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REMEDIAL INVESTIGATION REPORT

Plat 32, Lots 155 and 268 Waites Wharf Newport, Rhode Island prepared for the law firm of Licht and Semonoff



REMEDIAL INVESTIGATION

Conducted On

Assessor's Plat 32, Lots 155 and 268 Waites Wharf, Newport, R.I. Project #9321.1

prepared for

Mr. Richard Bennett, Esq. Licht and Semonoff One Park Row Providence, Rhode Island 02903

issued:

April 28, 1994

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Signature

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SECTION 1.0 INTRODUCTION

At the request of Richard P. Bennett of Licht and Semonoff, Triangle Environmental has conducted a site characterization and remedial investigation for the property identified as Waites Wharf, Newport, Rhode Island. The property is currently owned by Newport Coastal Partners; however, the owners have filed for bankruptcy under Chapter 11. Tenant leases on the property are currently under the receivership of Thomas S. Hemmendinger, Esq. of the law firm of Salter, McGowan, Swartz, and Holden.

1.1 Physical Description of the Site

The site is located on Waites Wharf in the City of Newport, Rhode Island. The site is composed of two lots, described by the Tax Assessor's office of the City of Newport as Plat 32, Lots 155 and 268.

Lot 155, the northernmost parcel, has a total area of approximately 58,300 square feet. A one story wood frame building occupies the lot which houses Anthony's Seafood Restaurant and Harbor Liquor.

Lot 268 has a total area of approximately 31,900 square feet. Three buildings occupy the property, including the Deck Restaurant, a building used for storage of restaurant supplies, and the Moy Works building.

The property is bordered to the North by Tallman and Mack Fish and Trap Company and a former Newport Electric Company site between Spring and Howard Wharfs. To the East, the site is bordered by Tallman and Mack Fish and Trap, as well as a blacksmith shop. To the South, the property is bordered by a condominium development on Coddington Landing. The properties to the south were at one time the site of a coal gasification plant owned by Providence Gas Company. West of the project site is Newport Harbor and Narragansett Bay.

Utilities available to the site include public water and sewers, electricity, and natural gas. The approximate location of the underground utilities, as well as the storm drains on the site, are included on the site plan in Appendix A.

1.2 Project Background

Triangle Environmental has described the previous work conducted on the site by other consultants in a document entitled "Site Investigation Report" dated May 28, 1993. Previous environmental assessments have noted the following issues of environmental concern based on visual observations and a review of historical information:

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- (1) According to RI Department of Environmental Management (RIDEM) records, a 10,000 gallon fuel oil spill occurred on the property in 1984. However, there was no detailed spill report on file for the incident.
- (2) There are four underground storage tanks (USTs) associated with the project site. Two 5,000 gallon USTs and one UST of unknown size were reported to have been abandoned on or removed from the property. It was discovered that the UST of unknown size still exists on the property. In addition, there is a 250 gallon fuel oil tank on the property which is used for heating one of the existing buildings.

Subsurface investigations were conducted by TRC Environmental Consultants in February and March, 1992. The purpose of the initial investigation conducted in February of 1992 was to confirm the existence of suspected subsurface contamination in the soil and groundwater. Eight soil borings were advanced on the project site during the initial investigation, with monitoring wells installed in borings B-1 (MW-1), B-2 (MW-2), and B-3 (MW-3). A site plan showing the locations of the borings and monitoring wells is provided in Appendix A.

The monitoring well elevations were surveyed by TRC to allow for the determination of groundwater flow direction. It was determined initially that groundwater flow was in a West/Southwesterly direction.

Soil and groundwater samples were collected and analyzed for total petroleum hydrocarbons (TPH) and volatile organic compounds (VOCs). Test results revealed the presence of elevated TPH and VOC concentrations on the Southeastern portion of the site.

Based on the findings of the initial investigation, a second, more extensive subsurface investigation was conducted by TRC at the project site. The purpose of the additional investigation was to better define the areal extent of the contamination found in the initial study. The scope of work for the second investigation consisted of a soil gas survey at sixteen sampling points, an electromagnetic survey, advancement of 15 additional soil borings, the installation of three additional monitoring wells (RW-1 through RW-3), and the collection and analysis of additional soil and groundwater samples. The locations of the additional borings, wells, and soil gas sampling points are included on the site plan in Appendix A.

During the second investigation, the elevations of the monitoring wells were surveyed to aid in the determination of groundwater flow direction. It was determined that the groundwater flow was in a Southeasterly direction. It was concluded that the difference in groundwater flow direction was in relation to tidal fluctuations due to the proximity of the site to Newport Harbor.

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By conducting an electromagnetic survey, the location and orientation of the UST containing unknown materials was determined. The location of the UST is depicted on the site plan in Appendix A.

The results of the soil gas survey indicated high total organic vapor concentrations in the soils on the Southeast and Southwest corners of the site. The results of the soil samples indicated elevated TPH and VOC levels in soils on the Southern half of the site. Two soil samples from the location of the UST of unknown size were found to contain lead levels in excess of the Toxicity Characteristic level of 5.0 mg/l. Polynuclear aromatic hydrocarbons were also identified in samples from SB-15.

Groundwater samples were collected from RW-1, RW-2, RW-3, RW-4, and MW-1. The samples were analyzed for volatile organic compounds by EPA Method 601/602, total eight RCRA metals, PCBs, and total petroleum hydrocarbons. Low levels of aromatic hydrocarbons (benzene, toluene, ethylbenzene, and xylenes or BTEX) were found in RW-3 and MW-1. None of the groundwater samples showed detectable concentrations of PCBs. The levels of heavy metals reported for the samples from all five wells were either relatively low with respect to drinking water standards, or were non-detectable. MW-1 was the only well with a total petroleum hydrocarbons concentration above the detection limit (8.0 mg/l).

Based on a review of the existing data for the site, Triangle Environmental made the following conclusions concerning the environmental condition of the project site in the Site Investigation Report:

- (1) The project site has been impacted by a release of a petroleum-type material. Contaminants significant to the project site include petroleum hydrocarbons, volatile organic compounds, polynuclear aromatic hydrocarbons, and lead. However, is not yet clear what, if any, remediation of these contaminants would be required by the RIDEM.
- (2) The majority of the contamination at the project site is located in the Southeast quadrant of the site, and is at an elevation of 4-12 feet below surface elevation. There are also volatile organic vapors in the soil in the Southwest quadrant of the site.
- (3) Contaminants of potential concern at the site appear to be limited to soil and soil vapor matrices. Groundwater, though impacted, does not appear to be significantly contaminated. There has been no evidence of significant floating product in the groundwater at the project site.



- (4) The contamination reported for the project site is consistent with the historical use of the site as an oil terminal and storage area. At least a portion of the contamination may have originated from a 10,000 gallon petroleum release at the site in 1984. A minimum of five aboveground storage tanks, at least two of which stored petroleum naptha, were located on the site in the early 1950's.
- (5) The direction of groundwater flow may vary according to tidal cycle.
- (6) It is the opinion of Triangle Environmental that tidal fluctuations may provide a flushing mechanism for the site. This may account for the absence of contaminants in some portions of the site, especially in groundwater. It is assumed that contaminants flushed to Narragansett Bay would be diluted to a concentration less than the detection limit for that substance, and therefore would not present a significant risk to human health or the environment.
- (7) There are a minimum of two underground storage tanks at the site which have neither been registered nor closed in accordance with the RIDEM regulations^{*}. The 250 gallon heating oil tank is currently in use, but has most likely exceeded its life expectancy and should be removed. The second tank was reported to be a UST of unknown size (hereinafter referred to as the waste oil UST). Triangle personnel measured the depth of the tank to be 64". Based on this measurement, the capacity of the tank is between 1,000 - 4,000 gallons, and the amount of product remaining in the tank is between 250 - 900 gallons. The contents have been analyzed by R.I. Analytical Laboratories. The tank appears to contain a mixture of gasoline and motor oil, with no excessive levels of PCBs, chlorinated solvents or leachable (TCLP) lead present. Although there is no evidence to suggest that either of these tanks may be leaking, the tanks should be precision tested.
- (8) There is currently insufficient evidence to suggest that any of the USTs located on the project site have released their contents to the environment, causing the identified contamination.
- (9) Potential migration pathways at the site include, but are not limited to, the following: volatilization of organic contaminants, adsorption of contaminants onto subsurface soils, flushing of contaminants to the harbor via tidal forces and storms, and leaching of contaminants from soil to groundwater. The later migration pathway does not appear to be significant at this time, based on the existing data. This mechanism may have been significant in the past; however, tidal flushing of the area, especially during storms, may have removed a majority of the contaminants.
- There may be two additional abandoned tanks beneath the courtyard in front of Anthony's Restaurant.



In addition to the conclusions stated above, Triangle Environmental made the following conclusions concerning the environmental condition of the area encompassing the project site:

- (1) There are no sensitive receptors, such as public or private drinking water wells, wetlands, endangered species, or critical habitats in the area of the project site. The contaminants identified at the site may present a risk to aquatic life if discharged to the bay; however, it is assumed that contaminants migrating into the bay would be diluted to a concentration of less than the detection limit, and would therefore not present a significant risk to human health or the environment.
- (2) Groundwater is classified as Class GB; therefore, it is considered to be in a degraded condition by the RIDEM Division of Groundwater and ISDS.
- (3) The closest surface water body is Newport Harbor and Narragansett Bay. Newport Harbor is classified Class SC; therefore, it is considered to be in a degraded condition by the RIDEM Division of Water Resources.
- (4) Based on the apparent direction of groundwater flow as determined by TRC, it did not appear likely that the site could have become contaminated from the former coal gasification plant to the South of the project site.
- (5) The majority of the contamination appears to be confined to the Southern portion of the site. It is not known, based on the existing data, if the site was contaminated from an off-site source to the North. The presence of low levels of methylene chloride in MW-2 and MW-3, which are near the upgradient boundary of the site, suggests that there may have been some minor migration of contamination to the project site from an off-site source.
- (6) Environmental studies at nearby sites have identified similar types and concentrations of contaminants in soils and groundwater as those found on the project site. Remediation at these sites has been confined to those soils disturbed during site development, with the full knowledge and consent of the RI Department of Environmental Management. Contamination is known to remain at these sites, even though the sites have been converted from industrial to residential and commercial uses.

Triangle Environmental recommended further investigation to determine the extent of the contamination at the site, to be followed by the preparation of a remedial action plan for submittal to the RIDEM for approval. This report documents the additional investigation activities carried out at the site by Triangle Environmental to determine the extent of the contamination.

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SECTION 2.0 INVESTIGATION OBJECTIVES

In order to define the extent of contamination for the purpose of preparing a remedial action plan, Triangle Environmental defined the following objectives for the current investigation:

- (1) Determine the extent of the lead contaminated soil which is in the area of the waste oil UST at the center of the property.
- (2) Determine the areal extent of the petroleum contaminated soil, so that remediation can be limited to specific, well-defined areas.
- (3) Determine the effect of tidal fluctuations on groundwater flow and the migration of the reported contaminants.
- (4) Verify the existence or removal of the two 5,000 gallon storage tanks reported to exist in the courtyard on the East side of Anthony's Seafood Restaurant.

Based on the objectives stated above, Triangle Environmental defined the following scope of work for the project:

(1) Using a systematic sampling scheme, soil borings will be advanced throughout the site in areas which will be indicative of the extent of contamination. Selected soil samples will be analyzed for total petroleum hydrocarbons, volatile organic compounds (EPA Method 8240), TCLP lead, polynuclear aromatic hydrocarbons, and total organic vapors (using a photoionization detector and the jar headspace method).

This investigative method will provide adequate data coverage to map contaminant concentrations, and provide the regulatory agencies with an accurate picture of the site during any future negotiations. In addition, increased data coverage can be used to isolate smaller pockets of contaminated materials, which can then be addressed at a reduced cost.

The numbers of soil samples to be analyzed for each parameter of interest is as follows:

TPH	20
VOCs	20
TCLP Lead	10
PNAs	10
Total Organic Vapors	20



- (2) Install monitoring wells in three of the borings to provide adequate data coverage concerning groundwater quality. Collect one round of groundwater samples from the new and existing wells, and analyze the samples for total petroleum hydrocarbons, volatile organic compounds by EPA Method 624, and total lead. The groundwater sample with the highest total lead content should be analyzed for dissolved lead. In addition, three of the well samples will be analyzed for polynuclear aromatic hydrocarbons.
- (3) Survey the locations and elevations of the monitoring wells and the water table at a peak high tide and peak low tide to determine the tidal influence on the site with respect to groundwater flow and contaminant migration. Groundwater samples will be collected on the two occasions for visual observations concerning changes in petroleum contamination levels.
- (4) Preparation of maps showing the spatial orientation of data collected during the investigation. The maps will include the potentiometric surface of the site with respect to groundwater flow, contaminant concentration gradients, and sampling locations.
- (5) Using a metal detection device or a magnetometer, attempt to locate the two 5,000 gallon tanks in the courtyard of Anthony's Restaurant.
- (6) A qualitative/semi-quantitative risk assessment will be conducted to define contaminant migration routes and potential exposure pathways for the site as it exists today, and for future uses of the site as proposed for development.

This report was prepared to detail the scope and findings of the investigation. A subsequent report will be prepared to include the risk assessment, remedial alternatives analysis and remedial action plan for submittal to the RIDEM Division of Site Remediation.

SECTION 3.0 SUMMARY OF CURRENT FIELD INVESTIGATIONS

3.1 Advancement of Soil Borings

Between the dates of March 21-25, 1994, Triangle Environmental, Allstate Drilling Company, and Soil Exploration Corporation advanced 41 soil borings on the project site. Monitoring wells were installed in five of the 41 borings. Boring logs for the project are included in Appendix B.

The borings were advanced using a 3.375 inch I.D. hollow-stem auger. Samples were collected at two foot intervals using a 1.375 inch I.D. split spoon sampling device and Standard Penetration Test techniques.



Soil samples were collected in 4 and 8 ounce widemouth glass jars. Sample containers were preserved by storing in refrigerated coolers until transported to the laboratory.

In borings where contamination was present or suspected, the contaminated layers were composited into one sample for analysis. In those borings where no evidence of contamination was found, composites were made from layers representing strata at or below the water table. For the purpose of this investigation, evidence of contamination was defined as visual discoloration of soil, petroleum odors, presence of petroleum products, or total organic vapor readings in excess of 30 ppm as benzene.

The approximate locations of the soil borings are depicted on the site plan enclosed in Appendix A. It should be noted that no borings were advanced in the grassy area on the Southwest corner of the site. The soil was extremely wet in this area at the time of the investigation. It was feared that the rig might get stuck, and tear up the grass in the process.

3.2 Monitoring Well Installation

Monitoring wells were installed in five of the soil borings advanced at the site. The approximate locations of the five wells are depicted on the site plan in Appendix A.

Two 5 foot lengths of 2 inch, 0.010 inch slotted PVC screen and 5 feet of 2 inch I.D. PVC riser were installed in each well. The annular space was filled with Grade 0 prewashed sand to a level approximating two feet above the well screen, followed by a one foot layer of bentonite to seal the annular space. The remainder of the annular space was filled with sand and fill material. Flush mount road boxes were used to cap the monitoring wells. A schematic diagram of the well construction method is included in Appendix B.

3.3 Field Observations

The soil boring logs are included in Appendix B. The soil at the site was found to consist of fine to coarse dark brown to gray sand, with a trace of silt, fine gravel, and shells. The compaction of these soils ranged from loose to very loose. In many areas, the soils were so loosely compacted that there was no recovery from the split spoon sampling device at various depths. In most areas of the site, the soil was intermixed with a fine black material, with a distinct odor of hydrogen sulfide. This black material is decaying organic material commonly found in the anaerobic (oxygen-deprived) subsurface environment along the coast.

During the soil sample collection process, Triangle Environmental screened each soil sample using a photoionization detector to measure total organic vapors as benzene in the headspace of the sample container. The jar headspace procedure is outlined in Appendix C.

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In 14 of the soil borings, there was no distinct odor detected in the soil samples, nor did the soils appear to be visibly stained or contaminated. No sheen was observed in pore water from wet soils removed below the water table. The total organic vapor concentrations in these soil ranged from <1 - 30 ppm.

Visual observations and field screening on the samples from the remaining 27 soil borings indicated that the soils were impacted by petroleum residuals. A strong petroleum odor was detected in most of the samples collected from 4-12 feet. Very small droplets of oil could be seen in the pore water of samples collected below the water table in Borings MW-3, SB-7, SB-9, SB-19, and SB-24.

Soil from the 27 soil borings were found to contain elevated concentrations of total organic vapors. The detected concentrations are presented in the table in Appendix C.

Triangle Environmental used a MetroTech Model 880 iron and steel locator for the purpose of locating wells MW-1 and RW-3 previously installed by other consultants. Triangle Environmental personnel were unable to locate these wells.

Triangle Environmental also used the MetroTech instrument to determine the orientation of the 5,000 gallon UST at the center of the parking area. The tank appears to be oriented in an East-West direction, with the fill located on the East end.

Triangle Environmental also surveyed the courtyard of Anthony's Restaurant to locate the two USTs which were reported to be in this area. Triangle Environmental detected a large metallic mass under the soil on the South side of the courtyard which may be the USTs. No metallic objects were found on the North side of the courtyard.

SECTION 4.0 GROUNDWATER SAMPLING PROCEDURES

On Friday, 1 April, 1994, Triangle Environmental personnel performed groundwater sampling on all of the exisiting monitoring wells. Field personnel determined the static water level with a Slope Indicator Company, Model 51453, Water Level Indicator. Measurements were taken to the nearest 0.1 foot. The static water levels at the site ranged from 5-6 feet at low tide, and from 4-5 feet at high tide.

Triangle Environmental surveyed the elevations of the monitoring well risers. A site plan showing the potentiometric surface of the water table was prepared. The potentiometric surface indicates that the direction of groundwater flow is toward the Northwest during both tides at the time of the investigation.

The wells were purged to three times their bore volume by hand using a separate disposable teflon bailer or clean stainless steel bailer for each well. Groundwater samples were collected with 5 foot, 0.875 inch I.D., stainless steel bailers, using a separate bailer for each well to minimize the need for field decontamination.



Samples were collected and preserved in the containers according to EPA protocols. The containers and preservatives for each parameter are listed in the table below. Samples collected for volatile organics analysis were collected in a manner such that no headspace remained in the sample container.

Т	TABLE OF CONTAINERS AND PRESERVATIVES										
PARAMETER	MATRIX	SAMPLE VOLUME	CONTAINER TYPE	PRESERVATION TECHNIQUE							
TPH, VOCs, PNAs, Lead	Soil	500 grams	Widemouth Glass	Refrigeration to 4°C							
VOCs	Ground- water	40 ml	Glass, Teflon septum	Refrigeration to 4°C No Headspace							
Total Metals	Ground- water	250 ml	Plastic	Nitric acid to pH<2 Refrigeration to 4°C							
PNAs, Soluble Metals	Ground- water	1000 ml	Glass, Amber	Refrigeration to 4°C							
Total Petroleum Hydrocarbons	Ground- water	1000 ml	Glass, Amber	Sulfuric acid to pH<2; Refrigeration to 4°C							



SECTION 5.0 LABORATORY ANALYSIS

The table below lists the analytical parameters, methodologies, and method detection limits for the soil and groundwater analyses conducted on samples from the Kenney Manufacturing site.

TABLE OF ANALYTICAL METHODOLOGIES AND METHOD DETECTION LIMITS								
PARAMETER	MATRIX	METHODOLOGY	METHOD DETECTION LIMIT					
Total Petroleum Hydrocarbons	Soils	9071	25 mg/kg					
Volatile Organic Compounds	Şoils	8240	1.0 mg/kg					
Polynuclear Aromatic Hydrocarbons	Soils	8270	Varies					
Toxicity Characteristic Leaching Procedure	Soils	1311	Not Applicable					
Lead	Soils	6010A	4 mg/kg					
Volatile Organic Compounds	Groundwater	602/624	1 μg/l					
Lead, Total/Soluble	Groundwater	6010A	0.04 mg/l					
Polynuclear Aromatic Hydrocarbons	Groundwater	627	10 μg/l					
Total Petroleum Hydrocarbons	Groundwater	418.1	0.1 mg/l					

SECTION 6.0 SUMMARY OF ANALYTICAL RESULTS

6.1 Soil Sample Results

The Certificates of Analysis for the soil samples collected at the site are included in Appendix D. The results are summarized in the tables on the following pages:

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TABLE OF SOIL ANALYTICAL RESULTS: TPH, TCLP/TOTAL LEAD									
BORING NUMBER	TPH (mg/kg)	TCLP LEAD (mg/l)	TOTAL LEAD (mg/kg)						
1		0.93							
2		0.43	538						
78 Tw-3	9,850	1.36							
4		10.7	1,220						
5	971	1.17							
6		0.33	419						
7	50 m m	<0.04							
8		9.27	411						
9	515	0.62							
10		4.80	1,994						
12	2,120								
13	<48.8								
14	<31.8								
15	75.2								
16	890								
17	350								
22	1,940								
23	2,160								
24	890								
25	830								
26	3,670								
27	734								
28	1,660								
29	397								
32	581								
35	2,400								



SOIL A	SOIL ANALYTICAL RESULTS: VOLATILE ORGANIC COMPOUNDS										
BORING NUMBER	BENZENE (mg/kg)	TOLUENE (mg/kg)	ETHYLBENZENE (mg/kg)	XYLENES (mg/kg)							
TMW-03	ND	ND	ND	ND							
SB-05	ND	ND	1.6	1.2							
SB-07	ND	ND	14	20							
SB-09	ND	ND	13	11							
SB-19	ND	5.5	6.5	18							
SB-21	ND	ND	ND	ND							
SB-24	ND	ND	ND	ND							
SB-25	ND	1.0	ND	4.3							
SB-30	ND	1.6	5.3	8.4							
SB-31	ND	1.5	5.7	14							
SB-34	ND	2.1	6.1	19							

Low levels of polynuclear aromatic hydrocarbons (PNAs) were found in SB-19, SB-21, SB-24, SB-25, SB-30, SB-31, SB-33, SB-34, and SB-36. These results are presented in Appendix D. The most elevated levels of PNAs were found in SB-36 (11 - 36 mg/kg).

6.2 Groundwater Analytical Results

The Certificates of Analysis for the groundwater samples collected at the site are included in Appendix D. The results are summarized in the tables on the following pages.

Three of the nine wells were sampled for polynuclear aromatic hydrocarbons (PNAs). The three wells selected had the greatest visual appearance of petroleum contamination. Monitoring well TW-5 was the only one of the three wells which was found to have detectable levels of PNAs in the groundwater. The concentrations of naphthalene and phenanthrene in TW-5 were reported at 110 mg/l and 21 mg/l, respectively.

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GROUNDWA	GROUNDWATER ANALYTICAL RESULTS: TPH, TOTAL/SOLUBLE LEAD										
MONITORING WELL	TPH (mg/l)	TOTAL LEAD (mg/l)	SOLUBLE LEAD (mg/l)								
TW-1	1.92	14.0									
TW-2	<0.96	0.63									
TW-3	33.7	1.01	0.71								
TW-4	93.2	1.74	0.06								
TW-5	97.9	0.67	0.48								
MW-2	<0.96	0.07									
MW-3	<2.41	0.04									
RW-1	<0.48	<0.04									
RW-2	<0.48	0.08									

GROUNDWATER ANALYTICAL RESULTS: VOLATILE ORGANIC COMPOUNDS									
MONITORING WELL	BENZENE (µg/l)	TOLUENE (µg/l)	ETHYLBENZENE (µg/l)	XYLENES (µg/l)					
TW-1	ND	ND	ND	ND					
TW-2	ND	ND	ND	ND					
TW-3	ND	15	ND	ND					
TW-4	4	9	ND	2					
TW-5	15	ND	ND	8					
MW-2	ND	ND	ND	ND					
MW-3	ND	ND	ND	ND					
RW-1	ND	ND	ND	ND					
RW-2	ND	ND	ND	ND					



SECTION 7.0 SUMMARY OF FINDINGS AND CONCLUSIONS

7.1 Summary of Findings

Triangle Environmental conducted a subsurface investigation of the property known as Waites Wharf in Newport, Rhode Island. The following is a summary of the findings of the current investigation:

- (1) Soils at the site have been impacted by petroleum residuals. Total petroleum hydrocarbons were found in the soils at concentrations ranging from <31.8 9,850 mg/kg. Low levels of benzene, toluene, ethylbenzene, and xylenes (collectively known as BTEX), as well as polynuclear aromatic hydrocarbons (PNAs) were found in the soils across the site.</p>
- (2) Three soil samples collected in close proximity to the waste oil UST were found to have TCLP lead levels close to or in exceedance of the Toxicity Characteristic level of 5.0 mg/l. The total lead concentrations in soils surrounding the tank ranged from 411 -1,994 mg/kg.
- (3) Elevated soil vapor concentrations were found in soils on the Southern portion of the site, and surrounding the 5,000 gallon waste oil UST. The highest concentration reported was 1,297 ppm from a depth of 8-10 feet below grade in SB-4. SB-4 is located within 5 feet of the waste oil UST.
- (4) The heaviest soil contamination was found at depths ranging from 4-12 feet below surface elevation.
- (5) Groundwater samples from nine wells indicate that the groundwater has been impacted in isolated areas by dissolved petroleum residuals. Elevated total petroleum hydrocarbons levels were reported in TW-3, TW-4, and TW-5. However, the concentrations of BTEX and PNAs reported in the groundwater were either very low or non-detectable.
- (6) At the time of the investigation, groundwater was determined to flow in a Northwesterly direction during both the low and high tides. The depth to groundwater ranged from 4-6 feet.



7.2 Sources of Contamination

It is the opinion of Triangle Environmental that there are at least two possible sources of the contamination encountered at the site. These are:

- (1) historical releases associated with the use of the property as an oil terminal prior to 1987; and,
- (2) the waste oil UST at the center of the parking lot, and the 275 gallon fuel oil UST on the East side of the Moy Works building.

If the direction of groundwater flow is predominantly to the Northwest, as determined by Triangle Environmental, then the bulk of the contamination at the site is most likely due to historical releases on the Southern part of the site. The contamination may be as a result of the 10,000 gallon petroleum release in 1984. Assuming a Northwesterly groundwater flow direction, it appears, based on the data collected at the site, that a contamination plume may have migrated as far North as the waste oil UST, and as far West as the property boundary.

If the direction of groundwater flow is predominantly to the Southeast/Southwest, as determined by TRC Environmental Consultants, then a large portion of the contamination at the site may be due to a leaking waste oil UST at the center of the site. Assuming a Southwesterly flow direction, a plume from the UST may have migrated as far as the Southwest corner of the site.

It is likely that both of these potential sources have contributed to the contamination at the site over time.

7.3 Contaminant Distribution

7.3.1 Soil Vapors

The distribution of soil vapors is plotted on the site plan in Appendix A. In the Southeast corner of the site, soil vapors in excess of 50 ppm were found just below surface elevation in the 0-2 foot samples. In the South-central and Southeast corners of the site, and in the location the waste oil UST, elevated soil vapor concentrations were, in general, found below four feet of depth. This distribution pattern suggests that there may have been a surficial petroleum release in the Southeast corner of the site which migrated to the North and West toward Narragansett Bay in the direction of the groundwater flow determined by Triangle Environmental.

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7.3.2 Petroleum Hydrocarbons

Petroleum hydrocarbons are found in soils across the entire length of Lot 268, which is the Southernmost parcel. The heaviest concentrations of total petroleum hydrocarbons were found in SB-26, SB-28, and SB-35 in the Southeast corner of the site, and in SB-23 located centrally on the parcel.

Petroleum hydrocarbons in soils on Lot 155 are limited to the roadway, and the soils adjacent to and South of the waste oil UST. The heaviest concentrations of total petroleum hydrocarbons were found in MW-3 and SB-12. The soil sample analyzed from SB-12 was from the 0.5-2 foot interval, suggesting that there may have been a surficial spill in this area at some time in the past. This is supported by the fact that the 0.5-2 foot sample had a total organic vapor concentration of 47.7 ppm, with the remaining samples from that boring having a total organic vapor concentration of <15 ppm.

Low concentrations of BTEX and PNAs were found in soil samples from both parcels. The highest levels were recorded in the Southeast corner of the site.

Based on visual observations made at the site, the vertical distribution of petroleum residuals is similar to that described for soil vapors in Section 7.3.1.

Dissolved petroleum hydrocarbons were found in the locations of TW-3, TW-4, and TW-5. However, the concentrations of BTEX and PNAs in the groundwater were either very low or non-detectable. This suggests the following:

- (1) BTEX compounds have volatilized, and are presently found in the vapor phase, as witnessed by the wide distribution of elevated total organic vapor concentrations found across the site by Triangle Environmental;
- (2) PNAs and other heavy petroleum fractions are most likely adsorbing onto soils instead of leaching into the groundwater, thus resulting in elevated soil TPH levels at or below the water table;
- (3) BTEX and PNAs may have been flushed into Narragansett Bay as a result of tidal action, storms, and so on, leaving behind those petroleum fractions which readily adsorb onto soil.

Earlier data reported by TRC indicates that dissolved petroleum hydrocarbons were also found in groundwater in the Southeast corner of the site. Triangle Environmental could not locate MW-1 and RW-3 to verify those results; however, the concentration of petroleum residuals in the soil on the Southeast corner of the site suggests that the TRC data was accurate.



It should be reiterated that Triangle Environmental found no layers of floating petroleum product in any of the wells installed at the site. Discontinuous sheen and very small droplets of oil were encountered in TW-3, TW-4, and TW-5.

Petroleum contaminant migration may have been influenced by the utility lines which are located in the roadway which separates Lot 155 from Lot 268. Contaminants may have migrated along these utilities in the direction of the Western property boundary.

7.3.3 Lead

Soils which exhibit the Toxicity characteristic for lead appear to be isolated to an area immediately adjacent to the waste oil UST and below the water table. Triangle Environmental suggests that the leachable lead may be a component of a petroleum product which may have been released from the waste oil UST in the past. If the leachable lead is associated with a petroleum matrix, this may result in a slower dissolution rate despite being below the water table.

It should be noted that the current contents of the tank do not exhibit the Toxicity characteristic for lead. The presence of leachable lead in the soil may be accounted for in the following manner:

- (1) Previous contents of the tank containing lead may have been released from the tank in the past; or
- (2) The lead has already leached out of the material currently in the tank.

The levels of total and soluble lead in the groundwater downgradient of the waste oil UST, and throughout the remainder of the site, do not represent significant levels of contamination for a commercial or industrial property. Based on the low levels of lead found in the groundwater at the site, and the depth at which the contaminated soil occurs, it is the conclusion of Triangle Environmental that the leachable lead associated with the soils adjacent to the waste oil UST are not a significant threat to human health and the environment at this time.

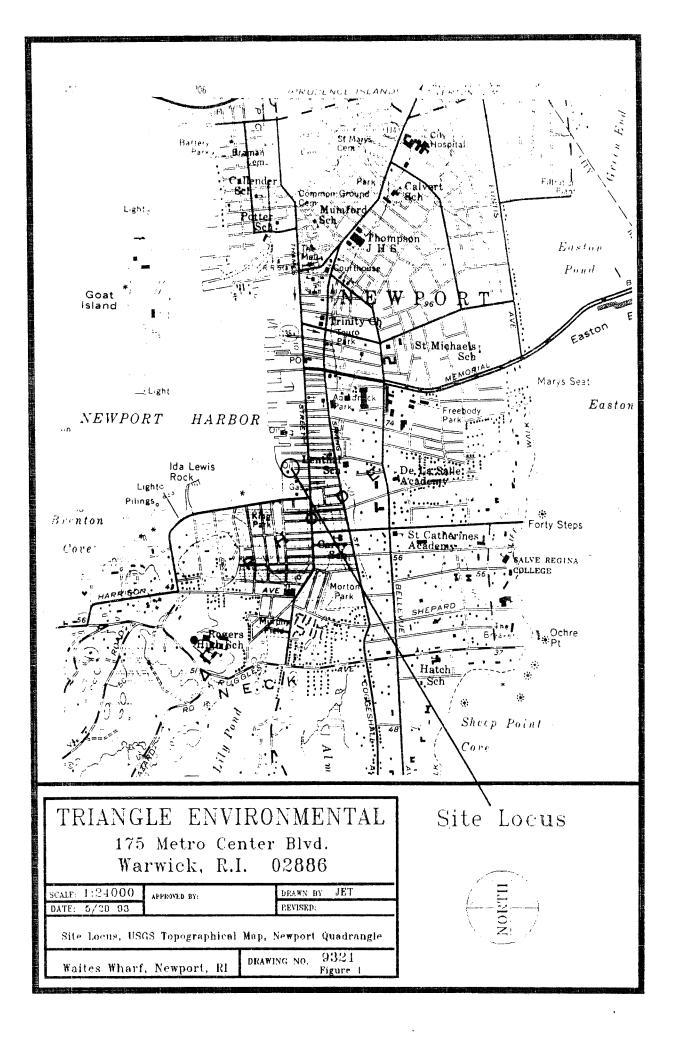


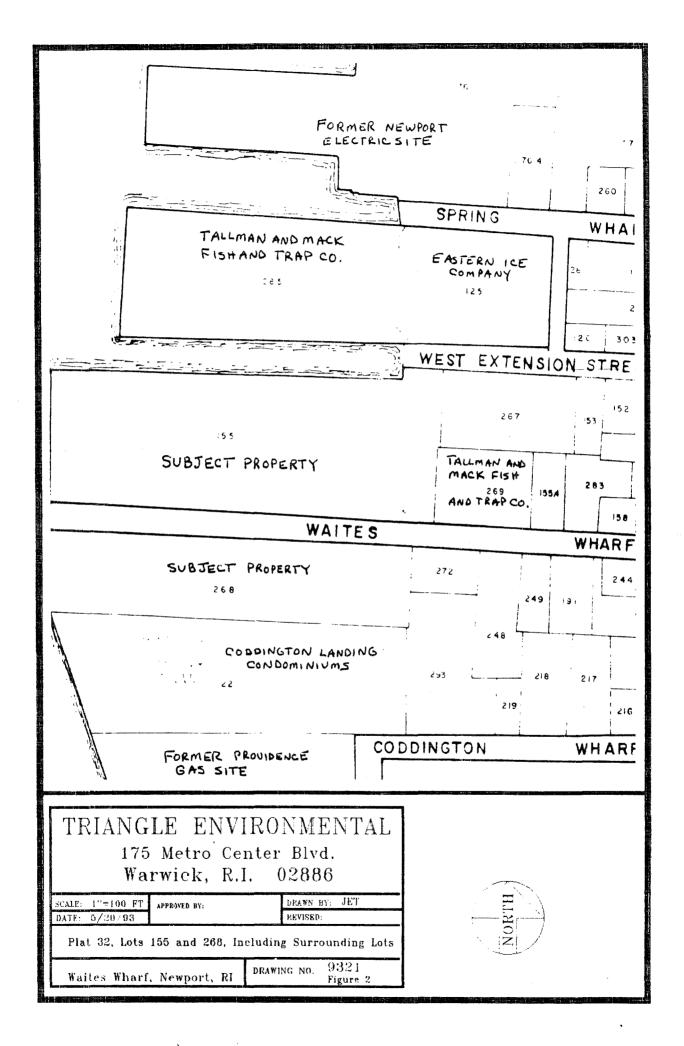
SECTION 8.0 LIMITATIONS

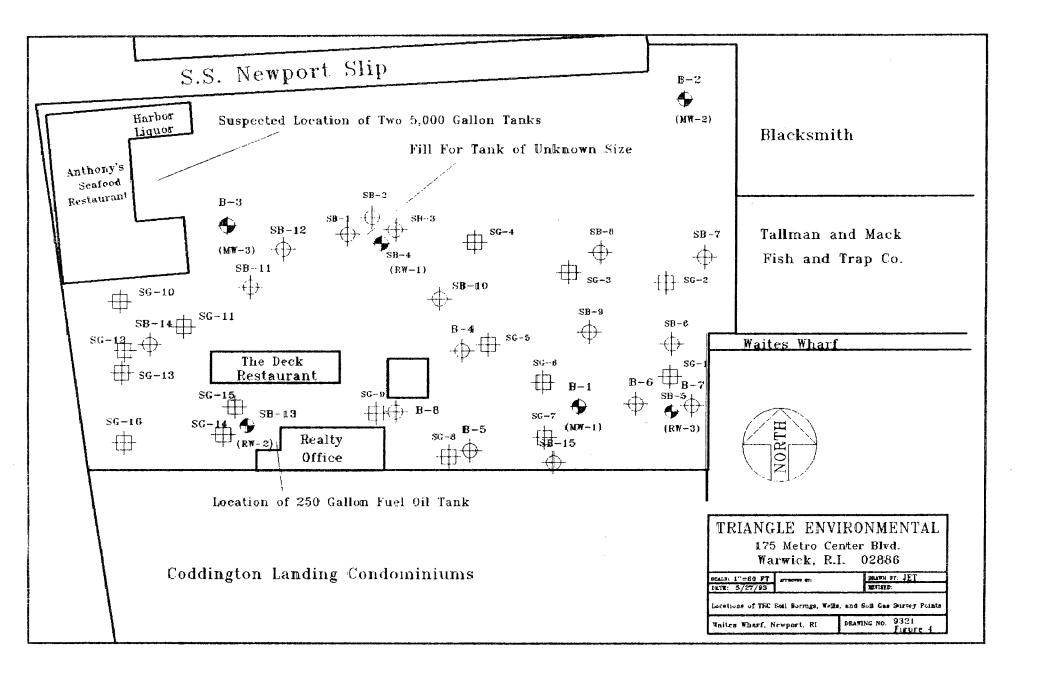
Triangle Environmental has based its conclusions and recommendations on visual observations, sampling, analysis, and the review of recorded information during the course of the site investigation. As such, our findings should not be considered scientific certainties, but as probabilities based on our professional knowledge and judgement pertaining to the relevance and importance of the limited data collected during our investigation.

All observations documented in this report were made under conditions existing at the time of this investigation. Should changes from existing conditions occur in the future warranting further analysis, they should be brought to the attention of Triangle Environmental for subsequent investigation and documentation. Future discoveries, after review by Triangle Environmental, may merit modification of conclusions stated in this report.

This report was prepared exclusively for Mr. Richard P. Bennett of Licht and Semonoff, and is for the sole use of the client and should not be represented, reproduced, or disseminated without the prior written approval of Triangle Environmental. No warranties other than those expressed in the contract for this project are expressed or implied.









SOIL EXPLORATION CORPORATION

Geotechnical Drilling and Groundwater Monitor Wells

Client		ciangle		سالسة مسالح جيدين اشدهمانية	the second s						Date	03/2	5/94	Job No.	94	-0333	
Locati		Waites		, Nev	mort,		ode	Isl				un		_			
BORI NO.																	
Ρ			Samp	ole Data						Soll and	d/or bed	irock stra	ta descri	ptions			
	No.	Sample Depth	(ft.)	6″ P	Blows enetration	n å r	Rec. Iches	Casing Blows Per ft.	Strata Change Depth	v	/isual Id	entification	n of Soil :	and/or Roc	k Strat	a	
	1	0'0"-	2'0"														
		- 1 - H															
	_2	2'0''-	4.0.							Dru to		ETN	E TO	COADCT			
5 _	3	4'0"-	6'0"							Dry to organi							ome
										wood,				C C	, ,	- -,	
	4	6'0"-	8'0"	l													
	5	8'0"-10	0'0''														
10																	
							~~~		10'0"								
						$\rightarrow$	n			End of					-	< 1 all	
										Water depend					ind	6'0"	
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Туре	of B		ing Size:					n Auger									
				s (blows per ft 30 to 50 De Over 50 Ve	ense	2 t	C to 2 Very S to 4 Soft to 8 Mediu	Soft	Soils (blow 8 to 15 15 to 3 Over 3	5 Stiff 30 Ver	y Stiff						
					Standar Blows a	d pene re per	etratio 6″ ta	n test (S ken with	SPT) = 140# ha an 18" long >	ammer falling 30" < 2" O.D. × 1 3/8	8″ I.D. s	plit spoon	sampler	unless oth	erwise	noted.	
by	time o	I year and wa	ter added d	luring the	e drilling p	proces	s, 🔳 V	Vater lev	els indicated m	cation of the retriev ay vary with seas ween soil types, t	onal fluc	ctuation ar	id the dep	gree of soil	satura	ay be affe tion when	cted the
- +1														g			



# SOIL EXPLORATION CORPORATION Geotechnical Drilling and Groundwater Monitor Wells

Client	Т	riangle	Envir	onmental	_					Date 03/	25/94	Job No.	94-03	33
Locati	on	Waites	Wharf	, Newpon	:t, 1	Rhod	e Isl	and						
BORI No.	NG	SB-2	Ground Elev.		Date Start			Date Complete		Drilling Foreman	D.L.	Eng./ Geol	Hydrol. ogist	
P			Sam	ole Data	ita				Soil an	d/or bedrock sti	rata descri	ptions		
D E U E E	No.	Sample Depth		Blows 6" Penetra	tion	Rec. Inches	Casing Blows Per ft.	Strata Change Depth	,	Visual Identificati	on of Soil a	and/or Rock	Strata	
5	1 2 3 4	2'0"- 4'0"- 6'0"-	2'0" 4'0" 6'0" 8'0"						Dry to organ	o wet, FI ic silt,	NE TO trace	COARSE fine g	C SAND, gravel,	some wood
10	5	8'0"-1	0'0"					10'0"						
15									Water	f boring level be ding on t	tween	3'0" a	and 6'0'	ı
20														
25														
30														
35										,				
40 _														
Туре	of Bo	oring Cas	ing Size:		Holl	ow Sten	n Auger	Size:						
	Pro	Trace 0 to Some 10 to And 40 to 5	10% 40%	4 to 10	0 10 Loo 10 30 M	/ Loose ose ledium I	Dense	s (blows per ft.) 30 to 50 Densi Over 50 Very [	Dense	0 to 2 Very 2 to 4 Soft 4 to 8 Med	Soft	Soils (blown 8 to 15 15 to 3 Over 3	Stiff 0 Very Stiff	
				Blow	s are p	er 6″ ta	ken with	PT) = 140# hamn an 18" long x 2"	0.D. x 1 3/	8" I.D. split spoo				
by	time o	f year and wa	ter added c	uring the drillin	a proce	ess. 🖬 V	Nater lev	n visual identificatio rels indicated may boundaries betwee	varv with seas	sonal fluctuation :	and the dec	pree of soil s	saturation wh	tected en the



## SOIL EXPLORATION CORPORATION

Geotechnical Drilling and Groundwater Monitor Wells

5 Monson Place Milford, NH 03055 (603) 672-2135

Client	T	riangle Envir	the second s					Date 03/25/94 Job No. 94-	-0333
Locati		Waites Wharf			e Isl	Land			
BORII NO,	NG	SB-3 Ground Elev.	Da Sta			Date Comp	lete	Drilling D.L. Eng./Hydrol. Foreman D.L. Geologist	, <u>, , , , , , , , , , , , , , , , , , </u>
βŢ		Sam	ple Data				Soil ar	d/or bedrock strata descriptions	
DEP TH	No.	Sample Depth (ft.)	Blows 6" Penetration	Rec. Inches	Casing Blows Per ft.	Strata Change Depth		Visual Identification of Soil and/or Rock Strata	
	1	0'0"- 2'0"						· · · · · · · · · · · · · · · · · · ·	an an Anna Marine an Anna Anna Anna Anna Anna Anna Anna
	?	2'0"- 4'0"					Dry t organ	o wet, FINE TO COARSE SAN ic silt, trace fine grave	ND, some el.
5	3	4'0"- 6'0"							
	4	6'0"- 8'0"							
10	5	8'0"-10'0"				8'0"	Wet, wood.	FINE SAND, some organic s	silt,
				<u> </u>		10'0"			
							Water	f boring at 10'0". level between 3'0" and 6 ding on the tide.	5'0"
15					<u> </u>				
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30									
				1					
35									
40									
Туре	of B	oring Casing Size:	l Holi	ow Ster	I n Auger	Size:	····.		
	Pr	oportion Percentages Trace 0 to 10% Some 10 to 40% And 40 to 50%	0 to 4 Ver 4 to 10 Lo 10 to 30 M	/ Loose ose		s (blows per ft. 30 to 50 De Over 50 Ver	inse	Cohesive Soils (blows per ft           0 to 2 Very Soft         8 to 15 Stiff           2 to 4 Soft         15 to 30 Very           4 to 8 Medium Stiff         Over 30 Hard	
			Standard pe Blows are p	netratio er 6" la	n test (S ken with	SPT) = 140# ha 1 an 18″ long x	mmer falling 30 2" O.D. x 1 3	" /8" I.D. split spoon sampler unless otherwise n	noted.
by I	time c	of year and water added o	during the drilling proc	ess. 🔳 🕻	Nater lev	els indicated m	ay vary with sea	eved samples. Moisture content indicated may sonal fluctuation and the degree of soil saturation the actual transitions may be gradual.	y be affected on when the

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Geotechnical Drilling and Groundwater Monitor Wells

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Client		riangle Envir					Date 03/25/94 Job No. 9	94-0333
Locat	ion	Waites Wharf	, Newport, H	Rhode	ls1	and		
BORI NO.	BORING SB-4 Ground Date NO. Elev. Start					Date Comple	Drilling D.L. Eng./Hy Foreman D.L. Geologi	
₽		Samp	pie Data				Soil and/or bedrock strata descriptions	
DwprH	No.	Sample Depth (ft.)	Blows 6" Penetration	Rec. Inches	Casing Blows Per ft.	Strata Change Depth	Visual Identification of Soil and/or Rock St	rata
	1	0'0"- 2'0"						
		01011	• •				Dry to not EINE TO COMPOSE	
	2	2'0"- 4'0"					Dry to wet, FINE TO COARSE sorganic silt, trace fine gra	SAND, some
-	3	4'0"- 6'0"			+		wood.	aver and
5 _								
	4	6'0"- 8'0"						
				<b> </b>		8'0"		• • •
	5	8'0"-10'0"				00	Wet, FINE SAND, some organic	e silt.
10				1		10'0"		
	<u> </u>			<b>_</b>	<b> </b>		End of boring at 10'0"	
4-				<b></b>			Water level between 3'0" and depending on the tide.	1 6'0"
15 _				1	1		depending on the tide.	
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ļ	1	1		1				
Туре	of B	oring Casing Size:	Hol	low Ster	n Auger	Size:		
	Pr	oportion Percentages Trace 0 to 10% Some 10 to 40%	0 to 4 Ver 4 to 10 Lo	y Loose		s (blows per ft.) 30 to 50 De Over 50 Ver		iff
	And 40 to 50% 10 to 30 Medium Dense					·····	4 to 8 Medium Stiff Over 30 H	
			Blows are p	er 6" ta	n test (3 iken with	SPT) = 140# ha n an 18" long x	mer falling 30" ." O.D. × 1 3/8" I.D. split spoon sampler unless otherw	ise noted.
Th	e lerm	s and percentages used t					on of the retrieved samples.	
by	time c	of year and water added of	during the drilling proc	ess. 🔳 '	Water le	vels indicated ma	vary with seasonal fluctuation and the degree of soil sat en soil types, the actual transitions may be gradual.	uration when the
	my w		anon mice rehiesent t		UNITIALE		on son types, the actual transitions findy by graudal.	



### SOIL EXPLORATION CORPORATION

Geotechnical Drilling and Groundwater Monitor Wells

5 Monson Place Milford, NH 03055 (603) 672-2135

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Client	T	ciangle							Date 03/25/94 Job No. 94-0333
Locat	on	Waites	Wharf	, Newp	port, I	Rhode	Is1	and	
BORI NO.	NG	SB <b>-</b> 5	Ground Elev.		Da Sta			Date Comp	Drilling D.L. Eng./Hydrol. Plete Foreman Geologist
p			Samp	ole Data					Soll and/or bedrock strata descriptions
D E E F H	No.	Sample Dept	h (ft.)	Bl 6" Pe	ows netration	Rec. Inches	Casing Blows Per ft.	Strata Change Depth	Visual Identification of Soil and/or Rock Strata
	1	0'0"-	2'0"			•			
	2	2'0''-	4'0"				ļ		Dry to wet, FINE TO COARSE SAND, some
5	3	410"-	6'0"	n	<del></del>				organic silt, trace fine gravel and wood.
э <u>–</u>			0_0_						wood.
	4	6'0"-	8'0"						
		01011	01.011			<del> .</del>			
	5	8'0"-1	0.0						
10		<u> </u>						10'0"	
								10 0	End of boring at 10'0".
							ļ		Water level between 3'0" and 6'0"
		<b> </b>					<b> </b>		depending on the tide.
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	<u> </u>	1					<u>+</u>		
							1	]	
							<b> </b>		
40 _	–								
Туре	of B	oring Ca	sing Size:	1	Но	llow Ster	n Auger	size:	1
	Proportion Percentages Trace 0 to 10% Some 10 to 40% And 40 to 50%				Granular Soils (blows per ft.) 0 to 4 Very Loose 30 to 50 Dense 4 to 10 Loose Over 50 Very De 10 to 30 Medium Dense			30 to 50 De	Dense 0 to 2 Very Soft 8 to 15 Stiff
					Standard p Blows are (	enetratio per 6" ta	n test (S ken with	SPT) = 140# ha n an 18" long >	ammer falling 30" x 2" O.D. x 1 3/8" I.D. split spoon sampler unless otherwise noted.
by	time c	of year and w	ater added o	juring the	drilling proc	cess. 🔳 🕯	Water lev	els indicated m	ication of the retrieved samples. Moisture content indicated may be affected nay vary with seasonal fluctuation and the degree of soil saturation when the tween soil types, the actual transitions may be gradual.



# SOIL EXPLORATION CORPORATION Geotechnical Drilling and Groundwater Monitor Wells

Client	T	riangle		NAME AND ADDRESS OF TAXABLE PARTY.	No. of Concession, Name of Street, or other					Date 03/	25/94	Job No.	94-0333
Locat	ion	Waites	Wharf	, Newpo			e Isl	and					
BORI NO.	NG	SB-6	Ground Elev.		Dal Sta			Date Comp		Drilling D.L. Eng./Hydrol. Foreman D.L. Geologist			
þ			Sam	ple Data					Soll an	d/or bedrock st	rata descrip	otions	
DEP F H	No.	Sample Depth	n (ft.)	Blow 6" Penet	s ration	Rec. Inches	Casing Blows Per ft.	Strata Change Depth		Visual Identificat	ion of Soil a	nd/or Rock	Strata
	1	0'0"-	2'0"			<u> </u>							
		0101	1.011			<b> </b>							
	2	2.0	4'0"						Dry t	o wet, FI	NE TO	COARSE	SAND,
5_	- 7	4'0"-	6'0"				<b> </b>			organic s shells.	11 <b>C, C</b>	race f	ine gravel,
9_			<u> </u>						wood,	onerro,			
	4	6'0"-	8'0"			ļ							
		8'0"-1	01011										
40		8.01	0.0.			+							
10								10'0"					
									End o	f boring	at 10'	0".	
					- Termére vitété		<u> </u>		Water	level be	tween	3'0" a	nd 6'0"
4.5				·		<u> </u>	<u> </u>		depen	ding on t	he tid	e.	
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40_	<b></b>					+	<u> </u>						
Туре	of Bo	oring Cas	ing Size:	1	Hol	low Ster	n Auger	i Size:	999-9 <u>999-999-999-999-999-999-999</u> -999-999	<del></del>			
	Proportion PercentagesGranular ScTrace 0 to 10%0 to 4 Very LooseSome 10 to 40%4 to 10 LooseAnd 40 to 50%10 to 30 Medium Dense				s (blows per ft 30 to 50 De Over 50 Ve	ense	0 to 2 Ven 2 to 4 Soft 4 to 8 Mec		8 to 15	Stiff 0 Very Stiff			
	Standard penetration test (S Blows are per 6" taken with					n test (S ken with	GPT) = 140# ha n an 18" long >	mmer falling 30 2" O.D. x 1 3	" '8" I.D. split spor	on sampler (	unless othe	rwise noted.	
by	time o	f year and wa	ater added o	during the dri	ling proc	ess. 🔳 \	Nater lev	vels indicated m	ay vary with sea	eved samples.	and the deg	ree of soil :	ted may be affected saturation when the
				Saon 11100 10	P1000111 1	ne appi	SAINDLE	Soundaries Del	noon oon types,		aono may Di	y y uuuai.	-



# SOIL EXPLORATION CORPORATION Geotechnical Drilling and Groundwater Monitor Wells

5 Monson Place Milford, NH 03055 (603) 672-2135

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Client	T		·····	onmental	•••••••••			Date 03/25/94 Job No. 94-0333
Locati	ion	Waites	Wharf	, Newport,	Rhode	e Isl	and	
BORI NO.	NG	SB-7	Ground Elev.	Da St		3/22/	94 Date Comp	plete 03/22/94 Foreman D.L. Geologist
p			Sam	ple Data				Soil and/or bedrock strata descriptions
DEPLE	No.	Sample Depth		Blows 6" Penetration	Rec. Inches	Casing Blows Per ft.	Strata Change Depth	Visual Identification of Soil and/or Rock Strata
	1	0'0"-	2'0"		1	1		
	_2	2'0''-	4'0"			<b> </b>		Dry to wet, FINE TO COARSE SAND,
			( Loll					some organic silt, trace fine gravel,
5		4'0"-	6'0"			┢───		wood, shells.
	4	6'0"-	8'0"					
		· ·	U		1		]	
	5	8'0"-1	0'0"			<u> </u>		
10						ļ		
					+	╂───	10'0"	
					+	<del> </del>	1	End of boring at 10'0".
					+	<u>†</u>	1	Water level between 3'0" and 6'0"
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· 1V						1	1	
Туре	of Bo		ing Size:	Но	low Ster			
	Some 10 to 40% 4			0 to 4 Ve 4 to 10 Lo 10 to 30 I	y Loose Xose		s (blows per ft 30 to 50 De Over 50 Ve	Dense 0 to 2 Very Soft 8 to 15 Stiff
				Standard p Blows are	enetratio per 6" ta	n test (S ken with	SPT) = 140# ha an 18" long >	ammer falling 30" × 2" O.D. × 1 3/8" I.D. split spoon sampler unless otherwise noted.
by l	time o	f vear and wa	iter added o	o describe soil and or Juring the drilling proc	rock are	based o Nater lev	n visual identific vels indicated m	ication of the retrieved samples. Moisture content indicated may be affected may vary with seasonal fluctuation and the degree of soil saturation when the tween soil types, the actual transitions may be gradual.
		·····			*			



# SOIL EXPLORATION CORPORATION Geotechnical Drilling and Groundwater Monitor Wells

Client	T			onmental	_					Date 03	/25/94	Job No.	94-0333
Locat	ion	Waites		, Newpor			Isl						
BORI NO.	NG	SB8	Ground Elev.		Date Start		/22/	94 Date Comp	lete 03/22/9			Geol	/Hydrol. ogist
þ			Sam	le Data					Soll and	l/or bedrock s	strata descr	iptions	
D E E E E E	No.	Sample Deptl		Blows 6" Penetra	lion	Rec. nches	Casing Blows Per ft.	Strata Change Depth	ļ	isual Identifica	ation of Soil	and/or Roci	k Strata
	1	0'0"-	2'0"					· · · · · · · · · · · · · · · · · · ·			<u></u>		
	2	2'0"-	4'0"						Dry to organi	wet, F c silt,	INE TO trace	COARSE fine g	E SAND, some gravel,
5 _	3	4'0"-	6'0"						wood.				
	4	6'0"-						6'0"	Wet, F	INE SAN	D, some	e organ	nic silt.
10 _	-5	8'0"-1	0.0.										
		· · · · · · · · · · · · · · · · · · ·						10'0"	Water	boring level b ing on	etween	3'0" a	und 6'0"
15 _													
20													
25			······································										
30													
35													
40				· · · · · · · · · · · · · · · · · · ·									
Type	of B	l Ces	ing Size	L	Hollo	w Ster	L	Size [.]	<u> </u>				
	Type of Boring         Casing Size:           Proportion         Percentages           Trace         0 to 10%           Some         10 to 40%           And         40 to 50%			4 to 10 Stan	Hollow Stem Auger Size: Granular Solls (blows per ft.) 0 to 4 Very Loose 30 to 50 Dense 4 to 10 Loose Over 50 Very Dense 10 to 30 Medium Dense Standard penetration test (SPT) = 140# hammer fail						ry Soft oft edium Stiff	Over 3	i Stiff 10 Very Stiff 10 Hard
bv	time o	of vear and wa	ater added d	o describe soil uring the drillin	and or ro	ck are is. 🔳 V	based o Vater lev	n visual identific vels indicated m	< 2" O.D. × 1 3/ cation of the retriev ay vary with seas ween soil types, t	ed samples.	Moisture con and the de	ontent indica	ited may be affected saturation when the



# SOIL EXPLORATION CORPORATION Geotechnical Drilling and Groundwater Monitor Wells

Client	T	riangle Envir					D	ate 03/2	25/94	Job No. 94-0333
Locati	on	Waites Wharf	, Newport, Rh	node	e Isl	and				
BORII NO.	NG	SB-9 Ground Elev.	Date Start			Date Comple	əte	Drilling Foreman	D.L.	Eng./Hydroi. Geologist
Ð		Samp	ole Data				Soil and	or bedrock str	ata descripti	ons
D UUPTH	No.	Sample Depth (ft.)	Blows 6" Penetration Ir	Rec. nches	Casing Blows Per ft.	Strata Change Depth	Vi	sual Identificatio	on of Soil and	d/or Rock Strata
	1	0'0"- 2'0"						,		
	2	2'0"- 4'0"					Drv to	wet. FT	NE TO C	OARSE SAND, some
_	3	4'0"- 6'0"					inorga	nic silt	, trace	fine gravel and
5 _		40-00					wood.			
	4	6'0"- 8'0"								
	5	8'0"-10'0"		·						
10						10'0"		· · · · · · · · · · · · · · · · · · ·		
						10.0.	End of	boring a	at 1010	11
					ļ]					'0" and 6'0"
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35										
	<u> </u>			<b>.</b>	<b> </b>					
	<u>}</u>									
40_	†									
Туре	of B	oring Casing Size:	Hollow	v Sten	n Auger	Size:				
	Proportion Percentages         Granu           Trace 0 to 10%         0 to 4 Very Loose           Some 10 to 40%         4 to 10 Loose           And 40 to 50%         10 to 30 Medium					s (blows per ft. 30 to 50 De Over 50 Ver	nse	0 to 2 Very 2 to 4 Soft 4 to 8 Med	Soft	ils (blows per ft.) 8 to 15 Stiff 15 to 30 Very Stiff Over 30 Hard
			Standard pene Blows are per	etratio 6" ta	n test (S ken with	PT) = 140# ha an 18" long x	mmer falling 30" 2" O.D. x 1 3/8	" I.D. split spoo	n sampler ur	nless otherwise noted.
by	time c	s and percentages used to if year and water added of as taken.	during the drilling proces	s. 🔳 V	Vater lev	els indicated ma	ay vary with sease	onal fluctuation a	and the degre	ent indicated may be affected se of soil saturation when the gradual.
-				·						



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Geotechnical Drilling and Groundwater Monitor Wells

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Client	T	riangle Envir					Date 03/25/94 Job No. 94-0333			
Locati		ويستخذ فيستبع فسيناف فالبسين وكنتك الالان المحدو	, Newport, Rh	ode	Is1					
BORII NO.	NG	SB-10 Ground Elev.	Date Start			Date Compl	Date Drilling Eng./Hydrol. Complete Foreman D.L. Geologist			
Ð	D Sample Data					Soll and/or bedrock strata descriptions				
D E P T	No.	Sample Depth (ft.)	Blows F 6" Penetration In	chesit	asing Blows	Strata Change	Visual Identification of Soll and/or Rock Strata			
н	1	0'0"- 2'0"		l'	Per ft.	Depth				
	1	00-20								
	2	2'0"- 4'0"								
							Dry to wet, FINE TO COARSE SAND, some			
5	3	4'0"- 6'0"					organic silt, trace fine gravel and wood, fill.			
	4	6'0"- 8'0"								
	5	8'0"-10'0"								
10 _										
						10'0"				
							End of boring at 10'0".			
				<u> </u>			Water level between 3'0" and 6'0"			
							depending on the tide.			
15					<u>.</u>	1 1				
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	<u> </u>		L		<u> </u>		L			
Туре	of B	oring Casing Size:	Hollow	Stem	Auger	Size:				
	Proportion Percentages         Granular Sc           Trace 0 to 10%         0 to 4 Very Loose           Some 10 to 40%         4 to 10 Loose           And 40 to 50%         10 to 30 Medium Dense				s (blows per ft. 30 to 50 De Over 50 Ver	ense 0 to 2 Very Soft 8 to 15 Stiff				
		,	Standard pene Blows are per	tration 6" tak	test (S en with	SPT) = 140# ha n an 18" long x	ammer falling 30" < 2" O.D. × 1 3/8" I.D. split spoon sampler unless otherwise noted.			
by	time c	of year and water added of	luring the drilling process	5. 🔳 Wa	ater lev	vels indicated m	cation of the retrieved samples. I Moisture content indicated may be affected hay vary with seasonal fluctuation and the degree of soil saturation when the ween soil types, the actual transitions may be gradual.			

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# SOIL EXPLORATION CORPORATION Geotechnical Drilling and Groundwater Monitor Wells

Client	T	riangle Env						Date 03/25/94 Job No. 94-0333
Locati	ion	Waites Wha	rf, N	lewport, F	thode	e Isl	and	
BORI NO.	NG	SB-11 Groun Elev.	nd	Date Star		3/22/	94 Date Comp	lete 03/22/94 Drilling D.L. Eng./Hydrol. Foreman D.L. Geologist
p		5	Sample D	ata				Soil and/or bedrock strata descriptions
Dupt	No.	Sample Depth (ft.)	6	Blows "Penetration	Rec. Inches	Casing Blows Per ft.	Strata Change Depth	Visual Identification of Soil and/or Rock Strata
<u> </u>	1	0'6"- 2'0	) <del>11</del>			1 01 14	Dopin	
				<u></u>				
	2	2'0"- 4'0	)"					Dry to wet, FINE TO COARSE SAND, some
					<b> </b>			organic silt, trace fine gravel, wood,
5	3	4'0"- 6'0	)"					shells.
		6'0"- 8'0	11		}			
		00-00	<u></u>					
	5	8'0"-10'0'					8'0"	Wet, FINE SAND, some organic silt.
10 _								
					<b> </b>		10'0"	
	<u> </u>	L			<u> </u>			End of boring at 10'0".
	<b> </b>				t	<u>†</u>		Water level between 3'0" and 6'0"
15								depending on the tide.
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	<u> </u>	l			L	L	L	L
Туре	of B	oring Casing Siz	e:	Holic	ow Sten	n Auger	Size:	
	Proportion Percentages Trace 0 to 10% Some 10 to 40% And 40 to 50%			0 to 4 Very 4 to 10 Loc 10 to 30 M	Loose Dse		s (blows per ft 30 to 50 De Over 50 Ve	ense 0 to 2 Very Soft 8 to 15 Stiff
					netratio er 6" ta	n test (S ken with	GPT) = 140# ha an 18" long x	mmer falling 30" < 2" O.D. × 1 3/8" I.D. split spoon sampler unless otherwise noted.
by	time c	I year and water add	led during	the drilling proce	ess. 🔳 V	Vater lev	els indicated m	cation of the retrieved samples. Moisture content indicated may be affected ay vary with seasonal fluctuation and the degree of soil saturation when the ween soil types, the actual transitions may be gradual.
					uppit			



# SOIL EXPLORATION CORPORATION

Geotechnical Drilling and Groundwater Monitor Wells

Client	Т	riangle Envir					Date 03/25/94 Job No. 94-0333					
Locati		Waites Wharf	, Newport, 1	Rhode	e Isl							
BORII NO.	NG	SB-12 Ground Elev.	Da Sta		3/22/	94 Date Comp	olete 03/22/94 Drilling D.L. Eng./Hydrol. Foreman D.L. Geologist					
Ρ		Sam	ple Data				Soil and/or bedrock strata descriptions					
D E E F H	No,	Sample Depth (ft.)	Blows 6" Penetration	Rec. Inches	Casing Blows Per ft.	Strata Change Depth	Visual Identification of Soil and/or Rock Strata					
	1	0'6"- 2'0"			ļ	0'2"	ASPHALT					
	2	2'0"- 4'0"					Dry to wet, FINE TO COARSE SAND, some organic silt, trace fine gravel, wood, fill.					
5 _	3	4'0"- 6'0"				6'0"						
	4	<u>6'0"- 8'0"</u> 8'0"-10'0"		<u> </u>			Wet, FINE SAND, some organic silt.					
10		8 0 -10 0		1		1						
10						10'0"	End of boring at 10'0". Water level between 3'0" and 6'0" depending on the tide.					
						4						
20												
25												
30												
35												
40												
Ti		aring Casing Size:	<u> </u>			- Siza:	1					
Туре	of B	oring Casing Size: oportion Percentages Trace 0 to 10% Some 10 to 40% And 40 to 50%	0 to 4 Ver 4 to 10 Lo 10 to 30 M Standard pe	Granu y Loose ose Medium enetratio	Dense n test (1	<b>is (blows per ff</b> 30 to 50 D Over 50 Ve SPT) = 140# h	Verse     0 to 2 Very Soft     8 to 15 Stiff       ery Dense     2 to 4 Soft     15 to 30 Very Stiff       4 to 8 Medium Stiff     Over 30 Hard					
by	Blows are per 6" taken with an 18" long x 2" O.D. x 1 3/8" I.D. split spoon sampler unless otherwise noted. The terms and percentages used to describe soil and or rock are based on visual identification of the retrieved samples. Moisture content indicated may be affected by time of year and water added during the drilling process. Water levels indicated may vary with seasonal fluctuation and the degree of soil saturation when the boring was taken. The stratification lines represent the approximate boundaries between soil types, the actual transitions may be gradual.											



## SOIL EXPLORATION CORPORATION

Geotechnical Drilling and Groundwater Monitor Wells

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Client	T	and the second se		onmental				Date 03/25/94 Job No. 94-0333
Locati	on	Waites	Wharf	, Newport, R	hode	e Isl	and	
BORI NO.	NG		Ground Elev.	Date Stat		3/22/	94 Date Comp	lete 03/22/94 Drilling D.L. Eng./Hydrol. Foreman D.L. Geologist
p			Sam	ple Data				Soll and/or bedrock strata descriptions
D U U P T H	No.	Sample Depth		Blows 6" Penetration	Rec. Inches	Casing Blows Per ft.	Strata Change Depth	Visual Identification of Soil and/or Rock Strata
	1	0'6"-	2'0"				0'2"	ÁSPHÁL.)
5 _	2	2'0"-					02	Dry to wet, FINE TO COARSE SAND, some organic silt, trace fine gravel and wood.
					ļ		<u></u>	
	4	6'0"- 8'0"-10					6'0"	Wet, FINE SAND, some organic silt, trace fine gravel.
10								
-15							10'0"	End of boring at 10'0". Water level between 3'0" and 6'0" depending on the tide.
20								·
25								
30								
35				· · · · · · · · · · · · · · · · · · ·				
40					<b> </b>		]	
Туре	of B	L pring Casin	ng Size:	l Holi	L ow Sten	n Auger	Size:	\
	Pn	Trace 0 to 10 Some 10 to 4 And 40 to 50	)% 0%	0 to 4 Very 4 to 10 Loc 10 to 30 M	Loose bse edium I	Dense	s (blows per ft 30 to 50 De Over 50 Ve	ense 0 to 2 Very Soft 8 to 15 Stiff ry Dense 2 to 4 Soft 15 to 30 Very Stiff 4 to 8 Medium Stiff Over 30 Hard
				Standard pe Blows are pi	netratio er 6" ta	n test (S ken with	SPT) = 140# ha 1 an 18″ long >	tammer falling 30" $\times$ 2" O.D. $\times$ 1 3/8" I.D. split spoon sampler unless otherwise noted.
by I	ime o	I vear and wate	er added o	Juring the drilling proce	oss. 📕 V	Vater lev	vels indicated m	cation of the retrieved samples. Moisture content indicated may be affected ay vary with seasonal fluctuation and the degree of soil saturation when the ween soil types, the actual transitions may be gradual.



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Leon	ninster,	MA	01453
(508)	840-03	191	

## SOIL EXPLORATION CORPORATION

Geotechnical Drilling and Groundwater Monitor Wells

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SINGL # ____ 0I ____

Client	T	riangle Envir					Date 03/25/94 Job No. 94-0333					
Locati	on	Waites Wharf	, Newport, R	hode	Isl							
BORI NO.	NG	SB-14 Ground Elev.	Dat Sta	e 03 rt	/23/	94 Date Comp	lete 03/23/94 Drilling D.L. Eng./Hydrol. Foreman D.L. Geologist					
Ð		Sam	ole Data				Soli and/or bedrock strata descriptions					
DELPTH	No.	Sample Depth (ft.)	Blows 6" Penetration	Rec. Inches	Casing Blows Per ft.	Strata Change Depth	Visual Identification of Soil and/or Rock Strata					
	1	0'0"- 2'0"		1								
	2	2'0"- 4'0"			<b> </b>		Dry to moist, FINE TO MEDIUM SAND,					
	3	4'0"- 6'0"			<u> </u>		some organic silt, trace fine gravel,					
5 _	— Ť						fill, wood.					
	4	6'0"- 8'0"										
	5	8'0"-10'0"										
10		8 0 -10 0										
10		· · · · · · · · · · · · · · · · · · ·				10'0"						
							End of boring at 10'0".					
1				<u> </u>			Water level between 3'0" and 6'0"					
15						1	depending on the tide.					
10						· .						
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00					<u> </u>							
20						1						
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30					1	1						
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40				+								
Туре	of B		Holl	ow Sten								
	Proportion PercentagesGranular Solls (blows per ft.)Cohesive Soils (blows per ft.)Trace 0 to 10%0 to 4 Very Loose30 to 50 Dense0 to 2 Very Soft8 to 15 StiffSome 10 to 40%4 to 10 LooseOver 50 Very Dense2 to 4 Soft15 to 30 Very StiffAnd 40 to 50%10 to 30 Medium Dense4 to 8 Medium StiffOver 30 Hard											
			Standard pe Blows are p	netratio er 6" ta	n test (S ken with	SPT) = 140# ha n an 18" long x	mmer falling 30" 2" O.D. x 1 3/8" I.D. split spoon sampler unless otherwise noted.					
by I	time o	of vear and water added d	uring the drilling proce	ss. 🔳 V	Vater lev	els indicated m	ation of the retrieved samples. Moisture content indicated may be affected ay vary with seasonal fluctuation and the degree of soil saturation when the ween soil types, the actual transitions may be gradual.					
	روی فنانه ای											



# SOIL EXPLORATION CORPORATION Geotechnical Drilling and Groundwater Monitor Wells

Client	Т	riangle Envir	and the second				Date 03/25/94 Job No. 94-0333
Locati		Waites Wharf			e Isl		
BORI NO.	NG	SB-15 Ground Elev.	Date State			Date Comp	
₽		Sam	ole Data	·	·		Soil and/or bedrock strata descriptions
D E P T H	No.	Sample Depth (ft.)	Blows 6" Penetration	Rec. Inches	Casing Blows Per ft.	Strata Change Depth	Visual Identification of Soil and/or Rock Strata
	1	0'0"- 2'0"					
ĺ							
	2	2'0"- 4'0"					Dry to wet, FINE TO MEDIUM SAND,
5	3	4'0"- 6'0"					some organic silt, trace fine gravel and wood.
° –							
	_4	6'0"- 8'0"					
		8'0"-10'0"					
10		8 0 -10 0		<b> </b>	1		
10						10'0"	
				<b> </b>	ļ		End of boring at 10'0".
		· · · · · · · · · · · · · · · · · · ·					Water level between 3'0" and 6'0"
15				<u> </u>	<u> </u>		depending on the tide.
10							
				<b> </b>	ļ		
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35 _						1	
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40_						1	
			I		1	]	
Туре	of B	oring Casing Size:	Holl	ow Ster	n Auger	Size:	
	Pr	oportion Percentages Trace 0 to 10% Some 10 to 40% And 40 to 50%	0 to 4 Very 4 to 10 Lo 10 to 30 M				ense 0 to 2 Very Soft 8 to 15 Stiff
			Standard pe Blows are p	netratio er 6" ta	n test (S iken with	SPT) = 140# ha n an 18" long >	ammer falling 30" $\times$ 2" O.D. x 1 3/8" I.D. split spoon sampler unless otherwise noted.
by	time c	of year and water added (	juring the drilling proce	ess. 🔳 ۱	Nater lev	vels indicated m	ication of the retrieved samples.  Moisture content indicated may be affected may vary, with seasonal fluctuation and the degree of soil saturation when the burger of soil saturation when the
DOI	my w	as lanen. Im The Sualing	auon nnes represent n	ie appr	UXIMALE	boundaries Det	tween soil types, the actual transitions may be gradual.



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Geotechnical Drilling and Groundwater Monitor Wells

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Client													
Locati		Waites	Wharf			e Isl	يكمد كبين يستخب الشاهد						
BORII NO.	NG	SB-16	Ground Elev.	Da Sta			Date Comp		Drilling Forema	n D.L	• Geol	Hydrol. ogist	
Ð			Samj	ole Data				Soil and	l/or bedrocl	strata desci	riptions		
D H H	No.	Sample Depti	h (ft.)	Blows 6" Penetration	Rec. Inches	Casing Blows Per ft.	Strata Change Depth	v	'isual Identif	cation of Soil	and/or Rock	Strata	
	1	0'0"-	2'0"										
		0101	(10)		<b>_</b>	ļ							
	2	2'0''-	4'0"		+	<u> </u>		Dry to	wet,	FINE TO	MEDIUM	SAND, some	
5	3	4'0"-	6'0"		+	1		organi	.c silt			ravel and	
у <u>–</u>		, <u> </u>						wood,	fill.				
	4	6'0"-	8'0"		ļ	ļ							
	5	8'0"-1	0101										
10		8 0 -1	0 0		+								
10							10'0"						
					<b>_</b>	<b> </b>		End of	borin	g at 10	'O".		
		<u> </u>				╂						nd 6'0"	
15					1	<u> </u>		. depend	ling on	the ti	de.		
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Туре	of B	oring Cas	ing Size:	Hol	low Ster	n Auger	Size:						
	Pr	oportion Per Trace 0 to Some 10 to And 40 to	10% 40%	0 to 4 Ver 4 to 10 Lo 10 to 30 N	y Loose ose		s (blows per ft 30 to 50 De Over 50 Ve	ense	2 to 4	Very Soft	Soils (blows 8 to 15 15 to 3 Over 3	Stiff D Very Stiff	
				Standard p	enetratio	n test (S	SPT) = 140# ha a an 18" long >	ammer falling 30" < 2" O.D. x 1 3/8	•			•	
by	The terms and percentages used to describe soil and or rock are based on visual identification of the retrieved samples. Moisture content indicated may be affected by time of year and water added during the drilling process. Water levels indicated may vary with seasonal fluctuation and the degree of soil saturation when the boring was taken.												
bor	ing w	as taken. 🔳	ine stratilic	alion lines represent l	ne appr	oximate	coundaries bet	ween soil types, t	ne actual tra	insilions may	pe gradual.		

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# SOIL EXPLORATION CORPORATION Geotechnical Drilling and Groundwater Monitor Wells

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Client	T	riangle E	nviro	onmental					Date 03/	25/94	Job No.	94-0333
Locati	on	Waites W	harf	, Newport,	Rhode	e Isl	and					
BORII NO.	NG		round lev.	Da Sta			Date Compl	ete	Drilling Foreman	D.L.	Eng. Geol	'Hydrol. ogist
Ρ			Samp	ole Data				Soll and	d/or bedrock st	rata descri	ptions	
D E P T H	No.		· ·	Blows 6" Penetration	Rec. Inches	Casing Blows Per ft.	Strata Change Depth	\\	/isual Identificat	ion of Soil a	and/or Rock	Strata
	1	0'0"- 2	'0"									
	2	2'0"- 4										SAND, some
5	3	4'0"- 6 6'0"- 8							brick, f		iine g	ravel and
10	5	8'0"-10'	0"									
10		10'0"-12					10101					
		12'0''-14	'0'		<u> </u>		12'0"	Wet, H	PEAT.			
15 _					+		14'0"					
								Water	boring level be ling on t	tween	3 <b>'</b> 0" a	nd 6'0"
20												
25												
30												
35 _												
40 _												
Туре	ofB	oring Casing	Size:	Ho	llow Ste	n Auger	Size:					<u> </u>
		oportion Percer Trace 0 to 109 Some 10 to 40 And 40 to 509	% %	0 to 4 Ve 4 to 10 Le 10 to 30 l	<b>Gran</b> u ny Loose pose Medium	l <b>lar Soil</b> Dense	s (blows per ft. 30 to 50 De Over 50 Ver	nse y Dense	0 to 2 Ver 2 to 4 Sof 4 to 8 Me	ť	8 to 15	Stiff 0 Very Stiff
				Standard p Blows are	enetratio per 6" ta	on test (S aken with	SPT) = 140# ha n an 18" long x	mmer falling 30' 2" O.D. × 1 3/	, 8″ I.D. split spo	on sampler	unless othe	erwise noted.
by	time o	of year and water	added d	o describe soil and or luring the drilling proc ation lines represent	cess, 🔳	Water lev	vels indicated m	ay vary with sea	sonal fluctuation	and the dec	gree of soil	saturation when the



## SOIL EXPLORATION CORPORATION

Geotechnical Drilling and Groundwater Monitor Wells

Client													
Locati						Isl							
BORI NO.	NG	SB-18 Gro Ele		Dat Sta			Date Comple	Constant and a second sec	Drilling Foreman	D.L.	Eng./Hydrol. Geologist		
P			Sample					Soil and	l/or bedrock stra	ita descript	tions		
D L L L L L L L L L L L L L L L L L L L	No.			Blows 6" Penetration	Rec. Inches	Casing Blows Per ft.	Strata Change Depth			n of Soil ar	nd/or Rock Strata		
	1	0'6"- 2'	'0''				0'6"	ASPHAL	1		ан ан ал ан		
	2	2'0"- 4	'0''										
								Dry to	wet, FIN	E TO M	IEDIUM SAND, some		
5	3	4'0"- 6'	"0"					wood,		I ACE I	ine graver and		
	4	<u>6'0''- 8'</u>	'0''										
	5	8'0"-10'0	<b></b>										
10							10'0"						
							10 0	End of	boring a	t 10'0	)".		
											3'0" and 6'0"		
15 _								aepena	ing on th	e tide	•		
					ļ								
20 _													
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25				<u></u>									
30 _						<u> </u>							
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35 _					<u>†</u>								
	·			•	<b>İ</b>	1							
40_													
Tunn		oring Casing S	Size:	Liall	DW Stor	n Auger	Size:	a an			<u></u>		
Type		oportion Percenti					s (blows per ft.)			ohesive S	olls (blows per ft.)		
		Trace 0 to 10% Some 10 to 40%	6	0 to 4 Very 4 to 10 Lo 10 to 30 M	/ Loose ose		30 to 50 Der Over 50 Ver	ise	0 to 2 Very 2 to 4 Soft	Soft	8 to 15 Stiff 15 to 30 Very Stiff Over 30 Hard		
		And 40 to 50%		Standard pe	netratio	n test (S	SPT) = 140# har	nmer falling 30"	4 to 8 Media				
		s and percentares	n hage						······		nless otherwise noted. tent indicated may be affected		
by	time c	of year and water a	added duri	ng the drilling proce ng lines represent t	ess. 🔳 🔪	Nater lev	els indicated ma	v varv with seas	onal fluctuation a	nd the dear	ee of soil saturation when the		



## SOIL EXPLORATION CORPORATION

Geotechnical Drilling and Groundwater Monitor Wells

Client	T	riangle Envir	and the second secon					Date 03,	25/94	Job No.	94-0333
Locati	on	Waites Wharf	and the second data was a second data w	····	s Isl						
BORI NO.	NG	SB-19 Ground Elev.	Dat Sta			Date Comp	lete	Drilling Foreman	D.L.	Eng./ Geole	Hydrol. ogist
P		Sam	ple Data				Soll and	i/or bedrock s	trata descri	ptions	
D E E F H	No.	Sample Depth (ft.)	Blows 6" Penetration	Rec. Inches	Casing Blows Per ft.	Strata Change Depth		isual Identifica	tion of Soil a	and/or Rock	Strata
	1	0'6"- 2'0"				0'2"	ASPHAT	<u>а</u>			
	2	2'0"- 4'0"				0 2					
5 _	3	4'0"- 6'0"					organi	.c silt,			SAND, some ravel, wood,
	4	6'0"- 8'0"					brick,	fill.			
10	5	8'0"-10'0"									
	6										
	7	12'0"-14'0"									
15						14'0"	End of	boring	st 1/1	101	
							Water	level be ling on (	etween	3'0" a	nd 6'0"
20							uepend	iing on t		C.	
						-					
25											
						-					
				<u> </u>							
30											
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35 _						4					
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40 _											
Туре	of B	oring Casing Size:	Hoi	ow Ster	n Auger	Size:					
	Pr	oportion Percentages Trace 0 to 10% Some 10 to 40% And 40 to 50%	0 to 4 Ver 4 to 10 Lo 10 to 30 M	y Loose ose		s (blows per ft 30 to 50 D Over 50 Ve	ense	0 to 2 Ve 2 to 4 So 4 to 8 Me		8 to 15	Stiff 0 Very Stiff
			Standard pe Blows are p	enetratio er 6" ta	n test (S ken with	SPT) = 140# ha n an 18" long p	ammer falling 30" < 2" O.D. × 1 3/	B" I.D. split spo	oon sampler	unless othe	rwise noted.
by	time c	s and percentages used of year and water added as taken. ■ The stratific	during the drilling proc	ess. 🔳 🔪	Nater le	vels indicated m	nay vary with seas	onal fluctuation	and the dec	ree of soil :	saturation when the
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## SOIL EXPLORATION CORPORATION

Geotechnical Drilling and Groundwater Monitor Wells

Values Wharf, Newport, Rhode Island         Determine Waltes Wharf, Newport, Rhode Island         DORNO       SB=20       Grand Pierre       Date Sample The Sample Pierre       Date Sample The Sample Pierre       Date Sample The Sample Pierre	Client	T	riangle Envir	onmental				Date 03/25/94 Job No. 94-0333
No.     Sbm2 0     Elev     Stan     Complete     Forenan, D.L.     Deciding 1       P     Sample Dat     Soliand/or bedrock strata descriptions     Soliand/or bedrock strata descriptions       1     016''-2''     6''Peretailon     Notes     Strata     Soliand/or bedrock strata descriptions       2     2''O''-4''O''     0''2''     ASEMALT     Or 2''     ASEMALT       2     2'O''-4'O''     0''2''     Dry to wet, FINE TO MEDIUM SAND, som organic silt, trace fine gravel, woo brick.       4     6''O''-a''     0''     0'''       5     8''O''-10'O''     0'''     End of boring at 10''O''.       10	Locati	on	Waites Whard	, Newport,	Rhode	e Isl	and	
F     Semple     Bitson     Fee: Casing     Stata bitson     Visual identification of Soil and/or Rock Strata       1     0.67 - 27.01     0.72.11     ASPHALT       2     2.70.11 - 41.01     0.72.11     Dry to wet, FINE TO MEDIUM SAND, som organic silt, trace fine gravel, woo brick.       3     4.10.11 - 61.01     0.10.101       4     6.10.11 - 01.01     0.10.101       5     8.10.11 - 10.101     0.10.101       5     8.10.11 - 10.101     0.10.101       10     0.10.101     0.10.101       11     0.10.101     0.10.101       12     0.10.101     0.10.101       13     0.10.101     0.10.101       14     0.10.101     0.10.101       15     0.10.101     0.10.101       16     0.10.101     0.10.101       17     0.10.101     0.10.101       18     0.10.101     0.10.101       19     0.10.101     0.10.101       20     0.10.101     0.10.101       21     0.10.101     0.10.101       22     0.10.101     0.10.101       23     0.10.101     0.10.101       24     0.10.101     0.10.101       25     0.10.101       36     0.10.101       37     0		NG						
1       0'6''' - 2'0''       APPIAL         2       2'0'' - 4'0''       D'2''       Dry to wet, FINE TO MEDIUM SAND, som organic silt, trace fine gravel, woo brick.         5       3       4'0'' - 6'0''       Dry to wet, FINE TO MEDIUM SAND, som organic silt, trace fine gravel, woo brick.         0	₽		San	ple Data				Soil and/or bedrock strata descriptions
1       0.6 - 2.0       0'2"         2       2'0" - 4'0"       0'2"         3       4'0" - 6'0"       0'2"         4       6'0" - 8'0"       0'2"         5       8'0" - 10'0"       0'1"         0       -       10'0"         5       8'0" - 10'0"       0'1"         0       -       -       0'1"         10       -       -       0'1"         10       -       -       0'1"         5       8'0" - 10'0"       -       0'1"         10       -       -       0'1"         10       -       -       0'1"         20       -       -       -         21       -       -       -         22       -       -       -         30       -       -       -         33       -       -       -         40       -       -       -         35       -       -       -         36       -       -       -       -         37       -       -       -       -       -         36       -       -	Р Т Н	No.			Rec. Inches	Blows	Change I	
2     2'0"-4'0"       3     4'0"-6'0"       4     6'0"-8'0"       5     8'0"-10'0"       5     8'0"-10'0"       10     10'0"       5     8'0"-10'0"       10     10'0"       11     10'0"       12     10'0"       13     10'0"       24     10'0"       15     10'0"       26     10'0"       27     10'0"       28     10'0"       29     10'0"       20     10'0"       21     10'0"       22     10'0"       23     10'0"       24     10'0"       25     10'0"       26     10'0"       30     10'0"       31     10'0"       32     10'0"       33     10'0"       40     10'0"       5     10'0"       33     10'0"       34     10'0"       35     10'0"       36     10'0"       37     10'0"       38     10'0"       39     10'0"       140     10'0"       150     10'0"       160'0"     10'0"       17<		1	0'6"- 2'0"		<b></b>		0'2"	ASPHALT
s 3 4'0"- 6'0" 4 6'0"- 8'0" 5 8'0"-10'0" 10 5 8'0"-10'0" 10 10 10 10 10 10 10 10 10 10					- <b> </b>	ļ		
5       3       4'0"- 6'0"       brick.         4       6'0"- 3'0"       brick.         9       5       8'0"-10'0"       brick.         10       10'0"       End of boring at 10'0". Water level between 3'0" and 6'0"       depending on the tide.         20       10       10'0"       End of boring at 10'0". Water level between 3'0" and 6'0"         20       10       10'0"       End of boring at 10'0". Water level between 3'0" and 6'0"         20       10       10'0"       End of boring at 10'0". Water level between 3'0" and 6'0"         20       10       10'0"       End of boring at 10'0". Water level between 3'0" and 6'0"         20       10       10'0"       End of boring at 10'0". Water level between 3'0" and 6'0"         20       10       10'0"       End of boring at 10'0".         30       10       10'0"       0'0"         31       10       10'0"       10'0"         32       10'0"       10'0"       10'0"         33       10'0"       10'0"       0'0"         40       10'0"       0'0" 0'0"       0'0"         34       10'0"       0'0" 2'0"       0'0" 2'0" 5'0"         50 for 0'0"       0'0" 0'0"       0'0 2'0" 5'0"       0'0 5'0" 5'		2	2.0 4.0.	+	+	┨────		
4       6'0"	c	3	4'0"- 6'0"					
10       10'0"         11       10'0"         10       10'0"         11       10'0"         15       10'0"         16       10'0"         17       End of boring at 10'0". Water level between 3'0" and 6'0" depending on the tide.         20       10         20       10         21       10'0"         22       10'0"         23       10'0"         34       10'0"         35       10'0"         36       10'0"         37       10'0"         38       10'0"         39       10'0"         30       10'0"         31       10'0"         32       10'0"         33       10'0"         34       10'0"         35       10'0"         36       10'0"         37       10'0"         38       10'0"         39       10'0"         10'0"       10'0"         10'0"       10'0"         10'0"       10'0"         10'0"       10'0"         10'0"       10'0"         10'0"	° –							brick.
10       10'0"         15       10'0"         15       10'0"         20       10'0"         21       10'0"         22       10'0"         23       10'0"         24       10'0"         25       10'0"         26       10'0"         27       10'0"         28       10'0"         29       10'0"         20       10'0"         25       10'0"         26       10'0"         30       10'0"         31       10'0"         32       10'0"         40       10'0"         40       10'0"         40       10'0"         10'0 2 Way State       8 to 15 State         10'0 2 Way State       10'0 State         10'0 3 Madum Denses       0'0'0 X yay State         10'0 3 Madum Denses       0'0'0 X yay State         10'0 3 Madum Dense       0'0'0 X yay State         10'0 3 Madum Dense       0'0'0 X yay way wayayayaya <t< td=""><td></td><td>4</td><td>6'0"- 8'0"</td><td></td><td></td><td><u> </u></td><td></td><td></td></t<>		4	6'0"- 8'0"			<u> </u>		
10       10'0"         15       10'0"         15       10'0"         20       10'0"         21       10'0"         22       10'0"         23       10'0"         24       10'0"         25       10'0"         26       10'0"         27       10'0"         28       10'0"         29       10'0"         20       10'0"         25       10'0"         26       10'0"         30       10'0"         31       10'0"         32       10'0"         40       10'0"         40       10'0"         40       10'0"         10'0 2 Way State       8 to 15 State         10'0 2 Way State       10'0 State         10'0 3 Madum Denses       0'0'0 X yay State         10'0 3 Madum Denses       0'0'0 X yay State         10'0 3 Madum Dense       0'0'0 X yay State         10'0 3 Madum Dense       0'0'0 X yay way wayayayaya <t< td=""><td></td><td>5</td><td>81011 10101</td><td></td><td></td><td><u> </u></td><td></td><td></td></t<>		5	81011 10101			<u> </u>		
10'0"       End of boring at 10'0".         15       10'0"         20       10'0"         21       10'0"         22       10'0"         23       10'0"         24       10'0"         25       10'0"         26       10'0"         27       10'0"         28       10'0"         29       10'0"         20       10'0"         21       10'0"         22       10'0"         23       10'0"         24       10'0"         25       10'0"         26       10'0"         27       10'0"         28       10'0"         39       10'0"         30       10'0"         31       10'0"         32       10'0"         33       10'0"         34       10'0"         35       10'0"         36       10'0"         37       10'0"         38       10'0"         39       10'0"         10'0"       10'0"         10'0"       10'0"         10'0"	10		0 0 -10 0					
Water level between 3'0" and 6'0"         15       Water level between 3'0" and 6'0"         20       Water level between 3'0"         25       Water level between 3'0"         30       Water level between 3'0"         31       Water level between 3'0"         32       Water level between 3'0"         33       Water level between 3'0"         40       Water level between 3'0"         10 to 2 Very Sott 30 to 50 berge 10 to 40% hover 30 hard 15 to 30 wer 30 hard 15 to 30 wer 30 hard 15 to 30 wer 30 hard 10 to 30 Medum Derse 10 harmer faling 30"	10				1	1	10'0"	
15     depending on the tide.       16     depending on the tide.       20     depending on the tide.       25     depending on the tide.       30     depending on the tide.       31     depending on the tide.       32     depending on the tide.       33     depending on the tide.       34     depending on the tide.       35     depending on the tide.       36     depending on the tide.       37     depending on the tide.       38     depending on the tide.       39     depending on the tide.       30     depending on the tide.       31     depending on the tide.       32     depending on the tide.       33     depending on the tide.       34     depending on the tide.       35     depending on the tide.       36     depending on the tide.       37     Tra						<b> </b>		
15							1	
20	15				†	1	1	depending on the tide.
25					-			
25					╉───			
25					+		1	
25	20				1			
30       30         30       30         31       31         32       32         33       33         34       35         35       35         36       36         37       36         38       37         39       38         39       39         30       30         31       35         32       36         33       36         34       36         35       30         36       37         37       38         38       39         39       30         39       30         39       30         39       30         39       30         39       30         30       30         30       30         30       30         30       30         30       30         30       30         30       30         30       30         30       30         30       30	20							
30       30         30       30         31       31         32       32         33       33         34       35         35       35         36       36         37       36         38       37         39       38         39       39         30       30         31       35         32       36         33       36         34       36         35       30         36       37         37       38         38       39         39       30         39       30         39       30         39       30         39       30         39       30         30       30         30       30         30       30         30       30         30       30         30       30         30       30         30       30         30       30         30       30								
30       30         30       30         31       31         32       32         33       33         34       35         35       35         36       36         37       36         38       37         39       38         39       39         30       30         31       35         32       36         33       36         34       36         35       30         36       37         37       38         38       39         39       30         39       30         39       30         39       30         39       30         39       30         30       30         30       30         30       30         30       30         30       30         30       30         30       30         30       30         30       30         30       30					+	+		
30       30         30       30         31       31         32       32         33       33         34       35         35       35         36       36         37       36         38       37         39       38         39       39         30       30         31       35         32       36         33       36         34       36         35       30         36       37         37       38         38       39         39       30         39       30         39       30         39       30         39       30         39       30         30       30         30       30         30       30         30       30         30       30         30       30         30       30         30       30         30       30         30       30	25	<b> </b>					1	
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40       Image: Construct of the second	30 _				1		1	
40       Image: Casing Size:       Hollow Stem Auger Size:         Proportion Percentages       Granular Solls (blows per ft.)       Cohesive Solls (blows per ft.)         Trace 0 to 10%       0 to 4 Very Loose       30 to 50 Dense       0 to 2 Very Soft       8 to 15 Stiff         Some 10 to 40%       0 to 0 Loose       Over 50 Very Dense       2 to 4 Soft       15 to 30 Very Stiff         10 to 30 Medium Dense       Standard penetration test (SPT) = 140# hammer falling 30"       Blows are per 6" taken with an 18" long x 2" O.D. x 1 3/8" I.D. split spoon sampler unless otherwise noted.         The terms and percentages used to describe soil and or rock are based on visual identification of the retrieved samples.       Moisture content indicated may be affected by time of year and water added during the drilling process.       Water levels indicated may vary with seasonal fluctuation and the degree of soil saturation when the								
40       Image: Construct of the second								
40       Image: Construct on the second					1	1	1	
Type of Boring       Casing Size:       Hollow Stem Auger Size:         Proportion Percentages       Granular Solls (blows per ft.)       Cohesive Solls (blows per ft.)         Trace 0 to 10%       0 to 4 Very Loose       30 to 50 Dense       0 to 2 Very Soft       8 to 15 Stiff         Some 10 to 40%       0 to 30 Medium Dense       0 to 2 Very Dense       2 to 4 Soft       15 to 30 Very Stiff         And 40 to 50%       10 to 30 Medium Dense       Standard penetration test (SPT) = 140# hammer falling 30"       Blows are per 6" taken with an 18" long x 2" O.D. x 1 3/8" I.D. split spoon sampler unless otherwise noted.         The terms and percentages used to describe soil and or rock are based on visual identification of the retrieved samples.       Moisture content indicated may be affected by time of year and water added during the drilling process.       Water levels indicated may vary with seasonal fluctuation and the degree of soil saturation when the	35 _				1			
Type of Boring       Casing Size:       Hollow Stem Auger Size:         Proportion Percentages       Granular Solls (blows per ft.)       Cohesive Solls (blows per ft.)         Trace 0 to 10%       0 to 4 Very Loose       30 to 50 Dense       0 to 2 Very Soft       8 to 15 Stiff         Some 10 to 40%       0 to 4 Very Loose       Over 50 Very Dense       2 to 4 Soft       15 to 30 Very Stiff         And 40 to 50%       10 to 30 Medium Dense       Standard penetration test (SPT) = 140# hammer falling 30"       Blows are per 6" taken with an 18" long x 2" O.D. x 1 3/8" I.D. split spoon sampler unless otherwise noted.         The terms and percentages used to describe soil and or rock are based on visual identification of the retrieved samples.       Moisture content indicated may be affected by time of year and water added during the drilling process.       Water levels indicated may vary with seasonal fluctuation and the degree of soil saturation when the							4	
Type of Boring       Casing Size:       Hollow Stem Auger Size:         Proportion Percentages       Granular Solls (blows per ft.)       Cohesive Solls (blows per ft.)         Trace 0 to 10%       0 to 4 Very Loose       30 to 50 Dense       0 to 2 Very Soft       8 to 15 Stiff         Some 10 to 40%       0 to 4 Very Loose       Over 50 Very Dense       2 to 4 Soft       15 to 30 Very Stiff         And 40 to 50%       10 to 30 Medium Dense       Standard penetration test (SPT) = 140# hammer falling 30"       Blows are per 6" taken with an 18" long x 2" O.D. x 1 3/8" I.D. split spoon sampler unless otherwise noted.         The terms and percentages used to describe soil and or rock are based on visual identification of the retrieved samples.       Moisture content indicated may be affected by time of year and water added during the drilling process.       Water levels indicated may vary with seasonal fluctuation and the degree of soil saturation when the					+	+		
Type of Boring       Casing Size:       Hollow Stem Auger Size:         Proportion Percentages       Granular Solls (blows per ft.)       Cohesive Solls (blows per ft.)         Trace 0 to 10%       0 to 4 Very Loose       30 to 50 Dense       0 to 2 Very Soft       8 to 15 Stiff         Some 10 to 40%       0 to 4 Very Loose       Over 50 Very Dense       2 to 4 Soft       15 to 30 Very Stiff         And 40 to 50%       10 to 30 Medium Dense       Standard penetration test (SPT) = 140# hammer falling 30"       Blows are per 6" taken with an 18" long x 2" O.D. x 1 3/8" I.D. split spoon sampler unless otherwise noted.         The terms and percentages used to describe soil and or rock are based on visual identification of the retrieved samples.       Moisture content indicated may be affected by time of year and water added during the drilling process.       Water levels indicated may vary with seasonal fluctuation and the degree of soil saturation when the					1		]	
Proportion Percentages       Granular Soils (blows per ft.)       Cohesive Soils (blows per ft.)         Trace 0 to 10%       0 to 4 Very Loose       30 to 50 Dense       0 to 2 Very Soft       8 to 15 Stiff         Some 10 to 40%       4 to 10 Loose       Over 50 Very Dense       2 to 4 Soft       15 to 30 Very Stiff         And 40 to 50%       10 to 30 Medium Dense       Standard penetration test (SPT) = 140# hammer falling 30"       9 to 2 Very Soft       8 to 15 Stiff         Standard penetration test (SPT) = 140# hammer falling 30"       Blows are per 6" taken with an 18" long x 2" O.D. x 1 3/8" I.D. split spoon sampler unless otherwise noted.         The terms and percentages used to describe soil and or rock are based on visual identification of the retrieved samples.       Moisture content indicated may be affected by time of year and water added during the drilling process.       Water levels indicated may vary with seasonal fluctuation and the degree of soil saturation when the	40 _						-	
Proportion Percentages       Granular Soils (blows per ft.)       Cohesive Soils (blows per ft.)         Trace 0 to 10%       0 to 4 Very Loose       30 to 50 Dense       0 to 2 Very Soft       8 to 15 Stiff         Some 10 to 40%       4 to 10 Loose       Over 50 Very Dense       2 to 4 Soft       15 to 30 Very Stiff         And 40 to 50%       10 to 30 Medium Dense       Standard penetration test (SPT) = 140# hammer falling 30"       9 to 2 Very Soft       8 to 15 Stiff         Standard penetration test (SPT) = 140# hammer falling 30"       Blows are per 6" taken with an 18" long x 2" O.D. x 1 3/8" I.D. split spoon sampler unless otherwise noted.         The terms and percentages used to describe soil and or rock are based on visual identification of the retrieved samples.       Moisture content indicated may be affected by time of year and water added during the drilling process.       Water levels indicated may vary with seasonal fluctuation and the degree of soil saturation when the		<u>ا</u>		<u>.</u>		<u> </u>		<u> </u>
Trace 0 to 10%       0 to 4 Very Loose       30 to 50 Dense       0 to 2 Very Soft       8 to 15 Stiff         Some 10 to 40%       4 to 10 Loose       Over 50 Very Dense       2 to 4 Soft       15 to 30 Very Stiff         And 40 to 50%       10 to 30 Medium Dense       Standard penetration test (SPT) = 140# hammer falling 30"       9 to 2 Very Soft       8 to 15 Stiff         Standard penetration test (SPT)       = 140# hammer falling 30"       9 to 2 Very Soft       8 to 15 Stiff         The terms and percentages used to describe soil and or rock are based on visual identification of the retrieved samples.       Moisture content indicated may be affected by time of year and water added during the drilling process.       Water levels indicated may vary with seasonal fluctuation and the degree of soil saturation when the	Туре			Ho				
Blows are per 6" taken with an 18" long x 2" O.D. x 1 3/8" I.D. split spoon sampler unless otherwise noted. The terms and percentages used to describe soil and or rock are based on visual identification of the retrieved samples. Moisture content indicated may be affected by time of year and water added during the drilling process. Water levels indicated may vary with seasonal fluctuation and the degree of soil saturation when the		Pn	Trace 0 to 10% Some 10 to 40%	4 to 10 Lo	y Loose Xose		30 to 50 De	ense 0 to 2 Very Soft 8 to 15 Stiff ry Dense 2 to 4 Soft 15 to 30 Very Stiff
by time of year and water added during the drilling process.				Standard p Blows are	enetratio ber 6" ta	on test (S iken will	SPT) = 140# ha h an 18" long x	ammer talling 30" $\times$ 2" O.D. $\times$ 1 3/8" I.D. split spoon sampler unless otherwise noted.
	by by	time c	of year and water added	during the drilling proc	ess. 🔳 🕯	Water le	vels indicated m	hay vary with seasonal fluctuation and the degree of soil saturation when the



# SOIL EXPLORATION CORPORATION Geotechnical Drilling and Groundwater Monitor Wells

Client	T	riangle Envir				Date 03/25/94 Job No. 94-0333
Locati	ion	Waites Wharf	, Newport,	Rhode I	sland	
BORII NO.	NG	SB-21 Ground Elev.	Dal Sta		Date Comp	
P		Sam	ple Data			Soll and/or bedrock strata descriptions
D H P H H	No.	Sample Depth (ft.)	Blows 6" Penetration	Rec. Cas Inches Blo Per	vs Change	Visual Identification of Soil and/or Rock Strata
	1	0'6"- 2'0"			0'2"	ASPHAT.T
_	2	2'0"- 4'0"				Dry to wet, FINE TO COARSE SAND, some organic silt, trace wood, brick, and fine gravel, shells, fill.
5		<u>4 0 - 8 0"</u> 6'0"- 8'0"	·			
	5					
10				<u> </u>		
15					10'0" 	End of boring at 10'0". Water level between 3'0" and 6'0" depending on the tide.
20						
20						
25						
30						
35 _						
40 _	 					
Type	of B	oring Casing Size:	Hol	low Stem Au	ger Size:	-
		oportion Percentages Trace 0 to 10% Some 10 to 40% And 40 to 50%	0 to 4 Ver 4 to 10 Lo 10 to 30 M	Granular S y Loose ose Aedium Dens	oils (blows per ft 30 to 50 D Over 50 Ve e	Dense0 to 2 Very Soft8 to 15 StiffVery Dense2 to 4 Soft15 to 30 Very Stiff4 to 8 Medium StiffOver 30 Hard
			Standard po Blows are p	enetration tes er 6" taken	t (SPT) = 140# ha with an 18" long >	hammer falling 30" x 2" O.D. x 1 3/8" I.D. split spoon sampler unless otherwise noted.
by	time c	of year and water added (	during the drilling proc	ess. 🛢 Wate	levels indicated m	ification of the retrieved samples. Moisture content indicated may be affected may vary, with seasonal fluctuation and the degree of soil saturation when the etween soil types, the actual transitions may be gradual.



### SOIL EXPLORATION CORPORATION

Geotechnical Drilling and Groundwater Monitor Wells

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Client		riangle Envi						Date	03/2	5/94	Job No.	94-03	33
Locati		Waites Whar			e Isl								
BORI NO.	NG	SB-22 Ground Elev.	Da Sta			Date Compl		Drilli Fore	man	D.L.	Geo	./Hydrol. logist	
P		San	ple Data				Soll and	d/or bedro	ock stra	ta descri	ptions		
D E E E E E E	No.	Sample Depth (ft.)	Blows 6" Penetration	Rec. Inches	Casing Blows Per ft.	Strata Change Depth		/isual Iden	ntificatio	n of Soil	and/or Roc	k Strata	
	1	0'6"- 2'0"				0'2"	ÁSPHÁT	·					
	2	2'0"- 4'0"											
5	3	4'0"- 6'0"					organi	ic sil	lt, t	race	COARS fine	E SAND, gravel,	some wood,
	4	6'0"- 8'0" 8'0"-10'0"			<u>↓</u>		brick,	, and	asn.				
10	6		· · · · · · · · · · · · · · · · · · ·										
	7	12'0"-14'0"											
15				<del> </del>	<u> </u>	14'0"					<u></u>		****
10													
								<pre>level</pre>	bet	ween	3'0"	and 6'0	11
20				1	<u> </u>	1	depend	ling o	on th	e tid	le.		
20						1							
					<b>_</b>								
	[!				+	4							
25													
				ļ	ļ								
					+								
-	<b> </b>			1	<u> </u>	1							
30 _													
					+								
						1							
35	ļ				<b> </b>								
[						4							
40 _				+	<b> </b>	4							
Туре	of Bo		Hoi	•	n Auger			ſ					
	Pro	Trace 0 to 10% Some 10 to 40% And 40 to 50%	0 to 4 Ver 4 to 10 Lo 10 to 30 N	y Loose ose		s (blows per ft.) 30 to 50 De Over 50 Ver	nse	2 to	2 Very 4 Soft 8 Mediu	Soft	8 to 1 15 to	<b>vs per ft.)</b> 5 Stiff 30 Very Stiff 30 Hard	
			Standard pe Blows are p	enetratio er 6" ta	n test (S iken with	SPT) = 140# hai n an 18" long x	mmer falling 30" 2" O.D. x 1 3/	, 8″ I.D. spli	it spoor	sampler	unless oth	erwise noted	I.
by I	lime o	s and percentages used f year and water added as taken. I The stratifi	during the drilling proc	ess. 📕 🛛	Nater lev	vels indicated ma	ay vary with seas	sonal fluctu	uation a	nd the de	aree of soil	saturation w	affected then the



# SOIL EXPLORATION CORPORATION Geotechnical Drilling and Groundwater Monitor Wells

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Client		riangle Envir				Date	03/2	5/94	Job No.	9	4-03	33		
Locali	_	Waites Wharf			e Isl									
BORI NO.	NG	SB-23 Ground Elev.	Dat Sta			Date Comple		Drillin Foren	nan	D.L.	Geo	./Hyd logist	rol.	
βÌ		Samp	ole Data	<b>T</b>	·		Soil an	d/or bedro	ck strate	a descri	ptions			
D L L L L L L L L L L L L L L L L L L L	No.	Sample Depth (ft.)	Blows 6" Penetration	Rec. Inches	Casing Blows Per ft.	Strata Change Depth	١	Visual Ident	tification	of Soil a	and/or Rocl	k Stra	ita	
	1	0'0"- 2'0"												
		2'0"- 4'0"												
	2	2.0 4.0.					_			_				
5	3	4'0"- 6'0"					organ	o wet, ic sil	t, t:	E TO race	COARSI	E S gra	AND, vel,	some
		6'0"- 8'0"					wood, shells.							4
				1										
	5	8'0"-10'0"		<u> </u>										
10	6	10'0"-12'0"	······································	<u> </u>	<b> </b>									
	7	12'0"-14'0"	L											
	<u>'</u>	12 0 -14 0		1										
15						14'0"								<del></del>
					<u> </u>									
				1			End of	f bori	ng at	t 14	10".	-		•
				<b></b>				level ding or				and	6'0'	1
20					╂		depend	uing o			e.			
				+										
				Į			NOTE:	Lost				10	'0" c	on
25	<b> </b>			<b> </b>				the f	irst	atte	mpt.			
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30 _			ļ		<u> </u>	} }								
	<u> </u>			+	<u>+</u>									
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35 _	┨───				+	{ [								
	<u> </u>			+										
						1								
				1	1									
40 _				+										
Туре	of B	oring Casing Size:	Holl	ow Ster	n Auger	Size:					<u></u>			
	Pn	oportion Percentages Trace 0 to 10% Some 10 to 40% And 40 to 50%	0 to 4 Ven 4 to 10 Lo 10 to 30 M	/ Loose ose		s (blows per ft.) 30 to 50 Der Over 50 Ver	nse	2 to 4	Co 2 Very S 4 Soft 8 Mediur	oft	Soils (blow 8 to 15 15 to 3 Over 3	5 Stiff 30 Ve	ry Stiff	
			Standard pe Blows are p	netratio er 6" ta	n test (S ken with	SPT) = 140# har an 18" long x	nmer falling 30' 2" O.D. x 1 3/	" /8" I.D. split	t spoon	sampler	unless othe	erwis	e noted.	
by	time o	s and percentages used t of year and water added c as taken. III The stratific	during the drilling proce	ess. 🔳 ۱	Nater lev	els indicated ma	y vary with sea	sonal fluctur	ation and	d the dec	pree of soil	satur	nay be a ation wh	ffected ien the
		and the second secon						-			·			



### SOIL EXPLORATION CORPORATION

Geotechnical Drilling and Groundwater Monitor Wells

Client	T	riangle Envir	the second s				 بر من محمد المحمد ال	Date 03	/25/94	Job No.	94-0333		
Locati	on	Waites Wharf	, Newport, I	Rhode	e Isl	and							
BORII NO.	NG	SB-24 Ground Elev.	Dat Sta			Date Compl	ete	Drilling Foreman	D.L.	Eng./ Geok	Hydrol. ogist		
p		Samp	le Data				Soll and	d/or bedrock	strata descri	ptions			
D E E F H	No.	Sample Depth (ft.)	Blows 6" Penetration	Rec. Inches	Casing Blows Per ft.	Strata Change Depth	١	/isual Identific	ation of Soil a	and/or Rock	Strata		
	1	0'0"- 2'0"									######################################		
				<b> </b>									
	2	2'0"- 4'0"											
_	3	4'0"- 6'0"		+							SAND, som		
5 _		40-00		<u> </u>			organi	ic silt,	trace	fine g	ravel, woo	od.	
	4	6'0"- 8'0"											
				L									
	5	8'0"-10'0"										ļ	
10 _		10'0"-12'0"		∔	<u> </u>								
	0	10.012.0.		<del> </del>	<u> </u>								
	7	12'0"-14'0"		1	1								
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15				<b> </b>	ļ	14'0"							
			19	ļ				- <b>.</b> .	,	1.011			
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40				†	1								
				[	1	1							
Туре	of B	oring Casing Size:	Holi	ow Ster	n Auger	Size:							
	Pr	oportion Percentages Trace 0 to 10% Some 10 to 40% And 40 to 50%	0 to 2 Ve 2 to 4 Se 4 to 8 M		8 to 15	Stiff O Very Stiff							
			10 to 30 M Standard pe Blows are p	netratio	n test (S	SPT) = 140# ha 1 an 18" long x	mmer falling 30" 2" O.D. × 1 3/		······································				
The	The terms and percentages used to describe soil and or rock are based on visual identification of the retrieved samples.												
by	lime c	of year and water added d as taken.  The stratifica	uring the drilling proce	ess. 🔳 🔪	Nater lev	vels indicated m	ay vary wilh seas	ional fluctuatio	in and the dec	ree of soil s	aturation when the		



### SOIL EXPLORATION CORPORATION

Geotechnical Drilling and Groundwater Monitor Wells

Client Triangle Environmental Date 03/25/94 Job No. 94-0333 Location Waites Wharf, Newport, Rhode Island													
Locati					e Isl				·				·
BORII NO.	NG	SB-25 Ground Elev.	Date Star			Date Comp		Drillir Forer	nan	D.L.	Geo	./Hydrol. logist	
β		Samp	le Data				Soll and	l/or bedro	ck strata	descrip	otions		
D E E E E E E	No.	Sample Depth (ft.)	Blows 6" Penetration	Rec. Inches	Casing Blows Per ft.	Strata Change Depth	v	'isual Iden	tification	of Soil a	nd/or Roc	k Strata	
	1	0'0"- 2'0"						•					
	2	2'0"- 4'0"											
		20-40											
5_	3	4'0"- 6'0"					Dry to						
							some o shells		c sil	t, t.	race	fine g	gravel,
	4	6'0"- 8'0"					snells,	•					
	5	8'0"-10'0"											
10													
	6	10'0"-12'0"											
	7	12'0"-14'0"	······································										
15 _						14'0"							
					<u> </u>		End of						
							Water					and 6	'0''
							depend	ing o	n the	tid	е.		
20													
					<u> </u>								
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25_													
30 _					<u> </u>								
					<u> </u>								
35_	<u> </u>				<u> </u>								
40_					1								
									····		- <u></u>		
Туре	of Bo	oring Casing Size:	Hollo	w Ster	n Auger	Size:							
	Proportion PercentagesGranular Soils (blows per ft.)Cohesive Soils (blows per ft.)Trace 0 to 10%0 to 4 Very Loose30 to 50 Dense0 to 2 Very Soft8 to 15 StiffSome 10 to 40%4 to 10 LooseOver 50 Very Dense2 to 4 Soft15 to 30 Very StiffAnd 40 to 50%10 to 30 Medium Dense4 to 8 Medium StiffOver 30 Hard												
	Standard penetration test (SPT) = $140\#$ hammer falling 30" Blows are per 6" taken with an 18" long x 2" O.D. x 1 3/8" I.D. split spoon sampler unless otherwise noted.												
by I	lime o	s and percentages used to If year and water added d as taken.  The stratifica	uring the drilling proce	ss. 🔳 🔪	Nater lev	els indicated m	av vary with sease	onal fluctu	ation and	I the dea	ree of soil	saturation	be affected when the
	ng w	us ianoji. 🔳 The suddinu	anon mes represent (	e appi	JANNALE	Doundaries Dell	neen son types, ti	ne actual i	และเอเมบก	a may Di	s gradual.	-	



### SOIL EXPLORATION CORPORATION

Geotechnical Drilling and Groundwater Monitor Wells

Client	Tı			onmental				Date 03/25/94 Job No. 94-0333
Locati	on	Waites	Wharf	, Newport,		Isl		
BORI NO.	NG	SB-26	Ground Elev.		Date C Start C	3/24	/94 Date Comp	
Ē			Sam	ole Data		r		Soll and/or bedrock strata descriptions
D U U U U U U U U U U U U U U U U U U U	No.	Sample Depth		Blows 6" Penetration	Rec. Inches	Casing Blows Per ft.	Strata Change Depth	Visual Identification of Soil and/or Rock Strata
	- 1	0'0"-	2'0"					
	2	2'0"-	4'0"					Dry to wet, FINE TO COARSE SAND, some
5	3	4'0"-	6'0"					organic silt, trace fine gravel.
	4	6'0"-	8'0"					
10	5	8'0"-10	)'0"					
10							10'0"	
								End of boring at 10'0". Water level between 3'0" and 6'0" depending on the tide.
15								
				· · · · · · · · · · · · · · · · · · ·				
20 _						+		
25								
30 _								
							1	
35	 					<u> </u>		
							1	
40 _								
Туре	of B	oring Casi	ing Size:	L	Hollow Ster	n Auger	Size:	L
	Pn	oportion Perc Trace 0 to 1 Some 10 to And 40 to 5	10% 40%	4 to 10	Granu Very Loose Loose 30 Medium		s (blows per ft 30 to 50 D Over 50 Ve	ense 0 to 2 Very Sott 8 to 15 Stiff
				Standar Blows a	d penetratio re per 6" ta	n test (S iken with	SPT) = 140# ha n an 18" long >	ammer falling 30" < 2" O.D. × 1 3/8" I.D. split spoon sampler unless otherwise noted.
by	time o	of year and wa	ter added o	luring the drilling p	process. 🔳 🕻	Nater lev	vels indicated rr	cation of the retrieved samples. Moisture content indicated may be affected nay vary, with seasonal fluctuation and the degree of soil saturation when the ween soil types, the actual transitions may be gradual.
00	any w	as (antri. 📾	HE SUBUIC	acon mes represe	an me appr	UNITIAL		ween son types, the actual traitstitons may be gradual.



48 Pioneer	Dr.
eominster,	MA 01453
508) 840-03	391

# SOIL EXPLORATION CORPORATION

Geotechnical Drilling and Groundwater Monitor Wells

5 Monson Place Milford, NH 03055 (603) 672-2135

ocati BORII		Waites Wharf	, Newport, F		e Isl	.and Date	Drilling D T Eng./Hydrol.
10.	10	Elev.	Star			Comp	ete Foreman D.L. Geologist
			ple Data				Soll and/or bedrock strata descriptions
P T H	No.	Sample Depth (ft.)	Blows 6" Penetration	Rec. Inches	Casing Blows Per ft.	Strata Change Depth	Visual Identification of Soil and/or Rock Strata
	1	0'0"- 2'0"					
ł	- 2	2'0"- 4'0"					
5 _	3	4'0"- 6'0"					Dry to wet, FINE TO COARSE SAND, some organic silt, trace fine gravel wood.
	- 4	6'0"- 8'0"					wood.
		8'0"-10'0"					
0		8 0 -10 0					
						10'0"	
							End of boring at 10'0". Water level between 3'0" and 6'0" depending on the tide.
5							
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35							
				<b> </b>			
40				<u> </u>			
	of Bo	bring Casing Size:		W Ster	n Auger	Size	
146		oportion Percentages			-	s (blows per ft	) Cohesive Soils (blows per ft.)
	1.17	Trace 0 to 10% Some 10 to 40% And 40 to 50%	0 to 4 Very 4 to 10 Loc 10 to 30 M	Loose se		30 to 50 De Over 50 Ve	nse 0 to 2 Very Soft 8 to 15 Stiff
			Standard per Blows are pe	netratio er 6" ta	n test (S ken with	PT) = 140# ha an 18" long x	mmer falling 30" 2" O.D. × 1 3/8" I.D. split spoon sampler unless otherwise noted.
by l	ime o	if year and water added o	luring the drilling proce	ss. 🔳 V	Nater lev	els indicated m	ation of the retrieved samples. Moisture content indicated may be affected ay vary with seasonal fluctuation and the degree of soil saturation when the veen soil types, the actual transitions may be gradual.

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148 Pioneer Dr. Leominster, MA 01453 (508) 840-0391

### SOIL EXPLORATION CORPORATION

Geotechnical Drilling and Groundwater Monitor Wells

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Client		riangle Enviro				-	Date 03/25/94 Job No. 94-0333
Locati		Waites Wharf			Isl		D 10
BORI NO.	NG	SB-29 Ground Elev.	Date Star			Date Comp	
βļ		Samp	ole Data				Soil and/or bedrock strata descriptions
D E E F H	No.	Sample Depth (ft.)	Blows 6" Penetration	Rec. Inches	Casing Blows Per ft.	Strata Change Depth	Visual Identification of Soil and/or Rock Strata
	1	0'0"- 2'0"					
	2	2'0"- 4'0"					Dry to wet, FINE TO COARSE SAND,
5	3	4'0"6'0"					organic silt, trace fine gravel.
	4	6'0"- 8'0"					
10	5	8'0"-10'0"					
'' _						10'0"	
							End of boring at 10'0". Water level between 3'0" and 6'0" depending on the tide.
15							appending on the title.
20					<u> </u>		
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35							
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40 _							
Туре	of B	oring Casing Size:	Hollo	w Sten	n Auger	Size:	
	Pr	oportion Percentages Trace 0 to 10% Some 10 to 40% And 40 to 50%	0 to 4 Very 4 to 10 Loo 10 to 30 Me	Loose se		s (blows per ft 30 to 50 De Over 50 Ve	ense 0 to 2 Very Soft 8 to 15 Stiff
			Standard per Blows are pe	netratio r 6″ ta	n test (S ken with	SPT) = 140# ha an 18" long >	ammer falling 30" < 2" O.D. × 1 3/8" I.D. split spoon sampler unless otherwise noted.
by t	time c	of year and water added d	luring the drilling proces	ss. 📕 V	Vater lev	els indicated m	cation of the retrieved samples. Moisture content indicated may be affected ay vary with seasonal fluctuation and the degree of soil saturation when the ween soil types, the actual transitions may be gradual.
	y #				Connett		noon con typo, mo actuar nanonono may be grautar.



#### SOIL EXPLORATION CORPORATION

Geotechnical Drilling and Groundwater Monitor Wells

5 Monson Place Milford, NH 03055 (603) 672-2135

Client	Т	riangle Envir					D	ate 03/	25/94	Job No.	94-0333	
Locat	ion	Waites Wharf	, Newport, H	Rhode	s Isl	and				7		
BORI NO.	NG	SB-30 Ground Elev.	Dat Sta			Date Comp		Drilling Foreman	D.L.	Geol	'Hydrol. ogist	
Ð		Sam	ple Data	<u></u>			Soil and	or bedrock st	rata descrip	otions		
D E E E E E	No.	Sample Depth (ft.)	Blows 6". Penetration	Rec. Inches	Casing Blows Per ft.	Strata Change Depth	Vi	sual Identificat	ion of Soil a	ind/or Rock	Strata	
	1	0'0"- 2'0"										
	2	2'0"- 4'0"						wet, FI c silt,			SAND, some rave1.	
5	3											
	5	8'0"- 9'0"		ļ								
10	5A	9'0"-10'0"				9'0"	Moist,	PEAT.				
·v						10'0"						
15							Water	boring level be ing on t	tween	3'0" a	nd 6'0"	
20												
25												
30												
35 _												
40 _												
Tuno	of B	oring Casing Size:	ـــــــــــــــــــــــــــــــــــــ	1 Ow Stor	n Auger	Size:						
туре		Trace 0 to 10% Some 10 to 40% And 40 to 50%	0 to 4 Ven 4 to 10 Lo 10 to 30 M Standard pe	Granu / Loose bse ledium l	lar Soile Dense n test (S	s (blows per ft 30 to 50 De Over 50 Ve GPT) = 140# ha	mse ry Dense mmer falling 30"	0 to 2 Very 2 to 4 Soft 4 to 8 Mec	lium Stiff	8 to 15 15 to 3 Over 3	Stiff 0 Very Stiff 0 Hard	
by	Blows are per 6" taken with an 18" long x 2" O.D. x 1 3/8" I.D. split spoon sampler unless otherwise noted. The terms and percentages used to describe soil and or rock are based on visual identification of the retrieved samples. Moisture content indicated may be affected by time of year and water added during the drilling process. Water levels indicated may vary with seasonal fluctuation and the degree of soil saturation when the boring was taken. The stratification lines represent the approximate boundaries between soil types, the actual transitions may be gradual.											

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# SOIL EXPLORATION CORPORATION Geotechnical Drilling and Groundwater Monitor Wells

Client	T	riangle Envir		]	Date 03/	25/94	Job No.	94-0333		
Locati	on	Waites Wharf	, Newport, Rhode	e Isl	and					
BORII NO.	NG	SB-31 Ground Elev.	Date Start		Date Compl	ete	Drilling Foreman	D.L.	Eng./ Geol	Hydrol. ogist
P		Samj	ple Data			Soli and	/or bedrock st	rata descri	ptions	
D P F H	No.	Sample Depth (ft.)	Blows 6" Penetration Inches	Casing Blows Per ft.	Strata Change Depth	۷	isual Identificat	ion of Soil a	and/or Rock	Strata
	1	0'0"- 2'0"								
	2	2'0"- 4'0"				Dry to	wet, FI	NE TO	COARSE	SAND, some
_	3	4'0"- 6'0"				organi	c silt,			
5_						wood.				
	4	6'0"- 8'0"			]					
	5	8'0"-10'0"								
		8 0 -10 0			{ }					
10				<u> </u>	10'0"		<u> </u>			
						End of	boring	at 10'	0".	
				<b> </b>		Water	level be	tween	3'0" a	nd 6'0"
4.5						depend	ing on t	he tid	e.	
15				1	1					
20					1					
					1					
					4					
25				<u> </u>	{					
					1					
				ļ						
30				+	1					
				+						
35 _			<u> </u>	<u> </u>	1	,				
					1					
					ļ					
				<b> </b>						
40_				<u> </u>	1					
Туре	of B	oring Casing Size:	Hollow Ster	n Auger	Size:					
	Pn	oportion Percentages Trace 0 to 10% Some 10 to 40% And 40 to 50%	Granu 0 to 4 Very Loose 4 to 10 Loose 10 to 30 Medium		s (blows per ft. 30 to 50 De Over 50 Ver	nse	0 to 2 Ven 2 to 4 Soft 4 to 8 Med		8 to 15	Stiff Very Stiff
			Standard penetration Blows are per 6" ta	n test (S ken with	SPT) = 140# ha n an 18" long x	mmer falling 30" 2" O.D. x 1 3/8	" I.D. split spo	on sampler	unless othe	rwise noted.
byt	ime c	of year and water added o	o describe soil and or rock are luring the drilling process.	Nater lev	vels indicated ma	ay vary with sease	onal fluctuation	and the dec	ree of soil s	aturation when the
		uo tanon, 💼 the stratme		CAIIII AIO		teon aon types, ti		aona may D	o graduai. I	-



### SOIL EXPLORATION CORPORATION

Geotechnical Drilling and Groundwater Monitor Wells

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UIICGL # ____ UI ____

Client	T	riangle ]	Envir	onmental				Date 03/25/94 Job No. 94-0333
Locati	ion	Waites V	Wharf	, Newport, I	Rhode	e Isl	and	
BORI NO.	NG		Ground Elev,	Dal Sta			Date Comple	Drilling Eng./Hydrol. te Foreman D.L. Geologist
Ð			Samp	le Data				Soil and/or bedrock strata descriptions
	No.	Sample Depth (	ft.)	Blows 6" Penetration	Rec. Inches	Casing Blows Per ft.	Strata Change Depth	Visual Identification of Soil and/or Rock Strata
	1	0'0"-	2'0"					
					ļ			
	_2	2'0"-	4 <b>'0''</b>		<b> </b>			Dry to wet, FINE TO COARSE SAND,
_	3	4'0"-	(101					some organic silt, trace fine gravel,
5		40-	0_0_		1			wood, brick.
	4	6'0"-	8'0"					
					<b> </b>			
	5	8'0"-10	'0"		<b> </b>			
10					╉────		1.01.01	
					1		10'0"	
								End of boring at 10'0". Water level between 3'0" and 6'0"
					ļ			depending on the tide.
15 _								
								· · · · · · · · · · · · · · · · · · ·
20						ļ		
					<b> </b>			
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20-								
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30 _	1			<u></u>		1		
						<b> </b>		
35 _	<u> </u>					+		
					1	1	1	
1				•			1	
	ļ							
40_	_							
<b>T</b>		L Coole	a Size	L	1	1	<u> </u>	
iype	of Bo		g Size:			n Auger		
	Pro	Trace 0 to 10 Some 10 to 40 And 40 to 50	% 0%	0 to 4 Ver 4 to 10 Lo 10 to 30 N	y Loose ose		s (blows per ft.) 30 to 50 Der Over 50 Very	ise 0 to 2 Very Soft 8 to 15 Stiff
				Standard pe Blows are p	enetratio er 6" ta	in test (S iken with	GPT) = 140# han 1 an 18" long x	nmer falling 30" 2" O.D. × 1 3/8" I.D. split spoon sampler unless otherwise noted.
l bγ i	time o	f year and wate	r added d	uring the drilling proc	ess. 🔳 🕯	Water lev	els indicated ma	tion of the retrieved samples.  Moisture content indicated may be affected y vary with seasonal fluctuation and the degree of soil saturation when the
bór	ing wa	as taken. 🖩 Th	e stratifica	ation lines represent t	he appr	oximate	boundaries betw	éen soil types, the actual transitions may be gradual.



# SOIL EXPLORATION CORPORATION Geotechnical Drilling and Groundwater Monitor Wells

Client		riangle Envir						Date	03/2	5/94	Job No.	94.	-0333
Locati			, Newport, Rl	hode	ls.								
BORII NO.	NG	SB-33 Ground Elev.	Date Start			Date Compl		Drillin Foren	man	D.L.	Geo	/Hydrol. logist	
Ð		Sam	ole Data	·		· · · · · · · · · · · · · · · · · · ·	Soil ar	nd/or bedro	ck strat	a descrip	tions		
D P T H	No.	Sample Depth (ft.)	Blows 6" Penetration	nches B	ising lows er fl.	Strata Change Depth		Visual Iden	tification	of Soil a	nd/or Roc	k Strata	
	1	0'0"- 2'0"											
5	. 2	2'0"- 4'0" 4'0"- 6'0"						o wet, inorga					
	4	6'0"- 8'0"											
	- 5	8'0"- 9'0"											
10	5A	9'0"-10'0"				9'0"	Moist	:, PEAT	•		······		
						10'0"							. With the dealer of the second s
15					· · · · ·		Water	of bori level nding o	. bet	ween	3'0" a	and (	5'0"
20													
25													
30 _													
35													
40								10 - 10 - 10 - 10 - 10 - 10 - 10 - 10 -			···.		
Туре	of B	oring Casing Size:	Hollow	v Stern A	luger	Size:							
	Pro	portion Percentages Trace 0 to 10% Some 10 to 40% And 40 to 50%	0 to 4 Very I 4 to 10 Loos 10 to 30 Me	Loose ie dium De	nse	s (blows per ft. 30 to 50 De Over 50 Ver	nse ry Dense	2 to 4 4 to 8	Co 2 Very S 4 Soft 8 Mediur	oft			
			Standard pen Blows are per	etration t 6" take	est (S n with	SPT) = 140# ha h an 18" long x	mmer falling 30 2" O.D. × 1 3	)" 3/8" 1.D. spli	t spoon	sampler u	inless oth	erwise n	oted.
i by	time o	s and percentages used t I year and water added c as taken. I The stratific	juring the drilling proces	s. 🔳 Wa	ter lev	els indicated m	ay vary with sea	asonal fluctu	ation and	d the deg	ree of soil	saturatio	be affected by when the



## SOIL EXPLORATION CORPORATION

Geotechnical Drilling and Groundwater Monitor Wells

Clien	T	-		onmental				Date 03/25/94 Job No. 94-0333
Locat	ion	Waites	Wharf	, Newport, 1	Rhode	Isl	and	
BORI NO.	NG	SB-34	Ground Elev.	Da St	ite art		Date Comp	Drilling D.L. Eng./Hydrol. Plete Foreman Geologist
₽			Sam	ole Data		_		Soil and/or bedrock strata descriptions
D P T H	No.	Sample Depti		Blows 6" Penetration	Rec. Inches	Casing Blows Per ft.	Strata Change Depth	Visual Identification of Soil and/or Rock Strata
	1	0'0"-	2'0"					·
5 _	2	2'0"-						Dry to wet, FINE TO COARSE SAND, some organic silt, trace fine gravel, wood, brick.
	4	6'0"- 8'0"-						
	5A	1				<b> </b>	9'0"	Moist, PEAT.
10 _		9.01					10'0"	MOISE, FEAL.
15	· · · ·							End of boring at 10'0" Water level between 3'0" and 6'0" depending on the tide.
20								
25 _								
30 _								
50								
35 _								
40 _	<u> </u>				-			
Tyne	of B	oring Cas	ing Size:	I Но	Low Ster	n Auner	LSize	1
1,740		oportion Perc Trace 0 to Some 10 to And 40 to 5	centages 10% 40%	0 to 4 Ver 4 to 10 Lo 10 to 30 t	Granu ry Loose cose Medium	lar Soll	s (blows per ft. 30 to 50 De Over 50 Ve	Vense0 to 2 Very Soft8 to 15 Stiffery Dense2 to 4 Soft15 to 30 Very Sliff4 to 8 Medium StiffOver 30 Hard
				Blows are	per 6" ta	ken with	an 18" long x	ammer falling 30" x 2" O.D. x 1 3/8" I.D. split spoon sampler unless otherwise noted.
by	time o	of vear and wa	ter added d	uring the drilling proc	ess. 🔳 🔪	Nater lev	els indicated m	ication of the retrieved samples. Moisture content indicated may be affected nay vary with seasonal fluctuation and the degree of soil saturation when the tween soil types, the actual transitions may be gradual.



# SOIL EXPLORATION CORPORATION

Geotechnical Drilling and Groundwater Monitor Wells

Client	T	riangle Envir				Date 03/25/94 Job No. 94-0333
Locati		التشكير ويرجي الالانا فينا فيستجدون ويبل فسأله فسيلحص وروا	, Newport, F			
BORII NO.	NG	SB-35 Ground Elev.	Dat Sta		Date Comp	plete Foreman D.L. Geologist
β		Sam	ple Data	<del>7</del>		Soli and/or bedrock strata descriptions
	No.	1 1 1	Blows 6" Penetration	Rec. Casir Inches Blow Per f	g Strata s Change t. Depth	Visual Identification of Soil and/or Rock Strata
	1	0'0"- 2'0"				
_	2		· · · · · · · · · · · · · · · · · · ·			Dry to wet, FINE TO COARSE SAND, some organic silt, trace fine gravel, wood, brick.
5					-	
	5	8'0"- 9'0"				
10 _		9'0"-10'0"			9'0"	Moist, PEAT.
15					10'0"	End of boring at 10'0". Water level between 3'0" and 6'0" depending on the tide.
20						
25						
30						
35 _						
40						
Туре	of B	oring Casing Size:	Hol	low Stem Aug	er Size:	
	Pr	Trace 0 to 10% Some 10 to 40% And 40 to 50%	Standard pe	y Loose ose ledium Dense anetration test	(SPT) = 140# ht	Dense 0 to 2 Very Soft 8 to 15 Stiff
by	time o	of year and water added	to describe soil and or i during the drilling proc	rock are based ess. 🔳 Water	l on visual identifi levels indicated n	fication of the retrieved samples. Moisture content indicated may be affected may vary with seasonal fluctuation and the degree of soil saturation when the etween soil types, the actual transitions may be gradual.

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# SOIL EXPLORATION CORPORATION Geotechnical Drilling and Groundwater Monitor Wells

Client	T	riangle Envir					(	Date 03	3/25/94	Job No.	94-0333
Locati	on	Waites Wharf	, Newport, F	lhode	Is]	Land					
BORI NO.	٩G	SB-36 Ground Elev.	Date Star			Date Comple	ote	Drilling Foremar	D.L.	Eng./ Geolo	Hydrol. ogist
Q		Samp	le Data				Soil and	d/or bedrock	strata descri	ptions	
D E P T H	No.		Blows 6" Penetration	Inches	Casing Blows Per ft.	Strata Change Depth	٧	/isual Identific	cation of Soil a	and/or Rock	Strata
	1	0'0"- 2'0"							,		
	2	2'0"- 4'0" 4'0"- 6'0"							FINE TO silt, t		SAND, ood, brick
5	4	<u>4 0 - 0 0</u> 6'0"- 8'0"									
	5	8'0"- 9'0" 9'0"-10'0"				9'0"					
10	<u>5</u> A	9.010.0.				10'0"	Moist,	, PEAT.			
15						10 0	Water		g at 10 between the tid		nd 6'0"
20											
25		· · · · · · · · · · · · · · · · · · ·									
30											
35 _			· · · · · · · · · · · · · · · · · · ·								
40											
Type	of B	oring Casing Size:	Holld	bw Stem	Auger	Size:					
- 40		oportion Percentages Trace 0 to 10% Some 10 to 40% And 40 to 50%	0 to 4 Very 4 to 10 Loc 10 to 30 M	<b>Granula</b> Loose se edium D	ar Solls ense	s (blows per ft.) 30 to 50 De Over 50 Ver	nse V Dense		ery Soft		
			Standard per Blows are pe	netration er 6" tak	test (S en with	SPT) = 140# har 1 an 18" long x	nmer falling 30" 2" O.D. x 1 3/	8" I.D. split sp	ooon sampler	unless othe	rwise noted.
by	ime c	is and percentages used to of year and water added d as taken. The stratifica	uring the drilling proce	ss. 🔳 W	ater lev	els indicated ma	y vary with seas	sonal fluctuation	on and the dep	pree of soil s	aturation when the



#### SOIL EXPLORATION CORPORATION

Geotechnical Drilling and Groundwater Monitor Wells

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Client	T	riangle Envi					Date 03/25/94 Job No. 94-0333
Locati	on	Waites Whar	f, Newport	, Rhode	e Isl		
BORII NO.	NG	SB-37 Ground Elev.		Date Start		Date Comp	
p		Sa	mple Data				Soll and/or bedrock strata descriptions
D H P T H	No.		Blows 6" Penetratio	n Inches	Casing Blows Per ft.	Strata Change Depth	Visual Identification of Soil and/or Rock Strata
	1	0'6"- 2'0'				0'2"	ASPHALT
	2	2'0"- 4'0'					Dry to wet, FINE TO COARSE SAND, some inroganic silt, trace fine gravel,
5 _	3						wood.
	5	8'0"-10'0"			<u> </u>		
10 _					╂───	10'0"	
15							End of boring at 10'0". Water level between 3'0" and 6'0" depending on the tide.
· · ·							
20							
25							
30							
35 _							
40			· · · · · · · · · · · · · · · · · · ·			-	
40	1	-				1	
Туре	of B	oring Casing Size		Hollow Ster	n Auger	Size:	
	Pr	oportion Percentage: Trace 0 to 10% Some 10 to 40% And 40 to 50%	0 to 4 4 to 1	Granular Solis (blows per ft.) 0 to 4 Very Loose 30 to 50 Dense 4 to 10 Loose Over 50 Very De 10 to 30 Medium Dense			Dense 0 to 2 Very Soft 8 to 15 Stiff
			Standa Blows	rd penetratic are per 6" ta	on test (S Iken will	SPT) = 140# ha h an 18" long >	nammer falling 30" $\times$ 2" O.D. $\times$ 1 3/8" I.D. split spoon sampler unless otherwise noted.
by	time c	of year and water adde	d during the drilling	process. 🔳	Water le	vels indicated m	ication of the retrieved samples. Moisture content indicated may be affected may vary with seasonal fluctuation and the degree of soil saturation when the etween soil types, the actual transitions may be gradual.



# **SOIL EXPLORATION CORPORATION** Geotechnical Drilling and Groundwater Monitor Wells

Client	T	riangle Envir					Date 03/25/94 Job No. 94-0333
Locati	on	Waites Wharf			<u>Isl</u>	and	
BORI NO.	NG	SB-38 Ground Elev.	Date Star			Date Comp	
Ð		Samp	ole Data				Soil and/or bedrock strata descriptions
DIMPLE	No.	Sample Depth (ft.)	Blows 6" Penetration	Rec. Inches	Casing Blows Per ft.	Strata Change Depth	Visual Identification of Soil and/or Rock Strata
	1	0'6"- 2'0"				0'2"	ASPHALT
	2	2'0"- 4'0"				02	Dry to wet, FINE TO COARSE SAND, some
5	3	4'0"- 6'0" 6'0"- 8'0"					organic silt, trace fine gravel, wood ash, brick.
	5						
10				<u> </u>		10101	
15						10'0"	End of boring at 10'0". Water level between 3'0" and 6'0" depending on the tide.
20							
25							
30							
35			· · · · · · · · · · · · · · · · · · ·				
40							
Туре	of Bo	oring Casing Size:	Holl	ow Ster	n Auger	Size:	
	Pro	pportion Percentages Trace 0 to 10% Some 10 to 40% And 40 to 50%	0 to 4 Very 4 to 10 Loc 10 to 30 M	Loose		s (blows per ft 30 to 50 De Over 50 Ve	Dense 0 to 2 Very Soft 8 to 15 Stiff
			Blows are po	er 6″ ta	ken with	an 18" long >	nammer falling 30" $\times$ 2" O.D. $\times$ 1 3/8" I.D. split spoon sampler unless otherwise noted.
by	time o	if year and water added c	luring the drilling proce	ess. 🔳 \	Nater lev	els indicated r	ication of the retrieved samples. I Moisture content indicated may be affected may vary, with seasonal fluctuation and the degree of soil saturation when the stween soil types, the actual transitions may be gradual.



## SOIL EXPLORATION CORPORATION

Geotechnical Drilling and Groundwater Monitor Wells

Client	Τı			onmental				Date 03/25/94 Job No. 94-0333
Locati	on	Waites	Wharf	, Newport,	Rhode	e Isl	and	
BORI NO.	NG	SB-39	Ground Elev.		ite art		Date Comp	plete Foreman D.L. Geologist
Ð			Sam	ole Data		-		Soli and/or bedrock strata descriptions
D L L L L L L L L L L L L L L L L L L L	No.	Sample Depth		Blows 6" Penetration	Rec. Inches	Casing Blows Per ft.	Strata Change Depth	Visual Identification of Soil and/or Rock Strata
	1	0'6"-	2'0"				0'2"	ASPHALT
5								Dry to wet, FINE TO COARSE SAND, some organic silt, trace fine gravel, wood.
10							10'0"	
15								End of boring at 10'0" Water level between 3'0" and 6'0" depending on the tide.
20								
25								
30 <u> </u>								
35 _			•					
40 _								
Type	of Be	pring Cas	ing Size:	н	llow Ster	n Auger	Size:	J
.,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		portion Pero Trace 0 to Some 10 to And 40 to 5	centages 10% 40%	0 to 4 Ve 4 to 10 L 10 to 30	<b>Granu</b> ry Loose oose Medium	l <b>lar Soil</b> Dense	<b>s (blows per ft</b> 30 to 50 De Over 50 Ve	Dense     0 to 2 Very Soft     8 to 15 Stiff       ery Dense     2 to 4 Soft     15 to 30 Very Stiff       4 to 8 Medium Stiff     Over 30 Hard
				Standard p Blows are	enetratio per 6" ta	n test (S Iken with	SPT) = 140# ha n an 18" long >	ammer falling 30" $\times$ 2" O.D. $\times$ 1 3/8" I.D. split spoon sampler unless otherwise noted.
by	time o	l year and wa	iter added o	luring the drilling pro	cess. 🔳 🔪	Nater le	vels indicated m	ication of the retrieved samples. Moisture content indicated may be affected nay vary with seasonal fluctuation and the degree of soil saturation when the tween soil types, the actual transitions may be gradual.



### SOIL EXPLORATION CORPORATION

Geotechnical Drilling and Groundwater Monitor Wells

Client	T	riangle			the second design of the secon				Date 03/25/94 Job No. 94-0333
Locat	ion	Waites	Wharf	, New			lsl		
BORI NO.	NG	SB-40	Ground Elev.		Da Sta			Date Comple	ete Foreman D.L. Eng./Hydrol. Geologist
Ð			Sam	ple Data					Soil and/or bedrock strata descriptions
O E E E E E E E E E E E E E E E E E E E	No.	Sample Depti		B 6" Pe	ows netration	Rec. Inches	Casing Blows Per ft.	Strata Change Depth	Visual Identification of Soil and/or Rock Strata
	1	0'0"-	2'0"						
		- 1 - 11					ļ		
	2	2'0"-	4'0"	<b> </b>					Dry to wet, FINE TO COARSE SAND, some
~	3	4'0"-	6'0"	4					inorganic silt, trace fine gravel,
5 _									wood.
	4	6'0"-	8'0"						
		01011	<u></u>	<b></b>					
	5	8'0"-1	0.0.						
10 _			·····					10'0"	
									End of boring at 10'0".
									Water level between 3'0" and 6'0"
				ļ			ļ		depending on the tide.
15									· .
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		1							
25									
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30								]	
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								-	
35 _			asini ana 1945 - 1949	1		+	1	1	
00 _				<u> </u>		1	1		
	<b> </b>			<u> </u>					
	-			+					
40	-			+					
4V _	1								
Туре	of B	oring Cas	sing Size:		Но	llow Ster	n Auger	Size:	
	Pr	oportion Per Trace 0 to Some 10 to And 40 to		Granular Soils (blow 0 to 4 Very Loose 30				Cohesive Soils (blows per ft.)ense0 to 2 Very Soft8 to 15 Stiffry Dense2 to 4 Soft15 to 30 Very Stiff4 to 8 Medium StiffOver 30 Hard	
					Standard p Blows are	enetratio per 6" ta	on test (S aken with	SPT) = 140# ha h an 18″ long x	mmer falling 30" 2" O.D. x 1 3/8" I.D. split spoon sampler unless otherwise noted.
by	time o	of year and wa	ater added (	during the	drilling pro	cess. 🔳	Water le	vels indicated ma	ation of the retrieved samples.  Moisture content indicated may be affected ay vary with seasonal fluctuation and the degree of soil saturation when the ween soil types, the actual transitions may be gradual.
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# **SOIL EXPLORATION CORPORATION** Geotechnical Drilling and Groundwater Monitor Wells

Client	Т			onmental				Date 03/25/94 Job No. 94-0333
Locat	ion	Waites	Wharf	, Newport,	Rhod	e Is	land	
BORI NO.	NG	SB-41	Ground Elev.	Da Sta			Date Comp	
₽			Sam	ole Data				Soil and/or bedrock strata descriptions
D E E E E E	No.	Sample Depti		Blows 6" Penetration	Rec. Inches	Casing Blows Per ft.	Strata Change Depth	Visual Identification of Soil and/or Rock Strata
	1	0'0"-	· 2'0"					
			(1.01)				А. С.	
	2	2'0"-	4'0"					Dry to wet, FINE TO COARSE SAND, some
5 _		4'0"-	6'0"		<u> </u>			organic silt, trace fine gravel, shells, wood.
5 _								shells, wood.
	4	6'0"-	8'0"		ļ	ļ		
		8'0"-1	0101			<u> </u>		
10		0 0 -1	0 0			<u></u>		
10					1	1	10'0"	
							10 0	End of boring at 10'0".
								Water level between 3'0" and 6'0"
					<u> </u>	<u> </u>		depending on the tide.
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35 _				<u> </u>	+	+-		
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							4	
	<b> </b>					<b> </b>	{	
40 _	<u> </u>					<u> </u>	4	
Туре	of B	oring Cas	ing Size:	Hol	low Ster	n Auger	Size:	L
	Pr	Disportion Per Trace 0 to Some 10 to And 40 to	10% 40%	4 to 10 Lo	Granular Solls (blows per ft.) 0 to 4 Very Loose 30 to 50 Dense 4 to 10 Loose Over 50 Very De 10 to 30 Medium Dense			ense 0 to 2 Very Soft 8 to 15 Stiff
				Standard po Blows are p	enetratio er 6" ta	n test (S iken with	SPT) = 140# ha n an 18" long ×	ammer falling 30" x 2" O.D. x 1 3/8" I.D. split spoon sampler unless otherwise noted.
by	time o	of year and wa	ater added o	luring the drilling proc	ess. 🔳 \	Nater lev	vels indicated m	ication of the retrieved samples. Moisture content indicated may be affected nay vary with seasonal fluctuation and the degree of soil saturation when the tween soil types, the actual transitions may be gradual.

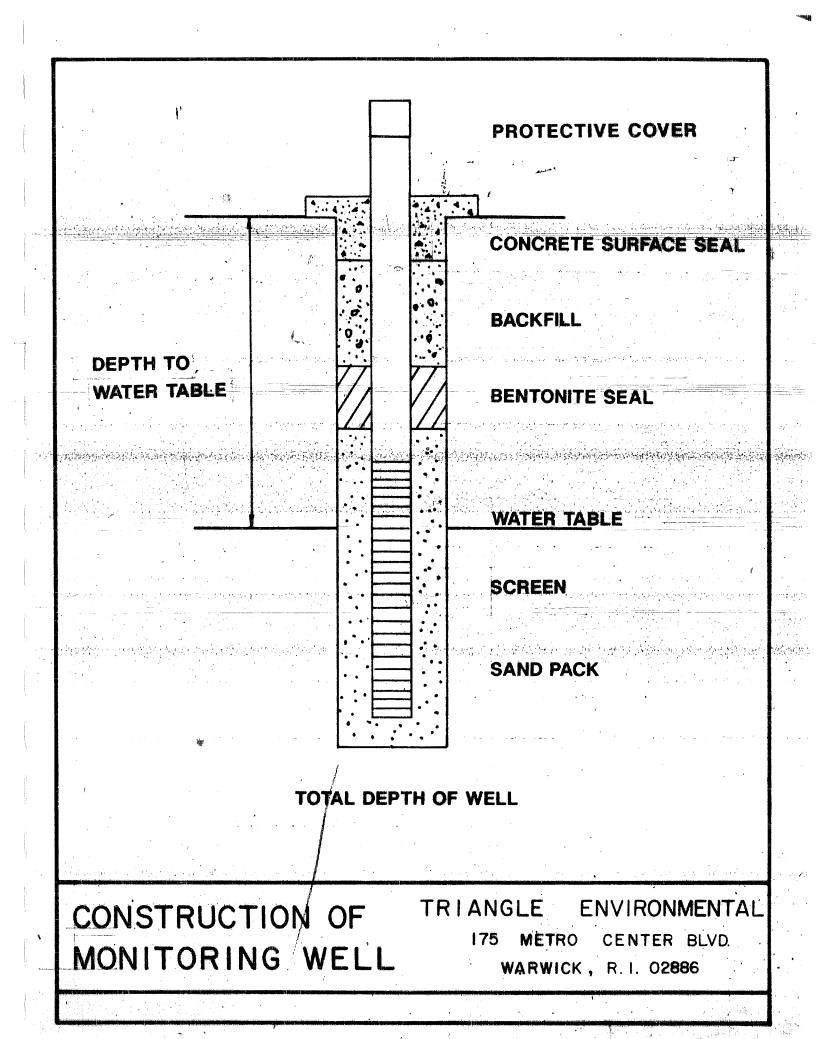
	HAMMER	FAIL	Α		Drill DVIDENCE, F	ing Co.	SHEET_1_OF LOCATION_ <u>Newport</u> HOLE NO <u>MW-A</u>	
	MPLER: WT. 140		client: Tria project: Wai			]		-
Dan	on J. Twining In R. Cook, J In J. Naismit	r		1 3/8"	ALLSTATE DATE, STA DATE, FIN		GROUND ELEVATION <u>Surface</u> GROUND WATER DEPTH 6.0'	-
DEPTH BELOW SURFACE	CASING BLOWS PER FOOT ELEV FT	TYPE OF SAMPLE	PENETRATION BLOWS PER & INCHES	DENSITY OR CONSIST MOISTURE	PROFILE CHANGE DEPTH ELEV	REMARKS INC	ATIFICATION OF SOILS, REMARKS LUDE COLOR GRADATION TYPE OF SOIL ETC CONDITION HARDNESS DEILLING TIME SEAMS ETC	KR
	$ \begin{array}{c} 0-2.0 \\ A \\ U \\ 2-4.0 \\ G \\ E \\ 4-6.0 \\ R \end{array} $	D-2 6-	6-6-7 6-7-8 2-1-3	Med. Dense Very Loose			Y SAND, LITTLE F-M e silt, tr of brick l	
-10	<u>S</u> 6-8.0	D-4 1-	1-1-2	Very Loose	9.0	Dk gray silt		
						End of Boring	- 13.0'	
-20								
							O' of 2" M.W. pipe reen and flush mount	
-30						Bentonite Sea 3 Bags of San	l at 1.0' to 2.0' d	
<u>- 40</u>	GROUND SURFACE TO Type of Sample D=Dry C=Cored W=		Proportions User trace 0 to	5 10% 0·4	140 II phesionless Dent	Loose 02 Very	tency Earth Barra 13.01	
	I'E Undisturbed Fiston P III Test Pit A Hauger IS III Undisturbed Shetby IIII Vane Test		some 21 to	5 20% 5 9 5 35% 10 29 5 50% 30 49 50 +	Med	Losse 3-4 Soft Dense 5-8 M/Sh Dense 9-15 Stiff Dense 16-30 V-Shift 31 + Hard	ff Rock Coring D-4	

₩-21

		HAMMER	FALL	A		Dril	ling Co. R.I. 02915	sheet <u>1</u> of <u>1</u> location <u>Newport</u> hole no. <u>MW-B</u>	
		140			iangle Eng ites Whar		g	LINE & STA OFFSET	
DRILL	LER: <u>R.</u>	Twining Cook, J Naismit	lr.	SAMPLER I. I CASING I. I	<u> </u>	ALLSTATE DATE, STA DATE, FIN	ART 03/21/94	GROUND ELEVATION <u>Surface</u> GROUND WATER DEPTH 7,0'	<u>2</u>
DEPTH BELOW SURFACE	CASING BLOWS PER FOOT	SAMPLE NO DEPTHS	TYPE OF SAMPLE	PENETRATION BLOWS PER 6 INCHES	DENSITY OR CONSIST MOISTURE	PROFILE CHANGE DEPTH ELEV	REMARKS INCL	TIFICATION OF SOILS, REMARKS UDE COLOR GRADATION TYPE OF SOIL ETC CONDITION HARDNESS, DRILLING TIME SEAMS ETC	
-0		0-2.0	D-1	1-3-4-6		1.0	Topsoil		
	A U	2-4.0		6-7-8-10	Med. Dense		F-M DK BR GRA GRAVEL, littl	Y SAND, LITTLE F-M e silt, some cobbles,	
	G E R	4-6.0	N/R	19-3-2-20			tr of brick f	ragments-111	
	S	6-8.0	D-3	3-2-1-3	Very Loose				
10			1		Very	9.0	F-M BLACK SAN	D and silt	
					Loose	13.0			
					_		End of Boring	- 13.0'	
20									
							Installed 13.	0' of 2" M.W. pipe	
							with 10.0' sc protector.	reen and flush mount	
—30							Bentonite Sea	l at 1.0' to 2.0'	
					_		4 Bags of San	đ	
_ 40	GROUND	SURFACE TO	13.0	r. used Auger	S CASING: THEN	Instal	lled Well	ноге но. ММ-В	
						140	Penetration Resistance Ib Wt talting 30" on 2" O.D. Sar	Summary	
υ			Washed	hitte 11	sed 1 to 10% 0.4 10 20% 5.9 10 35% 10.29	Cohesionless Den Very	r Loose 0.2 Very S Loose 3:4 Soft	Earth Boring 13.0'	

CA	Hamme sing: wt		Allstate Drilling Co. EAST PROVIDENCE, R.I. 02915				SHEET_1_OF1 LOCATION_ <u>Newport</u> HOLE NOMW-C LINE & STA	
SA	MPLER: WT. 140	)FALL_30	PROJECT: Wai				OFFSET	
DRIL	IOR: J. Twini LER: <u>R. Cook,</u> PER: J. Naism	Jr.		1 3/8"			GROUND ELEVATION Surface	
DEPTH BELOW SURFACE	CASING SAMPL BLOWS NO PER DEPTH FOOT LIEV FI	S OF	PENETRATION BLOWS PER 6 INCHES	DENSITY OR CONSIST MOISTUPE	PROFILE CHANGE DEPTH ELEV	REMARKS INC	NTIFICATION OF SOILS, REMARKS clude color gradation type of soil etc condition hardness, drilling time seams etc	
-0	0-2.0 A U 2-4.0		9-10-16-12	Med. Dense		F-M DK BR SAN little silt-f	ID, LITTLE F-M GRAVEL, ill	
	G E 4-6.0 R S	D-3	0-0-0-1	Very Loose			D, LITTLE F-M GRAVEL, little ash-fill	
-10				Loose	8.0	Dk gray silt		
					12.0	End of Boring	· · ·	·
-20						Refusal with wood pile tor	Auger (possible )	
				<b>4</b> 			O' of 2" M.W. pipe creen and flush mount	
30						Bentonite Sea	al at 1.0' to 2.0'	
						3 Bags of Sar	ıđ	
40		то 12.0 л	. USED Augers	CASING: THEN	Inctal	led Well	ноге но. ММ-С	
	Type of Sample D = Dry C = Cored V P = Undisturbed Piston $P = 1est Pi$ A = Auger IS = Undisturbed Shelby r = Vane lest		Proportions Use trace 0 1 listile 11 1 some 21 t		140 I ohesionless Den Very Med	Penetration Resistance b Wt talling 30" on 2" O D Sc sity Cohesire Consu- Loose 02 Very Loose 3-4 Soft	sitency Soft Earth Boring 12.0' Soft Rock Coring	

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#### STANDARD OPERATING PROCEDURE #004 SOIL SCREENING USING THE HNu PI-101: THE JAR HEADSPACE TECHNIQUE

- (1) Calibrate the instrument using the manufacturer's specifications. The instrument should be calibrated to yield "total organic vapors" in parts per million (ppm) as benzene.
- (2) Collect samples to be analyzed in two clean, widemouth glass containers, filling each container half way. Quickly cover the open top of each container with aluminum foil and apply screw caps. The containers used must be greater than 250 ml in volume.
- (3) Vigorously shake each container for 15 seconds. Allow the headspace to develop for approximately ten minutes, then shake the jar for an additional 15 seconds. If the ambient air temperature is less than 32°F, this procedure should take place in a heated room or vehicle.
- (4) Turn on the HNu meter, and set for the anticipated range. Make sure to zero the meter if necessary. Remove the screw cap on the container to be analyzed, exposing the foil seal. Quickly puncture the foil with the tip of the probe to a point about one-half of the headspace depth. Do not allow water droplets or soil particles to come in contact with the open end of the probe.
- (5) Record the highest meter response as the jar headspace concentration. Maximum response should occur between two and five seconds. The meter may respond erratically to high organic vapor or moisture concentrations, in which case, the data should be discounted.
- (6) The screening data from both jar samples should be recorded. A comparison of the results should yield values consistent to within  $\pm 20\%$ .
- (7) Recalibrate the instrument after every 10 samples using the manufacturer's calibration instructions.



#### SOIL VAPOR CONCENTRATIONS

BORING NUMBER	MINIMUM S CONCEN			INTERVAL EXCEEDING	
	INTERVAL	TOV (ppm)	INTERVAL	TOV (ppm)	50 PPM TOV
SB-01	0-2'	8.6	4-6'	48.9	NA
SB-02	4-6'	7.7	2-4'	22.7	NA
SB-03	4-6'	8.2	8-10'	19.9	NA
SB-04	0-2'	5.5	8-10'	1,297	4-10'
SB-05	2-4'	9.4	6-8'	745	4-10'
SB-06	8-10'	72.8	4-6'	466	0-10'
SB-07	0-2'	10.8	4-6'	717	4-10'
SB-08	2-4'	8.3	6-8'	22.2	NA
SB-09	2-4'	7.0	8-10'	740	6-10'
SB-10	2-4'	6.5	6-8'	551	6-10'
SB-11	8-10'	7.3	0-2'	11.4	NA
SB-12	8-10'	6.6	0-2'	47.7	NA
SB-13	6-8'	6.9	2-4'	9.7	NA
SB-14	0-8'	<1	8-10'	13.7	NA
SB-15	0-6'	<1	8-10'	24.5	NA
SB-16	0-2'	<1	8-10'	264	6-10'
SB-17	0-2'	2.7	12-14'	145	2-14'
SB-18	2-4'	1.5	8-10'	10.7	NA
SB-19	12-14'	77.1	6-8'	1,100	0-14'
SB-20	0-2'	2.7	2-4'	15.1	NA
SB-21	2-4'	10.9	6-8'	224	4-10'
SB-22	0-2'	5.2	8-10'	304	4-14'
SB-23	0-2'	3.8	6-8'	245	4-10'
SB-24	0-2'	6.5	6-8'	559	2-14'
SB-25	0-2'	5.8	6-8'	488	6-14'
SB-26	0-2'	<1	8-10'	647	6-10'
SB-27	0-2'	122	4-6'	357	0-10'
SB-28	0-2'	3.5	8-10'	340	4-10'



SB-29	0-2'	30.3	4-6'	597	2-10'
SB-30	0-2'	48.9	2-4'	986	2-10'
SB-31	4-6'	190	0-2'	344	0-10'
SB-32	0-2'	5.1	6-8'	425	6-10'
SB-33	0-2'	27.8	6-8'	208	2-8'
SB-34	0-2'	72.7	6-8'	247	0-10'
SB-35	0-2'	12.6	2-4'	446	2-10'
SB-36	0-2'	7.0	6-8'	155	4-10'
SB-37	0-2'	10.9	8-10'	491	6-10'
SB-38	0-2'	1.3	8-10'	26.7	NA
SB-39	0-2'	9.5	8-10'	117	8-10'
SB-40	0-2'	4.1	8-10'	12.5	NA
SB-41	8-10'	3.5	0-2'	17.2	NA
TW-01	0-2'	<1	8-10'	1.8	NA
TW-02	0-2'	<1	8-10'	2.8	NA
TW-03	0-2'	3.8	4-6'	185	4-8'



Triangle Environmental Attn: Mr. Jon Twining 175 Metro Center Blvd., Suite 7 Warwick, RI 02886 DATE RECEIVED: 03/22/94 DATE REPORTED: 04/06/94 P.O. #: INVOICE #: G2370

**DESCRIPTION:** Twelve (12) soil samples from Newport Coastal Partners, Waites Wharf, Newport, RI (Job #9321.1)

Subject samples have been analyzed by our laboratory with the attached results.

References: <u>Test Methods for Evaluating Solid Waste, Physical/</u> <u>Chemical Methods,</u> U.S. EPA, SW-846, November 1986, 3rd edition, Update I, July 1992.

TCLP Procedure, Federal Register, Vol. 55, No. 126, Friday, June 29, 1990.

If you have any questions regarding this work, or if we may be of further assistance, please contact us.

Approved by:

hail a

Michael S. Rose Laboratory Manager

tri/kah

Anthony E. Perrotti President Triangle Environmental April 6, 1994 Invoice # G2370

PARAMETER	SB #7, 4-10'	SB #9, 4-10'
Volatile Organic Compounds		
Method #8240 (mg/kg)	<1 C	<2.0
chloromethane	<1.6	<2.0
bromomethane	<1.6	<2.0 <2.0
vinyl chloride dichlorodifluoromethane	<1.6 <1.6	<2.0
chloroethane	<1.6	<2.0
methylene chloride	<1.6	<2.0
trichlorofluoromethane	<1.6	<2.0
1,1-dichloroethylene	<1.6	<2.0
1,1-dichloroethane	<1.6	<2.0
trans-1,2-dichloroethylene	<1.6	<2.0
chloroform	<1.6	<2.0
1,2-dichloroethane	<1.6	<2.0
1,1,1-trichloroethane	<1.6	<2.0
carbon tetrachloride	<1.6	<2.0
bromodichloromethane	<1.6	<2.0
1,2-dichloropropane	<1.6	<2.0
cis-1,3-dichloropropylene	<1.6	<2.0
trichloroethylene	<1.6	<2.0
trans-1,3-dichloropropylene	<1.6	<2.0
1,1,2-trichloroethane	<1.6	<2.0
dibromochloromethane	1.6	<2.0
bromoform	<1.6	<2.0
tetrachloroethylene	<1.6	<2.0
1,1,2,2-tetrachloroethane	<1.6	<2.0
chlorobenzene	<1.6	<2.0
2-chloroethyl vinyl ether	<1.6	<2.0
dichlorobenzenes	<1.6	<2.0
benzene	<1.6	<2.0
toluene	<1.6	<2.0
ethylbenzene	14	13
xylenes	20	11
acetone	<8.1	<10
carbon disulfide	<4.0	<5.0
2-butanone	<8.1	<10
vinyl acetate	<40	<50
4-methyl-2-pentanone	<40	<50
2-hexanone	<40	<50
styrene	<1.6	<2.0

## R.I. ANALYTICAL LABORATORIES, INC.

Triangle	Environmental
April 6,	1994
Invoice #	¥ G2370

Invoice # G2370	get glulan	
ARAMETER	MW #3, COMPOSITE (4-6' & 6-8')	SB #5, 4-10'
olatile Organic (mg/kg)		
compounds Method #8240		
chloromethane	<1.4	<0.8
bromomethane	<1.4	<0.8
vinyl chloride	<1.4	<0.8
dichlorodifluoromethane	<1.4	<0.8
chloroethane	<1.4	<0.8
methylene chloride	<1.4	<0.8
trichlorofluoromethane	<1.4	<0.8
1,1-dichloroethylene	<1.4	<0.8
1,1-dichloroethane	<1.4	<0.8
trans-1,2-dichloroethylene chloroform	<1.4	<0.8
	<1.4	<0.8
1,2-dichloroethane	<1.4	<0.8
1,1,1-trichloroethane carbon tetrachloride	<1.4	<0.8
bromodichloromethane	<1.4	<0.8
	<1.4	<0.8
1,2-dichloropropane	<1.4	<0.8
cis-1,3-dichloropropylene	<1.4	<0.8
trichloroethylene	<1.4	<0.8
trans-1,3-dichloropropylene	<1.4	<0.8
1,1,2-trichloroethane dibromochloromethane	<1.4	<0.8
	<1.4	<0.8
bromoform	<1.4	<0.8
tetrachloroethylene	<1.4	<0.8
1,1,2,2-tetrachloroethane	<1.4	<0.8
chlorobenzene	<1.4	<0.8
2-chloroethyl vinyl ether dichlorobenzenes	<1.4	<0.8
	<1.4	<0.8
benzene toluene	<1.4 <1.4	<0.8
ethylbenzene	<1.4 <1.4	<0.8
xylenes	<1.4 <1.4	1.6
acetone	<1.4 <7.1	1.2
carbon disulfide	<7.1	<4.2
2-butanone	<7.1	<2.1
vinyl acetate		<4.2
4-methy1-2-pentanone	<35 <35	<21 <21
2-hexanone	<35	<21<21
styrene	<35 <1.4	<0.8

# R.I. ANALYTICAL LABORATORIES, INC.

Triangle Environmental April 6, 1994 Invoice #: G2399

SAMPLE ID	<b>TOTAL PETROLUEM HYDROCARBONS</b> (mg/kg*)
<pre>SB14 (4-8 ft.) SB15 (6-10 ft.) SB16 (6-10 ft.) SB17 (2-14 ft.) SB22 (4-14 ft.) SB23 (4-14 ft.) SB24 (2-14 ft.) SB25 (2-14 ft.)</pre>	<31.8 75.2 890 350 1,940 2,160 890 830

*calculated on a dry weight basis

PARAMETER	SB19 (0-14')	SB23 (4-14')	SB24 (2-14')	8B25 (2-14')
Volatile Organic Compounds				
Method 8020: (mg/kg)				
benzene	<2.5	<1.0	<1.0	<1.0
toluene	5.5	<1.0	<1.0	1.0
ethylbenzene	6.5	<1.0	<1.0	<1.0
xylenes	18	<1.0	<1.0	4.3
PARAMETER	SB19	8B21	SB24	8B25
	(0-14")	(4-14')	(2-14")	(2-14')
Polynuclear Aromatic				
Hydrocarbons: (mg/kg*)				
naphthalene	<4.6	<0.8	1.9	3.6
acenaphthylene	<4.6	<0.8	<1.0	<1.0
acenaphthene	<4.6	<0.8	<1.0	<1.0
fluorene	<4.6	<0.8	<1.0	<1.0
phenanthrene	10	<0.8	3.2	2.2
anthracene	<4.6	<0.8	<1.0	<1.0
fluoranthene	9.0	0.9	3.5	3.6
pyrene	7.0	<0.8	2.8	3.8
chrysene	4.6	<0.8	1.4	2.5
benzo(a)anthracene	<4.6	<0.8	1.3	2.5
benzo(b)fluoranthene	<4.6	<0.8	1.1	3.4
benzo(k)fluoranthene	<4.6	<0.8	1.1	3.6
benzo(a)pyrene	<4.6	<0.8	1.2	3.2
indeno(1,2,3-cd)pyrene	<4.6	<0.8	<1.0	<1.0
dibenzo(a,h)anthracene	<4.6	<0.8	<1.0	<1.0
benzo(g,h,i)perylene	<4.6	<0.8	<1.0	<1.0

*calculated on a dry weight basis



Triangle Environmental Attn: Mr. Jonathan Twining 175 Metro Center Blvd., Suite 7 Warwick, RI 02886 DATE RECEIVED: 3/24/94 DATE REPORTED: 4/08/94 P.O. #: INVOICE #: G2417

**DESCRIPTION:** Eleven (11) soil samples from Newport Coastal Partners, Waites Wharf (Job #9321.1)

Subject samples have been analyzed by our laboratory with the attached results.

Reference: <u>Test Methods for Evaluating Solid Waste, Physical/</u> <u>Chemical Methods,</u> U.S. EPA, SW-846, November 1986, 3rd edition, Update I, July 1992.

If you have any questions regarding this work, or if we may be of further assistance, please contact us.

Approved by:

Michael S. Rose Laboratory Manager

Anthony -E. Perrotti

President

tri/afp

Triangle Environmental April 8, 1994 Invoice #: G2417

SAMPLE ID	<b>TOTAL PETROLEUM HYDROCARBONS</b> (mg/kg*)
SB26 (4-10 ft.)	3,670
SB27 (0-10 ft.)	734
SB28 (4-10 ft.)	1,660
SB29 (0-8 ft.)	397
SB32 (0-10 ft.)	581
SB35 (0-10 ft.)	2,400

*calculated on a dry weight basis

PARAMETER	8B30 (0-10)		3B31 -10')	SB34 (0-10')	
Volatile Organic Compounds Method 8020: (mg/kg) benzene toluene ethylbenzene xylenes	<1.0 1.6 5.3 8.4		<1.0 1.5 5.7 4	<1.0 2.1 6.1 19	
PARAMETER	8B30 (0-10')	SB31 (0-10')	8B33 (0-10')	8B34 (0-10')	8B36 (0-10')
Polynuclear Aromatic					
Hydrocarbons: (mg/kg*)					
naphthalene	6.4	<3.8	<4.2	<4.4	<4.1
acenaphthylene	<4.3	<3.8	<4.2	<4.4	<4.1
acenaphthene	<4.3	<3.8	<4.2	<4.4	<4.1
fluorene	<4.3	<3.8	<4.2 6.8	<4.4 5.3	<4.1
phenanthrene anthracene	8.4 <4.3	<3.8 <3.8	<4.2	5.3 <4.4	<4.1 <4.1
fluoranthene	<4.3	<3.8	<4.2	<4.4	<4.⊥ 36
pyrene	<4.3	<3.8	<4.2	<4.4	30
chrysene	<4.3	<3.8	<4.2	<4.4	21
benzo(a)anthracene	<4.3	<3.8	<4.2	<4.4	18
benzo(b)fluoranthene	<4.3	<3.8	<4.2	<4.4	22
benzo(k)fluoranthene	<4.3	<3.8	<4.2	<4.4	21
benzo(a)pyrene	<4.3	<3.8	<4.2	<4.4	22
indeno(1,2,3-cd)pyrene	<4.3	<3.8	<4.2	<4.4	11
dibenzo(a,h) anthracene	<4.3	<3.8	<4.2	<4.4	<4.1
benzo(g,h,i)perylene	<4.3	<3.8	<4.2	<4.4	18

*calculated on a dry weight basis

R.I. Analytical Laboratories, Inc. page 2 of 2



Triangle Environmental Attn: Mr. Jonathan Twining 175 Metro Center Blvd., Suite 7 Warwick, RI 02886 DATE RECEIVED: 4/01/94 DATE REPORTED: 4/13/94 P.O. #: INVOICE #: G2558

DESCRIPTION: Nine (9) groundwater samples from Newport Coastal Partners, Waites Wharf (Job #9321.1)

Subject samples have been analyzed by our laboratory with the attached results.

## Reference: <u>Guidelines Establishing Testing Procedures For The</u> <u>Analysis of Pollutants</u>, 40CFR, Part 136, July 1986.

If you have any questions regarding this work, or if we may be of further assistance, please contact us.

Approved by:

Michael S. Rose Laboratory Manager

tri/afp

Anthony E. Perrotti President

Triangle Environmental	·
April 13, 1994	
Invoice #: G2558	
INVOICE #. GZ558	

SAMPLE ID	TOTAL PETROLEUM HYDROCARBONS (mg/L)
TW-1	1.92
TW-2	<0.96
TW-3	33.7
TW-4	93.2
TW-5	97.9
MW-2	<0.96
MW-3	<2.41
RW-1	<0.48
RW-2	<0.48

SAMPLE ID	TOTAL LEAD (mg/L)	SOLUBLE LEAD (mg/L)
TW-1	14.0	
TW-2	0.63	
TW-3	1.01	0.71
TW-4	1.74	0.06
TW-5	0.67	0.48
MW-2	0.07	
MW-3	0.04	
RW-1	<0.04	
RW-2	0.08	

Triangle Environmental April 13, 1994 Invoice #: G2558				
PARAMETER	TW-1	TW-2	TW-3	
Volatile Organic Compounds Method 624 (µg/L) toluene	ND	ND	15	
PARAMETER	TW-4	TW-5	MW-2	
Volatile Organic Compounds Method 624 (µg/L) benzene toluene xylenes	4 9 2	15 ND 8	ND ND ND	NDP-par tang
PARAMETER	<b>MW-</b> 3	RW-1	RW-2	
Volatile Organic Compounds Method 624 ( $\mu$ g/L)	ND	ND	ND	
PARAMETER	TW-3	TW-4	TW-5	
Polynuclear Aromatic Hydrocarbo (µg/L)				
naphthalene acenaphthylene	<10 <10	<10 <10	110 <10	
acenaphthene	<10	<10	<10	
fluorene	<10	<10	<10	
phenanthrene	<10	<10	21	
anthracene	<10	<10	<10	
fluoranthene	<10	<10	<10	
pyrene	<10	<10	<10	
chrysene benzo(a)anthracene	<10 <10	<10 <10	<10 <10	
benzo(b) fluoranthene	<10	<10	<10 <10	
benzo(k)fluoranthene	<10	<10	<10	
benzo(a)pyrene	<10	<10	<10	
indeno(1,2,3-cd)pyrene	<10	<10	<10	
dibenzo(a,h)anthracene	<10	<10	<10	
benzo(g,h,i)perylene	<10	<10	<10	

Note: A list of volatile organic compounds tested for and their detection limits is attached.

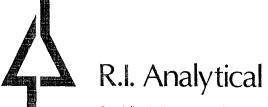
# R.I. Analytical Laboratories, Inc. page 3 of 4

Triangle Environmental April 13, 1994 Invoice #: G2558

## Volatile Organic Compounds Method #624

chloromethane bromomethane vinyl chloride dichlorodifluoromethane chloroethane methylene chloride trichlorofluoromethane 1,1-dichloroethylene 1,1-dichloroethane trans-1,2-dichloroethylene chloroform 1,2-dichloroethane 1,1,1-trichloroethane carbon tetrachloride bromodichloromethane 1,2-dichloropropane cis-1,3-dichloropropylene trichloroethylene trans-1,3-dichloropropylene 1,1,2-trichloroethane dibromochloromethane bromoform tetrachloroethylene 1,1,2,2-tetrachloroethane chlorobenzene 2-chloroethyl vinyl ether dichlorobenzenes benzene toluene ethylbenzene xylenes

Limit of Detection: 1  $\mu$ g/L



Specialists in Environmental Ser**GERTIFICATE OF ANALYSIS** 

Triangle Environmental Attn: Mr. Jonathan Twining 175 Metro Center Blvd., Suite 7 Warwick, RI 02886 DATE RECEIVED: 05/14/93 DATE REPORTED: 05/27/93 P.O. #: INVOICE #: F3272

**SAMPLE DESCRIPTION:** One (1) oil sample from the UST of unknown capacity, Coastal Partner's Property, Waites Wharf, Newport, RI (Job #9321)

Subject sample has been analyzed by our laboratory with the attached results.

References: <u>Test Methods for Evaluating Solid Waste, Physical/</u> <u>Chemical Methods,</u> U.S. EPA, SW-846, July 1982, second edition. Revised December 1987

> TCLP Procedure, Federal Register, Vol. 55, No. 126, Friday, June 29, 1990.

American Society for Testing and Materials

If you have any questions regarding this work, or if we may be of further assistance, please contact us.

Approved by:

Michael S. Rose Laboratory Manager

tri:cmc

Anthony E. Perrotti

Anthony E. Perrotti

Triangle Environ	nmental
Date Received:	05/14/93
Date Reported:	05/29/93
Invoice #:	F3272

## Volatile Organic Compounds Method #8240

chloromethane bromomethane vinyl chloride dichlorodifluoromethane chloroethane methylene chloride trichlorofluoromethane 1,1-dichloroethylene 1,1-dichloroethane trans-1,2-dichloroethylene chloroform 1,2-dichloroethane 1,1,1-trichloroethane carbon tetrachloride bromodichloromethane 1,2-dichloropropane cis-1,3-dichloropropylene trichloroethylene trans-1,3-dichloropropylene 1,1,2-trichloroethane dibromochloromethane bromoform tetrachloroethylene 1,1,2,2-tetrachloroethane chlorobenzene 2-chloroethyl vinyl ether dichlorobenzenes benzene toluene ethylbenzene xylenes

Limit of Detection: 5 mg/kg

R.I. ANALYTICAL LABORATORIES, INC.

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Triangle Environmental Date Received: 05/14/93 Date Reported: 05/29/93 Invoice #: F3272

# PARAMETER

RESULTS

Toxicity Characteristic Leaching Procedure: Metals:	
Lead	<0.04 mg/l
Flash Point (c/c)	>200 °F
Volatile Organic Compounds (Method 8240): benzene toluene ethylbenzene xylenes	5.5 mg/kg 23 " 6.0 " 81 "

Note: A list of volatile organic compounds tested for and their detection limits is attached.

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Triangle Environmental Date Received: 05/14/93 Date Reported: 05/29/93 Invoice #: F3272

### -OIL FINGERPRINT ANALYSIS-

## **PROCEDURE:**

The sample was extracted using a methylene chloride extraction procedure. This extract was analyzed via a Perkin Elmer Gas Chromatograph equipped with flame ionization detector (FID). Standards of known gasoline, diesel fuel, kerosene, mineral spirits, No 2,4,6, and bunker C fuel oils were prepared and analyzed in the same manner.

## RESULTS

The chromatogram produced by the sample shows a pattern of peaks that does not match any of the known standards. The general characteristics of the fingerprint indicate the presence of low, medium and high molecular weight hydrocarbons. The medium molecular weight hydrocarbons show some similarity to #2 fuel oil, while the higher molecular weight hydrocarbons show some similarity to lubricating oil.

## R.I. ANALYTICAL LABORATORIES, INC.

Triangle Environmental Date Received: 05/14/93 Date Reported: 05/29/93 Invoice #: F3272

# PARAMETER

RESULTS

Toxicity Characteristic Leaching Procedure: Metals:	
Lead	<0.04 mg/l
Flash Point (c/c)	>200 °F
Volatile Organic Compounds (Method 8240): benzene toluene ethylbenzene xylenes	5.5 mg/kg 23 " 6.0 " 81 "

Note: A list of volatile organic compounds tested for and their detection limits is attached.

R.I. ANALYTICAL LABORATORIES, INC.

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