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SITE REMEDIATION

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

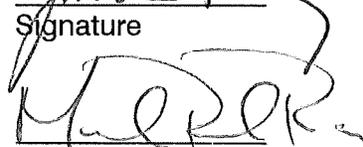
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issued:

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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:



- (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.



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, it 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 naphtha, 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.



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.



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 existing 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.

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	Soils	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
GROUNDWATER ANALYSES			
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:



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
755 TW-3	9,850	1.36	---
4	---	10.7	1,220
5	971	1.17	---
6	---	0.33	419
7	---	<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	---	---



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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.

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.
- (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.



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.

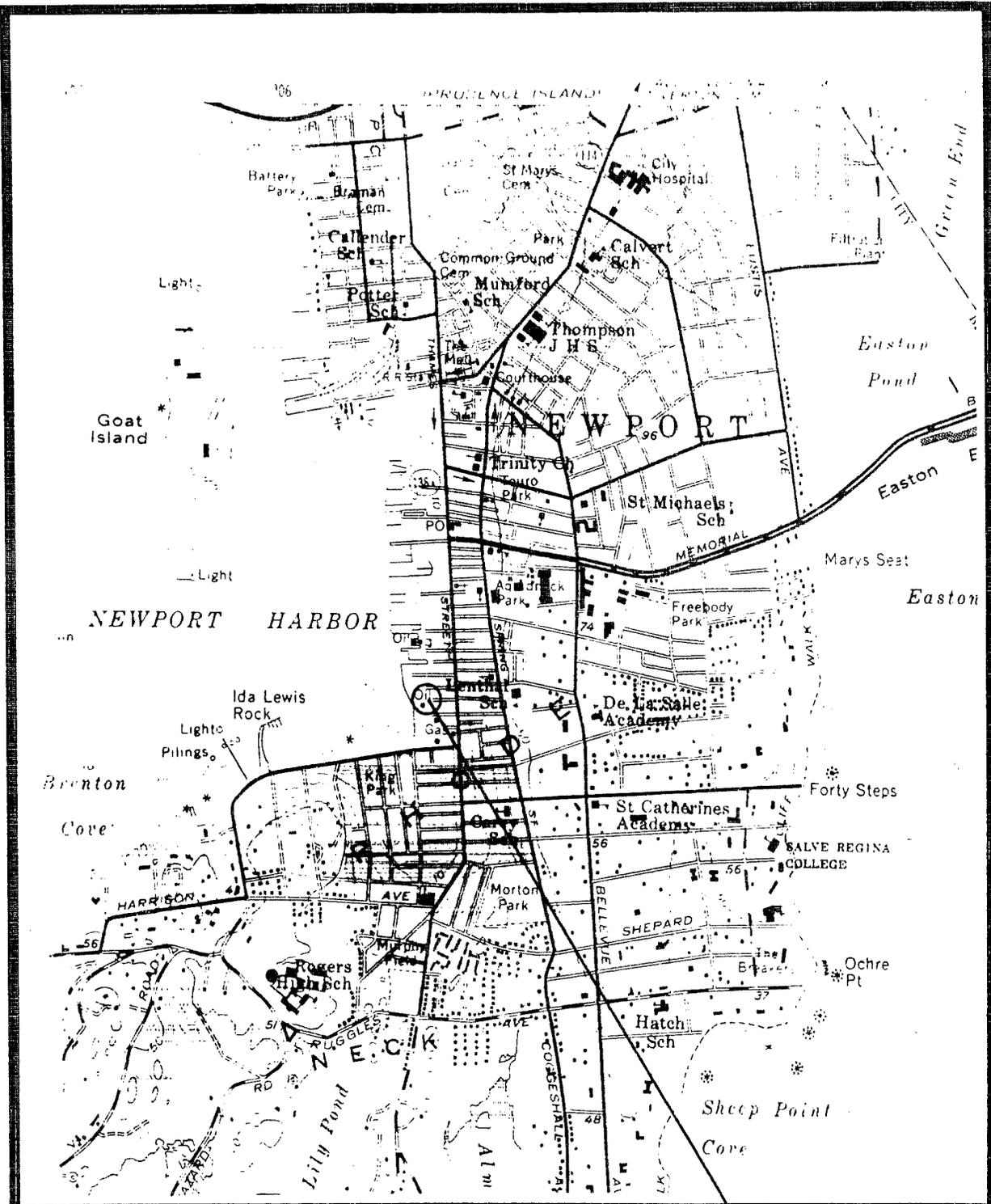


SECTION 8.0 LIMITATIONS

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.



TRIANGLE ENVIRONMENTAL
 175 Metro Center Blvd.
 Warwick, R.I. 02886

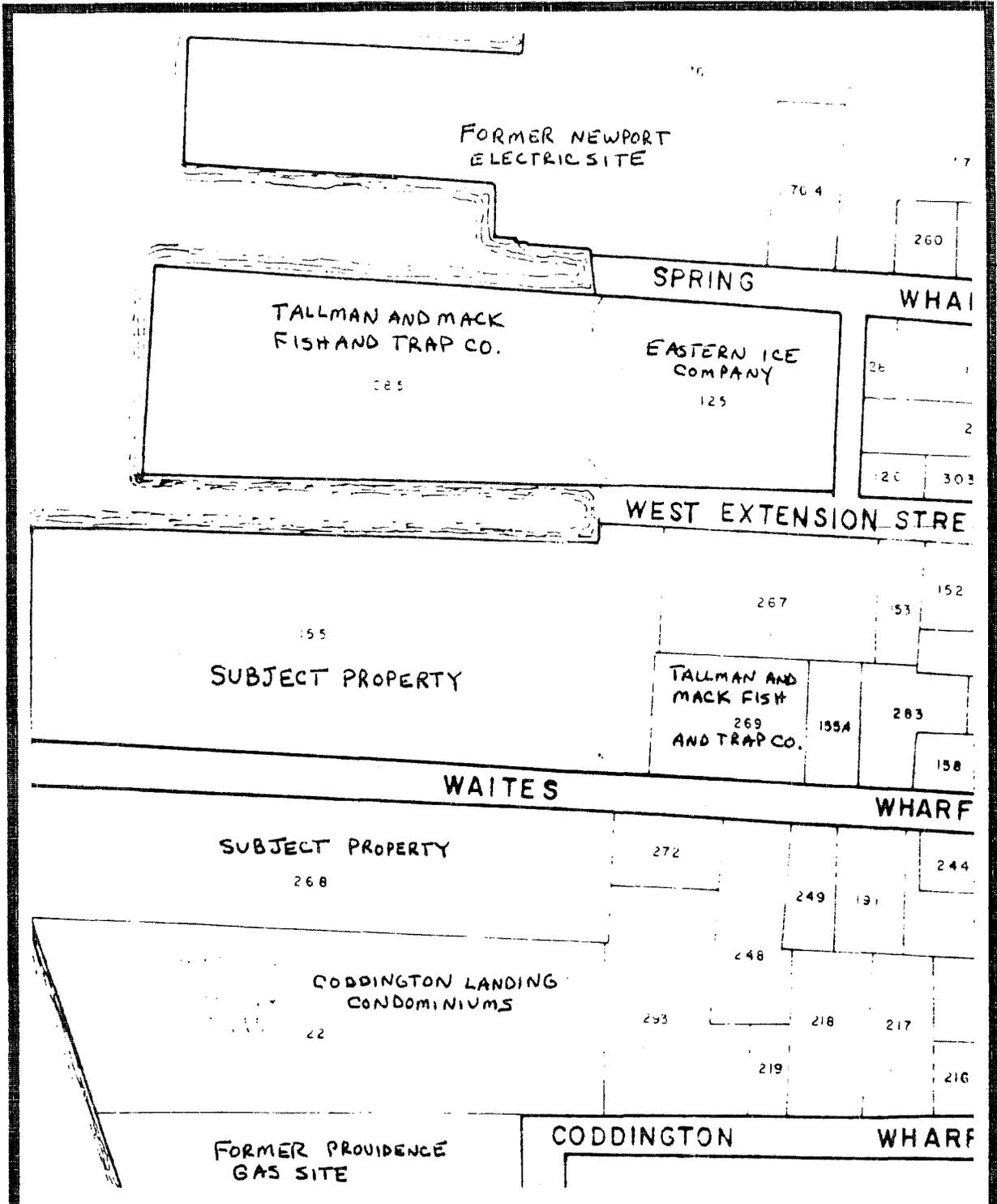
SCALE: 1:24000	APPROVED BY:	DRAWN BY JET
DATE: 5/20 03		REVISED:

Site Locus, USGS Topographical Map, Newport Quadrangle

Waite's Wharf, Newport, RI	DRAWING NO. 9321 Figure 1
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Site Locus





TRIANGLE ENVIRONMENTAL		
175 Metro Center Blvd. Warwick, R.I. 02886		
SCALE: 1"=100 FT	APPROVED BY:	DRAWN BY: JET
DATE: 5/20/93		REVISED:
Plat 32, Lots 155 and 268, Including Surrounding Lots		
Waites Wharf, Newport, RI	DRAWING NO. 9321 Figure 2	



S.S. Newport Slip

Harbor Liquor
Anthony's Seafood Restaurant

Suspected Location of Two 5,000 Gallon Tanks
Fill For Tank of Unknown Size

Blacksmith

Tallman and Mack Fish and Trap Co.

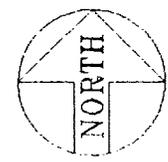
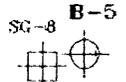
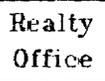
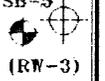
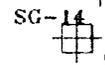
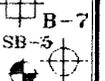
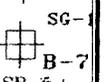
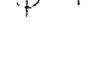
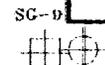
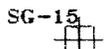
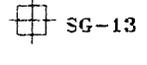
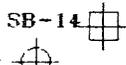
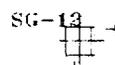
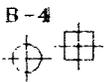
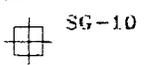
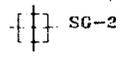
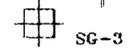
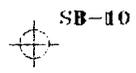
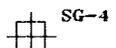
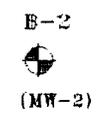
Waites Wharf

The Deck Restaurant

Realty Office

Location of 250 Gallon Fuel Oil Tank

Coddington Landing Condominiums



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Warwick, R.I. 02886

SCALE: 1"=60 FT	APPROVED BY:	DRAWN BY: JET
DATE: 3/27/93		REVISED:
Locations of TRC Soil Borings, Wells, and Soil Gas Survey Points		
Waites Wharf, Newport, RI	DRAWING NO. 9321	FIGURE 4



148 Pioneer Dr.
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SOIL EXPLORATION CORPORATION

Geotechnical Drilling and Groundwater Monitor Wells

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

Client **Triangle Environmental** Date **03/25/94** Job No. **94-0333**

Location **Waites Wharf, Newport, Rhode Island**

BORING NO. **SB-4** Ground Elev. _____ Date Start _____ Date Complete _____ Drilling Foreman **D.L.** Eng./Hydrol. Geologist _____

DEPTH	Sample Data					Soil and/or bedrock strata descriptions	
	No.	Depth (ft.)	Blows 6" Penetration	Rec. Inches	Casing Blows Per ft.	Strata Change Depth	Visual Identification of Soil and/or Rock Strata
5	1	0'0" - 2'0"					Dry to wet, FINE TO COARSE SAND, some organic silt, trace fine gravel and wood.
	2	2'0" - 4'0"					
	3	4'0" - 6'0"					
	4	6'0" - 8'0"					
	5	8'0" - 10'0"					
10					8'0"	Wet, FINE SAND, some organic silt.	
					10'0"	End of boring at 10'0" Water level between 3'0" and 6'0" depending on the tide.	
15							
20							
25							
30							
35							
40							

Type of Boring _____ Casing Size: _____ Hollow Stem Auger Size: _____

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 Dense 10 to 30 Medium Dense	Cohesive Soils (blows per ft.) 0 to 2 Very Soft 8 to 15 Stiff 2 to 4 Soft 15 to 30 Very Stiff 4 to 8 Medium Stiff Over 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.		

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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(603) 672-2135

Client **Triangle Environmental** Date **03/25/94** Job No. **94-0333**

Location **Waites Wharf, Newport, Rhode Island**

BORING NO. SB-11 **Ground Elev.** **Date Start** 03/22/94 **Date Complete** 03/22/94 **Drilling Foreman** D.L. **Eng./Hydrol. Geologist**

DEPTH	Sample Data				Soil and/or bedrock strata descriptions		
	No.	Depth (ft.)	Blows 6" Penetration	Rec. Inches	Casing Blows Per ft.	Strata Change Depth	Visual Identification of Soil and/or Rock Strata
5	1	0'6" - 2'0"					Dry to wet, FINE TO COARSE SAND, some organic silt, trace fine gravel, wood, shells.
	2	2'0" - 4'0"					
	3	4'0" - 6'0"					
	4	6'0" - 8'0"					
	5	8'0" - 10'0"				8'0"	
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							
35							
40							

Type of Boring **Casing Size:** Hollow Stem Auger Size:

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 Dense 10 to 30 Medium Dense	Cohesive Soils (blows per ft.) 0 to 2 Very Soft 8 to 15 Stiff 2 to 4 Soft 15 to 30 Very Stiff 4 to 8 Medium Stiff Over 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.		

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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Client **Triangle Environmental** Date **03/25/94** Job No. **94-0333**

Location **Waites Wharf, Newport, Rhode Island**

BORING NO. SB-13 **Ground Elev.** **Date Start** 03/22/94 **Date Complete** 03/22/94 **Drilling Foreman** D.L. **Eng./Hydrol. Geologist**

DEPTH	Sample 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	0'6" - 2'0"				0'2"	ASPHALT
	2	2'0" - 4'0"					Dry to wet, FINE TO COARSE SAND, some organic silt, trace fine gravel and wood.
5	3	4'0" - 6'0"					
	4	6'0" - 8'0"				6'0"	
	5	8'0" - 10'0"					
10							
						10'0"	
15							
20							
25							
30							
35							
40							

Type of Boring Casing Size: **Hollow Stem Auger Size:**

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 Dense 10 to 30 Medium Dense	Cohesive Soils (blows per ft.) 0 to 2 Very Soft 8 to 15 Stiff 2 to 4 Soft 15 to 30 Very Stiff 4 to 8 Medium Stiff Over 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.		

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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Client **Triangle Environmental** Date **03/25/94** Job No. **94-0333**

Location **Waites Wharf, Newport, Rhode Island**

BORING NO. SB-16 **Ground Elev.** **Date Start** **Date Complete** **Drilling Foreman** D.L. **Eng./Hydrol. Geologist**

DEPTH	Sample Data					Soil and/or bedrock strata descriptions	
	Sample		Blows 6" Penetration	Rec. Inches	Casing Blows Per ft.	Strata Change Depth	Visual Identification of Soil and/or Rock Strata
	No.	Depth (ft.)					
	1	0'0"- 2'0"					Dry to wet, FINE TO MEDIUM SAND, some organic silt, trace fine gravel and wood, fill.
	2	2'0"- 4'0"					
5	3	4'0"- 6'0"					
	4	6'0"- 8'0"					
	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							
35							
40							

Type of Boring Casing Size: Hollow Stem Auger Size:

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 Dense 10 to 30 Medium Dense	Cohesive Soils (blows per ft.) 0 to 2 Very Soft 8 to 15 Stiff 2 to 4 Soft 15 to 30 Very Stiff 4 to 8 Medium Stiff Over 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.	

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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(603) 672-2135

Client **Triangle Environmental** Date **03/25/94** Job No. **94-0333**

Location **Waites Wharf, Newport, Rhode Island**

BORING NO. SB-18 **Ground Elev.** **Date Start** **Date Complete** **Drilling Foreman** D.L. **Eng./Hydrol. Geologist**

DEPTH	Sample Data					Soil and/or bedrock strata descriptions	
	No.	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' 6"	ASPHALT
	2	2' 0" - 4' 0"					Dry to wet, FINE TO MEDIUM SAND, some organic silt, trace fine gravel and wood, fill.
5	3	4' 0" - 6' 0"					
	4	6' 0" - 8' 0"					
	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							
35							
40							

Type of Boring Casing Size: Hollow Stem Auger Size:

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 Dense 10 to 30 Medium Dense	Cohesive Soils (blows per ft.) 0 to 2 Very Soft 8 to 15 Stiff 2 to 4 Soft 15 to 30 Very Stiff 4 to 8 Medium Stiff Over 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.		

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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(603) 672-2135

Client **Triangle Environmental** Date **03/25/94** Job No. **94-0333**

Location **Waites Wharf, Newport, Rhode Island**

BORING NO. SB-19 **Ground Elev.** **Date Start** **Date Complete** **Drilling Foreman** **D.L.** **Eng./Hydrol. Geologist**

DEPTH	Sample 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	0'6" - 2'0"				0'2"	ASPHALT
	2	2'0" - 4'0"					Dry to wet, FINE TO MEDIUM SAND, some organic silt, trace fine gravel, wood, brick, fill.
5	3	4'0" - 6'0"					
	4	6'0" - 8'0"					
	5	8'0" - 10'0"					
10	6	10'0" - 12'0"					
	7	12'0" - 14'0"					
15						14'0"	End of boring at 14'0" Water level between 3'0" and 6'0" depending on the tide.
20							
25							
30							
35							
40							

Type of Boring Casing Size: **Hollow Stem Auger** Size:

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 Dense 10 to 30 Medium Dense	Cohesive Soils (blows per ft.) 0 to 2 Very Soft 8 to 15 Stiff 2 to 4 Soft 15 to 30 Very Stiff 4 to 8 Medium Stiff Over 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.		

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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(603) 672-2135

Client **Triangle Environmental** Date **03/25/94** Job No. **94-0333**

Location **Waites Wharf, Newport, Rhode Island**

BORING NO. SB-20 **Ground Elev.** **Date Start** **Date Complete** **Drilling Foreman** D.L. **Eng./Hydrol. Geologist**

DEPTH	Sample 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	0'6"- 2'0"				0'2"	ASPHALT
	2	2'0"- 4'0"					Dry to wet, FINE TO MEDIUM SAND, some organic silt, trace fine gravel, wood, brick.
5	3	4'0"- 6'0"					
	4	6'0"- 8'0"					
	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							
35							
40							

Type of Boring **Casing Size:** **Hollow Stem Auger Size:**

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 Dense 10 to 30 Medium Dense	Cohesive Soils (blows per ft.) 0 to 2 Very Soft 8 to 15 Stiff 2 to 4 Soft 15 to 30 Very Stiff 4 to 8 Medium Stiff Over 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.		

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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Milford, NH 03055
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Client **Triangle Environmental** Date **03/25/94** Job No. **94-0333**

Location **Waites Wharf, Newport, Rhode Island**

BORING NO. SB-22 **Ground Elev.** **Date Start** **Date Complete** **Drilling Foreman** D.L. **Eng./Hydrol. Geologist**

DEPTH	Sample Data					Soil and/or bedrock strata descriptions	
	Sample		Blows 6" Penetration	Rec. Inches	Casing Blows Per ft.	Strata Change Depth	Visual Identification of Soil and/or Rock Strata
	No.	Depth (ft.)					
	1	0'6" - 2'0"				0'2"	ASPHALT
	2	2'0" - 4'0"					Dry to wet, FINE TO COARSE SAND, some organic silt, trace fine gravel, wood, brick, and ash.
5	3	4'0" - 6'0"					
	4	6'0" - 8'0"					
	5	8'0" - 10'0"					
10	6	10'0" - 12'0"					
	7	12'0" - 14'0"					
15						14'0"	End of boring at 14'0". Water level between 3'0" and 6'0" depending on the tide.
20							
25							
30							
35							
40							

Type of Boring **Casing Size:** **Hollow Stem Auger Size:**

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 Dense 10 to 30 Medium Dense	Cohesive Soils (blows per ft.) 0 to 2 Very Soft 8 to 15 Stiff 2 to 4 Soft 15 to 30 Very Stiff 4 to 8 Medium Stiff Over 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.		

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. ■



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

SOIL EXPLORATION CORPORATION

Geotechnical Drilling and Groundwater Monitor Wells

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

Client **Triangle Environmental** Date **03/25/94** Job No. **94-0333**

Location **Waites Wharf, Newport, Rhode Island**

BORING NO. **SB-25** Ground Elev. _____ Date Start _____ Date Complete _____ Drilling Foreman **D.L.** Eng./Hydrol. Geologist _____

DEPTH	Sample 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"					Dry to wet, FINE TO COARSE SAND, some organic silt, trace fine gravel, shells.
	2	2'0"- 4'0"					
5	3	4'0"- 6'0"					
	4	6'0"- 8'0"					
	5	8'0"-10'0"					
10	6	10'0"-12'0"					
	7	12'0"-14'0"					
15					14'0"	End of boring at 14'0". Water level between 3'0" and 6'0" depending on the tide.	
20							
25							
30							
35							
40							

Type of Boring _____ Casing Size: _____ Hollow Stem Auger Size: _____

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 Dense 10 to 30 Medium Dense	Cohesive Soils (blows per ft.) 0 to 2 Very Soft 8 to 15 Stiff 2 to 4 Soft 15 to 30 Very Stiff 4 to 8 Medium Stiff Over 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.		

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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Client **Triangle Environmental** Date **03/25/94** Job No. **94-0333**

Location **Waites Wharf, Newport, Rhode Island**

BORING NO. SB-26 **Ground Elev.** **Date Start** 03/24/94 **Date Complete** 03/24/94 **Drilling Foreman** D.L. **Eng./Hydrol. Geologist**

DEPTH	Sample Data					Soil and/or bedrock strata descriptions	
	Sample		Blows 6" Penetration	Rec. Inches	Casing Blows Per ft.	Strata Change Depth	Visual Identification of Soil and/or Rock Strata
	No.	Depth (ft.)					
5	1	0'0" - 2'0"				Dry to wet, FINE TO COARSE SAND, some organic silt, trace fine gravel.	
	2	2'0" - 4'0"					
	3	4'0" - 6'0"					
	4	6'0" - 8'0"					
	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							
35							
40							

Type of Boring Casing Size: Hollow Stem Auger Size:

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 Dense 10 to 30 Medium Dense	Cohesive Soils (blows per ft.) 0 to 2 Very Soft 8 to 15 Stiff 2 to 4 Soft 15 to 30 Very Stiff 4 to 8 Medium Stiff Over 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.		

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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Client **Triangle Environmental** Date **03/25/94** Job No. **94-0333**

Location **Waites Wharf, Newport, Rhode Island**

BORING NO. SB-31 **Ground Elev.** **Date Start** **Date Complete** **Drilling Foreman** D.L. **Eng./Hydrol. Geologist**

DEPTH	Sample 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
5	1	0'0" - 2'0"					Dry to wet, FINE TO COARSE SAND, some organic silt, trace fine gravel, wood.
	2	2'0" - 4'0"					
	3	4'0" - 6'0"					
	4	6'0" - 8'0"					
	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							
35							
40							

Type of Boring Casing Size: Hollow Stem Auger Size:

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 Dense 10 to 30 Medium Dense	Cohesive Soils (blows per ft.) 0 to 2 Very Soft 8 to 15 Stiff 2 to 4 Soft 15 to 30 Very Stiff 4 to 8 Medium Stiff Over 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.		

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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Client **Triangle Environmental** Date **03/25/94** Job No. **94-0333**

Location **Waites Wharf, Newport, Rhode Island**

BORING NO. SB-33 **Ground Elev.** **Date Start** **Date Complete** **Drilling Foreman** D.L. **Eng./Hydrol. Geologist**

DEPTH	Sample 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
5	1	0'0"- 2'0"					Dry to wet, FINE TO COARSE SAND, some inorganic silt, trace fine gravel.
	2	2'0"- 4'0"					
	3	4'0"- 6'0"					
	4	6'0"- 8'0"					
	5	8'0"- 9'0"					
10	5A	9'0"-10'0"				9'0"	Moist, PEAT.
						10'0"	End of boring at 10'0". Water level between 3'0" and 6'0" depending on the tide.
15							
20							
25							
30							
35							
40							

Type of Boring Casing Size: Hollow Stem Auger Size:

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 Dense 10 to 30 Medium Dense	Cohesive Soils (blows per ft.) 0 to 2 Very Soft 8 to 15 Stiff 2 to 4 Soft 15 to 30 Very Stiff 4 to 8 Medium Stiff Over 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.	

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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Client **Triangle Environmental** Date **03/25/94** Job No. **94-0333**

Location **Waites Wharf, Newport, Rhode Island**

BORING NO. SB-34 **Ground Elev.** **Date Start** **Date Complete** **Drilling Foreman** D.L. **Eng./Hydrol. Geologist**

DEPTH	Sample 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"					Dry to wet, FINE TO COARSE SAND, some organic silt, trace fine gravel, wood, brick.
	2	2'0" - 4'0"					
5	3	4'0" - 6'0"					
	4	6'0" - 8'0"					
	5	8'0" - 9'0"					
10	5A	9'0" - 10'0"				9'0" 10'0"	Moist, PEAT.
							End of boring at 10'0" Water level between 3'0" and 6'0" depending on the tide.
15							
20							
25							
30							
35							
40							

Type of Boring Casing Size: Hollow Stem Auger Size:

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 Dense 10 to 30 Medium Dense	Cohesive Soils (blows per ft.) 0 to 2 Very Soft 8 to 15 Stiff 2 to 4 Soft 15 to 30 Very Stiff 4 to 8 Medium Stiff Over 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.		

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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Client **Triangle Environmental** Date **03/25/94** Job No. **94-0333**

Location **Waites Wharf, Newport, Rhode Island**

BORING NO. SB-36 **Ground Elev.** **Date Start** **Date Complete** **Drilling Foreman** D.L. **Eng./Hydro. Geologist**

DEPTH	Sample Data					Soil and/or bedrock strata descriptions	
	No.	Depth (ft.)	Blows 6" Penetration	Rec. Inches	Casing Blows Per ft.	Strata Change Depth	Visual Identification of Soil and/or Rock Strata
5	1	0'0" - 2'0"					Dry to wet, FINE TO COARSE SAND, some organic silt, trace wood, brick.
	2	2'0" - 4'0"					
	3	4'0" - 6'0"					
	4	6'0" - 8'0"					
	5	8'0" - 9'0"					
10	5A	9'0" - 10'0"				9'0"	Moist, PEAT.
						10'0"	End of boring at 10'0" Water level between 3'0" and 6'0" depending on the tide.
15							
20							
25							
30							
35							
40							

Type of Boring **Casing Size:** Hollow Stem Auger Size:

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 Dense 10 to 30 Medium Dense	Cohesive Soils (blows per ft.) 0 to 2 Very Soft 8 to 15 Stiff 2 to 4 Soft 15 to 30 Very Stiff 4 to 8 Medium Stiff Over 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.		

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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(603) 672-2135

Client **Triangle Environmental** Date **03/25/94** Job No. **94-0333**

Location **Waites Wharf, Newport, Rhode Island**

BORING NO. SB-38 **Ground Elev.** **Date Start** **Date Complete** **Drilling Foreman** D.L. **Eng./Hydro. Geologist**

DEPTH	Sample Data					Soil and/or bedrock strata descriptions	
	No.	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"					Dry to wet, FINE TO COARSE SAND, some organic silt, trace fine gravel, wood, ash, brick.
5	3	4'0"- 6'0"					
	4	6'0"- 8'0"					
	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							
35							
40							

Type of Boring Casing Size: Hollow Stem Auger Size:

<p>Proportion Percentages Trace 0 to 10% Some 10 to 40% And 40 to 50%</p>	<p>Granular Soils (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</p>	<p>Cohesive Soils (blows per ft.) 0 to 2 Very Soft 8 to 15 Stiff 2 to 4 Soft 15 to 30 Very Stiff 4 to 8 Medium Stiff Over 30 Hard</p>
<p>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.</p>		

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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Client **Triangle Environmental** Date **03/25/94** Job No. **94-0333**

Location **Waites Wharf, Newport, Rhode Island**

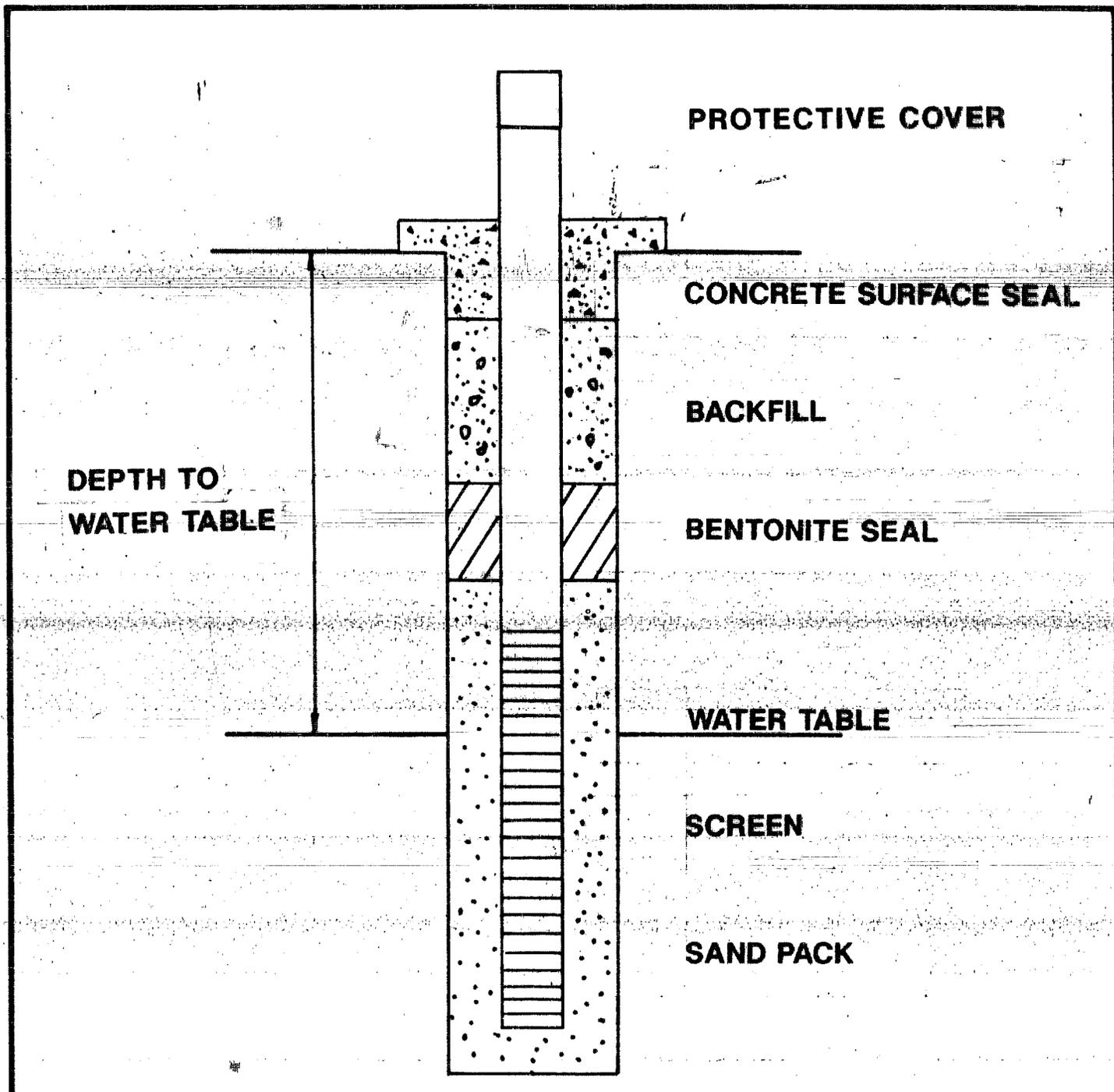
BORING NO. SB-39 **Ground Elev.** **Date Start** **Date Complete** **Drilling Foreman** D.L. **Eng./Hydrol. Geologist**

DEPTH	Sample Data					Soil and/or bedrock strata descriptions	
	No.	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
5							Dry to wet, FINE TO COARSE SAND, some organic silt, trace fine gravel, wood.
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							
35							
40							

Type of Boring **Casing Size:** **Hollow Stem Auger Size:**

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 Dense 10 to 30 Medium Dense	Cohesive Soils (blows per ft.) 0 to 2 Very Soft 8 to 15 Stiff 2 to 4 Soft 15 to 30 Very Stiff 4 to 8 Medium Stiff Over 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.		

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. ■



**CONSTRUCTION OF
MONITORING WELL**

TRIANGLE ENVIRONMENTAL
 175 METRO CENTER BLVD.
 WARWICK, R. I. 02886

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

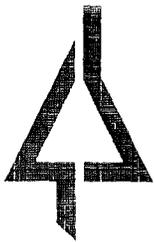
- (1) Calibrate the instrument using the manufacturer's specifications. The instrument should be calibrated to yield "total organic vapors" in parts per million (ppm) as benzene.
- (2) Collect samples to be analyzed in two clean, widemouth glass containers, filling each container half way. Quickly cover 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 SOIL VAPOR CONCENTRATION		MAXIMUM SOIL VAPOR CONCENTRATION		INTERVAL EXCEEDING 50 PPM TOV
	INTERVAL	TOV (ppm)	INTERVAL	TOV (ppm)	
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'



R.I. Analytical

Specialists in Environmental Services

CERTIFICATE OF ANALYSIS

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)

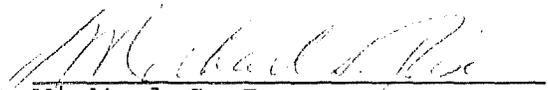
Subject samples have been analyzed by our laboratory with the attached results.

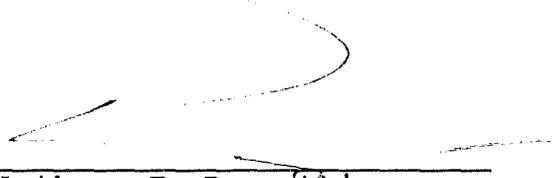
References: Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, U.S. EPA, SW-846, November 1986, 3rd edition, Update I, July 1992.

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:


Michael S. Rose
Laboratory Manager


Anthony E. Perrotti
President

tri/kah

CERTIFICATE OF ANALYSIS

Triangle Environmental April 6, 1994 Invoice # G2370
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PARAMETER	SB #7, 4-10'	SB #9, 4-10'
Volatile Organic Compounds		
Method #8240 (mg/kg)		
chloromethane	<1.6	<2.0
bromomethane	<1.6	<2.0
vinyl chloride	<1.6	<2.0
dichlorodifluoromethane	<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.

CERTIFICATE OF ANALYSIS

Triangle Environmental
 April 6, 1994
 Invoice # G2370

got 5/4/94

PARAMETER	MW #3, COMPOSITE (4-6' & 6-8')	SB #5, 4-10'
Volatile 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	<1.4	<0.8
chloroform	<1.4	<0.8
1,2-dichloroethane	<1.4	<0.8
1,1,1-trichloroethane	<1.4	<0.8
carbon tetrachloride	<1.4	<0.8
bromodichloromethane	<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	<1.4	<0.8
dibromochloromethane	<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	<1.4	<0.8
dichlorobenzenes	<1.4	<0.8
benzene	<1.4	<0.8
toluene	<1.4	<0.8
ethylbenzene	<1.4	1.6
xylenes	<1.4	1.2
acetone	<7.1	<4.2
carbon disulfide	<3.6	<2.1
2-butanone	<7.1	<4.2
vinyl acetate	<35	<21
4-methyl-2-pentanone	<35	<21
2-hexanone	<35	<21
styrene	<1.4	<0.8

R.I. ANALYTICAL LABORATORIES, INC.

CERTIFICATE OF ANALYSIS

Triangle Environmental April 6, 1994 Invoice #: G2399

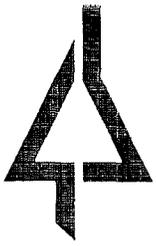
SAMPLE ID	TOTAL PETROLUUM HYDROCARBONS (mg/kg*)
SB14 (4-8 ft.)	<31.8
SB15 (6-10 ft.)	75.2
SB16 (6-10 ft.)	890
SB17 (2-14 ft.)	350
SB22 (4-14 ft.)	1,940
SB23 (4-14 ft.)	2,160
SB24 (2-14 ft.)	890
SB25 (2-14 ft.)	830

*calculated on a dry weight basis

PARAMETER	SB19 (0-14')	SB23 (4-14')	SB24 (2-14')	SB25 (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 (0-14')	SB21 (4-14')	SB24 (2-14')	SB25 (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



R.I. Analytical

Specialists in Environmental Services

CERTIFICATE OF ANALYSIS

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: Test Methods for Evaluating Solid Waste, Physical/
Chemical Methods, 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

CERTIFICATE OF ANALYSIS

Triangle Environmental
 April 8, 1994
 Invoice #: G2417

SAMPLE ID	TOTAL PETROLEUM HYDROCARBONS (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	SB30 (0-10')	SB31 (0-10')	SB34 (0-10')
Volatile Organic Compounds			
Method 8020: (mg/kg)			
benzene	<1.0	<1.0	<1.0
toluene	1.6	1.5	2.1
ethylbenzene	5.3	5.7	6.1
xylenes	8.4	14	19

PARAMETER	SB30 (0-10')	SB31 (0-10')	SB33 (0-10')	SB34 (0-10')	SB36 (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	<4.4	<4.1
phenanthrene	8.4	<3.8	6.8	5.3	<4.1
anthracene	<4.3	<3.8	<4.2	<4.4	<4.1
fluoranthene	<4.3	<3.8	<4.2	<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

Specialists in Environmental Services

CERTIFICATE OF ANALYSIS

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: Guidelines Establishing Testing Procedures For The Analysis of Pollutants, 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



Anthony E. Perrotti
President

tri/afp

CERTIFICATE OF ANALYSIS

Triangle Environmental
April 13, 1994
Invoice #: G2558

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	----

CERTIFICATE OF ANALYSIS

Triangle Environmental April 13, 1994 Invoice #: G2558
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PARAMETER	TW-1	TW-2	TW-3
Volatile Organic Compounds Method 624 ($\mu\text{g/L}$) toluene	ND	ND	15

PARAMETER	TW-4	TW-5	MW-2
Volatile Organic Compounds Method 624 ($\mu\text{g/L}$) benzene	4	15	ND
toluene	9	ND	ND
xylenes	2	8	ND

PARAMETER	MW-3	RW-1	RW-2
Volatile Organic Compounds Method 624 ($\mu\text{g/L}$)	ND	ND	ND

PARAMETER	TW-3	TW-4	TW-5
Polynuclear Aromatic Hydrocarbons: ($\mu\text{g/L}$)			
naphthalene	<10	<10	110
acenaphthylene	<10	<10	<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	<10	<10	<10
benzo(a)anthracene	<10	<10	<10
benzo(b)fluoranthene	<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.

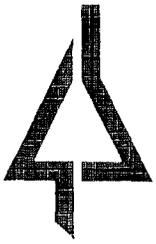
CERTIFICATE OF ANALYSIS

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 µg/L



R.I. Analytical

Specialists in Environmental Services **CERTIFICATE 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.

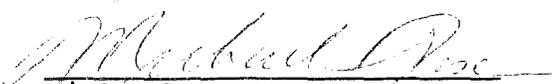
References: Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, U.S. EPA, SW-846, July 1982, second edition. Revised December 1987

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


Anthony E. Perrotti
President

tri:cmc

CERTIFICATE OF ANALYSIS

Triangle Environmental

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.

CERTIFICATE OF ANALYSIS

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	5.5 mg/kg
toluene	23 "
ethylbenzene	6.0 "
xylenes	81 "

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

CERTIFICATE OF ANALYSIS

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.

CERTIFICATE OF ANALYSIS

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	5.5 mg/kg
toluene	23 "
ethylbenzene	6.0 "
xylenes	81 "

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

R.I. ANALYTICAL LABORATORIES, INC.