAL REMARKS:

Relief Holder (No. 16)
 Note: Confirmed bottom of holder base at 9.5' with a second boring approx. 10' northeast

EOIPROV0003935



RESOURCE CONTROLS TEST PIT LOG

RESOURCE
CONTROL
ASSOCIATES, INC.

Project: Providence Gas Company		Location: 642 Allens Avenue, Providence, Rhode Island		Test Pit No. ETP-13	
Test pit dimensions: 4' x 15' x 4' (D)		Face of Test Pit logged: Composite		Date excavated: 2/21/96	Project No.: A2000
Depth to water: not encountered			Excavated by: EU (Zecco, Inc.)		Logged by: SC
Surface elevation: 11.13'		Surface conditions:			Elevation (feet)
DEPTH (feet)	Sample No.	Description			PID Readings (ppm)
	@	this test pit location is the south end junction of separating tank			19.4
	@	found lots of small steel pipes (<1" dia.) at 2 to 3' deep			
	@	trapped water and oily liquids (approximately 100 gallons) started coming from the west side of separating tank			
	@	at 8' north of test pit, an 8 to 16" steel pipe turned 90 degree angle from the west side of separating tank towards north at approximately 3.5' deep			
2	S-1	damp (with trapped water), brown/tan, med. SAND			
	@	excavation is stopped at approximately 4' deep due to trapped water in the test pit.			
EOIPROV0004167					Summary
					Depth: 4'
					No. of Samples: 1 soil sample
					Test Pit No. ETP-13

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 Environmental Assm., Engineering & Remediation
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 (401) 728-6860

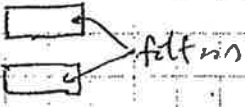
JOB A20013
 SHEET NO. 2 OF 2
 CALCULATED BY _____ DATE 2/21/96
 CHECKED BY _____ DATE _____
 SCALE _____

ETP-13

I)

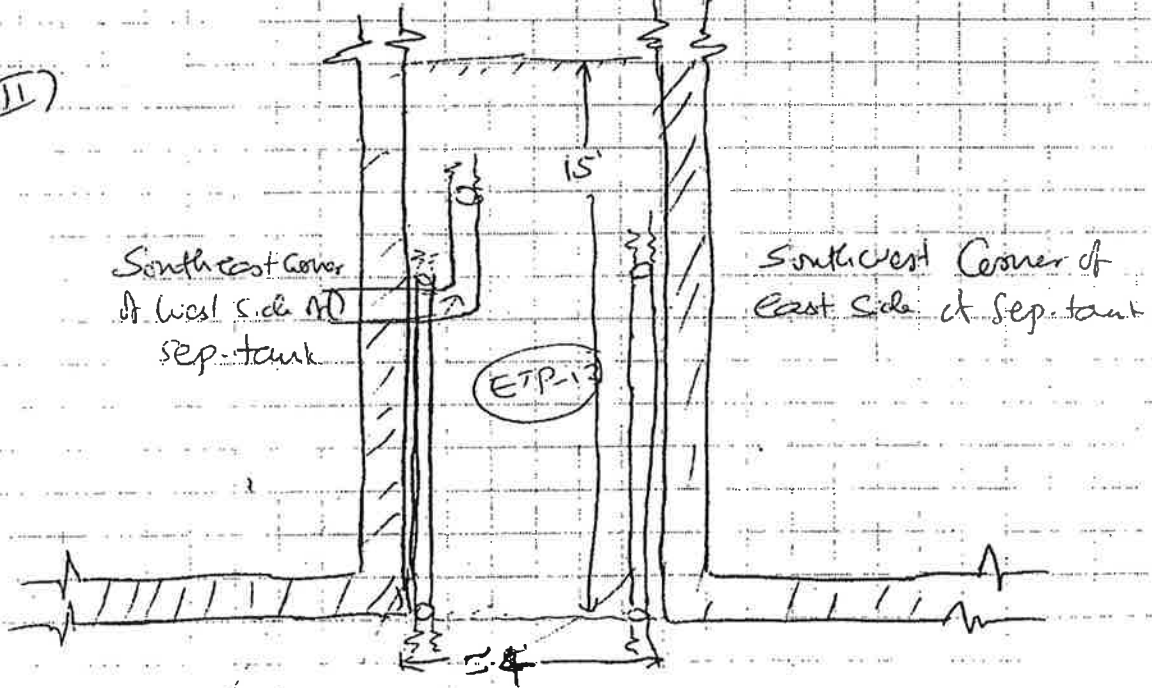


RG-4



ETP-13

II)



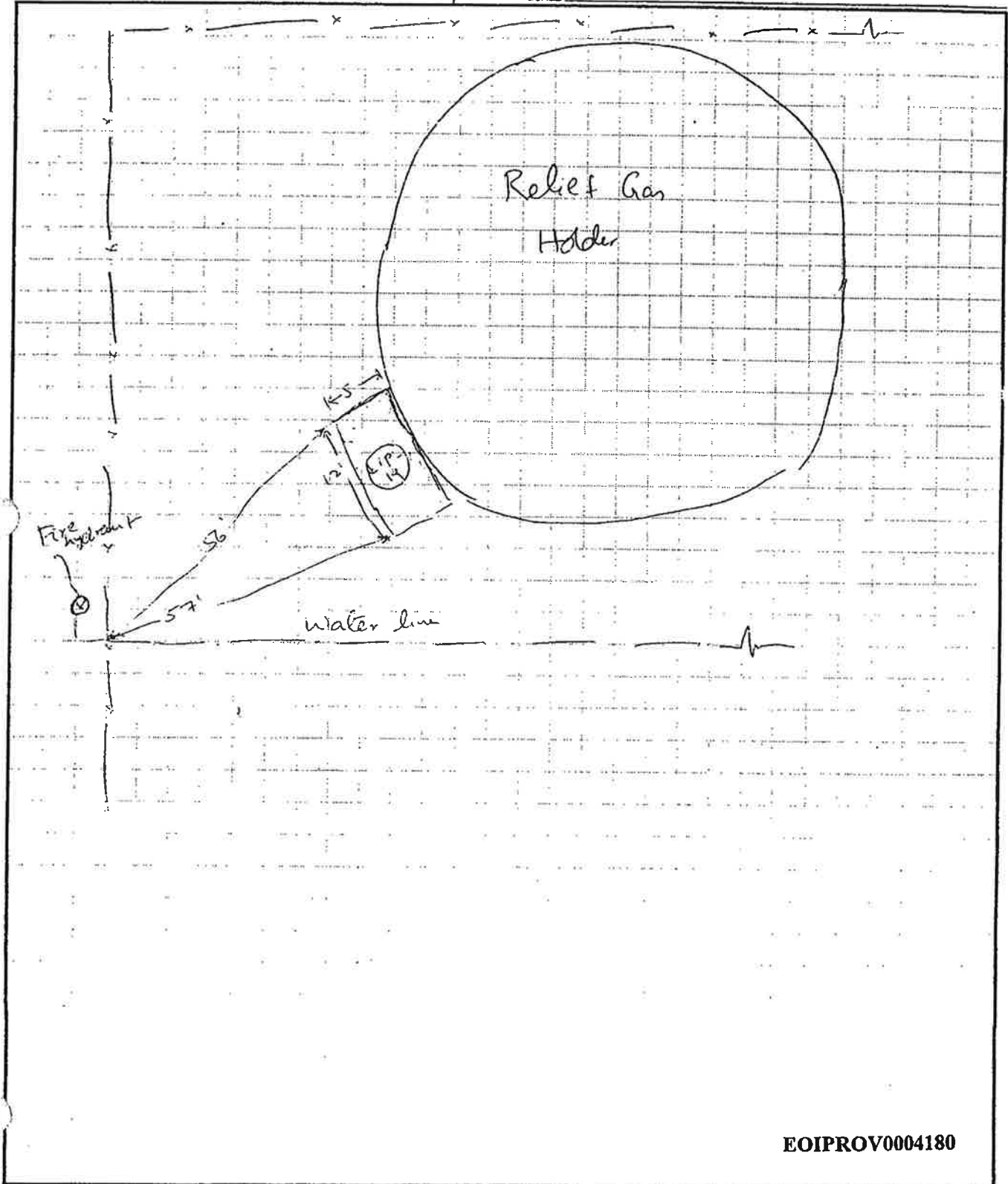
An 8.10" steel pipe
 turned 90° from 2.0.5" steel pipe at 3' deep
 for Sep. tank

EOIPROV0004168

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ETP-19

JOB A2000
SHEET NO. 2 OF 2
CALCULATED BY _____ DATE 2/22/96
CHECKED BY _____ DATE _____
SCALE _____

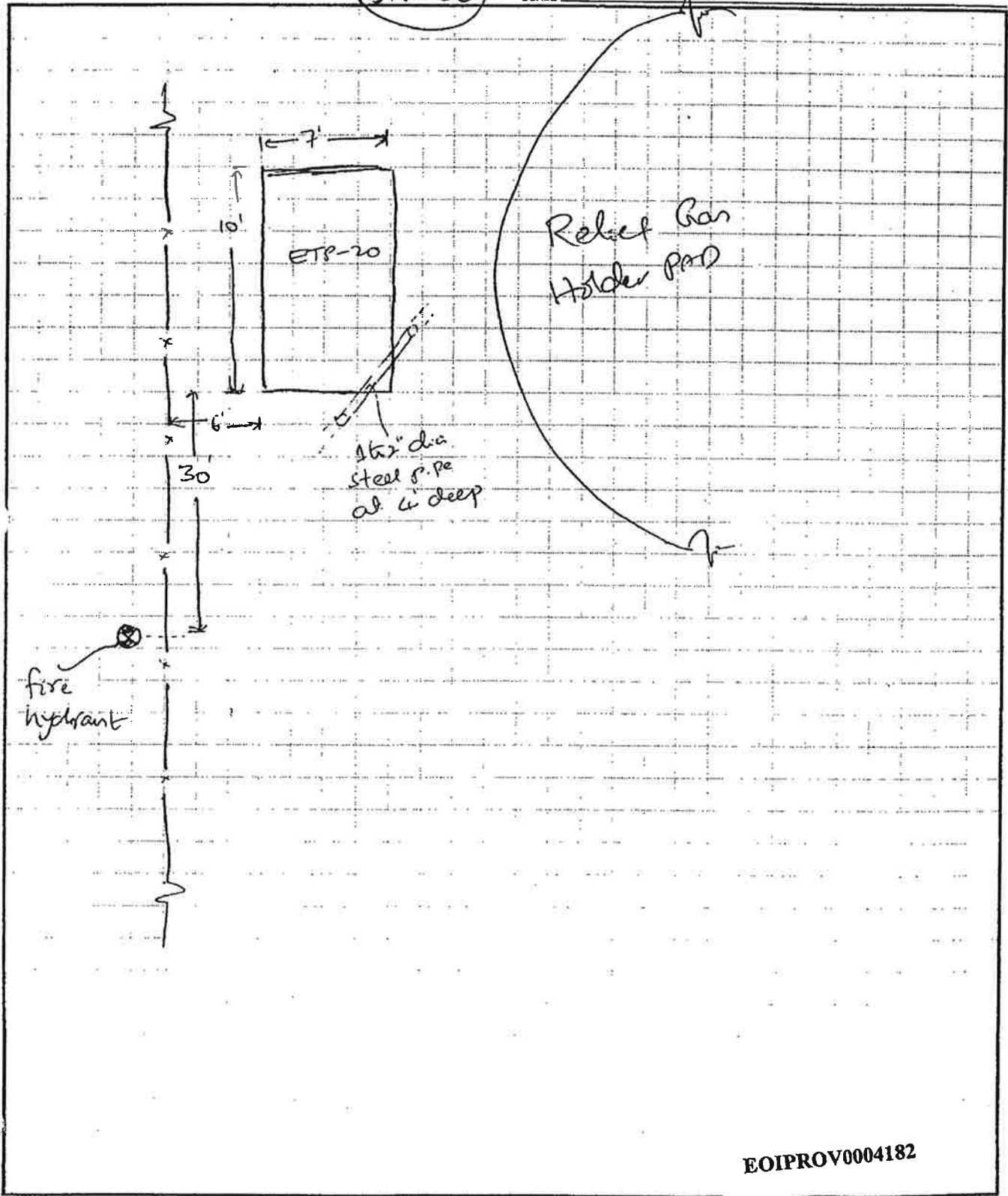


EOIPROV0004180

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JOB A2000
SHEET NO. 2 OF 2
CALCULATED BY _____ DATE 7/28/96
CHECKED BY _____ DATE _____
SCALE _____

ETP-20



EOIPROV0004182



RESOURCE CONTROLS TEST PIT LOG

RESOURCE CONTROL ASSOCIATES, INC.

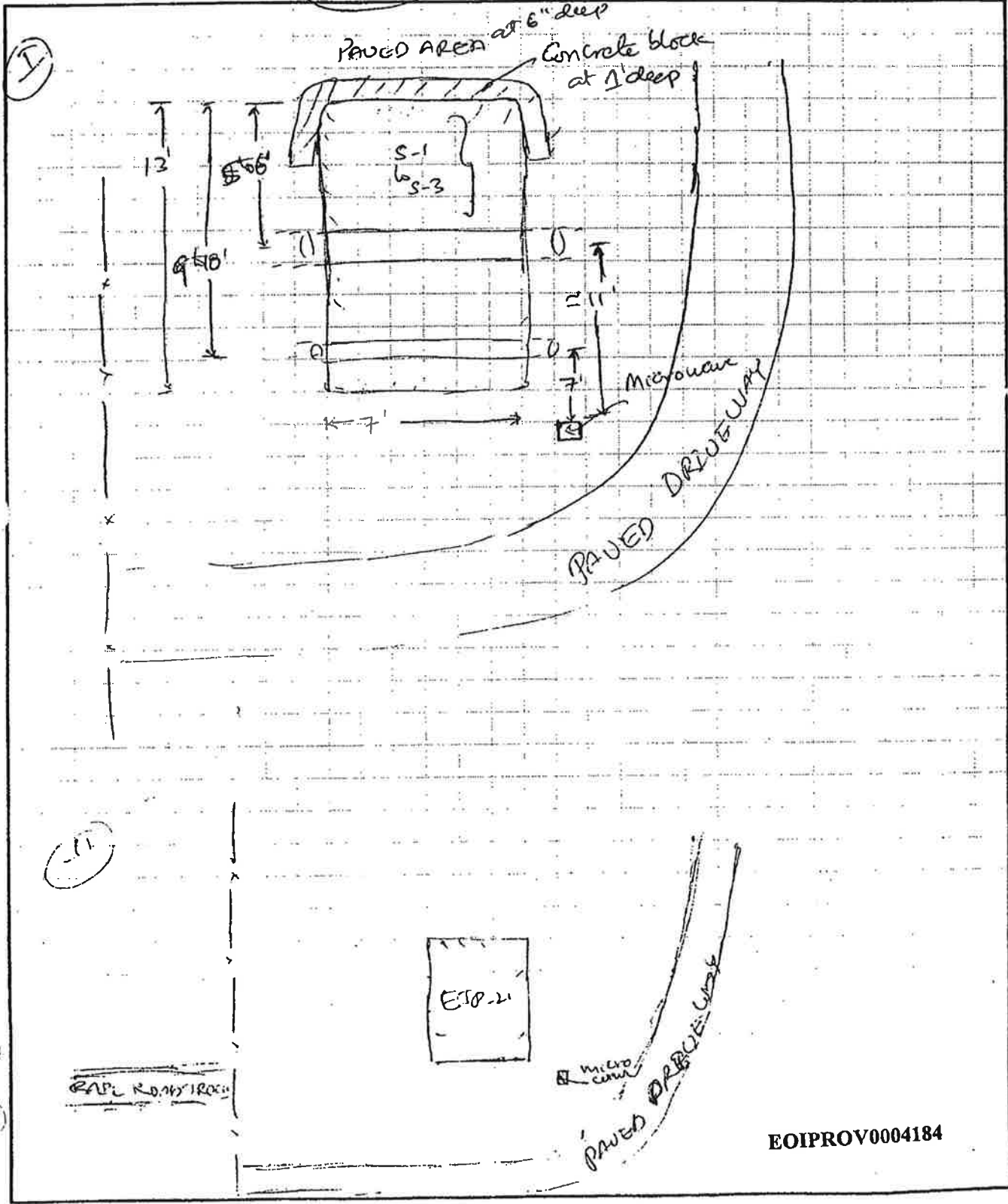
Project: Providence Gas Company		Location: 642 Allens Avenue, Providence, Rhode Island		Test Pit No. ETP-21	
Test pit dimensions: 13' x 5' x 8' (D)		Face of Test Pit logged: Composite		Date excavated: 2/28/96	
Depth to water: 8'		Excavated by: JP (Zecco, Inc.)		Project No.: A2000	
Surface elevation: 10.66'		Surface conditions:		Logged by: SC	
DEPTH (feet)	Sample No.	Description	Elevation (feet)	PID Readings (ppm)	
0-1'		dry/damp, black/tan, coarse SAND (fill)			
1-2'		dry/damp, red, coarse SAND of crushed brick			
2-3'	S-1	(at 3' deep) dry/damp, black, coarse SAND (breeze)		5.3	
3-4'		dry/damp, brown, medium to fine SAND			
4-8'		dry/damp, brown, medium to coarse SAND, clean, some fine sand			
5.5'	S-2	(at 5.5' deep)		5.8	
8.0'	S-3	(at 8.0' deep)		7.0	
	@	at north end of the test pit, at 1' deep, found 6" to 1' thick concrete circular base probably an edge of the paved area (like a curb)			
	@	groundwater is encountered at 8' deep			
	@	soils for the whole test pit are clean and no petroleum odor			
	@	at 8' deep, approximately 5 to 6' south from the north end of the test pit found approximately 24" clay pipe, the pipe is broken due to backhoe excavation and the pipe contained 1 to 2" of clean damp soil, no product or water			
	@	at 6' deep, approximately 9 to 10' south from the north end of the test pit, found approximately 8" to 10" cast iron pipe, the pipe is broken due to backhoe excavation and clear water (or clean water) started coming from the pipe into the test pit			
				Summary	
				Depth: 8'	
				No. of Samples: 3 soil samples	
				Test Pit No. ETP-21	

EOIPROV0004183

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ETP-21

JOB A2000
SHEET NO. 2 OF 2
CALCULATED BY _____ DATE 2/28/96
CHECKED BY _____ DATE _____
SCALE _____



EOIPROV0004184



RESOURCE CONTROLS TEST PIT LOG

RESOURCE
CONTROL
ASSOCIATES, INC.

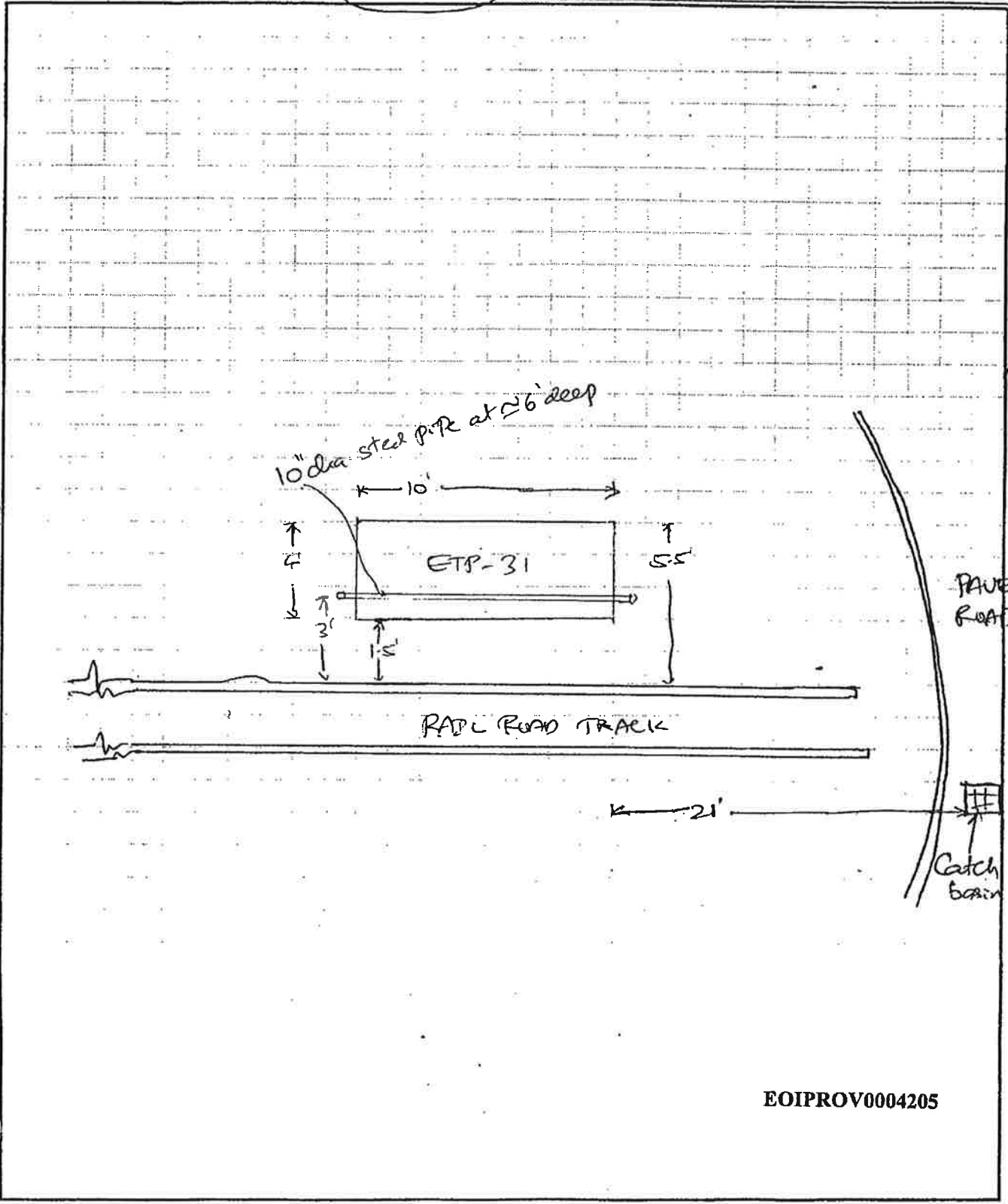
Project: Providence Gas Company		Location: 642, Allens Avenue, Providence, Rhode Island		Test Pit No. ETP-31
Test pit dimensions: 4'x10'x10.5' (D)		Face of Test Pit logged:	Date excavated: 5/1/96	Project No.: A2000
Depth to water: 7.5'		Excavated by: Mike (Cyn Environmental., Inc)		Logged by: SC
Surface elevation: 9.73'		Surface conditions:		Elevation (feet)
DEPTH (feet)	Sample No.	Description	Elevation (feet)	PID Readings (ppm)
0-1		fill, dry, black, coarse-medium SAND, timber beds of railroad track		
1-2	S-1	(at 2' deep) dry, olive/tan, medium SAND, some gravel		1.4
2-4	S-2	(at 4' deep) dry, olive/tan, medium SAND, some gravel		1.4
4-6	S-3	(at 6' deep) damp, tan/light gray, medium SAND		2.8
6-8	S-4	(at 8.5' deep) wet, medium gray, medium to coarse SAND		25.7
	@	S-5 at 10.5' deep		13.5
	@	groundwater is encountered at 7.5' deep		
	@	a 10" diameter steel pipe at approx. 6' deep runs east to west is found in the test pit located 3' north of railroad track		
				Summary
				Depth: 10.5'
				No. of Samples: 5
				Test Pit No. ETP-31

EOIPROV0004204

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ETP-31

JOB A2003
SHEET NO. 7 OF 7
CALCULATED BY _____ DATE 5/1/96
CHECKED BY _____ DATE _____
SCALE _____



EOIPROV0004205



RESOURCE CONTROLS TEST PIT LOG

RESOURCE CONTROL ASSOCIATES, INC.

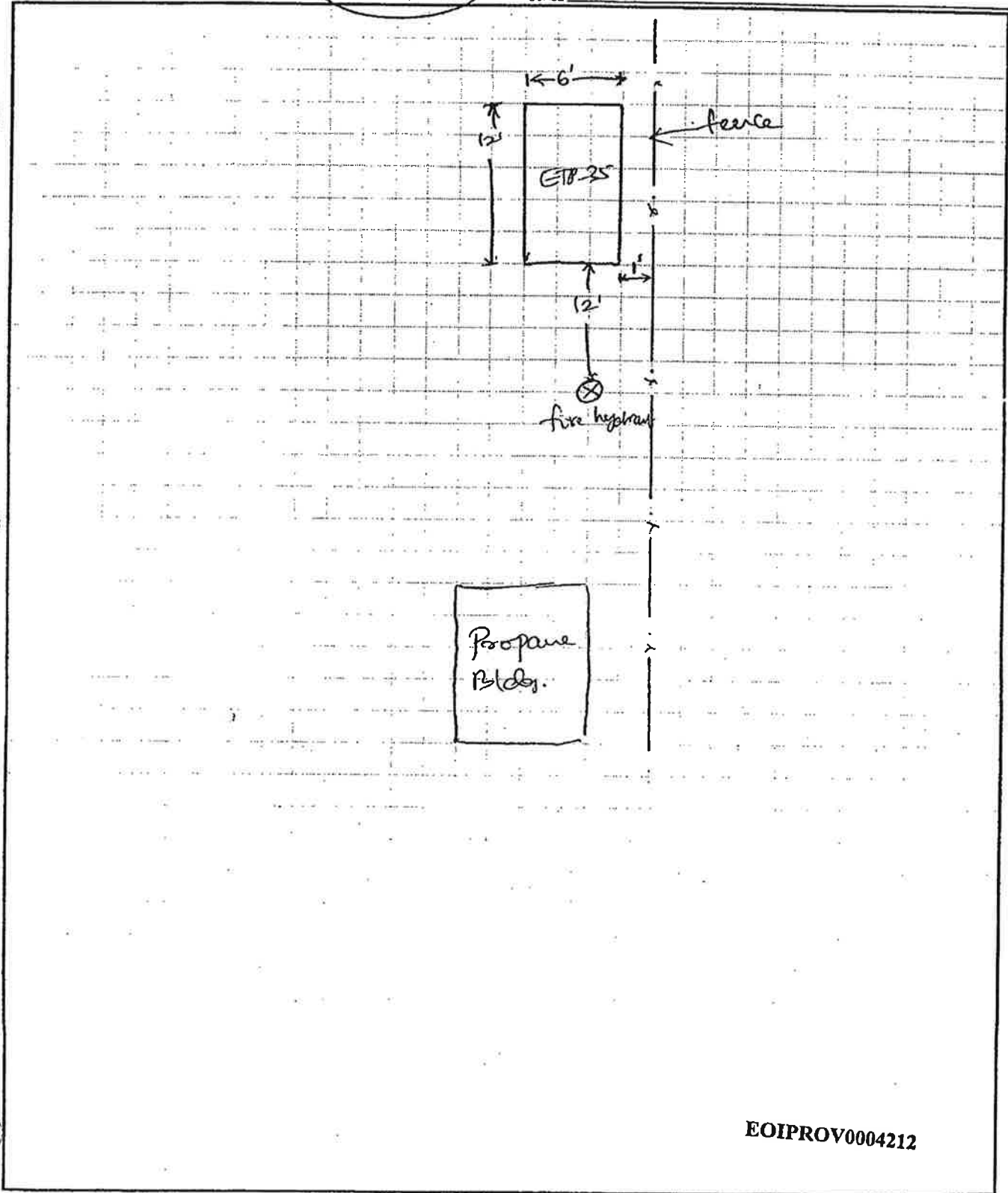
Project: Providence Gas Company		Location: 642, Allens Avenue, Providence, Rhode Island		Test Pit No. ETP-35	
Test pit dimensions: 6'x12'x10' (D)		Face of Test Pit logged:		Date excavated: 5/1/96	
Depth to water: 6.5'		Excavated by: Mike (Cyn Environmental, Inc)		Project No.: A2000	
Surface elevation: 9.51'		Surface conditions:		Sheet No.: 1 of 2	
Excavated by: Mike (Cyn Environmental, Inc)		Logged by:			
DEPTH (feet)	Sample No.	Description	Elevation (feet)	PID Readings (ppm)	
0'-1'		black/brown, dry, clinkers and breeze, coarse SAND, some gravel			
1'-3'	S-1	(at 2' deep) dry, brown/red, coarse SAND (crushed rock or oxide waste?)		89.5	
3'-4'	S-2	(at 4' deep) dry, light gray, coarse SAND, some medium sand, lots of gravel		94.20	
4'-6'	S-3	(at 6' deep) same as S-2 with petroleum odor		220.0	
6'-8.5'	S-4	(at 8.5' deep) wet, tan/light gray coarse SAND, some medium sand trace gravel, petroleum odor		171.0	
10'	S-5	same as S-4		169.0	
	@	groundwater is encountered at 6.5' deep			
	@	waited for 15 to 20 minutes for groundwater to recharge. Yellow/green color sheen is found. However, no product was encountered			
			Summary		
			Depth: 10'		
			No. of Samples: 5		
			Test Pit No. ETP-35		

EOIPROV0004211

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ETP-35

JOB A2000
SHEET NO. 2 OF 2
CALCULATED BY _____ DATE 5/1/96
CHECKED BY _____ DATE _____
SCALE _____

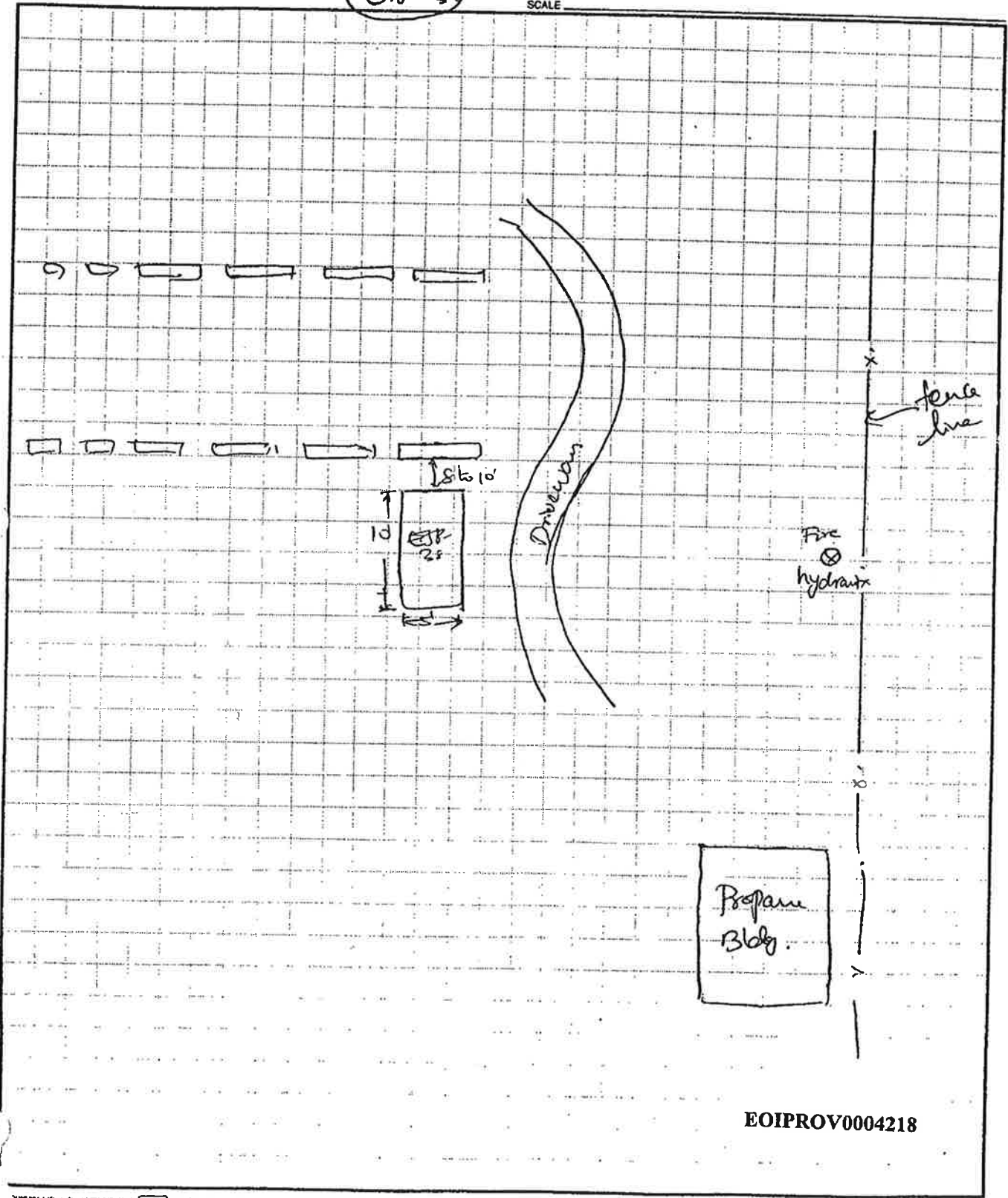


EOIPROV0004212

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ETP-28

JOB _____
 SHEET NO. _____ OF _____
 CALCULATED BY _____ DATE _____
 CHECKED BY _____ DATE _____
 SCALE _____



EOIPROV0004218

TEST BORING LOG



272 West Exchange Street, Suite 101

Providence, Rhode Island 02903
(401) 421-0398 Fax (401) 421-5731

Site: Providence Gas Company
642 Allens Avenue, Providence, RI
ESS Job No: P151-002

Driller.: Environmental Drilling, Inc.

Well Diameter: N/A

Drilling Method: Geoprobe

Sample Method: 4' Acetate Sampler

Boring No.: A67

Date: 2/25/00

Within 100' of Water: No

Instrument: Thermo Environmer.
Instruments, Inc., Model 580B OV

Boring Depth: 10.0'

Depth to Water: 4.5'

Logged By: Daryll Issa

Depth (intervals)	Sample Depth (feet)	Recovery/ Penetration (in.)	Sample Time	PID (ppm)	Materials Description (size, grade, color, moisture)
A	0-2	24/24	0930	0.0	(0-8") F/M brown sand with LI gravel; damp; no odor. (8-12") F/M light brown sand with TR gravel; damp; no odor. (12-24") F/M brown sand with SO gravel; dry; no odor.
B	2-4	48/48		0.0	(24-46") F/M brown sand and gravel; damp; no odor. (46-54") F/M tan sand with TR gravel; damp; no odor; red staining at 54". (54-72") F/M gray/black stained sand with SO gravel with SO M/large, dull and shiny black cinders; wet; heavy petroleum odor.
C	4-6		0945	18.0	
D	6-8	48/48		5.0	(72-106") F/brown/black/gray stained sand, silt, and cinder ash; damp; heavy odor. (106-120") F/M brown/dark brown sand and silt; saturated with water; light odor.
E	8-10			0.0	
F	10-12				
G	12-14				

Comments:

PROPORTIONS USED		ABBREVIATIONS	Well Construction	DEPTH INTERVALS	
TRACE (TR)	0-10%	F = FINE	N/A	A = 0-24 in.	G = 144-168 in.
LITTLE (LI)	10-20%	M = MEDIUM		B = 24-48 in.	H = 168-192 in.
SOME (SO)	20-35%	C = COARSE		C = 48-72 in.	I = 192-216 in.
AND	35-50%	F/M = FINE TO MEDIUM		D = 72-96 in.	J = 216-240 in.
		F/C = FINE TO COARSE		E = 96-120 in..	K = 240-264 in.
		M/C = MEDIUM TO COARSE		F = 120-144 in.	L = 264-288 in.

TEST BORING LOG



272 West Exchange Street, Suite 101
 Providence, Rhode Island 02903
 (401) 421-0398 Fax (401) 421-5731


Site: Providence Gas Company 642 Allens Avenue, Providence, RI	Boring No.: B02
ESS Job No: P151-002	Date: 1/27/00
Driller.: Environmental Drilling, Inc.	Within 100' of Water: No
Well Diameter: N/A	Instrument: Thermo Environment Instruments, Inc., Model 580B OVI
Drilling Method: Geoprobe	Boring Depth: 6.0'
Sample Method: 4' Acetate Sampler	Depth to Water: 5.5'
	Logged By: Jason Wiggin

Depth (Intervals)	Sample Depth (feet)	Recovery/ Penetration (in.)	Sample Time	PID (ppm)	Materials Description (size, grade, color, moisture)
A	0-2	24/24	0830	1.4	(0-24") F/M brown sand with SO gray/black silt and large sized gravel throughout the interval.
B	2-4	40/48	0845	4.2	(32-48") F/M brown sand with LI gravel; TR silt; moist gravel sized black cinders. (48-72") gray-black sandy silt; petroleum odor; LI gravel sized black cinders. Wet at 66°.
C	4-6	40/48		115	
D	6-8				
E	8-10				
F	10-12				
G	12-14				

Comments:

PROPORTIONS USED	ABBREVIATIONS	Well Construction	DEPTH INTERVALS
TRACE (TR) 0-10%	F = FINE	N/A	A = 0-24 in. G = 144-168 in.
LITTLE (LI) 10-20%	M = MEDIUM		B = 24-48 in. H = 168-192 in.
SOME (SO) 20-35%	C = COARSE		C = 48-72 in. I = 192-216 in.
AND 35-50%	F/M = FINE TO MEDIUM		D = 72-96 in. J = 216-240 in.
	F/C = FINE TO COARSE		E = 96-120 in.. K = 240-264 in.
	M/C = MEDIUM TO COARSE		F = 120-144 in. L = 264-288 in.

TEST BORING LOG

 2 West Exchange Street, Suite 101 Providence, Rhode Island 02903 (401) 421-0398 Fax (401) 421-5731					Site: Providence Gas Company 642 Allens Avenue, Providence, RI ESS Job No: P151-002			Boring No.: B03 Date: 1/27/00 Within 100' of Water: No	
					Driller.: Environmental Drilling, Inc.			Instrument: Thermo Environmental Instruments, Inc., Model 580B OVM	
					Well Diameter: N/A			Boring Depth: 6.0'	
					Drilling Method: Geoprobe			Depth to Water: 5.0'	
					Sample Method: 4' Acetate Sampler			Logged By: Daryll Issa	
Depth (intervals)	Sample Depth (feet)	Recovery/ Penetration (in.)	Sample Time	PID (ppm)	Materials Description (size, grade, color, moisture)				
A	0-2	24/24	0915	0.0	(0-24") F/M brown sand with SO gravel throughout the interval and SO white concrete/gravel dust; dry; no odor.				
B	2-4	40/48	0920	9.4	(32-58") F/M brown/dark brown sand with LI gravel and SO black/gray stained sand throughout the interval; dry; petroleum odor. (58-72") F/black/dark brown stained sand and silt; saturated with water; ; very heavy petroleum odor.				
C	4-6	40/48		164					
D	6-8								
E	8-10								
F	10-12								
G	12-14								
Comments: Located near SE corner of MHA									
PROPORTIONS USED TRACE (TR) 0-10% LITTLE (LI) 10-20% SOME (SO) 20-35% AND 35-50%			ABBREVIATIONS F = FINE M = MEDIUM C = COARSE F/M = FINE TO MEDIUM F/C = FINE TO COARSE M/C = MEDIUM TO COARSE		Well Construction N/A	DEPTH INTERVALS A = 0-24 in. G = 144-168 in. B = 24-48 in. H = 168-192 in. C = 48-72 in. I = 192-216 in. D = 72-96 in. J = 216-240 in. E = 96-120 in.. K = 240-264 in. F = 120-144 in. L = 264-288 in.			

TEST BORING LOG



272 West Exchange Street, Suite 101

Providence, Rhode Island 02903
(401) 421-0398 Fax (401) 421-5731

Site: Providence Gas Company
642 Allens Avenue, Providence, RI
ESS Job No: P151-002

Driller.: Environmental Drilling, Inc.

Well Diameter: N/A

Drilling Method: Geoprobe

Sample Method: 4' Acetate Sampler

Boring No.: B04

Date: 1/27/00

Within 100' of Water: No

Instrument: Thermo Environment
Instruments, Inc., Model 580B OVM

Boring Depth: 6.0'

Depth to Water: 5.8'

Logged By: Jason Wiggins

Depth (intervals)	Sample Depth (feet)	Recovery/ Penetration (in.)	Sample Time	PID (ppm)	Materials Description (size, grade, color, moisture)
A	0-2	24/24	0930	0.6	(0-12") F/M brown sand, LI gravel and TR silt. (12-24") F/M black ash with SO cinders and LI orange porous cinders.
B	2-4	45/48	0950	18.0	(27-42") F/C Br/orange sand with SO gravel sized black cinders and TR silt, dry. (42-66") gray silty sand. (66-72") F black sand with black petroleum staining; wet; petroleum odor.
C	4-6			35	
D	6-8				
E	8-10				
F	10-12				
G	12-14				

Comments:

PROPORTIONS USED		ABBREVIATIONS	Well Construction	DEPTH INTERVALS	
TRACE (TR)	0-10%	F = FINE	N/A	A = 0-24 in.	G = 144-168 in.
LITTLE (LI)	10-20%	M = MEDIUM		B = 24-48 in.	H = 168-192 in.
SOME (SO)	20-35%	C = COARSE		C = 48-72 in.	I = 192-216 in.
AND	35-50%	F/M = FINE TO MEDIUM		D = 72-96 in.	J = 216-240 in.
		F/C = FINE TO COARSE		E = 96-120 in.	K = 240-264 in.
		M/C = MEDIUM TO COARSE		F = 120-144 in.	L = 264-288 in.

TEST BORING LOG



West Exchange Street, Suite 101

Providence, Rhode Island 02903
(401) 421-0398 Fax (401) 421-5731

Site: Providence Gas Company
642 Allens Avenue, Providence, RI
ESS Job No: P151-002
Driller.: Environmental Drilling, Inc.
Well Diameter: N/A
Drilling Method: Geoprobe
Sample Method: 4' Acetate Sampler

Boring No.: B05
Date: 1/27/00
Within 100' of Water: No
Instrument: Thermo Environmental Instruments, Inc., Model 580B OVM
Boring Depth: 8.0'
Depth to Water: 4.8'
Logged By: Daryll Issa

Depth (intervals)	Sample Depth (feet)	Recovery/Penetration (in.)	Sample Time	PID (ppm)	Materials Description (size, grade, color, moisture)
A	0-2	24/24	1000	1.5	(0-20") F/M brown sand (frozen) with SO gray dry, no odor. (20-24") M/ black cinder ash with SO large black cinders, dry, LI petroleum odor.
B	2-4	46/48	1020	2.8	(28-33") F/light brown sand and loose black cinder ash; dry; no odor. (33-50") F/C orange/brown sand with SO large dull, black cinders and porous black cinders and cinder ash; dry; faint petroleum odor. (50-72") F gray stained sand with LI gravel; saturated with water; heavy petroleum odor.
C	4-6			29.0	
D	6-8				
E	8-10				
F	10-12				
G	12-14				

Comments:

PROPORTIONS USED	ABBREVIATIONS	Well Construction	DEPTH INTERVALS
TRACE (TR) 0-10%	F = FINE	(+1.5-3.0') PVC Solid Riser (3.0-8.0') PVC Screen One inch sump at 8.0'	A = 0-24 in. G = 144-168 in.
LITTLE (LJ) 10-20%	M = MEDIUM		B = 24-48 in. H = 168-192 in.
SOME (SO) 20-35%	C = COARSE		C = 48-72 in. I = 192-216 in.
AND 35-50%	F/M = FINE TO MEDIUM		D = 72-96 in. J = 216-240 in.
	F/C = FINE TO COARSE		E = 96-120 in.. K = 240-264 in.
	M/C = MEDIUM TO COARSE		F = 120-144 in. L = 264-288 in.

TEST BORING LOG



272 West Exchange Street, Suite 101

Providence, Rhode Island 02903
(401) 421-0398 Fax (401) 421-5731

Site: Providence Gas Company
642 Allens Avenue, Providence, RI
ESS Job No: P151-002

Driller.: Environmental Drilling, Inc.

Well Diameter: N/A

Drilling Method: Geoprobe

Sample Method: 4' Acetate Sampler

Boring No.: B06

Date: 1/27/00

Within 100' of Water: No

Instrument: Thermo Environment
Instruments, Inc., Model 580B OV

Boring Depth: 6.0'

Depth to Water: 4.0'

Logged By: Jason Wiggin

Depth (intervals)	Sample Depth (feet)	Recovery/ Penetration (in.)	Sample Time	PID (ppm)	Materials Description (size, grade, color, moisture)
A	0-2	24/24	1015	2.5	(0-20") F/M brown sand with TR gravel and silt. (20-24") black cinders/ash.
B	2-4	47/48	1040	2.4	(25-48") F/C black cinder/ash with LI porous cinders. (46-48") organic, fibrous material; dry. (48-72") F/C gray sand; LI silt; wet.
C	4-6			14.0	
D	6-8				
E	8-10				
F	10-12				
G	12-14				

Comments:

PROPORTIONS USED	ABBREVIATIONS	Well Construction	DEPTH INTERVALS
TRACE (TR) 0-10%	F = FINE	N/A	A = 0-24 in. G = 144-168 in.
LITTLE (LI) 10-20%	M = MEDIUM		B = 24-48 in. H = 168-192 in.
SOME (SO) 20-35%	C = COARSE		C = 48-72 in. I = 192-216 in.
AND 35-50%	F/M = FINE TO MEDIUM		D = 72-96 in. J = 216-240 in.
	F/C = FINE TO COARSE		E = 96-120 in.. K = 240-264 in.
	M/C = MEDIUM TO COARSE		F = 120-144 in. L = 264-288 in.

TEST BORING LOG



2 West Exchange Street, Suite 101

Providence, Rhode Island 02903
(401) 421-0398 Fax (401) 421-5731

Site: Providence Gas Company
642 Allens Avenue, Providence, RI
ESS Job No: P151-002

Driller.: Environmental Drilling, Inc.

Well Diameter: N/A

Drilling Method: Geoprobe

Sample Method: 4' Acetate Sampler

Boring No.: B07

Date: 1/27/00

Within 100' of Water: Yes

Instrument: Thermo Environmental
Instruments, Inc., Model 580B OVM

Boring Depth: 10.0'

Depth to Water: 5.3'

Logged By: Daryll Issa

Depth (intervals)	Sample Depth (feet)	Recovery/ Penetration (in.)	Sample Time	PID (ppm)	Materials Description (size, grade, color, moisture)
A	0-2	24/24	1100	0.0	(0-3") F/M brown sand with SO gravel; dry; no odor. (3-10") F/loose black cinder ash and M/large black cinders; dry; no odor. (10-24") F/C brown sand with LI gravel.
B	2-4	45/48		0.7	(27-40") F brown sand with TR black cinder ash and SO gravel; dry; no odor. (40-45") F orange/yellow sand; dry; no odor. (45-72") F gray stained/ brown sand with TR silt and TR gravel; saturated with petroleum; wet at 69"; sheen observed; heavy petroleum odor.
C	4-6		1115	16.5	
D	6-8	28/48		7.2	
E	8-10			7.2	(92-97") F gray sand with TR silt with water; heavy petroleum odor. (97-120") F brown stained sand with LI silt; saturated with water; heavy petroleum odor.
F	10-12				
G	12-14				

Comments:

PROPORTIONS USED	ABBREVIATIONS	Well Construction	DEPTH INTERVALS
TRACE (TR) 0-10%	F = FINE	N/A	A = 0-24 in. G = 144-168 in.
LITTLE (LI) 10-20%	M = MEDIUM		B = 24-48 in. H = 168-192 in.
SOME (SO) 20-35%	C = COARSE		C = 48-72 in. I = 192-216 in.
AND 35-50%	F/M = FINE TO MEDIUM		D = 72-96 in. J = 216-240 in.
	F/C = FINE TO COARSE		E = 96-120 in. K = 240-264 in.
	M/C = MEDIUM TO COARSE		F = 120-144 in. L = 264-288 in.

TEST BORING LOG



272 West Exchange Street, Suite 101

Providence, Rhode Island 02903
(401) 421-0398 Fax (401) 421-5731

Site: Providence Gas Company
642 Allens Avenue, Providence, RI
ESS Job No: P151-002
Driller.: Environmental Drilling, Inc.
Well Diameter: N/A
Drilling Method: Geoprobe
Sample Method: 4' Acetate Sampler

Boring No.: B08
Date: 1/27/00
Within 100' of Water: Yes
Instrument: Thermo Environment
Instruments, Inc., Model 580B OVM
Boring Depth: 10.0'
Depth to Water: 8.5'
Logged By: Jason Wiggin

Depth (intervals)	Sample Depth (feet)	Recovery/ Penetration (in.)	Sample Time	PID (ppm)	Materials Description (size, grade, color, moisture)
A	0-2	24/24	1110	0.0	(0-6") F/C brown sand; TR gravel; TR silt; dry. (6-24") F/C black cinder ash.
B	2-4	40/48		0.4	(32-35") F/C black cinder ash. (35-48") F/C yellow-brown sand; LI gravel; TR silt; dry. (48-72") F/C yellow-brown sand; LI gravel; TR silt; TR porous cinders, TR black ash; dry
C	4-6		1125	1.4	
D	6-8	22/48		1.4	(96-100") F/C brown sand; LI gravel; TR silt. (100-103") M/C black cinder ash. (103-120") gray-dark gray silt and sand; black staining; wet.
E	8-10				
F	10-12				
G	12-14				

Comments:

PROPORTIONS USED	ABBREVIATIONS	Well Construction	DEPTH INTERVALS
TRACE (TR) 0-10%	F = FINE	N/A	A = 0-24 in. G = 144-168 in.
LITTLE (LI) 10-20%	M = MEDIUM		B = 24-48 in. H = 168-192 in.
SOME (SO) 20-35%	C = COARSE		C = 48-72 in. I = 192-216 in.
AND 35-50%	F/M = FINE TO MEDIUM		D = 72-96 in. J = 216-240 in.
	F/C = FINE TO COARSE		E = 96-120 in. K = 240-264 in.
	M/C = MEDIUM TO COARSE		F = 120-144 in. L = 264-288 in.

TEST BORING LOG



2 West Exchange Street, Suite 101

Providence, Rhode Island 02903
(401) 421-0398 Fax (401) 421-5731

Site: Providence Gas Company
642 Allens Avenue, Providence, RI
ESS Job No: P151-002
Driller.: Environmental Drilling, Inc.
Well Diameter: N/A
Drilling Method: Geoprobe
Sample Method: 4' Acetate Sampler

Boring No.: B09
Date: 1/27/00
Within 100' of Water: Yes
Instrument: Thermo Environmental
instruments, Inc., Model 580B OVM
Boring Depth: 6.0'
Depth to Water: 3.5'
Logged By: Daryll Issa

Depth (intervals)	Sample Depth (feet)	Recovery/ Penetration (in.)	Sample Time	PID (ppm)	Materials Description (size, grade, color, moisture)
A	0-2	24/24	1130	0.0	(0-18") F/M brown sand with SO black sand, LI gravel, LI silt and LI small/M, shiny/dull black cinders; dry; light petroleum odor. (18-24") F/M brown/reddish stained cinders and cinder ash with LI gravel; dry; no odor.
B	2-4	43/48	1148	1.4	(29-43") F/M brown/orange sand with small/M black cinders and black cinder ash; TR gravel; damp; faint odor. (43-72") F black/gray stained sand with LI gravel and SO silt and SO black cinders; wet; heavy petroleum odor.
C	4-6			4.8	
D	6-8				
E	8-10				
F	10-12				
G	12-14				

Comments:

PROPORTIONS USED	ABBREVIATIONS	Well Construction	DEPTH INTERVALS
TRACE (TR) 0-10%	F = FINE	N/A	A = 0-24 in. G = 144-168 in.
LITTLE (LI) 10-20%	M = MEDIUM		B = 24-48 in. H = 168-192 in.
SOME (SO) 20-35%	C = COARSE		C = 48-72 in. I = 192-216 in.
AND 35-50%	F/M = FINE TO MEDIUM		D = 72-96 in. J = 216-240 in.
	F/C = FINE TO COARSE		E = 96-120 in. K = 240-264 in.
	M/C = MEDIUM TO COARSE		F = 120-144 in. L = 264-288 in.

TEST BORING LOG



272 West Exchange Street, Suite 101

Providence, Rhode Island 02903
(401) 421-0398 Fax (401) 421-5731

Site: Providence Gas Company
642 Allens Avenue, Providence, RI
ESS Job No: P151-002

Driller.: Environmental Drilling, Inc.

Well Diameter: N/A

Drilling Method: Geoprobe

Sample Method: 4' Acetate Sampler

Boring No.: B10

Date: 1/27/00

Within 100' of Water: No

Instrument: Thermo Environmental
Instruments, Inc., Model 580B OVM

Boring Depth: 6.0'

Depth to Water: 5.0'

Logged By: Jason Wiggin

Depth (intervals)	Sample Depth (feet)	Recovery/ Penetration (in.)	Sample Time	PID (ppm)	Materials Description (size, grade, color, moisture)
A	0-2	24/24	1150	1.0	(0-12") F/M brown/light brown sand; TR gravel; TR silt. (12-24") F/C black cinder ash; SO cinders; TR porous cinders.
B	2-4	47/48	1215	4.2	(25-48") F/C black cinder ash; SO gravel size cinders; LI porous cinders; dry. (48-55") F/C black cinder ash; SO gravel size cinders; LI porous cinders; dry. (55-72") F brown/gray sand; SO silt; wet.
C	4-6			37.0	
D	6-8				
E	8-10				
F	10-12				
G	12-14				

Comments:

PROPORTIONS USED	ABBREVIATIONS	Well Construction	DEPTH INTERVALS
TRACE (TR) 0-10%	F = FINE	N/A	A = 0-24 in. G = 144-168 in.
LITTLE (LI) 10-20%	M = MEDIUM		B = 24-48 in. H = 168-192 in.
SOME (SO) 20-35%	C = COARSE		C = 48-72 in. I = 192-216 in.
AND 35-50%	F/M = FINE TO MEDIUM		D = 72-96 in. J = 216-240 in.
	F/C = FINE TO COARSE		E = 96-120 in. K = 240-264 in.
	M/C = MEDIUM TO COARSE		F = 120-144 in. L = 264-288 in.

TEST BORING LOG



2 West Exchange Street, Suite 101

Providence, Rhode Island 02903
(401) 421-0398 Fax (401) 421-5731

Site: Providence Gas Company
642 Allens Avenue, Providence, RI

ESS Job No: P151-002

Driller.: Environmental Drilling, Inc.

Well Diameter: N/A

Drilling Method: Geoprobe

Sample Method: 4' Acetate Sampler

Boring No.: B11

Date: 1/27/00

Within 100' of Water: No

Instrument: Thermo Environmental
Instruments, Inc., Model 580B OVM

Boring Depth: 6.0'

Depth to Water: 4.0'

Logged By: Daryll Issa

Depth (intervals)	Sample Depth (feet)	Recovery/ Penetration (in.)	Sample Time	PID (ppm)	Materials Description (size, grade, color, moisture)
A	0-2	24/24	1330	2.8	(0-3") gravel and gray stained/green soil; wet from snow; light sweet odor. (3-19") F/M brown sand and silt; gray/black with TR cinders; damp; no odor. (19-24") F dense cinder ash and black cinders; dry; no odor.
B	2-4	45/48	1345	11.3	(27-45") black/orange cinders with SO cinder ash and LI gravel and TR silt at 27"; dry; no odor. (45-59") F black stained sand with LI silt and SO black cinder ash and black cinders; wet; heavy odor. (59-72") F gray/brown stain sand with TR silt; saturated with water; heavy petroleum odor.
C	4-6			28.0	
D	6-8				
E	8-10				
F	10-12				
G	12-14				

Comments:

PROPORTIONS USED	ABBREVIATIONS	Well Construction	DEPTH INTERVALS
TRACE (TR) 0-10%	F = FINE	N/A	A = 0-24 in. G = 144-168 in.
LITTLE (LI) 10-20%	M = MEDIUM		B = 24-48 in. H = 168-192 in.
SOME (SO) 20-35%	C = COARSE		C = 48-72 in. I = 192-216 in.
AND 35-50%	F/M = FINE TO MEDIUM		D = 72-96 in. J = 216-240 in.
	F/C = FINE TO COARSE		E = 96-120 in. K = 240-264 in.
	M/C = MEDIUM TO COARSE		F = 120-144 in. L = 264-288 in.

TEST BORING LOG



272 West Exchange Street, Suite 101

Providence, Rhode Island 02903
(401) 421-0398 Fax (401) 421-5731

Site: Providence Gas Company
642 Allens Avenue, Providence, RI
ESS Job No: P151-002

Driller.: Environmental Drilling, Inc.

Well Diameter: N/A

Drilling Method: Geoprobe

Sample Method: 4' Acetate Sampler

Boring No.: B12

Date: 1/27/00

Within 100' of Water: No

Instrument: Thermo Environmen.
Instruments, Inc., Model 580B OVI

Boring Depth: 6.0'

Depth to Water: 5.0'


Logged By: Daryll Issa

Depth (intervals)	Sample Depth (feet)	Recovery/ Penetration (in.)	Sample Time	PID (ppm)	Materials Description (size, grade, color, moisture)
A	0-2	24/24	1415	1.4	(0-2") asphalt. (2-24") F/M brown sand with SO gravel and LI black stained sand in the 4-8" interval; dry; no odor.
B	2-4	38/48		4.2	(34-51") F/M brown sand and gravel; dry; no odor. (51-72") F gray/brown stained sand with SO silt and LI black cinders; wet at 60"; heavy petroleum odor.
C	4-6		1430	46.8	
D	6-8				
E	8-10				
F	10-12				
G	12-14				

Comments:

PROPORTIONS USED		ABBREVIATIONS	Well Construction	DEPTH INTERVALS	
TRACE (TR)	0-10%	F = FINE	N/A	A = 0-24 in.	G = 144-168 in.
LITTLE (LI)	10-20%	M = MEDIUM		B = 24-48 in.	H = 168-192 in.
SOME (SO)	20-35%	C = COARSE		C = 48-72 in.	I = 192-216 in.
AND	35-50%	F/M = FINE TO MEDIUM		D = 72-96 in.	J = 216-240 in.
		F/C = FINE TO COARSE		E = 96-120 in..	K = 240-264 in.
		M/C = MEDIUM TO COARSE		F = 120-144 in.	L = 264-288 in.

TEST BORING LOG

 2 West Exchange Street, Suite 101 Providence, Rhode Island 02903 (401) 421-0398 Fax (401) 421-5731					Site: Providence Gas Company 642 Allens Avenue, Providence, RI		Boring No.: B13	
					ESS Job No: P151-002		Date: 1/27/00	
					Driller.: Environmental Drilling, Inc.		Within 100' of Water: No	
					Well Diameter: N/A		Instrument: Thermo Environmental Instruments, Inc., Model 580B OVM	
					Drilling Method: Geoprobe		Boring Depth: 6.0'	
Sample Method: 4' Acetate Sampler		Depth to Water: 4.5'		Logged By: Daryll Issa				
Depth (intervals)	Sample Depth (feet)	Recovery/ Penetration (in.)	Sample Time	PID (ppm)	Materials Description (size, grade, color, moisture)			
A	0-2	24/24	1445	2.8	(0-17") F/M dark brown/brown sand with SO gravel and TR silt; dry; no odor. (17-24") F brown sand and gravel with TR silt; dry; light petroleum odor.			
B	2-4	44/48	1450	17.2	(28-48") F/M gray/brown stained sand and gravel; dry; no odor. (48-72") F gray/brown stained sand and silt; wet at 54"; heavy petroleum odor.			
C	4-6			156.0				
D	6-8							
E	8-10							
F	10-12							
G	12-14							
<u>Comments:</u>								
PROPORTIONS USED		ABBREVIATIONS		Well Construction	DEPTH INTERVALS			
TRACE (TR)	0-10%	F = FINE		N/A	A = 0-24 in.			
LITTLE (LI)	10-20%	M = MEDIUM			G = 144-168 in.			
SOME (SO)	20-35%	C = COARSE			H = 168-192 in.			
AND	35-50%	F/M = FINE TO MEDIUM			I = 192-216 in.			
		F/C = FINE TO COARSE			J = 216-240 in.			
		M/C = MEDIUM TO COARSE			K = 240-264 in.			
					L = 264-288 in.			

TEST BORING LOG



272 West Exchange Street, Suite 101

Providence, Rhode Island 02903.
(401) 421-0398 Fax (401) 421-5731

Site: Providence Gas Company 642 Allens Avenue, Providence, RI ESS Job No: P151-002	Boring No.: B14 Date: 1/27/00 Within 100' of Water: No
Driller.: Environmental Drilling, Inc.	Instrument: Thermo Environmental Instruments, Inc., Model 580B OVI
Well Diameter: N/A	Boring Depth: 6.0'
Drilling Method: Geoprobe	Depth to Water: 5.4'
Sample Method: 4' Acetate Sampler	Logged By: Jason Wiggin

Depth (intervals)	Sample Depth (feet)	Recovery/Penetration (in.)	Sample Time	PID (ppm)	Materials Description (size, grade, color, moisture)
A	0-2	24/24	1445	2.8	(0-6") F/M dark brown sand; TR gravel and TR silt; moist. (6-14") F gravel with black cinders and black cinder ash. (14-24") F/M brown sand; TR gravel and TR porous cinders.
B	2-4	38/48	1510	0.0	(34-48") F/M brown sand; LI silt/gravel; TR porous cinders; dry. (48-65") F/M brown sand; LI silt/gravel; TR porous cinders; dry. (65-72") gray, sandy silt; wet.
C	4-6			0.0	
D	6-8				
E	8-10				
F	10-12				
G	12-14				

Comments:

PROPORTIONS USED	ABBREVIATIONS	Well Construction	DEPTH INTERVALS
TRACE (TR) 0-10% LITTLE (LI) 10-20% SOME (SO) 20-35% AND 35-50%	F = FINE M = MEDIUM C = COARSE F/M = FINE TO MEDIUM F/C = FINE TO COARSE M/C = MEDIUM TO COARSE	N/A	A = 0-24 in. G = 144-168 in. B = 24-48 in. H = 168-192 in. C = 48-72 in. I = 192-216 in. D = 72-96 in. J = 216-240 in. E = 96-120 in. K = 240-264 in. F = 120-144 in. L = 264-288 in.

TEST BORING LOG



1 West Exchange Street, Suite 101

Providence, Rhode Island 02903
(401) 421-0398 Fax (401) 421-5731

Site: Providence Gas Company
642 Allens Avenue, Providence, RI
ESS Job No: P151-002

Driller.: Environmental Drilling, Inc.

Well Diameter: N/A

Drilling Method: Geoprobe

Sample Method: 4' Acetate Sampler

Boring No.: B17

Date: 1/31/00

Within 100' of Water: Yes

Instrument: Thermo Environmental
Instruments, Inc., Model 580B OVM

Boring Depth: 6.0'

Depth to Water: 4.0'

Logged By: Daryll Issa

Depth (intervals)	Sample Depth (feet)	Recovery/ Penetration (in.)	Sample Time	PID (ppm)	Materials Description (size, grade, color, moisture)
A	0-2	24/24	1215	0.0	(0-5") F/C brown/gray sand with SO TR stained sand with SO gravel; dry; no odor. (5-18") small/M/large, shiny/dull black cinders with SO cinder ash; dry; no odor. (18-24") F/M brown sand and black cinder ash with TR gravel; dry; no odor.
B	2-4	32/48		0.0	(40-45") black cinder ash with SO gravel and SO small cinders. (45-58") F light brown/tan sand with LI gravel; wet; no odor. (58-68") F light brown/tan sand with LI gravel; wet; no odor. (68-72") F gray stained sand with LI silt/gravel; wet; petroleum odor.
C	4-6	32/48	1230	0.0	
D	6-8				
E	8-10				
F	10-12				
G	12-14				

Comments:

PROPORTIONS USED	ABBREVIATIONS	Well Construction	DEPTH INTERVALS
TRACE (TR) 0-10%	F = FINE	N/A	A = 0-24 in. G = 144-168 in.
LITTLE (LI) 10-20%	M = MEDIUM		B = 24-48 in. H = 168-192 in.
SOME (SO) 20-35%	C = COARSE		C = 48-72 in. I = 192-216 in.
AND 35-50%	F/M = FINE TO MEDIUM		D = 72-96 in. J = 216-240 in.
	F/C = FINE TO COARSE		E = 96-120 in.. K = 240-264 in.
	M/C = MEDIUM TO COARSE		F = 120-144 in. L = 264-288 in.

TEST BORING LOG



West Exchange Street, Suite 101

Providence, Rhode Island 02903
(401) 421-0398 Fax (401) 421-5731

Site: Providence Gas Company
642 Allens Avenue, Providence, RI
ESS Job No: P151-002

Driller.: Environmental Drilling, Inc.

Well Diameter: N/A

Drilling Method: Geoprobe

Sample Method: 4' Acetate Sampler

Boring No.: B20

Date: 1/31/00

Within 100' of Water: Yes

Instrument: Thermo Environmental
Instruments, Inc., Model 580B OVM

Boring Depth: 6.0'

Depth to Water: 2.5'

Logged By: Daryll Issa

Depth (intervals)	Sample Depth (feet)	Recovery/ Penetration (in.)	Sample Time	PID (ppm)	Materials Description (size, grade, color, moisture)
A	0-2	24/24	1240	0.0	(0-4") brown topsoil. (4-24") black/orange cinder with SO shiny and dull black cinders; dry; no odor.
B	2-4	40/48		0.0	(32-42") black cinder ash with SO black stained sand; wet; no odor. (42-53") F brown/gray sand with SO silt and TR gravel; wet; no odor. (53-72") F gray stained sand with TR silt and TR gravel; wet; heavy petroleum odor; sheen present.
C	4-6		1250	0.0	
D	6-8				
E	8-10				
F	10-12				
G	12-14				

Comments:

PROPORTIONS USED		ABBREVIATIONS	Well Construction	DEPTH INTERVALS	
TRACE (TR)	0-10%	F = FINE	N/A	A = 0-24 in.	G = 144-168 in.
LITTLE (LI)	10-20%	M = MEDIUM		B = 24-48 in.	H = 168-192 in.
SOME (SO)	20-35%	C = COARSE		C = 48-72 in.	I = 192-216 in.
AND	35-50%	F/M = FINE TO MEDIUM		D = 72-96 in.	J = 216-240 in.
		F/C = FINE TO COARSE		E = 96-120 in..	K = 240-264 in.
		M/C = MEDIUM TO COARSE		F = 120-144 in.	L = 264-288 in.

TEST BORING LOG



272 West Exchange Street, Suite 101

Providence, Rhode Island 02903
(401) 421-0398 Fax (401) 421-5731

Site: Providence Gas Company 642 Allens Avenue, Providence, RI	Boring No.: B19
ESS Job No: P151-002	Date: 1/27/00
Driller.: Environmental Drilling, Inc.	Within 100' of Water: No
Well Diameter: N/A	Instrument: Thermo Environmental Instruments, Inc., Model 580B OVI
Drilling Method: Geoprobe	Boring Depth: 6.0'
Sample Method: 4' Acetate Sampler	Depth to Water: 4.0'
	Logged By: Jason Wiggin

Depth (intervals)	Sample Depth (feet)	Recovery/ Penetration (in.)	Sample Time	PID (ppm)	Materials Description (size, grade, color, moisture)
A	0-2	24/24	1420	1.4	(0-24") F/C brown/dark brown sand; LI gravel; TR silt; TR porous cinders; TR cinder ash.
B	2-4	36/48	1435	0.0	(36-48") F/C brown sand; LI gravel; TR silt; TR porous cinders and cinder ash; dry. (48-72) F/C brown sand; LI gravel; TR silt, TR porous cinders; TR cinder and ash; moist/wet.
C	4-6			0.0	
D	6-8				
E	8-10				
F	10-12				
G	12-14				

Comments:

PROPORTIONS USED	ABBREVIATIONS	Well Construction	DEPTH INTERVALS
TRACE (TR) 0-10%	F = FINE	N/A	A = 0-24 in. G = 144-168 in.
LITTLE (LI) 10-20%	M = MEDIUM		B = 24-48 in. H = 168-192 in.
SOME (SO) 20-35%	C = COARSE		C = 48-72 in. I = 192-216 in.
AND 35-50%	F/M = FINE TO MEDIUM		D = 72-96 in. J = 216-240 in.
	F/C = FINE TO COARSE		E = 96-120 in. K = 240-264 in.
	M/C = MEDIUM TO COARSE		F = 120-144 in. L = 264-288 in.

TEST BORING LOG



272 West Exchange Street, Suite 101

Providence, Rhode Island 02903
(401) 421-0398 Fax (401) 421-5731

Site: Providence Gas Company
642 Allens Avenue, Providence, RI
ESS Job No: P151-002

Driller.: Environmental Drilling, Inc.

Well Diameter: N/A

Drilling Method: Geoprobe

Sample Method: 4' Acetate Sampler

Boring No.: B21

Date: 1/31/00

Within 100' of Water: Yes

Instrument: Thermo Environment
Instruments, Inc., Model 580B OVM

Boring Depth: 6.0'

Depth to Water: 5.3'

Logged By: Daryll Issa

Depth (intervals)	Sample Depth (feet)	Recovery/ Penetration (in.)	Sample Time	PID (ppm)	Materials Description (size, grade, color, moisture)
A	0-2	24/24	1300	0.0	(0-10") F/M gray/brown sand and gravel; dry; no odor. (10-11") F/C light brown sand with SO gravel; dry; no odor. (11-24") M/large black cinder ash and black/dark cinder ash; dry; no odor.
B	2-4	41/48		0.0	(31-42") F/C black stained sand and cinder ash with SO gravel and SO brick cinders; wet; no odor. (42-50") F brown/dark brown sand; damp; odor present. (50-72") F gray/brown stained sand with TR gravel; wet; heavy odor.
C	4-6		1315	0.0	
D	6-8				
E	8-10				
F	10-12				
G	12-14				

Comments:

PROPORTIONS USED	ABBREVIATIONS	Well Construction	DEPTH INTERVALS
TRACE (TR) 0-10%	F = FINE	N/A	A = 0-24 in. G = 144-168 in.
LITTLE (LI) 10-20%	M = MEDIUM		B = 24-48 in. H = 168-192 in.
SOME (SO) 20-35%	C = COARSE		C = 48-72 in. I = 192-216 in.
AND : 35-50%	F/M = FINE TO MEDIUM		D = 72-96 in. J = 216-240 in.
	F/C = FINE TO COARSE		E = 96-120 in.. K = 240-264 in.
	M/C = MEDIUM TO COARSE		F = 120-144 in. L = 264-288 in.

TEST BORING LOG



2 West Exchange Street, Suite 101

Providence, Rhode Island 02903
(401) 421-0398 Fax (401) 421-5731

Site: Providence Gas Company
642 Allens Avenue, Providence, RI
ESS Job No: P151-002

Driller.: Environmental Drilling, Inc.

Well Diameter: N/A

Drilling Method: Geoprobe

Sample Method: 4' Acetate Sampler

Boring No.: B22

Date: 1/31/00

Within 100' of Water: Yes

Instrument: Thermo Environmental
Instruments, Inc., Model 580B OVM

Boring Depth: 6.0'

Depth to Water: 5.6'

Logged By: Daryll Issa

Depth (Intervals)	Sample Depth (feet)	Recovery/ Penetration (in.)	Sample Time	PID (ppm)	Materials Description (size, grade, color, moisture)
A	0-2	24/24	1330	0.0	(0-3") F/M brown sand and gravel; dry; no odor. (3-11") F/M brown sand with SO gravel; dry; no odor. (11-24") M/large black cinders with SO F brown/dark brown sand; dry; no odor.
B	2-4	33/48		0.0	(39-49") black cinder ash and black cinders; dry; no odor. (49-68") F/C light brown sand with TR gravel; damp; no odor. (68-72") F black sand with TR silt and TR gravel; wet; no odor.
C	4-6	33/48	1340	0.0	
D	6-8	47/48		0.0	(73-90") F/C brown sand; TR silt. (90-92") F/M brown sand and black coal ash. (92-120") F/M brown sand; LI silt; black staining; petroleum odor.
E	8-10			0.0	
	10-12				
G	12-14				

Comments:

PROPORTIONS USED	ABBREVIATIONS	Well Construction	DEPTH INTERVALS
TRACE (TR) 0-10%	F = FINE	(+.75'-4.0') PVC Solid Riser (4.0-9.0') PVC Screen One inch sump at 9.0'	A = 0-24 in. G = 144-168 in.
LITTLE (LI) 10-20%	M = MEDIUM		B = 24-48 in. H = 168-192 in.
SOME (SO) 20-35%	C = COARSE		C = 48-72 in. I = 192-216 in.
AND 35-50%	F/M = FINE TO MEDIUM		D = 72-96 in. J = 216-240 in.
	F/C = FINE TO COARSE		E = 96-120 in. K = 240-264 in.
	M/C = MEDIUM TO COARSE		F = 120-144 in. L = 264-288 in.

TEST BORING LOG



272 West Exchange Street, Suite 101

Providence, Rhode Island 02903
(401) 421-0398 Fax (401) 421-5731

Site: Providence Gas Company
642 Allens Avenue, Providence, RI
ESS Job No: P151-002

Driller.: Environmental Drilling, Inc.

Well Diameter: N/A

Drilling Method: Geoprobe

Sample Method: 4' Acetate Sampler

Boring No.: B23

Date: 1/31/00

Within 100' of Water: Yes

Instrument: Thermo Environment
Instruments, Inc., Model 580B OVM

Boring Depth: 6.0'

Depth to Water: 5.0'

Logged By: Daryll Issa

Depth (intervals)	Sample Depth (feet)	Recovery/ Penetration (in.)	Sample Time	PID (ppm)	Materials Description (size, grade, color, moisture)
A	0-2	24/24	1355	0.0	(3-6") F/M gray/brown sand and gravel; dry; no odor. (6-24") F/C light brown sand and gravel; dry; no odor.
B	2-4	38/48		0.0	(34-56") F/M brown sand with SO gravel; dry; no odor. (56-61") F dark brown sand with LI silt and TR gravel; wet; no odor. (61-65') black cinders and cinder ash; wet; no odor. (65-72") F brown sand and silt; wet; no odor.
C	4-6		1410	0.0	
D	6-8				
E	8-10				
F	10-12				
G	12-14				

Comments:

PROPORTIONS USED	ABBREVIATIONS	Well Construction	DEPTH INTERVALS
TRACE (TR) 0-10%	F = FINE	N/A	A = 0-24 in. G = 144-168 in.
LITTLE (LI) 10-20%	M = MEDIUM		B = 24-48 in. H = 168-192 in.
SOME (SO) 20-35%	C = COARSE		C = 48-72 in. I = 192-216 in.
AND 35-50%	F/M = FINE TO MEDIUM		D = 72-96 in. J = 216-240 in.
	F/C = FINE TO COARSE		E = 96-120 in.. K = 240-264 in.
	M/C = MEDIUM TO COARSE		F = 120-144 in. L = 264-288 in.

TEST BORING LOG



West Exchange Street, Suite 101

Providence, Rhode Island 02903
(401) 421-0398 Fax (401) 421-5731

Site: Providence Gas Company
642 Allens Avenue, Providence, RI
ESS Job No: P151-002

Driller.: Environmental Drilling, Inc.

Well Diameter: N/A

Drilling Method: Geoprobe

Sample Method: 4' Acetate Sampler

Boring No.: B24

Date: 2/1/00

Within 100' of Water: Yes

Instrument: Thermo Environmental
Instruments, Inc., Model 580B OVM

Boring Depth: 10.0'

Depth to Water: 8.4'

Logged By: Jason Wiggin

Depth (intervals)	Sample Depth (feet)	Recovery/ Penetration (in.)	Sample Time	PID (ppm)	Materials Description (size, grade, color, moisture)
A	0-2	24/24	0940	0.0	(0-12") F/M brown sand; SO gravel; TR silt. (12-22") F/M brown/tan sand; TR silt; dry. (22-24") F/M dark brown sand; LI silt; TR cinders.
B	2-4	45/48		0.0	(27-29") F/C gray sand; TR silt; dry. (29-34") F brown sand; LI silt; dry. (34-38") F/C black coal ash; LI F/M brown sand. (38-43") F/M brown sand; TR silt; TR cinders at 40"; TR yellow ash at 42"; dry. (43-48") F/C black coal ash; LI F/M brown sand; dry.
C	4-6			0.0	
D	6-8	38/48	1010	0.0	(82-88") F/M black sand; LI silt; dry. (88-91") F/C tan sand; SO silt; dry. (91-93") F dark brown sand; SO silt; TR cinders; moist. (93-101") F brown sand; SO silt; moist. (101-118") F brown/gray sand and silt; wet. (118-120") petroleum stain/odor; TR coal/ash; wet.
E	8-10			0.0	
F	10-12				
G	12-14				

Comments:

PROPORTIONS USED	ABBREVIATIONS	Well Construction	DEPTH INTERVALS
TRACE (TR) 0-10%	F = FINE	N/A	A = 0-24 in. G = 144-168 in.
LITTLE (LI) 10-20%	M = MEDIUM		B = 24-48 in. H = 168-192 in.
SOME (SO) 20-35%	C = COARSE		C = 48-72 in. I = 192-216 in.
AND 35-50%	F/M = FINE TO MEDIUM		D = 72-96 in. J = 216-240 in.
	F/C = FINE TO COARSE		E = 96-120 in. K = 240-264 in.
	M/C = MEDIUM TO COARSE		F = 120-144 in. L = 264-288 in.

TEST BORING LOG



272 West Exchange Street, Suite 101

Providence, Rhode Island 02903
(401) 421-0398 Fax (401) 421-5731

Site: Providence Gas Company
642 Allens Avenue, Providence, RI
ESS Job No: P151-002

Driller.: Environmental Drilling, Inc.

Well Diameter: N/A

Drilling Method: Geoprobe

Sample Method: 4' Acetate Sampler

Boring No.: B25

Date: 2/1/00

Within 100' of Water: Yes

Instrument: Thermo Environmental
Instruments, Inc., Model 580B OVM

Boring Depth: 10.0'

Depth to Water: 9.0'

Logged By: Jason Wiggin

Depth (intervals)	Sample Depth (feet)	Recovery/ Penetration (in.)	Sample Time	PID (ppm)	Materials Description (size, grade, color, moisture)
A	0-2	24/24	1020	0.0	(0-24") F/C brown sand and gravel; TR silt; TR brick fragments at 7"; TR coal and ash throughout sample; dry.
B	2-4	38/48		0.0	(34-72") F/M brown sand and F/M black coal ash/coal fragments; TR silt; TR porous cinders; dry.
C	4-6		1040	0.0	
D	6-8	24/48		0.0	
E	8-10			5.0	(96-100") F/M brown/black sand; LI silt; moist. (100-102") F/M tan sand; TR silt; moist. (102-107") F/M brown/black sand; LI silt; TR porous cinders; moist. (107-120") F/C brown sand, LI silt; TR gravel; stained gray from 117-120" with petroleum odor; wet.
F	10-12				
G	12-14				

Comments:

PROPORTIONS USED	ABBREVIATIONS	Well Construction	DEPTH INTERVALS
TRACE (TR) 0-10%	F = FINE	N/A	A = 0-24 in. G = 144-168 in.
LITTLE (LI) 10-20%	M = MEDIUM		B = 24-48 in. H = 168-192 in.
SOME (SO) 20-35%	C = COARSE		C = 48-72 in. I = 192-216 in.
AND 35-50%	F/M = FINE TO MEDIUM		D = 72-96 in. J = 216-240 in.
	F/C = FINE TO COARSE		E = 96-120 in. K = 240-264 in.
	M/C = MEDIUM TO COARSE		F = 120-144 in. L = 264-288 in.

TEST BORING LOG



2 West Exchange Street, Suite 101
 Providence, Rhode Island 02903
 (401) 421-0398 Fax (401) 421-5731

Site: Providence Gas Company 642 Allens Avenue, Providence, RI	Boring No.: B26
ESS Job No: P151-002	Date: 2/3/00
Driller.: Environmental Drilling, Inc.	Within 100' of Water: Yes
Well Diameter: N/A	Instrument: Thermo Environmental Instruments, Inc., Model 580B OVM
Drilling Method: Geoprobe	Boring Depth: 10.0'
Sample Method: 4' Acetate Sampler	Depth to Water: 9.5'
	Logged By: Jason Wiggin

Depth (Intervals)	Sample Depth (feet)	Recovery/Penetration (in.)	Sample Time	PID (ppm)	Materials Description (size, grade, color, moisture)
A	0-2	24/24	0950	0.0	(0-24") F/M brown sand and F cinder ash; LI C cinders; TR F gravel; TR silt; brick fragments at 22".
B	2-4	32/48		0.0	(40-45") F black cinder ash; TR F brown sand; TR gravel; dry. (45-49") F/M brown sand; LI silt; LI brick fragments; dry. (49-54") black F ash; TR F brown sand; TR gravel; dry. (54-61") F/C tan/yellow ash and C gravel sized cinders; dry. (61-72") F/C black ash and F gravel sized cinders; SO brick; dry.
C	4-6		1005	0.0	
D	6-8	33/48		0.0	
E	8-10			0.0	(87-92") F/C black cinder ash and F gravel sized cinders; SO brick; dry. (92-94") F/M black ash and black cinders. (94-97") F/C brown sand; LI silt; dry. (97-120") C black sand F gravel sized cinders/porous cinders; wet.
F	10-12				
G	12-14				

Comments:

PROPORTIONS USED	ABBREVIATIONS	Well Construction	DEPTH INTERVALS
TRACE (TR) 0-10%	F = FINE	N/A	A = 0-24 in.
LITTLE (LI) 10-20%	M = MEDIUM		G = 144-168 in.
SOME (SO) 20-35%	C = COARSE		B = 24-48 in.
AND 35-50%	F/M = FINE TO MEDIUM		H = 168-192 in.
	F/C = FINE TO COARSE		I = 192-216 in.
	M/C = MEDIUM TO COARSE		D = 72-96 in.
			J = 216-240 in.
			E = 96-120 in.
			K = 240-264 in.
			F = 120-144 in.
			L = 264-288 in.

TEST BORING LOG



272 West Exchange Street, Suite 101

Providence, Rhode Island 02903
(401) 421-0398 Fax (401) 421-5731

Site: Providence Gas Company
642 Allens Avenue, Providence, RI
ESS Job No: P151-002

Driller.: Environmental Drilling, Inc.

Well Diameter: N/A

Drilling Method: Geoprobe

Sample Method: 4' Acetate Sampler

Boring No.: B27

Date: 2/22/00

Within 100' of Water: No

Instrument: Thermo Environmen.
Instruments, Inc., Model 580B OVM

Boring Depth: 9.0'

Depth to Water: 5.5'

Logged By: Nicole Murry

Depth (intervals)	Sample Depth (feet)	Recovery/ Penetration (in.)	Sample Time	PID (ppm)	Materials Description (size, grade, color, moisture)
A	0-2	18/24	1504	0.0	(6-8") gravel. (8-24") M/C loose orange/brown sand with small/M rounded stones.
B	2-4	48/48		0.0	(24-60") F/M brown silty sand with small/M rounded stones. (60-69") F brown silty sand; wet. (69-72") C black, wet cinder ash; cinder ash stone and porous cinders.
C	4-6		1525	0.0	
D	6-8	10/48		0.0	(110-112") large stone. (112-120") F/M orange/brown silty sand with M-large rounded stone; wet.
E	8-10			0.0	
F	10-12				
G	12-14				

Comments:

Very LI sample due to low recovery and refusal at 9'.

PROPORTIONS USED		ABBREVIATIONS	Well Construction	DEPTH INTERVALS	
TRACE (TR)	0-10%	F = FINE	N/A	A = 0-24 in.	G = 144-168 in.
LITTLE (LJ)	10-20%	M = MEDIUM		B = 24-48 in.	H = 168-192 in.
SOME (SO)	20-35%	C = COARSE		C = 48-72 in.	I = 192-216 in.
AND	35-50%	F/M = FINE TO MEDIUM		D = 72-96 in.	J = 216-240 in.
		F/C = FINE TO COARSE		E = 96-120 in.	K = 240-264 in.
		M/C = MEDIUM TO COARSE		F = 120-144 in.	L = 264-288 in.

TEST BORING LOG



2 West Exchange Street, Suite 101

Providence, Rhode Island 02903
(401) 421-0398 Fax (401) 421-5731

Site: Providence Gas Company
642 Allens Avenue, Providence, RI
ESS Job No: P151-002

Driller.: Environmental Drilling, Inc.

Well Diameter: N/A

Drilling Method: Geoprobe

Sample Method: 4' Acetate Sampler

Boring No.: B28

Date: 2/23/00

Within 100' of Water: No

Instrument: Thermo Environmental
Instruments, Inc., Model 580B OVM

Boring Depth: 10.0'

Depth to Water: 9.5'


Logged By: Nicole Murry

Depth (intervals)	Sample Depth (feet)	Recovery/ Penetration (in.)	Sample Time	PID (ppm)	Materials Description (size, grade, color, moisture)
A	0-2	24/24	1050	25.0	(0-20") F/C light brown/orange sand; loose with small/M rounded stones throughout; dry; (21-24") M/C brown sand; dry; petroleum odor.
B	2-4	48/48		0.0	(24-32") F/M brown sand with small/M/C gravel. (32-72") very F brown/orange silty sand.
C	4-6			0.0	
D	6-8	48/48		0.0	
E	8-10		1125	0.0	(72-96") very F brown/orange silty sand. (96-110") F black cinder ash; brick; concrete with LI black wood chips. (110-120") M brown sand mixed with coal bits; M black cinder ash and black cinder ash stone; wet at 116".
F	10-12				
G	12-14				

Comments:

PROPORTIONS USED		ABBREVIATIONS	Well Construction	DEPTH INTERVALS	
TRACE (TR)	0-10%	F = FINE	N/A	A = 0-24 in.	G = 144-168 in.
LITTLE (LI)	10-20%	M = MEDIUM		B = 24-48 in.	H = 168-192 in.
SOME (SO)	20-35%	C = COARSE		C = 48-72 in.	I = 192-216 in.
AND	35-50%	F/M = FINE TO MEDIUM		D = 72-96 in.	J = 216-240 in.
		F/C = FINE TO COARSE		E = 96-120 in..	K = 240-264 in.
		M/C = MEDIUM TO COARSE		F = 120-144 in.	L = 264-288 in.

TEST BORING LOG

 272 West Exchange Street, Suite 101 Providence, Rhode Island 02903 (401) 421-0398 Fax (401) 421-5731					Site: Providence Gas Company 642 Allens Avenue, Providence, RI			Boring No.: B35	
					ESS Job No: P151-002			Date: 2/22/00	
					Driller.: Environmental Drilling, Inc.			Within 100' of Water: No	
					Well Diameter: N/A			Instrument: Thermo Environmen. Instruments, Inc., Model 580B OVM	
					Drilling Method: Geoprobe			Boring Depth: 14.0'	
Sample Method: 4' Acetate Sampler			Depth to Water: 13.5'						
			Logged By: Nicole Murry						
Depth (intervals)	Sample Depth (feet)	Recovery/ Penetration (in.)	Sample Time	PID (ppm)	Materials Description (size, grade, color, moisture)				
A	0-2	24/24	1435	0.0	(0-4") asphalt. (4-24") F/M brown/orange sand with small/large rounded stones throughout; soft.				
B	2-4	48/48		0.0	(24-72") F/M loose brown silty sand; with small/M rounded stones.				
C	4-6			0.0					
D	6-8	48/48		0.0	(72-80") F/M brown silty sand; dense. (80-88") red brick with M brown sand. (88-98") M/C black cinder ash; cinder ash stone and porous cinders (black and red). (98-120") F brown silty sand; SO red brick and small rounded stones.				
E	8-10		1445	0.0					
F	10-12	30/48		0.0	(136-140") C black cinder ash with brick. (140-168") F/M brown silty sand with coal bits from 140-146" small/M rounded stones from 140-150"; wet at 164".				
G	12-14	30/48		0.0					
<u>Comments:</u>									
PROPORTIONS USED		ABBREVIATIONS		Well Construction	DEPTH INTERVALS				
TRACE (TR)	0-10%	F = FINE		N/A	A = 0-24 in.				
LITTLE (LI)	10-20%	M = MEDIUM			G = 144-168 in.				
SOME (SO)	20-35%	C = COARSE			H = 168-192 in.				
AND	35-50%	F/M = FINE TO MEDIUM			I = 192-216 in.				
		F/C = FINE TO COARSE			J = 216-240 in.				
		M/C = MEDIUM TO COARSE			E = 96-120 in.				
					K = 240-264 in.				
					F = 120-144 in.				
					L = 264-288 in.				

TEST BORING LOG



2 West Exchange Street, Suite 101

Providence, Rhode Island 02903
(401) 421-0398 Fax (401) 421-5731

Site: Providence Gas Company
642 Allens Avenue, Providence, RI
ESS Job No: P151-002

Driller.: Environmental Drilling, Inc.

Well Diameter: N/A

Drilling Method: Geoprobe

Sample Method: 4' Acetate Sampler

Boring No.: B36

Date: 2/22/00

Within 100' of Water: No

Instrument: Thermo Environmental
Instruments, Inc., Model 580B OVM

Boring Depth: 10.0'

Depth to Water: 5.0'

Logged By: Nicole Murry

Depth (intervals)	Sample Depth (feet)	Recovery/ Penetration (in.)	Sample Time	PID (ppm)	Materials Description (size, grade, color, moisture)
A	0-2	24/24	1345	0.0	(0-3") large gravel. (3-8") M light brown/yellow sand with small rounded stones. (8-24") F/M black/brown sand mixed with coal; brick; large jagged gravel and cinder ash (black) throughout interval.
B	2-4	44/48		0.0	(28-32") dense brown and black M sand with large brick bits; large amount of cinder ash at 31". (32-38") concrete and white concrete powder with F light brown sand. (38-42") M brown sand; dense with large bits of red brick. (42-43") M orange sand. (43-45") large gray stone; solid. (45-50") M brown sand; dense with large bits of red brick. (50-60") poorly sorted M brown sand with large rounded stone; SO cinder ash (black) at 55". (60-72") F/M brown silty sand with SO small rounded stones; wet.
C	4-6		1355	0.0	
D	6-8	24/48		0.0	
E	8-10			0.0	(96-120") F/M brown silty sand; wet.
	10-12				
G	12-14				

Comments:

PROPORTIONS USED	ABBREVIATIONS	Well Construction	DEPTH INTERVALS
TRACE (TR) 0-10%	F = FINE	N/A	A = 0-24 in. G = 144-168 in.
LITTLE (LI) 10-20%	M = MEDIUM		B = 24-48 in. H = 168-192 in.
SOME (SO) 20-35%	C = COARSE		C = 48-72 in. I = 192-216 in.
AND 35-50%	F/M = FINE TO MEDIUM		D = 72-96 in. J = 216-240 in.
	F/C = FINE TO COARSE		E = 96-120 in.. K = 240-264 in.
	M/C = MEDIUM TO COARSE		F = 120-144 in. L = 264-288 in.

TEST BORING LOG



2 West Exchange Street, Suite 101
 Providence, Rhode Island 02903
 (401) 421-0398 Fax (401) 421-5731

Site: Providence Gas Company
 642 Allens Avenue, Providence, RI
 ESS Job No: P151-002
 Driller.: Environmental Drilling, Inc.
 Well Diameter: N/A
 Drilling Method: Geoprobe
 Sample Method: 4' Acetate Sampler

Boring No.: B42
 Date: 2/22/00
 Within 100' of Water: No
 Instrument: Thermo Environmental
 Instruments, Inc., Model 580B OVM
 Boring Depth: 10.0'
 Depth to Water: 8.5'
 Logged By: Nicole Murry

Depth (intervals)	Sample Depth (feet)	Recovery/Penetration (in.)	Sample Time	PID (ppm)	Materials Description (size, grade, color, moisture)
A	0-2	24/24	1210	0.0	(0-3") large gravel. (3-20") F/C black cinder ash mixed with C black sand. (20-24") concrete bits with SO M brown sand.
B	2-4	36/48		0.0	(36-72") F/C black cinder ash with M/C coal bits and cinder ash; loose red and white porous cinders/cinder ash; stone; concrete at 72".
C	4-6		1225	0.0	
D	6-8	24/48		0.0	(96-100") F/C black cinder ash with M/C coal bits and cinder ash; pliable red and white porous cinders/cinder ash. (100-120") F/M silty brown sand; wet at 100".
E	8-10			0.0	
F	10-12				
G	12-14				

Comments:

PROPORTIONS USED	ABBREVIATIONS	Well Construction	DEPTH INTERVALS
TRACE (TR) 0-10%	F = FINE	N/A	A = 0-24 in. G = 144-168 in.
LITTLE (LI) 10-20%	M = MEDIUM		B = 24-48 in. H = 168-192 in.
SOME (SO) 20-35%	C = COARSE		C = 48-72 in. I = 192-216 in.
AND 35-50%	F/M = FINE TO MEDIUM		D = 72-96 in. J = 216-240 in.
	F/C = FINE TO COARSE		E = 96-120 in.. K = 240-264 in.
	M/C = MEDIUM TO COARSE		F = 120-144 in. L = 264-288 in.

TEST BORING LOG



272 West Exchange Street, Suite 101

Providence, Rhode Island 02903
(401) 421-0398 Fax (401) 421-5731

Site: Providence Gas Company
642 Allens Avenue, Providence, RI
ESS Job No: P151-002

Driller.: Environmental Drilling, Inc.

Well Diameter: N/A

Drilling Method: Geoprobe

Sample Method: 4' Acetate Sampler

Boring No.: B43

Date: 2/22/00

Within 100' of Water: No

Instrument: Thermo Environment
Instruments, Inc., Model 580B OVM

Boring Depth: 6.0'

Depth to Water: 5.75'

Logged By: Daryll Issa

Depth (intervals)	Sample Depth (feet)	Recovery/ Penetration (in.)	Sample Time	PID (ppm)	Materials Description (size, grade, color, moisture)
A	0-2	24/24	0930	0.0	(0-24") F/M dark brown/brown sand and gravel with SO small/M black cinders and SO cinder ash; dry; no odor.
B	2-4	48/48		0.0	(24-28") F brown sand with LI gravel; dry; no odor. (28-39") F/M brown sand with SO gravel and TR red brick (pulverized); dry; no odor. (39-50") F brown sand and gravel; dry; no odor. (50-68") F/M light brown sand with SO gravel; damp; no odor. (68-72") F light brown sand with SO silt; TR gravel; saturated with water; no odor.
C	4-6		0945	0.0	
D	6-8				
E	8-10				
F	10-12				
G	12-14				

Comments:

PROPORTIONS USED		ABBREVIATIONS	Well Construction	DEPTH INTERVALS	
TRACE (TR)	0-10%	F = FINE	N/A	A = 0-24 in.	G = 144-168 in.
LITTLE (LI)	10-20%	M = MEDIUM		B = 24-48 in.	H = 168-192 in.
SOME (SO)	20-35%	C = COARSE		C = 48-72 in.	I = 192-216 in.
AND	35-50%	F/M = FINE TO MEDIUM		D = 72-96 in.	J = 216-240 in.
		F/C = FINE TO COARSE		E = 96-120 in..	K = 240-264 in.
		M/C = MEDIUM TO COARSE		F = 120-144 in.	L = 264-288 in.

TEST BORING LOG



2 West Exchange Street, Suite 101

Providence, Rhode Island 02903
(401) 421-0398 Fax (401) 421-5731

Site: Providence Gas Company
642 Allens Avenue, Providence, RI
ESS Job No: P151-002

Driller.: Environmental Drilling, Inc.

Well Diameter: N/A

Drilling Method: Geoprobe

Sample Method: 4' Acetate Sampler

Boring No.: B44

Date: 2/22/00

Within 100' of Water: No

Instrument: Thermo Environmental
Instruments, Inc., Model 580B OVM

Boring Depth: 10.0'

Depth to Water: 9.5'

Logged By: Daryll Issa

Depth (intervals)	Sample Depth (feet)	Recovery/ Penetration (in.)	Sample Time	PID (ppm)	Materials Description (size, grade, color, moisture)
A	0-2	19/24	1000	0.0	(5-9") F/M pulverized stone/gravel with SO light brown F/M sand; wet from surficial snow; no odor. (9-24") F/M brown/dark brown sand with SO gravel with SO small black cinders and SO pulverized red stone (not brick) at 16-18"; dry; no odor.
B	2-4	28/48		0.0	(44-72") F/M brown sand and pulverized red brick and gravel; dry; no odor.
C	4-6			0.0	
D	6-8	38/48		0.0	
E	8-10		1020	0.0	(82-93") pulverized red brick with SO F/M dark sand and SO gravel; dry; no odor. (93-98") pulverized yellow brick and gravel; damp; no odor. (98-115") black cinder ash with TR gravel; damp; no odor. (115-120") F black/gray silt and sand; wet; no odor.
F	10-12				
G	12-14				

Comments:

PROPORTIONS USED	ABBREVIATIONS	Well Construction	DEPTH INTERVALS
TRACE (TR) 0-10%	F = FINE	N/A	A = 0-24 in. G = 144-168 in.
LITTLE (LI) 10-20%	M = MEDIUM		B = 24-48 in. H = 168-192 in.
SOME (SO) 20-35%	C = COARSE		C = 48-72 in. I = 192-216 in.
AND 35-50%	F/M = FINE TO MEDIUM		D = 72-96 in. J = 216-240 in.
	F/C = FINE TO COARSE		E = 96-120 in. K = 240-264 in.
	M/C = MEDIUM TO COARSE		F = 120-144 in. L = 264-288 in.

TEST BORING LOG



272 West Exchange Street, Suite 101

Providence, Rhode Island 02903
(401) 421-0398 Fax (401) 421-5731

Site: Providence Gas Company
642 Allens Avenue, Providence, RI
ESS Job No: P151-002

Driller.: Environmental Drilling, Inc.

Well Diameter: N/A

Drilling Method: Geoprobe

Sample Method: 4' Acetate Sampler

Boring No.: B45

Date: 2/22/00

Within 100' of Water: No

Instrument: Thermo Environmental
Instruments, Inc., Model 580B OVM

Boring Depth: 6.0'

Depth to Water: 5.5'

Logged By: Daryll Issa

Depth (Intervals)	Sample Depth (feet)	Recovery/Penetration (in.)	Sample Time	PID (ppm)	Materials Description (size, grade, color, moisture)
A	0-2	16/24	1025	0.0	(10-14") gravel. (14-24") F/C brown sand with SO gravel; damp; no odor.
B	2-4	43/48		0.0	(29-39") F/C light brown sand and LI large gravel; damp; no odor. (39-45") F dark brown sand with SO silt and SO gravel; damp; no odor. (45-72") F/M brown/dark brown sand with SO pulverized brick and SO gravel with a white, putty like substance; wet at 67"; no odor.
C	4-6		1100	0.0	
D	6-8				
E	8-10				
F	10-12				
G	12-14				

Comments:

PROPORTIONS USED

TRACE (TR) 0-10%
LITTLE (LI) 10-20%
SOME (SO) 20-35%
AND 35-50%

ABBREVIATIONS

F = FINE
M = MEDIUM
C = COARSE
F/M = FINE TO MEDIUM
F/C = FINE TO COARSE
M/C = MEDIUM TO COARSE

Well Construction

N/A

DEPTH INTERVALS

A = 0-24 in. G = 144-168 in.
B = 24-48 in. H = 168-192 in.
C = 48-72 in. I = 192-216 in.
D = 72-96 in. J = 216-240 in.
E = 96-120 in. K = 240-264 in.
F = 120-144 in. L = 264-288 in.

TEST BORING LOG



West Exchange Street, Suite 101

Providence, Rhode Island 02903
(401) 421-0398 Fax (401) 421-5731

Site: Providence Gas Company
642 Allens Avenue, Providence, RI
ESS Job No: P151-002

Driller.: Environmental Drilling, Inc.

Well Diameter: N/A

Drilling Method: Geoprobe

Sample Method: 4' Acetate Sampler

Boring No.: B46

Date: 2/18/00

Within 100' of Water: No

Instrument: Thermo Environmental
Instruments, Inc., Model 580B OVM

Boring Depth: 6.0'

Depth to Water: (see below)

Logged By: Daryll Issa

Depth (intervals)	Sample Depth (feet)	Recovery/ Penetration (in.)	Sample Time	PID (ppm)	Materials Description (size, grade, color, moisture)
A	0-2	22/24	1300	0.0	(2-6") F/C light brown sand; wet; no odor. (6-10") F/C brown sand with SO gravel; wet; no odor. (23-24") F brown sand with SO gravel; wet; no odor.
B	2-4	23/48		0.0	(49-57") F/C light brown sand with LI gravel; wet; no odor. (57-64") F/M brown sand with SO gravel; wet; no odor. (64-72") pulverized red brick with SO F/M brown sand and TR gravel; wet; no odor
C	4-6		1315	0.0	
D	6-8				
E	8-10				
F	10-12				
G	12-14				

Comments:
Due to snow and rain, unable to determine water table.

PROPORTIONS USED	ABBREVIATIONS	Well Construction	DEPTH INTERVALS
TRACE (TR) 0-10%	F = FINE	N/A	A = 0-24 in. G = 144-168 in.
LITTLE (LI) 10-20%	M = MEDIUM		B = 24-48 in. H = 168-192 in.
SOME (SO) 20-35%	C = COARSE		C = 48-72 in. I = 192-216 in.
AND 35-50%	F/M = FINE TO MEDIUM		D = 72-96 in. J = 216-240 in.
	F/C = FINE TO COARSE		E = 96-120 in. K = 240-264 in.
	M/C = MEDIUM TO COARSE		F = 120-144 in. L = 264-288 in.

TEST BORING LOG



272 West Exchange Street, Suite 101

Providence, Rhode Island 02903
(401) 421-0398 Fax (401) 421-5731

Site: Providence Gas Company
642 Allens Avenue, Providence, RI
ESS Job No: P151-002

Driller.: Environmental Drilling, Inc.

Well Diameter: N/A

Drilling Method: Geoprobe

Sample Method: 4' Acetate Sampler

Boring No.: B55

Date: 3/2/00

Within 100' of Water: No

Instrument: Thermo Environmental
Instruments, Inc., Model 580B OVM

Boring Depth: 6.0'

Depth to Water: 5.0'


Logged By: Daryll Issa

Depth (intervals)	Sample Depth (feet)	Recovery/ Penetration (in.)	Sample Time	PID (ppm)	Materials Description (size, grade, color, moisture)
A	0-2	24/24	1205	0.0	(0-4") black/dark brown topsoil and gravel; damp; no odor. (4-24") F/M brown sand; dry; no odor.
B	2-4	14/48		0.0	(58-63") F/M brown/dark brown sand with SO gravel; damp; no odor. (63-72") F/M dark brown sand with SO gravel; wet; no odor.
C	4-6	14/48	1225	0.0	
D	6-8				
E	8-10				
F	10-12				
G	12-14				

Comments:

PROPORTIONS USED		ABBREVIATIONS	Well Construction	DEPTH INTERVALS	
TRACE (TR)	0-10%	F = FINE	N/A	A = 0-24 in.	G = 144-168 in.
LITTLE (LI)	10-20%	M = MEDIUM		B = 24-48 in.	H = 168-192 in.
SOME (SO)	20-35%	C = COARSE		C = 48-72 in.	I = 192-216 in.
AND	35-50%	F/M = FINE TO MEDIUM		D = 72-96 in.	J = 216-240 in.
		F/C = FINE TO COARSE		E = 96-120 in..	K = 240-264 in.
		M/C = MEDIUM TO COARSE		F = 120-144 in.	L = 264-288 in.

TEST BORING LOG

 '2 West Exchange Street, Suite 101 Providence, Rhode Island 02903 (401) 421-0398 Fax (401) 421-5731	Site: Providence Gas Company 642 Allens Avenue, Providence, RI	Boring No.: B56
	ESS Job No: P151-002	Date: 2/18/00
	Driller.: Environmental Drilling, Inc.	Within 100' of Water: No
	Well Diameter: N/A	Instrument: Thermo Environmental Instruments, Inc., Model 580B OVM
	Drilling Method: Geoprobe	Boring Depth: 6.0'
Sample Method: 4' Acetate Sampler	Depth to Water: 5.0'	Logged By: Daryll Issa

Depth (intervals)	Sample Depth (feet)	Recovery/Penetration (in.)	Sample Time	PID (ppm)	Materials Description (size, grade, color, moisture)
A	0-2	20/24	0910	0.0	(4-6") topsoil/gravel. (6-24") F/M brown/dark brown sand with SO pulverized red brick and TR small black cinders and TR yellow brick; dry; no odor. Note: This interval was sampled on 2/18/00.
B	2-4	22/48		0.0	(30-55") pulverized red brick with SO brown sand, TR gravel, and SO coal/ash; dry; no odor. (55-60") pulverized concrete. (60-72") wood chips; wet; no odor. Note: This interval was sampled on 3/2/00.
C	4-6		1038	0.0	
D	6-8				
E	8-10				
	10-12				
G	12-14				

Comments:

Note: The area surrounding boring B56 provided poor recovery and heavy refusal. As a result, the surface and subsurface samples were obtained on different dates and are identified on a different Chain of Custody.

PROPORTIONS USED	ABBREVIATIONS	Well Construction	DEPTH INTERVALS
TRACE (TR) 0-10%	F = FINE	N/A	A = 0-24 in. G = 144-168 in.
LITTLE (LI) 10-20%	M = MEDIUM		B = 24-48 in. H = 168-192 in.
SOME (SO) 20-35%	C = COARSE		C = 48-72 in. I = 192-216 in.
AND 35-50%	F/M = FINE TO MEDIUM		D = 72-96 in. J = 216-240 in.
	F/C = FINE TO COARSE		E = 96-120 in. K = 240-264 in.
	M/C = MEDIUM TO COARSE		F = 120-144 in. L = 264-288 in.

TEST BORING LOG



2 West Exchange Street, Suite 101

Providence, Rhode Island 02903
(401) 421-0398 Fax (401) 421-5731

Site: Providence Gas Company
642 Allens Avenue, Providence, RI
ESS Job No: P151-002

Driller.: Environmental Drilling, Inc.

Well Diameter: N/A

Drilling Method: Geoprobe

Sample Method: 4' Acetate Sampler

Boring No.: B62

Date: 2/16/00

Within 100' of Water: No

Instrument: Thermo-Environmental
Instruments, Inc., Model 580B OVM

Boring Depth: 6.0'

Depth to Water: 3.8'

Logged By: Daryll Issa

Depth (intervals)	Sample Depth (feet)	Recovery/ Penetration (in.)	Sample Time	PID (ppm)	Materials Description (size, grade, color, moisture)
A	0-2	24/24	1515	0.0	(0-8") F/C light brown/brown sand and gravel; damp; no odor. (8-20") F/C light brown sand and gravel; damp; no odor. (20-24") F/M brown sand with LI gravel; damp; no odor.
B	2-4	48/48	1530	0.0	(24-31") F/M brown/dark brown sand and gravel. (31-39") F brown/dark brown sand with LI gravel; dry; no odor. (39-72") F brown silt with TR sand; saturated with water at 44"; no odor.
C	4-6			0.0	
D	6-8				
E	8-10				
	10-12				
G	12-14				

Comments:

PROPORTIONS USED		ABBREVIATIONS	Well Construction	DEPTH INTERVALS	
TRACE (TR)	0-10%	F = FINE	N/A	A = 0-24 in.	G = 144-168 in.
LITTLE (LJ)	10-20%	M = MEDIUM		B = 24-48 in.	H = 168-192 in.
SOME (SO)	20-35%	C = COARSE		C = 48-72 in.	I = 192-216 in.
AND	35-50%	F/M = FINE TO MEDIUM		D = 72-96 in.	J = 216-240 in.
		F/C = FINE TO COARSE		E = 96-120 in.	K = 240-264 in.
		M/C = MEDIUM TO COARSE		F = 120-144 in.	L = 264-288 in.

TEST BORING LOG



272 West Exchange Street, Suite 101

Providence, Rhode Island 02903
(401) 421-0398 Fax (401) 421-5731

Site: Providence Gas Company
642 Allens Avenue, Providence, RI
ESS Job No: P151-002

Driller.: Environmental Drilling, Inc.

Well Diameter: N/A

Drilling Method: Geoprobe

Sample Method: 4' Acetate Sampler

Boring No.: B64

Date: 2/18/00

Within 100' of Water: No

Instrument: Thermo Environmental
Instruments, Inc., Model 580B OVM

Boring Depth: 6.0'

Depth to Water: 5.8'

Logged By: Nicole Murry

Depth (intervals)	Sample Depth (feet)	Recovery/ Penetration (In.)	Sample Time	PID (ppm)	Materials Description (size, grade, color, moisture)
A	0-2	24/24	0825	0.0	(0-6") M light brown sand with large gravel and SO small rounded stone. (6-24") poorly sorted M/C dark brown sand mixed with SO small rounded gravel; very F black cinder ash throughout the interval; SO brick.
B	2-4	36/48	0840	0.0	(36-60") poorly sorted M/C brown sand with silt mixed with small/M rounded gravel; coal bits at (40"); cinder ash band at (38"); large stone at (44"). (60-66") F brown silty sand. (66-68") very F brown/orange silt. (68-72") F brown silty sand; saturation at 70".
C	4-6				
D	6-8				
E	8-10				
F	10-12				
G	12-14				

Comments:

PROPORTIONS USED	ABBREVIATIONS	Well Construction	DEPTH INTERVALS
TRACE (TR) 0-10%	F = FINE	N/A	A = 0-24 in. G = 144-168 in.
LITTLE (L) 10-20%	M = MEDIUM		B = 24-48 in. H = 168-192 in.
SOME (SO) 20-35%	C = COARSE		C = 48-72 in. I = 192-216 in.
AND 35-50%	F/M = FINE TO MEDIUM		D = 72-96 in. J = 216-240 in.
	F/C = FINE TO COARSE		E = 96-120 in. K = 240-264 in.
	M/C = MEDIUM TO COARSE		F = 120-144 in. L = 264-288 in.

TEST BORING LOG



72 West Exchange Street, Suite 101

Providence, Rhode Island 02903
(401) 421-0398 Fax (401) 421-5731

Site: Providence Gas Company
642 Allens Avenue, Providence, RI
ESS Job No: P151-002
Driller.: Environmental Drilling, Inc.
Well Diameter: N/A
Drilling Method: Geoprobe
Sample Method: 4' Acetate Sampler

Boring No.: B65
Date: 2/18/00
Within 100' of Water: No
Instrument: Thermo Environmental Instruments, Inc., Model 580B OVM
Boring Depth: 6.0'
Depth to Water: 4.3'
Logged By: Daryll Issa

Depth (intervals)	Sample Depth (feet)	Recovery/ Penetration (in.)	Sample Time	PID (ppm)	Materials Description (size, grade, color, moisture)
A	0-2	24/24	0840	0.0	(0-2") topsoil with SO gravel; dry; no odor. (2-6") F/M light brown sand with SO gravel and SO small/M black cinders; dry; no odor. (6-20") F/M brown/dark brown/black sand and gravel with SO black cinders; dry; no odor. (20-24") F/M dense black cinder ash with SO black cinders; dry; no odor.
B	2-4	48/48	0858	0.0	(24-26") F/M brown sand and small/M black cinders; dry; no odor. (26-48") F/M brown sand and gravel; dry; no odor. (48-72") F/M brown sand with SO silt and SO gravel; saturated; no odor.
C	4-6			0.0	
D	6-8				
E	8-10				
	10-12				
G	12-14				

Comments:

PROPORTIONS USED		ABBREVIATIONS	Well Construction	DEPTH INTERVALS	
TRACE (TR)	0-10%	F = FINE	N/A	A = 0-24 in.	G = 144-168 in.
LITTLE (L)	10-20%	M = MEDIUM		B = 24-48 in.	H = 168-192 in.
SOME (SO)	20-35%	C = COARSE		C = 48-72 in.	I = 192-216 in.
AND	35-50%	F/M = FINE TO MEDIUM		D = 72-96 in.	J = 216-240 in.
		F/C = FINE TO COARSE		E = 96-120 in..	K = 240-264 in.
		M/C = MEDIUM TO COARSE		F = 120-144 in.	L = 264-288 in.

TEST BORING LOG



2 West Exchange Street, Suite 101

Providence, Rhode Island 02903
(401) 421-0398 Fax (401) 421-5731

Site: Providence Gas Company
642 Allens Avenue, Providence, RI
ESS Job No: P151-002

Driller.: Environmental Drilling, Inc.

Well Diameter: N/A

Drilling Method: Geoprobe

Sample Method: 4' Acetate Sampler

Boring No.: B66

Date: 2/18/00

Within 100' of Water: No

Instrument: Thermo Environmental
Instruments, Inc., Model 580B OVM

Boring Depth: 6.0'

Depth to Water: 6.0'


Logged By: Nicole Murry

Depth (intervals)	Sample Depth (feet)	Recovery/ Penetration (in.)	Sample Time	PID (ppm)	Materials Description (size, grade, color, moisture)
A	0-2	14/24	0900	0.0	(10-14") M brown sand with M/large gravel; SO brick, cinder ash and cinder ash stone. (14-24") concrete and concrete powder with SO light brown sand.
B	2-4	12/48		0.0	(60-64") F/M light brown/gray silty sand mixed with coal bits, cinder ash stone, and SO orange porous cinders. (64-66") concrete and concrete powder with F/M gray sand and silty sand. (66-72") dense very F brown silty sand; SO small rounded stone at 68"; saturation at 70".
C	4-6		0915	0.0	
D	6-8				
E	8-10				
	10-12				
G	12-14				

Comments:

PROPORTIONS USED		ABBREVIATIONS	Well Construction	DEPTH INTERVALS	
TRACE (TR)	0-10%	F = FINE	N/A	A = 0-24 in.	G = 144-168 in.
LITTLE (LI)	10-20%	M = MEDIUM		B = 24-48 in.	H = 168-192 in.
SOME (SO)	20-35%	C = COARSE		C = 48-72 in.	I = 192-216 in.
AND	35-50%	F/M = FINE TO MEDIUM		D = 72-96 in.	J = 216-240 in.
		F/C = FINE TO COARSE		E = 96-120 in.	K = 240-264 in.
		M/C = MEDIUM TO COARSE		F = 120-144 in.	L = 264-288 in.

TEST BORING LOG

 2 West Exchange Street, Suite 101 Providence, Rhode Island 02903 (401) 421-0398 Fax (401) 421-5731	Site: Providence Gas Company	Boring No.: D38
	642 Allens Avenue, Providence, RI	Date: 12/3/99
	ESS Job No: P151-002	Within 100' of Water: No
	Driller.: Environmental Drilling, Inc.	Instrument: Thermo Environmental Instruments, Inc., Model 580B OVM
	Well Diameter: N/A	Boring Depth: 10.0'
	Drilling Method: Geoprobe	Depth to Water: 7.5'
Sample Method: 4' Acetate Sampler	Logged By: Daryll Issa	

Depth (Intervals)	Sample Depth (feet)	Recovery/ Penetration (in.)	Sample Time	PID (ppm)	Materials Description (size, grade, color, moisture)
A	0-2	24/24	0920	0.0	(0-24") F/M brown sand with TR gravel and LI black sand; dry; no odor.
B	2-4	32/48		0.0	(40-72") F/M brown sand and gravel; dry; no odor.
C	4-6			0.0	
D	6-8	36/48	0935	0.0	
E	8-10			0.0	(84-90") F/M brown sand with TR gravel; dry; no odor. (90-120") F/C brown sand with TR gravel and LI silt; wet; no odor.
F	10-12				
G	12-14				

Comments:

PROPORTIONS USED	ABBREVIATIONS	Well Construction	DEPTH INTERVALS
TRACE (TR) - 0-10%	F = FINE		A = 0-24 in.
LITTLE (LI) 10-20%	M = MEDIUM		B = 24-48 in.
SOME (SO) 20-35%	C = COARSE		C = 48-72 in.
AND 35-50%	F/M = FINE TO MEDIUM		D = 72-96 in.
	F/C = FINE TO COARSE		E = 96-120 in.
	M/C = MEDIUM TO COARSE		F = 120-144 in.
			G = 144-168 in.
			H = 168-192 in.
			I = 192-216 in.
			J = 216-240 in.
			K = 240-264 in.
			L = 264-288 in.

TEST BORING LOG



272 West Exchange Street, Suite 101

Providence, Rhode Island 02903
(401) 421-0398 Fax (401) 421-5731

Site: Providence Gas Company
642 Allens Avenue, Providence, RI
ESS Job No: P151-002

Driller.: Environmental Drilling, Inc.

Well Diameter: N/A

Drilling Method: Geoprobe

Sample Method: 4' Acetate Sampler

Boring No.: D57

Date: 12/8/99

Within 100' of Water: No

Instrument: Thermo Environmental
Instruments, Inc., Model 580B OVM

Boring Depth: 10.0'

Depth to Water: 3.5'

Logged By: Daryll Issa

Depth (intervals)	Sample Depth (feet)	Recovery/Penetration (in.)	Sample Time	PID (ppm)	Materials Description (size, grade, color, moisture)
A	0-2	20/24	1220	5.2	(4-10") concrete; dry. (10-24") F/M brown sand with LI gravel; dry; no odor.
B	2-4	48/48	1240	2.6	(24-42") F/M brown/gray sand and gravel with TR silt; dry; no odor. (42-72") F/M silt - uniform; saturated with water; no odor.
C	4-6			2.6	
D	6-8	48/48		2.6	(72-120") F/M silt - uniform; saturated with water; no odor.
E	8-10			2.6	
F	10-12				
G	12-14				

Comments:

PROPORTIONS USED		ABBREVIATIONS	Well Construction	DEPTH INTERVALS	
TRACE (TR)	0-10%	F = FINE		A = 0-24 in.	G = 144-168 in.
LITTLE (LI)	10-20%	M = MEDIUM		B = 24-48 in.	H = 168-192 in.
SOME (SO)	20-35%	C = COARSE		C = 48-72 in.	I = 192-216 in.
AND	35-50%	F/M = FINE TO MEDIUM		D = 72-96 in.	J = 216-240 in.
		F/C = FINE TO COARSE		E = 96-120 in.	K = 240-264 in.
		M/C = MEDIUM TO COARSE		F = 120-144 in.	L = 264-288 in.

TEST BORING LOG



2 West Exchange Street, Suite 101

Providence, Rhode Island 02903
(401) 421-0398 Fax (401) 421-5731

Site: Providence Gas Company
642 Allens Avenue, Providence, RI
ESS Job No: P151-002

Driller.: Environmental Drilling, Inc.

Well Diameter: N/A

Drilling Method: Geoprobe

Sample Method: 4' Acetate Sampler

Boring No.: D58

Date: 12/8/99

Within 100' of Water: No

Instrument: Thermo Environmental
Instruments, Inc., Model 580B OVM

Boring Depth: 10.0'

Depth to Water: 6.8'

Logged By: Daryll Issa

Depth (intervals)	Sample Depth (feet)	Recovery/ Penetration (in.)	Sample Time	PID (ppm)	Materials Description (size, grade, color, moisture)
A	0-2	19/24	1455	20.1	(5-12") concrete and asphalt. (12-24") F/M brown sand with TR gravel; dry; no odor.
B	2-4	25/48		1.3	(47-72") F/M brown/gray sand with SO gravel; dry; no odor.
C	4-6			1.3	
D	6-8	38/48	1505	82	
E	8-10			69	(82-120") F/M brown/black stained sand and gravel ; sheen visible on entire interval; saturated with water; heavy odor.
	10-12				
G	12-14				

Comments:

PROPORTIONS USED	ABBREVIATIONS	Well Construction	DEPTH INTERVALS
TRACE (TR) 0-10%	F = FINE		A = 0-24 in. G = 144-168 in.
LITTLE (L) 10-20%	M = MEDIUM		B = 24-48 in. H = 168-192 in.
SOME (SO) 20-35%	C = COARSE		C = 48-72 in. I = 192-216 in.
AND 35-50%	F/M = FINE TO MEDIUM		D = 72-96 in. J = 216-240 in.
	F/C = FINE TO COARSE		E = 96-120 in. K = 240-264 in.
	M/C = MEDIUM TO COARSE		F = 120-144 in. L = 264-288 in.

TEST BORING LOG



272 West Exchange Street, Suite 101
 Providence, Rhode Island 02903
 (401) 421-0398 Fax (401) 421-5731

Site: Providence Gas Company 642 Allens Avenue, Providence, RI	Boring No.: D59
ESS Job No: P151-002	Date: 12/8/99
Driller.: Environmental Drilling, Inc.	Within 100' of Water: No
Well Diameter: N/A	Instrument: Thermo Environmental Instruments, Inc., Model 580B OVM
Drilling Method: Geoprobe	Boring Depth: 10.0'
Sample Method: 4' Acetate Sampler	Depth to Water: not determined
	Logged By: Daryll Issa

Depth (intervals)	Sample Depth (feet)	Recovery/ Penetration (in.)	Sample Time	PID (ppm)	Materials Description (size, grade, color, moisture)
A	0-2	24/24	1515	0.0	(0-6") concrete dust. (6-24") F/M brown sand and gravel; wet at 18"; no odor.
B	2-4	31/48		0.0	(41-72") F/M brown sand and large gravel; wet; no odor.
C	4-6		1520	3.9	
D	6-8	30/48		1.3	
E	8-10			1.3	
F	10-12				
G	12-14				

Comments:

PROPORTIONS USED	ABBREVIATIONS	Well Construction	DEPTH INTERVALS
TRACE (TR) 0-10%	F = FINE		A = 0-24 in. G = 144-168 in.
LITTLE (LI) 10-20%	M = MEDIUM		B = 24-48 in. H = 168-192 in.
SOME (SO) 20-35%	C = COARSE		C = 48-72 in. I = 192-216 in.
AND 35-50%	F/M = FINE TO MEDIUM		D = 72-96 in. J = 216-240 in.
	F/C = FINE TO COARSE		E = 96-120 in. K = 240-264 in.
	M/C = MEDIUM TO COARSE		F = 120-144 in. L = 264-288 in.



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 (401) 421-0398 Fax (401) 421-5731

Site: Providence Gas/Algonquin Gas

Well / Boring No.: RHB-1

Job No: P151-000.1

Ground Elevation:

Drilling Co.: Envirotech

ESS Inspector: Erik A. Johnstone

Method: Hollow Stem Auger

Well Diameter: NA

Instrument:

Sample Method: Split spoon

Water Level: NA

Well / Boring Depth: 10'

Date: 9/3/98

Logged By: Erik A. Johnstone

Checked by:

Sample No.	Recovery/ Penetration (in inches)	Blow Counts	Headspace (ppm)	Depth (feet)	Soil Log	Materials Description (size, grade, color, moisture)			
0-1				2		Concrete.			() PVC Riser
1-3	16"	8	7.1-7.7	4		F to M sand (13") grey-green; some cobbles. 13"-16" F to M sand; black.			
3-5	16"	32 37 25 29	4.0-4.6	6		Grey/brown M sand; some cobbles; some dark staining; no odor.			() PVC Screen
5-7	15"	40 26 21 25	18.1	8		Grey/green medium sand; some cobbles; no odor.			
7-9	10"	5 63 30 32	9.2-9.7	10		Grey/brown medium sand; some cobbles. Yellow/grey M to coarse sand; wet; slight odor.			
9-10	12"	48 60	57.4	12		Grey/brown medium sand; wet; slight odor.			

Comments

Well Location

PROPORTIONS USED	ABBREVIATIONS USED	
TRACE (TR.) 0-10%	F = FINE	
LITTLE (LI.) 10-20%	M = MEDIUM	
SOME (SO.) 20-35%	C = COARSE	
AND 35-50%	F/M = FINE TO MEDIUM	
	F/C = FINE TO COARSE	
	M/C = MEDIUM TO COARSE	



272 West Exchange Street, Suite 101
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Site: Providence Gas/Algonquin Gas

Well / Boring No.: RHB-2

Job No: P151-000.1

Ground Elevation:

Drilling Co.: Envirotech

ESS Inspector: Erik A. Johnstone

Drill Method: Hollow Stem Auger

Well Diameter: NA

Instrument:

Sample Method: Split spoon

Water Level: NA

Well / Boring Depth: 9'

Date: 9/3/98


Logged By: Erik A. Johnstone

Checked by:

Sample No.	Recovery/ Penetration (in inches)	Blow Counts	Headspace (ppm)	Depth (feet)	Soil Log	Materials Description (size, grade, color, moisture)			
0-1				0		Concrete.			() PVC Riser
1-3	6"	3 4 3 3	2	2		F to M brown sand; no odor.			
3-5	3"	3 5 3 3	1	4		M brown sand; no odor.			() PVC Screen
5-7	3"	3 3 4 3	43	6		M/C brown sand; wet petroleum staining wet; petroleum odor.			
7-9	6"	5 6	186	8		M/C Brown sand; wet petroleum staining and odor.			
				10					
				12					

Comments
 9/4/98 PID readings in office GK

Well Location

PROPORTIONS USED	ABBREVIATIONS	
TRACE (TR.) 0-10%	F = FINE	
LITTLE (LI.) 10-20%	M = MEDIUM	
SOME (SO.) 20-35%	C = COARSE	
AND 35-50%	F/M = FINE TO MEDIUM	
	F/C = FINE TO COARSE	
	M/C = MEDIUM TO COARSE	



272 West Exchange Street, Suite 101
 Providence, Rhode Island 02903
 (401) 421-0398 Fax (401) 421-5731

Site: Providence Gas/Algonquin Gas

Well / Boring No.: RHB-3

Job No: P151-000.1

Ground Elevation:

Drilling Co.: Envirotech

ESS Inspector: Erik A. Johnstone

Method: Hollow Stem Auger

Well Diameter: NA

Instrument:

Sample Method: Split spoon

Water Level: NA

Well / Boring Depth: 9'

Date: 9/3/98


Logged By: Erik A. Johnstone

Checked by:

Sample No.	Recovery/ Penetration (in inches)	Blow Counts	Headspace (ppm)	Depth (feet)	Soil Log	Materials Description (size, grade, color, moisture)		
0-1				2		Concrete.		() PVC Riser
1-3	11"	4 4 4 6	3.8	4		F/M brown sand; some cobbles; slight odor.		
3-5	13"	5 10 15 16	4.3	6		M/C brown/grey sand; some cobbles.		() PVC Screen
5-7	6"	36 42 75 29	4.6	8		M/C brown/grey sand; some cobbles; wet; no odor.		
7-9	13"	22 16 71 80	180	10		F/M brown/grey sand, wet; petroleum odor.		
				12				

Comments
 9/4/98 PID readings in office GK

Well Location

PROPORTIONS USED	ABBREVIATIONS	
TRACE (TR.) 0-10%	F = FINE	
LITTLE (LI.) 10-20%	M = MEDIUM	
SOME (SO.) 20-35%	C = COARSE	
AND 35-50%	F/M = FINE TO MEDIUM	
	F/C = FINE TO COARSE	
	M/C = MEDIUM TO COARSE	



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 (401) 421-0398 Fax (401) 421-5731

Site: Providence Gas/Algonquin Gas

Well / Boring No.: RHB-4

Job No: P151-000.1

Ground Elevation:

Drilling Co.: Envirotech

ESS Inspector: Erik A. Johnstone

Drill Method: Hollow Stem Auger

Well Diameter: NA

Instrument:

Sample Method: Split spoon

Water Level: NA

Well / Boring Depth: 10.5'

Date: 9/4/98

Logged By: Erik A. Johnstone

Checked by:

Sample No.	Recovery/ Penetration (in inches)	Blow Counts	Headspace (ppm)	Depth (feet)	Soil Log	Materials Description (size, grade, color, moisture)			
0-2	NA	NA	NA	2		Concrete.			() PVC Riser
2-4	9"	4 4 8 11	-	4		Fine grey sand; little cobbles; slight odor.			
4-6	3"	4 4 8 11	-	6		Fine grey sand; and cobbles; slight odor. Not enough recovery for a sample.			() PVC Screen
6-8	3"	5 9 9 8	-	8		Fine grey sand; little cobbles; wet.			
8-10	8"	13 13 11 7	-	10		0"-5": F/M grey sand; wet; slight odor. 5"-8": M/C grey/yellow sand and cobbles; stronger odor.			
10-10.5	5"	19	-	12		Medium grey sand; wet; some staining and slight odor.			

Comments

Well Location

PROPORTIONS USED	ABBREVIATIONS
TRACE (TR.) 0-10%	F = FINE
LITTLE (LI.) 10-20%	M = MEDIUM
SOME (SO.) 20-35%	C = COARSE
AND 35-50%	F/M = FINE TO MEDIUM
	F/C = FINE TO COARSE
	M/C = MEDIUM TO COARSE



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Site: Providence Gas/Algonquin Gas

Well / Boring No.: RHB-5

Job No: P151-000.1

Ground Elevation:

Drilling Co.: Envirotech

ESS Inspector: Erik A. Johnstone

Method: Hollow Stem Auger

Well Diameter: NA

Instrument:

Sample Method: Split spoon

Water Level: NA

Well / Boring Depth: 10'

Date: 9/4/98


Logged By: Erik A. Johnstone

Checked by:

Sample No.	Recovery/ Penetration (in inches)	Blow Counts	Headspace (ppm)	Depth (feet)	Soil Log	Materials Description (size, grade, color, moisture)			
0-2	NA	NA	NA	2		Concrete.			() PVC Riser
2-4	5"	5 7 9 10	-	4		Medium grey/brown sand; some cobbles; slight petroleum odor.			
4-6	6"	4 5 3 8	-	6		Medium grey sand; little cobbles; moist; moderate odor.			() PVC Screen
6-8	3"	7 6 5 5	-	8		Medium grey sand; little cobbles; moist; moderate odor; not enough recovery for a sample.			
8-10	8"	8 11	-	10		Coarse grey/yellow sand and cobbles; moderate odor; last two inches of the sample interval have a heavier odor and some staining.			
				12					

Comments

Well Location

PROPORTIONS USED	ABBREVIATIONS	
TRACE (TR.) 0-10%	F = FINE	
LITTLE (LI.) 10-20%	M = MEDIUM	
SOME (SO.) 20-35%	C = COARSE	
AND 35-50%	F/M = FINE TO MEDIUM	
	F/C = FINE TO COARSE	
	M/C = MEDIUM TO COARSE	



272 West Exchange Street, Suite 101
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 (401) 421-0398 Fax (401) 421-5731

Site: Providence Gas/Algonquin Gas; Allens Avenue

Well / Boring No.: RHB-6

Job No: P151-000.1

Ground Elevation:

Drilling Co.: Envirotech

ESS Inspector: Erik A. Johnstone

Drill Method: Hollow Stem Auger

Well Diameter: NA

Instrument:

Sample Method: Split spoon

Water Level: NA

Well / Boring Depth: 9'

Date: 9/4/98

Logged By: Erik A. Johnstone

Checked by:

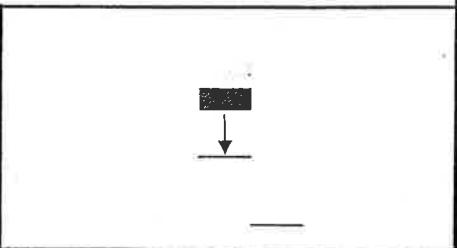
Sample No.	Recovery/ Penetration (in inches)	Blow Counts	Headspace (ppm)	Depth (feet)	Soil Log	Materials Description (size, grade, color, moisture)			
0-1	NA	NA	NA	0-2		Concrete.			() PVC Riser
1-3	11"	7 10 11 10	-	2-4		Medium grey/brown sand and cobbles; moist; moderate odor.			
3-5	15"	9 15 25 47	-	4-6		F/M grey sand cobbles; moist; moderate odor.			() PVC Screen
5-7	9.5"	25 26 22 18	-	6-8		F/M grey/yellow sand; some cobbles; slight odor.			
7-9	7"	8 13 12 16	-	8-10		F/M grey sand; little cobbles; wet; moderate odor.			
				10-12					

Comments


Well Location

PROPORTIONS USED	
TRACE (TR.)	0-10%
LITTLE (LI.)	10-20%
SOME (SO.)	20-35%
AND	35-50%

ABBREVIATIONS
F = FINE
M = MEDIUM
C = COARSE
F/M = FINE TO MEDIUM
F/C = FINE TO COARSE
M/C = MEDIUM TO COARSE



Test Pit Excavation Log

 Environmental Science Services, Inc. 272 West Exchange Street, Suite 101 Providence, Rhode Island 02903 (401) 421-0398 Environmental Scientists, Engineers, and Planners	Client	Providence Gas Company	Test Pit No.	B07
	Site Name	Allens Avenue Remediation Project	Date	9/5/00
	Site Address	642 Allens Avenue, Providence, Rhode Island	Observed By	Daryll Issa
	Job Number	P151-002	Checked By	Gary Kaufman
	Contractor	Tantara Corporation	Test Pit Depth	10.5 feet
	Excavator Reach	12 feet	Groundwater Depth	Damp at 10.5 feet

Test Pit Description

- 0-8" Fine/medium brown sand with some gravel, dry, no odor.
- 8-24" Fine/ medium brown sand with some black cinder/ash and some red brick, gravel, dry, no odor.
- 24-62" Fine/medium light brown sand with some gravel, dry, faint petroleum odor, no PID above background.
- 62-96" Fine/medium gray sand with some fine/medium brown and dark brown sand, dry, petroleum odor, no PID above background.
- 96-126" Fine/medium gray sand with trace gravel, damp at 126", petroleum odor present, no PID above background.

Remarks:
Soil damp at 10.5 feet. Test pit was ended due to sides caving in.

Location/Sketch:
Test pit is located within 100 feet of the river, adjacent to Boring B07. See Figure 2 in SIR.

Test Pit Excavation Log



Environmental Science Services, Inc.
 272 West Exchange Street, Suite 101
 Providence, Rhode Island 02903 (401) 421-0398
 Environmental Scientists, Engineers, and Planners



Client	Providence Gas Company	Test Pit No.	B09
Site Name	Allens Avenue Remediation Project	Date	9/5/00
Site Address	642 Allens Avenue, Providence, Rhode Island	Observed By	Daryll Issa
Job Number	P151-002	Checked By	Gary Kaufman
Contractor	Tantara Corporation	Test Pit Depth	10 feet
Excavator Reach	12 feet	Groundwater Depth	6 feet

Test Pit Description

- 0-3" Fine/medium brown sand with some gravel, dry, no odor.
- 3-10" Fine/medium black sand with black cinders/ash, dry, no odor.
- 10-36" Fine light brown sand, dry, no odor.
- 36-48" Fine/medium gray to olive gray sand with trace gravel, dry, strong petroleum odor.
- 48-72" Fine/medium gray sand with trace gravel, damp, petroleum odor, PID=48.0 ppm.
- 72-120" Fine/medium gray sand with trace gravel, wet, petroleum odor, PID=48.0 ppm.

Remarks:

Groundwater entered hole at approximately 72". Was able to excavate to 120" prior to hole filling with water.

Location/Sketch:

Within 100 feet of the river, adjacent to B09. See Figure 2 in SIR.

Soil Boring Report

PROJECT
New England Gas Company
642 Allens Avenue
Providence, Rhode Island

Report of Boring No. **VHB-17**

Well ID: **NA**

Job Number: **71274**

Sheet 1 of 1

Drilling Company: **Subsurface Drilling and Remediation**

Boring Location: **SW corner, by fence near RCA 14**

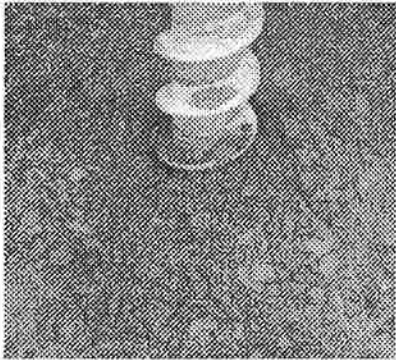
Driller: **Jim Goldthwaite / Josh Downing**

Elevation: **NA** Datum: **NA**

Inspector: **Keith Sullivan / Adam Rosenblatt**

Start Date: **1/17/2002** End Date: **1/17/2002**

The borings were drilled by hollow-stem auger. Unless otherwise noted, the soil samples were collected using a 2' split-spoon driven with a 140-lb. hammer falling 30".

Depth (ft)	PID Reading	Sample No.	Pen/Rec	Blows/6"	SAMPLE DESCRIPTION	Boring Photo
0 - 5	ND	S1	NA	NA	Auger cuttings - Light brown, loose, fine to coarse SAND, trace gravel, moist, no sheen or odor.	
5 - 6	118	S2	NA	NA	Auger cuttings - Light gray, fine SAND, trace silt, trace gravel, moist to wet, very strong chemical odor.	
						Bottom of exploration 6' below grade.

GRANULAR SOILS BLOWS/FT DENSITY		COHESIVE SOILS BLOWS/FT DENSITY		PROPORTIONS		Notes
0 - 4	V. Loose	<2	V. Soft	Trace	0 - 10%	
4 - 10	Loose	2 - 4	Soft	Little	10 - 20%	
10 - 30	M. Dense	4 - 8	M. Stiff	Some	20 - 35%	
30 - 50	Dense	8 - 15	Stiff	And	35 - 50%	
>50	V. Dense	15 - 30	V. Stiff			
		>30	Hard			








Soil Boring Report

PROJECT
New England Gas Company
642 Allens Avenue
Providence, Rhode Island

Report of Boring No. MHA-1
 Well ID: VHB-21
 Job Number: 71274
 Sheet 1 of 1

Drilling Company: Subsurface Environmental Drilling
 Driller: Phil/Brad
 Inspector: Claude Masse / Chris Mazzolini
 Boring Location: Southwestern corner of MHA.
 Elevation: NA Datum: NA
 Start Date: 1/28/2003 End Date: 1/28/2003

The borings were advanced by a hollow stem auger. Unless otherwise noted, the soil samples were collected using a two-foot split-spoon driven with a 140 lb. hammer falling 30 inches.

Depth (ft.)	PID Reading	Sample No.	Pen/Rec (in.)	Blews/6 in.	SAMPLE DESCRIPTION	Boring Photo
0 - 2	NA	S-1	24/12	41/120/52	Auger to approximately six inches below grade because surficial soil was frozen. Gray, light brown, fine to medium sand and silt with gravel, dry frozen.	
2 - 4	3.7	S-2	24/24	29/19/26/16	Gray, fine to med. sand and silt, with gravel.	
4 - 6	744	S-3	24/6	4/4/6/6	Dark gray to gray, fine to medium sand with gravel; moist with odor.	
6 - 8	NA	S-4	24/18	8/10/11/11	Gray, fine to med. sand with gravel; wet with odor.	
8 - 10	NA	S-5	24/12	10/11/10/10	Dark gray, fine sand and silt with gravel; wet with odor.	
10 - 12	1200	S-6	24/2	3/6/3/2	Gray to brown, medium to coarse sand with gravel; wet with strong odor.	
12 - 14	NA	S-7	24/12	1/1/1/1	Black and gray, fine to coarse sand; wet with odor.	

Set 2 inch monitoring well with standpipe at 16 ft. below grade with 10 ft. of screen.

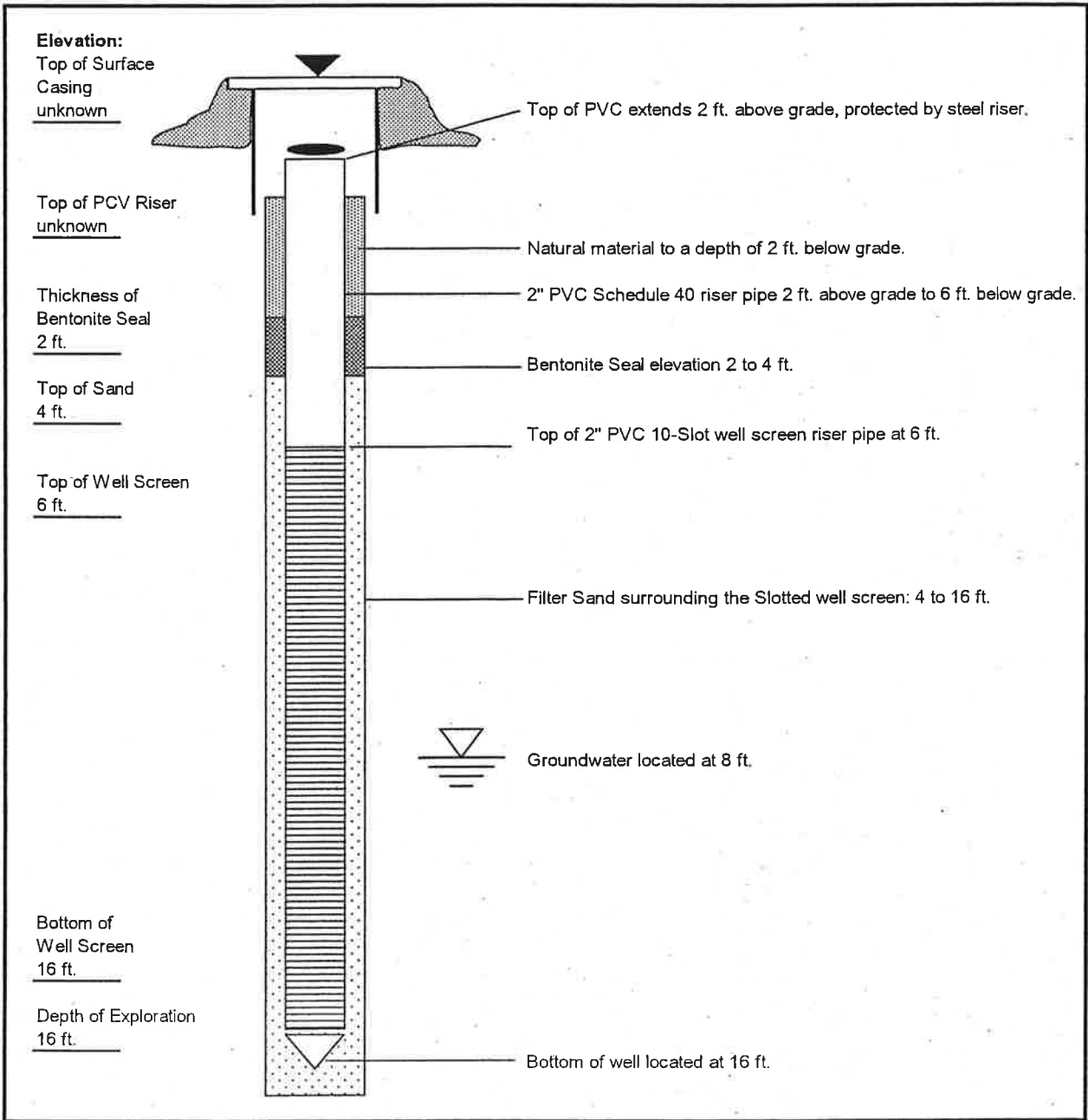
Bottom of exploration 16 ft. below grade.

GRANULAR SOILS BLOW/FT DENSITY	COHESIVE SOILS BLOW/FT DENSITY	PROPORTIONS	NOTES
0 - 4 V. Loose	<2 V. Soft	Trace 0 - 10%	1) Soil stratification lines represent a graphical depiction of changes in soil type and grainsize. Actual changes may be gradual. 2) Bedrock was not encountered. 3) Water levels may fluctuate due to ocean tides, season, and precipitation rates. 4) All soil samples were screened in the field for VOCs using a ThermoEnvironmental Instruments model 580B 10 eV photoionization detector (PID). 5) AFS = Auger Flight Sample 6) NSR = No Sample Recovered
4 - 10 Loose	2 - 4 Soft	Little 10 - 20%	
10 - 30 M. Dense	4 - 8 M. Stiff	Some 20 - 35%	
30 - 50 Dense	8 - 15 Stiff	And 35 - 50%	
>50 V. Dense	15 - 30 V. Stiff		
	>30 Hard		

N6

VHB Monitoring Well Diagram

Project Name: New England Gas Project No. 71274 Date: 29-Jan-03
Location: 642 Allens Ave Contractor: Subsurface Drilling Well No. VHB-23
Providence, RI Scientist: C. Masse/C. Mazzolini GW Depth: Approx. 8 Feet



BORING CO. <u>Guild</u>	BORING LOCATION <u>See Exploration Location Plan</u>
FOREMAN <u>Tom Paquette, John Medeiros</u>	GROUND SURFACE ELEV. <u>±14'</u> DATUM <u>MLLW</u>
GZA ENG. <u>Joanne Kissinger</u>	DATE START <u>4/19/04</u> DATE END <u>4/19/04</u>

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: 5" OTHER:

GROUNDWATER READINGS				
DATE	TIME	WATER	CASING	STABILIZATION TIME

DEPTH	CASING BLOWS	SAMPLE				SAMPLE DESCRIPTION BURMISTER CLASSIFICATION	R K	STRATUM DESCRIPTION
		NO	PEN./REC	DEPTH (FT)	BLOWS/6"			
5		S-1	18/10	0-1.5	3-8	Medium dense, brown, fine to medium SAND, trace fine	1	GRANULAR FILL
					60/6"	Gravel, trace Silt		
10						Refusal at ±1.5'		
15								
20								
25								
30								

GRANULAR SOILS BLOWS/FT DENSITY	COHESIVE SOILS BLOWS/FT DENSITY	REMARKS: 1. Obstruction encountered. Relocated hole 5' away.
0-4 VERY LOOSE	<2 VERY SOFT	
4-10 LOOSE	2-4 SOFT	
10-30 MEDIUM DENSE	4-8 M. STIFF	
30-50 DENSE	8-15 STIFF	
>50 VERY DENSE	15-30 V. STIFF	
	>30 HARD	

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 MAY OCCUR DUE TO OTHER FACTORS THAN THOSE PRESENT AT THE TIME MEASUREMENTS WERE MADE

BORING CO. <u>Guild</u>	BORING LOCATION <u>See Exploration Location Plan</u>
FOREMAN <u>Tom Paquette, John Mederios</u>	GROUND SURFACE ELEV. <u>±14'</u> DATUM <u>MLLW</u>
GZA ENG. <u>Joanne Kissinger</u>	DATE START <u>4/19/04</u> DATE END <u>4/19/04</u>

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: 5" OTHER:

DEPTH	CASING BLOWS	SAMPLE				SAMPLE DESCRIPTION BURMISTER CLASSIFICATION	R K	STRATUM DESCRIPTION
		NO	PEN./REC	DEPTH (FT)	BLOWS/6"			
5	P	S-1	24/18	0-2	7-7	Medium dense, orange, fine to medium SAND, little fine Gravel, trace Silt (Top 15"): Medium dense, tan, fine to medium SAND, little fine Gravel, trace Silt (Bottom 3"): Loose, dark brown, fine to medium SAND, some Silt, trace fine Gravel	1 2	GRANULAR FILL
	P				8-8			
	P	S-2	24/18	2-4	13-9			
	P				11-9			
	P	S-3	24/8	4-6	10-9			
10					8-13			
		S-4	18/12	6-7.5	11-13	S-3: Medium dense, orange-brown, fine to coarse SAND, some Silt		
					56/6"	S-4: Very dense, brown and orange, fine to coarse SAND, some Silt, trace fine Gravel (wet)		
						Refusal at ±7.5'		
15								
20								
25								
30								

GRANULAR SOILS BLOWS/FT DENSITY	COHESIVE SOILS BLOWS/FT DENSITY	REMARKS:
0-4 VERY LOOSE	<2 VERY SOFT	1. Obstruction encountered at ±7.5', pipe broke. Sample S-4 was collected and the hole relocated again 5' away. 2. Groundwater encountered at ±6'.
4-10 LOOSE	2-4 SOFT	
10-30 MEDIUM DENSE	4-8 M. STIFF	
30-50 DENSE	8-15 STIFF	
>50 VERY DENSE	15-30 V. STIFF	
	>30 HARD	

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 MAY OCCUR DUE TO OTHER FACTORS THAN THOSE PRESENT AT THE TIME MEASUREMENTS WERE MADE

GZA GEOENVIRONMENTAL INC. 140 BROADWAY, PROVIDENCE, RHODE ISLAND GEOTECH/GEOHYDROLOGICAL CONSULTANTS GEOTECHNICAL BORING LOG				PROJECT KeySpan LNG Terminal Providence, Rhode Island		REPORT OF BORING NO. <u>GZ-7 (C)</u> SHEET <u>1 of 5</u> FILE NO. <u>32784</u> CHKD BY <u>DMA</u>		
BORING CO. <u>Guild</u>		FOREMAN <u>Tom Paquette, John Mederios</u>		BORING LOCATION <u>See Exploration Location Plan</u>		GROUND SURFACE ELEV. <u>±14'</u> DATUM <u>MLLW</u>		
GZA ENG. <u>Joanne Kissinger</u>				DATE START <u>4/19/04</u>		DATE END <u>4/24/04</u>		
SAMPLER: UNLESS OTHERWISE NOTED, SAMPLER CONSISTS OF A 2" SPLIT SPOON DRIVEN USING A 140 lb. HAMMER FALLING 30 IN				GROUNDWATER READINGS				
CASING: UNLESS OTHERWISE NOTED, CASING DRIVEN USING A 300 lb HAMMER FALLING 24 IN.				DATE	TIME	WATER	CASING	
CASING SIZE: <u>5" / 4"</u> OTHER:				<u>4/24/04</u>		<u>±11'</u>		
							STABILIZATION TIME	
DEPTH	CASING BLOWS	SAMPLE				SAMPLE DESCRIPTION BURMISTER CLASSIFICATION	R K	STRATUM DESCRIPTION
		NO	PEN./REC	DEPTH (FT)	BLOWS/6"			
5	S						1	GRANULAR FILL
	S						2	
	S						3	
	P						4	
	P							
	S							
	S							
	S	S-5	24/2	8-10	4-1	Loose, gray, fine to coarse (-) SAND, little Silt (wet)		
	S				3-5			
	S							
10	S							
	S							
	S							
	S							
	S	S-6	24/0	14-16	19-18	NO RECOVERY		
	S				15-14			
	S	S-7	24/4	16-18	PUSH	Loose, black, fine to medium SAND, trace Silt (wet)		
	S							
	S							
	S							
15	S							
	S							
	S							
	S							
	S	S-8	24/6	19-21	20-8	Medium dense, dark brown, FIBROUS WOOD, trace medium Sand (wet)		
	S				5-5			
	S							
	S							
	S							
	S							
20	S							
	S							
	S							
	S							
	S							
	S							
	S							
	S	S-9A	24/0	24-26	15-3	NO RECOVERY		
	S				1-2			
	S	S-9B	24/15	24-26	PUSH	Very soft, gray, Organic SILT, trace Organics, Fibers, Shells		
25	S							
	S							
	S							
	S							
	S							
	S							
	S							
	S							
	S	UP-1	24/0	27-29		UNDISTURBED PISTON SAMPLE (NO RECOVERY)		
	S							
30	S							
	S							
	S							
	S							
	S							
	S							
	S							
	S							
	S	S-10A	24/0	29-31	2-4	NO RECOVERY		
	S				2-2			
S								
S	S-10B	24/20	29-31	PUSH	Very soft, gray, Organic SILT, trace Organics, Wood fibers			
GRANULAR SOILS BLOWS/FT DENSITY		COHESIVE SOILS BLOWS/FT DENSITY		REMARKS:				
0-4	VERY LOOSE	<2	VERY SOFT	1. Casing spun (s) or pushed (p).				
4-10	LOOSE	2-4	SOFT	2. Samples S-1 through S-4 collected in boring GZ-7 (B).				
10-30	MEDIUM DENSE	4-8	M. STIFF	3. Rollerbit from 0-8'. (Rollerbit through concrete from 1.5' to ±3'). Petroleum type odors 5-8' while rollerbit Spin casing to 8'.				
30-50	DENSE	8-15	STIFF	4. Rollerbit ahead to 14'. Rollerbit through obstruction 10-12.8' 8. Install 4" casing.				
>50	VERY DENSE	15-30	V. STIFF	5. Rollerbit ahead to 19'. 9. 3" spoon used to collect sample S-10B.				
		>30	HARD	6. Rollerbit ahead to 24' (wood encountered to 22.5')				
				7. 3" spoon used to collect sample S-9B.				
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 MAY OCCUR DUE TO OTHER FACTORS THAN THOSE PRESENT AT THE TIME MEASUREMENTS WERE MADE								
GZA							BORING NO. GZ-7(C)	

GZA GEOENVIRONMENTAL INC. 140 BROADWAY, PROVIDENCE, RHODE ISLAND GEOTECH/GEOHYDROLOGICAL CONSULTANTS	PROJECT	REPORT OF BORING NO.	GZ-7 (C)
	KeySpan LNG Terminal	SHEET	3 of 5
	Providence, Rhode Island	FILE NO.	32784
		CHKD BY	DMA

DEPTH	CASING BLOWS	SAMPLE				SAMPLE DESCRIPTION BURMISTER CLASSIFICATION	R K	STRATUM DESCRIPTION
		NO	PEN./REC	DEPTH (FT)	BLOWS/6"			
75		S-19	24/18	74-76	10-13	Dense, gray, fine to medium SAND, trace fine Gravel, trace Silt	17	OUTWASH DEPOSITS
					19-19			
80		S-20	24/14	79-81	16-13	Medium dense, gray, fine to medium SAND, trace Silt		
					15-14			
85		S-21	24/16	85-87	20-17	Dense, gray, fine to coarse (-) SAND, trace Silt		
					16-18			
90		S-22	24/20	89-91	20-15	Dense, gray, fine to medium SAND, trace Silt		
					20-18			
95		S-23	24/6	94-96	25-28	Very dense, gray, fine to medium SAND, trace fine Gravel, trace Silt		
					26-18			
100		S-24	24/18	99-101	17-20	Dense, gray, fine to medium SAND, little Silt		
					21-20			
105		S-25	24/19	104-106	14-12	Medium dense, gray, fine to medium SAND, little Silt		
					12-15			
110		S-26	24/20	109-111	18-19	Dense, gray, fine to medium SAND and SILT		
					28-37			
115		S-27	24/12	114-116	19-18	Dense, gray, fine to coarse (-) SAND and SILT, trace fine Gravel		
					17-17			

GRANULAR SOILS BLOWS/FT DENSITY		COHESIVE SOILS BLOWS/FT DENSITY		REMARKS: 17. Drill ahead to 85'. Cobble encountered at 84'.
0-4	VERY LOOSE	<2	VERY SOFT	
4-10	LOOSE	2-4	SOFT	
10-30	MEDIUM DENSE	4-8	M. STIFF	
30-50	DENSE	8-15	STIFF	
>50	VERY DENSE	15-30	V. STIFF	
		>30	HARD	

NOTES: 1) STRATIFICATION LINES REPRESENT APPROXIMATE BOUNDARY BETWEEN SOIL TYPES, TRANSITIONS MAY BE GRADUAL
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DEPTH	CASING BLOWS	SAMPLE				SAMPLE DESCRIPTION BURMISTER CLASSIFICATION	R K	STRATUM DESCRIPTION
		NO	PEN./REC	DEPTH (FT)	BLOWS/6"			
120		S-28	24/12	119-121	19-27	Very dense, gray, fine to coarse (-) SAND, some Silt		
					28-24			
125		S-29	24/20	124-126	23-17	Dense, gray, fine to coarse (-) SAND, little Silt, trace fine Gravel		
					17-16			
130		S-30	24/12	129-131	23-21	(Top 9"): Dense, gray, fine to coarse (-) SAND, some Silt (Bottom 3"): Dense, gray, fine SAND and SILT		
					17-19			
135		S-31	24/12	134-136	35-31	Very dense, gray, fine to coarse (-) SAND, some Silt	18 19	GLACIAL TILL
					29-33			
140		S-32	24/18	139-141	33-17	Dense, gray, fine to coarse (-) SAND, some Silt		
					23-22			
145		S-33	24/12	144-146	67-71	Very dense, gray, fine to coarse SAND, some Silt		
					64-30			
150		S-34	24/20	149-151	12-8	Medium dense, gray, fine SAND, little Silt	21 22	
					12-26			
155		S-35	24/24	154-156	27-32	Very dense, gray, fine SAND, little Silt	23 24	
					26-29			

GRANULAR SOILS BLOWS/FT DENSITY	COHESIVE SOILS BLOWS/FT DENSITY	REMARKS: 18. Hole collapsed (Bottom ±35') (Casing at ±64). 19. ±2" lens fine sand and silt. 20. After sample S-33 spin casing from 64' to 145'. 21. Two hours down time (rig repairs). 22. Drill ahead, approximately 3 feet of cobbles, then casing installed to ±149'. 23. 0.5 hours downtime (oil pressure leak). 24. Drill ahead collapsed, install casing to ±154'.
0-4 VERY LOOSE	<2 VERY SOFT	
4-10 LOOSE	2-4 SOFT	
10-30 MEDIUM DENSE	4-8 M. STIFF	
30-50 DENSE	8-15 STIFF	
>50 VERY DENSE	15-30 V. STIFF	
	>30 HARD	

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 MAY OCCUR DUE TO OTHER FACTORS THAN THOSE PRESENT AT THE TIME MEASUREMENTS WERE MADE

DEPTH	CASING BLOWS	SAMPLE				SAMPLE DESCRIPTION BURMISTER CLASSIFICATION	R K	STRATUM DESCRIPTION
		NO	PEN./REC	DEPTH (FT)	BLOWS/6"			
160		S-36	24/20	159-161	46-47 58-65	Very dense, gray, fine SAND, and Silt	25	GLACIAL TILL
165		S-37	6/4	164-164.5	100/4" 23/2"	(Top 2"): Very dense, gray, fine to medium SAND and SILT (Bottom 2"): Very dense, gray weathered SHALE	26	
170		S-38	0/0	169-169	50/0"	Refusal with spoon	27	
		C-1	60/8	169-174	min/ft RQD = 0 % 5 3 3	Gray, fine GRAVEL		
175					4 3		28	
180						End of Exploration at ±174'		
185								
190								
195								
200								

GRANULAR SOILS BLOWS/FT DENSITY		COHESIVE SOILS BLOWS/FT DENSITY		REMARKS: 25. Drill ahead install casing to ±159'. 26. Drill ahead from ±159' to ±164'. Casing installed to ±164', Replace pressure gauge. 27. Install casing to ±169'. 28. Casing to ±173'.
0-4	VERY LOOSE	<2	VERY SOFT	
4-10	LOOSE	2-4	SOFT	
10-30	MEDIUM DENSE	4-8	M. STIFF	
30-50	DENSE	8-15	STIFF	
>50	VERY DENSE	15-30 >30	V. STIFF HARD	

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 MAY OCCUR DUE TO OTHER FACTORS THAN THOSE PRESENT AT THE TIME MEASUREMENTS WERE MADE

BORING CO. <u>Guild</u>	BORING LOCATION <u>See Exploration Location Plan</u>
FOREMAN <u>Tom Paquette, John Medeiros</u>	GROUND SURFACE ELEV. <u>±14'</u> DATUM <u>MLLW</u>
GZA ENG. <u>Joanne Kissinger</u>	DATE START <u>4/27/04</u> DATE END <u>4/27/04</u>

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: 5" OTHER:

DEPTH	CASING BLOWS	SAMPLE				SAMPLE DESCRIPTION BURMISTER CLASSIFICATION	R K	STRATUM DESCRIPTION
		NO	PEN./REC	DEPTH (FT)	BLOWS/6"			
5						The objective of this boring is to drill to approximately ±27' to collect two undisturbed samples. Spoon samples not needed. Obstructions encountered where noted.	1	0.31 FILL
							±1.4' OBSTRUCTION	
							2	FILL
							3	±3.7' OBSTRUCTION
							3	±4.5' FILL
10						4	±7' OBSTRUCTION	
							FILL	
							CONCRETE OBSTRUCTION	
							±12.3'	
						5		
15						6	WOOD OBSTRUCTION	
20								
25								
30								

GRANULAR SOILS BLOWS/FT DENSITY	COHESIVE SOILS BLOWS/FT DENSITY	REMARKS: 1. Through five obstructions encountered. 6. Casing drive shoe left in hole. Casing shoe broke 36" wrench. 7. Hole was relocated approximately 10' away.
0-4 VERY LOOSE	<2 VERY SOFT	
4-10 LOOSE	2-4 SOFT	
10-30 MEDIUM DENSE	4-8 M. STIFF	
30-50 DENSE	8-15 STIFF	
>50 VERY DENSE	15-30 V. STIFF	
	>30 HARD	

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 MAY OCCUR DUE TO OTHER FACTORS THAN THOSE PRESENT AT THE TIME MEASUREMENTS WERE MADE

BORING CO. <u>Guild</u>	BORING LOCATION <u>See Exploration Location Plan</u>
FOREMAN <u>Tom Paquette, John Medeiros</u>	GROUND SURFACE ELEV. <u>±14'</u> DATUM <u>MLLW</u>
GZA ENG. <u>Joanne Kissinger</u>	DATE START <u>4/28/04</u> DATE END <u>4/28/04</u>

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: 5" OTHER:

GROUNDWATER READINGS				
DATE	TIME	WATER	CASING	STABILIZATION TIME

DEPTH	CASING BLOWS	SAMPLE				SAMPLE DESCRIPTION BURMISTER CLASSIFICATION	R K	STRATUM DESCRIPTION
		NO	PEN./REC	DEPTH (FT)	BLOWS/6"			
5						The objective of this boring is to drill to approximately 27' depth to collect two undisturbed samples. Spoon samples not needed		
30		UP-1	24/23	27-29				UNDISTURBED PISTON SAMPLE OF ORGANIC SILT
		UP-2	24/22	29-31		UNDISTURBED PISTON SAMPLE OF ORGANIC SILT		
						End of Exploration at ±31'		

	GRANULAR SOILS BLOWS/FT DENSITY	COHESIVE SOILS BLOWS/FT DENSITY	REMARKS:
0-4	VERY LOOSE	<2	VERY SOFT
4-10	LOOSE	2-4	SOFT
10-30	MEDIUM DENSE	4-8	M. STIFF
30-50	DENSE	8-15	STIFF
>50	VERY DENSE	15-30	V. STIFF
		>30	HARD

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 MAY OCCUR DUE TO OTHER FACTORS THAN THOSE PRESENT AT THE TIME MEASUREMENTS WERE MADE

GZA GEOENVIRONMENTAL INC. 40 BROADWAY, PROVIDENCE, RHODE ISLAND GEOTECH/GEOHYDROLOGICAL CONSULTANTS GEOTECHNICAL BORING LOG	PROJECT	REPORT OF BORING NO.	GZ-203 (OW)
	Keyspan LNG Facility	SHEET	1 of 3
	Providence, Rhode Island	FILE NO.	32784.01
		CHKD BY	AH

BORING CO.	New Hampshire Boring	BORING LOCATION	See Exploration Location Plan
OPERMAN	Charlie O'Donnel	GROUND SURFACE ELEV.	18 ft
GZA ENG.	Daniel Oaks	DATE START	03/30/05
		DATE END	04/01/05

SAMPLER: UNLESS OTHERWISE NOTED, SAMPLER CONSISTS OF 2" SPLIT SPOON DRIVEN USING A 140 lb. HAMMER FALLING 30 IN	GROUNDWATER READINGS			
	DATE	TIME	WATER	CASING
CASING: UNLESS OTHERWISE NOTED, CASING DRIVEN USING A 300 lb HAMMER FALLING 24 IN.	03/30/05	10:30 am	12.97	14'
	05/20/05		15.05	Well
				40 (Tidal) minutes
				51 Days

DEPTH	CASING BLOWS	SAMPLE			SAMPLE DESCRIPTION BURMISTER CLASSIFICATION	R K	STRATUM DESCRIPTION
		NO	PENI./REC	DEPTH (FT)			
10		S-1	24/12	0-2	7-9		FILL
					8-8		
		S-2	24/20	2-4	13-15		
					22-21		
		S-3	24/10	4-6	13-14		
					12-13		
		S-4a	24/20	6-8	22-31	1	
		S-4b			38-42	2	
		S-5	24/12	8-10	19-11		
					12-10		
		S-6	24/10	10-12	8-6		
					7-6		
		S-7	24/12	12-14	6-4		
					5-6		
5		S-8	21/2	14-15.75	7-4		
				15-104/3"			
		S-9	24/10	17-19	17-19	3	
					18-15		
0		S-10a	24/12	19-21	6-5		
		S-10b			9-11		
		S-11	24/12	21-23	19-18		
					20-19		
25		S-12	24/10	23-25	6-17	4	
					19-22		
		S-13	24/12	25-27	14-15		
					18-16		
0		S-14	24/20	29-31	6-2		
					2-2		
		UP-1	24/10	31-33	push		
		UP-2	24/24	33-35	push		

GRANULAR SOILS BLOWS/FT DENSITY	COHESIVE SOILS BLOWS/FT DENSITY	REMARKS: 1. Approximately 6" of running sands between 6-8". 2. Rollerbit between 6-8" possible ash in wash water. 3. Rollerbit 15.75 to 17" (sample 15-17) possible boulder cuttings in wash water. 4. Began use of bentonite (mud) in casing at 23' below ground surface.
0-4 VERY LOOSE	<2 VERY SOFT	
4-10 LOOSE	2-4 SOFT	
10-30 MEDIUM DENSE	4-8 M. STIFF	
30-50 DENSE	8-15 STIFF	
>50 VERY DENSE	15-30 V. STIFF	
	>30 HARD	

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 MAY OCCUR DUE TO OTHER FACTORS THAN THOSE PRESENT AT THE TIME MEASUREMENTS WERE MADE

DEPTH	CASING BLOWS	SAMPLE				SAMPLE DESCRIPTION BURMISTER CLASSIFICATION	R K	STRATUM DESCRIPTION
		NO	PEN./REC	DEPTH (FT)	BLOWS/6"			
35		S-15A	24/20	35-37	2-3	S-15A: (top 16") Medium dense, gray, Organic SILT	±36.5'	ORGANIC SILT
		S-15B			11-21	S-15B: (bottom 4") Medium dense, gray, fine to coarse GRAVEL, some fine to coarse Sand, little (+) Organic Silt		
40		S-16A	24/16	39-41	4-17	S-16A: (top 8") Dense, gray SILT, some fine to medium SAND, trace (-) fine Gravel		SAND
		S-16B			17-19	S-16B: (bottom 8") Dense, gray/tan, fine to coarse SAND, little Silt, trace (+) fine to coarse Gravel		
45		S-17	24/8	44-46	11-11	Medium dense, brown, fine to coarse SAND, trace (-) Silt, trace (-) fine Gravel		
					13-14			
50		S-18	24/10	49-51	15-9	Medium dense, brown/gray, fine to coarse SAND, some (+) fine to coarse Gravel, trace (+) Silt		
					8-8			
55		S-19	24/12	54-56	14-23	Dense, brown/gray, fine to coarse SAND, some (+) fine to coarse Gravel, trace (+) Silt		
					27-24			
60		S-20	24/12	59-61	19-27	Very dense, brown/gray/tan, fine to coarse SAND, little (-) fine to coarse Gravel, trace (+) Silt		
					34-23			
65		S-21	24/6	64-66	21-26	Very dense, gray, fine to coarse SAND, some fine to coarse Gravel (Boulder Chlp), little Silt		
					26-21			
70		S-22	24/9	69-71	63-39	Very dense, gray/tan, fine to coarse GRAVEL and fine to coarse Sand, little (+) Silt	5.	
					37-58			
75								

GRANULAR SOILS	COHESIVE SOILS	REMARKS: 5. Casing at 60'	
BLOWS/FT DENSITY	BLOWS/FT DENSITY		
0-4 VERY LOOSE	<2 VERY SOFT		
4-10 LOOSE	2-4 SOFT		
10-30 MEDIUM DENSE	4-8 M. STIFF		
30-50 DENSE	8-15 STIFF		
>50 VERY DENSE	15-30 V. STIFF		
	>30 HARD		

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 MAY OCCUR DUE TO OTHER FACTORS THAN THOSE PRESENT AT THE TIME MEASUREMENTS WERE MADE

DEPTH	CASING BLOWS	SAMPLE				SAMPLE DESCRIPTION BURMISTER CLASSIFICATION	R K	STRATUM DESCRIPTION
		NO	PEN./REC	DEPTH (FT)	BLOWS/6"			
5		S-23A	24/14	74-76	19-18	S-23A: (top 11") Very dense, gray SILT		SILT
		S-23B			24-23	S-23B: (bottom 3") Very dense, gray SILT, some fine to medium Sand	6	
10		S-24	24/14	79-81	8-16	Dense, gray SILT		SILT
					24-19		7	
65		S-25	24/15	84-86	27-24	Dense, gray SILT, little (+) fine Sand, little (+) fine to coarse		SAND
					24-19	Gravel		
100		S-26	14/3	89-91	35-73	Very dense, gray SILT and fine Sand, little (+) fine Gravel		TILL
					103/2"			
95		S-27	24/14	94-96	28-34	Very dense, gray, fine to medium SAND, trace (+) Silt		SAND
					38-31			
100		S-28	24/18	99-101	51-49	Very dense, gray, fine to medium SAND, little fine to coarse		TILL
					53-46	Gravel, trace (+) Silt		
05		S-29	11/10	104-106	105-120/5"	Very dense, gray, fine to coarse SAND, some (+) Silt, little (+) fine to coarse Gravel (TILL)		TILL
							8 9	
						End of Exploration at ±105'		
110								

GRANULAR SOILS BLOWS/FT DENSITY	COHESIVE SOILS BLOWS/FT DENSITY	REMARKS: 6. Casing advanced to 60', then sample S-23 taken (74-76'). 7. Driller reported 5" cave-in. Casing advanced from 60' to 74' then cleaned out to 79' prior to collecting sample S-24. 8. Proceeding open-hole from 74' to end of exploration. 9. Groundwater monitoring well installed; cuttings and boring collapse from 105' to 20', screened from 10' to 20', filter sand from 21' to 9', bentonite seal from 9' to 8', cuttings from 0-8', capped off with stand pipe to 1' above ground surface and cemented.
0-4 VERY LOOSE	<2 VERY SOFT	
4-10 LOOSE	2-4 SOFT	
0-30 MEDIUM DENSE	4-8 M. STIFF	
0-50 DENSE	8-15 STIFF	
>50 VERY DENSE	15-30 V. STIFF	
	>30 HARD	

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 MAY OCCUR DUE TO OTHER FACTORS THAN THOSE PRESENT AT THE TIME MEASUREMENTS WERE MADE

GZA GEOENVIRONMENTAL INC. 40 BROADWAY, PROVIDENCE, RHODE ISLAND GEOTECH/GEOHYDROLOGICAL CONSULTANTS GEOTECHNICAL BORING LOG	PROJECT	REPORT OF BORING NO.	GZ-204
	Keyspan LNG Facility	SHEET	1 of 1
	Providence, Rhode Island	FILE NO.	32784.01
		CHKD BY	AH

BORING CO.	New Hampshire Boring	BORING LOCATION	See Exploration Location Plan
OPERMAN	Charlie O'Donnel	GROUND SURFACE ELEV.	14 ft DATUM MLLW
GZA ENG.	Matthew Page	DATE START	4/12/05 DATE END 4/12/05

AMPLER: UNLESS OTHERWISE NOTED, SAMPLER CONSISTS OF .2" SPLIT SPOON DRIVEN USING A 140 lb. HAMMER FALLING 30 IN	GROUNDWATER READINGS				
CASING: UNLESS OTHERWISE NOTED, CASING DRIVEN USING A 300 lb HAMMER FALLING 24 IN.	DATE	TIME	WATER	CASING	STABILIZATION TIME
CASING SIZE: 4" OTHER:					

DEPTH	CASING BLOWS	SAMPLE				SAMPLE DESCRIPTION BURMISTER CLASSIFICATION	R K	STRATUM DESCRIPTION
		NO	PEN./REC	DEPTH (FT)	BLOWS/6"			
	P	S-1	24/14	0-2	5-11	Medium dense, brown, fine to coarse SAND, little fine to coarse		FILL
	P				11-13	Gravel, trace (+) Silt		
	P	S-2	24/12	2-4	9-17	Dense, brown, fine to coarse SAND, little fine to coarse		
	P				24-21	Gravel, trace (+) Silt	1	
		S-3	24/12	4-6	10-15	Dense, brown, fine to coarse SAND, little fine to coarse	2	
					18-29	Gravel, trace Silt, trace Brick		
		S-4	24/10	6-8	10-5	Loose, brown, fine to coarse SAND, trace (+) fine to coarse		
					4-5	Gravel, trace Silt		
10						End of Exploration at ±8'	3	
15								
20								
25								
30								
35								
40								
45								
50								

<table border="1"> <tr> <th>GRANULAR SOILS BLOWS/FT DENSITY</th> <th>COHESIVE SOILS BLOWS/FT DENSITY</th> </tr> <tr> <td>0-4 VERY LOOSE</td> <td><2 VERY SOFT</td> </tr> <tr> <td>4-10 LOOSE</td> <td>2-4 SOFT</td> </tr> <tr> <td>10-30 MEDIUM DENSE</td> <td>4-8 M. STIFF</td> </tr> <tr> <td>10-50 DENSE</td> <td>8-15 STIFF</td> </tr> <tr> <td>>50 VERY DENSE</td> <td>15-30 V. STIFF</td> </tr> <tr> <td></td> <td>>30 HARD</td> </tr> </table>	GRANULAR SOILS BLOWS/FT DENSITY	COHESIVE SOILS BLOWS/FT DENSITY	0-4 VERY LOOSE	<2 VERY SOFT	4-10 LOOSE	2-4 SOFT	10-30 MEDIUM DENSE	4-8 M. STIFF	10-50 DENSE	8-15 STIFF	>50 VERY DENSE	15-30 V. STIFF		>30 HARD	REMARKS: 1. Casing to 4' then S-3 collected. 2. Obstruction at ±5.5'. 3. Obstruction encountered.
GRANULAR SOILS BLOWS/FT DENSITY	COHESIVE SOILS BLOWS/FT DENSITY														
0-4 VERY LOOSE	<2 VERY SOFT														
4-10 LOOSE	2-4 SOFT														
10-30 MEDIUM DENSE	4-8 M. STIFF														
10-50 DENSE	8-15 STIFF														
>50 VERY DENSE	15-30 V. STIFF														
	>30 HARD														

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 MAY OCCUR DUE TO OTHER FACTORS THAN THOSE PRESENT AT THE TIME MEASUREMENTS WERE MADE

GZA GEOENVIRONMENTAL INC. 10 BROADWAY, PROVIDENCE, RHODE ISLAND EOTECH/GEOHYDROLOGICAL CONSULTANTS GEOTECHNICAL BORING LOG	PROJECT	REPORT OF BORING NO.	GZ-204A (OW)
	Keyspan LNG Facility	SHEET	1 of 2
	Providence, Rhode Island	FILE NO.	32784.01
		CHKD BY	AH

BORING CO.	New Hampshire Boring	BORING LOCATION	See Exploration Location Plan
DREMAN	Charlie O'Donnel	GROUND SURFACE ELEV.	14 ft
GZA ENG.	Dan Oaks	DATUM	MLLW
		DATE START	04/12/05
		DATE END	04/12/05

SAMPLER: UNLESS OTHERWISE NOTED, SAMPLER CONSISTS OF 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: 5" / 4" OTHER:	GROUNDWATER READINGS				
	DATE	TIME	WATER	CASING	STABILIZATION TIME
	05/20/05		11.40	Well	38 Days

DEPTH	CASING BLOWS	SAMPLE				SAMPLE DESCRIPTION BURMISTER CLASSIFICATION	R K	STRATUM DESCRIPTION
		NO	PEN./REC	DEPTH (FT)	BLOWS/6"			
	S					see boring GZ-204 for 0' to 8'	2	
	S							
	S							
	S							
	P							
	P							
	P							
	P							
10	5	S-1	24/8	8-10	10-12	Medium dense, brown SILT, some fine to coarse Sand		±8'
	11				8-3			±10'
	28	S-2A	24/24	10-12	15-16	S-2A: (top 12") Dense, brown, fine to coarse SAND, little (+) fine		
	24	S-2B			15-8	to coarse Gravel, trace Silt (Petro Odor)		±11.5'
	28					S-2B: (bottom 12") Dense, brown SILT, trace fine to coarse	3	
	35					Sand		
15	30	S-3	24/8	14-16	15-15	Medium dense, brown SILT, trace fine to coarse Sand, trace		
	33				12-7	fine Gravel		
	21						4	
	25							±17.5'
	23							
20	27	S-4	24/10	19-21	8-6	Medium dense, gray, fine to coarse SAND, little fine to coarse		
	18				5-4	Gravel, trace (+) Silt		
	18							
	21							
	24						5	
25	17	S-5A	24/12	24-26	5-15	S-5A: (top 10") Dense, gray, fine to coarse SAND, little fine to		
	42	S-5B			35-10	coarse Gravel, trace Silt		
	38					S-5B: (bottom 2") Dense, black/gray, fine to medium SAND,		
	46					trace (+) Silt		
	53							
30	41	S-6	24/12	29-31	13-8	Medium dense, black/gray, fine to medium SAND, trace Silt		
	42				12-12		6	
	39							
	41							
	40							

GRANULAR SOILS BLOWS/FT DENSITY 0-4 VERY LOOSE 4-10 LOOSE 10-30 MEDIUM DENSE 30-50 DENSE >50 VERY DENSE	COHESIVE SOILS BLOWS/FT DENSITY <2 VERY SOFT 2-4 SOFT 4-8 M. STIFF 8-15 STIFF 15-30 V. STIFF >30 HARD	REMARKS: 1. GZ-104A located 5' South from GZ-104. 2. Casing spun to 4', washed to 8' then pushed to 8', then S-1 taken (8-10'). 3. Casing driven to 14'. Washed to 14', then S-3 (14-16') taken. 4. Casing driven to 19', washed to 19', then S-4 (19-21') taken. 5. Casing driven to 24', washed to 24', then S-6 (24-26') taken. 6. Casing driven to 29', wash to 29', then S-6 (29-31') taken.
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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 MAY OCCUR DUE TO OTHER FACTORS THAN THOSE PRESENT AT THE TIME MEASUREMENTS WERE MADE

GZA GEOENVIRONMENTAL INC. 40 BROADWAY, PROVIDENCE, RHODE ISLAND	PROJECT	REPORT OF BORING NO.	GZ-204A (OW)
	Keyspan LNG Facility	SHEET	2 of 2
GEOTECH/GEOHYDROLOGICAL CONSULTANTS	Providence, Rhode Island	FILE NO.	32784.01
		CHKD BY	AH

DEPTH	CASING BLOWS	SAMPLE				SAMPLE DESCRIPTION BURMISTER CLASSIFICATION	R K	STRATUM DESCRIPTION
		NO	PEN./REC	DEPTH (FT)	BLOWS/6"			
35	53	S-7	24/12	34-36	9-17	Dense, gray/black, fine SAND, some Silt	7	SAND
	68				20-18			
	80							
	79							
	98							
40	94	S-8	24/10	39-41	59-56	Very dense, gray, fine to coarse SAND, some fine to coarse Gravel, little Silt	8	SAND and GRAVEL
	122				55-40			
	128							
	98							
	95							
45	75	S-9	24/11	44-46	40-46	Very dense, gray, fine to coarse SAND, some (+) fine to coarse Gravel, some Silt	9	
	108				106-78			
	112							
	118							
	100							
50		S-10	24/14	49-51	86-61	Very dense, gray, fine to coarse SAND, some (+) fine to coarse Gravel, some Silt	10 11	
					52-45			
End of Exploration at ±51'								
5								
60								
75								

GRANULAR SOILS BLOWS/FT DENSITY		COHESIVE SOILS BLOWS/FT DENSITY		REMARKS: 7. Casing driven to 34', washed to 34', then S-7 (34-36') taken. 8. Casing driven to 39', washed to 39' then S-8 (39-41') taken. 9. Casing driven to 44', washed to 44' then S-9 (44-46') taken. 10. Casing driven to 49', washed to 49', then to S-10 (49-51') taken. 11. Groundwater monitoring well installed; screened from 16-4', riser from 5' to 0, guard pipe to +2.8'. Filter sand from 16-4'. Bentonite seal from 4' to 3', drill cuttings from 3' to 0'. Capped off with guard pipe and cement.
0-4	VERY LOOSE	<2	VERY SOFT	
4-10	LOOSE	2-4	SOFT	
10-30	MEDIUM DENSE	4-8	M. STIFF	
30-50	DENSE	8-15	STIFF	
>50	VERY DENSE	15-30	V. STIFF	
		>30	HARD	

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 MAY OCCUR DUE TO OTHER FACTORS THAN THOSE PRESENT AT THE TIME MEASUREMENTS WERE MADE

DRILLING CO. <u>New Hampshire Boring</u> OPERATOR <u>Charlie O'Donnel</u> GZA ENG. <u>Daniel E. Oaks</u>	BORING LOCATION <u>See Exploration Location Plan</u> GROUND SURFACE ELEV. <u>14</u> DATUM <u>MLLW</u> DATE START <u>04/11/05</u> DATE END <u>04/11/05</u>
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SAMPLER: UNLESS OTHERWISE NOTED, SAMPLER CONSISTS OF 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: 4" OTHER:

DEPTH	CASING BLOWS	SAMPLE				SAMPLE DESCRIPTION BURMISTER CLASSIFICATION	R K	STRATUM DESCRIPTION
		NO	PEN./REC	DEPTH (FT)	BLOWS/6"			
	P	S-1	24/6	0-2	5-6	Medium dense, brown, fine to coarse SAND and SILT, some (-) fine to coarse Gravel	±1'	FILL
	P				4-5			
	P	S-2	24/14	2-4	7-11	Medium dense, brown SILT	1	SILT
	P				15-12			
	P	S-3	24/20	4-6	6-8	Medium dense, brown/gray SILT		
	P				10-11			
	P	S-4	24/20	6-8	12-12	Medium dense, brown/gray SILT		
	P				12-13			
10		S-5	24/18	9-11	12-14	Medium dense, brown/gray SILT, trace fine Sand		
					15-11			
15		S-6	24/18	14-16	13-11	Medium dense, brown SILT	±16.5'	SAND
					9-8			
20		S-7	24/14	19-21	11-11	Medium dense, black, fine to medium SAND, little (+) Silt		
					13-12			
25		S-8	24/14	24-26	15-13	Medium dense, gray, fine to medium SAND, trace Silt (Petroleum Odor)	±26.5'	SILT
					16-18			
30		S-9	24/20	29-31	16-17	Dense, gray/brown SILT, little (-) fine Sand	2	SILT
					20-20			

GRANULAR SOILS BLOWS/FT DENSITY	COHESIVE SOILS BLOWS/FT DENSITY	REMARKS: 1. Casing pushed to 9' then S-5 taken 9-11. 2. Driller reports greater drilling difficulty beginning at 32'.
0-4 VERY LOOSE	<2 VERY SOFT	
4-10 LOOSE	2-4 SOFT	
0-30 MEDIUM DENSE	4-8 M. STIFF	
0-50 DENSE	8-15 STIFF	
>50 VERY DENSE	15-30 V. STIFF	
	>30 HARD	

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 MAY OCCUR DUE TO OTHER FACTORS THAN THOSE PRESENT AT THE TIME MEASUREMENTS WERE MADE

GZA GEOENVIRONMENTAL INC. 40 BROADWAY, PROVIDENCE, RHODE ISLAND GEOTECH/GEOHYDROLOGICAL CONSULTANTS	PROJECT	REPORT OF BORING NO.	GZ-205
	Keyspan LNG Facility	SHEET	2 of 2
	Providence, Rhode Island	FILE NO.	32784.01
		CHKD BY	AH

DEPTH	CASING BLOWS	SAMPLE				SAMPLE DESCRIPTION BURMISTER CLASSIFICATION	R K	STRATUM DESCRIPTION
		NO	PEN./REC	DEPTH (FT)	BLOWS/6"			
35		S-10	24/12	34-36	23-20 21-21	Dense, gray SILT, trace (+) fine to coarse Sand, trace (-) fine Gavel		SILT ±37.5'
0		S-11	24/14	39-41	25-30 32-30	Very dense, brown SAND, some (-) fine to coarse Gravel, trace (+) Silt		
45		S-12	24/10	44-46	25-32 20-21	Very dense, brown, fine to coarse SAND, trace (+) Silt		SAND
50		S-13	24/0	49-51	61-68 16-16	NO RECOVERY	3	
						End of Exploration at ±51'		
5								
60								
75								

GRANULAR SOILS BLOWS/FT DENSITY		COHESIVE SOILS BLOWS/FT DENSITY		REMARKS: 3. 50-51', spoon drive with 300lb hammer, Impression: Pushing Cobble.
0-4	VERY LOOSE	<2	VERY SOFT	
4-10	LOOSE	2-4	SOFT	
0-30	MEDIUM DENSE	4-8	M. STIFF	
0-50	DENSE	8-15	STIFF	
>50	VERY DENSE	15-30 >30	V. STIFF HARD	

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 MAY OCCUR DUE TO OTHER FACTORS THAN THOSE PRESENT AT THE TIME MEASUREMENTS WERE MADE

GZA GEOENVIRONMENTAL INC. 40 BROADWAY, PROVIDENCE, RHODE ISLAND GEO/TECH/GEOHYDROLOGICAL CONSULTANTS GEO TECHNICAL BORING LOG	PROJECT	REPORT OF BORING NO.	GZ-213
	Keyspan LNG Facility	SHEET	1 of 2
	Providence, Rhode Island	FILE NO.	32784.01
		CHKD BY	AH

BORING CO.	New Hampshire Boring	BORING LOCATION	See Exploration Location Plan
BOREMAN	Charlie O'Donnel	GROUND SURFACE ELEV.	12 ft
GZA ENG.	Daniel E. Oaks	DATUM	MLLW
		DATE START	04-28-05
		DATE END	04-29-05

AMPLER: UNLESS OTHERWISE NOTED, SAMPLER CONSISTS OF 2" SPLIT SPOON DRIVEN USING A 140 lb. HAMMER FALLING 30 IN	GROUNDWATER READINGS				
	DATE	TIME	WATER	CASING	STABILIZATION TIME
CASING: UNLESS OTHERWISE NOTED, CASING DRIVEN USING A 300 lb HAMMER FALLING 24 IN.	04-29-05	0730	4.31	49'	17 Hours
CASING SIZE: 4" HW OTHER:					

DEPTH	CASING BLOWS	SAMPLE				SAMPLE DESCRIPTION BURMISTER CLASSIFICATION	R K	STRATUM DESCRIPTION
		NO	PEN./REC	DEPTH (FT)	BLOWS/6"			
	P	S-1	24/12	0-2	3-5	Medium dense, brown, fine to coarse SAND, little fine to coarse		
	P				9-11	Gravel, trace (+) Silt		
	20	S-2	24/14	2-4	10-13	Dense, brown, fine to coarse SAND, little (+) fine to coarse		
	24				21-19	Gravel, trace (+) Silt		
	24	S-3	24/6	4-6	15-11	Medium dense, brown, fine to coarse SAND, little (+) fine to	1	SAND (FILL)
	33				11-14	coarse Gravel, trace (+) Silt		
	27	S-4	24/20	6-8	15-20	Dense, brown, fine to coarse SAND, little fine to coarse Gravel,		
	26				21-27	trace (+) Silt		
	32	S-5	24/10	8-10	20-16	Dense, brown, fine to coarse SAND, little (+) fine to coarse	2	
10	45				15-19	Gravel, trace (+) Silt		
	24	S-6	24/12	10-12	16-11	Medium dense, brown, fine to coarse SAND, little (+) fine to coarse	3	
	24				17-22	Gravel, trace (+) Silt		
	22	S-7	24/14	12-14	12-14	Medium dense, gray/brown, fine to coarse SAND, little (+) fine		
	30				12-15	to coarse Gravel, trace Silt (Slightly Petro Odor)		
15	26	S-8	24/10	14-16	11-15	Dense, gray/brown, fine to coarse SAND, some (-) fine to coarse	4	
	53				20-19	Gravel, trace (-) Silt (Petro Odor)		
	65	S-9	24/18	16-18	28-27	Dense, brown, fine to coarse SAND, some (-) fine to coarse		
	60				21-24	Gravel, trace (+) Silt		
	30	S-10	24/10	18-20	13-17	Dense, gray, fine to coarse SAND, little (+) fine to coarse	5	
0	34				22-19	Gravel, trace (+) Silt		
	40	S-11	24/16	20-22	20-18	Dense, brown, fine to coarse SAND, little (+) fine to coarse		
	48				20-20	Gravel, trace (-) Silt		
	64	S-12	24/14	22-24	21-29	Very dense, brown, fine to coarse SAND, some (-) fine to coarse	6	
	58				27-28	Gravel, little (-) Silt		
25	20	S-13	24/14	24-26	12-12	Medium dense, brown, fine to medium SAND, trace Silt, trace (-)	7	
	33				12-15	fine Gravel		
	67							
	61							
	59							
30	61	S-14	24/12	29-31	7-5	Medium dense, brown/gray, fine to coarse SAND, trace (-) Silt	8	
	64				5-6			
	64							
	58							
	55							

GRANULAR SOILS BLOWS/FT DENSITY	COHESIVE SOILS BLOWS/FT DENSITY	REMARKS:
0-4 VERY LOOSE	<2 VERY SOFT	1. Casing pushed to 2' and driven to 4', cleared to 4' then S-3 (4-6') and S-4 (6-8') taken.
4-10 LOOSE	2-4 SOFT	2. Casing driven to 8', cleaned to 8' then S-5 (8-10') taken.
0-30 MEDIUM DENSE	4-8 M. STIFF	3. Casing drive to 10', cleaned to 10' then S-6 (10-12') and S-7 (12-14') taken.
0-50 DENSE	8-15 STIFF	4. Casing driven to 14', cleaned 14', then S-8 (14-16') and S-9 (16-18') taken.
>50 VERY DENSE	15-30 V. STIFF	5. Casing driven to 18', cleaned to 18' then S-10 (18-20') and S-11 (20-22') taken.
	>30 HARD	6. Casing driven to 22', cleaned to 22', then S-12 (22-24') taken.
		7. Casing driven to 24', cleaned to to 24' then S-13 (24-26') taken.

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 MAY OCCUR DUE TO OTHER FACTORS THAN THOSE PRESENT AT THE TIME MEASUREMENTS WERE MADE

DEPTH	CASING BLOWS	SAMPLE				SAMPLE DESCRIPTION BURMISTER CLASSIFICATION	R K	STRATUM DESCRIPTION
		NO	PEN./REC	DEPTH (FT)	BLOWS/6"			
35	35	S-15	24/12	34-36	4-4	Loose, brown, fine to medium SAND, trace (-) Silt	9	SAND
	31				5-7			
	39							
	53							
	63							
0	57	S-16	24/7	39-41	11-7	S-16A: (top 5") Medium dense, brown/red, fine to coarse SAND, some (+) fine to coarse Gravel, trace Silt	10	±40'
	59	S-16B			10-8			
	62							
	71							
	69					S-16B: (bottom 2") Medium dense, tan/brown SILT, little (-) fine to coarse Sand		±42.5'
5	56	S-17	24/12	44-46	15-13	Medium dense, brown, fine to coarse SAND, little (+) fine to coarse Gravel, trace (+) Silt	11	SAND
	55				10-11			
	68							
	114							
	113							
50		S-18	24/4	49-51	15-24	Dense, brown, fine to coarse SAND, some (+) fine to coarse Gravel, little (+) Silt	12	
					26-17			
End of Exploration at ±51'								
5								
60								
65								
0								
75								

GRANULAR SOILS BLOWS/FT DENSITY		COHESIVE SOILS BLOWS/FT DENSITY	
0-4	VERY LOOSE	<2	VERY SOFT
4-10	LOOSE	2-4	SOFT
0-30	MEDIUM DENSE	4-8	M. STIFF
0-50	DENSE	8-15	STIFF
>50	VERY DENSE	15-30	V. STIFF
		>30	HARD

REMARKS:
 8. Drive casing to 29', cleaned to 29' then S-14 (29-31') taken.
 9. Drive casing to 34', cleaned to 34' then S-15 (34-36') taken.
 10. Drive casing to 39', cleaned to 39', then S-16 (39-41') taken.
 11. Drive casing to 44'. Cleaned to 44' then S-17 (44-46') taken.
 12. Drive casing to 49', cleaned to 49' then S-18 (49-51') taken.

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 MAY OCCUR DUE TO OTHER FACTORS THAN THOSE PRESENT AT THE TIME MEASUREMENTS WERE MADE

GEOTECHNICAL BORING LOG GEOTECH/GEOHYDROLOGICAL CONSULTANTS 10 BROADWAY, PROVIDENCE, RHODE ISLAND GEOTECHNICAL BORING LOG	PROJECT	REPORT OF BORING NO.	GZ-214
	Keyspan LNG Facility	SHEET	1 of 2
	Providence, Rhode Island	FILE NO.	32784.01
		CHKD BY	AH

BORING CO.	New Hampshire Boring	BORING LOCATION	See Exploration Location Plan
OPERMAN	Charlie O'Donnel	GROUND SURFACE ELEV.	12 ft
GZA ENG.	Daniel E. Oaks	DATE START	04-29-05
		DATUM	MLLW
		DATE END	05-02-05

AMPLER: UNLESS OTHERWISE NOTED, SAMPLER CONSISTS OF 2" SPLIT SPOON DRIVEN USING A 140 lb. HAMMER FALLING 30 IN	GROUNDWATER READINGS			
CASING: UNLESS OTHERWISE NOTED, CASING DRIVEN USING A 300 lb HAMMER FALLING 24 IN.	DATE	TIME	WATER	CASING
CASING SIZE: 4" HW OTHER:	05-02-05	0700	7.9'	33'
				STABILIZATION TIME
				64 Hours

DEPTH	CASING BLOWS	SAMPLE				SAMPLE DESCRIPTION BURMISTER CLASSIFICATION	R K	STRATUM DESCRIPTION
		NO	PEN./REC	DEPTH (FT)	BLOWS/6"			
	P	S-1	24/18	0-2	3-8	Medium dense, brown/tan, fine to coarse SAND, trace (+) Silt		
	22				11-19			
	51	S-2	24/13	2-4	16-25	Dense, brown, fine to coarse SAND, trace (+) Silt, trace (-) fine Gravel		SAND
	49				22-25			(FILL)
	11	S-3A	24/18	4-6	9-15	S-3A: (top 9") Dense, brown, fine to medium SAND, trace (+) Silt	1	
	32	S-3B			17-21	S-3B: (bottom 9") Dense, black, fine to coarse SAND, little (+) Silt, trace (-) fine Gravel, trace (-) Wood, Ash (Petro Odor)		
	37	S-4A	24/24	6-8	37-36			
	70	S-4B			35-39	S-4A: (top 10") Very dense, brown, fine to medium SAND, trace (+) Silt		
	32	S-5	24/16	8-10	76-45	S-4B: (Bottom 14") Very dense, black, fine to coarse SAND, little fine Gravel, trace Silt (Petro Odor)	2	
10	25				31-45			
	37	S-6	24/18	10-12	13-19	S-5: Very dense, black, fine to coarse SAND, little Silt, trace (+) fine Gravel (Petro Odor)	3	
	64				21-51			
	46	S-7	24/16	12-14	30-28	S-6: Dense, black, fine to coarse SAND, little (-) Silt, trace fine Gravel (Petro Odor)	4	
	45				28-30			
15	37	S-8	24/16	14-16	17-17	S-7: Very dense, black/red, fine to coarse SAND, trace (+) Silt, trace Twig, trace Brick (Petro Odor)	5	
	61				38-34			
	52	S-9	24/17	16-18	22-42	S-8: Very dense, black, fine to coarse SAND, trace (+) Silt, trace brick (Petro Odor)	6	
	38				37-34			
	52	S-10	24/10	18-20	13-20	S-9: Very dense, black, fine to coarse SAND, some (-) Silt, trace (-) fine Gravel (Petro Odor and Sheen)	7	
	47				13-13			±20'
	26	S-11	24/14	20-22	13-21	S-10: Dense, black/green, fine to coarse SAND, some (-) Silt, trace (-) fine Gravel (Petro Odor and Sheen)	8	
	24				24-19			
	51					S-11: Dense, gray, fine to coarse SAND, little (-) Silt, trace (+) fine to coarse Gravel		
25	43	S-12	24/5	23-25	18-19		9	SAND
	42				18-14	S-12: Dense, gray, fine to coarse SAND, trace (+) Silt, trace (-) fine Gravel		
	28							
	28							
	37							
	43	S-13	24/6	28-30	15-10	Medium dense, brown/gray, fine to coarse SAND, trace fine Gravel, trace (-) Silt	10	
	45				14-12			
	47							
	48							
	43							
	46	S-14	24/1	33-35	10-13	Medium dense, gray, coarse GRAVEL	11	
					11-13			

GRANULAR SOILS BLOWS/FT DENSITY	COHESIVE SOILS BLOWS/FT DENSITY	REMARKS:
0-4 VERY LOOSE	<2 VERY SOFT	1. Casing driven to 4', cleaned to 4' then S-3 (4-6') and S-4 (6-8') taken.
4-10 LOOSE	2-4 SOFT	2. Casing driven to 8', cleaned to 8', then S-5 (8-10') taken (Hard Drilling).
10-30 MEDIUM DENSE	4-8 M. STIFF	3. Washed ahead to 10', then advance casing to 10', cleaned to 10' then S-6 (10-12').
30-50 DENSE	8-15 STIFF	4. Casing driven to 12', cleaned to 12' then S-7 (12-14') taken.
>50 VERY DENSE	15-30 V. STIFF	5. Casing driven to 14', cleaned to 14' then S-8 (14-16') taken.
	>30 HARD	6. Casing driven to 16', cleaned to 16' then S-9 (16-18') taken.
		7. Casing driven to 18', cleaned to 18', then S-10 (18-20') taken.

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 MAY OCCUR DUE TO OTHER FACTORS THAN THOSE PRESENT AT THE TIME MEASUREMENTS WERE MADE

DEPTH	CASING BLOWS	SAMPLE				SAMPLE DESCRIPTION BURMISTER CLASSIFICATION	R K	STRATUM DESCRIPTION
		NO	PEN./REC	DEPTH (FT)	BLOWS/6"			
35	48						SAND ----- ±36" SILT	
	47							
	52							
	54							
	58							
40	34	S-15	24/16	39-41	9-7	Medium dense, brown SILT, some fine Sand	12	
	36				11-11			
	39							
	46							
	51							
45	42	S-16	24/18	44-46	13-10	Medium dense, gray SILT	13	
	47				13-10			
	40							
	43							
	50							
50		S-17	24/16	49-51	10-11	Medium dense, gray SILT	14	
					11-11			
End of Exploration at ±51'								

GRANULAR SOILS BLOWS/FT DENSITY	COHESIVE SOILS BLOWS/FT DENSITY	REMARKS:
0-4 VERY LOOSE	<2 VERY SOFT	
4-10 LOOSE	2-4 SOFT	
10-30 MEDIUM DENSE	4-8 M. STIFF	
10-50 DENSE	8-15 STIFF	
>50 VERY DENSE	15-30 V. STIFF	
	>30 HARD	

NOTES:

- STRATIFICATION LINES REPRESENT APPROXIMATE BOUNDARY BETWEEN SOIL TYPES, TRANSITIONS MAY BE GRADUAL.
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BORING CO. <u>New Hampshire Boring</u> OPERMAN <u>Norm Stuttard</u> GZA ENG. <u>Joanne Kissinger/ Daniel E. Oaks</u>	BORING LOCATION <u>See Exploration Location Plan</u> GROUND SURFACE ELEV. <u>13 ft</u> DATUM <u>MLLW</u> DATE START <u>05-18-05</u> DATE END <u>05-20-05</u>
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AMPLER: UNLESS OTHERWISE NOTED, SAMPLER CONSISTS OF 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: <u>4" HW</u> OTHER:	GROUNDWATER READINGS <table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th>DATE</th> <th>TIME</th> <th>WATER</th> <th>CASING</th> <th>STABILIZATION TIME</th> </tr> </thead> <tbody> <tr> <td>05-19-05</td> <td>07:10</td> <td>6.36'</td> <td>19</td> <td>16.5</td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table>	DATE	TIME	WATER	CASING	STABILIZATION TIME	05-19-05	07:10	6.36'	19	16.5										
DATE	TIME	WATER	CASING	STABILIZATION TIME																	
05-19-05	07:10	6.36'	19	16.5																	

DEPTH	CASING BLOWS	SAMPLE				SAMPLE DESCRIPTION BURMISTER CLASSIFICATION	R K	STRATUM DESCRIPTION
		NO	PEN./REC	DEPTH (FT)	BLOWS/6"			
						1	±1'	
							±2' CONCRETE RUBBLE	
	11	S-1	24/7	2-4	4-9		FILL	
	14				8-9			
	42	S-2	24/14	4-6	16-8	2		
	27				9-9			
	12	S-3	24/8	6-8	11-6	3	SAND	
	5				3-7			
	17	S-4	24/7	8-10	11-6	4		
	16				3-2			
10	4	S-5	24/4	10-12	5-2	5	SAND	
	4				1-1			
	2	S-6	24/4	12-14	5-1	6		
	4				0-1			
15	10	S-7	24/4	14-16	3-1	7	SAND	
	8				1-5			
	11							
	9							
	15							
0	50	S-8	24/6	19-21	13-12	8	SAND	
	26				6-10			
	28							
	27							
	26							
25	30	S-9	24/3	24-26	18-13	9	SAND	
	35				18-16			
	35							
	40							
	35							
30	40	S-10A	24/14	29-31	8-6	10	SILT	
	35	S-10B			8-10			
	45							
	45							
	50							

GRANULAR SOILS BLOWS/FT DENSITY	COHESIVE SOILS BLOWS/FT DENSITY	REMARKS:
0-4 VERY LOOSE	<2 VERY SOFT	1. 0'-1' (PHD) Post Hole digger, Rollerbit concrete from 1'-2'.
4-10 LOOSE	2-4 SOFT	2. Casing driven to 4', cleaned to 4' then S-2 (4-6') taken.
0-30 MEDIUM DENSE	4-8 M. STIFF	3. Casing driven to 6', cleaned to 6' then S-3 (6-8') taken.
0-50 DENSE	8-15 STIFF	4. Casing driven to 8', cleaned to 8', then S-4 (8-10') taken.
>50 VERY DENSE	15-30 V. STIFF	5. Casing driven to 10', cleaned to 10' then S-5 (10-12') taken.
	>30 HARD	6. Casing driven to 12', cleaned to 12', then S-6 (12-14') taken.
		7. Casing driven to 16', cleaned to 16' then S-7 (14-16') taken.
		8. Casing driven to 19', cleaned to 19', then S-8 (19-21') taken.
		9. Casing driven to 24', cleaned to 24', then S-9 (24-26') taken.
		10. Casing driven to 29', cleaned to 29', then S-10 (29-31') taken.

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 MAY OCCUR DUE TO OTHER FACTORS THAN THOSE PRESENT AT THE TIME MEASUREMENTS WERE MADE

DEPTH	CASING BLOWS	SAMPLE				SAMPLE DESCRIPTION BURMISTER CLASSIFICATION	R K	STRATUM DESCRIPTION
		NO	PEN./REC	DEPTH (FT)	BLOWS/6"			
35	60	S-11	24/2	34-36	10-9	Medium dense, brown SILT	11	±37.5' ----- SAND ----- ±40'
	51				9-13			
	55							
	66							
	71							
0	75	S-12A	24/14	39-41	10-13	S-12A: (top 7") Medium dense, gray/brown, fine to coarse SAND, some (+) Silt, trace fine Gravel	12	±40' ----- SILT ----- ±47.5'
	101	S-12B			12-14			
	92							
	126							
5	50	S-13	24/16	44-46	11-11	Medium dense, brown/gray SILT, trace fine to medium SAND (1" Lense), trace coarse Gravel (Boulder Fragment in Spoon Tip)	13	±47.5' ----- SILTY SAND ----- ±65'
	63				15-20			
	93							
	98							
	87							
50	63	S-14	24/13	49-51	13-9	Medium dense, brown, fine SAND, some (+) Silt	14	±65' ----- SAND ----- End of Exploration at ±69.9'
	75				9-11			
	61							
	76							
	85							
5	106	S-15	24/18	54-56	15-15	Dense, gray, fine SAND, some (+) Silt	15	End of Exploration at ±69.9'
	126				21-24			
	155							
	167							
	47							
60	42	S-16	24/18	59-61	18-19	Dense, gray, fine SAND, some (+) Silt	16	End of Exploration at ±69.9'
	41				22-25			
	49							
	64							
	41							
5	67	S-17A	24/9	64-66	18-28	S-17A: (top 6") Very dense, gray, fine SAND, some (+) Silt	17	±65' ----- SAND ----- End of Exploration at ±69.9'
	81	S-17B			35-47			
	108							
	117							
0		S-18	9/0	69-71	137-198/3"	NO RECOVERY	18	End of Exploration at ±69.9'

GRANULAR SOILS BLOWS/FT DENSITY	COHESIVE SOILS BLOWS/FT DENSITY	REMARKS:
0-4 VERY LOOSE	<2 VERY SOFT	
4-10 LOOSE	2-4 SOFT	
0-30 MEDIUM DENSE	4-8 M. STIFF	
0-50 DENSE	8-15 STIFF	
>50 VERY DENSE	15-30 V. STIFF	
	>30 HARD	

NOTES: 1) STRATIFICATION LINES REPRESENT APPROXIMATE BOUNDARY BETWEEN SOIL TYPES, TRANSITIONS MAY BE GRADUAL.
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BORING CO. <u>New Hampshire Boring</u> OPERMAN <u>Norm Stuttard</u> GZA ENG. <u>Daniel E. Oaks</u>	BORING LOCATION <u>See Exploration Location Plan</u> GROUND SURFACE ELEV. <u>13 ft</u> DATUM <u>MLLW</u> DATE START <u>05/16/05</u> DATE END <u>05/17/05</u>
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AMPLER: UNLESS OTHERWISE NOTED, SAMPLER CONSISTS OF 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: <u>4" HW</u> OTHER:	GROUNDWATER READINGS <table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th>DATE</th> <th>TIME</th> <th>WATER</th> <th>CASING</th> <th>STABILIZATION TIME</th> </tr> </thead> <tbody> <tr> <td>05-16-05</td> <td>1700</td> <td>8.29'</td> <td>29'</td> <td>30 Minutes</td> </tr> <tr> <td>5-20-05</td> <td></td> <td>8.36</td> <td>Well</td> <td>4 Days</td> </tr> </tbody> </table>	DATE	TIME	WATER	CASING	STABILIZATION TIME	05-16-05	1700	8.29'	29'	30 Minutes	5-20-05		8.36	Well	4 Days
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05-16-05	1700	8.29'	29'	30 Minutes												
5-20-05		8.36	Well	4 Days												

DEPTH	CASING BLOWS	SAMPLE				SAMPLE DESCRIPTION BURMISTER CLASSIFICATION	R K	STRATUM DESCRIPTION
		NO	PEN./REC	DEPTH (FT)	BLOWS/6"			
	P					1		
	P					2		
	P						SAND (FILL)	
	P	S-1	24/12	3-5	11-10			
	P				7-7			
	7	S-2	24/5	5-7	10-7	3		
	17				6-7	±7'		
	22	S-3	24/14	7-9	11-8		SILT	
	29				4-2	±9'		
10	11	S-4	24/4	9-11	9-5	4		
	19				3-3		SAND (FILL)	
	22	S-5	24/10	11-13	5-4			
	27				4-7			
15	9	S-6	24/1	13-15	7-4	5		
	11				2-1			
	9	S-7	24/8	15-17	11-3	6		
	16				3-1	±17'		
	12	S-8	24/16	17-19	7-3	7		
	19				3-1			
20	22	S-9	24/16	19-21	3-1	8	ORGANIC SILT	
	26				3-7			
	28							
	52							
	55							
25	47	S-10	24/8	24-26	23-14	9		
	40				11-9		SAND (OUTWASH)	
	44							
	73							
	68							
30	122	S-11	24/16	29-31	33-16	10		
	133				18-23			
	138							
	140							
	139							

GRANULAR SOILS BLOWS/FT DENSITY	COHESIVE SOILS BLOWS/FT DENSITY	REMARKS:
0-4 VERY LOOSE	<2 VERY SOFT	1. Dug by hand to clear utilities.
4-10 LOOSE	2-4 SOFT	2. Concrete encountered at 1', cleared by KEYSpan and used rollerbit through concrete to 3' (2' thick) then S-1 (3-5') taken.
0-30 MEDIUM DENSE	4-8 M. STIFF	3. Push 4" HW casing to 5', cleaned to 5' then S-2 (5-7') and S-3 (7-9') taken.
0-50 DENSE	8-15 STIFF	4. Casing driven to 8', cleaned to 9' then S-4 (9-11') and S-5 (11-13') taken.
>50 VERY DENSE	15-30 V. STIFF	5. Casing driven to 13', cleaned to 13' then S-16 (13-15'), possible pushing gravel.
	>30 HARD	6. Casing driven to 15', cleaned to 15' then S-7 (15-17') taken.

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EPTH	CASING BLOWS	SAMPLE				SAMPLE DESCRIPTION BURMISTER CLASSIFICATION	R K	STRATUM DESCRIPTION
		NO	PEN./REC	DEPTH (FT)	BLOWS/6"			
35	50	S-12	24/12	34-36	13-13	Dense, brown SILT	11	SILT
	65				18-20			
	78							
	81							
	84							
45	70	S-13	24/14	39-41	11-15	Dense, brown SILT	12	SILT
	83				17-15			
	97							
	101							
	106							
55	119	S-14	24/18	44-46	15-18	Dense, brown/gray SILT	13	SILT
	136				25-26			
	140							
	159							
	198							
50		S-15	24/14	49-51	18-27	Very dense, gray SILT	14	SILT
					31-27			
End of Exploration at ±51'								

GRANULAR SOILS BLOWS/FT DENSITY	COHESIVE SOILS BLOWS/FT DENSITY	REMARKS: 7. Casing driven to 17', cleaned to 17' then S-8 (17-19') taken. 8. Casing driven to 19', cleaned out to 19', then S-9 (19-21') taken. 9. Casing driven to 24', cleaned to 24', then S-10 (24-26') taken. 10. Casing driven to 29', cleaned to 29' then S-11 (29-31') taken. 11. Casing driven to 34', cleaned to 34' then S-12 (34-36') taken. 12. Casing driven to 39', cleaned to 39' then S-13 (39-41') taken. 13. Casing driven to 44', cleaned to 44' then S-14 (44-46') taken.	14. Groundwater well installed, screened from 15' to 5', riser from 5' to 0', guard pipe from 0' to (+) 3', filter sand from 16' to 4', bentonite seal from 4' to 3', cuttings from 3 to 1'. Capped off with cement from 1' to 0'.
0-4 VERY LOOSE	<2 VERY SOFT		
4-10 LOOSE	2-4 SOFT		
10-30 MEDIUM DENSE	4-8 M. STIFF		
30-50 DENSE	8-15 STIFF		
>50 VERY DENSE	15-30 V. STIFF		
	>30 HARD		

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DRILLING CO. <u>New Hampshire Boring</u> OPERATOR <u>Charlie O'Donnel</u> ENGINEER <u>Daniel E. Oaks</u>	BORING LOCATION <u>See Exploration Location Plan</u> GROUND SURFACE ELEV. <u>13 ft</u> DATUM <u>MLLW</u> DATE START <u>05-17-05</u> DATE END <u>05-18-05</u>
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SAMPLER: UNLESS OTHERWISE NOTED, SAMPLER CONSISTS OF 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: <u>4" HW</u> OTHER:	GROUNDWATER READINGS <table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th>DATE</th> <th>TIME</th> <th>WATER</th> <th>CASING</th> <th>STABILIZATION TIME</th> </tr> </thead> <tbody> <tr> <td>05-18-05</td> <td>0730</td> <td>9.62'</td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>	DATE	TIME	WATER	CASING	STABILIZATION TIME	05-18-05	0730	9.62'												
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05-18-05	0730	9.62'																			

DEPTH	CASING BLOWS	SAMPLE				SAMPLE DESCRIPTION BURMISTER CLASSIFICATION	R K	STRATUM DESCRIPTION
		NO	PEN./REC	DEPTH (FT)	BLOWS/6"			
	P							
	P							
	P	S-1	24/14	2-4	10-9	Medium dense, brown, fine to coarse SAND, trace (+) Silt,	FILL	
	P				8-8	trace (-) fine Gravel		
	17	S-2	24/8	4-6	14-11	Medium dense, brown, fine to coarse SAND, trace (+) Silt,		
	15				10-9	trace (-) fine Gravel	±6.25'	
	3	S-3	24/3	6-6.25	50/3"	Very dense, brown, fine to coarse SAND, trace (+) Silt, trace	±6.75' CONCRETE RUBBLE	
	7				100/0"	(-) fine Gravel	±8.75'	
	7	S-4	24/7	6.75-8.75	3-1-1-1	S-4: Very Loose, Gray/black, fine to coarse SAND, some (+) Silt,	±9' CONCRETE RUBBLE	
10	10	S-5	24/8	9-11	8-3	trace fine Gravel		
	12				12-4	S-5: Medium dense, brown/black, fine SAND and SILT,	FILL	
	15	S-6	24/6	11-13	18-16	trace fine Gravel, trace Roots		
	25				10-8	S-6: Medium dense, brown/black, fine to medium SAND, some	±13'	
	22	S-7	24/3	13-15	14-7	(+) Silt, trace iron Pipe, trace fine Gravel	ORGANIC SILT AND PEAT	
15	18				4-4	S-7A: (top 2") Stiff, gray Organic SILT, trace (+) fine to coarse Sand	±15'	
	12	S-8	24/6	15-17	5-2	S-7B: (bottom 1") Stiff, black/gray SILT		
	9				2-1	and Fibrous Peat		
	8					S-8: Soft, gray Organic SILT, trace (-) Wood, trace (-) fine to medium	ORGANIC SILT	
	9					Sand		
0	9	S-9	24/5	19-21	5-2	Soft, gray/black Organic SILT, trace (-) Peat, trace (-) Shells		
	11				2-3			
	10							
	19							
	22						±23.5'	
25	35	S-10	24/8	24-26	13-13	Medium dense, gray, fine to coarse SAND, little (-) fine to		
	36				12-11	coarse Gravel, little (-) Silt	SAND	
	34							
	40							
	30							
0	33	S-11	24/11	29-31	24-13	Dense, gray, fine to coarse SAND, some (-) fine to coarse		
	40				17-18	Gravel, trace (+) Silt		
	34							
	32							
	28							

GRANULAR SOILS BLOWS/FT DENSITY	COHESIVE SOILS BLOWS/FT DENSITY	REMARKS:
0-4 VERY LOOSE	<2 VERY SOFT	1. Hand excavated 0-2' with Post Hole Digger (PHD).
4-10 LOOSE	2-4 SOFT	2. S-1 driven open hole.
10-30 MEDIUM DENSE	4-8 M. STIFF	3. Casing pushed to 4', cleaned to 4', then S-2 (4-6') taken.
10-50 DENSE	8-15 STIFF	4. Casing driven to 6', cleaned to 6' then S-3 (6-8') taken spoon obstructed. KEYSpan re-checked utility paths
>50 VERY DENSE	15-30 V. STIFF	and advised that slab may be present at 6.75' below ground surface.
	>30 HARD	

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 MAY OCCUR DUE TO OTHER FACTORS THAN THOSE PRESENT AT THE TIME MEASUREMENTS WERE MADE

DEPTH	CASING BLOWS	SAMPLE				SAMPLE DESCRIPTION BURMISTER CLASSIFICATION	R K	STRATUM DESCRIPTION		
		NO	PEN./REC	DEPTH (FT)	BLOWS/6"					
35	30	S-12	24/10	34-36	14-11	Medium dense, brown and grey, fine to coarse SAND and fine Gravel, Little Silt	±37'	SAND		
	36				14-14					
	66									
	78									
	73									
	75	S-13	24/10	39-41	43-17	Dense, olive SILT		SILT		
	103				16-21					
	116									
	120									
	124									
45	58	S-14	24/12	44-46	17-13	Medium dense, olive SILT				
	65				15-15					
	55									
	72									
50		S-15	24/8	49-51	15-12	Medium dense, olive/gray SILT				
					13-17					
						End of Exploration at ±51'				
5						6. S-4 Note: Spoon collected disturbed sample from 6.9' to 8.9' and encountered obstruction again. Impression is presence of concrete pipe with 2' ID and ±6" wall thickness. Keyspan LNG representative was contacted prior to using rollerbit at 6.3' obstacle. Paul Bailey cleared area for presence of active utilities. Keyspan representative Paul Bailey contacted upon encountering obstacle at ±8.9' and made second inspection of area and authorized continued drilling through what he suggested was an abandoned pipe from a former area structure. 7. Casing driven to 9' (experienced 2 bouncing blows at ±6.3' then only moderate effort to advance casing to 9'. 8. Casing driven to 11', cleaned to 11' then S-6 (11-13') taken Note: S-6 sample contained a fragment of iron (possible iron pipe)				
60										
65										
70										
75										

GRANULAR SOILS BLOWS/FT DENSITY	COHESIVE SOILS BLOWS/FT DENSITY	REMARKS:	
0-4 VERY LOOSE	<2 VERY SOFT		9. Casing driven to 13', cleaned to 13' then S-7 (13-15') taken. 10. Casing driven to 15', cleaned to 15' then S-8 (15-17') taken. 11. Casing driven to 19', cleaned to 19', then S-9 (19-21') taken. 12. Casing driven to 24', cleaned to 24' then S-10 (24-26') taken. 13. Casing driven to 29', cleaned to 29', then S-11 (29-31') taken. 14. Casing driven to 34', cleaned to 34' then S-12 (34-36') taken. 15. Casing installed to 39', cleaned then S-13 (39-41) taken.
4-10 LOOSE	2-4 SOFT		
0-30 MEDIUM DENSE	4-8 M. STIFF		
0-50 DENSE	8-15 STIFF		
>50 VERY DENSE	15-30 V. STIFF		
	>30 HARD		

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 MAY OCCUR DUE TO OTHER FACTORS THAN THOSE PRESENT AT THE TIME MEASUREMENTS WERE MADE

TEST BORING LOG



National Grid
642 Allens Avenue
Providence, Rhode Island

EXPLORATION NO.: GZ-314D
SHEET: 1 of 3
PROJECT NO: 33554
REVIEWED BY: MSK

Logged By: MJB/SN
Drilling Co.: Geologic
Foreman: Dave Sheldon

Type of Rig: Truck Mounted
Rig Model: CME
Drilling Method:
Vactor/Drive & Wash

Boring Location: See Plan
Ground Surface Elev. (ft.): 11.13
Final Boring Depth (ft.): 34
Date Start - Finish: 5/27/2014 - 6/3/2014

H. Datum:
NAD 83
V. Datum:
NAVD 88

Hammer Type: Safety Hammer
Hammer Weight (lb.): 140
Hammer Fall (in.): 30
Auger or Casing O.D./I.D. (in.): 4

Sampler Type: SS
Sampler O.D. (in.): 2.0
Sampler Length (in.): 24
Rock Core Size: N/A

Groundwater Depth (ft.)			
Date	Time	Water Depth	Stab. Time
6/4/14	11:00	8.99	1 Day

Depth (ft)	Sample				Blows (per 6 in.)	Sample Description Modified Burmister	Remark	Field Test Data	Visual	Odor	Stratum Description Depth(ft.) Elev.(ft.)	Equipment Installed
	No.	Depth (ft.)	Pen. (in)	Rec. (in)								
1	S-1	0-2	N/A	N/A		S-1 : Gray brown (10YR, 5/2) fine SAND, little Gravel, little Silt, dry, moderate oil-like odor	1 2 3	61.2			CRUSHED STONE 10.9	Stand Pipe
2	S-2	2-4	N/A	N/A		S-2 : Black (10YR, 2/1) fine to coarse SAND, little Gravel, little Silt, trace Brick, trace Slag, oil-like staining, moderate oil-like odor, moist		108		Mod		
3	S-3	4-6	N/A	N/A		S-3 : Black (10YR, 2/1) fine to coarse SAND, little Gravel, little Silt, trace Brick, trace Slag, oil-like staining, moderate oil-like odor, moist		175		Mod		
4	S-4	6-8	24	8	15 16 15 9	S-4 : Dense, light gray (GLE Y 1, 7/N) fine to medium SAND, some Gravel, trace Silt, slight oil-like odor, wet	4	9		Sigt		
5	S-5	8-10	24	11	7 6 6 9	S-5 : Medium dense, very dark brown (10YR, 3/1) fine to coarse SAND and GRAVEL, little Silt, slight oil-like odor, wet		26		Sigt	FILL	
6	S-6	10-12	24	6	4 4 WOH 1	S-6 : Loose, dark grayish brown (10YR, 4/2) fine to medium SAND, little Silt, trace Gravel, trace Brick, wet		3.6				
7	S-7	12-14	24	1	3 5 11 7	S-7 : Medium dense, black (10YR, 2/1) fine SAND and SILT, strong oil-like odor, oil-like staining, wet		136		Strg		PVC Riser Filter Sand
8	S-8	14-16	24	12	3 3 3 3	S-8 : Loose, black (10YR, 2/1) fine to medium SAND, some Silt, trace Gravel, strong oil-like odor, oil-like staining, slight sheen, wet		426				

REMARKS

1 - The upper 6 feet was cleared using an air knife and soil vactor truck. Soil samples were collected from the sidewalls. Therefore, blows and SPT values are not applicable for the vacuum excavated portion of the boring.

2 - The headspace of soil samples was screened for Total Volatile Organic Compounds (TVOCs) using a miniRae 3000 Photoionization Detector (PID) equipped with a 10.6 eV Lamp calibrated to a 100 ppmv isobutylene standard. ND indicates reading below the instruments detection limit of approximately 0.1 ppmv. N/A-Not Applicable, NM-Not Measured, bgs-below ground surface, WOH-Weight of Hammer

3 - 2" of crushed stone present at the surface.

4 - Water table observed at 6 feet bgs.

See Log Key for explanation of sample description, identification procedures, and visual and odor impacts. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Exploration No.:
GZ-314D

GZA TEMPLATE TEST BORING W/EQUIP NGRIDNE; 12/28/2015; 2:41:27 PM

TEST BORING LOG



**National Grid
642 Allens Avenue
Providence, Rhode Island**

**EXPLORATION NO.: GZ-314D
SHEET: 2 of 3
PROJECT NO: 33554
REVIEWED BY: MSK**

Depth (ft)	Sample				Blows per 6 in.	Sample Description Modified Burmister	Remark	Field Test Data	Visual	Odor	Stratum Description	Elev. (ft.)	Equipment Installed
	No.	Depth (ft.)	Pen. (in)	Rec. (in)									
16	S-9	16-18	24	15	3 2 3 3	S-9 : 0-7" Black (10YR, 2/1) fine to medium SAND, some Silt, trace Gravel, strong oil-like odor, oil-like staining, slight sheen, wet		408	Strg		FILL		
17						7"-15" Black (10YR, 2/1) fine SAND and SILT, some Gravel, oil-like coating, strong oil-like odor, wet		230	Strg				
18	S-10	18-20	24	19	3 2 1 1	S-10 : 0-3" Black (10YR, 2/1) fine SAND and SILT, some Gravel, oil-like coating, strong oil-like odor, wet		142	Strg		19	-7.9	
19						3"-7" Very dark brown (10YR, 3/1) fine to coarse SAND, some Gravel, little Silt, strong oil-like odor, oil-like coating, wet		190	Strg				
20	S-11	20-22	24	0	WOH 1 1	S-11 : Very soft cohesive soils, no recovery		18	Sigt				
21								NM					
22	S-12	22-24	24	20	3 2 3 2	S-12 : Medium stiff, greenish gray (GLEY 5, 10Y) ORGANIC SILT, trace Shells, slight oil-like odor, wet	5	24					Bentonite Seal
23									Sigt				Filter Sand
24	S-13	24-26	24	5	WOH	S-13 : Very soft, greenish gray (GLEY 5, 10Y) ORGANIC SILT, trace Shells, slight oil-like odor, wet		19					
25									Sigt				
26	S-14	26-28	24	15	WOH	S-14 : Very soft, greenish gray (GLEY 5, 10Y) ORGANIC SILT, trace Shells, slight oil-like odor, wet		10			ORGANIC SILT		
27									Sigt				
28	S-15	28-30	24	2	WOH	S-15 : Very soft, greenish gray (GLEY 5, 10Y) ORGANIC SILT, trace Shells, slight oil-like odor, wet		2.5					
29									Sigt				Well Screen
30	S-16	30-32	24	23	WOH	S-16 : Very soft, very dark greenish gray (GLEY 1, 3/10Y) ORGANIC SILT, trace Shells, trace Wood fibers, faint organic odor, wet		2.3					
31													
32	S-17	32-34	24	17	WOH	S-17 : Very soft, very dark greenish gray (GLEY 1, 3/10Y) ORGANIC SILT, trace Shells, trace Wood fibers, faint organic odor, wet		1.4					
33													

REMARKS

5 - A groundwater monitoring well of the following construction was installed: 10 feet of 2" Diameter, Schedule 40, flush joint, threaded, 10-slot PVC well screen at 34 feet bgs, 2" Diameter, Schedule 40, flush joint, threaded PVC Riser installed from 0-24 feet bgs; Filter Sand placed in annulus from 22-34 feet bgs; Bentonite Seals installed from 22-23 feet bgs. Remaining annulus filled with filter sand. Well protected with a stand pipe.

See Log Key for explanation of sample description, identification procedures, and visual and odor impacts. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

**Exploration No.:
GZ-314D**

TEST BORING LOG



GZA
GeoEnvironmental, Inc.
Engineers and Scientists

National Grid
 642 Allens Avenue
 Providence, Rhode Island

EXPLORATION NO.: GZ-314D
SHEET: 3 of 3
PROJECT NO: 33554
REVIEWED BY: MSK

Depth (ft)	Sample				Blows per 6 in.	Sample Description Modified Burmister	Remark	Field Test Data	Visual	Odor	Depth (ft.)	Stratum Description	Elev. (ft.)	Equipment Installed
	No.	Depth (ft.)	Pen. (in)	Rec. (in)										
34						End of exploration at 34 feet.					34	ORGANIC SILT	-22.9	
35														
36														
37														
38														
39														
40														
41														
42														
43														
44														
45														
46														
47														
48														
49														
50														
51														

REMARKS

See Log Key for explanation of sample description, identification procedures, and visual and odor impacts. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Exploration No.:
GZ-314D

TEST BORING LOG



GZA
GeoEnvironmental, Inc.
Engineers and Scientists

National Grid
 642 Allens Avenue
 Providence, Rhode Island

EXPLORATION NO.: GZ-314S
SHEET: 1 of 2
PROJECT NO: 33554
REVIEWED BY: MSK

Logged By: MJB/SN
Drilling Co.: Geologic
Foreman: Dave Sheldon

Type of Rig: Truck Mounted
Rig Model: CME
Drilling Method:
 Vactor/Drive & Wash

Boring Location: See Plan
Ground Surface Elev. (ft.): 11.13
Final Boring Depth (ft.): 19
Date Start - Finish: 5/27/2014 - 6/3/2014

H. Datum:
 NAD 83
V. Datum:
 NAVD 88

Hammer Type: Safety Hammer
Hammer Weight (lb.): 140
Hammer Fall (in.): 30
Auger or Casing O.D./I.D. (in): 4

Sampler Type: SS
Sampler O.D. (in.): 2.0
Sampler Length (in.): 24
Rock Core Size: N/A

Groundwater Depth (ft.)			
Date	Time	Water Depth	Stab. Time
6/4/14	11:05	9.05	1 Day

Depth (ft)	Sample				Blows (per 6 in.)	Sample Description Modified Burmister	Remark	Field Test Data	Visual	Odor	Stratum Description Depth (ft.)	Elev. (ft.)	Equipment Installed
	No.	Depth (ft.)	Pen. (in)	Rec. (in)									
1		0-19				: None/Refer to GZ-314D	1				0-2 CRUSHED STONE		Stand Pipe
2													PVC Riser
3								Mod					Bentonite Seal
4							2	Mod					Filter Sand
5								Mod					
6											FILL		
7								Sigt					
8													
9								Sigt					
10													
11													
12													Well Screen
13								Strg					
14													
15													

REMARKS

1 - No sampling completed at this location. See GZ-314D for sampling details. Stratum and impacts descriptions inferred from GZ-314D.
 2 - A groundwater monitoring well of the following construction was installed: 15 feet of 2" Diameter, Schedule 40, flush joint, threaded, 10-slot PVC well screen at 19 feet bgs. 2" Diameter, Schedule 40, flush joint, threaded PVC Riser installed from 0-4 feet bgs; Filter Sand placed in annulus from 3-19 feet bgs; Bentonite Seals installed from 2-3 feet bgs. Remaining annulus filled with filter sand. Well protected with a stand pipe.

See Log Key for explanation of sample description, identification procedures, and visual and odor impacts. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Exploration No.:
GZ-314S

GZA TEMPLATE TEST BORING W/EQUIP NGRIDNE; 12/28/2015; 2:41:29 PM

TEST BORING LOG



GZA
GeoEnvironmental, Inc.
Engineers and Scientists

National Grid
 642 Allens Avenue
 Providence, Rhode Island

EXPLORATION NO.: GZ-314S
SHEET: 2 of 2
PROJECT NO: 33554
REVIEWED BY: MSK

Depth (ft)	Sample				Blows per 6 in.	Sample Description Modified Burmister	Remark	Field Test Data	Visual	Odor	Stratum Description	Elev.(ft.)	Equipment Installed
	No.	Depth (ft.)	Pen. (in)	Rec. (in)									
16									Strg		FILL		
17								Strg					
18								Strg					
18.5								Strg					
19								Sigt					
19						End of exploration at 19 feet.					19	-7.9	
20													
21													
22													
23													
24													
25													
26													
27													
28													
29													
30													
31													
32													
33													

REMARKS

See Log Key for explanation of sample description, identification procedures, and visual and odor impacts. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Exploration No.: GZ-314S

TEST BORING LOG



GZA
GeoEnvironmental, Inc.
Engineers and Scientists

National Grid
642 Allens Avenue
Providence, Rhode Island

EXPLORATION NO.: GZ-315D
SHEET: 1 of 2
PROJECT NO: 33554
REVIEWED BY: MSK

Logged By: MJB/SN
Drilling Co.: Geologic
Foreman: Dave Sheldon

Type of Rig: Truck Mounted
Rig Model: CME
Drilling Method:
Vactor/Drive & Wash

Boring Location: See Plan
Ground Surface Elev. (ft.): 10.17
Final Boring Depth (ft.): 30
Date Start - Finish: 5/28/2014 - 6/4/2014

H. Datum:
NAD 83
V. Datum:
NAVD 88

Hammer Type: Safety Hammer
Hammer Weight (lb.): 140
Hammer Fall (in.): 30
Auger or Casing O.D./I.D. (in): 4

Sampler Type: SS
Sampler O.D. (in.): 2.0
Sampler Length (in.): 24
Rock Core Size: N/A

Groundwater Depth (ft.)

Date	Time	Water Depth	Stab. Time
6/4/14	11:30	8.99	2 Hrs

Depth (ft)	Sample				Blows (per 6 in.)	Sample Description Modified Burmister	Remark	Field Test Data	Visual	Odor	Stratum Description Depth(ft.) Elev.(ft.)	Equipment Installed
	No.	Depth (ft.)	Pen. (in)	Rec. (in)								
1	S-1	0-2	N/A	N/A		S-1 : Gray brown (10YR, /2) fine to coarse SAND, little Gravel, little Silt, dry, slight oil-like odor	1 2 3	41			CRUSHED STONE	Stand Pipe
2	S-2	2-4	N/A	N/A		S-2 : Black (10YR, 2/1) fine to medium SAND, little Silt, little Gravel, little (-) Ash, trace Slag, trace Brick, trace coal, slight oil-odor, moist, oil-like staining		38		Slight		
3	S-3	4-6	N/A	N/A		S-3 : Black (10YR, 2/1) fine to medium SAND, little Silt, little Gravel, little (-) Ash, trace Slag, trace Brick, trace coal, slight oil-odor, moist, oil-like staining		37		Slight		
4	S-4	6-8	24	8	6 4 3 4	S-4 : 0-5" Yellow brown (10YR, 5/6 fine SAND and SILT, trace gravel, slight oil-like odor, wet 5"-8" Black (10YR, 2/1) fine to coarse SAND, some Silt, slight oil-like odor, black oil-like staining, wet	4	102 106		Slight	FILL	
5	S-5	8-10	24	8	3 2 2 3	S-5 : Loose green gray (GLE Y 1, 10Y) fine SAND, some Silt, moderate oil-like odor, slight sheen, wet, top 2" strong oil-like odor		186		Slight		
6	S-6	10-12	24	5	3 2 2 2	S-6 : Loose, very dark green gray (GLE Y 1, 3/10Y) fine SAND, some Silt, slight sheen, strong oil-like odor, wet		188		Strong		
7	S-7	12-14	24	11	2 1 2 2	S-7 : Very loose, very dark green gray (GLE Y 1, 3/10Y) fine to medium SAND, some Gravel, some Silt, slight sheen, strong oil-like odor, wet		152		Strong		
8	S-8	14-16	24	13	4 3 3 4	S-8 : 0-7" Very dark green gray (GLE Y 1, 3/10Y) fine to medium SAND, some Gravel, some Silt, slight sheen, strong oil-like odor, wet, oil-like coating (4"-5")		90 114				PVC Riser

REMARKS

1 - The upper 6 feet was cleared using an air knife and soil vactor truck. Soil samples were collected from the sidewalls. Therefore, blows and SPT values are not applicable for the vacuum excavated portion of the boring.
 2 - The headspace of soil samples was screened for Total Volatile Organic Compounds (TVOCs) using a miniRae 3000 Photoionization Detector (PID) equipped with a 10.6 eV Lamp calibrated to a 100 ppmv isobutylene standard. ND indicates reading below the instruments detection limit of approximately 0.1 ppmv. N/A-Not Applicable, NM-Not Measured, bgs-below ground surface, WOH-Weight of Hammer
 3 - 2" Crushed stone present at the surface
 4 - Water table observed at 6 feet bgs.

See Log Key for explanation of sample description, identification procedures, and visual and odor impacts. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Exploration No.:
GZ-315D

GZA TEMPLATE TEST BORING W/EQUIP NGRIDNE; 12/28/2015; 2:41:30 PM

TEST BORING LOG



National Grid
642 Allens Avenue
Providence, Rhode Island

EXPLORATION NO.: GZ-315D
SHEET: 2 of 2
PROJECT NO: 33554
REVIEWED BY: MSK

Depth (ft)	Sample				Blows per 6 in.	Sample Description Modified Burmister	Remark	Field Test Data	Visual	Odor	Stratum Description	Elev. (ft.)	Equipment Installed
	No.	Depth (ft.)	Pen. (in)	Rec. (in)									
16	S-9	16-18	24	7	2 3 4 7	7"-13" Black (10YR, 2/1) fine to coarse SAND, trace Shells, trace Gravel, oil-like coating, strong oil-like odor, wet S-9 : Loose, black (1-YR, 2/1) fine to coarse SAND, little Gravel, oil-like coated, strong oil-like odor, wet, from 4"-7" color changes to more yellow brown (10YR, 3/4)				Strg			
17										Strg	FILL		
18	S-10	18-20	24	17	2 2 1 1	S-10 : Very soft, very dark green gray (GLEY 1, 3/10Y) ORGANIC SILT, trace Shells, slight oil-like odor, wet						18	-7.8
19							5			Sigt			Bentonite Seal
20	S-11	20-22	27	9	WOH	S-11 : Very soft, very dark green gray (GLEY 1, 3/10Y) ORGANIC SILT, trace Shells, slight oil-like odor, wet							Filter Sand
21										Sigt			
22	S-12	22-24	24	22	WOH	S-12 : Very soft, very dark green gray (GLEY 1, 3/10Y) ORGANIC SILT, trace Shells, slight oil-like odor, wet							
23										Sigt			
24	S-13	24-26	24	24	WOH	S-13 : Very soft, very dark green gray (GLEY 1, 3/10Y) ORGANIC SILT, trace Shells, slight oil-like odor, wet					ORGANIC SILT		
25										Sigt			Well Screen
26	S-14	26-28	24	24	WOH	S-14 : Very soft, very dark green gray (GLEY 1, 4/10Y) ORGANIC SILT, trace Shells, trace fine Sand, trace Wood, wet							
27													
28	S-15	28-30	24	24	WOH	S-15 : Very soft, dark green gray, ORGANIC SILT, trace Shells, 1/8" seam of fine Sand at 18", wet							
29													
30						End of exploration at 30 feet.						30	-19.8
31													
32													
33													

REMARKS

5 - A groundwater monitoring well of the following construction was installed: 10 feet of 2" diameter, schedule 40, flush joint, threaded, 10-slot PVC well screen at 30 feet bgs. 2" Diameter, Schedule 40, flush joint, threaded PVC Riser installed from 0-20 feet bgs; Filter Sand placed in annulus from 19.5-30 feet bgs; Bentonite Seals installed from 18-19.5 feet bgs. Remaining annulus filled with filter sand. Well protected with a stand pipe.

See Log Key for explanation of sample description, identification procedures, and visual and odor impacts. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

**Exploration No.:
GZ-315D**

TEST PIT FIELD LOG

GZA GEOENVIRONMENTAL, INC. 530 BROADWAY, PROVIDENCE, RI GEOTECHNICAL/GEOHYDROLOGICAL CONSULTANTS	PROJECT CLIENT: National Grid LOCATION: 642 Allens Avenue Providence, Rhode Island	TEST PIT NO.: TP-301 FILE NO.: 33554 DATE: 6/17/14
---	---	--

GZA ENGINEER: Sophia Narkiewicz WEATHER: Sunny 70s	EXCAVATION EQUIPMENT CONTRACTOR: Clean Harbors OPERATOR: Victor Delgado MAKE: CAT CAPACITY: ICY	DATUM: N/A GROUND ELEV.: NM TIME STARTED: 0800 TIME COMPLETED: 1600
---	---	--


DEPTH	PPM	EXCAV. EFFORT	BOULDER COUNT QTY. CLASS	REMARK NO.
-1-	0.0.5'	0	Gray 3/4" Crushed Stone, Dry	
	0.5'-1'	0	Gray (10YR, 5/2) fine to coarse SAND, little Gravel, trace Silt, Dry	E --
-2-	1.5'-5.5'	0	Dark brown (10YR, 3/2) fine to coarse SAND, little Gravel, little Silt, trace Coal, trace Wood, trace Brick, trace Metal, trace Slag, trace construction debris	E -- 1
-3-				E --
-4-				
-5-				
-6-	5.5'-13'	195	Black (10YR, 2/2) fine to coarse SAND, little Gravel, little Cobble, trace Slag, trace Silt, trace Wood, trace metal, trace (+) Coal, trace (+) Brick, moderate oil-like odor, trace blue staining, oil-like staining	E -- 2 3
-7-				
-8-				
-9-				
-10-				
-11-		▽		
-12-				
-13-	13' +	NM	Gray (10YR, 5/2) CLAYEY SILT, Wet	E -- 4 5
-14-				6

REMARKS:


N/A=Not Applicable
NM=Not Measured

1. Poly layer observed at 1.5 feet bgs and 5.5 feet bgs
2. Pile/wood observed at 7 feet bgs and 10 feet bgs.
3. PID reading around hole around 6 ppm.
4. Water observed at 11 feet bgs.
5. Oil seeping in from the south at the water table.
6. Recovery well (12" diameter) set at 13.25 feet bgs-screened from 8 to 13 feet bgs.


TEST PIT PLAN 	LEGEND: BOULDER COUNT SIZE RANGE LETTER CLASSIFICATION DESIGNATION 6"-18" A 18"-36" B 36" OR LARGER C	PROPORTIONS USED TRACE (TR) 0-10% LITTLE (LI) 10-20% SOME (SO) 20-35% AND 35-50%	EXCAVATION EFFORT E EASY M MODERATE D DIFFICULT
VOLUME= 50 CY		OBSERVED GROUNDWATER LEVEL	

WEIDLINGER ASSOCIATES, INC. CONSULTING ENGINEERS  27 WORMWOOD, SUITE 200 BOSTON, MA 02210-1625 Phone: (617) 250-4100				Project Providence LNG Location Providence, RI Project No. 21524028				BORING NO. SB-01 Page No. 1 of 2	
Client	Kiewit			GS Elev. N/A ft.		# of SPT Samples 13			
Contractor	Geologic			Boring Coordinates N/A		Length of Rock core - ft			
Driller	Dave					Total Depth of Boring 71 ft.			
WAI Rep.	Shawn Ingram (Roux)			EQUIPMENT	CASING	SAMPLER	CORE		
DATE	Start	Finish	Type		Split Spoon				
	6/3/2015	6/3/2015	Size I.D.	4"	2"				
Boring Location	See attached plan			Hammer Wt.	Hyd.	Hyd.			
				Hammer Fall				# of Shelby Tubes 1	
Borehole Depth (ft)	Sample Information					Remarks	Strata	Sample Description	
	No.	Depth (ft)	Pen (in)	Rec (in)	Blows per 6" (RQD %)				
5	SS-1	6-8	24	10	12/4/3/3		FILL	WIDELY GRADED SAND WITH GRAVEL (SP); ~80% fine to medium sand; ~15% fine gravel; <5% fines; gray; petroleum odor.	
10	SS-2	9-11	24	0	4/2/2/3			No Recovery.	
15	SS-3	14-16	24	2	5/3/2/1			NARROWLY GRADED GRAVEL (GW); fine gravel; <5% sand and fines; gray; petroleum odor and sheen.	
20	SS-4	19-21	24	28	woh(18")/2		ORGANIC SILT	SILT (ML); homogeneous organic silt; <10% fine sand; dark gray.	
	US-1	22-23	30	15	Push			Shelby tube undisturbed sample.	
25	SS-5	24-26	24	18	1/woh/1/1			WIDELY GRADED SAND WITH SILT AND GRAVEL (SW-SM); ~70% fine to medium subrounded sand; ~20% subangular fine gravel; ~10% fines; dark gray.	
30	SS-6	29-31	24	12	2/13/12/7			WIDELY GRADED SAND WITH SILT AND GRAVEL (SW-SM); ~70% fine to medium subrounded sand; ~20% subangular fine gravel; ~10% fines; dark gray.	
35	SS-7	34-36	24	14	13/9/10/6		SILT	WIDELY GRADED SAND WITH SILT AND GRAVEL (SW-SM); ~70% fine to medium subrounded sand; ~20% subangular fine gravel; ~10% fines; brown.	
40	SS-8	39-41	24	15	5/6/8/10			SILT (ML); homogeneous silt; <5% sand; brown.	
Notes:						PROJECT Providence LNG		Borehole No. SB-01	


Depth (ft)		Sample Information				Remarks	Strata	Sample Description
		No.	Depth (ft)	Pen (in)	Rec (in)			
45	SS-9	44-46	24	18	5/6/9/10		SILT	SILT (ML); homogeneous silt; <5% fine sand; light gray.
50	SS-10	49-51	24	16	9/6/11/9			SILT (ML); homogeneous silt; <5% fine sand and fine gravel; light gray.
55	SS-11	54-56	24	18	5/7/10/9			WIDELY GRADED SAND (SW); fine to medium subrounded sand; >5% fines; light brown and light gray.
60	SS-12	59-61	24	13	7/9/11/9			WIDELY GRADED SAND (SW); fine to medium subrounded sand; >5% fines; light brown and light gray.
70	SS-13	69-71	24	20	8/8/12/10			WIDELY GRADED SAND (SW); ~80% fine to medium subrounded sand; ~15% fine gravel; >5% fines; light brown and light gray.
75								Bottom of Boring, 71 feet
80								
85								
Notes:						PROJECT Providence LNG		Borehole No. SB-01


WEIDLINGER ASSOCIATES, INC. CONSULTING ENGINEERS  27 WORMWOOD, SUITE 200 BOSTON, MA 02210-1625 Phone: (617) 250-4100				Project Providence LNG Location Providence, RI Project No. 21524028				BORING NO. SB-02 Page No. 1 of 2	
Client	Kiewit			GS Elev.	N/A ft.		# of SPT Samples	14	
Contractor	Geologic			Boring Coordinates		N/A		Length of Rock core	- ft
Driller	Dave			EQUIPMENT	CASING	SAMPLER	CORE	Total Depth of Boring	71 ft.
WAI Rep.	Shawn Ingram (Roux)			Type		Split Spoon		# of Shelby Tubes	0
DATE	Start	Finish		Size I.D.	4"	2"			
	6/2/2015	6/2/2015		Hammer Wt.	Hyd.	Hyd.			
Boring Location	See attached plan			Hammer Fall					
Borehole Depth (ft)	Sample Information					Remarks	Strata	Sample Description	
	No.	Depth (ft)	Pen (in)	Rec (in)	Blows per 6" (RQD %)				
5	SS-1	6-8	24	9	9/6/6/4		FILL	WIDELY GRADED SAND WITH GRAVEL (SW); ~80% medium to coarse subrounded sand; ~20% fine subangular gravel; brown.	
10	SS-2	9-11	24	4	3/3/3/4			NARROWLY GRADED GRAVEL (GP); mostly fine subangular gravel; <5% fines; brown and gray.	
15	SS-3	14-16	24	5	2/woh/1/1			NARROWLY GRADED GRAVEL WITH SAND (GP); ~60% fine subangular gravel; ~40% fine to coarse, subrounded sand; gray; petroleum odor.	
20	SS-4	19-21	24	7	12/6/6/3			WIDELY GRADED SAND WITH SILT AND GRAVEL (SW-SM); ~60% fine to medium sand; ~30% fine subangular gravel; ~10% fines; dark gray.	
25	SS-5	24-26	24	8	12/6/6/3			WIDELY GRADED SAND WITH GRAVEL (SW); ~70% fine to medium sand; ~25% fine subangular gravel; <5% fines; dark gray.	
30	SS-6	29-31	24	10	5/3/3/3			WIDELY GRADED SAND (SW); Mostly fine to medium sand; <5% fines and fine subangular fine gravel; gray.	
35	SS-7	34-36	24	18	3/1/woh/9		ORGANIC SILT	WIDELY GRADED SAND (SW) and SILT WITH SAND (ML); Mostly fine to medium sand; <5% fines; A stratified layer (4 inches) organic silt; dark gray.	
40	SS-8	39-41	24	12	13/9/23/17		SAND	WIDELY GRADED SAND WITH GRAVEL; ~80% medium to coarse subrounded sand; ~20% fine subangular gravel; >5% fines; brown.	
Notes:						PROJECT Providence LNG		Borehole No. SB-02	

Depth (ft)		Sample Information				Remarks	Strata	Sample Description
		No.	Depth (ft)	Pen (in)	Rec (in)			
45	SS-9	44-46	24	10	9/7/7/7		SAND	WIDELY GRADED SAND WITH GRAVEL (SW); ~80% medium to coarse subrounded sand; ~20% fine subangular gravel; brown.
50	SS-10	49-51	24	10	6/6/8/7			WIDELY GRADED SAND WITH GRAVEL (SW); ~80% medium to coarse subrounded sand; ~20% fine subangular gravel; light gray and light brown.
55	SS-11	54-56	24	8	8/7/8/7			WIDELY GRADED SAND WITH GRAVEL (SW); ~80% medium to coarse subrounded sand; ~20% fine subangular gravel; light gray and light brown.
60	SS-12	59-61	24	12	3/3/7/7			WIDELY GRADED SAND WITH GRAVEL (SW); ~80% fine to medium subrounded sand; ~20% fine subangular gravel; dark brown.
65	SS-13	64-66	24	12	13/16/17/16			WIDELY GRADED SAND WITH GRAVEL (SW); ~80% medium to coarse subrounded sand; ~20% fine subangular gravel; brown.
70	SS-14	69-71	24	12	12/15/18/18			WIDELY GRADED SAND WITH GRAVEL (SW); ~80% medium to coarse subrounded sand; ~20% fine subangular gravel; brown.
75								Bottom of Boring, 71 feet
80								
85								
Notes:						PROJECT Providence LNG		Borehole No. SB-02

WEIDLINGER ASSOCIATES, INC. CONSULTING ENGINEERS  27 WORMWOOD, SUITE 200 BOSTON, MA 02210-1625 Phone: (617) 250-4100			Project Providence LNG Location Providence, RI Project No. 21524028			BORING NO. SB-04 Page No. 1 of 2			
Client	Kiewit		GS Elev. N/A ft.			# of SPT Samples 10			
Contractor	Geologic		Boring Coordinates N/A			Length of Rock core - ft			
Driller	Dave		EQUIPMENT			SAMPLER CORE			
WAI Rep.	Shawn Ingram (Roux)		Type			Split Spoon			
DATE	Start	Finish	Size I.D.			Total Depth of Boring 51 ft.			
	6/1/2015	6/1/2015	4" 2"						
Boring Location	See attached plan		Hammer Wt. Hyd.			# of Shelby Tubes 2			
			Hammer Fall						
Borehole Depth (ft)	Sample Information					Remarks	Strata	Sample Description	
	No.	Depth (ft)	Pen (in)	Rec (in)	Blows per 6" (RQD %)				
5	SS-1	6-8	24	5	7/4/4/3		FILL	WIDELY GRADED SAND WITH GRAVEL (SW); ~80% medium to coarse subrounded sand; ~20% fine subangular gravel; gray.	
10	SS-2	9-11	24	5	8/6/5/4			WIDELY GRADED SAND WITH SILT (SW-SM); ~80% fine to medium subrounded sand; ~20% fine subangular gravel; gray; petroleum odor.	
15	SS-3	14-16	24	10	7/4/3/3			SILT WITH GRAVEL (ML); medium plasticity organic silt; >5% fine subangular gravel; dark gray.	
20	SS-4	19-21	24	11	3/1/2/1			WIDELY GRADED SAND WITH SILT (SW-SM); ~50% fine to medium subrounded sand; ~50% organic silt; dark gray. Shelby tube undisturbed sample.	
25	US-1	21-23	30	24	Push				
25	SS-5	24-26	24	17	woh(12")/2/1		ORGANIC SILT	WIDELY GRADED SAND WITH SILT (SW-SM); ~50% fine to medium subrounded sand; ~50% organic silt; dark gray.	
30	SS-6	29-31	24	18	8/6/5/4			WIDELY GRADED SAND WITH SILT (SW-SM); ~50% fine to medium subrounded sand; ~50% organic silt; dark gray. Shelby tube undisturbed sample.	
30	US-2	31-33	30	22	Push				
35	SS-7	34-36	24	24	6/6/5/4			WIDELY GRADED SAND WITH GRAVEL (SW); ~80% fine to medium sand; ~20% fine subangular fine gravel; gray.	
40	SS-8	39-41	24	24	1/2/3/9			SILT WITH SAND (ML); ~85% medium plasticity organic silt; ~15% fine sand; dark gray.	
Notes:						PROJECT Providence LNG			Borehole No. SB-04

Depth (ft)		Sample Information				Remarks	Strata	Sample Description
		No.	Depth (ft)	Pen (in)	Rec (in)			
45		SS-9	44-46	24	14	24/18/16/14	SAND	WIDELY GRADED SAND WITH GRAVEL (SW); ~80% fine to medium subrounded sand; ~20% fine subangular gravel; brown and gray.
50		SS-10	49-51	24	8	23/12/13/13		WIDELY GRADED SAND WITH GRAVEL (SW); ~80% fine to medium subrounded sand; ~20% fine subangular gravel; brown and gray.
55								Bottom of Boring, 51 feet
60								
65								
70								
75								
80								
85								
Notes:						PROJECT Providence LNG		Borehole No. SB-04

WEIDLINGER ASSOCIATES, INC. CONSULTING ENGINEERS  27 WORMWOOD, SUITE 200 BOSTON, MA 02210-1625 Phone: (617) 250-4100				Project Providence LNG Location Providence, RI Project No. 21524028				BORING NO. SB-06 Page No. 1 of 3	
Client	Kiewit			GS Elev. _____ ft.		# of SPT Samples 19			
Contractor	Geologic			Boring Coordinates _____		Length of Rock core _____ ft			
Driller	Ray and Dave								
WAI Rep.	Shawn Ingram (Roux)			EQUIPMENT	CASING	SAMPLER	CORE		
DATE	Start	Finish	Type		Split Spoon		Total Depth of Boring 101 ft.		
	7/16/2015	7/17/2015	Size I.D.	4"	2"				
Boring Location				Hammer Wt.	Hyd.	Hyd	# of Shelby Tubes 3		
				Hammer Fall					
Borehole Depth (ft)	Sample Information					Remarks	Strata	Sample Description	
	No.	Depth (ft)	Pen (in)	Rec (in)	Blows per 6" (RQD %)				
5	SS-1	0-2	24	18	6/9/12/11		FILL	WIDELY GRADED SAND WITH GRAVEL (SW); ~80% medium to coarse subrounded sand; ~20% fine subangular gravel; light brown.	
	SS-2	4-6	24	15	5/3/3/2			WIDELY GRADED SAND WITH GRAVEL (SW); ~80% medium to coarse subrounded sand; ~20% fine subangular gravel; light brown.	
10	SS-3	9-10.5	18	8	6/4/5/78			WIDELY GRADED SAND WITH GRAVEL (SW); ~80% medium to coarse subrounded sand; ~20% fine subangular gravel; light brown; Stone/concrete foundation prevented advancing spoon past 10.5 ft. concrete	
15	SS-4	14-16	24	10	7/4/5/4			WIDELY GRADED SAND WITH GRAVEL (SW); ~80% medium to coarse subrounded sand; ~20% fine subangular gravel; black; petroleum odor.	
20	SS-5	19-21	24	24	w.o.h		ORGANIC SILT	SILT (ML); ~90% organic silt; ~10% fine sand; dark gray.	
	US-1	21-23	30	25	Push			Shelby tube. Undisturbed	
25	US-2	24-26	30	23	Push			Shelby tube. Undisturbed	
	US-3	27-29	30	25	Push			Shelby tube. Undisturbed	
30	SS-6	29-31	24	24	w.o.h			SILT (ML); ~90% organic silt; ~10% fine sand; dark gray.	
35	SS-7	34-36	24	5	w.o.h			SILT (ML); ~90% organic silt; ~10% fine sand; shell fragment clogged the spoon and impacted recovery; dark gray.	
40	SS-8	39-41	24	24	w.o.h			SILT (ML); ~90% organic silt; ~10% fine sand; dark gray.	
Notes:						PROJECT Providence LNG		Borehole No. SB-06	

WEIDLINGER ASSOCIATES, INC. CONSULTING ENGINEERS  27 WORMWOOD, SUITE 200 BOSTON, MA 02210-1625 Phone: (617) 250-4100		Project Providence LNG				BORING NO. SB-06		
		Project No. 21524028				Page No. 2 of 3		
		Location Providence, RI						
Depth (ft)	Sample Information					Remarks	Strata	Sample Description
	No.	Depth (ft)	Pen (in)	Rec (in)	Blows per 6" (RQD %)			
45	SS-9	44-46	24	24	w.o.h		ORGANIC SILT	SILT (ML); ~90% organic silt; ~10% fine sand; dark gray.
50	SS-10	49-51	24	24	w.o.h			SILT (ML); ~90% organic silt; ~10% fine sand; dark gray.
55	SS-11	54-56	24	24	woh/woh/3/3			SILT (ML); ~90% organic silt; ~10% fine sand; dark gray.
60	SS-12	59-61	24	24	woh/12/6/3			59-60 - SILT (ML); ~90% organic silt; ~10% fine sand; dark gray. 60-60.5 - WIDELY GRADED SAND (SW); ~95% F to M sand; gray 60.5-61 - SILT (ML); ~90% organic silt; ~10% fine sand; dark gray.
65	SS-13	64-66	24	15	3/2/5/4			64-65 - WIDELY GRADED SAND (SW); ~95% F to C sand; gray 65-66 - SILT (ML); ~90% silt; ~10% fine sand; dark brown.
70	SS-14	69-71	24	6	8/6/5/4			WIDELY GRADED SAND (SW); ~95% F to C sand; gray
75	SS-15	74-76	24	1	3/2/3/4			SILT (ML); ~90% organic silt; ~10% fine sand; dark gray.
80	SS-16	80-81	24	24	woh/woh/3/4			70-80 - SILT (ML); ~95% organic silt; black. 80-81 - SILT (ML); ~95% organic silt; dark gray.
85	SS-17	84-86	24	20	6/11/9/12		SAND	WIDELY GRADED SAND (SW); ~95% F to M sand; gray
Notes:						PROJECT Providence LNG		Borehole No. SB-06

Depth (ft)		Sample Information				Remarks	Strata	Sample Description
		No.	Depth (ft)	Pen (in)	Rec (in)			
90	SS-18	89-91	24	0	7/7/12/7		SAND	No recovery
100	SS-19	99-101	24	18	9/9/14/22			WIDELY GRADED SAND (SW); ~95% F to M sand; light brown.
105								BOTTOM OF BORING, 101 FT
110								
115								
120								
125								
130								
Notes:						PROJECT Providence LNG		Borehole No. SB-06

RECORD OF BOREHOLE B-201 (KW-1)

PROJECT: CHI LNG Bund Highwall
 PROJECT NUMBER: 154-6055
 DRILLED DEPTH: 61.0 ft
 LOCATION: Liquefier Area

DRILL METHOD: 4 inch Drive and Wash
 HAMMER TYPE: Auto
 DATE STARTED: 1/15/16
 DATE COMPLETED: 1/18/16

COORDS: N: 260,792.90 E: 356,903.17
 GS ELEVATION: 11.7 ft
 WEATHER: Cloudy
 TEMPERATURE: 34 deg F

SHEET 1 of 3
 INCLINATION: 90
 DEPTH W.L.: 1.7 ft
 ELEVATION W.L.: 10.0 ft
 DATE W.L.: 1/18/2016
 TIME W.L.: 08:00

SOIL PROFILE				SAMPLE INFORMATION							
DEPTH ft	ELEVATION ft	LITHOLOGY DESCRIPTION	USCS	GRAPHIC LOG	SAMPLE DEPTH	NUMBER	SAMPLE TYPE	BLOWS per 6 in	N	REC ATT	Sample Description
0.0	10	0.0 - 9.0ft Brown, fine to coarse SAND, some silt, trace gravel (FILL).	SM		0.0	S1	SS	12-15-20-15	35	1.1 2.0	Top 4": Gray, moist, dense, fine SAND, little silt, (SM). Pp=1536psf Bottom 9": Reddish brown, moist, dense, fine to coarse SAND, little silt, trace gravel, (SM). PID=0.1ppm
5.0	5				5.0	S2	SS	8-4-6-5	10	0.8 2.0	Dark brown, wet, loose, fine to coarse SAND, some silt, trace gravel, (SM). Slight hydrocarbon odor. PID=0.0ppm
9.0	10.0	9.0 - 19.4ft Dark gray, silty fine to coarse SAND, trace to little gravel.	SM		9.0	S3	SS	12-9-11-10	20	0.3 2.0	Dark gray, wet, medium dense, fine to coarse SAND, some silt, trace gravel, (SM). Strong hydrocarbon odor and visible sheen. PID=12.0ppm
14.0	15.0				14.0	S4	SS	10-4-1-1	5	0.5 2.0	Gray, wet, loose, silty SAND, trace gravel, (SM). Strong hydrocarbon odor and visible sheen. PID=3.0ppm
16.0	5				16.0	S5	SS	1-WOH- WOH-WOH	0	1.4 2.0	Dark gray, wet, very loose, silty medium to coarse SAND, little fine to medium gravel, (SM). Strong hydrocarbon odor and visible sheen. PID=1.5ppm
19.0	20.0				19.0	S6	SS	9-4-2-2	6	0.7 2.0	Top 5": Gray, wet, loose, silty fine to coarse SAND, little gravel, (SM). Strong hydrocarbon odor. Bottom 3": Dark gray to black, loose, organic SILT, (OH). Pp=1000psf, Tv = 100 psf.
21.0	-10				21.0	S7	VANE	WOP-WOP- WOP-WOP	0	0.3 2.0	Dark gray, wet, very loose, organic SILT, some shell fragments, (OH). 0.5" seam of dark gray, silty fine to coarse SAND, some shell fragments, some gravels, (SM), PID=0.4ppm V1: (21.5-22) Su = 133 psf; Remolded Su = 300 psf V2: (22.5-23) Su = 250 psf; Remolded Su = 359 psf
23.0		19.4 - 34.0ft Dark gray, organic SILT to organic silty fine SAND, trace shells.	OH		23.0	S8	SS	20-16-10-8	26	2.0 2.0	Top 12": Dark gray, wet, medium dense, silty fine SAND, trace shell fragments, (SM). Bottom 12": Dark gray, wet, very stiff, organic SILT, trace shell fragments, (OH). PID=0.1ppm
25.0											

Log continued on next page

- Fill (made ground)
- USCS Silty Sand (SM)
- USCS High Plasticity Organic silt or clay with shells (OHSH)
- USCS Well-graded Sand (SW)

D+W: Drive and Wash SH: Shelby Tube SSA: Solid Stem Auger AUG: Auger Cuttings PP: Pocket Penetrometer TV: Torvane

DRILLING COMPANY: Geologic Earth Exploration Inc.
 DRILLER: C. O'Donnel
 DRILL RIG: CME - 45

LOGGED BY: SAD
 CHECKED BY: JDL
 DATE: 2/19/16



003A MANCHESTER NH GEOTECHNICAL SOILRX CHI LNG BUND HIGHWALL.GPJ GOLDR NH 2011.GDT 5/10/16

RECORD OF BOREHOLE B-201 (KW-1)

SHEET 2 of 3

PROJECT: CHI LNG Bund Highwall
 PROJECT NUMBER: 154-6055
 DRILLED DEPTH: 61.0 ft
 LOCATION: Liquefier Area

DRILL METHOD: 4 inch Drive and Wash
 HAMMER TYPE: Auto
 DATE STARTED: 1/15/16
 DATE COMPLETED: 1/18/16

COORDS: N: 260,792.90 E: 356,903.17
 GS ELEVATION: 11.7 ft
 WEATHER: Cloudy
 TEMPERATURE: 34 deg F

INCLINATION: 90
 DEPTH W.L.: 1.7 ft
 ELEVATION W.L.: 10.0 ft
 DATE W.L.: 1/18/2016
 TIME W.L.: 08:00

SOIL PROFILE				SAMPLE INFORMATION							
DEPTH ft	ELEVATION ft	LITHOLOGY DESCRIPTION	USCS	GRAPHIC LOG	SAMPLE DEPTH	NUMBER	SAMPLE TYPE	BLOWS per 6 in	N	REC ATT	Sample Description
25.0	-15		OH		25.0	S9	SS	5-3-4-3	7	2.0 2.0	Top 6": Dark gray, wet, loose, silty fine to coarse SAND, trace fine gravel, trace shell fragments, (SM). Bottom 18": Dark gray, wet, medium stiff, organic SILT, trace fine gravel, trace shell fragments, (OH).
					29.0	S10	SS	4-2-12-100/2"	14	0.9 1.7	Dark gray, wet, medium dense, silty fine to coarse SAND, some shell fragments, trace fine gravel, (SM). PID=0.0ppm
34.0 - 61.0ft		Dark brown, fine to coarse SAND, trace gravel, trace silt, (Outwash).	SW		34.0	S11	SS	18-22-20-23	42	0.9 2.0	Brown, wet, hard, SILT, little fine sand, trace shells, (ML). 1.5" thick seam of gravel. PID=0.0ppm
					39.0	S12	SS	13-10-24-23	34	0.8 2.0	Dark brown, wet, dense, fine to coarse SAND, trace gravel, trace silt, (SW). PID=0.0ppm
					44.0	S13	SS	32-26-20-16	46	0.6 2.0	Dark brown, wet, dense, fine to coarse SAND, trace gravel, trace silt, (SP). PID=0.0ppm
					49.0		SS	18-10-12-13	22	0.0 2.0	NO RECOVERY.

Log continued on next page

Fill (made ground)
 USCS Silty Sand (SM)
 USCS High Plasticity Organic silt or clay with shells (OHSH)
 USCS Well-graded Sand (SW)

D+W: Drive and Wash SH: Shelby Tube SSA: Solid Stem Auger AUG: Auger Cuttings PP: Pocket Penetrometer TV: Torvane

DRILLING COMPANY: Geologic Earth Exploration Inc.
 DRILLER: C. O'Donnel
 DRILL RIG: CME - 45

LOGGED BY: SAD
 CHECKED BY: JDL
 DATE: 2/19/16



003A MANCHESTER NH GEOTECHNICAL SOILRX CHI LNG BUND HIGHWALL.GPJ GOLDRER NH 2011.GDT 5/10/16

RECORD OF BOREHOLE B-201 (KW-1)

SHEET 3 of 3

PROJECT: CHI LNG Bund Highwall
 PROJECT NUMBER: 154-6055
 DRILLED DEPTH: 61.0 ft
 LOCATION: Liquefier Area

DRILL METHOD: 4 inch Drive and Wash
 HAMMER TYPE: Auto
 DATE STARTED: 1/15/16
 DATE COMPLETED: 1/18/16

COORDS: N: 260,792.90 E: 356,903.17
 GS ELEVATION: 11.7 ft
 WEATHER: Cloudy
 TEMPERATURE: 34 deg F

INCLINATION: 90
 DEPTH W.L.: 1.7 ft
 ELEVATION W.L.: 10.0 ft
 DATE W.L.: 1/18/2016
 TIME W.L.: 08:00

SOIL PROFILE				SAMPLE INFORMATION							
DEPTH ft	ELEVATION ft	LITHOLOGY DESCRIPTION	USCS	GRAPHIC LOG	SAMPLE DEPTH	NUMBER	SAMPLE TYPE	BLOWS per 6 in	N	REC ATT	Sample Description
50.0				x x x x x			SS	18-10-12-13	22	0.0 2.0	
-40											
55.0			SW	x x x x x	54.0	S14	SS	24-17-19-22	36	1.0 2.0	Reddish brown, wet, dense, fine to coarse SAND, trace fine gravel, trace silt, (SW). PID=0.0ppm
-45											
60.0				x x x x x	59.0	S15	SS	11-11-20-24	31	2.0 2.0	Upper 18": Orange to reddish brown, wet, dense, medium to coarse SAND, trace gravel, (SP). Bottom 6": Gray, wet, dense, fine SAND, little silt, (SM).

Boring completed at 61.0 ft

Notes:

- Borehole backfilled with cuttings to ground surface.

003A MANCHESTER NH GEOTECHNICAL SOILRX CHI LNG BUND HIGHWALL.GPJ GOLDRER NH 2011.GDT 5/10/16

Fill (made ground)	USCS Silty Sand (SM)	USCS High Plasticity Organic silt or clay with shells (OHSH)	USCS Well-graded Sand (SW)
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D+W: Drive and Wash SH: Shelby Tube SSA: Solid Stem Auger AUG: Auger Cuttings PP: Pocket Penetrometer TV: Torvane

DRILLING COMPANY: Geologic Earth Exploration Inc.
 DRILLER: C. O'Donnel
 DRILL RIG: CME - 45

LOGGED BY: SAD
 CHECKED BY: JDL
 DATE: 2/19/16



RECORD OF BOREHOLE B-202 (KW-4)

PROJECT: CHI LNG Bund Highwall
 PROJECT NUMBER: 154-6055
 DRILLED DEPTH: 81.0 ft
 LOCATION: Liquefier Area

DRILL METHOD: 4 inch Drive and Wash
 HAMMER TYPE: Auto
 DATE STARTED: 1/20/16
 DATE COMPLETED: 1/21/16

COORDS: N: 260,939.76 E: 356,963.61
 GS ELEVATION: 10.8 ft
 WEATHER: Clear, windy
 TEMPERATURE: 18-25 deg F

SHEET 1 of 4
 INCLINATION: 90
 DEPTH W.L.: 0.2 ft
 ELEVATION W.L.: 10.6 ft
 DATE W.L.: 1/21/2016
 TIME W.L.: 07:30

SOIL PROFILE				SAMPLE INFORMATION									
DEPTH ft	ELEVATION ft	LITHOLOGY DESCRIPTION	USCS	GRAPHIC LOG	SAMPLE DEPTH	NUMBER	SAMPLE TYPE	BLOWS per 6 in	N	REC ATT	Sample Description		
	10	0.0 - 19.0ft Dark grayish brown, fine to coarse SAND to silty fine to medium SAND, trace to little gravel (FILL).	SP		0.0	S1	SS	10-10-25-21	35	1.1 2.0	Top 2": Gray, damp, dense, coarse GRAVEL, some fine sand, (GP). Middle 5": Brown, moist, dense, silty fine to medium SAND, trace asphalt, trace gravel, (SM). Bottom 6": Dark brown, moist, dense, fine to coarse SAND, trace asphalt, trace gravel, (SP) PID=0.1ppm		
	5				5.0	S2	SS	30-23-23-23	46	1.0 2.0		Dark grayish brown, moist, dense, medium to coarse SAND, some gravel, trace concrete (up to 1"), (SP). PID=0.5ppm	
	0				9.0	S3	SS	41-21-13-9	34	0.7 2.0			Dark grayish brown, wet, dense, fine to coarse SAND, little gravel, (SW). Slight hydrocarbon odor. PID=2.3ppm
	-5				14.0	S4	SS	18-13-13-13	26	0.9 2.0		Dark gray, wet medium dense, silty fine to medium SAND, little gravel, (SM). Slight hydrocarbon odor. PID=32.5ppm	
	-10				19.0	S5	SS	1-1-1-1	2	1.3 2.0			Dark brown, moist, soft, fine to medium sandy CLAY, (CH). Tv=300, 250, 360psf Pp=2000, 1700, 1500psf
	-15				21.0	S6	VANE	1-1-1-1	2	2.0 2.0		Dark brown, wet, soft, fine to medium sandy CLAY, trace shell fragments, (CH). Tv=250, 200, 200psf Pp=1500, 1000, 1200psf V1: (21.5-22) Su = 550 psf; Remolded Su = 200 psf V2: (22.5-23) Su = 583 psf; Remolded Su = 416 psf	
	-20				23.0	S7	SS	1-1-1-2	2	2.0 2.0			
-25	25.0	OH											

Log continued on next page

Fill (made ground)	USCS High Plasticity Organic silt or clay with shells (OHS)	USCS Poorly-graded Sand (SP)
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D+W: Drive and Wash SH: Shelby Tube SSA: Solid Stem Auger AUG: Auger Cuttings PP: Pocket Penetrometer TV: Torvane

DRILLING COMPANY: Geologic Earth Exploration Inc.
 DRILLER: C. O'Donnel
 DRILL RIG: CME - 45

LOGGED BY: SAD
 CHECKED BY: JDL
 DATE: 2/19/16



003A MANCHESTER NH GEOTECHNICAL SOILRX CHI LNG BUND HIGHWALL.GPJ GOLDRER NH 2011.GDT 5/10/16

RECORD OF BOREHOLE B-202 (KW-4)

PROJECT: CHI LNG Bund Highwall
 PROJECT NUMBER: 154-6055
 DRILLED DEPTH: 81.0 ft
 LOCATION: Liquefier Area

DRILL METHOD: 4 inch Drive and Wash
 HAMMER TYPE: Auto
 DATE STARTED: 1/20/16
 DATE COMPLETED: 1/21/16

COORDS: N: 260,939.76 E: 356,963.61
 GS ELEVATION: 10.8 ft
 WEATHER: Clear, windy
 TEMPERATURE: 18-25 deg F

SHEET 2 of 4
 INCLINATION: 90
 DEPTH W.L.: 0.2 ft
 ELEVATION W.L.: 10.6 ft
 DATE W.L.: 1/21/2016
 TIME W.L.: 07:30

SOIL PROFILE				SAMPLE INFORMATION							
DEPTH ft	ELEVATION ft	LITHOLOGY DESCRIPTION	USCS	GRAPHIC LOG	SAMPLE DEPTH	NUMBER	SAMPLE TYPE	BLOWS per 6 in	N	REC ATT	Sample Description
25.0	-15			OH							
30.0	-20				29.0	S8	SS	WOH-2-5-7	7	2.0 2.0	Top 14": Dark gray, wet, soft, organic SILT, trace fine sand, (OH). Bottom 10": Dark grayish brown, wet, loose, silty medium to coarse SAND, (SM). Tv=200, 250, 250psf Pp=2000, 1800, 1800psf
35.0	-25				34.0	S9	SS	1-2-1-2	3	2.0 2.0	Top 8": Dark gray, wet, soft, organic SILT, trace wood fragments, trace fine sand, trace shell fragments, (OH). Tv=600, 550, 350psf Pp=2500, 2000, 2250psf Bottom 16": Dark gray, wet, soft, sandy SILT, trace wood fragments, trace shell fragments, (ML).
40.0	-30				39.0	S10	SS	3-2-3-3	5	2.0 2.0	Dark gray, moist, soft, SILT, trace shell fragments, (ML). Tv=350, 650, 300psf Pp=2000, 1700, 2000psf
45.0	-35				41.0	S11	VANE	4-2-3-3	5	1.5 2.0	Dark gray, moist, soft, clayey SILT, trace fine sand, trace shell fragments, (MH). Tv=300, 360, 200psf Pp=1000, 1000, 1000psf PID=0.6ppm V3: (41.5-42) Su = 350 psf; Remolded Su = 183 psf V4: (42.5-43) Su = 200 psf; Remolded Su = 50 psf
50.0					49.0	S12	SS	4-3-3-3	6	2.0 2.0	Dark gray, moist, soft, organic SILT, trace wood, trace shell fragments, (OH). Tv=480, 400, 450psf, Pp=2500, 2600, 3000psf PID=0.6ppm

Log continued on next page

- Fill (made ground)
- USCS High Plasticity Organic silt or clay with shells (OHSH)
- USCS Poorly-graded Sand (SP)

D+W: Drive and Wash SH: Shelby Tube SSA: Solid Stem Auger AUG: Auger Cuttings PP: Pocket Penetrometer TV: Torvane

DRILLING COMPANY: Geologic Earth Exploration Inc.
 DRILLER: C. O'Donnel
 DRILL RIG: CME - 45

LOGGED BY: SAD
 CHECKED BY: JDL
 DATE: 2/19/16



003A MANCHESTER NH GEOTECHNICAL SOILRX CHI LNG BUND HIGHWALL.GPJ GOLDR NH 2011.GDT 5/10/16

RECORD OF BOREHOLE B-202 (KW-4)

PROJECT: CHI LNG Bund Highwall
 PROJECT NUMBER: 154-6055
 DRILLED DEPTH: 81.0 ft
 LOCATION: Liquefier Area

DRILL METHOD: 4 inch Drive and Wash
 HAMMER TYPE: Auto
 DATE STARTED: 1/20/16
 DATE COMPLETED: 1/21/16

COORDS: N: 260,939.76 E: 356,963.61
 GS ELEVATION: 10.8 ft
 WEATHER: Clear, windy
 TEMPERATURE: 18-25 deg F

SHEET 3 of 4
 INCLINATION: 90
 DEPTH W.L.: 0.2 ft
 ELEVATION W.L.: 10.6 ft
 DATE W.L.: 1/21/2016
 TIME W.L.: 07:30

SOIL PROFILE				SAMPLE INFORMATION							
DEPTH ft	ELEVATION ft	LITHOLOGY DESCRIPTION	USCS	GRAPHIC LOG	SAMPLE DEPTH	NUMBER	SAMPLE TYPE	BLOWS per 6 in	N	REC ATT	Sample Description
50.0	-40			OH		S12	SS	4-3-3-3	6	<u>2.0</u> 2.0	
					54.0	S13	SS	2-2-2-3	4	<u>2.0</u> 2.0	Dark gray, moist, soft, organic SILT, trace wood fragments, trace shell fragments, (OH). Tv=350, 300, 400psf Pp=2500, 2500, 2500psf
55.0	-45				56.0	S14	VANE	WOP-WOP-WOP-WOP	0	<u>1.5</u> 2.0	Dark gray, moist, very soft, organic SILT, trace wood fragments, trace roots, trace shell fragments, (OH). Tv=100, 250, 200psf Pp=2000, 1500, 1000psf V5: (56.5-57) Su = 1801 psf; Remolded Su = 995 psf V6: (57.5-58) Su = 2844 psf; Remolded Su = 1801 psf
					59.0	S15	SS	2-3-4-6	7	<u>2.0</u> 2.0	Dark gray, moist, medium stiff, organic SILT, trace wood fragments, trace roots, trace fine sand, (OH). Tv=240, 320, 300psf Pp=2000, 3200, 3500psf
					64.0	S16	SS	7-9-9-9	18	<u>1.7</u> 2.0	Top 5": Dark gray, moist, stiff, organic SILT, trace wood fragments, trace roots, trace fine sand, (OH). Tv=250, 200, 200psf Pp=2500, 2000, 2000psf Middle 10.5": Dark gray, wet, loose, silty fine to coarse SAND, (SM). Bottom 3.5": Dark gray, moist, stiff, organic SILT, trace wood fragments, trace fine sand, (OH). Pp=3000, 2500, 3500psf
					69.0	S17	SS	13-18-17-14	35	<u>0.7</u> 2.0	Dark gray, wet, dense, fine to coarse SAND, trace gravel, trace silt, (SP).
70.0	-60	69.0 - 81.0ft Dark gray, fine to coarse SAND to silty fine to medium SAND, trace gravel (outwash).	SP								
				74.0		SS	14-17-14-12	31	<u>0.0</u> 2.0	NO RECOVERY. Piece of gravel in tip.	
75.0											

Log continued on next page

- Fill (made ground)
- USCS High Plasticity Organic silt or clay with shells (OHS)
- USCS Poorly-graded Sand (SP)

D+W: Drive and Wash SH: Shelby Tube SSA: Solid Stem Auger AUG: Auger Cuttings PP: Pocket Penetrometer TV: Torvane

DRILLING COMPANY: Geologic Earth Exploration Inc.
 DRILLER: C. O'Donnel
 DRILL RIG: CME - 45

LOGGED BY: SAD
 CHECKED BY: JDL
 DATE: 2/19/16



003A MANCHESTER NH GEOTECHNICAL SOILRX CHI LNG BUND HIGHWALL.GPJ GOLDR NH 2011.GDT 5/10/16

RECORD OF BOREHOLE B-202 (KW-4)

PROJECT: CHI LNG Bund Highwall
 PROJECT NUMBER: 154-6055
 DRILLED DEPTH: 81.0 ft
 LOCATION: Liquefier Area

DRILL METHOD: 4 inch Drive and Wash
 HAMMER TYPE: Auto
 DATE STARTED: 1/20/16
 DATE COMPLETED: 1/21/16

COORDS: N: 260,939.76 E: 356,963.61
 GS ELEVATION: 10.8 ft
 WEATHER: Clear, windy
 TEMPERATURE: 18-25 deg F

SHEET 4 of 4
 INCLINATION: 90
 DEPTH W.L.: 0.2 ft
 ELEVATION W.L.: 10.6 ft
 DATE W.L.: 1/21/2016
 TIME W.L.: 07:30

SOIL PROFILE				SAMPLE INFORMATION							
DEPTH ft	ELEVATION ft	LITHOLOGY DESCRIPTION	USCS	GRAPHIC LOG	SAMPLE DEPTH	NUMBER	SAMPLE TYPE	BLOWS per 6 in	N	REC ATT	Sample Description
75.0	-65			[Dotted Pattern]			SS	14-17-14-12	31	0.0 2.0	
			SP								
80.0					79.0	S18	SS	15-12-11-8	23	1.5 2.0	Dark gray, wet, medium dense, silty fine to medium SAND, trace gravel, (SM).
-70											

Boring completed at 81.0 ft

Notes:

- Borehole backfilled with cuttings to ground surface.

003A MANCHESTER NH GEOTECHNICAL SOILRX CHI LNG BUND HIGHWALL.GPJ GOLDER NH 2011.GDT 5/10/16

Fill (made ground)	USCS High Plasticity Organic silt or clay with shells (OHS)	USCS Poorly-graded Sand (SP)
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D+W: Drive and Wash SH: Shelby Tube SSA: Solid Stem Auger AUG: Auger Cuttings PP: Pocket Penetrometer TV: Torvane

DRILLING COMPANY: Geologic Earth Exploration Inc.
 DRILLER: C. O'Donnel
 DRILL RIG: CME - 45

LOGGED BY: SAD
 CHECKED BY: JDL
 DATE: 2/19/16



RECORD OF BOREHOLE B-203 (KW-6)

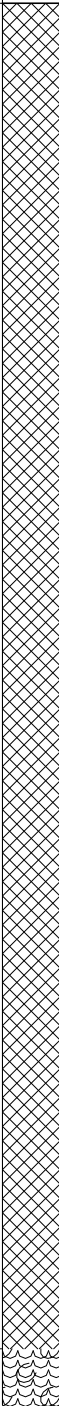

SHEET 1 of 4

PROJECT: CHI LNG Bund Highwall
 PROJECT NUMBER: 154-6055
 DRILLED DEPTH: 91.0 ft
 LOCATION: Outside Liquefier Area




DRILL METHOD: 4 inch Drive and Wash
 HAMMER TYPE: Auto
 DATE STARTED: 1/25/16
 DATE COMPLETED: 1/25/16

COORDS: N: 260,887.74 E: 356,815.54
 GS ELEVATION: 9.9 ft
 WEATHER: Clear, windy
 TEMPERATURE: 25 deg F

INCLINATION: 90
 DEPTH W.L.: 4.1 ft
 ELEVATION W.L.: 5.8 ft
 DATE W.L.: 1/26/2016
 TIME W.L.: 07:50

SOIL PROFILE				SAMPLE INFORMATION										
DEPTH ft	ELEVATION ft	LITHOLOGY DESCRIPTION	USCS	GRAPHIC LOG	SAMPLE DEPTH	NUMBER	SAMPLE TYPE	BLOWS per 6 in	N	REC ATT	Sample Description			
0.0		0.0 - 24.0ft Gray to black, fine to coarse SAND to silty SAND, trace gravel (FILL).	SM		0.0	S1	SS	18-18-15-17	33	1.6 2.0	Top 10": Grayish light brown, frozen, dense, fine to coarse SAND, trace gravel, trace silt (SW). Bottom 9": Dark brown, moist, dense, fine to medium SAND, little silt, (SM). N value may not be representative of in situ density/ consistency, due to frozen soil.			
4.0	5				S2	SS	24-10-12-11	22	0.9 2.0	Top 5.5": Black, wet, medium dense, fine to medium SAND, trace gravel, trace silt, (SP). Bottom 5": Light gray, moist, medium dense, fine to medium SAND, trace gravel, (SP).				
9.0					SS	11-8-6-13	14	0.0 2.0	NO RECOVERY.					
14.0	-5				S3	SS	22-10-6-4	16	0.8 2.0	Top 5": Light gray, moist, medium dense, silty fine SAND, trace concrete, trace gravel, (SM). PID=74.6ppm Bottom 5": Dark gray to black, wet, medium dense, fine to coarse SAND, trace gravel, trace silt (SW). Strong hydrocarbon odor and visible sheen. PID=702ppm				
19.0					S4	SS	11-4-3-3	7	0.6 2.0	Black, wet, loose, fine to coarse SAND, some fine gravel, (SW). Strong hydrocarbon odor and visible sheen. PID=78.1ppm				
24.0	-10				S5	SS	9-2-2-2	4	0.7 2.0	Dark gray, moist, soft, organic SILT, trace fine sand, (OH). Tv=300, 200, 200psf Pp=2000, 1500, 1800psf V1: (24.5-25) Su = 995 psf; Remolded Su = 521 psf				
25.0	-15				24.0 - 54.0ft Dark gray, organic SILT, trace fine sand, trace shells.	OH		24.0	S5	SS	9-2-2-2	4	0.7 2.0	Dark gray, moist, soft, organic SILT, trace fine sand, (OH). Tv=300, 200, 200psf Pp=2000, 1500, 1800psf V1: (24.5-25) Su = 995 psf; Remolded Su = 521 psf

Log continued on next page

-  Fill (made ground)
-  USCS High Plasticity Organic silt or clay with shells (OHS)
-  USCS Silty Sand (SM)

D+W: Drive and Wash SH: Shelby Tube SSA: Solid Stem Auger AUG: Auger Cuttings PP: Pocket Penetrometer TV: Torvane

DRILLING COMPANY: Geologic Earth Exploration Inc.
 DRILLER: C. O'Donnel
 DRILL RIG: CME - 45

LOGGED BY: SAD
 CHECKED BY: JDL
 DATE: 2/19/16



003A MANCHESTER NH GEOTECHNICAL SOILRX CHI LNG BUND HIGHWALL.GPJ GOLDRER NH 2011.GDT 5/10/16

RECORD OF BOREHOLE B-203 (KW-6)

PROJECT: CHI LNG Bund Highwall
 PROJECT NUMBER: 154-6055
 DRILLED DEPTH: 91.0 ft
 LOCATION: Outside Liquefier Area

DRILL METHOD: 4 inch Drive and Wash
 HAMMER TYPE: Auto
 DATE STARTED: 1/25/16
 DATE COMPLETED: 1/25/16

COORDS: N: 260,887.74 E: 356,815.54
 GS ELEVATION: 9.9 ft
 WEATHER: Clear, windy
 TEMPERATURE: 25 deg F

SHEET 2 of 4
 INCLINATION: 90
 DEPTH W.L.: 4.1 ft
 ELEVATION W.L.: 5.8 ft
 DATE W.L.: 1/26/2016
 TIME W.L.: 07:50

SOIL PROFILE				SAMPLE INFORMATION								
DEPTH ft	ELEVATION ft	LITHOLOGY DESCRIPTION	USCS	GRAPHIC LOG	SAMPLE DEPTH	NUMBER	SAMPLE TYPE	BLOWS per 6 in	N	REC ATT	Sample Description	
25.0				OH		S5	SS	9-2-2-2	4	0.7 2.0	V2: (25.5-26) Su = 1043 psf; Remolded Su = NA	
					26.0	S6	VANE	WOP-WOP- WOP-WOP		0	1.6 2.0	Top 9": Dark gray, wet, very soft, organic SILT, little fine to coarse sand, trace gravel, (OH). Bottom 10": Dark gray, moist, very soft, organic SILT, trace fine sand, (OH).
					29.0	S7	SS	1-1-3-2		4	1.6 2.0	Dark gray, moist, soft, organic SILT, trace fine sand, trace shell fragments, (OH). Tv=300, 300, 250psf Pp=2000, 1500, 1800psf
30.0	-20				31.0	S8	VANE	WOP-WOP- WOP-WOP		0	1.5 2.0	Dark gray, wet, very soft, organic SILT, trace fine sand, trace shell fragments, (OH). Tv=100, 250, 150psf Pp=2000, 1000, 1500psf V3: (31.5-32) Su = 853 psf; Remolded Su = 758 psf V4: (32.5-33) Su = 1042 psf; Remolded Su = 664 psf
					34.0	S9	SS	1-2-3-2		5	0.5 2.0	Dark gray, wet, medium stiff, organic SILT, trace fine to medium sand, trace shell fragments, (OH). Pp=1000, 1500, 1000psf
35.0	-25				39.0	S10	SS	1-1-1-2		2	0.3 2.0	Dark gray, wet, soft, organic SILT, some clay, trace fine sand, trace shell fragments, (OH). Pp=1000, 1000, 1000psf
					44.0	S11	SS	1-2-3-4		5	1.4 2.0	Dark gray, moist, medium stiff, organic SILT, trace fine sand, (OH). Tv=200, 150, 200psf Pp=1500, 1500, 1000psf
45.0	-35				49.0	S12	SS	7-11-11-11		22	0.4 2.0	Black, wet, medium dense, silty fine to medium SAND, some organics (wood fragments, roots), (SM). PID=9.0ppm
50.0	-40											

Log continued on next page

- Fill (made ground)
- USCS High Plasticity Organic silt or clay with shells (OHS)
- USCS Silty Sand (SM)

D+W: Drive and Wash SH: Shelby Tube SSA: Solid Stem Auger AUG: Auger Cuttings PP: Pocket Penetrometer TV: Torvane

DRILLING COMPANY: Geologic Earth Exploration Inc.
 DRILLER: C. O'Donnel
 DRILL RIG: CME - 45

LOGGED BY: SAD
 CHECKED BY: JDL
 DATE: 2/19/16



003A MANCHESTER NH GEOTECHNICAL SOILRX CHI LNG BUND HIGHWALL.GPJ GOLDR NH 2011.GDT 5/10/16

RECORD OF BOREHOLE B-203 (KW-6)

SHEET 3 of 4

PROJECT: CHI LNG Bund Highwall
 PROJECT NUMBER: 154-6055
 DRILLED DEPTH: 91.0 ft
 LOCATION: Outside Liquefier Area

DRILL METHOD: 4 inch Drive and Wash
 HAMMER TYPE: Auto
 DATE STARTED: 1/25/16
 DATE COMPLETED: 1/25/16

COORDS: N: 260,887.74 E: 356,815.54
 GS ELEVATION: 9.9 ft
 WEATHER: Clear, windy
 TEMPERATURE: 25 deg F

INCLINATION: 90
 DEPTH W.L.: 4.1 ft
 ELEVATION W.L.: 5.8 ft
 DATE W.L.: 1/26/2016
 TIME W.L.: 07:50

SOIL PROFILE				SAMPLE INFORMATION							
DEPTH ft	ELEVATION ft	LITHOLOGY DESCRIPTION	USCS	GRAPHIC LOG	SAMPLE DEPTH	NUMBER	SAMPLE TYPE	BLOWS per 6 in	N	REC ATT	Sample Description
50.0			OH			S12	SS	7-11-11-11	22	0.4 2.0	
55.0	-45	54.0 - 91.0ft Gray, fine to coarse SAND to silty SAND, trace to some gravel, (Outwash).			54.0	S13	SS	22-26-32-40	58	0.7 2.0	Top 2.5": Dark gray, wet, very dense, fine to medium SAND, (SP). Middle 2.5": Dark gray, wet, very dense, GRAVEL, trace medium to coarse sand, (GP). Bottom 3": Dark brown, wet, very dense, GRAVEL, trace organics, trace fine to coarse sand, trace silt, (GP).
60.0	-50				59.0	S14	SS	17-9-11-12	20	0.3 2.0	Brownish gray, wet, medium dense, fine to coarse SAND, some gravel, some silt, (SM).
65.0	-55		SM		64.0	S15	SS	20-8-7-9	15	0.6 2.0	Gray, wet, medium dense, fine to coarse SAND, little gravel, trace silt, (SP).
70.0	-60				69.0	S16	SS	14-14-6-4	20	0.9 2.0	Dark gray, moist, very stiff, medium to coarse sandy SILT, trace fine gravel, (ML).
75.0	-65				74.0	S17	SS	27-17-17-18	34	0.8 2.0	Gray, wet, dense, fine to coarse SAND, little silt, trace gravel, (SM).

Log continued on next page

Fill (made ground)
 USCS High Plasticity Organic silt or clay with shells (OHS)
 USCS Silty Sand (SM)

D+W: Drive and Wash SH: Shelby Tube SSA: Solid Stem Auger AUG: Auger Cuttings PP: Pocket Penetrometer TV: Torvane

DRILLING COMPANY: Geologic Earth Exploration Inc.
 DRILLER: C. O'Donnel
 DRILL RIG: CME - 45

LOGGED BY: SAD
 CHECKED BY: JDL
 DATE: 2/19/16



003A MANCHESTER NH GEOTECHNICAL SOILRX CHI LNG BUND HIGHWALL.GPJ GOLDR NH 2011.GDT 5/10/16

RECORD OF BOREHOLE B-203 (KW-6)

SHEET 4 of 4

PROJECT: CHI LNG Bund Highwall
 PROJECT NUMBER: 154-6055
 DRILLED DEPTH: 91.0 ft
 LOCATION: Outside Liquefier Area

DRILL METHOD: 4 inch Drive and Wash
 HAMMER TYPE: Auto
 DATE STARTED: 1/25/16
 DATE COMPLETED: 1/25/16

COORDS: N: 260,887.74 E: 356,815.54
 GS ELEVATION: 9.9 ft
 WEATHER: Clear, windy
 TEMPERATURE: 25 deg F

INCLINATION: 90
 DEPTH W.L.: 4.1 ft
 ELEVATION W.L.: 5.8 ft
 DATE W.L.: 1/26/2016
 TIME W.L.: 07:50

SOIL PROFILE				SAMPLE INFORMATION							
DEPTH ft	ELEVATION ft	LITHOLOGY DESCRIPTION	USCS	GRAPHIC LOG	SAMPLE DEPTH	NUMBER	SAMPLE TYPE	BLOWS per 6 in	N	REC ATT	Sample Description
75.0				[Dotted pattern]		S17	SS	27-17-17-18	34	$\frac{0.8}{2.0}$	
80.0	-70				79.0	S18	SS	38-11-7-7	18	$\frac{0.6}{2.0}$	Gray, wet, medium dense, silty fine to coarse SAND, some gravel, (SM). Driller noted possible cobbles.
85.0	-75		SM								
90.0	-80				89.0	S19	SS	15-13-18-28	31	$\frac{0.5}{2.0}$	Gray, wet, medium dense, fine to coarse SAND, some silt, little gravel, (SM).

Boring completed at 91.0 ft

Notes:

- Borehole backfilled with cuttings to ground surface.

003A MANCHESTER NH GEOTECHNICAL SOILRX CHI LNG BUND HIGHWALL.GPJ GOLDRER NH 2011.GDT 5/10/16

Fill (made ground)	USCS High Plasticity Organic silt or clay with shells (OHSH)	USCS Silty Sand (SM)	
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D+W: Drive and Wash SH: Shelby Tube SSA: Solid Stem Auger AUG: Auger Cuttings PP: Pocket Penetrometer TV: Torvane

DRILLING COMPANY: Geologic Earth Exploration Inc.
 DRILLER: C. O'Donnel
 DRILL RIG: CME - 45

LOGGED BY: SAD
 CHECKED BY: JDL
 DATE: 2/19/16



RECORD OF BOREHOLE B-204 (KW-10)

SHEET 1 of 5

PROJECT: CHI LNG Bund Highwall
 PROJECT NUMBER: 154-6055
 DRILLED DEPTH: 101.0 ft
 LOCATION: Liquefier Area

DRILL METHOD: 4 inch Drive and Wash
 HAMMER TYPE: Auto
 DATE STARTED: 1/28/16
 DATE COMPLETED: 1/29/16

COORDS: N: 261,006.13 E: 356,942.51
 GS ELEVATION: 9.6 ft
 WEATHER: Cloudy
 TEMPERATURE: 40 deg F

INCLINATION: 90
 DEPTH W.L.: 4.4 ft
 ELEVATION W.L.: 5.2 ft
 DATE W.L.: 1/28/2016
 TIME W.L.: 07:30

SOIL PROFILE				SAMPLE INFORMATION							
DEPTH ft	ELEVATION ft	LITHOLOGY DESCRIPTION	USCS	GRAPHIC LOG	SAMPLE DEPTH	NUMBER	SAMPLE TYPE	BLOWS per 6 in	N	REC ATT	Sample Description
0.0		0.0 - 14.0ft Brown to black, fine to coarse SAND, some to little gravel, some silt (FILL).	SP		0.0	S1	SS	15-8-7-6	15	1.1 2.0	Brown, moist (frozen), medium dense, GRAVEL, some fine to coarse sand, some silt, (GM). N value may not be representative of in situ density/ consistency, due to frozen soil.
4.0	S2				SS	14-5-5-12	10	0.4 2.0	Black, wet, loose, fine to coarse SAND, little gravel, trace asphalt, some silt, (SP).		
9.0	S3				SS	9-8-8-11	16	0.9 2.0	Top 3": Brown, moist, medium dense, silty fine SAND, little gravel, (SM). Bottom 8": Black, wet, medium dense, fine to coarse SAND, some gravel, (SP). Strong hydrocarbon odor and visible sheen. PID=5.4ppm		
14.0	-5	14.0 - 55.5ft Dark brown, organic SILT, some to trace fine sand, trace shells, and wood fragments.	OH		14.0	S4	SS	5-12-10-9	22	1.3 2.0	Top 4": Brown, wet, very stiff, organic SILT, trace fine sand, (OH). Bottom 11": Brownish gray, moist, fine to medium SAND, little gravel, trace wood fragments, (SP). Strong hydrocarbon odor and visible sheen. PID=12ppm
19.0	S5				VANE	WOH-1-1-1	2	0.3 2.0	Dark gray, wet, soft, organic SILT, little wood fragments, trace fine sand, (OH). Hydrocarbon odor. Tv=150, 200, 200psf Pp=1000, 1000, 1500psf V1: (19.5-20) Su = 711 psf; Remolded Su = 332 psf V2: (20.5-21) Su = 1138 psf; Remolded Su = 948 psf		
22.0	S6				SS	WOP-WOP-WOP-WOP	0	1.5 2.0	Dark brown, wet, very soft, organic SILT, some fine sand, (OH). Strong "rotting egg" odor. Tv=250, 300, 250psf Pp=1500, 2000, 2000psf		
24.0	S7				SS	4-3-4-4	7	2.0 2.0	Top 12": Dark brown, wet, medium stiff, organic SILT, little gravel, (OH). Bottom 12": Dark brown, moist, medium stiff, organic SILT, trace wood fragments, trace fine sand, (OH). Tv=250, 200, 250psf Pp=2000, 2000,		

Log continued on next page

Fill (made ground)
 USCS High Plasticity Organic silt or clay with shells (OHS)
 USCS Silty Sand (SM)

D+W: Drive and Wash SH: Shelby Tube SSA: Solid Stem Auger AUG: Auger Cuttings PP: Pocket Penetrometer TV: Torvane

DRILLING COMPANY: Geologic Earth Exploration Inc.
 DRILLER: C. O'Donnel
 DRILL RIG: CME - 45

LOGGED BY: SAD
 CHECKED BY: JDL
 DATE: 2/19/16



003A MANCHESTER NH GEOTECHNICAL SOILRX CHI LNG BUND HIGHWALL.GPJ GOLDRER NH 2011.GDT 5/10/16

RECORD OF BOREHOLE B-204 (KW-10)

SHEET 2 of 5

PROJECT: CHI LNG Bund Highwall
 PROJECT NUMBER: 154-6055
 DRILLED DEPTH: 101.0 ft
 LOCATION: Liquefier Area

DRILL METHOD: 4 inch Drive and Wash
 HAMMER TYPE: Auto
 DATE STARTED: 1/28/16
 DATE COMPLETED: 1/29/16

COORDS: N: 261,006.13 E: 356,942.51
 GS ELEVATION: 9.6 ft
 WEATHER: Cloudy
 TEMPERATURE: 40 deg F

INCLINATION: 90
 DEPTH W.L.: 4.4 ft
 ELEVATION W.L.: 5.2 ft
 DATE W.L.: 1/28/2016
 TIME W.L.: 07:30

SOIL PROFILE				SAMPLE INFORMATION								
DEPTH ft	ELEVATION ft	LITHOLOGY DESCRIPTION	USCS	GRAPHIC LOG	SAMPLE DEPTH	NUMBER	SAMPLE TYPE	BLOWS per 6 in	N	REC ATT	Sample Description	
25.0				OH		S7	SS	4-3-4-4	7	$\frac{2.0}{2.0}$	2000psf	
					29.0	S8	SS	1-WOH-1-2	1	$\frac{1.5}{2.0}$	Dark brown, moist, very soft, organic SILT, trace shell fragments, trace fine sand, (OH). Tv=100, 150, 150psf Pp=1000, 1000, 1000psf	
30.0	-20				31.0	S9	VANE	WOP-WOP- WOP-WOP	0	$\frac{1.6}{2.0}$	Dark gray, moist, very soft, organic SILT, some fine sand, trace wood fragments, (OH). Tv=100, 100, 100psf Pp=100, 100, 100psf V3: (31.5-32) Su = 1090 psf; Remolded Su = 568 psf V4: (32.5-33) Su = 1422 psf; Remolded Su = 1327 psf	
					33.0	S10	SS	2-2-2-2	4	$\frac{1.7}{2.0}$	Top 8": Dark brown, wet, soft, organic SILT, some fine to coarse sand, trace gravel, trace wood fragments, (OH). Tv= 100, 100, 100psf Pp=100, 100, 100psf Bottom 12": Dark gray, moist, soft, organic SILT, trace gravel, trace fine to medium sand, (OH). Tv=250, 200, 250psf Pp=2000, 2500, 2000psf	
35.0	-25											
					39.0	S11	SS	7-8-9-10	17	$\frac{1.3}{2.0}$	Dark gray, moist, medium dense, silty fine to medium SAND, trace gravel, (SM). Hydrocarbon odor and visible sheen. PID=0.5ppm	
40.0	-30											
45.0	-35											
50.0	-40											

Log continued on next page

- Fill (made ground)
- USCS High Plasticity Organic silt or clay with shells (OHS)
- USCS Silty Sand (SM)

D+W: Drive and Wash SH: Shelby Tube SSA: Solid Stem Auger AUG: Auger Cuttings PP: Pocket Penetrometer TV: Torvane

DRILLING COMPANY: Geologic Earth Exploration Inc.
 DRILLER: C. O'Donnel
 DRILL RIG: CME - 45

LOGGED BY: SAD
 CHECKED BY: JDL
 DATE: 2/19/16



003A MANCHESTER NH GEOTECHNICAL SOILRX CHI LNG BUND HIGHWALL.GPJ GOLDR NH 2011.GDT 5/10/16

RECORD OF BOREHOLE B-204 (KW-10)

SHEET 3 of 5

PROJECT: CHI LNG Bund Highwall
 PROJECT NUMBER: 154-6055
 DRILLED DEPTH: 101.0 ft
 LOCATION: Liquefier Area

DRILL METHOD: 4 inch Drive and Wash
 HAMMER TYPE: Auto
 DATE STARTED: 1/28/16
 DATE COMPLETED: 1/29/16

COORDS: N: 261,006.13 E: 356,942.51
 GS ELEVATION: 9.6 ft
 WEATHER: Cloudy
 TEMPERATURE: 40 deg F

INCLINATION: 90
 DEPTH W.L.: 4.4 ft
 ELEVATION W.L.: 5.2 ft
 DATE W.L.: 1/28/2016
 TIME W.L.: 07:30

SOIL PROFILE				SAMPLE INFORMATION							
DEPTH ft	ELEVATION ft	LITHOLOGY DESCRIPTION	USCS	GRAPHIC LOG	SAMPLE DEPTH	NUMBER	SAMPLE TYPE	BLOWS per 6 in	N	REC ATT	Sample Description
50.0			OH								
	-45				54.0	S12	SS	8-24-22-21	46	$\frac{2.0}{2.0}$	Top 14": Black, moist, hard, organic SILT, little wood fragments, trace gravel, (OL). Tv=450, 400, 400psf Pp=3000, 3500, 3000psf Middle 4": Dark brownish gray, moist, hard, fine to medium sandy SILT, (ML). Tv=150, 200, 150psf Pp=1000, 1000, 1500psf Bottom 6": Gray, wet, dense, fine to coarse SAND, trace gravel, (SP).
		55.5 - 101.0ft Gray, silty fine to coarse SAND, trace to some gravel (outwash).									
	-50				59.0	S13	SS	8-14-14-13	28	$\frac{0.8}{2.0}$	Gray, wet, medium dense, silty fine to medium SAND, trace gravel, (SM).
	-55		SM		64.0	S14	SS	9-14-15-16	29	$\frac{1.2}{2.0}$	Gray, wet, medium dense, silty fine SAND, (SM).
	-60				69.0	S15	SS	12-12-13-13	25	$\frac{1.3}{2.0}$	Gray, wet, medium dense, fine SAND, trace gravel, trace silt, (SP).
	-65				74.0	S16	SS	20-14-13-12	27	$\frac{0.5}{2.0}$	Gray, wet, medium dense, silty fine to coarse SAND, trace gravel, (SM).
75.0											

Log continued on next page

- Fill (made ground)
- USCS High Plasticity Organic silt or clay with shells (OHS)
- USCS Silty Sand (SM)

D+W: Drive and Wash SH: Shelby Tube SSA: Solid Stem Auger AUG: Auger Cuttings PP: Pocket Penetrometer TV: Torvane

DRILLING COMPANY: Geologic Earth Exploration Inc.
 DRILLER: C. O'Donnel
 DRILL RIG: CME - 45

LOGGED BY: SAD
 CHECKED BY: JDL
 DATE: 2/19/16



003A MANCHESTER NH GEOTECHNICAL SOILRX CHI LNG BUND HIGHWALL.GPJ GOLDRER NH 2011.GDT 5/10/16

RECORD OF BOREHOLE B-204 (KW-10)

SHEET 4 of 5

PROJECT: CHI LNG Bund Highwall
 PROJECT NUMBER: 154-6055
 DRILLED DEPTH: 101.0 ft
 LOCATION: Liquefier Area

DRILL METHOD: 4 inch Drive and Wash
 HAMMER TYPE: Auto
 DATE STARTED: 1/28/16
 DATE COMPLETED: 1/29/16

COORDS: N: 261,006.13 E: 356,942.51
 GS ELEVATION: 9.6 ft
 WEATHER: Cloudy
 TEMPERATURE: 40 deg F

INCLINATION: 90
 DEPTH W.L.: 4.4 ft
 ELEVATION W.L.: 5.2 ft
 DATE W.L.: 1/28/2016
 TIME W.L.: 07:30

SOIL PROFILE				SAMPLE INFORMATION							
DEPTH ft	ELEVATION ft	LITHOLOGY DESCRIPTION	USCS	GRAPHIC LOG	SAMPLE DEPTH	NUMBER	SAMPLE TYPE	BLOWS per 6 in	N	REC ATT	Sample Description
75.0				[Dotted pattern]		S16	SS	20-14-13-12	27	0.5 2.0	
					79.0	S17	SS	11-16-13-20	29	0.5 2.0	Gray, wet, medium dense, silty fine to coarse SAND, some gravel, (SM).
	-70										
					84.0	S18	SS	50/2"	R	0.2 0.2	Dark gray, wet, very dense, GRAVEL, trace fine to coarse sand, (GP).
	-75		SM								
					89.0	S19	SS	19-15-15-13	30	0.2 2.0	Gray, wet, very stiff, fine to coarse sandy SILT, little gravel, (ML).
	-80										
					95.0						
	-85										
					99.0	S20	SS	6-4-6-10	10	0.0 2.0	No recovery; resampled (recovery 0.5'/2.0'). Gray, wet, loose, fine to coarse SAND, some gravel, trace silt, (SP).
	-90										
100.0	-90										

Log continued on next page

- Fill (made ground)
- USCS High Plasticity Organic silt or clay with shells (OHS)
- USCS Silty Sand (SM)

D+W: Drive and Wash SH: Shelby Tube SSA: Solid Stem Auger AUG: Auger Cuttings PP: Pocket Penetrometer TV: Torvane

DRILLING COMPANY: Geologic Earth Exploration Inc.
 DRILLER: C. O'Donnel
 DRILL RIG: CME - 45

LOGGED BY: SAD
 CHECKED BY: JDL
 DATE: 2/19/16



003A MANCHESTER NH GEOTECHNICAL SOILRX CHI LNG BUND HIGHWALL.GPJ GOLDRER NH 2011.GDT 5/10/16

RECORD OF BOREHOLE B-204 (KW-10)


SHEET 5 of 5

PROJECT: CHI LNG Bund Highwall
 PROJECT NUMBER: 154-6055
 DRILLED DEPTH: 101.0 ft
 LOCATION: Liquefier Area

DRILL METHOD: 4 inch Drive and Wash
 HAMMER TYPE: Auto
 DATE STARTED: 1/28/16
 DATE COMPLETED: 1/29/16

COORDS: N: 261,006.13 E: 356,942.51
 GS ELEVATION: 9.6 ft
 WEATHER: Cloudy
 TEMPERATURE: 40 deg F

INCLINATION: 90
 DEPTH W.L.: 4.4 ft
 ELEVATION W.L.: 5.2 ft
 DATE W.L.: 1/28/2016
 TIME W.L.: 07:30




SOIL PROFILE				SAMPLE INFORMATION							
DEPTH ft	ELEVATION ft	LITHOLOGY DESCRIPTION	USCS	GRAPHIC LOG	SAMPLE DEPTH	NUMBER	SAMPLE TYPE	BLOWS per 6 in	N	REC ATT	Sample Description
100.0			SM			S20	SS	6-4-6-10	10	<u>0.0</u> 2.0	

Boring completed at 101.0 ft

Notes:

1. Borehole backfilled with cuttings to ground surface.

003A MANCHESTER NH GEOTECHNICAL SOILRX CHI LNG BUND HIGHWALL.GPJ GOLDBER NH 2011.GDT 5/10/16

 Fill (made ground)	 USCS High Plasticity Organic silt or clay with shells (OHSH)	 USCS Silty Sand (SM)	
--	--	--	--

D+W: Drive and Wash SH: Shelby Tube SSA: Solid Stem Auger AUG: Auger Cuttings PP: Pocket Penetrometer TV: Torvane

DRILLING COMPANY: Geologic Earth Exploration Inc.
 DRILLER: C. O'Donnel
 DRILL RIG: CME - 45

LOGGED BY: SAD
 CHECKED BY: JDL
 DATE: 2/19/16



RECORD OF BOREHOLE B-205 (PL-5)

PROJECT: CHI LNG Bund Highwall
 PROJECT NUMBER: 154-6055
 DRILLED DEPTH: 51.0 ft
 LOCATION: Southwest Tank Area

DRILL METHOD: 4 inch Drive and Wash
 HAMMER TYPE: Auto
 DATE STARTED: 2/1/16
 DATE COMPLETED: 2/1/16

COORDS: N: 260,902.81 E: 357,253.32
 GS ELEVATION: 8.5 ft
 WEATHER: Partly Cloudy
 TEMPERATURE: 50 deg F

SHEET 1 of 3
 INCLINATION: 90
 DEPTH W.L.: 7.0 ft
 ELEVATION W.L.: 1.5 ft
 DATE W.L.: 2/1/2016
 TIME W.L.: 1300

SOIL PROFILE				SAMPLE INFORMATION										
DEPTH ft	ELEVATION ft	LITHOLOGY DESCRIPTION	USCS	GRAPHIC LOG	SAMPLE DEPTH	NUMBER	SAMPLE TYPE	BLOWS per 6 in	N	REC ATT	Sample Description			
0.0		0.0 - 19.0ft Light to dark brown, gravelly fine to coarse SAND to fine to coarse SAND, some gravel, trace to some silt, (FILL).	SM		0.0	S1	SS	6-6-13-21	19	1.3 2.0	Light brown, dry, medium dense, fine to coarse SAND, some gravel, trace silt, (SW). PID = 0.1 ppm			
5														
5.0								4.0	S2	SS	12-16-16-21	32	1.0 2.0	Top 4": Brown, moist, dense, fine to coarse SAND, some gravel, trace silt, (SW). Bottom 8": Light brown, moist, dense, fine to medium SAND, some gravel, little silt, (SM). PID = 1.0 ppm 5.0-9.0 ft: Tight material - Difficult to drive casing
7.0														7.0 ft: Strong hydrocarbon odor coming from the borehole
10.0								9.0	S3	SS	25-30-28-16	58	1.3 2.0	Dark brown, wet, very dense, gravelly fine to coarse SAND, some silt, (SM). Strong hydrocarbon odor. PID = 3.9 ppm
15.0								14.0	S4	SS	15-14-11-10	25	1.1 2.0	Dark brown, wet, medium dense, gravelly fine to coarse SAND, some silt, (SM). Slight hydrocarbon odor. PID = 3.7 ppm
20.0		19.0 - 51.0ft Brown, silty fine to coarse SAND to SAND, some to trace gravel, some silt, (Outwash).	SM		19.0	S5	SS	9-13-16-21	29	0.8 2.0	Light brown, wet, medium dense, gravelly fine to coarse SAND, trace silt, trace clay, (SP-SM). PID = 0.5 ppm (very windy)			
25.0								24.0	S6	SS	21-19-18-16	37	1.3 2.0	Top 5": Dark brown, wet, dense, fine to coarse SAND, some gravel, some silt, (SM). Bottom 10": Brown, wet, dense, fine to coarse SAND, trace gravel, little

Log continued on next page

Fill (made ground) USCS Silty Sand (SM)

D+W: Drive and Wash SH: Shelby Tube SSA: Solid Stem Auger AUG: Auger Cuttings PP: Pocket Penetrometer TV: Torvane

DRILLING COMPANY: Geologic Earth Exploration Inc.
 DRILLER: C. O'Donnel
 DRILL RIG: CME - 45

LOGGED BY: CEM
 CHECKED BY: JDL
 DATE: 3/3/16



003A MANCHESTER NH GEOTECHNICAL SOILRX CHI LNG BUND HIGHWALL.GPJ GOLDR NH 2011.GDT 5/10/16

RECORD OF BOREHOLE B-205 (PL-5)

PROJECT: CHI LNG Bund Highwall
 PROJECT NUMBER: 154-6055
 DRILLED DEPTH: 51.0 ft
 LOCATION: Southwest Tank Area

DRILL METHOD: 4 inch Drive and Wash
 HAMMER TYPE: Auto
 DATE STARTED: 2/1/16
 DATE COMPLETED: 2/1/16

COORDS: N: 260,902.81 E: 357,253.32
 GS ELEVATION: 8.5 ft
 WEATHER: Partly Cloudy
 TEMPERATURE: 50 deg F

SHEET 2 of 3
 INCLINATION: 90
 DEPTH W.L.: 7.0 ft
 ELEVATION W.L.: 1.5 ft
 DATE W.L.: 2/1/2016
 TIME W.L.: 1300

SOIL PROFILE				SAMPLE INFORMATION								
DEPTH ft	ELEVATION ft	LITHOLOGY DESCRIPTION	USCS	GRAPHIC LOG	SAMPLE DEPTH	NUMBER	SAMPLE TYPE	BLOWS per 6 in	N	REC ATT	Sample Description	
25.0				SM		S6	SS	21-19-18-16	37	1.3 2.0	silt, (SM). PID = 0.4 ppm (very windy)	
	-20											
29.0						S7	SS	6-7-7-7	14	0.8 2.0	Brown, wet, medium dense, fine to coarse SAND, some gravel, trace silt, trace clay, (SP-SM). PID = 0.5 ppm (windy)	
	-25											
34.0						S8	SS	5-6-5-6	11	1.0 2.0	Brown, wet, medium dense, fine to coarse SAND, some gravel, some silt, trace clay, (SM). PID = 0.6 ppm	
												36.0 ft: Driller adds drilling mud to maintain open hole
	-30											
39.0						S9	SS	15-24-16-12	40	0.6 2.0	Brown, wet, dense, fine to coarse SAND, little gravel, little silt, little clay, (SM). Occasional 1/8" thick lenses of silt. PID = 0.7 ppm	
	-35											
44.0					S10	SS	10-8-12-16	20	1.1 2.0	Brown, wet, medium dense, silty fine to coarse SAND, little gravel, (SM). Alternating layers of sandy silt (3-4") and silty fine to coarse sand (2-3"). Gravel lense at 44'8". PID = 0.0 ppm		
	-40											
49.0					S11	SS	15-10-11-12	21	1.3 2.0	Top 12": Brown, wet, medium dense, silty fine to medium SAND, trace gravel, trace clay, (SM). Bottom 4": Brown, wet, medium dense, fine sandy SILT, trace clay, (ML).		
50.0												

Log continued on next page

Fill (made ground)
 USCS Silty Sand (SM)

D+W: Drive and Wash SH: Shelby Tube SSA: Solid Stem Auger AUG: Auger Cuttings PP: Pocket Penetrometer TV: Torvane

DRILLING COMPANY: Geologic Earth Exploration Inc.
 DRILLER: C. O'Donnel
 DRILL RIG: CME - 45

LOGGED BY: CEM
 CHECKED BY: JDL
 DATE: 3/3/16



003A MANCHESTER NH GEOTECHNICAL SOILRX CHI LNG BUND HIGHWALL.GPJ GOLDRER NH 2011.GDT 5/10/16

RECORD OF BOREHOLE B-205 (PL-5)


SHEET 3 of 3

PROJECT: CHI LNG Bund Highwall
 PROJECT NUMBER: 154-6055
 DRILLED DEPTH: 51.0 ft
 LOCATION: Southwest Tank Area

DRILL METHOD: 4 inch Drive and Wash
 HAMMER TYPE: Auto
 DATE STARTED: 2/1/16
 DATE COMPLETED: 2/1/16

COORDS: N: 260,902.81 E: 357,253.32
 GS ELEVATION: 8.5 ft
 WEATHER: Partly Cloudy
 TEMPERATURE: 50 deg F

INCLINATION: 90
 DEPTH W.L.: 7.0 ft
 ELEVATION W.L.: 1.5 ft
 DATE W.L.: 2/1/2016
 TIME W.L.: 1300

SOIL PROFILE					SAMPLE INFORMATION						
DEPTH ft	ELEVATION ft	LITHOLOGY DESCRIPTION	USCS	GRAPHIC LOG	SAMPLE DEPTH	NUMBER	SAMPLE TYPE	BLOWS per 6 in	N	REC ATT	Sample Description
50.0			SM			S11	SS	15-10-11-12	21	$\frac{13}{20}$	PID = 0.0 ppm

Boring completed at 51.0 ft

Notes:

1. Borehole backfilled with cuttings to ground surface.
2. Seismograph geophone was anchored to the LNG Tank foundation 24.5' away from the borehole. No vibrations detected.
3. 4" casing to 24' bgs - open hole below



Fill (made ground)



USCS Silty Sand (SM)

D+W: Drive and Wash SH: Shelby Tube SSA: Solid Stem Auger AUG: Auger Cuttings PP: Pocket Penetrometer TV: Torvane

DRILLING COMPANY: Geologic Earth Exploration Inc.
 DRILLER: C. O'Donnel
 DRILL RIG: CME - 45

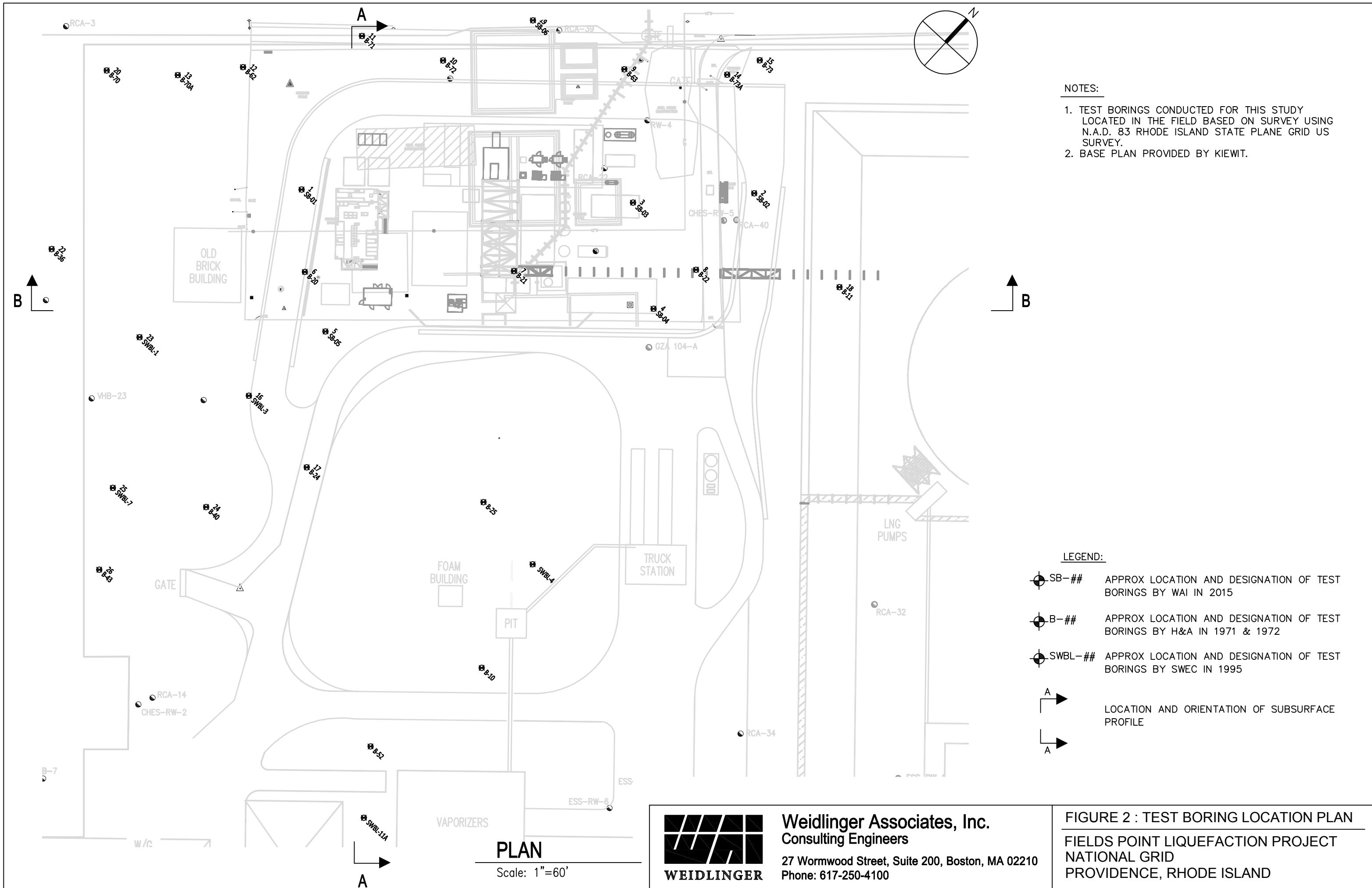
LOGGED BY: CEM
 CHECKED BY: JDL
 DATE: 3/3/16

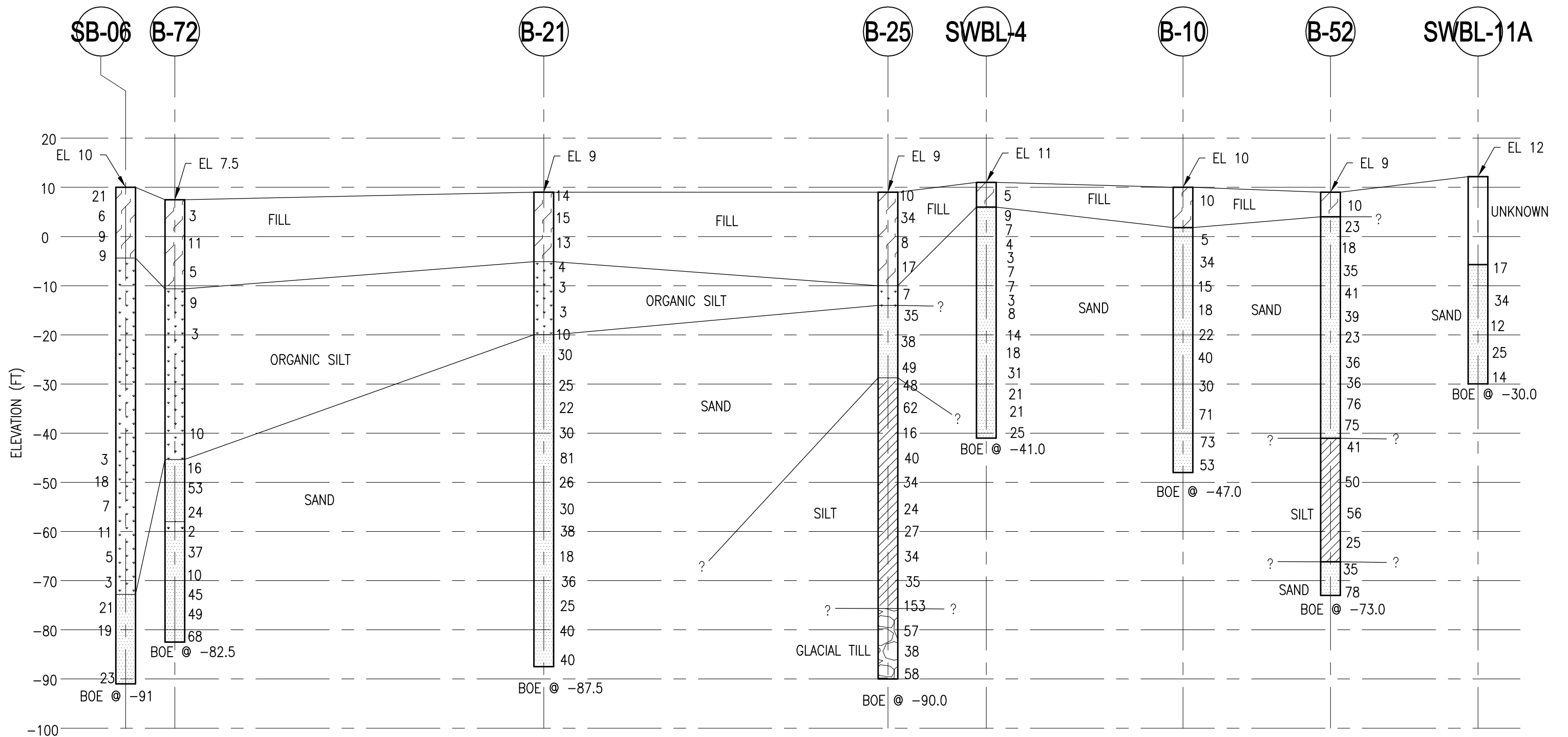




APPENDIX C

FIGURES PREPARED BY
WEIDLINGER AND ASSOCIATES, INC.
ON BEHALF OF KIEWIT ENGINEERING
AND DESIGN COMPANY





NOTE:

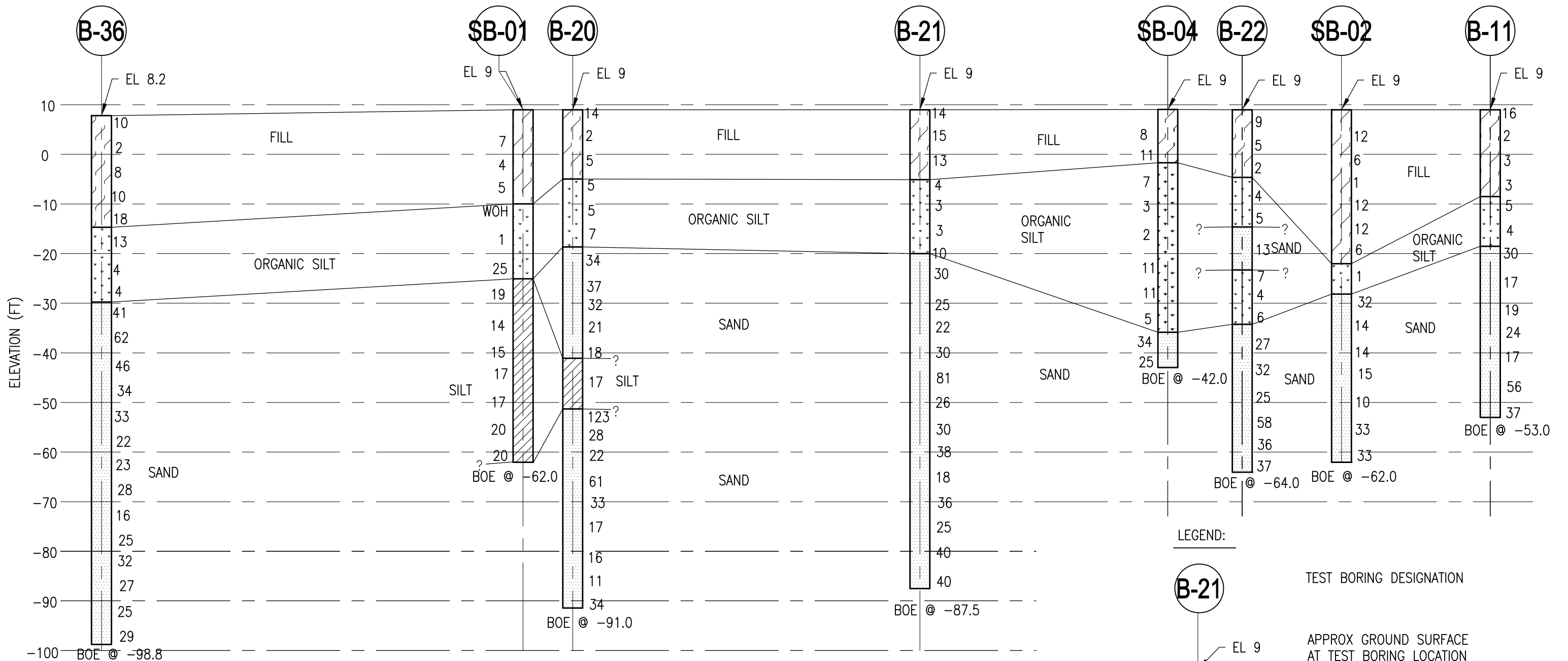
1. SEE NOTES AND LEGEND ON FIGURE 4



Weidlinger Associates, Inc.
Consulting Engineers

27 Wormwood Street, Suite 200, Boston, MA 02210
Phone: 617-250-4100

FIGURE 3 : SUBSURFACE PROFILE A-A
FIELDS POINT LIQUEFACTION PROJECT
NATIONAL GRID
PROVIDENCE, RHODE ISLAND



SECTION B-B

Scale: 1"=40' HORIZ
1"=20' VERT

NOTES:

1. SEE FIGURE 2 FOR LOCATION AND ORIENTATION OF PROFILES
2. GROUND SURFACE ELEVATIONS APPROXIMATE
3. SUBSURFACE CONDITIONS BETWEEN TEST BORINGS MAY VARY FROM LINEAR INTERPOLATION SHOWN
4. SEE TEST BORING LOGS FOR ADDITIONAL DETAIL



Weidlinger Associates, Inc.
 Consulting Engineers
 27 Wormwood Street, Suite 200, Boston, MA 02210
 Phone: 617-250-4100

FIGURE 4 : SUBSURFACE PROFILE B-B
 FIELDS POINT LIQUEFACTION PROJECT
 NATIONAL GRID
 PROVIDENCE, RHODE ISLAND



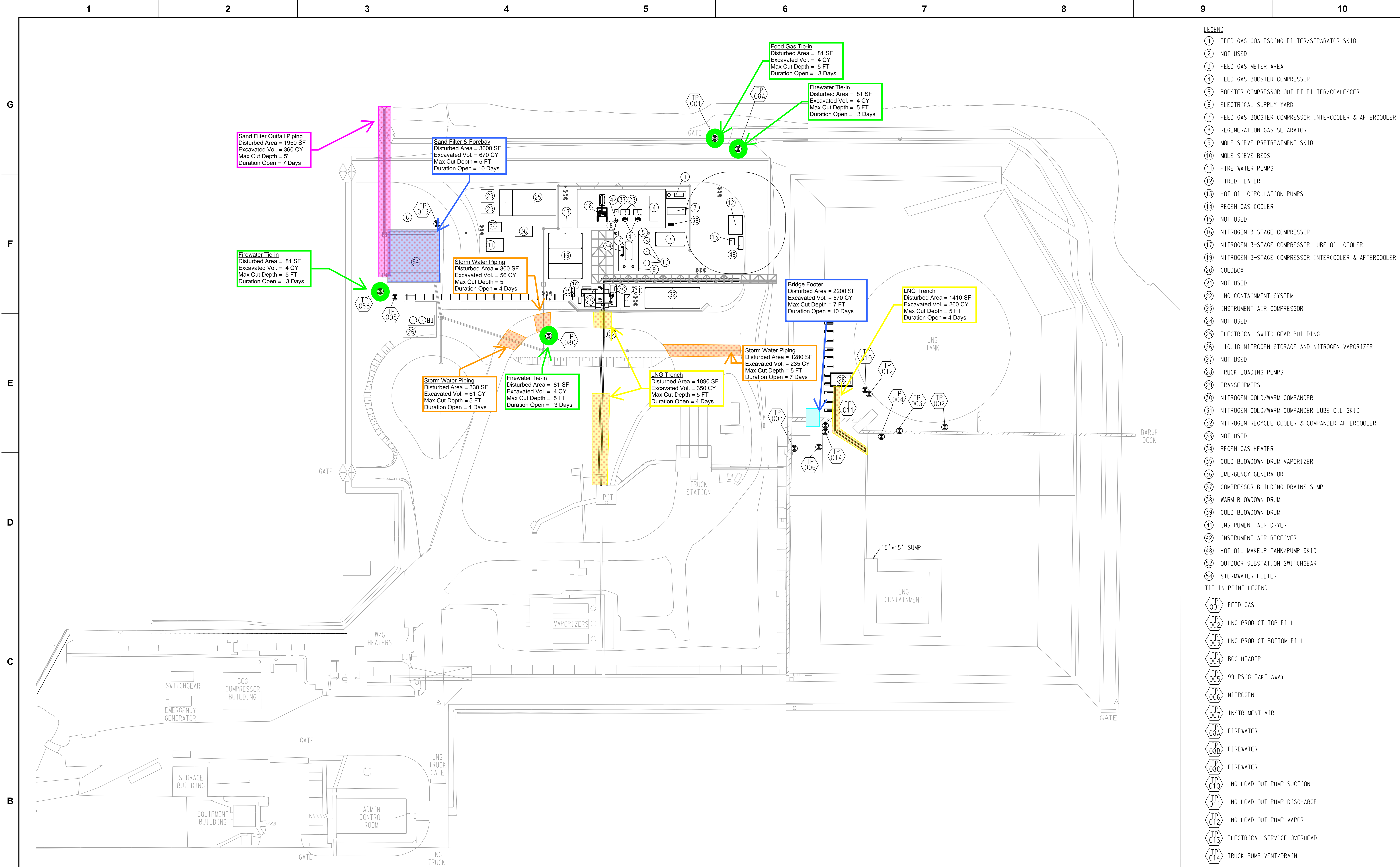
APPENDIX D

ESTIMATED STRAP EMISSIONS



APPENDIX D

FIGURES



PLANT NORTH
TRUE NORTH
42.4203°

SCALE: 1" = 40'-0"

40 0 40 80
SCALE IN FEET

CONFIDENTIAL

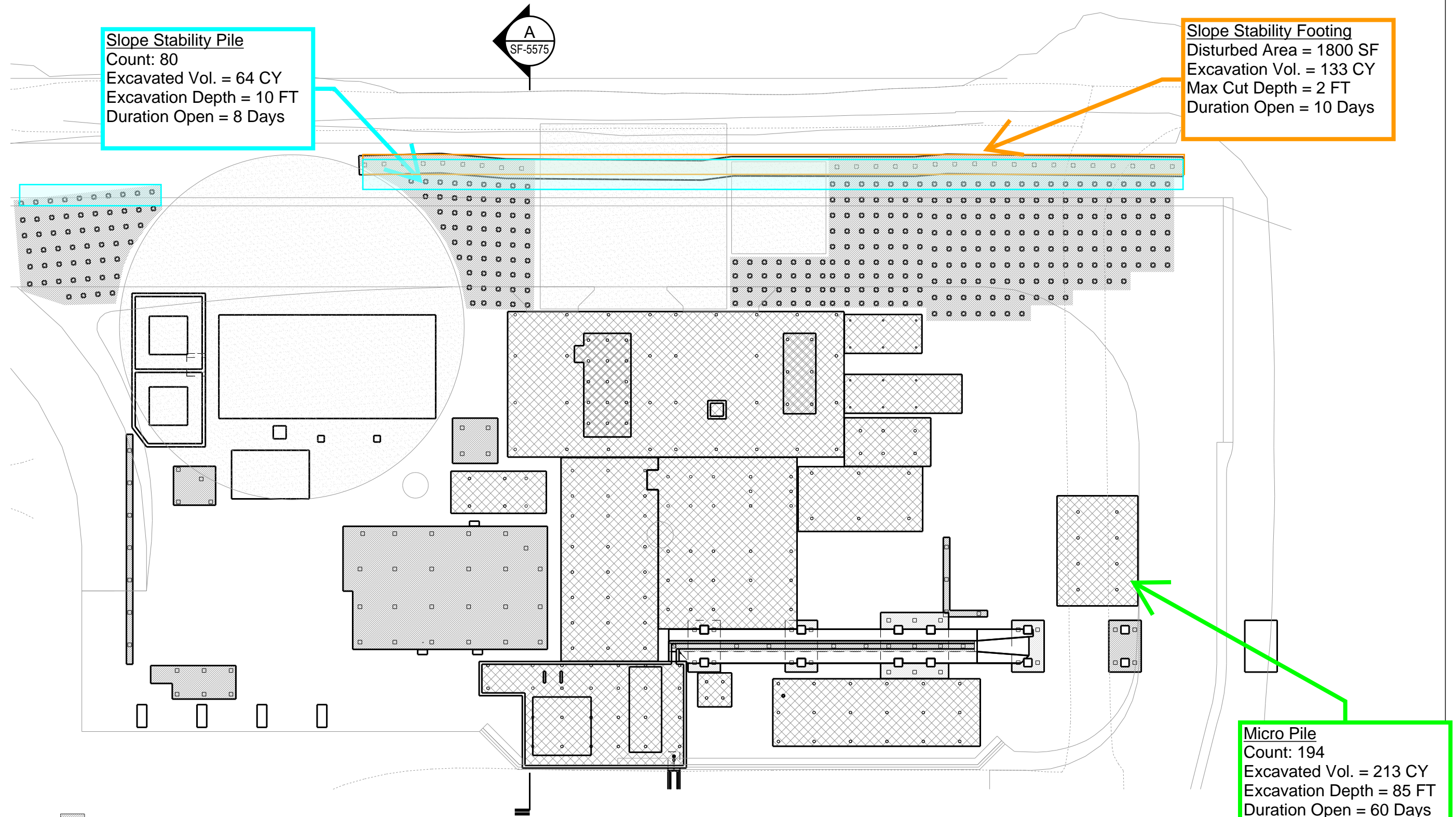
THESE DRAWINGS ARE CONFIDENTIAL IN NATURE. ANY MISUSE OR UNAUTHORIZED DISTRIBUTION OF THE DRAWINGS CONTAINED HEREIN WILL BE A VIOLATION OF THIS CONFIDENTIALITY AGREEMENT AND SUBJECT THE VIOLATOR TO LIABILITY. REVIEW OF THESE MATERIALS BY RECIPIENT SHALL CONSTITUTE AN ACCEPTANCE OF THESE TERMS AND THE TERMS OF ANY UNDERLYING CONFIDENTIALITY AGREEMENT MAY HAVE EXECUTED IN OBTAINING THIS INFORMATION FROM A THIRD PARTY. IF THE RECIPIENT IS NOT IN AGREEMENT WITH THE OBLIGATION OF CONFIDENTIALITY THEN THE DRAWINGS SHALL BE RETURNED TO THE ORIGINATOR.

REV	DATE	REVISION INFORMATION	BY	CHK	APP.
F	03-14-16	ISSUED FOR FERC FILING	DKM	PRS	RAR
E	11-06-15	ISSUED FOR DESIGN	DKM	PRS	RAR
D	07-09-15	ISSUED FOR MODELING	DKM	NAY	BAR
C	06-19-15	ISSUED FOR FERC PRE-FILING	DKM	NAY	BAR
B	05-15-15	ISSUED FOR APPROVAL	DKM	BSH	BAR
A	05-13-15	ISSUED FOR REVIEW & COMMENT	DKM	NAY	BAR

GENERAL NOTES AND COMMENTS:
1. FINAL LOCATION OF TP-008 SHALL BE DETERMINED DURING DETAILED DESIGN.

SEAL AND STAMP:
 nationalgrid
 Kiewit
 Kiewit Engineering and Design
 10000 West 10th Street
 Denver, Colorado 80202

PROFESSIONAL CERTIFICATION: I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A QUALIFIED PROFESSIONAL ENGINEER UNDER LICENSE NO. _____ OF THE STATE OF WYOMING. CONTRACT NO. _____		NATIONAL GRID LNG LLC	
ENG/DESIGN ORIG: D.MATHEWS	LEAD ENG: B.BIRDLE	FIELDS POINT LIQUEFACTION PROJECT	
ENG. MGR: J. BOCKELMAN	PRJ. MGR: A. PARRACK	PLOT PLAN	
DRAWING NO: 102761-B-00-0000-MEC-PP-1000	SHT: 1 OF 1	REV: E	



SITE PILING PLAN



APPENDIX D
CALCULATIONS

APPENDIX D
EXCAVATION EMISSIONS CALCULATIONS

STRAP – Liquefaction Project

Providence, Rhode Island

To estimate potential volatile emissions associated with planned construction activities at the 642 Allens Avenue Property (“the Site”), GZA GeoEnvironmental, Inc. (GZA) used the following modified versions of the equations given in Appendix D of “Air Emissions from the Treatment of Soils Contaminated with Petroleum Fuels and Other Substances” (Eklund 1997):

First, the total excavation emissions potential is calculated as a benchmark:

Total Excavation Emissions Potential:

$$E_{Potential} = C_{i,Soil} \times S_v \times \beta$$

Where,

$E_{Potential}$ = Total Mass of Component i in a given volume of soil in grams (g);

$C_{i,Soil}$ = Concentration of Component i in the Soil in micrograms of Component i per gram of Soil (ug/g);

β = Typical Bulk Density in grams per cubic centimeter (g/cm³) (assumed to be 1.5 g/cm³ – Eklund 1997); and

S_v = Total Volume of Soil Moved in cubic meters (m³).

Average Total Emissions (detailed model):

If the Average Total Emissions calculated by this detailed model (Eklund 1997) exceeds the calculated Total Excavation Emissions Potential, the Total Excavation Emissions Potential will be used.

$$E = E_{PS} + E_{DIFF}$$

$$E_{PS} = \frac{P_i MW 10^6 E_a S_v ExC}{R T}$$

$$E_{DIFF} = \frac{(C)(10,000)(SA)(t_v)}{\left(\frac{E_a}{K_{eq}k_g}\right) + \left(\frac{\pi t}{D_e K_{eq}}\right)^{1/2}}$$

Where,

E = Total Emissions from Excavation of Soil in g;

E_{PS} = Total Emissions due to Soil Pore Space Gas in g;

E_{DIFF} = Total Emissions due to Diffusion in g;

P_i = Partial Pressure of Component i in millimeters of mercury (mm Hg)¹;

MW = Molecular Weight in grams per mole (g/mol);

10^6 = Conversion Factor of cm³/m³;

¹ Note that because the impacts at the Site are primarily not separate phase, we have used the partial pressure as opposed to the vapor pressure of the pure component.

E_a = Air-Filled Porosity (0.35 for wet, or compacted soil; 0.55 for dry, uncompacted soil – Eklund (1997));

S_v = Total Volume of Soil Moved in m^3 ;

ExC = Soil-Gas to Atmosphere Exchange Constant (0.10 for wet or high-clay content soils; 0.33 for dry, sandy soils from Eklund - 1997);

R = Universal Gas Constant in mm-Hg* $cm^3/mol/K$ (62,361 mm-Hg* $cm^3/mol/K$);

T = Temperatures in K (assumed to be 15°C);

C = Mass Loading of Component i in soil in g/cm^3 ;

10,000 = Conversion Factor of square centimeters per square meter (cm^2/m^2); and

SA = Total Emitting Surface Area in square meters (m^2). GZA assumed the Total Emitting Surface Area to be the sides and bottom of the excavation and the sides and top of the stockpile.

D_e = Effective Diffusivity in Air in square centimeter per second (cm^2/s);

K_{eq} = Equilibrium Coefficient;

t_v = Time the Volume of Soil Moved is emitting in seconds (s) (360 s – Eklund (1997));

k_g = Gas-Phase Mass Transfer Coefficient in centimeter per second (cm/s) (Default of 0.15 cm/s – Eklund (1997));

and

t = Time that the Instantaneous Emission Rate approximates the Average Emission Rate over the 360 second period that Emissions from Freshly Excavated Soil are assumed to be Significant in s (60 s – Eklund (1997)).

P_i is calculated by:

For this scenario, the partial pressure was estimated using Raoult's Law assuming the constituents are in a mixture with the other organic matter in the soil.

Raoult's Law:

$$P_i = P_i^* x_i$$

Where,

P_i = Partial Pressure of the Component i in the Mixture;

P_i^* = Vapor Pressure of the pure Component i ; and

x_i = Mole Fraction of the Component i in the Mixture (moles component/total moles).

$$x_i = \frac{10^{-6} C_{i,Mixture} MW_{Mixture}}{MW_i}$$

Where,

10^{-6} = Conversion Factor of kilogram per milligram (kg/mg);

$MW_{Mixture}$ = Molecular Weight of Mixture in g/mol (assumed to be 250 g/mol);

MW_i = Molecular Weight of Component i in g/mol ; and

$C_{i,Mixture}$ = Concentration of Component i in the Mixture in milligrams of Component i per kilogram of Mixture (mg/kg).

$$C_{i,Mixture} = \frac{C_{i,Soil}}{TOC}$$

Where,

$C_{i,Mixture}$ = Concentration of Component i in the Mixture in milligrams of Component i per kilogram of Mixture (mg/kg);

$C_{i,Soil}$ = Concentration of Component i in the Soil in micrograms of Component i per gram of Soil (ug/g); and

TOC = Fraction of Total Organic Carbon in the Soil (g/g). Because Site-specific TOC data was not available, the default value of 0.002 from the USEPA's Soil Screening Guidance: User's Guide (1996) was used to be conservative.

We've assumed a soil temperature of 15°C in our calculations. We have therefore utilized the Clausius-Clapeyron equation to calculate vapor pressures at 15°C from those in the literature (typically 25°C):

Clausius-Clapeyron Equation:

$$\ln\left(\frac{P_1}{P_2}\right) = \left(\frac{\Delta H_{vap}}{R}\right)\left(\frac{1}{T_2} - \frac{1}{T_1}\right)$$

Where,

P_1 = Vapor Pressure at a Known Point;

P_2 = Vapor Pressure at a Given Point;

T_1 = Temperature at a Known Point in Kelvin (K);

T_2 = Temperature at a Given Point in K;

ΔH_{vap} = Enthalpy of Vaporization of Component i in kilojoules per mole (kJ/mol); and

R = Universal Gas Constant in kilojoules per Kelvin per mole (8.314E-03 kJ/K/mol).

C (Mass Loading of Component i in soil in g/cm³) is calculated by:

$$C = 10^{-6} C_{i,soil} \beta$$

Where,

10^{-6} = Conversion Factor of gram per microgram (g/ug);

$C_{i,soil}$ = Concentration of Component i in the Soil in micrograms of Component i per gram of Soil (ug/g); and

β = Typical Bulk Density in g/m³; (assumed to be 1.5 g/m³ – Eklund (1997)).

K_{eq} is calculated by:

$$K_{eq} = \frac{P_i MW_i E_a}{R T C}$$

Where,

P_i = Partial Pressure of the Component i in the Mixture in mm Hg;

MW_i = Molecular Weight of Component i in g/mol;

E_a = Air-Filled Porosity (0.35 for wet, or compacted soil; 0.55 for dry, uncompacted soil – Eklund (1997));

R = Universal Gas Constant in mm-Hg*cm³/mol/K (62,361 mm-Hg*cm³/mol/K);

T = Temperatures in K (assumed to be 15°C);

C = Mass Loading of Component i in soil in g/cm³;

D_e is calculated by:

$$D_e = \frac{D_a (E_a)^{3.33}}{(E_T)^2}$$

Where,

D_a = Diffusivity in Air of Component i in cm²/s (Default of 0.1 was used when chemical-specific values could not be found.);

E_a = Air-Filled Porosity (0.35 for wet, or compacted soil; 0.55 for dry, uncompacted soil – Eklund (1997)); and

E_T = Total Porosity (0.35 for compacted soil; 0.55 for uncompacted soil – Eklund (1997)).

For impacted soils to be managed on-Site (e.g., if it is not directly loaded into a truck but is first stockpiled), an additional Total Emissions due to Soil Pore Space Gas factor will be included in the Average Total Emissions to account for the additional emissions during soil handling and stockpiling. As a conservative measure, for losses during management of materials, GZA will utilize the Total Emissions due to Soil Pore Space Gas that was calculated above for losses during excavation. This is conservative since the concentrations in the re-handled soil will be lower than in the soil during excavation.

References:

Eklund, et al. 1997. Air Emissions from the Treatment of Soils Contaminated with Petroleum Fuels and Other Substances. Prepared for U.S. Environmental Protection Agency Office of Air and Radiation and Office of Research and Development Washington, D.C. EPA-600/R-97-116. October.

RIDEM. 2009. Air Pollution Control Regulation No. 9: Air Pollution Control Permits. December.

USEPA, 1996. Soil Screening Guidance: User's Guide. July.



APPENDIX D

TABLES

Table D-1
Summary of Analytical Data
 Pile Installation - Cut Area
 STRAP - Liquefaction Project
 Providence, Rhode Island

	RIDEM Industrial Commercial Direct Exposure Criteria (I/C DEC)	RIDEM GB Leachability Criteria	RIDEM Upper Concentration Limit (UCL)	Average	Maximum	Sample Name:	RCA-4	RCA-5		RCA-21		RCA-40	ETP-19			ETP-20		RCA-R10	B08		B17		B18	B19	B20		
						Date Collected:	8 - 10 FT	10 - 12 FT	14 - 16 FT	4 - 6 FT	8 - 10 FT	April 1996	1996			1996		1996	0 - 2 FT	4 - 6 FT	0 - 2 FT	4 - 6 FT	4 - 6 FT	2 - 4 FT	0 - 2 FT	4 - 6 FT	
						Sample Depth:	September 1994	September 1994		October 1995	8 - 10 FT	2 FT	4-5 FT	7-8 FT	2-4.5 FT	4.5-6 FT	0-2 FT	1/27/2000		1/31/2000		1/27/2000	1/27/2000	1/27/2000	1/27/2000	1/31/2000	
						Units																					
Semi-Volatile Organic Compounds (SVOCs)																											
Naphthalene	10,000	NE	10,000	43.94	377	mg/kg	172	ND	144	13.5	59.2	217	5.6	20.6	161	13	246	NA	0.51	NA	1.95	1.8	1.4	0.84	2.1	0.66	
Volatile Organic Compounds (VOCs)																											
Benzene	200	4.3	10,000	0.40	2.99	mg/kg	ND	ND	0.96	ND	ND	NA	NA	NA	NA	NA	NA	ND	0.6	0.455	0.7	0.55	0.6	0.454	0.8	0.5	
Chloroform	940	NE	10,000	0.14	0.8	mg/kg	ND	ND	ND	ND	ND	NA	NA	NA	NA	NA	NA	ND	0.6	0.455	0.7	0.55	0.6	0.454	0.8	0.5	
Ethylbenzene	10,000	62	10,000	6.23	97.3	mg/kg	35.4	0.47	13	ND	ND	NA	NA	NA	NA	NA	NA	ND	0.6	0.455	0.7	0.55	0.6	0.454	0.8	0.5	
Isopropylbenzene	10,000	NE	10,000	1.02	37.1	mg/kg	ND	ND	ND	ND	ND	NA	NA	NA	NA	NA	NA	ND	0.6	0.455	0.7	0.55	0.6	0.454	0.8	0.5	
Methylene Chloride	760	NE	10,000	0.52	28	mg/kg	28	ND	ND	ND	ND	NA	NA	NA	NA	NA	NA	0.007	0.6	0.455	0.7	0.55	0.6	0.454	0.8	0.5	
Naphthalene	NE	NE	10,000	86.28	825	mg/kg	ND	ND	ND	18.6	383	NA	NA	NA	NA	NA	NA	ND	0.6	0.455	0.7	0.55	0.6	0.454	0.8	0.5	
Styrene	190	64	10,000	1.17	77	mg/kg	ND	ND	ND	ND	ND	NA	NA	NA	NA	NA	NA	ND	0.6	0.455	0.7	0.55	0.6	0.454	0.8	0.5	
Toulene	10,000	62	10,000	1.54	81	mg/kg	13.5	0.19	2.47	ND	ND	NA	NA	NA	NA	NA	NA	ND	0.6	0.455	0.7	0.55	0.6	0.454	0.8	0.5	
Xylenes (Total)	10,000	NE	10,000	9.10	165	mg/kg	53.4	0.8	22.7	ND	ND	NA	NA	NA	NA	NA	NA	ND	0.6	0.455	0.7	0.55	0.6	0.454	0.8	0.5	

Notes

Data is compared to RIDEM Method 1 Standards. Shaded results represent exceedances of standards and subject to Note 2 below.

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Note 3. While the Direct Exposure and Leachability Criteria apply to the vadose zone, certain subsurface soil samples were collected below the water table to define the nature and extent of impact. The data comparisons summarized in these tables compare all subsurface soil data (vadose and saturated zone) to the I/C-DEC, GB Leachability criteria and Upper Concentration Limit (UCLs).

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Summary of Analytical Data
 Pile Installation - Cut Area
 STRAP - Liquefaction Project
 Providence, Rhode Island

	RIDEM Industrial Commercial Direct Exposure Criteria (I/C DEC)	RIDEM GB Leachability Criteria	RIDEM Upper Concentration Limit (UCL)	Average	Maximum	Sample Name:	B21		B22		B23		B24		B25		B26		TP-1	TP-2	TP-4	TP-6	TP-8	TP-9	TP-19	TP-25			
						Date Collected:	0 - 2 FT	4 - 6 FT	0 - 2 FT	4 - 6 FT	0 - 2 FT	4 - 6 FT	0 - 2 FT	6 - 8 FT	0 - 2 FT	4 - 6 FT	0 - 2 FT	4 - 6 FT	Note 1	Note 1	Note 1	Note 1	Note 1	Note 1	Note 1	Note 1	Note 1	Note 1	Note 1
						Sample Depth:	1/31/2000		1/31/2000		1/31/2000		2/1/2000		2/1/2000		2/3/2000		5/20/2002	5/20/2002	5/20/2002	5/20/2002	5/20/2002	5/20/2002	5/20/2002	5/20/2002	5/20/2002	5/20/2002	5/20/2002
						Units																							
Semi-Volatile Organic Compounds (SVOCs)																													
Naphthalene	10,000	NE	10,000	43.94	377	mg/kg	4.3	1.2	0.44	1.65	1.7	1.75	1.75	1.3	0.5	2.5	1.8	0.36	ND	ND	ND	13.2	31.4	10.6	ND	ND			
Volatile Organic Compounds (VOCs)																													
Benzene	200	4.3	10,000	0.40	2.99	mg/kg	0.7	0.55	0.44	0.4	0.35	0.5	0.47	0.5	0.49	0.65	0.55	0.6	ND	ND	ND	ND	2.7	ND	ND	ND			
Chloroform	940	NE	10,000	0.14	0.8	mg/kg	0.7	0.55	0.44	0.4	0.35	0.5	0.47	0.5	0.49	0.65	0.22	0.6	ND	ND	ND	ND	ND	ND	ND	ND			
Ethylbenzene	10,000	62	10,000	6.23	97.3	mg/kg	0.7	0.55	0.44	0.4	0.35	0.5	0.47	0.5	0.49	0.65	0.55	0.6	1.65	0.38	0.2	1.15	22.5	1.85	ND	4.6			
Isopropylbenzene	10,000	NE	10,000	1.02	37.1	mg/kg	0.7	0.55	0.44	0.4	0.35	0.5	0.47	0.5	0.49	0.65	0.55	0.6	ND	ND	ND	ND	4.1	ND	0.785	1.2			
Methylene Chloride	760	NE	10,000	0.52	28	mg/kg	0.7	0.55	0.44	0.4	0.35	0.5	0.47	0.5	0.49	0.65	0.55	0.6	ND	ND	ND	ND	ND	ND	ND	ND			
Naphthalene	NE	NE	10,000	86.28	825	mg/kg	0.7	3.3	0.44	0.4	0.35	0.5	0.47	0.45	0.49	0.65	0.57	0.6	51	9.71	3.97	23.7	779	123	4.06	25.2			
Styrene	190	64	10,000	1.17	77	mg/kg	0.7	0.55	0.44	0.4	0.35	0.5	0.47	0.5	0.49	0.65	0.55	0.6	ND	ND	ND	ND	ND	ND	ND	ND			
Toulene	10,000	62	10,000	1.54	81	mg/kg	0.7	0.55	0.44	0.4	0.35	0.5	0.47	0.5	0.49	0.65	0.55	0.6	ND	ND	ND	ND	3.7	ND	ND	ND			
Xylenes (Total)	10,000	NE	10,000	9.10	165	mg/kg	0.7	0.55	0.44	0.4	0.35	0.5	0.47	0.5	0.49	0.65	0.55	0.6	3.95	0.9	1.2	1.09	61.9	2.95	ND	7.4			

Notes

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 Providence, Rhode Island

	RIDEM Industrial Commercial Direct Exposure Criteria (I/C DEC)	RIDEM GB Leachability Criteria	RIDEM Upper Concentration Limit (UCL)	Average	Maximum	Sample Name:	TP-26	TP-27	GZ-314D	GZ-315D	EXA3-1	EXA3-2	EXA3-3	EXA3-4	EXA3-5	EXA3-6	EXA3-7	EXA3-8	EXA3-9	EXA3-10	EXA3-11					
						Date Collected:	Note 1	Note 1	4 - 6 FT	4 - 6 FT	Note 1	Note 1	Note 1	Note 1	Note 1	Note 1	Note 1	Note 1	Note 1	Note 1	Note 1	Note 1	Note 1	Note 1	Note 1	
						Sample Depth:	5/20/2002	5/20/2002	05/27/2014	05/28/2014	6/25/2002	6/25/2002	6/25/2002	6/25/2002	6/25/2002	6/25/2002	6/25/2002	6/25/2002	6/25/2002	6/25/2002	6/26/2002	6/26/2002	6/26/2002	6/26/2002	6/26/2002	6/24/1905
						Units																				
Semi-Volatile Organic Compounds (SVOCs)																										
Naphthalene	10,000	NE	10,000	43.94	377	mg/kg	108	365	127	17.2	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND					
Volatile Organic Compounds (VOCs)																										
Benzene	200	4.3	10,000	0.40	2.99	mg/kg	2.95	2.6	1.97	0.0477	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.106					
Chloroform	940	NE	10,000	0.14	0.8	mg/kg	ND	ND	0.0112	0.0159	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND					
Ethylbenzene	10,000	62	10,000	6.23	97.3	mg/kg	37.6	97.3	5.98	0.01	ND	ND	ND	ND	ND	ND	ND	ND	0.379	ND	0.56					
Isopropylbenzene	10,000	NE	10,000	1.02	37.1	mg/kg	ND	8.9	0.883	0.02095	ND	ND	ND	ND	ND	ND	ND	ND	0.269	ND	ND					
Methylene Chloride	760	NE	10,000	0.52	28	mg/kg	ND	ND	0.0875	0.1045	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND					
Naphthalene	NE	NE	10,000	86.28	825	mg/kg	825	760	120	0.868	0.26	0.519	0.554	ND	ND	ND	ND	ND	6.15	0.705	16					
Styrene	190	64	10,000	1.17	77	mg/kg	77	ND	0.0175	0.041	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND					
Toulene	10,000	62	10,000	1.54	81	mg/kg	81	ND	0.43	0.134	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.198					
Xylenes (Total)	10,000	NE	10,000	9.10	165	mg/kg	165	107	2.67	0.139	ND	0.125	ND	ND	ND	ND	ND	ND	0.364	ND	1.69					

Notes

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						Date Collected:	Note 1	Note 1	Note 1	Note 1	Note 1	Note 1	Note 1	Note 1	Note 1	Note 1	Note 1	Note 1	Note 1	Note 1	Note 1	Note 1	Note 1	Note 1	
						Sample Depth:	6/24/1905	6/24/1905	6/24/1905	6/24/1905	6/24/1905	6/24/1905	6/24/1905	6/24/1905	6/24/1905	6/24/1905	6/24/1905	6/24/1905	6/24/1905	6/24/1905	6/24/1905	6/24/1905	6/24/1905	6/24/1905	6/24/1905
						Units																			
Semi-Volatile Organic Compounds (SVOCs)																									
Naphthalene	10,000	NE	10,000	43.94	377	mg/kg	ND	ND	ND	89.8	99	148	39.4	249	377	129	ND	78.8	67	218					
Volatile Organic Compounds (VOCs)																									
Benzene	200	4.3	10,000	0.40	2.99	mg/kg	ND	ND	ND	ND	0.304	0.453	0.634	0.126	1.08	ND	ND	ND	ND	ND					
Chloroform	940	NE	10,000	0.14	0.8	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND					
Ethylbenzene	10,000	62	10,000	6.23	97.3	mg/kg	0.104	2.38	2.13	56.9	2.72	12.8	6.07	10.3	6.27	0.646	76.9	13.6	11	ND					
Isopropylbenzene	10,000	NE	10,000	1.02	37.1	mg/kg	ND	ND	ND	ND	1.24	2.59	1.69	1.72	1.37	0.363	37.1	1.26	ND	ND					
Methylene Chloride	760	NE	10,000	0.52	28	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND					
Naphthalene	NE	NE	10,000	86.28	825	mg/kg	4.64	92.8	72.3	412	108	171	122	298	297	305	193	101	436	5.68					
Styrene	190	64	10,000	1.17	77	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND					
Toulene	10,000	62	10,000	1.54	81	mg/kg	0.115	ND	ND	ND	ND	0.152	0.377	0.17	0.978	ND	ND	ND	ND	ND					
Xylenes (Total)	10,000	NE	10,000	9.10	165	mg/kg	0.271	3.21	2.16	40.1	1.7	15.7	8.95	17.7	18.6	0.64	82.2	4.87	ND	ND					

Notes

Data is compared to RIDEM Method 1 Standards. Shaded results represent exceedances of standards and subject to Note 2 below.

Table only indicates the compounds that were detected and have a RIDEM Minimum Quantity, other compounds were analyzed for, but not detected.

Table only shows explorations within the Liquefaction Area (cut areas only)

ND - Not Detected (Detection Limit Unknown)

NA - Not Analyzed NE - Not Established

Blue shading indicates compound was not detected - value shown is half the detection limit.

Sample depths noted here are from original grade. This table presents data that has since been capped with an engineered soil cap. As such, the final grades are unknown and as such the modified sampling depths are unknown.

Note 1. Exact sample depth is unknown, but is noted as being a subsurface sample (more than 2 feet bgs).

Note 2. Exact sample depth is unknown, but is noted as being a surface sample (less than 2 feet bgs).

Note 3. While the Direct Exposure and Leachability Criteria apply to the vadose zone, certain subsurface soil samples were collected below the water table to define the nature and extent of impact. The data comparisons summarized in these tables compare all subsurface soil data (vadose and saturated zone) to the I/C-DEC, GB Leachability criteria and Upper Concentration Limit (UCLs).

Orange shading indicates sample collected is a confirmatory sample.

Table D-1
Summary of Analytical Data
 Pile Installation - Cut Area
 STRAP - Liquefaction Project
 Providence, Rhode Island

	RIDEM Industrial Commercial Direct Exposure Criteria (I/C DEC)	RIDEM GB Leachability Criteria	RIDEM Upper Concentration Limit (UCL)	Average	Maximum	Sample Name:	EXA3-28	EXA3-29	EXA3-30	EXA3-31	EXA3-32	EXA3-33	EXAF-1	EXAF-2	EXAF-3	EXAF-4	EXAF-5	EXAF-6				
						Date Collected:	Note 1	Note 1	Note 1	Note 1	Note 1	Note 1	Note 1	Note 1	Note 1	Note 1	Note 1	Note 1	Note 1	Note 1	Note 1	Note 1
						Sample Depth:	6/24/1905	6/24/1905	6/24/1905	6/24/1905	6/24/1905	6/24/1905	6/25/2002	6/25/2002	6/25/2002	6/25/2002	6/25/2002	6/25/2002	6/25/2002	6/25/2002	6/25/2002	6/25/2002
						Units																
Semi-Volatile Organic Compounds (SVOCs)																						
Naphthalene	10,000	NE	10,000	43.94	377	mg/kg	ND	151	72.3	ND	ND	ND	ND	ND	ND	ND	ND	ND				
Volatile Organic Compounds (VOCs)																						
Benzene	200	4.3	10,000	0.40	2.99	mg/kg	2.99	0.198	ND	0.158	ND	0.91	ND	ND	0.669	ND	ND	ND				
Chloroform	940	NE	10,000	0.14	0.8	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND				
Ethylbenzene	10,000	62	10,000	6.23	97.3	mg/kg	19.4	4.55	0.143	0.674	1.96	4.07	ND	ND	0.375	ND	ND	ND				
Isopropylbenzene	10,000	NE	10,000	1.02	37.1	mg/kg	1.41	ND	ND	ND	ND	0.648	ND	ND	ND	ND	ND	ND				
Methylene Chloride	760	NE	10,000	0.52	28	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND				
Naphthalene	NE	NE	10,000	86.28	825	mg/kg	369	53.8	7.26	8.53	61	183	ND	3.17	1.74	0.495	ND	ND				
Styrene	190	64	10,000	1.17	77	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND				
Toulene	10,000	62	10,000	1.54	81	mg/kg	ND	ND	0.121	0.251	ND	0.369	ND	ND	0.235	ND	ND	ND				
Xylenes (Total)	10,000	NE	10,000	9.10	165	mg/kg	26.8	3.38	0.345	1.36	4.13	6.08	ND	ND	0.478	ND	ND	ND				

Notes

Data is compared to RIDEM Method 1 Standards. Shaded results represent exceedances of standards and subject to Note 2 below.

Table only indicates the compounds that were detected and have a RIDEM Minimum Quantity, other compounds were analyzed for, but not detected.

Table only shows explorations within the Liquefaction Area (cut areas only)

ND - Not Detected (Detection Limit Unknown)

NA - Not Analyzed NE - Not Established

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Sample depths noted here are from original grade. This table presents data that has since been capped with an engineered soil cap. As such, the final grades are unknown and as such the modified sampling depths are unknown.

Note 1. Exact sample depth is unknown, but is noted as being a subsurface sample (more than 2 feet bgs).

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Note 3. While the Direct Exposure and Leachability Criteria apply to the vadose zone, certain subsurface soil samples were collected below the water table to define the nature and extent of impact. The data comparisons summarized in these tables compare all subsurface soil data (vadose and saturated zone) to the I/C-DEC, GB Leachability criteria and Upper Concentration Limit (UCLs).

Orange shading indicates sample collected is a confirmatory sample.

Table D-2
Summary of Analytical Data
 Utility Installation - Cut Area
 STRAP - Liquefaction Project
 Providence, Rhode Island

	RIDEM Industrial Commercial Direct Exposure Criteria (I/C DEC)	RIDEM GB Leachability Criteria	RIDEM Upper Concentration Limit (UCL)	Average	Maximum	Sample Name:	RCA-5		RCA-23		RCA-39		RCA-R7	RCA-R10	RCA-R11	A67	B04	B05	B06	B07		B08		B09	B10	
						Date Collected:	10 - 12 FT	14 - 16 FT	4 - 6 FT	14 - 16 FT	April 1996		1996	1996	1996	2/25/2000	2 - 4 FT	2 - 4 FT	2 - 4 FT	0 - 2 FT	4 -6 FT	0 - 2 FT	4 -6 FT	2 - 4 FT	2 - 4 FT	
						Sample Depth:	September 1994		October 1995		8 - 10 FT	12 - 14 FT	0-2 FT	0-2 FT	0-2 FT	0-2 FT	4-6 FT	1/27/2000	1/27/2000	1/27/2000	1/27/2000		1/27/2000		1/27/2000	1/27/2000
						Units																				
Semi-Volatile Organic Compounds (SVOCs)																										
Naphthalene	10,000	NE	10,000	6.44	370	mg/kg	ND	144	370	51.7	1	0.8	ND	NA	ND	1.8	16	220	0.55	1.75	1.7	NA	0.51	NA	NA	3.1
Volatile Organic Compounds (VOCs)																										
Benzene	200	4.3	10,000	0.26	2.8	mg/kg	ND	0.96	ND	ND	ND	NA	ND	ND	ND	0.6	0.25	2.8	0.76	0.65	0.455	0.5	0.6	0.455	0.6	0.65
Chloroform	940	NE	10,000	0.16	1.7	mg/kg	ND	ND	ND	ND	ND	NA	ND	ND	ND	0.6	0.6	1.7	0.65	0.65	0.455	0.5	0.6	0.455	0.6	0.65
Ethylbenzene	10,000	62	10,000	0.27	13	mg/kg	0.47	13	ND	ND	ND	NA	ND	ND	ND	0.6	0.43	1.7	0.65	0.65	0.455	0.5	0.6	0.455	0.6	0.65
Isopropylbenzene	10,000	NE	10,000	0.17	1.7	mg/kg	ND	ND	ND	ND	ND	NA	ND	ND	ND	0.6	0.6	1.7	0.65	0.65	0.455	0.5	0.6	0.455	0.6	0.65
Methylene Chloride	760	NE	10,000	0.16	1.7	mg/kg	ND	ND	ND	ND	ND	NA	ND	0.007	ND	0.6	0.6	1.7	0.65	0.65	0.455	0.5	0.6	0.455	0.6	0.65
Naphthalene	NE	NE	10,000	6.53	500	mg/kg	ND	ND	500	133	ND	NA	0.034	ND	ND	0.6	11	300	0.65	0.65	0.455	0.71	0.6	0.455	0.6	0.65
Styrene	190	64	10,000	0.17	1.7	mg/kg	ND	ND	ND	ND	ND	NA	ND	ND	ND	0.6	0.6	1.7	0.65	0.65	0.455	0.5	0.6	0.455	0.6	0.65
Toulene	10,000	62	10,000	0.23	2.65	mg/kg	0.19	2.47	ND	ND	ND	NA	ND	ND	ND	0.6	0.4	1.7	0.41	0.65	0.455	0.5	0.6	0.455	0.6	0.65
Xylenes (Total)	10,000	NE	10,000	0.35	22.7	mg/kg	0.8	22.7	ND	ND	ND	NA	ND	ND	0.005	0.6	0.42	2.6	0.3	0.65	0.455	0.5	0.6	0.455	0.6	0.65

Notes

Data is compared to RIDEM Method 1 Standards. Shaded results represent exceedances of standards and subject to Note 2 below.

Table only indicates the compounds that were detected and have a RIDEM Minimum Quantity, other compounds were analyzed for, but not detected.

Table only shows explorations within the Liquefaction Area (cut areas only)

ND - Not Detected (Detection Limit Unknown)

NA - Not Analyzed NE - Not Established

Blue shading indicates compound was not detected - value shown is half the detection limit.

Sample depths noted here are from original grade. This table presents data that has since been capped with an engineered soil cap. As such, the final grades are unknown and as such the modified sampling depths are unknown.

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Note 3. While the Direct Exposure and Leachability Criteria apply to the vadose zone, certain subsurface soil samples were collected below the water table to define the nature and extent of impact. The data comparisons summarized in these tables compare all subsurface soil data (vadose and saturated zone) to the I/C-DEC, GB Leachability criteria and Upper Concentration Limit (UCLs).

Orange shading indicates sample collected is a confirmatory sample.

Table D-2
Summary of Analytical Data
 Utility Installation - Cut Area
 STRAP - Liquefaction Project
 Providence, Rhode Island

	RIDEM Industrial Commercial Direct Exposure Criteria (I/C DEC)	RIDEM GB Leachability Criteria	RIDEM Upper Concentration Limit (UCL)	Average	Maximum	Sample Name:	B11	B12		B18	B19	B24		B25		B26		B27		B35		B36		B42		B43		B44		B				
						Date Collected:	2 - 4 FT	0 - 2 FT	4 - 6 FT	4 - 6 FT	2 - 4 FT	0 - 2 FT	6 - 8 FT	0 - 2 FT	4 - 6 FT	0 - 2 FT	4 - 6 FT	0 - 2 FT	4 - 6 FT	0 - 2 FT	8 - 10 FT	0 - 2 FT	4 - 6 FT	0 - 2 FT	4 - 6 FT	0 - 2 FT	4 - 6 FT	0 - 2 FT	4 - 6 FT	0 - 2 FT	8 - 10 FT	0 - 2 FT	0 - 2 FT	
						Sample Depth:	1/27/2000	1/27/2000		1/27/2000	1/27/2000	2/1/2000		2/1/2000		2/3/2000		2/22/2000		2/22/2000		2/22/2000		2/22/2000		2/22/2000		2/22/2000		2/22/2000		2/22/2000		2/22/2000
						Units																												
Semi-Volatile Organic Compounds (SVOCs)																																		
Naphthalene	10,000	NE	10,000	6.44	370	mg/kg	0.8	1.7	150	1.4	0.84	1.75	1.3	0.5	2.5	1.8	0.36	1.95	1.8	1.7	0.38	1.9	1.8	1.6	1.3	1.8	1.85	0.4	0.66	1.7				
Volatile Organic Compounds (VOCs)																																		
Benzene	200	4.3	10,000	0.26	2.8	mg/kg	0.41	0.29	0.69	0.6	0.454	0.47	0.5	0.49	0.65	0.55	0.6	0.55	0.55	0.45	0.7	0.65	0.5	0.65	1.2	0.55	0.7	0.7	0.9	0.55				
Chloroform	940	NE	10,000	0.16	1.7	mg/kg	0.7	0.41	1.05	0.6	0.454	0.47	0.5	0.49	0.65	0.22	0.6	0.55	0.55	0.45	0.7	0.65	0.5	0.65	1.2	0.55	0.7	0.7	0.9	0.55				
Ethylbenzene	10,000	62	10,000	0.27	13	mg/kg	0.7	0.41	2.1	0.6	0.454	0.47	0.5	0.49	0.65	0.55	0.6	0.55	0.55	0.45	0.7	0.65	0.5	0.65	1.2	0.55	0.7	0.7	0.9	0.55				
Isopropylbenzene	10,000	NE	10,000	0.17	1.7	mg/kg	0.7	0.41	1.05	0.6	0.454	0.47	0.5	0.49	0.65	0.55	0.6	0.55	0.55	0.45	0.7	0.65	0.5	0.65	1.2	0.55	0.7	0.7	0.9	0.55				
Methylene Chloride	760	NE	10,000	0.16	1.7	mg/kg	0.7	0.41	1.05	0.6	0.454	0.47	0.5	0.49	0.65	0.55	0.6	0.55	0.45	0.45	0.63	0.64	0.44	0.61	0.99	0.45	0.61	0.7	0.9	0.49				
Naphthalene	NE	NE	10,000	6.53	500	mg/kg	3.8	0.41	34	0.6	0.454	0.47	0.45	0.49	0.65	0.57	0.6	0.55	0.55	0.45	0.7	0.65	0.5	0.65	1.2	0.55	0.7	0.7	0.9	0.55				
Styrene	190	64	10,000	0.17	1.7	mg/kg	0.7	0.41	1.05	0.6	0.454	0.47	0.5	0.49	0.65	0.55	0.6	0.55	0.55	0.45	0.7	0.65	0.5	0.65	1.2	0.55	0.7	0.7	0.9	0.55				
Toulene	10,000	62	10,000	0.23	2.65	mg/kg	0.7	0.22	1.05	0.6	0.454	0.47	0.5	0.49	0.65	0.55	0.6	0.55	0.55	0.45	0.7	0.65	0.5	0.65	1.2	0.55	0.7	0.7	0.9	0.55				
Xylenes (Total)	10,000	NE	10,000	0.35	22.7	mg/kg	0.7	0.41	0.45	0.6	0.454	0.47	0.5	0.49	0.65	0.55	0.6	0.55	0.55	0.45	0.7	0.65	0.5	0.65	1.2	0.55	0.7	0.7	0.9	0.55				

Notes

Data is compared to RIDEM Method 1 Standards. Shaded results represent exceedances of standards and subject to Note 2 below.

Table only indicates the compounds that were detected and have a RIDEM Minimum Quantity, other compounds were analyzed for, but not detected.

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ND - Not Detected (Detection Limit Unknown)

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Note 1. Exact sample depth is unknown, but is noted as being a subsurface sample (more than 2 feet bgs).

Note 2. Exact sample depth is unknown, but is noted as being a surface sample (less than 2 feet bgs).

Note 3. While the Direct Exposure and Leachability Criteria apply to the vadose zone, certain subsurface soil samples were collected below the water table to define the nature and extent of impact. The data comparisons summarized in these tables compare all subsurface soil data (vadose and saturated zone) to the I/C-DEC, GB Leachability criteria and Upper Concentration Limit (UCLs).

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Table D-2
Summary of Analytical Data
 Utility Installation - Cut Area
 STRAP - Liquefaction Project
 Providence, Rhode Island

	RIDEM Industrial Commercial Direct Exposure Criteria (I/C DEC)	RIDEM GB Leachability Criteria	RIDEM Upper Concentration Limit (UCL)	Average	Maximum	Sample Name:	45	B46		B47		B55		B56		EXA3-7	EXA3-8	EXA3-9	EXA3-10	EXA3-34	EXA3-35	EXA3-36	EXA3-37		
						Date Collected:	4 - 6 FT	0 - 2 FT	4 - 6 FT	0-2 FT	4-6 FT	0-2 FT	4-6 FT	0-2 FT	4-6 FT	0-2 FT	4-6 FT	6/26/2002	6/26/2002	6/26/2002	6/26/2002	8/15/2002	8/15/2002	8/15/2002	8/15/2002
						Sample Depth:	2000	2/18/2000		2/18/2000		3/2/2000		2/18/2000		Note 1	Note 1	Note 1	Note 1	Note 2	Note 2	Note 2	Note 2		
						Units																			
Semi-Volatile Organic Compounds (SVOCs)																									
Naphthalene	10,000	NE	10,000	6.44	370	mg/kg	1.4	1.8	0.78	1.9	1.8	1.7	1.75	1.5	7.8	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Volatile Organic Compounds (VOCs)																									
Benzene	200	4.3	10,000	0.26	2.8	mg/kg	0.6	0.455	0.8	0.6	0.48	0.415	0.55	0.6	0.65	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Chloroform	940	NE	10,000	0.16	1.7	mg/kg	0.6	0.455	0.8	0.6	0.48	0.415	0.55	0.6	0.65	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Ethylbenzene	10,000	62	10,000	0.27	13	mg/kg	0.6	0.455	0.8	0.6	0.48	0.415	0.55	0.6	0.65	ND	ND	0.379	ND	ND	ND	ND	ND	ND	
Isopropylbenzene	10,000	NE	10,000	0.17	1.7	mg/kg	0.6	0.455	0.8	0.6	0.48	0.415	0.55	0.6	0.65	ND	ND	0.269	ND	ND	ND	ND	ND	ND	
Methylene Chloride	760	NE	10,000	0.16	1.7	mg/kg	0.6	0.455	0.8	0.6	0.48	0.415	0.55	0.6	0.65	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Naphthalene	NE	NE	10,000	6.53	500	mg/kg	0.6	0.455	0.8	0.6	0.48	0.415	0.55	0.6	2.8	ND	ND	6.15	0.705	ND	0.37	ND	ND	ND	
Styrene	190	64	10,000	0.17	1.7	mg/kg	0.6	0.455	0.8	0.6	0.48	0.415	0.55	0.6	0.65	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Toulene	10,000	62	10,000	0.23	2.65	mg/kg	0.6	0.455	0.8	0.6	0.48	0.415	0.55	0.6	0.65	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Xylenes (Total)	10,000	NE	10,000	0.35	22.7	mg/kg	0.6	0.455	0.8	0.6	0.48	0.415	0.55	0.6	0.65	ND	ND	0.364	ND	ND	ND	ND	ND	ND	

Notes

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Table D-2
Summary of Analytical Data
 Utility Installation - Cut Area
 STRAP - Liquefaction Project
 Providence, Rhode Island

	RIDEM Industrial Commercial Direct Exposure Criteria (I/C DEC)	RIDEM GB Leachability Criteria	RIDEM Upper Concentration Limit (UCL)	Average	Maximum	Sample Name:	EXA3-38	EXA3-51	EXA3-52	EXA3-57	EXA3-58	EXA3-59	EXA3-60	EXA3-61	EXA3-62	EXA3-63	EXA3-64	EXA3-65	EXA3-66					
						Date Collected:	8/15/2002	8/15/2002	8/15/2002	9/12/2002	9/12/2002	9/12/2002	9/12/2002	9/12/2002	9/12/2002	9/12/2002	9/12/2002	9/12/2002	9/12/2002	9/12/2002	9/12/2002	9/12/2002	9/12/2002	
						Sample Depth:	Note 2	Note 2	Note 2	Note 2	Note 2	Note 2	Note 2	Note 2	Note 2	Note 2	Note 2	Note 2	Note 2	Note 2	Note 2	Note 2	Note 2	Note 2
						Units																		
Semi-Volatile Organic Compounds (SVOCs)																								
Naphthalene	10,000	NE	10,000	6.44	370	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND					
Volatile Organic Compounds (VOCs)																								
Benzene	200	4.3	10,000	0.26	2.8	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND					
Chloroform	940	NE	10,000	0.16	1.7	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND					
Ethylbenzene	10,000	62	10,000	0.27	13	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND					
Isopropylbenzene	10,000	NE	10,000	0.17	1.7	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND					
Methylene Chloride	760	NE	10,000	0.16	1.7	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND					
Naphthalene	NE	NE	10,000	6.53	500	mg/kg	ND	ND	0.139	0.0721	0.057	ND	0.141	0.0824	ND	ND	0.051	ND	ND					
Styrene	190	64	10,000	0.17	1.7	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND					
Toulene	10,000	62	10,000	0.23	2.65	mg/kg	ND	ND	ND	ND	ND	ND	ND	0.0522	ND	ND	ND	ND	ND					
Xylenes (Total)	10,000	NE	10,000	0.35	22.7	mg/kg	ND	ND	ND	ND	ND	ND	NO	ND	ND	ND	ND	ND	ND					

Notes

Data is compared to RIDEM Method 1 Standards. Shaded results represent exceedances of standards and subject to Note 2 below.

Table only indicates the compounds that were detected and have a RIDEM Minimum Quantity, other compounds were analyzed for, but not detected.

Table only shows explorations within the Liquefaction Area (cut areas only)

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Table D-2
Summary of Analytical Data
 Utility Installation - Cut Area
 STRAP - Liquefaction Project
 Providence, Rhode Island

	RIDEM Industrial Commercial Direct Exposure Criteria (I/C DEC)	RIDEM GB Leachability Criteria	RIDEM Upper Concentration Limit (UCL)	Average	Maximum	Sample Name:	EXA3-67	EXA3-68	EXAF-1	EXAF-2	EXAF-3	EXAF-4	EXAF-5	EXAF-6	EXA3-F8	EXA3-F9	EXA3-F10	EXA3-F11	EXA3-F12					
						Date Collected:	9/12/2002	9/12/2002	6/25/2002	6/25/2002	6/25/2002	6/25/2002	6/25/2002	6/25/2002	37432	2002	2002	2002	2002	2002	2002	2002	2002	
						Sample Depth:	Note 2	Note 2	Note 1	Note 1	Note 1	Note 1	Note 1	Note 1	Note 1	Note 1	Note 1	Note 1	Note 1	Note 1	Note 1	Note 1	Note 1	Note 1
						Units																		
Semi-Volatile Organic Compounds (SVOCs)																								
Naphthalene	10,000	NE	10,000	6.44	370	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND					
Volatile Organic Compounds (VOCs)																								
Benzene	200	4.3	10,000	0.26	2.8	mg/kg	NO	ND	ND	ND	0.669	ND	ND	ND	ND	ND	ND	ND	ND					
Chloroform	940	NE	10,000	0.16	1.7	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND					
Ethylbenzene	10,000	62	10,000	0.27	13	mg/kg	ND	ND	ND	ND	0.375	ND	ND	ND	ND	ND	ND	ND	ND					
Isopropylbenzene	10,000	NE	10,000	0.17	1.7	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND					
Methylene Chloride	760	NE	10,000	0.16	1.7	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND					
Naphthalene	NE	NE	10,000	6.53	500	mg/kg	ND	0.0393	ND	3.17	1.74	0.495	ND	ND	ND	ND	ND	ND	ND					
Styrene	190	64	10,000	0.17	1.7	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND					
Toulene	10,000	62	10,000	0.23	2.65	mg/kg	ND	ND	ND	ND	0.235	ND	ND	ND	ND	ND	ND	ND	ND					
Xylenes (Total)	10,000	NE	10,000	0.35	22.7	mg/kg	ND	ND	ND	ND	0.478	ND	ND	ND	0.0946	ND	ND	ND	ND					

Notes

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						Date Collected:	2002	2002	2002	2002	2002	2002	2002	2002	2002	2002	2002	2002	2002	2002	2002	2002	2002	
						Sample Depth:	Note 1	Note 1	Note 1	Note 1	Note 1	Note 1	Note 1	Note 1	Note 1	Note 1	Note 1	Note 1	Note 1	Note 1	Note 1	Note 1	Note 1	Note 1
						Units																		
Semi-Volatile Organic Compounds (SVOCs)																								
Naphthalene	10,000	NE	10,000	6.44	370	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND					
Volatile Organic Compounds (VOCs)																								
Benzene	200	4.3	10,000	0.26	2.8	mg/kg	0.0855	ND	ND	0.174	0.591	ND	ND	0.0708	ND	ND	ND	ND	0.0918	ND				
Chloroform	940	NE	10,000	0.16	1.7	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND				
Ethylbenzene	10,000	62	10,000	0.27	13	mg/kg	0.0658	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND				
Isopropylbenzene	10,000	NE	10,000	0.17	1.7	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND				
Methylene Chloride	760	NE	10,000	0.16	1.7	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND				
Naphthalene	NE	NE	10,000	6.53	500	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND				
Styrene	190	64	10,000	0.17	1.7	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND				
Toulene	10,000	62	10,000	0.23	2.65	mg/kg	ND	ND	ND	0.122	0.398	ND	ND	ND	ND	ND	ND	ND	ND	ND				
Xylenes (Total)	10,000	NE	10,000	0.35	22.7	mg/kg	0.27	ND	ND	0.291	0.381	ND	ND	ND	ND	ND	0.118	0.158	0.0778					

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 Providence, Rhode Island

	RIDEM Industrial Commercial Direct Exposure Criteria (I/C DEC)	RIDEM GB Leachability Criteria	RIDEM Upper Concentration Limit (UCL)	Average	Maximum	Sample Name:	EXA3-F26	EXA3-F27	EXA3-F28	EXA3-F29	EXA3-F30	EXA3-F31	EXA3-F32	EXA3-F33	EXA3-F34	EXA3-F35	EXA3-F36	EXA3-F37					
						Date Collected:	2002	2002	2002	2002	2002	2002	2002	2002	2002	2002	2002	2002	2002	2002	2002	2002	
						Sample Depth:	Note 1	Note 1	Note 1	Note 1	Note 1	Note 1	Note 1	Note 1	Note 1	Note 1	Note 1	Note 1	Note 1	Note 1	Note 1	Note 1	Note 1
						Units																	
Semi-Volatile Organic Compounds (SVOCs)																							
Naphthalene	10,000	NE	10,000	6.44	370	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND					
Volatile Organic Compounds (VOCs)																							
Benzene	200	4.3	10,000	0.26	2.8	mg/kg	0.0581	ND	0.25	1.09	1.79	2.35	ND	ND	ND	ND	0.149	ND					
Chloroform	940	NE	10,000	0.16	1.7	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND					
Ethylbenzene	10,000	62	10,000	0.27	13	mg/kg	ND	ND	ND	0.0556	0.149	0.238	ND	ND	ND	ND	ND	ND					
Isopropylbenzene	10,000	NE	10,000	0.17	1.7	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND					
Methylene Chloride	760	NE	10,000	0.16	1.7	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND					
Naphthalene	NE	NE	10,000	6.53	500	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND					
Styrene	190	64	10,000	0.17	1.7	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND					
Toulene	10,000	62	10,000	0.23	2.65	mg/kg	ND	ND	0.179	1.19	2.65	1.96	ND	ND	ND	ND	0.059	ND					
Xylenes (Total)	10,000	NE	10,000	0.35	22.7	mg/kg	ND	0.1	0.238	0.55	1.51	1.18	ND	ND	ND	ND	ND	ND					

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						Date Collected:	2002	2002	2002	2002	2002	2002	2002	2002	2002	2002	2002	2002	2002	2002	2002	2002	
						Sample Depth:	Note 1	Note 1	Note 1	Note 1	Note 1	Note 1	Note 1	Note 1	Note 1	Note 1	Note 1	Note 1	Note 1	Note 1	Note 1	Note 1	Note 1
						Units																	
Semi-Volatile Organic Compounds (SVOCs)																							
Naphthalene	10,000	NE	10,000	6.44	370	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND					
Volatile Organic Compounds (VOCs)																							
Benzene	200	4.3	10,000	0.26	2.8	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND					
Chloroform	940	NE	10,000	0.16	1.7	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND					
Ethylbenzene	10,000	62	10,000	0.27	13	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND					
Isopropylbenzene	10,000	NE	10,000	0.17	1.7	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND					
Methylene Chloride	760	NE	10,000	0.16	1.7	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND					
Naphthalene	NE	NE	10,000	6.53	500	mg/kg	ND	ND	ND	0.11	0.0453	ND	0.0427	0.0793	ND	ND	ND	ND					
Styrene	190	64	10,000	0.17	1.7	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND					
Toulene	10,000	62	10,000	0.23	2.65	mg/kg	ND	ND	ND	ND	ND	ND	ND	0.0471	ND	ND	ND	ND					
Xylenes (Total)	10,000	NE	10,000	0.35	22.7	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND					

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 Providence, Rhode Island

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						Date Collected:	2002	2002	2002	2002	2002	2002	2002	2002	2002	2002	2002	2002	2002	2002	2002	2002	
						Sample Depth:	Note 1	Note 1	Note 1	Note 1	Note 1	Note 1	Note 1	Note 1	Note 1	Note 1	Note 1	Note 1	Note 1	Note 1	Note 1	Note 1	Note 1
						Units																	
Semi-Volatile Organic Compounds (SVOCs)																							
Naphthalene	10,000	NE	10,000	6.44	370	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	5.49	ND					
Volatile Organic Compounds (VOCs)																							
Benzene	200	4.3	10,000	0.26	2.8	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	0.0724	ND	0.0797	ND					
Chloroform	940	NE	10,000	0.16	1.7	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND					
Ethylbenzene	10,000	62	10,000	0.27	13	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND					
Isopropylbenzene	10,000	NE	10,000	0.17	1.7	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND					
Methylene Chloride	760	NE	10,000	0.16	1.7	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND					
Naphthalene	NE	NE	10,000	6.53	500	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	2.01	ND	4.69	ND					
Styrene	190	64	10,000	0.17	1.7	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND					
Toulene	10,000	62	10,000	0.23	2.65	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND					
Xylenes (Total)	10,000	NE	10,000	0.35	22.7	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND					

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						Date Collected:	2002	2002	2002	2002	2002	2002	2002	2002	2002	2002	2002	2002	2002	2002	2002	2002	2002
						Sample Depth:	Note 1	Note 1	Note 1	Note 1	Note 2	Note 2	Note 2	Note 2	Note 2	Note 2	Note 2	Note 2	Note 2	Note 2	Note 2	Note 2	Note 2
						Units																	
Semi-Volatile Organic Compounds (SVOCs)																							
Naphthalene	10,000	NE	10,000	6.44	370	mg/kg	ND	ND	ND	ND	ND	ND	ND	1.57	ND	ND	ND	ND	ND				
Volatile Organic Compounds (VOCs)																							
Benzene	200	4.3	10,000	0.26	2.8	mg/kg	ND	ND	ND	0.0539	ND	0.23	0.089	0.087	ND	ND	ND	0.175	ND				
Chloroform	940	NE	10,000	0.16	1.7	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND				
Ethylbenzene	10,000	62	10,000	0.27	13	mg/kg	ND	ND	ND	ND	ND	ND	ND	0.043	ND	ND	ND	ND	ND				
Isopropylbenzene	10,000	NE	10,000	0.17	1.7	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND				
Methylene Chloride	760	NE	10,000	0.16	1.7	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND				
Naphthalene	NE	NE	10,000	6.53	500	mg/kg	ND	ND	ND	0.106	0.072	0.211	0.082	1.92	0.1	0.0909	0.156	0.119	ND				
Styrene	190	64	10,000	0.17	1.7	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND				
Toulene	10,000	62	10,000	0.23	2.65	mg/kg	ND	ND	ND	ND	ND	0.049	ND	ND	ND	ND	ND	0.0545	ND				
Xylenes (Total)	10,000	NE	10,000	0.35	22.7	mg/kg	ND	ND	ND	ND	ND	0.1	ND	ND	ND	ND	ND	ND	ND				

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						Date Collected:	2002	2002	2002	2002	2002	2002	2002	2002	2002	2002	2002	2002	2002	2002	2002	2002	
						Sample Depth:	Note 2	Note 2	Note 2	Note 2	Note 2	Note 2	Note 2	Note 2	Note 2	Note 2	Note 2	Note 2	Note 2	Note 2	Note 2	Note 2	Note 2
						Units																	
Semi-Volatile Organic Compounds (SVOCs)																							
Naphthalene	10,000	NE	10,000	6.44	370	mg/kg	ND	0.548	ND	ND	6.28	4.64	ND	21.7	ND	ND	ND	ND					
Volatile Organic Compounds (VOCs)																							
Benzene	200	4.3	10,000	0.26	2.8	mg/kg	0.131	0.415	0.184	0.819	2.28	0.331	0.406	0.527	0.193	ND	0.0464	0.0812					
Chloroform	940	NE	10,000	0.16	1.7	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND					
Ethylbenzene	10,000	62	10,000	0.27	13	mg/kg	ND	0.0882	0.049	0.273	0.346	0.152	0.123	0.769	ND	ND	ND	ND					
Isopropylbenzene	10,000	NE	10,000	0.17	1.7	mg/kg	ND	ND	ND	ND	ND	ND	ND	0.228	ND	ND	ND	ND					
Methylene Chloride	760	NE	10,000	0.16	1.7	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND					
Naphthalene	NE	NE	10,000	6.53	500	mg/kg	0.151	2.32	0.11	1.25	2.39	7.15	0.122	43.4	1.48	0.116	0.166	0.115					
Styrene	190	64	10,000	0.17	1.7	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND					
Toulene	10,000	62	10,000	0.23	2.65	mg/kg	0.0579	0.188	ND	ND	0.89	ND	ND	ND	ND	ND	0.119	0.0457					
Xylenes (Total)	10,000	NE	10,000	0.35	22.7	mg/kg	ND	0.162	ND	0.252	0.995	0.113	ND	0.449	0.139	ND	ND	ND					

Notes

Data is compared to RIDEM Method 1 Standards. Shaded results represent exceedances of standards and subject to Note 2 below.

Table only indicates the compounds that were detected and have a RIDEM Minimum Quantity, other compounds were analyzed for, but not detected.

Table only shows explorations within the Liquefaction Area (cut areas only)

ND - Not Detected (Detection Limit Unknown)

NA - Not Analyzed NE - Not Established

Blue shading indicates compound was not detected - value shown is half the detection limit.

Sample depths noted here are from original grade. This table presents data that has since been capped with an engineered soil cap. As such, the final grades are unknown and as such the modified sampling depths are unknown.

Note 1. Exact sample depth is unknown, but is noted as being a subsurface sample (more than 2 feet bgs).

Note 2. Exact sample depth is unknown, but is noted as being a surface sample (less than 2 feet bgs).

Note 3. While the Direct Exposure and Leachability Criteria apply to the vadose zone, certain subsurface soil samples were collected below the water table to define the nature and extent of impact. The data comparisons summarized in these tables compare all subsurface soil data (vadose and saturated zone) to the I/C-DEC, GB Leachability criteria and Upper Concentration Limit (UCLs).

Orange shading indicates sample collected is a confirmatory sample.

Table D-2
Summary of Analytical Data
Utility Installation - Cut Area
STRAP - Liquefaction Project
Providence, Rhode Island

	RIDEM Industrial Commercial Direct Exposure Criteria (I/C DEC)	RIDEM GB Leachability Criteria	RIDEM Upper Concentration Limit (UCL)	Average	Maximum	Sample Name:	EXB20-F13	EXB20-F14	EXB20-F15	EXB20-F16	EXB20-F17	EXB20-F18	EXB20-F19
						Date Collected:	2002	2002	2002	2002	2002	2002	2002
						Sample Depth:	Note 2	Note 2	Note 2	Note 2	Note 2	Note 2	Note 2
						Units							
Semi-Volatile Organic Compounds (SVOCs)													
Naphthalene	10,000	NE	10,000	6.44	370	mg/kg	ND	ND	,ND	ND	ND	ND	ND
Volatile Organic Compounds (VOCs)													
Benzene	200	4.3	10,000	0.26	2.8	mg/kg	ND	0.237	ND	0.0759	ND	ND	0.365
Chloroform	940	NE	10,000	0.16	1.7	mg/kg	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	10,000	62	10,000	0.27	13	mg/kg	ND	0.0813	,ND	ND	ND	ND	0.0408
Isopropylbenzene	10,000	NE	10,000	0.17	1.7	mg/kg	ND	ND	ND	ND	ND	ND	ND
Methylene Chloride	760	NE	10,000	0.16	1.7	mg/kg	ND	ND	ND	ND	ND	ND	ND
Naphthalene	NE	NE	10,000	6.53	500	mg/kg	0.088	0.0533	0.179	0.0575	ND	ND	0.0872
Styrene	190	64	10,000	0.17	1.7	mg/kg	ND	ND	ND	ND	ND	ND	ND
Toulene	10,000	62	10,000	0.23	2.65	mg/kg	ND	0.374	ND	ND	ND	ND	0.105
Xylenes (Total)	10,000	NE	10,000	0.35	22.7	mg/kg	ND	0.206	ND	ND	ND	ND	ND

Notes

Data is compared to RIDEM Method 1 Standards. Shaded results represent exceedances of standards and subject to Note 2 below.

Table only indicates the compounds that were detected and have a RIDEM Minimum Quantity, other compounds were analyzed for, but not detected.

Table only shows explorations within the Liquefaction Area (cut areas only)

ND - Not Detected (Detection Limit Unknown)

NA - Not Analyzed NE - Not Established

Blue shading indicates compound was not detected - value shown is half the detection limit.

Sample depths noted here are from original grade. This table presents data that has since been capped with an engineered soil cap. As such, the final grades are unknown and as such the modified sampling depths are unknown.

Note 1. Exact sample depth is unknown, but is noted as being a subsurface sample (more than 2 feet bgs).

Note 2. Exact sample depth is unknown, but is noted as being a surface sample (less than 2 feet bgs).

Note 3. While the Direct Exposure and Leachability Criteria apply to the vadose zone, certain subsurface soil samples were collected below the water table to define the nature and extent of impact. The data comparisons summarized in these tables compare all subsurface soil data (vadose and saturated zone) to the I/C-DEC, GB Leachability criteria and Upper Concentration Limit (UCLs).

Orange shading indicates sample collected is a confirmatory sample.

Table D-3
STRAP Emissions Potentials
 Pile Installation - Cut Area
 STRAP - Liquefaction Project
 Providence, Rhode Island

Site-Specific	
Volume of Soil - Excavation	410 (cy)
Volume of Soil Moved	410 (cy)
Volume of Soil Moved	309 (m ³)

Constants	
Typical Bulk Density	1.5 (g/cm ³)

Eklund 1997 Default

Conversion Factors	
ft/m	3.3
ft ³ /cy	27
g/lb	454
g/kg	1000

Analyte	Average Measured Concentration in Soil (µg/g)	Maximum Measured Concentration in Soil (µg/g)	Total Excavation Emissions Potential ¹ (lb)	Total Excavation Emissions Potential ² (lb)	RIDEM Annual Minimum Quantity (lb)
Benzene	0.40	2.99	0.40	3.05	10
Chloroform	0.14	0.8	0.14	0.82	20
Ethylbenzene	6.23	97.3	6.36	99.34	9000
Isopropylbenzene	1.02	37.1	1.04	37.88	1000
Methylene Chloride	0.52	28	0.53	28.59	200
Naphthalene	97.97	825	100.02	842.26	3
Styrene	1.17	77	1.20	78.61	3000
Toluene	1.54	81	1.57	82.69	1000
Xylenes (Total)	9.10	165	9.29	168.45	3000

Notes:

1. Total Excavation Emissions Potential based on Average Measured Concentration in Soil.
2. Total Excavation Emissions Potential based on Maximum Measured Concentration in Soil.
3. Only detected analytes with Rhode Island Department of Environmental Management (RIDEM) minimum quantity values are shown.
4. Naphthalene concentrations presented in this model are the maximum of naphthalene analyzed as a VOC or as a PAH
5. cm = centimeter; m = meter; g = gram; µg = microgram; ft = feet, lb = pound; kg = kilogram; cy = cubic yard.

6. Yellow Highlighting indicates model inputs.

7. Orange Highlighting indicates the calculated Total Excavation Emissions Potential exceeds the RIDEM Minimum Quantity.

Table D-4
STRAP Emissions Potentials
 Utility Installation - Cut Area
 STRAP - Liquefaction Project
 Providence, Rhode Island

Site-Specific	
Volume of Soil - Excavation	2,578 (cy)
Volume of Soil Moved	2,578 (cy)
Volume of Soil Moved	1,937 (m ³)

Constants	
Typical Bulk Density	1.5 (g/cm ³)

Eklund 1997 Default

Conversion Factors	
ft/m	3.3
ft ³ /cy	27
g/lb	454
g/kg	1000

Analyte	Average Measured Concentration in Soil (µg/g)	Maximum Measured Concentration in Soil (µg/g)	Total Excavation Emissions Potential ¹ (lb)	Total Excavation Emissions Potential ² (lb)	RIDEM Annual Minimum Quantity (lb)
Benzene	0.26	2.8	1.65	17.92	10
Chloroform	0.16	1.7	1.05	10.88	20
Ethylbenzene	0.27	13	1.74	83.20	9000
Isopropylbenzene	0.17	1.7	1.08	10.88	1000
Methylene Chloride	0.16	1.7	1.03	10.88	200
Naphthalene	8.19	500	52.40	3199.89	3
Styrene	0.17	1.7	1.06	10.88	3000
Toluene	0.23	2.65	1.48	16.96	1000
Xylenes (Total)	0.35	22.7	2.27	145.28	3000

Notes:

1. Total Excavation Emissions Potential based on Average Measured Concentration in Soil.
2. Total Excavation Emissions Potential based on Maximum Measured Concentration in Soil.
3. Only detected analytes with Rhode Island Department of Environmental Management (RIDEM) minimum quantity values are shown.
4. Naphthalene concentrations presented in this model are the maximum of naphthalene analyzed as a VOC or as a PAH
5. cm = centimeter; m = meter; g = gram; µg = microgram; ft = feet, lb = pound; kg = kilogram; cy = cubic yard.

6. Yellow Highlighting indicates model inputs.

7. Orange Highlighting indicates the calculated Total Excavation Emissions Potential exceeds the RIDEM Minimum Quantity.

Table D-5
Total STRAP Emissions Potentials
 STRAP - Liquefaction Project
 Providence, Rhode Island

Analyte	Pile Driving Installation Emissions Potential ¹ (lb)	Pile Driving Installation Emissions Potential ² (lb)	Utility Installation Emissions Potential ¹ (lb)	Utility Installation Emissions Potential ² (lb)	Total Excavation Emissions Potential ¹ (lb)	Total Excavation Emissions Potential ² (lb)	RIDEM Annual Minimum Quantity (lb)
Benzene	0.40	3.05	1.65	17.92	2.05	20.97	10
Chloroform	0.14	0.82	1.05	10.88	1.19	11.70	20.00
Ethylbenzene	6.36	99.34	1.74	83.20	8.09	182.53	9000
Isopropylbenzene	1.04	37.88	1.08	10.88	2.12	48.76	1000
Methylene Chloride	0.53	28.59	1.03	10.88	1.57	39.47	200.00
Naphthalene	100.02	842.26	52.40	3199.89	152.43	4042.15	3
Styrene	1.20	78.61	1.06	10.88	2.26	89.49	3000
Toluene	1.57	82.69	1.48	16.96	3.05	99.65	1000
Xylenes (Total)	9.29	168.45	2.27	145.28	11.56	313.73	3000

Notes:

1. Emissions Potential based on Average Measured Concentration in Soil.
2. Emissions Potential based on Maximum Measured Concentration in Soil.
3. Only detected analytes with Rhode Island Department of Environmental Management (RIDEM) minimum quantity values are shown.
4. lb = pound; ND = Non-Detect.
5. Orange Highlighting indicates the calculated Total Excavation Emissions Potential exceeds the RIDEM Minimum Quantity.

Table D-6
Predicted STRAP Emissions
 Pile Installation - Cut Area
 STRAP - Liquefaction Project
 Providence, Rhode Island

Assumptions	
Assumed Average MW of NAPL	250 (g/mol)
Assumed NAPL Temperature	15 (°C)

Initial Estimate	
Average Pile Installation Area	241 (ft ²)
Average Excavation Average Depth	46.0 (ft)
Excavation Surface Area	284 (m ²)
Pile Surface Area	284 (m ²)
Emitting Surface Area	569 (m ²)
Volume of Soil Moved	410 (cy)
Volume of Soil Moved	308 (m ³)

Constants		
Typical Bulk Density	1.5 (g/cm ³)	Eklund 1997 Default
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 (Dry, uncompacted Soils)	0.33 (%/100)	Eklund 1997 Default
Air-Filled Porosity (Dry, uncompacted Soils)	0.55	Eklund 1997 Default
Total Porosity (Uncompacted Soils)	0.55	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
TOC of Soil	0.002 (g OC/g soil)	USEPA 1996 Default

Analyte	Average Measured Concentration in Soil (ug/g)	Partial Pressure ¹ (atm)	Equilibrium Coefficient	Effective Diffusivity in Air (cm ² /s)	Total Excavation Emissions Potential ² (lb)	Total Excavation Emissions (lb)	RIDEM Annual Minimum Quantity (lb)
Benzene	0.40	1.22E-04	3.73E-01	4.21E-02	4.04E-01	0.12	10
Naphthalene	97.97	5.31E-06	1.08E-04	2.66E-02	9.98E+01	0.023	3

- Notes:
- The Partial Pressure was calculated using Raoult's Law.
 - If the calculated Total Excavation Emissions exceeds the Total Excavation Emissions Potential, the Total Excavation Emissions Potential was used as the Total Excavation Emissions.
 - Only detected analytes with RIDEM minimum quantity values are shown with Total Excavation Emissions Potentials above RIDEM minimum quantities.
 - Concentration units are in ug/g, which is equal to ppm and mg/kg.
 - 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.
 - Yellow Highlighting indicates model inputs.
 - Purple Highlighting indicates the Total Excavation Emissions exceeds the Rhode Island Department of Environmental Management (RIDEM) Minimum Quantity.

Table D-7
Predicted STRAP Emissions
Utility Installation - Cut Area
STRAP - Liquefaction Project
Providence, Rhode Island

Assumptions	
Assumed Average MW of NAPL	250 (g/mol)
Assumed NAPL Temperature	15 (°C)

Initial Estimate	
Average Regrading Surface Area	13,921 (ft ²)
Average Excavation Average Depth	5.0 (ft)
Excavation Surface Area	1,495 (m ²)
Pile Surface Area	1,495 (m ²)
Emitting Surface Area	2,990 (m ²)
Volume of Soil Moved	2,578 (cy)
Volume of Soil Moved	1,937 (m ³)

Constants		
Typical Bulk Density	1.5 (g/cm ³)	Eklund 1997 Default
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 (Dry, uncompacted Soils)	0.33 (%/100)	Eklund 1997 Default
Air-Filled Porosity (Dry, uncompacted Soils)	0.55	Eklund 1997 Default
Total Porosity (Uncompacted Soils)	0.55	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
TOC of Soil	0.002 (g OC/g soil)	USEPA 1996 Default

Analyte	Average Measured Concentration in Soil (ug/g)	Partial Pressure ¹ (atm)	Equilibrium Coefficient	Effective Diffusivity in Air (cm ² /s)	Total Excavation Emissions Potential ² (lb)	Total Excavation Emissions (lb)	RIDEM Annual Minimum Quantity (lb)
Benzene	0.26	7.94E-05	3.73E-01	4.21E-02	1.65E+00	0.48	10
Naphthalene	8.19	4.44E-07	1.08E-04	2.66E-02	5.24E+01	0.011	3

- Notes:
- The Partial Pressure was calculated using Raoult's Law.
 - If the calculated Total Excavation Emissions exceeds the Total Excavation Emissions Potential, the Total Excavation Emissions Potential was used as the Total Excavation Emissions.
 - Only detected analytes with RIDEM minimum quantity values are shown with Total Excavation Emissions Potentials above RIDEM minimum quantities.
 - Concentration units are in ug/g, which is equal to ppm and mg/kg.
 - 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.
 - Yellow Highlighting indicates model inputs.
 - Purple Highlighting indicates the Total Excavation Emissions exceeds the Rhode Island Department of Environmental Management (RIDEM) Minimum Quantity.

Table D-8
Total Predicted STRAP Emissions

STRAP - Liquefaction Project
Providence, Rhode Island

File No. 03.00033554.60

5/5/2017

Analyte	Pile Driving Emissions (lb)	Utility Installation Emissions (lb)	Total Excavation Emissions (lb)	RIDEM Annual Minimum Quantity (lb)
Benzene	0.122	0.483	0.61	10
Naphthalene	0.023	0.011	0.03	3

Notes:

1. Only detected analytes with Total Excavation Emissions Potentials above RIDEM minimum quantity values are shown.
2. lb = pound; ND = Non-Detect.
3. Purple Highlighting indicates the Total Excavation Emissions exceeds the Rhode Island Department of Environmental Management (RIDEM) Minimum Quantity.