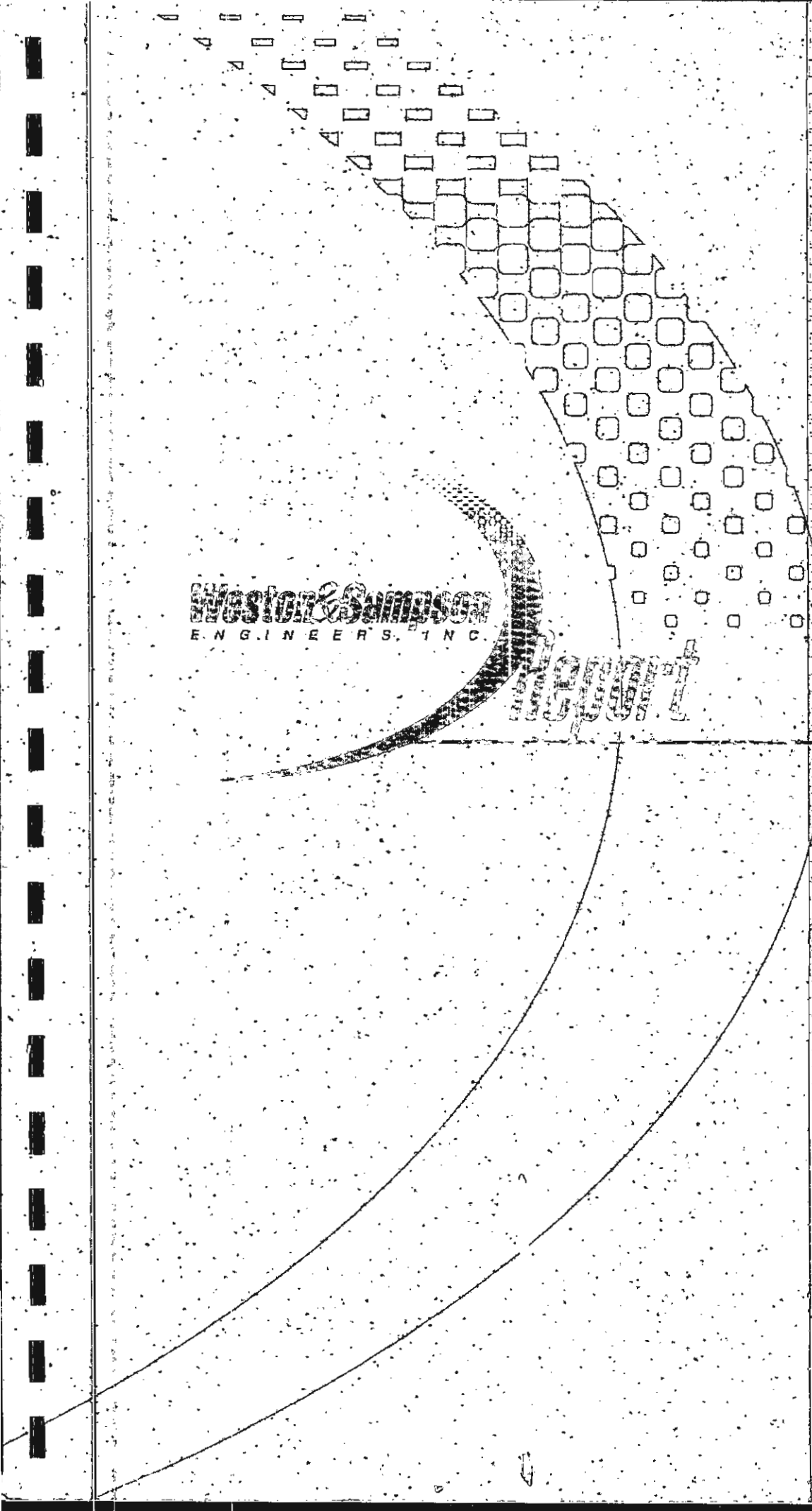

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BOSTON REDEVELOPMENT AUTHORITY

REPORT FOR PARCEL P-3 ROXBURY, MA RTN 3-15009

PHASE II - COMPREHENSIVE SITE ASSESSMENT AND PHASE III- REMEDIAL ACTION PLAN

APRIL 2002

Weston & Sampson ENGINEERS, INC.

Report

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EXECUTIVE SUMMARY

The Boston Redevelopment Authority (BRA) contracted Weston & Sampson Engineers, Inc., to perform a Phase II - Comprehensive Site Assessment and Phase III – Identification, Evaluation, and Selection of Remedial Alternatives (Phase II/III) report for BRA's Parcel P-3, which is located at the intersection of Whittier and Tremont Streets in Roxbury, Massachusetts.

Between November 1996 and March 1997, during a Phase I Initial Site Investigation (Phase I) at Parcel P-3, total petroleum hydrocarbons (TPH), certain polynuclear aromatic hydrocarbons (PAHs) and lead were detected in soil samples at concentrations in excess of applicable reportable concentrations (RCs); however, contaminants detected in groundwater were all below RCs. BRA submitted a Release Notification Form (RNF) to the Department of Environmental Protection (DEP) on April 14, 1997. DEP issued release tracking number (RTN) 3-15009 to this release, which was Tier Classified in April 1998 as Tier II with a Numerical Ranking Scoresheet score of 143.

The data presented in this Phase II report indicate that the extent of soil contamination the ("Site") is limited to the urban fill unit at two areas in the northern portion of Parcel P-3: Area 1 and Area 2. Lead concentrations exceeded Upper Concentration Limits (UCL) in two samples and the Toxicity Characteristic Leaching Procedure (TCLP) hazardous waste threshold in one sample. In addition, a lead impacted soil hot spot was identified in Area 2. Groundwater sampling results presented in this Phase II report indicate that contaminants in groundwater were all detected at concentrations below Method 1 Standards.

A Method 1 Risk Characterization and a Method 3 Risk Characterization screening was conducted using the Phase I and Phase II data. The Method 3 screening results were similar to the Method 1 findings, therefore we have included a Method 1 Risk Characterization in this report. The results of the risk characterization indicate that a condition of No Significant Risk does not exist at the Site due to the hot spot in Area 2 and limited EPH-contaminated soil in Area 1. Area 1 soil also contained lead and PAH concentrations similar to those typically found in urban fill. Although these contaminants were not included in the risk characterization, if residences are to be placed in Area 1, there would be a significant risk due to current soil contaminant concentrations.

Therefore, the Phase II concluded that to achieve a condition of No Significant Risk, at a minimum, the hot spot should be excavated and disposed off-Site. An Activity and Use Limitation (AUL) restricting future residential use may then be placed on Area 1. However, if future residential development of Area 1 is desired, then several remedial options are available, including excavation of all contaminated soil in Area 1, or a combination of limited excavation coupled with placement of a cap to provide adequate separation. Therefore, to attain site closure, we recommend Alternative 2, hot spot excavation in Area 2 and an AUL to identify Site use and activities that are consistent with maintaining a condition of No Significant Risk in Area 1.

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1.0 INTRODUCTION

1.1 General

Weston & Sampson Engineers, Inc., has prepared this Phase II - Comprehensive Site Assessment and Phase III – Identification, Evaluation, and Selection of Remedial Alternatives (Phase II/III) report on behalf of the Boston Redevelopment Authority (BRA) in accordance with the Massachusetts Contingency Plan (MCP), 310 CMR 40.0000 (Sections 40.0830 and 40.0850). The Department of Environmental Protection (DEP) issued Release Tracking Number (RTN) 3-15009 on May 28, 1997 to BRA's Parcel P-3 Facility (Parcel P-3), located at the intersection of Whittier and Tremont Streets in Roxbury, Massachusetts (Figure 1 – Locus Map). The release was associated with the detection of total petroleum hydrocarbons (TPH), polynuclear aromatic hydrocarbons (PAHs) and lead in soil above MCP reportable concentrations (RCs). The goal of this Phase II/III investigation was to further assess the nature and extent of oil and/or hazardous materials (OHM) in subsurface soil and groundwater, to evaluate the potential risk to human health, safety, public welfare, and the environment during current and future uses, and to evaluate remedial alternatives. This report is subject to the Limitations in Section 8.0.

1.2 Property Location and Description

Parcel P-3 consists of three subparcels totaling approximately 384,500 square feet (8.8 acres) and is located in the Campus High School Urban Renewal Area in Roxbury, Massachusetts (see Figure 2, Site Plan). Parcel P-3 is bounded by Tremont Street to the north, Whittier Street and residential apartments to the east, Downing Street to the south and Linden Park Street to the west. The Madison Park High School abuts a portion of Parcel P-3's western boundary.

The geographical location for the Parcel P-3 is described as follows:

UTM Coordinates:	N	4,688,700 m
	E	327,800 m
Latitude/Longitude:		42°20'03" N
		71°05'21" W

Parcel P-3 currently contains one structure, the Whittier Street Health Center (WSHC), located on the northeastern portion of Parcel P-3. From 1997 until approximately two years ago, the building

was an active day-health clinic. The building is currently unoccupied. Connolly's Tavern, a single story structure located at the northern corner of Parcel P-3, was demolished in April 1998. The central and northern portions of the parcel are overgrown and undeveloped, and crossed by two currently obstructed and unused streets (Hampshire and Vernon). The southern portion of Parcel P-3 consists of a large asphalt-paved parking area and is used by the adjacent Madison Park High School. A plan showing existing utilities across Parcel P-3 is included in Appendix A. For discussion purposes, Parcel P-3 has been divided into three areas: Area 1 (unpaved area behind the former Connelly's Tavern), Area 2 (behind the former WSHC) and Area 3 (western portion of Parcel P-3). In addition, Parcel P-3 includes the former WSHC (see Figure 2).

The WSHC is a four-story building with basement. It is connected to municipal water and sewer and is heated by oil. A vaulted underground storage tank (UST) is located in the basement of the health center. The northwest portion of Parcel P-3 is a vacant area containing approximately 5 feet of fill above street grade. In general, Parcel P-3 topography is flat, with the exception of the filled area behind the former Connolly's Tavern. With the exception of the filled area and landscaping, the rest of the parcel is paved. With the exception of the portion used by the High School as a parking lot, Parcel P-3 is surrounded with a 6-foot high security fence to restrict access. The fenced area includes the areas of soil contamination identified in the Phase I.

Solid waste, consisting mainly of construction and demolition debris, was observed in the paved area behind the Whittier Street Health Center. In addition, approximately 300 cubic yards of fill and an abandoned vehicle were dumped in this paved area. Based on our observations, the additional fill appears to have been dumped in this area between January and March 1997.

1.3 Property Ownership and History

The BRA is the current owner of Parcel P-3. Historically, Parcel P-3 formerly consisted of over 50 smaller commercial, industrial and residential lots for over 100 years. Entities that have occupied Parcel P-3 have included Boston Edison, St. John's Church, the Roxbury Crossing Station, a United States Postal Office, the Tremont Iron Foundry, an Electric Cable Manufacturer and the Roxbury Carpet Company.

1.4 Property Topography and Surface Water Drainage

In general the topography at Parcel P-3 slopes gently toward the northeast; however, the northeast corner of Parcel P-3 contains a raised land surface, which is approximately 5 to 10 feet above surrounding pavement (Figure 2). Because Parcel P-3 and the surrounding area are predominantly paved, surface water runoff is collected in catch basins and routed to the City sewer.

No surface water or drainage swales were observed on Parcel P-3. The Stony Brook Culvert, which is completely enclosed, borders Parcel P-3 and lies beneath Downing Street and Whittier Street (formerly Culvert Street). The Stony Brook Culvert ultimately discharges to the Muddy River, approximately ½-mile north-northwest of Parcel P-3, which in turn discharges to the Charles River.

1.5 Area Public Health and Sensitive Environmental Receptors

Weston & Sampson prepared Figure 3 - Area Receptors Map using Massachusetts Geographic Information System (MassGIS) data. Figure 3 includes 500-foot and ½-mile radii from the center of Parcel P-3.

1.5.1 Drinking Water Supplies

According to Figure 3, Parcel P-3 is not underlain by an Interim Wellhead Protection Area (IWPA), Zone II or potentially productive medium- or high-yield aquifer. The structure on Parcel P-3 and the surrounding area are served by municipal water. No public water supply wells are located within a mile of Parcel P-3. No private water supplies are located within 500 feet of Parcel P-3.

1.5.2 Potential Human and Environmental Receptors

Parcel P-3 is bordered by a residential neighborhood and a public school. In addition a vacant former health care facility (Whittier Street Health Center) is located within Parcel P-3 boundary. Parcel P-3 is located in the Charles River Basin; however, Figure 3 does not identify any surface water bodies, wetlands or any potential productive aquifers within ½-mile of Parcel P-3. The Stony Brook Culvert, currently underground, borders Parcel P-3 and is located below Whittier and Downing Streets. The nearest regulated open spaces are within 500-feet of Parcel P-3, located northwest of Tremont Street and some additional small patches adjacent to Whittier Street. No other environmental receptors are shown within ½-mile of Parcel P-3. There are no institutions within ½-mile of Parcel P-3, however, the nearest day school is the Madison Park High School, which abuts

Parcel P-3 to the south and west. The western portion of Parcel P-3 serves as one of the school's parking areas.

1.6 MCP Method 1 Soil and Groundwater Classification

1.6.1 Soil

In accordance with 310 CMR 40.0933, soil is classified as S-2 and S-3, depending on whether the soil is covered with pavement or the depth that contaminants were encountered. Parcel P-3 is both paved (western and southeastern portion) and unpaved (behind the former Connolly's Tavern). BRA has placed fencing to restrict access to Area 1. Contaminated soil is between 0 and 15 feet below the paved and unpaved ground surface, and is therefore considered both "accessible" and "potentially accessible." The frequency and intensity of use by children and adults is low.

1.6.2 Groundwater

Parcel P-3 is not within a Current or Potential Drinking Water Source Area, and therefore does not meet the GW-1 criteria in 310 CMR 40.0932(4). Most of Parcel P-3 area is greater than 30 feet from existing buildings. Portions of Parcel P-3, where groundwater is less than 15 feet and within 30 feet of the Whittier Street Health Center, met the GW-2 criteria when the Health Center structure was occupied, as defined in 310 CMR 40.0932(6). Groundwater across the rest of Parcel P-3 is classified as GW-3 in accordance with 310 CMR 40.0932(2).

2.0 RELEASE HISTORY AND RESPONSE ACTIONS

2.1 General

No environmental studies had been conducted for Parcel P-3 prior to the Preliminary Assessment and Phase I Initial Site Investigation, which began in November/December 1996. No releases had been reported prior to April 1997. A chronological summary of the DEP-reported releases, including associated field activities, sampling results, and response actions is presented below.

2.2 Preliminary Assessment and Phase I Initial Site Investigation

Between November 1996 and March 1997, Weston & Sampson performed the following field activities at Parcel P-3 as part of a preliminary environmental assessment and subsequent Phase I Initial Site Investigation:

- 7 test pit excavations (TP-1 through TP-7);
- 31 soil boring and 12 groundwater monitoring well installations (WS-1 through WS-12, B-1, B-2 and B-101 through B-117);
- Groundwater elevation survey; and
- Soil and groundwater sample collection and analysis.

Sample locations are shown on Figure 2.

The test pits, excavated up to 19 feet below grade using a backhoe, showed that two fill units are present. The first unit was present between 0 and 14 feet below grade and consisted of brown fine to coarse sand with debris that included concrete, brick, wood, metal, asphalt, glass, and rubber tires. Below this fill layer was either native soils (peat, clay, or sand) or a lower fill unit, which consisted of light to dark brown fine to coarse sand and burnt debris (cinders, brick, wood, and slag). This lower fill unit, observed at test pits TP-4, TP-5, TP-6 and TP-7, varied in depth between 7 and 19 feet below grade.

During the test pitting and drilling activities, Weston & Sampson collected soil samples and screened them for the presence of total volatile organic compounds (TVOCs) using a photo-ionization detector (PID). TVOC screening results are shown in Table 1. Selected soil samples were submitted for laboratory analysis of one or more of the following parameters: Volatile Organic Compounds (VOCs) by EPA Method 8260; TPH GC/FID scan by modified EPA Method 8100; PAHs by EPA

Method 8100; RCRA metals (arsenic, barium, cadmium, chromium, lead, mercury, selenium, silver); and, Polychlorinated Biphenyls (PCBs).

Weston & Sampson also collected groundwater samples from the twelve monitoring wells (WS-1 through WS-12) for laboratory analysis of VOCs by EPA Method 8260; TPH GC/FID scan by modified EPA Method 8100; PAHs by EPA Method 8100; and, dissolved RCRA metals (arsenic, barium, cadmium, chromium, lead, mercury, selenium, silver). Soil and groundwater sampling results are summarized in Tables 2 and 3, respectively.

The sampling results indicated that concentrations of TPH, PAH and lead were detected in soil above applicable RCs at borings WS-8, WS-10 and WS-12 in the fill area located southwest of the former Connolly's Tavern (Figure 2). Consequently, the BRA submitted a release notification form (RNF) to DEP on April 14, 1997. The DEP subsequently issued RTN 3-15009 and a Notice of Responsibility dated May 28, 1997 for this release. DEP correspondences are included in Appendix B. No parameters were detected above RCs in groundwater.

The findings of the preliminary environmental assessment and additional field work were used to complete the Phase I Initial Site Investigation report (Phase I) and prepare a Tier Classification (TC). Parcel P-3 was classified as Tier II based on a Numerical Ranking Score of 143. The Phase I and TC were submitted to DEP in April 1998. Prior to Phase II field work, the BRA submitted a notification of delay letter to DEP explaining the reasons for delay in this Phase II/III report.

2.3 Flooded Basement of the Whittier Street Health Center

In 2001, a ruptured pipe flooded the basement at the Whittier Street Health Center resulting in the tank floating and dislodging pipe fittings. Some oil was released to the basement. BRA obtained a NPDES exclusion permit and pumped out the oily water and discharged it via carbon canisters to a nearby storm drain. Following an inspection of the basement for cracks, etc., we understand that the release was completely contained within the basement and therefore no release to the environment occurred. No release tracking number has been issued as it appears that there was no release to the environment. Therefore the flooded basement condition is not part of the disposal site for RTN 3-15009 and is not discussed further in this report. In September 2001, Weston & Sampson re-sampled

WS-2 for volatile and extractable petroleum hydrocarbons (VPH/EPH) to evaluate if there was petroleum contamination in groundwater and to establish Site boundaries. The results are included in Section 4.3.4.

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3.0 PHASE II SUBSURFACE INVESTIGATION

3.1 General

3.1.1 Conceptual Site Model

Results from the various investigations were used to develop a conceptual site model for Parcel P-3. The site includes various layers of fill including recent (area behind Connolly's Tavern) and historic (whole parcel) phases of filling. Fill overlays organic silt and clay. Groundwater at the site appears to flow radially to the south and east and may be controlled by the Stony Brook Culvert. Groundwater is not a resource and data from the Phase I indicated that groundwater has not been impacted. The Phase I study focused primarily on the unpaved area located behind the former Connolly's Tavern ("Area 1"). This approximately 1.5-acre area is covered with a mound of urban fill to an elevation of approximately 6 feet above street grade.

Phase I sampling results indicated that elevated TPH, PAH and lead concentrations are present in subsurface soil above Method 1 Standards and the source of some of the PAH contamination may be attributed to the fill material. The source of the lead is unknown and may be due to historic site use, including the former Tremont Iron Foundry. Although there were no indications of discrete source areas and the contaminant concentrations appeared to be fairly randomly distributed, both horizontally and vertically, throughout this area, the detection of contaminants did not meet notification exemptions under the MCP. Consequently portions of Parcel P-3 became a DEP-listed disposal site. No surficial soil samples were collected from Area 1 during the Phase I investigation.

Several PAHs also exceeded Method 1 Standards in soil samples B-116 and B-117 between 0 and 3 feet below pavement in the 1-acre paved area located behind the Whittier Street Health Center ("Area 2"). The soil in these samples also contained urban fill similar to that was observed in Area 1. Area 2 also contained soil stockpiles from unknown sources that had not been characterized during the Phase I investigation.

The soil and groundwater data obtained from the 5.5-acre western portion of Parcel P-3 ("Area 3"), currently being used as a parking lot for the Madison Park High School, indicated that contaminant

concentrations were below Method 1 Standards. Therefore the "Site" is now defined as the portion of Parcel P-3 known as Areas 1 and 2, as shown on Figures 2 and 7.

The overall objective of the Phase II subsurface investigation was to evaluate the nature and extent of contamination in unpaved surficial soil in Area 1 and subsurface soil in Area 2. The soil stockpiles in Area 2 were also sampled during the Phase II investigation. In summary, the Phase II field investigation included the following activities:

- Collection of four surficial soil samples (SS-1 to SS-4) from Area 1.
- Advancement of 12 soil borings in Area 2 (B-201 to B-212).
- Installation of monitoring well WS-13 in Area 2.
- Collection of 4 soil samples (SP-1 through SP-4) from the stockpile in Area 2.

The only nearby surface water body is the Stony Brook Culvert that is below Whittier Street. Since the Brook is enclosed there does not appear to be a pathway for soil to impact the enclosed Brook. The soil stockpiles are heavily vegetated and there is no evidence of erosion to catchbasins in the streets.

A summary of activities performed for the Phase II investigation is detailed below and sampling locations are shown on Figure 2.

3.1.2 Quality Assurance Project Plan

Prior to implementing the Phase II investigation, Weston & Sampson developed a Brownfields Quality Assurance Project Plan (QAPP) as required under the Federal Brownfields Economic Redevelopment Initiative. The purpose of this QAPP was to provide the specific field and analytical procedures to meet EPA data quality requirements for the Phase II investigation. The QAPP was submitted to the Region I Environmental Protection Agency (EPA) in November 2000 and subsequently approved on December 1, 2000 (see Appendix B for approval letter).

3.2 Soil Boring Advancement

On January 10 and 11, 2001, Earth Exploration, Inc., of Hopkinton, Massachusetts, advanced 7 soil borings at Parcel P-3 at locations shown in Figure 2 under the oversight of a Weston & Sampson

geologist. One boring (B-201(D)) was advanced near the former Connolly's Tavern to evaluate the vertical extent of soil contamination in this area. Three borings were advanced in the area behind the Whittier Street Health Center (B-202(S), B-203(S), B-204(S)) and three borings were advanced in the western portion (B-205, B-206, B-207) to evaluate the horizontal extent of soil contamination.

On September 5, 2001, Earth Exploration, Inc., advanced 5 additional soil borings (B-208 through B-212) at locations shown in Figure 2 to further evaluate the extent of elevated lead detected in soil in this area. Weston & Sampson documented soil boring activities. One boring, B-209, was advanced adjacent to boring B-202(S) to evaluate the vertical extent of soil contamination in this area. This boring was completed as groundwater monitoring well WS-13. Four borings, B-208, B-210, B-211 and B-212, were advanced around B-209 to evaluate the horizontal extent of lead contamination in soil.

Borings were advanced using 3.25-inch or 4.25-inch inner diameter hollow stem augers (HSA) as specified in DEP Publication #WSC-310-91, *Standard References for Monitoring Wells.* During drilling, soil samples were collected at 5-foot depth intervals using a 2-foot split-spoon sampler and classified by a Weston & Sampson geologist using the Modified Burmister Soil Classification System. The samples were field-screened with a PID fitted with a 10.2 electron volt (eV) lamp, with a minimum detection limit of 0.2 parts per million vapor (ppmv). TVOC concentrations were measured using the jar headspace method outlined in DEP Waste Site Cleanup Policy #WSC-94-400 entitled *Interim Remediation Waste Management Policy for Petroleum Contaminated Soils.*

All drilling equipment was steam-cleaned prior to advancing each boring. No oil, grease, or other petroleum-based products were used to lubricate augers or rods. Soil cuttings did not exhibit visual or olfactory signs of contamination and were backfilled into each boring. Soil boring logs are provided in Appendix C.

3.3 Soil Sampling and Analysis

Soil samples were selected for analysis based on TVOC headspace results, visual and olfactory field observations, and depth to groundwater. Weston & Sampson submitted a total of 15 soil samples to AMRO Environmental Laboratories Corporation (AMRO) in Merrimack, New Hampshire, for

analysis of lead and extractable petroleum hydrocarbons (EPH) including target PAH compounds, using the DEP-approved method.

Soil samples were collected in accordance with procedures specified in the QAPP. All soil samples were submitted using standard chain-of-custody procedures. Two soil samples collected on September 5, 2001 were additionally analyzed for the Toxicity Characteristic Leaching Procedure (TCLP) for lead.

3.4 Surface Soil and Stockpile Soil Sampling and Analysis

On March 29, 2001, Weston & Sampson collected 4 surface soil samples at Parcel P-3 using decontaminated scoops and shovels. The surface soil samples were collected from the area behind former Connolly's Tavern (SS-1 through SS-4) from the top 6-inches of soil. These samples were submitted for laboratory analysis of lead and EPH including target compounds. One duplicate lead sample (DUP) was collected at SS-4.

Four soil samples (SP-1, SP-2, SP-3 and duplicate of SP-1, DUP2) were also collected from an existing soil stockpile behind the Whittier Street Health Center. Samples were collected from 2 feet below the stockpile surface. These samples were submitted for laboratory analysis of volatile petroleum hydrocarbons (VPH) including target VOCs, EPH including target PAHs, PCBs and RCRA 8 metals (arsenic, barium, cadmium, chromium, lead, mercury, selenium and silver). Samples collected for VPH analysis were preserved in the field with methanol in accordance with the DEP-approved method. Refer to Figure 2 for the surface soil sampling locations and Section 4.0 for the surface soil analytical results.

3.5 Groundwater Sampling and Analysis

On February 6, 2001, Weston & Sampson collected groundwater samples from 6 monitoring wells (WS-3, WS-5, WS-7, WS-8, WS-10, WS-12) and on September 10, 2001, Weston & Sampson collected groundwater samples from 2 monitoring wells (WS-2 and WS-13). Groundwater samples were collected using procedures detailed in the Environmental Protection Agency's (EPA's) low-flow sampling standard operating procedure (*EPA Region I Low Stress (low flow) Purging and*

Sampling Procedure for the Collection of Groundwater Samples from Monitoring Wells, July 30, 1996).

Prior to sampling, Weston & Sampson measured the depth to groundwater and total well depth in each well. During well purging, groundwater samples from each well were screened in the field for pH, temperature, specific conductance, turbidity, oxidation-reduction potential, and dissolved oxygen. Once groundwater field parameters stabilized, groundwater was sampled. Weston & Sampson's groundwater sampling field notes are included in Appendix C. Monitoring well samples were submitted for laboratory analysis of VPH/EPH parameters with target VOCs and PAHs, and dissolved lead. Weston & Sampson collected dissolved lead samples by filtering the groundwater with 0.45-micron filters prior to preserving the sample.

After they were collected, groundwater samples were kept on ice and transported to AMRO using standard chain-of-custody procedures. A VPH/VOC trip blank accompanied each cooler to the laboratory.

3.6 Survey

On March 29, September 5 and September 10, 2001, Weston & Sampson surveyed the horizontal and vertical locations of Phase II surface soil, soil boring, groundwater monitoring well and stockpile soil sample locations. The locations were measured by a tape survey using existing structures (e.g., wells, building corner, and fence). Elevations were surveyed using sight and stadia rod equipment and were referenced to existing known elevations at wells WS-9, WS-3 and WS-5.

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4.0 SUBSURFACE INVESTIGATION RESULTS

4.1 Surficial Geology

Five geologic units were encountered during the Phase I and Phase II investigations. These included, in stratigraphic succession from youngest (shallowest) to oldest (deepest):

Urban Fill: Heterogeneous dark brown to dark gray fine to coarse sand, trace silt and fine to coarse gravel, trace to some brick, glass, coal, wood, metal, asphalt, concrete, tires and cinders.

Sand: Brown fine to coarse sand, some to little fine to coarse gravel, silt, and cobbles and boulders.

Clay: Blue-green to gray-green clay with lenses of silt and fine sand.

Organic Silt and Peat: Dark brown organic silt and fibrous peat

Lower Sand: Brown fine to coarse sand, some to trace fine to coarse gravel

Weston & Sampson constructed geologic cross-sections of subsurface geology based on data collected to date. Geologic profiles trending southwest-northeast (A-A') and northwest-southeast (B-B') are shown in Figures 4 and 5, respectively. The units above are described in further detail below.

Urban fill was encountered at all drilling locations from immediately below the ground surface or pavement, up to 17 feet below grade in Areas 1 and 2 (defined in Section 3.1). Boring logs indicate that urban fill is likely to extend deeper than 17 feet at borings WS-5, WS-6 and WS-7, which are located in Area 3. Trace brick, glass, coal, wood, metal, asphalt, concrete, tires and cinders were observed in the urban fill.

Sand was encountered between 8.5 and 17 feet below grade at some drilling locations between the urban fill and clay, organic silt and peat. The vertical extent of sand is unknown in Area 2 and Area 3, namely at WS-5, WS-6, WS-7, WS-10 and WS-11. No anthropogenic materials were observed to be present in the sand unit.

Clay was observed at three locations (TP-5/B-8, B-201(D), TP-6/B-9) in Area 1, suggesting that the layer is discontinuous. Clay ranged in depth from 15.5 to 18 feet below grade. Weston & Sampson did not observe the Boston Blue Clay that is encountered below other areas of Boston.

Organic silt and peat was encountered at several locations beneath urban fill or clay, between 7.5 and 27 feet below grade. Boring logs from TP-2/B-2, TP-3/B-1/B-3 and WS-1 indicate that the organic silt and peat unit is 9 to 12.5 feet thick in Area 1; however, the unit becomes thinner (5 feet thick) at boring WS-4, in Area 2. Not enough information exists to evaluate the horizontal and vertical extent of the confining units (clay and organic silt and peat) in Area 3.

The lower sand unit was observed to underlie the organic silt and peat unit between 13.5 and 61 feet below grade at four drilling locations in Area 1 and Area 2. The vertical limit of this lower sand unit was not encountered, and is therefore unknown.

During the Phase I and Phase II investigations, the depth to bedrock was not determined and no bedrock outcrops were observed at or near Parcel P-3. According to the USGS Bedrock Geologic Map of Massachusetts (Zen *et al.*,1983) Parcel P-3 is underlain by Roxbury Conglomerate. This unit is typically a conglomerate, sandstone, siltstone, argillite and melaphyre, consisting of the Brookline, Dorchester and Squantum members.

4.2 Hydrogeology

Regional groundwater is assumed to follow topography and flow to the northwest, towards the Muddy River. However, the Stony Brook Culvert, located beneath Whittier and Downing Streets east and southeast of Parcel P-3, appears to influence the local groundwater flow direction.

4.2.1 Groundwater Elevations

All wells, except WS-13, were gauged on December 5, 6 and 12, 1996. Well WS-13 was gauged on September 10, 2001. Well gauging and groundwater elevation data are presented in Table 4. The groundwater gradient across Parcel P-3 is very flat with groundwater elevations varying by up to 2.87 feet. On December 5, 1996, groundwater elevations ranged from a maximum of 86.62 in WS-12 to a minimum of 83.75 in WS-2. Groundwater elevations were consistently highest in WS-12 and

were lowest in either WS-2 or WS-5 during the well gauging events. December 1996 data were used to create the groundwater contours in Figure 6. Figure 6 shows that in general, groundwater flows southeast across Parcel P-3. The more recent rounds show that generally flow directions are consistent with the 1996 data.

4.2.2 Hydraulic Gradients

The hydraulic gradient (I) across Parcel P-3 was calculated using groundwater elevations collected on December 12, 1996. According to the Phase I report, the horizontal gradient across Parcel P-3 is least in the southwestern portion of Parcel P-3 (parking lot of Madison Park High School) and the fill area and central part of Parcel P-3 (Figure 6), with the hydraulic gradient estimated to be 0.0028 in the southwestern portion and 0.02 in the northern portion, behind the former Connolly's Tavern.

4.2.3 Hydraulic Conductivity and Groundwater Velocity

Assuming a geologic unit of fine to coarse sand (the shallow overburden water table unit) and using conservative tabulated hydraulic conductivity (K) value of 0.28 feet/day (Freeze and Cherry, 1979), an average porosity value of 0.2 (Driscoll, 1989) and the I range shown above, the estimated groundwater velocity across Parcel P-3 varies from approximately 12 feet/year to 100 feet/year. This is below the 200 feet/year threshold for substantial release migration as defined in 310 CMR 40.0413 (2). All calculations are presented in Appendix D.

4.3 Sampling Analytical Results

4.3.1 Quality Assurance/Quality Control

The soil and groundwater analytical data obtained during the Phase II investigation was reviewed by Weston & Sampson for representativeness, completeness, comparability and sensitivity as part of the Phase II investigation. No unexpected, unusual or anomalous results were discovered. All analytical results met project quantitation limits specified in the QAPP (soil and groundwater laboratory method detection limits were below the MCP Method 1 Standards), and all laboratory quality assurance samples verified the project analytical accuracy requirements. No data limitations were discovered after Weston & Sampson reviewed the surrogate recovery, laboratory control samples, duplicates, field blanks, trip blanks and temperature blanks. In summary, the data met the 90 percent minimum completeness goal.

The field duplicate relative percent difference (RPD) was calculated for duplicate samples analyzed for this project. Most RPDs were within the <50% range for soils; no duplicate samples were collected for water as part of this project. The RPD for stockpiled soil sample duplicate PAH results were generally above the 50% target. This is attributed to the heterogeneous nature of the soil matrix, and not to sampling or analytical error.

4.3.2 Soil Results

PID measurements from soil samples obtained during Phase II drilling activities are included on the boring logs in Appendix C-1 and summarized in Table 5. The highest PID reading (21 ppmv) was measured in a soil sample from B-208 at 0 to 2 feet below grade. All remaining PID readings were equal to or less than 2.4 ppmv.

The Phase II soil analytical results are presented in Tables 6, 7 and 8. Analytical laboratory reports are provided in Appendix E. Stockpile soil analytical results are discussed in Section 4.3.3. For discussion purposes, analytical results are discussed by Area.

Area 1: Unpaved Area Behind Former Connolly's Tavern

- EPH: EPH concentrations were below laboratory method detection limits (MDLs) or below applicable Method 1 Standards.
- PAHs: PAH concentrations ranged from below laboratory MDLs to 19 mg/kg of benzo(b)fluoranthene at B-201(D), 10-12 foot depth. Six PAH compounds, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, chrysene, dibenzo(a,h)anthracene and ideno(1,2,3-cd)pyrene, were detected above Method 1 Standards at one soil boring location (B-201(D)) and at four surface soil locations (SS-1 through SS-4). These soil samples were collected from the urban fill unit.
- Total Lead: Total lead was detected above Method 1 Standards in soil. Lead concentrations at B-201(D) and at SS-1 through SS-4 were between 74 and 620 mg/kg.

Area 2: Paved Area Behind WSHC

- EPH: EPH concentrations were below laboratory MDLs or below applicable Method 1 Standards.
- PAHs: PAH concentrations ranged from below laboratory MDLs to 19 mg/kg of

benzo(a)anthracene at B-202(S). Five PAH compounds, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, dibenzo(a,h)anthracene and ideno(1,2,3-cd)pyrene, were detected above Method 1 Standards at B-202(S), B-203(S) and B-204(S). These soil samples were collected from the urban fill unit.

- Total and TCLP Lead: Total lead was detected above Method 1 Standards and Upper Concentration Levels at B-202(S) and B-211 with concentrations of 7,000 mg/kg and 13,000 mg/kg, respectively. The lead TCLP result at B-211 was 8.3 mg/l, which is above the TCLP threshold for hazardous waste of 5 mg/l for lead. These were the highest lead concentrations detected in soil at Parcel P-3 to date.

Area 3: Western Portion

- EPH: All EPH concentrations were below laboratory MDLs.
- PAHs: Most PAH concentrations were below laboratory MDLs. One PAH, benzo(a)pyrene, was detected above the Method 1 Standard between 3 and 5 feet below grade at borings B-206(S) and B-207(S). These soil samples were collected from the urban fill unit.
- Total Lead: Lead was detected above MDLs in soil, however, concentrations were below Method 1 Standards.

The Phase II investigation soil results show that urban fill in Areas 1 and 2 contains TPH, PAHs, and lead at concentrations at or above applicable S-2 or S-3 Method 1 Standards, as shown in Tables 6, 7a and 8. Lead concentrations in Area 2 have been detected above the UCL and above the TCLP threshold. Little to no soil contamination was observed in borings in Area 3, or in other geologic units at Parcel P-3.

4.3.3 Stockpile Soil

Samples collected during the Phase II investigation from soil stockpiles in Area 2 contained PAHs at concentrations above applicable S-2 Method 1 Standards, as shown in Table 7b. The four PAHs that were detected above Method 1 Standards include benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene and ideno(1,2,3-cd)pyrene. Concentrations of these PAHs ranged from 1.2 to 5.1 mg/kg. Stockpile soil was also tested for VPH, VOCs, EPH, PCBs and RCRA 8 metals; these parameters were either not detected or were detected at concentrations were below Method 1 Standards. It must also be noted that the soil piles are heavily vegetated and there was no evidence of erosion of soil to the nearby streets.

4.3.4 Groundwater

The Phase I groundwater data did not detect any contaminants in excess of Method 1 standards. No separate phase petroleum product was detected on groundwater during well sampling in 2001. Contaminants detected in groundwater (EPH only) in February 2001 and September 2001 were below Method 1 Standards. Therefore the only contaminants detected in groundwater were all below Method 1 Standards. The laboratory reports are included in Appendix E. Phase II results are shown in Tables 9 and 10.

Field parameter data on Tables 9 and 10 show fairly consistent pH, ranging from 6.24 in WS-10 to 6.85 in WS-13. Elevated specific conductance readings (>1,000 µS/cm) were detected in groundwater in WS-2, WS-3, WS-5, WS-7, WS-9, WS-10 and WS-12. Dissolved oxygen concentrations varied from 0.22 mg/l in WS-13 to 1.93 mg/l in WS-5.

4.4 Nature and Extent of Contamination

For the purposes of this MCP report, the "Site" is defined as the raised fill area southwest of the Former Connolly's Tavern (Area 1) and the paved area to the rear (southwest) of the Whittier Street Health Center (Area 2). Note that because of potential impacts to groundwater discussed in Sections 2.3 and 4.3.4, the "Site" does not include the area immediately surrounding the Whittier Street Health Center building. Area 3, the paved western portion of Parcel P-3, is not included in this "Site" definition because analytical and field results do not indicate that contaminants are present at concentrations that would pose a risk (see Section 5.0). The disposal site area (Site) and the three "Areas" are shown on Figure 7.

4.4.1 Soil

Based on data collected during preliminary, Phase I and Phase II investigations, the contaminants detected in soil are TPH, PAHs and lead, which have been detected at concentrations above applicable S-2 and S-3 Method 1 Standards, and for lead, the UCL and the TCLP hazardous waste threshold. These soil contaminants appear to be associated with the heterogeneous urban fill unit at the Site. The presence of these contaminants is consistent with Parcel P-3's historical use of mixed commercial, industrial and residential use since the early 1900s.

The data presented in this Phase II report show that the extent of soil contamination is limited to the urban fill unit at two areas in the northern portion of Parcel P-3: Area 1 and Area 2. Analytical results show that the highest TPH, PAH and lead contaminant concentrations in Area 1 are generally 3.5-19 feet below grade at and between WS-10, B-112, B-201(D) and TP-6. The most frequently detected contaminants in Area 1 are PAHs, however lead is detected above Method 1 Standards at various depths also in borings WS-9, B-105, B-110, B-111, B-114 and B-115. The highest levels of PAH and lead contaminant concentrations in Area 2 are approximately 5-7 feet below grade at and between B-202(S), B-203(S) and B-211. Contaminant concentrations in Area 2 appear to diminish to the east, as shown in PAH and lead results from B-203(S) and B-204(S). Lead at two soil samples (B-202(S) and B-211) was detected above the UCL and lead at B-211 was above the TCLP hazardous waste threshold.

4.4.2 Stockpile Soil

PAHs in soil stockpiled in Area 2 were detected above Method 1 Standards. Contaminants detected in the stockpiled soil were of similar type and concentration, regardless of the sampling location, suggesting a similar source of contamination and a fairly homogeneous matrix. The history of these stockpiles is unknown.

4.4.3 Groundwater

Groundwater sampling results presented in this Phase II report show that groundwater does not appear to be impacted by a release of oil and/or hazardous materials (OHM), with the contaminants in groundwater all detected at concentrations below Method 1 Standards. The most recent groundwater sampling rounds, conducted by Weston & Sampson in February and September 2001, indicate that the groundwater contaminant concentrations are below Method 1 Standards. Although leachable lead (as defined by TCLP) was detected in soil at boring location B-211, results show that groundwater does not contain detectable concentrations of dissolved lead.

5.0 RISK CHARACTERIZATION

5.1 General

A Method 1 Risk Characterization was performed to evaluate whether contaminants at Parcel P-3 pose a condition of No Significant Risk to human health, public welfare, and the environment for proposed future use conditions. Weston & Sampson also conducted a screening of the data to evaluate if a Method 3 Risk Characterization would yield significantly different results. Based on the screening, we concluded that Method 1 was most applicable at the time. Weston & Sampson evaluated risk under different development scenarios for all three Areas of Parcel P-3 (Area 1, 2 and 3). In accordance with 310 CMR 40.0942 and 310 CMR 40.0971, a Method 1 risk characterization was considered applicable for evaluating human health risk at Parcel P-3 based on the following criteria:

- Soil is the only exposure media. Groundwater does not appear to be impacted by the release, and there are no surface water bodies or sediments located at or near Parcel P-3. Contaminants at the Site consist primarily of EPH parameters, PAHs and lead, all of which are relatively non-volatile. Therefore, volatilization to air is not a likely migration pathway for contaminants.

- None of the contaminants identified within the top 2 feet of ground surface are known to bioaccumulate.

- Numerical standards for each contaminant in soil and groundwater can be found in the MCP Method 1 Standards (310 CMR 40.0974(2) – 310 CMR 40.0975(6)(c)).

The Method 1 Risk Characterization presented in this report is a preliminary screening intended to, in addition to meeting MCP requirements, provide a preliminary evaluation of future redevelopment options for Parcel P-3 with respect to human health risk. The Method 1 Risk Characterization was performed in accordance with 310 CMR 40.0970 and 310 CMR 40.0990 of the MCP, and the DEP guidance document "*Guidance for Disposal Site Risk Characterization – In Support of the Massachusetts Contingency Plan*" dated July 1995. The components of the risk characterization presented in this section include: Hazard Identification; Groundwater and Soil Exposure-Point Concentrations; and Comparison of EPCs to Applicable Method 1 Standards.

5.2 Data Evaluation

5.2.1 Risk Characterization Data Set

For this risk characterization, each of the areas identified in Sections 3.0 and 4.0 were evaluated separately as follows:

Area 1: 1.5-acre unpaved lot behind former Connolly's Tavern.

Area 2: 1-acre paved area behind Whittier Street Health Center.

Area 3: 5.5-acre western portion of Parcel P-3.

In total, approximately 80 soil samples were collected and analyzed for petroleum parameters from Parcel P-3 during the Phase I and II investigations. Of these, 6 samples were collected at depths greater than 15 feet below grade and, therefore, were not included in the risk characterization because they are considered to be inaccessible for exposure purposes. Soil data from an additional 6 samples collected at 8.5 to 12 feet below grade during the Phase I (WS-1, WS-2 and WS-4 through WS-7) were not included in the risk characterization because all petroleum concentrations were below MDLs.

5.2.2 Identification of Hot Spots

A hot spot is defined as a discrete area having a substantially higher concentration than surrounding areas. In accordance with the MCP, a hot spot cannot be combined with other areas of the Site and must be evaluated as separate exposure point in the risk characterization (310 CMR 40.0924(2)).

In Area 1, elevated lead concentrations ranging from 620 to 5,000 mg/kg were detected in 9 samples at various depths from 1 to 19 feet below grade. As shown in Figure 7, the concentrations appear to be randomly distributed throughout Area 1 and are generally less than or within an order-of-magnitude of concentrations in surrounding sample locations. Similarly, elevated PAH concentrations were also detected in B-112 through B-114 within Area 1. The concentrations, however, were within the same order-of-magnitude as other samples. This variation in contaminant concentrations is characteristic of heterogeneous urban fill material, therefore, these samples were not identified as hot spots.

In Area 2, elevated lead concentrations were detected in two borings located within 25 feet of each other. The lead concentrations in B-202 and B-211 (7,000 and 13,000 mg/kg, respectively) at the 5 to 7-foot depth exceeded UCLs and were significantly higher (by a factor greater than 100) than those detected at all other sample locations across the Site. Because these two borings are located within 25 feet of each other, the area surrounding B-202 and B-211 was identified as a hot spot and evaluated as a separate exposure point for lead. Petroleum concentrations reported in the hot spot samples (B-202 and B-211) were relatively high, but were included in the risk characterization to provide a more conservative estimate of risk.

No hot spots were identified in Area 3.

5.3 Hazard Identification

This section of the risk characterization identifies the contaminants-of-concern (COCs) to be evaluated in the human health risk characterization. Consistent with DEP risk assessment guidance (DEP, July 1995), a compound that was detected can be eliminated from consideration as a contaminant-of-concern (COC) based on any one of the following three criteria:

1) The compound is present at a low frequency of detection and at low concentrations.
2) The compound is a laboratory or field contaminant.
3) The compound is consistent with background concentrations and there is no evidence that the presence of the chemical is related to activities at a site.

During the Phase I investigation, VOCs were detected below MDLs in all samples submitted for analysis (12 total) except for TP-1 at 11.5 to 12 feet below grade. The total VOC concentration in this sample was 2.1 mg/kg and the PID reading was 34 ppmv, the highest of approximately 70 samples screened in the field (all other PID measurements were less than 4.4 ppmv). VOCs were, therefore, eliminated as COCs based on low detection frequency and concentrations (Criteria 1).

In Areas 1 and 2, PAHs and lead (excluding the lead hot spot) were compared to urban background concentrations to evaluate if these compounds could be eliminated from the risk characterization (Criteria 3). The "urban background" concentrations used for comparison were derived from data compiled by MassHighway during the field characterization phase of the Central Artery/Tunnel

(CA/T) project in Boston, Massachusetts. The data and statistical summary is based on over 800 samples collected in Boston and the results were presented in a draft report *"Background Soil Contaminant Assessment,"* prepared by Camp Dresser & McKee Inc. in April 1996.

In Areas 1 and 2, the lead and PAH concentrations were evaluated statistically to derive a 95th upper percentile mean (UPM) for comparison to the 95th UPM urban background concentrations. The data set in Area 3 was not evaluated statistically due to the relatively low number of samples collected from this area. Instead, the maximum concentration detected in that data set was compared directly to the urban background concentrations.

Soil concentrations throughout the Site were assumed to be normally distributed since the presence of PAHs and metals in soil are likely attributed to the fill material and not the result of an OHM "release". The 95th UPM was calculated is follows:

$$95^{th}\ UPM = x \pm t\,(s/n^{1/2})$$

Where:

x	=	sample data set mean (average concentration)
t	=	t-statistic ($\alpha = 0.05$ for 95th confidence limit)
s	=	standard deviation
n	=	number of samples in data set

The 95th UPM was selected for comparison to provide a more conservative estimate since statistically, 95% of the data will be at or below the values shown. All concentrations reported as MDLs were assumed to be equal to one-half the MDL. The data and statistical summary tables for each Area are included in Appendix F. The results are summarized in Table 11. All PAH and lead concentrations were consistent with urban background concentrations, therefore, these contaminants could be eliminated as COCs in the risk characterization. For non-residential future uses, the lead and PAHs were eliminated as COCs in the risk characterization. If either area is developed for residential use, it is assumed that an AUL would be required to reduce or eliminate exposure to soil in these areas and achieve a condition of No Significant Risk.

There are no published background concentrations for EPH parameters; consequently, the only COC retained for the risk characterization was C_{11}-C_{22} aromatics. The TPH parameter analyzed by EPA

Method 8100 was assumed to be equivalent to C_{11}-C_{22} aromatics since there is no risk-based health standard for TPH.

5.4 Exposure-Point Concentrations and Comparison to Method 1 Standards

The exposure-point concentrations (EPCs) were assumed to be equivalent to the 95th UPM concentration of C_{11}-C_{22} aromatics in Areas 1 and 2. The concentrations of C_{11}-C_{22} aromatics in all Area 3 samples were below MDLs. The statistical summaries are included in the tables presented in Appendix F and the EPCs are summarized below for each Area.

Area	Depth	C_{11}-C_{22} aromatics EPC, mg/kg
1	0 to 3	323
	4 to 15	1,668
2	0 to 15	307
3	0 to 15	<55
	Method 1 Standards	
	S-1/GW-2 and 3	800
	S-2/GW-2 and 3	2,000

The EPCs were compared to applicable S-2 Method 1 soil standards (2,000 mg/kg) and to the more stringent S-1 standards (800 mg/kg), which are considered to be protective of human health for future residential use. All EPCs in Areas 1 through 3 were below the applicable S-2 Method 1 standards. Consequently, all soil possibly could be left in place under future use conditions where S-2 and S-3 soil categories apply in accordance with 310 CMR 40.0933. An AUL would be required, however, to restrict future residential in Area 1 as described below. An AUL would not be required in Areas 2 or 3.

To further evaluate risk for Area 1, a Method 3 preliminary residential risk screening was performed using the DEP's No.2/Fuel Oil residential shortform based on a C_{11}-C_{22} aromatics EPC of 1,668 mg/kg. The results indicated that the non-cancer risk for a residential receptor exceeds DEP's acceptable limit of 1.0 due to long-term (chronic) ingestion of homegrown vegetables. Consequently, a condition of No Significant Risk does not exist for future residential use.

Additionally, if residential use is proposed for Area 1, as a conservative approach, we would not

recommend eliminating lead and PAHs as COCs in the risk characterization, even if the presence of these contaminants is due to urban fill background. Referring to Appendix F, the 95th UPM concentrations of PAHs and lead in Area 1 were significantly above S-1 Method 1 Standards. Therefore, an AUL would be required to restrict exposure to PAHs and lead, in addition to C_{11}-C_{22} aromatics. For residential purposes, the existing soil in Area 1 would either have to be removed or, at a minimum, be covered with a minimum of 3 feet of clean fill to meet category S-2 or S-3 soil requirements.

5.5 Characterization of Risk to Public Welfare

In accordance with 310 CMR 40.0994 of the MCP, a condition of No Significant Risk of harm to public welfare exists if the following conditions are met for current and reasonably foreseeable uses of a Site:

1) Nuisance conditions (e.g., odors, fires, flooding) are not present as a result of the release of oil and/or hazardous material at a site.

2) There is no loss of active or passive property use as a result of the release of oil and/or hazardous material at a site.

3) All soil and groundwater EPCs are below the Upper Concentration Limits (UCL) established in 310 CMR 40.0996(7).

The concentrations in hot spot area B-202 and B-211 exceed UCLs. Therefore, a condition of No Significant Risk to public welfare does not exist for current or proposed future Site use.

5.6 Characterization of Risk to Safety

The conditions that constitute a risk of harm to safety are described in 310 CMR 40.0960 of the MCP. Such conditions include a threat of fire or explosion, the presence of uncontained materials that exhibit characteristics of hazardous waste, and the presence of dangerous structures such as open pits, lagoons, corroded drums, etc. None of these conditions are present at the Site; therefore, future use conditions would not pose a risk of harm to safety.

5.7 Characterization of Risk to the Environment

A condition of No Significant Risk to environmental receptors exists based on the absence of contaminants in groundwater. Additionally, the nearest surface water is in an enclosed culvert below

Whittier Street. There is not a transport mechanism for soils to impact the surface water as there does not appear to be erosion of soils at the site.

5.8 Risk Assessment Conclusions

Human Health: A condition of Significant Risk does exist as soil contaminants exceed Method 1 standards. Additionally, using the Method 3 screening, for a residential user due to long-term chronic exposure via ingestion of homegrown vegetables. The non-cancer risk exceeds the DEP acceptable limit of 1.0, see Appendix F.

Safety: A condition of No Significant Risk exists to Safety.

Public Welfare: A condition of Significant Risk does exist due to the presence of lead hot spots at B-202 and B-211 in Area 2.

Environment: A condition of No Significant Risk exists to environmental receptors.

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6.0 PHASE III REMEDIAL ACTION PLAN (RAP)

6.1 General

Weston & Sampson performed a Phase III - Identification, Evaluation and Selection of Comprehensive Remedial Action Alternatives for the Site. The Phase III results are documented in this Remedial Action Plan (RAP), which has been prepared in accordance with 310 CMR 40.0861 of the MCP. The overall objective of the Phase III study is to identify, evaluate and select remedial alternatives that will achieve a condition of No Significant Risk at the Site.

6.2 Identification and Evaluation of Alternatives

The results of the risk assessment indicate the following:

- A condition of No Significant Risk to human health and public welfare does not exist for current and future Site uses due to the lead hot spot in Area 2 at borings B-202 and B-211. This hot spot is assumed to be rectangular shaped (40' long by 20' wide) and extends to an approximate depth of 9 feet.

- A condition of No Significant Risk to human health does not exist for future residential Site use in Area 1 based on the assumption that residual contaminants at the site should not be compared to urban background for a residential scenario.

Remediation of the Site will likely occur as part of site development and consequently the type of remediation selected will be based on the type of development proposed at the Site. For example, for a commercial development with limited exposure to Site soil, the contaminants in Area 1 could be considered as background and therefore no additional risk. However, development including residences may require limited soil removal, management of soil exposure through engineering design and/or restricting certain land use or development via an AUL.

Therefore, in the absence of a final development plan for the Site, we evaluated the following remedial action alternatives:

Alternative Description

1. No Action
2. Hot Spot Soil Excavation in Area 2, Off-Site Disposal, and AUL
3. Area 1 (0 to 15 feet) and Hot Spot Soil Excavation in Area 2, and Off-Site Disposal

4. Area 1 (0 to 8 feet) and Hot Spot Soil Excavation in Area 2, Off-Site Disposal, Capping, and AUL*

* = A cap can be placed over Area 1 at any elevation however 0-8 feet of soil excavation was selected as a likely development scenario as 8-feet of soil would meet surrounding grade.

These alternatives were evaluated for technical feasibility and cost based on the following criteria:

- The alternative must be a demonstrated, proven technology that can be implemented at the site in a short period of time.
- The alternative results in the reuse, recycling, destruction, and/or treatment of OHM present at the site.
- The alternative will not pose a significant risk to human health, safety, public welfare, or the environment.
- The alternative will result in the reduction and/or elimination of contamination in soil.

6.2.1 Alternative No. 1: No Action

The results of the Phase II investigation and risk characterization indicate that a condition of Significant Risk to human health and public welfare exists at the Site under current and future Site uses. Therefore, this alternative is not suitable and will not be retained for further evaluation.

6.2.2 Alternative No. 2: Hot Spot Soil Excavation, Off-Site Disposal, and Activity and Use Limitation

Soil excavation is recommended for accessible contaminated soil which, following removal, can be recycled or disposed of at an off-site facility. The excavation is then backfilled with clean soil to eliminate potential future exposures. In this alternative, the hot spot of lead-contaminated soil at borings B-202 and B-211 would be excavated and transported to an off-site disposal facility. Due to the elevated TCLP-lead concentrations detected at boring B-211, this material would be considered a hazardous waste and would require stabilization prior to landfilling. As stated in Section 6.2, the dimensions of the hot spot are approximately 40' x 20' x 9', which equals approximately 270 cubic yards.

This alternative will result in the reduction and/or elimination of exposure to contaminated soil, and will also reduce or eliminate actual contaminant concentrations in on-Site soils. With regard to the

evaluation criteria above, soil excavation and off-Site disposal is a widely used, proven technology that can be implemented in a short period of time without prior studies or engineering design. Following hot spot excavation, an AUL would be placed on Area 1 to identify site use and activities that are consistent with maintaining a condition of No Significant Risk. A Class A RAO may be obtained if soil concentrations left in place pose a condition of No Significant Risk to human health, safety, public welfare, and the environment. This alternative will be retained for further evaluation.

6.2.3 Alternative No. 3: Area 1 (0 to 15 Feet) and Hot Spot Soil Excavation, and Off-Site Disposal

As described above, soil excavation and off-Site disposal of soil is an alternative that meets the evaluation criteria listed in Section 6.2. In addition to excavation of the hot spot, the soil in Area 1 found to contain urban fill contaminated with lead and petroleum compounds would be excavated and disposed off-Site. The dimensions of the soil to be excavated from Area 1 are approximately 300' x 220' x 15', which equals approximately 37,000 cubic yards. The estimated volume of the lead hot spot is 270 cubic yards. This alternative would require shoring of the excavation and dewatering. Following completion of the alternative, a condition of No Significant Risk to human health, safety, public welfare, and the environment will have been achieved. Also, potential future uses of the Site would be unrestricted. This alternative will be retained for further evaluation.

6.2.4 Alternative No. 4: Area 1 (0 to 8 Feet) and Hot Spot Soil Excavation, Off-Site Disposal, Capping, and AUL

As described above, soil excavation and off-Site disposal of soil is an alternative that meets the evaluation criteria listed in Section 6.2. In addition to excavation of the hot spot, the top 8 feet of soil in Area 1 found to contain elevated concentrations of lead and petroleum compounds would be excavated and disposed off-Site. This amount of soil to be excavated was chosen as a development option that would meet surrounding grade. The dimensions of the soil to be excavated from Area 1 are approximately 300' x 220' x 8', which equals approximately 20,000 cubic yards. The estimated volume of the lead hot spot is 270 cubic yards.

Following excavation, a geotextile filter fabric would be installed on the subgrade and 3 feet of clean backfill would be placed on top. Following completion of the cap, an AUL would be placed on Area 1 restricting future residential use. A Class A RAO may then be obtained if soil concentrations left

in place pose a condition of No Significant Risk to human health, safety, public welfare, and the environment. This alternative will be retained for further evaluation.

6.3 Detailed Evaluation of Remedial Action Alternatives

This section presents a more detailed evaluation of Alternatives No. 2 through 4 based on the criteria presented in 310 CMR 40.0858 of the MCP.

6.3.1 Effectiveness

Alternative No. 2 – Hot Spot Soil Excavation, Off-Site Disposal, and AUL: Excavation and off-Site disposal is most effective when the extent of contaminated soil is well-defined. In this instance, the hot spot is defined by borings B-202 and B-211 only. The surrounding soil samples were found to contain significantly (2 orders of magnitude) lower concentrations of lead. This alternative will likely result in a permanent solution (Class A RAO), although an AUL restricting/maintaining future residential use or exposure would be required for Area 1.

Alternative No. 3 – Area 1 (0 to 15 Feet) and Hot Spot Soil Excavation, and Off-Site Disposal: In addition to removing the hot spot, this alternative will remove all potentially-accessible contaminated soil from Area 1 and thereby eliminate the need for an AUL. Therefore, this alternative will achieve a Permanent Solution and a Class A RAO may be obtained for the Site.

Alternative No. 4 – Area 1 (0 to 8 Feet) and Hot Spot Soil Excavation, Off-Site Disposal, Capping, and AUL: In addition to removing the hot spot, this alternative will remove the top 8 feet of potentially-accessible contaminated soil from Area 1. Following removal, a cap (including a geotextile filter fabric base) will be installed preventing exposure to residual contaminated soil. An AUL would be required on Area 1 to restrict future residential use. Therefore, this alternative will achieve a Permanent Solution and a Class A RAO may be obtained for the Site.

6.3.2 Short-Term and Long-Term Reliability

Alternative No. 2 – Hot Spot Soil Excavation, Off-Site Disposal, and AUL: There is a relatively high degree of certainty that this alternative will successfully reduce contaminants in the hot spot area to levels that will achieve a condition of No Significant Risk. Any residual wastes generated during this alternative can be effectively managed. Excavated soil would be stockpiled on and

covered with polyethylene sheeting to prevent further contamination at the Site.

Alternative No. 3 – Area 1 (0 to 15 Feet) and Hot Spot Soil Excavation, and Off-Site Disposal: There is a relatively high degree of certainty that this alternative will successfully reduce contaminants across the Site to levels that will achieve a condition of No Significant Risk. Any residual wastes generated during this alternative can be effectively managed. Excavated soil would be stockpiled on and covered with polyethylene sheeting to prevent further contamination at the Site.

Alternative No. 4 – Area 1 (0 to 8 Feet) and Hot Spot Soil Excavation, Off-Site Disposal, Capping, and AUL: There is a relatively high degree of certainty that this alternative will successfully reduce contaminants across the Site to levels that will achieve a condition of No Significant Risk. Excavated soil would be stockpiled on and covered with polyethylene sheeting to prevent further contamination at the Site. In addition, capping is a reliable short-term and long-term measure that will prevent future exposures and potential migration of contaminants. The cap can be easily maintained and repaired over the long-term. Any residual wastes generated during this alternative can be effectively managed. Once Area 1 is capped, potential exposures will be eliminated for current and future-use conditions.

6.3.3 Difficulty in Implementing Each Alternative

Alternative No. 2 – Hot Spot Soil Excavation, Off-Site Disposal, and AUL: This alternative could be implemented with low to moderate difficulty. Equipment and technology are readily available and the amount of soil to be excavated would not require a large stockpiling and staging area.

Alternative No. 3 – Area 1 (0 to 15 Feet) and Hot Spot Soil Excavation, and Off-Site Disposal: This alternative could be implemented with moderate to high difficulty. Equipment and technology are readily available; however, because of the amount of soil to be excavated, the area required for equipment staging, soil stockpiling and transferring soil to vehicles for off-Site disposal would be extensive. Due to the excavation depth (15 feet), shoring or steel sheeting would be necessary to prevent excavation collapse. Excavation dewatering and treatment, if necessary, would be required to access soils located between 12 and 15 feet below grade.

Alternative No. 4 – Area 1 (0 to 8 Feet) and Hot Spot Soil Excavation, Off-Site Disposal, Capping, and AUL: This alternative could be implemented with moderate to high difficulty. Equipment and technology are readily available; however, because of the amount of soil to be excavated, the area required for equipment staging, soil stockpiling and transferring soil to vehicles for off-Site disposal would be extensive. Due to the excavation depth (8 feet), shoring or steel sheeting may be necessary to prevent excavation collapse. The capping portion of this alternative can be easily implemented since the technology is widely available and would require readily available equipment and materials. Long-term monitoring is not required to maintain the cap other than periodic inspection.

6.3.4 Costs

Alternative No. 2 – Hot Spot Soil Excavation, Off-Site Disposal, and AUL: The lead hot spot soil would be shipped off-Site as a RCRA hazardous waste for stabilization and landfilling. The volume of the hot spot is estimated to be 270 cubic yards. Using a 1.5 tons per cubic yard multiplier, the weight of the hot spot soil is approximately 405 tons. This material could be shipped off-Site for stabilization and landfilling at a cost of $300 per ton, or $121,500.

Alternative No. 3 – Area 1 (0 to 15 Feet) and Hot Spot Soil Excavation, and Off-Site Disposal: We have evaluated the data for soil in Area 1 and we anticipate that the majority of the soil could be shipped for off-Site recycling. Approximately 5% of the soil in Area 1 would likely require disposal as a RCRA hazardous waste due to elevated lead concentrations. Costs for this alternative are estimated to range between $2,500,000 and $3,000,000 for equipment, labor, and materials. Cost components include engineering design, excavation shoring, dewatering, and placement of clean backfill in Area 1.

Alternative No. 4 – Area 1 (0 to 8 Feet) and Hot Spot Soil Excavation, Off-Site Disposal, Capping, and AUL: The majority of the soil in Area 1 could be shipped for off-Site recycling and approximately 5% would likely require disposal as a RCRA hazardous waste due to elevated lead concentrations. Costs for this alternative are estimated to range between $1,500,000 and $2,000,000 for equipment, labor, and materials. Cost components include engineering design, excavation shoring, installation of the geotextile filter fabric, and placement of 3 feet of clean backfill in Area 1 as a cap. Please note that the costs for Alternative 4 are driven by soil excavation and disposal costs.

Reducing the amount of soil excavated or simply placing the cap on top of existing grade, assuming that the development could support the grade difference, would significantly reduce costs and may make this a more effective solution.

6.3.5 Risks

Alternative No. 2 – Hot Spot Soil Excavation, Off-Site Disposal, and AUL: During excavation activities, any risk to construction workers would likely be attributed to ingestion of lead-contaminated soil. Exposure to soil can be reduced, however, through dust control measures and the use of personal protective equipment. These measures would be specified in the construction plans and specifications.

Alternative No. 3 – Area 1 (0 to 15 Feet) and Hot Spot Soil Excavation, and Off-Site Disposal: This alternative will pose risks similar to those in Alternative No. 1.

Alternative No. 4 – Area 1 (0 to 8 Feet) and Hot Spot Soil Excavation, Off-Site Disposal, Capping, and AUL: This alternative will pose risks similar to those in Alternative No. 1. Also, capping will pose minimal risks during and after implementation. Fugitive dust emissions may occur during installation of the cap, but this can be addressed through dust control measures and personal protective equipment. Installation of a cap will not increase risks over current conditions and the AUL will serve to restrict activities that could result in unacceptable risk to human health.

6.3.6 Benefits

Alternative No. 2 – Hot Spot Soil Excavation, Off-Site Disposal, and AUL: This alternative will remove the lead-contaminated hot spot from the Site, thereby reducing the potential for exposure in that location. The AUL will maintain a level of No Significant Risk from other urban fill contaminants.

Alternative No. 3 – Area 1 (0 to 15 Feet) and Hot Spot Soil Excavation, and Off-Site Disposal: This alternative will remove the contaminated soil from the Site, thereby reducing the potential for exposure.

Alternative No. 4 – Area 1 (0 to 8 Feet) and Hot Spot Soil Excavation, Off-Site Disposal, Capping, and AUL: This alternative will remove the hot spot and the top 8 feet of contaminated soil in Area 1 from the Site, thereby reducing the potential for exposure in those locations. Capping Area 1 will provide immediate benefits in that potential exposure will be eliminated.

6.3.7 Timeliness

Alternative No. 2 – Hot Spot Soil Excavation, Off-Site Disposal, and AUL: Excavation of the hot spot, off-Site disposal, and attachment of an AUL to the deed for Area 1 can be implemented relatively quickly and is estimated to take approximately 6 to 12 months to complete.

Alternative No. 3 – Area 1 (0 to 15 Feet) and Hot Spot Soil Excavation, and Off-Site Disposal: Excavation and off-Site disposal of the hot spot and Area 1 (0 to 15 feet) can be performed in approximately 1 to 2 years. Plans and specifications would have to be prepared for construction of excavation shoring and the dewatering system.

Alternative No. 4 – Area 1 (0 to 8 Feet) and Hot Spot Soil Excavation, Off-Site Disposal, Capping, and AUL: Excavation and off-Site disposal of the hot spot and Area 1 (0 to 8 feet), construction of a cap, and attachment of an AUL to the deed for Area 1 can be accomplished in approximately 1 to 2 years. Plans and specifications would have to be prepared for construction of excavation shoring and the cap.

6.4 Selection of Remedial Action Alternative

A comparative evaluation of alternatives was described in the preceding section. Table 12 provides a relative scoring of the alternatives with respect to each of the criteria. For each criterion, the alternatives were scored relative to each other on a scale of 1 (best) to 3 (worst). Alternative No. 2 – Hot Spot Soil Excavation, Off-Site Disposal, and AUL received the lowest scoring (total score = 12) and, therefore, was selected as the remedial action alternative for the Site.

6.5 Feasibility of Permanent Solutions

6.5.1 Feasibility of Restoration to Background

The selected remedial action alternative, Alternative No. 2 – Hot Spot Soil Excavation, Off-Site Disposal, and AUL, meets most of the following criteria of 310 CMR 40.0860(5):

- The selected remedial technology is technically feasible.
- The cost of implementing the alternative is justified by the benefits.
- Individuals with the expertise required to implement the alternative are available.
- The alternative does not require land disposal of OHM materials for which there are no current facilities available to accept such materials.
- The alternative will be implemented at the source to reduce and/or eliminate source area contamination.

The reduction of contaminant concentrations in soil to background levels will not occur under the selected remedial alternative. The primary objective of hot spot removal and implementation of an AUL is to limit exposure to contaminants. Additional remediation or excavation to achieve background will cost orders-of-magnitude higher and would take much longer to implement. These costs would clearly be disproportionate to the marginal incremental benefit which further remediation might provide. Given that the selected remedial action alternative will result in a condition of No Significant Risk for current and future Site uses, further reduction of contaminant levels would not provide significant benefits relative to risk reduction. Therefore, the achievement of background concentrations in soil does not appear to be warranted for this Site. Also, the Site is situated in an area where much of the subsurface has been impacted with urban fill, consequently, benefits associated with "environmental restoration" which would result from further remediation are negligible.

6.6 Phase III Completion Statement

A copy of the Phase III Completion Statement is provided in Appendix G. In accordance with 310 CMR 40.1403, a Notice of a Remedial Plan was submitted to the City of Boston Chief Municipal Official and Board of Health. Copies of this notice are included in Appendix G. A copy of the legal notice is included in Appendix G.

7.0 CONCLUSIONS AND RECOMMENDATIONS

7.1 Conclusions

Based on data collected to-date, the contaminants detected in soil included TPH, PAHs and lead, which have been detected at concentrations above applicable S-2 and S-3 Method 1 Standards. The data presented in this Phase II report indicate that the extent of soil contamination is limited to the urban fill unit at two areas in the northern portion of Parcel P-3: Area 1 and Area 2 (Figures 2 and 7). Lead concentrations also exceeded UCLs at two locations and the TCLP hazardous waste threshold in one sample. A lead impacted soil hot spot was identified in Area 2.

Groundwater sampling results presented in this Phase II report indicate that groundwater does not appear to be impacted by a release of OHM, with the contaminants in groundwater all detected at concentrations below Method 1 Standards. A release of oil to the basement of the former Whittier Street Health Center does not appear to have impacted the environment and is not part of this disposal site.

The results of the Method 1 risk characterization indicate that a condition of No Significant Risk does not exist at the Site due to the hot spot in Area 2 and EPH-contaminated soil detected at one location in Area 1. Area 1 soil also contained lead and PAH concentrations similar to those typically found in urban fill. Therefore, these contaminants were not included in the risk characterization. However, if residences are to be placed in Area 1, there is a significant risk due to current soil contaminant concentrations.

The Phase II concluded that to achieve a condition of No Significant Risk, at a minimum, the hot spot in Area 2 should be excavated and disposed off-Site. An AUL restricting future residential use and/or to identify site use and activities which are consistent with maintaining a condition of No Significant Risk may then be placed on Area 1. If future residential development of Area 1 is desired then several remedial options are available. These options include excavation of all contaminated soil in Area 1, or a combination of limited excavation (to meet grades for

development) coupled with placement of a geotextile and a 3-foot earthen cap or barrier to provide adequate separation.

Therefore, although we recommend Alternative 2 (hot spot excavation in Area 2 and an AUL to restrict residential development of Area 1), site closure will likely occur during the development of Parcel P-3 and be amended to reflect the desired development for the Site.

7.2 Recommendations

Based on the findings presented in this report, Weston & Sampson recommends that the BRA:

1) Extend Site fencing to prohibit trespasser access to Area 2 and prevent new dumping.

2) Implement Remedial Alternative No. 2, which is excavation of the hot spot in Area 2 and placement of an AUL on the deed to identify site use and activities, which are consistent with maintaining a condition of No Significant Risk in Area 1.

3) Conduct necessary response actions to achieve MCP compliance and site closure.

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8.0 LIMITATIONS

This report was prepared on behalf of and for the exclusive use of the Boston Redevelopment Authority for use in evaluating the environmental conditions at Parcel P-3. The findings provided by Weston & Sampson in this report are based solely on the information reported in this document. Soil and groundwater data are representative of the samples collected at the locations specified and at the time of collection. Future investigations, and/or information that were not available to Weston & Sampson at the time of the investigation, may result in a modification of the findings stated in this report.

Should additional information become available concerning Parcel P-3 or neighboring properties in the future, the information should be made available to Weston & Sampson Engineers, Inc. for review so that the conclusions presented in this report may be modified as necessary. The conclusions of this report are based solely on the data collected by Weston & Sampson personnel at the time of the investigation(s) discussed herein. The information collected has not been used to assess if contaminants from Parcel P-3 have migrated to other nearby properties, or if contaminants from potential off-site sources have impacted Parcel P-3. This report has been prepared in accordance with generally accepted engineering and geological practices. No other warranty, express or implied, is made.

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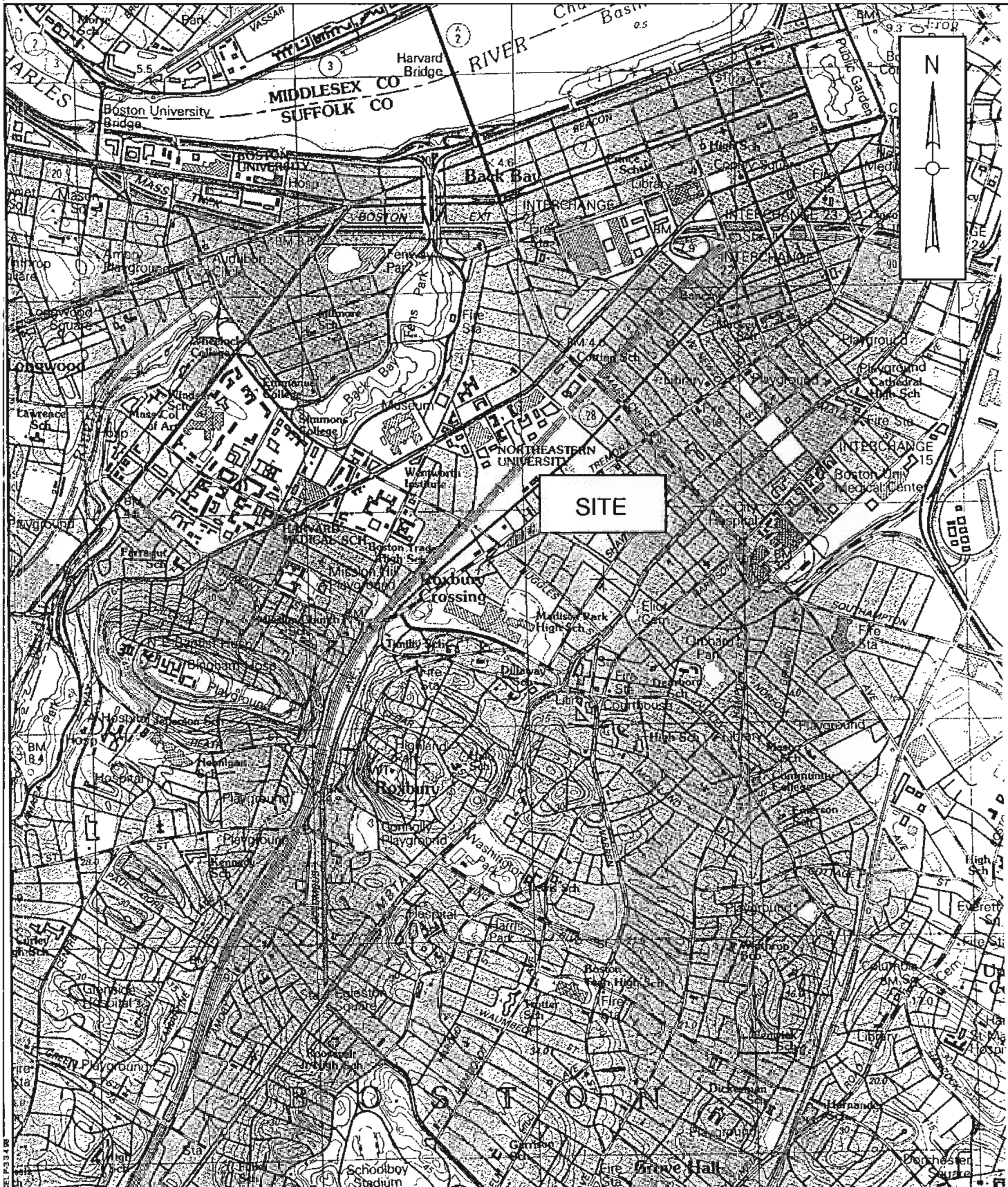

FIGURE 1

BRA/EDIC -- PARCEL P-3; ROXBURY, MASSACHUSETTS

LOCUS MAP

SOURCE: USGS 7.5 x 15 MINUTE SERIES BOSTON SOUTH, MASS. QUAD, 1987

SCALE : 1 : 25,000

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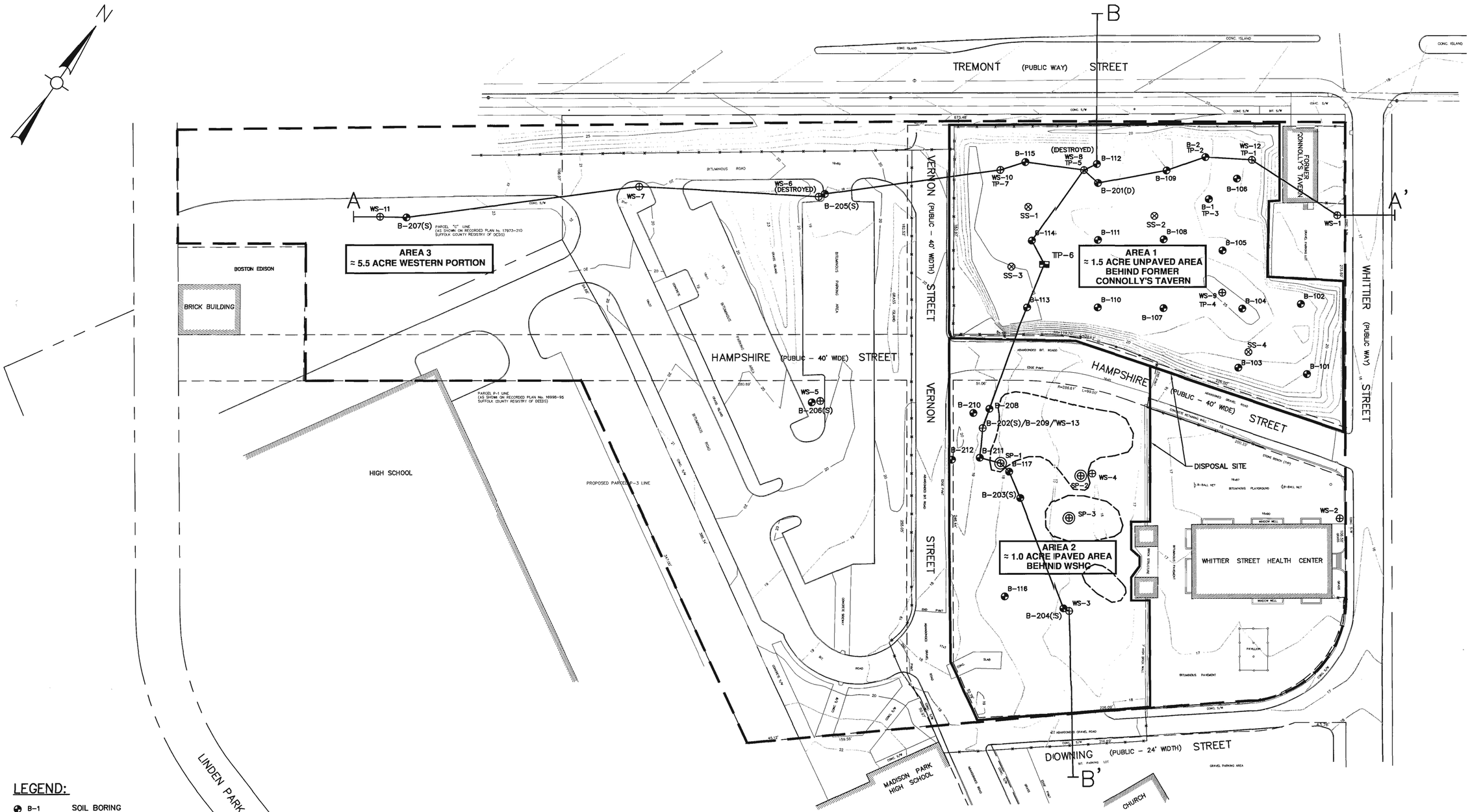
Weston & Sampson



LEGEND:

B-1	SOIL BORING
WS-1	GROUNDWATER MONITORING WELL
SS-1	SURFICIAL SOIL SAMPLING LOCATION
SP-1	STOCKPILE SOIL SAMPLE
B-201(D)	DEEP SOIL BORING
B-203(S)	SHALLOW SOIL BORING
TP-6	TEST PIT
A — A'	GEOLOGIC CROSS-SECTION
	P-3 PARCEL BOUNDARY
	CHAIN LINK FENCE
	DISPOSAL SITE BOUNDARY
	APPROXIMATE LIMITS OF SURFICIAL SOIL STOCKPILE

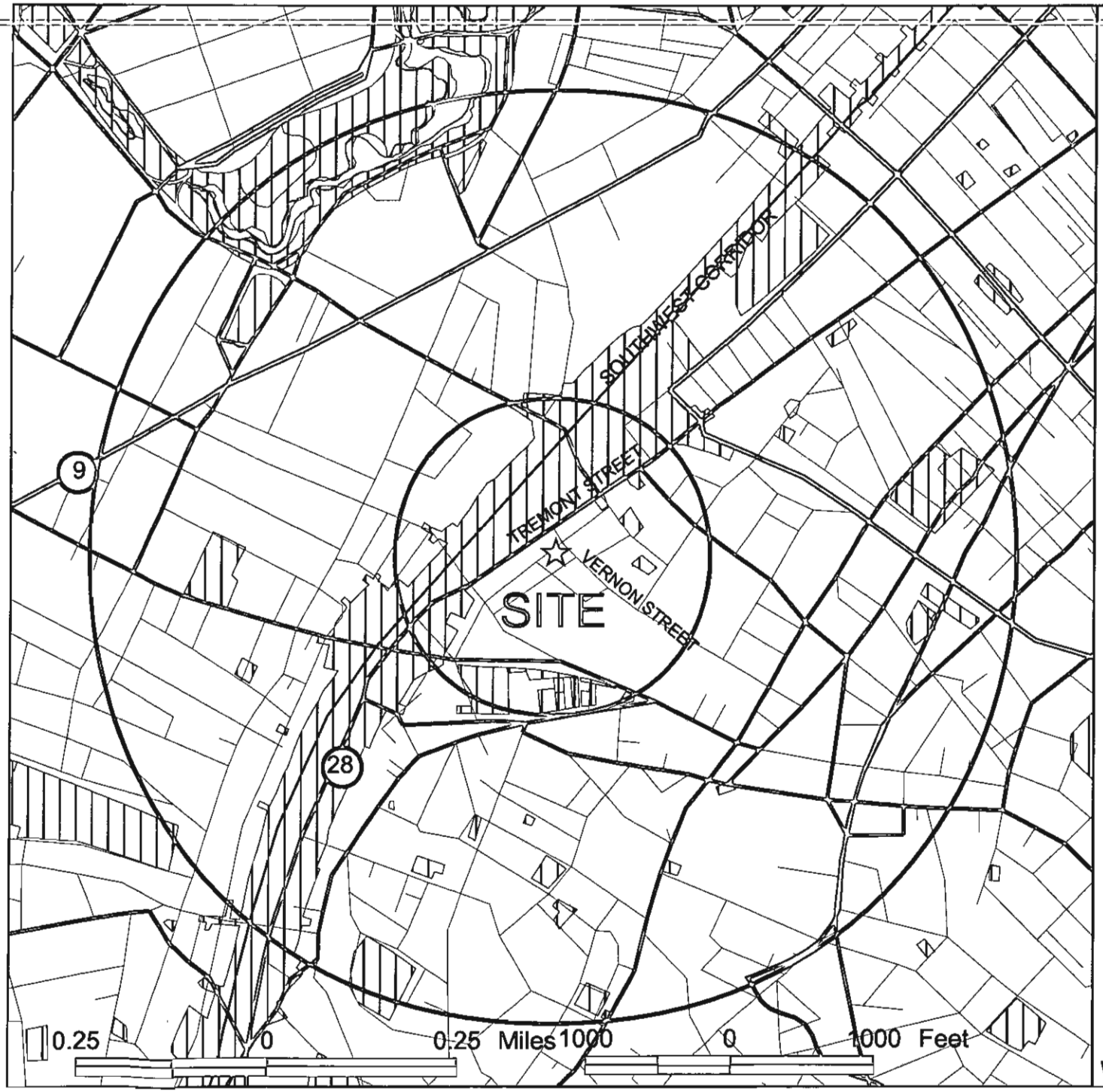
SOURCES:

1. PLAN OF LAND IN BOSTON PARCELS P-3X, P-3Y, P-3Z, NOV. 1996 GREEN INTERNATIONAL AFFLIATES, INC.
2. BRA RUGGLES PLAZA PLAN

FIG 2
ROXBURY, MASSACHUSETTS
BRA PARCEL P-3
SITE PLAN

MARCH, 2002 SCALE: 1"=40'

WESTON & SAMPSON ENGINEERS, INC.



LEGEND

- NHESP Wetlands Habitat
- NHESP Certified Vernal Pool
- Maj. Roads Labels and Shields
- *Text* Town Names

Water Supplies
- Ground Water
- Surface Water
- Non Community

Towns
- Town Arcs
- County Arcs
- Transmission Lines
- Trains

MHD Roads
- Limited Access Highway
- Multi-lane Hwy, not limited access
- Other Numbered Hwy
- Major Road - Connector
- Minor Street or Road
- Track
- Trail
- Sub-basins
- Major Basins
- Rivers & Streams
- Solid Waste Sites
- Openspace
- ACECs
- Zone A
- IWPAs
- Zone IIs
- Sole Source Aquifers

Lakes & Ponds
- Water
- Wetlands

Potential Drinking Water Sourc
- HIGH YIELD
- MEDIUM YIELD

Non Potential Drinking Water S
- HIGH YIELD
- MEDIUM YIELD
- MA Towns

FIGURE 3
AREA RECEPTORS MAP

ROXBURY, MASSACHUSETTS
BRA/EDIC PARCEL P-3

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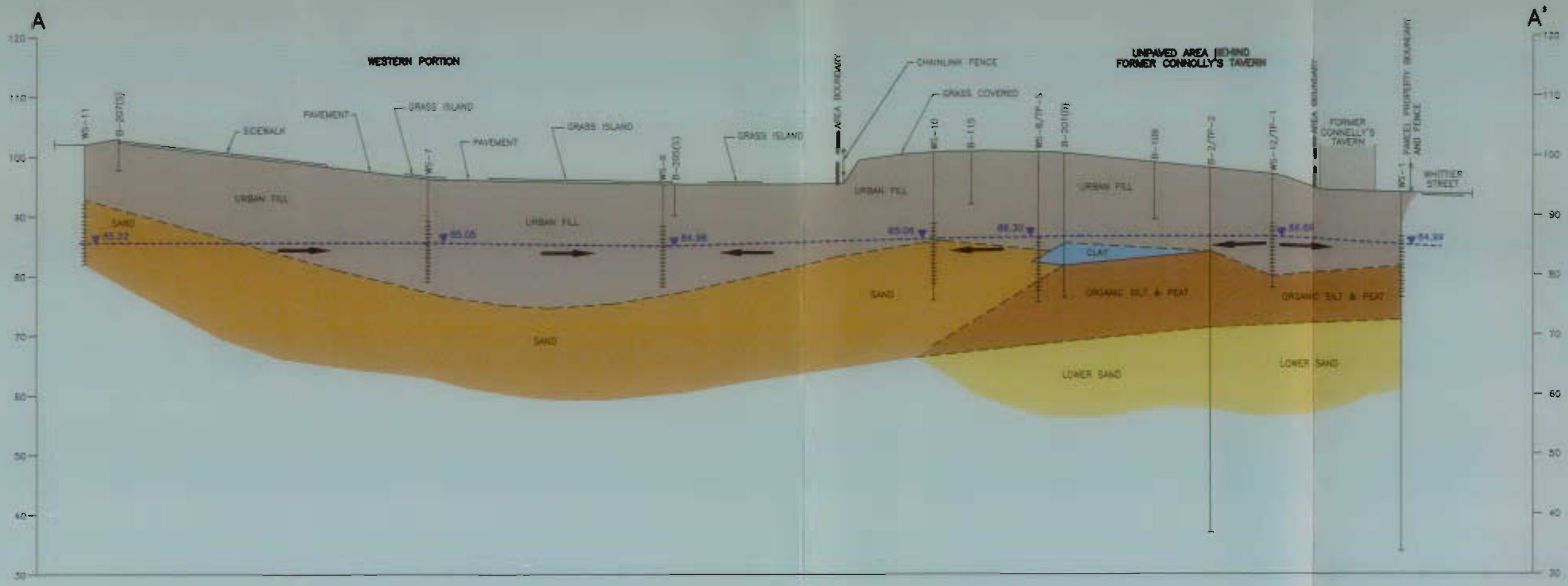

VERTICAL SCALE: 1"=20'

HORIZONTAL SCALE: 1"=80'

LEGEND:

- URBAN FILL
- SAND
- CLAY
- ORGANIC SILT & PEAT
- LOWER SAND
- APPROXIMATE BOUNDARY BETWEEN GEOLOGIC UNITS
- GROUNDWATER TABLE AND GROUNDWATER ELEVATION
- GROUNDWATER FLOW DIRECTION
- PARCEL SUB-AREA BOUNDARY

NOTE:

1. WESTON & SAMPSON MEASURED GROUNDWATER ELEVATIONS ON DECEMBER 12, 1996.
2. CROSS-SECTION WAS PREPARED FROM FIELD NOTES AND STRATUM DEPTHS ARE APPROXIMATE.

FIGURE 4

ROXBURY, MASSACHUSETTS
BRA/EDIC PARCEL P-3

GEOLOGIC CROSS-SECTION
A-A'

DESIGNED BY: AMW | CHECKED BY: GDN | DATE: OCTOBER 2001

WESTON & SAMPSON ENGINEERS, INC.

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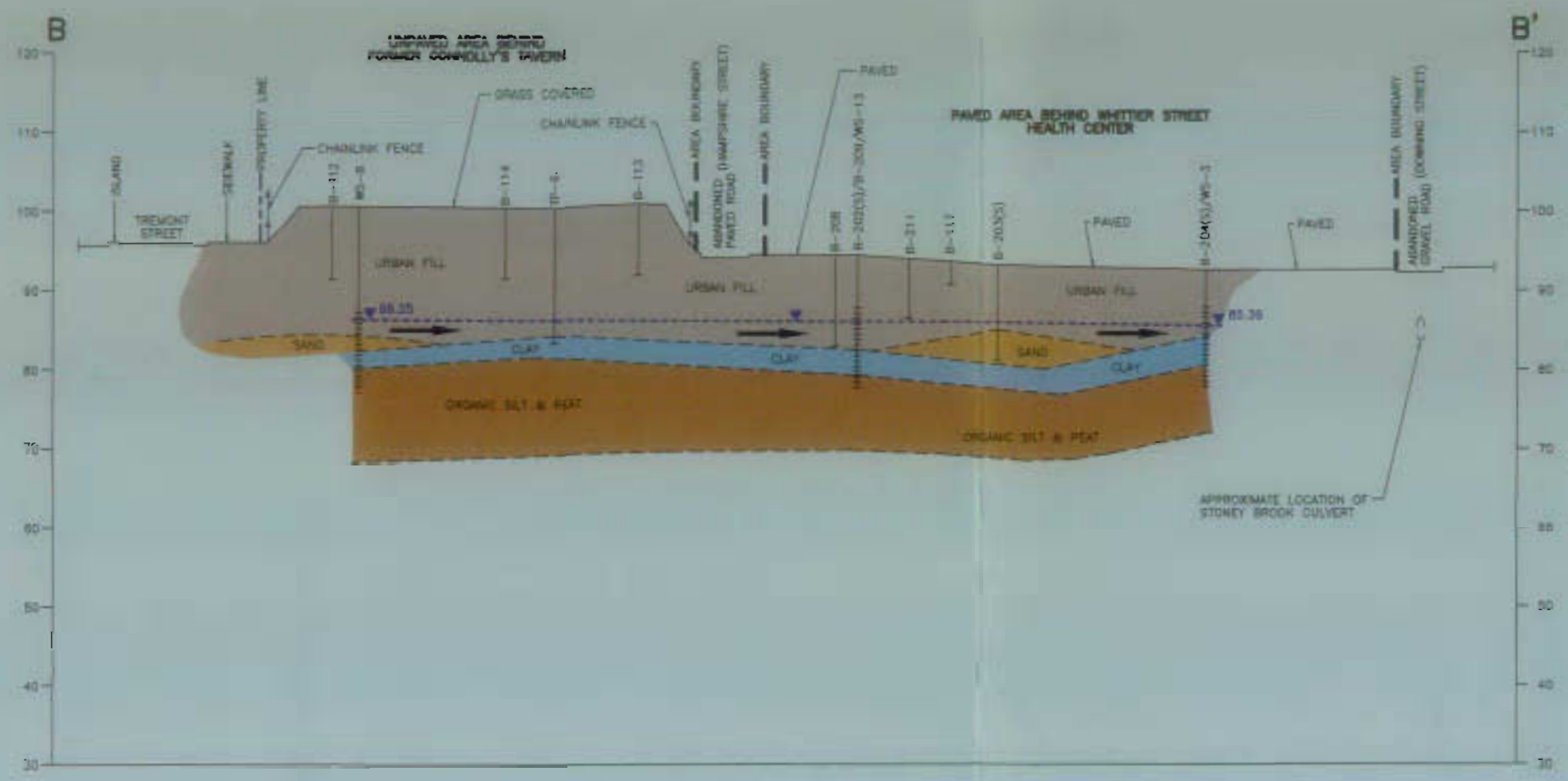

VERTICAL SCALE: 1"=20'

HORIZONTAL SCALE: 1"=80'

LEGEND:

- URBAN FILL
- SAND
- CLAY
- ORGANIC SILT & PEAT
- LOWER SAND
- APPROXIMATE BOUNDARY BETWEEN GEOLOGIC UNITS
- GROUNDWATER TABLE AND GROUNDWATER ELEVATION
- GROUNDWATER FLOW DIRECTION
- PARCEL SUB-AREA BOUNDARY

NOTE:

1. WESTON & SAMPSON MEASURED GROUNDWATER ELEVATIONS ON DECEMBER 12, 1996.
2. CROSS-SECTION WAS PREPARED FROM FIELD NOTES AND STRATUM DEPTHS ARE APPROXIMATE.

FIGURE 5

ROXBURY, MASSACHUSETTS
BRA/EDIC PARCEL P-3

GEOLOGIC CROSS-SECTION
B-B'

DESIGNED BY: AMW	CHECKED BY: GDN	DATE: OCTOBER, 2001

WESTON & SAMPSON ENGINEERS, INC.

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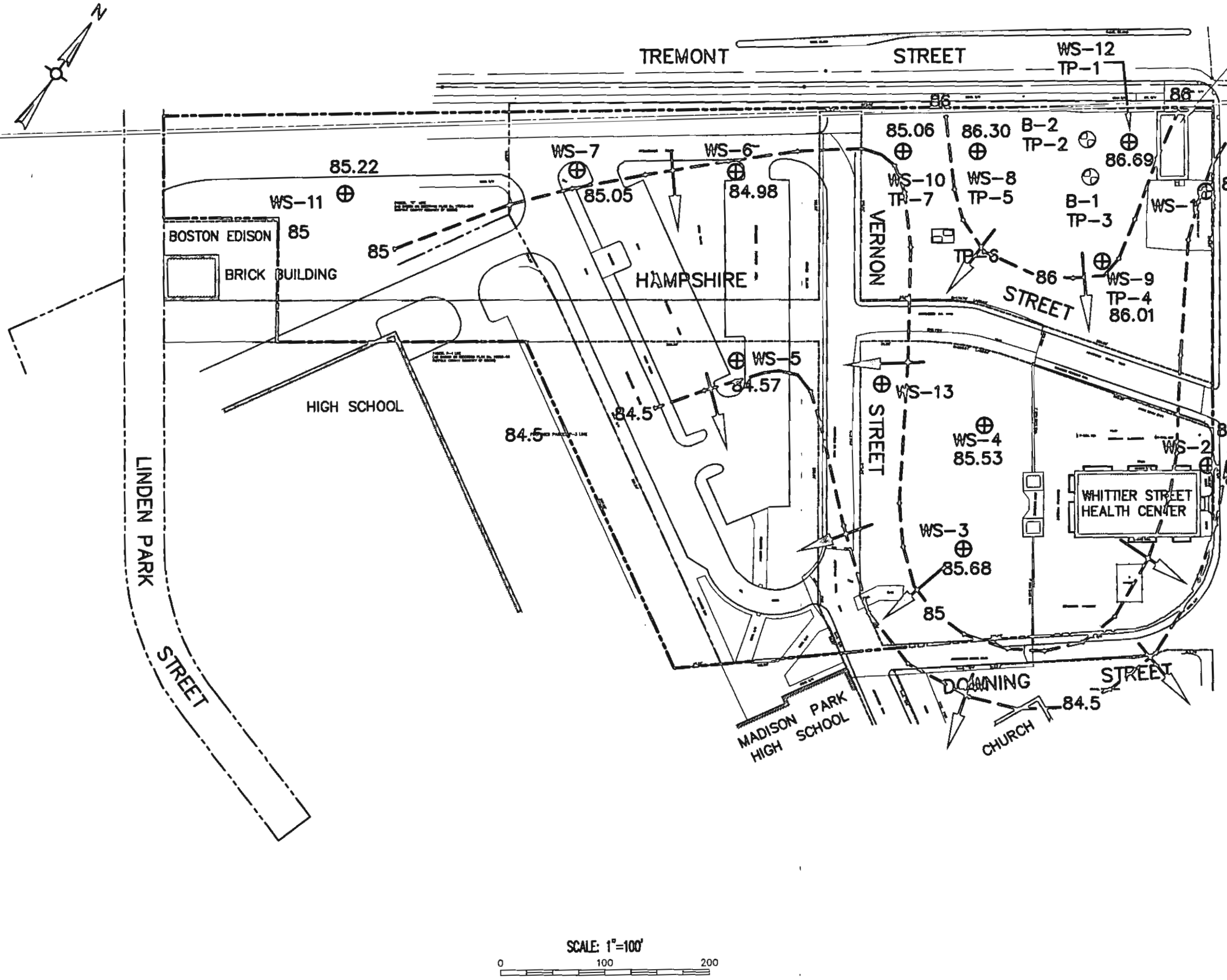
Weston & Sampson Engineers, Inc.



LEGEND:

- ⊕ B-1 BORING
- ⊕ WS-1 MONITORING WELL
- TP-6 TEST PIT
- P-3 PARCEL BOUNDARY
- 85.06 GROUNDWATER ELEVATION DECEMBER 12, 1996
- 85 — 85 GROUNDWATER ELEVATION CONTOUR (INFERRED) AND GROUNDWATER FLOW DIRECTION

SCALE: 1"=100'
0 100 200

FIGURE 6

ROXBURY, MASSACHUSETTS
BRA/EDIC PARCEL P-3

GROUNDWATER ELEVATION
CONTOUR MAP DECEMBER 12, 1996

DESIGNED BY: GDN	CHECKED BY: AMW	DATE: OCTOBER, 2001

WESTON & SAMPSON
ENGINEERS, INC.

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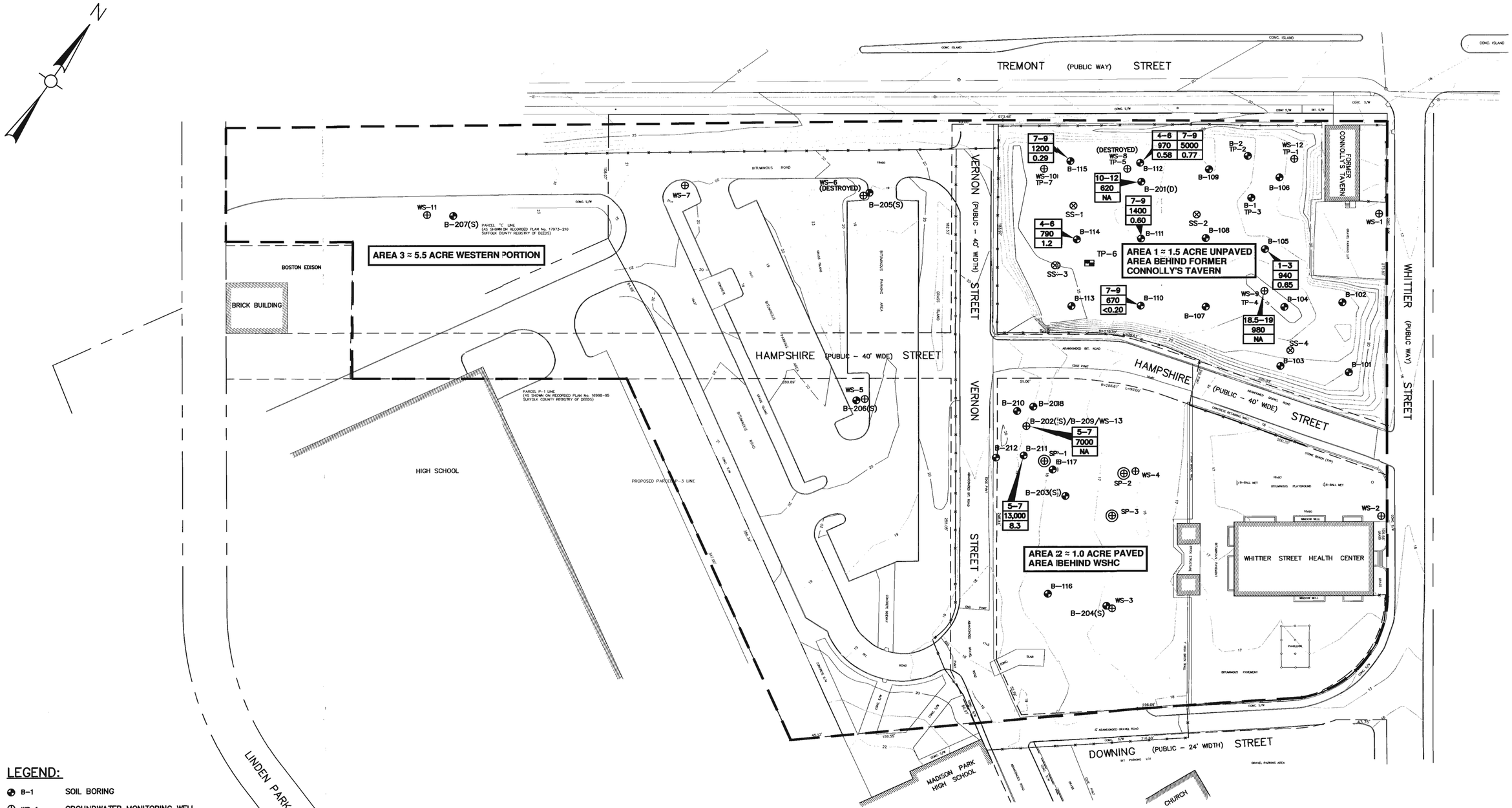

LEGEND:

B-1	SOIL BORING
WS-1	GROUNDWATER MONITORING WELL
SS-1	SURFICIAL SOIL SAMPLING LOCATION
SP-1	STOCKPILE SOIL SAMPLE
B-201(D)	DEEP SOIL BORING
B-203(S)	SHALLOW SOIL BORING
TP-6	TEST PIT
— —	P-3 PARCEL BOUNDARY
×—×—×	CHAIN LINK FENCE
	DISPOSAL SITE AREA

10-12 — SAMPLE DEPTH (FEET BELOW GRADE)
620 — LEAD CONCENTRATION (MILLIGRAMS PER KILOGRAM)
8.3 — TOXICITY CHARACTERISTIC LEACHING PROCEDURE RESULT FOR LEAD (MILLIGRAMS PER LITER)
NA — NOT ANALYZED

SOURCES:

1. PLAN OF LAND IN BOSTON PARCELS P-3X, P-3Y, P-3Z, NOV. 1996 GREEN INTERNATIONAL AFFLIATES, INC.
2. BRA RUGGLES PLAZA PLAN

FIG 7
ROXBURY, MASSACHUSETTS
BRA PARCEL P-3

DISTRIBUTION OF LEAD IN SOIL ABOVE METHOD 1 STANDARDS

MARCH, 2002 SCALE: 1"=40'

WESTON & SAMPSON ENGINEERS, INC.

H:\20037\LEAD-CONT-40

TABLE 1

PHASE I PID FIELD SCREENING RESULTS
TEST PITS AND SOIL BORINGS
BRA PARCEL P-3

Boring	Sample	Sample Depth (feet)	PID Reading (ppm)
TP-1/WS-12		11.5 - 12	34
	S-1	17 - 19	NS
TP-2/B-2		13.5 - 14	3.7
	S-1	29 - 31	0.4
	S-2	34 - 36	0.8
	S-3	39 - 41	0.8
	S-4	44 - 46	0.9
	S-5	49 - 49.1	0.8
	S-6	54 - 56	0.9
	S-7	59 - 61	1
TP-3/B-1		15.5 - 16	2.6
	S-1	19 - 21	1.6
	S-2	24 - 26	2.6
	S-3	29 - 31	2.3
	S-4	34 - 36	2.7
	S-5	39 - 41	1
	S-6	44 - 46	1.9
	S-7	49 - 51	1.7
	S-8	54 - 56	1.2
	S-9	59 - 61	1.4
TP-4/WS-9		18.5 - 19	5.5
	S-1	19 - 21	1.2
	S-2	23 - 25	0.5
TP-5/WS-8		17 - 17.5	2
	S-1	18 - 20	ND
	S-2	23 - 25	0.8
TP-6	S-1	15.5 - 16	1.1
TP-7/WS-10		17.5 - 18	0.5
	S-1	19 - 21	4.4

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Notes:

PID = Photoionization Detector Photovac Microtip Model HL-2000.

ppm = parts per million.

ND = Not Detected or less than Background.

NS = Not Screened.

Background concentrations (ND) = <0.2 ppm.

(--) indicates no sample recovered.

PID readings were measured between November 27 and December 5, 1996.

TABLE 1 - Continued

PHASE I PID FIELD SCREENING RESULTS
SOIL BORINGS
BRA PARCEL P-3

Boring	Sample	Sample Depth (feet)	PID Reading (ppm)
WS-1	S-1	0 - 2	ND
	S-2	3.5 - 5.5	ND
	S-3	8.5 - 10.5	1.4
	S-4	13.5 - 15.5	ND
	S-5	18.5 - 20.5	ND
	S-6	13.5 - 25.5	ND
	S-7	28 - 30	ND
	S-8	33 - 35	ND
	S-9	38 - 40	ND
	S-10	43 - 45	ND
	S-11	48 - 50	ND
	S-12	53 - 55	ND
	S-13	58 - 60	ND
WS-2	S-1	1 - 3	ND
	S-2	5 - 7	ND
	S-3	10 - 12	ND
	S-4	15 - 17	ND
WS-3	S-1	0 - 2	ND
	S-2	5 - 6	–
	S-3	10 - 12	ND
	S-4	15 - 17	ND
WS-4	S-1	0 - 2	ND
	S-2	5 - 7	ND
	S-3	10 - 12	ND
	S-4	15 - 17	ND
WS-5	S-1	0 - 2	0.3
	S-2	5 - 7	0.6
	S-3	10 - 12	0.5
	S-4	15 - 17	0.6
WS-6	S-1	0 - 2	0.5
	S-2	5 - 7	ND
	S-3	10 - 12	0.8
	S-4	15 - 17	0.5
WS-7	S-1	0 - 2	ND
	S-2	5 - 7	ND
	S-3	10 - 12	0.7
	S-4	15 - 17	0.2
WS-11	S-1	0 - 2	1.2
	S-2	5 - 7	1
	S-3	10 - 12	1.6
	S-4	15 - 17	--
	S-5	20 - 22	1.7

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Notes:
PID = Photoionization Detector Photovac Microtip Model HL-2000.
ppm = parts per million.
ND = Not Detected or less than Background.
NS = Not Screened.
Background concentrations = ND - 0.2 ppm.
(–) indicates no sample recovered.
PID readings were measured between December 3 and 5, 1996.

TABLE 2

PHASE I SOIL SAMPLING RESULTS
BRA PARCEL P-3
November 27 to December 5, 1996

Parameter	Units	Method 1 Cleanup Standards S-2 (GW-2/GW-3)	Method 1 Cleanup Standards S-3 (GW-2/GW-3)	Upper Concentration Level (UCL)	Sample Identification and Sample Depth (feet)											
					WS-1 8.5-10.5	WS-2 10-12	WS-3 15-17	WS-4 10-12	WS-5 10-12	WS-6 10-12	WS-7 10-12	WS-8 TP-5 17-17.5	WS-9 TP-4 18.5-19	WS-10 TP-7 17.5-18	WS-11 20-22	WS-12 TP-1 11.5-12
VOLATILE ORGANIC COMPOUNDS*																
Benzene	mg/kg	60	100	2,000	<0.025	<0.070	<0.047	<0.070	<0.027	<0.024	<0.027	<0.030	0.087	<0.027	<0.027	<0.034
Isopropylbenzene	mg/kg	NS	NS	NS	<0.025	<0.070	<0.047	<0.070	<0.027	<0.024	<0.027	<0.030	<0.026	<0.027	<0.027	0.33
n-Propylbenzene	mg/kg	NS	NS	NS	<0.025	<0.070	<0.047	<0.070	<0.027	<0.024	<0.027	<0.030	<0.026	<0.027	<0.027	0.76
Xylenes (total)	mg/kg	500	500	10,000	<0.025	<0.070	<0.047	<0.070	<0.027	<0.024	<0.027	<0.030	<0.026	<0.027	<0.027	0.032
tert-Butylbenzene	mg/kg	NS	NS	NS	<0.025	<0.070	<0.047	<0.070	<0.027	<0.024	<0.027	<0.030	<0.026	<0.027	<0.027	0.036
sec-Butylbenzene	mg/kg	NS	NS	NS	<0.025	<0.070	<0.047	<0.070	<0.027	<0.024	<0.027	<0.030	<0.026	<0.027	<0.027	0.27
n-Butylbenzene	mg/kg	NS	NS	NS	<0.025	<0.070	<0.047	<0.070	<0.027	<0.024	<0.027	<0.030	<0.026	<0.027	<0.027	0.47
Naphthalene	mg/kg	1,000	1,000	10,000	<0.025	<0.070	<0.047	<0.070	<0.027	<0.024	<0.027	0.15	<0.028	0.15	<0.027	0.16
1,2,4-Trimethylbenzene	mg/kg	NS	NS	NS	<0.025	<0.070	<0.047	<0.070	<0.027	<0.024	<0.027	<0.030	<0.026	<0.027	<0.027	0.070
Total BTEX	mg/kg	--	--	--	ND	ND	ND	ND	ND	ND	ND	ND	0.087	ND	ND	0.032
Total VOCs	mg/kg	--	--	--	ND	ND	ND	ND	ND	ND	ND	0.15	0.087	0.15	ND	2.1
TOTAL PETROLEUM HYDROCARBONS**																
Gasoline	mg/kg	--	--	--	<52	<110	<86	<110	<54	<45	<51	<59	<58	<52	<47	<72
Kerosene	mg/kg	--	--	--	<52	<110	<66	<110	<54	<45	<51	<59	<58	<52	<47	<72
Mineral Spirits	mg/kg	--	--	--	<52	<110	<86	<110	<54	<45	<51	<59	<58	<52	<47	<72
Fuel Oil #2/Diesel	mg/kg	--	--	--	<52	<110	<86	<110	<54	<45	<51	<59	<58	150*	<47	8,400*
Fuel Oil #4	mg/kg	--	--	--	<52	<110	<66	<110	<54	<45	<51	<59	<58	<52	<47	<72
Fuel Oil #6	mg/kg	--	--	--	<110	<230	<170	<230	<110	<90	<100	<120	<120	<100	<94	<140
Motor Oil/Hydraulic Oil	mg/kg	--	--	--	<52	<110	<86	<110	<54	<45	<51	500	<56	920	<47	<72
TOTAL TPH	mg/kg	5,000	5,000	10,000,000	ND	ND	ND	ND	ND	ND	ND	500**	ND	1,070**	ND	8,400
POLYNUCLEAR AROMATIC HYDROCARBONS***																
Naphthalene	mg/kg	1,000	1,000	10,000	NA	<0.057	<0.025	NA	NA	NA	NA	8.2	0.13	NA	<0.028	1.0
2-Melhylnaphthalene	mg/kg	2,500	1,000	10,000	NA	<0.057	<0.025	NA	NA	NA	NA	4.3	0.060	NA	<0.028	23
Acenaphthylene	mg/kg	1,000	1,000	10,000	NA	<0.057	<0.025	NA	NA	NA	NA	2.0	<0.059	NA	<0.028	0.80
Acenaphthene	mg/kg	2,500	1,000	10,000	NA	<0.057	<0.025	NA	NA	NA	NA	12	0.18	NA	<0.028	3.4
Fluorene	mg/kg	2,000	1,000	10,000	NA	<0.057	<0.025	NA	NA	NA	NA	11	0.20	NA	<0.028	3.9
Phenanthrene	mg/kg	100	100	10,000	NA	<0.057	<0.025	NA	NA	NA	NA	93	1.5	NA	<0.028	11
Anthracene	mg/kg	2,500	5,000	10,000	NA	<0.057	<0.025	NA	NA	NA	NA	21	0.44	NA	<0.028	2.7
Fluoranthene	mg/kg	1,000	1,000	10,000	NA	<0.057	<0.025	NA	NA	NA	NA	92	1.6	NA	<0.028	4.1
Pyrene	mg/kg	2,000	5,000	10,000	NA	<0.057	<0.025	NA	NA	NA	NA	82	1.4	NA	<0.028	4.1
Benzo(a)anthracene	mg/kg	1	4	100	NA	<0.057	<0.025	NA	NA	NA	NA	38	0.63	NA	<0.028	1.5
Chrysene	mg/kg	10	40	400	NA	<0.057	<0.025	NA	NA	NA	NA	44	0.69	NA	<0.028	1.7
Benzo(b)fluoranthene	mg/kg	1	4	100	NA	<0.057	<0.025	NA	NA	NA	NA	34	0.56	NA	<0.028	1.2
Benzo(k)fluoranthene	mg/kg	10	40	400	NA	<0.057	<0.025	NA	NA	NA	NA	35	0.55	NA	<0.026	1.3
Benzo(a)pyrene	mg/kg	0.7	0.7	100	NA	<0.057	<0.025	NA	NA	NA	NA	39	0.61	NA	<0.028	1.4
Dibenzo(a,h)anthracene	mg/kg	0.7	0.6	100	NA	<0.11	<0.050	NA	NA	NA	NA	4.7	<0.012	NA	<0.056	<0.072
Benzo(g,h,i)perylene	mg/kg	2,500	2,500	10,000	NA	<0.11	<0.050	NA	NA	NA	NA	13	0.19	NA	<0.056	<0.072
Indeno(1,2,3-cd)pyrene	mg/kg	1	4	100	NA	<0.11	<0.050	NA	NA	NA	NA	14	0.20	NA	<0.056	<0.072
METALS																
Arsenic, Total	mg/kg	30	30	300	NA	7.1	7.5	NA	NA	NA	NA	7.3	7.8	NA	8.1	4.4
Barium, Total	mg/kg	2,500	5,000	10,000	NA	62	57	NA	NA	NA	NA	240	160	NA	53	72
Cadmium, Total	mg/kg	80	60	800	NA	<5.5	<4.2	NA	NA	NA	NA	4.5	<2.7	NA	<2.4	<3.3
Chromium, Total	mg/kg	2,500	5,000	10,000	NA	54	84	NA	NA	NA	NA	23	14	NA	11	27
Lead, Total	mg/kg	600	600	6,000	NA	13	9.6	NA	NA	NA	NA	520	980	NA	51	120
Mercury, Total	mg/kg	60	60	600	NA	<0.033	0.059	NA	NA	NA	NA	3.07	0.204	NA	<0.015	<0.022
Selenium, Total	mg/kg	2,500	2,500	10,000	NA	<5.5	<4.2	NA	NA	NA	NA	<2.6	<2.7	NA	<2.4	<3.3
Silver, Total	mg/kg	200	200	2,000	NA	<5.2	<4.1	NA	NA	NA	NA	<2.8	<2.6	NA	<2.4	<3.3

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Notes:

ND = Not Detected
NA = Not Analyzed
NS = No Standard
-- = Not Applicable
mg/kg = milligrams per kilogram (parts per million)
µg/kg = micrograms per kilogram (parts per billion)
<0.057 = not detected, i.e., below detection limit of 0.057.

* Weathered TPH
** = PAHs present
BOLD - exceeds applicable Method 1 Cleanup Standard published in 310 CMR 40.0000 (10/29/99).
BOLD - exceeds Upper Concentration Limit published in 310 CMR 40.0000 (10/29/99).

TABLE 2 - Continued

PHASE I SOIL SAMPLING RESULTS
BRA PARCEL P-3
March 24 to 26, 1997

Parameter	Units	Method 1 Cleanup Standards S-2 (GW-2/GW-3)	Method 1 Cleanup Standards S-3 (GW-2/GW-3)	Upper Concentration Level (UCL)	Sample Identification and Sample Depth (feet)											
					B-101			B-102			B-103			B-104		
					S1	S2	S3	S1	S2	S3	S1	S2	S3	S1	S2	S3
					1-2.5	4.5-6.5	7-9	1-3	4-6	7-9	1-3	4-6	7-9	1-3	4-6	7-9
TOTAL PETROLEUM HYDROCARBONS																
Gasoline	mg/kg	--	--	--	<56	<53	<61	<56	<55	<56	<55	<56	<55	<54	<56	<55
Kerosene	mg/kg	--	--	--	<56	<53	<61	<56	<55	<56	<55	<56	<55	<54	<56	<55
Mineral Spirits	mg/kg	--	--	--	<56	<53	<61	<56	<55	<56	<55	<56	<55	<54	<56	<55
Fuel Oil #2/Diesel	mg/kg	--	--	--	<56	<53	<61	<56	<55	<56	<55	<56	<55	<54	<56	<55
Fuel Oil #4	mg/kg	--	--	--	<56	<53	<61	<56	<55	<56	<55	<56	<55	<54	<56	<55
Fuel Oil #6	mg/kg	--	--	--	<110	<110	<120	<110	<110	<110	<110	<110	<110	<110	<110	<110
Motor Oil/Hydraulic Oil	mg/kg	--	--	--	<56	350	<61	440	380	560	160	270	120	320	240	490
Unidentified Hydrocarbons	mg/kg	--	--	--	500	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
TOTAL TPH	mg/kg	5,000	5,000	10,000,000	500	350	ND	440	380	560	160	270	120	320	240	490
POLYNUCLEAR AROMATIC HYDROCARBONS																
Naphthalene	mg/kg	1,000	1,000	10,000	<0.14	0.28	<0.030	0.55	0.28	0.25	0.061	0.19	0.048	0.70	0.051	**0.61**
2-Methylnaphthalene	mg/kg	2,500	1,000	10,000	<0.14	0.32	<0.030	<0.28	0.15	0.16	<0.055	0.12	0.032	0.40	0.033	0.26
Acenaphthylene	mg/kg	1,000	1,000	10,000	<0.14	0.22	<0.030	<0.28	0.096	0.14	<0.055	<0.055	<0.027	0.24	0.041	0.24
Acenaphthene	mg/kg	2,500	4,000	10,000	0.30	0.58	<0.030	0.80	0.41	0.47	0.20	0.45	<0.027	1.0	0.14	1.1
Fluorene	mg/kg	2,000	4,000	10,000	0.24	0.64	<0.030	0.82	0.42	0.51	0.16	0.35	<0.027	1.1	0.15	1.1
Phenanthrene	mg/kg	100	100	10,000	3.2	5.4	0.060	7.9	4.6	6.0	1.8	4.6	0.19	9.6	1.2	**12**
Anthracene	mg/kg	2,500	5,000	10,000	0.67	1.3	<0.030	2.1	0.87	1.2	0.40	0.81	0.030	2.0	0.36	2.3
Fluoranthene	mg/kg	1,000	1,000	10,000	3.6	5.7	0.42	9.6	5.6	7.4	2.0	5.2	0.18	12	2.0	13
Pyrene	mg/kg	2,000	5,000	10,000	3.8	5.8	0.38	8.7	4.3	5.8	2.1	4.2	0.16	10	1.9	13
Benzo(a)anthracene	mg/kg	1	4	100	**1.8**	2.8	<0.030	**4.3**	1.9	2.5	**1.0**	1.8	0.064	**5.5**	0.68	6.0
Chrysene	mg/kg	10	40	400	1.9	2.9	<0.030	4.3	1.9	2.4	1.1	1.8	0.094	5.7	0.84	6.3
Benzo(b)fluoranthene	mg/kg	1	4	100	**1.3**	1.7	<0.030	**2.9**	1.2	1.6	0.65	1.2	0.050	**4.2**	0.96	**4.2**
Benzo(k)fluoranthene	mg/kg	10	40	400	1.5	1.9	<0.030	2.9	1.3	1.6	0.68	1.3	0.039	4.5	1.0	5.0
Benzo(a)pyrene	mg/kg	0.7	0.7	100	**1.8**	**2.6**	<0.030	**4.0**	**1.8**	**2.3**	**0.98**	**1.7**	0.048	**5.6**	**0.89**	**5.9**
Dibenzo(a,h)anthracene	mg/kg	0.7	0.6	100	0.48	0.75	<0.030	**1.1**	0.50	0.57	0.25	0.40	<0.055	0.65	0.078	0.67
Benzo(g,h,i)perylene	mg/kg	2,500	2,500	10,000	1.6	2.2	<0.030	2.8	1.4	1.4	0.64	0.97	<0.055	1.4	0.19	1.5
Indeno(1,2,3-cd)pyrene	mg/kg	1	4	100	**1.3**	1.8	<0.030	**3.2**	1.3	1.4	0.62	0.98	<0.055	**1.5**	0.20	1.6
POLYCHLORINATED BIPHENYLS	mg/kg	2	2	100	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.030***	<0.028	<0.027
METALS																
Arsenic, Total	mg/kg	30	30	300	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cadmium, Total	mg/kg	80	80	800	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chromium, Total	mg/kg	2,500	5,000	10,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lead, Total	mg/kg	600	600	6,000	210	360	46.0	200	150	200	170	110	57	270	270	98
Lead, TCLP	mg/l	5*****	5*****	NA	<0.20	<0.20	NA	<0.20	0.27	<0.20	<0.20	0.28	NA	0.24	<0.20	NA
Mercury, Total	mg/kg	60	60	600	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

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Notes:

ND = Not Detected
NA = Not Analyzed
NS = No Standard
-- = Not Applicable
mg/kg = milligrams per kilogram (parts per million)
µg/kg = micrograms per kilogram (parts per billion)

*** PCB identified as #1260
**** PCB identified as #1242
***** RCRA Action Level
BOLD - exceeds applicable Method 1 cleanup Standard published in 310 CMR 40.0000 (10/29/99).
BOLD - exceeds Upper Concentration Limit published in 310 CMR 40.0000 (10/29/99).
<0.057 = not detected, i.e., below detection limit of 0.057.

TABLE 2 - Continued

PHASE I SOIL SAMPLING RESULTS
BRA PARCEL P-3
March 24 to 26, 1997

Parameter	Units	Method 1 Cleanup Standards S-2 (GW-2/GW-	Method 1 Cleanup Standards S-3 (GW-2/GW-	Upper Concentration Level (UCL)	Sample Identification and Sample Depth (feet)											
					B-105			B-106			B-107			B-108		
					S1	S2	S3	S1	S2	S3	S1	S2	S3	S1	S2	S3
					1-3	4-6	7-9	1-3	4-6	7-9	1-3	4-6	7-9	1-3	4-6	7-9
TOTAL PETROLEUM HYDROCARBONS																
Gasoline	mg/kg	--	--	--	<54	<57	<56	<56	<57	<560	<55	<280	<59	<57	<120	<56
Kerosene	mg/kg	--	--	--	<54	<57	<56	<56	<57	<560	<55	<280	<59	<57	<120	<56
Mineral Spirits	mg/kg	--	--	--	<54	<57	<56	<56	<57	<560	<55	<280	<59	<57	<120	<56
Fuel Oil #2/Diesel	mg/kg	--	--	--	<54	<57	<56	<56	<57	<560	<55	<280	<59	<57	<120	<56
Fuel Oil #4	mg/kg	--	--	--	<54	<57	<56	<56	<57	<560	<55	<280	<59	<57	<120	<56
Fuel Oil #6	mg/kg	--	--	--	<110	<110	<110	<110	<110	<1,100	<110	<560	<120	<110	<240	<110
Motor Oil/Hydraulic Oil	mg/kg	--	--	--	140	230	180	450	700	6,700	140	2,300	700	220	1,600	110
Unidentified Hydrocarbons	mg/kg	--	--	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
TOTAL TPH	mg/kg	5,000	5,000	10,000,000	140	230	180	450	700	**6,700**	140	2,300	700	220	1,600	110
POLYNUCLEAR AROMATIC HYDROCARBONS																
Naphthalene	mg/kg	1,000	1,000	10,000	1.6	1.1	0.071	0.25	0.56	0.27	0.085	0.20	0.40	0.070	0.19	<0.055
2-Methylnaphthalene	mg/kg	2,500	1,000	10,000	0.82	0.51	<0.055	0.15	0.30	0.15	<0.056	0.14	0.29	<0.058	0.096	<0.055
Acenaphthylene	mg/kg	1,000	1,000	10,000	0.35	<0.28	<0.055	0.11	0.16	0.11	<0.056	<0.11	0.12	<0.058	0.090	<0.055
Acenaphthene	mg/kg	2,500	4,000	10,000	1.9	1.3	0.091	0.39	0.91	0.47	0.17	0.41	1.0	0.22	0.21	0.057
Fluorene	mg/kg	2,000	4,000	10,000	1.9	1.5	0.11	0.41	0.82	0.44	0.14	0.38	0.88	0.18	0.22	<0.055
Phenanthrene	mg/kg	100	100	10,000	15	11	1.2	5.1	8.9	4.6	1.7	4.0	9.7	1.8	3.0	0.60
Anthracene	mg/kg	2,500	5,000	10,000	3.9	2.8	0.29	0.96	1.7	0.98	0.39	0.98	4.9	0.43	0.40	0.15
Fluoranthene	mg/kg	1,000	1,000	10,000	16	11	1.4	5.8	9.7	5.3	2.1	4.1	11	2.3	3.6	0.67
Pyrene	mg/kg	2,000	5,000	10,000	14	9.1	1.3	4.8	7.9	4.6	1.9	3.7	9.0	2.0	2.8	0.57
Benzo(a)anthracene	mg/kg	1	4	100	**8.1**	**4.9**	0.67	**1.9**	3.8	1.9	**1.1**	2.1	4.5	**1.1**	1.1	0.35
Chrysene	mg/kg	10	40	400	8.7	4.8	0.70	1.9	4.0	1.9	1.1	2.1	4.7	1.1	1.2	0.37
Benzo(b)fluoranthene	mg/kg	1	4	100	**5.3**	3.2	0.45	**1.2**	2.0	1.2	0.73	1.4	2.4	0.79	0.80	0.25
Benzo(k)fluoranthene	mg/kg	10	40	400	5.5	3.3	0.53	1.3	2.1	1.3	0.74	1.5	2.5	0.78	0.82	0.27
Benzo(a)pyrene	mg/kg	0.7	0.7	100	**7.5**	**4.1**	0.64	**1.8**	**3.6**	**1.8**	**1.0**	**1.9**	**4.1**	**1.1**	**1.1**	0.34
Dibenzo(a,h)anthracene	mg/kg	0.7	0.8	100	**2.0**	**1.0**	0.14	0.41	0.64	0.34	0.21	0.33	0.66	0.20	0.19	<0.11
Benzo(g,h,i)perylene	mg/kg	2,500	2,500	10,000	5.8	2.8	0.50	0.97	1.5	0.79	**0.48**	0.73	1.5	0.47	0.14	0.11
Indeno(1,2,3-cd)pyrene	mg/kg	1	4	100	**4.8**	2.5	0.41	0.98	1.5	0.80	**51**	0.81	**1.6**	0.51	0.48	0.12
POLYCHLORINATED BIPHENYLS	mg/kg	2	2	100	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
METALS																
Arsenic, Total	mg/kg	30	30	300	7.8	6.2	2.6	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cadmium, Total	mg/kg	80	80	800	2.4	<2.5	<2.5	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chromium, Total	mg/kg	2,500	5,000	10,000	38	30	14	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lead, Total	mg/kg	600	600	6,000	**940**	330	49	150	330	350	280	290	190	450	190	110
Lead, TCLP	mg/l	5*****	5*****	NA	0.65	0.27	NA	0.30	0.32	0.70	0.23	0.62	0.31	0.24	0.23	<0.20
Mercury, Total	mg/kg	60	60	600	0.321	0.475	0.332	NA	NA	NA	NA	NA	NA	NA	NA	NA

G:\Hazwaste\BRA\20031\Results-Tables\[Soil Sampling Table2.xls]soil

Notes:
ND = Not Detected
NA = Not Analyzed
NS = No Standard
-- = Not Applicable
mg/kg = milligrams per kilogram (parts per million)
µg/kg = micrograms per kilogram (parts per billion)

*** PCB Identified as #1260
**** PCB identified as #1242
***** RCRA Action Level
BOLD - exceeds applicable Method 1 cleanup Standard published in 310 CMR 40.0000 (10/29/99).
BOLD - exceeds Upper Concentration Limit published in 310 CMR 40.0000 (10/29/99).
<0.057 = not detected, i.e., below detection limit of 0.057.

TABLE 2 - Continued

PHASE I SOIL SAMPLING RESULTS
BRA PARCEL P-3
March 24 to 26, 1997

Parameter	Units	Method 1 Cleanup Standards S-2 (GW-2/GW-	Method 1 Cleanup Standards S-3 (GW-2/GW-	Upper Concentration Level (UCL)	Sample Identification and Sample Depth (feet)											
					B-109			B-110			B-111			B-112		
					S1	S2	S3	S1	S2	S3	S1	S2	S3	S1	S2	S3
					1-3	4-6	7-9	1-3	4-6	7-9	1-3	4-6	7-9	1-3	4-6	7-9
TOTAL PETROLEUM HYDROCARBONS																
Gasoline	mg/kg	--	--	--	<56	<57	<56	<55	<58	<56	<56	<54	<110	<57	<56	<60
Kerosene	mg/kg	--	--	--	<56	<57	<56	<55	<58	<56	<56	<54	<110	<57	<56	<60
Mineral Spirits	mg/kg	--	--	--	<56	<57	<56	<55	<58	<56	<56	<54	<110	<57	<56	<60
Fuel Oil #2/Diesel	mg/kg	--	--	--	<56	<57	<56	<55	<58	<56	<56	<54	<110	<57	<56	<60
Fuel Oil #4	mg/kg	--	--	--	<56	<57	<56	<55	<58	<56	<56	<54	<110	<57	<56	<60
Fuel Oil #6	mg/kg	--	--	--	<110	<110	<110	<110	<120	<110	<110	<110	<220	<110	<110	<120
Motor Oil/Hydraulic Oil	mg/kg	--	--	--	230	330	170	170	140	1,100	190	200	1,300	500	190	970
Unidentified Hydrocarbons	mg/kg	--	--	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
TOTAL TPH	mg/kg	5,000	5,000	10,000,000	230	330	170	170	140	1,100	190	200	1,300	500	190	970
POLYNUCLEAR AROMATIC HYDROCARBONS																
Naphthalene	mg/kg	1,000	1,000	10,000	0.28	0.29	0.32	0.11	0.11	<0.29	0.055	<0.27	0.49	0.21	0.077	14
2-Methylnaphthalene	mg/kg	2,500	1,000	10,000	0.17	0.17	0.15	0.069	0.061	<0.29	<0.055	<0.27	<0.29	0.12	0.050	4.1
Acenaphthylene	mg/kg	1,000	1,000	10,000	0.088	0.063	0.092	0.069	0.059	<0.29	<0.055	<0.27	<0.29	0.082	0.042	0.77
Acenaphthene	mg/kg	2,500	4,000	10,000	0.48	0.64	0.44	0.29	0.19	0.49	0.10	0.35	1.0	0.46	0.16	20
Fluorene	mg/kg	2,000	4,000	10,000	0.48	0.64	0.43	0.26	0.20	0.63	0.086	0.36	0.86	0.45	0.17	17
Phenanthrene	mg/kg	100	100	10,000	5.4	6.7	4.9	2.4	2.3	5.0	1.2	3.7	8.1	5.4	1.3	**110**
Anthracene	mg/kg	2,500	5,000	10,000	1.1	1.3	1.0	0.67	0.46	1.2	0.29	0.91	1.7	0.89	0.40	0.59
Fluoranthene	mg/kg	1,000	1,000	10,000	6.0	8.0	5.6	4.5	3.1	5.3	1.9	4.7	9.3	6.2	2.1	96
Pyrene	mg/kg	2,000	5,000	10,000	5.0	6.3	5.4	4.2	2.8	6.6	1.7	4.1	8.2	5.9	2.2	80
Benzo(a)anthracene	mg/kg	1	4	100	**2.0**	2.7	1.9	**1.7**	1.1	2.5	0.94	2.0	**4.0**	**2.2**	0.84	**39**
Chrysene	mg/kg	10	40	400	2.0	2.7	2.0	1.8	1.1	2.7	0.96	2.1	4.2	2.3	0.90	**40**
Benzo(b)fluoranthene	mg/kg	1	4	100	**1.3**	1.9	1.8	**1.8**	1.2	2.5	0.85	1.5	2.7	**2.2**	0.83	**29**
Benzo(k)fluoranthene	mg/kg	10	40	400	1.5	2.1	1.8	1.7	1.2	2.7	0.73	1.5	3.0	2.4	0.88	29
Benzo(a)pyrene	mg/kg	0.7	0.7	100	**1.9**	**2.5**	**2.0**	**1.7**	**1.2**	**2.5**	**0.94**	**1.9**	**3.7**	**2.2**	**0.81**	**35**
Dibenzo(a,h)anthracene	mg/kg	0.7	0.8	100	0.29	0.40	0.25	0.21	0.12	<0.58	0.27	0.41	**0.90**	0.25	0.081	**3.0**
Benzo(g,h,i)perylene	mg/kg	2,500	2,500	10,000	0.58	0.60	0.55	0.43	0.27	0.52	0.73	1.6	3.0	0.53	0.19	6.4
Indeno(1,2,3-cd)pyrene	mg/kg	1	4	100	0.67	0.92	0.62	0.47	0.29	0.58	0.69	1.3	2.5	0.80	0.21	**7.2**
POLYCHLORINATED BIPHENYLS	mg/kg	2	2	100	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
METALS																
Arsenic, Total	mg/kg	30	30	300	NA	NA	NA	NA	NA	NA	5	6	6	NA	NA	NA
Cadmium, Total	mg/kg	80	80	800	NA	NA	NA	NA	NA	NA	2	2	4	NA	NA	NA
Chromium, Total	mg/kg	2,500	5,000	10,000	NA	NA	NA	NA	NA	NA	21	28	23	NA	NA	NA
Lead, Total	mg/kg	600	600	6,000	190	130	280	240	220	**670**	200	230	**1,400**	150	**970**	**5,000**
Lead, TCLP	mg/l	5*****	5*****	NA	0.22	<0.20	0.35	0.32	0.37	<0.20	<0.20	0.25	0.60	<0.20	0.58	**0.77**
Mercury, Total	mg/kg	60	60	600	NA	NA	NA	NA	NA	NA	0.206	0.549	0.355	NA	NA	NA

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Notes:

ND = Not Detected
NA = Not Analyzed
NS = No Standard
-- = Not Applicable
mg/kg = milligrams per kilogram (parts per million)
µg/kg = micrograms per kilogram (parts per billion)

*** PCB identified as #1260
**** PCB identified as #1242
***** RCRA Action Level
BOLD - exceeds applicable Method 1 cleanup Standard published in 310 CMR 40.0000 (10/29/99).
BOLD - exceeds Upper Concentration Limit published in 310 CMR 40.0000 (10/29/99).
<0.057 = not detected, i.e., below detection limit of 0.057.

TABLE 2 - Continued

PHASE I SOIL SAMPLING RESULTS
BRA PARCEL P-3
March 24 to 26, 1997

Parameter	Units	Method 1 Cleanup Standards S-2 (GW-2/GW-	Method 1 Cleanup Standards S-3 (GW-2/GW-	Upper Concentration Level (UCL)	Sample Identification and Sample Depth (feet)										
					B-113			B-114			B-115			B-116	B-117
					S1	S2	S3	S1	S2	S3	S1	S2	S3	S1	S1
					1-3	4-6	7-9	1-3	4-6	7-9	1-3	4-6	7-9	1-3	1-3
TOTAL PETROLEUM HYDROCARBONS															
Gasoline	mg/kg	--	--	--	<54	<55	<53	<58	<56	<55	<54	<56	<560	<56	<54
Kerosene	mg/kg	--	--	--	<54	<55	<53	<58	<56	<55	<54	<56	<560	<56	<54
Mineral Spirits	mg/kg	--	--	--	<54	<55	<53	<58	<56	<55	<54	<56	<560	<56	<54
Fuel Oil #2/Diesel	mg/kg	--	--	--	<54	<55	<53	<58	<56	<55	<54	<56	<560	<56	<54
Fuel Oil #4	mg/kg	--	--	--	<54	<55	<53	<58	<56	<55	<54	<56	<560	<56	<54
Fuel Oil #6	mg/kg	--	--	--	<110	<110	<110	<120	<120	<110	<110	<110	<1,100	<110	<110
Motor Oil/Hydraulic Oil	mg/kg	--	--	--	290	360	730	480	910	450	140	280	2,400	110	110
Unidentified Hydrocarbons	mg/kg	--	--	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
TOTAL TPH	mg/kg	5,000	5,000	10,000,000	290	360	730	480	910	450	140	280	2,400	110	110
POLYNUCLEAR AROMATIC HYDROCARBONS															
Naphthalene	mg/kg	1,000	1,000	10,000	0.36	0.35	1.6	<0.28	4.3	3.0	<0.56	0.43	0.32	0.38	0.42
2-Methylnaphthalene	mg/kg	2,500	1,000	10,000	0.28	0.22	0.78	<0.28	<1.4	1.6	<0.56	0.27	0.21	0.23	0.34
Acenaphthylene	mg/kg	1,000	1,000	10,000	0.29	0.47	0.36	<0.28	<1.4	0.70	<0.56	0.18	0.17	0.17	0.25
Acenaphthene	mg/kg	2,500	4,000	10,000	1.1	0.86	2.6	1.0	9.3	4.4	<0.56	1.1	0.51	0.79	1.2
Fluorene	mg/kg	2,000	4,000	10,000	1.0	0.82	2.1	0.85	6.4	4.4	<0.56	0.92	0.54	0.76	1.3
Phenanthrene	mg/kg	100	100	10,000	12	10	20	9.5	53	36	2.2	8.6	4.8	7.2	11
Anthracene	mg/kg	2,500	5,000	10,000	1.9	2.1	4.9	2.0	13	8.8	0.57	2.0	1.2	1.5	2.6
Fluoranthene	mg/kg	1,000	1,000	10,000	13	15	21	9.3	66	36	3.0	9.9	6.2	7.6	11
Pyrene	mg/kg	2,000	5,000	10,000	13	15	20	9.6	48	30	2.8	8.6	5.7	7.3	9.9
Benzo(a)anthracene	mg/kg	1	4	100	**6.1**	**8.4**	**9.5**	**4.2**	**26**	**15**	**1.5**	**4.3**	2.7	3.3	**5.1**
Chrysene	mg/kg	10	40	400	6.6	8.2	**10**	4.4	**26**	**15**	1.6	4.4	3.1	3.5	5.2
Benzo(b)fluoranthene	mg/kg	1	4	100	**4.8**	**5.6**	**7.6**	**3.1**	**20**	**11**	**1.1**	3.4	2.0	2.4	3.0
Benzo(k)fluoranthene	mg/kg	10	40	400	5.0	6.6	8.5	3.2	**21**	**10**	1.1	3.8	2.3	2.7	3.7
Benzo(a)pyrene	mg/kg	0.7	0.7	100	**5.6**	**7.3**	**8.7**	**3.9**	**25**	**14**	**1.3**	**4.0**	**2.6**	**3.1**	**4.5**
Dibenzo(a,h)anthracene	mg/kg	0.7	0.8	100	0.49	**0.70**	**0.89**	<0.57	**5.7**	**3.5**	**<1.1**	0.42	0.29	0.34	0.48
Benzo(g,h,i)perylene	mg/kg	2,500	2,500	10,000	1.1	1.4	1.8	2.1	16	10	<1.1	0.84	0.65	0.68	0.91
Indeno(1,2,3-cd)pyrene	mg/kg	1	4	100	**1.1**	1.6	2.1	**1.8**	**15**	**8.9**	**<1.1**	0.94	0.70	0.79	1.0
POLYCHLORINATED BIPHENYLS	mg/kg	2	2	100	NA	NA	NA	<0.028	<0.028	0.057****	NA	NA	NA	NA	NA
METALS															
Arsenic, Total	mg/kg	30	30	300	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cadmium, Total	mg/kg	80	80	800	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chromium, Total	mg/kg	2,500	5,000	10,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lead, Total	mg/kg	600	600	6,000	300	230	340	390	**790**	470	170	590	**1,200**	300	270
Lead, TCLP	mg/l	5*****	5*****	NA	0.31	<0.20	<0.20	0.23	1.2	0.33	<0.20	0.24	0.29	0.22	0.45
Mercury, Total	mg/kg	60	60	600	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

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Notes:

ND = Not Detected
NA = Not Analyzed
NS = No Standard
-- = Not Applicable
mg/kg = milligrams per kilogram (parts per million)
µg/kg = micrograms per kilogram (parts per billion)

*** PCB identified as #1260
**** PCB identified as #1242
***** RCRA Action Level
BOLD - exceeds applicable Method 1 cleanup Standard published in 310 CMR 40.0000 (10/29/99).
BOLD - exceeds Upper Concentration Limit published in 310 CMR 40.0000 (10/29/99).
<0.057 = not detected, i.e., below detection limit of 0.057.

TABLE 3

PHASE I GROUNDWATER SAMPLING RESULTS
BRA PARCEL P-3
December 12, 1996

Parameter	Units	Method 1 Cleanup Standards (GW-2/GW-3)	Upper Concentration Level (UCL)	Sample Identification and Sample Depth (feet)												
				WS-1	WS-2	WS-3	WS-4	WS-5	WS-6	WS-7	WS-8	WS-9	WS-10	WS-11	WS-12	WS-12 (DUP)
FIELD PARAMETERS																
Temperature	°C	NS	NS	11.0	13.0	10.5	9.9	13.5	13.5	12.2	12.3	11.5	12.2	13.2	10.8	NA
pH	unitless	NS	NS	6.7	6.9	7.0	6.6	6.6	6.8	6.5	6.6	6.6	7.3	6.1	6.7	NA
Specific Conductivity	µS/cm	NS	NS	940	1,200	670	624	1,050	220	929	1,520	1,240	478	970	1,670	NA
Dissolved Oxygen	mg/l	NS	NS	3.6	4.2	2.7	2.2	2.4	4.4	4.4	2.0	1.4	3.6	1.7	2.7	NA
VOLATILE ORGANIC COMPOUNDS*																
Chloroform	µg/l	400	100,000	<2.0	<2.0	<2.0	<2.0	<2.0	9.1	<2.0	<2.0	<2.0	5.8	<2.0	<2.0	<2.0
Trichloroethene	µg/l	300	100,000	<2.0	<2.0	<2.0	<2.0	2.2	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
4-Isopropyltoluene	µg/l	NS	NS	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.8	2.6
PAHs **	µg/l	1,000	100,000	NA	ND	NA	NA	ND	NA	NA	ND	ND	NA	ND	ND	NA
PETROLEUM HYDROCARBONS**	mg/l	1,000	100,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
METALS																
Arsenic, Total	mg/l	0.400	4.0	NA	<0.01	NA	NA	<0.01	NA	NA	<0.02	<0.01	NA	<0.01	<0.01	NA
Barium, Total	mg/l	30	100	NA	<0.05	NA	NA	0.11	NA	NA	0.15	0.11	NA	<0.05	0.12	NA
Cadmium, Total	mg/l	0.010	0.100	NA	<0.005	NA	NA	<0.005	NA	NA	<0.005	<0.005	NA	<0.005	<0.005	NA
Chromium, Total	mg/l	2.0	20	NA	<0.03	NA	NA	<0.03	NA	NA	<0.03	<0.03	NA	<0.03	<0.03	NA
Lead, Total	mg/l	0.030	0.300	NA	<0.005	NA	NA	<0.005	NA	NA	<0.010	<0.010	NA	<0.010	<0.005	NA
Mercury, Total	mg/l	0.001	0.020	NA	<0.0002	NA	NA	<0.0002	NA	NA	<0.0002	<0.0002	NA	<0.0002	<0.0002	NA
Selenium, Total	mg/l	0.080	0.800	NA	<0.025	NA	NA	<0.025	NA	NA	<0.025	<0.025	NA	<0.005	<0.025	NA
Silver, Total	mg/l	0.007	0.400	NA	<0.007	NA	NA	<0.007	NA	NA	<0.007	<0.007	NA	<0.007	<0.007	NA

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Notes:

ND = Not Detected; reporting limits ranged from 0.5 ug/l to 5.0 ug/l (for PAHs) and 0.60 mg/l to 2.0 mg/l (for Petroleum Hydrocarbons).

NA - Not Analyzed.

NS = No Standard.

mg/l = milligrams per liter (parts per million).

ug/l = micrograms per liter (parts per billion).

* Volatile Organic Compounds by EPA Method 8260. Methylene chloride was detected in the VOC trip blank at a concentration of 2.8 ug/l.

** PAHs (Polynuclear Aromatic Hydrocarbons) by EPA Method 8100. Petroleum Hydrocarbons by Gas Chromatography, EPA Method 8100 (Modified). The Method 1 standard is for total petroleum hydrocarbons.

<0.007 = not detected, i.e., below detection limit of 0.007.

TABLE 4

GROUNDWATER ELEVATION SURVEY DATA
BRA PARCEL P-3

Monitoring Well Number	Top of PVC Elevation (feet)	Ground Elevation (feet)	Depth to Water (feet)					Groundwater Elevation (feet)				
			12/5/96	12/6/96	12/12/96	2/6/01	9/10/01	12/5/96	12/6/96	12/12/96	2/6/01	9/10/01
WS-1	92.49	93.42	7.80	7.63	7.50	--	--	84.69	84.86	84.99	--	--
WS-2	92.32	92.48	8.57	7.75	7.59	--	--	83.75	84.57	84.73	--	--
WS-3	93.86	92.61	8.49	8.43	8.20	8.75	--	85.39	85.45	85.66	85.13	--
WS-4	94.06	92.00	8.84	8.88	8.53	--	--	85.22	85.18	85.53	--	--
WS-5	98.27	98.39	14.19	14.17	13.70	15.34	--	84.08	84.10	84.57	82.93	--
WS-6	97.03	95.18	12.56	12.55	12.05	destroyed	--	84.47	84.48	84.98	destroyed	--
WS-7	98.12	96.34	13.80	13.58	13.07	14.78	--	84.52	84.54	85.05	83.36	--
WS-8	102.95	100.70	18.70	18.86	16.85	destroyed	--	86.25	86.27	86.30	destroyed	--
WS-9	102.70	100.52	17.43	16.75	16.89	17.90	--	85.27	85.95	86.01	84.80	--
WS-10	101.99	100.98	16.80	17.38	16.93	16.85	--	85.19	84.61	85.06	83.34	--
WS-11	103.88	101.90	19.20	19.18	18.86	--	--	84.68	84.70	85.22	--	--
WS-12	99.35	96.89	12.73	12.72	12.66	12.66	--	86.62	86.63	86.69	86.47	--
WS-13	97.83	--	--	--	--	--	15.01	--	--	--	--	82.82

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Notes:

1. Elevations were measured relative to an on-site arbitrary 100.00-foot benchmark which was the fire hydrant on Vernon Street.
2. Depth to water was measured from the top of PVC riser.

* = All locations are soil borings or surface soil samples and were only measured for ground elevations on March 29, 2001.

-- = Not measured

3. -- Indicates no water depth was measured.
4. During site reconnaissance on Feb. 8, 2001, and March 29, 2001, Weston & Sampson observed that monitoring wells WS-6 and WS-8 were destroyed.

TABLE 5

PHASE II PID FIELD SCREENING RESULTS
BRA PARCEL P-3

Boring	Sample	Sample Depth (feet)	PID Reading (ppm)
B-201(D)	S-1	0 - 2	ND
	S-2	5 - 7	ND
	S-3	10 - 12	ND
	S-4	12 - 14	ND
	S-5	14 - 16	ND
	S-6	16 - 18	0.6
	S-7	18 - 20	ND
	S-8	20 - 22	0.2
	S-9	22 - 24	ND
B-202(S)	S-1	0 - 2	ND
	S-2	5 - 7	ND
	S-3	10 - 12	ND
B-203(S)	S-1	0 - 2	ND
	S-2	5 - 7	ND
	S-3	10 - 12	ND
B-204(S)	S-1	0 - 2	ND
	S-2	5 - 7	ND
	S-3	10 - 12	ND
B-205(S)	S-1	0 - 2	ND
	S-2	2 - 3	ND
	S-3	3 - 5	ND
B-206(S)	S-1	0 - 2	ND
	S-2	2 - 3	ND
	S-3	3 - 5	ND
B-207(S)	S-1	0 - 3	ND
	S-2	3 - 5	ND
B-208	S-1	0 - 2	21
	S-2	5 - 7	0.6
	S-3	10 - 12	ND
B-209	S-1	0 - 2	ND
	S-2	4 - 6	ND
	S-3	6 - 8	2.4
	S-4	8 - 10	--
	S-5	10 - 12	ND
	S-6	14 - 16	ND
B-210	S-1	0 - 2	ND
	S-2	5 - 7	ND
	S-3	10 - 12	ND
B-211	S-1	0 - 2	ND
	S-2	5 - 7	ND
B-212	S-1	0 - 2	ND
	S-2	5 - 7	ND
	S-3	10 - 12	ND

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Notes:
PID = Photoionization Detector Photovac Microtip Model HL-2000.
ppm = parts per million.
ND = Not Detected or less than Background (<0.2 ppm).
NS = Not Screened.
Background PID concentrations were ND, or less than 0.2 ppm.
(--) indicates no sample recovered.
PID readings at B-201(D) - B-207(S) were measured on January 10 and 11, 2001.
All other PID readings were measured on September 5, 2001.

TABLE 6

PHASE II SOIL SAMPLING RESULTS - SOIL BORING SAMPLES
BRA PARCEL P-3
January 10, 2001

Parameter	Units	Method 1 Cleanup Standards *		Upper Concentration Level (UCL)*	Sample Identification and Sample Depth (feet)								
					B-201(D)			B-202(S)	B-203(S)	B-204(S)	B-205(S)	B-206(S)	B-207(S)
		S-2 (GW-2/GW-3)	S-3 (GW-2/GW-3)		10-12	10-12 DUP	22-24	5-7	5-7	5-7	3-5	3-5	3-5
EXTRACTABLE PETROLEUM HYDROCARBONS													
C_9 - C_{18} Aliphatic Hydrocarbons	mg/kg	2,500	5,000	20,000	<53	<58	<130	<53	<57	<61	<50	<110	<56
C_{19} - C_{36} Aliphatic Hydrocarbons	mg/kg	5,000	5,000	20,000	<53	<58	<130	<53	<57	<61	<50	<110	<56
C_{11} - C_{22} Aromatic Hydrocarbons	mg/kg	2,000	5,000	10,000	290	300	<130	520	110	<61	<50	<110	<56
TARGET POLYNUCLEAR AROMATIC HYDROCARBONS													
2-Methylnaphthalene	mg/kg	1,000	1,000	10,000	0.89	1.3	<0.65	2.6	0.57	<0.31	<0.25	<0.56	<0.28
Acenaphthene	mg/kg	2,500	4,000	10,000	6.3	5.1	<0.65	5.0	1.2	<0.31	<0.25	<0.56	<0.28
Acenaphthylene	mg/kg	1,000	1,000	10,000	0.27	0.76	<0.65	1.3	<0.29	<0.31	<0.25	<0.56	<0.28
Anthracene	mg/kg	2,500	5,000	10,000	8.9	8.6	<0.65	11	2.1	0.50	<0.25	<0.56	0.46
Benzo(a)anthracene	mg/kg	1	4	100	**17**	**16**	<0.65	**19**	**4.0**	1.0	<0.25	1.4	1.1
Benzo(a)pyrene	mg/kg	0.7	0.7	100	**14**	**14**	<0.65	**15**	**3.7**	**0.90**	<0.25	**1.3**	**0.94**
Benzo(b)fluoranthene	mg/kg	1	4	100	**19**	**18**	<0.65	**17**	**4.3**	1.1	<0.25	1.7	1.3
Benzo(g,h,i)perylene	mg/kg	2,500	2,500	10,000	7.8	8.4	<0.65	8.4	2.3	0.55	<0.25	0.83	0.58
Benzo(k)fluoranthene	mg/kg	10	40	400	5.5	5.1	<0.65	5.9	1.5	0.34	<0.25	<0.56	0.33
Chrysene	mg/kg	10	40	400	**16**	**15**	<0.65	18	3.8	0.99	<0.25	1.4	1.0
Dibenzo(a,h)anthracene	mg/kg	0.7	0.8	100	**2.6**	**2.6**	<0.65	**2.6**	0.62	<0.31	<0.25	<0.56	<0.28
Fluoranthene	mg/kg	1,000	1,000	10,000	41	41	<0.65	41	9.6	2.3	<0.25	2.7	2.3
Fluorene	mg/kg	2,000	4,000	10,000	4.9	4.8	<0.65	5.0	1.0	<0.31	<0.25	<0.56	<0.28
Indeno(1,2,3-cd)pyrene	mg/kg	1	4	100	**9.5**	**9.7**	<0.65	**9.2**	2.6	0.59	<0.25	0.97	0.62
Naphthalene	mg/kg	1,000	1,000	10,000	2.8	3.4	<0.65	4.0	0.74	<0.31	<0.25	<0.56	<0.28
Phenanthrene	mg/kg	100	100	10,000	37	37	<0.65	48	9.7	2.1	<0.25	1.6	1.9
Pyrene	mg/kg	2,000	5,000	10,000	31	32	<0.65	40	8.2	2.0	<0.25	2.6	2.1
METALS													
Lead, Total	mg/kg	600	600	6,000	550	**620**	74	**7,000**	460	230	10	98	220

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Notes

mg/kg = milligrams per kilogram, or parts per million (ppm)
PAH = Polynuclear Aromatic Hydrocarbons
PCBs = Polychlorinated Biphenyls
* = Method 1 cleanup standards and Upper Concentration Limits (UCLs) taken from MCP dated 10/29/99

BOLD - exceeds applicable Method 1 Cleanup Standard published in 310 CMR 40.0000 (10/29/99).
BOLD - exceeds Upper Concentration Limit published in 310 CMR 40.0000 (10/29/99).
<0.65 = not detected, i.e., below detection limit of 0.65.

TABLE 7a

PHASE II SOIL SAMPLING RESULTS - SURFACE SOIL AND STOCKPILE SOIL SAMPLES
BRA PARCEL P-3
March 29, 2001

Parameter		Method 1 Cleanup Standards *		Upper Concentration Limit (UCL)	Sample ID and Depth				
					Surficial Soil				
		S-2 (GW-2/GW-3)	S-3 (GW-2/GW-3)		SS-1 0-6"	SS-2 0-6"	SS-3 0-6"	SS-4 0-6"	SS-4 0-6" (DUP)
VOLATILE PETROLEUM HYDROCARBONS (VPH)									
C_5 - C_8 Aliphatic Hydrocarbons	mg/kg	500	500	5,000	NA	NA	NA	NA	NA
C_9 - C_{12} Aliphatic Hydrocarbons	mg/kg	2,500	5,000	20,000	NA	NA	NA	NA	NA
C_9 - C_{10} Aromatic Hydrocarbons	mg/kg	500	500	5,000	NA	NA	NA	NA	NA
TARGET VOLATILE ORGANIC COMPOUNDS (VOCs)									
Methyl tert-butyl ether	mg/kg	200	200	5,000	NA	NA	NA	NA	NA
Benzene	mg/kg	60	200	2,000	NA	NA	NA	NA	NA
Toluene	mg/kg	500	2,500	10,000	NA	NA	NA	NA	NA
Ethylbenzene	mg/kg	500	500	10,000	NA	NA	NA	NA	NA
Xylenes	mg/kg	500	2,500	10,000	NA	NA	NA	NA	NA
Naphthalene	mg/kg	1,000	1,000	10,000	NA	NA	NA	NA	NA
EXTRACTABLE PETROLEUM HYDROCARBONS (EPH)									
C_9 - C_{18} Aliphatic Hydrocarbons	mg/kg	2,500	5,000	20,000	<63	<61	<59	<59	NA
C_{19} - C_{36} Aliphatic Hydrocarbons	mg/kg	5,000	5,000	20,000	<63	<61	<59	<59	NA
C_{11} - C_{22} Aromatic Hydrocarbons	mg/kg	2,000	5,000	10,000	100	190	170	<59	NA
TARGET POLYNUCLEAR AROMATIC HYDROCARBONS (PAHs)									
2-Methylnaphthalene	mg/kg	1,000	1,000	10,000	<0.32	<0.30	0.35	<0.30	NA
Acenaphthene	mg/kg	2,500	4,000	10,000	0.87	1.6	1.3	0.35	NA
Acenaphthylene	mg/kg	1,000	1,000	10,000	0.62	<0.30	0.67	<0.30	NA
Anthracene	mg/kg	2,500	5,000	10,000	2.2	3.7	3.4	1.1	NA
Benzo(a)anthracene	mg/kg	1	4	100	**5.2**	**9.4**	**7.1**	**2.8**	NA
Benzo(a)pyrene	mg/kg	0.7	0.7	100	**5.0**	**8.7**	**6.8**	**2.5**	NA
Benzo(b)fluoranthene	mg/kg	1	4	100	**6.4**	**12**	**8.3**	**3.3**	NA
Benzo(g,h,i)perylene	mg/kg	2,500	2,500	10,000	3.1	6.1	4.0	1.5	NA
Benzo(k)fluoranthene	mg/kg	10	40	400	2.2	4.4	3.2	1.1	NA
Chrysene	mg/kg	10	40	400	4.8	9.1	6.3	2.6	NA
Dibenzo(a,h)anthracene	mg/kg	0.7	0.8	100	**0.83**	**1.6**	**1.1**	0.42	NA
Fluoranthene	mg/kg	1,000	1,000	10,000	11	20	14	5.3	NA
Fluorene	mg/kg	2,000	4,000	10,000	1.0	1.4	1.4	0.41	NA
Indeno(1,2,3-cd)pyrene	mg/kg	1	4	100	**3.7**	**7.0**	**4.6**	**1.8**	NA
Naphthalene	mg/kg	1,000	1,000	10,000	<0.32	0.31	0.69	<0.30	NA
Phenanthrene	mg/kg	100	100	10,000	9.6	18	12	4.4	NA
Pyrene	mg/kg	2,000	5,000	10,000	9.0	16	11	4.7	NA
POLYCHLORINATED BIPHENYLS (PCBs)									
Aroclor 1254	mg/kg	2	2	100	NA	NA	NA	NA	NA
METALS									
Arsenic, Total	mg/kg	30	30	300	NA	NA	NA	NA	NA
Barium, Total	mg/kg	2,500	5,000	10,000	NA	NA	NA	NA	NA
Cadmium, Total	mg/kg	80	80	800	NA	NA	NA	NA	NA
Chromium, Total	mg/kg	2,500	5,000	10,000	NA	NA	NA	NA	NA
Lead, Total	mg/kg	600	600	6,000	200	300	220	310	340
Mercury, Total	mg/kg	60	60	600	NA	NA	NA	NA	NA
Selenium, Total	mg/kg	2,500	2,500	10,000	NA	NA	NA	NA	NA
Silver, Total	mg/kg	200	200	2,000	NA	NA	NA	NA	NA

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Notes

mg/kg = milligrams per kilogram
ug/kg = micrograms per kilogram
NA = Not Analyzed
-- = No Standard
* = Method 1 cleanup standards and Upper Concentration Limits (UCLs) taken from MCP dated 10/29/99
<0.30 = not detected, i.e., below detection limit of 0.30.

BOLD = Exceeds applicable Method 1 cleanup standard
BOLD = Exceeds UCL

TABLE 7b

PHASE II SOIL SAMPLING RESULTS - SURFACE SOIL AND STOCKPILE SOIL SAMPLES
BRA PARCEL P-3
March 29, 2001

Parameter		Method 1 Cleanup Standards *		Upper Concentration Limit (UCL)	Sample ID and Depth			
					Stockpile Soil			
		S-2 (GW-2/GW-3)	S-3 (GW-2/GW-3)		SP-1 2'	SP-1 2' (DUP2)	SP-2 2'	SP-3 2'
VOLATILE PETROLEUM HYDROCARBONS (VPH)								
C_5 - C_8 Aliphatic Hydrocarbons	mg/kg	500	500	5,000	<2.8	<2.8	<2.9	<2.7
C_9 - C_{12} Aliphatic Hydrocarbons	mg/kg	2,500	5,000	20,000	<0.69	<0.69	<0.73	<0.67
C_9 - C_{10} Aromatic Hydrocarbons	mg/kg	500	500	5,000	<0.69	<0.69	<0.73	<0.67
TARGET VOLATILE ORGANIC COMPOUNDS (VOCs)								
Methyl tert-butyl ether	mg/kg	200	200	5,000	<0.056	<0.055	<0.058	<0.053
Benzene	mg/kg	60	200	2,000	<0.056	<0.055	<0.058	<0.053
Toluene	mg/kg	500	2,500	10,000	<0.056	<0.055	<0.058	<0.053
Ethylbenzene	mg/kg	500	500	10,000	<0.056	<0.055	<0.058	<0.053
Xylenes	mg/kg	500	2,500	10,000	<0.056	<0.055	<0.058	<0.053
Naphthalene	mg/kg	1,000	1,000	10,000	<0.14	<0.14	<0.15	<0.13
EXTRACTABLE PETROLEUM HYDROCARBONS (EPH)								
C_9 - C_{18} Aliphatic Hydrocarbons	mg/kg	2,500	5,000	20,000	<55	<57	<60	<54
C_{19} - C_{36} Aliphatic Hydrocarbons	mg/kg	5,000	5,000	20,000	<55	65	<60	55
C_{11} - C_{22} Aromatic Hydrocarbons	mg/kg	2,000	5,000	10,000	73	<57	66	92
TARGET POLYNUCLEAR AROMATIC HYDROCARBONS (PAHs)								
2-Methylnaphthalene	mg/kg	1,000	1,000	10,000	<0.28	<0.29	<0.30	0.31
Acenaphthene	mg/kg	2,500	4,000	10,000	0.89	0.36	0.47	1.2
Acenaphthylene	mg/kg	1,000	1,000	10,000	<0.28	<0.29	<0.30	0.30
Anthracene	mg/kg	2,500	5,000	10,000	1.7	0.99	0.95	2.3
Benzo(a)anthracene	mg/kg	1	4	100	**3.9**	**2.3**	**2.2**	**4.3**
Benzo(a)pyrene	mg/kg	0.7	0.7	100	**3.7**	**2.0**	**1.9**	**4.2**
Benzo(b)fluoranthene	mg/kg	1	4	100	**4.9**	**2.6**	**2.4**	**5.1**
Benzo(g,h,i)perylene	mg/kg	2,500	2,500	10,000	2.2	1.2	1.2	2.5
Benzo(k)fluoranthene	mg/kg	10	40	400	1.5	0.81	0.64	2.0
Chrysene	mg/kg	10	40	400	3.6	2.2	2.3	4.1
Dibenzo(a,h)anthracene	mg/kg	0.7	0.8	100	0.55	0.34	0.32	0.60
Fluoranthene	mg/kg	1,000	1,000	10,000	7.9	4.4	3.9	8.6
Fluorene	mg/kg	2,000	4,000	10,000	0.73	0.32	0.37	1.3
Indeno(1,2,3-cd)pyrene	mg/kg	1	4	100	**2.4**	**1.3**	**1.2**	**2.8**
Naphthalene	mg/kg	1,000	1,000	10,000	<0.28	<0.29	<0.30	0.29
Phenanthrene	mg/kg	100	100	10,000	7.1	3.8	4.2	8.0
Pyrene	mg/kg	2,000	5,000	10,000	6.8	4.1	4.1	7.3
POLYCHLORINATED BIPHENYLS (PCBs)								
Aroclor 1254	mg/kg	2	2	100	0.048	<0.028	0.068	<0.027
METALS								
Arsenic, Total	mg/kg	30	30	300	15	11	20	9.1
Barium, Total	mg/kg	2,500	5,000	10,000	61	69	54	47
Cadmium, Total	mg/kg	80	80	800	<0.63	<0.68	<0.74	<0.68
Chromium, Total	mg/kg	2,500	5,000	10,000	28	23	16	12
Lead, Total	mg/kg	600	600	6,000	85	120	170	160
Mercury, Total	mg/kg	60	60	600	0.34	0.41	0.45	0.16
Selenium, Total	mg/kg	2,500	2,500	10,000	<10	<11	<12	<11
Silver, Total	mg/kg	200	200	2,000	<1.8	<1.9	<2.1	<1.9

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Notes

mg/kg = milligrams per kilogram
ug/kg = micrograms per kilogram
NA = Not Analyzed
-- = No Standard
* = Method 1 cleanup standards and Upper Concentration Limits (UCLs) taken from MCP dated 10/29/99
<0.30 = not detected, i.e., below detection limit of 0.30.

BOLD = Exceeds applicable Method 1 cleanup standard
BOLD = Exceeds UCL

TABLE 8

PHASE II SOIL SAMPLING RESULTS - SOIL BORING SAMPLES
BRA PARCEL P-3
September 5, 2001

Parameter	Units	Method 1 Cleanup Standards *		Upper Concentration Level (UCL)*	Maximum Concentration** (mg/l)	Sample Identification and Sample Depth (feet)					
		S-2 (GW-2/GW-3)	S-3 (GW-2/GW-3)			B-208 5-7	B-209 6-8	B-209 10-12	B-210 5-7	B-211 5-7	B-212 5-7
Total Lead	mg/kg	600	600	6,000	-	230	33	55	250	**13,000**	33
TCLP Lead	mg/l	-	-	-	5.0	-	-	-	<1.0	**8.3**	-

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Notes

mg/kg = milligrams per kilogram, or parts per million (ppm)
TCLP = Toxicity Characteristic Leaching Procedure
* = Method 1 cleanup standards and Upper Concentration Limits (UCLs) taken from MCP dated 10/29/99
** = Maximum Concentration of Contaminants for Characteristics of EP Toxicity and EPA Hazardous Waste (310 CMR 30.125A).
BOLD - exceeds Upper Concentration Limit and Method 1 cleanup standard published in 310 CMR 40.0000 (10/29/99), or the Maximum Concentration published in 310 CMR 30.125A.
<1.0 = not detected, i.e., below detection limit of 1.0.

TABLE 9

PHASE II - GROUNDWATER SAMPLING RESULTS
BRA PARCEL P-3
February 6, 2001

Parameter	Units	Method 1 Cleanup Standards		Upper Concentration Limit (UCL)	Monitoring Well and Sample Number					
		GW-2	GW-3		WS-3	WS-5	WS-7	WS-9	WS-10	WS-12
FIELD PARAMETERS										
Dissolved Oxygen	mg/l	NA	NA	NA	0.44	1.93	0.85	0.43	1.04	0.62
Oxygen Reduction Potential	mV	NA	NA	NA	121	141	143	106	130	96
pH	unitless	NA	NA	NA	6.48	6.40	6.37	6.40	6.24	6.51
Specific Conductivity	µS/cm	NA	NA	NA	1,050	2,350	2,380	1,490	1,380	2,550
Temperature	°C	NA	NA	NA	8.02	11.68	11.39	11.03	12.84	10.4
Turbidity	NTU	NA	NA	NA	4.3	3.0	1.62	3.4	28.5	2.8
VOLATILE PETROLEUM HYDROCARBONS (VPH)										
C_5-C_8 Aliphatic Hydrocarbons	ug/l	1,000	4,000	100,000	<100	<100	<100	<100	<100	<100
C_9-C_{12} Aliphatic Hydrocarbons	ug/l	1,000	20,000	100,000	<25	<25	<25	<25	<25	<25
C_9-C_{10} Aromatic Hydrocarbons	ug/l	5,000	4,000	100,000	<25	<25	<25	<25	<25	<25
TARGET VOLATILE ORGANIC COMPOUNDS (VOCs)										
Benzene	ug/l	2,000	7,000	70,000	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Ethylbenzene	ug/l	30,000	4,000	100,000	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Methyl tert-butyl ether	ug/l	50,000	50,000	100,000	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Naphthalene	ug/l	6,000	6,000	60,000	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Toluene	ug/l	6,000	50,000	100,000	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Total Xylenes	ug/l	6,000	50,000	100,000	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
EXTRACTABLE PETROLEUM HYDROCARBONS (EPH)										
C_9-C_{18} Aliphatic Hydrocarbons	ug/l	1,000	20,000	100,000	<100	<100	<100	<100	<100	<100
C_{19}-C_{36} Aliphatic Hydrocarbons	ug/l	NA	20,000	100,000	<100	<100	<100	<100	<100	<100
C_{11}-C_{22} Aromatic Hydrocarbons	ug/l	50,000	30,000	100,000	<100	<100	<100	<100	<100	160
TARGET POLYNUCLEAR AROMATIC HYDROCARBONS (PAHs)										
2-Methylnaphthalene	ug/l	10,000	3,000	100,000	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Acenaphthene	ug/l	NA	5,000	50,000	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Acenaphthylene	ug/l	NA	3,000	30,000	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Anthracene	ug/l	NA	3,000	30,000	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Benzo (a) anthracene	ug/l	NA	3,000	30,000	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Benzo (a) pyrene	ug/l	NA	3,000	30,000	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Benzo (b) fluoranthene	ug/l	NA	3,000	30,000	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Benzo (g,h,I) perylene	ug/l	NA	3,000	30,000	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Benzo (k) fluoranthene	ug/l	NA	3,000	30,000	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Chrysene	ug/l	NA	3,000	30,000	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Dibenzo (a,h) anthracene	ug/l	NA	3,000	30,000	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Fluoranthene	ug/l	NA	200	3,000	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Fluorene	ug/l	NA	3,000	30,000	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Indeno (1,2,3-cd) pyrene	ug/l	NA	3,000	30,000	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Naphthalene	ug/l	6,000	6,000	60,000	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Phenanthrene	ug/l	NA	50	3,000	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Pyrene	ug/l	NA	3,000	30,000	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
METALS										
Lead, Dissolved	ug/l	NA	30	300	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0

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NOTES:

MCP Method 1 Cleanup Standards were taken from 310 CMR 40.0974(2) and UCLs were taken from 310 CMR 40.0996(7).

uS/cm = microseimens per centimeter

ug/l = micrograms per liter, or parts per billion (ppb)

<0.10 = not detected, i.e., below detection limit of 0.10.

TABLE 10

PHASE II GROUNDWATER SAMPLING RESULTS
BRA PARCEL P-3
September 10, 2001

Parameter	Units	Method 1 Cleanup Standards		Upper Concentrat-ion Limit (UCL)	Monitoring Well and Sample Number	
		GW-2	GW-3		WS-2	WS-13
FIELD PARAMETERS						
Dissolved Oxygen	mg/l	NA	NA	NA	0.27	0.22
Oxygen Reduction Potential	mV	NA	NA	NA	-	-
pH	unitless	NA	NA	NA	6.79	6.85
Specific Conductivity	µS/cm	NA	NA	NA	2,110	821
Temperature	°C	NA	NA	NA	18	15.9
Turbidity	NTU	NA	NA	NA	25	10
VOLATILE PETROLEUM HYDROCARBONS (VPH)						
C_5-C_8 Aliphatic Hydrocarbons	ug/l	1,000	4,000	100,000	<100	-
C_9-C_{12} Aliphatic Hydrocarbons	ug/l	1,000	20,000	100,000	<25	-
C_9-C_{10} Aromatic Hydrocarbons	ug/l	5,000	4,000	100,000	<25	-
TARGET VOLATILE ORGANIC COMPOUNDS (VOCs)						
Benzene	ug/l	2,000	7,000	70,000	<2.0	-
Ethylbenzene	ug/l	30,000	4,000	100,000	<2.0	-
Methyl tert-butyl ether	ug/l	50,000	50,000	100,000	<2.0	-
Naphthalene	ug/l	6,000	6,000	60,000	<5.0	-
Toluene	ug/l	6,000	50,000	100,000	<2.0	-
Total Xylenes	ug/l	6,000	50,000	100,000	<2.0	-
EXTRACTABLE PETROLEUM HYDROCARBONS (EPH)						
C_9-C_{18} Aliphatic Hydrocarbons	ug/l	1,000	20,000	100,000	<100	-
C_{19}-C_{36} Aliphatic Hydrocarbons	ug/l	NA	20,000	100,000	140	-
C_{11}-C_{22} Aromatic Hydrocarbons	ug/l	50,000	30,000	100,000	<100	-
TARGET POLYNUCLEAR AROMATIC HYDROCARBONS (PAHs)						
2-Methylnaphthalene	ug/l	10,000	3,000	100,000	<1.0	-
Acenaphthene	ug/l	NA	5,000	50,000	<1.0	-
Acenaphthylene	ug/l	NA	3,000	30,000	<1.0	-
Anthracene	ug/l	NA	3,000	30,000	<1.0	-
Benzo (a) anthracene	ug/l	NA	3,000	30,000	<1.0	-
Benzo (a) pyrene	ug/l	NA	3,000	30,000	<1.0	-
Benzo (b) fluoranthene	ug/l	NA	3,000	30,000	<1.0	-
Benzo (g,h,I) perylene	ug/l	NA	3,000	30,000	<1.0	-
Benzo (k) fluoranthene	ug/l	NA	3,000	30,000	<1.0	-
Chrysene	ug/l	NA	3,000	30,000	<1.0	-
Dibenzo (a,h) anthracene	ug/l	NA	3,000	30,000	<1.0	-
Fluoranthene	ug/l	NA	200	3,000	<1.0	-
Fluorene	ug/l	NA	3,000	30,000	<1.0	-
Indeno (1,2,3-cd) pyrene	ug/l	NA	3,000	30,000	<1.0	-
Naphthalene	ug/l	6,000	6,000	60,000	<1.0	-
Phenanthrene	ug/l	NA	50	3,000	<1.0	-
Pyrene	ug/l	NA	3,000	30,000	<1.0	-
METALS						
Lead, Dissolved	ug/l	NA	30	300	-	<12

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NOTES:

MCP Method 1 Cleanup Standards were taken from 310 CMR 40.0974(2) and UCLs were taken from 310 CMR 40.0996(7).

uS/cm = microseimens per centimeter

ug/l = micrograms per liter, or parts per billion (ppb)

<2.0 = not detected, i.e., below detection limit of 2.0.

TABLE 11
Comparison of PAH and Metal Concentrations to Urban Background
Parcel P-3

Parameter	Units	Concentrations				Upper 95th Percentile Urban Background Concentrations
		Area 1		Area 2	Area 3	
		0 to 3 feet	4 to 15 feet	0 to 15	0 to 15	
C_{11}-C_{22} Aliphatics	mg/kg	323	1,968	307	55	-
2-Methylnaphthalene	mg/kg	0.3	**2.6**	1.7	0.3	2.2
Acenaphthene	mg/kg	0.9	3.2	3.3	0.3	4.1
Acenaphthylene	mg/kg	0.3	0.3	0.8	0.3	1.9
Anthracene	mg/kg	2.0	3.2	7.3	0.5	10
Benzo[a]anthracene	mg/kg	4.8	8.3	12.8	1.4	19
Benzo[a]pyrene	mg/kg	4.5	7.6	10.3	1.3	17
Benzo[b]fluoranthene	mg/kg	4.6	6.5	11.3	1.7	18
Benzo[g,h,i]perylene	mg/kg	2.6	3.3	5.5	0.8	7.7
Benzo[k]fluoranthene	mg/kg	3.0	6.0	4.7	0.3	9.7
Chrysene	mg/kg	4.8	8.4	12.2	1.4	18
Dibenzo[a,h]anthracene	mg/kg	0.8	1.2	1.7	0.3	2.1
Fluoranthene	mg/kg	10.2	20.2	27.7	2.7	33
Fluorene	mg/kg	0.9	2.9	3.3	0.3	5.5
Indeno[1,2,3-cd]pyrene	mg/kg	2.5	3.3	6.0	1.0	7
Naphthalene	mg/kg	0.5	1.9	2.6	0.28	3
Phenanthrene	mg/kg	9.0	19.9	31.8	1.9	38
Pyrene	mg/kg	8.9	16.6	26.7	2.6	35
Arsenic, Total	mg/kg	9	6	-	-	21
Cadmium, Total	mg/kg	3	3	-	-	5
Chromium, Total	mg/kg	46	30	-	-	50
Lead, Total	mg/kg	361	821	300	220	1100
Mercury, Total	mg/kg	0.4	0.6	-	-	2.6

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Notes:
Concentrations shown for Areas 1 and 2 are upper 95th percentile mean of each contaminant in that Area.
Concentrations shown for Area 3 are the maximum for each contaminant in that Area.
Bold indicates concentration exceeds urban background.
Urban Background Concentrations source: *"Backgound Soil Contaminant Assessment"*, CDM, April 1996.

TABLE 12
PHASE III - REMEDIAL ACTION ALTERNATIVE SCREENING
BRA PARCEL P-3
October 2001

	Alternative	Evaluation Criteria [1]							TOTAL
		Effectiveness	Reliability	Difficulty	Costs [2]	Risks	Benefits	Timeliness	
2	"Hot Spot" Soil Excavation, Off-Site Disposal, and Activity and Use Limitation (AUL)	2	2	1	1	2	2	2	**12**
3	Area 1 (0 to 15 feet) and "Hot Spot" Soil Excavation, and Off-Site Disposal	1	1	3	3	2	1	3	14
4	Area 1 (0 to 8 feet) and "Hot Spot" Soil Excavation, Off-Site Disposal, Capping, and AUL	2	1	2	3	2	1	3	14

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Notes:

1 Criteria rating: 1 = Best, 3 = Worst

2 Estimated costs are summarized in the Phase III section of the report.

APPENDIX A

Site Plans

PARCEL "C" LINE
(AS SHOWN ON RECORDED PLAN No. 17973-210
SUFFOLK COUNTY REGISTRY OF DEEDS)

PARCEL P-1 LINE
(AS SHOWN ON RECORDED PLAN No. 16998-95
SUFFOLK COUNTY REGISTRY OF DEEDS)

PROPOSED PARCEL P-3 LINE

HAMPSHIRE (PUBLIC - 40' WIDE) STREET

VERNON (PUBLIC - 30' WIDE) STREET

DOWNING (PUBLIC - 24' WIDE) STREET

CONNOLLY'S PUB

WHITTIER STREET HEALTH CENTER

MADISON PARK HIGH SCHOOL

CHURCH

BITUMINOUS ROAD

CONC. ISLAND

BITUMINOUS PLAYGROUND

GRAVEL PARKING AREA

SCALE: 1" = 40'-0"

Thomas M. Menino,
Mayor

Marisa Lago,
Director

BRA/EDIC
BOSTON'S PLANNING &
ECONOMIC DEVELOPMENT OFFICE
10 DRYDOCK AVENUE, BOSTON, MA 02210
(617) 635-3300

RUGGLES PLAZA

APPENDIX B

Correspondence

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 1
1 CONGRESS STREET, SUITE 1100
BOSTON, MASSACHUSETTS 02114-2023

December 1, 2000 VIA FAX

George Naslas
Weston & Sampson Engineers, Inc.
Five Centennial Drive
Peabody, MA 01960-7985

Dear Mr. Naslas:

EPA has reviewed your response to our comments on the Quality Assurance Project Plan (QAPP) for the Boston Redevelopment Authority's Parcel P-3 site in Roxbury, Massachusetts and has no further comments. This letter represents EPA's approval of the revised QAPP for this site. The work outlined in your revised QAPP may begin at your earliest convenience.

Enclosed is the EPA QA Unit approval memorandum for the QAPP. If you have any questions, feel free to call me at (617) 918-1394.

Sincerely,

James S. Chow
Brownfields Program

cc: Noah Luskin (BRA)
Alan Peterson (EPA w/o enclosure)

enclosure

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION I
Office of Environmental Measurement and Evaluation
60 Westview Street, Lexington, MA 02421-3185

MEMORANDUM

Date: November 30, 2000

Subject: QA approval of the Brownfields Quality Assurance Project Plan for Boston Redevelopment Authority's Parcel P-3 in Roxbury, Massachusetts (November 2000).

From: Alan Peterson, QA Chemist

To: James Chow, EPA Project Manager

The Quality Assurance Unit has reviewed Weston and Sampson's responses to EPA comments for the Roxbury QAPP (dated 11/27/00). Based on the responses provided, the EPA QA Unit approves the plan for site work.

Should you have any questions, please feel free to contact me at 781-860-4322.

File
96230.G - BRA/
Roxbur

GD
PI

COMMONWEALTH OF MASSACHUSETTS
EXECUTIVE OFFICE OF ENVIRONMENTAL AFFAIRS
DEPARTMENT OF ENVIRONMENTAL PROTECTION
METROPOLITAN BOSTON - NORTHEAST REGIONAL OFFICE

WILLIAM F. WELD
Governor

ARGEO PAUL CELLUCCI
Lt. Governor

TRUDY C
Secr

DAVID B. STR
Commissi

URGENT LEGAL MATTER: PROMPT ACTION NECESSARY
CERTIFIED MAIL: RETURN RECEIPT REQUESTED MAY 28 1997

Boston Redevelopment Authority
1 City Hall Plaza
Boston, MA 02201-1007

RE: Boston/Roxbury
Parcel P-3
Tremont & Whittier St.
RTN #3-15009

NOTICE OF RESPONSIBILITY;
M.G.L. c. 21E & 310 CMR 40.0000

Attention: Mr. Richard Mertens

Dear Mr. Mertens:

Information contained in a Release Notification Form (RNF) submitted to the Department of Environmental Protection (the Department or DEP) on April 14, 1997 and submitted by Boston Redevelopment Authority indicates that there is or has been a release of oil and/or hazardous material at the above-referenced property which exceeds a "120 day" reporting threshold (310 CMR 40.0315) and which requires one or more response actions.

Based on this information, the Department has reason to believe that the subject property or portion(s) thereof is a disposal site as defined in the Massachusetts Oil and Hazardous Material Release Prevention and Response Act, M.G.L. c. 21E, and the Massachusetts Contingency Plan, 310 CMR 40.0000 (the MCP). The assessment and cleanup of disposal sites is governed by M.G.L. c. 21E and the MCP.

The purpose of this notice is to inform you of your legal responsibilities under state law for assessing and/or remediating the subject release. For purposes of this notice, the terms and phrases used herein shall have the meaning ascribed to them by the MCP unless the text clearly indicates otherwise.

STATUTORY LIABILITIES

The Department has reason to believe that you (as used in this letter, "you" refers to Boston Redevelopment Authority) are

a Potentially Responsible Party (a PRP) with liability under M.G.L. c. 21E, § 5, for response action costs. Section 5 makes the following parties liable to the Commonwealth of Massachusetts: current owners or operators of a site from or at which there is or has been a release/threat of release of oil or hazardous material; any person who owned or operated a site at the time hazardous material was stored or disposed of; any person who arranged for the transport, disposal, storage or treatment of hazardous material to or at a site; any person who transported hazardous material to a transport, disposal, storage or treatment site from which there is or has been a release/threat of release of such material; and any person who otherwise caused or is legally responsible for a release/threat of release of oil or hazardous material at a site.

This liability is "strict", meaning it is not based on fault, but solely on your status as an owner, operator, generator, transporter or disposer. It is also joint and several, meaning that you may be liable for all response action costs incurred at the site, regardless of the existence of any other liable parties.

The MCP requires responsible parties to take necessary response actions at properties where there is or has been a release or threat of release of oil and/or hazardous material. If you do not take the necessary response actions, or fail to perform them in an appropriate and timely manner, the Department is authorized by M.G.L. c. 21E to have the work performed by its contractors. By taking such actions, you can avoid liability for response action costs incurred by the Department and its contractors in performing these actions, and any sanctions which may be imposed for failure to perform response actions under the MCP.

You may be liable for up to three (3) times all response action costs incurred by the Department. Response action costs include, without limitation, the cost of direct hours spent by Department employees arranging for response actions or overseeing work performed by persons other than the Department or their contractors, expenses incurred by the Department in support of those direct hours, and payments to the Department's contractors. (For more detail on cost liability, see 310 CMR 40.1200.)

The Department may also assess interest on costs incurred at the rate of twelve percent (12%), compounded annually. To secure payment of this debt, the Commonwealth may place liens on all of your property in the Commonwealth. To recover the debt, the Commonwealth may foreclose on these liens or the Attorney General may bring legal action against you.

In addition to your liability for up to three (3) times all

response action costs incurred by the Department, you may also be liable to the Commonwealth for damages to natural resources caused by the release. Civil and criminal liability may also be imposed under M.G.L. c. 21E, § 11, and civil administrative penalties may be imposed under M.G.L. c. 21A, § 16 for each violation of M.G.L. c. 21E, the MCP, or any order, permit or approval issued thereunder.

NECESSARY RESPONSE ACTIONS

The subject site shall not be deemed to have had all the necessary and required response actions taken unless and until all substantial hazards presented by the site have been eliminated and a level of No Significant Risk exists or has been achieved in compliance with M.G.L. c. 21E and the MCP. In addition, the MCP requires persons undertaking response actions at disposal sites to perform Immediate Response Actions (IRAs) in response to "sudden releases", Imminent Hazards and Substantial Release Migration. Such persons must continue to evaluate the need for IRAs and notify the Department immediately if such a need exists.

You must employ or engage a Licensed Site Professional (LSP) to manage, supervise or actually perform the necessary response actions at the subject site. In addition, the MCP requires persons undertaking response action at a disposal site to submit to the Department a Response Action Outcome Statement (RAO) prepared by an LSP in accordance with 310 CMR 40.1000 upon determining that a level of No Significant Risk already exists or has been achieved at a disposal site or portion thereof. [You may obtain a list of the names and addresses of these licensed professionals from the Board of Registration of Hazardous Waste Site Cleanup Professionals at (617) 556-1091].

The Department has determined that the following response actions are necessary at the subject site:

> Initial site investigation activities in accordance with 310 CMR 40.0405 are necessary. In addition, unless an RAO is submitted earlier, a completed Tier Classification Submittal pursuant to 310 CMR 40.0510, and, if appropriate, a completed Tier I Permit Application pursuant to 310 CMR 40.0700, must be submitted to DEP within one year of the initial date notice of a release is provided to the Department pursuant to 310 CMR 40.0300 or from the date the Department issues a Notice of Responsibility (NOR), whichever occurs earlier.

It is important to note that you must dispose of any Remediation Waste generated at the subject location in accordance with 310 CMR 40.0030 including, without limitation, contaminated

Massachusetts Department of Environmental Protection
Bureau of Waste Site Cleanup

BWSC-103

RELEASE NOTIFICATION & NOTIFICATION RETRACTION FORM

Pursuant to 310 CMR 40.0335 and 310 CMR 40.0371 (Subpart)

Release Tracking Number: _____ - _____
If assigned by DEP

A. RELEASE OR THREAT OF RELEASE LOCATION:

Street: Parcel P-3, Tremont and Whittier Streets Location Aid: UTMs: 4688700 mN, 327800 mE

City/Town: Boston (Roxbury) ZIP Code: 02120-0000

B. THIS FORM IS BEING USED TO: (check one)

☑ Submit a Release Notification (complete all sections of this form).

☐ Submit a Retraction of a Previously Reported Notification of a Release or Threat of Release (complete Sections A, B, E, F and G of this form). You MUST attach the supporting documentation required by 310 CMR 40.0335.

C. INFORMATION DESCRIBING THE RELEASE OR THREAT OF RELEASE (TOR):

Date and time you obtained knowledge of the Release or TOR. Date: 12/18/96 Time: _____ Specify: ☐ AM ☐ PM

The date you obtained knowledge is always required. The time you obtained knowledge is not required if reporting only 120 Day Conditions.

IF KNOWN, record date and time release or TOR occurred. Date: _____ Time: _____ Specify: ☐ AM ☐ PM

☐ Check here if you previously provided an Oral Notification to DEP (2 Hour and 72 Hour Reporting Conditions only).

Provide date and time of Oral Notification. Date: _____ Time: _____ Specify: ☐ AM ☐ PM

Check all Notification Thresholds that apply to the Release or Threat of Release: (for more information see 310 CMR 40.0310 - 40.0315)

2 HOUR REPORTING CONDITIONS	72 HOUR REPORTING CONDITIONS	120 DAY REPORTING CONDITIONS
☐ Sudden Release	☐ Subsurface Non-Aqueous Phase Liquid (NAPL) Equal to or Greater than 1/2 Inch	☑ Release of Hazardous Material(s) to Soil or Groundwater Exceeding Reportable Concentration(s)
☐ Threat of Sudden Release	☐ Underground Storage Tank (UST) Release	☐ Release of Oil to Soil Exceeding Reportable Concentration(s) and Affecting More than 2 Cubic Yards
☐ Oil Sheen on Surface Water	☐ Threat of UST Release	☐ Release of Oil to Groundwater Exceeding Reportable Concentration(s)
☐ Poses Imminent Hazard	☐ Release to Groundwater near Water Supply	☐ Subsurface Non-Aqueous Phase Liquid (NAPL) Equal to or Greater than 1/8 Inch and Less than 1/ Inch
☐ Could Pose Imminent Hazard	☐ Release to Groundwater near School or Residence	
☐ Release Detected in Private Well		
☐ Release to Storm Drain		
☐ Sanitary Sewer Release (Imminent Hazard Only)		

List below the Oils or Hazardous Materials that exceed their Reportable Concentration or Reportable Quantity by the greatest amount. If necessary, attach a list of additional Oil and Hazardous Material substances subject to reporting.

Name and Quantities of Oils (O) and Hazardous Materials (HM) Released:

O or HM Released	O (check one)	HM (check one)	CAS # (if known)	Amount or Concentration	Units	Reportable Concentrations Exceeded, if Applicable (RCS-1, RCS-2, RCGW-1, RCGW-
PAHs (see Table 1)	☐	☑				RCS-1
TPH (see Table 1)	☑	☐				RCS-1
Lead (see Table 1)	☐	☑				RCS-1

D. ADDITIONAL INVOLVED PARTIES:

☐ Check here if attaching names and addresses of owners of properties affected by the Release or Threat of Release, other than an owner who is submitting this Release Notification (required).

☑ Check here if attaching Licensed Site Professional (LSP) name and address (optional).

You may write in names and addresses on the bottom of the second page of this form.

Massachusetts Department of Environmental Protection
Bureau of Waste Site Cleanup

BWSC-10

RELEASE NOTIFICATION & NOTIFICATION RETRACTION FORM

Pursuant to 310 CMR 40.0335 and 310 CMR 40.0371 (Subpart C)

Release Tracking Number ___ - ___ (If assigned by DEP)

E. PERSON REQUIRED TO NOTIFY:

Name of Organization: Boston Redevelopment Authority

Name of Contact: Mr. Richard Mertens Title: Environmental Review Officer

Street: 1 City Hall Plaza

City/Town: Boston State: MA ZIP Code: 02201-1007

Telephone: 617-722-4300 Ext: 4283 FAX: (optional) 617-742-4464

F. RELATIONSHIP OF PERSON REQUIRED TO NOTIFY TO RELEASE OR THREAT OF RELEASE: (check one)

☒ RP or PRP Specify ◉ Owner ○ Operator ○ Generator ○ Transporter Other RP or PRP: ___

☐ Fiduciary, Secured Lender or Municipality with Exempt Status (as defined by M.G.L. c. 21E, s. 2)

☐ Agency or Public Utility on a Right of Way (as defined by M.G.L. c. 21E, s. 5(j))

☐ Any Person Otherwise Required to Notify Specify Relationship: ___

G. CERTIFICATION OF PERSON REQUIRED TO NOTIFY:

I, Thomas N. O'Brien, attest under the pains and penalties of perjury (i) that I have personally examined and familiar with the information contained in this submittal, including any and all documents accompanying this transmittal form, (ii) that, based on my inquiry of those individuals immediately responsible for obtaining the information, the material information contained in this submittal is, to the best o my knowledge and belief, true, accurate and complete, and (iii) that I am fully authorized to make this attestation on behalf of the entity legally responsible for this submittal. I/the person or entity on whose behalf this submittal is made am/is aware that there are significant penalties, including, but not limited to, possible fines and imprisonment, for willfully submitting false, inaccurate, or incomplete information.

By: ___ (signature) Title: Director

For: Boston Redevelopment Authority (print name of person or entity recorded in Section E) Date: 4/9/97

Enter address of the person providing certification, if different from address recorded in Section E:

Street: ___

City/Town: ___ State: ___ ZIP Code: ___

Telephone: ___ Ext ___ FAX: (optional) ___

YOU MUST COMPLETE ALL RELEVANT SECTIONS OF THIS FORM OR DEP MAY RETURN THE DOCUMENT AS INCOMPLETE. IF YOU SUBMIT AN INCOMPLETE FORM, YOU MAY BE PENALIZED FOR MISSING A REQUIRED DEADLINE.

Licensed Site Professional:
Dr. Prasanta K. Bhunia, Ph.D.
Weston & Sampson Engineers, Inc.
5 Centennial Drive
Peabody, Massachusetts 01960

L.S.P. Number 2999

(508) 532-1900

TABLE 1

SOIL HEADSPACE SCREENING AND SAMPLING RESULTS
BRAEDIC PARCEL P-3
Test Pit and Soil Boring Samples

Parameter	Units	Reportable Concs. RCS-1	Sample Identification and sample depth (feet) WS-1 8.5-10.5	WS-2 10-12	WS-3 15-17	WS-4 10-12	WS-5 10-12	WS-6 10-12	WS-7 10-12	WS-8 TP-5 17-17.5	WS-9 TP-4 18.5-19	WS-10 TP-7 17.5-18	WS-11 20-22	WS-12 TP-1 11.5-1
VOLATILE ORGANIC COMPOUNDS*														
Benzene	ug/kg	10,000	ND	ND	ND	ND	ND	ND	ND	ND	87	ND	ND	ND
Isopropylbenzene	ug/kg	11,000,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	330
n-Propylbenzene	ug/kg	100,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	760
Xylene (total)	ug/kg	500,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	32
tert-Butylbenzene	ug/kg	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	36
sec-Butlbenzene	ug/kg	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	270
n-Butylbenzene	ug/kg	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	470
Napthalene	ug/kg	4,000	ND	ND	ND	ND	ND	ND	ND	150	ND	150	ND	160
1,2,4-Trimethylbenzene	ug/kg	1,000,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	70
Total BTEX	ug/kg	-	ND	ND	ND	ND	ND	ND	ND	ND	87	ND	ND	32
Total VOCs	ug/kg	-	ND	ND	ND	ND	ND	ND	ND	150	87	150	ND	2,125
TOTAL PETROLEUM HYDROCARBONS**														
Gasoline	mg/kg	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Kerosene	mg/kg	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Mineral Spirits	mg/kg	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Fuel Oil #2/Diesel	mg/kg	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	150*	ND	8,400
Fuel Oil #4	mg/kg	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Fuel Oil #6	mg/kg	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Motor Oil/Hydraulic Oil	mg/kg	-	ND	ND	ND	ND	ND	ND	ND	500	ND	920	ND	ND
Total TPH	mg/kg	500	ND	ND	ND	ND	ND	ND	ND	500**	ND	1070**	ND	8,400
POLYNUCLEAR AROMATIC HYDROCARBONS ***														
Napthalene	ug/kg	4,000	NA	ND	ND	NA	NA	NA	NA	8,200	130	NA	ND	1,000
2-Methylnaphthalene	ug/kg	700	NA	ND	ND	NA	NA	NA	NA	4,300	60	NA	ND	23,000
Acenaphthylene	ug/kg	100,000	NA	ND	ND	NA	NA	NA	NA	2,000	ND	NA	ND	800
Acenaphthene	ug/kg	20,000	NA	ND	ND	NA	NA	NA	NA	12,000	180	NA	ND	3,400
Fluorene	ug/kg	400,000	NA	ND	ND	NA	NA	NA	NA	11,000	200	NA	ND	3,900
Phenanthrene	ug/kg	100,000	NA	ND	ND	NA	NA	NA	NA	93,000	1,500	NA	ND	11,000
Anthracene	ug/kg	1,000,000	NA	ND	ND	NA	NA	NA	NA	21,000	440	NA	ND	2,700
Fluoranthene	ug/kg	600,000	NA	ND	ND	NA	NA	NA	NA	92,000	1,600	NA	ND	4,100
Pyrene	ug/kg	500,000	NA	ND	ND	NA	NA	NA	NA	82,000	1,400	NA	ND	4,100
Benzo[a]anthracene	ug/kg	700	NA	ND	ND	NA	NA	NA	NA	38,000	630	NA	ND	1,500
Chrysene	ug/kg	7,000	NA	ND	ND	NA	NA	NA	NA	44,000	690	NA	ND	1,700
Benzo[b]fluoranthene	ug/kg	700	NA	ND	ND	NA	NA	NA	NA	34,000	560	NA	ND	1,200
Benzo[k]fluoranthene	ug/kg	7,000	NA	ND	ND	NA	NA	NA	NA	35,000	550	NA	ND	1,300
Benzo[a]pryene	ug/kg	700	NA	ND	ND	NA	NA	NA	NA	39,000	610	NA	ND	1,400
Dibenzo[a,h]anthracene	ug/kg	700	NA	ND	ND	NA	NA	NA	NA	4,700	ND	NA	ND	ND
Benzo[g,h,i]perylene	ug/kg	100,000	NA	ND	ND	NA	NA	NA	NA	13,000	190	NA	ND	ND
Indeno[1,2,3-cd]pyrene	ug/kg	700	NA	ND	ND	NA	NA	NA	NA	14,000	200	NA	ND	ND
METALS														
Arsenic, Total	mg/kg	30	NA	7.1	7.5	NA	NA	NA	NA	7.3	7.8	NA	8.1	4.4
Barium, Total	mg/kg	1,000	NA	62	57	NA	NA	NA	NA	240	160	NA	53	72
Cadmium, Total	mg/kg	30	NA	<5.5	<4.2	NA	NA	NA	NA	4.5	<2.7	NA	<2.4	<3.
Chromium, Total	mg/kg	1,000	NA	54	84	NA	NA	NA	NA	23	14	NA	11	27
Lead, Total	mg/kg	300	NA	13	9.8	NA	NA	NA	NA	520	980	NA	51	120
Mercury, Total	mg/kg	10	NA	<0.033	0.055	NA	NA	NA	NA	3.07	0.204	NA	<0.015	<0.022
Selenium, Total	mg/kg	300	NA	<5.5	<4.2	NA	NA	NA	NA	<2.6	<2.7	NA	<2.4	<3.
Silver, Total	mg/kg	100	NA	<5.2	<4.1	NA	NA	NA	NA	<2.8	<2.6	NA	<2.4	<3.

NOTES:

ND = Not detected
NA = Not analyzed
NS = No standard
- = Not applicable
mg/kg = milligrams per kilogram (parts per million)
ug/kg = micrograms per kilogram (parts per billion)
* = weathered TPH
** = PAHs present
Bold/Shaded = Exceeds applicable reportable concentration

APPENDIX C

Field Documentation

C-1 Soil Boring, Test Pit Logs and Field Notes
C-2 Groundwater Monitoring Well Construction Logs
C-3 Groundwater Sampling Field Notes

Appendix C-1

Soil Boring, Test Pit Logs and Field Notes

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: Weston & Sampson Engineers, Inc. Date: 3/27/97 Job No. 97-0332

Location: Corner Tremont and Whittier Street, Roxbury, MA

BORING NO. B-101 Ground Elev. Date Start 3/24/97 Date Complete 3/24/97 Drilling Foreman MC Eng./Hydrol. Geologist

DEPTH	Sample Data: Sample No.	Sample Depth (ft.)	Blows 6" Penetration	Rec. Inches	Casing Blows Per ft.	Strata Change Depth	Soil and/or bedrock strata descriptions: Visual Identification of Soil and/or Rock Strata
	1	1'0"-2'6"	8-9-35				Dry, dense to medium dense, fine to coarse sand, trace to some inorganic silt, trace fine to coarse gravel, brick, glass, coal, etc. Fill
5	2	4'6"-6'6"	3-6-7-9				
	3	7'0"-9'0"	7-4-9-9				
10						9'0"	End of boring at 9'0" No water encountered upon completion.
15							
20							
25							
30							
35							
40							

Type of Boring Casing Size: Hollow Stem Auger Size: 4-1/4"

Proportion Percentages
Trace 0 to 10%
Some 10 to 40%
And 40 to 50%

Granular Soils (blows per ft.)
0 to 4 Very Loose
4 to 10 Loose
10 to 30 Medium Dense
30 to 50 Dense
Over 50 Very Dense

Cohesive Soils (blows per ft.)
0 to 2 Very Soft
2 to 4 Soft
4 to 8 Medium Stiff
8 to 15 Stiff
15 to 30 Very 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: Weston & Sampson Engineers, Inc. Date: 3/27/97 Job No.: 97-0332

Location: Corner Tremont and Whittier Street, Roxbury, MA

BORING NO.: B-102 Ground Elev.: Date Start: 3/24/97 Date Complete: 3/24/97 Drilling Foreman: MC Eng./Hydrol. Geologist:

DEPTH	Sample 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	1'0"-3'0"	8-9-9-15				Dry, medium dense, fine to coarse sand, trace to some inorganic silt, trace fine to coarse gravel, cobbles and boulders, brick, glass, coal. Fill.
5	2	4'0"-6'0"	4-3-6-6				
	3	7'0"-9'0"	6-6-6-7				
10						9'0"	End of boring at 9'0" No water encountered upon completion.
15							
20							
25							
30							
35							
40							

Type of Boring: Casing Size: Hollow Stem Auger Size: 4-1/4"

Proportion Percentages
Trace 0 to 10%
Some 10 to 40%
And 40 to 50%

Granular Soils (blows per ft.)
0 to 4 Very Loose
4 to 10 Loose
10 to 30 Medium Dense
30 to 50 Dense
Over 50 Very Dense

Cohesive Soils (blows per ft.)
0 to 2 Very Soft
2 to 4 Soft
4 to 8 Medium Stiff
8 to 15 Stiff
15 to 30 Very 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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SOIL EXPLORATION CORPORATION

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

Client: Weston & Sampson Engineers, Inc. Date: 3/27/97 Job No.: 97-0332

Location: Corner Tremont and Whittier Street, Roxbury, MA

BORING NO.: B-103 Ground Elev.: Date Start: 3/24/97 Date Complete: 3/24/97 Drilling Foreman: MC Eng./Hydrol. Geologist:

DEPTH	Sample 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	1'0"-3'0"	4-5-5-10				Dry, medium dense to dense, fine to coarse sand, trace to some inorganic silt, trace fine to coarse gravel, cobbles and boulders, brick, glass, coal, etc. Fill.
5	2	4'0"-6'0"	6-6-9-7				
	3	7'0"-9'0"	24-20-19-27				
10						9'0"	End of boring at 9'0" No water encountered upon completion.
15							
20							
25							
30							
35							
40							

Type of Boring: Casing Size: Hollow Stem Auger Size: 4-1/4"

Proportion Percentages
Trace 0 to 10%
Some 10 to 40%
And 40 to 50%

Granular Soils (blows per ft.)
0 to 4 Very Loose
4 to 10 Loose
10 to 30 Medium Dense
30 to 50 Dense
Over 50 Very Dense

Cohesive Soils (blows per ft.)
0 to 2 Very Soft
2 to 4 Soft
4 to 8 Medium Stiff
8 to 15 Stiff
15 to 30 Very 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: Weston & Sampson Engineers, Inc. Date: 3/27/97 Job No. 97-0332

Location: Corner Tremont and Whittier Street, Roxbury, MA

BORING NO.: B-104 Ground Elev.: Date Start: 3/24/97 Date Complete: 3/24/97 Drilling Foreman: MC Eng./Hydrol. Geologist:

DEPTH	Sample No.	Sample Depth (ft.)	Blows 6" Penetration	Rec. Inches	Casing Blows Per ft.	Strata Change Depth	Soil and/or bedrock strata descriptions: Visual Identification of Soil and/or Rock Strata
	1	1'0"-3'0"	17-15-7-7				Dry. medium dense to dense, fine to coarse sand, some inorganic silt, trace fine to coarse gravel, cobbles and boulders, brick, glass, coal, etc. Fill
5	2	4'0"-6'0"	7-7-8-7				
	3	7'0"-9'0"	35-21-24-19				
10						9'0"	End of boring at 9'0" No water encountered upon completion.
15							
20							
25							
30							
35							
40							

Type of Boring: Casing Size: Hollow Stem Auger Size: 4-1/4"

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: Weston & Sampson Engineers, Inc. Date: 3/27/97 Job No. 97-0332

Location: Corner Tremont and Whittier Street, Roxbury, MA

BORING NO.: B-105 Ground Elev.: Date Start: 3/24/97 Date Complete: 3/24/97 Drilling Foreman: MC Eng./Hydrol. Geologist:

Sample Data					Soil and/or bedrock strata descriptions	
Sample 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	1'0"-3'0"	12-13-7-10				Dry, medium dense, fine to coarse sand, some inorganic silt, some fine to coarse gravel, cobbles and boulders, brick, glass, coal, wood. Fill.
2	4'0"-6'0"	4-3-4-6				
3	7'0"-9'0"	15-15-10-13			9'0"	End of boring at 9'0" No water encountered upon completion.

Type of Boring: Casing Size: Hollow Stem Auger Size: 4-1/4"

Proportion Percentages	Granular Soils (blows per ft.)		Cohesive Soils (blows per ft.)	
Trace 0 to 10%	0 to 4 Very Loose	30 to 50 Dense	0 to 2 Very Soft	8 to 15 Stiff
Some 10 to 40%	4 to 10 Loose	Over 50 Very Dense	2 to 4 Soft	15 to 30 Very Stiff
And 40 to 50%	10 to 30 Medium Dense		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	Weston & Sampson Engineers, Inc.		Date 3/27/97	Job No. 97-0332	
Location	Corner Tremont and Whittier Street, Roxbury, MA				
BORING NO. B-106	Ground Elev.	Date Start 3/24/97	Date Complete 3/24/97	Drilling Foreman MC	Eng./Hydrol. Geologist

DEPTH	Sample No.	Sample Depth (ft.)	Blows 6" Penetration	Rec. Inches	Casing Blows Per ft.	Strata Change Depth	Soil and/or bedrock strata descriptions: Visual Identification of Soil and/or Rock Strata
	1	1'0"-3'0"	3-5-9-9				Dry, medium dense, fine to coarse sand. some inorganic silt, some fine to coarse gravel, cobbles and boulders, brick, wood, glass, coal. Fill
5	2	4'0"-6'0"	7-7-10-9				
	3	7'0"-9'0"	7-8-8-7				
10						9'0"	End of boring at 9'0" No water encountered upon completion.
15							
20							
25							
30							
35							
40							

Type of Boring Casing Size: Hollow Stem Auger Size: 4-1/4"

Proportion Percentages
Trace 0 to 10%
Some 10 to 40%
And 40 to 50%

Granular Soils (blows per ft.)
0 to 4 Very Loose
4 to 10 Loose
10 to 30 Medium Dense
30 to 50 Dense
Over 50 Very Dense

Cohesive Soils (blows per ft.)
0 to 2 Very Soft
2 to 4 Soft
4 to 8 Medium Stiff
8 to 15 Stiff
15 to 30 Very 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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5 Monson Place
Milford, NH 03055
(603) 672-2135

Client: Weston & Sampson Engineers, Inc. Date: 3/27/97 Job No. 97-0332

Location: Corner Tremont and Whittier Street, Roxbury, MA

BORING NO.: B-107 Ground Elev. Date Start: 3/25/97 Date Complete: 3/25/97 Drilling Foreman: MC Eng./Hydrol. Geologist

Sample Data					Soil and/or bedrock strata descriptions	
Sample 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	1'0"-3'0"	5-9-12-12				Dry, medium dense, fine to coarse sand, some inorganic silt, some fine to coarse gravel, cobbles and boulders, brick, wood, glass, coal. Fill
2	4'0"-6'0"	4-4-4-5				
3	7'0"-9'0"	9-12-15-15			9'0"	End of boring at 9'0" No water encountered upon completion.

Type of Boring: Casing Size: Hollow Stem Auger Size: 4-1/4"

Proportion Percentages
Trace 0 to 10%
Some 10 to 40%
And 40 to 50%

Granular Soils (blows per ft.)
0 to 4 Very Loose
4 to 10 Loose
10 to 30 Medium Dense
30 to 50 Dense
Over 50 Very Dense

Cohesive Soils (blows per ft.)
0 to 2 Very Soft
2 to 4 Soft
4 to 8 Medium Stiff
8 to 15 Stiff
15 to 30 Very 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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SOIL EXPLORATION CORPORATION

Geotechnical Drilling and Groundwater Monitor Wells

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

Client: Weston & Sampson Engineers, Inc. Date: 3/27/97 Job No. 97-0332

Location: Corner Tremont and Whittier Street, Roxbury, MA

BORING NO. B-112 Ground Elev. Date Start 3/25/97 Date Complete 3/25/97 Drilling Foreman MC Eng./Hydrol. Geologist

DEPTH	Sample Data: Sample No.	Sample Depth (ft.)	Blows 6" Penetration	Rec. Inches	Casing Blows Per ft.	Soil and/or bedrock strata descriptions: Strata Change Depth	Visual Identification of Soil and/or Rock Strata
	1	1'0"-3'0"	3-4-7-11				Dry, medium dense, fine to coarse sand, some fine to coarse gravel, some inorganic silt, cobbles and boulders, brick, glass, coal, etc. Fill.
5	2	4'0"-6'0"	9-7-7-20				
	3	7'0"-9'0"	6-4-3-7				
10						9'0"	End of boring at 9'0" No water encountered upon completion.
15							
20							
25							
30							
35							
40							

Type of Boring Casing Size: Hollow Stem Auger Size: 4-1/4"

Proportion Percentages
Trace 0 to 10%
Some 10 to 40%
And 40 to 50%

Granular Soils (blows per ft.)
0 to 4 Very Loose
4 to 10 Loose
10 to 30 Medium Dense
30 to 50 Dense
Over 50 Very Dense

Cohesive Soils (blows per ft.)
0 to 2 Very Soft
2 to 4 Soft
4 to 8 Medium Stiff
8 to 15 Stiff
15 to 30 Very 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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Geotechnical Drilling and Groundwater Monitor Wells

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Milford, NH 03055
(603) 672-2135

Client: Weston & Sampson Engineers, Inc. Date: 3/27/97 Job No. 97-0332

Location: Corner Tremont and Whittier Street, Roxbury, MA

BORING NO.: B-113 Ground Elev.: Date Start: 3/25/97 Date Complete: 3/25/97 Drilling Foreman: MC Eng./Hydrol. Geologist:

DEPTH	Sample Data: Sample No.	Sample Data: Sample Depth (ft.)	Sample Data: Blows 6" Penetration	Sample Data: Rec. Inches	Sample Data: Casing Blows Per ft.	Soil and/or bedrock strata descriptions: Strata Change Depth	Soil and/or bedrock strata descriptions: Visual Identification of Soil and/or Rock Strata
	1	1'0"-3'0"	2-3-4-4				Dry, loose to medium dense, fine to coarse sand, some fine to coarse gravel, some inorganic silt, cobbles and boulders, brick, glass, coal, etc. Fill.
5	2	4'0"-6'0"	9-10-10-12				
	3	7'0"-9'0"	10-11-15-15				
10						9'0"	End of boring at 9'0" No water encountered upon completion.
15							
20							
25							
30							
35							
40							

Type of Boring: Casing Size: Hollow Stem Auger Size: 4-1/4"

Proportion Percentages	Granular Soils (blows per ft.)		Cohesive Soils (blows per ft.)	
Trace 0 to 10%	0 to 4 Very Loose	30 to 50 Dense	0 to 2 Very Soft	8 to 15 Stiff
Some 10 to 40%	4 to 10 Loose	Over 50 Very Dense	2 to 4 Soft	15 to 30 Very Stiff
And 40 to 50%	10 to 30 Medium Dense		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	Weston & Sampson Engineers, Inc.			Date 3/27/97		Job No. 97-0332	
Location	Corner Tremont and Whittier Street, Roxbury, MA						
BORING NO. B-114	Ground Elev.	Date Start 3/25/97	Date Complete 3/25/97	Drilling Foreman MC	Eng./Hydrol. Geologist		

DEPTH	Sample 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	1'0"-3'0"	5-5-5-5				Dry, medium dense, fine to coarse sand, some fine to coarse gravel, some inorganic silt, cobbles and boulders, brick, wood, glass, coal, etc. Fill.
5	2	4'0"-6'0"	7-12-14-18				
	3	7'0"-9'0"	6-6-9-7				
10						9'0"	End of boring at 9'0" No water encountered upon completion.
15							
20							
25							
30							
35							
40							

Type of Boring Casing Size: Hollow Stem Auger Size: 4-1/4"

Proportion Percentages
Trace 0 to 10%
Some 10 to 40%
And 40 to 50%

Granular Soils (blows per ft.)
0 to 4 Very Loose
4 to 10 Loose
10 to 30 Medium Dense
30 to 50 Dense
Over 50 Very Dense

Cohesive Soils (blows per ft.)
0 to 2 Very Soft
2 to 4 Soft
4 to 8 Medium Stiff
8 to 15 Stiff
15 to 30 Very 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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Geotechnical Drilling and Groundwater Monitor Wells

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

Client: Weston & Sampson Engineers, Inc. Date: 3/27/97 Job No.: 97-0332

Location: Corner Tremont and Whittier Street, Roxbury, MA

BORING NO.: B-115 Ground Elev.: Date Start: 3/26/97 Date Complete: 3/26/97 Drilling Foreman: MC Eng./Hydrol. Geologist:

DEPTH	Sample 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	1'0"-3'0"	1-3-3-5				Dry, loose to medium dense to loose, fine to coarse sand, some fine to coarse gravel, some inorganic silt, cobbles and boulders, brick, wood, coal. Fill.
5	2	4'0"-6'0"	6-7-3-3				
	3	7'0"-9'0"	1-1-7-10			9'0"	End of boring at 9'0" No water encountered upon completion.
10							
15							
20							
25							
30							
35							
40							

Type of Boring: Casing Size: Hollow Stem Auger Size: 4-1/4"

Proportion Percentages
Trace 0 to 10%
Some 10 to 40%
And 40 to 50%

Granular Soils (blows per ft.)
0 to 4 Very Loose
4 to 10 Loose
10 to 30 Medium Dense
30 to 50 Dense
Over 50 Very Dense

Cohesive Soils (blows per ft.)
0 to 2 Very Soft
2 to 4 Soft
4 to 8 Medium Stiff
8 to 15 Stiff
15 to 30 Very 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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SOIL EXPLORATION CORPORATION

Geotechnical Drilling and Groundwater Monitor Wells

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

Client	Weston & Sampson Engineers, Inc.	Date 3/27/97	Job No. 97-0332
Location	Corner Tremont and Whittier Street, Roxbury, MA		

BORING NO.	Ground Elev.	Date Start	Date Complete	Drilling Foreman	Eng./Hydrol. Geologist
B-116		3/26/97	3/26/97	MC	

DEPTH	Sample Data: Sample No.	Sample Depth (ft.)	Blows 6" Penetration	Rec. Inches	Casing Blows Per ft.	Strata Change Depth	Soil and/or bedrock strata descriptions: Visual Identification of Soil and/or Rock Strata
	1	1'0"-3'0"	9-9-13-20				Dry, medium dense, fine to medium sand, trace fine to coarse gravel, trace inorganic silt, cobbles, brick, wood, glass coal. Fill.
						3'0"	
5							End of boring at 3'0"
							No water encountered upon completion.
10							
15							
20							
25							
30							
35							
40							

Type of Boring Casing Size: Hollow Stem Auger Size: 4-1/4"

Proportion Percentages
Trace 0 to 10%
Some 10 to 40%
And 40 to 50%

Granular Soils (blows per ft.)
0 to 4 Very Loose
4 to 10 Loose
10 to 30 Medium Dense
30 to 50 Dense
Over 50 Very Dense

Cohesive Soils (blows per ft.)
0 to 2 Very Soft
2 to 4 Soft
4 to 8 Medium Stiff
8 to 15 Stiff
15 to 30 Very 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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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: Weston & Sampson Engineers, Inc. Date: 3/27/97 Job No. 97-0332

Location: Corner Tremont and Whittier Street, Roxbury, MA

BORING NO: B-117 Ground Elev. Date Start: 3/27/97 Date Complete: 3/27/97 Drilling Foreman: MC Eng./Hydrol. Geologist

DEPTH	Sample Data: Sample No.	Sample Data: Sample Depth (ft.)	Sample Data: Blows 6" Penetration	Sample Data: Rec. Inches	Sample Data: Casing Blows Per ft.	Soil and/or bedrock strata descriptions: Strata Change Depth	Soil and/or bedrock strata descriptions: Visual Identification of Soil and/or Rock Strata
	1	1'0"-3'0"	3-4-79				Dry, medium dense, fine to medium sand, trace fine to coarse gravel, inorganic silt, cobbles, brick, wood, glass. Fill.
5						3'0"	End of boring at 3'0" No water encountered upon completion.
10							
15							
20							
25							
30							
35							
40							

Type of Boring Casing Size: Hollow Stem Auger Size: 4-1/4"

Proportion Percentages
Trace 0 to 10%
Some 10 to 40%
And 40 to 50%

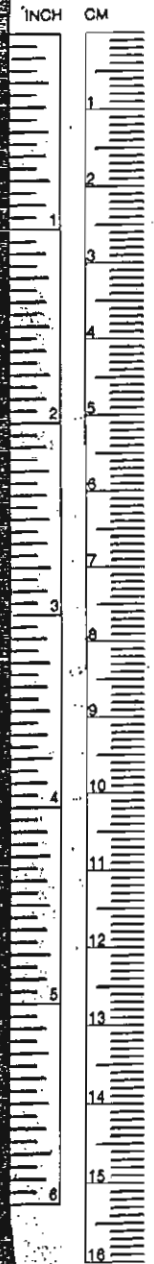
Granular Soils (blows per ft.)
0 to 4 Very Loose
4 to 10 Loose
10 to 30 Medium Dense
30 to 50 Dense
Over 50 Very Dense

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

1452



MEASUREMENT CONVERSIONS

IF YOU KNOW	MULTIPLY BY	TO FIND
LENGTH		
inches	2.540	centimeters
feet	30.480	centimeters
yards	0.914	meters
miles	1.609	kilometers
millimeters	0.039	inches
centimeters	0.393	inches
meters	3.280	feet
meters	1.093	yards
kilometers	0.621	miles
WEIGHT		
ounces	28.350	grams
pounds	0.453	kilograms
grams	0.035	ounces
kilograms	2.204	pounds
VOLUME		
fluid ounces	29.573	milliliters
pints	0.473	liters
quarts	0.948	liters
gallons (U.S.)	3.785	liters
milliliters	0.033	fluid ounces
liters	1.056	quarts
liters	0.264	gallons (U.S.)
TEMPERATURE		

°C = (°F - 32) x .555
°F = (°C x 1.8) + 32

Inches	Decimals of foot	Milli-meters
1/16	.0052	1.5875
1/8	.0104	3.1750
3/16	.0156	4.7625
1/4	.0208	6.3500
5/16	.0260	7.9350
3/8	.0313	9.5250
1/2	.0417	12.700
5/8	.0521	15.875
3/4	.0625	19.050
7/8	.0729	22.225
1"	.0833	25.400
2"	.1667	50.800
3"	.2500	76.200
4"	.3333	101.60
5"	.4167	127.00
6"	.5000	152.40
7"	.5833	177.80
8"	.6667	203.20
9"	.7500	228.60
10"	.8333	254.00
11"	.9167	279.40
1 foot	1.0000	304.80

"Rite in the Rain" ®
ALL-WEATHER WRITING PAPER

Name Weston + Sampson Engineers, Inc.

Address 5 Centennial Drive Peabody, Mass. 01960

Phone (508) 532-1900

Project BRA/EDIC Parcel P-3 96230.A

Book # 1

Andrew D. Wise

Also see BRA/EDIC Book #2 - WSE # 1451

"Rite In the Rain" - a unique all-weather writing surface created to shed water and to enhance the written image. Makes it possible to write sharp, legible field data in any kind of weather.

EDIC/Boston - Paul R. Osborn
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11/26/96 Tuesday 96030.A (0)

CONTENTS		
PAGE	REFERENCE	DATE
	- 7:30 - A. Wise and G. Naples on site. Test pit excavations cancelled because of heavy rain. ADW and GDN tour the site, locate and identify test pit and soil boring locations. Cyn Environmental excavator remains on site overnight.	

11/27/96 Wednesday 96030.A (1)

- 8:10 - Arrive BRA/EDIC Parcel P-3, Whittier and Tremont Streets, Roxbury MA
- A. Wise, Weston & Sampson
- Today's weather, Overcast, low 30's, snow falling. Approx. 1 inch accumulated, may clear partially by mid afternoon, may reach high 30's today.
- Today: Excavate at least seven test pits on Parcel P-3. Describe soil conditions. Collect soil samples for laboratory analyses of
  VOC 8260 TPH GC/FID
  PAH 8100 RCRA 8 metals
- Sign chain-of-custody forms for actual samples submitted.

ADW

11/07/96 96230.A (4)

TP-2 (at B-2)

0-14'
Med. brown, C-F SAND, little F-C gravel, trace concrete boulders + cobbles, trace brick, wood, asphalt pieces

14-18'
Dk. brown, fibrous PEAT and organic silt

Dk. gray discoloration and slight petroleum odor at bottom of sand, top of peat layer 13.5-14.5 ft

Groundwater barely seeping into pit at 18 ft.

Sampled 13.5-14.0 ft
10:00 3.7 ppm
Sample is dry.

ADW

11/07/96 96230.A (5)

TP-3 (at B-3)

0-11'
Med. Brown, C-F SAND, little F-C gravel, trace concrete cobbles + boulders, trace brick, wood asphalt pieces, rubber tires

11-14'
Lt. Brown, C-F SAND, little F-C gravel, little brick, trace cobbles

14-16'
Med brown, C-F SAND, little F-C gravel, trace cobbles

16-19'
Dk. brown, fibrous PEAT and organic silt

Dk. gray discoloration 1/2" into peat, barely discernable. No odor.

Groundwater seeping at 19'

Sampled 15.5-16 ft.
10:40 2.6 ppm
Sample is dry.

ADW

11/27/96 96230.A (2)

- Photoionization detector:
  - Photovac Microtip, model HL-2000
  - Calibrated and tested prior to arrival at site.
- Cyn-Environmental (Cyn-O-I Co.)
  S. Boston, Mass.
  - Mike Coughlin
  - Link-Belt LS-2700 C Series II track-mounted backhoe excavator

ADW

11/27/96 96230.A (3)

TP-1 (at B-4)

0-12'
Med. brown, C-F SAND, little F-C gravel, little boulders and cobbles (consisting mostly of concrete construction debris), trace brick, wood, metal debris, asphalt pieces, rubber tires

12-17'
Dk. brown, flavour PEAT and organic silt

Dk. gray discoloration and slight petroleum odor at bottom of sand and top of peat layer, 11.5-12.5'

Groundwater seeping very slowly into pit @ 16.5 ft.

Sampled 11.5-12.0'
0.9:25 34.0 ppm
Sample is dry.

ADW

11/27/96 96230.A (6)

TP-4 (at B-5)

0 - 11'
Med. brown, C-F SAND, little F-C gravel, trace concrete boulders + cobbles, trace brick, metal wire

11 - 19: Lt to dk. brown, mottled, C-F SAND and cinders, little brick, trace cobbles, trace slag

No discoloration or odor

Pit walls collapsed to 17 ft.
No groundwater observed in pit bottom

Sampled 18.5 - 19.0 ft.
12:10 5.5 ppm.
Sample is wet.

ADW

11/27/96 96230.A (7)

TP-5 (at B-8)

0 - 8
Med. brown, F-F SAND, little F-C gravel, trace concrete cobbles, brick, glass, wood

8 - 11' lt. to med. brown, mottled, C-F SAND and cinders, trace brick

11 - 17.5' Med. brown, C-F SAND, little F-C gravel, little cinders

17.5 - 18'
Blue-green / gray-green CLAY and silt, trace F-C sand

No discoloration or odor
No groundwater observed in pit bottom.

Sampled 17 - 17.5'
12:50 2.0 ppm
Sample is dry.

ADW

TP-6 (at B-9)

See location diagram, p. 35

0 - 7'
med. brown, C-F SAND, little F-C gravel, trace concrete, brick, glass, metal, wood

7 - 9'
Lt to med. brown, C-F SAND, some cinders, some brick

9 - 16'
med. brown, C-F SAND, little F gravel, little cinders, trace wood

16 - 17'
Blue-green/gray-green CLAY and silt, trace F-C sand

No discoloration or odor.
No groundwater observed in pit bottom.
Pit walls collapsed to 14 ft.

Sampled 15.5 - 16 ft.
13:40 1.1 ppm
Sample is moist/wet.

ADW

TP-7 (at B-7)

0 - 8' med. brown, C-F SAND, little F-C gravel, little concrete boulders + cobbles, trace brick, glass

8 - 10' Lt. to med. brown, C-F SAND and cinders, some brick

10 - 14' med. brown, C-F SAND, little F-C gravel, little cinders, trace brick

14 - 18' Med. brown, C-F SAND and F-M gravel (well rounded), little C gravel

No discoloration or odor.
Groundwater seeping into pit bottom at 17.5 ft.

Sampled 17.5 - 18 ft.
14:30 0.5 ppm
Sample is wet.

ADW

11/27/96 96230.A (10)

- 2:30 - Sampling completed.

- Excavator remains to backfill open test pits.

- A. Wise remains to take PID readings, complete notes, label sample jars fill out chain of custody forms and consolidate equipment.

- 3:55 - Samples picked up at site for delivery to Amro Labs, Merrimack, NH.

- 4:00 - Boston police threaten to remove excavator left at site. A. Wise calls Cyn. Cyn says that the trailer is already on the way.

- 4:15 - A. Wise departs.

ADW

12/2/96 Monday 96230.A (11)

- 7:25 Arrive BRA/EDIC Parcel P-3, Whittier and Tremont Sts., Roxbury, Mass.

- A. Wise, C. Hughes, G. Nestas, Weston Sampson

- Today's weather: Overcast, mid 50's, heavy wind-driven rain. Rain expected to subside by approx 10:00 clearing by noon. Temp expected to drop to the mid 40's.

- Today: Begin drilling of geotechnical and environmental soil borings and installation of groundwater monitoring wells.

ADW

12/2/96 96030.A (12)

- A. Wise to oversee our drilling sys, and C. Hughes to oversee the other.

- Photoionization Detector: Photovac Microtip HL-2000, calibrated upon arrival at site.

- Zone - Hobart, Inc. Raynham, Mass. (508) 822-1880
  - Diedrich D-100 truck-mounted drilling sys
  - Ford F-350 support pickup truck
  - Paul Schaefer

- 8:45: Work cancelled for the day because of heavy, wind-driven rains. Depart site. (ADW)

12/3/96 Tuesday 96030.A (13)

- 6:35 - Arrive BRA/EDIC Parcel R-3 Whittier and Tremont Sts. Roxbury, Mass

- A. Wise, C. Hughes, Weston & Sampson

- Today's weather: Clear, sunny, high 30's. Mon readings mid 40's today.

- Today: Begin drilling of geotechnical and environmental soil borings and installation of groundwater monitoring wells.

- A. Wise to oversee our drilling sys, and C. Hughes to oversee the other.

(ADW)

- Photoionization Detector: Photovac Microtip HL-2000, calibrated upon arrival at site

- Zoino - Hebert, Inc.
Raynham, Mass.
(508) 828-1880

- Drilling Crew #1, 7:20
A. Wick, inspector:
- Dave Andersen
- Dave Sylvia
- Diedrich D-120 truck-mounted drilling rig
- Dodge Ram 2500 support pickup truck

- Note: Crew #1 has brought casing only, not augers, and was told to drill the deep holes only.

ADW

7:10
- Drilling Crew #2,
E. Hynes, inspector:
- Paul Sundgren
- Paul Rosinha
- Diedrich D-120 truck-mounted drilling rig
- Ford F-350 support pickup truck

- 9:00 - George Nassar of USE visits site.

- 10:00 - Paul O'Hearn of EDIC visits site, discusses project progress w/ ADW / GDN

- 10:15 - Tony Leonido, ops manager of Zoino-Hebert visits site.

- 11:00 - Michael Kaufman, principal, Kaufman associates visits site. ADW / GDN

A.D.W

WS-1 (at B-1)
4" I.D. Casing

S-1 0-2' 19-15-18-27-23" 0.0 ppm
Dry, dk. brown, F-M SAND and silt, trace F-M gravel, trace brick, trace asphalt
— GRANULAR FILL —

S-2 3.5-5.5' 13-20-24-22 6" 0.0 ppm
(Drive and wash from S-2 on. All samples will be wet.)
Brown, F-C SAND and silt, little F-C gravel, little clay

S-3 8.5-10.5' 25-92-6-3 6" 1.4 ppm
Brown, F-C SAND and silt, little F-M gravel, trace clay

12.0'

S-4 13.5-15.5' 10-6-3-3 9" 0.0 ppm
Dk. br. organic SILT and fibrous peat
— ORGANIC DEPOSITS —

ADW

WS-1

S-5 18.5-20.5 8-6-6-7 14" 0.0 ppm
Dk. brown, organic SILT and fibrous peat

21.0'

S-6 23.5-25.5 43-40-37-28 11" 0.0 ppm
Lt. brown to red-brown, C-F SAND, little F-C gravel
— GLACIAL OUTWASH —

S-7 28-30' 26-25-16-19 2" 0.0 ppm
Brown, C-F SAND, some F-C gravel

S-8 33-35' 30-20-16-14 6" 0.0 ppm
Brown, C-F SAND, little F-C gravel

ADW

12/3/96 96230.A (18)

WS-1

S-9 38-40' 18-18-24-19 2" 0.0 ppm
Sample consists of F-M GRAVEL
wash, probably not representative
of actual deposits at this depth

S-10 43-45' 20-27-26-26 8" 0.0 ppm
Brown, C-F SAND, little
F-M gravel

S-11 48-50' 24-27-33-37 10" 0.0 ppm
Brown, C-F SAND, trace
F-M gravel

S-12 53-55' 57-49-47-38 2" 0.0 ppm
Brown, C-F SAND and
C-F gravel

S-13 58-60' 21-32-52-43 12" 0.0 ppm
Brown, C-F SAND, trace
F-C gravel

ADW

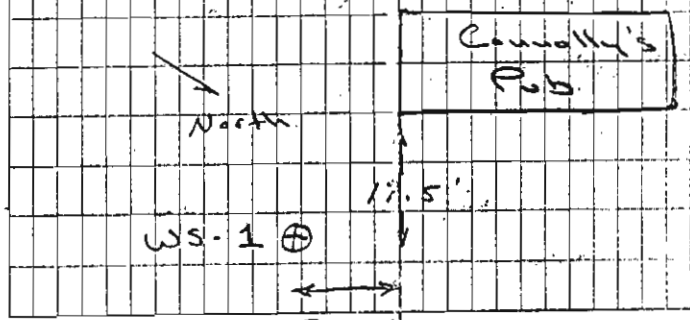
12/3/96 96230.A (19)

WS-1

Well Construction Details

B.O.E.	60'
Native Fill	60 - 21
Bentonite	21 - 18
Sand	18 - 5
Screen	17 - 7
Bentonite	5 - 3
Native Fill	3 - 1
Concrete	1 - 0

Flush-mounted aluminum
roadbox, 1½" x 6" HD
pentagon bolt



ADW

- Driller D. Andersen reports that a Boston police officer, apparently an owner of Connolly's pub (same officer in unmarked blue van that spoke with ADW on 11/27/96), angrily demanded that the support truck be moved so that cars could enter his parking lot. Cars had been entering and leaving the lot without problem all day, however.

- 1:00 - Small wheel-mounted front-end loader (hired locally by Zolno-Hebert) arrives on site to build a ramp leading up onto the filled area of B-2, 3, 4.

- Drilling rig #1 moved up ramp onto fill area near B-3

(ADW)

+ 2:05 - Drillers depart site. ADW and CEH remain to take PID readings and prepare sample containers for laboratory analyses.

- 3:00 - C. Hughes departs site

- 4:00 - A. Wise departs site after completion of C-O-C forms and call to GDN at WSE

- No lunch break today.

(ADW)

12/4/96 Wednesday 96230.A (22)

- 6:45 a.m. Arrive BRA/EDIC Parcel P-3, Whittier and Tremont Sts., Roxbury, Mass.

- A. Wise, C. Hughes, - 7:00 Weston & Sampson

- Today's weather: Mostly clear sunny, some clouds, low 30's. May reach mid 40's today. Clouding and light rain/drizzle expected.

- Today: Continue drilling of geotechnical and environmental soil borings and installation of groundwater monitoring wells.

- A. Wise to oversee one drilling rig, and C. Hughes to oversee the other.

(ASW)

12/4/96 96230.A (23)

- Photoionization Detector: Photovac Microtip HC-2000 calibrated upon arrival on site

- Nova-Hebert, Inc., Raynham, Mass. (508) 823-1850

- Drilling Crew #1, A. Wise, inspector:
  - Same personnel and equipment on site as yesterday (see p. 14)

- Drilling Crew #2, C. Hughes, inspector:
  - Same personnel and equipment on site as yesterday (see p. 15).

- Work: Both drilling crews arrived on site at 6:30.

(DW)

- Water Levels

WS-1

below PVC 7.86

below ground 8.61

WS-2

below PVC 11.53

below ground 11.67

WS-3 and WS-4

see Field book # 2,
C. Hughes, 12/3/96

- 9:45 - Call to G. Nadas and M. Khiralla at WSE:

1) GDN will continue attempts at contacting Boston Edison re location of B-12. Do not drill B-12 until OK from GDN

2) Bentonite the top 5 feet of the post in borings

(ADW)

B-1 and B-2 (locations B-3 and B-5 at the site plan respectively)

Example B-1:

Native Fill 60-24'

Bentonite 24-19'

Native Fill 19-0'

3) Drill B-1 and B-2 to depths of 60 ft BGS only. Do not drill deeper. The B-1 and B-2 B.O.H will be the equivalent elevation of 50 BGS in boring WS-1. (Ground surface elevations are approx. 8 ft higher at B-1 and B-2 than WS-1)

4) Take undisturbed tubes in the peat at B-2:

1) 20-22'

2) 25-27' (if possible)

(ADW)

12/4/96 96230.A (26)

Photographs

Exposure	Direction
1	West
Completed well WS-1, Whittier St. side of pub	
2	South
Completed well WS-2, Whittier St. Health Center	
3	North
Completed well WS-3	
4	East
Completed well WS-4	
5	→
Accidental Shot	
6	North
Completed well WS-5	

ADW

12/4/96 96230.A (27)

Exposure	Direction
7	North
Completed well WS-6	
8	NE
WSE truck, drilling rig at WS-7, boom of rig at B-1 in background	
9	NW
Drilling rig, drilling and well construction at WS-7	
10	SW
Completed well WS-7 and WSE truck	
11	North
Ruts and muck on approach to B-4 location	

ADW

12/4/96 96230.A (38)

Exposure	Direction
12	West
Both drilling rigs parked near B-8 location at end of work day	
13 (12/5)	East
Completed well WS-9	
14	SW
Completed well WS-8, Drilling rig # 2 at WS-10	
15	West
Rig, truck and crew # 1, drilling operations at B-2	
16	South
Two completed tubes from B-2	
17	NE
Completed well WS-10, WS-8 and Rig # 1 in background	

ADW

12/4/96 96230.A (39)

Exposure	Direction
18	SW
Drilling operations at WS-11	
19	East
Drilling rig # 2 at WS-12	
20	North
Completed well WS-12	
21	SE
Completed well WS-11	
22	West
The "mud pit" after completion of well installation	
23	NW
The "mud pit", shot # 2	
24	
The "mud pit", shot # 3	

ADW

12/4/96 96230.A (30)

B-1 (at B-3, TP-3)

4" I.D. Casing to 19.0 ft.

Note: 11/07 test pit TP-3 B.O.E. at 19.0 ft. B.G.S. Begin sampling B-1 at 19.0 ft. B.G.S.

S-1 19-21' 2-2-3-3 24" 1.6 ppm
Moist, dk. brown, fibrous PEAT and organic silt
— ORGANIC DEPOSITS —

3" I.D. Casing telescoped at 23 ft.

S-2 24-26' 3-3-2-3 24" 2.6 ppm
Moist, dk. brown, organic SILT and fibrous PEAT

— 27.2' —
(measured by driller)

S-3 29-31' 23-16-16-17 8" 2.3 ppm
Wet, dk. gray, F-C SAND, little f-m gravel
— GLACIAL OUTWASH —

(TDW)

12/4/96 96230.A (31)

B-1

S-4 34-36' 32-26-29-20 6" 2.7 ppm
Wet, brown, C-F SAND, little C-F gravel with cobbles

S-5 39-41' 33-39-24-50 8" 1.0 ppm
Wet, brown, C-F SAND, trace F-M gravel

S-6 44-46' 30-24-30-22-10" 1.9 ppm
Wet, brown, C-F SAND, little F-M gravel

S-7 49-51' 39-58-40-29 5" 1.7 ppm
Wet, brown C-F GRAVEL, some C-F sand, with cobbles

S-8 54-56' 21-23-28-18 8" 1.2 ppm
Wet, brown, C-F SAND, little C-F gravel

(ADW)

12/4/96 96230.A (32)

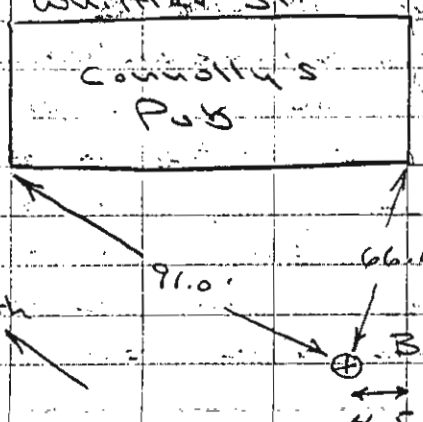
B-1

S-9 59-61' 65-48-21-22 4" 1.4 ppm
Wet brown, c-F GRAVEL
and c-F SAND

B.O.E. = 61.0 ft.
No well installed.

Backfill details

Native Fill	61 - 24'
Bentonite	24 - 19
Native Fill	19 - 0



AZW

12/4/96 96030.A (33)

- 10:45 - Bud Knox of Boston Edison Co. visits site, checks location of B-12 with ADW. Will page ADW or will mark B-12 location as "E OK" if we can drill.

- Rig #2 got stuck in mud on approach to B-5 location. Could not access B-5. Moved to B-8 location, drilled with CFH.

- Rig #1 got stuck in mud on approach to B-6 location. Could not access B-6. Attempted to move back to B-2 location. Got stuck again. Attempts to extricate rig from mud using 4x4 pickup truck were mostly unsuccessful. Rig eventually pulled

ADW

12/4/96 96230.A (34)

- Tony Leonido of Z-H also on site.
out of B-4 and past B-2 location after approx. 1 hours.

- Locations remaining to be drilled:
B-2-4-5-7-12

- 2:00 - Rig # 1 crew departs.
- 2:15 - Rig # 2 crew departs. ADW and CEH remain to take PID readings and prepare sample containers for laboratory analyses.

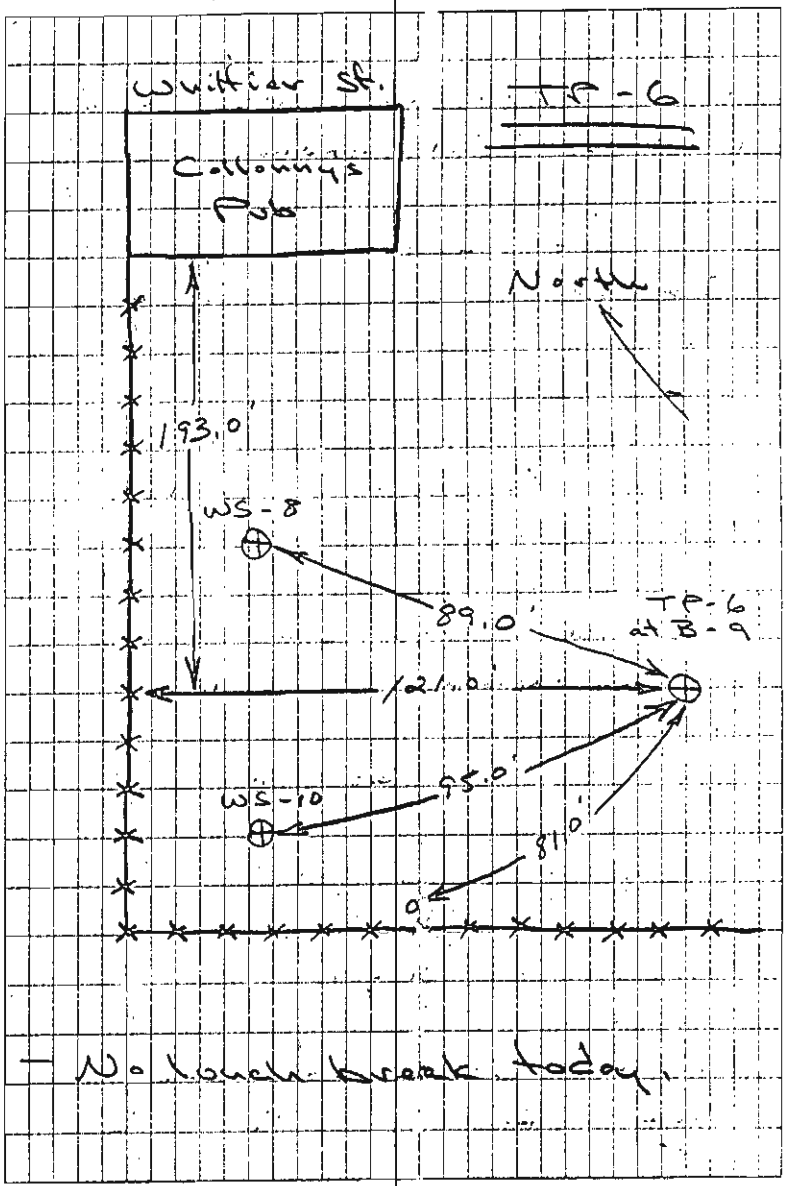
- 2:45 - C. Hughes departs site.

- B-12 location has been marked "E OK" by Boston Edison Co.

- 3:55 - A. Wise departs site after completion of C-O-C form and call to GDN at WSE.

(ADW)

12/4/96 96230.A (35)



- No lunch break today.

(ADW)

- 6:45 - Arrive BRA/EDIC Parcel P-3, Roxbury, Mass.

- A. Wise, C. Hughes, Weston + Sampson ~7:00

- Today's weather: Mostly cloudy, partly clear, high 30's. May reach low 40's today.

- Today: Continue drilling of geotechnical and environmental soil borings and installation of groundwater monitoring wells.

- A. Wise to oversee one drilling rig, and C. Hughes to oversee the other.

- Photoionization Detector: Photovac Microtip HL-2000, recharged, calibrated and tested prior to arrival at site.

- Zollo - Hebert, Inc. Raynham, Mass. (508) 828-1880

- Drilling Crew # 1
A. Wise, inspector:
  - Same personnel and equipment on site as previously (see p. 14).

- Drilling Crew # 2,
C. Hughes, inspector:
  - Same personnel and equipment on site as previously (see p. 15).

- Note: Both drilling crews arrived on site ~ 6:30.

- 7:05 - Call / message to O. Naslas at WSE:
Drilling rig #1 cannot get to the B-4 locations this morning. The ground did not freeze overnight. The ground is still as soft and muddy as it was yesterday, when three attempts were made to access the B-4 location. This leaves 2 alternatives:
1) Wait until the ground freezes, to allow access by a truck-mounted drilling rig.
2) Bring a track-mounted rig to the site (today or tomorrow?) to drill this final borehole.

ADW

- Problem: Z-H has run out of padlocks for the wells. All locks so far have been keyed differently. Four wells remain. Locks needed

- 11:30 - All wheel driven drilling rig arrives from Rainier Hubert, also with Matt Sullivan, Z-H supervisor.
- Drilling crew #1:
  - Art Hohnson Sr.
  - Art (Barney) Hohnson III
  - CME 55 truck-mounted (AWJ) drilling rig
  - Ford F-250 support pickup
- 12:10 - Boston Gas Co. representative visits site. OK's drilling at all boreholes

- 12:25 - Courier pickup delivered with Ammo at WSE Peabody, 12/6, 10:00

ADW

B-2 (at B-2, TP-2)

4" Casing to 19', washed to 20'

T-1 20-22' undisturbed tube ("Gus tube") in PEAT and organic silt
penetration: 24"
recovery: 9"

Borehole washed to 25'

T-2 25-27' undisturbed tube in PEAT and organic silt
penetration: 25"
recovery: 16½"
Bottom of tube T-2 was slightly damaged upon removal from borehole, indicating sand and gravel at approx. 26.5 to 27.0 ft.

ADW

B-2

PEAT and organic silt
26.5 ft.
C-F SAND with gravel
+ GLACIAL OUTWASH -

S-1 29-31' 8-24-20-19 4" 0.4 ppm
Wet, dk. brn., C-F SAND, some F-M gravel, trace silt

S-2 34-36' 12-24-19-20 7" 0.8 ppm
wet, brown, C-F SAND, little F gravel

S-3 39-41' 40-38-45-50 10" 0.8 ppm
Wet, brown, C-F SAND, little F-M gravel

S-4 44-46' 35-30-20-30 9" 0.9 ppm
Wet, brown, C-F SAND, little F-M gravel

ADW

12/5/96 96230.A (42)

B-2

S-5 49-49.1' 100/1" 0.8 ppm
Sample consists of F-M GRAVEL-sized cobble or boulder fragments and pieces

S-6 54-56' 50-65-72-70 8" 0.9 ppm
Wet, brown, C-F SAND, little F-M gravel

S-7 59-61' 61-72-87-77 10" 1.0 ppm
Wet, brown, C-F SAND, some F-M gravel

B.O.E. = 61.0 ft.
No well installed

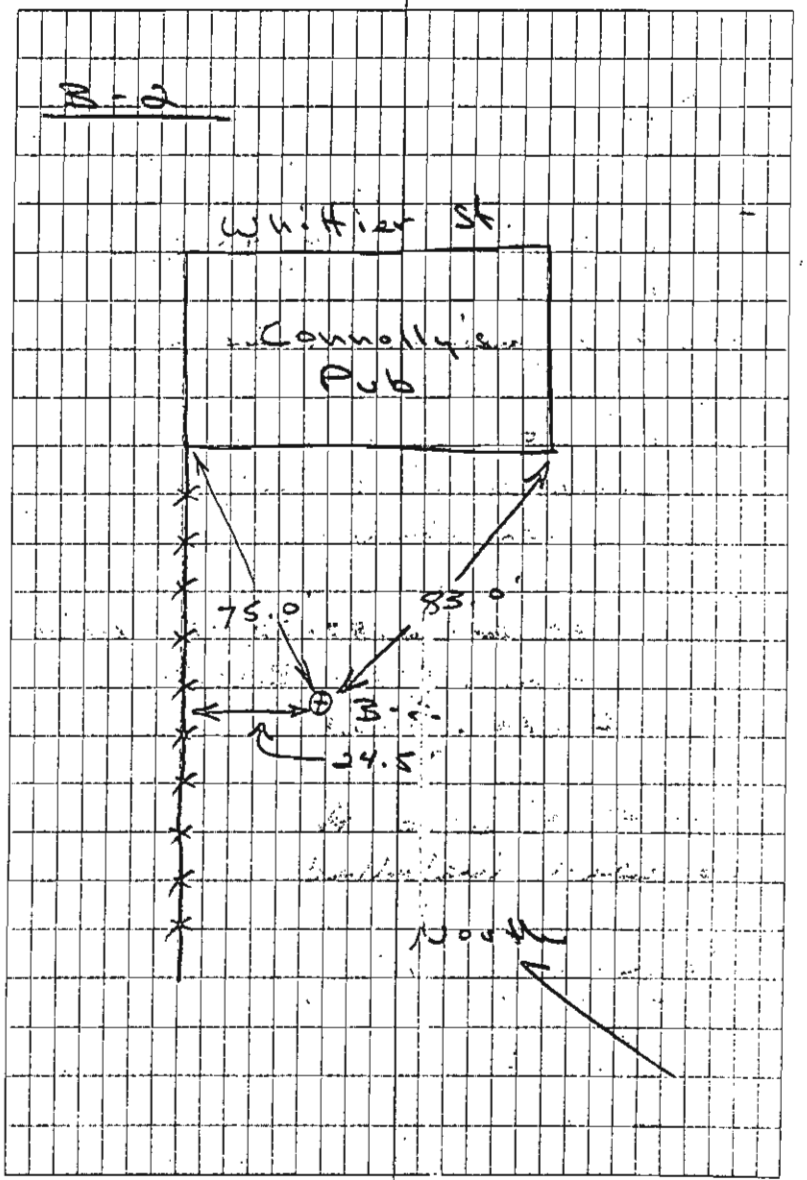
Backfill details

Native Fill	61-23'
Bentonite	23-18
Native Fill	18-0

ADW

12/5/96 96230.A (43)

B-2



ADW

12/5/96 96230.A (44)

WS-12

Drilling Crew and Rig #3
4" I.D. HSA to 120 ft.

S-1 17-19' WOH-1-1-1 24"
Moist, dk. brown, fibrous
PEAT and organic silt
- ORGANIC DEPOSITS -

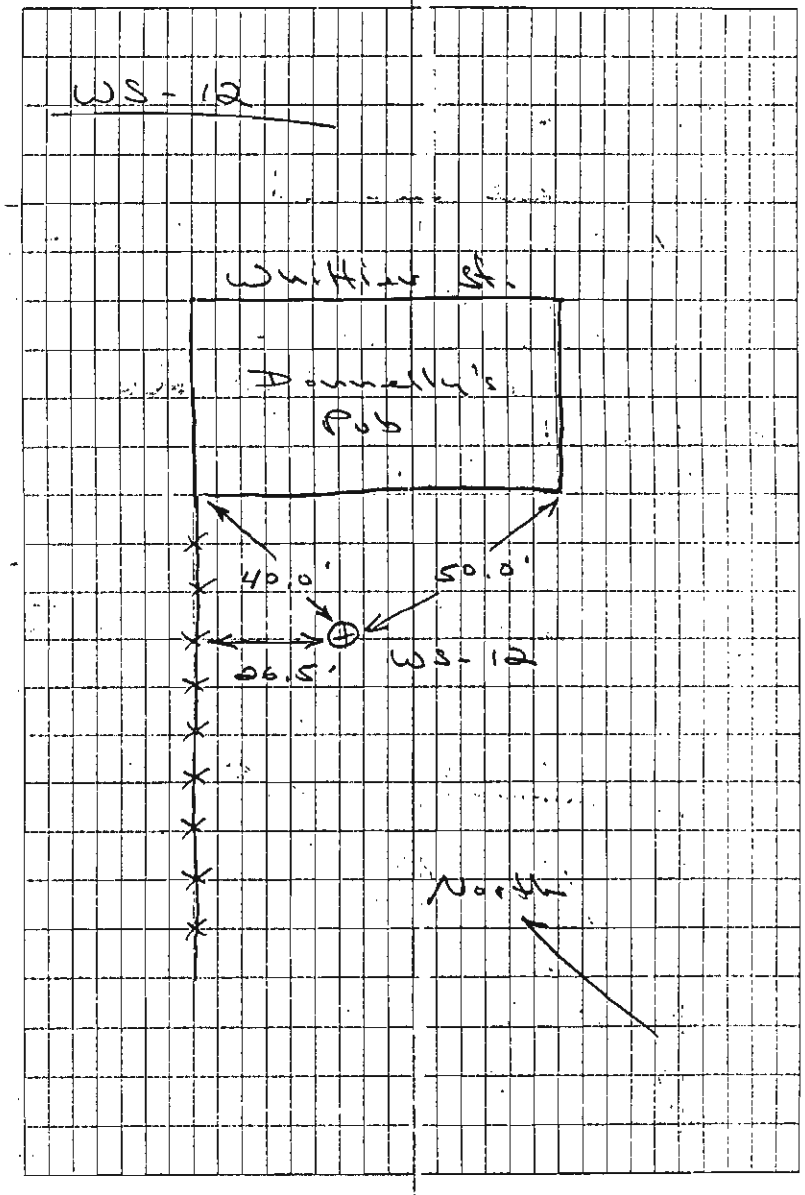
Groundwater observed on
drilling rods at 11.5 ft. B.G.S.

Well Construction Details

B.O.E	19'
Sand	19 - 6
Screen	18 - 8
Bentonite	6 - 4
Native Fill	4 - 1
Concrete	1 - 0

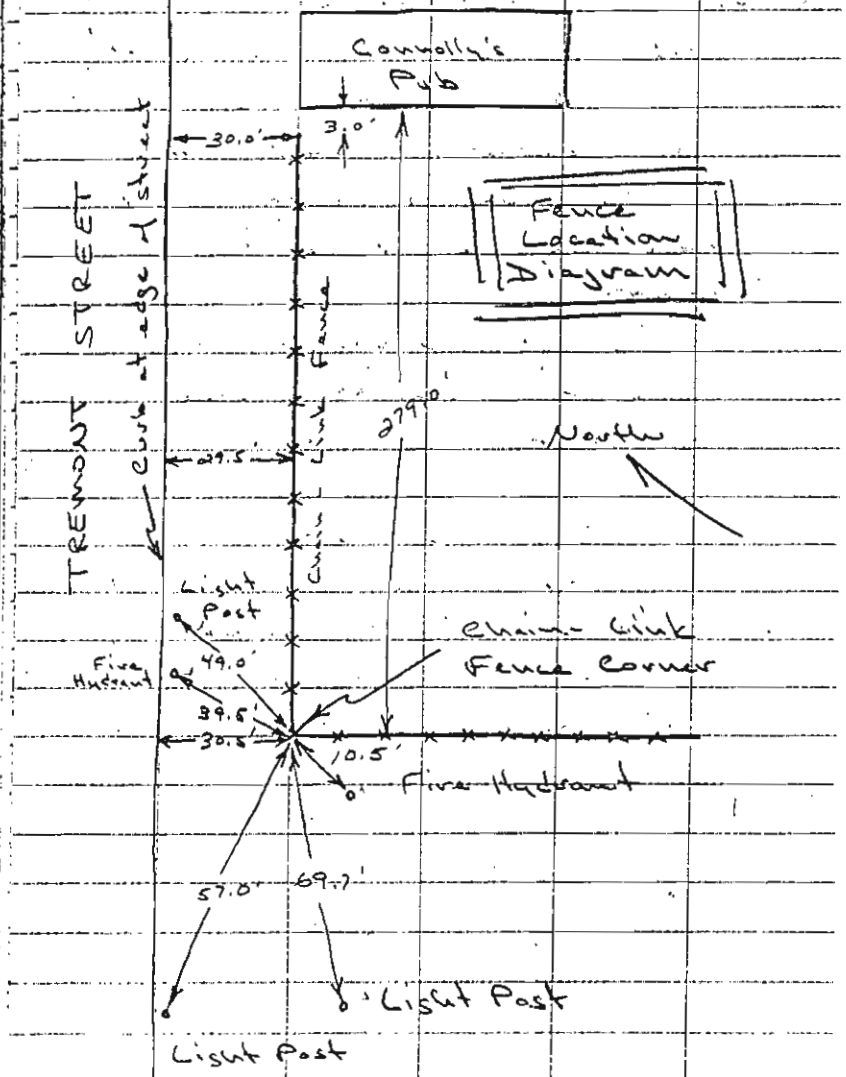
ADW

12/5/96 96230.A (45)



ADW

12/5/96 96230.A (46)



ADW

12/5/96 96230.A (47)

- 12:50 - Bob Donnelly & WSE visits site. Delivers new padlocks from WSE with matching keys. Locks installed at 11 of 12 wells. Well US. 2 could not accept a locking expander cap or flushmount PVC riser because the riser top is cut at a high angle.

- See BRADFORD field book for final water level and total depth readings both below top of PVC and below ground surface.

- 2:30 - All well installations and site cleanup completed. Drilling crews #1 and 3 depart site. Drilling crew #2 had departed approx. 1 hour earlier.

ADW

- ADW and CEH remain to take PID readings, prepare sample containers for laboratory analyses and take measurements of chain-link-fence locations.

- 2:40 - C. Hughes departs site. A. Wise remains to complete photographs and photograph log, complete notes, repack equipment, complete c-o-c form and draw location diagrams of WS-12 and fence.

- 4:00 - A. Wise departs site after call to GDN at WSE.

ADW

- 7:50 - Arrive BRA/EDIC Parcel P-3, Whittier and Tremont Sts., Roxbury, Mass.

- A. Wise, Weston + Sampson

- Today's weather: Overcast, very windy, low 40's. Light rain has begun. Rain expected to continue. May reach mid 40's today.

- Today: Develop all 12 newly-installed groundwater monitoring wells by removing 3 to 5 times the well bore volumes of groundwater. Wells will be ready for sampling by next Thursday, 12/12/96.

- 12:00 - Development completed. A. Wise departs site.

ADW

12/6/96 96230.A (50)

WS-1

Total Depth	16.53
Depth H_2O	- 7.63
	8.90
	x .17
	1.51
	x 5
Bailed dry at 4.5 gal.	7.57 gal

WS-2

Total Depth	16.45
Depth H_2O	- 7.75
	8.70
	x .17
	1.48
	x 5
Bailed dry at 6.0 gal.	7.40 gal

ADW

12/6/96 96230.A (51)

WS-3

Total Depth	16.36
Depth H_2O	- 8.43
	7.93
	x .17
	1.35
	x 5
Bailed 6.0 gal	6.74 gal

WS-4

Total Depth	17.05
Depth H_2O	- 8.88
	8.37
	x .17
	1.42
	x 5
Bailed 6.0 gal	7.11 gal

ADW

12/6/96 96230.A (52)

WS-5

Total Depth	16.95
Depth H_2O	− 14.17
	2.78
	× .17
	0.47
	× 5
Bailed 4.0 gal.	2.63 gal

WS-6

Total Depth	18.89
Depth H_2O	− 12.55
	6.34
	× .17
	1.08
	× 5
Bailed 6.0 gal	5.39 gal

ADW

12/6/96 96230.A (53)

WS-7

Total Depth	19.20
Depth H_2O	− 13.58
	5.62
	× .17
	0.96
	× 5
Bailed 6.0 gal	4.78 gal

WS-8

Total Depth	24.77
Depth H_2O	− 16.68
	8.09
	× .17
	1.38
	× 5
Bailed 6.0 gal.	6.88 gal

ADW

12/6/96 96230.A (54)

WS-9

Total Depth 24.35
Depth H_2O 16.75
7.60
× .17
1.29
× 5
Bailed 6.0 gal. 6.46 gal

WS-10

Total Depth 22.77
Depth H_2O 17.38
5.39
× .17
0.92
× 5
Bailed 6.0 gal. 5.92 gal

ADW

12/6/96 96230.A (55)

WS-11

Total Depth 21.51
Depth H_2O 19.18
2.33
× .17
040
× 5
Bailed 12.5 gal. 1.98 gal

WS-12

Total Depth 20.15
Depth H_2O 12.72
7.43
× .17
1.26
× 5
Bailed 6.0 gal. 6.32 gal

ADW

12/10/96 Tuesday 96030.A (56)

- 1:25 - Arrive BRA/EDIC Parcel P-3, Whittier and Tremont Sts., Roxbury, Mass.

- A. Wise, C. Hughes, Weston + Sampson

- Today's weather: Mostly clear, sunny, windy, low 40's.

- Today: Begin elevation survey of all newly-installed groundwater monitoring wells. Survey:
  - top of casing
  - top of PVC
  - ground surface

of all 12 wells.

ADW

12/10/96 96230.A (57)

- Survey begins on page 58.

ADW

12/10/96 96230.A (58)

BS	HI	MH	Elev.
4.74	104.74		100.00
		2.23	102.51
		2.75	101.99
		3.76	100.98
		1.64	103.10
		1.79	102.95
		4.04	100.70
		5.29	99.45
		5.39	99.35
		7.85	96.89
		11.32	93.42
		12.25	92.49
		1.87	102.87
		2.04	102.70
		4.22	100.52
		4.74	100.00

ADW

12/10/96 96230.A (59)

Top of Fire Hydrant on Vernon St. West Tremont St (Not the hydrant on Tremont)

WS-10 Casing
PVC
Ground
WS-8 Casing
PVC
Ground
WS-12 Casing
PVC
Ground
WS-1 Ground
PVC
WS-9 Casing
PVC
Ground
Top of Fire Hydrant

ADW

12/10/96 96230.A (60)

BS	HI	MH	Elev
3.75	97.17		93.42
		4.71	92.46
		4.85	92.32
		3.75	93.42

12/12/96

100.00

- Survey attempt aborted for today. Difficulty identifying numbers on survey rod during low shots in the rain. Also height problem with survey level. Level must be raised at first setup to sight above WS-11 easily. Will attempt survey again at a later date.

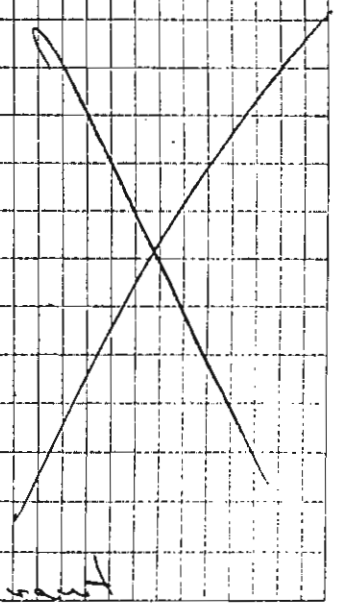
ADW

12/10/96 96230.A (61)

WS-1 Ground
WS-2 Ground
WS-2 PVC
WS-1 Ground

12/12/96 See p. 75

Top of Pine. Hydrant
WS-11 Casing
PVC
Ground
WS-7 Casing
PVC
Ground
WS-6 Casing
PVC
Ground
WS-5 Casing
PVC
Ground
Top of Pine. Hydrant



ADW

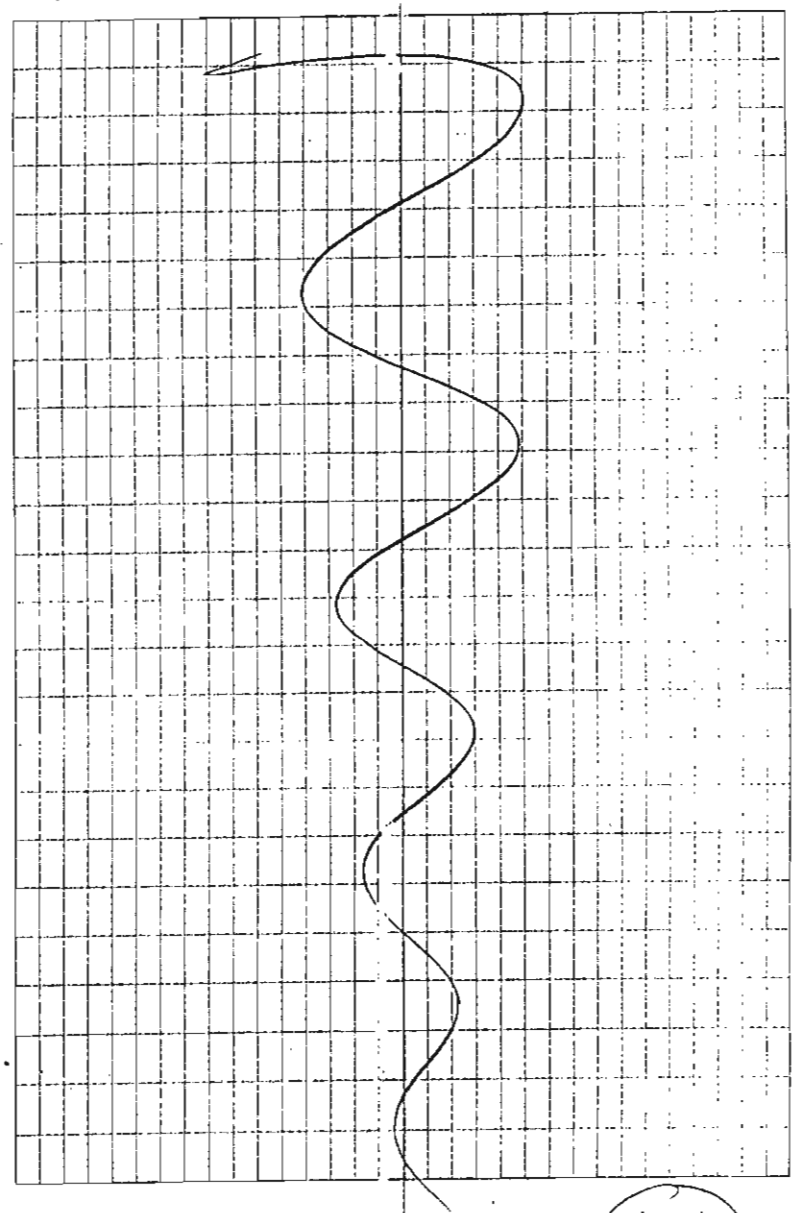
12/12/96 96230.A (68)

- Groundwater sampling by A. Wise, C. Hughes.
  - 12 wells plus 1 duplicate

- 2:05 - A. Wise and C. Hughes depart site.

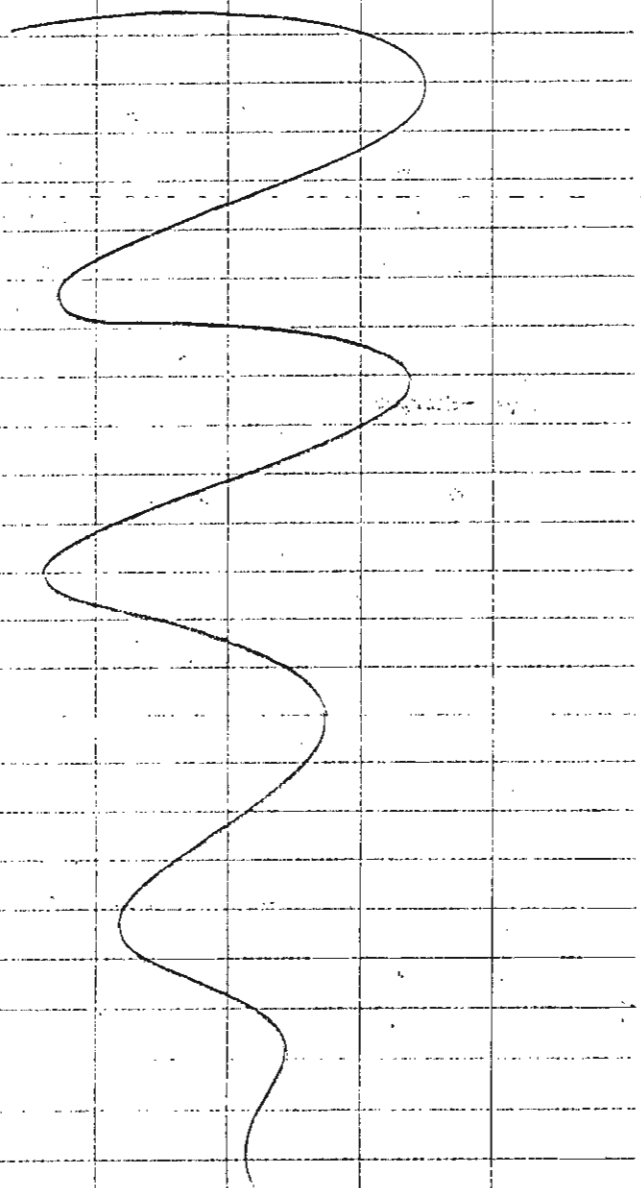
ADW

12/12/96 96230.A (23)



ADW

12/12/96 96230.A (64)



96230.A (65)

12.12.96

- C HUGHES Arrives on site to meet ADW, (already on site) to perform groundwater monitoring on wells WS-1, WS-2, WS-3, WS-4, WS-5, WS-6, WS-7, WS-8, WS-9, WS-10, WS-11 and WS-10 to be analyzed for VOC 8260, TPH GCFID, PAH ~~Mod~~ 8100 and metals RCRA 8, PAH and RCRA 8 to be field filtered.
- Todays Weather: Rain

Well #	DTW	Well #	DTW
WS-1	7.50	WS-7	15.07
WS-2	7.59	WS-8	16.65
WS-3	8.00	WS-9	16.68
WS-4	8.53	WS-10	16.93
WS-5	13.70	WS-11	18.66
WS-6	12.05	WS-12	12.66

12.12.96

WS-1

Temp	11.0 °C	TD	16.54
pH	6.7	DTW	7.50
SC	940 µS		9.04
DO	3.6 mg/L		0.17
time	9:15		1.54
			5
			7.69 gal

Bailed dry @ 4.5

WS-2

temp	13.0 °C	TD	16.86
pH	6.9	DTW	7.59
SC	1200 µS		9.27
DO	4.2 mg/L		0.17
Time	9:25		1.58
			5
Dry @ 6.5 gal			7.88 gal

12.12.96

WS-3

Temp	10.5 °C	TD	16.60
pH	7.0	DTW	8.20
SC	670 µS		8.4
DO	2.7 mg/L		0.17
Time	11:45		1.4
			5
			7.1 gal

WS-4

TEMP	9.9°	TD	17.25
pH	6.6	DTW	8.53
SC	624 µS/cm		8.72
DO	8.2 mg/L		0.17
TIME	11:55		1.48
			5
			7.41 gal

96230.A (69)

12.12.96

WS-5

Temp 13.5 °C
PH 6.6
SC 1050 uS
DO 2.4 mg/L
TIME 12:25

TD 16.95
DTW 13.70
3.25
0.17
0.5
5
2.7 gal

WS-6

TEMP 13.5 °C
PH 6.8
SC 220 uS
DO 4.4 mg/L
TIME: 12:35

TD 18.89
DTW 12.05
6.84
0.0
1.7
5
8.8 gal

12.12.96

WS-7

TEMP 12.2°
PH 6.5
SC 9.29 mS/cm
DO 4.4 mg/L
TIME: 13:05

TD 19.20
DTW 13.07
6.13
0.10
1.0
5
5.2 gal

WS-8

TEMP 12.3°C
PH 6.6
SC 1520 uS/cm
DO 2.0 mg/L
TIME 10:40

TD 25.30
DTW 16.65
8.65
0.17
1.4
7.39

12.12.96

WS-9

TEMP 11.5°C
PH 6.6
SC 1240 uS
DO 1.4 mg/L
TIME 10:40

TD 24.35
DTW 16.69
7.66
0.17
1.30
5
6.51 gal

WS-10

TEMP 12.2°C
PH 7.3
SC 478 uS/cm
DO 3.6 mg/L
TIME 11:15

TD 22.27
DTW 16.93
5.34
0.17
0.9
5
4.9 gal

12.12.96

WS-11

TEMP 13.2°C
PH 6.4
SC 0970 uS/cm
DO 1.7 mg/L
TIME 13:25

TD 21.51
DTW 18.66
2.85
0.17
0.4
5
2.4 gal

WS-12

TEMP 10.8°C
PH 6.7
SC 1670
DO 2.7 mg/L
TIME 9.50

TD 20.15
DTW 12.66
7.49
0.3
1.2
5
6.3 gal

* Dup to be taken here
Sampled @ 10:00

1/2/97 Thursday 96030.A (70)

- 9:30 - Arrive BRA/EDIC Parcel P-3, Tremont St., Roxbury, Mass.

- A. Wise, M. Edwards, Weston & Sampson

- Today's weather: Overcast, low 30's, no wind. Light snow / drizzle earlier, but partial clearing expected.

- Today: Continue and complete groundwater monitoring well survey, originally begun on 12/10/96. Six of twelve wells remain to be surveyed.

- 11:55. Survey completed. WSE personnel depart site.

ADW

1/2/97 96030.A (73)

- Survey begins on p. 74

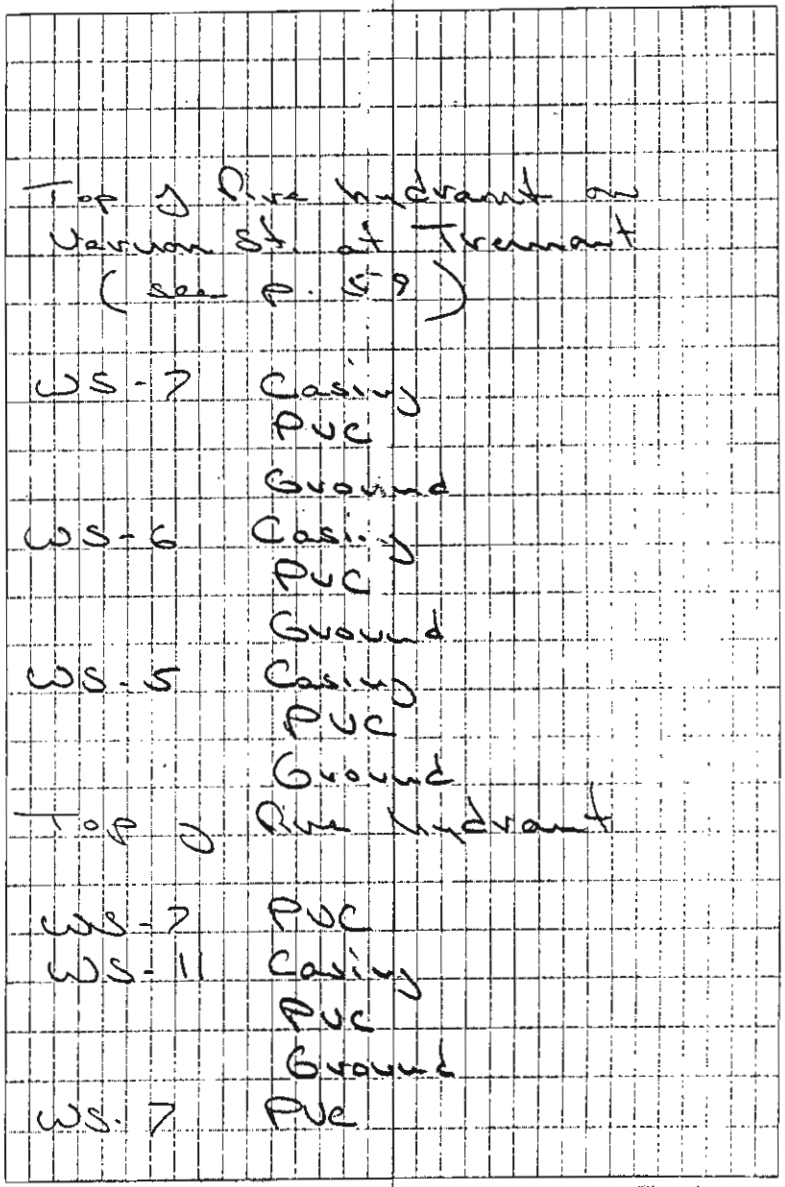
ADW

1/2/97 96230. A (74)

BS	HI	MH	Elev.
3.86	103.86		100.00
		5.66	98.20
		5.74	98.12
		7.52	96.34
		6.60	97.26
		6.83	97.03
		8.70	95.16
		5.43	98.43
		5.59	98.27
		7.47	96.39
		3.87	99.99
8.64	106.76		98.12
		2.71	104.05
		2.88	103.88
		4.86	101.90
		8.64	98.12

ADW

1/2/97 96230. A (75)



ADW

1/2/97 (76)

BS	HI	MH	Elev
3.09	101.36		98.27
		7.21	94.15
		7.30	94.06
		9.36	92.00
		6.97	94.39
		7.48	93.88
		8.75	92.61
		3.09	98.27

ADW

1/2/97 96230.A (77)

33-5	PVC
33-4	Casing
	PVC
	Ground
33-3	Casing
	PVC
	Ground
33-5	PVC

ADW

CONTENTS

PAGE	REFERENCE	DATE
	SECOND	
	NOTEBOOK -	

12.2.96

BRA/EDIC

7.30 Arrive at Site
Met A Wise G. Naslao
For Briefing Drillers
arrive on Site Zoino-Hebert
Raynham MA - Drillers -

Todays weather - Heavy Rain
Wind 50's
Today - Begin drilling of
Geotechnical and environmental
Soil Borings and installation
of Groundwater Monitoring
Wells.

9.30 - Depart Site due to
drillers not equipped w/
proper equipment.
Will Resume Drilling activities
on 12.3.96.

C. HUGHES

12.3.96 Arrives on site @ 7:00 to oversee Drilling operations Zaino-Hebert of Raynham Paul Schaefer, Paul Rosinha

SDD Drillers Setting up Rig Diedrich-D-120 mounted on a Ford F Series pickup

WS-2 Asphalt 1-3" concrete

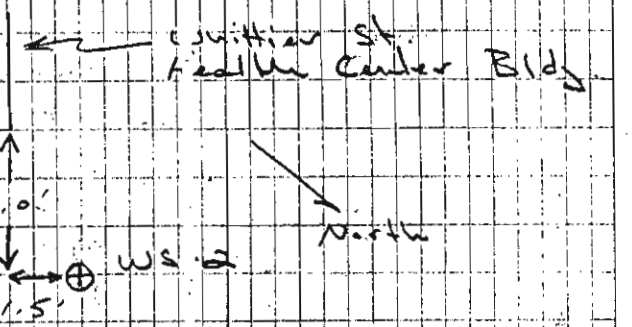
S-1 1-3' 10-7-5-3 13"Rec PID 0.0
Dry DK Br. F-M SAND and Silt, trace F-C Gravel trace asphalt
— Granular Fill —

S-2 5-7 5-7-11-12 15"Rec. PID 0.0
Dry DK Br F-M Sand and Silt trace F Gravel

S-3 10-12' 1-3-2-4 20"Rec. PID 0.0
WET DK Br F Sand and Silt
11' organic PEAT Begins
Slight Petroleum odor
Dk. brown, fibrous PEAT and organic silt

WS-2 15-17' 1-1-2-2 24"Rec (PID 0.0)
S4 — Wet DK Br organic Silt and Peat

B.O.E. = 17.0'



WS-2 Located at B-6

WELL Construction Details

BOE: 17.0'
Screen: 17'-7'
Sand: 17'-5'
Bentonite: 5'-3'
Native Fill: 3'-0'
Concrete: 1'-0'

Flush Mounted Road Box
10 1/4" x 10" Aluminum Pentagon Bolt

10-3-7-

10:10 entrance in off of Vernon St through School Parking lot.

WS-3 Located at B-11

Formally B-11-

S-1 0-2' 7-7-10-19 9" Rec. PID 0.0
Wet Lt MED BR-GY FCSAND trace Silt
Trace F gravel Trace Brick
Granular Fill

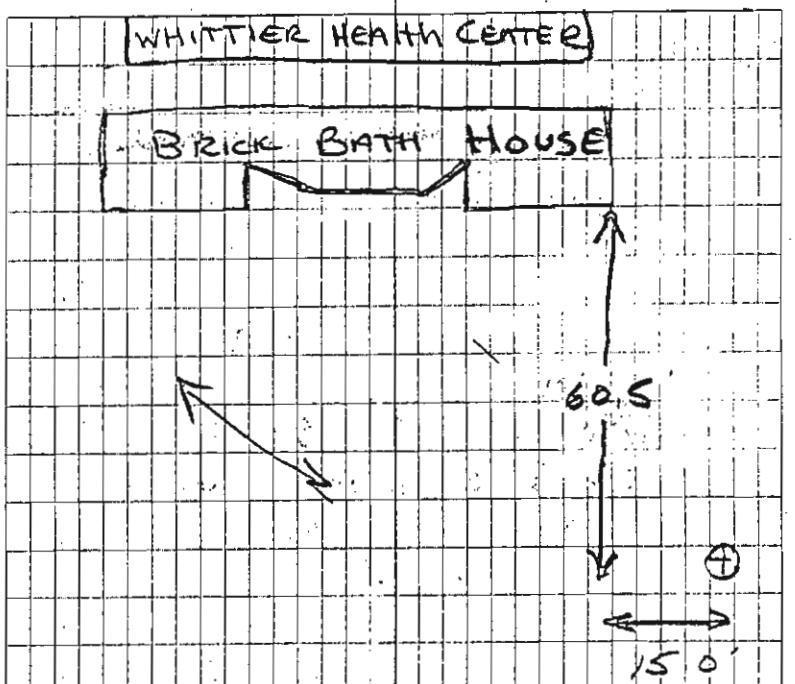
S-2 5-6' 13-58 5" Rec
* Hit refusal @ 5' Augering through
Construction concrete @ 6-7.5'
- No Sample Retrieved -
Hit water @ 8.0'-

S-3 10-12' 7-5-3 @ 4" Rec. PID 0.0
Wet DK Br. organic Silt

S-4 15-17' 3-4-12-14 14" Rec. PID 0.0
WET DK BN organic Silt
trace PEAT

end of Boring

DTW: Below PVC: 8.61'
Below Ground: 7.37'



WELL CONSTRUCTION DETAILS

BOE 17'
Screen: 15-5'
Sand: 17-3'
Bentonite: 3-1'
Native Fill: —
Concrete: 1-0'
5' x 4" ID Steel protective Standpipe
w/ Protective Cover

12.3.96

WS-4 Formally B-10

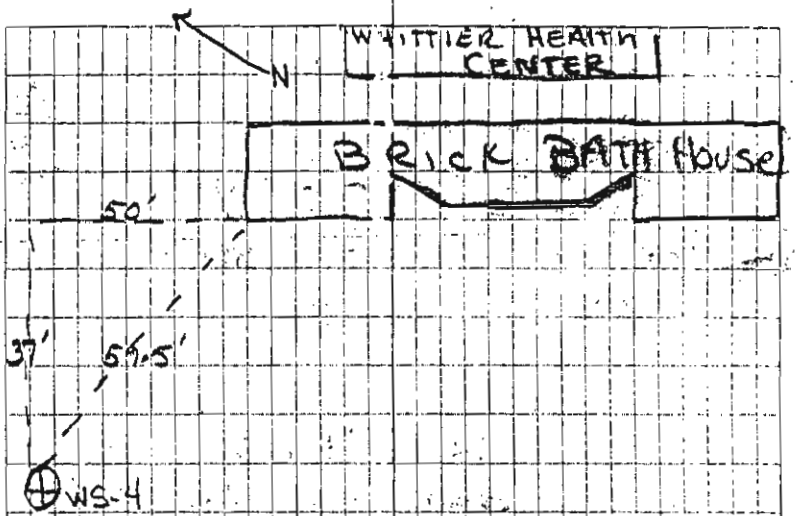
S-1 0-2' 3-8-20-17 8" Rec PID-0.0
Dry DK Brown F-C SAND
Trace F Gravel Trace Brick, Trace
Construction Debris

S-2 5-7' 13-12-7-7 14" Rec. PID-0.0
Dry MED Brown F-C SAND
Trace M Gravel Trace Brick
Trace Construction Concrete.
Hit WATER @ about 8.0'
S-3 10-12' 1-2-2-2 20" Rec. PID-0.0
WET DK bn. organic PEAT and Silt

S-4 15-17' 1 2 3 4 - 24" Rec PID-0.0
WET C&F-M SAND and Silt
Trace F-M Gravel trace coarse sand
trace PEAT

End of Boring

DTW Below PVC - 8.42'
Below Grand - 6.30'



*Drillers Parked Rig in back lot From WHITTIER ST. Health Center. OVERNIGHT

Well Construction Details:
BOE: 17'
Screen: 15-5'
SAND: 17-3
Bentonite 3-1'
Concrete: 1-0'
5' x 4" ID Steel protective Standpipe w/ protective cover
Drillers Depart Site @ 1130
-Paul Shafer Paul Rozitha-

15.00 C HUGHES

12.4.96
7:00 C. Hughes arrives on site to Resume Drilling activities.

WS-5 formally B-15 → TPH - VOC
09:45 AM
S1 0-2' 3-5-7-8 12" Rec
PID - 0.3
Top 6": Dry, dk. brown, SILT, some F-M sand, trace roots
- LOAMY TOPSOIL -
0.5
Bottom 6" Lt. brown to brown, M-F SAND, trace F-C gravel, trace C sand, trace silt
- GRANULAR FILL -

S-2 5-7' 6-2-3-8 13" PID - 0.6
Dry, brown, SILT and clay, little brick, trace F-C sand
- COHESIVE FILL -

PID 0.5
S-3 10-12' 32-60-24-20 20" Rec
WET Lt Brn M-F SAND trace FC gravel Trace C Sand trace brick

S-4 15-17' 15-7-10-25 10" Rec PID-0.6
WET Brown - F-C SAND and Silt Trace gravel, Trace Brick

WATER @ approx 9-10'
END OF Boring

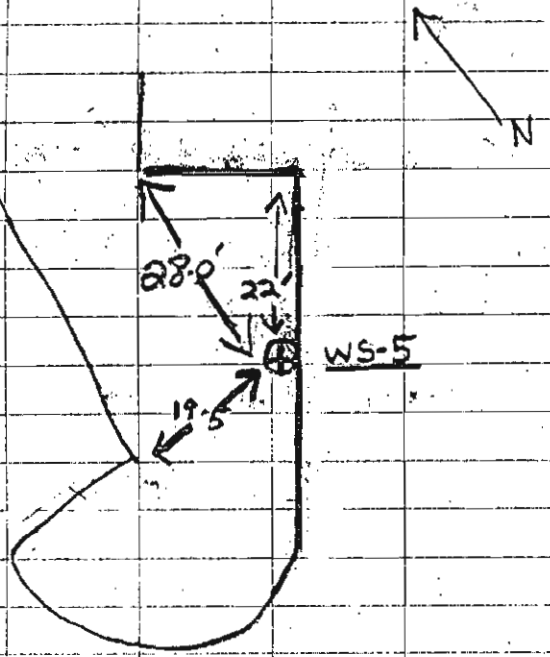
Well Construction

BOE 17.0'
Screen 15-5'
Sand 17-3
Bentonite 3-1
Concrete 1-0'
5x4 ID Steel protective Stickup w/ protective Cover

DTW 14.17'

12.4.96

WS-5 Cont.



Located in parking lot of Highschool

9:15

WS-6 - Formally B-13

S-1 0-2' 2-3-4 3 8" Rec. PID-0.5

Top 4" Dry Dk Brown Silt
Some F-M-Sand Trace Roots
— Loamy Topsoil —
Bottom 4" Lt Brown M-F SAND
Trace F-C gravel trace C Sand
— Granular Fill —

S-2 5-7' 18-19-19-14 8" Rec-PID-00
Dry Lt Brown M-F SAND
Trace Silt trace FC
gravel trace organic Roots

S-3 10-12' 14-15-18 19 10" Rec PID 0.8
WET LT Brown FC SAND.
Trace F-M gravel trace Silt.

S-4 15-17- 9-11-25-27 12" Rec. PID 0.5
WET Lt Br FC SAND trace F gravel.
Augered Down to 17.0

* Set Screen at 17-7'
Due to the fact that
DTW is @ or Near
13-14' NO SAmple taken
at 17-20'

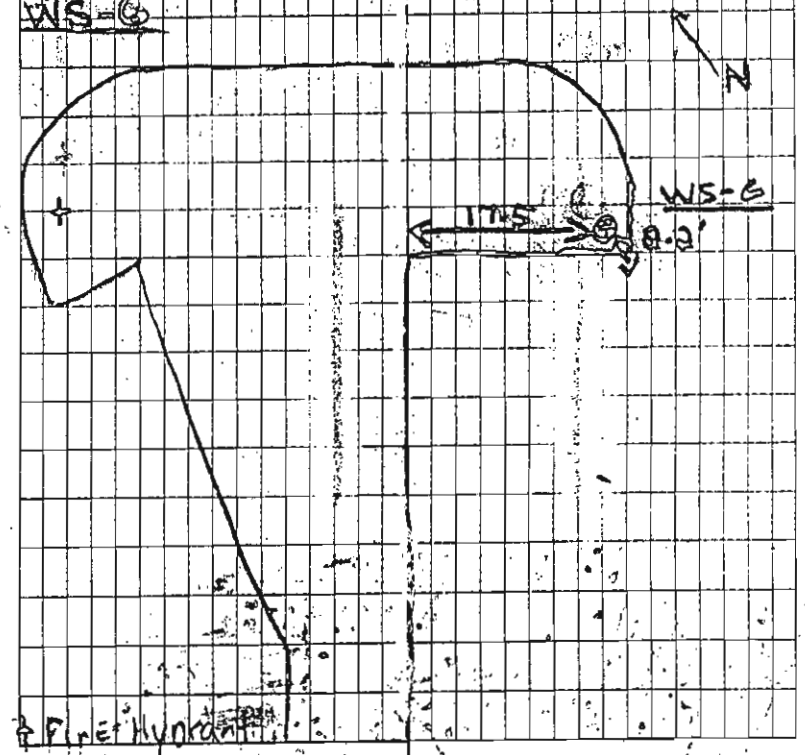
DTW upon installing WELL 12.5'

to ground 10.4'

Well Construction

B.O.E. 17.0'
Screen 17-7'
Sand 17-5'
Bentonite 3-1
Concrete 1-0
5x4 ID Protective Steel Stickup w/cover

WS-6



10:40 AM.

WS-7 - Formally B-14

S-1 0-2' 2-4-5-7 9" Rec PID-0.0

Top 5" Dry DK Bn. Silt Some F Med Trace organic.

— Loamy Topsoil —

Bottom 4' Lt Bn M-F SAND trace Silt ~~Trace~~ F-C gravel

— Granular Fill —

S-2 5-7' 12-14-14-14 10" Rec PID-0.0

Dry Med Bn. M-F SAND trace F gravel trace Brick

S-3 10-12' 8-10-14-17 20" Rec PID-0.7

WET Bn. F-M. SAND trace Coarse Sand

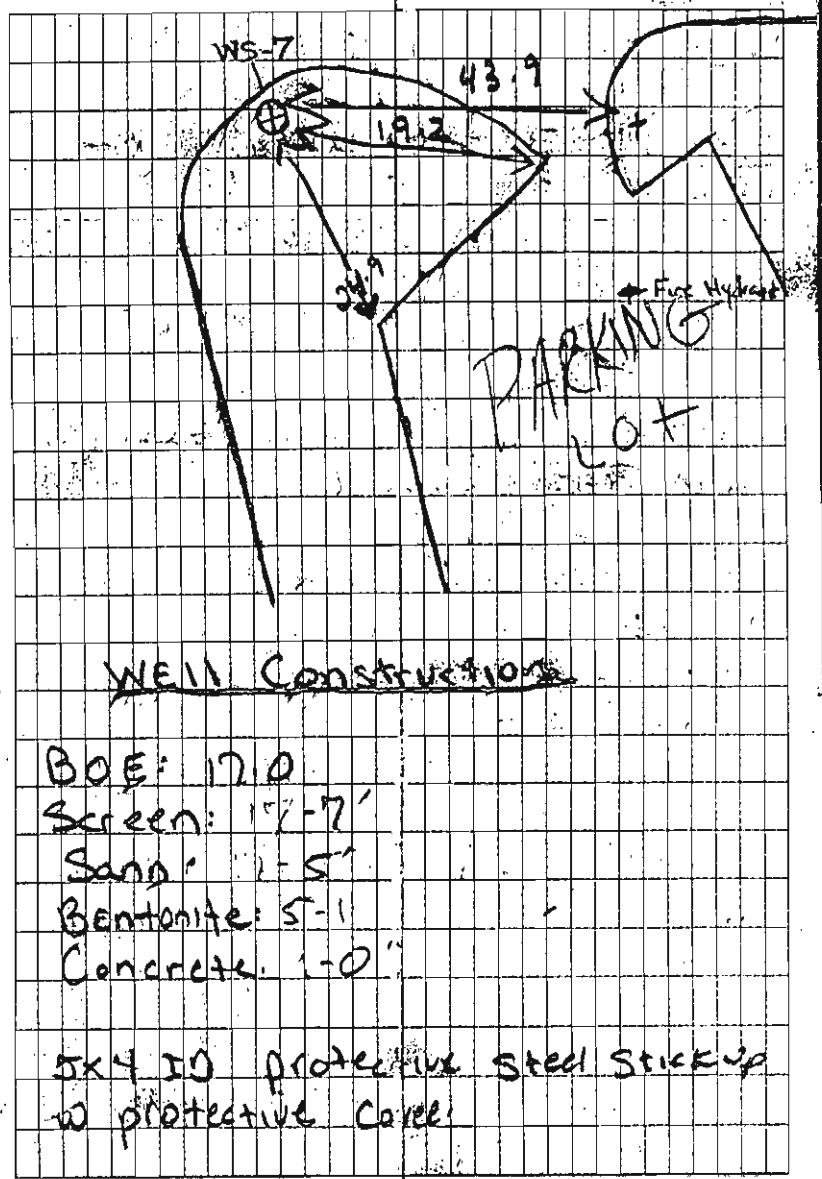
S-4 16-17' 10-12-11-17 15" Rec. PID-0.2

WET Bn. F-C SAND Trace Coarse Sand trace Silt trace Brick

17.0' End of Boring.

DTW From PVC 13.57'

DTW from Ground 11.71'



WELL Construction

BOE: 12.0

Screen: 12'-7'

Sand: 7-5'

Bentonite: 5-1'

Concrete: 1-0'

5x4 ID protective steel stick-up w protective Cover

12.4.96 12:30 PM

WS-8 - Formally B8 PID - 0.0

*Water observed @ 17.0'

S-1 18-20' 3-2-1-3 3" Rec. Wet brGrey F-M Sand, Clay and Silt, trace 1/4 Sand

S-2 22-25' WOR 1' 2 2 3 24" Recovery

Moist dk Brown organic SILT and fiberous PEAT trace Clay PID - 0.8

25' End of Boring

BOE: 25.0'

Screen 25-13'

Sand 25-5'

Bentonite 5-1

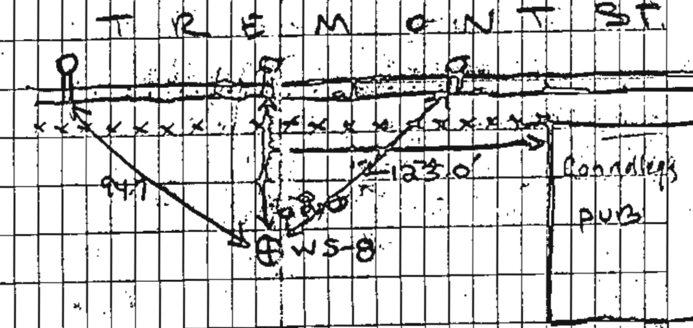
Concrete - 1-0'

5X4 ID Protective steel stickup w/locking cover

DTW 16.0

12.4.96

WS-8



15:00 C HUGHES Departs Site

12.5.96

7:00 C Hughes arrives on site to Resume Drilling operations

7:00

WS-9 Formally B5

S-1 19-21' 3-2-1-3- 6" Rec PID

WET, bn-gray F-M SAND, Clay and Silt trace C. sand

PID 1.2

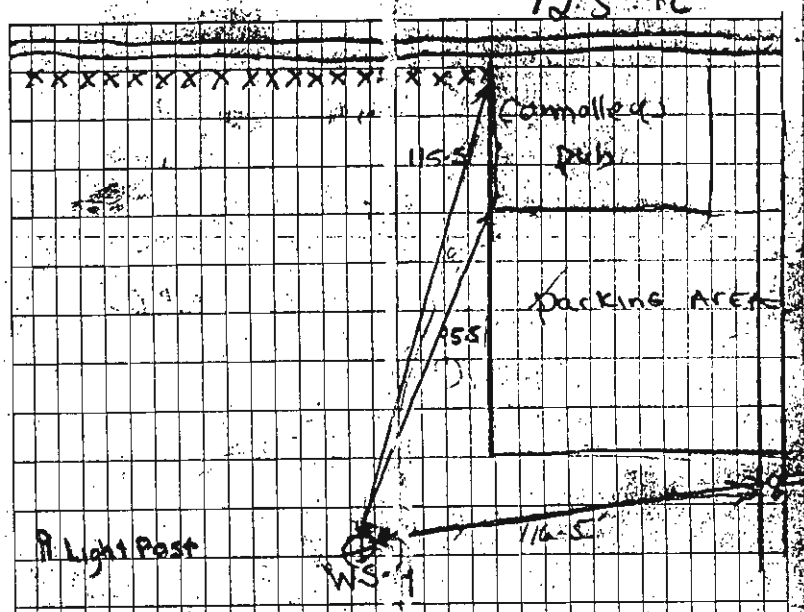
S-2 23-25' Work 5' 15" Rec. PID-

WET DK. Brn. organic Silt and Fiberous peat PID 0.5

END OF Boring @ 25'

DTW 15.5'

12.5.96



Well Construction

BOE 25.0'

Screen 25-10'

Sand 25-10'

Native Fill 10-5'

Bentonite 5-1'

Concrete 1-0'

5x4.00 protective steel stickup w/ Hexagon Bolt protective Cover

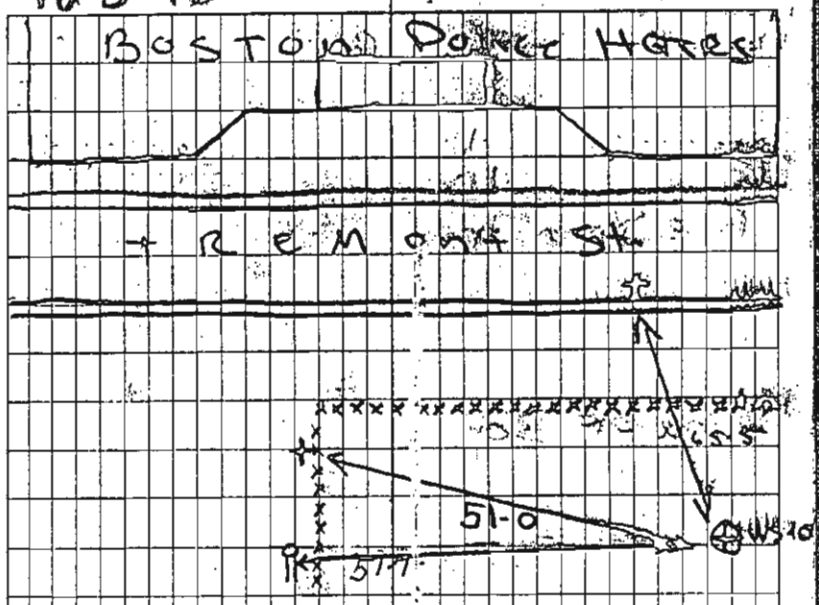
9:15

WS-10 Formally B-7

S-1 -19'-21'-9-11-12-13 14" Rec. PID-4.4
WET F-C SAND C gravel trace
Fine Sand trace Silt

End of Boring @ 25.0'

12.5.96



Light Post
Fire Hydrants

WELL-CONSTRUCTION

BOG: 25.0'
Screen: 12-10'
Sand 2<-10
Bentonite-10-8
Native Fill 8-1'
Concrete 1-0'

10:30

WS-11 - Formally B-12

Adjacent to High School parking Lot

1.2 ppm

S-1 0-2' 3-7-13-12 15" Rec.

Moist Dk Brown F-M SILT C gravel, trace C Sand trace organic Matter

S-2 5-7' 9 7-6-5 15" Rec 1.0 ppm

Moist Md Brown SILT F-M Sand trace clay trace Brick

S-3 10-12' 1-2-6-9 8" Rec 1.6 ppm

Moist Md Bn. SILT FM Sand trace gravel trace C Sand

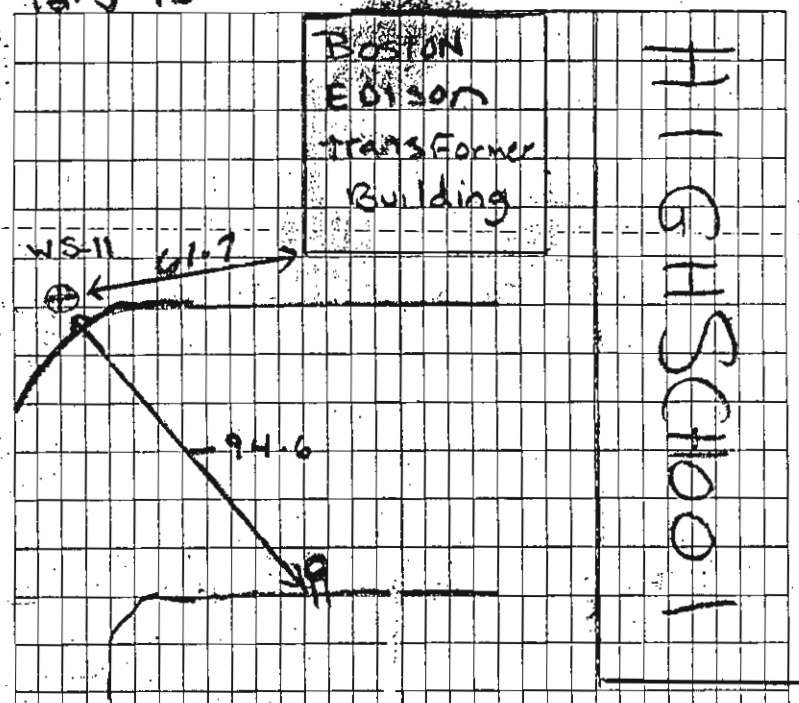
Water at approx @ 17.0'

S-4 15-15.3 - No Recovery

S-5 20-22' 17-24-27-30 1.7 ppm

WET Brn. grey M-C SAND C gravel trace Silt.

12.5.96



WELL Construction

B.O.E. 22.0'

Screen 20-10'

Sand 20-8'

Bentonite 18-6'

Native-Fill 6-1'

Concrete 1-0'

Complete well installation @ 13:00:00

13:05 Drillers Depart Site

@ Hughes departs site @ 14:30

12.5.96

WELL #	TD (PVC)	TD ground	DTW (PVC)	DTW (G)
WS-1	17.0	15.0	7.8	8.8
WS-2	17.2	17.37	8.57	8.87
WS-3	16.4	13.9	8.49	6.06
WS-4	17.24	15.09	8.84	6.70
WS-5	17.65	15.35	14.19	11.76
WS-6	19.4	17.0	12.56	10.14
WS-7	19.4	17.4	13.6	11.6
WS-8	25.7	23.05	16.7	14.12
WS-9	23.5	21.4	17.03	15.35
WS-10	25.2	22.7	16.8	14.35
WS-11	22.3	19.3	19.2	17.0
WS-12	19.43	18.15	12.73	10

Weston & Sampson ENGINEERS, INC.	PROJECT: BRA P-3, Roxbury, MA	REPORT OF BORING No. B-201 (D)
		SHEET 1 OF 2
		Project No. 200317.A
		CHKD BY CRM

BORING Co.	Eath Exploration (Geologic)	BORING LOCATION	See attached plan
FOREMAN	Mike Martinelli	GROUND SURFACE ELEV.	DATUM
WSE GEOLOGIST:	Robert F. Butler	DATE START 1/10/2001	DATE END 1/10/2001

SAMPLER: SAMPLER CONSISTS OF 2" SPLIT SPOON DRIVEN USING A 140 lb. HAMMER FALLING 30 in.

CASING: NA

CASING SIZE: NA OTHER: 3.25" HSA

GROUNDWATER READINGS

DATE	TIME	WATER AT	CASING AT	STABILIZATION TIME
1/10/2001	NA	NA	NA	NA

DEPTH (feet)	CASING (lb/ft)	SAMPLE No.	SAMPLE PEN/REC (in)	SAMPLE DEPTH (ft)	SAMPLE BLOWS/6"	PID (ppm)	SAMPLE DESCRIPTION Burmister Classification	NOTES	STRATUM DESCRIPTION
		S-1	NA	0-2	NA	<0.2	Dry, dark yellowish brown, (+)fine to coarse SAND, little Silt, trace fine Gravel and organics. Pieces of red brick present.	(1)	
2									
4									
		S-2	24/6	5-7	10-8	<0.2	Dry, dark yellowish brown, (+)fine to coarse SAND, some Silt, trace fine Gravel. Pieces of red brick, and a few pieces of coal tar/asphalt present.		FILL
					9-42				
6									
8									
10		S-3	24/10	10-12	24-20	<0.2	Dry, light gray to black, (+)fine to coarse SAND, trace Silt and fine Gravel. Lots of red brick present.		
					10-9				
12		S-4	24/19	12-14	5-7	<0.2	Dry, black to light gray, (+)fine to (-)coarse SAND, little Silt, trace fine Gravel. Some pieces of red brick and coal tar/asphalt present.		
					8-9				

GRANULAR SOILS		COHESIVE SOILS	
BLOWS/FT	DENSITY	BLOWS/FT	DENSITY
0-4	V. LOOSE	0-2	V. SOFT
4-10	LOOSE	2-4	SOFT
10-30	M. DENSE	4-8	M. STIFF
30-50	DENSE	8-15	STIFF
> 50	V. DENSE	15-30	V. STIFF
		> 30	HARD

REMARKS:

(1) S-1 sample was taken off the auger flights for classification.

NOTES:

1) THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES. TRANSITIONS MAY BE GRADUAL.
2) WATER LEVEL READINGS HAVE BEEN MADE IN THE DRILL HOLES AT TIMES AND UNDER CONDITIONS STATED ON THIS BORING LOG. FLUCTUATIONS IN THE LEVEL OF GROUNDWATER MAY OCCUR DUE TO OTHER FACTORS THAN THOSE PRESENT AT THE TIME MEASUREMENTS ARE MADE.

BORING No. B-201 (D)

Weston & Sampson
ENGINEERS, INC.

PROJECT	REPORT OF BORING No.	B-201 (D)
BRA P-3	SHEET	2 OF 2
Roxbury, MA	Project No.	200317.A
	CHKD BY	CRM

BORING Co.	Eath Exploration (Geologic)	BORING LOCATION	See attached plan
FOREMAN	Mike Martinelli	GROUND SURFACE ELEV.	DATUM
WSE GEOLOGIST:	Robert F. Butler	DATE START 1/10/2001	DATE END 1/10/2001

SAMPLER: SAMPLER CONSISTS OF 2" SPLIT SPOON DRIVEN USING A 140 lb. HAMMER FALLING 30 in.
CASING: NA
CASING SIZE: NA OTHER: 3.25" HSA

GROUNDWATER READINGS

DATE	TIME	WATER AT	CASING AT	STABILIZATION TIME
1/10/2001	NA	NA	NA	NA

DEPTH (feet)	CASING (lb/ft)	SAMPLE No.	PEN/REC (in)	DEPTH (ft)	BLOWS/6"	PID (ppm)	SAMPLE DESCRIPTION Burmister Classification	NOTES	STRATUM DESCRIPTION
									FILL
14							14'-15' Same as S-4.		
		S-5	24/22	14-16	9-8	<0.2	15-15.5' Wet, dark yellowish brown (-) fine		
					14-6		to (-)coarse SAND, trace fine Gravel and Silt.		SAND
							15.5-16' Wet, bluish gray CLAYEY SILT,,		CLAYEY SILT
16							trace fine to medium Sand.		
		S-6	24/10	16-18	12-14	0.6	Wet, bluish gray, CLAY, trace Silt.		
					10-10		Small pieces of peat fibers at 16'.		CLAY
18									
		S-7	24/0	18-20	5-6	<0.2	No recovery.		
					6-4				
20									
		S-8	24/20	20-22	1-1	0.2	Moist, brownish PEAT, little Silt.		
					5-5				PEAT
22									
		S-9	24/15	22-24	4-5	<0.2	Moist, brownish PEAT, little Silt.		
					6-6				
24									EOB at 24.0 ft

GRANULAR SOILS		COHESIVE SOILS	
BLOWS/FT	DENSITY	BLOWS/FT	DENSITY
0-4	V. LOOSE	0-2	V. SOFT
4-10	LOOSE	2-4	SOFT
10-30	M. DENSE	4-8	M. STIFF
30-50	DENSE	8-15	STIFF
> 50	V. DENSE	15-30	V. STIFF
		> 30	HARD

REMARKS:

NOTES:
1) THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES. TRANSITIONS MAY BE GRADUAL.
2) WATER LEVEL READINGS HAVE BEEN MADE IN THE DRILL HOLES AT TIMES AND UNDER CONDITIONS STATED ON THIS BORING LOG. FLUCTUATIONS IN THE LEVEL OF GROUNDWATER MAY OCCUR DUE TO OTHER FACTORS THAN THOSE PRESENT AT THE TIME MEASUREMENTS ARE MADE.

BORING No. B-201 (D)

Weston & Sampson ENGINEERS, INC.	PROJECT: BRA P-3, Roxbury, MA	REPORT OF BORING No. B-202 (S)
		SHEET 1 OF 1
		Project No. 200317.A
		CHKD BY CRM

BORING Co.	Eath Exploration (Geologic)	BORING LOCATION	See attached plan
FOREMAN	Mike Martinelli	GROUND SURFACE ELEV.	DATUM
WSE GEOLOGIST:	Robert F. Butler	DATE START 1/11/2001	DATE END 1/11/2001

SAMPLER: SAMPLER CONSISTS OF 2" SPLIT SPOON DRIVEN USING A 140 lb. HAMMER FALLING 30 in.

CASING: NA

CASING SIZE: NA OTHER: 3.25" HSA

GROUNDWATER READINGS

DATE	TIME	WATER AT	CASING AT	STABILIZATION TIME
1/11/2001	NA	NA	NA	NA

DEPTH (feet)	CASING (lb/ft)	SAMPLE No.	PEN/REC (in)	DEPTH (ft)	BLOWS/6"	PID (ppm)	SAMPLE DESCRIPTION Burmister Classification	NOTES	STRATUM DESCRIPTION
		S-1	24/8	0-2	7-8	<0.2	Dry, moderate yellowish brown, fine to (-)coarse SAND, little Silt, trace fine Gravel.		
					6-10				
5		S-2	24/5	5-7	32-10	<0.2	Dry, black to very dark brown, (+)fine to (-)coarse SAND, little Silt, trace fine Gravel. Pieces of red brick and coal tar/asphalt present.		FILL
					15-32				
10		S-3	24/2	10-12	21-23	<0.2	Moist , moderate yellowish brown, fine SAND, some Silt. Trace bluish green CLAY at tip of spoon.		SAND
					45-46				SILT
15									EOB at 12.0 ft
20									
25									
30									

GRANULAR SOILS		COHESIVE SOILS	
BLOWS/FT	DENSITY	BLOWS/FT	DENSITY
0-4	V. LOOSE	0-2	V. SOFT
4-10	LOOSE	2-4	SOFT
10-30	M. DENSE	4-8	M. STIFF
30-50	DENSE	8-15	STIFF
> 50	V. DENSE	15-30	V. STIFF
		> 30	HARD

REMARKS:

NOTES:
1) THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES. TRANSITIONS MAY BE GRADUAL.
2) WATER LEVEL READINGS HAVE BEEN MADE IN THE DRILL HOLES AT TIMES AND UNDER CONDITIONS STATED ON THIS BORING LOG. FLUCTUATIONS IN THE LEVEL OF GROUNDWATER MAY OCCUR DUE TO OTHER FACTORS THAN THOSE PRESENT AT THE TIME MEASUREMENTS ARE MADE.

BORING No. B-202 (S)

Weston & Sampson
ENGINEERS, INC.

PROJECT
BRA P-3
Roxbury, MA

REPORT OF BORING No. B-203 (S)
SHEET 1 OF 1
Project No. 200317.A
CHKD BY CRM

BORING Co. Eath Exploration (Geologic)
FOREMAN Mike Martinelli
WSE GEOLOGIST: Robert F. Butler

BORING LOCATION See attached plan
GROUND SURFACE ELEV. DATUM
DATE START 1/11/2001 DATE END 1/11/2001

SAMPLER: SAMPLER CONSISTS OF 2" SPLIT SPOON DRIVEN USING A 140 lb. HAMMER FALLING 30 in.
CASING: NA
CASING SIZE: NA OTHER: 3.25" HSA

GROUNDWATER READINGS

DATE	TIME	WATER AT	CASING AT	STABILIZATION TIME
1/11/2001	NA	NA	NA	NA

DEPTH (feet)	CASING (lb/ft)	SAMPLE No.	PEN/REC (in)	DEPTH (ft)	BLOWS/6"	PID (ppm)	SAMPLE DESCRIPTION Burmister Classification	NOTES	STRATUM DESCRIPTION
		S-1	24/12	0-2	7-9	<0.2	Moist, dark yellowish brown, fine to coarse SAND, little Silt, trace fine Gravel.		FILL
					11-14				
5		S-2	24/6	5-7	8-10	<0.2	Moist, black to very dark brown, (+)fine to (-)coarse SAND, some Silt, trace fine Gravel. Pieces of red brick and coal tar/asphalt present.		
					10-6				SAND
10		S-3	24/16	10-12	14-29	<0.2	Moist, dark yellowish brown, fine to coarse SAND, little Silt, trace fine Gravel.		
					49-64				EOB at 12.0 ft
15									
20									
25									
30									

GRANULAR SOILS		COHESIVE SOILS	
BLOWS/FT	DENSITY	BLOWS/FT	DENSITY
0-4	V. LOOSE	0-2	V. SOFT
4-10	LOOSE	2-4	SOFT
10-30	M. DENSE	4-8	M. STIFF
30-50	DENSE	8-15	STIFF
> 50	V. DENSE	15-30	V. STIFF
		> 30	HARD

REMARKS:

NOTES:
1) THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES. TRANSITIONS MAY BE GRADUAL.
2) WATER LEVEL READINGS HAVE BEEN MADE IN THE DRILL HOLES AT TIMES AND UNDER CONDITIONS STATED ON THIS BORING LOG. FLUCTUATIONS IN THE LEVEL OF GROUNDWATER MAY OCCUR DUE TO OTHER FACTORS THAN THOSE PRESENT AT THE TIME MEASUREMENTS ARE MADE.

BORING No. B-203 (S)

Weston & Sampson
ENGINEERS, INC.

PROJECT: BRA P-3, Roxbury, MA

REPORT OF BORING No. B-204 (S)
SHEET 1 OF 1
Project No. 200317.A
CHKD BY CRM

BORING Co. Eath Exploration (Geologic)
FOREMAN Mike Martinelli
WSE GEOLOGIST: Robert F. Butler
BORING LOCATION See attached plan
GROUND SURFACE ELEV. DATUM
DATE START 1/11/2001 DATE END 1/11/2001

SAMPLER: SAMPLER CONSISTS OF 2" SPLIT SPOON DRIVEN USING A 140 lb. HAMMER FALLING 30 in.
CASING: NA
CASING SIZE: NA OTHER: 3.25" HSA

GROUNDWATER READINGS

DATE	TIME	WATER AT	CASING AT	STABILIZATION TIME
1/11/2001	NA	NA	NA	NA

DEPTH (feet)	CASING (lb/ft)	SAMPLE No.	PEN/REC (in)	DEPTH (ft)	BLOWS/6"	PID (ppm)	SAMPLE DESCRIPTION Burmister Classification	NOTES	STRATUM DESCRIPTION
		S-1	24/12	0-2	6-9	<0.2	Dry, moderate yellowish brown, (+)fine to (-)coarse SAND, little Silt, trace fine Gravel.		FILL
					11-11				
5		S-2	24/8	5-7	5-7	<0.2	Moist, black to very dark brown, (+)fine to (-)coarse SAND, little Silt, trace fine Gravel. Pieces of red brick and coal tar/asphalt present.		
					18-11				
10		S-3	24/24	10-12	1-1	<0.2	Moist, olive black, CLAYEY SILT, with traces of peat fibers.		CLAYEY SILT
					1-1				EOB at 12.0 ft
15									
20									
25									
30									

GRANULAR SOILS		COHESIVE SOILS	
BLOWS/FT	DENSITY	BLOWS/FT	DENSITY
0-4	V. LOOSE	0-2	V. SOFT
4-10	LOOSE	2-4	SOFT
10-30	M. DENSE	4-8	M. STIFF
30-50	DENSE	8-15	STIFF
> 50	V. DENSE	15-30	V. STIFF
		> 30	HARD

REMARKS:

NOTES:
1) THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES. TRANSITIONS MAY BE GRADUAL.
2) WATER LEVEL READINGS HAVE BEEN MADE IN THE DRILL HOLES AT TIMES AND UNDER CONDITIONS STATED ON THIS BORING LOG. FLUCTUATIONS IN THE LEVEL OF GROUNDWATER MAY OCCUR DUE TO OTHER FACTORS THAN THOSE PRESENT AT THE TIME MEASUREMENTS ARE MADE.

BORING No. B-204 (S)

Weston & Sampson
ENGINEERS, INC.

PROJECT: BRA P-3, Roxbury, MA

REPORT OF BORING No. B-205 (S)
SHEET 1 OF 1
Project No. 200317.A
CHKD BY CRM

BORING Co. Eath Exploration (Geologic)
FOREMAN Mike Martinelli
WSE GEOLOGIST: Robert F. Butler

BORING LOCATION See attached plan
GROUND SURFACE ELEV. DATUM
DATE START 1/11/2001 DATE END 1/11/2001

SAMPLER: SAMPLER CONSISTS OF 2" SPLIT SPOON DRIVEN USING A 140 lb. HAMMER FALLING 30 in.
CASING: NA
CASING SIZE: NA OTHER: 3.25" HSA

GROUNDWATER READINGS

DATE	TIME	WATER AT	CASING AT	STABILIZATION TIME
1/11/2001	NA	NA	NA	NA

DEPTH (feet)	CASING (lb/ft)	SAMPLE No.	PEN/REC (in)	DEPTH (ft)	BLOWS/6"	PID (ppm)	SAMPLE DESCRIPTION Burmister Classification	NOTES	STRATUM DESCRIPTION
		S-1	24/18	0-2	14-16	<0.2	Dry, dark brown, (+)fine to (-)coarse SAND, little Silt, trace fine Gravel. Pieces of red brick present.		FILL
					12-10				
2		S-2	12/8	2-3	14-18	<0.2	Dry, light yellowish brown (+)fine to (-)coarse SAND, trace Silt & fine Gravel with red brick		
		S-3	24/12	3-5	40-43	<0.2	Dry, light yellowish brown, (-)fine to (-)coarse SAND, little fine Gravel, trace Silt and red brick.		
4					30-31				
6									EOB at 5.0 ft
8									
10									
12									

GRANULAR SOILS		COHESIVE SOILS	
BLOWS/FT	DENSITY	BLOWS/FT	DENSITY
0-4	V. LOOSE	0-2	V. SOFT
4-10	LOOSE	2-4	SOFT
10-30	M. DENSE	4-8	M. STIFF
30-50	DENSE	8-15	STIFF
> 50	V. DENSE	15-30	V. STIFF
		> 30	HARD

REMARKS:

NOTES:
1) THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES. TRANSITIONS MAY BE GRADUAL.
2) WATER LEVEL READINGS HAVE BEEN MADE IN THE DRILL HOLES AT TIMES AND UNDER CONDITIONS STATED ON THIS BORING LOG. FLUCTUATIONS IN THE LEVEL OF GROUNDWATER MAY OCCUR DUE TO OTHER FACTORS THAN THOSE PRESENT AT THE TIME MEASUREMENTS ARE MADE.

BORING No. B-205 (S)

Weston & Sampson
ENGINEERS, INC.

PROJECT
BRA P-3
Roxbury, MA

REPORT OF BORING No. B-206 (S)
SHEET 1 OF 1
Project No. 200317.A
CHKD BY CRM

BORING Co. Eath Exploration (Geologic)
FOREMAN Mike Martinelli
WSE GEOLOGIST: Robert F. Butler

BORING LOCATION See attached plan
GROUND SURFACE ELEV. DATUM
DATE START 1/11/2001 DATE END 1/11/2001

SAMPLER: SAMPLER CONSISTS OF 2" SPLIT SPOON DRIVEN USING A 140 lb. HAMMER FALLING 30 in.
CASING: NA
CASING SIZE: NA OTHER: 3.25" HSA

GROUNDWATER READINGS

DATE	TIME	WATER AT	CASING AT	STABILIZATION TIME
1/11/2001	NA	NA	NA	NA

DEPTH (feet)	CASING (lb/ft)	SAMPLE No.	PEN/REC (in)	DEPTH (ft)	BLOWS/6"	PID (ppm)	SAMPLE DESCRIPTION Burmister Classification	NOTES	STRATUM DESCRIPTION
		S-1	24/18	0-2	6-10	<0.2	Dry, dark brown, (+)fine to (-)coarse SAND, little Silt, trace fine Gravel. Pieces of red brick present.		FILL
					11-11				
2		S-2	12/6	2-3	11-9	<0.2	Same as S-1.		
		S-3	24/4	3-5	12-13	<0.2	Same as S-1.		
4					33-40				EOB at 5.0 ft
6									
8									
10									
12									

GRANULAR SOILS		COHESIVE SOILS	
BLOWS/FT	DENSITY	BLOWS/FT	DENSITY
0-4	V. LOOSE	0-2	V. SOFT
4-10	LOOSE	2-4	SOFT
10-30	M. DENSE	4-8	M. STIFF
30-50	DENSE	8-15	STIFF
> 50	V. DENSE	15-30	V. STIFF
		> 30	HARD

REMARKS:

NOTES:
1) THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES. TRANSITIONS MAY BE GRADUAL.
2) WATER LEVEL READINGS HAVE BEEN MADE IN THE DRILL HOLES AT TIMES AND UNDER CONDITIONS STATED ON THIS BORING LOG. FLUCTUATIONS IN THE LEVEL OF GROUNDWATER MAY OCCUR DUE TO OTHER FACTORS THAN THOSE PRESENT AT THE TIME MEASUREMENTS ARE MADE.

BORING No. B-206 (S)

Weston & Sampson ENGINEERS, INC.	PROJECT BRA P-3 Roxbury, MA	REPORT OF BORING No. B-207 (S) SHEET 1 OF 1 Project No. 200317.A CHKD BY CRM

BORING Co.	Eath Exploration (Geologic)	BORING LOCATION	See attached plan
FOREMAN	Mike Martinelli	GROUND SURFACE ELEV.	DATUM
WSE GEOLOGIST:	Robert F. Butler	DATE START 1/10/2001	DATE END 1/10/2001

SAMPLER: SAMPLER CONSISTS OF 2" SPLIT SPOON DRIVEN USING A 140 lb. HAMMER FALLING 30 in.

CASING: NA

CASING SIZE: NA OTHER: 3.25" HSA

GROUNDWATER READINGS

DATE	TIME	WATER AT	CASING AT	STABILIZATION TIME
1/10/2001	NA	NA	NA	NA

DEPTH (feet)	CASING (lb/ft)	SAMPLE No.	PEN/REC (in)	DEPTH (ft)	BLOWS/6"	PID (ppm)	SAMPLE DESCRIPTION Burmister Classification	NOTES	STRATUM DESCRIPTION
		S-1	24/18	0-2	12-16	<0.2	Dry, dark brown, (+)fine to (-)coarse SAND, little Silt, trace fine Gravel. Pieces of red brick present.		FILL
					14-18				
2		S-2	12/8	2-3	14-18	<0.2	Same as S-1.		
		S-3	24/10	3-5	47-53	<0.2	Same as S-1.		
4					33-35				EOB at 5.0 ft
6									
8									
10									
12									

GRANULAR SOILS		COHESIVE SOILS	
BLOWS/FT	DENSITY	BLOWS/FT	DENSITY
0-4	V. LOOSE	0-2	V. SOFT
4-10	LOOSE	2-4	SOFT
10-30	M. DENSE	4-8	M. STIFF
30-50	DENSE	8-15	STIFF
> 50	V. DENSE	15-30	V. STIFF
		> 30	HARD

REMARKS:

NOTES:
1) THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES. TRANSITIONS MAY BE GRADUAL.
2) WATER LEVEL READINGS HAVE BEEN MADE IN THE DRILL HOLES AT TIMES AND UNDER CONDITIONS STATED ON THIS BORING LOG. FLUCTUATIONS IN THE LEVEL OF GROUNDWATER MAY OCCUR DUE TO OTHER FACTORS THAN THOSE PRESENT AT THE TIME MEASUREMENTS ARE MADE.

BORING No. B-207 (S)

Weston & Sampson
ENGINEERS, INC.

PROJECT: BRA P-3, Roxbury, MA

REPORT OF BORING No. B-208
SHEET 1 OF 1
Project No. 200317.A
CHKD BY AMW

BORING Co. Earth Exploration Services
FOREMAN Derek Makudera
WSE GEOLOGIST: Len Rappoli

BORING LOCATION See attached plan
GROUND SURFACE ELEV. DATUM
DATE START 9/5/2001 DATE END 9/5/2001

SAMPLER: SAMPLER CONSISTS OF 2" SPLIT SPOON DRIVEN USING A 300 lb. HAMMER FALLING 30 in.
CASING: N/A
CASING SIZE: N/A OTHER: 4.25" HSA

GROUNDWATER READINGS

DATE	TIME	WATER AT	CASING AT	STABILIZATION TIME

DEPTH (feet)	CASING (lb/ft)	SAMPLE No.	PEN/REC (in)	DEPTH (ft)	BLOWS/6"	PID (ppm)	SAMPLE DESCRIPTION Burmister Classification	NOTES	STRATUM DESCRIPTION
		S-1	24/15	0-2	1-2	21	Dark brown SILT, little fine to coarse Sand, trace Brick, Glass, Slag, Ash and/or Wood Chips		
					4-3				
5		S-2	24/12	5-7	3-5	0.6	Dark brown SILT, little fine to coarse Sand, little Brick, Glass, Slag, Ash and/or Wood Chips		URBAN FILL
					7-6				
10		S-3	24/14	10-12	8-11	<0.2	Brown SILT and fine to coarse SAND, trace fine Gravel, trace Brick, Glass, Slag, Ash and/or Wood Chips		
					13-13				EOB at 12.0 ft
15									
20									
25									
30									

GRANULAR SOILS		COHESIVE SOILS	
BLOWS/FT	DENSITY	BLOWS/FT	DENSITY
0-4	V. LOOSE	0-2	V. SOFT
4-10	LOOSE	2-4	SOFT
10-30	M. DENSE	4-8	M. STIFF
30-50	DENSE	8-15	STIFF
> 50	V. DENSE	15-30	V. STIFF
		> 30	HARD

REMARKS:

NOTES:
1) THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES. TRANSITIONS MAY BE GRADUAL.
2) WATER LEVEL READINGS HAVE BEEN MADE IN THE DRILL HOLES AT TIMES AND UNDER CONDITIONS STATED ON THIS BORING LOG. FLUCTUATIONS IN THE LEVEL OF GROUNDWATER MAY OCCUR DUE TO OTHER FACTORS THAN THOSE PRESENT AT THE TIME MEASUREMENTS ARE MADE.

BORING No. B-208

Weston & Sampson
ENGINEERS, INC.

PROJECT: BRA P-3, Roxbury, MA

REPORT OF BORING No. B-209
SHEET 1 OF 1
Project No. 200317.A
CHKD BY AMW

BORING Co. Earth Exploration Services
FOREMAN Derek Makudera
WSE GEOLOGIST: Len Rappoli

BORING LOCATION See attached plan
GROUND SURFACE ELEV. DATUM
DATE START 9/5/2001 DATE END 9/5/2001

SAMPLER: SAMPLER CONSISTS OF 2" SPLIT SPOON DRIVEN USING A 300 lb. HAMMER FALLING 30 in.
CASING: N/A
CASING SIZE: N/A OTHER: 4.25" HSA

GROUNDWATER READINGS

DATE	TIME	WATER AT	CASING AT	STABILIZATION TIME
9/5/2001	12:40	11.5 ft	N/A	-

DEPTH (feet)	CASING (lb/ft)	SAMPLE No.	PEN/REC (in)	DEPTH (ft)	BLOWS/6"	PID (ppm)	SAMPLE DESCRIPTION Burmister Classification	NOTES	STRATUM DESCRIPTION
		S-1	24/12	0-2	3-3	<0.2	1-2': Dark brown SILT and fine to coarse GRAVEL; 2-3': Light brown fine to medium SAND, trace Brick, Glass, Slag, Ash and/or Wood Chips.		URBAN FILL
					3-5				
5		S-2	24/8	4-6	2-3	<0.2	4-8': Light brown to gray SILT, some fine to coarse Sand, trace fine Gravel, trace Brick, Glass, Slag, Ash and/or Wood Chips		
					4-4				
		S-3	24/12	6-8	13-12	2.4			
					10-13				
		S-4	24/0	8-10	10-12	–	No recovery		9.0 ft
10					6-6				
		S-5	24/18	10-12	4-8	<0.2	Dark gray CLAY and SILT	(1)	CLAY and SILT
					10-16				13.0 ft
15		S-6	24/18	14-16	8-12	<0.2	Dark brown fine to coarse SAND and fine to coarse GRAVEL, trace Silt, wet		SAND and GRAVEL
									EOB at 16.0 ft
20									
25									
30									

GRANULAR SOILS		COHESIVE SOILS	
BLOWS/FT	DENSITY	BLOWS/FT	DENSITY
0-4	V. LOOSE	0-2	V. SOFT
4-10	LOOSE	2-4	SOFT
10-30	M. DENSE	4-8	M. STIFF
30-50	DENSE	8-15	STIFF
> 50	V. DENSE	15-30	V. STIFF
		> 30	HARD

REMARKS:
(1) Faint organics odor
Boring B-209 was completed as monitoring well WS-13.

NOTES:
1) THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES. TRANSITIONS MAY BE GRADUAL.
2) WATER LEVEL READINGS HAVE BEEN MADE IN THE DRILL HOLES AT TIMES AND UNDER CONDITIONS STATED ON THIS BORING LOG. FLUCTUATIONS IN THE LEVEL OF GROUNDWATER MAY OCCUR DUE TO OTHER FACTORS THAN THOSE PRESENT AT THE TIME MEASUREMENTS ARE MADE.

BORING No. B-209

Weston & Sampson *ENGINEERS, INC.*	PROJECT BRA P-3 Roxbury, MA	REPORT OF BORING No. B-210 SHEET 1 OF 1 Project No. 200317.A CHKD BY AMW

BORING Co. Earth Exploration Services
FOREMAN Derek Makudera
WSE GEOLOGIST: Len Rappoli

BORING LOCATION See attached plan
GROUND SURFACE ELEV. DATUM
DATE START 9/5/2001 DATE END 9/5/2001

SAMPLER: SAMPLER CONSISTS OF 2" SPLIT SPOON DRIVEN USING A 300 lb. HAMMER FALLING 30 in.
CASING: N/A
CASING SIZE: N/A OTHER: 4.25" HSA

GROUNDWATER READINGS

DATE	TIME	WATER AT	CASING AT	STABILIZATION TIME
9/5/2001	12:40	11.5	N/A	-

DEPTH (feet)	CASING (lb/ft)	SAMPLE No.	PEN/REC (in)	DEPTH (ft)	BLOWS/6"	PID (ppm)	SAMPLE DESCRIPTION Burmister Classification	NOTES	STRATUM DESCRIPTION
		S-1	24/12	0-2	2-5	<0.2	Light to dark brown SILT, little fine to coarse Sand, little Brick and Ash		
					6-8				URBAN FILL
5		S-2	24/10	5-7	5-6	<0.2	Brown SILT, some fine to coarse Sand, little Brick and Ash		
					2-2				
10		S-3	24/14	10-12	5-8	<0.2	10-11': Brown SILT, BRICK and SLAG, some fine to coarse Sand		11.0 ft SILT and fine SAND
					6-6		11-12': Light brown SILT and very fine SAND, wet		EOB at 12.0 ft
15									
20									
25									
30									

GRANULAR SOILS		COHESIVE SOILS	
BLOWS/FT	DENSITY	BLOWS/FT	DENSITY
0-4	V. LOOSE	0-2	V. SOFT
4-10	LOOSE	2-4	SOFT
10-30	M. DENSE	4-8	M. STIFF
30-50	DENSE	8-15	STIFF
> 50	V. DENSE	15-30	V. STIFF
		> 30	HARD

REMARKS:

NOTES:
1) THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES. TRANSITIONS MAY BE GRADUAL.
2) WATER LEVEL READINGS HAVE BEEN MADE IN THE DRILL HOLES AT TIMES AND UNDER CONDITIONS STATED ON THIS BORING LOG. FLUCTUATIONS IN THE LEVEL OF GROUNDWATER MAY OCCUR DUE TO OTHER FACTORS THAN THOSE PRESENT AT THE TIME MEASUREMENTS ARE MADE.

BORING No. B-210

Weston & Sampson
ENGINEERS, INC.

PROJECT	REPORT OF BORING No.	B-211
BRA P-3	SHEET 1	OF 1
Roxbury, MA	Project No.	200317.A
	CHKD BY	AMW

BORING Co.	Earth Exploration Services	BORING LOCATION	See attached plan
FOREMAN	Derek Makudera	GROUND SURFACE ELEV.	DATUM
WSE GEOLOGIST:	Len Rappoli	DATE START 9/5/2001	DATE END 9/5/2001

SAMPLER: SAMPLER CONSISTS OF 2" SPLIT SPOON DRIVEN USING A 300 lb. HAMMER FALLING 30 in.
CASING: N/A
CASING SIZE: N/A OTHER: 4.25" HSA

GROUNDWATER READINGS

DATE	TIME	WATER AT	CASING AT	STABILIZATION TIME

DEPTH (feet)	CASING (lb/ft)	SAMPLE No.	PEN/REC (in)	DEPTH (ft)	BLOWS/6"	PID (ppm)	SAMPLE DESCRIPTION Burmister Classification	NOTES	STRATUM DESCRIPTION
		S-1	24/12	0-2	1-4	<0.2	0-1.5': Dark brown SILT, little fine to coarse Gravel, little Brick, Slag and Glass;1.5-2': Light brown very fine to medium SAND		URBAN FILL
					4-3				
5		S-2	24/12	5-7	2-6	<0.2	Brown to gray SILT, some Brick and Ash, trace fine to coarse Sand		
					3-4				EOB at 7.5 ft
10									
15									
20									
25									
30									

GRANULAR SOILS		COHESIVE SOILS	
BLOWS/FT	DENSITY	BLOWS/FT	DENSITY
0-4	V. LOOSE	0-2	V. SOFT
4-10	LOOSE	2-4	SOFT
10-30	M. DENSE	4-8	M. STIFF
30-50	DENSE	8-15	STIFF
> 50	V. DENSE	15-30	V. STIFF
		> 30	HARD

REMARKS:
Auger refusal at 7.5 ft.

NOTES:
1) THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES. TRANSITIONS MAY BE GRADUAL.
2) WATER LEVEL READINGS HAVE BEEN MADE IN THE DRILL HOLES AT TIMES AND UNDER CONDITIONS STATED ON THIS BORING LOG. FLUCTUATIONS IN THE LEVEL OF GROUNDWATER MAY OCCUR DUE TO OTHER FACTORS THAN THOSE PRESENT AT THE TIME MEASUREMENTS ARE MADE.

BORING No. B-211

Weston & Sampson
ENGINEERS, INC.

PROJECT: BRA P-3, Roxbury, MA

REPORT OF BORING No. B-212
SHEET 1 OF 1
Project No. 200317.A
CHKD BY AMW

BORING Co. Earth Exploration Services
FOREMAN Derek Makudera
WSE GEOLOGIST: Len Rappoli
BORING LOCATION See attached plan
GROUND SURFACE ELEV. ____ DATUM ____
DATE START 9/5/2001 DATE END 9/5/2001

SAMPLER: SAMPLER CONSISTS OF 2" SPLIT SPOON DRIVEN USING A 300 lb. HAMMER FALLING 30 in.
CASING: N/A
CASING SIZE: N/A OTHER: 4.25" HSA

GROUNDWATER READINGS

DATE	TIME	WATER AT	CASING AT	STABILIZATION TIME

DEPTH (feet)	CASING (lb/ft)	SAMPLE No.	PEN/REC (in)	DEPTH (ft)	BLOWS/6"	PID (ppm)	SAMPLE DESCRIPTION Burmister Classification	NOTES	STRATUM DESCRIPTION
		S-1	24/10	0-2	3-5	<0.2	Brown SILT, little fine to coarse Sand, little Brick and Ash		
					4-3				URBAN FILL
5		S-2	24/16	5-7	4-3	<0.2	Brown fine to coarse SAND, little Silt, little Brick and Ash		
					6-7				8.5 ft
									CLAY and SILT
10		S-3	24/17	10-12	3-13	<0.2	10-11': Light brown CLAY and SILT		11.0 ft
					13-10		11-12': Brown SILT and fine to coarse SAND		SAND
									EOB at 12.0 ft
15									
20									
25									
30									

GRANULAR SOILS		COHESIVE SOILS	
BLOWS/FT	DENSITY	BLOWS/FT	DENSITY
0-4	V. LOOSE	0-2	V. SOFT
4-10	LOOSE	2-4	SOFT
10-30	M. DENSE	4-8	M. STIFF
30-50	DENSE	8-15	STIFF
> 50	V. DENSE	15-30	V. STIFF
		> 30	HARD

REMARKS:

NOTES:
1) THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES. TRANSITIONS MAY BE GRADUAL.
2) WATER LEVEL READINGS HAVE BEEN MADE IN THE DRILL HOLES AT TIMES AND UNDER CONDITIONS STATED ON THIS BORING LOG. FLUCTUATIONS IN THE LEVEL OF GROUNDWATER MAY OCCUR DUE TO OTHER FACTORS THAN THOSE PRESENT AT THE TIME MEASUREMENTS ARE MADE.

BORING No. B-212

Appendix C-2

Groundwater Monitoring Well Construction Logs

GROUNDWATER MONITORING WELL INSTALLATION REPORT

PROJECT NAME/NO.	BRA/EDIC Parcel P-3 / Job No: 96230.A			MONITORING WELL NO.	
LOCATION	Roxbury, MA			WS - 1	
CLIENT	BRA/EDIC			ELEVATION	
CONTRACTOR	Zoino - Hebert, Inc.	DRILLER	Dave Andersen	TOP OF PVC	92.49 '
OBSERVED BY	Andrew Wise	DATE	Dec. 3, 1996	DEPTH TO GROUNDWATER FROM	
CHECKED BY	Andrew Wise	DATE	Dec. 11, 1996	TOP OF PVC	7.80 '

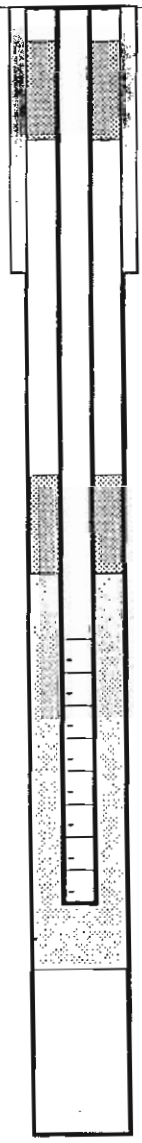
GROUND ELEVATION 93.42 '

GENERAL SOIL CONDITIONS
(NOT TO SCALE)

0.0 - 12.0 ft. :
Fine to coarse SAND
FILL

12.0 - 21.0 ft. :
Organic SILT and PEAT

21.0 - 60.0 ft. :
Coarse to Fine SAND/
GRAVEL
GLACIAL OUTWASH



<---	FLUSH-MOUNTED ROADBOX	(GROUND SURFACE)
	THICKNESS OF SURFACE SEAL(S)	1.0 '
<---	TYPE OF SURFACE SEAL(S)	Concrete
	TYPE OF SURFACE CASING	Aluminum Roadbox
<---	ID OF SURFACE CASING	6 "
<---	DEPTH BOTTOM OF CASING	18 "
	ID OF RISER PIPE	2 "
<---	TYPE OF RISER PIPE	Schedule 40 PVC
<---	TYPE OF BACKFILL AROUND RISER PIPE	Native Fill
	DEPTH TOP OF SEAL	3.0 '
<---	TYPE OF SEAL	Bentonite
	DEPTH BOTTOM OF SEAL/TOP OF SAND COLUMN	5.0 '
<---	DEPTH TOP OF SCREEN	7.0 '
	TYPE OF SCREEN	Machine-slotted PVC
<---	SIZE OPENINGS	0.010 "
	ID OF SCREEN	2 "
<---	TYPE OF BACKFILL AROUND SCREEN	#1 Silica Sand
<---	DEPTH BOTTOM OF SCREEN	17.0 '
<---	DEPTH BOTTOM OF SAND COLUMN	18.0 '
		Bentonite: 18 - 21 '
<---	TYPE OF BACKFILL BELOW SCREEN	Native Fill: 21 - 60 '
<---	DIAMETER OF BOREHOLE	4 "
<---	DEPTH BOTTOM OF BOREHOLE	60.0 '

NOTES:

Depth to groundwater measured on December 5, 1996.

Elevation relative to an arbitrary 100.00 foot datum.

MONITORING WELL NO.
WS - 1

WESTON & SAMPSON
ENGINEERS, INC.

GROUNDWATER MONITORING WELL INSTALLATION REPORT

PROJECT NAME/NO.	BRA/EDIC Parcel P-3 / Job No: 96230.A			**MONITORING WELL NO.**	
LOCATION	Roxbury, MA			**WS - 2**	
CLIENT	BRA/EDIC			ELEVATION	
CONTRACTOR	Zoino - Hebert, Inc.	DRILLER	Paul Schaefer	TOP OF PVC	92.32 '
OBSERVED BY	Christine Hughes	DATE	Dec. 3, 1996	DEPTH TO GROUNDWATER FROM	
CHECKED BY	Andrew Wise	DATE	Dec. 11, 1996	TOP OF PVC	8.57 '

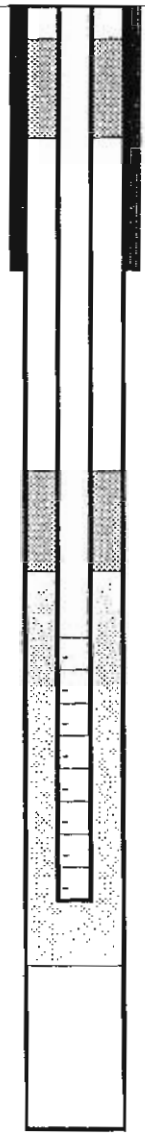
GROUND ELEVATION 92.46 '

GENERAL SOIL CONDITIONS (NOT TO SCALE)

0.0 - 0.3 ft. : ASPHALT

0.3 - 11.0 ft. : Fine to medium SAND FILL

11.0 - 17.0 ft. : PEAT and organic silt



<—	FLUSH-MOUNTED ROADBOX	(GROUND SURFACE)
	THICKNESS OF SURFACE SEAL(S)	1.0 '
<—	TYPE OF SURFACE SEAL(S)	Concrete
	TYPE OF SURFACE CASING	Aluminum Roadbox
<—	ID OF SURFACE CASING	4 "
<—	DEPTH BOTTOM OF CASING	10 "
	ID OF RISER PIPE	2"
<—	TYPE OF RISER PIPE	Schedule 40 PVC
<—	TYPE OF BACKFILL AROUND RISER PIPE	Native Fill
	DEPTH TOP OF SEAL	3.0 '
<—	TYPE OF SEAL	Bentonite
	DEPTH BOTTOM OF SEAL/TOP OF SAND COLUMN	5.0 '
<—	DEPTH TOP OF SCREEN	7.0 '
	TYPE OF SCREEN	Machine-slotted PVC
<—	SIZE OPENINGS	0.010 "
	ID OF SCREEN	2 "
<—	TYPE OF BACKFILL AROUND SCREEN	#1 Silica Sand
<—	DEPTH BOTTOM OF SCREEN	17.0 '
<—	DEPTH BOTTOM OF SAND COLUMN	17.0 '
<—	TYPE OF BACKFILL BELOW SCREEN	N/A
<—	DIAMETER OF BOREHOLE	8 "
<—	DEPTH BOTTOM OF BOREHOLE	17.0 '

NOTES:

Depth to groundwater measured on December 5, 1996.

Elevation relative to an arbitrary 100.00 foot datum.

MONITORING WELL NO.
WS - 2

WESTON & SAMPSON ENGINEERS, INC.

GROUNDWATER MONITORING WELL INSTALLATION REPORT

PROJECT NAME/NO.	BRA/EDIC Parcel P-3 / Job No: 96230.A			MONITORING WELL NO.	
LOCATION	Roxbury, MA			WS - 3	
CLIENT	BRA/EDIC			ELEVATION	
CONTRACTOR	Zoino - Hebert, Inc.	DRILLER	Paul Schaefer	TOP OF PVC	93.88 '
OBSERVED BY	Christine Hughes	DATE	Dec. 3, 1996	DEPTH TO GROUNDWATER FROM	
CHECKED BY	Andrew Wise	DATE	Dec. 11,1996	TOP OF PVC	8.49 '

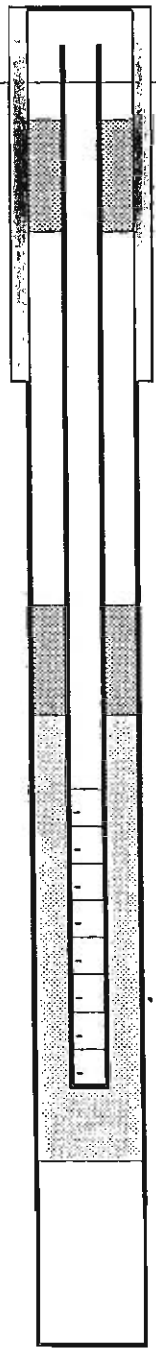
GROUND ELEVATION 92.61 '

GENERAL SOIL CONDITIONS

(NOT TO SCALE)

0.0 - 8.5 ft. :
Fine to coarse SAND,
Concrete
FILL

8.5 - 17.0 ft. :
Organic SILT and PEAT



LENGTH OF CASING ABOVE GROUND SURFACE	1.78 '
LENGTH OF RISER PIPE ABOVE GROUND SURFAC	1.27 '
THICKNESS OF SURFACE SEAL(S)	1.0 '
TYPE OF SURFACE SEAL(S)	Concrete
TYPE OF SURFACE CASING	Steel
ID OF SURFACE CASING	4 "
DEPTH BOTTOM OF CASING	3.24 '
ID OF RISER PIPE	2 "
TYPE OF RISER PIPE	Schedule 40 PVC
TYPE OF BACKFILL AROUND RISER PIPE	Bentonite
DEPTH TOP OF SEAL	1.0 '
TYPE OF SEAL	Bentonite
DEPTH BOTTOM OF SEAL/TOP OF SAND COLUMN	3.0 '
DEPTH TOP OF SCREEN	5.0 '
TYPE OF SCREEN	Machine-slotted PVC
SIZE OPENINGS	0.010 "
ID OF SCREEN	2 "
TYPE OF BACKFILL AROUND SCREEN	#1 Silica Sand
DEPTH BOTTOM OF SCREEN	15.0 '
DEPTH BOTTOM OF SAND COLUMN	17.0'
TYPE OF BACKFILL BELOW SCREEN	#1 Silica Sand
DIAMETER OF BOREHOLE	8 "
DEPTH BOTTOM OF BOREHOLE	17.0 '

NOTES:
Depth to groundwater measured on December 5, 1996.
Elevation relative to an arbitrary 100.00 foot datum.

MONITORING WELL NO.
WS - 3

WESTON & SAMPSON ENGINEERS, INC.

GROUNDWATER MONITORING WELL INSTALLATION REPORT

PROJECT NAME/NO.	BRA/EDIC Parcel P-3 / Job No: 96230.A			MONITORING WELL NO.	
LOCATION	Roxbury, MA			WS - 4	
CLIENT	BRA/EDIC			ELEVATION	
CONTRACTOR	Zoino - Hebert, Inc.	DRILLER	Paul Schaefer	TOP OF PVC	94.06 '
OBSERVED BY	Christine Hughes	DATE	Dec. 3, 1996	DEPTH TO GROUNDWATER FROM	
CHECKED BY	Andrew Wise	DATE	Dec. 11,1996	TOP OF PVC	8.84 '

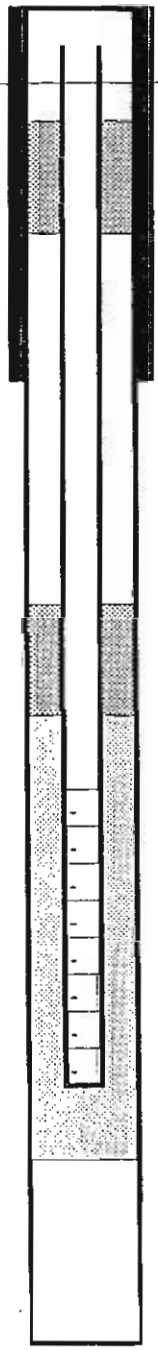
GROUND ELEVATION 92.00 '

GENERAL SOIL CONDITIONS
(NOT TO SCALE)

0.0 - 8.5 ft. :
Fine to coarse SAND
FILL

8.5 - 13.5 ft. :
PEAT and organic silt

13.5 - 17.0 ft. :
Fine to medium SAND
GLACIAL OUTWASH



LENGTH OF CASING ABOVE GROUND SURFACE	2.15 "
LENGTH OF RISER PIPE ABOVE GROUND SURFAC	2.06 '
THICKNESS OF SURFACE SEAL(S)	1.0 "
TYPE OF SURFACE SEAL(S)	Concrete
TYPE OF SURFACE CASING	Steel
ID OF SURFACE CASING	4 "
DEPTH BOTTOM OF CASING	2.85 '
ID OF RISER PIPE	2 "
TYPE OF RISER PIPE	Schedule 40 PVC
TYPE OF BACKFILL AROUND RISER PIPE	Bentonite
DEPTH TOP OF SEAL	1.0 '
TYPE OF SEAL	Bentonite
DEPTH BOTTOM OF SEAL/TOP OF SAND COLUMN	3.0 '
DEPTH TOP OF SCREEN	5.0 '
TYPE OF SCREEN	Machine-slotted PVC
SIZE OPENINGS	0.010 "
ID OF SCREEN	2 "
TYPE OF BACKFILL AROUND SCREEN	#1 Silica Sand
DEPTH BOTTOM OF SCREEN	15.0 '
DEPTH BOTTOM OF SAND COLUMN	17.0 '
TYPE OF BACKFILL BELOW SCREEN	#1 Silica Sand
DIAMETER OF BOREHOLE	8 "
DEPTH BOTTOM OF BOREHOLE	17.0 '

NOTES:
Depth to groundwater measured on December 5, 1996.
Elevation relative to an arbitrary 100.00 foot datum.

MONITORING WELL NO.
WS - 4

WESTON & SAMPSON
ENGINEERS, INC.

GROUNDWATER MONITORING WELL INSTALLATION REPORT

PROJECT NAME/NO.	BRA/EDIC Parcel P-3 / Job No: 96230.A			MONITORING WELL NO.	WS - 5
LOCATION	Roxbury, MA				
CLIENT	BRA/EDIC			ELEVATION	
CONTRACTOR	Zoino - Hebert, Inc.	DRILLER	Paul Schaefer	TOP OF PVC	98.27'
OBSERVED BY	Christine Hughes	DATE	Dec. 4, 1996	DEPTH TO GROUNDWATER FROM	
CHECKED BY	Andrew Wise	DATE	Dec. 11,1996	TOP OF PVC	14.19'

GROUND ELEVATION 96.39'

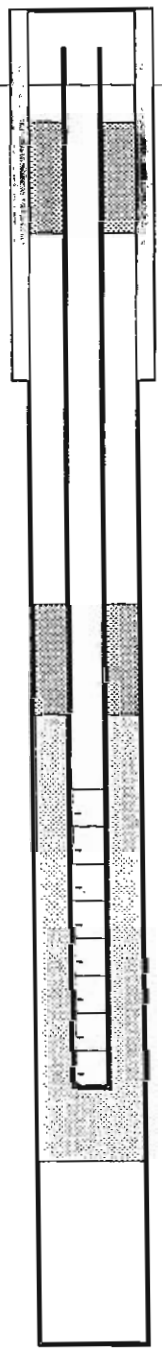
GENERAL SOIL CONDITIONS
(NOT TO SCALE)

0.0 - 0.5 ft. :
SILT and sand
TOPSOIL

0.5 - 3.5 ft. :
Medium to fine SAND
FILL

3.5 - 8.5 ft. :
Silt and clay
FILL

8.5 - 17.0 ft. :
Fine to coarse SAND
FILL



LENGTH OF CASING ABOVE GROUND SURFACE	2.04'
LENGTH OF RISER PIPE ABOVE GROUND SURFAC	1.88'
THICKNESS OF SURFACE SEAL(S)	1.0'
TYPE OF SURFACE SEAL(S)	Concrete
TYPE OF SURFACE CASING	Steel
ID OF SURFACE CASING	4"
DEPTH BOTTOM OF CASING	2.96'
ID OF RISER PIPE	2"
TYPE OF RISER PIPE	Schedule 40 PVC
TYPE OF BACKFILL AROUND RISER PIPE	Bentonite
DEPTH TOP OF SEAL	1.0'
TYPE OF SEAL	Bentonite
DEPTH BOTTOM OF SEAL/TOP OF SAND COLUMN	3.0'
DEPTH TOP OF SCREEN	5.0'
TYPE OF SCREEN	Machine-slotted PVC
SIZE OPENINGS	0.010"
ID OF SCREEN	2"
TYPE OF BACKFILL AROUND SCREEN	#1 Silica Sand
DEPTH BOTTOM OF SCREEN	15.0'
DEPTH BOTTOM OF SAND COLUMN	17.0'
TYPE OF BACKFILL BELOW SCREEN	#1 Silica Sand
DIAMETER OF BOREHOLE	8"
DEPTH BOTTOM OF BOREHOLE	17.0'

NOTES:
Depth to groundwater measured on December 5, 1996.
Elevation relative to an arbitrary 100.00 foot datum.

MONITORING WELL NO.
WS - 5

WESTON & SAMPSON ENGINEERS, INC.

GROUNDWATER MONITORING WELL INSTALLATION REPORT

PROJECT NAME/NO.	BRA/EDIC Parcel P-3 / Job No: 96230.A			MONITORING WELL NO.	
LOCATION	Roxbury, MA			WS - 6	
CLIENT	BRA/EDIC			ELEVATION	
CONTRACTOR	Zoino - Hebert. Inc.	DRILLER	Paul Schaefer	TOP OF PVC	97.03 '
OBSERVED BY	Christine Hughes	DATE	Dec. 4, 1996	DEPTH TO GROUNDWATER FROM	
CHECKED BY	Andrew Wise	DATE	Dec. 11, 1996	TOP OF PVC	12.56 '

GROUND ELEVATION 96.15 '

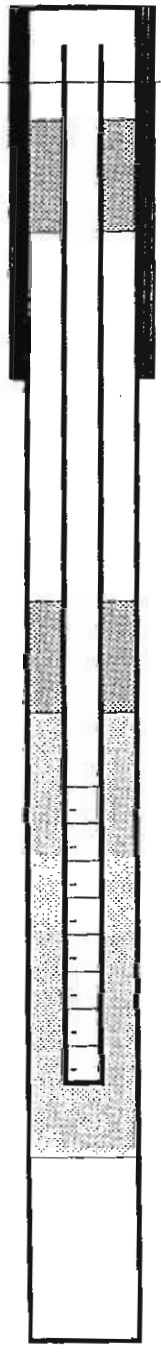
GENERAL SOIL CONDITIONS

(NOT TO SCALE)

0.0 - 0.5 ft.: SILT and sand TOPSOIL

0.5 - 8.5 ft.: Medium to fine SAND FILL

8.5 - 17.0 ft. : Fine to coarse SAND GLACIAL OUTWASH



LENGTH OF CASING ABOVE GROUND SURFACE	2.10 '
LENGTH OF RISER PIPE ABOVE GROUND SURFAC	1.87 '
THICKNESS OF SURFACE SEAL(S)	1.0 '
TYPE OF SURFACE SEAL(S)	Concrete
TYPE OF SURFACE CASING	Steel
ID OF SURFACE CASING	4 "
DEPTH BOTTOM OF CASING	2.90 '
ID OF RISER PIPE	2 "
TYPE OF RISER PIPE	Schedule 40 PVC
TYPE OF BACKFILL AROUND RISER PIPE	Native Fill
DEPTH TOP OF SEAL	3.0 '
TYPE OF SEAL	Bentonite
DEPTH BOTTOM OF SEAL/TOP OF SAND COLUMN	5.0 '
DEPTH TOP OF SCREEN	7.0 '
TYPE OF SCREEN	Machine-slotted PVC
SIZE OPENINGS	0.010 "
ID OF SCREEN	2 "
TYPE OF BACKFILL AROUND SCREEN	#1 Silica Sand
DEPTH BOTTOM OF SCREEN	17.0 '
DEPTH BOTTOM OF SAND COLUMN	17.0 '
TYPE OF BACKFILL BELOW SCREEN	N/A
DIAMETER OF BOREHOLE	8 "
DEPTH BOTTOM OF BOREHOLE	17.0 '

NOTES:

Depth to groundwater measured on December 5, 1996.

Elevation relative to an arbitrary 100.00 foot datum.

MONITORING WELL NO.
WS - 6

WESTON & SAMPSON ENGINEERS, INC.

GROUNDWATER MONITORING WELL INSTALLATION REPORT

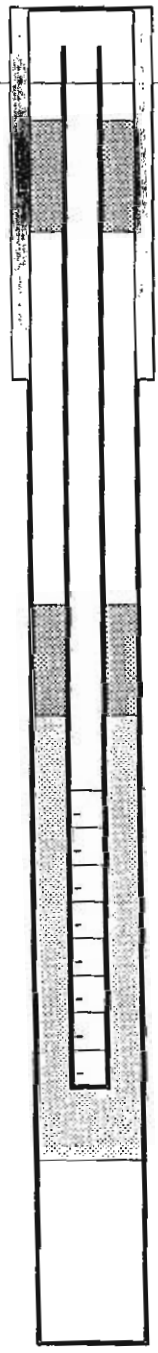
PROJECT NAME/NO.	BRA/EDIC Parcel P-3 / Job No: 96230.A			MONITORING WELL NO.	WS - 7
LOCATION	Roxbury, MA				
CLIENT	BRA/EDIC			ELEVATION	
CONTRACTOR	Zoino - Hebert, Inc.	DRILLER	Paul Schaefer	TOP OF PVC	98.12 '
OBSERVED BY	Christine Hughes	DATE	Dec. 4, 1996	DEPTH TO GROUNDWATER FROM	
CHECKED BY	Andrew Wise	DATE	Dec. 11,1996	TOP OF PVC	13.60 '

GROUND ELEVATION 96.34 '

GENERAL SOIL CONDITIONS
(NOT TO SCALE)

0.0 - 0.5 ft. :
SILT and sand
TOPSOIL

0.5 - 17.0 ft. :
Fine to coarse SAND
GLACIAL OUTWASH



LENGTH OF CASING ABOVE GROUND SURFACE	1.86 '
LENGTH OF RISER PIPE ABOVE GROUND SURFAC	1.78 '
THICKNESS OF SURFACE SEAL(S)	1.0 '
TYPE OF SURFACE SEAL(S)	Concrete
TYPE OF SURFACE CASING	Steel
ID OF SURFACE CASING	4 "
DEPTH BOTTOM OF CASING	3.14 '
ID OF RISER PIPE	2 "
TYPE OF RISER PIPE	Schedule 40 PVC
TYPE OF BACKFILL AROUND RISER PIPE	Native Fill
DEPTH TOP OF SEAL	3.0 '
TYPE OF SEAL	Bentonite
DEPTH BOTTOM OF SEAL/TOP OF SAND COLUMN	5.0 '
DEPTH TOP OF SCREEN	7.0 '
TYPE OF SCREEN	Machine-slotted PVC
SIZE OPENINGS	0.010 "
ID OF SCREEN	2 "
TYPE OF BACKFILL AROUND SCREEN	#1 Silica Sand
DEPTH BOTTOM OF SCREEN	17.0 '
DEPTH BOTTOM OF SAND COLUMN	17.0 '
TYPE OF BACKFILL BELOW SCREEN	N/A
DIAMETER OF BOREHOLE	8 "
DEPTH BOTTOM OF BOREHOLE	17.0 '

NOTES:
Depth to groundwater measured on December 5, 1996.
Elevation relative to an arbitrary 100.00 foot datum.

MONITORING WELL NO.
WS - 7

WESTON & SAMPSON ENGINEERS, INC.

GROUNDWATER MONITORING WELL INSTALLATION REPORT

PROJECT NAME/NO.	BRA/EDIC Parcel P-3 / Job No: 96230.A			MONITORING WELL NO.	
LOCATION	Roxbury, MA			WS - 8	
CLIENT	BRA/EDIC			ELEVATION	
CONTRACTOR	Zoino - Hebert, Inc.	DRILLER	Paul Schaefer	TOP OF PVC	102.95 '
OBSERVED BY	Christine Hughes	DATE	Dec. 4, 1996	DEPTH TO GROUNDWATER FROM	
CHECKED BY	Andrew Wise	DATE	Dec. 11, 1996	TOP OF PVC	16.70 '

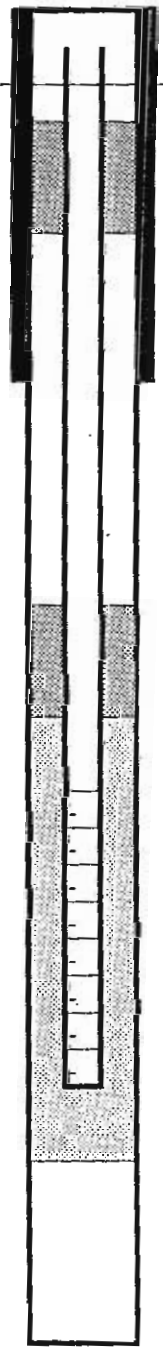
GROUND ELEVATION 100.70 '

GENERAL SOIL CONDITIONS (NOT TO SCALE)

0.0 - 17.5 ft. : Coarse to fine SAND FILL

17.5 - 21.5 ft. : Clay and silt

21.5 - 25.0 ft. : Organic SILT and PEAT



LENGTH OF CASING ABOVE GROUND SURFACE	2.40 '
LENGTH OF RISER PIPE ABOVE GROUND SURFAC	2.25 '
THICKNESS OF SURFACE SEAL(S)	1.0 '
TYPE OF SURFACE SEAL(S)	Concrete
TYPE OF SURFACE CASING	Steel
ID OF SURFACE CASING	4 "
DEPTH BOTTOM OF CASING	2.60 '
ID OF RISER PIPE	2 "
TYPE OF RISER PIPE	Schedule 40 PVC
TYPE OF BACKFILL AROUND RISER PIPE	Native Fill
DEPTH TOP OF SEAL	9.0 '
TYPE OF SEAL	Bentonite
DEPTH BOTTOM OF SEAL/TOP OF SAND COLUMN	11.0 '
DEPTH TOP OF SCREEN	13.0 '
TYPE OF SCREEN	Machine-slotted PVC
SIZE OPENINGS	0.010 "
ID OF SCREEN	2 "
TYPE OF BACKFILL AROUND SCREEN	#1 Silica Sand
DEPTH BOTTOM OF SCREEN	23.0 '
DEPTH BOTTOM OF SAND COLUMN	25.0 '
TYPE OF BACKFILL BELOW SCREEN	#1 Silica Sand
DIAMETER OF BOREHOLE	8 "
DEPTH BOTTOM OF BOREHOLE	25.0 '

NOTES:

Depth to groundwater measured on December 5, 1996.

Elevation relative to an arbitrary 100.00 foot datum.

MONITORING WELL NO.
WS - 8

WESTON & SAMPSON ENGINEERS, INC.

GROUNDWATER MONITORING WELL INSTALLATION REPORT

PROJECT NAME/NO.	BRA/EDIC Parcel P-3 / Job No: 96230.A			MONITORING WELL NO.	WS - 9
LOCATION	Roxbury, MA				
CLIENT	BRA/EDIC			ELEVATION	
CONTRACTOR	Zoino - Hebert, Inc.	DRILLER	Paul Schaefer	TOP OF PVC	102.70 '
OBSERVED BY	Christine Hughes	DATE	Dec. 5, 1996	DEPTH TO GROUNDWATER FROM	
CHECKED BY	Andrew Wise	DATE	Dec. 11, 1996	TOP OF PVC	17.43 '

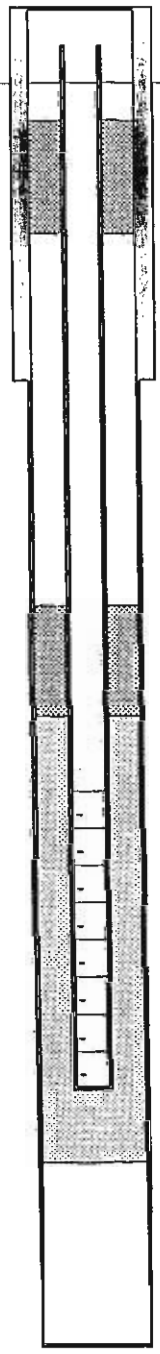
GROUND ELEVATION 100.25 '

GENERAL SOIL CONDITIONS
(NOT TO SCALE)

0.0 - 19.0 ft. :
Coarse to fine SAND
FILL

19.0 - 22.0 ft. :
Clay and silt

22.0 - 25.0 ft. :
Organic SILT and PEAT



LENGTH OF CASING ABOVE GROUND SURFACE	2.35 '
LENGTH OF RISER PIPE ABOVE GROUND SURFAC	2.18 '
THICKNESS OF SURFACE SEAL(S)	1.0 '
TYPE OF SURFACE SEAL(S)	Concrete
TYPE OF SURFACE CASING	Steel
ID OF SURFACE CASING	4 "
DEPTH BOTTOM OF CASING	2.65 '
ID OF RISER PIPE	2 "
TYPE OF RISER PIPE	Schedule 40 PVC
TYPE OF BACKFILL AROUND RISER PIPE	Native Fill
DEPTH TOP OF SEAL	8.0 '
TYPE OF SEAL	Bentonite
DEPTH BOTTOM OF SEAL/TOP OF SAND COLUMN	10.0 '
DEPTH TOP OF SCREEN	12.0 '
TYPE OF SCREEN	Machine-slotted PVC
SIZE OPENINGS	0.010 "
ID OF SCREEN	2 "
TYPE OF BACKFILL AROUND SCREEN	#1 Silica Sand
DEPTH BOTTOM OF SCREEN	22.0 '
DEPTH BOTTOM OF SAND COLUMN	25.0 '
TYPE OF BACKFILL BELOW SCREEN	#1 Silica Sand
DIAMETER OF BOREHOLE	8 "
DEPTH BOTTOM OF BOREHOLE	25.0 '

NOTES:
Depth to groundwater measured on December 5, 1996.
Elevation relative to an arbitrary 100.00 foot datum.

MONITORING WELL NO.
WS - 9

WESTON & SAMPSON ENGINEERS, INC.

GROUNDWATER MONITORING WELL INSTALLATION REPORT

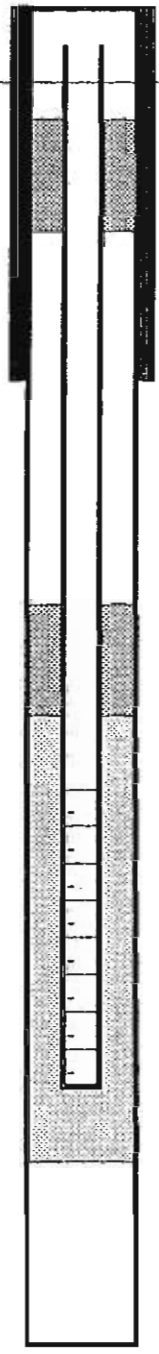
PROJECT NAME/NO.	BRA/EDIC Parcel P-3 / Job No: 96230.A			MONITORING WELL NO.	
LOCATION	Roxbury, MA			WS - 10	
CLIENT	BRA/EDIC			ELEVATION	
CONTRACTOR	Zoino - Hebert, Inc.	DRILLER	Paul Schaefer	TOP OF PVC	101.99 '
OBSERVED BY	Christine Hughes	DATE	Dec. 5, 1996	DEPTH TO GROUNDWATER FROM	
CHECKED BY	Andrew Wise	DATE	Dec. 11, 1996	TOP OF PVC	16.80 '

GROUND ELEVATION 100.98 '

GENERAL SOIL CONDITIONS (NOT TO SCALE)

0.0 - 14.4 ft. : Coarse to fine SAND FILL

14.0 - 25.0 ft. : Coarse to fine SAND GLACIAL OUTWASH



LENGTH OF CASING ABOVE GROUND SURFACE	1.53 '
LENGTH OF RISER PIPE ABOVE GROUND SURFAC	1.01 '
THICKNESS OF SURFACE SEAL(S)	1.0 '
TYPE OF SURFACE SEAL(S)	Concrete
TYPE OF SURFACE CASING	Steel
ID OF SURFACE CASING	4 "
DEPTH BOTTOM OF CASING	3.47 '
ID OF RISER PIPE	2 "
TYPE OF RISER PIPE	Schedule 40 PVC
TYPE OF BACKFILL AROUND RISER PIPE	Native Fill
DEPTH TOP OF SEAL	8.0 '
TYPE OF SEAL	Bentonite
DEPTH BOTTOM OF SEAL/TOP OF SAND COLUMN	10.0 '
DEPTH TOP OF SCREEN	12.0 '
TYPE OF SCREEN	Machine-slotted PVC
SIZE OPENINGS	0.010 "
ID OF SCREEN	2 "
TYPE OF BACKFILL AROUND SCREEN	#1 Silica Sand
DEPTH BOTTOM OF SCREEN	22.0 '
DEPTH BOTTOM OF SAND COLUMN	25.0 '
TYPE OF BACKFILL BELOW SCREEN	#1 Silica Sand
DIAMETER OF BOREHOLE	8 "
DEPTH BOTTOM OF BOREHOLE	25.0 '

NOTES:

Depth to groundwater measured on December 5, 1996.

Elevation relative to an arbitrary 100.00 foot datum.

MONITORING WELL NO.
WS - 10

WESTON & SAMPSON ENGINEERS, INC.

GROUNDWATER MONITORING WELL INSTALLATION REPORT

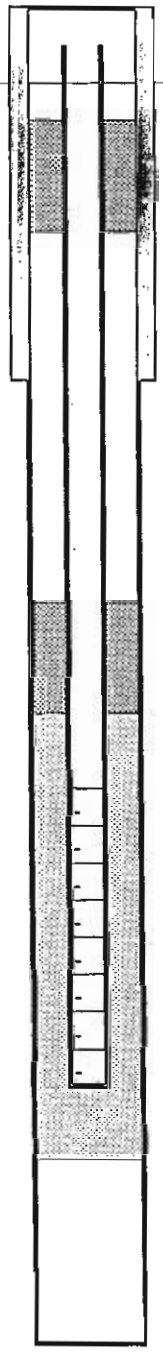
PROJECT NAME/NO.	BRA/EDIC Parcel P-3 / Job No: 96230.A			MONITORING WELL NO.	
LOCATION	Roxbury, MA			WS - 11	
CLIENT	BRA/EDIC			ELEVATION	
CONTRACTOR	Zoino - Hebert, Inc.	DRILLER	Paul Schaefer	TOP OF PVC	103.88 '
OBSERVED BY	Christine Hughes	DATE	Dec. 5, 1996	DEPTH TO GROUNDWATER FROM	
CHECKED BY	Andrew Wise	DATE	Dec. 11 1996	TOP OF PVC	19.20 '

GROUND ELEVATION 101.90 '

GENERAL SOIL CONDITIONS
(NOT TO SCALE)

0.0 - 13.5 ft. :
SILT and sand
FILL

13.5 - 22.0 ft. :
Medium to coarse SAND
GLACIAL OUTWASH



LENGTH OF CASING ABOVE GROUND SURFACE	2.15 '
LENGTH OF RISER PIPE ABOVE GROUND SURFAC	1.98 '
THICKNESS OF SURFACE SEAL(S)	1.0 '
TYPE OF SURFACE SEAL(S)	Concrete
TYPE OF SURFACE CASING	Steel
ID OF SURFACE CASING	4 "
DEPTH BOTTOM OF CASING	2.85 '
ID OF RISER PIPE	2 "
TYPE OF RISER PIPE	Schedule 40 PVC
TYPE OF BACKFILL AROUND RISER PIPE	Native Fill
DEPTH TOP OF SEAL	6.0 '
TYPE OF SEAL	Bentonite
DEPTH BOTTOM OF SEAL/TOP OF SAND COLUMN	8.0 '
DEPTH TOP OF SCREEN	10.0 '
TYPE OF SCREEN	Machine-slotted PVC
SIZE OPENINGS	0.010 "
ID OF SCREEN	2 "
TYPE OF BACKFILL AROUND SCREEN	Silica Sand
DEPTH BOTTOM OF SCREEN	20.0 '
DEPTH BOTTOM OF SAND COLUMN	22.0 '
TYPE OF BACKFILL BELOW SCREEN	#1 Silica Sand
DIAMETER OF BOREHOLE	8 "
DEPTH BOTTOM OF BOREHOLE	22.0 '

NOTES:
Depth to groundwater measured on December 5, 1996.
Elevation relative to an arbitrary 100.00 foot datum.

MONITORING WELL NO.
WS - 11

WESTON & SAMPSON
ENGINEERS, INC.

GROUNDWATER MONITORING WELL INSTALLATION REPORT

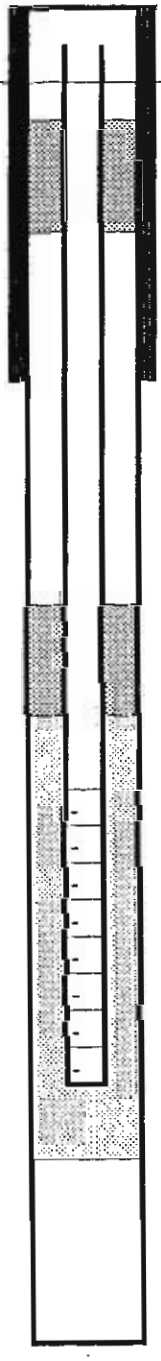
PROJECT NAME/NO.	BRA/EDIC Parcel P-3 / Job No: 96230.A			MONITORING WELL NO.	
LOCATION	Roxbury, MA			WS - 12	
CLIENT	BRA/EDIC			ELEVATION	
CONTRACTOR	Zoino - Hebert, Inc.	DRILLER	Art Johnson	TOP OF PVC	99.35 '
OBSERVED BY	Andrew Wise	DATE	Dec. 5, 1996	DEPTH TO GROUNDWATER FROM	
CHECKED BY	Andrew Wise	DATE	Dec. 11, 1996	TOP OF PVC	12.73 '

GROUND ELEVATION 96.89 '

GENERAL SOIL CONDITIONS (NOT TO SCALE)

0.0 - 12.0 ft. : Coarse to fine SAND FILL

12.0 - 19.0 ft. : PEAT and organic silt



LENGTH OF CASING ABOVE GROUND SURFACE	2.56 '
LENGTH OF RISER PIPE ABOVE GROUND SURFAC	2.46 '
THICKNESS OF SURFACE SEAL(S)	1.0 '
TYPE OF SURFACE SEAL(S)	Concrete
TYPE OF SURFACE CASING	Steel
ID OF SURFACE CASING	4 "
DEPTH BOTTOM OF CASING	2.44 '
ID OF RISER PIPE	2 "
TYPE OF RISER PIPE	Schedule 40 PVC
TYPE OF BACKFILL AROUND RISER PIPE	Native Fill
DEPTH TOP OF SEAL	4.0 '
TYPE OF SEAL	Bentonite
DEPTH BOTTOM OF SEAL/TOP OF SAND COLUMN	6.0 '
DEPTH TOP OF SCREEN	8.0 '
TYPE OF SCREEN	Machine-slotted PVC
SIZE OPENINGS	0.010 "
ID OF SCREEN	2 "
TYPE OF BACKFILL AROUND SCREEN	#1 Silica Sand
DEPTH BOTTOM OF SCREEN	18.0 '
DEPTH BOTTOM OF SAND COLUMN	19.0 '
TYPE OF BACKFILL BELOW SCREEN	#1 Silica Sand
DIAMETER OF BOREHOLE	8 "
DEPTH BOTTOM OF BOREHOLE	19.0 '

NOTES:

Depth to groundwater measured on December 5, 1996.

Elevation relative to an arbitrary 100.00 foot datum.

MONITORING WELL NO.
WS - 12

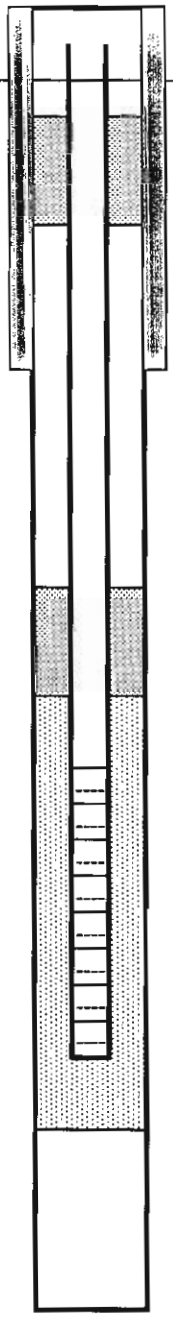
WESTON & SAMPSON ENGINEERS, INC.

GROUNDWATER MONITORING WELL INSTALLATION REPORT

PROJECT NAME/NO.	BRA Parcel P-3 / Job No: 200317.A			**MONITORING WELL NO.**	
LOCATION	Roxbury, MA			**WS-13**	
CLIENT	Boston Redevelopment Agency			ELEVATION	
CONTRACTOR	Earth Exploration	DRILLER	D. Makudera	TOP OF PVC	97.83'
OBSERVED BY	Len Rappoli	DATE	9/5/01	DEPTH TO GROUNDWATER FROM	
CHECKED BY	Annika Willis	DATE	10/4/01	TOP OF PVC	11.5'

GROUND ELEVATION

GENERAL SOIL CONDITIONS (NOT TO SCALE)



0.0 - 9.0 ft: URBAN FILL

9.0 - 13.0 ft: CLAY and SILT

13.0 - 16.0 ft: SAND and GRAVEL

<--------	LENGTH OF CASING ABOVE GROUND SURFACE	3'
<--------	LENGTH OF RISER PIPE ABOVE GROUND SURFACE	-
|	THICKNESS OF SURFACE SEAL(S)	1.0'
<--------	TYPE OF SURFACE SEAL(S)	Concrete
|	TYPE OF SURFACE CASING	Cast Iron
<--------	ID OF SURFACE CASING	4"
<--------	DEPTH BOTTOM OF CASING	2.25'
|	ID OF RISER PIPE	2"
<--------	TYPE OF RISER PIPE	Schedule 40 PVC
<--------	TYPE OF BACKFILL AROUND RISER PIPE	Natural Collapse
|	DEPTH TOP OF SEAL	2.0'
<--------	TYPE OF SEAL	Bentonite
|	DEPTH BOTTOM OF SEAL/TOP OF SAND COLUMN	4.0'
<--------	DEPTH TOP OF SCREEN	6.0'
|	TYPE OF SCREEN	Schedule 40 PVC
<--------	SIZE OPENINGS	0.010"
|	ID OF SCREEN	2"
<--------	TYPE OF BACKFILL AROUND SCREEN	#0 Silica Sand
<--------	DEPTH BOTTOM OF SCREEN	16.0'
<--------	DEPTH BOTTOM OF SAND COLUMN	16.0'
<--------	TYPE OF BACKFILL BELOW SCREEN	N/A
<--------	DIAMETER OF BOREHOLE	8"
<--------	DEPTH BOTTOM OF BOREHOLE	16.0'

NOTES:
Well WS 13 was installed in Boring B-209.

MONITORING WELL NO.
WS-13

WESTON & SAMPSON ENGINEERS, INC.

G:\Hazwaste\BRA\200317\Logs\[WS-13.XLS]A

Appendix C-3

Groundwater Sampling Field Notes

Clear 30°

2/6/01 P-3 Roxbury

0800 RFB arrives on site to collect groundwater samples from on site wells using low flow sampling techniques.

HF Scientific Turbidimeter
Serial # 809010
Calibrated to:
0.02 NTU with 0.02 NTU
10.0 NTU with 10.0 NTU
100.0 NTU with 100.0 NTU
1000.0 NTU with 1000.0 NTU

Hydrolab Quanta Water quality meter
Serial # Q000386
Calibrated to:
PH to 7.0 with 7.0
PH to 4.0 with 4.0
ORP to 433 MV with 432 MV
SpCond to 4.50 ms/cm with 4.49 ms/cm
D.O to 9.03 mg/L with 100% Saturated Air

Samples to be analyzed for VPH, EPHw/Targets, Dissolved lead.

2/6/01 P-3 Roxbury

WS-12 DTW 12.88
TD 21.3

TURB	TIME	TEMP	SpC	DO	PH	ORP	H_2O level	flow
NTU	24H	°C	ms/cm	mg/L	UNITLESS	MV	14.0	mL/M
5.6	0948	10.3	3.69	0.87	6.4	103	14.0	300
5.8	0952	10.39	3.55	0.96	6.43	103	14.0	300
6.1	0955	10.35	3.33	0.99	6.44	102	14.0	300
6.0	0958	10.32	3.18	0.94	6.45	101	14.0	300
6.1	1001	10.32	3.09	0.88	6.46	100	14.0	300
5.8	1004	10.37	3.01	0.83	6.47	99	14.0	300
5.9	1007	10.47	2.92	0.76	6.48	98	14.0	300
5.7	1010	10.43	2.88	0.72	6.48	98	14.0	300
5.8	1013	10.39	2.82	0.70	6.49	97	14.0	300
6.1	1016	10.36	2.76	0.68	6.50	97	14.0	300
5.7	1022	10.45	2.68	0.63	6.51	96	14.0	300
3.6	1025	10.47	2.64	0.61	6.51	96	14.0	300
2.9	1028	10.41	2.61	0.61	6.51	95	14.0	300
2.8	1031	10.40	2.57	0.62	6.51	95	14.0	300
2.8	1034	10.40	2.55	0.62	6.51	96	14.0	300

Sample collected @ 1036

2/6/01 using well P-3 Roxbury

WS-8

~~DTW~~ ~~TD~~

— DESTROYED —

WS-10

DTW 18.65

TD 22.0

TURB	TIME	TEMP	SpC	DO	PH	ORP	H_2O level	flow
NTU	24H	°C	ms/cm	mg/L	—	mV	feet	ml/min
36.1	1300	12.94	13.87	1.13	6.30	130	19.25	500
32.3	1303	12.89	1.382	1.11	6.28	130	19.25	500
31.6	1306	12.99	1.385	1.10	6.27	130	19.25	500
28.6	1309	12.83	1.385	1.10	6.25	130	19.25	500
28.8	1312	12.84	1.382	1.05	6.25	130	19.25	500
28.9	1315	12.89	1.385	1.04	6.24	130	19.25	500
28.1	1318	12.82	1.388	1.04	6.24	130	19.25	500
28.5	1321	12.84	1.383	1.04	6.24	130	19.25	500

Sample collected @ 1325

2/6/01 P-3 ROXBURY

WS-9

DTW 17.9

TD 23.21

TURB	TIME	TEMP	SpC	DO	PH	ORP	H_2O level	flow
NTU	24H	°C	ms/cm	mg/L	—	mV	feet	ml/min
27.1	1450	11.14	1.49	0.52	6.47	115	17.6	400
21.5	1453	11.04	1.50	0.69	6.42	113	17.6	400
14.7	1459	11.15	1.49	0.54	6.41	111	17.6	400
6.9	1502	11.10	1.49	0.50	6.39	109	17.6	400
3.0	1505	11.14	1.49	0.47	6.41	109	17.6	400
3.1	1508	11.11	1.48	0.45	6.39	108	17.6	400
3.3	1511	11.03	1.49	0.44	6.39	108	17.6	400
3.2	1514	10.98	1.49	0.43	6.40	106	17.6	400
3.4	1517	11.03	1.49	0.43	6.40	106	17.6	400

Samples collected @ 1530

2/7/01 P-3 Roxbury

WS-3 DTW 8.75
TD 16.0

TURB	TIME	TEMP	SpC	DO	PH	ORP	H_2O Level	Flow
29.1	0900	8.0	0.99	0.79	6.55	116	9.6'	475
14.8	0903	7.97	1.000	0.67	6.54	117	9.6'	475
9.7	0909	7.99	1.017	0.60	6.51	118	9.6	475
6.9	0912	7.97	1.025	0.54	6.51	119	9.6'	475
5.7	0915	8.03	1.03	0.52	6.51	118	9.6'	475
4.6	0918	8.01	1.039	0.49	6.49	119	9.6'	475
4.5	0921	8.02	1.042	0.48	6.48	120	9.6'	475
4.3	0924	8.02	1.045	0.46	6.44	120	9.6'	475
4.4	0927	8.03	1.046	0.45	6.48	120	9.6'	475
4.5	0930	8.01	1.051	0.44	6.48	121	9.6	475
4.3	0933	8.02	1.050	0.44	6.48	121	9.6	475

Samples collected @ 0940

2/7/01 P-3 Roxbury

WS-7 DTW 14.76
TD

TURB	TIME	TEMP	SpC	DO	PH	ORP	H_2O Level	Flow
NTU	24H	°C	ms/cm	mg/l	—	mV	Feet	ml/min
3.5	1026	11.48	2.37	0.68	6.37	169	14.75	450
2.1	1032	11.61	2.36	0.74	6.38	165	14.75	450
1.38	1035	11.53	2.38	0.71	6.35	163	14.75	450
1.36	1038	11.48	2.37	0.70	6.38	160	14.75	450
1.42	1055	11.36	2.37	0.77	6.35	158	14.75	450
1.68	1058	11.59	2.37	0.74	6.36	157	14.75	450
1.41	1101	11.47	2.37	0.84	6.35	155	14.75	450
1.31	1121	11.37	2.38	0.85	6.36	152	14.75	450
1.38	1124	11.41	2.37	0.87	6.37	150	14.75	450
1.41	1127	11.42	2.37	0.84	6.63	149	14.75	450
1.68	1145	11.46	2.37	0.84	6.63	145	14.75	450
1.62	1148	11.42	2.37	0.85	6.36	144	14.75	450
1.64	1151	11.39	2.37	0.85	6.36	143	14.75	450
1.62	1154	11.39	2.38	0.85	6.37	143	14.75	450

Samples collected @ 1205

2/7/01

WS-5

DTW 15.34

TD 17.0

TURB NTU	TIME 24H	TEMP °C	SpC ms/cm	DO mg/l	PH —	ORP mV	H_2O Level Feet	Flow #5ml/min
3.1	1300	11.75	2.36	2.20	6.45	144	15.5'	450
3.2	1303	11.58	2.36	2.10	6.43	143	15.5'	450
3.5	1315	11.61	2.36	2.06	6.42	143	15.5'	450
3.0	1318	11.59	2.35	2.02	6.43	143	15.5'	450
2.6	1321	11.63	2.36	1.98	6.42	143	15.5'	450
3.4	1324	11.51	2.35	1.96	6.40	141	15.5'	450
3.1	1330	11.71	2.35	1.94	6.48	141	15.5'	450
3.0	1333	11.68	2.35	1.93	6.40	141	15.5'	450

Samples collected 1345

3/29/01

0600 LVR, NRH ARRIVE AT WSE OFFICE TO MOBE UP FOR SOIL SAMPLING AND SURVEY WORK AT BRA PARCEL P-3 IN ROXBURY, MA.

0745 LVR, NRH ARRIVE AT P-3. CHECK OUT SITE. WS-6 HAS BEEN DESTROYED. WS-11 INTACT BUT METAL COVER IS GONE. OTHER WELLS APPEAR TO BE OK.

AWAITING PHONE CALL / ARRIVAL OF AMRO LABS FOR BOTTLE DELIVERY.

0815 LVR, NRH PREPARING TO SAMPLE SS-1 TO SS-4 (PLUS DUP) FOR EPH, LEAD.

0830 SAMPLE COLLECTED FROM SS-4
DUP COLLECTED AT SS-4

0840 SAMPLE COLLECTED FROM SS-2

0850 SAMPLE COLLECTED FROM SS-1

0900 SAMPLE COLLECTED FROM SS-3

APPENDIX D

Hydraulic Gradient and Groundwater Velocity Calculations

Weston & Sampson ENGINEERS, INC.	PROJECT: BRA/EDIC 90230 A	DATE: 2/20/98	PAGE: 1
		BY: G.D. Nastas	
		CHKD. BY: BEE 2/27/98	

HORIZONTAL HYDRAULIC GRADIENTS

PARCEL P-3

Hydraulic Gradient in SW Portion of P-3, Madison Park High School Parking Lot:

ΔH = 85' contour to 84.5' contour = 0.5 Feet
ΔL = 220 Feet.

$$\text{Gradient } (I) = \frac{0.5}{220} = 0.002273 = \underline{0.0023}$$ ✓

Hydraulic Gradient near Connollys Tavern:

ΔH = 86' contour to 85' contour = 1 Foot
ΔL = 50'

$$\text{Gradient } (I) = 1/50 = \underline{0.02}$$ ✓

Weston & Sampson ENGINEERS, INC.	PROJECT: BRA/EDIC 90230.A	DATE: 2/20/98	PAGE: (2)
		BY: G.D. NASLAS	
		CHKD. BY: (BEE) 2/27/98	

GROUNDWATER VELOCITY CALCULATIONS

$$V = \frac{Ki}{n}$$

K = Hydraulic Conductivity

- assumed value of 283 ft/day * Freeze + Cherry K=79 value for silty sand & bottom of till / top organic silt.

$i = 0.0023$ to 0.02

$n = 0.2$ (Driscoll, 1986)

a) For i value of 0.0023

$$V = \frac{283 \times 0.0023}{0.2} = 0.03255 \text{ ft/day} \checkmark$$

$$= 11.9 \text{ ft/year} \checkmark$$

b) For i value of 0.02

$$V = \frac{283 \times 0.02}{0.2}$$

$$= 0.283 \text{ ft/day} \checkmark$$

$$= 103.4 \text{ ft/year} \checkmark$$

APPENDIX E

Phase II Laboratory Analytical Data Reports

E-1 Soil
E-2 Groundwater
E-3 Surface Soil

Appendix E-1

Soil

AMRO Environmental Laboratories Corporation

111 Herrick Street, Merrimack, NH 03054
TEL: (603) 424-2022 · FAX: (603) 429-8496

Rec'd 9/28/01.

September 24, 2001

Annika Willis
Weston & Sampson Engineers
5 Centennial Drive
Peabody, MA 019607985
TEL: (978) 532-1900
FAX: (978) 977-0100

RE: 200317.B BRA - PARCEL P3 Order No.: 0109098

Dear Annika Willis:

AMRO Environmental Laboratories Corp. received 2 samples on 9/17/01 for the analyses presented in the following report.

The enclosed results are additional analyses requested after the original report was issued. AMRO operates a Quality Assurance Program which meets or exceeds National Environmental Laboratory Accreditation Conference (NELAC), state, and EPA requirements. A copy of the appropriate state and/or NELAC Certificate is attached.

The enclosed Sample Receipt Checklist details the condition of your sample(s) upon receipt. Please be advised that any unused sample volume and sample extracts will be stored for a period of thirty (30) days from this report date. After this time, AMRO will properly dispose of the remaining sample(s). If you require further analysis, or need the samples held for a longer period, please contact us immediately.

This report consists of a total of 11 pages. This letter is an integral part of your data report. If you have any questions regarding this project in the future, please refer to the Order Number above.

Sincerely,

Nancy Stewart
Vice President / Lab Director

AMRO Environmental Laboratories Corp.

Date: *24-Sep-01*

CLIENT: Weston & Sampson Engineers
Project: 200317.B BRA - PARCEL P3
Lab Order: 0109098
Date Received: 9/17/01

Work Order Sample Summary

Lab Sample ID	Client Sample ID	Collection Date
0109098-01A	B-210 5-7'	9/5/01
0109098-02A	B-211 5-7'	9/5/01

AMRO Environmental Laboratories Corp.

Date: *24-Sep-01*

CLIENT:	Weston & Sampson Engineers	**Client Sample ID:**	B-210 5-7'
Lab Order:	0109098		
Project:	200317.B BRA - PARCEL P3	**Collection Date:**	9/5/01
Lab ID:	0109098-01A	**Matrix:**	SOIL

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
ICP METALS, TCLP LEACHED		**SW1311/6010B**				Analyst: RK
Lead	ND	1.0		mg/L	1	9/20/01 1:49:14 PM

Qualifiers:

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
B - Analyte deteeted in the associatcd Method Blank
H - Method prescribed holding time exceeded
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range
- See Case Narrative
RL - Reporting Limit; defined as the lowest concentration the laboratory can accurately quantitate.

AMRO Environmental Laboratories Corp.

Date: *24-Sep-01*

CLIENT:	Weston & Sampson Engineers	**Client Sample ID:**	B-211 5-7'
Lab Order:	0109098		
Project:	200317.B BRA - PARCEL P3	**Collection Date:**	9/5/01
Lab ID:	0109098-02A	**Matrix:**	SOIL

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
ICP METALS, TCLP LEACHED		**SW1311/6010B**				Analyst: RK
Lead	8.3	1.0		mg/L	1	9/20/01 1:52:46 PM

Qualifiers:

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
B - Analyte detected in the associated Method Blank
H - Method prescribed holding time exceeded
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range
- See Case Narrative
RL - Reporting Limit; defined as the lowest concentration the laboratory can accurately quantitate.

Lab Order: 0109098
Client: Weston & Sampson Engineers
Project: 200317.B BRA - PARCEL P3

DATES REPORT

Sample ID	Client Sample ID	Collection Date	Matrix	Test Name	TCLP Date	Prep Date	Analysis Date
0109098-01A	B-210 5-7'	9/5/01	Soil	ICP METALS, TCLP	9/19/01	9/20/01	9/20/01
0109098-02A	B-211 5-7'			ICP METALS, TCLP	9/19/01	9/20/01	9/20/01

Weston & Sampson Engineers, Inc.
Five Centennial Drive
Peabody, Massachusetts 01960-7985
www.westonandsampson.com
Tel: (978) 532-1900 Fax: (978) 977-0100

Innovative Solutions since 1899

FAX TRANSMISSION

Amro #0109098

To:		From:	
Co. Name:	AMRO	Name:	Annika Willis
Address:	Merrimack, NH	No. of Pages:	1 (including cover sheet)
		Date/Time:	9-17-01 1:34 pm
Fax No.:	603.429.8496	Chargeable No.:	200317.A
Attention:	Denise, Marianne Sheen	Verifying No.:	(978) 532-1900 ext. 2215
Re:	BRA P-3 Soil samples LAB order 109025	Fax No.:	(978) 977-0100

Note: If you did not receive all of the pages or if you have a question, please call the verifying number (above).

Remarks:

Please run TCLP-Lead tests for the following Soil samples:

	Sample ID	Lab Sample ID
1.	B-210 5-7'	109025-04A
2.	B-211 5-7'	109025-05A

Report the data to me within the standard turn-around time (10 business days).

Thank you,
Annika

AMRO Environmental Laboratories Corporation

SAMPLE RECEIPT CHECKLIST

111 Herrick Street
Merrimack, NH 03054
(603) 424-2022

Client: WESTON & SAMPSON ENG
Project Name: 20037.B BRA-PARCEL P3
Ship via: (circle one) Fed Ex., UPS, AMRO Courier,
Hand Del., Other Courier, Other:

AMRO ID: 0109025
Date Rec.: 9-6-01
Date Due: 9-18-01

Items to be Checked Upon Receipt	Yes	No	NA	Comments
1. Army Samples received in individual plastic bags?			✓	
2. Custody Seals present?			✓	
3. Custody Seals Intact?			✓	
4. Air Bill included in folder if received?			✓	
5. Is COC included with samples?	✓			
6. Is COC signed and dated by client?	✓			
7. Laboratory receipt temperature. TEMP = 5°				
Samples rec. with ice ✓ ice packs ___ neither ___				
8. Were samples received the same day they were sampled?		✓		
Is client temperature 4°C ± 2°C?	✓			
If no obtain authorization from the client for the analyses.				
Client authorization from: Date: Obtained by:				
9. Is the COC filled out correctly and completely?	✓			
10. Does the info on the COC match the samples?	✓			
11. Were samples rec. within holding time?	✓			
12. Were all samples properly labeled?	✓			
13. Were all samples properly preserved?	✓			
14. Were proper sample containers used?	✓			
15. Were all samples received intact? (none broken or leaking)	✓			
16. Were VOA vials rec. with no air bubbles?			✓	
17. Were the sample volumes sufficient for requested analysis?	✓			
18. Were all samples received?	✓			
19. VPH and VOA Soils only:			✓	
Sampling Method VPH (circle one): M=Methanol, E=EnCore (air-tight container)				
Sampling Method VOA (circle one): M=Methanol, SB=Sodium Bisulfate, E=EnCore, B=Bulk				
If M or SB:				
Does preservative cover the soil?				
If NO then client must be faxed.				
Does preservation level come close to the fill line on the vial?				
If NO then client must be faxed.				
Were vials provided by AMRO?				
If NO then weights MUST be obtained from client				
Was dry weight aliquot provided?				
If NO then fax client and inform the VOA lab ASAP.				
20. Subcontracted Samples:			✓	
What samples sent:				
Where sent:				
Date:				
Analysis:				
TAT:				
21. Information entered into:				
Internal Tracking Log?	✓			
Dry Weight Log?	✓			
Client Log?			✓	
Composite Log?			✓	
Filtration Log?			✓	

Received By: CC Date: 9-6-01 Logged in By: CC Date: 9-7-01
Labeled By: CC Date: 9-7-01 Checked By: MG Date: 9-11-01

NA= Not Applicable

AMRO Environmental Laboratories Corporation
111 Herrick Street
Merrimack, NH 03054

CHAIN-OF-CUSTODY RECORD

4-1339

Office: (603) 424-2022
Fax: (603) 429-8496

Project No.:	Project Name:	Project Manager:	Samplers (Signature):	AMRO Project No.:
200317.B	BRA - PARCEL P3	GEORGE NASLAS	L V Rappl	0109025
	Project State: MA			

Sample ID	Date/Time Sampled	Matrix (A= Air, S= Soil, GW= Ground W., WW= Waste W., DW= Drinking W., O= Oil, Other= Specify)	Total # of Cont. & Size	Analysis Required: TOTAL LEAD	Remarks
B-208 5-7'	9/5/01 0950	SOIL	1 40z CG	X	
B-209 6-8'	1100				
B-209 10-12'	1130				
B-210 5-7'	1400				
B-211 5-7'	1450				
B-212 5-7'	1520				

Preservative: Cl-HCl, MeOH, N-HN03, S-H2SO4, Na-NaOH, O- Other — 1
Container Type: P- Plastic, G-Glass, V-Vial, T- Teflon, O-Other — G

Please print clearly, legibly and completely. Samples can not be logged in and the turnaround time clock will not start until any ambiguities are resolved.

FAX No.: (978) 977-0100

NOTES: Preservatives, Special reporting limits, Known Contamination, etc;
PLS HOLD SAMPLES FOR POSSIBLE TCLP LEAD.

Send Results To: WESTON AND SAMPSON ENGINEERS
5 CENTENNIAL DRIVE
PEABODY MA 01960
ATTN: ANNIKA WILLIS

Seal Intact? Yes No N/A

GW-1 ___ GW-2 ___ GW-3 ___

MCP Level Needed: RCS-1

Relinquished By	Date/ Time	Received By	Date/Time
L V Rappl	9/6/01 13:45	D Stevenson	9/6/01 13:45
D Stevenson	9/6/01 1600	C Cearley	9/6/01 1600

P.O. No:

Results Needed By: STANDARD

PRIORITY TURNAROUND TIME AUTHORIZATION
Before submitting samples for expedited TAT, you must have requested in advance and received a coded TAT AUTHORIZATION NUMBER
AUTHORIZATION No. _____ BY: _____

SHEET 1 OF 1

White: Lab Copy Yellow: Accompanies Report Pink: Client Copy

The Commonwealth of Massachusetts

Department of Environmental Protection

Division of Environmental Analysis
Senator William X. Wall Experiment Station

certifies

M-NH012

AMRO ENVIRONMENTAL LAB
111 HERRICK ST
MERRIMACK, NH 03054-0000

Laboratory Director: Nancy Stewart

for the analysis of NON POTABLE WATER (CHEMISTRY)
POTABLE WATER (CHEMISTRY)

pursuant to 310 CMR 42.00

This certificate supersedes all previous Massachusetts certificates issued to this laboratory. The laboratory is regulated by and shall be responsible for being in compliance with Massachusetts regulations at 310 CMR 42.00.

This certificate is valid only when accompanied by the latest dated Certified Parameter List as issued by the Massachusetts D.E.P. Contact the Division of Environmental Analysis to verify the current certification status of the laboratory.

Certification is no guarantee of the validity of the data. This certification is subject to unannounced laboratory inspections.

Issued: 01 JUL 2001

Expires: 30 JUN 2002

Director, Division of Environmental Analysis

COMMONWEALTH OF MASSACHUSETTS
DEPARTMENT OF ENVIRONMENTAL PROTECTION

Certified Parameter List as of: 09 JUL 2001

M-NH012 AMRO-ENVIRONMENTAL LAB
MERRIMACK NH

NON POTABLE WATER (CHEMISTRY) Effective Date 01 JUL 2001 Expiration Date 30 JUN 2002

Analytes and Methods

ALUMINUM	EPA 200.7	NITRATE-N	EPA 353.2
ANTIMONY	EPA 200.7	KJELDAHL-N	EPA 351.1
ANTIMONY	EPA 204.2	KJELDAHL-N	EPA 351.2
ARSENIC	EPA 200.7	ORTHOPHOSPHATE	EPA 365.2
ARSENIC	EPA 206.2	ORTHOPHOSPHATE	EPA 300.0
ARSENIC	ASTM D2972-93(C)	TOTAL PHOSPHORUS	EPA 365.2
BERYLLIUM	EPA 200.7	CHEMICAL OXYGEN DEMAND	EPA 410.4
CADMIUM	EPA 200.7	CHEMICAL OXYGEN DEMAND	HACH METHOD 8
CHROMIUM	EPA 200.7	BIOCHEMICAL OXYGEN DEMAND	EPA 405.1
COBALT	EPA 200.7	TOTAL CYANIDE	EPA 335.2
COPPER	EPA 200.7	NON-FILTERABLE RESIDUE	EPA 160.2
IRON	EPA 200.7	TOTAL RESIDUAL CHLORINE	SM 4500-CL-G
LEAD	EPA 200.7	OIL AND GREASE	EPA 413.1
LEAD	EPA 239.2	TOTAL PHENOLICS	EPA 420.1
MANGANESE	EPA 200.7	VOLATILE HALOCARBONS	EPA 624
MERCURY	EPA 245.1	VOLATILE AROMATICS	EPA 624
MOLYBDENUM	EPA 200.7	CHLORDANE	EPA 608
NICKEL	EPA 200.7	ALDRIN	EPA 608
SELENIUM	EPA 200.7	DIELDRIN	EPA 608
SELENIUM	EPA 270.2	DDD	EPA 608
SILVER	EPA 200.7	DDT	EPA 608
STRONTIUM	EPA 200.7	HEPTACHLOR	EPA 608
THALLIUM	EPA 200.7	HEPTACHLOR EPOXIDE	EPA 608
THALLIUM	EPA 279.2	POLYCHLORINATED BIPHENYLS (WATER)	EPA 608
ZINC	EPA 200.7	POLYCHLORINATED BIPHENYLS (OIL)	EPA 600/4-81-045
PH	EPA 150.1		
SPECIFIC CONDUCTIVITY	EPA 120.1		
TOTAL DISSOLVED SOLIDS	EPA 160.1		
TOTAL HARDNESS (CACO3)	EPA 200.7		
CALCIUM	EPA 200.7		
MAGNESIUM	EPA 200.7		
SODIUM	EPA 200.7		
POTASSIUM	EPA 200.7		
TOTAL ALKALINITY	EPA 310.1		
CHLORIDE	EPA 325.3		
CHLORIDE	EPA 300.0		
FLUORIDE	EPA 340.2		
FLUORIDE	EPA 300.0		
SULFATE	EPA 375.4		
SULFATE	EPA 300.0		
AMMONIA-N	EPA 350.2		
NITRATE-N	EPA 300.0		

COMMONWEALTH OF MASSACHUSETTS
DEPARTMENT OF ENVIRONMENTAL PROTECTION

Certified Parameter List as of: 09 JUL 2001

M-NH012 AMRO ENVIRONMENTAL LAB
MERRIMACK NH

POTABLE WATER (CHEMISTRY) Effective Date 09 JUL 2001 Expiration Date 30 JUN 2002

Analytes and Methods	
ANTIMONY	EPA 200.9
ARSENIC	EPA 200.7
ARSENIC	EPA 200.9
BARIUM	EPA 200.7
BERYLLIUM	EPA 200.7
CADMIUM	EPA 200.7
CHROMIUM	EPA 200.7
COPPER	EPA 200.7
LEAD	EPA 200.9
MERCURY	EPA 245.1
NICKEL	EPA 200.7
SELENIUM	EPA 200.9
THALLIUM	EPA 200.9
NITRATE-N	EPA 353.2
NITRITE-N	EPA 353.2
FLUORIDE	EPA 300.0
FLUORIDE	SM 4500-F-E
SULFATE	EPA 300.0
CYANIDE	SM 4500-CN-C,E
TURBIDITY	EPA 180.1
RESIDUAL FREE CHLORINE	SM 4500-CL-G
CALCIUM	EPA 200.7
TOTAL ALKALINITY	SM 2320B
TOTAL DISSOLVED SOLIDS	SM 2540C
PH	EPA 150.1
1,2-DIBROMOETHANE	EPA 504.1
1,2-DIBROMO-3-CHLOROPROPANE	EPA 504.1

AMRO Environmental Laboratories Corporation

111 Herrick Street, Merrimack, NH 03054
TEL: (603) 424-2022 · FAX: (603) 429-8496

rec'd 9/20/01
200317.B

September 14, 2001

Annika Willis
Weston & Sampson Engineers
5 Centennial Drive
Peabody, MA 019607985
TEL: (978) 532-1900
FAX: (978) 977-0100

RE: 200317.B BRA - PARCEL P3 Order No.: 0109025

Dear Annika Willis:

AMRO Environmental Laboratories Corp. received 6 samples on 9/6/01 for the analyses presented in the following report.

AMRO operates a Quality Assurance Program which meets or exceeds National Environmental Laboratory Accreditation Conference (NELAC), state, and EPA requirements. A copy of the appropriate state and/or NELAC Certificate is attached.

The enclosed Sample Receipt Checklist details the condition of your sample(s) upon receipt. Please be advised that any unused sample volume and sample extracts will be stored for a period of thirty (30) days from this report date. After this time, AMRO will properly dispose of the remaining sample(s). If you require further analysis, or need the samples held for a longer period, please contact us immediately.

This report consists of a total of 14 pages. This letter is an integral part of your data report. If you have any questions regarding this project in the future, please refer to the Order Number above.

Sincerely,

Nancy Stewart
Vice President / Lab Director

AMRO Environmental Laboratories Corp.

Date: *14-Sep-01*

CLIENT: Weston & Sampson Engineers
Project: 200317.B BRA - PARCEL P3
Lab Order: 0109025
Date Received: 9/6/01

Work Order Sample Summary

Lab Sample ID	Client Sample ID	Collection Date
0109025-01A	B-208 5-7'	9/5/01
0109025-02A	B-209 6-8'	9/5/01
0109025-03A	B-209 10-12'	9/5/01
0109025-04A	B-210 5-7'	9/5/01
0109025-05A	B-211 5-7'	9/5/01
0109025-06A	B-212 5-7'	9/5/01

2

AMRO Environmental Laboratories Corp.

Date: *14-Sep-01*

CLIENT:	Weston & Sampson Engineers	**Client Sample ID:**	B-208 5-7'
Lab Order:	0109025		
Project:	200317.B BRA - PARCEL P3	**Collection Date:**	9/5/01
Lab ID:	0109025-01A	**Matrix:**	SOIL

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
CP METALS TOTAL SW-846 - 3051/6010		**SW6010B**				Analyst: **RK**
Lead	230	3.3		mg/Kg-dry	1	9/11/01 1:44:15 PM
PERCENT MOISTURE		**D2216**				Analyst: **CLM**
Percent Moisture	9.0	0		wt%	1	9/7/01

Qualifiers:

- ND - Not Detected at the Reporting Limit
- J - Analyte detected below quantitation limits
- B - Analyte detected in the associated Method Blank
- H - Method prescribed holding time exceeded
- S - Spike Recovery outside accepted recovery limits
- R - RPD outside accepted recovery limits
- E - Value above quantitation range
- # - See Case Narrative

RL - Reporting Limit; defined as the lowest concentration the laboratory can accurately quantitate.

AMRO Environmental Laboratories Corp.

Date: *14-Sep-01*

CLIENT:	Weston & Sampson Engineers	**Client Sample ID:**	B-209 6-8'
Lab Order:	0109025		
Project:	200317.B BRA - PARCEL P3	**Collection Date:**	9/5/01
Lab ID:	0109025-02A	**Matrix:**	SOIL

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
ICP METALS TOTAL SW-846 - 3051/6010		**SW6010B**				Analyst: **RK**
Lead	33	3.3		mg/Kg-dry	1	9/11/01 1:49:24 PM
PERCENT MOISTURE		**D2216**				Analyst: **CLM**
Percent Moisture	3.9	0		wt%	1	9/7/01

Qualifiers:

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
B - Analyte detected in the associated Method Blank
H - Method prescribed holding time exceeded
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range
- See Case Narrative
RL - Reporting Limit; defined as the lowest concentration the laboratory can accurately quantitate.

AMRO Environmental Laboratories Corp.

Date: *14-Sep-01*

CLIENT:	Weston & Sampson Engineers	**Client Sample ID:**	B-209 10-12'
Lab Order:	0109025		
Project:	200317.B BRA - PARCEL P3	**Collection Date:**	9/5/01
Lab ID:	0109025-03A	**Matrix:**	SOIL

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
ICP METALS TOTAL SW-846 - 3051/6010		**SW6010B**				Analyst: **RK**
Lead	55	3.7		mg/Kg-dry	1	9/11/01 1:54:22 PM
PERCENT MOISTURE		**D2216**				Analyst: **CLM**
Percent Moisture	18.5	0		wt%	1	9/7/01

Qualifiers:

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
B - Analyte detected in the associated Method Blank
H - Method prescribed holding time exceeded
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range
- See Case Narrative
RL - Reporting Limit; defined as the lowest concentration the laboratory can accurately quantitate.

AMRO Environmental Laboratories Corp.

Date: *14-Sep-01*

CLIENT:	Weston & Sampson Engineers	**Client Sample ID:**	B-210 5-7'
Lab Order:	0109025		
Projeet:	200317.B BRA - PARCEL P3	**Collection Date:**	9/5/01
Lab ID:	0109025-04A	**Matrix:**	SOIL

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
ICP METALS TOTAL SW-846 - 3051/6010		**SW6010B**				Analyst: **RK**
Lead	250	3.4		mg/Kg-dry	1	9/11/01 1:59:18 PM
PERCENT MOISTURE		**D2216**				Analyst: **CLM**
Percent Moisture	9.5	0		wt%	1	9/7/01

Qualifiers:

ND - Not Deteeted at the Reporting Limit

J - Analyte deteeted below quantitation limits

B - Analyte detected in the associated Method Blank

H - Method preseribed holding time exceeded

S - Spike Recovery outside accepted recovery limits

R - RPD outside aeecpted recovery limits

E - Value above quantitation range

- See Case Narrative

RL - Reporting Limit; defined as the lowest concentration the laboratory can accurately quantitate.

AMRO Environmental Laboratories Corp.

Date: *14-Sep-01*

CLIENT:	Weston & Sampson Engineers	**Client Sample ID:**	B-211 5-7'
Lab Order:	0109025		
Project:	200317.B BRA - PARCEL P3	**Collection Date:**	9/5/01
Lab ID:	0109025-05A	**Matrix:**	SOIL

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
ICP METALS TOTAL SW-846 - 3051/6010		**SW6010B**				Analyst: **RK**
Lead	13,000	3.3		mg/Kg-dry	1	9/11/01 2:04:26 PM
PERCENT MOISTURE		**D2216**				Analyst: **CLM**
Percent Moisture	9.6	0		wt%	1	9/7/01

Qualifiers:

ND - Not Dctected at the Reporting Limit
J - Analyte detected below quantitation limits
B - Analyte detected in the associated Method Blank
H - Method preseribed holding time exceeded
S - Spike Recovery outside accepted recovery limits
R - RPD outside aceepted reeovery limits
E - Value above quantitation range
- See Case Narrative
RL - Reporting Limit; defined as the lowest concentration the laboratory can accurately quantitate.

AMRO Environmental Laboratories Corp.

Date: *14-Sep-01*

CLIENT:	Weston & Sampson Engineers	**Client Sample ID:**	B-212 5-7'
Lab Order:	0109025		
Project:	200317.B BRA - PARCEL P3	**Collection Date:**	9/5/01
Lab ID:	0109025-06A	**Matrix:**	SOIL

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
ICP METALS TOTAL SW-846 - 3051/6010		**SW6010B**				Analyst: **RK**
Lead	33	3.4		mg/Kg-dry	1	9/11/01 2:10:24 PM
PERCENT MOISTURE		**D2216**				Analyst: **CLM**
Percent Moisture	13.7	0		wt%	1	9/7/01

Qualifiers:

- ND - Not Detected at the Reporting Limit
- J - Analyte detected below quantitation limits
- B - Analyte detected in the associated Method Blank
- H - Method prescribed holding time exceeded
- S - Spike Recovery outside accepted recovery limits
- R - RPD outside aceepted recovery limits
- E - Value above quantitation range
- # - See Case Narrative

RL - Reporting Limit; defined as the lowest concentration the laboratory can aeeurately quantitate.

Lab Order: 0109025
Client: Weston & Sampson Engineers
Project: 200317.B BRA - PARCEL P3

DATES REPORT

Sample ID	Client Sample ID	Collection Date	Matrix	Test Name	TCLP Date	Prep Date	Analysis Date
0109025-01A	B-208 5-7'	9/5/01	Soil	ICP METALS, 3051/6010		9/10/01	9/11/01
				Percent Moisture			9/7/01
0109025-02A	B-209 6-8'			ICP METALS, 3051/6010		9/10/01	9/11/01
				Percent Moisture			9/7/01
0109025-03A	B-209 10-12'			ICP METALS, 3051/6010		9/10/01	9/11/01
				Percent Moisture			9/7/01
0109025-04A	B-210 5-7'			ICP METALS, 3051/6010		9/10/01	9/11/01
				Percent Moisture			9/7/01
0109025-05A	B-211 5-7'			ICP METALS, 3051/6010		9/10/01	9/11/01
				Percent Moisture			9/7/01
0109025-06A	B-212 5-7'			ICP METALS, 3051/6010		9/10/01	9/11/01
				Percent Moisture			9/7/01

AMRO Environmental Laboratories Corporation

SAMPLE RECEIPT CHECKLIST

111 Herrick Street
Merrimack, NH 03054
(603) 424-2022

Client: WESTON & SAMPSON ENG
Project Name: 20037.B BRA-PARCEL P3
Ship via: (circle one) Fed Ex., UPS, AMRO Courier, Hand Del., Other Courier, Other:

AMRO ID: 0109025
Date Rec.: 9-6-01
Date Due: 9-18-01

Items to be Checked Upon Receipt	Yes	No	NA	Comments
1. Army Samples received in individual plastic bags?			✓	
2. Custody Seals present?			✓	
3. Custody Seals Intact?			✓	
4. Air Bill included in folder if received?			✓	
5. Is COC included with samples?	✓			
6. Is COC signed and dated by client?	✓			
7. Laboratory receipt temperature. TEMP = 5°				
Samples rec. with ice ✓ ice packs ___ neither ___				
8. Were samples received the same day they were sampled?		✓		
Is client temperature 4°C ± 2°C?	✓			
If no obtain authorization from the client for the analyses.				
Client authorization from: Date: Obtained by:				
9. Is the COC filled out correctly and completely?	✓			
10. Does the info on the COC match the samples?	✓			
11. Were samples rec. within holding time?	✓			
12. Were all samples properly labeled?	✓			
13. Were all samples properly preserved?	✓			
14. Were proper sample containers used?	✓			
15. Were all samples received intact? (none broken or leaking)	✓			
16. Were VOA vials rec. with no air bubbles?			✓	
17. Were the sample volumes sufficient for requested analysis?	✓			
18. Were all samples received?	✓			
19. VPH and VOA Soils only:			✓	
Sampling Method VPH (circle one): M=Methanol, E=EnCore (air-tight container)				
Sampling Method VOA (circle one): M=Methanol, SB=Sodium Bisulfate, E=EnCore, B=Bulk				
If M or SB:				
Does preservative cover the soil?				
If NO then client must be faxed.				
Does preservation level come close to the fill line on the vial?				
If NO then client must be faxed.				
Were vials provided by AMRO?				
If NO then weights MUST be obtained from client				
Was dry weight aliquot provided?				
If NO then fax client and inform the VOA lab ASAP.				
20. Subcontracted Samples:			✓	
What samples sent:				
Where sent:				
Date:				
Analysis:				
TAT:				
21. Information entered into:				
Internal Tracking Log?	✓			
Dry Weight Log?	✓			
Client Log?			✓	
Composite Log?			✓	
Filtration Log?			✓	

Received By: CC Date: 9-6-01
Labeled By: CC Date: 9-7-01
Logged in By: CC Date: 9-7-01
Checked By: MG Date: 9-11-01

NA= Not Applicable

qc/qcmemos/forms/samplerec Rev.18 06/00

AMRO Environmental Laboratories Corporation
111 Herrick Street
Merrimack, NH 03054

CHAIN-OF-CUSTODY RECORD

41339

Office: (603) 424-[illegible]
Fax: (603) 429-8496

Project No.:	Project Name:	Project Manager:	Samplers (Signature):	AMRO Project No.:
200317.B	BRA - PARCEL P3	GEORGE NASLAS	L V Rappl	0109025
	Project State: MA			

Sample ID	Date/Time Sampled	Matrix (A= Air, S= Soil, GW= Ground W., WW= Waste W., DW= Drinking W., O= Oil, Other= Specify)	Total # of Cont. & Size	Analysis Required: TOTAL LEAD	Remarks
B-208 5-7'	9/5/01 0950	SOIL	1402CG	X	
B-209 6-8'	1100				
B-209 10-12'	1130				
B-210 5-7'	1400				
B-211 5-7'	1450				
B-212 5-7'	1520				
Preservative: Cl-HCl, MeOH, N-HN03, S-H2SO4, Na-NaOH, O- Other				I	
Container Type: P- Plastic, G-Glass, V-Vial, T- Teflon, O-Other				G	

Please print clearly, legibly and completely. Samples can not be logged in and the turnaround time clock will not start until any ambiguities are resolved.

FAX No.: (978) 977-0100

NOTES: Preservatives, Special reporting limits, Known Contamination, etc;
PLS HOLD SAMPLES FOR POSSIBLE TCLP LEAD.

Send Results To: WESTON AND SAMPSON ENGINEERS
5 CENTENNIAL DRIVE
PEABODY MA 01960
ATTN: ANNIKA WILLIS

Seal Intact? Yes No N/A

GW-1 ___ GW-2 ___ GW-3 ___

MCP Level Needed: RCS-1

P.O. No:

Results Needed By: STANDARD

PRIORITY TURNAROUND TIME AUTHORIZATION
Before submitting samples for expedited TAT, you must have requested in advance and received a coded TAT AUTHORIZATION NUMBER
AUTHORIZATION No. ____ BY: ____

Relinquished By	Date/ Time	Received By	Date/Time
L V Rappl	9/6/01 13:40	D Stefanko	9/6/01 13:40
D Stefanko	9/6/01 1600	C Cearley	9/6/01 1600

SHEET 1 OF 1

White: Lab Copy Yellow: Accompanies Report Pink: Client Copy

The Commonwealth of Massachusetts

Department of Environmental Protection

Division of Environmental Analysis

Senator William X. Wall Experiment Station

certifies

M-NH012

AMRO ENVIRONMENTAL LAB
111 HERRICK ST
MERRIMACK, NH 03054-0000

Laboratory Director: Nancy Stewart

for the analysis of NON POTABLE WATER (CHEMISTRY)
POTABLE WATER (CHEMISTRY)

pursuant to 310 CMR 42.00

This certificate supersedes all previous Massachusetts certificates issued to this laboratory. The laboratory is regulated by and shall be responsible for being in compliance with Massachusetts regulations at 310 CMR 42.00.

This certificate is valid only when accompanied by the latest dated Certified Parameter List as issued by the Massachusetts D.E.P. Contact the Division of Environmental Analysis to verify the current certification status of the laboratory.

Certification is no guarantee of the validity of the data. This certification is subject to unannounced laboratory inspections.

Issued: 01 JUL 2001

Expires: 30 JUN 2002

Oscar C. Jacobs

Director, Division of Environmental Analysis

COMMONWEALTH OF MASSACHUSETTS
DEPARTMENT OF ENVIRONMENTAL PROTECTION

Certified Parameter List as of: 09 JUL 2001

M-NH012 AMRO ENVIRONMENTAL LAB
MERRIMACK NH

NON POTABLE WATER (CHEMISTRY) Effective Date 01 JUL 2001 Expiration Date 30 JUN 2002

Analytes and Methods

ALUMINUM	EPA 200.7	NITRATE-N	EPA 353.2
ANTIMONY	EPA 200.7	KJELDAHL-N	EPA 351.1
ANTIMONY	EPA 204.2	KJELDAHL-N	EPA 351.2
ARSENIC	EPA 200.7	ORTHOPHOSPHATE	EPA 365.2
ARSENIC	EPA 206.2	ORTHOPHOSPHATE	EPA 300.0
ARSENIC	ASTM D2972-93(C)	TOTAL PHOSPHORUS	EPA 365.2
BERYLLIUM	EPA 200.7	CHEMICAL OXYGEN DEMAND	EPA 410.4
CADMIUM	EPA 200.7	CHEMICAL OXYGEN DEMAND	HACH METHOD 800
CHROMIUM	EPA 200.7	BIOCHEMICAL OXYGEN DEMAND	EPA 405.1
COBALT	EPA 200.7	TOTAL CYANIDE	EPA 335.2
COPPER	EPA 200.7	NON-FILTERABLE RESIDUE	EPA 160.2
IRON	EPA 200.7	TOTAL RESIDUAL CHLORINE	SM 4500-CL-G
LEAD	EPA 200.7	OIL AND GREASE	EPA 413.1
LEAD	EPA 239.2	TOTAL PHENOLICS	EPA 420.1
MANGANESE	EPA 200.7	VOLATILE HALOCARBONS	EPA 624
MERCURY	EPA 245.1	VOLATILE AROMATICS	EPA 624
MOLYBDENUM	EPA 200.7	CHLORDANE	EPA 608
NICKEL	EPA 200.7	ALDRIN	EPA 608
SELENIUM	EPA 200.7	DIELDRIN	EPA 608
SELENIUM	EPA 270.2	DDD	EPA 608
SILVER	EPA 200.7	DDT	EPA 608
STRONTIUM	EPA 200.7	HEPTACHLOR	EPA 608
THALLIUM	EPA 200.7	HEPTACHLOR EPOXIDE	EPA 608
THALLIUM	EPA 279.2	POLYCHLORINATED BIPHENYLS (WATER)	EPA 608
ZINC	EPA 200.7	POLYCHLORINATED BIPHENYLS (OIL)	EPA 600/4-81-045
PH	EPA 150.1		
SPECIFIC CONDUCTIVITY	EPA 120.1		
TOTAL DISSOLVED SOLIDS	EPA 160.1		
TOTAL HARDNESS (CACO3)	EPA 200.7		
CALCIUM	EPA 200.7		
MAGNESIUM	EPA 200.7		
SODIUM	EPA 200.7		
POTASSIUM	EPA 200.7		
TOTAL ALKALINITY	EPA 310.1		
CHLORIDE	EPA 325.3		
CHLORIDE	EPA 300.0		
FLUORIDE	EPA 340.2		
FLUORIDE	EPA 300.0		
SULFATE	EPA 375.4		
SULFATE	EPA 300.0		
AMMONIA-N	EPA 350.2		
NITRATE-N	EPA 300.0		

COMMONWEALTH OF MASSACHUSETTS
DEPARTMENT OF ENVIRONMENTAL PROTECTION

Certified Parameter List as of: 09 JUL 2001

M- NH012 AMRO ENVIRONMENTAL LAB
MERRIMACK NH

POTABLE WATER (CHEMISTRY) Effective Date 09 JUL 2001 Expiration Date 30 JUN 2002

Analytes	Methods
ANTIMONY	EPA 200.9
ARSENIC	EPA 200.7
ARSENIC	EPA 200.9
BARIUM	EPA 200.7
BERYLLIUM	EPA 200.7
CADMIUM	EPA 200.7
CHROMIUM	EPA 200.7
COPPER	EPA 200.7
LEAD	EPA 200.9
MERCURY	EPA 245.1
NICKEL	EPA 200.7
SELENIUM	EPA 200.9
THALLIUM	EPA 200.9
NITRATE-N	EPA 353.2
NITRITE-N	EPA 353.2
FLUORIDE	EPA 300.0
FLUORIDE	SM 4500-F-E
SULFATE	EPA 300.0
CYANIDE	SM 4500-CN-C,E
TURBIDITY	EPA 180.1
RESIDUAL FREE CHLORINE	SM 4500-CL-G
CALCIUM	EPA 200.7
TOTAL ALKALINITY	SM 2320B
TOTAL DISSOLVED SOLIDS	SM 2540C
PH	EPA 150.1
1,2-DIBROMOETHANE	EPA 504.1
1,2-DIBROMO-3-CHLOROPROPANE	EPA 504.1

AMRO Environmental Laboratories Corporation

111 Herrick Street, Merrimack, NH 03054
TEL: (603) 424-2022 · FAX: (603) 429-8496

January 26, 2001

Chris McDermott
Weston & Sampson Engineers
5 Centennial Drive
Peabody, MA 019607985
TEL: (978) 532-1900
FAX (978) 977-0100

RE: 200317.A BRA P-3 Roxbury Order No.: 0101094

Dear Chris McDermott:

AMRO Environmental Laboratories Corp. received 9 samples on 1/12/01 for the analyses presented in the following report.

AMRO operates a Quality Assurance Program which meets or exceeds National Environmental Laboratory Accreditation Conference (NELAC), state, and EPA requirements. A copy of the appropriate state and/or NELAC Certificate is attached. Please see the enclosed Case Narrative for quality control deviations that were encountered during the analyses associated with this project.

The enclosed Sample Receipt Checklist details the condition of your sample(s) upon receipt. Please be advised that any unused sample volume and sample extracts will be stored for a period of thirty (30) days from this report date. After this time, AMRO will properly dispose of the remaining sample(s). If you require further analysis, or need the samples held for a longer period, please contact us immediately.

This report consists of a total of 56 pages. This letter is an integral part of your data report. If you have any questions regarding this project in the future, please refer to the Order Number above.

Sincerely,

Nancy Stewart
Vice President / Lab Director

WORK ORDER SAMPLE SUMMARY

AMRO Environmental Laboratories Corp.

Date: *26-Jan-01*

CLIENT: Weston & Sampson Engineers
Project: 200317.A BRA P-3 Roxbury
Lab Order: 0101094
Date Received: 1/12/01

Work Order Sample Summary

Lab Sample ID	Client Sample ID	Collection Date
0101094-01A	B-201(D) 10-12'	1/10/01
0101094-02A	B-201(D) 22-24'	1/10/01
0101094-03A	B-207(S)- 3-5'	1/10/01
0101094-04A	DUP	1/10/01
0101094-05A	B-202(S) 5-7'	1/11/01
0101094-06A	B-203(S) 5-7'	1/11/01
0101094-07A	B-204(S) 5-7'	1/11/01
0101094-08A	B-205(S) 3-5'	1/11/01
0101094-09A	B-206(S) 3-5'	1/11/01

Lab Order: 0101094
Client: Weston & Sampson Engineers
Project: 200317.A BRA P-3 Roxbury

DATES REPORT

Sample ID	Client Sample ID	Collection Date	Matrix	Test Name	TCLP Date	Prep Date	Analysis Date
0101094-01A	B-201(D) 10-12'	1/10/01	Soil	EPH, Soil, Full List		1/15/01	1/17/01
				EPH, Soil, Full List		1/15/01	1/19/01
				ICP METALS, 3051/6010		1/15/01	1/15/01
				Percent Moisture			1/15/01
0101094-02A	B-201(D) 22-24'			EPH, Soil, Full List		1/15/01	1/17/01
				ICP METALS, 3051/6010		1/15/01	1/15/01
				Percent Moisture			1/15/01
0101094-03A	B-207(S)- 3-5'			EPH, Soil, Full List		1/15/01	1/17/01
				ICP METALS, 3051/6010		1/15/01	1/15/01
				Percent Moisture			1/15/01
0101094-04A	DUP			EPH, Soil, Full List		1/15/01	1/19/01
				EPH, Soil, Full List		1/15/01	1/17/01
				ICP METALS, 3051/6010		1/15/01	1/15/01
				Percent Moisture			1/15/01
0101094-05A	B-202(S) 5-7'	1/11/01		EPH, Soil, Full List		1/15/01	1/17/01
				EPH, Soil, Full List		1/15/01	1/19/01
				ICP METALS, 3051/6010		1/15/01	1/15/01
				Percent Moisture			1/15/01
0101094-06A	B-203(S) 5-7'			EPH, Soil, Full List		1/15/01	1/17/01
				ICP METALS, 3051/6010		1/15/01	1/15/01
				Percent Moisture			1/15/01
0101094-07A	B-204(S) 5-7'			EPH, Soil, Full List		1/15/01	1/17/01
				ICP METALS, 3051/6010		1/15/01	1/15/01
				Percent Moisture			1/15/01
0101094-08A	B-205(S) 3-5'			EPH, Soil, Full List		1/15/01	1/17/01
				ICP METALS, 3051/6010		1/15/01	1/15/01
				Percent Moisture			1/15/01
0101094-09A	B-206(S) 3-5'			EPH, Soil, Full List		1/15/01	1/17/01

Lab Order: 0101094
Client: Weston & Sampson Engineers
Project: 200317.A BRA P-3 Roxbury

DATES REPORT

Sample ID	Client Sample ID	Collection Date	Matrix	Test Name	TCLP Date	Prep Date	Analysis Date
0101094-09A	B-206(S) 3-5'	1/11/01	Soil	ICP METALS, 3051/6010		1/15/01	1/15/01
				Percent Moisture			1/15/01

CHAIN-OF-CUSTODY

AMRO Environmental Laboratories Corporation
111 Herrick Street
Merrimack, N.H. 03054
Office: 603-424-2022 Fax: 603-429-8496

CHAIN OF CUSTODY RECORD

32009

Proj. No. 20037.A | Project Name: BRA P-3 ROXBURY | Project State: MA

Samplers (Signature): Robert F. Butler

PAGE 1 OF 1

Sta. No.	Date	Time	Comp	Grab	Station Location	Type Size, & No. of Containers	MATRIX (Water - A, Soil/Solid-S, Waste-W, Other-O, Explain)	EPH w/ PAHs by MA DEP	LEAD	Remarks
	1/10/01	1120	X		B-201(D) 10-12'	1-8oz Amber	S	X	X	
	1/10/01	1300	X		B-201(D) 22-24'	1-8oz Amber	S	X	X	
	1/10/01	1505	X		B-207(S) 3-5'	1-8oz Amber	S	X	X	
	1/10/01	—	X		DUP	1-8oz Amber	S	X	X	
	1/11/01	1250	X		B-202(S) 5-7'	1-8oz Amber	S	X	X	
	1/11/01	1030	X		B-203(S) 5-7'	1-8oz Amber	S	X	X	
	1/11/01	1210	X		B-204(S) 5-7'	1-8oz Amber	S	X	X	
	1/11/01	0933	X		B-205(S) 3-5'	1-8oz Amber	S	X	X	
	1/11/01	0856	X		B-206(S) 3-5'	1-8oz Amber	S	X	X	

Please print clearly, legibly and completely. Samples cannot be logged in and the turnaround time clock will not start until any ambiguities are resolved.

PRIORITY TURNAROUND TIME AUTHORIZATION

Before submitting samples for expedited T.A.T., you must have requested in advance and received a coded **T.A.T. AUTHORIZATION NUMBER.**

AUTHORIZATION NO. _____ **T.A.T. authorized by:** _____

Relinquished by (Signature)	Date Time	Received by (Signature)
Robert F. Butler	01/12/01 10:45	
	01/14/01 14:20	
		1-12-01 15:20

☒ Fax to (phone) 978 937-0100

Results needed: STANDARD

PO#:

AMRO Project No.: 010144

Seal Intact? Yes No N/A

Send Results to:
Chris McDermott
WESTON & SAMPSON ENGINEERS
5 Centennial Drive
Peabody, MA 01960
TEL: 978-532-1900

Remarks: *MCP S-1 standards

White: Lab copy Yellow: Accompanies report Pink: Client copy

SAMPLE RECEIPT CHECKLIST

AMRO Environmental Laboratories Corporation

SAMPLE RECEIPT CHECKLIST

111 Herrick Street
Merrimack, NH 03054
(603) 424-2022

Client: WESTON & SAMPSON
Project Name: ROXBURY
Ship via: (circle one) Fed Ex., UPS, AMRO Courier.
Hand Del., Other Courier, Other:

AMRO ID: 0101094
Date Rec.: 1-12-01
Date Due: 1-24-01

Items to be Checked Upon Receipt	Yes	No	NA	Comments
1. Army Samples received in individual plastic bags?		✓		
2. Custody Seals present?			—	
3. Custody Seals Intact?			—	
4. Air Bill included in folder if received?			✓	
5. Is COC included with samples?	—			
6. Is COC signed and dated by client?	✓			
7. Laboratory receipt temperature. TEMP = 2°				
Samples rec. with ice ✓ ice packs ___ neither ___				
8. Were samples received the same day they were sampled?		✓		
Is client temperature 4°C ± 2°C?				
If no obtain authorization from the client for the analyses.				
Client authorization from: Date: Obtained by:				
9. Is the COC filled out correctly and completely?	✓			
10. Does the info on the COC match the samples?	✓			
11. Were samples rec. within holding time?	✓			
12. Were all samples properly labeled?	✓			
13. Were all samples properly preserved?	✓			
14. Were proper sample containers used?	✓			
15. Were all samples received intact? (none broken or leaking)	✓			
16. Were VOA vials rec. with no air bubbles?			✓	
17. Were the sample volumes sufficient for requested analysis?	✓	V		limited sample
18. Were all samples received?	✓			
19. VPH and VOA Soils only:			✓	
Sampling Method VPH (circle one): M=Methanol, E=EnCore (air-tight container)				
Sampling Method VOA (circle one): M=Methanol, SB=Sodium Bisulfate, E=EnCore, B=Bulk				
If M or SB:				
Does preservative cover the soil?				
If NO then client must be faxed.				
Does preservation level come close to the fill line on the vial?				
If NO then client must be faxed.				
Were vials provided by AMRO?				
If NO then weights MUST be obtained from client				
Was dry weight aliquot provided?				
If NO then fax client and inform the VOA lab ASAP.				
20. Subcontracted Samples:			✓	
What samples sent:				
Where sent:				
Date:				
Analysis:				
TAT:				
21. Information entered into:				
Internal Tracking Log?	✓			
Dry Weight Log?	✓		•	
Client Log?			✓	
Composite Log?			✓	
Filtration Log?			✓	

Received By: MG Date: 1/12/01 Logged in By: NLM Date: 1/12/01
Labeled By: Date: Checked By: Date:

NA= Not Applicable

qc/qcmemos/forms/samplerec Rev.18 06/00

STATE CERTIFICATE

State of New Hampshire
Environmental Laboratory Accreditation Program

Awards Primary Accreditation to

AMRO Environmental Laboratories
of
Merrimack, NH

For the analyses listed on the attached page(s) in accordance with the provisions of the NELAC Standards and Env-C 300.

Certificate Number: 100100-C

Date of Issue: January 24, 2001

Expiration Date: July 19, 2001

Program Manager

Continuing accreditation status is dependent on successful ongoing participation in the program.
Customers may verify the laboratory's current status by calling (603) 271-2991 or (603) 271-2998

NEW HAMPSHIRE ENVIRONMENTAL LABORATORY ACCREDITATION PROGRAM

Laboratory: AMRO Environmental Laboratories Address: Merrimack, NH
Certificate Number: 100100-C Date of Issue: January 24, 2001 Expiration Date: July 19, 2001

ACCREDITS THE ABOVED MENTIONED LABORATORY FOR THE FOLLOWING ANALYSES:

(ANALYSES IN **UNDERLINED BOLD** ARE NOT EPA APPROVED FOR COMPLIANCE TESTING)

DRINKING WATER METALS

Aluminum:	EPA 200.7
Antimony:	EPA 200.7, EPA 200.9
Arsenic:	EPA 200.7, EPA 200.9
Barium:	EPA 200.7
Beryllium:	EPA 200.7, EPA 200.9
Cadmium:	EPA 200.7, EPA 200.9
Calcium:	EPA 200.7
Chromium:	EPA 200.7, EPA 200.9
Copper:	EPA 200.7, EPA 200.9
Iron:	EPA 200.7, EPA 200.9
Lead:	EPA 200.7, EPA 200.9
Mercury:	EPA 245.1
Nickel:	EPA 200.7, EPA 200.9
Selenium:	EPA 200.9
Silver:	EPA 200.7, EPA 200.9
Sodium:	EPA 200.7
Thallium:	EPA 200.9
Zinc:	EPA 200.7

DRINKING WATER INORGANIC CONTAMINANTS

Alkalinity:	**EPA 310.1**
Chloride	EPA 300.0, EPA 325.3
Chlorine, Total Residual:	SM 4500Cl G mod.
Chlorine, Free Residual:	SM 4500Cl G mod.
Conductivity	EPA 120.1
Cyanide, Total:	SM 4500-CN E
Fluoride	EPA 300.0, EPA 340.2
Fluoride	SM 4500-F E
Hardness by Calculation:	EPA 200.7
Nitrate-N:	EPA 353.2
Nitrite-N:	EPA 353.2
Orthophosphate	EPA 300.0
pH:	EPA 150.1
Sulfate	**EPA 375.4**, EPA 300.0
Total Filt. Residue (TDS):	SM 2540C
Turbidity:	EPA 180.1

INDIVIDUAL DRINKING WATER ORGANIC CONTAMINANTS

DBCP:	EPA 504.1
EDB:	EPA 504.1

WASTEWATER METALS

Aluminum:	EPA 200.7

WASTEWATER METALS Cont.)

Antimony:	EPA 200.7, EPA 204.2
Arsenic:	EPA 200.7, D297293C
Arsenic:	EPA 206.2
Barium:	EPA 200.7
Beryllium:	EPA 200.7
Cadmium:	EPA 200.7
Calcium:	EPA 200.7
Chromium:	EPA 200.7
Cobalt:	EPA 200.7
Copper:	EPA 200.7
Iron:	EPA 200.7
Lead:	EPA 200.7, EPA 239.2
Manganese:	EPA 200.7
Mercury:	EPA 245.1
Molybdenum:	EPA 200.7
Nickel:	EPA 200.7
Selenium:	EPA 200.7, EPA 270.2
Silver:	EPA 200.7
Thallium:	EPA 200.7, EPA 279.2
Vanadium:	EPA 200.7
Zinc:	EPA 200.7

WASTEWATER INORGANIC CONTAMINANTS

Alkalinity:	EPA 310.1
Ammonia-N:	EPA 350.2
BOD:	EPA 405.1
Chloride:	EPA 325.3, EPA 300.0
COD:	HACH 8000, EPA 410.4
Conductivity (Spec. Cond.):	EPA 120.1
Cyanide, Total:	EPA 335.2
Fluoride:	EPA 340.2, EPA 300.0
Hardness by Calculation:	EPA 200.7
Magnesium:	EPA 200.7
Nitrate by calculation:	EPA 353.2
Nitrate-Nitrite, Total:	EPA 353.2
Nitrate-N:	EPA 300.0
Oil & Grease:	EPA 413.1
Orthophosphate:	EPA 365.2, EPA 300.0
pH:	EPA 150.1
Potassium:	EPA 200.7
Residue, Filterable (TDS):	EPA 160.1
Residue, Non-Filt.	EPA 160.2
Residue, Total:	EPA 160.3
Sodium:	EPA 200.7
Sulfate:	EPA 375.4, EPA 300.0

This certificate supercedes all previously issued certificates.

Program Manager

NEW HAMPSHIRE ENVIRONMENTAL LABORATORY ACCREDITATION PROGRAM

Laboratory: AMRO Environmental Laboratories Address: Merrimack, NH
Certificate Number: 100100-C Date of Issue: January 24, 2001 Expiration Date: July 19, 2001

ACCREDITS THE ABOVED MENTIONED LABORATORY FOR THE FOLLOWING ANALYSES:

WASTEWATER INORGANIC CONTAMINANTS (cont.)

TKN:	EPA 351.1
Total Phosphorus:	EPA 365.2
Total Phenolics:	EPA 420.1

PCBs IN WASTEWATER

PCB-Aroclor 1016:	EPA 608
PCB-Aroclor 1221:	EPA 608
PCB-Aroclor 1232:	EPA 608
PCB-Aroclor 1242:	EPA 608
PCB-Aroclor 1248:	EPA 608
PCB-Aroclor 1254:	EPA 608
PCB-Aroclor 1260:	EPA 608

PESTICIDES IN WASTEWATER

Aldrin:	EPA 608
a-BHC:	EPA 608
b-BHC:	EPA 608
d-BHC	EPA 608
g-BHC (Lindane):	EPA 608
Chlordane:	EPA 608
4,4'-DDD:	EPA 608
4,4'-DDE:	EPA 608
4,4'-DDT:	EPA 608
Dieldrin:	EPA 608
Endosulfan I:	EPA 608
Endosulfan II:	EPA 608
Endosulfan Sulfate:	EPA 608
Endrin:	EPA 608
Endrin Aldehyde:	EPA 608
Heptachlor:	EPA 608
Heptachlor Epoxide:	EPA 608

VOLATILE ORGANICS IN WASTEWATER

Benzene:	EPA 624
Bromodichloromethane:	EPA 624
Bromoform:	EPA 624
Bromomethane:	EPA 624
Carbon Tetrachloride:	EPA 624
Chloroethane:	EPA 624
Chloroform:	EPA 624
Chloromethane:	EPA 624
1,2-Dichlorobenzene:	EPA 624
1,3-Dichlorobenzene:	EPA 624
1,4-Dichlorobenzene	EPA 624
1,1-Dichloroethane:	EPA 624

This certificate supercedes all previously issued certificates.

VOLATILE ORGANICS IN WASTEWATER (Cont.)

1,2 Dichloroethane:	EPA 624
1,1-Dichloroethene:	EPA 624
t-1,2-Dichloroethene:	EPA 624
1,2-Dichloropropane:	EPA 624
t-1,3-Dichloropropene:	EPA 624
Ethylbenzene:	EPA 624
Methylene Chloride:	EPA 624
Tetrachloroethene:	EPA 624
1,1,2,2-Tetrachloroethane:	EPA 624
Toluene:	EPA 624
1,1,1 Trichloroethane:	EPA 624
1,1,2-Trichloroethane:	EPA 624
Trichloroethene:	EPA 624
Trichlorofluoromethane:	EPA 624
Vinyl Chloride:	EPA 624

WASTEWATER SEMIVOLATILE ORGANICS

Acenaphthene:	EPA 625
Anthracene:	EPA 625
Benzidine:	EPA 625
Benzo(a)anthracene:	EPA 625
Benzo(b)fuoranthene:	EPA 625
Benzo(a)pyrene:	EPA 625
Benzyl butyl phthalate:	EPA 625
Bis(2-chloroethyl) ether:	EPA 625
Bis(2-chloroethoxy) methane:	EPA 625
Bis(2-chloroisopropyl) ether:	EPA 625
Bis(2-ethylhexyl) phthalate:	EPA 625
4-Bromophenyl phenyl ether:	EPA 625
4-Chloro-3-methylphenol:	EPA 625
2-Chloronaphthalene:	EPA 625
2-Chlorophenol:	EPA 625
4-Chlorophenyl phenyl ether:	EPA 625
Chrysene:	EPA 625
Di-n-butyl phthalate:	EPA 625
Di-n-octyl phthalate:	EPA 625
3,3-Dichlorobenzidine:	EPA 625
2,4-Dichlorophenol:	EPA 625
Diethyl phthalate:	EPA 625
Dimethyl phthalate:	EPA 625
2,4-Dimethylphenol:	EPA 625
2,4-Dinitrophenol:	EPA 625
2,4-Dinitrotoluene:	EPA 625
2,6-Dinitrotoluene:	EPA 625
Fluoranthene:	EPA 625
Hexachlorobenzene:	EPA 625
Hexachlorobutadiene:	EPA 625

Charles M. Mayer
Program Manager

NEW HAMPSHIRE ENVIRONMENTAL LABORATORY ACCREDITATION PROGRAM

Laboratory: AMRO Environmental Laboratories Address: Merrimack, NH
Certificate Number: 100100-C Date of Issue: January 24, 2001 Expiration Date: July 19, 2001

ACCREDITS THE ABOVED MENTIONED LABORATORY FOR THE FOLLOWING ANALYSES:

WASTEWATER SEMIVOLATILE ORGANICS

Hexachlorocyclopentadiene:	EPA 625
Hexachloroetnane:	EPA 625
Indeno(1,2,3-c,d)pyrene:	EPA 625
Isophorone:	EPA 625
2-Methyl-4,6-dinitrophenol:	EPA 625
Nitrobenzene:	EPA 625
2-Nitrophenol:	EPA 625
4-Nitrophenol:	EPA 625
n-Nitrosodi-n-propylamine:	EPA 625
n-Nitrosodiphenylamine:	EPA 625
Pentachlorophenol:	EPA 625
Phenol:	EPA 625
Pyrene:	EPA 625
1,2,4-Trichlorobenzene:	EPA 625
2,4,6-Trichlorophenol:	EPA 625

This certificate supercedes all previously issued certificates.

Charles H. Hoyer
Program Manager

The Commonwealth of Massachusetts

Department of Environmental Protection

Division of Environmental Analysis
Senator William X. Wall Experiment Station

certifies

M-NH012

AMRO ENVIRONMENTAL LAB
111 HERRICK ST
MERRIMACK, NH 03054-0000

Laboratory Director: Nancy Stewart

for the analysis of NON POTABLE WATER (CHEMISTRY)
POTABLE WATER (CHEMISTRY)

pursuant to 310 CMR 42.00

This certificate supersedes all previous Massachusetts certificates issued to this laboratory. The laboratory is regulated by and shall be responsible for being in compliance with Massachusetts regulations at 310 CMR 42.00.

This certificate is valid only when accompanied by the latest dated Certified Parameter List as issued by the Massachusetts D.E.P. Contact the Division of Environmental Analysis to verify the current certification status of the laboratory.

Certification is no guarantee of the validity of the data. This certification is subject to unannounced laboratory inspections.

Issued: 01 JUL 2000

Expires: 30 JUN 2001

Oscar C. Pacobo

Director, Division of Environmental Analysis

COMMONWEALTH OF MASSACHUSETTS
DEPARTMENT OF ENVIRONMENTAL PROTECTION

Certified Parameter List as of: 28 DEC 2000

M-NH012 AMRO ENVIRONMENTAL LAB
MERRIMACK NH

NON POTABLE WATER (CHEMISTRY) Effective Date 20 DEC 2000 Expiration Date 30 JUN 2001

Analyte	Method
ALDRIN	
ALUMINUM	
AMMONIA-N	
ANTIMONY	
ARSENIC	
BERYLLIUM	
BIOCHEMICAL OXYGEN DEMAND	
CADMIUM	
CALCIUM	
CHEMICAL OXYGEN DEMAND	
CHLORDANE	
CHLORIDE	
CHROMIUM	
COBALT	
COPPER	
DDD	
DDT	
DIELDRIN	
FLUORIDE	
HEPTACHLOR	
HEPTACHLOR EPOXIDE	
IRON	
KJELDAHL-N	
LEAD	
MAGNESIUM	
MANGANESE	
MERCURY	
MOLYBDENUM	
NICKEL	
NITRATE-N	
NON-FILTERABLE RESIDUE	
OIL AND GREASE	
ORTHOPHOSPHATE	
PH	
POLYCHLORINATED BIPHENYLS (OIL)	
POLYCHLORINATED BIPHENYLS (WATER)	
POTASSIUM	
SELENIUM	
SILVER	
SODIUM	
SPECIFIC CONDUCTIVITY	
STRONTIUM	

012

COMMONWEALTH OF MASSACHUSETTS
DEPARTMENT OF ENVIRONMENTAL PROTECTION

Certified Parameter List as of: 28 DEC 2000

M-NH012 AMRO ENVIRONMENTAL LAB
MERRIMACK NH

NON POTABLE WATER (CHEMISTRY) Effective Date 20 DEC 2000 Expiration Date 30 JUN 2001

Analyte	Method
SULFATE	
THALLIUM	
TOTAL ALKALINITY	
TOTAL CYANIDE	
TOTAL DISSOLVED SOLIDS	
TOTAL HARDNESS (CACO3)	
TOTAL PHENOLICS	
TOTAL PHOSPHORUS	
TOTAL RESIDUAL CHLORINE	
VOLATILE AROMATICS	
VOLATILE HALOCARBONS	
ZINC	

POTABLE WATER (CHEMISTRY) Effective Date 28 DEC 2000 Expiration Date 30 JUN 2001

Analyte	Method
1.2-DIBROMO-3-CHLOROPROPANE	
1.2-DIBROMOETHANE	
ANTIMONY	
ARSENIC	
BARIUM	
BERYLLIUM	
CADMIUM	
CALCIUM	
CHROMIUM	
COPPER	
CYANIDE	
FLUORIDE	
LEAD	
MERCURY	
NICKEL	
NITRATE-N	
NITRITE-N	
PH	
RESIDUAL FREE CHLORINE	
SELENIUM	
SODIUM	
SULFATE	
THALLIUM	
TOTAL ALKALINITY	
TOTAL DISSOLVED SOLIDS	
TURBIDITY	

CASE NARRATIVE

CASE NARRATIVE
0101094

GENERAL

1. No QC deviations were observed.

MADEP-EPH
SOIL

1. The matrix spike (MS) was performed on sample B-203 (S) 5-7' (0101094-06A). The recoveries for Anthracene, Pyrene, and Chrysene were outside the laboratory control limits (40-140%) possibly due to non-homogeneity between the native sample and the MS.

2. The batch duplicate (0101098-07A) had a %RPD for the C9-C18 Aliphatic Hydrocarbons at 50.7% outside the laboratory control limit (50%).

3. No other QC deviations were observed.

METALS
SOIL

1. No QC deviations were observed.

AMRO Environmental Laboratories Corporation
111 Herrick Street
Merrimack, NH 03054

Volatile Petroleum Hydrocarbons (VPH)
Massachusetts Department of Environmental Protection (MADEP)
Method 1.0 - January 1998
AMRO Modifications

This modification is based on the use of a purge and trap gas chromatography mass spectrometer (GC/MS) system to analyze samples for VPH. The hydrocarbon ranges are quantified using predominant mass fragmentation ions which are characteristic for the range being measured. This approach eliminates potential false positives for the target analytes while providing accurate hydrocarbon range data.

The chromatographic column is an HP-624 capillary column which has been validated by GC/MS analysis of a gasoline standard to correctly identify the marker compounds and elution order of specific gasoline components. Batch quality control includes, at a minimum, method blank, laboratory control sample, and duplicate analysis. A matrix spike and/or matrix spike duplicate is analyzed if sufficient sample is submitted to the laboratory.

The Reporting Limit (RL) of this method for each of the collective aliphatic and aromatic ranges is approximately 0.6-2.8 mg/kg in soil and 25-110 µg/L in water. The RL of this method for the target analytes ranges from approximately 0.05-0.13 mg/kg in soil and 2.0-5.0 µg/L for water samples.

Extractable Petroleum Hydrocarbons (EPH)
Massachusetts Department of Environmental Protection (MADEP)
Method 1.0 - January 1998
AMRO Modifications

This modification is based on a solvent extraction and gas chromatography mass spectrometer (GC/MS) analysis. The hydrocarbon ranges are quantified using predominant mass fragmentation ions which are characteristic for the range being measured. This approach eliminates the silica gel solid-phase fractionation step. False positives for targeted PAH analytes are eliminated by using GC/MS as the primary analysis technique.

The chromatographic column is a J&W Scientific DB-5ms capillary column.
Internal standard calibration is performed using 5α-Androstane at a concentration of 40 ng/µL. o-Terphenyl and 1-Chlorooctadecane are added as surrogate compounds at 20 ng/µL in the sample extract. These two surrogates monitor the effects of the sample matrix and extraction efficiency. Two additional surrogates, 2-Fluorobiphenyl and 2-Bromonaphthalene, are added to the finished extract prior to analysis to monitor instrument performance. Batch quality control includes, at a minimum, a procedure blank, laboratory control sample and duplicate sample analysis. A matrix spike is analyzed if sufficient sample is submitted to the laboratory.

The Reporting Limit (RL) of this method for each of the collective aliphatic and aromatic ranges is approximately 2-15 mg/kg in soil and 10-50 µg/L in water. The RL of this method for the Target PAH analytes ranges from approximately 0.25 to 0.5mg/kg in soil. 1.0µg/L for water when operating the GC/MS in full scan mode, and 0.1 to 1.0µg/L when operating the GC/MS in SIM mode. For sites requiring the lowest levels cited in the Massachusetts Contingency Plan for water, GC/MS in the Selected Ion Monitoring (SIM) mode is used.

EXTRACTABLE PETROLEUM HYDROCARBONS (EPH)
SOIL

SAMPLE RESULTS

AMRO Environmental Laboratories Corp.

Date: *26-Jan-01*

CLIENT:	Weston & Sampson Engineers	**Client Sample ID:**	B-201(D) 10-12'
Lab Order:	0101094	**Tag Number:**	
Project:	200317.A BRA P-3 Roxbury	**Collection Date:**	1/10/01
Lab ID:	0101094-01A	**Matrix:**	SOIL

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EXTRACTABLE PETROLEUM HYDROCARBONS	**MAEPH**					Analyst: **KEM**
C9-C18 Aliphatic Hydrocarbons	ND	53		mg/Kg-dry	1	1/17/01 1:12:00 PM
C19-C36 Aliphatic Hydrocarbons	ND	53		mg/Kg-dry	1	1/17/01 1:12:00 PM
C11-C22 Aromatic Hydrocarbons	290	53		mg/Kg-dry	1	1/17/01 1:12:00 PM
Naphthalene	2.8	0.26		mg/Kg-dry	1	1/17/01 1:12:00 PM
2-Methylnaphthalene	0.89	0.26		mg/Kg-dry	1	1/17/01 1:12:00 PM
Acenaphthylene	0.27	0.26		mg/Kg-dry	1	1/17/01 1:12:00 PM
Acenaphthene	6.3	0.26		mg/Kg-dry	1	1/17/01 1:12:00 PM
Fluorene	4.9	0.26		mg/Kg-dry	1	1/17/01 1:12:00 PM
Phenanthrene	37	2.6		mg/Kg-dry	10	1/19/01 3:44:00 AM
Anthracene	8.9	0.26		mg/Kg-dry	1	1/17/01 1:12:00 PM
Fluoranthene	41	2.6		mg/Kg-dry	10	1/19/01 3:44:00 AM
Pyrene	31	2.6		mg/Kg-dry	10	1/19/01 3:44:00 AM
Benz(a)anthracene	17	0.26		mg/Kg-dry	1	1/17/01 1:12:00 PM
Chrysene	16	0.26		mg/Kg-dry	1	1/17/01 1:12:00 PM
Benzo(b)fluoranthene	19	0.26		mg/Kg-dry	1	1/17/01 1:12:00 PM
Benzo(k)fluoranthene	5.5	0.26		mg/Kg-dry	1	1/17/01 1:12:00 PM
Benzo(a)pyrene	14	0.26		mg/Kg-dry	1	1/17/01 1:12:00 PM
Dibenz(a,h)anthracene	2.6	0.26		mg/Kg-dry	1	1/17/01 1:12:00 PM
Indeno(1,2,3-cd)pyrene	9.5	0.26		mg/Kg-dry	1	1/17/01 1:12:00 PM
Benzo(g,h,i)perylene	7.8	0.26		mg/Kg-dry	1	1/17/01 1:12:00 PM
Surr: 1-Chlorooctadecane	82.2	40-140		%REC	1	1/17/01 1:12:00 PM
Surr: 2-Bromonaphthalene	123	40-140		%REC	1	1/17/01 1:12:00 PM
Surr: 2-Fluorobiphenyl	119	40-140		%REC	1	1/17/01 1:12:00 PM
Surr: o-Terphenyl	80.8	40-140		%REC	1	1/17/01 1:12:00 PM

Hydrocarbon range data exclude concentrations of any surrogate(s) and/or internal standards eluting in that range. EPH: C11-C22 Aromatic Hydrocarbons exclude the concentration of target PAH analytes. VPH: C5-C8 Aliphatic Hydrocarbons exclude the concentration of target analytes eluting in this range. C9-C12 Aliphatic Hydrocarbons exclude the concentration of target analytes eluting in this range and concentration of C9-C10 Aromatic Hydrocarbons.

CERTIFICATION

Were all QA/QC procedures required by the VPH or EPH method followed: ✓ Yes ___ No - If No, See Case Narrative

Were all performance/acceptance standards for required QA/QC procedures achieved: ___ Yes ✓ No - If No, See Case Narrative

Were any significant modifications made to the method as specified in section 11.3: ___ No ✓ Yes - Details enclosed

I attest under the pains and penalties of perjury that, based upon my inquiry of those individuals immediately responsible for obtaining the information, the material contained in this report is, to the best of my knowledge and belief, accurate and complete.

SIGNATURE: _____ DATE: 1-26-01

PRINTED NAME: Nancy Stewart POSITION: Laboratory Director (or designee)

Qualifiers: RL - Reporting Limit; defined as the lowest concentration the laboratory can accurately quantitate.

ND - Not Detected at the Reporting Limit S - Spike Recovery outside accepted recovery limits E - Value above quantitation range

J - Analyte detected below quantitation limits R - RPD outside accepted recovery limits # - See Case Narrative

B - Analyte detected in the associated Method Blank

AMRO Environmental Laboratories Corp.

Date: *26-Jan-01*

CLIENT:	Weston & Sampson Engineers	**Client Sample ID:**	B-201(D) 22-24'
Lab Order:	0101094	**Tag Number:**	
Project:	200317.A BRA P-3 Roxbury	**Collection Date:**	1/10/01
Lab ID:	0101094-02A	**Matrix:**	SOIL

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EXTRACTABLE PETROLEUM HYDROCARBONS	**MAEPH**					Analyst: **KEM**
C9-C18 Aliphatic Hydrocarbons	ND	130		mg/Kg-dry	1	1/17/01 1:48:00 PM
C19-C36 Aliphatic Hydrocarbons	ND	130		mg/Kg-dry	1	1/17/01 1:48:00 PM
C11-C22 Aromatic Hydrocarbons	ND	130		mg/Kg-dry	1	1/17/01 1:48:00 PM
Naphthalene	ND	0.65		mg/Kg-dry	1	1/17/01 1:48:00 PM
2-Methylnaphthalene	ND	0.65		mg/Kg-dry	1	1/17/01 1:48:00 PM
Acenaphthylene	ND	0.65		mg/Kg-dry	1	1/17/01 1:48:00 PM
Acenaphthene	ND	0.65		mg/Kg-dry	1	1/17/01 1:48:00 PM
Fluorene	ND	0.65		mg/Kg-dry	1	1/17/01 1:48:00 PM
Phenanthrene	ND	0.65		mg/Kg-dry	1	1/17/01 1:48:00 PM
Anthracene	ND	0.65		mg/Kg-dry	1	1/17/01 1:48:00 PM
Fluoranthene	ND	0.65		mg/Kg-dry	1	1/17/01 1:48:00 PM
Pyrene	ND	0.65		mg/Kg-dry	1	1/17/01 1:48:00 PM
Benz(a)anthracene	ND	0.65		mg/Kg-dry	1	1/17/01 1:48:00 PM
Chrysene	ND	0.65		mg/Kg-dry	1	1/17/01 1:48:00 PM
Benzo(b)fluoranthene	ND	0.65		mg/Kg-dry	1	1/17/01 1:48:00 PM
Benzo(k)fluoranthene	ND	0.65		mg/Kg-dry	1	1/17/01 1:48:00 PM
Benzo(a)pyrene	ND	0.65		mg/Kg-dry	1	1/17/01 1:48:00 PM
Dibenz(a,h)anthracene	ND	0.65		mg/Kg-dry	1	1/17/01 1:48:00 PM
Indeno(1,2,3-cd)pyrene	ND	0.65		mg/Kg-dry	1	1/17/01 1:48:00 PM
Benzo(g,h,i)perylene	ND	0.65		mg/Kg-dry	1	1/17/01 1:48:00 PM
Surr: 1-Chlorooctadecane	100	40-140		%REC	1	1/17/01 1:48:00 PM
Surr: 2-Bromonaphthalene	130	40-140		%REC	1	1/17/01 1:48:00 PM
Surr: 2-Fluorobiphenyl	122	40-140		%REC	1	1/17/01 1:48:00 PM
Surr: o-Terphenyl	92.8	40-140		%REC	1	1/17/01 1:48:00 PM

Hydrocarbon range data exclude concentrations of any surrogate(s) and/or internal standards eluting in that range. EPH: C11-C22 Aromatic Hydrocarbons exclude the concentration of target PAH analytes. VPH: C5-C8 Aliphatic Hydrocarbons exclude the concentration of target analytes eluting in this range. C9-C12 Aliphatic Hydrocarbons exclude the concentration of target analytes eluting in this range and concentration of C9-C10 Aromatic Hydrocarbons.

CERTIFICATION

Were all QA/QC procedures required by the VPH or EPH method followed: ✓ Yes ___ No - If No, See Case Narrative

Were all performance/acceptance standards for required QA/QC procedures achieved: ___ Yes ✓ No - If No, See Case Narrative

Were any significant modifications made to the method as specified in section 11.3: ___ No ✓ Yes - Details enclosed

I attest under the pains and penalties of perjury that, based upon my inquiry of those individuals immediately responsible for obtaining the information, the material contained in this report is, to the best of my knowledge and belief, accurate and complete.

SIGNATURE: _____ DATE: 1-26-01

PRINTED NAME: Nancy Stewart POSITION: Laboratory Director (or designee)

Qualifiers: RL - Reporting Limit; defined as the lowest concentration the laboratory can accurately quantitate.

ND - Not Detected at the Reporting Limit S - Spike Recovery outside accepted recovery limits E - Value above quantitation range

J - Analyte detected below quantitation limits R - RPD outside accepted recovery limits # - See Case Narrative

B - Analyte detected in the associated Method Blank

AMRO Environmental Laboratories Corp.

Date: *26-Jan-01*

CLIENT:	Weston & Sampson Engineers	**Client Sample ID:**	B-207(S)- 3-5'
Lab Order:	0101094	**Tag Number:**	
Project:	200317.A BRA P-3 Roxbury	**Collection Date:**	1/10/01
Lab ID:	0101094-03A	**Matrix:**	SOIL

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EXTRACTABLE PETROLEUM HYDROCARBONS	**MAEPH**					Analyst: **KEM**
C9-C18 Aliphatic Hydrocarbons	ND	56		mg/Kg-dry	1	1/17/01 2:23:00 PM
C19-C36 Aliphatic Hydrocarbons	ND	56		mg/Kg-dry	1	1/17/01 2:23:00 PM
C11-C22 Aromatic Hydrocarbons	ND	56		mg/Kg-dry	1	1/17/01 2:23:00 PM
Naphthalene	ND	0.28		mg/Kg-dry	1	1/17/01 2:23:00 PM
2-Methylnaphthalene	ND	0.28		mg/Kg-dry	1	1/17/01 2:23:00 PM
Acenaphthylene	ND	0.28		mg/Kg-dry	1	1/17/01 2:23:00 PM
Acenaphthene	ND	0.28		mg/Kg-dry	1	1/17/01 2:23:00 PM
Fluorene	ND	0.28		mg/Kg-dry	1	1/17/01 2:23:00 PM
Phenanthrene	1.9	0.28		mg/Kg-dry	1	1/17/01 2:23:00 PM
Anthracene	0.46	0.28		mg/Kg-dry	1	1/17/01 2:23:00 PM
Fluoranthene	2.3	0.28		mg/Kg-dry	1	1/17/01 2:23:00 PM
Pyrene	2.1	0.28		mg/Kg-dry	1	1/17/01 2:23:00 PM
Benz(a)anthracene	1.1	0.28		mg/Kg-dry	1	1/17/01 2:23:00 PM
Chrysene	1.0	0.28		mg/Kg-dry	1	1/17/01 2:23:00 PM
Benzo(b)fluoranthene	1.3	0.28		mg/Kg-dry	1	1/17/01 2:23:00 PM
Benzo(k)fluoranthene	0.33	0.28		mg/Kg-dry	1	1/17/01 2:23:00 PM
Benzo(a)pyrene	0.94	0.28		mg/Kg-dry	1	1/17/01 2:23:00 PM
Dibenz(a,h)anthracene	ND	0.28		mg/Kg-dry	1	1/17/01 2:23:00 PM
Indeno(1,2,3-cd)pyrene	0.62	0.28		mg/Kg-dry	1	1/17/01 2:23:00 PM
Benzo(g,h,i)perylene	0.58	0.28		mg/Kg-dry	1	1/17/01 2:23:00 PM
Surr: 1-Chlorooctadecane	104	40-140		%REC	1	1/17/01 2:23:00 PM
Surr: 2-Bromonaphthalene	123	40-140		%REC	1	1/17/01 2:23:00 PM
Surr: 2-Fluorobiphenyl	119	40-140		%REC	1	1/17/01 2:23:00 PM
Surr: o-Terphenyl	96.2	40-140		%REC	1	1/17/01 2:23:00 PM

Hydrocarbon range data exclude concentrations of any surrogate(s) and/or internal standards eluting in that range. EPH: C11-C22 Aromatic Hydrocarbons exclude the concentration of target PAH analytes. VPH: C5-C8 Aliphatic Hydrocarbons exclude the concentration of target analytes eluting in this range. C9-C12 Aliphatic Hydrocarbons exclude the concentration of target analytes eluting in this range and concentration of C9-C10 Aromatic Hydrocarbons.

CERTIFICATION

Were all QA/QC procedures required by the VPH or EPH method followed: ✓ Yes ___ No - If No, See Case Narrative

Were all performance/acceptance standards for required QA/QC procedures achieved: ___ Yes ✓ No - If No, See Case Narrative

Were any significant modifications made to the method as specified in section 11.3: ___ No ✓ Yes - Details enclosed

I attest under the pains and penalties of perjury that, based upon my inquiry of those individuals immediately responsible for obtaining the information, the material contained in this report is, to the best of my knowledge and belief, accurate and complete.

SIGNATURE: _____ DATE: 1-26-01

PRINTED NAME: Nancy Stewart POSITION: Laboratory Director (or designee)

Qualifiers: RL - Reporting Limit; defined as the lowest concentration the laboratory can accurately quantitate.

ND - Not Detected at the Reporting Limit

J - Analyte detected below quantitation limits

B - Analyte detected in the associated Method Blank

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

E - Value above quantitation range

- See Case Narrative

AMRO Environmental Laboratories Corp.

Date: *26-Jan-01*

CLIENT:	Weston & Sampson Engineers	**Client Sample ID:**	DUP
Lab Order:	0101094	**Tag Number:**	
Project:	200317.A BRA P-3 Roxbury	**Collection Date:**	1/10/01
Lab ID:	0101094-04A	**Matrix:**	SOIL

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EXTRACTABLE PETROLEUM HYDROCARBONS	**MAEPH**					Analyst: **KEM**
C9-C18 Aliphatic Hydrocarbons	ND	58		mg/Kg-dry	1	1/17/01 2:59:00 PM
C19-C36 Aliphatic Hydrocarbons	ND	58		mg/Kg-dry	1	1/17/01 2:59:00 PM
C11-C22 Aromatic Hydrocarbons	300	58		mg/Kg-dry	1	1/17/01 2:59:00 PM
Naphthalene	3.4	0.29		mg/Kg-dry	1	1/17/01 2:59:00 PM
2-Methylnaphthalene	1.3	0.29		mg/Kg-dry	1	1/17/01 2:59:00 PM
Acenaphthylene	0.76	0.29		mg/Kg-dry	1	1/17/01 2:59:00 PM
Acenaphthene	5.1	0.29		mg/Kg-dry	1	1/17/01 2:59:00 PM
Fluorene	4.8	0.29		mg/Kg-dry	1	1/17/01 2:59:00 PM
Phenanthrene	37	2.9		mg/Kg-dry	10	1/19/01 4:20:00 AM
Anthracene	8.6	0.29		mg/Kg-dry	1	1/17/01 2:59:00 PM
Fluoranthene	41	2.9		mg/Kg-dry	10	1/19/01 4:20:00 AM
Pyrene	32	2.9		mg/Kg-dry	10	1/19/01 4:20:00 AM
Benz(a)anthracene	16	0.29		mg/Kg-dry	1	1/17/01 2:59:00 PM
Chrysene	15	0.29		mg/Kg-dry	1	1/17/01 2:59:00 PM
Benzo(b)fluoranthene	18	0.29		mg/Kg-dry	1	1/17/01 2:59:00 PM
Benzo(k)fluoranthene	5.1	0.29		mg/Kg-dry	1	1/17/01 2:59:00 PM
Benzo(a)pyrene	14	0.29		mg/Kg-dry	1	1/17/01 2:59:00 PM
Dibenz(a,h)anthracene	2.6	0.29		mg/Kg-dry	1	1/17/01 2:59:00 PM
Indeno(1,2,3-cd)pyrene	9.7	0.29		mg/Kg-dry	1	1/17/01 2:59:00 PM
Benzo(g,h,i)perylene	8.4	0.29		mg/Kg-dry	1	1/17/01 2:59:00 PM
Surr: 1-Chlorooctadecane	89.1	40-140		%REC	1	1/17/01 2:59:00 PM
Surr: 2-Bromonaphthalene	114	40-140		%REC	1	1/17/01 2:59:00 PM
Surr: 2-Fluorobiphenyl	114	40-140		%REC	1	1/17/01 2:59:00 PM
Surr: o-Terphenyl	80.6	40-140		%REC	1	1/17/01 2:59:00 PM

Hydrocarbon range data exclude concentrations of any surrogate(s) and/or internal standards eluting in that range. EPH: C11-C22 Aromatic Hydrocarbons exclude the concentration of target PAH analytes. VPH: C5-C8 Aliphatic Hydrocarbons exclude the concentration of target analytes eluting in this range. C9-C12 Aliphatic Hydrocarbons exclude the concentration of target analytes eluting in this range and concentration of C9-C10 Aromatic Hydrocarbons.

CERTIFICATION

Were all QA/QC procedures required by the VPH or EPH method followed: ✓ Yes ___ No - If No, See Case Narrative

Were all performance/acceptance standards for required QA/QC procedures achieved: ___ Yes ✓ No - If No, See Case Narrative

Were any significant modifications made to the method as specified in section 11.3: ___ No ✓ Yes - Details enclosed

I attest under the pains and penalties of perjury that, based upon my inquiry of those individuals immediately responsible for obtaining the information, the material contained in this report is, to the best of my knowledge and belief, accurate and complete.

SIGNATURE: _____ DATE: 1-26-01

PRINTED NAME: Nancy Stewart POSITION: Laboratory Director (or designee)

Qualifiers: RL - Reporting Limit; defined as the lowest concentration the laboratory can accurately quantitate.

ND - Not Detected at the Reporting Limit | S - Spike Recovery outside accepted recovery limits | E - Value above quantitation range

J - Analyte detected below quantitation limits | R - RPD outside accepted recovery limits | # - See Case Narrative

B - Analyte detected in the associated Method Blank

AMRO Environmental Laboratories Corp.

Date: *26-Jan-01*

CLIENT:	Weston & Sampson Engineers	**Client Sample ID:**	B-202(S) 5-7'
Lab Order:	0101094	**Tag Number:**	
Project:	200317.A BRA P-3 Roxbury	**Collection Date:**	1/11/01
Lab ID:	0101094-05A	**Matrix:**	SOIL

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EXTRACTABLE PETROLEUM HYDROCARBONS	**MAEPH**					Analyst: **KEM**
C9-C18 Aliphatic Hydrocarbons	ND	53		mg/Kg-dry	1	1/17/01 3:35:00 PM
C19-C36 Aliphatic Hydrocarbons	ND	53		mg/Kg-dry	1	1/17/01 3:35:00 PM
C11-C22 Aromatic Hydrocarbons	520	53		mg/Kg-dry	1	1/17/01 3:35:00 PM
Naphthalene	4.0	0.26		mg/Kg-dry	1	1/17/01 3:35:00 PM
2-Methylnaphthalene	2.6	0.26		mg/Kg-dry	1	1/17/01 3:35:00 PM
Acenaphthylene	1.3	0.26		mg/Kg-dry	1	1/17/01 3:35:00 PM
Acenaphthene	5.0	0.26		mg/Kg-dry	1	1/17/01 3:35:00 PM
Fluorene	5.0	0.26		mg/Kg-dry	1	1/17/01 3:35:00 PM
Phenanthrene	48	2.6		mg/Kg-dry	10	1/19/01 4:55:00 AM
Anthracene	11	0.26		mg/Kg-dry	1	1/17/01 3:35:00 PM
Fluoranthene	41	2.6		mg/Kg-dry	10	1/19/01 4:55:00 AM
Pyrene	40	2.6		mg/Kg-dry	10	1/19/01 4:55:00 AM
Benz(a)anthracene	19	0.26		mg/Kg-dry	1	1/17/01 3:35:00 PM
Chrysene	18	0.26		mg/Kg-dry	1	1/17/01 3:35:00 PM
Benzo(b)fluoranthene	17	0.26		mg/Kg-dry	1	1/17/01 3:35:00 PM
Benzo(k)fluoranthene	5.9	0.26		mg/Kg-dry	1	1/17/01 3:35:00 PM
Benzo(a)pyrene	15	0.26		mg/Kg-dry	1	1/17/01 3:35:00 PM
Dibenz(a,h)anthracene	2.6	0.26		mg/Kg-dry	1	1/17/01 3:35:00 PM
Indeno(1,2,3-cd)pyrene	9.2	0.26		mg/Kg-dry	1	1/17/01 3:35:00 PM
Benzo(g,h,i)perylene	8.4	0.26		mg/Kg-dry	1	1/17/01 3:35:00 PM
Surr: 1-Chlorooctadecane	93.8	40-140		%REC	1	1/17/01 3:35:00 PM
Surr: 2-Bromonaphthalene	124	40-140		%REC	1	1/17/01 3:35:00 PM
Surr: 2-Fluorobiphenyl	119	40-140		%REC	1	1/17/01 3:35:00 PM
Surr: o-Terphenyl	84.0	40-140		%REC	1	1/17/01 3:35:00 PM

Hydrocarbon range data exclude concentrations of any surrogate(s) and/or internal standards eluting in that range. EPH: C11-C22 Aromatic Hydrocarbons exclude the concentration of target PAH analytes. VPH: C5-C8 Aliphatic Hydrocarbons exclude the concentration of target analytes eluting in this range. C9-C12 Aliphatic Hydrocarbons exclude the concentration of target analytes eluting in this range and concentration of C9-C10 Aromatic Hydrocarbons.

CERTIFICATION

Were all QA/QC procedures required by the VPH or EPH method followed: ✓ Yes ___ No - If No, See Case Narrative

Were all performance/acceptance standards for required QA/QC procedures achieved: ___ Yes ✓ No - If No, See Case Narrative

Were any significant modifications made to the method as specified in section 11.3: ___ No ✓ Yes - Details enclosed

I attest under the pains and penalties of perjury that, based upon my inquiry of those individuals immediately responsible for obtaining the information, the material contained in this report is, to the best of my knowledge and belief, accurate and complete.

SIGNATURE: _____ DATE: 1-26-01

PRINTED NAME: Nancy Stewart POSITION: Laboratory Director (or designee)

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J - Analyte detected below quantitation limits R - RPD outside accepted recovery limits # - See Case Narrative

B - Analyte detected in the associated Method Blank

AMRO Environmental Laboratories Corp.

Date: *26-Jan-01*

CLIENT:	Weston & Sampson Engineers	**Client Sample ID:**	B-203(S) 5-7'
Lab Order:	0101094	**Tag Number:**	
Project:	200317.A BRA P-3 Roxbury	**Collection Date:**	1/11/01
Lab ID:	0101094-06A	**Matrix:**	SOIL

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EXTRACTABLE PETROLEUM HYDROCARBONS	**MAEPH**					Analyst: **KEM**
C9-C18 Aliphatic Hydrocarbons	ND	57		mg/Kg-dry	1	1/17/01 4:11:00 PM
C19-C36 Aliphatic Hydrocarbons	ND	57		mg/Kg-dry	1	1/17/01 4:11:00 PM
C11-C22 Aromatic Hydrocarbons	110	57		mg/Kg-dry	1	1/17/01 4:11:00 PM
Naphthalene	0.74	0.29		mg/Kg-dry	1	1/17/01 4:11:00 PM
2-Methylnaphthalene	0.57	0.29		mg/Kg-dry	1	1/17/01 4:11:00 PM
Acenaphthylene	ND	0.29		mg/Kg-dry	1	1/17/01 4:11:00 PM
Acenaphthene	1.2	0.29		mg/Kg-dry	1	1/17/01 4:11:00 PM
Fluorene	1.0	0.29		mg/Kg-dry	1	1/17/01 4:11:00 PM
Phenanthrene	9.7	0.29		mg/Kg-dry	1	1/17/01 4:11:00 PM
Anthracene	2.1	0.29		mg/Kg-dry	1	1/17/01 4:11:00 PM
Fluoranthene	9.6	0.29		mg/Kg-dry	1	1/17/01 4:11:00 PM
Pyrene	8.2	0.29		mg/Kg-dry	1	1/17/01 4:11:00 PM
Benz(a)anthracene	4.0	0.29		mg/Kg-dry	1	1/17/01 4:11:00 PM
Chrysene	3.8	0.29		mg/Kg-dry	1	1/17/01 4:11:00 PM
Benzo(b)fluoranthene	4.3	0.29		mg/Kg-dry	1	1/17/01 4:11:00 PM
Benzo(k)fluoranthene	1.5	0.29		mg/Kg-dry	1	1/17/01 4:11:00 PM
Benzo(a)pyrene	3.7	0.29		mg/Kg-dry	1	1/17/01 4:11:00 PM
Dibenz(a,h)anthracene	0.62	0.29		mg/Kg-dry	1	1/17/01 4:11:00 PM
Indeno(1,2,3-cd)pyrene	2.6	0.29		mg/Kg-dry	1	1/17/01 4:11:00 PM
Benzo(g,h,i)perylene	2.3	0.29		mg/Kg-dry	1	1/17/01 4:11:00 PM
Surr: 1-Chlorooctadecane	89.2	40-140		%REC	1	1/17/01 4:11:00 PM
Surr: 2-Bromonaphthalene	118	40-140		%REC	1	1/17/01 4:11:00 PM
Surr: 2-Fluorobiphenyl	118	40-140		%REC	1	1/17/01 4:11:00 PM
Surr: o-Terphenyl	102	40-140		%REC	1	1/17/01 4:11:00 PM

Hydrocarbon range data exclude concentrations of any surrogate(s) and/or internal standards eluting in that range. EPH: C11-C22 Aromatic Hydrocarbons exclude the concentration of target PAH analytes. VPH: C5-C8 Aliphatic Hydrocarbons exclude the concentration of target analytes eluting in this range. C9-C12 Aliphatic Hydrocarbons exclude the concentration of target analytes eluting in this range and concentration of C9-C10 Aromatic Hydrocarbons.

CERTIFICATION

Were all QA/QC procedures required by the VPH or EPH method followed: ✓ Yes ___ No - If No, See Case Narrative

Were all performance/acceptance standards for required QA/QC procedures achieved: ___ Yes ✓ No - If No, See Case Narrative

Were any significant modifications made to the method as specified in section 11.3: ___ No ✓ Yes - Details enclosed

I attest under the pains and penalties of perjury that, based upon my inquiry of those individuals immediately responsible for obtaining the information, the material contained in this report is, to the best of my knowledge and belief, accurate and complete.

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B - Analyte detected in the associated Method Blank

AMRO Environmental Laboratories Corp.

Date: *26-Jan-01*

CLIENT:	Weston & Sampson Engineers	**Client Sample ID:**	B-204(S) 5-7'
Lab Order:	0101094	**Tag Number:**	
Project:	200317.A BRA P-3 Roxbury	**Collection Date:**	1/11/01
Lab ID:	0101094-07A	**Matrix:**	SOIL

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EXTRACTABLE PETROLEUM HYDROCARBONS	**MAEPH**					**Analyst: KEM**
C9-C18 Aliphatic Hydrocarbons	ND	61		mg/Kg-dry	1	1/17/01 5:22:00 PM
C19-C36 Aliphatic Hydrocarbons	ND	61		mg/Kg-dry	1	1/17/01 5:22:00 PM
C11-C22 Aromatic Hydrocarbons	ND	61		mg/Kg-dry	1	1/17/01 5:22:00 PM
Naphthalene	ND	0.31		mg/Kg-dry	1	1/17/01 5:22:00 PM
2-Methylnaphthalene	ND	0.31		mg/Kg-dry	1	1/17/01 5:22:00 PM
Acenaphthylene	ND	0.31		mg/Kg-dry	1	1/17/01 5:22:00 PM
Acenaphthene	ND	0.31		mg/Kg-dry	1	1/17/01 5:22:00 PM
Fluorene	ND	0.31		mg/Kg-dry	1	1/17/01 5:22:00 PM
Phenanthrene	2.1	0.31		mg/Kg-dry	1	1/17/01 5:22:00 PM
Anthracene	0.50	0.31		mg/Kg-dry	1	1/17/01 5:22:00 PM
Fluoranthene	2.3	0.31		mg/Kg-dry	1	1/17/01 5:22:00 PM
Pyrene	2.0	0.31		mg/Kg-dry	1	1/17/01 5:22:00 PM
Benz(a)anthracene	1.0	0.31		mg/Kg-dry	1	1/17/01 5:22:00 PM
Chrysene	0.99	0.31		mg/Kg-dry	1	1/17/01 5:22:00 PM
Benzo(b)fluoranthene	1.1	0.31		mg/Kg-dry	1	1/17/01 5:22:00 PM
Benzo(k)fluoranthene	0.34	0.31		mg/Kg-dry	1	1/17/01 5:22:00 PM
Benzo(a)pyrene	0.90	0.31		mg/Kg-dry	1	1/17/01 5:22:00 PM
Dibenz(a,h)anthracene	ND	0.31		mg/Kg-dry	1	1/17/01 5:22:00 PM
Indeno(1,2,3-cd)pyrene	0.59	0.31		mg/Kg-dry	1	1/17/01 5:22:00 PM
Benzo(g,h,i)perylene	0.55	0.31		mg/Kg-dry	1	1/17/01 5:22:00 PM
Surr: 1-Chlorooctadecane	113	40-140		%REC	1	1/17/01 5:22:00 PM
Surr: 2-Bromonaphthalene	111	40-140		%REC	1	1/17/01 5:22:00 PM
Surr: 2-Fluorobiphenyl	111	40-140		%REC	1	1/17/01 5:22:00 PM
Surr: o-Terphenyl	96.6	40-140		%REC	1	1/17/01 5:22:00 PM

Hydrocarbon range data exclude concentrations of any surrogate(s) and/or internal standards eluting in that range. EPH: C11-C22 Aromatic Hydrocarbons exclude the concentration of target PAH analytes. VPH: C5-C8 Aliphatic Hydrocarbons exclude the concentration of target analytes eluting in this range. C9-C12 Aliphatic Hydrocarbons exclude the concentration of target analytes eluting in this range and concentration of C9-C10 Aromatic Hydrocarbons.

CERTIFICATION

Were all QA/QC procedures required by the VPH or EPH method followed: ✓ Yes ___ No - If No, See Case Narrative

Were all performance/acceptance standards for required QA/QC procedures achieved: ___ Yes ✓ No - If No, See Case Narrative

Were any significant modifications made to the method as specified in section 11.3: ___ No ✓ Yes - Details enclosed

I attest under the pains and penalties of perjury that, based upon my inquiry of those individuals immediately responsible for obtaining the information, the material contained in this report is, to the best of my knowledge and belief, accurate and complete.

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B - Analyte detected in the associated Method Blank

AMRO Environmental Laboratories Corp.

Date: *26-Jan-01*

CLIENT:	Weston & Sampson Engineers	**Client Sample ID:**	B-205(S) 3-5'
Lab Order:	0101094	**Tag Number:**	
Project:	200317.A BRA P-3 Roxbury	**Collection Date:**	1/11/01
Lab ID:	0101094-08A	**Matrix:**	SOIL

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EXTRACTABLE PETROLEUM HYDROCARBONS	**MAEPH**					Analyst: **KEM**
C9-C18 Aliphatic Hydrocarbons	ND	50		mg/Kg-dry	1	1/17/01 5:58:00 PM
C19-C36 Aliphatic Hydrocarbons	ND	50		mg/Kg-dry	1	1/17/01 5:58:00 PM
C11-C22 Aromatic Hydrocarbons	ND	50		mg/Kg-dry	1	1/17/01 5:58:00 PM
Naphthalene	ND	0.25		mg/Kg-dry	1	1/17/01 5:58:00 PM
2-Methylnaphthalene	ND	0.25		mg/Kg-dry	1	1/17/01 5:58:00 PM
Acenaphthylene	ND	0.25		mg/Kg-dry	1	1/17/01 5:58:00 PM
Acenaphthene	ND	0.25		mg/Kg-dry	1	1/17/01 5:58:00 PM
Fluorene	ND	0.25		mg/Kg-dry	1	1/17/01 5:58:00 PM
Phenanthrene	ND	0.25		mg/Kg-dry	1	1/17/01 5:58:00 PM
Anthracene	ND	0.25		mg/Kg-dry	1	1/17/01 5:58:00 PM
Fluoranthene	ND	0.25		mg/Kg-dry	1	1/17/01 5:58:00 PM
Pyrene	ND	0.25		mg/Kg-dry	1	1/17/01 5:58:00 PM
Benz(a)anthracene	ND	0.25		mg/Kg-dry	1	1/17/01 5:58:00 PM
Chrysene	ND	0.25		mg/Kg-dry	1	1/17/01 5:58:00 PM
Benzo(b)fluoranthene	ND	0.25		mg/Kg-dry	1	1/17/01 5:58:00 PM
Benzo(k)fluoranthene	ND	0.25		mg/Kg-dry	1	1/17/01 5:58:00 PM
Benzo(a)pyrene	ND	0.25		mg/Kg-dry	1	1/17/01 5:58:00 PM
Dibenz(a,h)anthracene	ND	0.25		mg/Kg-dry	1	1/17/01 5:58:00 PM
Indeno(1,2,3-cd)pyrene	ND	0.25		mg/Kg-dry	1	1/17/01 5:58:00 PM
Benzo(g,h,i)perylene	ND	0.25		mg/Kg-dry	1	1/17/01 5:58:00 PM
Surr: 1-Chlorooctadecane	92.6	40-140		%REC	1	1/17/01 5:58:00 PM
Surr: 2-Bromonaphthalene	111	40-140		%REC	1	1/17/01 5:58:00 PM
Surr: 2-Fluorobiphenyl	109	40-140		%REC	1	1/17/01 5:58:00 PM
Surr: o-Terphenyl	93.5	40-140		%REC	1	1/17/01 5:58:00 PM

Hydrocarbon range data exclude concentrations of any surrogate(s) and/or internal standards eluting in that range. EPH: C11-C22 Aromatic Hydrocarbons exclude the concentration of target PAH analytes. VPH: C5-C8 Aliphatic Hydrocarbons exclude the concentration of target analytes eluting in this range. C9-C12 Aliphatic Hydrocarbons exclude the concentration of target analytes eluting in this range and concentration of C9-C10 Aromatic Hydrocarbons.

CERTIFICATION

Were all QA/QC procedures required by the VPH or EPH method followed: ✓ Yes ___ No - If No, See Case Narrative

Were all performance/acceptance standards for required QA/QC procedures achieved: ___ Yes ✓ No - If No, See Case Narrative

Were any significant modifications made to the method as specified in section 11.3: ___ No ✓ Yes - Details enclosed

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B - Analyte detected in the associated Method Blank

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

E - Value above quantitation range

- See Case Narrative

AMRO Environmental Laboratories Corp.

Date: *26-Jan-01*

CLIENT:	Weston & Sampson Engineers	**Client Sample ID:**	B-206(S) 3-5'
Lab Order:	0101094	**Tag Number:**	
Project:	200317.A BRA P-3 Roxbury	**Collection Date:**	1/11/01
Lab ID:	0101094-09A	**Matrix:**	SOIL

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EXTRACTABLE PETROLEUM HYDROCARBONS	**MAEPH**					Analyst: KEM
C9-C18 Aliphatic Hydrocarbons	ND	110		mg/Kg-dry	1	1/17/01 6:33:00 PM
C19-C36 Aliphatic Hydrocarbons	ND	110		mg/Kg-dry	1	1/17/01 6:33:00 PM
C11-C22 Aromatic Hydrocarbons	ND	110		mg/Kg-dry	1	1/17/01 6:33:00 PM
Naphthalene	ND	0.56		mg/Kg-dry	1	1/17/01 6:33:00 PM
2-Methylnaphthalene	ND	0.56		mg/Kg-dry	1	1/17/01 6:33:00 PM
Acenaphthylene	ND	0.56		mg/Kg-dry	1	1/17/01 6:33:00 PM
Acenaphthene	ND	0.56		mg/Kg-dry	1	1/17/01 6:33:00 PM
Fluorene	ND	0.56		mg/Kg-dry	1	1/17/01 6:33:00 PM
Phenanthrene	1.6	0.56		mg/Kg-dry	1	1/17/01 6:33:00 PM
Anthracene	ND	0.56		mg/Kg-dry	1	1/17/01 6:33:00 PM
Fluoranthene	2.7	0.56		mg/Kg-dry	1	1/17/01 6:33:00 PM
Pyrene	2.6	0.56		mg/Kg-dry	1	1/17/01 6:33:00 PM
Benz(a)anthracene	1.4	0.56		mg/Kg-dry	1	1/17/01 6:33:00 PM
Chrysene	1.4	0.56		mg/Kg-dry	1	1/17/01 6:33:00 PM
Benzo(b)fluoranthene	1.7	0.56		mg/Kg-dry	1	1/17/01 6:33:00 PM
Benzo(k)fluoranthene	ND	0.56		mg/Kg-dry	1	1/17/01 6:33:00 PM
Benzo(a)pyrene	1.3	0.56		mg/Kg-dry	1	1/17/01 6:33:00 PM
Dibenz(a,h)anthracene	ND	0.56		mg/Kg-dry	1	1/17/01 6:33:00 PM
Indeno(1,2,3-cd)pyrene	0.97	0.56		mg/Kg-dry	1	1/17/01 6:33:00 PM
Benzo(g,h,i)perylene	0.83	0.56		mg/Kg-dry	1	1/17/01 6:33:00 PM
Surr: 1-Chlorooctadecane	103	40-140		%REC	1	1/17/01 6:33:00 PM
Surr: 2-Bromonaphthalene	111	40-140		%REC	1	1/17/01 6:33:00 PM
Surr: 2-Fluorobiphenyl	110	40-140		%REC	1	1/17/01 6:33:00 PM
Surr: o-Terphenyl	96.8	40-140		%REC	1	1/17/01 6:33:00 PM

Hydrocarbon range data exclude concentrations of any surrogate(s) and/or internal standards eluting in that range. EPH: C11-C22 Aromatic Hydrocarbons exclude the concentration of target PAH analytes. VPH: C5-C8 Aliphatic Hydrocarbons exclude the concentration of target analytes eluting in this range. C9-C12 Aliphatic Hydrocarbons exclude the concentration of target analytes eluting in this range and concentration of C9-C10 Aromatic Hydrocarbons.

CERTIFICATION

Were all QA/QC procedures required by the VPH or EPH method followed: ✓ Yes ___ No - If No, See Case Narrative

Were all performance/acceptance standards for required QA/QC procedures achieved: ___ Yes ✓ No - If No, See Case Narrative

Were any significant modifications made to the method as specified in section 11.3: ___ No ✓ Yes - Details enclosed

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METHOD BLANK

AMRO Environmental Laboratories Corp.

Date: *26-Jan-01*

CLIENT: Weston & Sampson Engineers
Work Order: 0101094
Project: 200317.A BRA P-3 Roxbury

QC SUMMARY REPORT
Method Blank

Sample ID **MB-3591** Batch ID: **3591** Test Code: **MAEPH** Units: **mg/Kg** Analysis Date **1/17/01 12:00:00 PM** Prep Date **1/15/01**
Client ID: Run ID: **SV-2_010117A** SeqNo: **103950**

Analyte	QC Sample Result	RL	Units	QC Spike Amount	Original Sample Result	%REC	LowLimit	HighLimit	Original Sample or MS Result	%RPD	RPDLimit	Qua
C9-C18 Aliphatic Hydrocarbons	ND	50	mg/Kg									
C19-C36 Aliphatic Hydrocarbons	ND	50	mg/Kg									
C11-C22 Aromatic Hydrocarbons	ND	50	mg/Kg									
Naphthalene	ND	0.25	mg/Kg									
2-Methylnaphthalene	ND	0.25	mg/Kg									
Acenaphthylene	ND	0.25	mg/Kg									
Acenaphthene	ND	0.25	mg/Kg									
Fluorene	ND	0.25	mg/Kg									
Phenanthrene	ND	0.25	mg/Kg									
Anthracene	ND	0.25	mg/Kg									
Fluoranthene	ND	0.25	mg/Kg									
Pyrene	ND	0.25	mg/Kg									
Benz(a)anthracene	ND	0.25	mg/Kg									
Chrysene	ND	0.25	mg/Kg									
Benzo(b)fluoranthene	ND	0.25	mg/Kg									
Benzo(k)fluoranthene	ND	0.25	mg/Kg									
Benzo(a)pyrene	ND	0.25	mg/Kg									
Dibenz(a,h)anthracene	ND	0.25	mg/Kg									
Indeno(1,2,3-cd)pyrene	ND	0.25	mg/Kg									
Benzo(g,h,i)perylene	ND	0.25	mg/Kg									
Surr: 1-Chlorooctadecane	0.94	0.25	mg/Kg	1	0	94	40	140	0			
Surr: 2-Bromonaphthalene	6.199	0.25	mg/Kg	5	0	124	40	140	0			
Surr: 2-Fluorobiphenyl	5.948	0.25	mg/Kg	5	0	119	40	140	0			
Surr: o-Terphenyl	0.9888	0.25	mg/Kg	1	0	98.9	40	140	0			

Qualifiers: ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte deteeted in the associated Method Blank
NA - Not applicable where J values or ND results occur
RL - Reporting Limit; defined as the lowest concentration the laboratory can accurately quantitate.

MATRIX SPIKE

AMRO Environmental Laboratories Corp.

Date: *26-Jan-01*

CLIENT: Weston & Sampson Engineers
Work Order: 0101094
Project: 200317.A BRA P-3 Roxbury

QC SUMMARY REPORT
Sample Matrix Spike

Sample ID **0101094-06AMS** Batch ID: **3591** Test Code: **MAEPH** Units: **mg/Kg-dry** Analysis Date **1/17/01 4:46:00 PM** Prep Date **1/15/01**
Client ID: **B-203(S) 5-7'** Run ID: **SV-2_010117A** SeqNo: **103958**

Analyte	QC Sample Result	RL	Units	QC Spike Amount	Original Sample Result	%REC	LowLimit	HighLimit	Original Sample or MS Result	%RPD	RPDLimit	Qua
n-Eicosane	1.515	0.28	mg/Kg-dry	1.423	0	106	40	140	0			
n-Nonadecane	1.556	0.28	mg/Kg-dry	1.423	0	109	40	140	0			
n-Nonane	1.165	0.28	mg/Kg-dry	1.423	0	81.9	40	140	0			
n-Octacosane	1.515	0.28	mg/Kg-dry	1.423	0	106	40	140	0			
n-Tetradecane	1.411	0.28	mg/Kg-dry	1.423	0	99.2	40	140	0			
Naphthalene	1.677	0.28	mg/Kg-dry	1.423	0.7419	65.8	40	140	0			
Acenaphthene	1.928	0.28	mg/Kg-dry	1.423	1.179	52.6	40	140	0			
Anthracene	2.612	0.28	mg/Kg-dry	1.423	2.113	35.1	40	140	0			S
Pyrene	6.723	0.28	mg/Kg-dry	1.423	8.182	-103	40	140	0			S
Chrysene	3.669	0.28	mg/Kg-dry	1.423	3.841	-12.1	40	140	0			S
Surr: 1-Chlorooctadecane	0.966	0.28	mg/Kg-dry	1.138	0	84.9	40	140	0			
Surr: 2-Bromonaphthalene	7.24	0.28	mg/Kg-dry	5.691	0	127	40	140	0			
Surr: 2-Fluorobiphenyl	6.849	0.28	mg/Kg-dry	5.691	0	120	40	140	0			
Surr: o-Terphenyl	1.077	0.28	mg/Kg-dry	1.138	0	94.6	40	140	0			

Qualifiers: ND - Not Deteeted at the Reporting Limit
J - Analyte detected below quantitation limits
RL - Reporting Limit; defined as the lowest coneentration the laboratory can accurately quantitate.
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank
NA - Not applicable where J values or ND results occur

SAMPLE AND SAMPLE DUPLICATE

EPH SOIL SAMPLE / SAMPLE DUPLICATE AND RPD

Amro Project ID : 0101098-07A
Amro Duplicate ID : 0101098-07ADUP
Analysis Date : 19-Jan-10

Instrument # : SV-2
Analyst : KEM [011801]

COMPOUND	SAMPLE CONCENTRATION (mg/Kg)	DUPLICATE CONCENTRATION (mg/Kg)	% RPD		QC LIMITS RPD
C9-C18 ALIPHATICS	178	106	50.7	*	50
C19-C36 ALIPHATICS	310	206	40.3		50
C11-C22 AROMATICS	122	77.3	44.9		50
NAPHTHALENE	0	0	0.0		50
2-METHYLNAPHTHALENE	0	0	0.0		50
ACENAPHTHYLENE	0	0	0.0		50
ACENAPHTHENE	0	0	0.0		50
FLUORENE	0	0	0.0		50
PHENANTHRENE	0	0	0.0		50
ANTHRACENE	0	0	0.0		50
FLUORANTHENE	0	0	0.0		50
PYRENE	0.345	0.315	9.1		50
BENZO(A)ANTHRACENE	0	0	0.0		50
CHRYSENE	0	0	0.0		50
BENZO(B)FLUORANTHEN	0	0	0.0		50
BENZO(K)FLUORANTHEN	0	0	0.0		50
BENZO(A)PYRENE	0	0	0.0		50
DIBENZO(A,H)ANTHRACE	0	0	0.0		50
INDENO(1,2,3-CD)PYRENE	0	0	0.0		50
BENZO(G,H,I)PERYLENE	0	0	0.0		50

* Values outside QC limits
RPD: 1 of 20 outside limits.
Sample File: 2B15233.D
Duplicate File: 2B15235.D
Amro Environmental Laboratories Corp.

LABORATORY CONTROL SAMPLE

AMRO Environmental Laboratories Corp.

Date: *26-Jan-01*

CLIENT: Weston & Sampson Engineers
Work Order: 0101094
Project: 200317.A BRA P-3 Roxbury

QC SUMMARY REPORT
Laboratory Control Spike

Sample ID **LCS-3591** Batch ID: **3591** Test Code: **MAEPH** Units: **mg/Kg** Analysis Date **1/17/01 12:36:00 PM** Prep Date **1/15/01**

Client ID: Run ID: **SV-2_010117A** SeqNo: **103951**

Analyte	QC Sample Result	RL	Units	QC Spike Amount	Original Sample Result	%REC	LowLimit	HighLimit	Original Sample or MS Result	%RPD	RPDLimit	Qua
n-Eicosane	1.229	0.25	mg/Kg	1.25	0	98.3	40	140	0			
n-Nonadecane	1.239	0.25	mg/Kg	1.25	0	99.1	40	140	0			
n-Nonane	0.9038	0.25	mg/Kg	1.25	0	72.3	40	140	0			
n-Octacosane	1.246	0.25	mg/Kg	1.25	0	99.7	40	140	0			
n-Tetradecane	1.119	0.25	mg/Kg	1.25	0	89.5	40	140	0			
Naphthalene	1.048	0.25	mg/Kg	1.25	0	83.8	40	140	0			
Acenaphthene	1.14	0.25	mg/Kg	1.25	0	91.2	40	140	0			
Anthracene	1.136	0.25	mg/Kg	1.25	0	90.9	40	140	0			
Pyrene	1.202	0.25	mg/Kg	1.25	0	96.2	40	140	0			
Chrysene	1.206	0.25	mg/Kg	1.25	0	96.5	40	140	0			
Surr: 1-Chlorooctadecane	0.9562	0.25	mg/Kg	1	0	95.6	40	140	0			
Surr: 2-Bromonaphthalene	6.054	0.25	mg/Kg	5	0	121	40	140	0			
Surr: 2-Fluorobiphenyl	6.056	0.25	mg/Kg	5	0	121	40	140	0			
Surr: o-Terphenyl	0.975	0.25	mg/Kg	1	0	97.5	40	140	0			

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank
NA - Not applicable where J values or ND results occur
RL - Reporting Limit; defined as the lowest concentration the laboratory can accurately quantitate.

TRACE METALS-SOIL

SW-846 METHODS: 6010B

SAMPLE RESULTS

AMRO Environmental Laboratories Corp.

Date: *26-Jan-01*

CLIENT:	Weston & Sampson Engineers	**Client Sample ID:**	B-201(D) 10-12'
Lab Order:	0101094		
Project:	200317.A BRA P-3 Roxbury	**Collection Date:**	1/10/01
Lab ID:	0101094-01A	**Matrix:**	SOIL

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
ICP METALS TOTAL SW-846 - 3051/6010		**SW6010B**				Analyst: **REB**
Lead	550	3.3		mg/Kg-dry	1	1/15/01 5:23:54 PM
PERCENT MOISTURE		**D2216**				Analyst: **CH**
Percent Moisture	6.0	0		wt%	1	1/15/01

Qualifiers:

ND - Not Detected at the Reporting Limit

J - Analyte detected below quantitation limits

B - Analyte detected in the associated Method Blank

* - Value exceeds Maximum Contaminant Level

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

E - Value above quantitation range

\# - See Case Narrative

RL - Reporting Limit; defined as the lowest concentration the laboratory can accurately quantitate.

AMRO Environmental Laboratories Corp.

Date: *26-Jan-01*

CLIENT:	Weston & Sampson Engineers	**Client Sample ID:**	B-201(D) 22-24'
Lab Order:	0101094		
Project:	200317.A BRA P-3 Roxbury	**Collection Date:**	1/10/01
Lab ID:	0101094-02A	**Matrix:**	SOIL

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
CP METALS TOTAL SW-846 - 3051/6010		**SW6010B**				Analyst: **REB**
Lead	74	7.8		mg/Kg-dry	1	1/15/01 5:29:00 PM
PERCENT MOISTURE		**D2216**				Analyst: **CH**
Percent Moisture	62.0	0		wt%	1	1/15/01

Qualifiers:

- ND - Not Detected at the Reporting Limit
- J - Analyte detected below quantitation limits
- B - Analyte detected in the associated Method Blank
- * - Value exceeds Maximum Contaminant Level
- S - Spike Recovery outside accepted recovery limits
- R - RPD outside accepted recovery limits
- E - Value above quantitation range
- # - See Case Narrative

RL - Reporting Limit; defined as the lowest concentration the laboratory can accurately quantitate.

AMRO Environmental Laboratories Corp.

Date: *26-Jan-01*

CLIENT:	Weston & Sampson Engineers	**Client Sample ID:**	B-207(S)- 3-5'
Lab Order:	0101094		
Project:	200317.A BRA P-3 Roxbury	**Collection Date:**	1/10/01
Lab ID:	0101094-03A	**Matrix:**	SOIL

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
CP METALS TOTAL SW-846 - 3051/6010		**SW6010B**				Analyst: **REB**
Lead	220	3.5		mg/Kg-dry	1	1/15/01 5:41:46 PM
PERCENT MOISTURE		**D2216**				Analyst: **CH**
Percent Moisture	11.6	0		wt%	1	1/15/01

Qualifiers:

- ND - Not Detected at the Reporting Limit
- J - Analyte detected below quantitation limits
- B - Analyte detected in the associated Method Blank
- * - Value exceeds Maximum Contaminant Level
- S - Spike Recovery outside aeeepted recovery limits
- R - RPD outside accepted reeovery limits
- E - Value above quantitation range
- # - See Case Narrative

RL - Reporting Limit; defined as the lowest concentration the laboratory can accurately quantitate.

AMRO Environmental Laboratories Corp.

Date: *26-Jan-01*

CLIENT:	Weston & Sampson Engineers	**Client Sample ID:**	DUP
Lab Order:	0101094		
Project:	200317.A BRA P-3 Roxbury	**Collection Date:**	1/10/01
Lab ID:	0101094-04A	**Matrix:**	SOIL

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
ICP METALS TOTAL SW-846 - 3051/6010		**SW6010B**				Analyst: **REB**
Lead	620	3.6		mg/Kg-dry	1	1/15/01 5:46:35 PM
PERCENT MOISTURE		**D2216**				Analyst: **CH**
Percent Moisture	15.2	0		wt%	1	1/15/01

Qualifiers:

ND - Not Detected at the Reporting Limit

J - Analyte detected below quantitation limits

B - Analyte dctected in the associated Method Blank

* - Value exceeds Maximum Contaminant Level

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

E - Value above quantitation range

\# - See Case Narrative

RL - Reporting Limit; defined as the lowest concentration the laboratory can accurately quantitate.

AMRO Environmental Laboratories Corp.

Date: *26-Jan-01*

CLIENT:	Weston & Sampson Engineers	**Client Sample ID:**	B-202(S) 5-7'
Lab Order:	0101094		
Project:	200317.A BRA P-3 Roxbury	**Collection Date:**	1/11/01
Lab ID:	0101094-05A	**Matrix:**	SOIL

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
CP METALS TOTAL SW-846 - 3051/6010		**SW6010B**				Analyst: **REB**
Lead	7,000	3.1		mg/Kg-dry	1	1/15/01 5:51:42 PM
PERCENT MOISTURE		**D2216**				Analyst: **CH**
Percent Moisture	6.8	0		wt%	1	1/15/01

Qualifiers:

ND - Not Detected at the Reporting Limit

J - Analyte detected below quantitation limits

B - Analyte detected in the associated Method Blank

* - Value exceeds Maximum Contaminant Level

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

E - Value above quantitation range

\# - See Case Narrative

RL - Reporting Limit; defined as the lowest concentration the laboratory can accurately quantitate.

AMRO Environmental Laboratories Corp.

Date: *26-Jan-01*

CLIENT:	Weston & Sampson Engineers	**Client Sample ID:**	B-203(S) 5-7'
Lab Order:	0101094		
Project:	200317.A BRA P-3 Roxbury	**Colleetion Date:**	1/11/01
Lab ID:	0101094-06A	**Matrix:**	SOIL

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
ICP METALS TOTAL SW-846 - 3051/6010		**SW6010B**				Analyst: **REB**
Lead	460	3.5		mg/Kg-dry	1	1/15/01 5:56:24 PM
PERCENT MOISTURE		**D2216**				Analyst: **CH**
Percent Moisture	16.2	0		wt%	1	1/15/01

Qualifiers:	ND - Not Detected at the Reporting Limit	S - Spike Recovery outside aecepted recovery limits
	J - Analyte detected below quantitation limits	R - RPD outside accepted recovery limits
	B - Analyte detected in the associated Method Blank	E - Value above quantitation range
	* - Value exceeds Maximum Contaminant Level	# - See Case Narrative

RL - Reporting Limit; defined as the lowest concentration the laboratory can accurately quantitate.

AMRO Environmental Laboratories Corp.

Date: *26-Jan-01*

CLIENT:	Weston & Sampson Engineers	**Client Sample ID:**	B-204(S) 5-7'
Lab Order:	0101094		
Project:	200317.A BRA P-3 Roxbury	**Collection Date:**	1/11/01
Lab ID:	0101094-07A	**Matrix:**	SOIL

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
ICP METALS TOTAL SW-846 - 3051/6010		**SW6010B**				Analyst: **REB**
Lead	230	3.5		mg/Kg-dry	1	1/15/01 6:01:23 PM
PERCENT MOISTURE		**D2216**				Analyst: **CH**
Percent Moisture	18.4	0		wt%	1	1/15/01

Qualifiers:

- ND - Not Detected at the Reporting Limit
- J - Analyte detected below quantitation limits
- B - Analyte detected in the associated Method Blank
- * - Value exceeds Maximum Contaminant Level
- S - Spike Recovery outside accepted recovery limits
- R - RPD outside accepted recovery limits
- E - Value above quantitation range
- # - See Case Narrative

RL - Reporting Limit; defined as the lowest concentration the laboratory can accurately quantitate.

AMRO Environmental Laboratories Corp.

Date: *26-Jan-01*

CLIENT:	Weston & Sampson Engineers	**Client Sample ID:**	B-205(S) 3-5'
Lab Order:	0101094		
Project:	200317.A BRA P-3 Roxbury	**Collection Date:**	1/11/01
Lab ID:	0101094-08A	**Matrix:**	SOIL

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
ICP METALS TOTAL SW-846 - 3051/6010		**SW6010B**				Analyst: **REB**
Lead	10	3.1		mg/Kg-dry	1	1/15/01 6:06:11 PM
PERCENT MOISTURE		**D2216**				Analyst: **CH**
Percent Moisture	3.3	0		wt%	1	1/15/01

Qualifiers:

ND - Not Detected at the Reporting Limit

J - Analyte detected below quantitation limits

B - Analyte detected in the associated Method Blank

* - Value exceeds Maximum Contaminant Level

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

E - Value above quantitation range

\# - See Case Narrative

RL - Reporting Limit; defined as the lowest concentration the laboratory can accurately quantitate.

AMRO Environmental Laboratories Corp.

Date: *26-Jan-01*

CLIENT:	Weston & Sampson Engineers	**Client Sample ID:**	B-206(S) 3-5'
Lab Order:	0101094		
Project:	200317.A BRA P-3 Roxbury	**Collection Date:**	1/11/01
Lab ID:	0101094-09A	**Matrix:**	SOIL

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
ICP METALS TOTAL SW-846 - 3051/6010		**SW6010B**				Analyst: **REB**
Lead	98	7.2		mg/Kg-dry	1	1/15/01 6:10:59 PM
PERCENT MOISTURE		**D2216**				Analyst: **CH**
Percent Moisture	57.0	0		wt%	1	1/15/01

Qualifiers:

ND - Not Detected at the Reporting Limit

J - Analyte detected below quantitation limits

B - Analyte detected in the associated Method Blank

* - Value exeeeds Maximum Contaminant Level

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

E - Value above quantitation range

- See Case Narrative

RL - Reporting Limit; defined as the lowest concentration the laboratory can accurately quantitate.

METHOD BLANK

AMRO Environmental Laboratories Corp.

Date: *19-Jan-01*

CLIENT: Weston & Sampson Engineers
Work Order: 0101094
Project: 200317.A BRA P-3 Roxbury

QC SUMMARY REPORT
Method Blank

Sample ID **MB-3585** Batch ID: **3585** Test Code: **SW6010B** Units: **mg/Kg** Analysis Date **1/15/01 4:52:38 PM** Prep Date **1/15/01**
Client ID: Run ID: **ICP-OPTIMA_010115C** SeqNo: **102219**

Analyte	QC Sample Result	RL	Units	QC Spike Amount	Original Sample Result	%REC	LowLimit	HighLimit	Original Sample or MS Result	%RPD	RPDLimit	Qua
Lead	ND	2.5	mg/Kg									

Qualifiers: ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
RL - Reporting Limit; defined as the lowest concentration the laboratory can accurately quantitate.
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank
NA - Not applicable where J values or ND results occur

MATRIX SPIKE AND MATRIX SPIKE DUPLICATE

AMRO Environmental Laboratories Corp.

Date: *19-Jan-01*

CLIENT: Weston & Sampson Engineers
Work Order: 0101094
Project: 200317.A BRA P-3 Roxbury

QC SUMMARY REPORT
Sample Matrix Spike

Sample ID **0101091-01BMS** Batch ID: **3585** Test Code: **SW6010B** Units: **mg/Kg-dry** Analysis Date **1/15/01 5:14:15 PM** Prep Date **1/15/01**
Client ID: Run ID: **ICP-OPTIMA_010115C** SeqNo: **102224**

Analyte	QC Sample Result	RL	Units	QC Spike Amount	Original Sample Result	%REC	LowLimit	HighLimit	Original Sample or MS Result	%RPD	RPDLimit	Qua
Lead	263.1	3.2	mg/Kg-dry	255.1	9.787	99.3	75	125	0			

Sample ID **0101091-01BMSD** Batch ID: **3585** Test Code: **SW6010B** Units: **mg/Kg-dry** Analysis Date **1/15/01 5:19:05 PM** Prep Date **1/15/01**
Client ID: Run ID: **ICP-OPTIMA_010115C** SeqNo: **102225**

Analyte	QC Sample Result	RL	Units	QC Spike Amount	Original Sample Result	%REC	LowLimit	HighLimit	Original Sample or MS Result	%RPD	RPDLimit	Qua
Lead	259.3	3.2	mg/Kg-dry	254.5	9.787	98	75	125	263.1	1.47	20	

Qualifiers: ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank
NA - Not applicable where J values or ND results occur
RL - Reporting Limit; defined as the lowest concentration the laboratory can accurately quantitate.

LABORATORY CONTROL SAMPLE

AMRO Environmental Laboratories Corp.

Date: *19-Jan-01*

CLIENT: Weston & Sampson Engineers
Work Order: 0101094
Project: 200317.A BRA P-3 Roxbury

QC SUMMARY REPORT
Laboratory Control Spike

Sample ID **LCS-3585** Batch ID: **3585** Test Code: **SW6010B** Units: **mg/Kg** Analysis Date **1/15/01 4:55:45 PM** Prep Date **1/15/01**
Client ID: Run ID: **ICP-OPTIMA_010115C** SeqNo: **102220**

Analyte	QC Sample Result	RL	Units	QC Spike Amount	Original Sample Result	%REC	LowLimit	HighLimit	Original Sample or MS Result	%RPD	RPDLimit	Qua
Lead	196.9	2.5	mg/Kg	200	0	98.5	80	120	0			

Qualifiers: ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
RL - Reporting Limit; defined as the lowest concentration the laboratory can accurately quantitate.
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank
NA - Not applicable where J values or ND results occur

Appendix E-2

Groundwater

AMRO Environmental Laboratories Corporation

111 Herrick Street, Merrimack, NH 03054
TEL: (603) 424-2022 · FAX: (603) 429-8496

September 25, 2001

George Naslas
Weston & Sampson Engineers
5 Centennial Drive
Peabody, MA 019607985
TEL: (978) 532-1900
FAX: (978) 977-0100

RE: 200317B BRA P 3 Order No.: 0109052

Dear George Naslas:

AMRO Environmental Laboratories Corp. received 2 samples on 9/11/01 for the analyses presented in the following report.

AMRO operates a Quality Assurance Program which meets or exceeds National Environmental Laboratory Accreditation Conference (NELAC), state, and EPA requirements. A copy of the appropriate state and/or NELAC Certificate is attached.

The enclosed Sample Receipt Checklist details the condition of your sample(s) upon receipt. Please be advised that any unused sample volume and sample extracts will be stored for a period of thirty (30) days from this report date. After this time, AMRO will properly dispose of the remaining sample(s). If you require further analysis, or need the samples held for a longer period, please contact us immediately.

This report consists of a total of 13 pages. This letter is an integral part of your data report. If you have any questions regarding this project in the future, please refer to the Order Number above.

Sincerely,

Nancy Stewart
Vice President / Lab Director

AMRO Environmental Laboratories Corp.

Date: *25-Sep-01*

CLIENT: Weston & Sampson Engineers
Project: 200317B BRA P 3
Lab Order: 0109052
Date Received: 9/11/01

Work Order Sample Summary

Lab Sample ID	Client Sample ID	Collection Date
0109052-01A	WS-13	9/10/01
0109052-02A	WS-2	9/10/01
0109052-02B	WS-2	9/10/01

AMRO Environmental Laboratories Corp. **Date:** *25-Sep-01*

CLIENT: Weston & Sampson Engineers
Project: 200317B BRA P 3
Lab Order: 0109052

CASE NARRATIVE

MADEP-VPH

1. Sample 0109052-02A had a recovery for the surrogate 2,5-Dibromotoluene outside the QC limits.

AMRO Environmental Laboratories Corp.

Date: *25-Sep-01*

CLIENT:	Weston & Sampson Engineers	**Client Sample ID:**	WS-13
Lab Order:	0109052		
Project:	200317B BRA P 3	**Collection Date:**	9/10/01
Lab ID:	0109052-01A	**Matrix:**	GROUNDWATER

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
ICP METALS DISSOLVED SW-846		**SW6010B**				Analyst: **RK**
Lead	ND	12		µg/L	1	9/13/01 3:52:33 PM

Qualifiers:

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
B - Analyte detected in the associated Method Blank
H - Method prescribed holding time exceeded
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range
- See Case Narrative
RL - Reporting Limit; defined as the lowest concentration the laboratory can accurately quantitate.

AMRO Environmental Laboratories Corp.

Date: *25-Sep-01*

CLIENT:	Weston & Sampson Engineers	**Client Sample ID:**	WS-2
Lab Order:	0109052	**Tag Number:**	
Project:	200317B BRA P 3	**Collection Date:**	9/10/01
Lab ID:	0109052-02A	**Matrix:**	GROUNDWATER

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
VOLATILE PETROLEUM HYDROCARBONS		**MAVPH**				Analyst: JC
C5-C8 Aliphatic Hydrocarbons	ND	100		µg/L	1	9/13/01 3:34:00 PM
C9-C12 Aliphatic Hydrocarbons	ND	25		µg/L	1	9/13/01 3:34:00 PM
C9-C10 Aromatic Hydrocarbons	ND	25		µg/L	1	9/13/01 3:34:00 PM
Methyl tert-butyl ether	ND	2.0		µg/L	1	9/13/01 3:34:00 PM
Benzene	ND	2.0		µg/L	1	9/13/01 3:34:00 PM
Toluene	ND	2.0		µg/L	1	9/13/01 3:34:00 PM
Ethylbenzene	ND	2.0		µg/L	1	9/13/01 3:34:00 PM
m,p-Xylene	ND	2.0		µg/L	1	9/13/01 3:34:00 PM
o-Xylene	ND	2.0		µg/L	1	9/13/01 3:34:00 PM
Naphthalene	ND	5.0		µg/L	1	9/13/01 3:34:00 PM
Surr: 1,2-Dichloroethane-d4	103	70-130		%REC	1	9/13/01 3:34:00 PM
Surr: 2,5-Dibromotoluene	159	70-130	S	%REC	1	9/13/01 3:34:00 PM
Surr: 4-Bromofluorobenzene	85.9	70-130		%REC	1	9/13/01 3:34:00 PM
Surr: Dibromofluoromethane	108	70-130		%REC	1	9/13/01 3:34:00 PM
Surr: Toluene-d8	105	70-130		%REC	1	9/13/01 3:34:00 PM

Hydrocarbon range data exclude concentrations of any surrogate(s) and/or internal standards eluting in that range. EPH: C11-C22 Aromatic Hydrocarbons exclude the concentration of target PAH analytes. VPH: C5-C8 Aliphatic Hydrocarbons exclude the concentration of target analytes eluting in this range. C9-C12 Aliphatic Hydrocarbons exclude the concentration of target analytes eluting in this range and concentration of C9-C10 Aromatic Hydrocarbons.

CERTIFICATION

Were all QA/QC procedures required by the VPH or EPH method followed: ✓ Yes ___ No - If No, See Case Narrative

Were all performance/acceptance standards for required QA/QC procedures achieved: ___ Yes ✓ No - If No, See Case Narrative

Were any significant modifications made to the method as specified in section 11.3: ___ No ✓ Yes - Details enclosed

I attest under the pains and penalties of perjury that, based upon my inquiry of those individuals immediately responsible for obtaining the information, the material contained in this report is, to the best of my knowledge and belief, accurate and complete.

SIGNATURE: _____ DATE: 9-25-01

PRINTED NAME: Nancy Stewart POSITION: Laboratory Director (or designee)

Qualifiers: RL - Reporting Limit; defined as the lowest concentration the laboratory can accurately quantitate.

ND - Not Detected at the Reporting Limit S - Spike Recovery outside accepted recovery limits E - Value above quantitation range

J - Analyte detected below quantitation limits R - RPD outside accepted recovery limits # - See Case Narrative

B - Analyte detected in the associated Method Blank H - Method prescribed holding time exceeded

AMRO Environmental Laboratories Corp.

Date: *25-Sep-01*

CLIENT:	Weston & Sampson Engineers	**Client Sample ID:**	WS-2
Lab Order:	0109052	**Tag Number:**	
Project:	200317B BRA P 3	**Collection Date:**	9/10/01
Lab ID:	0109052-02B	**Matrix:**	GROUNDWATER

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EXTRACTABLE PETROLEUM HYDROCARBONS	**MAEPH**					Analyst: RKK
C9-C18 Aliphatic Hydrocarbons	ND	100		µg/L	1	9/19/01 9:54:00 PM
C19-C36 Aliphatic Hydrocarbons	140	100		µg/L	1	9/19/01 9:54:00 PM
C11-C22 Aromatic Hydrocarbons	ND	100		µg/L	1	9/19/01 9:54:00 PM
Naphthalene	ND	1.0		µg/L	1	9/19/01 9:54:00 PM
2-Methylnaphthalene	ND	1.0		µg/L	1	9/19/01 9:54:00 PM
Acenaphthylene	ND	1.0		µg/L	1	9/19/01 9:54:00 PM
Acenaphthene	ND	1.0		µg/L	1	9/19/01 9:54:00 PM
Fluorene	ND	1.0		µg/L	1	9/19/01 9:54:00 PM
Phenanthrene	ND	1.0		µg/L	1	9/19/01 9:54:00 PM
Anthracene	ND	1.0		µg/L	1	9/19/01 9:54:00 PM
Fluoranthene	ND	1.0		µg/L	1	9/19/01 9:54:00 PM
Pyrene	ND	1.0		µg/L	1	9/19/01 9:54:00 PM
Benz(a)anthracene	ND	1.0		µg/L	1	9/19/01 9:54:00 PM
Chrysene	ND	1.0		µg/L	1	9/19/01 9:54:00 PM
Benzo(b)fluoranthene	ND	1.0		µg/L	1	9/19/01 9:54:00 PM
Benzo(k)fluoranthene	ND	1.0		µg/L	1	9/19/01 9:54:00 PM
Benzo(a)pyrene	ND	1.0		µg/L	1	9/19/01 9:54:00 PM
Dibenz(a,h)anthracene	ND	1.0		µg/L	1	9/19/01 9:54:00 PM
Indeno(1,2,3-cd)pyrene	ND	1.0		µg/L	1	9/19/01 9:54:00 PM
Benzo(g,h,i)perylene	ND	1.0		µg/L	1	9/19/01 9:54:00 PM
Surr: 1-Chlorooctadecane	51.7	40-140		%REC	1	9/19/01 9:54:00 PM
Surr: 2-Bromonaphthalene	87.7	40-140		%REC	1	9/19/01 9:54:00 PM
Surr: 2-Fluorobiphenyl	86.5	40-140		%REC	1	9/19/01 9:54:00 PM
Surr: o-Terphenyl	73.7	40-140		%REC	1	9/19/01 9:54:00 PM

Hydrocarbon range data exclude concentrations of any surrogate(s) and/or internal standards eluting in that range. EPH: C11-C22 Aromatic Hydrocarbons exclude the concentration of target PAH analytes. VPH: C5-C8 Aliphatic Hydrocarbons exclude the concentration of target analytes eluting in this range. C9-C12 Aliphatic Hydrocarbons exclude the concentration of target analytes eluting in this range and concentration of C9-C10 Aromatic Hydrocarbons.

CERTIFICATION

Were all QA/QC procedures required by the VPH or EPH method followed: ✓ Yes ___ No - If No, See Case Narrative

Were all performance/acceptance standards for required QA/QC procedures achieved: ✓ Yes ___ No - If No, See Case Narrative

Were any significant modifications made to the method as specified in section 11.3: ___ No ✓ Yes - Details enclosed

I attest under the pains and penalties of perjury that, based upon my inquiry of those individuals immediately responsible for obtaining the information, the material contained in this report is, to the best of my knowledge and belief, accurate and complete.

SIGNATURE: _____ DATE: 9-25-01

PRINTED NAME: Nancy Stewart POSITION: Laboratory Director (or designee)

Qualifiers: RL - Reporting Limit; defined as the lowest concentration the laboratory can accurately quantitate.

ND - Not Detected at the Reporting Limit | S - Spike Recovery outside accepted recovery limits | E - Value above quantitation range

J - Analyte detected below quantitation limits | R - RPD outside accepted recovery limits | # - See Case Narrative

B - Analyte detected in the associated Method Blank | H - Method prescribed holding time exceeded

Lab Order: 0109052
Client: Weston & Sampson Engineers
Project: 200317B BRA P 3

DATES REPORT

Sample ID	Client Sample ID	Collection Date	Matrix	Test Name	TCLP Date	Prep Date	Analysis Date
0109052-01A	WS-13	9/10/01	Groundwater	ICP METALS, DISSOLVED		9/13/01	9/13/01
0109052-02A	WS-2			Volatile Petroleum Hydrocarbons		9/13/01	9/13/01
0109052-02B				EPH, Water, Full List		9/15/01	9/19/01

AMRO Environmental Laboratories Corporation

SAMPLE RECEIPT CHECKLIST

111 Herrick Street
Merrimack, NH 03054
(603) 424-2022

Client: Weston & Sampson Eng
Project Name: 20b317B BEA P-3
Ship via: (circle one) Fed Ex., UPS, (AMRO Courier)
Hand Del., Other Courier, Other:

AMRO ID: 0109052
Date Rec.: 9-12-01
Date Due: 9-24-01

Items to be Checked Upon Receipt	Yes	No	NA	Comments
1. Army Samples received in individual plastic bags?			✓	
2. Custody Seals present?			✓	
3. Custody Seals Intact?			✓	
4. Air Bill included in folder if received?			✓	
5. Is COC included with samples?	✓			
6. Is COC signed and dated by client?	✓			
7. Laboratory receipt temperature. TEMP = 2.5°				
Samples rec. with ice ✓ ice packs ___ neither ___				
8. Were samples received the same day they were sampled?		✓		
Is client temperature 4°C ± 2°C?	✓			
If no obtain authorization from the client for the analyses.				
Client authorization from: Date: Obtained by:				
9. Is the COC filled out correctly and completely?	✓			
10. Does the info on the COC match the samples?	✓			
11. Were samples rec. within holding time?	✓			
12. Were all samples properly labeled?	✓			
13. Were all samples properly preserved?	✓			02B(2) needs adj.
14. Were proper sample containers used?	✓			
15. Were all samples received intact? (none broken or leaking)	✓			
16. Were VOA vials rec. with no air bubbles?				
17. Were the sample volumes sufficient for requested analysis?	✓			
18. Were all samples received?	✓			
19. VPH and VOA Soils only:			✓	
Sampling Method VPH (circle one): M=Methanol, E=EnCore (air-tight container)				
Sampling Method VOA (circle one): M=Methanol, SB=Sodium Bisulfate, E=EnCore, B=Bulk				
If M or SB:				
Does preservative cover the soil?				
If NO then client must be faxed.				
Does preservation level come close to the fill line on the vial?				
If NO then client must be faxed.				
Were vials provided by AMRO?				
If NO then weights MUST be obtained from client				
Was dry weight aliquot provided?				
If NO then fax client and inform the VOA lab ASAP.				
20. Subcontracted Samples:			✓	
What samples sent:				
Where sent:				
Date:				
Analysis:				
TAT:				
21. Information entered into:				
Internal Tracking Log?	✓			
Dry Weight Log?			✓	
Client Log?			✓	
Composite Log?			✓	
Filtration Log?			✓	

Received By: NS Date: 9-12-01 Logged in By: cc Date: 9-12-01
Labeled By: CC Date: 9-12-01 Checked By: NS Date: 9-12-01

NA= Not Applicable

AMRO Environmental
Laboratories Corporation

111 Herrick Street
Merrimack, NH 03054
(603) 424-2022

Please Circle if:
Sample= Soil
Sample= Waste

Sample ID	Analysis	Volume Sample	Preserv. Listed	Initial pH	Acceptable? Y or N	List Preserv. Added by AMRO	Solution ID # of Preserv.	Volume Preservative Added	Final adjusted pH
01A	D Pb	1-500P	HNO_3	<2	Y				
02A	VPH	3-44ml	HCl	—	Y				
02B(1)	EPH	1-1LA	HCl	<2	Y				
02B(2)	EPH	1-1LA	HCl	3	N	HCl	R02831	2 ml	<2

pH Checked By: CC Date: 9-12-01 pH adjusted By: CC Date: 9-12-01

2ml R02831

AMRO Environmental Laboratories Corporation
111 Herrick Street
Merrimack, NH 03054

CHAIN-OF-CUSTODY RECORD

41423

Office: (603) 424-2022
Fax: (603) 429-8496

Project No.: 200317B	Project Name: BRA P-3	Project Manager: George Nassis	Samplers (Signature):	AMRO Project No.: 0109052
	Project State:			

Sample ID	Date/Time Sampled	Matrix (A= Air, S= Soil, GW= Ground W., WW= Waste W., DW= Drinking W., O= Oil, Other= Specify)	Total # of Cont. & Size	Analysis Required: VPH	EPH	Dissolved Lead	Remarks
WS-13	9/10 1150	GW	1 teflon			X	
* WS-2	9/10 1350	GW	2Am 3V	X	X		* field observations noted sheen on water purged from WS-2
Preservative: Cl-HCl, MeOH, N-HN03, S-H2SO4, Na-NaOH, O- Other				Cl	Cl	N	
Container Type: P- Plastic, G-Glass, V-Vial, T- Teflon, O-Other				V	G	T	

Please print clearly, legibly and completely. Samples can not be logged in and the turnaround time clock will not start until any ambiguities are resolved.

FAX No.: 978 977 0100

NOTES: Preservatives, Special reporting limits, Known Contamination, etc;

Send Results To: George Nassis
5 Centennial Drive
Peabody MA 01960

Seal Intact? Yes No N/A

GW-1 ✓ GW-2 ✓ GW-3 ✓

MCP Level Needed:

Relinquished By	Date/ Time	Received By	Date/Time
Nancy Haynes	9-11-01 1410	[illegible]	9/11/01 16:20
[illegible]	9/12/01 0845		
		[illegible] 9/12/01 0845	

P.O. No: 200317

Results Needed By: Standard TAT

PRIORITY TURNAROUND TIME AUTHORIZATION
Before submitting samples for expedited TAT, you must have requested in advance and received a coded TAT AUTHORIZATION NUMBER
AUTHORIZATION No. _____ BY: _____

SHEET 1 OF 1

White: Lab Copy Yellow: Accompanies Report Pink: Client Copy

The Commonwealth of Massachusetts

Department of Environmental Protection

Division of Environmental Analysis
Senator William X. Wall Experiment Station

certifies

M-NH012 AMRO ENVIRONMENTAL LAB
111 HERRICK ST
MERRIMACK, NH 03054-0000

Laboratory Director: Nancy Stewart

for the analysis of NON POTABLE WATER (CHEMISTRY)
POTABLE WATER (CHEMISTRY)

pursuant to 310 CMR 42.00

This certificate supersedes all previous Massachusetts certificates issued to this laboratory. The laboratory is regulated by and shall be responsible for being in compliance with Massachusetts regulations at 310 CMR 42.00.

This certificate is valid only when accompanied by the latest dated Certified Parameter List as issued by the Massachusetts D.E.P. Contact the Division of Environmental Analysis to verify the current certification status of the laboratory.

Certification is no guarantee of the validity of the data. This certification is subject to unannounced laboratory inspections.

Issued: 01 JUL 2001
Expires: 30 JUN 2002

Oscar C. Jacobs

Director, Division of Environmental Analysis

COMMONWEALTH OF MASSACHUSETTS
DEPARTMENT OF ENVIRONMENTAL PROTECTION

Certified Parameter List as of: 09 JUL 2001

MA-NH012 AMRO ENVIRONMENTAL LAB
MERRIMACK NH

NON POTABLE WATER (CHEMISTRY) Effective Date 01 JUL 2001 Expiration Date 30 JUN 2002

Analytes and Methods

ALUMINUM	EPA 200.7	NITRATE-N	EPA 353.2
ANTIMONY	EPA 200.7	KJELDAHL-N	EPA 351.1
ANTIMONY	EPA 204.2	KJELDAHL-N	EPA 351.2
ARSENIC	EPA 200.7	ORTHOPHOSPHATE	EPA 365.2
ARSENIC	EPA 206.2	ORTHOPHOSPHATE	EPA 300.0
ARSENIC	ASTM D2972-93(C)	TOTAL PHOSPHORUS	EPA 365.2
BERYLLIUM	EPA 200.7	CHEMICAL OXYGEN DEMAND	EPA 410.4
CADMIUM	EPA 200.7	CHEMICAL OXYGEN DEMAND	HACH METHOD
CHROMIUM	EPA 200.7	BIOCHEMICAL OXYGEN DEMAND	EPA 405.1
COBALT	EPA 200.7	TOTAL CYANIDE	EPA 335.2
COPPER	EPA 200.7	NON-FILTERABLE RESIDUE	EPA 160.2
IRON	EPA 200.7	TOTAL RESIDUAL CHLORINE	SM 4500-CL-G
LEAD	EPA 200.7	OIL AND GREASE	EPA 413.1
LEAD	EPA 239.2	TOTAL PHENOLICS	EPA 420.1
MANGANESE	EPA 200.7	VOLATILE HALOCARBONS	EPA 624
MERCURY	EPA 245.1	VOLATILE AROMATICS	EPA 624
MOLYBDENUM	EPA 200.7	CHLORDANE	EPA 608
NICKEL	EPA 200.7	ALDRIN	EPA 608
SELENIUM	EPA 200.7	DIELDRIN	EPA 608
SELENIUM	EPA 270.2	DDD	EPA 608
SILVER	EPA 200.7	DDT	EPA 608
STRONTIUM	EPA 200.7	HEPTACHLOR	EPA 608
THALLIUM	EPA 200.7	HEPTACHLOR EPOXIDE	EPA 608
THALLIUM	EPA 279.2	POLYCHLORINATED BIPHENYLS (WATER)	EPA 608
ZINC	EPA 200.7	POLYCHLORINATED BIPHENYLS (OIL)	EPA 600/4-81-0
PH	EPA 150.1		
SPECIFIC CONDUCTIVITY	EPA 120.1		
TOTAL DISSOLVED SOLIDS	EPA 160.1		
TOTAL HARDNESS (CACO3)	EPA 200.7		
CALCIUM	EPA 200.7		
MAGNESIUM	EPA 200.7		
SODIUM	EPA 200.7		
POTASSIUM	EPA 200.7		
TOTAL ALKALINITY	EPA 310.1		
CHLORIDE	EPA 325.3		
CHLORIDE	EPA 300.0		
FLUORIDE	EPA 340.2		
FLUORIDE	EPA 300.0		
SULFATE	EPA 375.4		
SULFATE	EPA 300.0		
AMMONIA-N	EPA 350.2		
NITRATE-N	EPA 300.0		

COMMONWEALTH OF MASSACHUSETTS
DEPARTMENT OF ENVIRONMENTAL PROTECTION

Certified Parameter List as of: 09 JUL 2001

M-NH012 AMRO ENVIRONMENTAL LAB
MERRIMACK NH

POTABLE WATER (CHEMISTRY) Effective Date 09 JUL 2001 Expiration Date 30 JUN 2002

Analytes and Methods	
ANTIMONY	EPA 200.9
ARSENIC	EPA 200.7
ARSENIC	EPA 200.9
BARIUM	EPA 200.7
BERYLLIUM	EPA 200.7
CADMIUM	EPA 200.7
CHROMIUM	EPA 200.7
COPPER	EPA 200.7
LEAD	EPA 200.9
MERCURY	EPA 245.1
NICKEL	EPA 200.7
SELENIUM	EPA 200.9
THALLIUM	EPA 200.9
NITRATE-N	EPA 353.2
NITRITE-N	EPA 353.2
FLUORIDE	EPA 300.0
FLUORIDE	SM 4500-F-E
SULFATE	EPA 300.0
CYANIDE	SM 4500-CN-CE
TURBIDITY	EPA 180.1
RESIDUAL FREE CHLORINE	SM 4500-CL-G
CALCIUM	EPA 200.7
TOTAL ALKALINITY	SM 2320B
TOTAL DISSOLVED SOLIDS	SM 2540C
PH	EPA 150.1
1,2-DIBROMOETHANE	EPA 504.1
1,2-DIBROMO-3-CHLOROPROPANE	EPA 504.1

AMRO Environmental Laboratories Corporation

111 Herrick Street, Merrimack, NH 03054
TEL: (603) 424-2022 · FAX: (603) 429-8496

rec'd. 2/23/01.

February 20, 2001

George Naslas
Weston & Sampson Engineers
5 Centennial Drive
Peabody, MA 019607985
TEL: (978) 532-1900
FAX: (978) 977-0100

RE: 200317.A P-3 Roxbury Order No.: 0102063

Dear George Naslas:

AMRO Environmental Laboratories Corp. received 7 samples on 2/8/01 for the analyses presented in the following report.

AMRO operates a Quality Assurance Program which meets or exceeds National Environmental Laboratory Accreditation Conference (NELAC), state, and EPA requirements. A copy of the appropriate state and/or NELAC Certificate is attached. Please see the enclosed Case Narrative for quality control deviations that were encountered during the analyses associated with this project.

The enclosed Sample Receipt Checklist details the condition of your sample(s) upon receipt. Please be advised that any unused sample volume and sample extracts will be stored for a period of thirty (30) days from this report date. After this time, AMRO will properly dispose of the remaining sample(s). If you require further analysis, or need the samples held for a longer period, please contact us immediately.

This report consists of a total of 67 pages. This letter is an integral part of your data report. If you have any questions regarding this project in the future, please refer to the Order Number above.

Sincerely,

Nancy Stewart
Vice President / Lab Director

WORK ORDER SAMPLE SUMMARY

AMRO Environmental Laboratories Corp.

Date: *19-Feb-01*

CLIENT: Weston & Sampson Engineers
Project: 200317.A P-3 Roxbury
Lab Order: 0102063
Date Received: 2/8/01

Work Order Sample Summary

Lab Sample ID	Client Sample ID	Collection Date
0102063-01A	WS-12	2/6/01
0102063-01B	WS-12	2/6/01
0102063-01C	WS-12	2/6/01
0102063-02A	WS-10	2/6/01
0102063-02B	WS-10	2/6/01
0102063-02C	WS-10	2/6/01
0102063-03A	WS-9	2/6/01
0102063-03B	WS-9	2/6/01
0102063-03C	WS-9	2/6/01
0102063-04A	WS-7	2/7/01
0102063-04B	WS-7	2/7/01
0102063-04C	WS-7	2/7/01
0102063-05A	WS-5	2/7/01
0102063-05B	WS-5	2/7/01
0102063-05C	WS-5	2/7/01
0102063-06A	WS-3	2/7/01
0102063-06B	WS-3	2/7/01
0102063-06C	WS-3	2/7/01
0102063-07A	TRIP BLANK	2/7/01

Lab Order: 0102063
Client: Weston & Sampson Engineers
Project: 200317.A P-3 Roxbury

DATES REPORT

Sample ID	Client Sample ID	Collection Date	Matrix	Test Name	TCLP Date	Prep Date	Analysis Date
0102063-01A	WS-12	2/6/01	Aqueous	Volatile Petroleum Hydrocarbons		2/8/01	2/8/01
0102063-01B				EPH, Water, PAHs by SIM		2/8/01	2/14/01
				EPH, Water, PAHs by SIM		2/8/01	2/12/01
0102063-01C				LEAD, Dissolved		2/12/01	2/13/01
0102063-02A	WS-10			Volatile Petroleum Hydrocarbons		2/8/01	2/8/01
0102063-02B				EPH, Water, PAHs by SIM		2/8/01	2/12/01
				EPH, Water, PAHs by SIM		2/8/01	2/14/01
0102063-02C				LEAD, Dissolved		2/12/01	2/13/01
0102063-03A	WS-9			Volatile Petroleum Hydrocarbons		2/8/01	2/9/01
0102063-03B				EPH, Water, PAHs by SIM		2/8/01	2/14/01
				EPH, Water, PAHs by SIM		2/8/01	2/12/01
0102063-03C				LEAD, Dissolved		2/12/01	2/13/01
0102063-04A	WS-7	2/7/01		Volatile Petroleum Hydrocarbons		2/8/01	2/9/01
0102063-04B				EPH, Water, PAHs by SIM		2/8/01	2/12/01
				EPH, Water, PAHs by SIM		2/8/01	2/14/01
0102063-04C				LEAD, Dissolved		2/12/01	2/13/01
0102063-05A	WS-5			Volatile Petroleum Hydrocarbons		2/8/01	2/9/01
0102063-05B				EPH, Water, PAHs by SIM		2/8/01	2/14/01
				EPH, Water, PAHs by SIM		2/8/01	2/13/01
0102063-05C				LEAD, Dissolved		2/12/01	2/13/01
0102063-06A	WS-3			Volatile Petroleum Hydrocarbons		2/8/01	2/9/01
0102063-06B				EPH, Water, PAHs by SIM		2/8/01	2/14/01
				EPH, Water, PAHs by SIM		2/8/01	2/13/01
0102063-06C				LEAD, Dissolved		2/12/01	2/13/01
0102063-07A	TRIP BLANK			Volatile Petroleum Hydrocarbons		2/16/01	2/16/01

CHAIN-OF-CUSTODY

AMRO Environmental Laboratories Corporation
111 Herrick Street
Merrimack, N.H. 03054
Office: 603-424-2022 Fax: 603-429-8496

32011

CHAIN OF CUSTODY RECORD

Proj. No.	Project Name	Project State
200317.A	P-3 Roxbury	MA

Samplers (Signature): Robert F. Batta

PAGE 1 OF 1

Sta. No.	Date	Time	Comp	Grab	Station Location	Type Size, & No. of Containers	MATRIX Water - A Soil/Solid-S Waste-W Other-O Explain	VPH	EPH w/ Targets	Dissolved Lead	Remarks
	2/6/01	1036			WS-12	3-VOA 3-1L	A	X	X	X	
	2/6/01	1325			WS-10	↓	A	X	X	X	
	2/6/01	1530			WS-9		A	X	X	X	
	2/7/01	1205			WS-7		A	X	X	X	
	2/7/01	1345			WS-5		A	X	X	X	
	2/7/01	0940			WS-3		A	X	X	X	
					1 TRIP BLANK						

Please print clearly, legibly and completely. Samples cannot be logged in and the turnaround time clock will not start until any ambiguities are resolved.

PRIORITY TURNAROUND TIME AUTHORIZATION

Before submitting samples for expedited T.A.T., you must have requested in advance and received a coded **T.A.T. AUTHORIZATION NUMBER.**

AUTHORIZATION NO. _____ **T.A.T. authorized by:** _____

Relinquished by (Signature)	Date Time	Received by (Signature)
Robert F. Batta	2/8/01 1028	W. Lawrence
Relinquished by (Signature)	Date Time	Received by (Signature)
Relinquished by (Signature)	Date Time	Received by (Signature)
Relinquished by (Signature) W. Lawrence	Date Time 2/8/01 1330	Received for Laboratory by: (Signature) Constance Cearley

☐ Fax to (phone)

Results needed: Standard

PO#

AMRO Project No.: 0102063

Seal Intact? Yes No N/A

Send Results to:
George Naslas
WESTON & SAMPSON ENGINEERS
5 Centennial Drive
Peabody MA, 01960

Remarks
GW-1 Standards

White: Lab copy Yellow: Accompanies report Pink: Client copy

SAMPLE RECEIPT CHECKLIST

AMRO Environmental Laboratories Corporation

SAMPLE RECEIPT CHECKLIST

111 Herrick Street
Merrimack, NH 03054
(603) 424-2022

Client: W+S
Project Name: 200317.A P-3 Roxbury
Ship via: (circle one) Fed Ex., UPS, AMRO Courier,
Hand Del., Other Courier. Other:

AMRO ID: 0102063
Date Rec.: 2-8-01
Date Due: 2-20-01

Items to be Checked Upon Receipt	Yes	No	NA	Comments
1. Army Samples received in individual plastic bags?			✓	
2. Custody Seals present?			✓	
3. Custody Seals intact?			✓	
4. Air Bill included in folder if received?			✓	
5. Is COC included with samples?	✓			
6. Is COC signed and dated by client?	✓			
7. Laboratory receipt temperature. TEMP = 2°				
Samples rec. with ice ✓ ice packs ___ neither ___				
8. Were samples received the same day they were sampled?		✓		
Is client temperature 4°C ± 2°C?	✓			
If no obtain authorization from the client for the analyses.				
Client authorization from: Date: Obtained by:				
9. Is the COC filled out correctly and completely?	✓			
10. Does the info on the COC match the samples?	✓			
11. Were samples rec. within holding time?	✓			
12. Were all samples properly labeled?	✓			1-500 ml label not filled out
13. Were all samples properly preserved?	✓			
14. Were proper sample containers used?	✓			
15. Were all samples received intact? (none broken or leaking)	✓			
16. Were VOA vials rec. with no air bubbles?	✓			
17. Were the sample volumes sufficient for requested analysis?	✓			
18. Were all samples received?	✓			
19. VPH and VOA Soils only:			✓	
Sampling Method VPH (circle one): M=Methanol, E=EnCore (air-tight container)				
Sampling Method VOA (circle one): M=Methanol, SB=Sodium Bisulfate, E=EnCore, B=Bulk				
If M or SB:				
Does preservative cover the soil?				
If NO then client must be faxed.				
Does preservation level come close to the fill line on the vial?				
If NO then client must be faxed.				
Were vials provided by AMRO?				
If NO then weights MUST be obtained from client				
Was dry weight aliquot provided?				
If NO then fax client and inform the VOA lab ASAP.				
20. Subcontracted Samples:			✓	
What samples sent:				
Where sent:				
Date:				
Analysis:				
TAT:				
21. Information entered into:				
Internal Tracking Log?	✓			
Dry Weight Log?			✓	
Client Log?		✓		
Composite Log?			✓	
Filtration Log?			✓	

Received By: CC Date: 2-8-01 Logged in By: CC Date: 2-8-01
Labeled By: CC Date: 2-8-01 Checked By: Date:

NA= Not Applicable

qc/qcmemos/forms/samplerec Rev.18 06/00

AMRO Environmental
Laboratories Corporation

111 Herrick Street
Merrimack, NH 03054
(603) 424-2022

Please Circle if:
Sample= Soil
Sample= Waste

Sample ID	Analysis	Volume Sample	Preserv. Listed	Initial pH	Acceptable? Y or N	List Preserv. Added by AMRO	Solution ID # of Preserv.	Volume Preservative Added	Final adjusted pH
01A-06A	VPH	3x44ml	HCl	—	—				
07A	VPH	8x44ml	HCl	—	—				
01B-06B	EPH	2x1LA	HCl	1	Y				
01C-06C	Diss Pb	1x500P	HNO_3	1	Y				

pH Checked By: CC Date: 2-8-01 pH adjusted By: Date:

STATE CERTIFICATE

The Commonwealth of Massachusetts

Department of Environmental Protection

Division of Environmental Analysis
Senator William X. Wall Experiment Station

certifies

M-NH012

AMRO ENVIRONMENTAL LAB
111 HERRICK ST
MERRIMACK, NH 03054-0000

Laboratory Director: **Nancy Stewart**

for the analysis of

NON POTABLE WATER (CHEMISTRY)
POTABLE WATER (CHEMISTRY)

pursuant to 310 CMR 42.00

This certificate supersedes all previous Massachusetts certificates issued to this laboratory. The laboratory is regulated by and shall be responsible for being in compliance with Massachusetts regulations at 310 CMR 42.00.

This certificate is valid only when accompanied by the latest dated Certified Parameter List as issued by the Massachusetts D.E.P. Contact the Division of Environmental Analysis to verify the current certification status of the laboratory.

Certification is no guarantee of the validity of the data. This certification is subject to unannounced laboratory inspections.

Issued: **01 JUL 2000**

Expires: **30 JUN 2001**

Oscar C. Parcells

Director, Division of Environmental Analysis

CASE NARRATIVE

CASE NARRATIVE
0102063

GENERAL

1. No QC deviations were observed.

MADEP-VPH
WATER

1. The surrogate 2,5-Dibromotoluene was outside the laboratory control limits (70-130%) in the following samples: WS-12 (0102063-01A), WS-10 (0102063-02A), WS-5 (0102063-05A), WS-3 (0102063-06A), Batch QC 0102045-08AMS/MSD and 0102009-01ADUP.

2. The batch Matrix Spike (MS) and Matrix Spike duplicate (MSD) analyzed on 02/17/01 were performed on sample 0102079-04. All %R's and %RPD's were within control limits with the following exceptions:

    2.1 The recovery for Methyl tert-butyl ether and Toluene were outside the laboratory control limits (70-130%) in the MS.

3. No other QC deviations were observed.

MADEP-EPH
WATER

1. No QC deviations were observed.

METALS

1. No QC deviations were observed.

AMRO Environmental Laboratories Corporation
111 Herrick Street
Merrimack, NH 03054

Volatile Petroleum Hydrocarbons (VPH)
Massachusetts Department of Environmental Protection (MADEP)
Method 1.0 - January 1998
AMRO Modifications

This modification is based on the use of a purge and trap gas chromatography mass spectrometer (GC/MS) system to analyze samples for VPH. The hydrocarbon ranges are quantified using predominant mass fragmentation ions which are characteristic for the range being measured. This approach eliminates potential false positives for the target analytes while providing accurate hydrocarbon range data.

The chromatographic column is an HP-624 capillary column which has been validated by GC/MS analysis of a gasoline standard to correctly identify the marker compounds and elution order of specific gasoline components. Batch quality control includes, at a minimum, method blank, laboratory control sample, and duplicate analysis. A matrix spike and/or matrix spike duplicate is analyzed if sufficient sample is submitted to the laboratory.

The Reporting Limit (RL) of this method for each of the collective aliphatic and aromatic ranges is approximately 0.6-2.8 mg/kg in soil and 25-110 µg/L in water. The RL of this method for the target analytes ranges from approximately 0.05-0.13 mg/kg in soil and 2.0-5.0 µg/L for water samples.

Extractable Petroleum Hydrocarbons (EPH)
Massachusetts Department of Environmental Protection (MADEP)
Method 1.0 - January 1998
AMRO Modifications

This modification is based on a solvent extraction and gas chromatography mass spectrometer (GC/MS) analysis. The hydrocarbon ranges are quantified using predominant mass fragmentation ions which are characteristic for the range being measured. This approach eliminates the silica gel solid-phase fractionation step. False positives for targeted PAH analytes are eliminated by using GC/MS as the primary analysis technique.

The chromatographic column is a J&W Scientific DB-5ms capillary column.
Internal standard calibration is performed using 5α-Androstane at a concentration of 40 ng/µL. o-Terphenyl and 1-Chlorooctadecane are added as surrogate compounds at 20 ng/µL in the sample extract. These two surrogates monitor the effects of the sample matrix and extraction efficiency. Two additional surrogates, 2-Fluorobiphenyl and 2-Bromonaphthalene, are added to the finished extract prior to analysis to monitor instrument performance. Batch quality control includes, at a minimum, a procedure blank, laboratory control sample and duplicate sample analysis. A matrix spike is analyzed if sufficient sample is submitted to the laboratory.

The Reporting Limit (RL) of this method for each of the collective aliphatic and aromatic ranges is approximately 2-15 mg/kg in soil and 10-50 µg/L in water. The RL of this method for the Target PAH analytes ranges from approximately 0.25 to 0.5mg/kg in soil; 1.0µg/L for water when operating the GC/MS in full scan mode, and 0.1 to 1.0µg/L when operating the GC/MS in SIM mode. For sites requiring the lowest levels cited in the Massachusetts Contingency Plan for water, GC/MS in the Selected Ion Monitoring (SIM) mode is used.

VOLATILE PETROLEUM HYDROCARBONS (VPH)
WATER

SAMPLE RESULTS

AMRO Environmental Laboratories Corp.

Date: *19-Feb-01*

CLIENT:	Weston & Sampson Engineers	**Client Sample ID:**	WS-12
Lab Order:	0102063	**Tag Number:**	
Project:	200317.A P-3 Roxbury	**Collection Date:**	2/6/01
Lab ID:	0102063-01A	**Matrix:**	AQUEOUS

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
VOLATILE PETROLEUM HYDROCARBONS		**MAVPH**				Analyst: **JSL**
C5-C8 Aliphatic Hydrocarbons	ND	100		µg/L	1	2/8/01 11:20:00 PM
C9-C12 Aliphatic Hydrocarbons	ND	25		µg/L	1	2/8/01 11:20:00 PM
C9-C10 Aromatic Hydrocarbons	ND	25		µg/L	1	2/8/01 11:20:00 PM
Methyl tert-butyl ether	ND	2.0		µg/L	1	2/8/01 11:20:00 PM
Benzene	ND	2.0		µg/L	1	2/8/01 11:20:00 PM
Toluene	ND	2.0		µg/L	1	2/8/01 11:20:00 PM
Ethylbenzene	ND	2.0		µg/L	1	2/8/01 11:20:00 PM
m,p-Xylene	ND	2.0		µg/L	1	2/8/01 11:20:00 PM
o-Xylene	ND	2.0		µg/L	1	2/8/01 11:20:00 PM
Naphthalene	ND	5.0		µg/L	1	2/8/01 11:20:00 PM
Surr: 1,2-Dichloroethane-d4	103	70-130		%REC	1	2/8/01 11:20:00 PM
Surr: 2,5-Dibromotoluene	61.0	70-130	S	%REC	1	2/8/01 11:20:00 PM
Surr: 4-Bromofluorobenzene	87.4	70-130		%REC	1	2/8/01 11:20:00 PM
Surr: Dibromofluoromethane	110	70-130		%REC	1	2/8/01 11:20:00 PM
Surr: Toluene-d8	103	70-130		%REC	1	2/8/01 11:20:00 PM

Hydrocarbon range data exclude concentrations of any surrogate(s) and/or internal standards eluting in that range. EPH: C11-C22 Aromatic Hydrocarbons exclude the concentration of target PAH analytes. VPH: C5-C8 Aliphatic Hydrocarbons exclude the concentration of target analytes eluting in this range. C9-C12 Aliphatic Hydrocarbons exclude the concentration of target analytes eluting in this range and concentration of C9-C10 Aromatic Hydrocarbons.

CERTIFICATION

Were all QA/QC procedures required by the VPH or EPH method followed: ✓ Yes ___ No - If No, See Case Narrative

Were all performance/acceptance standards for required QA/QC procedures achieved: ___ Yes ✓ No - If No, See Case Narrative

Were any significant modifications made to the method as specified in section 11.3: ___ No ✓ Yes - Details enclosed

I attest under the pains and penalties of perjury that, based upon my inquiry of those individuals immediately responsible for obtaining the information, the material contained in this report is, to the best of my knowledge and belief, accurate and complete.

SIGNATURE: Nancy Stewart DATE: 2-20-01

PRINTED NAME: Nancy Stewart POSITION: Laboratory Director (or designee)

Qualifiers: RL - Reporting Limit; defined as the lowest concentration the laboratory can accurately quantitate.

ND - Not Detected at the Reporting Limit | S - Spike Recovery outside accepted recovery limits | E - Value above quantitation range

J - Analyte detected below quantitation limits | R - RPD outside accepted recovery limits | # - See Case Narrative

B - Analyte detected in the associated Method Blank

AMRO Environmental Laboratories Corp.

Date: *19-Feb-01*

CLIENT:	Weston & Sampson Engineers	**Client Sample ID:**	WS-10
Lab Order:	0102063	**Tag Number:**	
Project:	200317.A P-3 Roxbury	**Collection Date:**	2/6/01
Lab ID:	0102063-02A	**Matrix:**	AQUEOUS

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
VOLATILE PETROLEUM HYDROCARBONS		**MAVPH**				Analyst: **JSL**
C5-C8 Aliphatic Hydrocarbons	ND	100		µg/L	1	2/8/01 11:51:00 PM
C9-C12 Aliphatic Hydrocarbons	ND	25		µg/L	1	2/8/01 11:51:00 PM
C9-C10 Aromatic Hydrocarbons	ND	25		µg/L	1	2/8/01 11:51:00 PM
Methyl tert-butyl ether	ND	2.0		µg/L	1	2/8/01 11:51:00 PM
Benzene	ND	2.0		µg/L	1	2/8/01 11:51:00 PM
Toluene	ND	2.0		µg/L	1	2/8/01 11:51:00 PM
Ethylbenzene	ND	2.0		µg/L	1	2/8/01 11:51:00 PM
m,p-Xylene	ND	2.0		µg/L	1	2/8/01 11:51:00 PM
o-Xylene	ND	2.0		µg/L	1	2/8/01 11:51:00 PM
Naphthalene	ND	5.0		µg/L	1	2/8/01 11:51:00 PM
Surr: 1,2-Dichloroethane-d4	106	70-130		%REC	1	2/8/01 11:51:00 PM
Surr: 2,5-Dibromotoluene	68.8	70-130	S	%REC	1	2/8/01 11:51:00 PM
Surr: 4-Bromofluorobenzene	87.2	70-130		%REC	1	2/8/01 11:51:00 PM
Surr: Dibromofluoromethane	110	70-130		%REC	1	2/8/01 11:51:00 PM
Surr: Toluene-d8	103	70-130		%REC	1	2/8/01 11:51:00 PM

Hydrocarbon range data exclude concentrations of any surrogate(s) and/or internal standards eluting in that range. EPH: C11-C22 Aromatic Hydrocarbons exclude the concentration of target PAH analytes. VPH: C5-C8 Aliphatic Hydrocarbons exclude the concentration of target analytes eluting in this range. C9-C12 Aliphatic Hydrocarbons exclude the concentration of target analytes eluting in this range and concentration of C9-C10 Aromatic Hydrocarbons.

CERTIFICATION

Were all QA/QC procedures required by the VPH or EPH method followed: ✓ Yes ___ No - If No, See Case Narrative

Were all performance/acceptance standards for required QA/QC procedures achieved: ___ Yes ✓ No - If No, See Case Narrative

Were any significant modifications made to the method as specified in section 11.3: ___ No ✓ Yes - Details enclosed

I attest under the pains and penalties of perjury that, based upon my inquiry of those individuals immediately responsible for obtaining the information, the material contained in this report is, to the best of my knowledge and belief, accurate and complete.

SIGNATURE: _____ DATE: 2-20-01

PRINTED NAME: Nancy Stewart POSITION: Laboratory Director (or designee)

Qualifiers: RL - Reporting Limit; defined as the lowest concentration the laboratory can accurately quantitate.

ND - Not Detected at the Reporting Limit

J - Analyte detected below quantitation limits

B - Analyte detected in the associated Method Blank

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

E - Value above quantitation range

- See Case Narrative

AMRO Environmental Laboratories Corp.

Date: *19-Feb-01*

CLIENT:	Weston & Sampson Engineers	**Client Sample ID:**	WS-9
Lab Order:	0102063	**Tag Number:**	
Project:	200317.A P-3 Roxbury	**Collection Date:**	2/6/01
Lab ID:	0102063-03A	**Matrix:**	AQUEOUS

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
VOLATILE PETROLEUM HYDROCARBONS		**MAVPH**				Analyst: **JSL**
C5-C8 Aliphatic Hydrocarbons	ND	100		µg/L	1	2/9/01 12:21:00 AM
C9-C12 Aliphatic Hydrocarbons	ND	25		µg/L	1	2/9/01 12:21:00 AM
C9-C10 Aromatic Hydrocarbons	ND	25		µg/L	1	2/9/01 12:21:00 AM
Methyl tert-butyl ether	ND	2.0		µg/L	1	2/9/01 12:21:00 AM
Benzene	ND	2.0		µg/L	1	2/9/01 12:21:00 AM
Toluene	ND	2.0		µg/L	1	2/9/01 12:21:00 AM
Ethylbenzene	ND	2.0		µg/L	1	2/9/01 12:21:00 AM
m,p-Xylene	ND	2.0		µg/L	1	2/9/01 12:21:00 AM
o-Xylene	ND	2.0		µg/L	1	2/9/01 12:21:00 AM
Naphthalene	ND	5.0		µg/L	1	2/9/01 12:21:00 AM
Surr: 1,2-Dichloroethane-d4	106	70-130		%REC	1	2/9/01 12:21:00 AM
Surr: 2,5-Dibromotoluene	74.2	70-130		%REC	1	2/9/01 12:21:00 AM
Surr: 4-Bromofluorobenzene	86.0	70-130		%REC	1	2/9/01 12:21:00 AM
Surr: Dibromofluoromethane	107	70-130		%REC	1	2/9/01 12:21:00 AM
Surr: Toluene-d8	102	70-130		%REC	1	2/9/01 12:21:00 AM

Hydrocarbon range data exclude concentrations of any surrogate(s) and/or internal standards eluting in that range. EPH: C11-C22 Aromatic Hydrocarbons exclude the concentration of target PAH analytes. VPH: C5-C8 Aliphatic Hydrocarbons exclude the concentration of target analytes eluting in this range. C9-C12 Aliphatic Hydrocarbons exclude the concentration of target analytes eluting in this range and concentration of C9-C10 Aromatic Hydrocarbons.

CERTIFICATION

Were all QA/QC procedures required by the VPH or EPH method followed: ✓ Yes ___ No - If No, See Case Narrative

Were all performance/acceptance standards for required QA/QC procedures achieved: ✓ Yes ___ No - If No, See Case Narrative

Were any significant modifications made to the method as specified in section 11.3: ___ No ✓ Yes - Details enclosed

I attest under the pains and penalties of perjury that, based upon my inquiry of those individuals immediately responsible for obtaining the information, the material contained in this report is, to the best of my knowledge and belief, accurate and complete.

SIGNATURE: _____ DATE: 2-20-01

PRINTED NAME: Nancy Stewart POSITION: Laboratory Director (or designee)

Qualifiers: RL - Reporting Limit; defined as the lowest concentration the laboratory can accurately quantitate.

ND - Not Detected at the Reporting Limit S - Spike Recovery outside accepted recovery limits E - Value above quantitation range

J - Analyte detected below quantitation limits R - RPD outside accepted recovery limits # - See Case Narrative

B - Analyte detected in the associated Method Blank

AMRO Environmental Laboratories Corp.

Date: *19-Feb-01*

CLIENT:	Weston & Sampson Engineers	**Client Sample ID:**	WS-7
Lab Order:	0102063	**Tag Number:**	
Project:	200317.A P-3 Roxbury	**Collection Date:**	2/7/01
Lab ID:	0102063-04A	**Matrix:**	AQUEOUS

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
VOLATILE PETROLEUM HYDROCARBONS		**MAVPH**				Analyst: **JSL**
C5-C8 Aliphatic Hydrocarbons	ND	100		µg/L	1	2/9/01 12:51:00 AM
C9-C12 Aliphatic Hydrocarbons	ND	25		µg/L	1	2/9/01 12:51:00 AM
C9-C10 Aromatic Hydrocarbons	ND	25		µg/L	1	2/9/01 12:51:00 AM
Methyl tert-butyl ether	ND	2.0		µg/L	1	2/9/01 12:51:00 AM
Benzene	ND	2.0		µg/L	1	2/9/01 12:51:00 AM
Toluene	ND	2.0		µg/L	1	2/9/01 12:51:00 AM
Ethylbenzene	ND	2.0		µg/L	1	2/9/01 12:51:00 AM
m,p-Xylene	ND	2.0		µg/L	1	2/9/01 12:51:00 AM
o-Xylene	ND	2.0		µg/L	1	2/9/01 12:51:00 AM
Naphthalene	ND	5.0		µg/L	1	2/9/01 12:51:00 AM
Surr: 1,2-Dichloroethane-d4	106	70-130		%REC	1	2/9/01 12:51:00 AM
Surr: 2,5-Dibromotoluene	72.6	70-130		%REC	1	2/9/01 12:51:00 AM
Surr: 4-Bromofluorobenzene	84.6	70-130		%REC	1	2/9/01 12:51:00 AM
Surr: Dibromofluoromethane	106	70-130		%REC	1	2/9/01 12:51:00 AM
Surr: Toluene-d8	100	70-130		%REC	1	2/9/01 12:51:00 AM

Hydrocarbon range data exclude concentrations of any surrogate(s) and/or internal standards eluting in that range. EPH: C11-C22 Aromatic Hydrocarbons exclude the concentration of target PAH analytes. VPH: C5-C8 Aliphatic Hydrocarbons exclude the concentration of target analytes eluting in this range. C9-C12 Aliphatic Hydrocarbons exclude the concentration of target analytes eluting in this range and concentration of C9-C10 Aromatic Hydrocarbons.

CERTIFICATION

Were all QA/QC procedures required by the VPH or EPH method followed: ✓ Yes ___ No - If No, See Case Narrative

Were all performance/acceptance standards for required QA/QC procedures achieved: ✓ Yes ___ No - If No, See Case Narrative

Were any significant modifications made to the method as specified in section 11.3: ___ No ✓ Yes - Details enclosed

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SIGNATURE: Nancy Stewart DATE: 2-20-01

PRINTED NAME: Nancy Stewart POSITION: Laboratory Director (or designee)

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J - Analyte detected below quantitation limits R - RPD outside accepted recovery limits # - See Case Narrative

B - Analyte detected in the associated Method Blank

AMRO Environmental Laboratories Corp.

Date: *19-Feb-01*

CLIENT:	Weston & Sampson Engineers	**Client Sample ID:**	WS-5
Lab Order:	0102063	**Tag Number:**	
Project:	200317.A P-3 Roxbury	**Collection Date:**	2/7/01
Lab ID:	0102063-05A	**Matrix:**	AQUEOUS

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
VOLATILE PETROLEUM HYDROCARBONS	**MAVPH**					Analyst: JSL
C5-C8 Aliphatic Hydrocarbons	ND	100		µg/L	1	2/9/01 1:21:00 AM
C9-C12 Aliphatic Hydrocarbons	ND	25		µg/L	1	2/9/01 1:21:00 AM
C9-C10 Aromatic Hydrocarbons	ND	25		µg/L	1	2/9/01 1:21:00 AM
Methyl tert-butyl ether	ND	2.0		µg/L	1	2/9/01 1:21:00 AM
Benzene	ND	2.0		µg/L	1	2/9/01 1:21:00 AM
Toluene	ND	2.0		µg/L	1	2/9/01 1:21:00 AM
Ethylbenzene	ND	2.0		µg/L	1	2/9/01 1:21:00 AM
m,p-Xylene	ND	2.0		µg/L	1	2/9/01 1:21:00 AM
o-Xylene	ND	2.0		µg/L	1	2/9/01 1:21:00 AM
Naphthalene	ND	5.0		µg/L	1	2/9/01 1:21:00 AM
Surr: 1,2-Dichloroethane-d4	106	70-130		%REC	1	2/9/01 1:21:00 AM
Surr: 2,5-Dibromotoluene	62.8	70-130	S	%REC	1	2/9/01 1:21:00 AM
Surr: 4-Bromofluorobenzene	86.4	70-130		%REC	1	2/9/01 1:21:00 AM
Surr: Dibromofluoromethane	109	70-130		%REC	1	2/9/01 1:21:00 AM
Surr: Toluene-d8	100	70-130		%REC	1	2/9/01 1:21:00 AM

Hydrocarbon range data exclude concentrations of any surrogate(s) and/or internal standards eluting in that range. EPH: C11-C22 Aromatic Hydrocarbons exclude the concentration of target PAH analytes. VPH: C5-C8 Aliphatic Hydrocarbons exclude the concentration of target analytes eluting in this range. C9-C12 Aliphatic Hydrocarbons exclude the concentration of target analytes eluting in this range and concentration of C9-C10 Aromatic Hydrocarbons.

CERTIFICATION

Were all QA/QC procedures required by the VPH or EPH method followed: ✓ Yes ___ No - If No, See Case Narrative

Were all performance/acceptance standards for required QA/QC procedures achieved: ___ Yes ✓ No - If No, See Case Narrative

Were any significant modifications made to the method as specified in section 11.3: ___ No ✓ Yes - Details enclosed

I attest under the pains and penalties of perjury that, based upon my inquiry of those individuals immediately responsible for obtaining the information, the material contained in this report is, to the best of my knowledge and belief, accurate and complete.

SIGNATURE: _____ DATE: 2-20-01

PRINTED NAME: Nancy Stewart POSITION: Laboratory Director (or designee)

Qualifiers: RL - Reporting Limit; defined as the lowest concentration the laboratory can accurately quantitate.

ND - Not Detected at the Reporting Limit S - Spike Recovery outside accepted recovery limits E - Value above quantitation range

J - Analyte detected below quantitation limits R - RPD outside accepted recovery limits # - See Case Narrative

B - Analyte detected in the associated Method Blank

AMRO Environmental Laboratories Corp.

Date: *19-Feb-01*

CLIENT:	Weston & Sampson Engineers	**Client Sample ID:**	WS-3
Lab Order:	0102063	**Tag Number:**	
Project:	200317.A P-3 Roxbury	**Collection Date:**	2/7/01
Lab ID:	0102063-06A	**Matrix:**	AQUEOUS

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
VOLATILE PETROLEUM HYDROCARBONS		**MAVPH**				Analyst: **JSL**
C5-C8 Aliphatic Hydrocarbons	ND	100		µg/L	1	2/9/01 1:51:00 AM
C9-C12 Aliphatic Hydrocarbons	ND	25		µg/L	1	2/9/01 1:51:00 AM
C9-C10 Aromatic Hydrocarbons	ND	25		µg/L	1	2/9/01 1:51:00 AM
Methyl tert-butyl ether	ND	2.0		µg/L	1	2/9/01 1:51:00 AM
Benzene	ND	2.0		µg/L	1	2/9/01 1:51:00 AM
Toluene	ND	2.0		µg/L	1	2/9/01 1:51:00 AM
Ethylbenzene	ND	2.0		µg/L	1	2/9/01 1:51:00 AM
m,p-Xylene	ND	2.0		µg/L	1	2/9/01 1:51:00 AM
o-Xylene	ND	2.0		µg/L	1	2/9/01 1:51:00 AM
Naphthalene	ND	5.0		µg/L	1	2/9/01 1:51:00 AM
Surr: 1,2-Dichloroethane-d4	105	70-130		%REC	1	2/9/01 1:51:00 AM
Surr: 2,5-Dibromotoluene	63.4	70-130	S	%REC	1	2/9/01 1:51:00 AM
Surr: 4-Bromofluorobenzene	86.6	70-130		%REC	1	2/9/01 1:51:00 AM
Surr: Dibromofluoromethane	110	70-130		%REC	1	2/9/01 1:51:00 AM
Surr: Toluene-d8	104	70-130		%REC	1	2/9/01 1:51:00 AM

Hydrocarbon range data exclude concentrations of any surrogate(s) and/or internal standards eluting in that range. EPH: C11-C22 Aromatic Hydrocarbons exclude the concentration of target PAH analytes. VPH: C5-C8 Aliphatic Hydrocarbons exclude the concentration of target analytes eluting in this range. C9-C12 Aliphatic Hydrocarbons exclude the concentration of target analytes eluting in this range and concentration of C9-C10 Aromatic Hydrocarbons.

CERTIFICATION

Were all QA/QC procedures required by the VPH or EPH method followed: ✓ Yes ___ No - If No, See Case Narrative

Were all performance/acceptance standards for required QA/QC procedures achieved: ___ Yes ✓ No - If No, See Case Narrative

Were any significant modifications made to the method as specified in section 11.3: ___ No ✓ Yes - Details enclosed

I attest under the pains and penalties of perjury that, based upon my inquiry of those individuals immediately responsible for obtaining the information, the material contained in this report is, to the best of my knowledge and belief, accurate and complete.

SIGNATURE: _____ DATE: 22001

PRINTED NAME: Nancy Stewart POSITION: Laboratory Director (or designee)

Qualifiers: RL - Reporting Limit; defined as the lowest concentration the laboratory can accurately quantitate.

ND - Not Detected at the Reporting Limit S - Spike Recovery outside accepted recovery limits E - Value above quantitation range

J - Analyte detected below quantitation limits R - RPD outside accepted recovery limits # - See Case Narrative

B - Analyte detected in the associated Method Blank

AMRO Environmental Laboratories Corp.

Date: *19-Feb-01*

CLIENT:	Weston & Sampson Engineers	**Client Sample ID:**	TRIP BLANK
Lab Order:	0102063	**Tag Number:**	
Project:	200317.A P-3 Roxbury	**Collection Date:**	2/7/01
Lab ID:	0102063-07A	**Matrix:**	AQUEOUS

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
VOLATILE PETROLEUM HYDROCARBONS		**MAVPH**				Analyst: **SK**
C5-C8 Aliphatic Hydrocarbons	ND	100		µg/L	1	2/16/01 12:38:00 PM
C9-C12 Aliphatic Hydrocarbons	ND	25		µg/L	1	2/16/01 12:38:00 PM
C9-C10 Aromatic Hydrocarbons	ND	25		µg/L	1	2/16/01 12:38:00 PM
Methyl tert-butyl ether	ND	2.0		µg/L	1	2/16/01 12:38:00 PM
Benzene	ND	2.0		µg/L	1	2/16/01 12:38:00 PM
Toluene	ND	2.0		µg/L	1	2/16/01 12:38:00 PM
Ethylbenzene	ND	2.0		µg/L	1	2/16/01 12:38:00 PM
m,p-Xylene	ND	2.0		µg/L	1	2/16/01 12:38:00 PM
o-Xylene	ND	2.0		µg/L	1	2/16/01 12:38:00 PM
Naphthalene	ND	5.0		µg/L	1	2/16/01 12:38:00 PM
Surr: 1,2-Dichloroethane-d4	94.5	70-130		%REC	1	2/16/01 12:38:00 PM
Surr: 2,5-Dibromotoluene	85.5	70-130		%REC	1	2/16/01 12:38:00 PM
Surr: 4-Bromofluorobenzene	99.5	70-130		%REC	1	2/16/01 12:38:00 PM
Surr: Dibromofluoromethane	101	70-130		%REC	1	2/16/01 12:38:00 PM
Surr: Toluene-d8	94.8	70-130		%REC	1	2/16/01 12:38:00 PM

Hydrocarbon range data exclude concentrations of any surrogate(s) and/or internal standards eluting in that range. EPH: C11-C22 Aromatic Hydrocarbons exclude the concentration of target PAH analytes. VPH: C5-C8 Aliphatic Hydrocarbons exclude the concentration of target analytes eluting in this range. C9-C12 Aliphatic Hydrocarbons exclude the concentration of target analytes eluting in this range and concentration of C9-C10 Aromatic Hydrocarbons.

CERTIFICATION

Were all QA/QC procedures required by the VPH or EPH method followed: ✓ Yes ___ No - If No, See Case Narrative

Were all performance/acceptance standards for required QA/QC procedures achieved: ✓ Yes ___ No - If No, See Case Narrative

Were any significant modifications made to the method as specified in section 11.3: ___ No ✓ Yes - Details enclosed

I attest under the pains and penalties of perjury that, based upon my inquiry of those individuals immediately responsible for obtaining the information, the material contained in this report is, to the best of my knowledge and belief, accurate and complete.

SIGNATURE: _____ DATE: 2-20-01

PRINTED NAME: Nancy Stewart POSITION: Laboratory Director (or designee)

Qualifiers: RL - Reporting Limit; defined as the lowest concentration the laboratory can accurately quantitate.

ND - Not Detected at the Reporting Limit S - Spike Recovery outside aeeepted recovery limits E - Value above quantitation range

J - Analyte detected below quantitation limits R - RPD outside accepted recovery limits # - See Case Narrative

B - Analyte detected in the associated Method Blank

METHOD BLANK

AMRO Environmental Laboratories Corp.

Date: *12-Feb-01*

CLIENT: Weston & Sampson Engineers
Work Order: 0102063
Project: 200317.A P-3 Roxbury

QC SUMMARY REPORT
Method Blank

Sample ID **mblk 02/08/01** Batch ID: **R7119** Test Code: **MAVPH** Units: **µg/L** Analysis Date **2/8/01 2:33:00 PM** Prep Date **2/8/01**
Client ID: Run ID: **V-4_010208A** SeqNo: **106920**

Analyte	QC Sample Result	RL	Units	QC Spike Amount	Original Sample Result	%REC	LowLimit	HighLimit	Original Sample or MS Result	%RPD	RPDLimit	Qua
C5-C8 Aliphatic Hydrocarbons	ND	100	µg/L									
C9-C12 Aliphatic Hydrocarbons	ND	25	µg/L									
C9-C10 Aromatic Hydrocarbons	ND	25	µg/L									
Methyl tert-butyl ether	ND	2.0	µg/L									
Benzene	ND	2.0	µg/L									
Toluene	ND	2.0	µg/L									
Ethylbenzene	ND	2.0	µg/L									
m,p-Xylene	ND	2.0	µg/L									
o-Xylene	ND	2.0	µg/L									
Naphthalene	ND	5.0	µg/L									
Surr: 1,2-Dichloroethane-d4	25.5	0	µg/L	25	0	102	70	130	0			
Surr: 2,5-Dibromotoluene	23.4	0	µg/L	25	0	93.6	70	130	0			
Surr: 4-Bromofluorobenzene	23.04	0	µg/L	25	0	92.2	70	130	0			
Surr: Dibromofluoromethane	26.52	0	µg/L	25	0	106	70	130	0			
Surr: Toluene-d8	25.61	0	µg/L	25	0	102	70	130	0			

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
RL - Reporting Limit; defined as the lowest concentration the laboratory can accurately quantitate.
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank
NA - Not applicable where J values or ND results occur

AMRO Environmental Laboratories Corp.

Date: *19-Feb-01*

CLIENT: Weston & Sampson Engineers
Work Order: 0102063
Project: 200317.A P-3 Roxbury

QC SUMMARY REPORT
Method Blank

Sample ID **mblk02/16/01** Batch ID: **R7220** Test Code: **MAVPH** Units: **µg/L** Analysis Date **2/16/01 12:03:00 PM** Prep Date **2/16/01**
Client ID: Run ID: **V-2_010216A** SeqNo: **107951**

Analyte	QC Sample Result	RL	Units	QC Spike Amount	Original Sample Result	%REC	LowLimit	HighLimit	Original Sample or MS Result	%RPD	RPDLimit	Qua
C5-C8 Aliphatic Hydrocarbons	ND	100	µg/L									
C9-C12 Aliphatic Hydrocarbons	ND	25	µg/L									
C9-C10 Aromatic Hydrocarbons	ND	25	µg/L									
Methyl tert-butyl ether	ND	2.0	µg/L									
Benzene	ND	2.0	µg/L									
Toluene	ND	2.0	µg/L									
Ethylbenzene	ND	2.0	µg/L									
m,p-Xylene	ND	2.0	µg/L									
o-Xylene	ND	2.0	µg/L									
Naphthalene	ND	5.0	µg/L									
Surr: 1,2-Dichloroethane-d4	24.47	0	µg/L	25	0	97.9	70	130	0			
Surr: 2,5-Dibromotoluene	23.29	0	µg/L	25	0	93.2	70	130	0			
Surr: 4-Bromofluorobenzene	24.69	0	µg/L	25	0	98.8	70	130	0			
Surr: Dibromofluoromethane	25.16	0	µg/L	25	0	101	70	130	0			
Surr: Toluene-d8	24.65	0	µg/L	25	0	98.6	70	130	0			

Qualifiers: ND - Not Detected at the Reporting Limit
S - Spike Recovery outside accepted recovery limits
B - Analyte detected in the associated Method Blank
J - Analyte detected below quantitation limits
R - RPD outside accepted recovery limits
NA - Not applicable where J values or ND results occur
RL - Reporting Limit; defined as the lowest concentration the laboratory can accurately quantitate.

MATRIX SPIKE AND MATRIX SPIKE DUPLICATE

AMRO Environmental Laboratories Corp.

Date: *12-Feb-01*

CLIENT: Weston & Sampson Engineers
Work Order: 0102063
Project: 200317.A P-3 Roxbury

QC SUMMARY REPORT

Sample Matrix Spike

Sample ID **0102045-08AMS** Batch ID: **R7119** Test Code: **MAVPH** Units: **µg/L** Analysis Date **2/8/01 9:19:00 PM** Prep Date **2/8/01**

Client ID: Run ID: **V-4_010208A** SeqNo: **106938**

Analyte	QC Sample Result	RL	Units	QC Spike Amount	Original Sample Result	%REC	LowLimit	HighLimit	Original Sample or MS Result	%RPD	RPDLimit	Qua
Methyl tert-butyl ether	75.6	10	µg/L	100	0	75.6	70	130	0			
Benzene	96.55	10	µg/L	100	0	96.6	70	130	0			
Toluene	96.55	10	µg/L	100	0	96.6	70	130	0			
Ethylbenzene	86.55	10	µg/L	100	0	86.6	70	130	0			
m,p-Xylene	189.4	10	µg/L	200	0	94.7	70	130	0			
o-Xylene	77.6	10	µg/L	100	0	77.6	70	130	0			
Naphthalene	83.5	25	µg/L	100	0	83.5	70	130	0			
Surr: 1,2-Dichloroethane-d4	120.3	0	µg/L	125	0	96.2	70	130	0			
Surr: 2,5-Dibromotoluene	46	0	µg/L	125	0	36.8	70	130	0			S
Surr: 4-Bromofluorobenzene	136.2	0	µg/L	125	0	109	70	130	0			
Surr: Dibromofluoromethane	128.1	0	µg/L	125	0	102	70	130	0			
Surr: Toluene-d8	144.4	0	µg/L	125	0	116	70	130	0			

Qualifiers: ND - Not Dctected at the Reporting Limit
J - Analyte detected below quantitation limits
S - Spike Recovery outsidc accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank
NA - Not applicable where J values or ND results occur
RL - Reporting Limit; defined as the lowest concentration the laboratory can accurately quantitate.

CLIENT: Weston & Sampson Engineers
Work Order: 0102063
Project: 200317.A P-3 Roxbury

QC SUMMARY REPORT

Sample Matrix Spike Duplicate

Sample ID **0102045-08AMSD** Batch ID: **R7119** Test Code: **MAVPH** Units: **µg/L** Analysis Date **2/8/01 9:50:00 PM** Prep Date **2/8/01**

Client ID: Run ID: **V-4_010208A** SeqNo: **106940**

Analyte	QC Sample Result	RL	Units	QC Spike Amount	Original Sample Result	%REC	LowLimit	HighLimit	Original Sample or MS Result	%RPD	RPDLimit	Qua
Methyl tert-butyl ether	81	10	µg/L	100	0	81	70	130	75.6	6.9	50	
Benzene	101.8	10	µg/L	100	0	102	70	130	96.55	5.29	50	
Toluene	101.2	10	µg/L	100	0	101	70	130	96.55	4.65	50	
Ethylbenzene	88.05	10	µg/L	100	0	88	70	130	86.55	1.72	50	
m,p-Xylene	196.4	10	µg/L	200	0	98.2	70	130	189.4	3.63	50	
o-Xylene	79.55	10	µg/L	100	0	79.6	70	130	77.6	2.48	50	
Naphthalene	95.6	25	µg/L	100	0	95.6	70	130	83.5	13.5	50	
Surr: 1,2-Dichloroethane-d4	114.9	0	µg/L	125	0	91.9	70	130	0	0	0	
Surr: 2,5-Dibromotoluene	63.1	0	µg/L	125	0	50.5	70	130	0	0	0	S
Surr: 4-Bromofluorobenzene	141	0	µg/L	125	0	113	70	130	0	0	0	
Surr: Dibromofluoromethane	126.3	0	µg/L	125	0	101	70	130	0	0	0	
Surr: Toluene-d8	148.8	0	µg/L	125	0	119	70	130	0	0	0	

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
RL - Reporting Limit; defined as the lowest concentration the laboratory can accurately quantitate.
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank
NA - Not applicable where J values or ND results occur

AMRO Environmental Laboratories Corp.

Date: *19-Feb-01*

CLIENT: Weston & Sampson Engineers
Work Order: 0102063
Project: 200317.A P-3 Roxbury

QC SUMMARY REPORT

Sample Matrix Spike

Sample ID **0102079-04ms** Batch ID: **R7220** Test Code: **MAVPH** Units: **µg/L** Analysis Date **2/17/01 1:27:00 AM** Prep Date **2/16/01**

Client ID: Run ID: **V-2_010216A** SeqNo: **107970**

Analyte	QC Sample Result	RL	Units	QC Spike Amount	Original Sample Result	%REC	LowLimit	HighLimit	Original Sample or MS Result	%RPD	RPDLimit	Qua
Methyl tert-butyl ether	143.1	10	µg/L	100	0	143	70	130	0			S
Benzene	123.9	10	µg/L	100	0	124	70	130	0			
Toluene	137	10	µg/L	100	0	137	70	130	0			S
Ethylbenzene	125.4	10	µg/L	100	0	125	70	130	0			
m,p-Xylene	253.2	10	µg/L	200	0	127	70	130	0			
o-Xylene	120.4	10	µg/L	100	0	120	70	130	0			
Naphthalene	101.8	25	µg/L	100	0	102	70	130	0			
Surr: 1,2-Dichloroethane-d4	133.8	0	µg/L	125	0	107	70	130	0			
Surr: 2,5-Dibromotoluene	116.4	0	µg/L	125	0	93.2	70	130	0			
Surr: 4-Bromofluorobenzene	126.2	0	µg/L	125	0	101	70	130	0			
Surr: Dibromofluoromethane	144.7	0	µg/L	125	0	116	70	130	0			
Surr: Toluene-d8	131.2	0	µg/L	125	0	105	70	130	0			

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
RL - Reporting Limit; defined as the lowest concentration the laboratory can accurately quantitate.
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank
NA - Not applicable where J values or ND results occur

AMRO Environmental Laboratories Corp.

Date: *19-Feb-01*

CLIENT: Weston & Sampson Engineers
Work Order: 0102063
Project: 200317.A P-3 Roxbury

QC SUMMARY REPORT

Sample Matrix Spike Duplicate

Sample ID **0102079-04msd** Batch ID: **R7220** Test Code: **MAVPH** Units: **µg/L** Analysis Date **2/17/01 2:02:00 AM** Prep Date **2/16/01**

Client ID: Run ID: **V-2_010216A** SeqNo: **107971**

Analyte	QC Sample Result	RL	Units	QC Spike Amount	Original Sample Result	%REC	LowLimit	HighLimit	Original Sample or MS Result	%RPD	RPDLimit	Qua
Methyl tert-butyl ether	123.7	10	µg/L	100	0	124	70	130	143.1	14.5	50	
Benzene	109.4	10	µg/L	100	0	109	70	130	123.9	12.5	50	
Toluene	118.5	10	µg/L	100	0	118	70	130	137	14.4	50	
Ethylbenzene	110.1	10	µg/L	100	0	110	70	130	125.4	13	50	
m,p-Xylene	219.7	10	µg/L	200	0	110	70	130	253.2	14.2	50	
o-Xylene	106	10	µg/L	100	0	106	70	130	120.4	12.7	50	
Naphthalene	99.35	25	µg/L	100	0	99.4	70	130	101.8	2.39	50	
Surr: 1,2-Dichloroethane-d4	133.8	0	µg/L	125	0	107	70	130	0	0	0	
Surr: 2,5-Dibromotoluene	123.6	0	µg/L	125	0	98.9	70	130	0	0	0	
Surr: 4-Bromofluorobenzene	125	0	µg/L	125	0	100	70	130	0	0	0	
Surr: Dibromofluoromethane	145	0	µg/L	125	0	116	70	130	0	0	0	
Surr: Toluene-d8	133.9	0	µg/L	125	0	107	70	130	0	0	0	

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
RL - Reporting Limit; defined as the lowest concentration the laboratory can accurately quantitate.
S - Spike Reeovcry outsidc accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank
NA - Not applicable where J values or ND results occur

SAMPLE AND SAMPLE DUPLICATE

AMRO Environmental Laboratories Corp.

Date: *12-Feb-01*

CLIENT: Weston & Sampson Engineers
Work Order: 0102063
Project: 200317.A P-3 Roxbury

QC SUMMARY REPORT
Sample Duplicate

Sample ID **0102009-01Adup** Batch ID: **R7119** Test Code: **MAVPH** Units: **µg/L** Analysis Date **2/8/01 4:10:00 PM** Prep Date **2/8/01**
Client ID: Run ID: **V-4_010208A** SeqNo: **106928**

Analyte	QC Sample Result	RL	Units	QC Spike Amount	Original Sample Result	%REC	LowLimit	HighLimit	Original Sample or MS Result	%RPD	RPDLimit	Qua
C5-C8 Aliphatic Hydrocarbons	ND	100	µg/L	0	0	0	0	0	0	0	50	
C9-C12 Aliphatic Hydrocarbons	ND	25	µg/L	0	0	0	0	0	0	0	50	
C9-C10 Aromatic Hydrocarbons	ND	25	µg/L	0	0	0	0	0	0	0	50	
Methyl tert-butyl ether	ND	2.0	µg/L	0	0	0	0	0	0	0	50	
Benzene	ND	2.0	µg/L	0	0	0	0	0	0	0	50	
Toluene	ND	2.0	µg/L	0	0	0	0	0	0	0	50	
Ethylbenzene	0.71	2.0	µg/L	0	0	0	0	0	0	0	50	J,NA
m,p-Xylene	ND	2.0	µg/L	0	0	0	0	0	0	0	50	
o-Xylene	ND	2.0	µg/L	0	0	0	0	0	0	0	50	
Naphthalene	ND	5.0	µg/L	0	0	0	0	0	0	0	50	
Surr: 1,2-Dichloroethane-d4	24.45	0	µg/L	25	0	97.8	70	130	0	0	0	
Surr: 2,5-Dibromotoluene	8.49	0	µg/L	25	0	34	70	130	0	0	0	S
Surr: 4-Bromofluorobenzene	23.16	0	µg/L	25	0	92.6	70	130	0	0	0	
Surr: Dibromofluoromethane	25.72	0	µg/L	25	0	103	70	130	0	0	0	
Surr: Toluene-d8	24.83	0	µg/L	25	0	99.3	70	130	0	0	0	

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
RL - Reporting Limit; defined as the lowest concentration the laboratory can accurately quantitate.
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank
NA - Not applicable where J values or ND results occur

LABORATORY CONTROL SAMPLE

AMRO Environmental Laboratories Corp.

Date: *12-Feb-01*

CLIENT: Weston & Sampson Engineers
Work Order: 0102063
Project: 200317.A P-3 Roxbury

QC SUMMARY REPORT
Laboratory Control Spike

Sample ID **lcs 02/08/01** Batch ID: **R7119** Test Code: **MAVPH** Units: **µg/L** Analysis Date **2/8/01 1:27:00 PM** Prep Date **2/8/01**
Client ID: Run ID: **V-4_010208A** SeqNo: **106908**

Analyte	QC Sample Result	RL	Units	QC Spike Amount	Original Sample Result	%REC	LowLimit	HighLimit	Original Sample or MS Result	%RPD	RPDLimit	Qua
Methyl tert-butyl ether	14.65	2.0	µg/L	20	0	73.2	70	130	0			
Benzene	18.96	2.0	µg/L	20	0	94.8	70	130	0			
Toluene	19.23	2.0	µg/L	20	0	96.2	70	130	0			
Ethylbenzene	16.34	2.0	µg/L	20	0	81.7	70	130	0			
m,p-Xylene	36.87	2.0	µg/L	40	0	92.2	70	130	0			
o-Xylene	14.99	2.0	µg/L	20	0	75	70	130	0			
Naphthalene	20.56	5.0	µg/L	20	0	103	70	130	0			
Surr: 1,2-Dichloroethane-d4	24.04	0	µg/L	25	0	96.2	70	130	0			
Surr: 2,5-Dibromotoluene	22.49	0	µg/L	25	0	90	70	130	0			
Surr: 4-Bromofluorobenzene	27.72	0	µg/L	25	0	111	70	130	0			
Surr: Dibromofluoromethane	25.22	0	µg/L	25	0	101	70	130	0			
Surr: Toluene-d8	30.11	0	µg/L	25	0	120	70	130	0			

Qualifiers: ND - Not Detected at the Reporting Limit
S - Spike Recovery outside accepted recovery limits
B - Analyte detected in the associated Method Blank
J - Analyte detected below quantitation limits
R - RPD outside accepted recovery limits
NA - Not applicable where J values or ND results occur
RL - Reporting Limit; defined as the lowest concentration the laboratory can accurately quantitate.

AMRO Environmental Laboratories Corp.

Date: *19-Feb-01*

CLIENT: Weston & Sampson Engineers
Work Order: 0102063
Project: 200317.A P-3 Roxbury

QC SUMMARY REPORT
Laboratory Control Spike

Sample ID **lcs02/16/01** Batch ID: **R7220** Test Code: **MAVPH** Units: **µg/L** Analysis Date **2/16/01 10:51:00 AM** Prep Date **2/16/01**
Client ID: Run ID: **V-2_010216A** SeqNo: **107950**

Analyte	QC Sample Result	RL	Units	QC Spike Amount	Original Sample Result	%REC	LowLimit	HighLimit	Original Sample or MS Result	%RPD	RPDLimit	Qua
Methyl tert-butyl ether	18.34	2.0	µg/L	20	0	91.7	70	130	0			
Benzene	20.39	2.0	µg/L	20	0	102	70	130	0			
Toluene	20.14	2.0	µg/L	20	0	101	70	130	0			
Ethylbenzene	20.15	2.0	µg/L	20	0	101	70	130	0			
m,p-Xylene	41.07	2.0	µg/L	40	0	103	70	130	0			
o-Xylene	19.74	2.0	µg/L	20	0	98.7	70	130	0			
Naphthalene	19.05	5.0	µg/L	20	0	95.2	70	130	0			
Surr: 1,2-Dichloroethane-d4	25.14	0	µg/L	25	0	101	70	130	0			
Surr: 2,5-Dibromotoluene	23.16	0	µg/L	25	0	92.6	70	130	0			
Surr: 4-Bromofluorobenzene	25.63	0	µg/L	25	0	103	70	130	0			
Surr: Dibromofluoromethane	25.68	0	µg/L	25	0	103	70	130	0			
Surr: Toluene-d8	25.13	0	µg/L	25	0	101	70	130	0			

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank
NA - Not applicable where J values or ND results occur
RL - Reporting Limit; defined as the lowest concentration the laboratory can accurately quantitate.

EXTRACTABLE PETROLEUM HYDROCARBONS (EPH)
WATER

SAMPLE RESULTS

AMRO Environmental Laboratories Corp.

Date: *19-Feb-01*

CLIENT:	Weston & Sampson Engineers	**Client Sample ID:**	WS-12
Lab Order:	0102063	**Tag Number:**	
Project:	200317.A P-3 Roxbury	**Collection Date:**	2/6/01
Lab ID:	0102063-01B	**Matrix:**	AQUEOUS

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPH PAHS BY SIM		**MAEPH**				Analyst: **KEM**
C11-C22 Aromatic Hydrocarbons	160	100		µg/L	1	2/12/01 10:08:00 PM
C19-C36 Aliphatic Hydrocarbons	ND	100		µg/L	1	2/12/01 10:08:00 PM
C9-C18 Aliphatic Hydrocarbons	ND	100		µg/L	1	2/12/01 10:08:00 PM
Naphthalene	ND	0.10		µg/L	1	2/14/01 5:57:00 PM
2-Methylnaphthalene	ND	0.10		µg/L	1	2/14/01 5:57:00 PM
Acenaphthylene	ND	0.10		µg/L	1	2/14/01 5:57:00 PM
Acenaphthene	ND	0.10		µg/L	1	2/14/01 5:57:00 PM
Fluorene	ND	0.10		µg/L	1	2/14/01 5:57:00 PM
Phenanthrene	ND	0.10		µg/L	1	2/14/01 5:57:00 PM
Anthracene	ND	0.10		µg/L	1	2/14/01 5:57:00 PM
Fluoranthene	ND	0.10		µg/L	1	2/14/01 5:57:00 PM
Pyrene	ND	0.10		µg/L	1	2/14/01 5:57:00 PM
Benz(a)anthracene	ND	0.10		µg/L	1	2/14/01 5:57:00 PM
Chrysene	ND	0.10		µg/L	1	2/14/01 5:57:00 PM
Benzo(b)fluoranthene	ND	0.10		µg/L	1	2/14/01 5:57:00 PM
Benzo(k)fluoranthene	ND	0.10		µg/L	1	2/14/01 5:57:00 PM
Benzo(a)pyrene	ND	0.10		µg/L	1	2/14/01 5:57:00 PM
Dibenz(a,h)anthracene	ND	0.10		µg/L	1	2/14/01 5:57:00 PM
Indeno(1,2,3-cd)pyrene	ND	0.10		µg/L	1	2/14/01 5:57:00 PM
Benzo(g,h,i)perylene	ND	0.10		µg/L	1	2/14/01 5:57:00 PM
Surr: 1-Chlorooctadecane	55.4	40-140		%REC	1	2/12/01 10:08:00 PM
Surr: 2-Bromonaphthalene	85.2	40-140		%REC	1	2/12/01 10:08:00 PM
Surr: 2-Fluorobiphenyl	80.1	40-140		%REC	1	2/12/01 10:08:00 PM
Surr: o-Terphenyl	71.3	40-140		%REC	1	2/12/01 10:08:00 PM

Hydrocarbon range data exclude concentrations of any surrogate(s) and/or internal standards eluting in that range. EPH: C11-C22 Aromatic Hydrocarbons exclude the concentration of target PAH analytes. VPH: C5-C8 Aliphatic Hydrocarbons exclude the concentration of target analytes eluting in this range. C9-C12 Aliphatic Hydrocarbons exclude the concentration of target analytes eluting in this range and concentration of C9-C10 Aromatic Hydrocarbons.

CERTIFICATION

Were all QA/QC procedures required by the VPH or EPH method followed: ✓ Yes ___ No - If No, See Case Narrative

Were all performance/acceptance standards for required QA/QC procedures achieved: ✓ Yes ___ No - If No, See Case Narrative

Were any significant modifications made to the method as specified in section 11.3: ___ No ✓ Yes - Details enclosed

I attest under the pains and penalties of perjury that, based upon my inquiry of those individuals immediately responsible for obtaining the information, the material contained in this report is, to the best of my knowledge and belief, accurate and complete.

SIGNATURE: _____ DATE: 2-20-01

PRINTED NAME: Nancy Stewart POSITION: Laboratory Director (or designee)

Qualifiers: RL - Reporting Limit; defined as the lowest concentration the laboratory can accurately quantitate.

ND - Not Detected at the Reporting Limit S - Spike Recovery outside accepted recovery limits E - Value above quantitation range

J - Analyte detected below quantitation limits R - RPD outside accepted recovery limits # - See Case Narrative

B - Analyte detected in the associated Method Blank

AMRO Environmental Laboratories Corp.

Date: *19-Feb-01*

CLIENT:	Weston & Sampson Engineers	**Client Sample ID:**	WS-10
Lab Order:	0102063	**Tag Number:**	
Project:	200317.A P-3 Roxbury	**Collection Date:**	2/6/01
Lab ID:	0102063-02B	**Matrix:**	AQUEOUS

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPH PAHS BY SIM		**MAEPH**				Analyst: **KEM**
C11-C22 Aromatic Hydrocarbons	ND	100		µg/L	1	2/12/01 10:43:00 PM
C19-C36 Aliphatic Hydrocarbons	ND	100		µg/L	1	2/12/01 10:43:00 PM
C9-C18 Aliphatic Hydrocarbons	ND	100		µg/L	1	2/12/01 10:43:00 PM
Naphthalene	ND	0.10		µg/L	1	2/14/01 6:28:00 PM
2-Methylnaphthalene	ND	0.10		µg/L	1	2/14/01 6:28:00 PM
Acenaphthylene	ND	0.10		µg/L	1	2/14/01 6:28:00 PM
Acenaphthene	ND	0.10		µg/L	1	2/14/01 6:28:00 PM
Fluorene	ND	0.10		µg/L	1	2/14/01 6:28:00 PM
Phenanthrene	ND	0.10		µg/L	1	2/14/01 6:28:00 PM
Anthracene	ND	0.10		µg/L	1	2/14/01 6:28:00 PM
Fluoranthene	ND	0.10		µg/L	1	2/14/01 6:28:00 PM
Pyrene	ND	0.10		µg/L	1	2/14/01 6:28:00 PM
Benz(a)anthracene	ND	0.10		µg/L	1	2/14/01 6:28:00 PM
Chrysene	ND	0.10		µg/L	1	2/14/01 6:28:00 PM
Benzo(b)fluoranthene	ND	0.10		µg/L	1	2/14/01 6:28:00 PM
Benzo(k)fluoranthene	ND	0.10		µg/L	1	2/14/01 6:28:00 PM
Benzo(a)pyrene	ND	0.10		µg/L	1	2/14/01 6:28:00 PM
Dibenz(a,h)anthracene	ND	0.10		µg/L	1	2/14/01 6:28:00 PM
Indeno(1,2,3-cd)pyrene	ND	0.10		µg/L	1	2/14/01 6:28:00 PM
Benzo(g,h,i)perylene	ND	0.10		µg/L	1	2/14/01 6:28:00 PM
Surr: 1-Chlorooctadecane	64.8	40-140		%REC	1	2/12/01 10:43:00 PM
Surr: 2-Bromonaphthalene	86.9	40-140		%REC	1	2/12/01 10:43:00 PM
Surr: 2-Fluorobiphenyl	79.5	40-140		%REC	1	2/12/01 10:43:00 PM
Surr: o-Terphenyl	71.9	40-140		%REC	1	2/12/01 10:43:00 PM

Hydrocarbon range data exclude concentrations of any surrogate(s) and/or internal standards eluting in that range. EPH: C11-C22 Aromatic Hydrocarbons exclude the concentration of target PAH analytes. VPH: C5-C8 Aliphatic Hydrocarbons exclude the concentration of target analytes eluting in this range. C9-C12 Aliphatic Hydrocarbons exclude the concentration of target analytes eluting in this range and concentration of C9-C10 Aromatic Hydrocarbons.

CERTIFICATION

Were all QA/QC procedures required by the VPH or EPH method followed: ✓ Yes ___ No - If No, See Case Narrative

Were all performance/acceptance standards for required QA/QC procedures achieved: ✓ Yes ___ No - If No, See Case Narrative

Were any significant modifications made to the method as specified in section 11.3: ___ No ✓ Yes - Details enclosed

I attest under the pains and penalties of perjury that, based upon my inquiry of those individuals immediately responsible for obtaining the information, the material contained in this report is, to the best of my knowledge and belief, accurate and complete.

SIGNATURE: _____ DATE: 2-20-01

PRINTED NAME: Nancy Stewart POSITION: Laboratory Director (or designee)

Qualifiers: RL - Reporting Limit; defined as the lowest concentration the laboratory can accurately quantitate.

ND - Not Detected at the Reporting Limit S - Spike Recovery outside accepted recovery limits E - Value above quantitation range

J - Analyte detected below quantitation limits R - RPD outside accepted recovery limits # - See Case Narrative

B - Analyte detected in the associated Method Blank

AMRO Environmental Laboratories Corp.

Date: *19-Feb-01*

CLIENT:	Weston & Sampson Engineers	**Client Sample ID:**	WS-9
Lab Order:	0102063	**Tag Number:**	
Project:	200317.A P-3 Roxbury	**Collection Date:**	2/6/01
Lab ID:	0102063-03B	**Matrix:**	AQUEOUS

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPH PAHS BY SIM		**MAEPH**				Analyst: **KEM**
C11-C22 Aromatic Hydrocarbons	ND	110		µg/L	1	2/12/01 11:19:00 PM
C19-C36 Aliphatic Hydrocarbons	ND	110		µg/L	1	2/12/01 11:19:00 PM
C9-C18 Aliphatic Hydrocarbons	ND	110		µg/L	1	2/12/01 11:19:00 PM
Naphthalene	ND	0.11		µg/L	1	2/14/01 7:00:00 PM
2-Methylnaphthalene	ND	0.11		µg/L	1	2/14/01 7:00:00 PM
Acenaphthylene	ND	0.11		µg/L	1	2/14/01 7:00:00 PM
Acenaphthene	ND	0.11		µg/L	1	2/14/01 7:00:00 PM
Fluorene	ND	0.11		µg/L	1	2/14/01 7:00:00 PM
Phenanthrene	ND	0.11		µg/L	1	2/14/01 7:00:00 PM
Anthracene	ND	0.11		µg/L	1	2/14/01 7:00:00 PM
Fluoranthene	ND	0.11		µg/L	1	2/14/01 7:00:00 PM
Pyrene	ND	0.11		µg/L	1	2/14/01 7:00:00 PM
Benz(a)anthracene	ND	0.11		µg/L	1	2/14/01 7:00:00 PM
Chrysene	ND	0.11		µg/L	1	2/14/01 7:00:00 PM
Benzo(b)fluoranthene	ND	0.11		µg/L	1	2/14/01 7:00:00 PM
Benzo(k)fluoranthene	ND	0.11		µg/L	1	2/14/01 7:00:00 PM
Benzo(a)pyrene	ND	0.11		µg/L	1	2/14/01 7:00:00 PM
Dibenz(a,h)anthracene	ND	0.11		µg/L	1	2/14/01 7:00:00 PM
Indeno(1,2,3-cd)pyrene	ND	0.11		µg/L	1	2/14/01 7:00:00 PM
Benzo(g,h,i)perylene	ND	0.11		µg/L	1	2/14/01 7:00:00 PM
Surr: 1-Chlorooctadecane	61.2	40-140		%REC	1	2/12/01 11:19:00 PM
Surr: 2-Bromonaphthalene	81.9	40-140		%REC	1	2/12/01 11:19:00 PM
Surr: 2-Fluorobiphenyl	78.7	40-140		%REC	1	2/12/01 11:19:00 PM
Surr: o-Terphenyl	70.0	40-140		%REC	1	2/12/01 11:19:00 PM

Hydrocarbon range data exclude concentrations of any surrogate(s) and/or internal standards eluting in that range. EPH: C11-C22 Aromatic Hydrocarbons exclude the concentration of target PAH analytes. VPH: C5-C8 Aliphatic Hydrocarbons exclude the concentration of target analytes eluting in this range. C9-C12 Aliphatic Hydrocarbons exclude the concentration of target analytes eluting in this range and concentration of C9-C10 Aromatic Hydrocarbons.

CERTIFICATION

Were all QA/QC procedures required by the VPH or EPH method followed: ✓ Yes ___ No - If No, See Case Narrative

Were all performance/acceptance standards for required QA/QC procedures achieved: ✓ Yes ___ No - If No, See Case Narrative

Were any significant modifications made to the method as specified in section 11.3: ___ No ✓ Yes - Details enclosed

I attest under the pains and penalties of perjury that, based upon my inquiry of those individuals immediately responsible for obtaining the information, the material contained in this report is, to the best of my knowledge and belief, accurate and complete.

SIGNATURE: _____ DATE: 2-20-01

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J - Analyte detected below quantitation limits R - RPD outside accepted recovery limits # - See Case Narrative

B - Analyte detected in the associated Method Blank

AMRO Environmental Laboratories Corp.

Date: *19-Feb-01*

CLIENT:	Weston & Sampson Engineers	**Client Sample ID:**	WS-7
Lab Order:	0102063	**Tag Number:**	
Project:	200317.A P-3 Roxbury	**Collection Date:**	2/7/01
Lab ID:	0102063-04B	**Matrix:**	AQUEOUS

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPH PAHS BY SIM		**MAEPH**				Analyst: **KEM**
C11-C22 Aromatic Hydrocarbons	ND	100		µg/L	1	2/12/01 11:54:00 PM
C19-C36 Aliphatic Hydrocarbons	ND	100		µg/L	1	2/12/01 11:54:00 PM
C9-C18 Aliphatic Hydrocarbons	ND	100		µg/L	1	2/12/01 11:54:00 PM
Naphthalene	ND	0.10		µg/L	1	2/14/01 7:31:00 PM
2-Methylnaphthalene	ND	0.10		µg/L	1	2/14/01 7:31:00 PM
Acenaphthylene	ND	0.10		µg/L	1	2/14/01 7:31:00 PM
Acenaphthene	ND	0.10		µg/L	1	2/14/01 7:31:00 PM
Fluorene	ND	0.10		µg/L	1	2/14/01 7:31:00 PM
Phenanthrene	ND	0.10		µg/L	1	2/14/01 7:31:00 PM
Anthracene	ND	0.10		µg/L	1	2/14/01 7:31:00 PM
Fluoranthene	ND	0.10		µg/L	1	2/14/01 7:31:00 PM
Pyrene	ND	0.10		µg/L	1	2/14/01 7:31:00 PM
Benz(a)anthracene	ND	0.10		µg/L	1	2/14/01 7:31:00 PM
Chrysene	ND	0.10		µg/L	1	2/14/01 7:31:00 PM
Benzo(b)fluoranthene	ND	0.10		µg/L	1	2/14/01 7:31:00 PM
Benzo(k)fluoranthene	ND	0.10		µg/L	1	2/14/01 7:31:00 PM
Benzo(a)pyrene	ND	0.10		µg/L	1	2/14/01 7:31:00 PM
Dibenz(a,h)anthracene	ND	0.10		µg/L	1	2/14/01 7:31:00 PM
Indeno(1,2,3-cd)pyrene	ND	0.10		µg/L	1	2/14/01 7:31:00 PM
Benzo(g,h,i)perylene	ND	0.10		µg/L	1	2/14/01 7:31:00 PM
Surr: 1-Chlorooctadecane	64.8	40-140		%REC	1	2/12/01 11:54:00 PM
Surr: 2-Bromonaphthalene	90.2	40-140		%REC	1	2/12/01 11:54:00 PM
Surr: 2-Fluorobiphenyl	82.2	40-140		%REC	1	2/12/01 11:54:00 PM
Surr: o-Terphenyl	74.3	40-140		%REC	1	2/12/01 11:54:00 PM

Hydrocarbon range data exclude concentrations of any surrogate(s) and/or internal standards eluting in that range. EPH: C11-C22 Aromatic Hydrocarbons exclude the concentration of target PAH analytes. VPH: C5-C8 Aliphatic Hydrocarbons exclude the concentration of target analytes eluting in this range. C9-C12 Aliphatic Hydrocarbons exclude the concentration of target analytes eluting in this range and concentration of C9-C10 Aromatic Hydrocarbons.

CERTIFICATION

Were all QA/QC procedures required by the VPH or EPH method followed: ✓ Yes ___ No - If No, See Case Narrative

Were all performance/acceptance standards for required QA/QC procedures achieved: ✓ Yes ___ No - If No, See Case Narrative

Were any significant modifications made to the method as specified in section 11.3: ___ No ✓ Yes - Details enclosed

I attest under the pains and penalties of perjury that, based upon my inquiry of those individuals immediately responsible for obtaining the information, the material contained in this report is, to the best of my knowledge and belief, accurate and complete.

SIGNATURE: _____ DATE: 2-20-01

PRINTED NAME: Nancy Stewart POSITION: Laboratory Director (or designee)

Qualifiers: RL - Reporting Limit; defined as the lowest concentration the laboratory can accurately quantitate.

ND - Not Detected at the Reporting Limit S - Spike Recovery outside accepted recovery limits E - Value above quantitation range

J - Analyte detected below quantitation limits R - RPD outside accepted recovery limits # - See Case Narrative

B - Analyte detected in the associated Method Blank

AMRO Environmental Laboratories Corp.

Date: *19-Feb-01*

CLIENT:	Weston & Sampson Engineers	**Client Sample ID:**	WS-5
Lab Order:	0102063	**Tag Number:**	
Project:	200317.A P-3 Roxbury	**Collection Date:**	2/7/01
Lab ID:	0102063-05B	**Matrix:**	AQUEOUS

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPH PAHS BY SIM		**MAEPH**				Analyst: **KEM**
C11-C22 Aromatic Hydrocarbons	ND	110		µg/L	1	2/13/01 12:30:00 AM
C19-C36 Aliphatic Hydrocarbons	ND	110		µg/L	1	2/13/01 12:30:00 AM
C9-C18 Aliphatic Hydrocarbons	ND	110		µg/L	1	2/13/01 12:30:00 AM
Naphthalene	ND	0.11		µg/L	1	2/14/01 8:02:00 PM
2-Methylnaphthalene	ND	0.11		µg/L	1	2/14/01 8:02:00 PM
Acenaphthylene	ND	0.11		µg/L	1	2/14/01 8:02:00 PM
Acenaphthene	ND	0.11		µg/L	1	2/14/01 8:02:00 PM
Fluorene	ND	0.11		µg/L	1	2/14/01 8:02:00 PM
Phenanthrene	ND	0.11		µg/L	1	2/14/01 8:02:00 PM
Anthracene	ND	0.11		µg/L	1	2/14/01 8:02:00 PM
Fluoranthene	ND	0.11		µg/L	1	2/14/01 8:02:00 PM
Pyrene	ND	0.11		µg/L	1	2/14/01 8:02:00 PM
Benz(a)anthracene	ND	0.11		µg/L	1	2/14/01 8:02:00 PM
Chrysene	ND	0.11		µg/L	1	2/14/01 8:02:00 PM
Benzo(b)fluoranthene	ND	0.11		µg/L	1	2/14/01 8:02:00 PM
Benzo(k)fluoranthene	ND	0.11		µg/L	1	2/14/01 8:02:00 PM
Benzo(a)pyrene	ND	0.11		µg/L	1	2/14/01 8:02:00 PM
Dibenz(a,h)anthracene	ND	0.11		µg/L	1	2/14/01 8:02:00 PM
Indeno(1,2,3-cd)pyrene	ND	0.11		µg/L	1	2/14/01 8:02:00 PM
Benzo(g,h,i)perylene	ND	0.11		µg/L	1	2/14/01 8:02:00 PM
Surr: 1-Chlorooctadecane	67.0	40-140		%REC	1	2/13/01 12:30:00 AM
Surr: 2-Bromonaphthalene	106	40-140		%REC	1	2/13/01 12:30:00 AM
Surr: 2-Fluorobiphenyl	102	40-140		%REC	1	2/13/01 12:30:00 AM
Surr: o-Terphenyl	75.6	40-140		%REC	1	2/13/01 12:30:00 AM

Hydrocarbon range data exclude concentrations of any surrogate(s) and/or internal standards eluting in that range. EPH: C11-C22 Aromatic Hydrocarbons exclude the concentration of target PAH analytes. VPH: C5-C8 Aliphatic Hydrocarbons exclude the concentration of target analytes eluting in this range. C9-C12 Aliphatic Hydrocarbons exclude the concentration of target analytes eluting in this range and concentration of C9-C10 Aromatic Hydrocarbons.

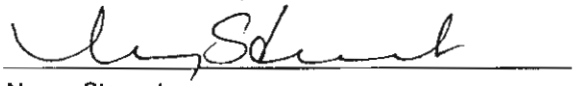
CERTIFICATION

Were all QA/QC procedures required by the VPH or EPH method followed: ✓ Yes ___ No - If No, See Case Narrative

Were all performance/acceptance standards for required QA/QC procedures achieved: ✓ Yes ___ No - If No, See Case Narrative

Were any significant modifications made to the method as specified in section 11.3: ___ No ✓ Yes - Details enclosed

I attest under the pains and penalties of perjury that, based upon my inquiry of those individuals immediately responsible for obtaining the information, the material contained in this report is, to the best of my knowledge and belief, accurate and complete.

SIGNATURE:  DATE: 2-20-01

PRINTED NAME: Nancy Stewart POSITION: Laboratory Director (or designee)

Qualifiers: RL - Reporting Limit; defined as the lowest concentration the laboratory can accurately quantitate.

ND - Not Detected at the Reporting Limit S - Spike Recovery outside accepted recovery limits E - Value above quantitation range

J - Analyte detected below quantitation limits R - RPD outside accepted recovery limits # - See Case Narrative

B - Analyte detected in the associated Method Blank

AMRO Environmental Laboratories Corp.

Date: *19-Feb-01*

CLIENT:	Weston & Sampson Engineers	**Client Sample ID:**	WS-3
Lab Order:	0102063	**Tag Number:**	
Project:	200317.A P-3 Roxbury	**Collection Date:**	2/7/01
Lab ID:	0102063-06B	**Matrix:**	AQUEOUS

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPH PAHS BY SIM		**MAEPH**				Analyst: **KEM**
C11-C22 Aromatic Hydrocarbons	ND	110		µg/L	1	2/13/01 1:05:00 AM
C19-C36 Aliphatic Hydrocarbons	ND	110		µg/L	1	2/13/01 1:05:00 AM
C9-C18 Aliphatic Hydrocarbons	ND	110		µg/L	1	2/13/01 1:05:00 AM
Naphthalene	ND	0.11		µg/L	1	2/14/01 8:34:00 PM
2-Methylnaphthalene	ND	0.11		µg/L	1	2/14/01 8:34:00 PM
Acenaphthylene	ND	0.11		µg/L	1	2/14/01 8:34:00 PM
Acenaphthene	ND	0.11		µg/L	1	2/14/01 8:34:00 PM
Fluorene	ND	0.11		µg/L	1	2/14/01 8:34:00 PM
Phenanthrene	ND	0.11		µg/L	1	2/14/01 8:34:00 PM
Anthracene	ND	0.11		µg/L	1	2/14/01 8:34:00 PM
Fluoranthene	ND	0.11		µg/L	1	2/14/01 8:34:00 PM
Pyrene	ND	0.11		µg/L	1	2/14/01 8:34:00 PM
Benz(a)anthracene	ND	0.11		µg/L	1	2/14/01 8:34:00 PM
Chrysene	ND	0.11		µg/L	1	2/14/01 8:34:00 PM
Benzo(b)fluoranthene	ND	0.11		µg/L	1	2/14/01 8:34:00 PM
Benzo(k)fluoranthene	ND	0.11		µg/L	1	2/14/01 8:34:00 PM
Benzo(a)pyrene	ND	0.11		µg/L	1	2/14/01 8:34:00 PM
Dibenz(a,h)anthracene	ND	0.11		µg/L	1	2/14/01 8:34:00 PM
Indeno(1,2,3-cd)pyrene	ND	0.11		µg/L	1	2/14/01 8:34:00 PM
Benzo(g,h,i)perylene	ND	0.11		µg/L	1	2/14/01 8:34:00 PM
Surr: 1-Chlorooctadecane	63.7	40-140		%REC	1	2/13/01 1:05:00 AM
Surr: 2-Bromonaphthalene	86.1	40-140		%REC	1	2/13/01 1:05:00 AM
Surr: 2-Fluorobiphenyl	80.0	40-140		%REC	1	2/13/01 1:05:00 AM
Surr: o-Terphenyl	72.2	40-140		%REC	1	2/13/01 1:05:00 AM

Hydrocarbon range data exclude concentrations of any surrogate(s) and/or internal standards eluting in that range. EPH: C11-C22 Aromatic Hydrocarbons exclude the concentration of target PAH analytes. VPH: C5-C8 Aliphatic Hydrocarbons exclude the concentration of target analytes eluting in this range. C9-C12 Aliphatic Hydrocarbons exclude the concentration of target analytes eluting in this range and concentration of C9-C10 Aromatic Hydrocarbons.

CERTIFICATION

Were all QA/QC procedures required by the VPH or EPH method followed: ✓ Yes ___ No - If No, See Case Narrative

Were all performance/acceptance standards for required QA/QC procedures achieved: ✓ Yes ___ No - If No, See Case Narrative

Were any significant modifications made to the method as specified in section 11.3: ___ No ✓ Yes - Details enclosed

I attest under the pains and penalties of perjury that, based upon my inquiry of those individuals immediately responsible for obtaining the information, the material contained in this report is, to the best of my knowledge and belief, accurate and complete.

SIGNATURE: _____ DATE: 2-20-01

PRINTED NAME: Nancy Stewart POSITION: Laboratory Director (or designee)

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J - Analyte detected below quantitation limits R - RPD outside accepted recovery limits # - See Case Narrative

B - Analyte detected in the associated Method Blank

METHOD BLANK

AMRO Environmental Laboratories Corp.

Date: *19-Feb-01*

CLIENT: Weston & Sampson Engineers
Work Order: 0102063
Project: 200317.A P-3 Roxbury

QC SUMMARY REPORT
Method Blank

Sample ID **MB-3797** Batch ID: **3797** Test Code: **MAEPH** Units: **µg/L** Analysis Date **2/12/01 5:24:00 PM** Prep Date **2/8/01**
Client ID: Run ID: **SV-2_010212B** SeqNo: **107814**

Analyte	QC Sample Result	RL	Units	QC Spike Amount	Original Sample Result	%REC	LowLimit	HighLimit	Original Sample or MS Result	%RPD	RPDLimit	Qua
C11-C22 Aromatic Hydrocarbons	ND	100	µg/L									
C19-C36 Aliphatic Hydrocarbons	ND	100	µg/L									
C9-C18 Aliphatic Hydrocarbons	ND	100	µg/L									
Surr: 1-Chlorooctadecane	9.42	0	µg/L	20	0	47.1	40	140	0			
Surr: 2-Bromonaphthalene	17.62	0	µg/L	20	0	88.1	40	140	0			
Surr: 2-Fluorobiphenyl	16.06	0.10	µg/L	20	0	80.3	40	140	0			
Surr: o-Terphenyl	11.8	0.10	µg/L	20	0	59	40	140	0			

Qualifiers: ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank
NA - Not applicable where J values or ND results occur
RL - Reporting Limit; defined as the lowest concentration the laboratory can accurately quantitate.

AMRO Environmental Laboratories Corp.

Date: *19-Feb-01*

CLIENT: Weston & Sampson Engineers
Work Order: 0102063
Project: 200317.A P-3 Roxbury

QC SUMMARY REPORT
Method Blank

Sample ID **MB-3797** Batch ID: **3797** Test Code: **MAEPH** Units: **µg/L** Analysis Date **2/14/01 5:25:00 PM** Prep Date **2/8/01**
Client ID: Run ID: **SV-1_010214A** SeqNo: **107650**

Analyte	QC Sample Result	RL	Units	QC Spike Amount	Original Sample Result	%REC	LowLimit	HighLimit	Original Sample or MS Result	%RPD	RPDLimit	Qua
Naphthalene	ND	0.10	µg/L	0	0	0	0	0	0			
2-Methylnaphthalene	ND	0.10	µg/L	0	0	0	0	0	0			
Acenaphthylene	ND	0.10	µg/L	0	0	0	0	0	0			
Acenaphthene	ND	0.10	µg/L	0	0	0	0	0	0			
Fluorene	ND	0.10	µg/L	0	0	0	0	0	0			
Phenanthrene	ND	0.10	µg/L	0	0	0	0	0	0			
Anthracene	ND	0.10	µg/L	0	0	0	0	0	0			
Fluoranthene	ND	0.10	µg/L	0	0	0	0	0	0			
Pyrene	ND	0.10	µg/L	0	0	0	0	0	0			
Benz(a)anthracene	ND	0.10	µg/L	0	0	0	0	0	0			
Chrysene	ND	0.10	µg/L	0	0	0	0	0	0			
Benzo(b)fluoranthene	ND	0.10	µg/L	0	0	0	0	0	0			
Benzo(k)fluoranthene	ND	0.10	µg/L	0	0	0	0	0	0			
Benzo(a)pyrene	ND	0.10	µg/L	0	0	0	0	0	0			
Dibenz(a,h)anthracene	ND	0.10	µg/L	0	0	0	0	0	0			
Indeno(1,2,3-cd)pyrene	ND	0.10	µg/L	0	0	0	0	0	0			
Benzo(g,h,i)perylene	ND	0.10	µg/L	0	0	0	0	0	0			

Qualifiers: ND - Not Detected at the Reporting Limit; S - Spike Recovery outside accepted recovery limits; B - Analyte detected in the associated Method Blank
J - Analyte detected below quantitation limits; R - RPD outside accepted recovery limits; NA - Not applicable where J values or ND results occur
RL - Reporting Limit; defined as the lowest concentration the laboratory can accurately quantitate.

MATRIX SPIKE

AMRO Environmental Laboratories Corp.

Date: *19-Feb-01*

CLIENT: Weston & Sampson Engineers
Work Order: 0102063
Project: 200317.A P-3 Roxbury

QC SUMMARY REPORT
Sample Matrix Spike

Sample ID **0102045-05BMS** Batch ID: **3798** 3797 Test Code: **MAEPH** Units: **µg/L** Analysis Date **2/12/01 7:10:00 PM** Prep Date **2/8/01**
Client ID: **LE-1** Run ID: **SV-2_010212B** SeqNo: **107802**

Analyte	QC Sample Result	RL	Units	QC Spike Amount	Original Sample Result	%REC	LowLimit	HighLimit	Original Sample or MS Result	%RPD	RPDLimit	Qua
n-Eicosane	18.09	1.1	µg/L	27.17	0	66.6	40	140	0			
n-Nonadecane	21.01	1.1	µg/L	27.17	0	77.3	40	140	0			
n-Nonane	13.66	1.1	µg/L	27.17	1.525	44.6	40	140	0			
n-Octacosane	20.11	1.1	µg/L	27.17	0	74	40	140	0			
n-Tetradecane	17.49	1.1	µg/L	27.17	1.345	59.4	40	140	0			
Naphthalene	21.23	1.1	µg/L	27.17	2.255	69.8	40	140	0			
Acenaphthene	18.15	1.1	µg/L	27.17	0	66.8	40	140	0			
Anthracene	18.45	1.1	µg/L	27.17	0	67.9	40	140	0			
Pyrene	16.83	1.1	µg/L	27.17	0	61.9	40	140	0			
Chrysene	17.32	1.1	µg/L	27.17	0	63.7	40	140	0			
Surr: 1-Chlorooctadecane	12.86	1.1	µg/L	21.74	0	59.2	40	140	0			
Surr: 2-Bromonaphthalene	19.57	1.1	µg/L	21.74	0	90	40	140	0			
Surr: 2-Fluorobiphenyl	17.4	1.1	µg/L	21.74	0	80	40	140	0			
Surr: o-Terphenyl	15.65	1.1	µg/L	21.74	0	72	40	140	0			

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
RL - Reporting Limit; defined as the lowest concentration the laboratory can accurately quantitate.
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank
NA - Not applicable where J values or ND results occur

SAMPLE AND SAMPLE DUPLICATE

AMRO Environmental Laboratories Corp.

Date: *19-Feb-01*

CLIENT: Weston & Sampson Engineers
Work Order: 0102063
Project: 200317.A P-3 Roxbury

QC SUMMARY REPORT
Sample Duplicate

Sample ID **0102045-06BDUP** Batch ID: **3798** (3797) Test Code: **MAEPH** Units: **µg/L** Analysis Date **2/12/01 8:21:00 PM** Prep Date **2/8/01**
Client ID: **LE-2** Run ID: **SV-2_010212B** SeqNo: **107804**

Analyte	QC Sample Result	RL	Units	QC Spike Amount	Original Sample Result	%REC	LowLimit	HighLimit	Original Sample or MS Result	%RPD	RPDLimit	Qua
C9-C18 Aliphatic Hydrocarbons	ND	120	µg/L	0	0	0	0	0	130.5	0	50	NA
C19-C36 Aliphatic Hydrocarbons	ND	120	µg/L	0	0	0	0	0	0	0	50	
C11-C22 Aromatic Hydrocarbons	ND	120	µg/L	0	0	0	0	0	122.6	0	50	NA
Naphthalene	ND	1.2	µg/L	0	0	0	0	0	0	0	50	
2-Methylnaphthalene	ND	1.2	µg/L	0	0	0	0	0	0	0	50	
Acenaphthylene	ND	1.2	µg/L	0	0	0	0	0	0	0	50	
Acenaphthene	ND	1.2	µg/L	0	0	0	0	0	0	0	50	
Fluorene	ND	1.2	µg/L	0	0	0	0	0	0	0	50	
Phenanthrene	ND	1.2	µg/L	0	0	0	0	0	0	0	50	
Anthracene	ND	1.2	µg/L	0	0	0	0	0	0	0	50	
Fluoranthene	ND	1.2	µg/L	0	0	0	0	0	0	0	50	
Pyrene	ND	1.2	µg/L	0	0	0	0	0	0	0	50	
Benz(a)anthracene	ND	1.2	µg/L	0	0	0	0	0	0	0	50	
Chrysene	ND	1.2	µg/L	0	0	0	0	0	0	0	50	
Benzo(b)fluoranthene	ND	1.2	µg/L	0	0	0	0	0	0	0	50	
Benzo(k)fluoranthene	ND	1.2	µg/L	0	0	0	0	0	0	0	50	
Benzo(a)pyrene	ND	1.2	µg/L	0	0	0	0	0	0	0	50	
Dibenz(a,h)anthracene	ND	1.2	µg/L	0	0	0	0	0	0	0	50	
Indeno(1,2,3-cd)pyrene	ND	1.2	µg/L	0	0	0	0	0	0	0	50	
Benzo(g,h,i)perylene	ND	1.2	µg/L	0	0	0	0	0	0	0	50	
Surr: 1-Chlorooctadecane	10.81	1.2	µg/L	25	0	43.2	40	140	0	0	0	
Surr: 2-Bromonaphthalene	22.05	1.2	µg/L	25	0	88.2	40	140	0	0	0	
Surr: 2-Fluorobiphenyl	20.41	1.2	µg/L	25	0	81.7	40	140	0	0	0	
Surr: o-Terphenyl	16.92	1.2	µg/L	25	0	67.7	40	140	0	0	0	

Qualifiers: ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank
NA - Not applicable where J values or ND results occur
RL - Reporting Limit; defined as the lowest concentration the laboratory can accurately quantitate.

LABORATORY CONTROL SAMPLE

AMRO Environmental Laboratories Corp.

Date: *19-Feb-01*

CLIENT: Weston & Sampson Engineers
Work Order: 0102063
Project: 200317.A P-3 Roxbury

QC SUMMARY REPORT
Laboratory Control Spike

Sample ID **LCS-3798** Batch ID: **3798** 3797 Test Code: **MAEPH** Units: **µg/L** Analysis Date **2/12/01 5:59:00 PM** Prep Date **2/8/01**

Client ID: Run ID: **SV-2_010212B** SeqNo: **107801**

Analyte	QC Sample Result	RL	Units	QC Spike Amount	Original Sample Result	%REC	LowLimit	HighLimit	Original Sample or MS Result	%RPD	RPDLimit	Qua
n-Eicosane	19.5	1.0	µg/L	25	0	78	40	140	0			
n-Nonadecane	19.3	1.0	µg/L	25	0	77.2	40	140	0			
n-Nonane	10.36	1.0	µg/L	25	0	41.4	40	140	0			
n-Octacosane	23.4	1.0	µg/L	25	0	93.6	40	140	0			
n-Tetradecane	14.98	1.0	µg/L	25	0	59.9	40	140	0			
Naphthalene	14.89	1.0	µg/L	25	0	59.6	40	140	0			
Acenaphthene	16.1	1.0	µg/L	25	0	64.4	40	140	0			
Anthracene	17.25	1.0	µg/L	25	0	69	40	140	0			
Pyrene	18.07	1.0	µg/L	25	0	72.3	40	140	0			
Chrysene	17.77	1.0	µg/L	25	0	71.1	40	140	0			
Surr: 1-Chlorooctadecane	12.56	1.0	µg/L	20	0	62.8	40	140	0			
Surr: 2-Bromonaphthalene	16.94	1.0	µg/L	20	0	84.7	40	140	0			
Surr: 2-Fluorobiphenyl	15.5	1.0	µg/L	20	0	77.5	40	140	0			
Surr: o-Terphenyl	15.4	1.0	µg/L	20	0	77	40	140	0			

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
RL - Reporting Limit; defined as the lowest concentration the laboratory can accurately quantitate.
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank
NA - Not applicable where J values or ND results occur

TRACE METALS

SAMPLE RESULTS

AMRO Environmental Laboratories Corp.

Date: *20-Feb-01*

CLIENT:	Weston & Sampson Engineers	**Client Sample ID:**	WS-12
Lab Order:	0102063		
Project:	200317.A P-3 Roxbury	**Collection Date:**	2/6/01
Lab ID:	0102063-01C	**Matrix:**	AQUEOUS

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
LEAD, DISSOLVED		**SW7421**				Analyst: **APL**
Lead	ND	5.0		µg/L	1	2/13/01

Qualifiers:

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
B - Analyte detected in the associated Method Blank
* - Value exceeds Maximum Contaminant Level
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range
- See Case Narrative
RL - Reporting Limit; defined as the lowest concentration the laboratory can accurately quantitate.

AMRO Environmental Laboratories Corp.

Date: *20-Feb-01*

CLIENT:	Weston & Sampson Engineers	**Client Sample ID:**	WS-10
Lab Order:	0102063		
Project:	200317.A P-3 Roxbury	**Collection Date:**	2/6/01
Lab ID:	0102063-02C	**Matrix:**	AQUEOUS

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
LEAD, DISSOLVED		**SW7421**				Analyst: APL
Lead	ND	5.0		µg/L	1	2/13/01

Qualifiers:

- ND - Not Detected at the Reporting Limit
- J - Analyte detected below quantitation limits
- B - Analyte detected in the associated Method Blank
- * - Value exceeds Maximum Contaminant Level
- S - Spike Recovery outside accepted recovery limits
- R - RPD outside accepted recovery limits
- E - Value above quantitation range
- # - See Case Narrative

RL - Reporting Limit; defined as the lowest concentration the laboratory can accurately quantitate.

AMRO Environmental Laboratories Corp.

Date: *20-Feb-01*

CLIENT:	Weston & Sampson Engineers	**Client Sample ID:**	WS-9
Lab Order:	0102063		
Project:	200317.A P-3 Roxbury	**Collection Date:**	2/6/01
Lab ID:	0102063-03C	**Matrix:**	AQUEOUS

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
LEAD, DISSOLVED		**SW7421**				Analyst: **APL**
Lead	ND	5.0		µg/L	1	2/13/01

Qualifiers:

- ND - Not Detected at the Reporting Limit
- J - Analyte detected below quantitation limits
- B - Analyte detected in the associated Method Blank
- * - Value exceeds Maximum Contaminant Level
- S - Spike Recovery outside accepted recovery limits
- R - RPD outside accepted recovery limits
- E - Value above quantitation range
- # - See Case Narrative

RL - Reporting Limit; defined as the lowest concentration the laboratory can accurately quantitate.

AMRO Environmental Laboratories Corp.

Date: *20-Feb-01*

CLIENT:	Weston & Sampson Engineers	**Client Sample ID:**	WS-7
Lab Order:	0102063		
Project:	200317.A P-3 Roxbury	**Collection Date:**	2/7/01
Lab ID:	0102063-04C	**Matrix:**	AQUEOUS

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
LEAD, DISSOLVED		**SW7421**				Analyst: **APL**
Lead	ND	5.0		µg/L	1	2/13/01

Qualifiers:	ND - Not Detected at the Reporting Limit	S - Spike Recovery outside accepted recovery limits
	J - Analyte detected below quantitation limits	R - RPD outside accepted recovery limits
	B - Analyte detected in the associated Method Blank	E - Value above quantitation range
	* - Value exceeds Maximum Contaminant Level	# - See Case Narrative

RL - Reporting Limit; defined as the lowest concentration the laboratory can accurately quantitate.

AMRO Environmental Laboratories Corp.

Date: *20-Feb-01*

CLIENT:	Weston & Sampson Engineers	**Client Sample ID:**	WS-5
Lab Order:	0102063		
Project:	200317.A P-3 Roxbury	**Collection Date:**	2/7/01
Lab ID:	0102063-05C	**Matrix:**	AQUEOUS

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
LEAD, DISSOLVED		**SW7421**				Analyst: **APL**
Lead	ND	5.0		µg/L	1	2/13/01

Qualifiers:

- ND - Not Detected at the Reporting Limit
- J - Analyte detected below quantitation limits
- B - Analyte detected in the associated Method Blank
- * - Value exceeds Maximum Contaminant Level
- S - Spike Recovery outside accepted recovery limits
- R - RPD outside accepted recovery limits
- E - Value above quantitation range
- # - See Case Narrative

RL - Reporting Limit; defined as the lowest concentration the laboratory can accurately quantitate.

AMRO Environmental Laboratories Corp.

Date: *20-Feb-01*

CLIENT:	Weston & Sampson Engineers	**Client Sample ID:**	WS-3
Lab Order:	0102063		
Project:	200317.A P-3 Roxbury	**Collection Date:**	2/7/01
Lab ID:	0102063-06C	**Matrix:**	AQUEOUS

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
LEAD, DISSOLVED		**SW7421**				Analyst: **APL**
Lead	ND	5.0		µg/L	1	2/13/01

Qualifiers:

- ND - Not Detected at the Reporting Limit
- J - Analyte detected below quantitation limits
- B - Analyte detected in the associated Method Blank
- * - Value exceeds Maximum Contaminant Level
- S - Spike Recovery outside aeeepted recovery limits
- R - RPD outside accepted recovery limits
- E - Value above quantitation range
- # - See Case Narrative

RL - Reporting Limit; defined as the lowest concentration the laboratory can accurately quantitate.

METHOD BLANK

AMRO Environmental Laboratories Corp.

Date: *16-Feb-01*

CLIENT: Weston & Sampson Engineers
Work Order: 0102063
Project: 200317.A P-3 Roxbury

QC SUMMARY REPORT
Method Blank

Sample ID: **MB-3804** Batch ID: **3804** Test Code: **SW7421** Units: **µg/L** Analysis Date **2/13/01** Prep Date: **2/12/01**
Client ID: Run ID: **GFAA-6000_010213A** SeqNo: **107425**

Analyte	QC Sample Result	RL	Units	QC Spike Amount	Original Sample Result	%REC	LowLimit	HighLimit	Original Sample or MS Result	%RPD	RPDLimit	Qu
Lead	ND	5.0	µg/L									

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
RL - Reporting Limit; defined as the lowest concentration the laboratory can accurately quantitate.
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank
NA - Not applicable where J values or ND results occur

MATRIX SPIKE & MATRIX SPIKE DUPLICATE

AMRO Environmental Laboratories Corp.

Date: *16-Feb-01*

CLIENT: Weston & Sampson Engineers
Work Order: 0102063
Project: 200317.A P-3 Roxbury

QC SUMMARY REPORT
Sample Matrix Spike

Sample ID: **0102063-01CMS** Batch ID: **3804** Test Code: **SW7421** Units: **µg/L** Analysis Date **2/13/01** Prep Date: **2/12/01**
Client ID: **WS-12** Run ID: **GFAA-6000_010213A** SeqNo: **107395**

Analyte	QC Sample Result	RL	Units	QC Spike Amount	Original Sample Result	%REC	LowLimit	HighLimit	Original Sample or MS Result	%RPD	RPDLimit	Qu
Lead	47.9	5.0	µg/L	50	2.006	91.8	75	125	0			

Sample ID: **0102063-01CMSD** Batch ID: **3804** Test Code: **SW7421** Units: **µg/L** Analysis Date **2/13/01** Prep Date: **2/12/01**
Client ID: **WS-12** Run ID: **GFAA-6000_010213A** SeqNo: **107398**

Analyte	QC Sample Result	RL	Units	QC Spike Amount	Original Sample Result	%REC	LowLimit	HighLimit	Original Sample or MS Result	%RPD	RPDLimit	Qu
Lead	49.36	5.0	µg/L	50	2.006	94.7	75	125	47.9	3	20	

Qualifiers: ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
RL - Reporting Limit; defined as the lowest concentration the laboratory can accurately quantitate.
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank
NA - Not applicable where J values or ND results occur

LABORATORY CONTROL SAMPLE

AMRO Environmental Laboratories Corp.

Date: *16-Feb-01*

CLIENT: Weston & Sampson Engineers
Work Order: 0102063
Project: 200317.A P-3 Roxbury

QC SUMMARY REPORT
Laboratory Control Spike

Sample ID: **LCS-3804** Batch ID: **3804** Test Code: **SW7421** Units: **µg/L** Analysis Date **2/13/01** Prep Date: **2/12/01**

Client ID: Run ID: **GFAA-6000_010213A** SeqNo: **107422**

Analyte	QC Sample Result	RL	Units	QC Spike Amount	Original Sample Result	%REC	LowLimit	HighLimit	Original Sample or MS Result	%RPD	RPDLimit	Qu
Lead	52.09	5.0	µg/L	50	0	104	80	120	0			

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
RL - Reporting Limit; defined as the lowest concentration the laboratory can accurately quantitate.
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank
NA - Not applicable where J values or ND results occur

Appendix E-3

Surface Soil

AMRO Environmental Laboratories Corporation

111 Herrick Street, Merrimack, NH 03054
TEL: (603) 424-2022 · FAX: (603) 429-8496

rec'd. 4/13/01

April 10, 2001

Annika Willis
Weston & Sampson Engineers
5 Centennial Drive
Peabody, MA 019607985
TEL: (978) 532-1900
FAX: (978) 977-0100

RE: 200317A BRA P3-Roxbury Order No.: 0104006

Dear Annika Willis:

AMRO Environmental Laboratories Corp. received 10 samples on 3/30/01 for the analyses presented in the following report.

AMRO operates a Quality Assurance Program which meets or exceeds National Environmental Laboratory Accreditation Conference (NELAC), state, and EPA requirements. A copy of the appropriate state and/or NELAC Certificate is attached.

The enclosed Sample Receipt Checklist details the condition of your sample(s) upon receipt. Please be advised that any unused sample volume and sample extracts will be stored for a period of thirty (30) days from this report date. After this time, AMRO will properly dispose of the remaining sample(s). If you require further analysis, or need the samples held for a longer period, please contact us immediately.

This report consists of a total of 39 pages. This letter is an integral part of your data report. If you have any questions regarding this project in the future, please refer to the Order Number above.

Sincerely,

Nancy Stewart
Vice President / Lab Director

AMRO Environmental Laboratories Corp.

Date: *10-Apr-01*

CLIENT: Weston & Sampson Engineers
Project: 200317A BRA P3-Roxbury
Lab Order: 0104006
Date Received: 3/30/01

Work Order Sample Summary

Lab Sample ID	Client Sample ID	Collection Date
0104006-01A	SS-1	3/29/01
0104006-01B	SS-1	3/29/01
0104006-02A	SS-2	3/29/01
0104006-02B	SS-2	3/29/01
0104006-03A	SS-3	3/29/01
0104006-03B	SS-3	3/29/01
0104006-04A	SS-4	3/29/01
0104006-04B	SS-4	3/29/01
0104006-05A	DUP	3/29/01
0104006-06A	SP-1	3/29/01
0104006-06B	SP-1	3/29/01
0104006-06C	SP-1	3/29/01
0104006-06D	SP-1	3/29/01
0104006-07A	SP-2	3/29/01
0104006-07B	SP-2	3/29/01
0104006-07C	SP-2	3/29/01
0104006-07D	SP-2	3/29/01
0104006-08A	SP-3	3/29/01
0104006-08B	SP-3	3/29/01
0104006-08C	SP-3	3/29/01
0104006-08D	SP-3	3/29/01
0104006-09A	DUP2	3/29/01
0104006-09B	DUP2	3/29/01
0104006-09C	DUP2	3/29/01
0104006-09D	DUP2	3/29/01
0104006-10A	Trip Blank	3/29/01

AMRO Environmental Laboratories Corp. **Date:** *10-Apr-01*

CLIENT: Weston & Sampson Engineers
Project: 200317A BRA P3-Roxbury
Lab Order: 0104006

CASE NARRATIVE

METALS

1. Analytical Comments for METHOD HG_7471, SAMPLE SP-1(0104006-06D): The %R for the Matrix Spike Duplicate and the % RPD for the Duplicate were outside laboratory control limits due to sample non-homogeneity.

Method 8082

1. The Laboratory Control Sample (LCS-4212) had the recovery for the Aroclor-1260 at 126% outside the laboratory control limits (61-125%).

MADEP-EPH

1. The duplicate 0104006-08A had several %RPD's outside the laboratory control limits.

AMRO Environmental Laboratories Corp.

Date: *10-Apr-01*

CLIENT:	Weston & Sampson Engineers	**Client Sample ID:**	SS-1
Lab Order:	0104006		
Project:	200317A BRA P3-Roxbury	**Collection Date:**	3/29/01
Lab ID:	0104006-01A	**Matrix:**	SOIL

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
PERCENT MOISTURE	**D2216**					Analyst: **CW**
Percent Moisture	21.4	0		wt%	1	4/4/01

Qualifiers:

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
B - Analyte detected in the associated Method Blank
H - Method prescribed holding time exceeded
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range
- See Case Narrative
RL - Reporting Limit; defined as the lowest concentration the laboratory can accurately quantitate.

AMRO Environmental Laboratories Corp.

Date: *10-Apr-01*

CLIENT:	Weston & Sampson Engineers	**Client Sample ID:**	SS-1
Lab Order:	0104006		
Project:	200317A BRA P3-Roxbury	**Collection Date:**	3/29/01
Lab ID:	0104006-01B	**Matrix:**	SOIL

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
ICP METALS TOTAL SW-846 - 3051/6010		**SW6010B**				Analyst: **REB**
Lead	200	4.0		mg/Kg-dry	1	4/4/01 5:54:16 PM

Qualifiers:

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
B - Analyte detected in the associated Method Blank
H - Method preseribed holding time exeeeded
S - Spike Recovery outsidc accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range
- See Case Narrative
RL - Reporting Limit; defined as the lowest concentration the laboratory can accurately quantitate.

AMRO Environmental Laboratories Corp.

Date: *10-Apr-01*

CLIENT:	Weston & Sampson Engineers	**Client Sample ID:**	SS-2
Lab Order:	0104006		
Project:	200317A BRA P3-Roxbury	**Collection Date:**	3/29/01
Lab ID:	0104006-02A	**Matrix:**	SOIL

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
PERCENT MOISTURE	**D2216**					Analyst: **CW**
Percent Moisture	19.6	0		wt%	1	4/4/01

Qualifiers:

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
B - Analyte detected in the associated Method Blank
H - Method prescribed holding time exceeded
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range
- See Case Narrative
RL - Reporting Limit; defined as the lowest concentration the laboratory can accurately quantitate.

AMRO Environmental Laboratories Corp.

Date: *10-Apr-01*

CLIENT:	Weston & Sampson Engineers	**Client Sample ID:**	SS-2
Lab Order:	0104006		
Project:	200317A BRA P3-Roxbury	**Collection Date:**	3/29/01
Lab ID:	0104006-02B	**Matrix:**	SOIL

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
ICP METALS TOTAL SW-846 - 3051/6010		**SW6010B**				Analyst: **REB**
Lead	300	3.7		mg/Kg-dry	1	4/4/01 5:58:48 PM

Qualifiers:

ND - Not Detected at the Reporting Limit

J - Analyte detected below quantitation limits

B - Analyte detected in the associated Method Blank

H - Method prescribed holding time exceeded

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

E - Value above quantitation range

- See Case Narrative

RL - Reporting Limit; defined as the lowest concentration the laboratory can accurately quantitate.

AMRO Environmental Laboratories Corp.

Date: *10-Apr-01*

CLIENT:	Weston & Sampson Engineers	**Client Sample ID:**	SS-3
Lab Order:	0104006		
Project:	200317A BRA P3-Roxbury	**Collection Date:**	3/29/01
Lab ID:	0104006-03A	**Matrix:**	SOIL

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
PERCENT MOISTURE		**D2216**				Analyst: **CW**
Percent Moisture	16.9	0		wt%	1	4/4/01

Qualifiers:

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
B - Analyte detected in the associated Method Blank
H - Method prescribed holding time exceeded
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range
- See Case Narrative
RL - Reporting Limit; defined as the lowest concentration the laboratory can accurately quantitate.

AMRO Environmental Laboratories Corp.

Date: *10-Apr-01*

CLIENT:	Weston & Sampson Engineers	**Client Sample ID:**	SS-3
Lab Order:	0104006		
Project:	200317A BRA P3-Roxbury	**Collection Date:**	3/29/01
Lab ID:	0104006-03B	**Matrix:**	SOIL

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
ICP METALS TOTAL SW-846 - 3051/6010		**SW6010B**				Analyst: **REB**
Lead	220	3.8		mg/Kg-dry	1	4/4/01 6:11:17 PM

Qualifiers:

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
B - Analyte detected in the associated Method Blank
H - Method prescribed holding time exceeded
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range
- See Case Narrative
RL - Reporting Limit; defined as the lowest concentration the laboratory can accurately quantitate.

AMRO Environmental Laboratories Corp.

Date: *10-Apr-01*

CLIENT:	Weston & Sampson Engineers	**Client Sample ID:**	SS-4
Lab Order:	0104006		
Project:	200317A BRA P3-Roxbury	**Collection Date:**	3/29/01
Lab ID:	0104006-04A	**Matrix:**	SOIL

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
PERCENT MOISTURE	**D2216**					Analyst: **CW**
Percent Moisture	15.9	0		wt%	1	4/4/01

Qualifiers:

ND - Not Detected at the Reporting Limit

J - Analyte detected below quantitation limits

B - Analyte detected in the associated Method Blank

H - Method prescribed holding time exceeded

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

E - Value above quantitation range

- See Case Narrative

RL - Reporting Limit; defined as the lowest concentration the laboratory can accurately quantitate.

AMRO Environmental Laboratories Corp.

Date: *10-Apr-01*

CLIENT:	Weston & Sampson Engineers	**Client Sample ID:**	SS-4
Lab Order:	0104006		
Project:	200317A BRA P3-Roxbury	**Collection Date:**	3/29/01
Lab ID:	0104006-04B	**Matrix:**	SOIL

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
ICP METALS TOTAL SW-846 - 3051/6010		**SW6010B**				Analyst: **REB**
Lead	310	3.5		mg/Kg-dry	1	4/4/01 6:16:06 PM

Qualifiers:

ND - Not Detected at the Reporting Limit

J - Analyte detected below quantitation limits

B - Analyte detected in the associated Method Blank

H - Method prescribed holding time exceeded

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

E - Value above quantitation range

- See Case Narrative

RL - Reporting Limit; defined as the lowest concentration the laboratory can accurately quantitate.

AMRO Environmental Laboratories Corp.

Date: *10-Apr-01*

CLIENT:	Weston & Sampson Engineers	**Client Sample ID:**	DUP
Lab Order:	0104006		
Project:	200317A BRA P3-Roxbury	**Collection Date:**	3/29/01
Lab ID:	0104006-05A	**Matrix:**	SOIL

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
ICP METALS TOTAL SW-846 - 3051/6010		**SW6010B**				Analyst: **REB**
Lead	340	3.6		mg/Kg-dry	1	4/4/01 6:21:00 PM
PERCENT MOISTURE		**D2216**				Analyst: **CW**
Percent Moisture	16.2	0		wt%	1	4/4/01

Qualifiers:

- ND - Not Detected at the Reporting Limit
- J - Analyte detected below quantitation limits
- B - Analyte detected in the associated Method Blank
- H - Method prescribed holding time exeeeded
- S - Spike Recovery outside accepted recovery limits
- R - RPD outside accepted recovery limits
- E - Value above quantitation range
- # - See Case Narrative

RL - Reporting Limit; defined as the lowest concentration the laboratory can accurately quantitate.

AMRO Environmental Laboratories Corp.

Date: *10-Apr-01*

CLIENT:	Weston & Sampson Engineers	**Client Sample ID:**	SP-1
Lab Order:	0104006		
Project:	200317A BRA P3-Roxbury	**Collection Date:**	3/29/01
Lab ID:	0104006-06D	**Matrix:**	SOIL

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
ICP METALS TOTAL SW-846 - 3051/6010		**SW6010B**				Analyst: **REB**
Arsenic	15	6.3		mg/Kg-dry	1	4/4/01 5:30:33 PM
Barium	61	25		mg/Kg-dry	1	4/4/01 5:30:33 PM
Cadmium	ND	0.63		mg/Kg-dry	1	4/4/01 5:30:33 PM
Chromium	28	1.3		mg/Kg-dry	1	4/4/01 5:30:33 PM
Lead	85	3.2		mg/Kg-dry	1	4/4/01 5:30:33 PM
Selenium	ND	10		mg/Kg-dry	1	4/4/01 5:30:33 PM
Silver	ND	1.8		mg/Kg-dry	1	4/4/01 5:30:33 PM
MERCURY, 7471A		**SW7471A**				Analyst: **MT**
Mercury	0.34	0.026		mg/Kg-dry	1	4/4/01
PERCENT MOISTURE		**D2216**				Analyst: **CW**
Percent Moisture	10.1	0		wt%	1	4/4/01

Qualifiers:

- ND - Not Detected at the Reporting Limit
- J - Analyte detected below quantitation limits
- B - Analyte detected in the associated Method Blank
- H - Method prescribed holding time exceeded
- S - Spike Recovery outside accepted recovery limits
- R - RPD outside accepted recovery limits
- E - Value above quantitation range
- # - See Case Narrative

RL - Reporting Limit; defined as the lowest concentration the laboratory can accurately quantitate.

AMRO Environmental Laboratories Corp.

Date: *10-Apr-01*

CLIENT:	Weston & Sampson Engineers	**Client Sample ID:**	SP-2
Lab Order:	0104006		
Project:	200317A BRA P3-Roxbury	**Collection Date:**	3/29/01
Lab ID:	0104006-07D	**Matrix:**	SOIL

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
ICP METALS TOTAL SW-846 - 3051/6010		**SW6010B**				Analyst: **REB**
Arsenic	20	7.4		mg/Kg-dry	1	4/4/01 6:25:50 PM
Barium	54	29		mg/Kg-dry	1	4/4/01 6:25:50 PM
Cadmium	ND	0.74		mg/Kg-dry	1	4/4/01 6:25:50 PM
Chromium	16	1.5		mg/Kg-dry	1	4/4/01 6:25:50 PM
Lead	170	3.7		mg/Kg-dry	1	4/4/01 6:25:50 PM
Selenium	ND	12		mg/Kg-dry	1	4/4/01 6:25:50 PM
Silver	ND	2.1		mg/Kg-dry	1	4/4/01 6:25:50 PM
MERCURY, 7471A		**SW7471A**				Analyst: **MT**
Mercury	0.45	0.027		mg/Kg-dry	1	4/4/01
PERCENT MOISTURE		**D2216**				Analyst: **CW**
Percent Moisture	16.6	0		wt%	1	4/4/01

Qualifiers:

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
B - Analyte detected in the associated Method Blank
H - Method prescribed holding time exceeded
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range
- See Case Narrative
RL - Reporting Limit; defined as the lowest concentration the laboratory can accurately quantitate.

AMRO Environmental Laboratories Corp.

Date: *10-Apr-01*

CLIENT:	Weston & Sampson Engineers	**Client Sample ID:**	SP-3
Lab Order:	0104006		
Project:	200317A BRA P3-Roxbury	**Collection Date:**	3/29/01
Lab ID:	0104006-08D	**Matrix:**	SOIL

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
ICP METALS TOTAL SW-846 - 3051/6010		**SW6010B**				Analyst: **REB**
Arsenic	9.1	6.8		mg/Kg-dry	1	4/4/01 6:30:33 PM
Barium	47	27		mg/Kg-dry	1	4/4/01 6:30:33 PM
Cadmium	ND	0.68		mg/Kg-dry	1	4/4/01 6:30:33 PM
Chromium	12	1.4		mg/Kg-dry	1	4/4/01 6:30:33 PM
Lead	160	3.4		mg/Kg-dry	1	4/4/01 6:30:33 PM
Selenium	ND	11		mg/Kg-dry	1	4/4/01 6:30:33 PM
Silver	ND	1.9		mg/Kg-dry	1	4/4/01 6:30:33 PM
MERCURY, 7471A		**SW7471A**				Analyst: **MT**
Mercury	0.16	0.029		mg/Kg-dry	1	4/4/01
PERCENT MOISTURE		**D2216**				Analyst: **CW**
Percent Moisture	9.5	0		wt%	1	4/4/01

Qualifiers:

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
B - Analyte detected in the associated Method Blank
H - Method prescribed holding time exceeded
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range
- See Case Narrative
RL - Reporting Limit; defined as the lowest concentration the laboratory can accurately quantitate.

AMRO Environmental Laboratories Corp.

Date: *10-Apr-01*

CLIENT:	Weston & Sampson Engineers	**Client Sample ID:**	DUP2
Lab Order:	0104006		
Project:	200317A BRA P3-Roxbury	**Collection Date:**	3/29/01
Lab ID:	0104006-09D	**Matrix:**	SOIL

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
ICP METALS TOTAL SW-846 - 3051/6010		**SW6010B**				Analyst: **REB**
Arsenic	11	6.8		mg/Kg-dry	1	4/4/01 6:35:19 PM
Barium	69	27		mg/Kg-dry	1	4/4/01 6:35:19 PM
Cadmium	ND	0.68		mg/Kg-dry	1	4/4/01 6:35:19 PM
Chromium	23	1.4		mg/Kg-dry	1	4/4/01 6:35:19 PM
Lead	120	3.4		mg/Kg-dry	1	4/4/01 6:35:19 PM
Selenium	ND	11		mg/Kg-dry	1	4/4/01 6:35:19 PM
Silver	ND	1.9		mg/Kg-dry	1	4/4/01 6:35:19 PM
MERCURY, 7471A		**SW7471A**				Analyst: **MT**
Mercury	0.41	0.031		mg/Kg-dry	1	4/4/01
PERCENT MOISTURE		**D2216**				Analyst: **CW**
Percent Moisture	12.9	0		wt%	1	4/4/01

Qualifiers:

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
B - Analyte detected in the associated Method Blank
H - Method prescribed holding time exceeded
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range
- See Case Narrative
RL - Reporting Limit; defined as the lowest concentration the laboratory can accurately quantitate.

AMRO Environmental Laboratories Corp.

Date: *10-Apr-01*

CLIENT:	Weston & Sampson Engineers	**Client Sample ID:**	SP-1
Lab Order:	0104006		
Project:	200317A BRA P3-Roxbury	**Collection Date:**	3/29/01
Lab ID:	0104006-06C	**Matrix:**	SOIL

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
PCBS BY EPA8082		**SW8082**				Analyst: **RAP**
Aroclor 1016	ND	27		µg/Kg-dry	1	4/9/01 8:06:00 PM
Aroclor 1221	ND	27		µg/Kg-dry	1	4/9/01 8:06:00 PM
Aroclor 1232	ND	27		µg/Kg-dry	1	4/9/01 8:06:00 PM
Aroclor 1242	ND	27		µg/Kg-dry	1	4/9/01 8:06:00 PM
Aroclor 1248	ND	27		µg/Kg-dry	1	4/9/01 8:06:00 PM
Aroclor 1254	48	27		µg/Kg-dry	1	4/9/01 8:06:00 PM
Aroclor 1260	ND	27		µg/Kg-dry	1	4/9/01 8:06:00 PM

Qualifiers:

- ND - Not Detected at the Reporting Limit
- J - Analyte detected below quantitation limits
- B - Analyte detected in the associated Method Blank
- H - Method prescribed holding time exceeded
- S - Spike Recovery outside accepted recovery limits
- R - RPD outside accepted recovery limits
- E - Value above quantitation range
- # - See Case Narrative

RL - Reporting Limit; defined as the lowest concentration the laboratory can accurately quantitate.

AMRO Environmental Laboratories Corp.

Date: *10-Apr-01*

CLIENT:	Weston & Sampson Engineers	**Client Sample ID:**	SP-2
Lab Order:	0104006		
Project:	200317A BRA P3-Roxbury	**Collection Date:**	3/29/01
Lab ID:	0104006-07C	**Matrix:**	SOIL

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
PCBS BY EPA8082		**SW8082**				Analyst: **RAP**
Aroclor 1016	ND	29		µg/Kg-dry	1	4/9/01 8:33:00 PM
Aroclor 1221	ND	29		µg/Kg-dry	1	4/9/01 8:33:00 PM
Aroclor 1232	ND	29		µg/Kg-dry	1	4/9/01 8:33:00 PM
Aroclor 1242	ND	29		µg/Kg-dry	1	4/9/01 8:33:00 PM
Aroclor 1248	ND	29		µg/Kg-dry	1	4/9/01 8:33:00 PM
Aroclor 1254	68	29		µg/Kg-dry	1	4/9/01 8:33:00 PM
Aroclor 1260	ND	29		µg/Kg-dry	1	4/9/01 8:33:00 PM

Qualifiers:

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
B - Analyte deteeted in the associated Method Blank
H - Method prescribed holding time exceeded
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range
- See Case Narrative
RL - Reporting Limit; defined as the lowest concentration the laboratory can accurately quantitate.

AMRO Environmental Laboratories Corp.

Date: *10-Apr-01*

CLIENT:	Weston & Sampson Engineers	**Client Sample ID:**	SP-3
Lab Order:	0104006		
Project:	200317A BRA P3-Roxbury	**Collection Date:**	3/29/01
Lab ID:	0104006-08C	**Matrix:**	SOIL

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
PCBS BY EPA8082		**SW8082**				Analyst: **RAP**
Aroclor 1016	ND	27		µg/Kg-dry	1	4/9/01 9:00:00 PM
Aroclor 1221	ND	27		µg/Kg-dry	1	4/9/01 9:00:00 PM
Aroclor 1232	ND	27		µg/Kg-dry	1	4/9/01 9:00:00 PM
Aroclor 1242	ND	27		µg/Kg-dry	1	4/9/01 9:00:00 PM
Aroclor 1248	ND	27		µg/Kg-dry	1	4/9/01 9:00:00 PM
Aroclor 1254	ND	27		µg/Kg-dry	1	4/9/01 9:00:00 PM
Aroclor 1260	ND	27		µg/Kg-dry	1	4/9/01 9:00:00 PM

Qualifiers:

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
B - Analyte detected in the associated Method Blank
H - Method prescribed holding time exceeded
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range
- See Case Narrative
RL - Reporting Limit; defined as the lowest concentration the laboratory can accurately quantitate.

AMRO Environmental Laboratories Corp.

Date: *10-Apr-01*

CLIENT:	Weston & Sampson Engineers	**Client Sample ID:**	DUP2
Lab Order:	0104006		
Project:	200317A BRA P3-Roxbury	**Collection Date:**	3/29/01
Lab ID:	0104006-09C	**Matrix:**	SOIL

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
PCBS BY EPA8082		**SW8082**				Analyst: **RAP**
Aroclor 1016	ND	28		µg/Kg-dry	1	4/9/01 9:26:00 PM
Aroclor 1221	ND	28		µg/Kg-dry	1	4/9/01 9:26:00 PM
Aroclor 1232	ND	28		µg/Kg-dry	1	4/9/01 9:26:00 PM
Aroclor 1242	ND	28		µg/Kg-dry	1	4/9/01 9:26:00 PM
Aroclor 1248	ND	28		µg/Kg-dry	1	4/9/01 9:26:00 PM
Aroclor 1254	ND	28		µg/Kg-dry	1	4/9/01 9:26:00 PM
Aroclor 1260	ND	28		µg/Kg-dry	1	4/9/01 9:26:00 PM

Qualifiers:

- ND - Not Detected at the Reporting Limit
- J - Analyte detected below quantitation limits
- B - Analyte detected in the associated Method Blank
- H - Method prescribed holding time exceeded
- S - Spike Recovery outside accepted recovery limits
- R - RPD outside accepted recovery limits
- E - Value above quantitation range
- # - See Case Narrative

RL - Reporting Limit; defined as the lowest concentration the laboratory can accurately quantitate.

AMRO Environmental Laboratories Corp.

Date: *10-Apr-01*

CLIENT:	Weston & Sampson Engineers	**Client Sample ID:**	SP-1
Lab Order:	0104006	**Tag Number:**	
Project:	200317A BRA P3-Roxbury	**Collection Date:**	3/29/01
Lab ID:	0104006-06B	**Matrix:**	SOIL

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
VOLATILE PETROLEUM HYDROCARBONS	**MAVPH**					Analyst: SK
C5-C8 Aliphatic Hydrocarbons	ND	2.8		mg/Kg-dry	1	4/3/01 7:25:00 PM
C9-C12 Aliphatic Hydrocarbons	ND	0.69		mg/Kg-dry	1	4/3/01 7:25:00 PM
C9-C10 Aromatic Hydrocarbons	ND	0.69		mg/Kg-dry	1	4/3/01 7:25:00 PM
Methyl tert-butyl ether	ND	0.056		mg/Kg-dry	1	4/3/01 7:25:00 PM
Benzene	ND	0.056		mg/Kg-dry	1	4/3/01 7:25:00 PM
Toluene	ND	0.056		mg/Kg-dry	1	4/3/01 7:25:00 PM
Ethylbenzene	ND	0.056		mg/Kg-dry	1	4/3/01 7:25:00 PM
m,p-Xylene	ND	0.056		mg/Kg-dry	1	4/3/01 7:25:00 PM
o-Xylene	ND	0.056		mg/Kg-dry	1	4/3/01 7:25:00 PM
Naphthalene	ND	0.14		mg/Kg-dry	1	4/3/01 7:25:00 PM
Surr: Dibromofluoromethane	84.5	70-130		%REC	1	4/3/01 7:25:00 PM
Surr: 1,2-Dichloroethane-d4	95.0	70-130		%REC	1	4/3/01 7:25:00 PM
Surr: Toluene-d8	87.9	70-130		%REC	1	4/3/01 7:25:00 PM
Surr: 4-Bromofluorobenzene	93.8	70-130		%REC	1	4/3/01 7:25:00 PM
Surr: 2,5-Dibromotoluene	99.0	70-130		%REC	1	4/3/01 7:25:00 PM

Hydrocarbon range data exclude concentrations of any surrogate(s) and/or internal standards eluting in that range. EPH: C11-C22 Aromatic Hydrocarbons exclude the concentration of target PAH analytes. VPH: C5-C8 Aliphatic Hydrocarbons exclude the concentration of target analytes eluting in this range. C9-C12 Aliphatic Hydrocarbons exclude the concentration of target analytes eluting in this range and concentration of C9-C10 Aromatic Hydrocarbons.

CERTIFICATION

Were all QA/QC procedures required by the VPH or EPH method followed: ✓ Yes ___ No - If No, See Case Narrative

Were all performance/acceptance standards for required QA/QC procedures achieved: ✓ Yes ___ No - If No, See Case Narrative

Were any significant modifications made to the method as specified in section 11.3: ___ No ✓ Yes - Details enclosed

I attest under the pains and penalties of perjury that, based upon my inquiry of those individuals immediately responsible for obtaining the information, the material contained in this report is, to the best of my knowledge and belief, accurate and complete.

SIGNATURE: _____ DATE: 4-10-01

PRINTED NAME: Nancy Stewart POSITION: Laboratory Director (or designee)

Qualifiers: RL - Reporting Limit; defined as the lowest concentration the laboratory can accurately quantitate.

ND - Not Detected at the Reporting Limit S - Spike Recovery outside accepted recovery limits E - Value above quantitation range

J - Analyte detected below quantitation limits R - RPD outside accepted recovery limits # - See Case Narrative

B - Analyte detected in the associated Method Blank H - Method prescribed holding time exceeded

AMRO Environmental Laboratories Corp.

Date: *10-Apr-01*

CLIENT:	Weston & Sampson Engineers	**Client Sample ID:**	SP-2
Lab Order:	0104006	**Tag Number:**	
Project:	200317A BRA P3-Roxbury	**Collection Date:**	3/29/01
Lab ID:	0104006-07B	**Matrix:**	SOIL

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
VOLATILE PETROLEUM HYDROCARBONS	**MAVPH**					Analyst: **SK**
C5-C8 Aliphatic Hydrocarbons	ND	2.9		mg/Kg-dry	1	4/3/01 8:02:00 PM
C9-C12 Aliphatic Hydrocarbons	ND	0.73		mg/Kg-dry	1	4/3/01 8:02:00 PM
C9-C10 Aromatic Hydrocarbons	ND	0.73		mg/Kg-dry	1	4/3/01 8:02:00 PM
Methyl tert-butyl ether	ND	0.058		mg/Kg-dry	1	4/3/01 8:02:00 PM
Benzene	ND	0.058		mg/Kg-dry	1	4/3/01 8:02:00 PM
Toluene	ND	0.058		mg/Kg-dry	1	4/3/01 8:02:00 PM
Ethylbenzene	ND	0.058		mg/Kg-dry	1	4/3/01 8:02:00 PM
m,p-Xylene	ND	0.058		mg/Kg-dry	1	4/3/01 8:02:00 PM
o-Xylene	ND	0.058		mg/Kg-dry	1	4/3/01 8:02:00 PM
Naphthalene	ND	0.15		mg/Kg-dry	1	4/3/01 8:02:00 PM
Surr: Dibromofluoromethane	85.5	70-130		%REC	1	4/3/01 8:02:00 PM
Surr: 1,2-Dichloroethane-d4	92.7	70-130		%REC	1	4/3/01 8:02:00 PM
Surr: Toluene-d8	85.6	70-130		%REC	1	4/3/01 8:02:00 PM
Surr: 4-Bromofluorobenzene	90.0	70-130		%REC	1	4/3/01 8:02:00 PM
Surr: 2,5-Dibromotoluene	93.1	70-130		%REC	1	4/3/01 8:02:00 PM

Hydrocarbon range data exclude concentrations of any surrogate(s) and/or internal standards eluting in that range. EPH: C11-C22 Aromatic Hydrocarbons exclude the concentration of target PAH analytes. VPH: C5-C8 Aliphatic Hydrocarbons exclude the concentration of target analytes eluting in this range. C9-C12 Aliphatic Hydrocarbons exclude the concentration of target analytes eluting in this range and concentration of C9-C10 Aromatic Hydrocarbons.

CERTIFICATION

Were all QA/QC procedures required by the VPH or EPH method followed: ✓ Yes ___ No - If No, See Case Narrative

Were all performance/acceptance standards for required QA/QC procedures achieved: ✓ Yes ___ No - If No, See Case Narrative

Were any significant modifications made to the method as specified in section 11.3: ___ No ✓ Yes - Details enclosed

I attest under the pains and penalties of perjury that, based upon my inquiry of those individuals immediately responsible for obtaining the information, the material contained in this report is, to the best of my knowledge and belief, accurate and complete.

SIGNATURE: _____ DATE: 4-10-01

PRINTED NAME: Nancy Stewart POSITION: Laboratory Director (or designee)

Qualifiers: RL - Reporting Limit; defined as the lowest concentration the laboratory can accurately quantitate.

ND - Not Detected at the Reporting Limit S - Spike Recovery outside accepted recovery limits E - Value above quantitation range

J - Analyte detected below quantitation limits R - RPD outside accepted recovery limits # - See Case Narrative

B - Analyte detected in the associated Method Blank H - Method prescribed holding time exceeded

AMRO Environmental Laboratories Corp.

Date: *10-Apr-01*

CLIENT:	Weston & Sampson Engineers	**Client Sample ID:**	SP-3
Lab Order:	0104006	**Tag Number:**	
Project:	200317A BRA P3-Roxbury	**Collection Date:**	3/29/01
Lab ID:	0104006-08B	**Matrix:**	SOIL

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
VOLATILE PETROLEUM HYDROCARBONS	**MAVPH**					Analyst: **SK**
C5-C8 Aliphatic Hydrocarbons	ND	2.7		mg/Kg-dry	1	4/3/01 9:13:00 PM
C9-C12 Aliphatic Hydrocarbons	ND	0.67		mg/Kg-dry	1	4/3/01 9:13:00 PM
C9-C10 Aromatic Hydrocarbons	ND	0.67		mg/Kg-dry	1	4/3/01 9:13:00 PM
Methyl tert-butyl ether	ND	0.053		mg/Kg-dry	1	4/3/01 9:13:00 PM
Benzene	ND	0.053		mg/Kg-dry	1	4/3/01 9:13:00 PM
Toluene	ND	0.053		mg/Kg-dry	1	4/3/01 9:13:00 PM
Ethylbenzene	ND	0.053		mg/Kg-dry	1	4/3/01 9:13:00 PM
m,p-Xylene	ND	0.053		mg/Kg-dry	1	4/3/01 9:13:00 PM
o-Xylene	ND	0.053		mg/Kg-dry	1	4/3/01 9:13:00 PM
Naphthalene	ND	0.13		mg/Kg-dry	1	4/3/01 9:13:00 PM
Surr: Dibromofluoromethane	89.7	70-130		%REC	1	4/3/01 9:13:00 PM
Surr: 1,2-Dichloroethane-d4	95.1	70-130		%REC	1	4/3/01 9:13:00 PM
Surr: Toluene-d8	88.8	70-130		%REC	1	4/3/01 9:13:00 PM
Surr: 4-Bromofluorobenzene	95.3	70-130		%REC	1	4/3/01 9:13:00 PM
Surr: 2,5-Dibromotoluene	99.5	70-130		%REC	1	4/3/01 9:13:00 PM

Hydrocarbon range data exclude concentrations of any surrogate(s) and/or internal standards eluting in that range. EPH: C11-C22 Aromatic Hydrocarbons exclude the concentration of target PAH analytes. VPH: C5-C8 Aliphatic Hydrocarbons exclude the concentration of target analytes eluting in this range. C9-C12 Aliphatic Hydrocarbons exclude the concentration of target analytes eluting in this range and concentration of C9-C10 Aromatic Hydrocarbons.

CERTIFICATION

Were all QA/QC procedures required by the VPH or EPH method followed: ✓ Yes ___ No - If No, See Case Narrative

Were all performance/acceptance standards for required QA/QC procedures achieved: ✓ Yes ___ No - If No, See Case Narrative

Were any significant modifications made to the method as specified in section 11.3: ___ No ✓ Yes - Details enclosed

I attest under the pains and penalties of perjury that, based upon my inquiry of those individuals immediately responsible for obtaining the information, the material contained in this report is, to the best of my knowledge and belief, accurate and complete.

SIGNATURE: _____ DATE: 4-10-01

PRINTED NAME: Nancy Stewart POSITION: Laboratory Director (or designee)

Qualifiers: RL - Reporting Limit; defined as the lowest concentration the laboratory can accurately quantitate.

ND - Not Detected at the Reporting Limit S - Spike Recovery outside accepted recovery limits E - Value above quantitation range

J - Analyte detected below quantitation limits R - RPD outside accepted recovery limits # - See Case Narrative

B - Analyte detected in the associated Method Blank H - Method prescribed holding time exceeded

AMRO Environmental Laboratories Corp.

Date: *10-Apr-01*

CLIENT:	Weston & Sampson Engineers	**Client Sample ID:**	DUP2
Lab Order:	0104006	**Tag Number:**	
Project:	200317A BRA P3-Roxbury	**Collection Date:**	3/29/01
Lab ID:	0104006-09B	**Matrix:**	SOIL

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
VOLATILE PETROLEUM HYDROCARBONS	**MAVPH**					Analyst: **SK**
C5-C8 Aliphatic Hydrocarbons	ND	2.8		mg/Kg-dry	1	4/3/01 9:49:00 PM
C9-C12 Aliphatic Hydrocarbons	ND	0.69		mg/Kg-dry	1	4/3/01 9:49:00 PM
C9-C10 Aromatic Hydrocarbons	ND	0.69		mg/Kg-dry	1	4/3/01 9:49:00 PM
Methyl tert-butyl ether	ND	0.055		mg/Kg-dry	1	4/3/01 9:49:00 PM
Benzene	ND	0.055		mg/Kg-dry	1	4/3/01 9:49:00 PM
Toluene	ND	0.055		mg/Kg-dry	1	4/3/01 9:49:00 PM
Ethylbenzene	ND	0.055		mg/Kg-dry	1	4/3/01 9:49:00 PM
m,p-Xylene	ND	0.055		mg/Kg-dry	1	4/3/01 9:49:00 PM
o-Xylene	ND	0.055		mg/Kg-dry	1	4/3/01 9:49:00 PM
Naphthalene	ND	0.14		mg/Kg-dry	1	4/3/01 9:49:00 PM
Surr: Dibromofluoromethane	87.9	70-130		%REC	1	4/3/01 9:49:00 PM
Surr: 1,2-Dichloroethane-d4	86.6	70-130		%REC	1	4/3/01 9:49:00 PM
Surr: Toluene-d8	88.0	70-130		%REC	1	4/3/01 9:49:00 PM
Surr: 4-Bromofluorobenzene	92.9	70-130		%REC	1	4/3/01 9:49:00 PM
Surr: 2,5-Dibromotoluene	97.0	70-130		%REC	1	4/3/01 9:49:00 PM

Hydrocarbon range data exclude concentrations of any surrogate(s) and/or internal standards eluting in that range. EPH: C11-C22 Aromatic Hydrocarbons exclude the concentration of target PAH analytes. VPH: C5-C8 Aliphatic Hydrocarbons exclude the concentration of target analytes eluting in this range. C9-C12 Aliphatic Hydrocarbons exclude the concentration of target analytes eluting in this range and concentration of C9-C10 Aromatic Hydrocarbons.

CERTIFICATION

Were all QA/QC procedures required by the VPH or EPH method followed: ✓ Yes ___ No - If No, See Case Narrative

Were all performance/acceptance standards for required QA/QC procedures achieved: ✓ Yes ___ No - If No, See Case Narrative

Were any significant modifications made to the method as specified in section 11.3: ___ No ✓ Yes - Details enclosed

I attest under the pains and penalties of perjury that, based upon my inquiry of those individuals immediately responsible for obtaining the information, the material contained in this report is, to the best of my knowledge and belief, accurate and complete.

SIGNATURE: _____ DATE: 4-10-01

PRINTED NAME: Nancy Stewart POSITION: Laboratory Director (or designee)

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J - Analyte detected below quantitation limits R - RPD outside accepted recovery limits # - See Case Narrative

B - Analyte detected in the associated Method Blank H - Method prescribed holding time exceeded

AMRO Environmental Laboratories Corp.

Date: *10-Apr-01*

CLIENT:	Weston & Sampson Engineers	**Client Sample ID:**	Trip Blank
Lab Order:	0104006	**Tag Number:**	
Project:	200317A BRA P3-Roxbury	**Collection Date:**	3/29/01
Lab ID:	0104006-10A	**Matrix:**	SOIL

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
VOLATILE PETROLEUM HYDROCARBONS	**MAVPH**					Analyst: **SK**
C5-C8 Aliphatic Hydrocarbons	ND	2.5		mg/Kg	1	4/3/01 6:49:00 PM
C9-C12 Aliphatic Hydrocarbons	ND	0.62		mg/Kg	1	4/3/01 6:49:00 PM
C9-C10 Aromatic Hydrocarbons	ND	0.62		mg/Kg	1	4/3/01 6:49:00 PM
Methyl tert-butyl ether	ND	0.050		mg/Kg	1	4/3/01 6:49:00 PM
Benzene	ND	0.050		mg/Kg	1	4/3/01 6:49:00 PM
Toluene	ND	0.050		mg/Kg	1	4/3/01 6:49:00 PM
Ethylbenzene	ND	0.050		mg/Kg	1	4/3/01 6:49:00 PM
m,p-Xylene	ND	0.050		mg/Kg	1	4/3/01 6:49:00 PM
o-Xylene	ND	0.050		mg/Kg	1	4/3/01 6:49:00 PM
Naphthalene	ND	0.12		mg/Kg	1	4/3/01 6:49:00 PM
Surr: Dibromofluoromethane	90.6	70-130		%REC	1	4/3/01 6:49:00 PM
Surr: 1,2-Dichloroethane-d4	107	70-130		%REC	1	4/3/01 6:49:00 PM
Surr: Toluene-d8	97.2	70-130		%REC	1	4/3/01 6:49:00 PM
Surr: 4-Bromofluorobenzene	103	70-130		%REC	1	4/3/01 6:49:00 PM
Surr: 2,5-Dibromotoluene	98.2	70-130		%REC	1	4/3/01 6:49:00 PM

Hydrocarbon range data exclude concentrations of any surrogate(s) and/or internal standards eluting in that range. EPH: C11-C22 Aromatic Hydrocarbons exclude the concentration of target PAH analytes. VPH: C5-C8 Aliphatic Hydrocarbons exclude the concentration of target analytes eluting in this range. C9-C12 Aliphatic Hydrocarbons exclude the concentration of target analytes eluting in this range and concentration of C9-C10 Aromatic Hydrocarbons.

CERTIFICATION

Were all QA/QC procedures required by the VPH or EPH method followed: ✓ Yes ___ No - If No, See Case Narrative

Were all performance/acceptance standards for required QA/QC procedures achieved: ✓ Yes ___ No - If No, See Case Narrative

Were any significant modifications made to the method as specified in section 11.3: ___ No ✓ Yes - Details enclosed

I attest under the pains and penalties of perjury that, based upon my inquiry of those individuals immediately responsible for obtaining the information, the material contained in this report is, to the best of my knowledge and belief, accurate and complete.

SIGNATURE: _____ DATE: 4-10-01

PRINTED NAME: Nancy Stewart POSITION: Laboratory Director (or designee)

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ND - Not Detected at the Reporting Limit S - Spike Recovery outside accepted recovery limits E - Value above quantitation range

J - Analyte detected below quantitation limits R - RPD outside accepted recovery limits # - See Case Narrative

B - Analyte detected in the associated Method Blank H - Method prescribed holding time exceeded

AMRO Environmental Laboratories Corp.

Date: *10-Apr-01*

CLIENT:	Weston & Sampson Engineers	**Client Sample ID:**	SS-1
Lab Order:	0104006	**Tag Number:**	
Project:	200317A BRA P3-Roxbury	**Collection Date:**	3/29/01
Lab ID:	0104006-01A	**Matrix:**	SOIL

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EXTRACTABLE PETROLEUM HYDROCARBONS MAEPH						Analyst: **GG**
C9-C18 Aliphatic Hydrocarbons	ND	63		mg/Kg-dry	1	4/5/01 4:39:00 PM
C19-C36 Aliphatic Hydrocarbons	ND	63		mg/Kg-dry	1	4/5/01 4:39:00 PM
C11-C22 Aromatic Hydrocarbons	100	63		mg/Kg-dry	1	4/5/01 4:39:00 PM
Naphthalene	ND	0.32		mg/Kg-dry	1	4/5/01 4:39:00 PM
2-Methylnaphthalene	ND	0.32		mg/Kg-dry	1	4/5/01 4:39:00 PM
Acenaphthylene	0.62	0.32		mg/Kg-dry	1	4/5/01 4:39:00 PM
Acenaphthene	0.87	0.32		mg/Kg-dry	1	4/5/01 4:39:00 PM
Fluorene	1.0	0.32		mg/Kg-dry	1	4/5/01 4:39:00 PM
Phenanthrene	9.6	0.32		mg/Kg-dry	1	4/5/01 4:39:00 PM
Anthracene	2.2	0.32		mg/Kg-dry	1	4/5/01 4:39:00 PM
Fluoranthene	11	0.32		mg/Kg-dry	1	4/5/01 4:39:00 PM
Pyrene	9.0	0.32		mg/Kg-dry	1	4/5/01 4:39:00 PM
Benz(a)anthracene	5.2	0.32		mg/Kg-dry	1	4/5/01 4:39:00 PM
Chrysene	4.8	0.32		mg/Kg-dry	1	4/5/01 4:39:00 PM
Benzo(b)fluoranthene	6.4	0.32		mg/Kg-dry	1	4/5/01 4:39:00 PM
Benzo(k)fluoranthene	2.2	0.32		mg/Kg-dry	1	4/5/01 4:39:00 PM
Benzo(a)pyrene	5.0	0.32		mg/Kg-dry	1	4/5/01 4:39:00 PM
Dibenz(a,h)anthracene	0.83	0.32		mg/Kg-dry	1	4/5/01 4:39:00 PM
Indeno(1,2,3-cd)pyrene	3.7	0.32		mg/Kg-dry	1	4/5/01 4:39:00 PM
Benzo(g,h,i)perylene	3.1	0.32		mg/Kg-dry	1	4/5/01 4:39:00 PM
Surr: 1-Chlorooctadecane	99.2	40-140		%REC	1	4/5/01 4:39:00 PM
Surr: 2-Bromonaphthalene	116	40-140		%REC	1	4/5/01 4:39:00 PM
Surr: 2-Fluorobiphenyl	123	40-140		%REC	1	4/5/01 4:39:00 PM
Surr: o-Terphenyl	104	40-140		%REC	1	4/5/01 4:39:00 PM

Hydrocarbon range data exclude concentrations of any surrogate(s) and/or internal standards eluting in that range. EPH: C11-C22 Aromatic Hydrocarbons exclude the concentration of target PAH analytes. VPH: C5-C8 Aliphatic Hydrocarbons exclude the concentration of target analytes eluting in this range. C9-C12 Aliphatic Hydrocarbons exclude the concentration of target analytes eluting in this range and concentration of C9-C10 Aromatic Hydrocarbons.

CERTIFICATION

Were all QA/QC procedures required by the VPH or EPH method followed: ✓ Yes ___ No - If No, See Case Narrative

Were all performance/acceptance standards for required QA/QC procedures achieved: ___ Yes ✓ No - If No, See Case Narrative

Were any significant modifications made to the method as specified in section 11.3: ___ No ✓ Yes - Details enclosed

I attest under the pains and penalties of perjury that, based upon my inquiry of those individuals immediately responsible for obtaining the information, the material contained in this report is, to the best of my knowledge and belief, accurate and complete.

SIGNATURE: _____ DATE: 4-10-01

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J - Analyte detected below quantitation limits R - RPD outside accepted recovery limits # - See Case Narrative

B - Analyte detected in the associated Method Blank H - Method prescribed holding time exceeded

AMRO Environmental Laboratories Corp.

Date: *10-Apr-01*

CLIENT:	Weston & Sampson Engineers	**Client Sample ID:**	SS-2
Lab Order:	0104006	**Tag Number:**	
Project:	200317A BRA P3-Roxbury	**Collection Date:**	3/29/01
Lab ID:	0104006-02A	**Matrix:**	SOIL

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EXTRACTABLE PETROLEUM HYDROCARBONS MAEPH						Analyst: GG
C9-C18 Aliphatic Hydrocarbons	ND	61		mg/Kg-dry	1	4/5/01 5:13:00 PM
C19-C36 Aliphatic Hydrocarbons	ND	61		mg/Kg-dry	1	4/5/01 5:13:00 PM
C11-C22 Aromatic Hydrocarbons	190	61		mg/Kg-dry	1	4/5/01 5:13:00 PM
Naphthalene	0.31	0.30		mg/Kg-dry	1	4/5/01 5:13:00 PM
2-Methylnaphthalene	ND	0.30		mg/Kg-dry	1	4/5/01 5:13:00 PM
Acenaphthylene	ND	0.30		mg/Kg-dry	1	4/5/01 5:13:00 PM
Acenaphthene	1.6	0.30		mg/Kg-dry	1	4/5/01 5:13:00 PM
Fluorene	1.4	0.30		mg/Kg-dry	1	4/5/01 5:13:00 PM
Phenanthrene	18	0.30		mg/Kg-dry	1	4/5/01 5:13:00 PM
Anthracene	3.7	0.30		mg/Kg-dry	1	4/5/01 5:13:00 PM
Fluoranthene	20	0.30		mg/Kg-dry	1	4/5/01 5:13:00 PM
Pyrene	16	0.30		mg/Kg-dry	1	4/5/01 5:13:00 PM
Benz(a)anthracene	9.4	0.30		mg/Kg-dry	1	4/5/01 5:13:00 PM
Chrysene	9.1	0.30		mg/Kg-dry	1	4/5/01 5:13:00 PM
Benzo(b)fluoranthene	12	0.30		mg/Kg-dry	1	4/5/01 5:13:00 PM
Benzo(k)fluoranthene	4.4	0.30		mg/Kg-dry	1	4/5/01 5:13:00 PM
Benzo(a)pyrene	8.7	0.30		mg/Kg-dry	1	4/5/01 5:13:00 PM
Dibenz(a,h)anthracene	1.6	0.30		mg/Kg-dry	1	4/5/01 5:13:00 PM
Indeno(1,2,3-cd)pyrene	7.0	0.30		mg/Kg-dry	1	4/5/01 5:13:00 PM
Benzo(g,h,i)perylene	6.1	0.30		mg/Kg-dry	1	4/5/01 5:13:00 PM
Surr: 1-Chlorooctadecane	80.6	40-140		%REC	1	4/5/01 5:13:00 PM
Surr: 2-Bromonaphthalene	114	40-140		%REC	1	4/5/01 5:13:00 PM
Surr: 2-Fluorobiphenyl	114	40-140		%REC	1	4/5/01 5:13:00 PM
Surr: o-Terphenyl	90.2	40-140		%REC	1	4/5/01 5:13:00 PM

Hydrocarbon range data exclude concentrations of any surrogate(s) and/or internal standards eluting in that range. EPH: C11-C22 Aromatic Hydrocarbons exclude the concentration of target PAH analytes. VPH: C5-C8 Aliphatic Hydrocarbons exclude the concentration of target analytes eluting in this range. C9-C12 Aliphatic Hydrocarbons exclude the concentration of target analytes eluting in this range and concentration of C9-C10 Aromatic Hydrocarbons.

CERTIFICATION

Were all QA/QC procedures required by the VPH or EPH method followed: ✓ Yes ___ No - If No, See Case Narrative

Were all performance/acceptance standards for required QA/QC procedures achieved: ___ Yes ✓ No - If No, See Case Narrative

Were any significant modifications made to the method as specified in section 11.3: ___ No ✓ Yes - Details enclosed

I attest under the pains and penalties of perjury that, based upon my inquiry of those individuals immediately responsible for obtaining the information, the material contained in this report is, to the best of my knowledge and belief, accurate and complete.

SIGNATURE: _____ DATE: 4-10-01

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J - Analyte detected below quantitation limits R - RPD outside accepted recovery limits # - See Case Narrative

B - Analyte detected in the associated Method Blank H - Method preseribed holding time exceeded

AMRO Environmental Laboratories Corp.

Date: *10-Apr-01*

CLIENT:	Weston & Sampson Engineers	**Client Sample ID:**	SS-3
Lab Order:	0104006	**Tag Number:**	
Project:	200317A BRA P3-Roxbury	**Collection Date:**	3/29/01
Lab ID:	0104006-03A	**Matrix:**	SOIL

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EXTRACTABLE PETROLEUM HYDROCARBONS MAEPH						Analyst: GG
C9-C18 Aliphatic Hydrocarbons	ND	59		mg/Kg-dry	1	4/5/01 5:48:00 PM
C19-C36 Aliphatic Hydrocarbons	ND	59		mg/Kg-dry	1	4/5/01 5:48:00 PM
C11-C22 Aromatic Hydrocarbons	170	59		mg/Kg-dry	1	4/5/01 5:48:00 PM
Naphthalene	0.69	0.30		mg/Kg-dry	1	4/5/01 5:48:00 PM
2-Methylnaphthalene	0.35	0.30		mg/Kg-dry	1	4/5/01 5:48:00 PM
Acenaphthylene	0.67	0.30		mg/Kg-dry	1	4/5/01 5:48:00 PM
Acenaphthene	1.3	0.30		mg/Kg-dry	1	4/5/01 5:48:00 PM
Fluorene	1.4	0.30		mg/Kg-dry	1	4/5/01 5:48:00 PM
Phenanthrene	12	0.30		mg/Kg-dry	1	4/5/01 5:48:00 PM
Anthracene	3.4	0.30		mg/Kg-dry	1	4/5/01 5:48:00 PM
Fluoranthene	14	0.30		mg/Kg-dry	1	4/5/01 5:48:00 PM
Pyrene	11	0.30		mg/Kg-dry	1	4/5/01 5:48:00 PM
Benz(a)anthracene	7.1	0.30		mg/Kg-dry	1	4/5/01 5:48:00 PM
Chrysene	6.3	0.30		mg/Kg-dry	1	4/5/01 5:48:00 PM
Benzo(b)fluoranthene	8.3	0.30		mg/Kg-dry	1	4/5/01 5:48:00 PM
Benzo(k)fluoranthene	3.2	0.30		mg/Kg-dry	1	4/5/01 5:48:00 PM
Benzo(a)pyrene	6.8	0.30		mg/Kg-dry	1	4/5/01 5:48:00 PM
Dibenz(a,h)anthracene	1.1	0.30		mg/Kg-dry	1	4/5/01 5:48:00 PM
Indeno(1,2,3-cd)pyrene	4.6	0.30		mg/Kg-dry	1	4/5/01 5:48:00 PM
Benzo(g,h,i)perylene	4.0	0.30		mg/Kg-dry	1	4/5/01 5:48:00 PM
Surr: 1-Chlorooctadecane	91.8	40-140		%REC	1	4/5/01 5:48:00 PM
Surr: 2-Bromonaphthalene	124	40-140		%REC	1	4/5/01 5:48:00 PM
Surr: 2-Fluorobiphenyl	125	40-140		%REC	1	4/5/01 5:48:00 PM
Surr: o-Terphenyl	96.1	40-140		%REC	1	4/5/01 5:48:00 PM

Hydrocarbon range data exclude concentrations of any surrogate(s) and/or internal standards eluting in that range. EPH: C11-C22 Aromatic Hydrocarbons exclude the concentration of target PAH analytes. VPH: C5-C8 Aliphatic Hydrocarbons exclude the concentration of target analytes eluting in this range. C9-C12 Aliphatic Hydrocarbons exclude the concentration of target analytes eluting in this range and concentration of C9-C10 Aromatic Hydrocarbons.

CERTIFICATION

Were all QA/QC procedures required by the VPH or EPH method followed: ✓ Yes ___ No - If No, See Case Narrative

Were all performance/acceptance standards for required QA/QC procedures achieved: ___ Yes ✓ No - If No, See Case Narrative

Were any significant modifications made to the method as specified in section 11.3: ___ No ✓ Yes - Details enclosed

I attest under the pains and penalties of perjury that, based upon my inquiry of those individuals immediately responsible for obtaining the information, the material contained in this report is, to the best of my knowledge and belief, accurate and complete.

SIGNATURE: _____ DATE: 4-10-01

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J - Analyte detected below quantitation limits R - RPD outside accepted recovery limits # - See Case Narrative

B - Analyte detected in the associated Method Blank H - Method prescribed holding time exceeded

AMRO Environmental Laboratories Corp.

Date: *10-Apr-01*

CLIENT:	Weston & Sampson Engineers	**Client Sample ID:**	SS-4
Lab Order:	0104006	**Tag Number:**	
Project:	200317A BRA P3-Roxbury	**Collection Date:**	3/29/01
Lab ID:	0104006-04A	**Matrix:**	SOIL

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EXTRACTABLE PETROLEUM HYDROCARBONS MAEPH						Analyst: GG
C9-C18 Aliphatic Hydrocarbons	ND	59		mg/Kg-dry	1	4/5/01 6:22:00 PM
C19-C36 Aliphatic Hydrocarbons	ND	59		mg/Kg-dry	1	4/5/01 6:22:00 PM
C11-C22 Aromatic Hydrocarbons	ND	59		mg/Kg-dry	1	4/5/01 6:22:00 PM
Naphthalene	ND	0.30		mg/Kg-dry	1	4/5/01 6:22:00 PM
2-Methylnaphthalene	ND	0.30		mg/Kg-dry	1	4/5/01 6:22:00 PM
Acenaphthylene	ND	0.30		mg/Kg-dry	1	4/5/01 6:22:00 PM
Acenaphthene	0.35	0.30		mg/Kg-dry	1	4/5/01 6:22:00 PM
Fluorene	0.41	0.30		mg/Kg-dry	1	4/5/01 6:22:00 PM
Phenanthrene	4.4	0.30		mg/Kg-dry	1	4/5/01 6:22:00 PM
Anthracene	1.1	0.30		mg/Kg-dry	1	4/5/01 6:22:00 PM
Fluoranthene	5.3	0.30		mg/Kg-dry	1	4/5/01 6:22:00 PM
Pyrene	4.7	0.30		mg/Kg-dry	1	4/5/01 6:22:00 PM
Benz(a)anthracene	2.8	0.30		mg/Kg-dry	1	4/5/01 6:22:00 PM
Chrysene	2.6	0.30		mg/Kg-dry	1	4/5/01 6:22:00 PM
Benzo(b)fluoranthene	3.3	0.30		mg/Kg-dry	1	4/5/01 6:22:00 PM
Benzo(k)fluoranthene	1.1	0.30		mg/Kg-dry	1	4/5/01 6:22:00 PM
Benzo(a)pyrene	2.5	0.30		mg/Kg-dry	1	4/5/01 6:22:00 PM
Dibenz(a,h)anthracene	0.42	0.30		mg/Kg-dry	1	4/5/01 6:22:00 PM
Indeno(1,2,3-cd)pyrene	1.8	0.30		mg/Kg-dry	1	4/5/01 6:22:00 PM
Benzo(g,h,i)perylene	1.5	0.30		mg/Kg-dry	1	4/5/01 6:22:00 PM
Surr: 1-Chlorooctadecane	90.5	40-140		%REC	1	4/5/01 6:22:00 PM
Surr: 2-Bromonaphthalene	104	40-140		%REC	1	4/5/01 6:22:00 PM
Surr: 2-Fluorobiphenyl	105	40-140		%REC	1	4/5/01 6:22:00 PM
Surr: o-Terphenyl	92.8	40-140		%REC	1	4/5/01 6:22:00 PM

Hydrocarbon range data exclude concentrations of any surrogate(s) and/or internal standards eluting in that range. EPH: C11-C22 Aromatic Hydrocarbons exclude the concentration of target PAH analytes. VPH: C5-C8 Aliphatic Hydrocarbons exclude the concentration of target analytes eluting in this range. C9-C12 Aliphatic Hydrocarbons exclude the concentration of target analytes eluting in this range and concentration of C9-C10 Aromatic Hydrocarbons.

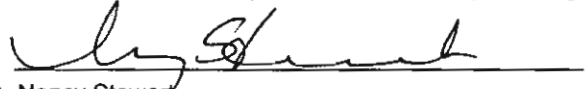
CERTIFICATION

Were all QA/QC procedures required by the VPH or EPH method followed: ✓ Yes ___ No - If No, See Case Narrative

Were all performance/acceptance standards for required QA/QC procedures achieved: ___ Yes ✓ No - If No, See Case Narrative

Were any significant modifications made to the method as specified in section 11.3: ___ No ✓ Yes - Details enclosed

I attest under the pains and penalties of perjury that, based upon my inquiry of those individuals immediately responsible for obtaining the information, the material contained in this report is, to the best of my knowledge and belief, accurate and complete.

SIGNATURE:  DATE: 4-10-01

PRINTED NAME: Nancy Stewart POSITION: Laboratory Director (or designee)

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ND - Not Detected at the Reporting Limit S - Spike Recovery outside accepted recovery limits E - Value above quantitation range

J - Analyte detected below quantitation limits R - RPD outside accepted recovery limits # - See Case Narrative

B - Analyte detected in the associated Method Blank H - Method prescribed holding time exceeded

AMRO Environmental Laboratories Corp.

Date: *10-Apr-01*

CLIENT:	Weston & Sampson Engineers	**Client Sample ID:**	SP-1
Lab Order:	0104006	**Tag Number:**	
Project:	200317A BRA P3-Roxbury	**Collection Date:**	3/29/01
Lab ID:	0104006-06A	**Matrix:**	SOIL

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EXTRACTABLE PETROLEUM HYDROCARBONS MAEPH						Analyst: **GG**
C9-C18 Aliphatic Hydrocarbons	ND	55		mg/Kg-dry	1	4/5/01 6:57:00 PM
C19-C36 Aliphatic Hydrocarbons	ND	55		mg/Kg-dry	1	4/5/01 6:57:00 PM
C11-C22 Aromatic Hydrocarbons	73	55		mg/Kg-dry	1	4/5/01 6:57:00 PM
Naphthalene	ND	0.28		mg/Kg-dry	1	4/5/01 6:57:00 PM
2-Methylnaphthalene	ND	0.28		mg/Kg-dry	1	4/5/01 6:57:00 PM
Acenaphthylene	ND	0.28		mg/Kg-dry	1	4/5/01 6:57:00 PM
Acenaphthene	0.89	0.28		mg/Kg-dry	1	4/5/01 6:57:00 PM
Fluorene	0.73	0.28		mg/Kg-dry	1	4/5/01 6:57:00 PM
Phenanthrene	7.1	0.28		mg/Kg-dry	1	4/5/01 6:57:00 PM
Anthracene	1.7	0.28		mg/Kg-dry	1	4/5/01 6:57:00 PM
Fluoranthene	7.9	0.28		mg/Kg-dry	1	4/5/01 6:57:00 PM
Pyrene	6.8	0.28		mg/Kg-dry	1	4/5/01 6:57:00 PM
Benz(a)anthracene	3.9	0.28		mg/Kg-dry	1	4/5/01 6:57:00 PM
Chrysene	3.6	0.28		mg/Kg-dry	1	4/5/01 6:57:00 PM
Benzo(b)fluoranthene	4.9	0.28		mg/Kg-dry	1	4/5/01 6:57:00 PM
Benzo(k)fluoranthene	1.5	0.28		mg/Kg-dry	1	4/5/01 6:57:00 PM
Benzo(a)pyrene	3.7	0.28		mg/Kg-dry	1	4/5/01 6:57:00 PM
Dibenz(a,h)anthracene	0.55	0.28		mg/Kg-dry	1	4/5/01 6:57:00 PM
Indeno(1,2,3-cd)pyrene	2.4	0.28		mg/Kg-dry	1	4/5/01 6:57:00 PM
Benzo(g,h,i)perylene	2.2	0.28		mg/Kg-dry	1	4/5/01 6:57:00 PM
Surr: 1-Chlorooctadecane	97.6	40-140		%REC	1	4/5/01 6:57:00 PM
Surr: 2-Bromonaphthalene	108	40-140		%REC	1	4/5/01 6:57:00 PM
Surr: 2-Fluorobiphenyl	108	40-140		%REC	1	4/5/01 6:57:00 PM
Surr: o-Terphenyl	88.8	40-140		%REC	1	4/5/01 6:57:00 PM

Hydrocarbon range data exclude concentrations of any surrogate(s) and/or internal standards eluting in that range. EPH: C11-C22 Aromatic Hydrocarbons exclude the concentration of target PAH analytes. VPH: C5-C8 Aliphatic Hydrocarbons exclude the concentration of target analytes eluting in this range. C9-C12 Aliphatic Hydrocarbons exclude the concentration of target analytes eluting in this range and concentration of C9-C10 Aromatic Hydrocarbons.

CERTIFICATION

Were all QA/QC procedures required by the VPH or EPH method followed: ✓ Yes ___ No - If No, See Case Narrative

Were all performance/acceptance standards for required QA/QC procedures achieved: ___ Yes ✓ No - If No, See Case Narrative

Were any significant modifications made to the method as specified in section 11.3: ___ No ✓ Yes - Details enclosed

I attest under the pains and penalties of perjury that, based upon my inquiry of those individuals immediately responsible for obtaining the information, the material contained in this report is, to the best of my knowledge and belief, accurate and complete.

SIGNATURE: _____ DATE: 4-10-01

PRINTED NAME: Nancy Stewart POSITION: Laboratory Director (or designee)

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J - Analyte detected below quantitation limits R - RPD outside accepted recovery limits # - See Case Narrative

B - Analyte detected in the associated Method Blank H - Method prescribed holding time exceeded

AMRO Environmental Laboratories Corp.

Date: *10-Apr-01*

CLIENT:	Weston & Sampson Engineers	**Client Sample ID:**	SP-2
Lab Order:	0104006	**Tag Number:**	
Project:	200317A BRA P3-Roxbury	**Collection Date:**	3/29/01
Lab ID:	0104006-07A	**Matrix:**	SOIL

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EXTRACTABLE PETROLEUM HYDROCARBONS MAEPH						Analyst: GG
C9-C18 Aliphatic Hydrocarbons	ND	60		mg/Kg-dry	1	4/5/01 7:31:00 PM
C19-C36 Aliphatic Hydrocarbons	ND	60		mg/Kg-dry	1	4/5/01 7:31:00 PM
C11-C22 Aromatic Hydrocarbons	66	60		mg/Kg-dry	1	4/5/01 7:31:00 PM
Naphthalene	ND	0.30		mg/Kg-dry	1	4/5/01 7:31:00 PM
2-Methylnaphthalene	ND	0.30		mg/Kg-dry	1	4/5/01 7:31:00 PM
Acenaphthylene	ND	0.30		mg/Kg-dry	1	4/5/01 7:31:00 PM
Acenaphthene	0.47	0.30		mg/Kg-dry	1	4/5/01 7:31:00 PM
Fluorene	0.37	0.30		mg/Kg-dry	1	4/5/01 7:31:00 PM
Phenanthrene	4.2	0.30		mg/Kg-dry	1	4/5/01 7:31:00 PM
Anthracene	0.95	0.30		mg/Kg-dry	1	4/5/01 7:31:00 PM
Fluoranthene	3.9	0.30		mg/Kg-dry	1	4/5/01 7:31:00 PM
Pyrene	4.1	0.30		mg/Kg-dry	1	4/5/01 7:31:00 PM
Benz(a)anthracene	2.2	0.30		mg/Kg-dry	1	4/5/01 7:31:00 PM
Chrysene	2.3	0.30		mg/Kg-dry	1	4/5/01 7:31:00 PM
Benzo(b)fluoranthene	2.4	0.30		mg/Kg-dry	1	4/5/01 7:31:00 PM
Benzo(k)fluoranthene	0.64	0.30		mg/Kg-dry	1	4/5/01 7:31:00 PM
Benzo(a)pyrene	1.9	0.30		mg/Kg-dry	1	4/5/01 7:31:00 PM
Dibenz(a,h)anthracene	0.32	0.30		mg/Kg-dry	1	4/5/01 7:31:00 PM
Indeno(1,2,3-cd)pyrene	1.2	0.30		mg/Kg-dry	1	4/5/01 7:31:00 PM
Benzo(g,h,i)perylene	1.2	0.30		mg/Kg-dry	1	4/5/01 7:31:00 PM
Surr: 1-Chlorooctadecane	105	40-140		%REC	1	4/5/01 7:31:00 PM
Surr: 2-Bromonaphthalene	119	40-140		%REC	1	4/5/01 7:31:00 PM
Surr: 2-Fluorobiphenyl	118	40-140		%REC	1	4/5/01 7:31:00 PM
Surr: o-Terphenyl	88.2	40-140		%REC	1	4/5/01 7:31:00 PM

Hydrocarbon range data exclude concentrations of any surrogate(s) and/or internal standards eluting in that range. EPH: C11-C22 Aromatic Hydrocarbons exclude the concentration of target PAH analytes. VPH: C5-C8 Aliphatic Hydrocarbons exclude the concentration of target analytes eluting in this range. C9-C12 Aliphatic Hydrocarbons exclude the concentration of target analytes eluting in this range and concentration of C9-C10 Aromatic Hydrocarbons.

CERTIFICATION

Were all QA/QC procedures required by the VPH or EPH method followed: ✓ Yes ___ No - If No, See Case Narrative

Were all performance/acceptance standards for required QA/QC procedures achieved: ___ Yes ✓ No - If No, See Case Narrative

Were any significant modifications made to the method as specified in section 11.3: ___ No ✓ Yes - Details enclosed

I attest under the pains and penalties of perjury that, based upon my inquiry of those individuals immediately responsible for obtaining the information, the material contained in this report is, to the best of my knowledge and belief, accurate and complete.

SIGNATURE: _____ DATE: 4-10-01

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J - Analyte detected below quantitation limits R - RPD outside accepted recovery limits # - See Case Narrative

B - Analyte detected in the associated Method Blank H - Method prescribed holding time exceeded

AMRO Environmental Laboratories Corp.

Date: *10-Apr-01*

CLIENT:	Weston & Sampson Engineers	**Client Sample ID:**	SP-3
Lab Order:	0104006	**Tag Number:**	
Project:	200317A BRA P3-Roxbury	**Collection Date:**	3/29/01
Lab ID:	0104006-08A	**Matrix:**	SOIL

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EXTRACTABLE PETROLEUM HYDROCARBONS MAEPH						Analyst: GG
C9-C18 Aliphatic Hydrocarbons	ND	54		mg/Kg-dry	1	4/5/01 8:06:00 PM
C19-C36 Aliphatic Hydrocarbons	55	54		mg/Kg-dry	1	4/5/01 8:06:00 PM
C11-C22 Aromatic Hydrocarbons	92	54		mg/Kg-dry	1	4/5/01 8:06:00 PM
Naphthalene	0.29	0.27		mg/Kg-dry	1	4/5/01 8:06:00 PM
2-Methylnaphthalene	0.31	0.27		mg/Kg-dry	1	4/5/01 8:06:00 PM
Acenaphthylene	0.30	0.27		mg/Kg-dry	1	4/5/01 8:06:00 PM
Acenaphthene	1.2	0.27		mg/Kg-dry	1	4/5/01 8:06:00 PM
Fluorene	1.3	0.27		mg/Kg-dry	1	4/5/01 8:06:00 PM
Phenanthrene	8.0	0.27		mg/Kg-dry	1	4/5/01 8:06:00 PM
Anthracene	2.3	0.27		mg/Kg-dry	1	4/5/01 8:06:00 PM
Fluoranthene	8.6	0.27		mg/Kg-dry	1	4/5/01 8:06:00 PM
Pyrene	7.3	0.27		mg/Kg-dry	1	4/5/01 8:06:00 PM
Benz(a)anthracene	4.3	0.27		mg/Kg-dry	1	4/5/01 8:06:00 PM
Chrysene	4.1	0.27		mg/Kg-dry	1	4/5/01 8:06:00 PM
Benzo(b)fluoranthene	5.1	0.27		mg/Kg-dry	1	4/5/01 8:06:00 PM
Benzo(k)fluoranthene	2.0	0.27		mg/Kg-dry	1	4/5/01 8:06:00 PM
Benzo(a)pyrene	4.2	0.27		mg/Kg-dry	1	4/5/01 8:06:00 PM
Dibenz(a,h)anthracene	0.60	0.27		mg/Kg-dry	1	4/5/01 8:06:00 PM
Indeno(1,2,3-cd)pyrene	2.8	0.27		mg/Kg-dry	1	4/5/01 8:06:00 PM
Benzo(g,h,i)perylene	2.5	0.27		mg/Kg-dry	1	4/5/01 8:06:00 PM
Surr: 1-Chlorooctadecane	81.6	40-140		%REC	1	4/5/01 8:06:00 PM
Surr: 2-Bromonaphthalene	119	40-140		%REC	1	4/5/01 8:06:00 PM
Surr: 2-Fluorobiphenyl	116	40-140		%REC	1	4/5/01 8:06:00 PM
Surr: o-Terphenyl	97.8	40-140		%REC	1	4/5/01 8:06:00 PM

Hydrocarbon range data exclude concentrations of any surrogate(s) and/or internal standards eluting in that range. EPH: C11-C22 Aromatic Hydrocarbons exclude the concentration of target PAH analytes. VPH: C5-C8 Aliphatic Hydrocarbons exclude the concentration of target analytes eluting in this range. C9-C12 Aliphatic Hydrocarbons exclude the concentration of target analytes eluting in this range and concentration of C9-C10 Aromatic Hydrocarbons.

CERTIFICATION

Were all QA/QC procedures required by the VPH or EPH method followed: ✓ Yes ___ No - If No, See Case Narrative

Were all performance/acceptance standards for required QA/QC procedures achieved: ___ Yes ✓ No - If No, See Case Narrative

Were any significant modifications made to the method as specified in section 11.3: ___ No ✓ Yes - Details enclosed

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B - Analyte detected in the associated Method Blank H - Method prescribed holding time exceeded

AMRO Environmental Laboratories Corp.

Date: *10-Apr-01*

CLIENT:	Weston & Sampson Engineers	**Client Sample ID:**	DUP2
Lab Order:	0104006	**Tag Number:**	
Project:	200317A BRA P3-Roxbury	**Collection Date:**	3/29/01
Lab ID:	0104006-09A	**Matrix:**	SOIL

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EXTRACTABLE PETROLEUM HYDROCARBONS MAEPH						Analyst: **GG**
C9-C18 Aliphatic Hydrocarbons	ND	57		mg/Kg-dry	1	4/5/01 9:15:00 PM
C19-C36 Aliphatic Hydrocarbons	65	57		mg/Kg-dry	1	4/5/01 9:15:00 PM
C11-C22 Aromatic Hydrocarbons	ND	57		mg/Kg-dry	1	4/5/01 9:15:00 PM
Naphthalene	ND	0.29		mg/Kg-dry	1	4/5/01 9:15:00 PM
2-Methylnaphthalene	ND	0.29		mg/Kg-dry	1	4/5/01 9:15:00 PM
Acenaphthylene	ND	0.29		mg/Kg-dry	1	4/5/01 9:15:00 PM
Acenaphthene	0.36	0.29		mg/Kg-dry	1	4/5/01 9:15:00 PM
Fluorene	0.32	0.29		mg/Kg-dry	1	4/5/01 9:15:00 PM
Phenanthrene	3.8	0.29		mg/Kg-dry	1	4/5/01 9:15:00 PM
Anthracene	0.99	0.29		mg/Kg-dry	1	4/5/01 9:15:00 PM
Fluoranthene	4.4	0.29		mg/Kg-dry	1	4/5/01 9:15:00 PM
Pyrene	4.1	0.29		mg/Kg-dry	1	4/5/01 9:15:00 PM
Benz(a)anthracene	2.3	0.29		mg/Kg-dry	1	4/5/01 9:15:00 PM
Chrysene	2.2	0.29		mg/Kg-dry	1	4/5/01 9:15:00 PM
Benzo(b)fluoranthene	2.6	0.29		mg/Kg-dry	1	4/5/01 9:15:00 PM
Benzo(k)fluoranthene	0.81	0.29		mg/Kg-dry	1	4/5/01 9:15:00 PM
Benzo(a)pyrene	2.0	0.29		mg/Kg-dry	1	4/5/01 9:15:00 PM
Dibenz(a,h)anthracene	0.34	0.29		mg/Kg-dry	1	4/5/01 9:15:00 PM
Indeno(1,2,3-cd)pyrene	1.3	0.29		mg/Kg-dry	1	4/5/01 9:15:00 PM
Benzo(g,h,i)perylene	1.2	0.29		mg/Kg-dry	1	4/5/01 9:15:00 PM
Surr: 1-Chlorooctadecane	85.8	40-140		%REC	1	4/5/01 9:15:00 PM
Surr: 2-Bromonaphthalene	112	40-140		%REC	1	4/5/01 9:15:00 PM
Surr: 2-Fluorobiphenyl	106	40-140		%REC	1	4/5/01 9:15:00 PM
Surr: o-Terphenyl	89.1	40-140		%REC	1	4/5/01 9:15:00 PM

Hydrocarbon range data exclude concentrations of any surrogate(s) and/or internal standards eluting in that range. EPH: C11-C22 Aromatic Hydrocarbons exclude the concentration of target PAH analytes. VPH: C5-C8 Aliphatic Hydrocarbons exclude the concentration of target analytes eluting in this range. C9-C12 Aliphatic Hydrocarbons exclude the concentration of target analytes eluting in this range and concentration of C9-C10 Aromatic Hydrocarbons.

CERTIFICATION

Were all QA/QC procedures required by the VPH or EPH method followed: ✓ Yes ___ No - If No, See Case Narrative

Were all performance/acceptance standards for required QA/QC procedures achieved: ___ Yes ✓ No - If No, See Case Narrative

Were any significant modifications made to the method as specified in section 11.3: ___ No ✓ Yes - Details enclosed

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B - Analyte detected in the associated Method Blank H - Method prescribed holding time exceeded

Lab Order: 0104006
Client: Weston & Sampson Engineers
Project: 200317A BRA P3-Roxbury

DATES REPORT

Sample ID	Client Sample ID	Collection Date	Matrix	Test Name	TCLP Date	Prep Date	Analysis Date
0104006-01A	SS-1	3/29/01	Soil	EPH, Soil, Full List		4/4/01	4/5/01
				Percent Moisture			4/4/01
0104006-01B				ICP METALS, 3051/6010		4/4/01	4/4/01
0104006-02A	SS-2			EPH, Soil, Full List		4/4/01	4/5/01
				Percent Moisture			4/4/01
0104006-02B				ICP METALS, 3051/6010		4/4/01	4/4/01
0104006-03A	SS-3			EPH, Soil, Full List		4/4/01	4/5/01
				Percent Moisture			4/4/01
0104006-03B				ICP METALS, 3051/6010		4/4/01	4/4/01
0104006-04A	SS-4			EPH, Soil, Full List		4/4/01	4/5/01
				Percent Moisture			4/4/01
0104006-04B				ICP METALS, 3051/6010		4/4/01	4/4/01
0104006-05A	DUP			ICP METALS, 3051/6010		4/4/01	4/4/01
				Percent Moisture			4/4/01
0104006-06A	SP-1			EPH, Soil, Full List		4/4/01	4/5/01
0104006-06B				Volatile Petroleum Hydrocarbons		3/29/01	4/3/01
0104006-06C				PCBS IN SOIL/SOLIDS		4/6/01	4/9/01
0104006-06D				ICP METALS, 3051/6010		4/4/01	4/4/01
				MERCURY, Soil		4/4/01	4/4/01
				Percent Moisture			4/4/01
0104006-07A	SP-2			EPH, Soil, Full List		4/4/01	4/5/01
0104006-07B				Volatile Petroleum Hydrocarbons		3/29/01	4/3/01
0104006-07C				PCBS IN SOIL/SOLIDS		4/6/01	4/9/01
0104006-07D				ICP METALS, 3051/6010		4/4/01	4/4/01
				MERCURY, Soil		4/4/01	4/4/01
				Percent Moisture			4/4/01
0104006-08A	SP-3			EPH, Soil, Full List		4/4/01	4/5/01
0104006-08B				Volatile Petroleum Hydrocarbons		3/29/01	4/3/01

Lab Order: 0104006
Client: Weston & Sampson Engineers
Project: 200317A BRA P3-Roxbury

DATES REPORT

Sample ID	Client Sample ID	Collection Date	Matrix	Test Name	TCLP Date	Prep Date	Analysis Date
0104006-08C	SP-3	3/29/01	Soil	PCBS IN SOIL/SOLIDS		4/6/01	4/9/01
0104006-08D				ICP METALS, 3051/6010		4/4/01	4/4/01
				MERCURY, Soil		4/4/01	4/4/01
				Percent Moisture			4/4/01
0104006-09A	DUP2			EPH, Soil, Full List		4/4/01	4/5/01
0104006-09B				Volatile Petroleum Hydrocarbons		3/29/01	4/3/01
0104006-09C				PCBS IN SOIL/SOLIDS		4/6/01	4/9/01
0104006-09D				ICP METALS, 3051/6010		4/4/01	4/4/01
				MERCURY, Soil		4/4/01	4/4/01
				Percent Moisture			4/4/01
0104006-10A	Trip Blank			Volatile Petroleum Hydrocarbons		3/29/01	4/3/01

AMRO Environmental Laboratories Corporation
111 Herrick Street
Merrimack, NH 03054

Volatile Petroleum Hydrocarbons (VPH)
Massachusetts Department of Environmental Protection (MADEP)
Method 1.0 - January 1998
AMRO Modifications

This modification is based on the use of a purge and trap gas chromatography mass spectrometer (GC/MS) system to analyze samples for VPH. The hydrocarbon ranges are quantified using predominant mass fragmentation ions which are characteristic for the range being measured. This approach eliminates potential false positives for the target analytes while providing accurate hydrocarbon range data.

The chromatographic column is an HP-624 capillary column which has been validated by GC/MS analysis of a gasoline standard to correctly identify the marker compounds and elution order of specific gasoline components. Batch quality control includes, at a minimum, method blank, laboratory control sample, and duplicate analysis. A matrix spike and/or matrix spike duplicate is analyzed if sufficient sample is submitted to the laboratory.

The Reporting Limit (RL) of this method for each of the collective aliphatic and aromatic ranges is approximately 0.6-2.8 mg/kg in soil and 25-110 µg/L in water. The RL of this method for the target analytes ranges from approximately 0.05-0.13 mg/kg in soil and 2.0-5.0 µg/L for water samples.

Extractable Petroleum Hydrocarbons (EPH)
Massachusetts Department of Environmental Protection (MADEP)
Method 1.0 - January 1998
AMRO Modifications

This modification is based on a solvent extraction and gas chromatography mass spectrometer (GC/MS) analysis. The hydrocarbon ranges are quantified using predominant mass fragmentation ions which are characteristic for the range being measured. This approach eliminates the silica gel solid-phase fractionation step. False positives for targeted PAH analytes are eliminated by using GC/MS as the primary analysis technique.

The chromatographic column is a J&W Scientific DB-5ms capillary column.
Internal standard calibration is performed using 5α-Androstane at a concentration of 40 ng/µL. o-Terphenyl and 1-Chlorooctadecane are added as surrogate compounds at 20 ng/µL in the sample extract. These two surrogates monitor the effects of the sample matrix and extraction efficiency. Two additional surrogates, 2-Fluorobiphenyl and 2-Bromonaphthalene, are added to the finished extract prior to analysis to monitor instrument performance. Batch quality control includes, at a minimum, a procedure blank, laboratory control sample and duplicate sample analysis. A matrix spike is analyzed if sufficient sample is submitted to the laboratory.

The Reporting Limit (RL) of this method for each of the collective aliphatic and aromatic ranges is approximately 2-15 mg/kg in soil and 10-50 µg/L in water. The RL of this method for the Target PAH analytes ranges from approximately 0.25 to 0.5mg/kg in soil; 1.0µg/L for water when operating the GC/MS in full scan mode, and 0.1 to 1.0µg/L when operating the GC/MS in SIM mode. For sites requiring the lowest levels cited in the Massachusetts Contingency Plan for water, GC/MS in the Selected Ion Monitoring (SIM) mode is used.

AMRO Environmental Laboratories Corporation

SAMPLE RECEIPT CHECKLIST

111 Herrick Street
Merrimack, NH 03054
~~(603) 424-2622~~

Client: W&S
Project Name: 200317A BRA P3 - Roxbury
Ship via: (circle one) Fed Ex., UPS, (AMRO Courier)
Hand Del., Other Courier, Other:

AMRO ID: 0104006
Date Rec.: 3-30-01
Date Due: 4-11-01

Items to be Checked Upon Receipt	Yes	No	NA	Comments
1. Army Samples received in individual plastic bags?			✓	
2. Custody Seals present?			✓	
3. Custody Seals Intact?			✓	
4. Air Bill included in folder if received?			✓	
5. Is COC included with samples?	✓			
6. Is COC signed and dated by client?	✓			
7. Laboratory receipt temperature. TEMP = 3°				
Samples rec. with ice ✓ ice packs ___ neither ___				
8. Were samples received the same day they were sampled?		✓		
Is client temperature 4°C ± 2°C?	✓			
If no obtain authorization from the client for the analyses.				
Client authorization from: Date: Obtained by:				
9. Is the COC filled out correctly and completely?	✓			
10. Does the info on the COC match the samples?	✓			
11. Were samples rec. within holding time?	✓			
12. Were all samples properly labeled?	✓			
13. Were all samples properly preserved?	✓			
14. Were proper sample containers used?	✓			
15. Were all samples received intact? (none broken or leaking)	✓			
16. Were VOA vials rec. with no air bubbles?			✓	
17. Were the sample volumes sufficient for requested analysis?	✓			
18. Were all samples received?	✓			
19. VPH and VOA Soils only:	✓			
Sampling Method VPH (circle one): M=Methanol, E=EnCore (air-tight container)				
Sampling Method VOA (circle one): M=Methanol, SB=Sodium Bisulfate, E=EnCore, B=Bulk				
If M or SB:				
Does preservative cover the soil?	✓			
If NO then client must be faxed.				
Does preservation level come close to the fill line on the vial?	✓			
If NO then client must be faxed.				
Were vials provided by AMRO?	✓			
If NO then weights MUST be obtained from client				
Was dry weight aliquot provided?			✓	
If NO then fax client and inform the VOA lab ASAP.				
20. Subcontracted Samples:			✓	
What samples sent:				
Where sent:				
Date:				
Analysis:				
TAT:				
21. Information entered into:				
Internal Tracking Log?	✓			
Dry Weight Log?	✓			
Client Log?		✓		
Composite Log?			✓	
Filtration Log?			✓	

Received By: MG Date: 3-30-01 Logged in By: CC Date: 4-2-01
Labeled By: CC Date: 4-2-01 Checked By: MG Date: 4-3-01

NA= Not Applicable

AMRO Environmental Laboratories Corporation
~~111 Herrick Street~~
Merrimack, NH 03054

CHAIN-OF-CUSTODY RECORD

38186

Office: (603) 424-2022
Fax: (603) 429-8496

01-0400-6

Project No.: 20037A	Project Name: BRA P3 - Roxbury	Project Manager: Annika Willis	Samplers (Signature): Danny Haynes, LV Rappa	AMRO Project No.: ~~01-0330~~ cc
	Project State: MA			

Sample ID	Date/Time Sampled	Matrix (A= Air, S= Soil, GW= Ground W., WW= Waste W., DW= Drinking W., O= Oil, Other= Specify)	Total # of Cont. & Size	Analysis Required: EPH w/ PAHs	Lead	VPH	PCBs	RCRA 8 Metals	Remarks
SS-1	3/29/01 0850	S	1 4oz A, 1 4oz C	X	X				
SS-2	0840	S	1 4oz A, 1 4oz C	X	X				
SS-3	0900	S	1 4oz A, 1 4oz C	X	X				
SS-4	0830	S	1 4oz A, 1 4oz C	X	X				
Dup	—	S	~~1 4oz C~~ LVB 1 4oz C	~~X~~	X				
SP-1	0925	S	3 2oz A (3 VOA)	X		X	X	X	
SP-2	1000	S	2 2oz, 1 4oz (3 VOA)	X		X	X	X	
SP-3	1030	S	3 2oz A (3 VOA)	X		X	X	X	
Dup2	—	S	3 2oz A (3 VOA)	X		X	X	X	
Trip Blank	↓ —	MeOH	1 VoA			X			
Preservative: Cl-HCl, MeOH, N-HN03, S-H2SO4, Na-NaOH, O- Other				—	—	MeOH	—	—	
Container Type: P- Plastic, G-Glass, V-Vial, T- Teflon, O-Other				6	6	6	6	6	

Please print clearly, legibly and completely. Samples can not be logged in and the turnaround time clock will not start until any ambiguities are resolved.

FAX No.: 978 977 0100

NOTES: Preservatives, Special reporting limits, Known Contamination, etc;
Level 1 data package.

Send Results To: Annika Willis
5 Centennial Drive
Peabody MA 01960

Seal Intact? Yes No (N/A)

GW-1 ___ GW-2 ___ GW-3 ___

MCP Level Needed: RCS-1 (Final)

P.O. No: 20037A

Results Needed By: 7-10 day TAT

PRIORITY TURNAROUND TIME AUTHORIZATION
Before submitting samples for expedited TAT, you must have requested in advance and received a coded TAT AUTHORIZATION NUMBER
AUTHORIZATION No. ___ BY: ___

Relinquished By	Date/ Time	Received By	Date/Time
LV Rappa	3/30/01	D Stratton	3/30/01 13:00
D Stratton	3/30/01	Custody Seal	3-30-01 1510

SHEET 1 OF 1

White: Lab Copy Yellow: Accompanies Report Pink: Client Copy

The Commonwealth of Massachusetts

Department of Environmental Protection

Division of Environmental Analysis
Senator William X. Wall Experiment Station

certifies

M-NH012

AMRO ENVIRONMENTAL LAB
111 HERRICK ST
MERRIMACK, NH 03054-0000

Laboratory Director: Nancy Stewart

for the analysis of NON POTABLE WATER (CHEMISTRY)
POTABLE WATER (CHEMISTRY)

pursuant to 310 CMR 42.00

This certificate supersedes all previous Massachusetts certificates issued to this laboratory. The laboratory is regulated by and shall be responsible for being in compliance with Massachusetts regulations at 310 CMR 42.00.

This certificate is valid only when accompanied by the latest dated Certified Parameter List as issued by the Massachusetts D.E.P. Contact the Division of Environmental Analysis to verify the current certification status of the laboratory.

Certification is no guarantee of the validity of the data. This certification is subject to unannounced laboratory inspections.

Issued: 01 JUL 2000

Expires: 30 JUN 2001

Oscar C. Jacobs

Director, Division of Environmental Analysis

APPENDIX F

Risk Characterization Summary Tables

Summary Data Table
Surficial Soil (0 to 3 feet)
Area 1 - Unpaved Lot Behind Fomer Connolly's Tavern
BRA PARCEL P-3

Parameter	Units	Sample Location																	
		SS-1	SS-2	SS-3	SS-4	B-101	B-102	B-103	B-104	B-105	B-106	B-107	B-108	B-109	B-110	B-111	B-112	B-113	B-114	B-115
		0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	1-2.5	1-3	1-3	1-3	1-3	1-3	1-3	1-3	1-3	1-3	1-3	1-3	1-3	1-3	1-3
EPH Parameters																				
C_9-C_{18} Aliphatics	mg/kg	*31.5*	*30.5*	*29.5*	*29.5*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
C_{19}-C_{36} Aliphaties	mg/kg	*31.5*	*30.5*	*29.5*	*29.5*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
C_{11}-C_{22} Aliphatics*	mg/kg	100	190	170	*29.5*	500	440	160	320	140	450	140	220	230	170	190	500	290	480	140
PAHs																				
2-Methylnaphthalene	mg/kg	*0.16*	*0.15*	0.35	*0.15*	*0.07*	*0.1*	*0.03*	0.4	0.8	0.2	*0.03*	*0.03*	0.2	0.7	*0.03*	0.1	0.3	*0.1*	*0.3*
Acenaphthene	mg/kg	0.87	1.6	1.3	0.35	0.3	0.8	0.2	1.0	1.9	0.4	0.2	0.2	0.5	0.3	0.1	0.5	1.1	1.0	*0.3*
Acenaphthylene	mg/kg	0.62	*0.15*	0.67	*0.15*	*0.07*	*0.1*	*0.03*	0.2	0.4	0.1	*0.03*	*0.03*	0.1	0.1	*0.03*	0.1	0.3	*0.1*	*0.3*
Anthracene	mg/kg	2.2	3.7	3.4	1.1	0.7	2.1	0.4	2.0	3.9	1.0	0.4	0.4	1.1	0.7	0.3	0.9	1.9	2.0	0.6
Benzo[a]anthraeene	mg/kg	5.2	9.4	7.1	2.8	1.8	4.3	1.0	5.5	8.1	1.9	1.1	1.1	2.0	1.7	0.9	2.2	6.1	4.2	1.5
Benzo[a]pyrene	mg/kg	5.0	8.7	6.8	2.5	1.8	4.0	1.0	5.6	7.5	1.8	1.0	1.1	1.9	1.7	0.9	2.2	5.6	3.9	1.3
Benzo[b]fluoranthene	mg/kg	6.4	12	8.3	3.3	1.3	2.9	0.7	4.2	5.3	1.2	0.7	0.8	1.3	1.8	0.7	2.2	4.8	3.1	1.1
Benzo[g,h,i]perylene	mg/kg	3.1	6.1	4.0	1.5	1.6	2.8	0.6	1.4	5.8	1.0	0.5	0.5	0.6	0.4	0.7	0.5	1.1	2.1	*0.3*
Benzo[k]fluoranthene	mg/kg	2.2	4.4	3.2	1.1	1.5	2.9	0.7	4.5	5.5	1.3	0.7	0.8	1.5	1.7	0.7	2.4	5.0	3.2	1.1
Chrysene	mg/kg	4.8	9.1	6.3	2.6	1.9	4.3	1.1	5.7	8.7	1.9	1.1	1.1	2.0	1.8	1.0	2.3	6.6	4.4	1.6
Dibenzo[a,h]anthracene	mg/kg	0.83	1.6	1.1	0.42	0.5	1.1	0.3	0.7	2.0	0.4	0.2	0.2	0.3	0.2	0.3	0.3	0.5	*0.1*	*0.3*
Fluoranthene	mg/kg	11	20	14	5.3	3.8	9.6	2.0	12.0	16.0	5.8	2.1	2.3	6.0	4.5	1.9	6.2	13.0	9.3	3.0
Fluorene	mg/kg	1.0	1.4	1.4	0.41	0.2	0.8	0.2	1.1	1.9	0.4	0.1	0.2	0.5	0.3	0.1	0.5	1.0	0.9	*0.3*
Indeno[1,2,3-cd]pyrene	mg/kg	3.7	7.0	4.6	1.8	1.3	3.2	0.6	1.5	1.8	1.0	0.5	0.5	0.7	0.5	0.7	0.6	1.1	1.8	*0.3*
Naphthalene	mg/kg	*0.16*	0.31	0.69	*0.15*	*0.07*	0.6	0.1	0.7	1.6	0.3	0.1	0.1	0.3	0.1	0.1	0.2	0.4	*0.1*	*0.3*
Phenanthrene	mg/kg	9.6	18	12	4.4	3.2	7.9	1.8	9.6	15.0	5.1	1.7	1.8	5.4	2.4	1.2	5.4	12.0	9.5	2.2
Pyrene	mg/kg	9.0	16	11	4.7	3.8	8.7	2.1	10.0	14.0	4.8	1.9	2.0	5.0	4.2	1.7	5.9	13.0	9.6	2.8
Metals																				
Arsenic, Total	mg/kg	na	na	na	na	na	na	na	na	7.8	na	na	na	na	na	5.4	na	na	na	na
Cadmium, Total	mg/kg	na	na	na	na	na	na	na	na	2.4	na	na	na	na	na	2	na	na	na	na
Chromium, Total	mg/kg	na	na	na	na	na	na	na	na	38	na	na	na	na	na	21	na	na	na	na
Lead, Total	mg/kg	200	300	220	310	210	200	170	270	940	150	280	450	190	240	200	150	300	390	170
Mercury, Total	mg/kg	na	na	na	na	na	na	na	na	0.32	na	na	na	na	na	0.21	na	na	na	na

G:\Hazwaste\Risk Assessments\BRA\P-3 Parcel\Risk Assessment\[Area 1 soil.xls]Surficial Soil Data

Notes:
Italics = one-half the laboratory method detection limit.
na = not analyzed.
* Concentrations shown for B-101 through B-115 are total TPH by GC/FID results.

Statistical Summary
Area 1 - Unpaved Lot Behind Fomer Connolly's Tavern
Surficial Soil (0 to 3 feet)
BRA PARCEL P-3

Parameter	Units	No. of Samples	No. of Detects	Maximum Concentration	Average Concentration	Standard Deviation	Upper 95th Confidence Limit	Upper 95th Percentile Concentrations	
								Site	CA/T
EPH Parameters									
C_9-C_{18} Aliphatics	mg/kg								
C_{19}-C_{36} Aliphatics	mg/kg								
C_{11}-C_{22} Aliphatics*	mg/kg	19	18	500	256	148	67	323	-
PAHs									
2-Methylnaphthalene	mg/kg	19	8	0.82	0.2	0.2	0.1	0.3	2.2
Acenaphthene	mg/kg	19	18	1.9	0.7	0.5	0.2	0.9	4.1
Acenaphthylene	mg/kg	19	10	0.67	0.2	0.2	0.1	0.3	1.9
Anthracene	mg/kg	19	19	3.9	1.5	1.2	0.5	2.0	10
Benzo[a]anthracene	mg/kg	19	19	9.4	3.6	2.6	1.2	4.8	19
Benzo[a]pyrene	mg/kg	19	19	8.7	3.4	2.5	1.1	4.5	17
Benzo[b]fluoranthene	mg/kg	19	19	12	3.3	3.0	1.4	4.6	18
Benzo[g,h,i]perylene	mg/kg	19	18	6.1	1.8	1.8	0.8	2.6	7.7
Benzo[k]fluoranthene	mg/kg	19	19	5.5	2.3	1.6	0.7	3.0	9.7
Chrysene	mg/kg	19	19	9.1	3.6	2.6	1.2	4.8	18
Dibenzo[a,h]anthracene	mg/kg	19	17	2	0.6	0.5	0.2	0.8	2.1
Fluoranthene	mg/kg	19	19	20	7.8	5.3	2.4	10.2	33
Fluorene	mg/kg	19	18	1.9	0.7	0.5	0.2	0.9	5.5
Indeno[1,2,3-ed]pyrene	mg/kg	19	18	7	1.7	1.7	0.8	2.5	7
Naphthalene	mg/kg	19	14	1.6	0.3	0.4	0.2	0.5	3
Phenanthrene	mg/kg	19	19	18	6.7	5.0	2.2	9.0	38
Pyrene	mg/kg	19	19	16	6.9	4.5	2.0	8.9	35
Metals									
Arsenic, Total	mg/kg	2	2	7.8	6.6	1.7	2.4	9	21
Cadmium, Total	mg/kg	2	2	2.4	2.2	0.3	0.4	3	5
Chromium, Total	mg/kg	2	2	38	29.5	12.0	16.7	46	50
Lead, Total	mg/kg	19	19	940	281	178.5	80.3	361	1,100
Mercury, Total	mg/kg	2	2	0.321	0.3	0.1	0.1	0.4	2.6

Notes:
CA/T Background Concentrations souree: *"Backgound Soil Contaminant Assessment"*, CDM, April 1996.

Parameter	Units	B-101 4.5-6.5	B-102 4-6	B-103 4-6	B-104 4-6	B-109 7-9	B-110 7-9	B-111 7-9	B-112 7-9	B-113 7-9	B-114 7-9	B-115 7-9	B-201 10-12	WS-12/ TP-1 11.5 - 12
EPH Parameters														
C_9-C_{18} Aliphatics	mg/kg													
C_{19}-C_{36} Aliphatics	mg/kg													
C_{11}-C_{22} Aliphatics	mg/kg	350	380	270	240	700	110	1,300	970	730	450	2,400	290	8,400
PAHs														
2-Methylnaphthalene	mg/kg	0.3	0.2	0.1	0.03	0.2	*0.15*	*0.15*	4.1	0.8	1.6	0.2	1.3	23
Acenaphthene	mg/kg	0.6	0.4	0.5	0.1	0.4	0.5	1.0	20.0	2.6	4.4	0.5	6.3	3.4
Acenaphthylene	mg/kg	0.2	0.1	*0.03*	0.04	0.1	*0.15*	*0.15*	0.8	0.4	0.7	0.2	0.8	0.8
Anthracene	mg/kg	1.3	0.9	0.8	0.4	1.0	1.2	1.7	0.6	4.9	8.8	1.2	8.9	2.7
Benzo[a]anthracene	mg/kg	2.8	1.9	1.8	0.9	1.9	2.5	4.0	39.0	9.5	15	2.7	17	2
Benzo[a]pyrene	mg/kg	2.6	1.8	1.7	0.9	2.0	2.5	3.7	35.0	8.7	14	2.6	14	1.4
Benzo[b]fluoranthene	mg/kg	1.7	1.2	1.2	1.0	1.8	2.5	2.7	29.0	7.6	11	2.0	19	1.2
Benzo[g,h,i]perylene	mg/kg	2.2	1.4	1.0	0.2	0.6	0.5	3.0	6.4	1.8	10	0.7	7.8	*0.18*
Benzo[k]fluoranthene	mg/kg	1.9	1.3	1.3	1.0	1.8	2.7	3.0	29.0	8.5	10	2.3	5.5	1.3
Chrysene	mg/kg	2.9	1.9	1.8	0.8	2.0	2.7	4.2	40.0	10.0	15	3.1	16	1.7
Dibenzo[a,h]anthracene	mg/kg	0.8	0.5	0.4	0.1	0.3	*0.15*	0.9	3.0	0.9	3.5	0.3	2.6	*0.18*
Fluoranthene	mg/kg	5.7	5.6	5.2	2.0	5.6	5.3	9.3	96.0	21.0	36	6.2	41	4
Fluorene	mg/kg	6.4	0.4	0.4	0.2	0.4	0.6	0.9	17.0	2.1	4.4	0.5	4.9	3.9
Indeno[1,2,3-cd]pyrene	mg/kg	1.8	1.3	1.0	0.2	0.6	0.6	2.5	7.2	2.1	8.9	0.7	9.5	*0.18*
Naphthalene	mg/kg	0.3	0.3	0.2	0.1	0.3	*0.15*	0.5	14.0	1.6	3	0.3	2.8	1
Phenanthrene	mg/kg	5.4	4.6	4.6	1.2	4.9	5.0	8.1	110.0	20.0	36	4.8	37	11
Pyrene	mg/kg	5.8	4.3	4.2	1.9	5.4	6.6	8.2	80.0	20.0	30	5.7	31	4.1
Metals														
Arsenic, Total	mg/kg	na	na	na	na	na	na	6	na	na	na	na	na	4
Cadmium, Total	mg/kg	na	na	na	na	na	na	3.6	na	na	na	na	na	*1.7*
Chromium, Total	mg/kg	na	na	na	na	na	na	23	na	na	na	na	na	27
Lead, Total	mg/kg	360	150	110	270	280	670	1,400	5,000	340	470	1,200	620	120
Mercury, Total	mg/kg	na	na	na	na	na	na	0.36	na	na	na	na	na	*0.01*

Notes:

CA/T Background Concentrations source: *"Backgound Soil Contaminant Assessment"*, CDM

Italics = one-half the lahoratory method detection limit.

na = not analyzed.

Bold indicates concentration exceeds CA/T Background Concentration

Statistical Summary
Area 1 - Unpaved Lot Behind Fomer Connolly's Tavern
Subsurface Soil (4 to 15 feet)
BRA PARCEL P-3

Parameter	Units	No. of Samples	No. of Detects	50th Percentile Mean	Standard Deviation	Upper 95th Confidence Limit	95th Percentile Mean	CA/T 95th Percentile Mean	Method 1 Standards S1/GW-3**
C_9-C_{18} Aliphatics	mg/kg								
C_{19}-C_{36} Aliphatics	mg/kg								
C_{11}-C_{22} Aliphatics	mg/kg	32	31	1,038	1,819	630	1,668	-	800
PAHs									
2-Methylnaphthalene	mg/kg	32	22	1.2	4.1	1.4	2.6	2.2	500
Acenaphthene	mg/kg	32	27	1.8	3.9	1.3	3.2	4.1	1,000
Acenaphthylene	mg/kg	32	18	0.2	0.3	0.1	0.3	1.9	100
Anthracene	mg/kg	32	28	2.2	2.9	1.0	3.2	10	1,000
Benzo[a]anthracene	mg/kg	32	28	5.4	8.3	2.9	8.3	19	0.7
Benzo[a]pyrene	mg/kg	32	28	5.0	7.5	2.6	7.6	17	0.7
Benzo[b]fluoranthene	mg/kg	32	28	4.2	6.6	2.3	6.5	18	0.7
Benzo[g,h,i]perylene	mg/kg	32	27	2.1	3.4	1.2	3.3	7.7	1,000
Benzo[k]fluoranthene	mg/kg	32	28	3.9	6.1	2.1	6.0	9.7	7
Chrysene	mg/kg	32	28	5.5	8.4	2.9	8.4	18	7
Dibenzo[a,h]anthracene	mg/kg	32	25	0.8	1.2	0.4	1.2	2.1	0.7
Fluoranthene	mg/kg	32	29	13.1	20.4	7.1	20.2	33	1,000
Fluorene	mg/kg	32	26	1.8	3.3	1.1	2.9	5.5	1,000
Indeno[1,2,3-cd]pyrene	mg/kg	32	27	2.1	3.3	1.2	3.3	7	1
Naphthalene	mg/kg	32	25	1.1	2.6	0.9	1.9	3	100
Phenanthrene	mg/kg	32	29	12.5	21.3	7.4	19.9	38	100
Pyrene	mg/kg	32	29	11.0	16.3	5.6	16.6	35	700
Metals									
Arsenic, Total	mg/kg	4	4	5.3	-	-	-	-	30
Cadmium, Total	mg/kg	4	2	2.0	-	-	-	-	30
Chromium, Total	mg/kg	4	4	23.8	7.1	7.0	31	50	1,000
Lead, Total	mg/kg	32	28	525.0	908.4	314.7	840	1,100	300
Mercury, Total	mg/kg	2	4	0.5	-	-	-	-	20

G:\Hazwaste\Risk Assessments\BRA\P-3 Parcel\Risk Assessment\[Area 1 soil.xls]Subsurface soil statistics]Subsurface soil statistics

Notes:
CA/T Background Concentrations source: *"Backgound Soil Contaminant Assessment"*, CDM, April 1996.

Soil Data and Statistical Summary
TPH and PAH Concentrations
AREA 2 - Paved Area Behind WSHC
0 to 15 feet depth
BRA PARCEL P-3

Parameters	Units	AREA 2					
		B-116	B-117	B-202(S)	B-203(S)	B-204(S)	WS-4
		1-3	1-3	5-7'	5-7'	5-7'	10-12
TPH							
Eq. C11 -C22 Aromatics	mg/kg	110	110	520	110	*30.5*	*115*
PAHs							
2-Methylnaphthalene	mg/kg	0.2	0.3	2.6	0.57	*0.155*	-
Acenaphthylene	mg/kg	0.8	1.2	5.0	1.2	*0.155*	-
Acenaphthene	mg/kg	0.2	0.3	1.3	*0.145*	*0.155*	-
Anthracene	mg/kg	1.5	2.6	11	2.1	0.50	-
Benzo[a]anthracene	mg/kg	3.3	5.1	19	4.0	1.0	-
Benzo[a]pryene	mg/kg	3.1	4.5	15	3.7	0.90	-
Benzo[b]fluoranthene	mg/kg	2.4	3.0	17	4.3	1.1	-
Benzo[g,h,i]perylene	mg/kg	0.7	0.9	8.4	2.3	0.55	-
Benzo[k]fluoranthene	mg/kg	2.7	3.7	5.9	1.5	0.34	-
Chrysene	mg/kg	3.5	5.2	18	3.8	0.99	-
Dibenzo[a,h]anthracene	mg/kg	0.3	0.5	2.6	0.62	*0.155*	-
Fluoranthene	mg/kg	7.6	11.0	41	9.6	2.3	-
Fluorene	mg/kg	0.8	1.3	5.0	1.0	*0.155*	-
Indeno[1,2,3-cd]pyrene	mg/kg	0.8	1.0	9.2	2.6	0.59	-
Naphthalene	mg/kg	0.4	0.4	4.0	0.74	*0.155*	-
Phenanthrene	mg/kg	7.2	11.0	48	9.7	2.1	-
Pyrene	mg/kg	7.3	9.9	40	8.2	2.0	-

NOTES: G:\Hazwaste\Risk Assessments\BRA\P-3 Parcel\Risk Assessment\[Area 2 soil.XLS]Data summary

mg/kg = milligrams per kilogram (parts per million)

Bold = Exceeds applicable Method 1 Cleanup Standard

Bold/Shade = Exceeds applicable Method 1 Cleanup Standard and CA/T background concentrations

Italics = one-half MDL

Equivalent C11-C22 aromatics analyzed by TPH Method 8100M.

Statistical Summary
TPH and PAH Concentrations
AREA 2 - Paved Area Behind WSHC
0 to 15 feet depth
BRA PARCEL P-3

Parameters	Units	No of Samples	No. of Detects	Maximum Concentration	Average Concentration	Standard Deviation	Upper 95th Confidence Limit	Upper 95th Percentile Concentrations	
								Site	CA/T
TPH									
Eq. C11 -C22 Aromatics	mg/kg	6	4	520	166	176	141	307	-
PAHs									
2-Methylnaphthalene	mg/kg	5	4	3	0.8	1.0	0.9	1.7	2.2
Acenaphthylene	mg/kg	5	4	5	1.7	1.9	1.7	3.3	4.1
Acenaphthene	mg/kg	5	3	1	0.4	0.5	0.4	0.8	1.9
Anthracene	mg/kg	5	5	11	3.5	4.2	3.7	7.3	10
Benzo[a]anthracene	mg/kg	5	5	19	6.5	7.2	6.3	12.8	19
Benzo[a]pryene	mg/kg	5	5	15	5.4	5.5	4.8	10.3	17
Benzo[b]fluoranthene	mg/kg	5	5	17	5.6	6.5	5.7	11.3	18
Benzo[g,h,i]perylene	mg/kg	5	5	8	2.6	3.3	2.9	5.5	7.7
Benzo[k]fluoranthene	mg/kg	5	5	6	2.8	2.1	1.9	4.7	9.7
Chrysene	mg/kg	5	5	18	6.3	6.7	5.9	12.2	18
Dibenzo[a,h]anthracene	mg/kg	5	4	3	0.8	1.0	0.9	1.7	2.1
Fluoranthene	mg/kg	5	5	41	14.3	15.3	13.4	27.7	33
Fluorene	mg/kg	5	4	5	1.6	1.9	1.7	3.3	5.5
Indeno[1,2,3-cd]pyrene	mg/kg	5	5	9	2.8	3.6	3.2	6.0	7
Naphthalene	mg/kg	5	4	4	1.1	1.6	1.4	2.6	3
Phenanthrene	mg/kg	5	5	48	15.6	18.4	16.2	31.8	38
Pyrene	mg/kg	5	5	40	13.5	15.1	13.2	26.7	35

G:\Hazwaste\Risk Assessments\BRA\P-3 Parcel\Risk Assessment\[Area 2 soil.XLS]Stat summary

NOTES:

mg/kg = milligrams per kilogram (parts per million)

Bold = Exceeds applicable Method 1 Cleanup Standard

Bold/Shade = Exceeds applicable Method 1 Cleanup Standard and CA/T background concentrations

Italics = one-half MDL

Equivalent C11-C22 aromatics analyzed by TPH Method 8100M.

SOIL SAMPLING RESULTS
BRA PARCEL P-3
AREA 2 - Lead Concentrations

Parameters	Units	Area 2									No. Samples	No. Detects	Mean	Standard Deviation	95th Confidence Limit	Upper 95th Mean	Urban Background CA/T
		B-116	B-117	B-203(S)	B-204(S)	B-208	B-209	B-209	B-210	B-212							
		1-3	1-3	5-7'	5-7'	5-7'	6-8'	10-12'	5-7'	5-7'							
Total	mg/kg	300	270	460	230	230	33	55	250	33	9	8	229	135.9	88.8	317	1,100
TCLP	mg/l	-	-	-	-	-	-	-	<1.0	-							

OTES:

TCLP = Toxicity Characteristic Leaching Procedure
mg/kg = milligrams per kilogram (parts per million)
Bold/Shade = Exceeds applicable Method 1 Cleanup Standard and UCL
* = Method 1 S-3/GW-3 soil standard
**= RCRA Hazardous Waste Limit
- = not analyzed

Soil Data and Statistical Summary
Area 3 - Western Portion
0 to 15 feet depth
BRA PARCEL P-3

Parameters	Units	Area 3						No. of Samples	No. of Detects	Maximum Concentration	CA/T 95th Percentile Mean
		WS-5	WS-6	WS-7	B-205(S)	B-206(S)	B-207(S)				
		10-12'	10-12'	10-12'	3-5'	3-5'	3-5'				
VOCs by Method 8260	mg/kg	*0.0135*	*0.012*	*0.0135*	na	na	na	3	0	*0.0135*	-
TPH by Method 8100	mg/kg	*55*	*45*	*50*	*25*	*55*	*28*	6	0	*55*	-
PAHs											
2-Methylnaphthalene	mg/kg	na	na	na	*0.125*	*0.28*	*0.14*	3	3	0.3	2.2
Acenaphthylene	mg/kg	na	na	na	*0.125*	*0.28*	*0.14*	3	3	0.3	4.1
Acenaphthene	mg/kg	na	na	na	*0.125*	*0.28*	*0.14*	3	3	0.3	1.9
Anthracene	mg/kg	na	na	na	*0.125*	*0.28*	0.46	3	1	0.5	10
Benzo[a]anthracene	mg/kg	na	na	na	*0.125*	1.4	1.1	3	2	1.4	19
Benzo[a]pyrene	mg/kg	na	na	na	*0.125*	1.3	0.94	3	2	1.3	17
Benzo[b]fluoranthene	mg/kg	na	na	na	*0.125*	1.7	1.3	3	2	1.7	18
Benzo[g,h,i]perylene	mg/kg	na	na	na	*0.125*	0.83	0.58	3	2	0.8	7.7
Benzo[k]fluoranthene	mg/kg	na	na	na	*0.125*	*0.28*	0.33	3	1	0.3	9.7
Chrysene	mg/kg	na	na	na	*0.125*	1.4	1.0	3	2	1.4	18
Dibenzo[a,h]anthracene	mg/kg	na	na	na	*0.125*	*0.28*	*0.14*	3	0	*0.3*	2.1
Fluoranthene	mg/kg	na	na	na	*0.125*	2.7	2.3	3	2	2.7	33
Fluorene	mg/kg	na	na	na	*0.125*	*0.28*	*0.14*	3	0	*0.3*	5.5
Indeno[1,2,3-cd]pyrene	mg/kg	na	na	na	*0.125*	0.97	0.62	3	2	1.0	7
Naphthalene	mg/kg	na	na	na	*0.125*	*0.28*	*0.14*	3	0	*0.3*	3
Phenanthrene	mg/kg	na	na	na	*0.125*	1.6	1.9	3	2	1.9	38
Pyrene	mg/kg	na	na	na	*0.125*	2.6	2.1	3	2	2.6	35
Metals											
Lead, Total	mg/kg	na	na	na	10	98	220	3	3	220	1,100

G:\Hazwaste\Risk Assessments\BRA\P-3 Parcel\Risk Assessment\[Area 3 soil.XLS]Shallow and deep

Notes:
CA/T Background Concentrations source: *"Backgound Soil Contaminant Assessment"*, CDM, April 1996.
Italics = one-half method detection limit
na = not analyzed.

INPUT DATA TABLE

OIL OR HAZARDOUS MATERIAL	note	CAS NUMBER	Exposure Point Concentration ‡ SOIL mg/kg	Exposure Point Concentration ‡ DRINKING WATER ug/liter	Exposure Point Concentration ‡ INDOOR AIR ug/cu m
BENZENE	(1)	71432			
ETHYLBENZENE	(1)	100414			
TOLUENE	(1)	108883			
XYLENES	(1)	1330207			
ACENAPHTHENE	(2)	83329			Less likely to be found in air
2-METHYLNAPHTHALENE	(2)	91576			
NAPHTHALENE	(2)	91203			
PHENANTHRENE	(2)	85018			Less likely to be found in air
TOTAL PETROLEUM HYDROCARBON	(4)	generic			
ALIPHATIC HYDROCARBONS					
C5 - C8 Aliphatic	(3)	VPH			
C9 - C12 Aliphatic	(3)	VPH			
C9 - C18 Aliphatic		EPH			
C19 - C36 Aliphatic		EPH			Less likely to be found in air
AROMATIC HYDROCARBONS					
C9 - C10 Aromatic	(3)	VPH			
C11 - C22 Aromatic		EPH	1,968		

METHOD 3 ASSESSMENTS MUST CONSIDER SAFETY, PUBLIC WELFARE AND THE ENVIRONMENT SEPARATELY.

See "Characterizing Risks Posed by Petroleum Contaminated Sites: Implementation of MADEP VPH/EPH Approach" for additional detail and caveats about notes 1 through 4.

(1) BTEX compounds are Target Analytes in shallow groundwater or sensitive (GW-1) areas.
(2) Test for PAHs in soil if TPH > 500 µg/g. Test for PAHs in groundwater if near drinking water supplies.
(3) Test for VPH fractions in FRESH Diesel/#2 Fuel releases only.
(4) TPH by an appropriate analytical method. Cannot be used in combination with fraction-specific concentrations.
‡ Concentrations in Soil, Groundwater or Air which are demonstrated to be less than typical background levels may be excluded from this evaluation. See Section 2.3 of *Guidance for Disposal Site Risk Characterization* (July 1995).

Additional Notes for the Data Entry Table:

1. The User should check to determine whether the Exposure Point Concentration identified for a chemical or fraction is less than or equal to background levels. The MADEP Guidance for Disposal Site Risk Characterization will provide soil background levels for PAHs in urban soil when current draft guidance is final. The Residential ShortForm (1992) provides indoor air "background" levels for some VOCs. Site specific soil, air and groundwater background levels may also be employed.

2. The calculated Exposure Point Concentrations should be consistent with the guidance provided in Section 5.8 of the Guidance for Disposal Site Risk Characterization.

SUMMARY TABLE - SOILS

OIL OR HAZARDOUS MATERIAL	Exposure Point Concentration SOIL mg/kg	SUBCHRONIC HAZARD INDEX SOIL INGESTION & DERMAL	CHRONIC HAZARD INDEX SOIL INGESTION & DERMAL	ELCR SOIL INGEST & DERMAL
BENZENE				
ETHYLBENZENE				
TOLUENE				
XYLENES				
ACENAPHTHENE				
2-METHYLNAPHTHALENE				
NAPHTHALENE				
PHENANTHRENE				
TOTAL PETROLEUM HYDROCARBON				
ALIPHATIC HYDROCARBONS				
C5 - C8 Aliphatic				
C9 - C12 Aliphatic				
C9 - C18 Aliphatic				
C19 - C36 Aliphatic				
AROMATIC HYDROCARBONS				
C9 - C10 Aromatic				
C11 - C22 Aromatic	1.97E+03	5.6E-02	4.9E-01	
TOTALS:		**5.6E-02**	**4.9E-01**	

METHOD 3 ASSESSMENTS MUST CONSIDER SAFETY, PUBLIC WELFARE AND THE ENVIRONMENT SEPARATELY.

EQUATIONS:

Subhronic Hazard Index: (EPC/RfD) x ((3.4 x RAForal) + (30.6 x RAFdermal))/1,000,000

Chronic Hazard Index: (EPC/RfD) x ((2.51 x RAForal) + (28.5 x RAFdermal))/1,000,000

Excess Lifetime Cancer Risk: (EPC x ((0.37 x RAForal) + (7.3 x RAFdermal)) x CSF / 1,000,000

Where:

EPC = Exposure Point Concentration, column B
RfD = Reference Dose, subchronic (Toxicity sheet column B) or chronic (Toxicity sheet column D)
RAF = Relative Absorption Factor, oral or dermal (Toxicity sheet columns R through W)
CSF = Cancer Slope Factor (Toxicity sheet column J)
3.4 = Normalized Average Daily Soil Intake Rate, subchronic, threshold effects
30.6 = Normalized Average Daily Soil/Skin Contact Rate, subchronic, threshold effects
2.51 = Normalized Average Daily Soil Intake Rate, chronic, threshold effects
28.5 = Normalized Average Daily Soil/Skin Contact Rate, chronic, threshold effects
0.37 = Normalized Lifetime Average Daily Soil Intake Rate, nonthreshold effects
7.3 = Normalized Lifetime Average Daily Soil/Skin Contact Rate, nonthreshold effects
1,000,000 = Conversion Factor, mg/kg

SUMMARY TABLE - HOMEGROWN VEGETABLES

OIL OR HAZARDOUS MATERIAL	Exposure Point Concentration SOIL mg/kg	SUBCHRONIC HI VEGETABLE INGESTION	CHRONIC HI VEGETABLE INGESTION	ELCR VEGETABLE INGESTION
BENZENE				
ETHYLBENZENE				
TOLUENE				
XYLENES				
ACENAPHTHENE				
2-METHYLNAPHTHALENE				
NAPHTHALENE				
PHENANTHRENE				
TOTAL PETROLEUM HYDROCARBON				
ALIPHATIC HYDROCARBONS				
C5 - C8 Aliphatic				
C9 - C12 Aliphatic				
C9 - C18 Aliphatic				
C19 - C36 Aliphatic				
AROMATIC HYDROCARBONS				
C9 - C10 Aromatic				
C11 - C22 Aromatic	1.97E+03	2.3E-01	2.0E+00	
TOTALS:		**2.3E-01**	**2.0E+00**	

SUMMARY TABLE - CUMULATIVE RECEPTOR RISK
RESIDENTIAL SCENARIO

EXPOSURE MEDIUM	EXPOSURE ROUTES		SUBCHRONIC HAZARD INDEX	CHRONIC HAZARD INDEX	EXCESS LIFETIME CANCER RISK
SOIL	INGESTION DERMAL	\ /	5.6E-02	4.9E-01	
DRINKING WATER	INGESTION DERMAL INHALATION	\ > /			
VEGETABLES HOMEGROWN	INGESTION	>	2.3E-01	2.0E+00	
INDOOR AIR	INHALATION	>			
TOTAL:			**2.9E-01**	**2.5E+00**	

METHOD 3 ASSESSMENTS MUST CONSIDER SAFETY, PUBLIC WELFARE AND THE ENVIRONMENT SEPARATELY.

APPENDIX G

BWSC Form 108
Public Notification Letters
Remedial Action Plan Legal Notice

Massachusetts Department of Environmental Protection **BWSC-108**
Bureau of Waste Site Cleanup

COMPREHENSIVE RESPONSE ACTION TRANSMITTAL FORM & PHASE I COMPLETION STATEMENT

Pursuant to 310 CMR 40.0484 (Subpart D) and 40.0800 (Subpart H)

Release Tracking 3 - 15009

A. SITE LOCATION:

Site Name: (optional) Parcel P-3

Street: Tremont and Whittier Street Location Aid: UTMs: 4688700mN, 327800mE

City/Town: Boston (Roxbury) ZIP 02120-0000

Related Release Tracking Numbers that this Form Addresses:

Tier Classification: (check one of the following) ☐ Tier IA ☐ Tier IB ☐ Tier IC ☑ Tier II ☐ Not Tier Classified

If a Tier I Permit has been issued, state the Permit

B. THIS FORM IS BEING USED TO: (check all that apply)

RECEIVED
APR 19 2002
DEP
NORTHEAST REGIONAL OFFICE

☐ Submit a **Phase I Completion Statement**, pursuant to 310 CMR 40.0484 (complete Sections A, B, [illegible]).

☐ Submit a **Phase II Scope of Work**, pursuant to 310 CMR 40.0834 (complete Sections A, B, C, G, H, I and J).

☑ Submit a final **Phase II Comprehensive Site Report and Completion Statement**, pursuant to 310 CMR 40.0836 (complete Sections A, B, C, D, G, H, I and J).

☑ Submit a **Phase III Remedial Action Plan and Completion Statement**, pursuant to 310 CMR 40.0862 (complete Sections A, B, C, [illegible] and J).

☐ Submit a **Phase IV Remedy Implementation Plan**, pursuant to 310 CMR 40.0874 (complete Sections A, B, C, G, H, I and J).

☐ Submit an **As-Built Construction Report**, pursuant to 310 CMR 40.0875 (complete Sections A, B, C, G, H, I and J).

☐ Submit a **Phase IV Final Inspection Report and Completion Statement**, pursuant to 310 CMR 40.0878 and 40.0879 (complete Sections A, B, C, E, G, H, I and J).

☐ Submit a periodic **Phase V Inspection & Monitoring Report**, pursuant to 310 CMR 40.0892 (complete Sections A, B, C, G, H, I and J).

☐ Submit a final **Phase V Inspection & Monitoring Report and Completion Statement**, pursuant to 310 CMR 40.0893 (complete Sections A, B, C, F, G, H, I and J).

You must attach all supporting documentation required for each use of form indicated, including copies of any Legal Notices and Notices to Public Officials required by 310 CMR 40.1400.

C. RESPONSE ACTIONS:

☐ Check here if any response action(s) that serves as the basis for the Phase submittal(s) involves the use of Innovative Technologies. (DEP is interested in using this information to create an Innovative Technologies Clearinghouse.)

Describe

D. PHASE II COMPLETION STATEMENT:

Specify the outcome of the Phase II Comprehensive Site Assessment:

☑ Additional Comprehensive Response Actions are necessary at this Site, based on the results of the Phase II Comprehensive Site Assessment

☐ The requirements of a Class A Response Action Outcome have been met and a completed Response Action Outcome Statement (BWSC-104) will be submitted to DEP.

☐ The requirements of a Class B Response Action Outcome have been met and a completed Response Action Outcome Statement (BWSC-104) will be submitted to DEP.

☐ Rescoring of this Site using the Numerical Ranking System is necessary, based on the results of the final Phase II Report.

E. PHASE IV COMPLETION STATEMENT:

Specify the outcome of Phase IV activities:

☐ Phase V operation, maintenance or monitoring of the Comprehensive Response Action is necessary to achieve a Response Action Outcome.
(This site will be subject to a Phase V Operation, Maintenance and Monitoring Annual Compliance Fee.)

☐ The requirements of a Class A Response Action Outcome have been met. No additional operation, maintenance or monitoring is necessary to ensure the integrity of the Response Action Outcome. A completed Response Action Outcome Statement (BWSC-104) will be submitted to DEP.

☐ The requirements of a Class C Response Action Outcome have been met. No additional operation, maintenance or monitoring is necessary to ensure the integrity of the Response Action Outcome. A completed Response Action Outcome Statement (BWSC-104) will be submitted to DEP.

SECTION E IS CONTINUED ON THE NEXT PAGE

COMPREHENSIVE RESPONSE ACTION TRANSMITTAL FORM & PHASE I COMPLETION STATEMENT

Pursuant to 310 CMR 40.0484 (Subpart D) and 40.0800 (Subpart H)

Release Tracking 3 - 15009

E. PHASE IV COMPLETION STATEMENT: (continued)

☐ The requirements of a Class C Response Action Outcome have been met. Further operation, maintenance or monitoring of the remedial action is necessary to ensure that conditions are maintained and that further progress is made toward a Permanent Solution. A completed Response Action Outcome Statement (BWSC-104) will be submitted to DEP.

Indicate whether the operation and maintenance will be Active or Passive. (Active Operation and Maintenance is defined at 310 CMR

◯ Active Operation and Maintenance ◯ Passive Operation and Maintenance

(Active Operation and Maintenance makes the Site subject to a Post-RAO Class C Active Operation and Maintenance Annual Compliance Fee.)

F. PHASE V COMPLETION STATEMENT:

Specify the outcome of Phase V activities:

☐ The requirements of a Class A Response Action Outcome have been met and a completed Response Action Outcome Statement (BWSC-104) will be submitted to DEP.

☐ The requirements of a Class C Response Action Outcome have been met. No additional operation, maintenance or monitoring is necessary to ensure the integrity of the Response Action Outcome. A completed Response Action Outcome Statement (BWSC-104) will be submitted to DEP.

☐ The requirements of a Class C Response Action Outcome have been met. Further operation, maintenance or monitoring of the remedial action is necessary to ensure that conditions are maintained and that further progress is made toward a Permanent Solution. A completed Response Action Outcome Statement (BWSC-104) will be submitted to DEP.

Indicate whether the operation and maintenance will be Active or Passive. (Active Operation and Maintenance is defined at 310 CMR

◯ Active Operation and Maintenance ◯ Passive Operation and Maintenance

(Active Operation and Maintenance makes the Site subject to a Post-RAO Class C Active Operation and Maintenance Annual Compliance

G. LSP OPINION:

I attest under the pains and penalties of perjury that I have personally examined and am familiar with the information contained in this transmittal form, including any and all documents accompanying this submittal. In my professional opinion and judgment based upon application of (i) the standard of care in 309 CMR 4.02(1), (ii) the applicable provisions of 309 CMR 4.02(2) and (3), and (iii) the provisions of 309 CMR 4.03(5), to the best of my knowledge, information and belief,

> *if Section B indicates that a **Phase I, Phase II, Phase III, Phase IV or Phase V Completion Statement** is being submitted*, the response action(s) that is (are) the subject of this submittal (i) has (have) been developed and implemented in accordance with the applicable provisions of M.G.L. c. 21E and 310 CMR 40.0000, (ii) is (are) appropriate and reasonable to accomplish the purposes of such response action(s) as set forth in the applicable provisions of M.G.L. c. 21E and 310 CMR 40.0000, and (iii) complies(y) with the identified provisions of all orders, permits, and approvals identified in this submittal;

> *if Section B indicates that a **Phase II Scope of Work** or a **Phase IV Remedy Implementation Plan** is being submitted*, the response action(s) that is (are) the subject of this submittal (i) has (have) been developed in accordance with the applicable provisions of M.G.L. c. 21E and 310 CMR 40.0000, (ii) is (are) appropriate and reasonable to accomplish the purposes of such response action(s) as set forth in the applicable provisions of M.G.L. c. 21E and 310 CMR 40.0000, and (iii) complies(y) with the identified provisions of all orders, permits, and approvals identified in this submittal;

> *if Section B indicates that an **As-Built Construction Report** or a **Phase V Inspection and Monitoring Report** is being submitted*, the response action(s) that is (are) the subject of this submittal (i) is (are) being implemented in accordance with the applicable provisions of M.G.L. c. 21E and 310 CMR 40.0000, (ii) is (are) appropriate and reasonable to accomplish the purposes of such response action(s) as set forth in the applicable provisions of M.G.L. c. 21E and 310 CMR 40.0000, and (iii) complies(y) with the identified provisions of all orders, permits, and approvals identified in this submittal.

I am aware that significant penalties may result, including, but not limited to, possible fines and imprisonment, if I submit information which I know to be false, inaccurate or materially incomplete.

☐ Check here if the Response Action(s) on which this opinion is based, if any, are (were) subject to any order(s), permit(s) and/or approval(s) issued by DEP or EPA. If the box is checked, you MUST attach a statement identifying the applicable provisions thereof.

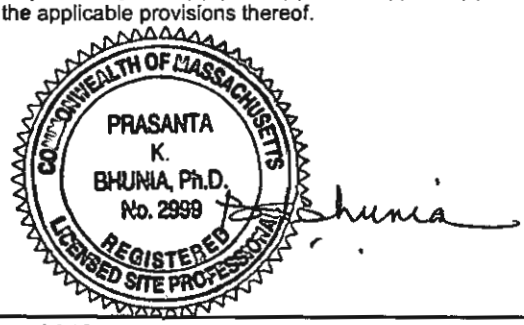
LSP Name: Prasanta K. Bhunia LSP #: 2999 Stamp:

Telephone: 978-532-1900 Ext.: 2287

FAX: (optional) 978-977-0100

Signature: P K Bhunia

Date: 4/19/02



Massachusetts Department of Environmental Protection **BWSC-108**
Bureau of Waste Site Cleanup

COMPREHENSIVE RESPONSE ACTION TRANSMITTAL FORM & PHASE I COMPLETION STATEMENT

Pursuant to 310 CMR 40.0484 (Subpart D) and 40.0800 (Subpart H)

Release Tracking 3 - 15009

H. PERSON UNDERTAKING RESPONSE ACTION(S):

Name of: Boston Redevelopment Authority

Name of: Noah Luskin Title: Senior Project Manager

* Acting on behalf of the Authority not as an individual.

Street: 1 City Hall Plaza

City/Town: Boston State: MA ZIP Code: 02201-1007

Telephone: 617-722-4300 Ext.: _____ FAX: 617-248-1937

☐ Check here if there has been a change in the person undertaking the Response Action.

I. RELATIONSHIP TO SITE OF PERSON UNDERTAKING RESPONSE ACTION(S): (check one)

☑ RP or PRP Specify: ◉ Owner ○ Operator ○ Generator ○ Transporter Other RP or PRP: _____

☐ Fiduciary, Secured Lender or Municipality with Exempt Status (as defined by M.G.L. c. 21E, s. 2)

☐ Agency or Public Utility on a Right of Way (as defined by M.G.L. c. 21E, s. 5(j))

☐ Any Other Person Undertaking Response Action Specify _____

J. CERTIFICATION OF PERSON UNDERTAKING RESPONSE ACTION(S):

Noah Luskin, attest under the pains and penalties of perjury (i) that I have personally examined and am familiar with the information contained in this submittal, including any and all documents accompanying this transmittal form, (ii) that, based on my inquiry of those individuals immediately responsible for obtaining the information, the material information contained in this submittal is, to the best of my knowledge and belief, true, accurate and complete, and (iii) that I am fully authorized to make this attestation on behalf of the entity legally responsible for this submittal. I/the person or entity on whose behalf this submittal is made am/is aware that there are significant penalties, including, but not limited to, possible fines and imprisonment, for willfully submitting false, inaccurate, or incomplete information.

By: _____ Title: Sr. Project Manager
(signature)

For: Boston Redevelopment Authority Date: 3/29/02
(print name of person or entity recorded in Section H)

Enter address of the person providing certification, if different from address recorded in Section H:

Street: _____

City/Town: _____ State: _____ ZIP Code: _____

Telephone: _____ Ext.: _____ FAX: (optional) _____

YOU MUST COMPLETE ALL RELEVANT SECTIONS OF THIS FORM OR DEP MAY RETURN THE DOCUMENT AS INCOMPLETE. IF YOU SUBMIT AN INCOMPLETE FORM, YOU MAY BE PENALIZED FOR MISSING A REQUIRED DEADLINE.

Weston & Sampson
ENGINEERS, INC.

Weston & Sampson Engineers, Inc.
Five Centennial Drive
Peabody, MA 01960-7985
www.westonandsampson.com
Tel: (978) 532-1900 Fax: (978) 977-0100

Innovative Solutions since 1899

Boston Redevelopment Authority
WSE Project No. 200317.A

April 19, 2002

Mr. John Auerbach
Boston Public Health Commission
Environmental Health Department
1010 Massachusetts Avenue
Boston, Massachusetts 02118

Re: Public Notification of Phase II/III
Comprehensive Site Assessment and Remedial
Action Plan Submittal
Boston Redevelopment Authority, Parcel P-3
Tremont and Whittier Streets, Roxbury, Massachusetts
Release Tracking Number 3-15009

Dear Mr. Auerbach:

Weston & Sampson Engineers, Inc. was contracted by the Boston Redevelopment Authority (BRA) to prepare a Phase II-Comprehensive Site Assessment and Phase III-Remedial Action Plan for the Parcel P-3 property located at Tremont and Whittier Streets (the Site).

The Phase II/III report was prepared in accordance with the Massachusetts Contingency Plan (MCP), 310 CMR 40.0000 and was submitted to the Department of Environmental Protection's Northeast Regional Office (DEP-NERO) in Wilmington, Massachusetts, where it is available for public review. If you have any questions regarding this Site, please contact George Naslas of Weston & Sampson at (978) 532-1900 or Noah Luskin, Senior Project Manager, BRA at (617) 722-4300.

Very truly yours,

WESTON & SAMPSON ENGINEERS, INC.

P. Bhunia

Prasanta K. Bhunia, Ph.D., LSP
Vice President

cc: DEP-NERO, Wilmington, MA
Mark Maloney, Director, BRA, Boston, MA
The Honorable Thomas M. Menino, Mayor, Boston, MA
File

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Boston Redevelopment Authority
WSE Project No. 200317.A

April 19, 2002

The Honorable Thomas M. Menino
Mayor's Office
One Boston City Hall Office
Boston, Massachusetts 02108

Re: Public Notification of Phase II/III
Comprehensive Site Assessment and Remedial
Action Plan Submittal
Boston Redevelopment Authority, Parcel P-3
Tremont and Whittier Streets, Roxbury, Massachusetts
Release Tracking Number 3-15009

Dear Mayor Menino:

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Very truly yours,

WESTON & SAMPSON ENGINEERS, INC.

P. Bhunia

Prasanta K. Bhunia, Ph.D., LSP
Vice President

cc: DEP-NERO, Wilmington, MA
Mark Maloney, Director, BRA, Boston, MA
Mr. John Auerbach, Boston Public Health Commission, Boston, MA
File

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NOTICE OF A REMEDIAL ACTION PLAN

BOSTON REDEVELOPMENT AUTHORITY
PARCEL P-3
TREMONT AND WHITTIER STREETS
ROXBURY, MA
RTN 3-15009

A **Remedial Action Plan** (310 CMR 40.0861) has been developed for the above-referenced site pursuant to the Massachusetts Contingency Plan (310 CMR 40.1406). This disposal site was classified as Tier II on **April 10, 1998**.

The **Remedial Action Plan** proposes the following measures to respond to a release of oil and/or hazardous material at this disposal site:

- Excavation and off-site disposal of the lead-contaminated soil "hot spot".

- Restricting future residential use of a portion of the site using an Activity and Use Limitation (AUL).

M.G.L. c. 21E and the Massachusetts Contingency Plan provide additional opportunities for public notice of and involvement in decisions regarding response actions at disposal sites: 1) The Chief Municipal Official and Board of Health of the community in which the site is located will be notified of major milestones and events, pursuant to 310 CMR 40.1403; and 2) Upon receipt of a petition from ten or more residents of the municipality in which the disposal site is located, or of a municipality potentially affected by the disposal site, a plan for involving the public in decisions regarding response actions at the site will be prepared and implemented, pursuant to 310 CMR 40.1405.

To obtain more information on this disposal site and the opportunities for public involvement during its remediation, please contact **Mr. Noah Luskin, Senior Project Manager, Boston Redevelopment Authority, 1 City Hall Plaza, Boston, MA** at **(617) 722-4300.**

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