INTERIM PHASE II COMPREHENSIVE SITE ASSESSMENT

PARKER STREET WASTE SITE

NEW BEDFORD HIGH SCHOOL AND DR. PAUL F. WALSH MEMORIAL FIELD NEW BEDFORD, MASSACHUSETTS

Release Tracking Number: 4-15685

Prepared for:

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EXECUTIVE SUMMARY

TRC Environmental Corporation (TRC) prepared this Interim Phase II Comprehensive Site Assessment (CSA) Report for the New Bedford High School (NBHS) campus and Walsh Field portions of the former Parker Street Waste Site (the "Site") located along Hathaway Boulevard and Liberty, Parker, Hunter, and Maxfield Streets in New Bedford, Massachusetts for data collected through December 2008. The Site is a portion of a larger disposal site under the Massachusetts Contingency Plan (MCP; 310 CMR 40.0000) that is tracked by the Massachusetts Department of Environmental Protection (MassDEP) under Release Tracking Number (RTN) 4-15685. Response actions at this Site are conducted under a Special Project designation due to logistical complexities.

The NBHS campus and Walsh Field properties, as well as additional properties in the area are impacted by the presence of fill variously contaminated by polychlorinated biphenyls (PCBs), polyaromatic hydrocarbons (PAHs), and heavy metals (including but not limited to arsenic, lead, and cadmium). The fill material appears to be attributable to waste disposal associated with the Parker Street Waste Site (PSWS), formerly located in the vicinity of the NBHS campus.

The investigative work completed at the Site by TRC supplements previous assessment work at the Site conducted by the BETA Group, Incorporated (BETA). The results of TRC's investigative work were evaluated with respect to regulatory requirements under the MCP, and fulfill the data requirements for a Phase II CSA under the MCP (310 CMR 40.0830). TRC analytical data were also obtained consistent with the most recent edition of the MassDEP Compendium of Analytical Methods (CAM).

The disposal site tracked by RTN 4-15685 encompasses an estimated 140-acre area (not yet fully delineated) in the vicinity of NBHS. The area of focus under this Interim Phase II CSA occupies an approximately 59.5-acre area within the Disposal Site and is identified by the City of New Bedford Assessor as the following parcels: map 75 block 12, map 69 block 345, map 70 block 1, map 63 block 92, map 63 block 2, and map 63 block 48. The NBHS portion of the Site is located on the north side of Parker Street between Hathaway Boulevard on the west and Liberty Street on the east. The Walsh Field portion of the Site is located on the south side of Parker Street, to the east of Hunter Street, and to the north of Maxfield Street. The east side of the Walsh Field portion of the Site is bordered by Lindsey Street and a City maintenance yard.

For the purpose of characterizing current risk, the Site is treated as 15 separate exposure areas based on current known uses of those areas. The Walsh Field area was divided into exposure points applicable to the athletic activities that occur at the field as follows:

- WF-1: Football Field
- WF-2: Soccer Field
- WF-3: Practice Area
- WF-4: Junior Varsity Baseball Field
- WF-5: Varsity Baseball Field

The NBHS campus was divided into the following exposure points based on current activities known to be occurring:

- HS-1: Children's Playground Area
- HS-2: Fenced Playing Field Area
- HS-3: Unfenced Playing Field Area
- HS-4: Gym Area
- HS-5: Flag Pole Area
- HS-6: House Area
- HS-7: Student Congregating Area
- HS-8: Junior High School Gym Class Area
- HS-9: Beneath Pavement/Building Areas
- HS-10: Tree Belts Area
- HS-11: Miscellaneous Samples of Unknown Location

Environmental site investigation activities described in this Interim Phase II CSA were conducted by TRC on behalf of the City between July 2008 and December 2008 and build on prior work conducted by a previous consultant.

TRC's environmental investigations consisted of direct push soil borings using track-, truck-, or dolly-mounted drill rigs to sample soil and observe subsurface soil conditions. Surface soil samples were collected using hand tools. Soil sampling was the primary means of identifying and delineating Site contamination under the approved scope of work with the City. In addition, TRC installed and sampled five groundwater monitoring wells at the Site to confirm the absence of significant impact to groundwater noted by the prior consultant.

The investigative approach was intended to evaluate the presence or absence of fill, the horizontal and vertical extent of contamination, and the potential presence of contaminants of concern in soil and fill material based on documentation available to TRC and past sampling in the area. In general, soil borings were advanced and soil samples were collected until native overburden was encountered unless refusal was encountered first. Where native material was submitted for laboratory analysis, two samples of native material from two different depths were typically collected in borings selected to characterize the native horizon. The lower native sample was retained for analysis contingent upon the results of the upper native horizon analysis in an attempt to delineate the vertical extent of contamination exceeding applicable standards, if present, without having to remobilize sampling teams. The contingent native material was not analyzed if the native material interval above it was found to be uncontaminated (below cleanup criteria) based on laboratory analysis or as directed by the TRC LSP. TRC also collected some relatively shallow soil samples to supplement data previously collected by others where shallow soil data gaps were perceived and to support an evaluation of current risk.

All sampling locations were professionally surveyed following TRC's sampling activities.

TRC conducted field screening and logging of soil samples consisting of visual and olfactory observations, jar headspace readings using an appropriately calibrated photoionization detector (PID), and professional judgment, consistent with TRC Standard Operating Procedures (SOPs) and general industry practice.

The following table summarizes soil samples collected by TRC from Walsh Field for laboratory analysis between July and November 2008.

Summary of Investigation Activities – Walsh Field – 2008						
Location	**Soil Borings**	**Number of Soil Samples Submitted for Laboratory Analysis**	**Analyses[1]**			
			PCBs[2]	**PAHs[3]**	**MCP Metals/Hg[4]**	**Arsenic Only**
Walsh Field	102[5]	139	78	78	81	58[6]

Notes:
[1]Does not include quality control (QC) samples.
[2]Polychlorinated biphenyls (PCBs) as Aroclors by SW-846 Method 8082; four samples were additionally submitted for PCB homolog analysis by EPA Method 680.
[3]Polyaromatic hydrocarbons (PAHs) by SW-846 Method 8270C.
[4]Massachusetts Contingency Plan (MCP) Metals/Hg - antimony, arsenic, barium, beryllium, cadmium, chromium, lead, nickel, selenium, silver, thallium, vanadium, zinc and mercury by SW-846 Methods 6010B/7471A.
[5]Including 35 surface soil samples collected manually by TRC personnel; 2 stockpile soil samples; and 1 sample of white line chalk.
[6]Five samples were additionally analyzed for arsenic leachability using the Toxicity Characteristic Leaching Procedure (TCLP) by SW-846 Methods 1311/6010B.

The following table summarizes soil and groundwater samples collected by TRC from New Bedford High School for laboratory analysis between July and December 2008.

Summary of Investigation Activities – New Bedford High School – 2008					
Soil Sampling					
Location	**Soil Borings**	**Number of Soil Samples Submitted for Laboratory Analysis**	**Analyses[1]**		
			PCBs[2]	**PAHs[3]**	**MCP Metals/Hg[4]**
New Bedford High School	140[5]	258	245	158	182
Groundwater Sampling					
Location	**Number of Groundwater Samples Submitted for Laboratory Analysis**		**Analyses[1]**		
			PCBs[2]	**PAHs[3]**	**MCP Metals/Hg[4]**
New Bedford High School	5		5	5	5[6]

Notes:
[1]Does not include quality control (QC) samples.
[2]Polychlorinated biphenyls (PCBs) as Aroclors by SW-846 Method 8082; ten soil samples were additionally submitted for PCB homolog analysis by EPA Method 680.
[3]Polyaromatic hydrocarbons (PAHs) by SW-846 Method 8270C.

[4]Massachusetts Contingency Plan (MCP) Metals/Hg - antimony, arsenic, barium, beryllium, cadmium, chromium, lead, nickel, selenium, silver, thallium, vanadium, zinc and mercury by SW-846 Methods 6010B/7471A/7470A.
[5]Including 41 surface soil samples collected manually by TRC personnel.
[6]Groundwater samples were analyzed for total metals and dissolved (field-filtered) metals.

TRC collected groundwater samples from three monitoring wells (MW-4 through MW-6) on August 19, 2008 and from two monitoring wells (MW-7 and MW-8B) on September 16, 2008. Groundwater samples were collected following EPA Region I low stress (low flow) sampling guidelines. During purging activities, water quality parameters were monitored and water quality parameters were recorded on groundwater sampling log forms. Groundwater samples were collected after water quality parameters had stabilized in accordance with the low flow guidance, or after one hour of purging if parameters did not stabilize. A modification of the low flow guidance was the use of peristaltic pumps to collect the samples.

A Method 2 risk characterization approach was selected to characterize the risk of harm to health, public welfare and safety, and a Stage I environmental screening was used to characterize risk to the environment. A Method 2 approach was applied to this Site for health, public welfare and safety for the following reasons:

- The OHM that have been detected at the Site environmental media are predominately limited to groundwater and soil; and

- Since Method 1 soil cleanup standards do not exist for all the compounds detected at the Site, Method 2 soil cleanup standards have been developed for chemicals lacking Method 1 soil standards using methods and assumptions described in the MCP.

The use of Method 2 to develop MCP Method 1 S-1/GW-2 and S-1/GW-3 soil cleanup standards for dibenzofuran, carbazole, 1,2,3-trichlorobenzene, 4-bromophenyl phenyl ether, 4-methylphenol, alpha-BHC, benzoic acid, endosulfan sulfate, and dinoseb is documented herein.

A Stage I environmental screening was performed to assess risk to the environment because materials with the potential to bioaccumulate (e.g., PCBs and lead) are known to be present within 2 feet of the ground surface. However, there is limited potential for environmental receptors (other than typical urban fauna such as pigeons or rodents) to be present at the Site due to the highly urbanized character of the Site location.

Based on the available information, groundwater categories GW-2 and GW-3 apply to groundwater beneath this Site. In addition, soil categories S-1, S-2 and S-3 currently apply to Site soil. The Method 1 S-1 soil category was also used to evaluate risk in an unrestricted future use scenario and to evaluate the potential need to implement an Activity and Use Limitation (AUL) or conduct additional remediation to achieve an unrestricted use condition.

Based on the results of the Interim Phase II CSA, TRC has developed the following conclusions:

- The Site is underlain by extensive deposits of contaminated fill material associated with historical and undocumented waste management practices associated with the PSWS.

- No Imminent Hazard condition currently exists at the Walsh Field or NBHS campus based on data collected through December 2008.

- Soil EPCs for PAHs, DRO, PCBs, arsenic, barium cadmium, chromium and lead exceed applicable MCP Method 1 S-1/GW-2 and S-1/GW-3 soil cleanup standards for current and future Site conditions. As a result, a Condition of No Significant Risk does not exist for soil contamination at the Site under current and future use scenarios. The applicable contaminants, exposure areas and time frames are summarized below:

  → Current Site Conditions

  - WF-1: lead
  - WF-2: benzo(a)pyrene, cadmium, lead
  - WF-3: cadmium, lead
  - WF-4: arsenic, cadmium, lead
  - WF-5: arsenic, lead
  - WFB-4 hot spot: dibenzofuran, acenaphthylene, carcinogenic PAHs, DRO
  - HS-1: none
  - HS-2: none
  - HS-3: lead
  - HS-4: PCBs, cadmium, lead
  - HS-5: benzo(a)pyrene, dibenz(a,h)anthracene, cadmium, chromium, lead
  - HS-6: benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, indeno(1,2,3-cd)pyrene, PCBs, arsenic, barium, cadmium, chromium, lead
  - HS-7: none
  - HS-8: benzo(a)pyrene, PCBs, cadmium, chromium, lead
  - HS-10: benzo(a)pyrene, PCBs, barium, cadmium, chromium, lead
  - HS-11: benzo(a)pyrene, dibenz(a,h)anthracene, cadmium, lead

  → Future Site Conditions

  - Walsh Field: arsenic, cadmium, lead

  - WFB-4 hot spot: dibenzofuran, acenaphthylene, carcinogenic PAHs, DRO

  - High School: benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, PCBs, cadmium, chromium, lead

  - SB-308 (3.5') hot spot: benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenz(a,h)anthracene, fluoranthene, indeno(1,2,3-cd)pyrene, 2-methylnaphthalene, naphthalene, phenanthrene, pyrene, and lead

- The groundwater EPC for total lead in monitoring well MW-5 also exceeds the MCP Method 1 GW-3 groundwater cleanup standard. However, the dissolved lead result for this well did not exceed the MCP Method 1 GW-3 groundwater cleanup standard. As a result, a Condition of No Significant Risk exists for groundwater contamination at the Site under current and future use scenarios.

- With regard to public welfare, no community in the vicinity of the Site is believed to be currently experiencing, or expected to experience, significant adverse impacts as a result of the degradation of public or private resources directly attributable to the soil and groundwater contamination at the Site. No other non-pecuniary effects are known to be present, or to be accruing, due to soil and groundwater contamination at this Site. Individual concentrations of OHM in groundwater at the Site as measured in 2008 did not exceed MCP UCLs. However, benzo(a)pyrene in hot spot SB-308 soil exceeded the MCP UCL of 300 mg/kg for this contaminant. Based on this information a condition of No Significant Risk to public welfare does not exist at the Site.

- A Stage I Environmental Risk Characterization indicated no significant soil exposure pathways exist at the Site and groundwater data indicate a condition of no significant risk to environmental receptors. Therefore, further ecological investigation at the Walsh Field and NBHS campus portions of the Site is not warranted.

- Remedial actions are required to achieve Site closure.

- Additional assessment is warranted to improve the understanding of the nature and extent of soil contamination and to support remedial planning. Areas for which additional characterization appears warranted include:

    - Additional characterization of the 0 to 1 foot and 1 to 3 foot soil horizons is needed to improve understanding of current risk and support remedial planning and volume estimates for a potential excavation-based remedy for all or portions of the site.
    - Additional vertical characterization of the presence of contamination in discrete soil intervals to address potential data gaps between the surface soil interval and the contaminated fill.
    - Additional characterization of soil "hot spots" as noted herein at:
        - WFB-4 (1-2.5')
        - SB-308 (3.5')
    - Additional investigation and sampling for PAHs and metals due to elevated levels of these contaminants in composite soil samples collected at the NBHS campus, whose locations and depths are unknown, but may represent as yet uncharacterized areas of the Site (i.e., HS-11 data gap).
    - Additional characterization of groundwater at Walsh Field and the NBHS campus to verify the non-leaching character of site contaminants.

- Focused sampling for arsenic at the varsity and JV fields to refine the understanding of the lateral and vertical extent of arsenic in soil at the ballfields and clarify the conceptual site model for contaminant deposition in these areas.

1.0 INTRODUCTION

TRC Environmental Corporation (TRC) prepared this Interim Phase II Comprehensive Site Assessment (CSA) Report on behalf of the City of New Bedford (City) for the New Bedford High School (NBHS) Campus and Dr. Paul F. Walsh Memorial Field (Walsh Field), which are portions of the former Parker Street Waste Site (PSWS; the "Site"). The Site as defined for the purposes of this Interim Phase II CSA includes the NBHS campus and Walsh Field and presents data and activities up through December 2008. The Site is located along Hathaway Boulevard and Liberty, Parker, Hunter, and Maxfield Streets in New Bedford, Massachusetts. The location of the Site is shown on Figure 1-1. The Site is a portion of a larger disposal site, the PSWS, under the Massachusetts Contingency Plan (MCP; 310 CMR 40.0000) that is tracked by the Massachusetts Department of Environmental Protection (MassDEP) under Release Tracking Number (RTN) 4-15685. Response actions at this Site are conducted under a Special Project designation due to logistical complexities.

Other properties in the area of the Site that are tracked under this RTN include:

- The Keith Middle School (KMS) property and a wetland adjacent to the KMS (referred to as the KMS wetland). A Class A-3 partial Response Action Outcome (RAO-P) has been submitted by others for the KMS portion of the PSWS. Response actions are on-going for the wetland portion;
- The Former Keith Junior High School (KJHS) property;
- Several other City-owned parcels (e.g., Department of Public Infrastructure [DPI] facilities);
- Several residential properties along Greenwood, Ruggles, and Durfee Streets, including vacant parcels along Ruggles Street and Hathaway Boulevard presently owned by the Bethel AME Church;
- A church property located at the corner of Hathaway Boulevard and Parker Street; and
- A commercial property located at 319 Hathaway Boulevard.

These properties and the NBHS campus and Walsh Field properties are impacted by the presence of fill variously contaminated by polychlorinated biphenyls (PCBs), polyaromatic hydrocarbons (PAHs), and heavy metals (including but not limited to arsenic, lead, and cadmium). The fill material appears to be attributable to waste disposal associated with the PSWS, formerly located in the vicinity of the NBHS campus.

Assessment activities at the disposal site have been conducted at several properties in the area; however, this Interim Phase II CSA focuses on the NBHS campus and Walsh Field portions of the disposal site in order to support remedial planning activities targeting these locations. The other properties associated with the PSWS will be addressed in future Interim Phase II CSA reports. For the purposes of this Interim Phase II CSA, analytical results for samples collected up to and including December 15, 2008 have been included. Data generated up to this date are sufficient to characterize the nature and extent of contamination. Additional soil sampling has

been recommended herein in order to refine the delineation of contaminated areas and to support remedial planning.

Additionally, a potential imminent hazard (IH) condition was identified on the Site during the timeframe covered by this Interim Phase II CSA. This IH condition was addressed with an Immediate Response Action (IRA), as described in Section 3.3 of this report, and is tracked by RTN 4-21407. Other potential IH conditions that have been identified on the portion of the Site evaluated in this report include RTNs 4-21823, 4-21847, and 4-21872, which were encountered on portions of the PSWS after the timeframe addressed by this Interim Phase II CSA (i.e., were encountered after December 2008). These three RTNs will be discussed in subsequent Phase II CSA documentation.

The investigative work completed at the Site by TRC supplements previous assessment work at the Site conducted by the BETA Group, Incorporated (BETA). The results of TRC's investigative work were evaluated with respect to regulatory requirements under the MCP, and fulfill the data requirements for a Phase II CSA under the MCP (310 CMR 40.0830). TRC analytical data were also obtained consistent with the most recent edition of the MassDEP Compendium of Analytical Methods (CAM).

1.1 Special Project Designation

The disposal site has a Special Project Designation, in accordance with 310 CMR 40.0060. On behalf of the City, Vanasse Hangen Brustlin, Incorporated (VHB) submitted an application to MassDEP for a Special Project Designation on August 27, 2001. The Special Project Designation was granted for the disposal site on December 20, 2001. On June 2, 2007 MassDEP granted a five-year extension of the Special Project Designation based on an application for extension submitted by TRC. The existing Special Project Designation will expire on February 25, 2012.

The disposal site has not yet been Tier Classified, as allowed consistent with 310 CMR 40.0064 of the MCP. Public involvement meetings are held on a quarterly basis to inform concerned citizens of the project status. The public involvement meetings are broadcast on local public access television and include visual presentations by the Licensed Site Professional (LSP) with as needed interpretive services for Portuguese and/or Spanish speaking attendees.

TRC is conducting Immediate Response Actions (IRAs) as necessary on behalf of the City. Pursuant to 310 CMR 40.0060, IRAs must be managed in accordance with the MCP on Special Project sites. A discussion of the IRAs conducted on the Site is included in Section 3.3.

1.2 Objectives

The objectives of this Interim Phase II CSA report are to evaluate the nature and extent of contamination at the Site (focused on the NBHS campus and Walsh Field), complete a risk characterization, and determine the need for additional response actions per the MCP (310 CMR 40.0833). Work performed at the Site by TRC addressed data gaps and supplemented previous

work at the Site conducted by BETA. Summaries of BETA's work are contained in the following documents:

- BETA, 2006b – *Summary of Analytical Data, New Bedford High School, New Bedford, Massachusetts.* Prepared for: City of New Bedford, Department of Environmental Stewardship, 133 William Street, New Bedford, Massachusetts. Prepared by: BETA Group, Inc., Norwood, Massachusetts. June 9, 2006.

- BETA, 2006c – *Summary of Analytical Data, Walsh Field, New Bedford, Massachusetts.* Prepared for: City of New Bedford, Department of Environmental Stewardship, 133 William Street, New Bedford, Massachusetts. Prepared by: BETA Group, Inc., Norwood, Massachusetts. June 9, 2006.

- TRC, 2008a – *Data Summary Report, New Bedford High School, New Bedford, Massachusetts*. Prepared for: City of New Bedford, Department of Environmental Stewardship, 133 William Street, New Bedford, Massachusetts. Prepared by: TRC, Lowell, Massachusetts. December 2008.

- TRC, 2008b – *Data Summary Report, Walsh Field, New Bedford, Massachusetts*. Prepared for: City of New Bedford, Department of Environmental Stewardship, 133 William Street, New Bedford, Massachusetts. Prepared by: TRC, Lowell, Massachusetts. October 2008.

This report is subject to the Limitations presented in Appendix A. Public notice letters are included in Appendix B. Other appendices provided herein include Appendix C (Field Logs), Appendix D (Laboratory Data Reports), Appendix E (Method 2 Human Health Risk Characterization Tables), Appendix F (Method 2 Standard Development Documentation), Appendix G (Chemical Contaminant Characteristics), Appendix H (Historical Documentation), and Appendix I (Data Usability Assessment and Data Validation Reports).

2.0 DISPOSAL SITE BACKGROUND INFORMATION

Consistent with 310 CMR 40.0835(4) subparts a through c, the following provides basic information related to the disposal site (name, location, etc.), a summary of disposal site maps depicting relevant investigation and sampling points, and an updated disposal site history.

2.1 Disposal Site Information

Consistent with 310 CMR 40.0835(4)(a) of the MCP, the following table summarizes the required disposal site information.

Site/Disposal Site Name	Parker Street Waste Site
Address	Hathaway Boulevard and Parker Street
City	New Bedford
Release Tracking Number	4-15685
Latitude/Longitude	41.642686°/-70.946229°
UTM Coordinates	Northing: 4611923 meters; Easting: 337873 meters

2.1.1 Site Demographics

Based on information obtained from Lawrence Oliveira, Chief Administrator for Finance & Operations New Bedford Public Schools, there are approximately 303 full and part-time employees at the Site (Oliveira, 2009). The population density in the vicinity of the Site is expected to be approximately 9,537 persons/square mile (www.census.gov). Based on this estimate, there are expected to be approximately 14,592 persons living within ½ -mile of the Site.

2.1.2 Land Uses Surrounding the Site

Land uses at properties surrounding the Site are largely residential except:

- City maintenance facilities that are located to the east of the Walsh Field portion of the Site and across Liberty Street from the NBHS campus;
- An indoor rock climbing gym that is located across Parker Street from the southwest corner of the NBHS campus portion of the Site;
- The former KJHS property located across Hunter Street from Walsh Field;
- A church located at the intersection of Parker Street and Hathaway Boulevard;
- The KMS located across Hathaway Boulevard from the NBHS campus;
- The Hetland Memorial Skating Rink located to the north of the NBHS campus; and
- The Oakgrove Cemetery located to the east of the NBHS campus beyond the City yard.

2.1.3 Institutions within 500 feet of Site

Based on Site reconnaissance and review of topographic maps, there are no institutions within 500 feet of the Site. The MCP defines an institution as, "any publicly or privately owned hospital, health care facility, orphanage, nursing home, convalescent home, educational facility, or correctional facility where such facility in whole or in part provides overnight housing."

2.1.4 Natural Resources within 500 feet of Site

Based on review of a MassDEP Priority Resource Map (Figure 2-1), there are no drinking water supply wells, surface water bodies, vegetated wetlands, or areas of critical environmental concern (ACECs) on the Site. The Site and the surrounding area are connected to the municipal water supply.

There is a small isolated wetland immediately to the north of the NBHS in the rear of the Hetland Rink. There is also a wetland located in the rear of the KMS. Both are estimated to be within 500 feet of the Site.

2.2 Disposal Site Maps

Consistent with 310 CMR 40.0835(4)(b), the following table summarizes the disposal site maps and other supporting figures that are provided as part of this Phase II CSA.

Figure 1-1	Site Location Map
Figure 2-1	MassDEP Priority Resource Map
Figure 2-2A	Disposal Site Map – New Bedford High School
Figure 2-2B	Disposal Site Map – Walsh Field
Figure 2-3	Soil Exposure Areas
Figure 3-1	Estimated Groundwater Contour Map
Figure 3-2	FEMA Floodplain Map
Figure 3-3	Walsh Field Fill Thickness
Figure 3-4	NBHS Campus Fill Thickness
Figure 4-1	Arsenic Results for Soil Samples (0-1 Foot) Walsh Field
Figure 4-2	Arsenic Results for Soil Samples (1-3 Feet) Walsh Field
Figure 4-3	Cadmium Results for Soil Samples (0-1 Foot) Walsh Field
Figure 4-4	Cadmium Results for Soil Samples (1-3 Feet) Walsh Field
Figure 4-5	Lead Results for Soil Samples Field (0-1 Foot) Walsh Field
Figure 4-6	Lead Results for Soil Samples (1-3 Feet) Walsh Field
Figure 4-7	Benzo(a)pyrene Results for Soil Samples (0-1 Foot) Walsh Field
Figure 4-8	Benzo(a)pyrene Results for Soil Samples (1-3 Feet) Walsh Field
Figure 4-9	Total PCB Results for Soil Samples (0-1 Foot) Walsh Field
Figure 4-10	Total PCB Results for Soil Samples (1-3 Feet) Walsh Field

Figure 4-11	Arsenic Results for Soil Samples (0-1 Foot) New Bedford High School
Figure 4-12	Arsenic Results for Soil Samples (1-3 Feet) New Bedford High School
Figure 4-13	Arsenic Results for Soil Samples (>3 Feet) New Bedford High School
Figure 4-14	Barium Results for Soil Samples (0-1 Foot) New Bedford High School
Figure 4-15	Barium Results for Soil Samples (1-3 Feet) New Bedford High School
Figure 4-16	Barium Results for Soil Samples (>3 Feet) New Bedford High School
Figure 4-17	Cadmium Results for Soil Samples (0-1 Foot) New Bedford High School
Figure 4-18	Cadmium Results for Soil Samples (1-3 Feet) New Bedford High School
Figure 4-19	Cadmium Results for Soil Samples (>3 Feet) New Bedford High School
Figure 4-20	Chromium Results for Soil Samples (0-1 Foot) New Bedford High School
Figure 4-21	Chromium Results for Soil Samples (1-3 Feet) New Bedford High School
Figure 4-22	Chromium Results for Soil Samples (>3 Feet) New Bedford High School
Figure 4-23	Lead Results for Soil Samples (0-1 Foot) New Bedford High School
Figure 4-24	Lead Results for Soil Samples (1-3 Feet) New Bedford High School
Figure 4-25	Lead Results for Soil Samples (>3 Feet) New Bedford High School
Figure 4-26	Benzo(a)pyrene Results for Soil Samples (0-1 Foot) New Bedford High School
Figure 4-27	Benzo(a)pyrene Results for Soil Samples (1-3 Feet) New Bedford High School
Figure 4-28	Benzo(a)pyrene Results for Soil Samples (>3 Feet) New Bedford High School
Figure 4-29	Total PCB Results for Soil Samples (0-1 Foot) New Bedford High School
Figure 4-30	Total PCB Results for Soil Samples (1-3 Feet) New Bedford High School
Figure 4-31	Total PCB Results for Soil Samples (>3 Feet) New Bedford High School
Figure 5-1	Schematic Conceptual Site Model

2.3 Disposal Site History

Consistent with 310 CMR 40.0835(4)(c), the following presents an updated Site Description and Site History.

2.3.1 Site Description

The Disposal Site tracked by RTN 4-15685 encompasses an estimated 140-acre area (not yet fully delineated) in the vicinity of NBHS. The area of focus under this Interim Phase II CSA occupies an approximately 59.5-acre area within the Disposal Site and is identified by the City of New Bedford Assessor as the following parcels: map 75 block 12, map 69 block 345, map 70 block 1, map 63 block 92, map 63 block 2, and map 63 block 48. The NBHS portion of the Site is located on the north side of Parker Street between Hathaway Boulevard on the west and Liberty Street on the east. The Walsh Field portion of the Site is located on the south side of Parker Street, to the east of Hunter Street, and to the north of Maxfield Street. The east side of the Walsh Field portion of the Site is bordered by Lindsey Street and a City maintenance yard.

Properties in the vicinity of the Site include a state-owned ice arena (Hetland Rink), City maintenance facilities, a City-managed housing complex, a church, the KMS, a vacant lot, several single family residences and a small number of commercial properties (stores). The

Universal Transverse Mercator (UTM) coordinates for the Site are 4,612,139 meters north and 337,806 meters east in Zone 19. The latitude and longitude of the Site are 41.644559 latitude and -70.947316 longitude. A Site Location Map is provided as Figure 1-1 that provides 500-foot and ½-mile radii for the NBHS campus and Walsh Field property boundaries.

Review of the United States Geological Survey (USGS) Topographic Quadrangles for New Bedford South dated 1977 and New Bedford North dated 1979 indicates that the Site is located at approximately 90 feet above mean sea level (amsl). The Site is level with hills to the east and west. New Bedford Harbor is located approximately 1.3 miles east of the Site.

There is one building on the NBHS portion of the Site – the approximately 529,192 square foot NBHS building, as well as several paved parking areas, lawn and landscaped areas for recreational use, and paved tennis and basketball courts. Approximately 47-percent of the NBHS campus portion of the Site is covered by impervious surfaces (e.g., pavement or building).

The Walsh Field complex includes several athletic fields including a large baseball field near the corner of Hunter and Parker Streets (Varsity Field), a smaller baseball field ("JV Field"), a softball field, a soccer field, and a football/track and field complex. There are small maintenance buildings within Walsh Field including restrooms, a field house, and maintenance buildings as well as bleachers/viewing stands at the football field and varsity baseball field. The track at Walsh Field is made of crumb rubber and there are paved areas along Hunter Street and along Maxfield Street. Approximately 10-percent of the Walsh Field portion of the Site is covered by impervious surfaces (e.g., paved parking areas and the running track).

A MassDEP 21-E Site Priority Resource Map is provided as Figure 2-1. Figures 2-2A and 2-2B present current Site conditions at NBHS and Walsh Field, respectively.

For the purpose of evaluating the several uses of the Site relative to human exposure to Site contaminants, this Interim Phase II CSA discusses analytical results by defined exposure areas. Exposure Areas HS-1 through HS-10 are located on the NBHS campus portion of the Site, while exposure areas WF-1 through WF-5 are located on the Walsh Field portion of the Site. The boundaries of the exposure areas are indicated on Figure 2-3, and their use/application is discussed in Section 6.0 (Human Health Risk Characterization and Exposure Assessment).

For the purposes of the current risk characterization, the NBHS campus was divided into the following exposure points based on current activities known to be occurring:

- HS-1: Children's Playground Area
- HS-2: Fenced Playing Field Area
- HS-3: Unfenced Playing Field Area
- HS-4: Gym Area
- HS-5: Flag Pole Area
- HS-6: House Area
- HS-7: Student Congregating Area
- HS-8: Junior High School Gym Class Area

- HS-9: Beneath Pavement/Building Areas
- HS-10: Tree Belts Area
- HS-11: Miscellaneous Samples of Unknown Location

The Walsh Field area was divided into exposure points applicable to the athletic activities that occur at the field as follows:

- WF-1: Football Field
- WF-2: Soccer Field
- WF-3: Practice Area
- WF-4: Junior Varsity Baseball Field
- WF-5: Varsity Baseball Field

2.3.2 Site History

Based on review of historical USGS topographic maps from 1941 and 1949 (see Appendix H) the Site was the location of a wetland area prior to the apparent waste disposal activity associated with the PSWS, which is sometimes referred to as a burn dump. In the 1941 (1936 survey data) map and 1949 (1948 survey data) map, the Walsh Field portion of the Site has already been filled and is indicated as dry land; however, the NBHS portion of the Site is still illustrated as wetland. A historic photograph of the Site from 1953 (see Appendix H) indicates that the football field and a baseball diamond had been constructed on Walsh Field by that time. The photograph captures a small portion of the southern end of the NBHS property; however, this portion of the Site does not appear to be a wetland.

Based on review of historical aerial photographs (see Appendix H), the NBHS campus portion of the Site appears to be impacted by waste disposal activity in the 1950s and early 1960s. NBHS was constructed between 1968 and 1972. Soils displaced for construction of the building's foundation may have been transported to the lot across Hathaway Boulevard that was vacant at the time (the present-day location of the KMS). In 1994, much of the stockpiled soil was used for grading to create the Former Andre McCoy Soccer Field (Former McCoy Field) across Hathaway Boulevard from the NBHS campus. In 2000, the City sought a location for the new middle school. During an environmental due-diligence investigation of the Former McCoy Field as a possible location for the middle school, concentrations of PCBs above regulatory reporting criteria were detected, triggering a reporting condition to MassDEP. MassDEP assigned RTN 4-15685 to the Site. (The Site name for RTN 4-15685 was originally McCoy Field based on the original location of the reported contamination).

The KMS was constructed in 2006 on a three-foot cap (2 to 2 ½ feet of sandy gravel and topsoil overlying 6 to 12 inches of crushed stone) to limit exposures to soil contaminants with a geotextile separation fabric and orange snow fence warning layer. Other areas of the former McCoy Field were remediated through removal of contaminated soil/sediment. Please refer to BETA's 2006 Final Completion and Inspection Report (BETA, 2006a) for additional details concerning the KMS portion of the PSWS.

On December 11, 2006, the Former Andre McCoy Field portion of the disposal site was closed with a class A-3 Response Action Outcome (RAO) including an activity and use limitation (AUL). The KMS remedy is monitored under a Long-Term Monitoring and Maintenance Implementation Plan (LTMMIP) approved by the United States Environmental Protection Agency (EPA).

Following the original detection of PCBs at the former McCoy Field, additional investigations of the surrounding area were undertaken by BETA on behalf of the City in response to a conditional approval for the KMS site remedy issued by EPA[1]. These additional investigations included soil sampling at the NBHS property and Walsh Field (see BETA, 2006b and BETA, 2006c).

2.3.3 Petroleum and Hazardous Substance Storage History

The contaminated fill that has been noted on the Site is associated with historical landfilling activities of the Walsh Field portion of the Site prior to 1941 and use of the NBHS campus portion of the Site as part of the PSWS in the 1950s and early 1960s. Historical documentation indicates that the Site was undeveloped wetland prior to waste disposal activities. The NBHS is presently heated via natural gas-fired boilers, and back-up power is provided by a natural gas generator. The boilers were formerly fired using fuel oil stored in underground storage tanks (USTs), which were removed in 1999 (Oliveira, 2009). Any hazardous substances stored on the Site are associated with building maintenance (small quantities of solvents, oils, cleaning products), high school science laboratories, and the wood and automotive shops. There is also an indoor shooting range where small quantities of small arms ammunition are stored.

2.3.4 Previous Subsurface Investigations

Previous subsurface environmental investigations at the Site were conducted by BETA between September 2004 and February 2006. During that time, BETA advanced 343 soil borings plus an additional 12 surface soil samples (0-6 inches) at the NBHS campus portion of the Site and 80 soil borings plus an additional 12 surface soil samples (0-6 inches) at the Walsh Field portion of the Site. Of these 447 sampling locations, BETA observed fill at 350 (BETA, 2006b and BETA, 2006c). Soil samples were collected and submitted for the following laboratory analyses:

Analysis	**Number of Soil Samples**	
	Grab Samples	**Composite Samples**
PCBs	311	-
RCRA 8 Metals	60	150
Total Lead	56	-
SVOCs and PAHs	57	66
TCLP Lead	51	119
TCLP Barium	3	6
TCLP Mercury	-	3
TCLP Cadmium	-	3

[1] EPA jurisdiction over the KMS portion of the PSWS is due to the presence of PCBs above Toxic Substances Control Act (TSCA) thresholds.

Analysis	Number of Soil Samples	
	Grab Samples	Composite Samples
TCLP Chromium	5	14
VOCs	18	-
Dibenzofuran	22	-
Pesticides	13	6
Herbicides	10	6
TPH	19	6
Ignitability	13	6
Reactive Cyanide	13	6
Reactive Sulfide	13	6

Notes:
PCBs – polychlorinated biphenyls
RCRA – Resource Conservation and Recovery Act
TCLP – Toxicity Characteristic Leaching Procedure
VOCs – volatile organic compounds
TPH – total petroleum hydrocarbons
PAHs – polyaromatic hydrocarbons

The results of laboratory analyses are discussed in Section 4.0 relative to applicable MCP regulatory standards. BETA identified the following Site contaminants of concern (BETA, 2006b and BETA, 2006c):

- PCBs
- arsenic
- barium
- cadmium
- chromium
- lead
- mercury
- PAHs (specifically: benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenz(a,h)anthracene, indeno(1,2,3-cd) pyrene, phenanthrene, and pyrene).

2.4 Phase I Information Updates

A Phase I Initial Site Investigation (ISI) has not been prepared for the Site. This Interim Phase II CSA is intended to fulfill the requirements of a Phase I ISI, as set forth in 310 CMR 40.0483, as summarized below:

Phase I ISI-Required Information	Section(s) of Interim Phase II CSA
General Disposal Site Information	2.1
Disposal Site Map	2.2
Disposal Site History	2.3
Site Hydrogeological Characteristics	3.0

Phase I ISI-Required Information	Section(s) of Interim Phase II CSA
Nature and Extent of Contamination	4.0
Migration Pathways and Exposure Potential	5.0 and 6.0
Evaluation of Immediate Response Actions	3.3

3.0 SITE HYDROGEOLOGICAL CHARACTERISTICS

Environmental site investigation activities described in the Interim Phase II CSA were conducted by TRC on behalf of the City between July 2008 and December 2008. Information and observations relative to Site geology and hydrogeology are summarized below.

3.1 Relevant TRC Subsurface Investigations/Documentation

TRC's environmental investigations consisted of direct push soil borings using track-, truck-, or dolly-mounted drill rigs to sample soil and observe subsurface soil conditions. Surface soil samples were collected using hand tools. Drilling services and equipment were provided by New England Geotech, LLC (New England Geotech) of Jamestown, Rhode Island. Copies of associated soil boring logs prepared by TRC's field geologists/engineers are provided in Appendix C. Soil sampling was the primary means of identifying and delineating Site contamination under the approved scope of work with the City. In addition, TRC installed and sampled five groundwater monitoring wells at the Site to confirm the absence of significant impact to groundwater noted by the prior consultant (BETA, 2006a).

The investigative approach was intended to evaluate the presence or absence of fill, the horizontal and vertical extent of contamination, and the potential presence of contaminants of concern in soil and fill material based on documentation available to TRC and past sampling in the area. In general, soil borings were advanced and soil samples were collected until native overburden was encountered unless refusal was encountered first. Where native material was submitted for laboratory analysis, two samples of native material from two different depths were typically collected in borings selected to characterize the native horizon. The lower native sample was retained for analysis contingent upon the results of the upper native horizon analysis in an attempt to delineate the vertical extent of contamination exceeding applicable standards, if present, without having to remobilize sampling teams. The contingent native material was not analyzed if the native material interval above it was found to be uncontaminated (below cleanup criteria) based on laboratory analysis or as directed by the TRC LSP. TRC also collected some relatively shallow soil samples to supplement data previously collected by others where shallow soil data gaps were perceived and to support an evaluation of current risk.

Figures 2-2A and 2-2B illustrate the locations investigated by TRC at the NBHS campus and Walsh Field, respectively, using the above-described techniques. The sampling locations were surveyed by Land Planning, Incorporated of Hanson, Massachusetts (Land Planning) following TRC's sampling activities.

TRC conducted field screening of soil samples consisting of visual and olfactory observations, jar headspace readings using an appropriately calibrated photoionization detector (PID), and professional judgment, consistent with TRC Standard Operating Procedures (SOPs) and general industry practice. TRC employed the MassDEP jar headspace technique (MassDEP, 1996) to screen for the presence of volatile organic compounds (VOCs) in soil. TRC also evaluated and logged the geologic character of the soil samples consistent with the Burmeister (1958) method.

Sections 3.1.1 and 3.1.2 summarize TRC's 2008 Site investigations. Soil samples for PCB Aroclor and homolog analyses were submitted to Northeast Analytical Laboratories (NEA) of

Schenectady, New York. Soil samples for MCP metals and mercury, PAH, and Toxicity Characteristic Leaching Procedure (TCLP) metals analyses were submitted to Con-Test Analytical Laboratory (Con-Test) of East Longmeadow, Massachusetts. All samples were submitted under chain-of-custody.

3.1.1 Walsh Field Soil Investigations

The following table summarizes soil samples collected by TRC from Walsh Field for laboratory analysis between July and November 2008, as further detailed below.

Summary of Investigation Activities – Walsh Field – 2008

Location	Soil Borings	Number of Soil Samples Submitted for Laboratory Analysis	Analyses[1]			
			PCBs[2]	PAHs[3]	MCP Metals/Hg[4]	Arsenic Only
Walsh Field	102[5]	139	78	78	81	58[6]

Notes:
[1]Does not include quality control (QC) samples.
[2]Polychlorinated biphenyls (PCBs) as Aroclors by SW-846 Method 8082; four samples were additionally submitted for PCB homolog analysis by EPA Method 680.
[3]Polyaromatic hydrocarbons (PAHs) by SW-846 Method 8270C.
[4]Massachusetts Contingency Plan (MCP) Metals/Hg - antimony, arsenic, barium, beryllium, cadmium, chromium, lead, nickel, selenium, silver, thallium, vanadium, zinc and mercury by SW-846 Methods 6010B/7471A.
[5]Including 35 surface soil samples collected manually by TRC personnel; 2 stockpile soil samples; and 1 sample of white line chalk.
[6]Five samples were additionally analyzed for arsenic leachability using the Toxicity Characteristic Leaching Procedure (TCLP) by SW-846 Methods 1311/6010B.

Soil boring details are summarized below and in the soil boring logs provided in Appendix C. Boring logs were not prepared for surface soil samples collected with hand tools or for samples collected of soil stockpiles and white line chalk.

Soil Boring/Sample Summary – Walsh Field

Soil Boring	Date Advanced	Total Depth (ft bgs)	Depths Submitted for Laboratory Analysis* (ft bgs)	Drill Rig
SB-222	7/9/2008	12	1, 3.5, 6, (10)	Model 5400 Truck Rig
SB-223	7/9/2008	12	1, 4, 7.5, (11)	Model 5400 Truck Rig
SB-224	7/9/2008	12	1, 4, 7.5, (10)	Model 5400 Truck Rig
SB-225	7/9/2008	12	1, 4, 8, (11)	Model 5400 Truck Rig
SB-226	7/9/2008	12	1, 4, 8, (11)	Model 5400 Truck Rig
SB-227	7/10/2008	12	1, 4.5, 8.5, (11)	AMS 9100 Track Rig
SB-228	7/10/2008	12	1, 4, 8.5, (11)	AMS 9100 Track Rig
SB-229	7/10/2008	12	1, 5, 8, (11)	AMS 9100 Track Rig
SB-230	7/10/2008	4	0.5, (2)	Model 5400 Truck Rig
SB-231	7/10/2008	4	0.5, (2)	Model 5400 Truck Rig

Soil Boring/Sample Summary – Walsh Field				
Soil Boring	**Date Advanced**	**Total Depth (ft bgs)**	**Depths Submitted for Laboratory Analysis* (ft bgs)**	**Drill Rig**
SB-232	7/10/2008	4	0.5, (2)	Model 5400 Truck Rig
SB-233	7/10/2008	4	0.5, 2	Model 5400 Truck Rig
SB-234	7/10/2008	4	0.5, 2	Model 5400 Truck Rig
SB-234A**	7/31/2008	0.5	0-0.5[A]	Hand Tools
SB-234B**	7/31/2008	0.5	0-0.5	Hand Tools
SB-234C**	7/31/2008	0.5	0-0.5	Hand Tools
SB-234D**	7/31/2008	0.5	0-0.5	Hand Tools
SB-235	7/10/2008	4	0.5, 2	Model 5400 Truck Rig
SB-235A**	7/31/2008	0.5	0-0.5[A]	Hand Tools
SB-235B**	7/31/2008	0.5	0-0.5[A]	Hand Tools
SB-236	7/10/2008	4	0.5, 2	Model 5400 Truck Rig
SB-236A**	7/31/2008	0.5	0-0.5[A]	Hand Tools
SB-237	7/10/2008	4	0.5, 2	Model 5400 Truck Rig
SB-237A**	7/31/2008	0.5	0-0.5[A]	Hand Tools
SB-238	7/11/2008	4	0.5, (2)	Model 5400 Truck Rig
SB-239	7/11/2008	4	0.5, (2)	Model 5400 Truck Rig
SB-240	7/11/2008	4	0.5, (2)	Model 5400 Truck Rig
SB-241	7/11/2008	4	0.5, (2)	Model 5400 Truck Rig
SB-242	7/11/2008	4	0.5, (2)	Model 5400 Truck Rig
SB-243	7/11/2008	4	0.5, (2)	Model 5400 Truck Rig
SB-244	7/11/2008	4	0.5, 2	Model 5400 Truck Rig
SB-245	7/11/2008	4	0.5, (2)	Model 5400 Truck Rig
SB-246	7/11/2008	4	0.5, (2)	Model 5400 Truck Rig
SB-247	7/11/2008	4	0.5, (2)	Model 5400 Truck Rig
SB-248	7/11/2008	4	0.5, (2)	Model 5400 Truck Rig
SB-249	7/11/2008	4	0.5, 2	Model 5400 Truck Rig
SB-250	7/11/2008	4	0.5, (2)	Model 5400 Truck Rig
SB-251	7/11/2008	4	0.5, (2)	Model 5400 Truck Rig
SB-252	7/15/2008	4	(0.5), 2	Model 5400 Truck Rig
SB-252A**	7/31/2008	0.5	0-0.5[A]	Hand Tools
SB-252B**	7/31/2008	0.5	0-0.5	Hand Tools
SB-252C**	7/31/2008	0.5	0-0.5	Hand Tools
SB-252D**	7/31/2008	0.5	0-0.5	Hand Tools

Soil Boring/Sample Summary – Walsh Field				
Soil Boring	**Date Advanced**	**Total Depth (ft bgs)**	**Depths Submitted for Laboratory Analysis* (ft bgs)**	**Drill Rig**
SB-253	7/15/2008	4	0.5[A], 2	Model 5400 Truck Rig
SB-253A**	7/31/2008	0.5	0-0.5[A]	Hand Tools
SB-253B**	7/31/2008	0.5	0-0.5	Hand Tools
SB-253C**	7/31/2008	0.5	0-0.5	Hand Tools
SB-253D**	7/31/2008	0.5	0-0.5[A]	Hand Tools
SB-253E**	7/31/2008	0.5	0-0.5	Hand Tools
SB-254	7/15/2008	4	0.5, 2	Model 5400 Truck Rig
SB-255	7/15/2008	4	0.5, 2	Model 5400 Truck Rig
SB-256	8/12/2008	12	4.5, 8, (11)	Model 5400 Truck Rig
SB-257	8/12/2008	12	5, 7.5, (11)	Model 5400 Truck Rig
SB-258	8/12/2008	12	5, 8, (11)	Model 5400 Truck Rig
SB-259	8/12/2008	12	5, 8, (11)	Model 5400 Truck Rig
SB-266	7/15/2008	12	1, 4, 9, (11)	Model 5400 Truck Rig
SB-268	7/15/2008	12	1, 4.5, 9, (12)	Model 5400 Truck Rig
SB-269	7/14/2008	12	1, 4, 9.5, (12)	Model 5400 Truck Rig
WF-1**	9/30/2008	0.5	0-0.5	Hand Tools
WF-2**	9/30/2008	0.5	0-0.5	Hand Tools
WF-3**	9/30/2008	0.5	0-0.5	Hand Tools
WF-4**	9/30/2008	0.5	0-0.5	Hand Tools
WF-5**	9/30/2008	0.5	0-0.5	Hand Tools
WF-6**	9/30/2008	0.5	0-0.5	Hand Tools
WF-7**	9/30/2008	0.5	0-0.5	Hand Tools
WF-8**	9/30/2008	0.5	0-0.5	Hand Tools
WF-9**	9/30/2008	0.5	0-0.5	Hand Tools
WF-10**	9/30/2008	0.5	0-0.5	Hand Tools
WF-11**	9/30/2008	0.5	0-0.5	Hand Tools
WF-12**	9/30/2008	0.5	0-0.5	Hand Tools
WF-13**	9/30/2008	0.5	0-0.5	Hand Tools
WF-14**	9/30/2008	0.5	0-0.5	Hand Tools
WF-15**	9/30/2008	0.5	0-0.5	Hand Tools
WF-16**	9/30/2008	0.5	0-0.5	Hand Tools
WF-17**	9/30/2008	0.5	0-0.5	Hand Tools
WF-18**	9/30/2008	0.5	0-0.5	Hand Tools

Soil Boring/Sample Summary – Walsh Field				
Soil Boring	**Date Advanced**	**Total Depth (ft bgs)**	**Depths Submitted for Laboratory Analysis* (ft bgs)**	**Drill Rig**
SP-1[+]	8/7/2008	N/A	N/A	N/A
SP-2[+]	8/7/2008	N/A	N/A	N/A
WC-1[^]	8/7/2008	N/A	N/A	N/A
JV-1**	11/17/2008	0.5	0-0.5	Hand Tools
JV-2**	11/17/2008	0.5	0-0.5	Hand Tools
JV-3**	11/17/2008	0.5	0-0.5	Hand Tools
JV-4**	11/17/2008	0.5	0-0.5	Hand Tools
JV-5**	11/17/2008	0.5	0-0.5[A]	Hand Tools
JV-6**	11/17/2008	0.5	0-0.5[A]	Hand Tools
JV-7**	11/17/2008	0.5	0-0.5	Hand Tools
JV-8**	11/17/2008	0.5	0-0.5	Hand Tools
JV-9**	11/17/2008	0.5	0-0.5[A]	Hand Tools
JV-10**	11/17/2008	0.5	0-0.5[A]	Hand Tools
JV-11**	11/17/2008	0.5	0-0.5	Hand Tools
JV-12**	11/17/2008	0.5	0-0.5[A]	Hand Tools
JV-13**	11/17/2008	0.5	0-0.5	Hand Tools
POST-1	11/18/2008	N/A	0.5-0.67[§]	Hand Tools
POST-2	11/18/2008	N/A	0.5-0.67[§]	Hand Tools
POST-3	11/18/2008	N/A	0.5-0.67[§]	Hand Tools
POST-4	11/18/2008	N/A	0.5-0.67[§]	Hand Tools
POST-5	11/18/2008	N/A	0.5-0.67[§]	Hand Tools
POST-6	11/19/2008	N/A	0.5-0.67[§]	Hand Tools
POST-7	11/20/2008	N/A	0.5-0.67[§]	Hand Tools
POST-8	11/20/2008	N/A	0.5-0.67[§]	Hand Tools
POST-9	11/20/2008	N/A	0.5-0.67[§]	Hand Tools
POST-10	11/20/2008	N/A	0.5-0.67[§]	Hand Tools

Notes:
*- Depth in parentheses submitted to laboratory but placed on hold for contingency. Analyses of these samples were not required.
** - Surface soil sample collected using hand tools.
[+] - Sample collected of soil stockpiled on site.
[^] - Sample collected of white line chalk
[§] - Depth beneath final grade
bgs – below ground surface
N/A – Not applicable
ft – feet
[A] – Sample was removed during excavation as part of an Immediate Response Action.

3.1.2 New Bedford High School Soil Investigations

The following table summarizes soil and groundwater samples collected by TRC from NBHS for laboratory analysis between July and December 2008, as further detailed below.

Summary of Investigation Activities – New Bedford High School – 2008					
Soil Sampling					
Location	**Soil Borings**	**Number of Soil Samples Submitted for Laboratory Analysis**	**Analyses[1]**		
			PCBs[2]	**PAHs[3]**	**MCP Metals/Hg[4]**
New Bedford High School	140[5]	258	245	158	182
Groundwater Sampling					
Location	**Number of Groundwater Samples Submitted for Laboratory Analysis**		**Analyses[1]**		
			PCBs[2]	**PAHs[3]**	**MCP Metals/Hg[4]**
New Bedford High School	5		5	5	5[6]

Notes:
[1]Does not include quality control (QC) samples.
[2]Polychlorinated biphenyls (PCBs) as Aroclors by SW-846 Method 8082; ten soil samples were additionally submitted for PCB homolog analysis by EPA Method 680.
[3]Polyaromatic hydrocarbons (PAHs) by SW-846 Method 8270C.
[4]Massachusetts Contingency Plan (MCP) Metals/Hg - antimony, arsenic, barium, beryllium, cadmium, chromium, lead, nickel, selenium, silver, thallium, vanadium, zinc and mercury by SW-846 Methods 6010B/7471A/7470A.
[5]Including 41 surface soil samples collected manually by TRC personnel.
[6]Groundwater samples were analyzed for total metals and dissolved (field-filtered) metals.

Soil boring details are summarized below and in the soil boring logs provided in Appendix C. Boring logs were not prepared for surface soil samples collected with hand tools.

Soil Boring/Sample Summary - NBHS				
Soil Boring	**Date Advanced**	**Total Depth (ft bgs)**	**Depths Submitted for Laboratory Analysis* (ft bgs)**	**Drill Rig**
SB-01	3/31/2008	9	1, 3, (6), (9)	Model 6620 Track Rig
SB-02	3/31/2008	9	1, 3, (6), (9)	Model 6620 Track Rig
SB-03	3/31/2008	14	1, 3, (8), (14)	Model 6620 Track Rig
SB-04	3/31/2008	14	1, 3.5, (8), (14)	Model 6620 Track Rig
SB-05	3/31/2008	14	1, 8, (14)	Model 6620 Track Rig
SB-270	7/16/2008	12	1, 3, 9.5, (12)	Model 5400 Truck Rig
SB-271	7/16/2008	12	1, 3.5,10, (12)	Model 5400 Truck Rig
SB-272	7/16/2008	12	1, 3, 10, (12)	Model 5400 Truck Rig
SB-273	7/16/2008	12	5.5, 8, (11)	Model 5400 Truck Rig

Soil Boring/Sample Summary - NBHS				
Soil Boring	**Date Advanced**	**Total Depth (ft bgs)**	**Depths Submitted for Laboratory Analysis* (ft bgs)**	**Drill Rig**
SB-274	7/16/2008	12	4, 8, (11)	Model 5400 Truck Rig
SB-275	7/16/2008	12	4, 9.5, (12)	Model 5400 Truck Rig
SB-276	7/16/2008	12	4, 9.5, (12)	Model 5400 Truck Rig
SB-277	7/16/2008	12	4, 9, (11)	Model 5400 Truck Rig
SB-278	7/17/2008	12	4, 6, (9)	Model 5400 Truck Rig
SB-279	7/23/2008	12	4, 11	Model 5400 Truck Rig
SB-280	7/23/2008	12	4, 9.5, (12)	Model 5400 Truck Rig
SB-281	7/21/2008	12	4, 8, (11)	Model 5400 Truck Rig
SB-282	7/21/2008	12	3.5, 8, (11)	Model 5400 Truck Rig
SB-283	7/17/2008	12	3.5, 6, (10)	Model 5400 Truck Rig
SB-284	7/17/2008	5	3, 5	Model 5400 Truck Rig
SB-285	7/17/2008	12	3.5, 7.5, (11)	Model 5400 Truck Rig
SB-286	7/17/2008	12	4, 9, (12)	Model 5400 Truck Rig
SB-287	7/17/2008	12	4, 9, (12)	Model 5400 Truck Rig
SB-288	7/17/2008	12	4, 9, (12)	Model 5400 Truck Rig
SB-289	7/17/2008	12	3.5, 6, (10)	Model 5400 Truck Rig
SB-290	7/21/2008	10.5	2.5, 6, (10)	Model 5400 Truck Rig
SB-291	7/21/2008	10	2, 6, (9.5)	Model 5400 Truck Rig
SB-292	7/21/2008	5	2, 5	Model 5400 Truck Rig
SB-293	7/21/2008	12	6.5, 9, 12	Model 5400 Truck Rig
SB-294	7/21/2008	12	4, 8.5, 12	Model 5400 Truck Rig
SB-295	7/22/2008	12	5.5, 9, (12)	Model 5400 Truck Rig
SB-296	7/22/2008	12	5, 10, (12)	Model 5400 Truck Rig
SB-297	7/22/2008	12	6, 8, 11	Model 5400 Truck Rig
SB-298	8/4/2008	12	4, 8, (11)	AMS 9100 Track Rig
SB-299	8/4/2008	12	4, 8, (12)	AMS 9100 Track Rig
SB-300	7/22/2008 & 7/31/2008	12	4, 8, (11)	Model 5400 Truck Rig
SB-301	7/22/2008	12	7, 10.5, (12)	Model 5400 Truck Rig
SB-302	7/22/2008	12	2.5, 8, (11)	Model 5400 Truck Rig
SB-303	7/22/2008	12	5, 10, (12)	Model 5400 Truck Rig
SB-304	7/22/2008	12	5, 8, (11)	Model 5400 Truck Rig
SB-305	7/22/2008	12	4, 9, (12)	Model 5400 Truck Rig
SB-306	7/23/2008	12	1, 4, 7, (11)	Model 5400 Truck Rig
SB-307	7/23/2008	12	3, 6, 9	Model 5400 Truck Rig
SB-308	7/23/2008	12	3.5, 6, (10)	Model 5400 Truck Rig

Soil Boring/Sample Summary - NBHS				
Soil Boring	**Date Advanced**	**Total Depth (ft bgs)**	**Depths Submitted for Laboratory Analysis* (ft bgs)**	**Drill Rig**
SB-309	7/23/2008	12	4, 8, (11)	Model 5400 Truck Rig
SB-310	7/23/2008	12	3, 7, (10)	Model 5400 Truck Rig
SB-311	7/23/2008	12	6, 9, (11)	Model 5400 Truck Rig
SB-312	8/5/2008	12	5, 9, (12)	Model 6620 DT Track Rig
SB-313	8/4/2008	10	5, 8, (10)	AMS 9100 Track Rig
SB-349	8/21/2008	15	1, 8, 11, 14	Model 6600 DT Truck Rig
SB-350	8/21/2008	14	0.5, 5, 8, (11)	Model 6600 DT Truck Rig
NBHS-1	7/29/2008	14	(0.5), 8, 12, (14)	Model 5400 Truck Rig
NBHS-2	8/4/2008	5	1.5, 3.5, 5	Hammer Drill
NBHS-3	7/30/2008	8	4, 6, (8)	540 M Dolly Rig
NBHS-4	7/31/2008	12	2, 6, 8, (10)	Model 5400 Truck Rig
NBHS-5	7/30/2008	10	4, 8, (10)	Model 5400 Truck Rig
NBHS-6	7/28/2008	12	3, 6, (11)	540 M Dolly Rig
NBHS-7	7/29/2008	10	3, 7, (10)	540 M Dolly Rig
NBHS-8	7/28/2008	8	2.5, 6, (8)	540 M Dolly Rig
NBHS-SS-1**	8/6/2008	0.5	0-0.5	Hand Tools
NBHS-SS-2**	8/6/2008	0.5	0-0.5	Hand Tools
NBHS-SS-3**	8/6/2008	0.5	0-0.5	Hand Tools
NBHS-SS-4**	8/6/2008	0.5	0-0.5	Hand Tools
NBHS-SS-5**	8/6/2008	0.5	0-0.5	Hand Tools
NBHS-SS-6**	8/6/2008	0.5	0-0.5	Hand Tools
NBHS-SS-7**	8/6/2008	0.5	0-0.5	Hand Tools
NBHS-SS-8**	8/6/2008	0.5	0-0.5	Hand Tools
NBHS-SS-9**	8/6/2008	0.5	0-0.5	Hand Tools
NBHS-SS-10**	8/6/2008	0.5	0-0.5	Hand Tools
SS-11**	8/6/2008	2	0.5, 2	Hand Tools
SS-12**	8/6/2008	2	0.5, 2	Hand Tools
SS-13**	8/6/2008	1.5	0.5, 1.5	Hand Tools
SS-14**	8/6/2008	2	0.5, 2	Hand Tools
SS-15**	8/6/2008	2	0.5, 2	Hand Tools
SS-16**	8/6/2008	2	0.5, 1, 2	Hand Tools
SS-17**	8/6/2008	2	0.5, 1.5	Hand Tools
SS-18**	8/6/2008	2	0.5, 2	Hand Tools
SS-19**	8/7/2008	2	0.5, 1, 2	Hand Tools
SS-20**	8/7/2008	2	0.5, 1, 2	Hand Tools

Soil Boring/Sample Summary - NBHS				
Soil Boring	**Date Advanced**	**Total Depth (ft bgs)**	**Depths Submitted for Laboratory Analysis* (ft bgs)**	**Drill Rig**
SS-21**	8/7/2008	2	0.5, 2	Hand Tools
SS-22**	8/7/2008	2	0.5, 1.5	Hand Tools
SS-23**	8/7/2008	2	0.5, 2	Hand Tools
SS-24**	8/7/2008	1.5	0.5, 1.5	Hand Tools
SS-25**	8/7/2008	1.5	0.5, 1.5	Hand Tools
SS-26**	8/7/2008	2	0.5, 1.5, 2	Hand Tools
SS-27**	8/7/2008	2	0.5, 2	Hand Tools
SS-28**	8/7/2008	1.5	0.5, 1.5	Hand Tools
SS-29**	8/7/2008	2	0.5, 2	Hand Tools
SS-30**	8/7/2008 & 8/19/2008	1.5	0.5, 1.5	Hand Tools
SS-31**	8/7/2008	2	0.5, 2	Hand Tools
SS-32**	8/7/2008	1.5	0.5, 1.5	Hand Tools
SS-33**	8/7/2008	2	0.5, 2	Hand Tools
SS-34**	8/7/2008	2	0.5, 2	Hand Tools
SS-35**	8/7/2008	1.5	0.5, 1.5	Hand Tools
SS-36**	8/7/2008	2	0.5, 2	Hand Tools
SS-37**	8/8/2008	2	0.5, 2	Hand Tools
SS-38**	8/8/2008	1.5	0.5, 1.5	Hand Tools
SS-39**	8/8/2008	2	0.5, 2	Hand Tools
SS-40**	8/8/2008	2	0.5, 2	Hand Tools
SS-41**	8/8/2008	2	0.5, 2	Hand Tools
SS-42**	12/2/2008	0.5	0-0.5	Hand Tools
SS-43**	12/2/2008	0.5	0-0.5	Hand Tools
SS-44**	12/2/2008	0.5	0-0.5	Hand Tools
SS-45**	12/2/2008	0.5	0-0.5	Hand Tools
SS-46**	12/2/2008	0.5	0-0.5	Hand Tools
SS-47**	12/2/2008	0.5	0-0.5	Hand Tools
SS-48**	12/2/2008	0.5	0-0.5	Hand Tools
SS-49**	12/2/2008	0.5	0-0.5	Hand Tools
SS-50**	12/2/2008	0.5	0-0.5	Hand Tools
SS-51**	12/2/2008	0.5	0-0.5	Hand Tools
SS-52**	12/2/2008	0.5	0-0.5	Hand Tools
SS-53**	12/2/2008	0.5	0-0.5	Hand Tools
SS-54**	12/2/2008	0.5	0-0.5	Hand Tools
SS-55**	12/2/2008	0.5	0-0.5	Hand Tools

Soil Boring/Sample Summary - NBHS				
Soil Boring	**Date Advanced**	**Total Depth (ft bgs)**	**Depths Submitted for Laboratory Analysis* (ft bgs)**	**Drill Rig**
SS-56**	12/2/2008	0.5	0-0.5	Hand Tools
SS-57**	12/2/2008	0.5	0-0.5	Hand Tools
SS-58**	12/2/2008	0.5	0-0.5	Hand Tools
SS-59**	12/2/2008	0.5	0-0.5	Hand Tools
SS-60**	12/2/2008	0.5	0-0.5	Hand Tools
SS-61**	12/2/2008	0.5	0-0.5	Hand Tools
SS-62**	12/2/2008	0.5	0-0.5	Hand Tools
SS-63**	12/15/2008	0.5	0-0.5	Hand Tools
SS-64**	12/15/2008	0.5	0-0.5	Hand Tools
SS-65**	12/15/2008	0.5	0-0.5	Hand Tools

Notes:
*- Depth in parentheses submitted to laboratory but placed on hold for contingency. Analyses of these samples were not required.
** - Surface soil sample collected using hand tools.
bgs – below ground surface
ft – feet

3.1.3 New Bedford High School Groundwater Investigation

TRC collected groundwater samples from three monitoring wells (MW-4 through MW-6) on August 19, 2008 and from two monitoring wells (MW-7 and MW-8B) on September 16, 2008. Figure 2-2A shows the locations of monitoring wells MW-4 through MW-8B. Groundwater samples were collected following EPA Region I low stress (low flow) sampling guidelines (USEPA, 1996). During purging activities, water quality parameters were monitored using a YSI 600XL Sonde and 650 MDS datalogger and a LaMotte 2020 turbidity meter. Water quality parameters were recorded on groundwater sampling log forms included in Appendix C. Groundwater samples were collected after water quality parameters had stabilized in accordance with the low flow guidance, or after one hour of purging if parameters did not stabilize. A modification of the low flow guidance was the use of peristaltic pumps to collect the samples.

3.1.4 Groundwater Elevation Survey

On March 13, 2009, TRC conducted a synoptic water level event to assess groundwater flow direction and gradient at the Site. The synoptic round included 13 monitoring wells on the Site and additional properties that are part of the PSWS (as shown on Figure 3-1). Ten of the wells were installed by TRC between July 2008 and February 2009. The remaining three monitoring wells were installed by BETA in August and November 2006 on the KMS property to support long-term monitoring activities at that portion of the site. All wells except MW-WFB4 were constructed as flush-mount installations with the well screen bridging the water table, based on observations made during boring advancement. Monitoring well MW-WFB4 was installed approximately four inches beneath the ground surface to be unobtrusive to sports activities since it was located in the middle of an athletic field. All TRC wells were installed utilizing the

services of New England Geotech. All monitoring wells were surveyed by Land Planning following installation. The well construction information, depth to water, and calculated water elevations are summarized below.

Well ID	Date of Installation	Location	Reference Elevation (ft AMSL)	Depth to water (ft)	Calculated water elevation (ft AMSL)
MW-1	8/31/2006	KMS	94.09	9.85	84.24
MW-2	8/31/2006	KMS	94.03	9.31	84.72
MW-3	11/17/2006	KMS	93.47	9.35	84.12
MW-4	7/31/2008	NBHS	84.53	1.75	82.78
MW-5	7/30/2008	NBHS	84.55	1.95	82.6
MW-6	7/28/2008	NBHS	84.74	1.41	83.33
MW-7	8/21/2008	NBHS	91.10	8.51	82.59
MW-8A	8/21/2008	NBHS	89.35	3.06	86.29
MWTRC-1	1/20/2009	Former KJHS	85.59	4.89	80.7
MWTRC-2	1/21/2009	Former KJHS	85.25	4.50	80.75
MW-WFB4	2/25/2009	Walsh Field	85.15	4.35	80.8
MW-WFE5H	2/25/2009	Walsh Field	84.99	4.41	80.58
MW-WFC13	2/25/2009	Walsh Field	84.18	3.94	80.24

Notes:
KMS – Keith Middle School
KJHS –Former Keith Junior High School
AMSL – above mean sea level
ft – feet

3.2 Site Geologic/Hydrogeologic Conditions

3.2.1 Site Geology

The Site is underlain by topsoil and up to approximately 11 feet of anthropogenic fill material that includes sandy material with ash, related to the historical PSWS. In places, the ash fill includes broken glass, brick fragments, rubber, slag, coal, cinders, and/or metallic fragments. Location of the top and bottom of fill material is varied throughout the Site, ranging from 0.5 to 8.0 feet to 2.0 to 10 feet below ground surface, respectively. Fill thickness across the Site ranges from 0.1 feet 11.0 feet. Figures 3-3 and 3-4 depict fill thickness at Walsh Field and the NBHS campus, respectively. Anthropogenic fill materials are underlain by approximately 0.25 to 6.0 feet of native dark brown organic peat material, mixed with silt and clay in places from the wetland that predates the development of the area. Native soils below the organic peat layer are characterized by gray fine silty sands with trace gravel and/or medium sand in places. Boring logs documenting soil boring advancement are included in Appendix C.

Observation of Site soils and review of historic topographic maps indicates that surficial geology at the Site consists of glacial outwash sediments. Drumlins flank the Site to the east and west.

Based on review of the USGS Bedrock Geologic Map of Massachusetts (Zen et al., 1983), bedrock beneath the Site is light gray, pinkish-gray to tan, mafic-poor granite known as Alaskite (Zagr). Soil boring activities were terminated in native material unless refusal was encountered first. Direct push methods were employed to sample Site soils to characterize the presence of fill

materials and the horizontal and vertical extents of soil contamination. Bedrock was not assessed during this investigation. However, the boring methods employed were sufficient to assess the vertical extent of Site contamination (see Section 4.0).

3.2.2 Site Hydrogeology

As discussed in Section 3.1.3, TRC conducted a synoptic groundwater monitoring round on March 13, 2009 to determine groundwater flow direction and gradient across the study area. Figure 3-1 shows the water table elevation throughout the study area. The groundwater flows predominantly to the southeast at a gradient of about $2x10^{-3}$ ft/ft. The groundwater aquifer is unconfined and is present about 10 feet below ground surface. The unconfined aquifer is composed of ash fill, organic peat, and/or glacial outwash sediments (listed from the ground surface down, as typically observed). The thickness of the ash fill and peat layers vary, as described in Section 3.2.1. In places no fill was identified (see Figures 3-3 and 3-4). The aquifer thickness is not known. It is expected to extend down to the underlying bedrock. This aquifer is not potentially productive, as shown in Figure 2-1.

Based on literature values, the peat layer is expected to exhibit low hydraulic conductivity, on the range of 10^{-6} to 10^{-3} centimeters per second (cm/sec) while glacial outwash deposits having relatively less fine material could exhibit a hydraulic conductivity range of 10^{-3} to 15 cm/sec (Fetter, 1980). The hydraulic conductivity of the ash fill material is more difficult to estimate, since the material is heterogeneous in its nature and typical approximate ranges are not found in the available technical references; however, a study of the hydraulic conductivity of ash-sand mixtures indicates that the hydraulic conductivity of the ash fill could be as low as approximately $4.4x10^{-5}$ cm/sec (Pathan et al., 2003) with higher hydraulic conductivities (10^{-1} cm/sec; Fetter, 1980) a possibility depending on the relative amounts of sand and ash. Since the deposition is fairly loose, based on observations made during boring advancement, the hydraulic conductivity of the fill material is estimated to be high, relative to the underlying peat layer.

The City of New Bedford receives 47.34 inches of precipitation annually (www.fedstats.gov). Infiltration of rainwater to the aquifer is expected to be higher in the Walsh Field portion of the Site and lower in the NBHS campus, which has relatively more impervious surfaces (Section 2.3.2). There are no surface water bodies on the Site.

3.2.3 Flooding Potential

As shown in Figure 3-2, the Site is not within the 100-year or 500-year flood plains and flooding potential appears to be low.

3.3 Immediate Response Actions

The following summarizes IRA activities undertaken at the Site.

3.3.1 Varsity and JV Baseball Diamonds

Surface soil samples (0-0.5 foot below grade) collected from the Varsity and Junior Varsity (JV) Baseball Diamond portions of Walsh Field contained arsenic at concentrations above a threshold

that could pose an imminent hazard (IH) under 310 CMR 40.0321(2)(b). MassDEP was notified of the reportable condition by TRC via telephone in conjunction with representatives of the City on July 30, 2008. MassDEP orally approved IRA assessment activities and assigned RTN 4-21407. Follow-up work completed as part of the IRA included additional soil sampling, preparation of an IH evaluation, and implementation of controls limiting access to the Site. The controls included locking the perimeter fence around the area and posting "No Trespassing" signs. The IH evaluation concluded that an IH condition was present at the Varsity Baseball Diamond, but not at the JV Baseball Diamond. In September 2008, TRC submitted an IRA Completion Report to MassDEP. The objective of the September IRA Completion Report was to document the assessment and delineation of the potential IH condition and the mitigation of the condition through fencing. TRC subsequently submitted a Release Abatement Measure (RAM) Plan on October 27, 2008 that set forth a soil removal action intended to reduce risk. MassDEP later advised that response actions proposed for the Site would be preferably conducted as an IRA. In response, TRC withdrew the RAM Plan and filed an IRA Plan in November 2008. The objectives of the IRA Plan were to:

1. Remove the top 6 inches of base path, pitcher's mound, and infield soil within the Varsity Baseball Diamond that contain elevated concentrations of arsenic;

2. Remove additional soil around the outer perimeter of the infield extending into the outfield and foul territory to a depth of 6-inches; and

3. Replace the removed surface soil with appropriately documented, contaminant-free soil.

Three soil samples collected by TRC (SB-234, SB-252, and SB-253) indicated concentrations of arsenic in excess of the MassDEP potential IH threshold of 40 mg/kg in the top six inches of soil (310 CMR 40.0321[2][b]). Eight additional samples collected during a follow-up phase of sampling contained arsenic above the potential IH threshold: SB-252A (0-0.5 feet), SB-252B (0-0.5 feet), SB-252C (0-0.5 feet), SB-252D (0-0.5 feet), SB-253A (0-0.5 feet), SB-253B (0-0.5 feet), SB-253C (0-0.5 feet), and SB-253D (0-0.5 feet). All of the concentrations over the "could pose" IH threshold were found to be in the top 6 inches of base path/infield soil at the Varsity Baseball Diamond except SB-234, which was located in the grassed area adjacent to the base path/infield at the JV Baseball Diamond.

The JV Baseball Diamond was included in the excavation plans as a risk reduction measure, despite the determination that an IH was not present at this field.

In November 2008, TRC oversaw the excavation of approximately 1,118 tons of arsenic-contaminated soil from the Varsity and JV Baseball Diamonds. The soil was temporarily stockpiled at the Shawmut Avenue Transfer Station, which is owned and operated by the City. Following a Special Waste Determination Approval, the soil was accepted for disposal by the Crapo Hill Landfill in New Bedford/Dartmouth. The soil was shipped for disposal on March 12 and 13, 2009.

A post-excavation evaluation demonstrated that an IH condition does not exist at either the Varsity or JV Baseball Diamond and that the fields can continue to be safely used until a

permanent remedy that addresses the remaining soil contamination can be implemented. TRC filed an IRA Completion Report on the City's behalf on April 13, 2009.

3.3.2 Additional Immediate Response Actions

Subsequent (post-December 2008) soil sampling events at the Site have indicated additional IH-related reporting conditions and have resulted in on-going IRAs. The following conditions were identified after the targeted end date for this Interim Phase II CSA but are included herein for completeness.

- **Location WFE-5.** RTN 4-21823 was triggered on March 4, 2009 by the detection of lead at a concentration presenting an IH in surface soil (0 to 1 foot in depth) at the Soccer Field area of Walsh Field. TRC conducted additional soil sampling, prepared an IH evaluation, and removed approximately 41 cubic yards of contaminated soil. The soil was moved to the Shawmut Avenue Transfer Station in lined and covered roll-off containers for temporary storage. The City is currently identifying reuse, recycling, and/or disposal options for the material. TRC submitted an IRA Plan for this release on May 4, 2009.

- **Location HB-23.** RTN 4-21847 was triggered on March 19, 2009 by the detection of total PCBs at a concentration that could pose an IH under 310 CMR 40.0321(2)(b) in surface soil (0 to 1 foot in depth) at the HB-23 area of the NBHS campus. TRC conducted additional soil sampling, prepared an IH evaluation, and removed approximately 63 cubic yards of contaminated soil. The soil is temporarily stored at the Shawmut Avenue Transfer Station in lined and covered roll-off containers. The City is currently identifying disposal options for the material. TRC submitted an IRA Plan for this release on May 18, 2009.

- **Location HH-13.** RTN 4-21872 was triggered on April 2, 2009 by the detections of arsenic and chromium at concentrations that could pose an IH under 310 CMR 40.0321(2)(b) in surface soil (0 to 1 foot in depth) at the HH-13 area of the NBHS campus. Additional soil sampling and an IH evaluation indicated that an IH does not exist. TRC submitted an IRA Completion Report for this reportable condition on June 1, 2009.

4.0 NATURE AND EXTENT OF CONTAMINATION

Consistent with 310 CMR 40.0835(4)(f) of the MCP, the following presents an analysis of the current nature and extent of compounds detected in soil and groundwater for the NBHS campus, located between Hathaway Boulevard and Liberty Street in New Bedford, Massachusetts, and Walsh Field, located across Parker Street from the NBHS campus. This section summarizes the results of chemical analyses for soil and groundwater samples collected at the Site by TRC and samples collected during previous assessments conducted by BETA. For the purposes of this report, the discussion of the nature and extent of contamination is focused on data collected on or before December 15, 2008. Additional sampling data are currently being collected to refine the delineation of contaminated areas and support remedial planning, which will be included in subsequent submittals to MassDEP.

A data usability assessment was performed by TRC to evaluate the usability of the data obtained by TRC in fulfilling the project objectives. The data usability assessment is included in Section 7.0 of this report. Copies of the laboratory data reports are provided in Appendix D.

As discussed in Section 6.0 of this Report, the MCP Method 1 soil categories S-1, S-2 and S-3 currently apply to Site soil. Based on the available information, groundwater categories GW-2 and GW-3 apply to groundwater beneath this Site. An MCP Method 2 Risk Characterization has been completed for this Site and is presented in Section 6.0 of this Report, which considers both current and foreseeable future use of the Site.

4.1 Analytical Results

The following is a discussion of the results of laboratory analysis for soil and groundwater samples collected at the NBHS campus and Walsh Field portion of the Site. Analytical results indicate soil and groundwater contamination consistent with the Site's historic use as a burn dump. Tables summarizing the results of chemical analysis for soil and groundwater samples collected at the NBHS and Walsh Field portion of the Site are provided in Tables 4-1 through Table 4-10 of this report organized by the defined exposure areas illustrated in Figure 2-3. Where duplicate samples were collected, the maximum results are cited below. Copies of the laboratory data reports are provided in Appendix D.

4.1.1 Soil Analytical Results

The nature and extent of soil contamination is discussed as separate exposure point areas based on the identification of varied activities and uses throughout the different areas of the NBHS campus and Walsh Field portions of the Site, and in consideration of future remedial actions. The exposure point area boundaries are illustrated in Figure 2-3.

The discussion of the nature and extent of soil contamination focuses on the 0 to 1 foot below ground surface horizon, 1 to 3 feet below ground surface horizon, and greater than 3 feet below ground surface horizon. The 0 to 1 foot horizon is considered to be representative of contamination located at or near the ground surface that is directly accessible, has a high potential for contact by people, and is representative of current exposures. The 1 to 3 feet

horizon is considered to be representative of contamination that is below the ground surface, not immediately accessible and has a lower potential for contact by people (potential for contact by maintenance or construction personnel when performing activities that require digging below the ground surface exists). In some exposure point areas, the intervals of some samples collected by BETA encompass more than one soil horizon. For discussion purposes, where the sample interval includes surficial soil (for example sampling interval 0 to 2 feet), the sampling interval was considered to be part of the 0 to 1 foot soil horizon. Where a sample interval does not include surficial soil (for example 0.5 to 1.5 feet), the sampling interval was considered to be part of the 1 to 3 feet soil horizon. The BETA data, and their respective interval assignments, are included in Tables 4-1 through 4-15.

All analyses of soil samples submitted by TRC for PAHs, PCB Aroclors, and MCP metals and mercury, were conducted in accordance with the MassDEP Compendium of Analytical Methods (CAM). Analyses of soil samples submitted by TRC for PCB homologs were conducted in accordance with EPA Method 680.

Samples submitted by BETA for metals analyses were analyzed for the RCRA 8 metals (arsenic, barium, cadmium, chromium, lead, mercury, selenium, and silver). BETA also submitted soil samples for analysis of PCB Aroclors, volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), pesticides, herbicides, total petroleum hydrocarbons (TPH), TCLP metals, flashpoint, reactivity, and dibenzofuran. See Section 2.3.3 for a summary of BETA soil sampling and analytical assignments.

Method 2 soil standards have been developed for chemicals lacking tabulated MCP Method 1 soil cleanup standards using methods and assumptions described in 310 CMR 40.0983 and 40.0884 of the MCP. The use of Method 2 to develop Method 1 S-1/GW-2 and S-1/GW-3 soil standards for dibenzofuran, carbazole, 1,2,3-trichlorobenzene, 4-bromophenyl phenyl ether, 4-methylphenol, alpha-BHC, benzoic acid, endosulfan sulfate, and dinoseb is documented in Appendix F. Such standards are referenced in the discussions of contaminant concentrations as Method 1 cleanup standards and tabulated accordingly.

The soil contaminant concentration units in the following discussion are in milligrams per kilogram (mg/kg). The discussion is presented by soil exposure point area (see Figure 2-3). Laboratory detection limits were below the applicable Method 1 standards, unless otherwise noted and discussed in the following sections.

4.1.1.1 Walsh Field Football Field Soil Results (WF-1)

For soil samples taken from the Walsh Field Football Field area of the Site, identified as Exposure Point Area WF-1 on Figure 2-3, the laboratory results did not indicate the detection of any contaminants at concentrations that exceed the applicable MCP Method 1 soil cleanup standards with the exception of two PAHs [benzo(a)pyrene and dibenz(a,h)anthracene], and three MCP metals (arsenic, chromium, and lead). A summary of the Walsh Field Football Field (WF-1) soil analytical results for detected contaminants only is included in Table 4-1.

Walsh Field Football Field (WF-1) Soil PAH Results

For soil samples taken in the 0 to 1 foot below ground surface horizon, the analytical results did not indicate the detection of any PAHs at concentrations exceeding the applicable MCP Method 1 soil cleanup standards.

For soil samples taken in the 1 to 3 feet below ground surface horizon, the analytical results did not indicate the detection of any PAHs at concentrations exceeding the applicable MCP Method 1 soil cleanup standards, with the following exceptions:

- benzo(a)pyrene at sampling locations WFD-13 (6.4 mg/kg) and WFF-11 (3.5 mg/kg).
- dibenz(a,h)anthracene at sampling locations WFA-12 (0.840 mg/kg), WFD-13 (1.10 mg/kg) and WFF-11 (2.00 mg/kg).

Walsh Field Football Field (WF-1) Soil Metals Results

For soil samples taken in the 0 to 1 foot below ground surface horizon, the analytical results did not indicate the detection of any MCP Metals or mercury at concentrations exceeding the applicable MCP Method 1 soil cleanup standards, with the following exceptions:

- chromium at sampling location SB-249 (32.1 mg/kg).
- lead at sampling location SB-244 (311 mg/kg).

For soil samples taken in the 1 to 3 feet below ground surface horizon, the analytical results did not indicate the detection of any MCP Metals and mercury at concentrations exceeding the applicable MCP Method 1 soil cleanup standards, with the following exceptions:

- arsenic at sampling location WFE-11 (55.6 mg/kg).
- chromium at sampling locations WFE-11 (42.1 mg/kg) and SB-249 (32.1 mg/kg).
- lead at eight sampling locations (WFA-11, WFA-12, WFB-11, WFC-13, WFD-13, WFE-11, WFF-13, and SB-244) at concentrations ranging from 311 mg/kg (SB-244) to 2,390 mg/kg (WFC-13).

Walsh Field Football Field (WF-1) Soil PCB Results

For soil samples taken in the 0 to 1 foot below ground surface horizon and the 1 to 3 feet below ground surface horizon, the analytical results did not indicate the detection of total PCBs at concentrations exceeding the applicable MCP Method 1 soil cleanup standards. Total PCBs were detected above laboratory reporting limits at sampling locations WFF-11 (0.185 mg/kg at 0–0.5 feet, and 0.040 mg/kg at 1–2.5 feet) and WFF-12 (0.045 mg/kg at 0-0.5 feet).

Walsh Field Football Field (WF-1) Soil Pesticide Results

For soil samples taken in the 1 to 3 feet below ground surface horizon, the analytical results did not indicate the detection of pesticides at concentrations exceeding the applicable MCP Method 1 soil cleanup standards. No samples taken in the 0 to 1 foot below ground surface horizon were analyzed for pesticides. Pesticides were detected above laboratory reporting limits at sampling locations WFA-12 (4,4'-DDE at 0.019 mg/kg and 4,4'-DDT at 0.0062 mg/kg at 1–2.5 feet), and WFE-11 (endosulfan sulfate at 0.0047 mg/kg at 2-2.5 feet).

Walsh Field Football Field (WF-1) Soil Herbicide Results

For soil samples taken in the 1 to 3 feet below ground surface horizon, the analytical results did not indicate the detection of herbicides above laboratory reporting limits at any sampling locations. No samples taken in the 0 to 1 foot below ground surface horizon were analyzed for herbicides.

Walsh Field Football Field (WF-1) Soil TPH Results

For soil samples taken in the 1 to 3 feet below ground surface horizon, the analytical results did not indicate the detection of TPH at concentrations exceeding the applicable MCP Method 1 cleanup standards. No samples taken in the 0 to 1 foot below ground surface horizon were analyzed for TPH. TPH was detected above laboratory reporting limits at sampling locations WFA-12 (Diesel Range Organics at 120 mg/kg at 1–2.5 feet), WFC-13 (Diesel Range Organics at 102 mg/kg and Gasoline Range Organics at 5.3 mg/kg at 1.5–2.5 feet), and WFE-11 (Diesel Range Organics at 57 mg/kg at 2–2.5 feet).

Walsh Field Football Field (WF-1) Soil Dibenzofuran Results

For soil samples taken in the 1 to 3 feet below ground surface horizon, the analytical results did not indicate the detection of dibenzofuran at concentrations exceeding the applicable MCP Method 1 soil cleanup standards. No samples taken in the 0 to 1 foot below ground surface horizon were analyzed for dibenzofuran. Dibenzofuran was detected above laboratory reporting limits at sampling locations WFC-13 (0.080 mg/kg at 1.5–2.5 feet) and WFD-13 (2.10 mg/kg at 1.75–2.5 feet).

Walsh Field Football Field (WF-1) Soil VOC Results

For soil samples taken in the 1 to 3 feet below ground surface horizon, the analytical results did not indicate the detection of VOCs at concentrations exceeding the applicable MCP Method 1 soil cleanup standards. No samples taken in the 0 to 1 foot below ground surface horizon were analyzed for VOCs. VOCs were detected above laboratory reporting limits at sampling location WFC-13 (methylene chloride at 0.046 mg/kg at 1.5–2.5 feet). During boring advancement conducted by TRC in this exposure point area (WF-1), no VOCs were detected using a PID.

4.1.1.2 Walsh Field Soccer Field Soil Results (WF-2)

For soil samples taken from the Walsh Field Soccer Field area of the Site, identified as Exposure Point Area WF-2 on Figure 2-3, the laboratory results did not indicate the detection of any contaminants at concentrations that exceed the applicable MCP Method 1 soil cleanup standards with the exception of four PAHs [benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene and dibenz(a,h)anthracene], and three MCP metals (cadmium, chromium, and lead). The reporting limits were below applicable MCP Method 1 soil cleanup standards for all analytes. A summary of the Walsh Field Soccer Field (WF-2) soil analytical results for detected contaminants only is included in Table 4-2.

No samples were collected in the greater than 3 feet below ground surface horizon.

Walsh Field Soccer Field (WF-2) Soil PAH Results

For soil samples taken in the 0 to 1 foot below ground surface horizon, the analytical results did not indicate the detection of any PAHs at concentrations exceeding the applicable MCP Method 1 soil cleanup standards.

For soil samples taken in the 1 to 3 feet below ground surface horizon, the analytical results did not indicate the detection of any PAHs at concentrations exceeding the applicable MCP Method 1 soil cleanup standards, with the following exceptions:

- benzo(a)anthracene at sampling location WFF-5 (14.0 mg/kg).
- benzo(a)pyrene at sampling locations WFE-1 (3.0 mg/kg), WFE-2 (2.40 mg/kg), WFE-6 (3.2 mg/kg), and WFF-5 (11.0 mg/kg).
- benzo(b)fluoranthene at sampling location WFF-5 (8.10 mg/kg).
- dibenz(a,h)anthracene at sampling locations WFE-6 (1.90 mg/kg) and WFF-5 (1.50 mg/kg).

Walsh Field Soccer Field (WF-2) Soil Metals Results

For soil samples taken in the 0 to 1 foot below ground surface horizon, the analytical results did not indicate the detection of any MCP Metals or mercury at concentrations exceeding the applicable MCP Method 1 soil cleanup standards.

For soil samples taken in the 1 to 3 feet below ground surface horizon, the analytical results did not indicate the detection of any MCP Metals or mercury at concentrations exceeding the applicable MCP Method 1 soil cleanup standards, with the following exceptions:

- cadmium at sampling location WFE-5 (61.0 mg/kg).
- chromium at sampling location WFE-6 (37.4 mg/kg).

- lead at sampling locations WFE-1 (1,160 mg/kg), WFE-4 (339 mg/kg), WFE-5 (562 mg/kg), and WFE-6 (719 mg/kg).

Walsh Field Soccer Field (WF-2) Soil PCB Results

For soil samples taken in the 0 to 1 foot below ground surface horizon, and the 1 to 3 feet below ground surface horizon the analytical results did not indicate the detection of total PCBs above laboratory reporting limits at any sampling locations.

Walsh Field Soccer Field (WF-2) Soil Pesticide Results

For soil samples taken in the 1 to 3 feet below ground surface horizon, the analytical results did not indicate the detection of pesticides above laboratory reporting limits at any sampling locations. No samples taken in the 0 to 1 foot below ground surface horizon were analyzed for pesticides.

Walsh Field Soccer Field (WF-2) Soil Herbicide Results

For soil samples taken in the 1 to 3 feet below ground surface horizon, the analytical results did not indicate the detection of herbicides above laboratory reporting limits at any sampling locations. No samples taken in the 0 to 1 foot below ground surface horizon were analyzed for herbicides.

Walsh Field Soccer Field (WF-2) Soil TPH Results

For soil samples taken in the 1 to 3 feet below ground surface horizon, the analytical results did not indicate the detection of TPH at concentrations exceeding the applicable MCP Method 1 soil cleanup standards. No samples taken in the 0 to 1 foot below ground surface horizon were analyzed for TPH. TPH was detected above laboratory reporting limits at sampling locations WFE-5 (Diesel Range Organics at 45 mg/kg and Gasoline Range Organics at 9.9 mg/kg at 1.75–2.5 feet) and WFE-6 (Diesel Range Organics at 290 mg/kg at 1–2.5 feet).

Walsh Field Soccer Field (WF-2) Soil Dibenzofuran Results

For soil samples taken in the 1 to 3 feet below ground surface horizon, the analytical results did not indicate the detection of dibenzofuran at concentrations exceeding the applicable MCP Method 1 soil cleanup standards. No samples taken in the 0 to 1 foot below ground surface horizon were analyzed for dibenzofuran. Dibenzofuran was detected above laboratory reporting limits at sampling locations WFE-1 (0.230 mg/kg at 0.75–2.5 feet), WFE-2 (0.130 mg/kg at 1.75-2.5 feet), and WFF-5 (4.4 mg/kg at 2–2.5 feet).

Walsh Field Soccer Field (WF-2) Soil VOC Results

For soil samples taken in the 1 to 3 feet below ground surface horizon, the analytical results did not indicate the detection of VOCs above laboratory reporting limits at any sampling locations.

No samples taken in the 0 to 1 foot below ground surface horizon were analyzed for VOCs. During boring advancement conducted by TRC in this exposure point area (WF-2), no VOCs were detected using a PID.

4.1.1.3 Walsh Field Practice Area Soil Results (WF-3)

For soil samples taken from the Walsh Field Practice area of the Site, identified as Exposure Point Area WF-3 on Figure 2-3, the laboratory results did not indicate the detection of any contaminants at concentrations that exceed the applicable MCP Method 1 soil cleanup standards with the exception of five PAHs [benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, dibenz(a,h)anthracene, indeno(1,2,3-cd)pyrene], and four MCP metals (arsenic, cadmium, chromium, and lead). The reporting limits were below applicable MCP Method 1 soil cleanup standards for all analytes except dibenz(a,h)anthracene in WFD-5 (1-2.5). A summary of the Walsh Field Practice Area (WF-3) soil analytical results for detected contaminants only is included in Table 4-3.

Walsh Field Practice Area (WF-3) Soil PAH Results

For soil samples taken in the 0 to 1 foot below ground surface horizon, the analytical results did not indicate the detection of any PAHs at concentrations exceeding the applicable MCP Method 1 soil cleanup standards, with the exceptions of sampling location SB-226 (benzo(a)pyrene at 4.80 mg/kg, and dibenz(a,h)anthracene at 0.883 mg/kg).

For soil samples taken in the 1 to 3 feet below ground surface horizon, the analytical results did not indicate the detection of any PAHs at concentrations exceeding the applicable MCP Method 1 soil cleanup standards, with the following exceptions:

- benzo(a)anthracene at sampling location SB-233 (7.53 mg/kg).
- benzo(a)pyrene at sampling location WFB-7 (2.50 mg/kg), SB-226 (4.80 mg/kg), and SV-233 (5.48 mg/kg).
- dibenz(a,h) anthracene at sampling location WFB-7 (1.60 mg /kg).

For soil samples taken at depths greater than the three feet below ground surface, the analytical results did not indicate the detection of PAHs at concentrations exceeding the applicable MCP Method 1 cleanup standards, with the following exceptions:

- benzo(a)anthracene at sampling locations SB-224 (13.8 mg/kg) and SB-228 (15.2 mg/kg).
- benzo(a)pyrene at sampling locations SB-224 (21.1 mg/kg) and SB-228 (12.8 mg/kg).
- benzo(b)fluoranthene at sampling locations SB-224 (22.8 mg/kg) and SB-228 (15.4 mg/kg).

- dibenz(a,h)anthracene at sampling locations SB-224 (5.57 mg/kg) and SB-228 (2.52 mg/kg).

- indeno(1,2,3-cd)pyrene at sampling locations SB-224 (22.3 mg//kg) and SB-228 (10.0 mg/kg).

Walsh Field Practice Area (WF-3) Soil Metals Results

For soil samples taken in the 0 to 1 foot below ground surface horizon, the analytical results did not indicate the detection of any MCP Metals or mercury at concentrations exceeding the applicable MCP Method 1 soil cleanup standards.

For soil samples taken in the 1 to 3 feet below ground surface horizon, the analytical results did not indicate the detection of any MCP Metals or mercury at concentrations exceeding the applicable MCP Method 1 soil cleanup standards, with the following exceptions:

- arsenic at five sampling locations (WFA-10, WFB-7, WFD-5, WFD-6, and WFE-9) at concentrations ranging from 21.5 mg/kg (WFE-9) to 30.4 mg/kg (WFD-6).

- cadmium at sampling locations WFA-10 (3.82 mg/kg), WFD-5 (5.97 mg/kg), and WFD-6 (41.4 mg/kg).

- chromium at sampling locations WFA-10 (41.8 mg/kg), WFD-6 (156 mg/kg), and WFE-9 (37.8 mg/kg).

- lead at nine sampling locations (WFA-10, WFB-7, WFC-6, WFC-7, WFC-10, WFD-5, WFD-6, WFE-9, and SB-233) at concentration ranging from 354 mg/kg (WFC-7) to 1,640 mg/kg (SB-233).

For soil samples taken at depths greater than the three feet below ground surface, the analytical results did not indicate the detection of any MCP metals and mercury at concentrations exceeding the applicable MCP Method 1 cleanup standards, with the exception of lead at sampling locations SB-222 (494 mg/kg), SB-223 (549 mg/kg), SB-226 (482 mg/kg), SB-227 (511 mg/kg) and SB-228 (418 mg/kg).

Walsh Field Practice Area (WF-3) Soil PCB Results

For soil samples taken in the 0 to 1 foot below ground surface horizon and the 1 to 3 feet below ground surface horizon, the analytical results did not indicate the detection of total PCBs at concentrations exceeding the applicable MCP Method 1 soil cleanup standards. Total PCBs were detected above laboratory reporting limits at sampling locations WFA-6 (0.250 mg/kg at 2–3 feet), WFA-10 (0.052 mg/kg at 1.5–2.5 feet), WFB-10 (0.076 mg/kg at 0–0.5 feet), WFC-9 (0.036 mg/kg at 2.0–2.5 feet), WFD-8 (0.028 mg/kg at 2.0–2.5 feet), and WFD-10 (0.092 mg/kg at 0-0.5 feet).

For soil samples taken in the greater than 3 feet below ground surface horizon, the analytical results did not indicate the detection of total PCBs at concentrations above laboratory reporting limits.

Walsh Field Practice Area (WF-3) Soil Pesticide Results

For soil samples taken in the 1 to 3 feet below ground surface horizon, the analytical results did not indicate the detection of pesticides at concentrations exceeding the applicable MCP Method 1 cleanup standards. No samples taken in the 0 to 1 foot below ground surface horizon or the greater than 3 feet below ground surface horizon were analyzed for pesticides. Pesticides were detected above laboratory reporting limits at sampling locations WFC-8 (4,4'-DDE at 0.014 mg/kg at 1–2.5 feet), WFC-10 (alpha-BHC at 0.0024 mg/kg, 4,4'-DDE at 0.026 mg/kg and 4,4'-DDT, at 0.0064 mg/kg at 2–2.5 feet), and WFD-9 (4,4'-DDE at 0.0048 mg/kg at 2–2.5 feet).

Walsh Field Practice Area (WF-3) Soil TPH Results

For soil samples taken in the 1 to 3 feet below ground surface horizon, the analytical results did not indicate the detection of TPH at concentrations exceeding the applicable MCP Method 1 soil cleanup standards. No samples taken in the 0 to 1 foot below ground surface horizon or the greater than 3 feet below ground surface horizon were analyzed for TPH. TPH was detected above laboratory reporting limits at sampling location WFC-10 (Diesel Range Organics at 77 mg/kg at 2–2.5 feet).

Walsh Field Practice Area (WF-3) Soil Dibenzofuran Results

For the soil samples taken in the 1 to 3 feet below ground surface horizon, the analytical results did not indicate the detection of dibenzofuran at concentrations above laboratory reporting limits. No samples taken in the 0 to 1 foot below ground surface horizon or the greater than 3 feet below ground surface horizon were analyzed for dibenzofuran.

Walsh Field Practice Area (WF-3) Soil VOC Results

For soil samples taken in the 1 to 3 feet below ground surface horizon, the analytical results did not indicate the detection of VOCs at concentrations above laboratory reporting limits. No samples taken in the 0 to 1 foot below ground surface horizon or the greater than 3 feet below ground surface horizon were analyzed for VOCs. PID field screening conducted by TRC during boring advancement did not indicate the presence of VOCs.

4.1.1.4 Walsh Field Junior Varsity Baseball Field Area Soil Results (WF-4)

For soil samples taken from the Walsh Field Junior Varsity Baseball Field area of the Site, identified as Exposure Point Area WF-4 on Figure 2-3, the laboratory results did not indicate the detection of any contaminants at concentrations that exceed the applicable MCP Method 1 soil cleanup standards with the exception of four MCP metals (arsenic, cadmium, chromium, and lead). The reporting limits were below applicable MCP Method 1 soil cleanup standards for all analytes except arsenic in sample WFG-7. A summary of the Walsh Field Junior Varsity

Baseball Field (WF-4) soil analytical results for detected contaminants only is included in Table 4-4.

Walsh Field Junior Varsity Baseball Field (WF-4) Soil PAH Results

For soil samples taken in the 0 to 1 foot below ground surface horizon and the 1 to 3 feet below ground surface horizon, the analytical results did not indicate the detection of any PAHs at concentrations exceeding the applicable MCP Method 1 cleanup standards. Various PAHs were detected above laboratory reporting limits at sampling locations WFF-8, WFG-8, WFG-9, SB-234, and SB-236.

Walsh Field Junior Varsity Baseball Field (WF-4) Soil Metals Results

For soil samples taken in the 0 to 1 foot below ground surface horizon, the analytical results did not indicate the detection of any MCP Metals or mercury at concentrations exceeding the applicable MCP Method 1 cleanup standards, with the following exception: arsenic at six sampling locations (SB-234, JV-13, POST-6, POST-7, POST-9 and POST-10) at concentrations ranging from 25.0 mg/kg (JV-13) to 238 mg/kg (POST-10). (Note that all "POST" concentrations are located beneath 6 to 8 inches of clean, arsenic free soil installed as part of an IRA contaminated soil removal effort.)

For soil samples taken in the 1 to 3 feet below ground surface horizon, the analytical results did not indicate the detection of any MCP Metals or mercury at concentrations exceeding the applicable MCP Method 1 soil cleanup standards, with the following exceptions:

- arsenic at sampling location WFG-8 (24.1 mg/kg) and WFG-9 (20.9 mg/kg).
- cadmium at sampling location WFG-7 (38.4 mg/kg).
- chromium at sampling location WFG-9 (33.1 mg/kg).
- lead at sampling locations WFF-8 (885 mg/kg), WFG-7 (1,710 mg/kg), and WFG-9 (1,160 mg/kg).

No samples were collected from the greater than 3 feet below ground surface horizon.

Walsh Field Junior Varsity Baseball Field (WF-4) Soil PCB Results

For soil samples taken in the 0 to 1 foot below ground surface horizon and the 1 to 3 feet below ground surface horizon, the analytical results did not indicate the detection of total PCBs at concentrations exceeding the applicable MCP Method 1 soil cleanup standards. Total PCBs were detected above laboratory reporting limits at sampling locations WFG-9 (0.081 mg/kg at 0–0.5 feet), SB-234 (0.108 mg/kg at 0.5 feet), and SB-236 (0.0555 mg/kg at 0.5 feet).

Walsh Field Junior Varsity Baseball Field (WF-4) Soil Pesticide Results

For the one soil sample (WFG-8) taken in the 1 to 3 feet below ground surface horizon that was submitted for pesticides analysis, the analytical results did not indicate the detection of pesticides at concentrations exceeding the applicable MCP Method 1 soil cleanup standards. No samples taken in the 0 to 1 foot below ground surface horizon were analyzed for pesticides. Pesticides were detected above laboratory reporting limits at sampling location WFG-8 (alpha-BHC at 0.012 mg/kg, 4,4'-DDE at 0.0085 mg/kg, heptachlor epoxide at 0.0038 mg/kg and hexachlorobenzene at 0.004 mg/kg at 1.5–2.5 feet).

Walsh Field Junior Varsity Baseball Field (WF-4) Soil TPH Results

For the one soil sample (WFG-8) taken in the 1 to 3 feet below ground surface horizon that was submitted for TPH analysis, the analytical results did not indicate the detection of TPH at concentrations exceeding the applicable MCP Method 1 soil cleanup standards. No samples taken in the 0 to 1 foot below ground surface horizon were analyzed for TPH. TPH was detected above laboratory reporting limits at sampling location WFG-8 (Diesel Range Organics at 180 mg/kg at 1.5–2.5 feet).

Walsh Field Junior Varsity Baseball Field (WF-4) Soil VOC Results

For the one soil sample (WFG-8) taken in the 1 to 3 feet below ground surface horizon that was submitted for VOC analysis, the analytical results did not indicate the detection of VOCs at concentrations exceeding the applicable MCP Method 1 soil cleanup standards. No samples taken in the 0 to 1 foot below ground surface horizon were analyzed for VOCs. VOCs were detected above laboratory reporting limits at sampling location WFG-8 (m & p-xylene at 0.049 mg/kg at 1.5–2.5 feet). PID field screening conducted by TRC during boring advancement did not indicate the presence of VOCs.

4.1.1.5 Walsh Field Varsity Baseball Field Area Soil Results (WF-5)

A discrete "Hot Spot" area, where the concentrations of contaminants of concern are substantially higher than those present in the surrounding area, was identified at the Walsh Field Varsity Baseball Field Area at sample location WFB-4 (1-2.5 feet). The analytical results for the Hot Spot are discussed separately in a following section.

For the remainder of the soil samples taken from the Walsh Field Varsity Baseball Field area of the Site, identified as Exposure Point Area WF-5 on Figure 2-3, the laboratory results did not indicate the detection of any contaminants at concentrations that exceed the applicable MCP Method 1 cleanup standards with the exception of three PAHs [benzo(a)anthracene, benzo(a)pyrene, and dibenz(a,h)anthracene], and seven MCP metals (mercury, arsenic, barium, cadmium, chromium, lead, and nickel). The reporting limits were below applicable MCP Method 1 cleanup standards for all analytes except for dibenz(a,h)anthracene in WFD-3. A summary of the Walsh Field Varsity Baseball Field (WF-5) soil analytical results for detected contaminants only is included in Table 4-5.

Walsh Field Varsity Baseball Field (WF-5) Soil "Hot Spot" Results

At soil sample location WFB-4 (1-2.5 feet), a Hot Spot was identified due to elevated concentrations of carcinogenic PAHs and petroleum hydrocarbons 100-fold above concentrations typically found in this area of the Site. The analytical results are discussed herein, independently of the rest of the Walsh Field Varsity Baseball Field Area analytical results.

The analytical results at WFB-4 (1-2.5 feet) did not indicate the detection of any contaminants of concern at concentrations exceeding the applicable MCP Method 1 cleanup standards, with the following exceptions: dibenzofuran at 28.0 mg/kg; PAHs including acenapthylene at 47.0 mg/kg, benzo(a)anthracene at 160 mg/kg, benzo(a)pyrene at 95.0 mg/kg, benzo(b)fluoranthene at 76.0 mg/kg, benzo(k)fluoranthene at 110 mg/kg, chrysene at 170 mg/kg, dibenz(a,h)anthracene at 17.0 mg/kg, and indeno(1,2,3-cd)pyrene at 28.0 mg/kg; and diesel range organics at 6,063 mg/kg.

Walsh Field Varsity Baseball Field (WF-5) Soil PAH Results

For soil samples taken in the 0 to 1 foot below ground surface horizon and the greater than 3 feet below ground surface horizon, the analytical results did not indicate the detection of any PAHs at concentrations exceeding the applicable MCP Method 1 soil cleanup standards.

For soil samples taken in the 1 to 3 feet below ground surface horizon, the analytical results did not indicate the detection of any PAHs at concentrations exceeding the applicable MCP Method 1 soil cleanup standards, with the following exceptions:

- benzo(a)anthracene at sampling location WFD-4 (7.20 mg/kg).
- benzo(a)pyrene at sampling locations WFA-2 (3.0 mg/kg), WFD-4 (3.90 mg/kg), and SB-254 (2.98 mg/kg).
- dibenz(a,h)anthracene at sampling locations WFD-4 (0.830 mg/kg) and SB-254 (0.711 mg/kg).

Walsh Field Varsity Baseball Field (WF-5) Soil Metals Results

For soil samples taken in the 0 to 1 foot below ground surface horizon, the analytical results did not indicate the detection of any MCP Metals or mercury at concentrations exceeding the applicable MCP Method 1 soil cleanup standards, with the following exception: arsenic at ten sampling locations (SB-252-B, SB-252-C, SB-252-D, SB-253-B, SB-253-C, WF-4, POST-1, POST-2, POST-3, and POST-4) at concentrations ranging from 25.8 mg/kg (WF-4) to 1,040 mg/kg (POST-3). (Note that all "POST" concentrations are located beneath clean, arsenic-free soil installed as part of an IRA soil removal effort.)

For soil samples taken in the 1 to 3 feet below ground surface horizon, the analytical results did not indicate the detection of any MCP Metals and mercury at concentrations exceeding the applicable MCP Method 1 cleanup standards, with the following exceptions:

- arsenic at sampling location WFC-2 (26 mg/kg).
- barium at sampling location WFC-2 (1,060 mg/kg).
- cadmium at sampling location WFC-2 (5.61 mg/kg).
- chromium at sampling locations WFC-2 (62 mg/kg) and WFD-3 (56 mg/kg).
- lead at five sampling locations (WFA-4, WFB-2, WFC-2, WFD-3, and SB-254) at concentrations ranging from 319 mg/kg (WFA-4) to 4,590 mg/kg (WFC-2).

For soil samples taken at depths greater than three feet below ground surface, the analytical results did not indicate the detection of any MCP Metals or mercury at concentrations exceeding the applicable MCP Method 1 soil cleanup standards, with the following exceptions:

- mercury at sampling location SB-268 (38.4 mg/kg at 4.5 feet).
- arsenic at sampling location SB-268 (27.8 mg/kg at 4.5 feet).
- chromium at sampling location SB-268 (51.9 mg/kg at 4.5 feet)
- lead at sampling locations SB-268 (1,320 mg/kg at 4.5 feet) and SB-269 (1,790 mg/kg at 4 feet).
- nickel at sampling location SB-268 (24.2 mg/kg at 4.5 feet).

Walsh Field Varsity Baseball Field (WF-5) Soil PCB Results

For soil samples taken in the 0 to 1 foot below ground surface horizon and the 1 to 3 feet below ground surface horizon, the analytical results did not indicate the detection of PCBs at concentrations exceeding the applicable MCP Method 1 soil cleanup standards. For soil samples taken at depths greater than three feet below ground surface, the analytical results did not indicate the detection of PCBs above laboratory reporting limits at any sampling locations. Total PCBs were detected above laboratory reporting limits at sampling locations WFA-2 (0.13 mg/kg at 2-2.5 feet), SB-255 (0.126 mg/kg at 2 feet), and SB-268 (0.073 mg/kg at 1 foot).

Walsh Field Varsity Baseball Field (WF-5) Soil Pesticide Results

For soil samples taken in the 1 to 3 feet below ground surface horizon for pesticides, the analytical results did not indicate the detection of pesticides at concentrations above laboratory reporting limits. No samples taken in the 0 to 1 foot below ground surface horizon or the greater than 3 feet below ground surface horizon were analyzed for pesticides.

Walsh Field Varsity Baseball Field (WF-5) Soil Herbicide Results

For soil samples taken in the 1 to 3 feet below ground surface horizon for herbicides, the analytical results did not indicate the detection of herbicides at concentrations above laboratory reporting limits. No samples taken in the 0 to 1 foot below ground surface horizon or the greater than 3 feet below ground surface horizon were analyzed for herbicides.

Walsh Field Varsity Baseball Field (WF-5) Soil TPH Results

For the soil samples taken in the 1 to 3 feet below ground surface horizon, the analytical results did not indicate the detection of TPH at concentrations exceeding the applicable MCP Method 1 soil cleanup standards. No samples taken in the 0 to 1 foot below ground surface horizon or the greater than 3 feet below ground surface horizon were analyzed for TPH. TPH was detected above laboratory reporting limits at sampling locations WFA-4 (Diesel Range Organics at 112 mg/kg at 1–2.5 feet, Gasoline Range Organics at 5.3 mg/kg at 1-2.5 feet), WFD-1 (Diesel Range Organics at 73 mg/kg at 1.25-2.5 feet), and WFD-3 (Diesel Range Organics at 984 mg/kg at 1-2.5 feet).

Walsh Field Varsity Baseball Field (WF-5) Soil Dibenzofuran Results

For the soil samples taken in the 1 to 3 feet below ground surface horizon, the analytical results did not indicate the detection of dibenzofuran at concentrations exceeding the applicable MCP Method 1 soil cleanup standards. No samples taken in the 0 to 1 foot below ground surface horizon or the greater than 3 feet below ground surface horizon were analyzed for dibenzofuran. Dibenzofuran was detected above laboratory reporting limits at sampling locations WFA-4 (0.059 at 1-2.5 feet), WFD-1 (0.084 at 1.25-2.5 feet), WFD-2 (0.059 mg/kg at 0.75-2.5 feet).

Walsh Field Varsity Baseball Field (WF-5) Soil Volatile Organic Compound Results

For the soil samples taken in the 1 to 3 feet below ground surface horizon, the analytical results did not indicate the detection of VOCs at concentrations exceeding the applicable MCP Method 1 soil cleanup standards. No samples taken in the 0 to 1 foot below ground surface horizon or the greater than 3 feet below ground surface horizon were analyzed for VOCs. PID field headspace screening conducted by TRC during boring advancement did not indicate the presence of VOCs.

4.1.1.6 New Bedford High School Children's Playground Area Soil Results (HS-1)

For soil samples taken from the NBHS Children's Playground Area of the Site, identified as Exposure Point Area HS-1 on Figure 2-3, the laboratory results did not indicate the detection of any contaminants at concentrations that exceed the applicable MCP Method 1 soil cleanup standards. The reporting limits were below applicable MCP Method 1 soil cleanup standards for all analytes. A summary of the NBHS Children's Playground Area (HS-1) soil analytical results for detected contaminants only is included in Table 4-6.

No samples were collected from the greater than 3 feet below ground surface horizon.

New Bedford High School Children's Playground Area (HS-1) Soil PAH Results

For soil samples taken in the 0 to 1 foot below ground surface horizon and the 1 to 3 foot below ground surface horizon, the analytical results did not indicate the detection of any PAHs at concentrations above laboratory reporting limits.

New Bedford High School Children's Playground Area (HS-1) Soil Metals Results

For soil samples taken in the 0 to 1 foot below ground surface horizon and the 1 to 3 feet below ground surface horizon, the analytical results did not indicate the detection of any MCP Metals or mercury at concentrations exceeding the applicable MCP Method 1 soil cleanup standards. At various locations the following metals were detected at concentrations above laboratory reporting limits: arsenic, barium, cadmium, chromium, lead, nickel, vanadium, and zinc.

New Bedford High School Children's Playground Area (HS-1) Soil PCB Results

For soil samples taken in the 0 to 1 foot below ground surface horizon and the 1 to 3 feet below ground surface horizon, the analytical results did not indicate the detection of total PCBs at concentrations above laboratory reporting limits.

4.1.1.7 New Bedford High School Fenced Playing Field Area Soil Results (HS-2)

For soil samples taken from the NBHS Fenced Playing Field Area of the Site, identified as Exposure Point Area HS-2 on Figure 2-3, the laboratory results did not indicate the detection of any contaminants at concentrations that exceed the applicable MCP Method 1 soil cleanup standards with the exception of total PCBs, two PAHs [benzo(a)pyrene and dibenz(a,h)anthracene], and four MCP metals (cadmium, chromium, lead, and nickel). The reporting limits were below applicable MCP Method 1 soil cleanup standards for all analytes except dibenz(a,h)anthracene in SS-19 (1'). A summary of the NBHS Fenced Playing Field Area (HS-2) soil analytical results for detected contaminants only is included in Table 4-7.

New Bedford High School Fenced Playing Field Area (HS-2) Soil PAH Results

For soil samples taken in the 0 to 1 foot below ground surface horizon, the analytical results did not indicate the detection of any PAHs at concentrations exceeding the applicable MCP Method 1 soil cleanup standards.

For soil samples taken in the 1 to 3 feet below ground surface horizon, the analytical results did not indicate the detection of any PAHs at concentrations exceeding the applicable MCP Method 1 soil cleanup standards, with the following exceptions:

- benzo(a)pyrene at sampling locations SS-13 (2.16 mg/kg), SS-21 (3.93 mg/kg), and SS-26 (3.09 mg/kg).

- dibenz(a,h)anthracene at sampling location SS-21 (0.722 mg/kg).

- benzo(a)pyrene at sampling locations SS-16 (2.11 mg/kg) and SS-19 (2.24 mg/kg).

The one sample (HRJ-26) taken in the greater than three feet below ground surface horizon was not analyzed for PAHs.

New Bedford High School Fenced Playing Field Area (HS-2) Soil Metals Results

For soil samples taken in the 0 to 1 foot below ground surface horizon, the analytical results did not indicate the detection of any MCP Metals or mercury at concentrations exceeding the applicable MCP Method 1 soil cleanup standards, with the following exceptions:

- cadmium at sampling locations SS-19 (5.29 mg/kg) and SS-20 (2.74 mg/kg).

- chromium at seven sampling locations (SS-15, SS-16, SS-17, SS-18, SS-19 at 0.5 feet, SS-19 at 1 foot, and SS-20) at concentrations ranging from 30.2 mg/kg (SS-19 at 1 foot) to 68.1 mg/kg (SS-19 at 0.5 feet).

- lead at sampling locations SS-14 (363 mg/kg), SS-16 (342 mg/kg), and SS-19 (671 mg/kg).

- nickel at seven sampling locations (SS-15, SS-16, SS-17, SS-18, SS-19 at 0.5 feet, SS-19 at 1 foot, and SS-20) at concentrations ranging from 21.4 mg/kg (SS-19 at 1 foot) to 33.6 mg/kg (SS-15).

For soil samples taken in the 1 to 3 feet below ground surface horizon, the analytical results did not indicate the detection of any MCP Metals or mercury at concentrations exceeding the applicable MCP Method 1 soil cleanup standards, with the following exceptions:

- cadmium at sampling locations SS-26 (2.43 mg/kg) and SS-32 (2.32 mg/kg).

- lead at seven sampling locations (SS-13, SS-22, SS-26, SS-28, SS-29, SS-31, and SS-32) at concentrations ranging from 302 mg/kg (SS-31) to 805 mg/kg (SS-32).

- nickel at sampling location SS-26 (25.7 mg/kg).

The one sample (HRJ-26) taken in the greater than three feet below ground surface horizon was not analyzed for metals.

New Bedford High School Fenced Playing Field Area (HS-2) Soil PCB Results

For soil samples taken in the 0 to 1 foot below ground surface horizon, the analytical results did not indicate the detection of total PCBs at concentrations exceeding the applicable MCP Method 1 soil cleanup standards with the exception of sampling locations SS-16 (3.43 mg/kg), SS-19 (4.93 mg/kg), and SS-28 (4.19 mg/kg).

For soil samples taken in the 1 to 3 feet below ground surface horizon, the analytical results did not indicate the detection of total PCBs at concentrations exceeding the applicable MCP Method 1 soil cleanup standards with the exception of sampling locations HRG-27 (3.79 mg/kg), SS-28 (2.25 mg/kg), and SS-32 (18.5 mg/kg).

The one sample (HRJ-26) taken in the greater than three feet below ground surface horizon did not indicate the detection of total PCBs at a concentration exceeding the applicable MCP Method 1 soil cleanup standards.

New Bedford High School Fenced Playing Field Area (HS-2) Soil TPH Results

For the soil samples taken 1 to 3 feet below ground surface horizon, the analytical results did not indicate the detection of TPH at concentrations exceeding the applicable MCP Method 1 soil cleanup standards. Samples were analyzed for the gasoline range organics (GRO) only. TPH was detected above laboratory reporting limits at sampling locations HRG25 (gasoline range organics at 17.3 mg/kg) and HRI29 (gasoline range organics at 9.4 mg/kg). The samples taken in the 0 to 1 foot below ground surface horizon and the greater than 3 feet below ground surface horizon were not analyzed for TPH.

New Bedford High School Fenced Playing Field Area (HS-2) Soil VOC Results

For the one soil sample (HRG25) taken in the 1 to 3 feet below ground surface horizon, the analytical results did not indicate the detection of VOCs at concentrations exceeding the applicable MCP Method 1 soil cleanup standards. No samples taken in the 0 to 1 foot below ground surface horizon and the greater than 3 feet below ground surface horizon were analyzed for VOCs. VOCs were detected above laboratory reporting limits at sampling location HRG-25 (acetone at 0.55 mg/kg and naphthalene at 0.15 mg/kg). PID field screening conducted by TRC during soil boring advancement did not indicate the presence of VOCs.

4.1.1.8 New Bedford High School Unfenced Playing Field Area Soil Results (HS-3)

For soil samples taken from the NBHS Unfenced Playing Field Area of the Site, identified as Exposure Point Area HS-3 on Figure 2-3, the laboratory results did not indicate the detection of any contaminants at concentrations that exceed the applicable MCP Method 1 soil cleanup standards with the exception of two PAHs [benzo(a)pyrene and dibenz(a,h)anthracene], and three MCP metals (arsenic, lead, and nickel). The reporting limits were below applicable MCP Method 1 soil cleanup standards for all analytes. A summary of the NBHS Unfenced Playing Field Area (HS-3) soil analytical results for detected contaminants only is included in Table 4-8.

No samples were collected in the greater than 3 feet below ground surface horizon.

New Bedford High School Unfenced Playing Field Area (HS-3) Soil PAH Results

For soil samples taken in the 0 to 1 foot below ground surface horizon, the analytical results did not indicate the detection of any PAHs at concentrations exceeding the applicable MCP Method 1 soil cleanup standards.

For soil samples taken in the 1 to 3 feet below ground surface horizon, the analytical results did not indicate the detection of any PAHs at concentrations exceeding the applicable MCP Method 1 soil cleanup standards, with the following exceptions:

- benzo(a)pyrene at sampling locations SS-36 (3.07 mg/kg), and SS-37 (6.76 mg/kg).
- benzo(b)fluoranthene at sampling location SS-37 (7.26 mg/kg).
- dibenz(a,h)anthracene at sampling location SS-37 (1.01 mg/kg).

New Bedford High School Unfenced Playing Field Area (HS-3) Soil Metals Results

For soil samples taken in the 0 to 1 foot below ground surface horizon, the analytical results did not indicate the detection of any MCP Metals and mercury at concentrations exceeding the applicable MCP Method 1 soil cleanup standards.

For soil samples taken in the 1 to 3 feet below ground surface horizon, the analytical results did not indicate the detection of any MCP Metals and mercury at concentrations exceeding the applicable MCP Method 1 soil cleanup standards, with the following exceptions:

- arsenic at sampling location SS-36 (23.1 mg/kg).
- lead at sampling locations SS-36 (1,270 mg/kg), SS-37 (302 mg/kg), SS-38 (605 mg/kg), and SS-40 (819 mg/kg).
- nickel at sampling location SS-36 (43.9 mg/kg).

New Bedford High School Unfenced Playing Field Area (HS-3) Soil PCB Results

For soil samples taken in the 0 to 1 foot below ground surface horizon and the 1 to 3 feet below ground surface horizon, the analytical results did not indicate the detection of PCBs at concentrations exceeding the applicable MCP Method 1 soil cleanup standards. Total PCBs were detected above laboratory reporting limits at nine sampling locations (HRG-21, HRI-17, HRI-19, HRJ.75-17, NBHS-SS-5, SS-37, SS-38 at 0.5 feet, SS-38 at 1.5 feet, and SS-40) at concentrations ranging from 0.096 mg/kg (NBHS-SS-5) to 0.76 mg/kg (HRJ.75-17).

New Bedford High School Unfenced Playing Field Area (HS-3) Soil TPH Results

For the soil sample (HRJ.75-17) taken in the 1 to 3 feet below ground surface horizon, the analytical results did not indicate the detection of TPH at concentrations above laboratory

reporting limits. The sample was analyzed for GRO only. No samples taken in the 0 to 1 foot below ground surface horizon were analyzed for TPH.

New Bedford High School Unfenced Playing Field Area (HS-3) Soil VOC Results

For the soil sample (HRJ.75-17) taken in the 1 to 3 feet below ground surface horizon, the analytical results did not indicate the detection of VOCs at concentrations exceeding the applicable MCP Method 1 soil cleanup standards. No samples taken in the 0 to 1 foot below ground surface horizon were analyzed for VOCs. VOCs were detected above laboratory reporting limits at sampling location HRJ.75-17 (benzene at 0.036 mg/kg, naphthalene at 11.0 mg/kg, toluene at 0.041 mg/kg, and 1,2,4-trimethylbenzene at 0.046 mg/kg). PID field headspace screening conducted by TRC during boring advancement did not indicate the presence of VOCs.

4.1.1.9 New Bedford High School Gym Area Soil Results (HS-4)

For soil samples taken from the New Bedford High School Gym Area of the Site, identified as Exposure Point Area HS-4 on Figure 2-3, the laboratory results did not indicate the detection of any contaminants at concentrations that exceed the applicable MCP Method 1 soil cleanup standards with the exception of total PCBs, four PAHs [benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, and dibenz(a,h)anthracene], and five MCP metals (arsenic, cadmium, chromium, lead, and nickel). The reporting limits were below applicable MCP Method 1 soil cleanup standards for all analytes except for PCBs in HF44 and HI43. A summary of the New Bedford High School Gym Area (HS-4) soil analytical results for detected contaminants only is included in Table 4-9.

New Bedford High School Gym Area (HS-4) Soil PAH Results

For soil samples taken in the 0 to 1 foot below ground surface horizon, the analytical results did not indicate the detection of any PAHs at concentrations exceeding the applicable MCP Method 1 soil cleanup standards.

For soil samples taken in the 1 to 3 feet below ground surface horizon, the analytical results did not indicate the detection of any PAHs at concentrations exceeding the applicable MCP Method 1 soil cleanup standards, with the following exceptions:

- benzo(a)anthracene at composite sampling location HF44+HG44 (7.9 mg/kg).
- benzo(a)pyrene at composite sampling locations HF35+HF40 (2.8 mg/kg), and composite HF44+HG44 (6.9 mg/kg).
- benzo(b)fluoranthene at composite sampling location HF44+HG44 (8.9 mg/kg).
- dibenz(a,h)anthracene at composite sampling location HF44+HG44 (0.71 mg/kg).

For soil samples taken at depths greater than the three feet below ground surface, the analytical results did not indicate the detection of any PAHs at concentrations exceeding the applicable MCP Method 1 cleanup standards, with the exception of sampling location NBHS-1 (benzo(a)pyrene at 2.86 mg/kg).

New Bedford High School Gym Area (HS-4) Soil Metals Results

For soil samples taken in the 0 to 1 foot below ground surface horizon, the analytical results did not indicate the detection of any MCP Metals or mercury at concentrations exceeding the applicable MCP Method 1 soil cleanup standards.

For soil samples taken in the 1 to 3 feet below ground surface horizon, the analytical results did not indicate the detection of any MCP Metals or mercury at concentrations exceeding the applicable MCP Method 1 soil cleanup standards, with the following exceptions:

- cadmium at composite sampling locations HF35+HF40 (3.67 mg/kg), HF43+HE44 (8.59 mg/kg), HH44+HI44 (2.24 mg/kg), and HJ42+HF31 (4.92 mg/kg).
- chromium at composite sampling locations HH43+HI42 (36 mg/kg) and HJ42+HF31 (36 mg/kg).
- lead at six composite sampling locations (HF35+HF40, HF43+HE44, HH43+HI42, HH44+HI44, HJ44+HI43, and HJ42+HF31) at concentrations ranging from 351 mg/kg (HH44+HI44) to 1,910 mg/kg (HF43+HE44).

For soil samples taken at depths greater than three feet below ground surface, the analytical results did not indicate the detection of any MCP metals or mercury at concentrations exceeding the applicable MCP Method 1 soil cleanup standards, with the following exceptions at sampling location NBHS-1 at eight feet below ground surface:

- arsenic (34.0 mg/kg)
- cadmium (8.78 mg/kg)
- chromium (154 mg/kg)
- lead (2,780 mg/kg).
- nickel (173 mg/kg).

New Bedford High School Gym Area (HS-4) Soil PCB Results

For soil samples taken in the 0 to 1 foot below ground surface horizon, the analytical results did not indicate the detection of PCBs at concentrations above laboratory reporting limits.

For soil samples taken in the 1 to 3 feet below ground surface horizon, the analytical results did not indicate the detection of total PCBs at concentrations exceeding the applicable MCP Method 1 soil cleanup standards with the exception of sampling locations HF31 (2.55 mg/kg) and HF40 (25.5 mg/kg).

For soil samples taken at depths greater than three feet below ground surface horizon, the analytical results did not indicate the detection of PCBs at concentrations exceeding the applicable MCP Method 1 cleanup standards. Total PCBs were detected above laboratory reporting limits at sampling location NBHS-1 (1.80 mg/kg at 8 feet).

4.1.1.10 New Bedford High School Flag Pole Area Soil Results (HS-5)

For soil samples taken from the NBHS Flag Pole Area of the Site, identified as Exposure Point Area HS-5 on Figure 2-3, the laboratory results did not indicate the detection of any contaminants at concentrations that exceed the applicable MCP Method 1 soil cleanup standards with the exception of total PCBs, four PAHs [benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, and dibenz(a,h)anthracene], and eight MCP metals (arsenic, barium, cadmium, chromium, lead, mercury, nickel and zinc). The reporting limits were below applicable MCP Method 1 soil cleanup standards for all analytes except for PCBs in HB25, dibenz(a,h)anthracene in comp SS-13-AQ, benzo(a)pyrene and dibenz(a,h)anthracene in Comp SS-13 U,Z,AA,AB. A summary of the NBHS Flag Pole Area (HS-5) soil analytical results for detected contaminants only is included in Table 4-10.

New Bedford High School Flag Pole Area (HS-5) Soil PAH Results

For soil samples taken in the 0 to 1 foot below ground surface horizon, the analytical results did not indicate the detection of any PAHs at concentrations exceeding the applicable MCP Method 1 soil cleanup standards. PAHs were detected above laboratory reporting limits at sampling location SS-47 (fluoranthene at 0.345 mg/kg and pyrene at 0.246 mg/kg).

For soil samples taken in the 1 to 3 feet below ground surface horizon, the analytical results did not indicate the detection of any PAHs at concentrations exceeding the applicable MCP Method 1 soil cleanup standards, with the following exceptions:

- benzo(a)anthracene at composite sampling locations SS-13-A,F,S,T (17 mg/kg) and composite SS-13-Q,R,C,D (10 mg/kg).

- benzo(a)pyrene at eleven sampling locations (composite HA29+HB29; composite HB25+HB26; composite HB28+HB27; composite SS-13-A,F,S,T; composite SS-13-AI, BA,BB,BC,BD composite SS-13-AQ, composite SS-13-AS,AT,AU,AV; composite SS-13-AW,AX,AY,AZ; composite SS-13-M,N,O,P; composite SS-13-Q,R,C,D; composite S-13-V,W,X,Y) at concentrations ranging from 2.1 mg/kg (composite S-13-V,W,X,Y) to 11 mg/kg (composite SS-13-Q,R,C,D).

- benzo(b)fluoranthene at sampling locations composite HB28+HB27 (7.5 mg/kg), composite SS-13-A,F,S,T (13 mg/kg), and composite SS-13-Q,R,C,D (8.4 mg/kg).

- dibenz(a,h)anthracene at eight sampling locations (composite SS-13-A,F,S,T; composite SS-13-AI,BA,BB,BC,BD; composite SS-13-AS,AT,AU,AV; composite SS-13-AW,AX,AY,AZ; composite SS-13-G,H,I,J; composite SS-13-M,N,O,P; composite Q,R,C,D; composite S-13-V,W,X,Y) at concentrations ranging from 0.72 mg/kg (composite SS-13-M,N,O,P) to 2.7 mg/kg (composite SS-13-A,F,S,T).

For soil samples taken at depths greater than three feet below ground surface, the analytical results did not indicate the detection of any PAHs at concentrations exceeding the applicable MCP Method 1 cleanup standards.

New Bedford High School Flag Pole Area (HS-5) Soil Metals Results

For soil samples taken in the 0 to 1 foot below ground surface horizon, the analytical results did not indicate the detection of any MCP Metals or mercury at concentrations exceeding the applicable MCP Method 1 soil cleanup standards.

For soil samples taken in the 1 to 3 feet below ground surface horizon, the analytical results did not indicate the detection of any MCP Metals or mercury at concentrations exceeding the applicable MCP Method 1 soil cleanup standards, with the following exceptions:

- arsenic at composite sampling locations HB23+HB27 (91 mg/kg), SS-13-A,F,S,T (31 mg/kg), SS-13-E,L,K,B (48 mg/kg), and SS-13-U,Z,AA,AB (27 mg/kg).

- barium at composite sampling location HB25+HB26 (1,010 mg/kg).

- cadmium at 13 sampling locations (composite HA29+HB29; composite HB23+HB27; composite HB25+HB26; composite HB28+HB27; composite SS-13-A,F,S,T; composite SS-13-AC,AD,AE,AF; composite SS-13-AI,BA,BB,BC,BD; composite SS-13-AS,AT,AU,AV; composite SS-13-E,L,K,B; composite SS-13-G,H,I,J, composite SS-13-M,N,O,P; composite SS-13-U,Z,AA,AB; composite S-13-V,W,X,Y) at concentrations ranging from 2.1 mg/kg (composite SS-13-AC,AD,AE,AF) to 82 mg/kg (composite HB23+HB27).

- chromium at 12 sampling locations (composite HA29+HB29; composite HB23+HB27; composite HB25+HB26; composite HB28+HB27; composite SS-13- AI,BA,BB,BC,BD; composite SS-13-AS,AT,AU,AV; composite SS-13-AW,AX,AY,AZ; composite SS-13-E,L,K,B; composite SS-13-G,H,I,J; composite SS-13-M,N,O,P; composite SS-13-U,Z,AA,AB; composite S-13-V,W,X,Y) at concentrations ranging from 31 mg/kg (composite SS-13-AI,BA,BB,BC,BD) to 143 mg/kg (composite HB23+HB27).

- mercury at sampling location composite SS-13-E,L,K,B (76 mg/kg).

- lead at 60 out of 72 sampling locations at concentrations ranging from 320 mg/kg (SS-13-AC) to 11,000 mg/kg (SS-13-W).

For soil samples taken at depths greater than three feet below ground surface, the analytical results did not indicate the detection of any MCP metals or mercury at concentrations exceeding the applicable MCP Method 1 soil cleanup standards, with the following exceptions at sampling location SB-349: lead (571 mg/kg at eight feet); nickel (48.1 at eight feet, and 39.3 at eleven feet); and zinc (2,670 mg/kg at eight feet).

New Bedford High School Flag Pole Area (HS-5) Soil PCB Results

For soil samples taken in the 0 to 1 foot below ground surface horizon, the analytical results did not indicate the detection of PCBs at concentrations exceeding the applicable MCP Method 1 soil cleanup standards with the exception of sampling locations HS-6 (3.11 mg/kg) and SB-349 (4.22 mg/kg).

For soil samples taken in the 1 to 3 feet below ground surface horizon, the analytical results did not indicate the detection of total PCBs at concentrations exceeding the applicable MCP Method 1 soil cleanup standards with the exception of sampling locations HA29 (2.63 mg/kg), HB26 (5.17 mg/kg), HB27 (3.37 mg/kg), HB28 (2.80 mg/kg), HB29 (6.48 mg/kg), SS-13-AF (12.6 mg/kg), SS-13-AI (2.24 mg/kg), SS-13-AM (4.56 mg/kg), SS-13-AO (4.87 mg/kg), SS-13-AQ (5.48 mg/kg) SS-13-AX (2.21 mg/kg), and SS-13-J (2.75 mg/kg).

For soil samples taken at depths greater than three feet below ground surface horizon, the analytical results did not indicate the detection of PCBs at concentrations exceeding the applicable MCP Method 1 cleanup standards. Total PCBs were detected above laboratory reporting limits at sampling location SB-349 (0.17 mg/kg at 8 feet).

4.1.1.11 New Bedford High School House Area Soil Results (HS-6)

For soil samples taken from the NBHS House Area of the Site, identified as Exposure Point Area HS-6 on Figure 2-3, the laboratory results did not indicate the detection of any contaminants at concentrations that exceed the applicable MCP Method 1 soil cleanup standards with the exception of total PCBs, eight PAHs [benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, indeno(1,2,3-cd)pyrene, naphthalene, and phenanthrene], dibenzofuran, and five MCP metals (arsenic, barium, cadmium, chromium, and lead). The reporting limits were below applicable MCP Method 1 soil cleanup standards for all analytes except for dibenz(a,h)anthracene and acenaphthylene in HH13. A summary of the NBHS House Area (HS-6) soil analytical results for detected contaminants only is included in Table 4-11.

No samples were collected in the greater than 3 feet below ground surface horizon.

New Bedford High School House Area (HS-6) Soil PAH Results

For soil samples taken in the 0 to 1 foot below ground surface horizon, the analytical results did not indicate the detection of any PAHs at concentrations exceeding the applicable MCP Method 1 soil cleanup standards.

For soil samples taken in the 1 to 3 feet below ground surface horizon, the analytical results did not indicate the detection of any PAHs at concentrations exceeding the applicable MCP Method 1 soil cleanup standards, with the following exceptions:

- benzo(a)anthracene at composite sampling locations HD19+HD20+HD21 (33 mg/kg), HF14 (25 mg/kg), HH13 (400 mg/kg).

- benzo(a)pyrene at composite sampling location HD19+HD20+HD21 (33 mg/kg),composite sampling location HD22+HC22+HB22 (4.5 mg/kg), HF14 (25 mg/kg), HH13 (360 mg/kg).

- benzo(b)fluoranthene at composite sampling locations HD19+HD20+HD21 (25 mg/kg), HF14 (34 mg/kg), HH13 (460 mg/kg).

- benzo(k)fluoranthene at sampling location HH13 (200 mg/kg).

- chrysene at sampling location HH13 (280 mg/kg).

- indeno(1,2,3-cd)pyrene at composite sampling location HD19+HD20+HD21 (22 mg/kg) and at sampling locations HF14 (14 mg/kg), and HH13 (140 mg/kg).

- naphthalene at sampling location HH13 (53 mg/kg).

- phenanthrene at sampling location HH13 (1,000 mg/kg).

New Bedford High School House Area (HS-6) Soil Metals Results

For soil samples taken in the 0 to 1 foot below ground surface horizon, the analytical results did not indicate the detection of any MCP Metals or mercury at concentrations exceeding the applicable MCP Method 1 soil cleanup standards.

For soil samples taken in the 1 to 3 feet below ground surface horizon, the analytical results did not indicate the detection of any MCP Metals or mercury at concentrations exceeding the applicable MCP Method 1 soil cleanup standards, with the following exceptions:

- arsenic at composite sampling locations HD22+HC22+HB22 (33 mg/kg), and at sampling locations HF14 (23 mg/kg), and HH13 (25 mg/kg).

- barium at sampling locations HF14 (6,700 mg/kg) and HH13 (2,910 mg/kg).

- cadmium at composite sampling locations HD19+HD20+HD21 (6.51 mg/kg) and HD22+HC22+HB22 (4.71 mg/kg), and sampling locations HF14 (12 mg/kg), and HH13 (4.81 mg/kg).

- chromium at composite HD19+HD20+HD21 (77 mg/kg), composite HD22+HC22+HB22 (52 mg/kg), HF14 (1,290 mg/kg), and HH13 (1,100 mg/kg).

- lead at composite HD19+HD20+HD21 (1,220 mg/kg), composite HD22+HC22+HB22 (1,020 mg/kg), HF14 (650 mg/kg), and HH13 (333 mg/kg).

New Bedford High School House Area (HS-6) Soil PCB Results

For soil samples taken in the 0 to 1 foot below ground surface horizon, the analytical results did not indicate the detection of total PCBs at concentrations exceeding the applicable MCP Method 1 soil cleanup standards.

For soil samples taken in the 1 to 3 feet below ground surface horizon, the analytical results did not indicate the detection of total PCBs at concentrations exceeding the applicable MCP Method 1 soil cleanup standards with the exception of sampling locations HD19 (18.7 mg/kg), HD22 (5.44), and HD23 (4.16 mg/kg).

4.1.1.12 New Bedford High School Student Congregating Area Soil Results (HS-7)

For soil samples taken from the NBHS Student Congregating Area at the Site, identified as Exposure Point Area HS-7 on Figure 2-3, the laboratory results did not indicate the detection of any contaminants at concentrations that exceed the applicable MCP Method 1 soil cleanup standards. The reporting limits were below applicable MCP Method 1 soil cleanup standards for all analytes. A summary of the NBHS Student Congregating Area (HS-7) soil analytical results for detected contaminants only is included in Table 4-12.

Soil sampling data in the New Bedford High School Student Congregating Area currently is limited to the 0 to 1 foot below ground surface horizon. Additional soil sampling data, including data in the 1 to 3 feet below ground surface horizon, are currently being collected and will be included in a forthcoming Interim Phase III Response Action Plan (RAP).

New Bedford High School Student Congregating Area (HS-7) Soil PAH Results

For soil samples taken in the 0 to 1 foot below ground surface horizon, the analytical results did not indicate the detection of any PAHs at concentrations exceeding the applicable MCP Method 1 soil cleanup standards. Various PAHs were detected above laboratory reporting limits at sampling location SS-53.

New Bedford High School Student Congregating Area (HS-7) Soil Metals Results

For soil samples taken in the 0 to 1 foot below ground surface horizon, the analytical results did not indicate the detection of any MCP Metals or mercury at concentrations exceeding the applicable MCP Method 1 soil cleanup standards. Various metals were detected above laboratory reporting limits at all sampling locations.

New Bedford High School Student Congregating Area (HS-7) Soil PCB Results

For soil samples taken in the 0 to 1 foot below ground surface horizon, the analytical results did not indicate the detection of total PCBs at concentrations exceeding the applicable MCP Method 1 soil cleanup standards. Total PCBs were detected above laboratory reporting limits at sampling locations SS-53 (0.429 mg/kg), SS-54 (0.219 mg/kg), and SS-55 (0.148 mg/kg).

4.1.1.13 New Bedford High School Junior High Gym Class Area Soil Results (HS-8)

For soil samples taken from the New Bedford High School Junior High Gym Class Area of the Site, identified as Exposure Point Area HS-8 on Figure 2-3, the laboratory results did not indicate the detection of any contaminants at concentrations that exceed the applicable MCP Method 1 soil cleanup standards with the exception of total PCBs, five PAHs [benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, dibenz(a,h)anthracene, and indeno(1,2,3-cd)pyrene], and seven MCP metals (arsenic, barium, cadmium, chromium, lead, nickel and vanadium). The reporting limits were below applicable MCP Method 1 soil cleanup standards for all analytes except for dibenz(a,h)anthracene in HG4+HG3, PCBs in HG5, dibenz(a,h)anthracene in HI3+HH3, and PCBs in HK6+HL7. A summary of the New Bedford High School Junior High Gym Class Area (HS-8) soil analytical results for detected contaminants only is included in Table 4-13.

New Bedford High School Junior High Gym Class Area (HS-8) Soil PAH Results

For soil samples taken in the 0 to 1 foot below ground surface horizon, the analytical results did not indicate the detection of any PAHs at concentrations exceeding the applicable MCP Method 1 soil cleanup standards, with the following exceptions at sampling location composite HI2.5+HJ2.5; benzo(a)anthracene (40 mg/kg), benzo(a)pyrene (33 mg/kg), benzo(b)fluoranthene (45 mg/kg), dibenz(a,h)anthracene (3.3 mg/kg), and indeno(1,2,3-cd)pyrene (9.8 mg/kg).

For soil samples taken in the 1 to 3 feet below ground surface horizon, the analytical results did not indicate the detection of any PAHs at concentrations exceeding the applicable MCP Method 1 cleanup standards, with the following exceptions:

- benzo(a)anthracene at composite sampling locations HG2.5+HH2.5 (10 mg/kg), HI3+HH3 (26 mg/kg), and HJ5+HK5 (16 mg/kg).
- benzo(a)pyrene at eight sampling locations (HG2, composite HG2.5+HH2.5, composite HH4+HI4, composite HI3+HH3, composite HI6+HH6, composite HJ5+HK5, composite HJ8+HI8, and HL4) at concentrations ranging from 2.2 mg/kg (HG-2) to 21 mg/kg (HI3+HH3).
- benzo(b)fluoranthene at composite sampling locations HG2.5+HH2.5 (13 mg/kg), HH4+HI4 (9 mg/kg), HI3+HH3 (32 mg/kg), and HJ5+HK5 (9.8 mg/kg).

For soil samples taken at depths greater than the three feet below ground surface, the analytical results did not indicate the detection of any PAHs at concentrations exceeding the applicable MCP Method 1 soil cleanup standards.

New Bedford High School Junior High Gym Class Area (HS-8) Soil Metals Results

For soil samples taken in the 0 to 1 foot below ground surface horizon, the analytical results did not indicate the detection of any MCP Metals or mercury at concentrations exceeding the applicable MCP Method 1 soil cleanup standards, with following exceptions:

- cadmium at composite sampling location HI2.5+HJ2.5 (4.53 mg/kg).
- chromium at composite sampling location HI2.5+HJ2.5 (62 mg/kg).
- lead at sampling location HH3 (693 mg/kg) and composite sampling location HI2.5+HJ2.5 (866 mg/kg).

For soil samples taken in the 1 to 3 feet below ground surface horizon, the analytical results did not indicate the detection of any MCP Metals or mercury at concentrations exceeding the applicable MCP Method 1 soil cleanup standards, with the following exceptions:

- arsenic at sampling locations composite HH8+HG8 (22 mg/kg) and composite HK6+HJ6 (35 mg/kg).
- barium at seven sampling locations (composite HG7+HH7, composite HH4+HI4, composite HH8+HG8, composite HH9+HI9, composite HJ8+HI8, composite HJ9+HK8, and HL4) at concentrations ranging from 1,210 mg/kg (HH4+HI4) to 5,110 mg/kg (HH8+HG8).
- cadmium at 23 sampling locations (HG2, composite HG2.5+HH2.5, composite HG4+HG3, composite HG3+HG4, composite HG6+HG5, composite HG7+HH7, composite HG10+HG9, composite HH4+HI4, composite HH5+HI5, composite HH8+HG8, composite HH9+HI9, composite HH10+HI10, composite HI3+HH3, composite HI6+HH6, composite HI7+HJ7, composite HJ4+HK4, composite HJ5+HK5, composite HJ8+HI8, composite HJ9+HK8, HJ10, composite HK2.5+HM2.5, composite HK6+HJ6, and HL4) at concentrations ranging from 2.09 mg/kg (HG3+HG4) to 18 mg/kg (HJ8+HI8).
- chromium at 20 sampling locations (HG2, composite HG2.5+HH2.5, composite HG4+HG3, composite HG7+HH7, composite HG10+HG9, composite HH4+HI4, composite HH8+HG8, composite HH9+HI9, composite HH10+HI10, composite HI3+HH3, composite HI6+HH6, composite HI7+HJ7, composite HJ4+HK4, composite HJ5+HK5, composite HJ8+HI8, composite HJ9+HK8, HJ10, composite HK2.5+HM2.5, composite HK6+HJ6, and HL4) at concentrations ranging from 36 mg/kg (HK2.5+HM2.5) to 741 mg/kg (HJ8+HI8).
- lead at 22 sampling locations (HG2, composite HG2.5+HH2.5, composite HG4+HG3, composite HG3+HG4, composite HG6+HG5, composite HG7+HH7, composite HG10+HG9, composite HH4+HI4, composite HH5+HI5, composite HH8+HG8,

composite HH9+HI9, composite HI3+HH3, composite HI6+HH6, composite HI7+HJ7, composite HJ4+HK4, composite HJ5+HK5, composite HJ8+HI8, composite HJ9+HK8, HJ10, composite HK2.5+HM2.5, composite HK6+HJ6, HL4) at concentrations ranging from 354 mg/kg (HG3+HG4) to 4,380 mg/kg (HI3+HH3).

For soil samples taken at depths greater than three feet below ground surface, the analytical results did not indicate the detection of any MCP metals or mercury at concentrations exceeding the applicable MCP Method 1 soil cleanup standards, with the following exceptions at sampling location SB-350 at five feet below ground surface; arsenic (59.8 mg/kg), barium (7,430 mg/kg), cadmium (4.74 mg/kg), chromium (1,370 mg/kg), lead (638 mg/kg), nickel (167 mg/kg), and vanadium (602 mg/kg).

New Bedford High School Junior High Gym Class Area (HS-8) Soil PCB Results

For soil samples taken in the 0 to 1 foot below ground surface horizon, the analytical results did not indicate the detection of total PCBs at concentrations exceeding the applicable MCP Method 1 soil cleanup standards with the exception of sampling location HS-2 (6.51 mg/kg).

For soil samples taken in the 1 to 3 feet below ground surface horizon, the analytical results did not indicate the detection of total PCBs at concentrations exceeding the applicable MCP Method 1 soil cleanup standards with the exception of twenty-seven sampling locations (HG2, HG2.5, HG3, HG4, HG7, HG8, HG9, HH2.5, HH3, HH4, HH5, HH7, HH8, HH9, HI3, HI4, HI5, HI6, HI7, HI8, HI9, HI10, HJ2.5, HJ7, HJ9, HK2.5, and HL4) at concentrations ranging from 2.11 mg/kg (HG7) to 19.8 mg/kg (HG2.5).

For soil samples taken at depths greater than three feet below ground surface, the analytical results did not indicate the detection of PCBs at concentrations exceeding the applicable MCP Method 1 cleanup standards. Total PCBs were detected above laboratory reporting limits at sampling location SB-350 (0.86 mg/Kg at 5 feet).

4.1.1.14 New Bedford High School Beneath Pavement/Building Areas Soil Results (HS-9)

For soil samples taken from the NBHS Beneath Pavement/Building Areas of the Site, identified as Exposure Point Area HS-9 on Figure 2-3, the laboratory results did not indicate the detection of any contaminants at concentrations that exceed the applicable MCP Method 1 soil cleanup standards with the exception of twelve PAHs [benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenz(a,h)anthracene, fluoranthene, indeno(1,2,3-cd)pyrene, 2-methylnapthalene, naphthalene, phenanthrene, and pyrene], and eight MCP metals (antimony, arsenic, barium, cadmium, chromium, lead, nickel, and zinc). The reporting limits were below applicable MCP Method 1 soil cleanup standards for all analytes except for dibenz(a,h)anthracene in SB-281(8’), SB-285(3.5’), SB-287(14’), SB-289(3.5’), SB-293(9’), SB-300(8’), SB-303(10’), and SB-311(6’), and antimony in SB-304(5’) and SB-307(16’). A summary of the NBHS Beneath Pavement/Building Areas (HS-9) soil analytical results for detected contaminants only is included in Table 4-14.

No samples were collected in the 0 to 1 foot below ground surface horizon in Exposure Point Area HS-9 to avoid potential interferences from artificial material immediately beneath the surface. This is not considered to be a significant data gap relative to the findings of this Interim Phase II because HS-9 soils are below paved surfaces or buildings and therefore not immediately accessible.

New Bedford High School Beneath Pavement/Building Areas (HS-9) Soil PAH Results

No samples were taken in the 1 to 3 feet below ground surface horizon.

For soil samples taken in the greater than 3 feet below ground surface horizon, the analytical results did not indicate the detection of any PAHs at concentrations exceeding the applicable MCP Method 1 soil cleanup standards, with the following exceptions:

- benzo(a)anthracene at sampling locations SB-274 (35.9 mg/kg at 4 feet), SB-283 (7.90 at 3.5 feet), SB-287 (10.2 mg/kg at 4 feet), and SB-308 (644 mg/kg at 3.5 feet).

- benzo(a)pyrene at five sampling locations (SB-274 at 4 feet, SB-279 at 4 feet, SB-283 at 3.5 feet, SB-287 at 4 feet, and SB-308 at 3.5 feet) at concentrations ranging from 2.70 mg/kg (SB-279 at 4 feet)) to 564 mg/kg (SB-308 at 3.5 feet).

- benzo(b)fluoranthene at sampling locations SB-274 (26.0 mg/kg at 4 feet), SB-283 (9.39 mg/kg at 3.5 feet), SB-287 (9.21 mg/kg at 4 feet), and SB-308 (635 mg/kg at 3.5 feet).

- benzo(k)fluoranthene at sampling location SB-308 (257 mg/kg at 3.5 feet).

- chrysene at sampling location SB-308 (587 mg/kg at 3.5 feet).

- dibenz(a,h)anthracene at sampling locations SB-274 (6.41 mg/kg at 4 feet), SB-279 (0.77 mg/kg at 4 feet), SB-283 (2.27 mg/kg at 3.5 feet), and SB-308 (143 mg/kg at 3.5 feet).

- fluoranthene at sampling location SB-308 (1,300 mg/kg at 3.5 feet).

- indeno(1,2,3-cd)pyrene at sampling locations SB-274 (24.3 mg/kg at 4 feet), SB-283 (9.27 mg/kg at 3.5 feet), and SB-308 (400 mg/kg at 3.5 feet).

- 2-methylnapthalene at sampling location SB-308 (146 mg/kg at 3.5 feet).

- naphthalene at sampling location SB-308 (354 mg/kg at 3.5 feet).

- phenanthrene at sampling location SB-308 (1,310 mg/kg at 3.5 feet).

- pyrene at sampling location SB-308 (1,050 mg/kg at 3.5 feet).

New Bedford High School Beneath Pavement/Building Areas (HS-9) Soil Metals Results

For soil samples taken in the 1 to 3 feet below ground surface horizon, the analytical results did not indicate the detection of any MCP Metals or mercury at concentrations exceeding the applicable MCP Method 1 soil cleanup standards, with the following exceptions:

- lead at sampling locations SB-302 (2,440 mg/kg), SB-307 (589 mg/kg), SB-310 (443 mg/kg), and NBHS-6 (322 mg/kg).

- chromium at sampling location NBHS-6 (31.0 mg/kg).

- nickel at sampling location SB-307 (35.2 mg/kg).

For soil samples taken in the greater than 3 feet below ground surface horizon, the analytical results did not indicate the detection of any MCP Metals or mercury at concentrations exceeding the applicable MCP Method 1 soil cleanup standards, with the following exceptions:

- antimony at sampling location SB-285 (226 mg/kg at 3.5 feet).

- arsenic at 10 sampling locations (SB-274 at 4 feet, SB-279 at 4 feet, SB-280 at 4 feet, SB-281 at 4 feet, SB-285 at 3.5 feet, SB-287 at 4 feet, SB-289 at 6 feet, SB-293 at 9 feet, SB-294 at 4 feet, and SB-303 at 5 feet) at concentrations ranging from 21.3 mg/kg (SB-280 at 4 feet) to 44.5 mg/kg (SB-281 at 4 feet).

- barium at sampling locations SB-274 (1,240 mg/kg at 4 feet), SB-287 (1,810 mg/kg at 4 feet), SB-294 (1,920 mg/kg at 4 feet), and SB-303 (1,960 mg/kg at 5 feet).

- cadmium at 17 sampling locations (SB-273 at 5.5 feet, SB-274 at 4 feet, SB-277 at 4 feet, SB-279 at 4 feet, SB-280 at 4 feet, SB-281 at 4 feet, SB-283 at 3.5 feet, SB-285 at 3.5 feet, SB-287 at 4 feet, SB-289 at 3.5 feet, SB-293 at 9 feet, SB-294 at 4 feet, SB-294 at 8.5 feet, SB-294 at 12 feet, SB-296 at 5 feet, SB-297 at 8 feet, and SB-307 at 6 feet) at concentrations ranging from 2.08 mg/kg (SB-277 at 4 feet) to 84.3 mg/kg (SB-287 at 4 feet).

- chromium at 10 sampling locations (SB-274 at 4 feet, SB-279 at 4 feet, SB-281 at 4 feet, SB-283 at 3.5 feet, SB-285 at 3.5 feet, SB-287 at 4 feet, SB-289 at 3.5 feet, SB-289 at 6 feet, SB-294 at 4 feet, and SB-311 at 6 feet) at concentrations ranging from 30.4 mg/kg (SB-283 at 3.5 feet) to 302 mg/kg (SB-287 at 4 feet).

- lead at 22 sampling locations (SB-273 at 5.5 feet, SB-274 at 4 feet, SB-275 at 4 feet, SB-277 at 4 feet, SB-279 at 4 feet, SB-280 at 4 feet, SB-281 at 4 feet, SB-283 at 3.5 feet, SB-285 at 3.5 feet, SB-287 at 4 feet, SB-289 at 3.5 feet, SB-293 at 6.5 feet, SB-293 at 9 feet, SB-294 at 4 feet, SB-294 at 8.5 feet, SB-296 at 5 feet, SB-297 at 6 feet, SB-298 at 4 feet, SB-303 at 5 feet, SB-305 at 4 feet, SB-308 at 3.5 feet, and SB-311 at 6 feet) at concentrations ranging from 330 mg/kg (SB-275 at 4 feet) to 4,970 mg/kg (SB-281 at 4 feet).

- nickel at 11 sampling locations (SB-274 at 4 feet, SB-279 at 4 feet, SB-281 at 4 feet, SB-283 at 3.5 feet, SB-285 at 3.5 feet, SB-287 at 4 feet, SB-289 at 6 feet, SB-293 at 9 feet, SB-294 at 4 feet, SB-303 at 5 feet, and SB-311 at 6 feet) at concentrations ranging from 21.5 mg/kg (SB-283 at 3.5 feet) to 113 mg/kg (SB-274 at 4 feet).

- zinc at sampling locations SB-287 (3,540 mg/kg at 4 feet) and SB-293 (4,500 mg/kg at 9 feet).

New Bedford High School Beneath Pavement/Building Areas (HS-9) Soil PCB Results

For soil samples taken in the 1 to 3 feet below ground surface horizon, the analytical results did not indicate the detection of total PCBs at concentrations exceeding the applicable MCP Method 1 soil cleanup standards.

For soil samples taken in the greater than 3 feet below ground surface horizon, the analytical results did not indicate the detection of total PCBs at concentrations exceeding the applicable MCP Method 1 soil cleanup standards, with the exception of sampling locations SB-277 (15.2 mg/kg at 4 feet, SB-285 (7.50 mg/kg at 4 feet), SB-286 (7.19 mg/kg at 4 feet), SB-289 (2.93 mg/kg at 3.5 feet), SB-312 (19.7 mg/kg at 5 feet), and SB-313 (6.32 mg/kg at 5 feet).

4.1.1.15 New Bedford High School Tree Belts Area Soil Results (HS-10)

For soil samples taken from the NBHS Tree Belts Area of the Site, identified as Exposure Point Area HS-10 on Figure 2-3, the laboratory results did not indicate the detection of any contaminants at concentrations that exceed the applicable MCP Method 1 soil cleanup standards with the exception of total PCBs, five PAHs [benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, dibenz(a,h)anthracene, and indeno(1,2,3-cd)pyrene], and six MCP metals (arsenic, barium, cadmium, chromium, lead, and nickel). The reporting limits were below applicable MCP Method 1 soil cleanup standards for all analytes except for PCBs in HD10. A summary of the New Bedford High School Tree Belts Area (HS-10) soil analytical results for detected contaminants only is included in Table 4-15.

New Bedford High School Tree Belts Area (HS-10) Soil PAH Results

For soil samples taken in the 0 to 1 foot below ground surface horizon, the analytical results did not indicate the detection of any PAHs at concentrations exceeding the applicable MCP Method 1 soil cleanup standards.

For soil samples taken in the 1 to 3 feet below ground surface horizon, the analytical results did not indicate the detection of any PAHs at concentrations exceeding the applicable MCP Method 1 soil cleanup standards, with the following exceptions:

- benzo(a)anthracene at sampling locations composite HA10+HA9 (28 mg/kg), composite HA38+HA40 (8.2 mg/kg), and composite HC16+HC15+HC14 (31 mg/kg).

- benzo(a)pyrene at 13 composite sampling locations (HA8+HA5, HA10+HA9, HA33+HA35, HA38+HA40, HA43+HA44, HB7+HB9, HB12+HB16, HB38+HB40, HC13+HC12+HD12, HC16+HC15+HC14, HD13+HD14+HD15, HD22+HC22+HB22, and HE10+HF10) at concentrations ranging from 2.2 mg/kg (HB7+HB9) to 30 mg/kg (HC16+HC15+HC14).

- benzo(b)fluoranthene at composite sampling locations HA10+HA9 (19 mg/kg), HA38+HA40 (7.1 mg/kg), HC13+HC12+HD12 (7.8 mg/kg), and HC16+HC15+HC14 (42 mg/kg).

- dibenz(a,h)anthracene at composite sampling location HA38+HA40 (0.85 mg/kg).

- indeno(1,2,3-cd)pyrene at sampling locations composite HA10+HA9 (7.4 mg/kg) and composite HC16+HC15+HC14 (14 mg/kg).

For soil samples taken at depths greater than three feet below ground surface, the analytical results did not indicate the detection of any PAHs at concentrations exceeding the applicable MCP Method 1 cleanup standards.

New Bedford High School Tree Belts Area (HS-10) Soil Metals Results

For soil samples taken in the 0 to 1 foot below ground surface horizon, the analytical results did not indicate the detection of any MCP Metals or mercury at concentrations exceeding the applicable MCP Method 1 soil cleanup standards.

For soil samples taken in the 1 to 3 feet below ground surface horizon, the analytical results did not indicate the detection of any MCP Metals or mercury at concentrations exceeding the applicable MCP Method 1 soil cleanup standards, with the following exceptions:

- arsenic at six composite sampling locations (HB12+HB16, HB23+HB27, HC16+HC15+HC14, HD13+HD14+HD15, HD22+HC22+HB22, and HE10+HF10) at concentrations ranging from 21 mg/kg (HE10+HF10) to 94 mg/kg (HD13+HD14+HD15).

- barium at five composite sampling locations (HB7+HB9, HB12+HB16, HC16+HC15+HC14, HD13+HD14+HD15, and HE10+HF10) at concentrations ranging from 1,590 mg/kg (HB7+HB9) to 15,400 mg/kg (HC16+HC15+HC14).

- cadmium at 13 composite sampling locations (HA41+HA42, HB7+HB9, HB10+HD10, HB12+HB16, HB23+HB27, HB31+HB32, HB39+HB40, HB41+HB42, HC13+HC12+HD12, HC16+HC15+HC14, HD13+HD14+HD15, HD22+HC22+HB22, and HE10+HF10) at concentrations ranging from 2.03 mg/kg (HB31+HB32) to 82 mg/kg (HB23+HB27).

- chromium at nine composite sampling locations (HB7+HB9, HB10+HD10, HB12+HB16, HB23+HB27, HC13+HC12+HD12, HC16+HC15+HC14,

D13+HD14+HD15, HD22+HC22+HB22, and HE10+HF10) at concentrations ranging from 52 mg/kg (HD22+HC22+HB22) to 2,050 mg/kg (HD13+HD14+HD15).

- lead at 14 composite sampling locations (HA41+HA42, HA43+HA44, HB7+HB9, HB10+HD10, HB12+HB16, HB23+HB27, HB31+HB32, HB39+HB40, HB41+HB42, HC13+HC12+HD12, HC16+HC15+HC14, HD13+HD14+HD15, HD22+HC22+HB22, HE10+HF10) and sampling location SB-270 at concentrations ranging from 304 mg/kg (HB41+HB42) to 8,300 mg/kg (HE10+HF10).

- nickel at sampling location SB-272 at 22.0 mg/kg.

For soil samples taken at depths greater than the three feet below ground surface, the analytical results did not indicate the detection of any MCP Metals or mercury at concentrations exceeding the applicable MCP Method 1 cleanup standards

New Bedford High School Tree Belts Area (HS-10) Soil PCB Results

For soil samples taken in the 0 to 1 foot below ground surface horizon, the analytical results did not indicate the detection of total PCBs at concentrations exceeding the applicable MCP Method 1 soil cleanup standards.

For soil samples taken in the 1 to 3 feet below ground surface horizon, the analytical results did not indicate the detection of total PCBs at concentrations exceeding the applicable MCP Method 1 soil cleanup standards with the exception of eleven sampling locations (HA4, HA35, HB16, HB23, HC12, HC15, HC23, HD12, HD14, HD15, and HRC-33) at concentrations ranging from 2.60 mg/kg (HA35) to 40 mg/kg (HRC-33).

For soil samples taken at depths greater than three feet below ground surface horizon, the analytical results did not indicate the detection of total PCBs at concentrations above laboratory reporting limits.

New Bedford High School Tree Belts Area (HS-10) Soil TPH Results

For soil samples taken in the 1 to 3 feet below ground surface horizon, the analytical results did not indicate the detection of TPH at concentrations exceeding the applicable MCP Method 1 soil cleanup standards. The samples were analyzed for GRO only. No samples taken in the 0 to 1 foot below ground surface horizon or the greater than 3 feet below ground surface horizon were analyzed for TPH. TPH was detected above laboratory reporting limits at sampling location HRA33 (GRO at 12.3 mg/kg).

New Bedford High School Tree Belts Area (HS-10) Soil VOC Results

For soil samples taken in the 1 to 3 feet below ground surface horizon, the analytical results did not indicate the detection of VOCs at concentrations exceeding the applicable MCP Method 1 soil cleanup standards. No samples taken in the 0 to 1 foot below ground surface horizon or the greater than 3 feet below ground surface horizon were analyzed for VOCs. VOCs were detected

above laboratory reporting limits at sampling locations HRA33 (acetone at 0.92 mg/kg and naphthalene at 0.33 mg/kg) and HRM-25 (naphthalene at 0.45 mg/kg).

4.1.1.16 New Bedford High School, Miscellaneous Samples of Unknown Location (HS-11)

For several soil samples collected by BETA, data concerning the sampling location(s) or the sample depth(s) were not available. These samples were conceptually grouped together in a separate exposure point area (HS-11) for discussion herein.

For the soil samples associated with Exposure Point Area HS-11, the laboratory results did not indicate the detection of contaminants at concentrations that exceed the applicable MCP Method 1 soil cleanup standards with the exception of three PAHs (benzo(a)anthracene, benzo(a)pyrene, and dibenz(a,h)anthracene), four MCP metals (arsenic, cadmium, chromium, and lead), and TPH DRO. The laboratory reporting limits were below applicable MCP Method 1 soil cleanup standards for all analytes. A summary of the miscellaneous NBHS soil samples (HS-11) analytical results for detected contaminants only is included in Table 4-16.

New Bedford High School Miscellaneous Samples (HS-11) Soil PAH Results

For soil samples taken from Exposure Point Area HS-11, the analytical results did not indicate the detection of any PAHs at concentrations exceeding the applicable MCP Method 1 soil cleanup standards, with the following exceptions:

- Benzo(a)anthracene at composite sampling location Comp-13 (9.0 mg/kg).
- Benzo(a)pyrene at composite sampling locations Comp-1 (3.8 mg/kg), Comp-13 (4.3 mg/kg), HS Comp-10 (2.2 mg/kg), and HS Comp-12 (4.2 mg/kg).
- Dibenz(a,h)anthracene at composite sampling locations Comp-13 (0.83 mg/kg) and HS Comp-12 (0.88 mg/kg).

New Bedford High School Miscellaneous Samples (HS-11) Soil RCRA-8 Metals Results

For soil samples taken from Exposure Point Area HS-11, the analytical results did not indicate the detection of any RCRA-8 Metals at concentrations exceeding the applicable MCP Method 1 soil cleanup standards, with the following exceptions:

- Arsenic at composite sampling locations Comp-1 (24.4 mg/kg), Comp-5 (24.7 mg/kg), and Comp-7 (24.9 mg/kg).
- Cadmium at five composite sampling locations (Comp-9, Comp-11, HS Comp-2, HS Comp-10, and HS Comp-12) at concentrations ranging from 2.10 mg/kg to 42 mg/kg.
- Chromium at composite sampling locations Comp-1 (47.8 mg/kg), Comp-5 (34.7 mg/kg), Comp-7 (37.1 mg/kg), and Comp-11 (33.5 mg/kg).

- Lead at 14 composite sampling locations (Comp-1, Comp-3, Comp-5, Comp-7, Comp-9, Comp-11, HA Comp-2, HS Comp-4, HS Comp-6, HS Comp-8, HS Comp-10, HS Comp-12, and HS Comp-16) at concentrations ranging from 328 mg/kg to 2,670 mg/kg.

New Bedford High School Miscellaneous Samples (HS-11) Soil TPH Results

For soil samples taken from Exposure Area HS-11, the analytical results did not indicate the detection of TPH at concentrations exceeding the applicable MCP Method 1 soil cleanup standards, with the exception for DRO at composite sampling location Comp-1 (3,800 mg/kg).

New Bedford High School Miscellaneous Samples (HS-11) Soil Pesticide Results

For soil samples taken from Exposure Area HS-11, the analytical results did not indicate the detection of pesticides at concentrations exceeding the applicable MCP Method 1 soil cleanup standards. Pesticides were detected above laboratory reporting limits at composite sampling locations Comp-1 (4,4-DDD at 0.029 mg/kg, 4,4-DDE at 0.18 mg/kg, 4-4,DDT at 0.16 mg/kg, and endosulfan sulfate at 0.1 mg/kg), Comp-13 (4,4-DDE at 0.18 mg/kg and 4,4-DDT at 0.046 mg/kg), HS Comp-10 (4,4-DDD at 0.113 mg/kg and 4,4-DDT at 0.123 mg/kg), and HS Comp-12 (4,4-DDD at 0.0126 mg/kg, 4,4-DDE at 0.0483 mg/kg, and 4,4-DDT at 0.157 mg/kg).

New Bedford High School Miscellaneous Samples (HS-11) Soil Herbicides Results

For soil samples taken from Exposure Area HS-11, the analytical results did not indicate the detection of any herbicides at concentrations exceeding the applicable MCP Method 1 soil cleanup standards. Dinoseb was detected above the laboratory reporting limit at HS Comp-10 (0.043 mg/kg).

4.1.2 Groundwater Analytical Results

Groundwater samples were collected from five newly installed monitoring wells (MW-4, MW-5, MW-6, MW-7, and MW-8B) at the NBHS portion of the Site during TRC's Phase II investigation on August 19, 2008 (MW-4 through MW-6) and September 6, 2008 (MW-7 and MW-8B). (Additional groundwater monitoring wells are currently being installed at the Walsh Field portion of the Site and groundwater sampling data from these wells will be included in subsequent reports.) All Site groundwater samples were submitted for laboratory analysis for PAHs, PCBs, and both total and dissolved MCP Metals and mercury to evaluate the potential for groundwater impacts from identified Site soil contaminants of concern.

Groundwater samples were collected using peristaltic pumps and dedicated polyethylene tubing. During purging of Site groundwater monitoring wells, TRC monitored dissolved oxygen, temperature, oxidation/reduction potential, conductivity, pH, turbidity, and depth to water. Groundwater sampling forms prepared during sample collection are included in Appendix C.

The results of all laboratory analysis of Site groundwater samples are provided in Table 4-16. Where duplicate samples were collected, the maximum results are cited below. Monitoring well locations are depicted in Figure 2-2A.

Groundwater analytical results are compared below to Method 1 GW-2 or GW-3 groundwater cleanup standards based on the current land use and location. The groundwater sampling techniques employed by TRC were described previously in Section 3.1.3.

4.1.2.1 Groundwater PAH Results

Analysis of groundwater for PAHs was conducted on samples from all groundwater monitoring wells (including a duplicate sample) in accordance with the MassDEP Compendium of Analytical Methods. The analytical results for the groundwater samples did not indicate the detection of any PAHs at concentrations exceeding their applicable MCP Method 1 groundwater cleanup standards for the applicable GW-3 or GW-2 category. The PAH reporting limits were below all applicable Method 1 groundwater cleanup standards.

4.1.2.2 Groundwater PCB Results

Analysis of groundwater for PCB Aroclors was conducted on samples from all groundwater monitoring wells (including a duplicate sample) in accordance with the MassDEP Compendium of Analytical Methods. The analytical results for the groundwater samples did not indicate the detection of any PCBs at concentrations exceeding their applicable MCP Method 1 groundwater cleanup standards for the applicable GW-3 or GW-2 category. The PCB reporting limits were below all applicable Method 1 groundwater cleanup standards.

4.1.2.3 Groundwater MCP Metals and Mercury Results

Analysis of groundwater for total and dissolved MCP metals and mercury was conducted on samples from all groundwater wells (including a duplicate sample) in accordance with MassDEP Compendium of Analytical Methods. The analytical results for the groundwater samples did not indicate the detection of any MCP metals or mercury at concentrations exceeding their applicable MCP Method 1 groundwater cleanup standards for the applicable GW-3 category, with the exception of the detection of total lead in MW-5 at 19.2 µg/L, which exceeds the GW-3 standard of 10 µg/L. The analytical results for dissolved lead at MW-5 did not indicate the presence of lead above the laboratory reporting limit of 8.0 µg/L. Lead was not detected above the reporting limit for all other groundwater samples submitted.

The detection of lead in groundwater monitoring well MW-5 is most likely attributable to the lead being adsorbed to, or contained in, particulates in the groundwater sample. During groundwater sample collection, final field turbidity values for groundwater monitoring wells, MW-4, MW-6, MW-7 and MW-8B were between 0.68 and 5.4 nephelometric turbidity units (NTUs) at the time of metals sample collection. However, during the groundwater sample collection of monitoring well MW-5, a final field turbidity value of 270 NTU was observed. For all groundwater monitoring wells sampled, groundwater samples were taken for total lead, and dissolved lead (sample field filtered). Given the relatively high turbidity value observed during

the sampling of groundwater monitoring well MW-5, and lead being undetected in the field filtered sample for MW-5, the detection of total lead at MW-5 at 19.2 µg/L is associated with particulates in the groundwater sample.

The MCP metals and mercury reporting limits were below all applicable Method 1 groundwater cleanup standards.

4.2 Extent of Contamination

This section describes the horizontal and vertical extent of contamination for constituents of concern identified during TRC's subsurface investigations and during previous assessments conducted by BETA, as presented in previous reports for the NBHS campus and Walsh Field portions of the Site. For the purposes of this report, the discussion of the Nature and Extent of Contamination is limited to data collected on or before December 15, 2008. Additional sampling data currently being collected to refine the contaminant delineation and support remedial planning will be included in a forthcoming Interim Phase III RAP.

4.2.1 Soil

As noted in Section 4.1.1, compounds detected in soil samples collected from the NBHS campus and Walsh Field portions of the Site in excess of their respective MCP Method 1 soil cleanup standards include PCBs, metals (arsenic, barium, cadmium, chromium, lead, mercury, nickel, vanadium, and zinc), dibenzofuran, diesel range organics (DRO), and various PAHs. The discussion of the extent of contamination focuses on Site contaminants that are indicative of a group of contaminants (i.e., benzo(a)pyrene for the PAH group of contaminants) and/or will drive remedial actions contemplated at the Site.

4.2.1.1 Walsh Field Soil

Soil contaminants in excess of MCP Method 1 soil cleanup standards identified in the Walsh Field portion of the Site include PAHs [acenaphthalene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenz(a,h)anthracene, and indeno(1,2,3-cd)pyrene] dibenzofuran, diesel range organics, and metals (arsenic, barium, cadmium, chromium, lead, mercury, and nickel). Tables summarizing the results of chemical analysis for soil samples collected at the Walsh Field portion of the Site are provided in Tables 4-1 through Table 4-5 of this report. Contaminant concentrations for arsenic, cadmium, lead, benzo(a)pyrene, and total PCBs are mapped in Figures 4-1 to 4-10 for Walsh Field. The contaminant concentrations are provided for the 0 to 1 and 1 to 3 feet below ground surface intervals for each contaminant. Fill thickness isopach contours for Walsh Field are provided in Figure 3-3 and discussed in Section 3.2.1 based on fill thickness estimates from observations made during advancement of soil borings.

Arsenic. Arsenic contamination was detected above MCP Method 1 standards predominantly in the 0 to 1 foot soil horizon in the Walsh Field Varsity Baseball Field (WF-5) and Walsh Field Junior Varsity Baseball Field (WF-4) portions of Walsh Field and may be attributable to materials utilized to construct the base paths/diamonds or past undocumented herbicide use since

PSWS-related fill was not found in these areas at a 0 to 1 foot depth. Arsenic contamination was also detected above MCP Method 1 Standards in the 1 to 3 feet horizon at various locations across the Walsh Field portion of the Site. No arsenic contamination in excess of MCP Method 1 soil cleanup standards was observed in the greater than 3 feet soil horizon. Arsenic concentrations are mapped in Figures 4-1 and 4-2 for the 0 to 1 and 1 to 3 feet soil horizons, respectively, at Walsh Field.

Cadmium. Cadmium contamination was detected above MCP Method 1 soil cleanup standards in the 1 to 3 feet horizon only, predominantly in the northeast portion of Walsh Field Practice area (WF-3) and southwest portion of the Walsh Field Soccer Field area (WF-2) in the vicinity of sample locations WFD-6 and WFE-5. Further detections of cadmium in excess of MCP Method 1 soil cleanup standards were noted at the Varsity Field Baseball Field area (WF-5) in the vicinity of sample location WFC-2, and Walsh Field Practice area (WF-3) in the vicinity of sample location WFA-10. No cadmium detections in excess of the MCP Method 1 soil cleanup standards in the 0 to 1 foot and greater than 3 feet soil horizons. Cadmium concentrations are mapped in Figures 4-3 and 4-4 for the 0 to 1 and 1 to 3 foot soil horizons, respectively, at Walsh Field.

Lead. Lead contamination was detected above MCP Method 1 soil cleanup standards primarily in the 1 to 3 feet and the greater than 3 feet horizons generally across the entire Walsh Field portion of the site. In the 0 to 1 foot horizon, lead exceeded the MCP Method 1 standard in the Walsh Field Football Field area (WF-1) at sample location SB-244 only. In the 1 to 3 feet horizon, lead concentrations exceeded the MCP Method 1 soil cleanup standards with certain identifiable areas below MCP Method 1 soil cleanup standards interspersed, and with a concentration in excess of the Upper Concentration Limit (UCL) at sample location WFC-2[2]. In the greater than 3 feet horizon, lead MCP Method 1 soil cleanup standards were exceeded across the Walsh Field portion of the Site, with the exception of two areas in the Walsh Field Practice area (WF-3) in the vicinity of sample locations SB-244 and SB-229. Lead concentrations are mapped in Figures 4-5 to 4-6 for the 0 to 1 and 1 to 3 feet soil horizons, respectively, at Walsh Field.

Benzo(a)pyrene. Benzo(a)pyrene contamination was detected above MCP Method 1 standards in the 0 to 1 foot horizon in the Walsh Field Practice area (WF-3) at sample location SB-226 only. In the 1 to 3 feet horizon, benzo(a)pyrene exceeded MCP Method 1 soil cleanup standards in the southern portion of the Walsh Field Varsity Baseball Field area (WF-5) and northern portion of the Walsh Field Practice area (WF-3), as well as the southern half of Walsh Field Soccer Field area (WF-2), and the southeastern corner of the Walsh Field Football Field area (WF-1). In the greater than 3 feet horizon, benzo(a)pyrene exceeded MCP Method 1 soil cleanup standards only in the western portion of Walsh Field Practice area (WF-3) in the vicinity of sample locations SB-226 and SB-224. Benzo(a)pyrene concentrations are mapped in Figures 4-7 to 4-8 for the 0 to 1 and 1 to 3 foot soil horizons, respectively, at Walsh Field.

PCBs. PCBs were not detected above MCP Method 1 soil cleanup standards in the Walsh Field portion of the site. PCBs were detected above laboratory reporting limits across the Walsh Field

[2] The concentration that exceeds the UCL is an individual sample concentration and does not represent an exposure point concentration in excess of the UCL.

portion of the site in the 0 to 1 foot, 1 to 3 feet, and greater than 3 feet horizons. PCB concentrations are mapped in Figures 4-9 to 4-10 for the 0 to 1 and 1 to 3 foot soil horizons, respectively, at Walsh Field.

4.2.1.2 NBHS Soil

Soil contaminants in excess of MCP Method 1 soil cleanup standards identified in the NBHS campus portion of the Site include PAHs [benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenz(a,h)anthracene, fluoranthene, indeno(1,2,3-cd)pyrene, 2-methylnapthalene, naphthalene, phenanthrene, and pyrene], metals (antimony, arsenic, barium, cadmium, chromium, lead, nickel, mercury, vanadium, and zinc), and PCBs. Tables summarizing the results of chemical analysis for soil samples collected at the NBHS portion of the Site are provided in Tables 4-6 through Table 4-15 of this report. Contaminant concentrations of arsenic, barium, cadmium, chromium, lead, benzo(a)pyrene, and total PCBs are mapped in Figures 4-11 to 4-31 for the NBHS campus. The contaminant contours are provided for the 0 to 1, 1 to 3, and greater than 3 feet below ground surface intervals for each contaminant. Fill thickness isopach contours are provided in Figure 3-4 and discussed in Section 3.2.1 based on fill thickness estimates from observations made during advancement of soil borings.

Arsenic. Arsenic contamination was detected above MCP Method 1 soil cleanup standards in the 1 to 3 feet soil horizon and the greater than 3 feet horizon. No arsenic was detected at concentrations greater than the MCP Method 1 soil cleanup standards in the 0 to 1 foot soil horizon. In the 1 to 3 feet horizon, arsenic exceeded MCP Method 1 soil cleanup standards in the center of the NBHS Junior High Gym Class area (HS-8) in the vicinity of sample location HK6+HJ6, in a southern portion of the NBHS Unfenced Playing Field area (HS-3) in the vicinity of sample location SS-36, and in an area on the western side of the NBHS campus portion of the Site extending from the NBHS Flag Pole area (HS-5) in a northerly direction to the southwest of the NBHS Junior High Gym Class area (HS-8). In the greater than 3 feet horizon, arsenic exceeded MCP Method 1 soil cleanup standards across the NBHS campus portion of the Site with the exception of an area beneath the NBHS building footprint, and an area in the southern portion and southeastern corner of the NBHS campus portion of the Site. Arsenic concentrations are mapped in Figures 4-11 to 4-13 for the 0 to 1, 1 to 3 and greater than 3 feet soil horizons, respectively, for the NBHS campus.

Barium. Barium contamination was detected above MCP Method 1 soil cleanup standards in the 1 to 3 feet soil horizon and the greater than 3 feet horizon. Barium was not detected in excess of the MCP Method 1 soil cleanup standards in the 0 to 1 foot soil horizon. In the 1 to 3 feet horizon, barium exceeded MCP Method 1 soil cleanup standards in the northwestern portion of the NBHS campus, with a concentration in excess of the barium UCL at sample location HC16+HC15+HC14[3]. In the greater than 3 feet horizon, barium exceeded MCP Method 1 soil cleanup standards in the northern portion of the campus extending along the easterly boundary with an area in the vicinity of sample location SB-294, as well as an area in the southeast corner of the NBHS portion of the Site in the vicinity of sample location SB-303. Barium

[3] The concentration that exceeds the UCL is an individual sample concentration and does not represent an exposure point concentration in excess of the UCL.

concentrations are mapped in Figures 4-14 to 4-16 for the 0 to 1, 1 to 3 and greater than 3 foot soil horizons, respectively, for the NBHS campus.

Cadmium. Cadmium contamination was detected above MCP Method 1 soil cleanup standards in the 0 to 1 foot, 1 to 3 feet, and greater than 3 feet horizons. In the 0 to 1 foot horizon, cadmium was detected in excess of the MCP Method 1 soil cleanup standards in one location located along the northern boundary of the campus in the vicinity of sample location HI2.5+HJ2.5. In the 1 to 3 feet horizon, cadmium exceeded the MCP Method 1 soil cleanup standards in the western portion of the campus, with an isolated area in the NBHS Fenced Playing Field area (HS-2) in the vicinity of sample location SS-32, and an area of higher concentrations located along the western boundary in the vicinity of sample location HB23+HB27/MSB (HS-5). In the greater than 3 feet horizon, cadmium exceeded the MCP Method 1 soil cleanup standards in a number of locations across the NBHS campus portion of the Site with areas below the MCP Method 1 soil cleanup standards in the northeast corner, southern portion extending to the southeast corner, under the footprint of the NBHS building, and on the western border in the vicinity of sample location SB-275 (HS-9). An area of higher concentrations was observed in the northwest portion of the campus in the vicinity of sample location SB-287 (HS-9). Cadmium concentrations are mapped in Figures 4-17 to 4-19 for the 0 to 1, 1 to 3 and greater than 3 feet soil horizons, respectively, for the NBHS campus.

Chromium. Chromium contamination was detected above the hexavalent-chromium based MCP Method 1 soil cleanup standards in the 0 to 1 foot, 1 to 3 feet, and greater than 3 feet horizons. In the 0 to 1 foot horizon, chromium exceeded MCP Method 1 soil cleanup standards in a location located along the northern boundary of the campus in the vicinity of sample location HI2.5+HJ2.5 (HS-8), and in the southwestern portion of NBHS Fenced Playing Field area (HS-2) in the vicinity of sample location SS-15 and SS-19. In the 1 to 3 feet horizon, chromium exceeded the MCP Method 1 soil cleanup standards in the northwestern portion of the NBHS campus, with isolated areas in the NBHS Gym area (HS-4) in the vicinity of sample locations HJ42+HF31 and HH43+HI42. In the greater than 3 feet horizon, chromium was detected in excess of the MCP Method 1 soil cleanup standards generally across the NBHS campus portion of the Site, with areas below the MCP Method 1 soil cleanup standards in the southeast corner, and center of the campus under the footprint of the NBHS building. Areas of higher concentrations were observed in the northern portion of the campus. Chromium concentrations are mapped in Figures 4-20 to 4-22 for the 0 to 1, 1 to 3 and greater than 3 feet soil horizons, respectively. Note that future investigative work at the Site will evaluate the species (valence state) predominance of chromium, which is expected to be trivalent chromium based on typical soil pH and oxidation conditions. This work will be documented in future submittals, including a forthcoming Interim Phase III RAP.

Lead. Lead contamination was detected above MCP Method 1 soil cleanup standards primarily in the 1 to 3 feet and the greater than 3 feet horizons. In the 0 to 1 foot horizon, lead was detected in excess of the MCP Method 1 soil cleanup standard in the NBHS Junior High Gym Class area (HS-8) in the vicinity of sample location HH3 only. In the 1 to 3 feet horizon, lead concentrations were detected in excess of the MCP Method 1 soil cleanup standards generally in the northern, western and southeastern portions of the NBHS campus. UCLs were exceeded in individual sample locations in the vicinity of sample locations HI3+HH3, HB10+HD10,

HB12+HB16, and SS-13-H in the 1 to 3 feet horizon[4]. In the greater than 3 feet horizon, lead MCP Method 1 soil cleanup standards were exceeded across the NBHS campus portion of the site, with the exception of areas along the southern boundary, southeast corner, and center of the campus. UCLs were exceeded in individual samples in the vicinity of SB-305, SB-294, and SB-281 and SB-287 in the greater than 3 feet horizon[5]. Lead concentrations are mapped in Figures 4-23 to 4-25 for the 0 to 1, 1 to 3 and greater than 3 foot soil horizons, respectively, for the NBHS campus.

Benzo(a)pyrene. Benzo(a)pyrene contamination was detected above MCP Method 1 soil cleanup standards predominantly in the 1 to 3 feet, and greater than 3 feet horizons. Benzo(a)pyrene contamination was detected above MCP Method 1 soil cleanup standards in the 0 to 1 foot horizon in the northern portion of the NBHS Junior High Gym Class area (HS-8) in the vicinity of sample locations HH3 and HI2.5+HJ2.5 only. In the 1 to 3 feet horizon, benzo(a)pyrene exceeded MCP Method 1 soil cleanup standards generally across the NBHS campus portion of the Site, with the exception of an area in the northwest corner and the southeast portion of the campus. The benzo(a)pyrene UCL was exceeded at sample location HH13 in the 1 to 3 feet horizon. In the greater than 3 feet horizon, benzo(a)pyrene exceeded MCP Method 1 soil cleanup standards in the southern half of the NBHS portion of the Site and in the northwest portion of the NBHS campus portion of the Site. The UCL was exceeded at individual sample location SB-308 in the greater than 3 foot horizon. Benzo(a)pyrene concentrations are provided in Figures 4-26 to 4-28 for the 0 to 1, 1 to 3 and greater than 3 feet soil horizons, respectively.

PCB. PCB contamination was detected above MCP Method 1 soil cleanup standards in the 0 to 1 foot, 1 to 3 feet, and greater than 3 feet horizons. In the 0 to 1 foot horizon, PCBs exceeded the MCP Method 1 soil cleanup standards in the vicinity of sample locations SS-28, HS-2, SB-349, and HS-6. In the 1 to 3 feet horizon, PCB contamination was detected above MCP Method 1 soil cleanup standards generally in the western and southern portions of the NBHS campus. In the greater than 3 feet horizon, PCB contamination was detected above MCP Method 1 soil cleanup standards in the northwest corner, west of the center of the campus, and along the southern portion of the western boundary of the campus. PCBs concentrations are mapped in Figures 4-29 to 4-31 for the 0 to 1, 1 to 3 and greater than 3 feet soil horizons, respectively.

4.2.2 Groundwater

The results of the analysis of groundwater at the NBHS portion of the Site for PAHs, PCBs, both total and dissolved MCP metals and mercury contaminants of concern did not indicate the presence of contaminants in excess of the MCP Method 1 groundwater standards with the exception of total lead at MW-5 which is located near the center of the NBHS campus portion of the Site. As discussed in Section 4.1.2.3, the total lead concentration is most likely attributable to the lead being adsorbed to, or contained in, particulates in the groundwater sample, and not likely to be dissolved phase lead contamination.

[4] The concentrations that exceed the UCL are individual sample concentrations and do not represent exposure point concentrations in excess of the UCL.

[5] The concentrations that exceed the UCL are individual sample concentrations and do not represent exposure point concentrations in excess of the UCL.

The locations of monitoring wells are presented on Figure 2-2A. Groundwater sampling results are presented on Table 4-16 and were discussed previously in Section 4.1.2.

5.0 FATE AND TRANSPORT ANALYSIS

Consistent with 310 CMR 40.0835(4) (e), the following section provides an analysis of the fate and transport of contaminants identified in the NBHS and Walsh Field portion of the Site. This section summarizes environmental fate and transport characteristics of identified contaminants and identifies existing and potential migration pathways of oil and hazardous material (OHM) at the NBHS campus and Walsh Field portions of the Site.

5.1 Environmental Fate and Transport Characteristics

Compounds identified in Site soil and groundwater include PAHs, PCBs, arsenic, barium, cadmium, chromium, lead, mercury, nickel, vanadium, and zinc (see Tables 4-1 to 4-16) based on TRC's subsurface investigations and during previous assessments conducted by BETA. The distribution of chemical contamination is influenced, in part, by factors such as the physical and chemical properties of the constituents, the nature and location of sources, and Site characteristics such as geology, hydrology, and topography. Characteristics of these compounds that affect mobility, stability, volatility, persistence, and bioaccumulative potential are discussed herein. Contaminant chemical characteristics are summarized in a table provided in Appendix G.

5.1.1 Contaminant Properties

To evaluate the fate and transport of chemicals in the environment, it is important to identify the physical and chemical properties that influence fate and transport processes. Chemicals that are structurally similar tend to exhibit like behavior in the environment and as such are grouped into classes. Classes of chemicals detected in soil at the NBHS campus and Walsh Field portions of the Site include PAHs, PCBs, and metals.

General definitions of physical properties are discussed below, followed by a description of the characteristics of each chemical class.

Specific Gravity. The specific gravity of a chemical is the ratio of the mass of a given volume of the chemical to an equal volume of water at a specified temperature, usually 4 degrees Celsius (°C). Specific gravity is a relative measure of density. Compounds with specific gravities greater than 1.0, if they are immiscible with water, will separate as a sinking phase. Immiscible compounds with specific gravities less than 1.0 will tend to float on water. The majority of the contamination evidenced on the NBHS campus and Walsh Field portion of the Site includes various contaminants with specific gravities greater than 1.0 indicating the potential to sink in water.

Water Solubility. The solubility of a chemical in water is the maximum amount of chemical that will dissolve in pure water at a specific temperature and pressure. Water solubility is a general predictor of a chemical's potential mobility and distribution in the environment. Chemicals with moderate to high solubility (greater than 100 milligrams per liter [mg/L]) can readily leach from soils into groundwater, and once there, are generally mobile. Compounds that are highly soluble in water will be less likely to volatilize from water and may be more

susceptible to microbial degradation. Contaminants detected at the NBHS campus and Walsh Field portions of the Site generally exhibit a relatively low level of water solubility.

Vapor Pressure. The vapor pressure of a liquid or solid is a relative measure of its volatility in its pure form. This value expresses the pressure of the vapor phase of a compound in equilibrium with its liquid or solid phase of the compound at a given temperature. Vapor pressure is important in evaluating migration of chemicals to air from other environmental media; factors such as temperature, wind speed, water solubility and degree of adsorption also play a key role. Chemicals with vapor pressures greater than 10 millimeters of mercury (mm Hg) are considered to be highly volatile. Contaminants detected at the NBHS campus and Walsh Field portions of the Site generally exhibit a relatively low vapor pressure.

Henry's Law Constant. The Henry's Law Constant is another measure of chemical volatility. It is expressed as a ratio of the concentration of a chemical in air to the chemical's concentration in water (i.e., dissolved state). The higher the Henry's Law Constant value, the greater the tendency to volatilize. In general, compounds with values above 10^{-5} atmospheres-cubic meter per mole (atm-m^3/mol) are considered highly volatile and have a greater potential for movement into groundwater. Contaminants detected at the NBHS campus and Walsh Field portions of the Site generally exhibit a relatively low Henry's Law Constant.

Organic Carbon Partition Coefficient (K_{oc}). This value is a measure of the relative sorption potential of organic compounds. K_{oc} reflects the tendency of an organic compound to be adsorbed onto soils and sediments and is generally independent of soil properties. This value is expressed as the ratio of the amount of a compound adsorbed per unit weight of organic carbon, to the concentration of the compound in aqueous solution at equilibrium. Chemicals with a high K_{oc} (greater than 1,000 milliliters per gram [mL/g]) may exhibit a high sorption potential in soils and are less likely to leach into groundwater. K_{oc} values less than 100 mL/g indicate that the chemical has a high potential to leach into groundwater. Organic contaminants detected at the NBHS campus and Walsh Field portions of the Site generally exhibit a relatively high K_{oc} values and tend to exhibit high sorption potential and limited potential to leach.

Log K_{ow} (log octanol/water partition coefficient). This value is a measure of the tendency of a compound to partition between an organic phase (octanol) and an aqueous phase. Log K_{ow} relates indirectly to water solubility and directly to soil adsorption. Chemicals with low partition coefficients (log K_{ow} less than 1) have high water solubilities and low adsorption coefficients, and would, therefore, be expected to have a high potential to leach into groundwater. Organic contaminants detected at the NBHS campus and Walsh Field portions of the Site generally exhibit relatively high K_{oc} values and tend to exhibit high sorption potential and limited potential to leach. The organic compounds detected in soil are more likely to bind to soil, based on their log K_{ow} values.

5.1.2 Contaminant Types

Chemical classes detected at the NBHS campus and Walsh Field portions of the Site include PAH's, PCBs, and metals. At the NBHS campus and Walsh Field portions of the Site, the compounds detected in excess of MCP Method 1 soil cleanup standards are attributable to PSWS

fill, with the exception of the arsenic detected in surface soil at the Varsity and JV Baseball Diamonds at Walsh Field. The Varsity and JV Diamonds surface soil contamination appears to be attributable to a contaminated soil importation event associated with past field refurbishment or potentially the historical application of arsenic-based herbicides.

Polycyclic Aromatic Hydrocarbons (PAHs). PAHs are the product of incomplete combustion of fossil fuels. They are also components of petroleum and coal. Compounds of this class generally have low mobility in soil and posses very low aqueous solubility. Therefore, compounds in this class are not likely to be conveyed in the dissolved phase in groundwater and have low relative mobility. PAHs have a tendency to strongly partition (adsorb) to soils and soil organic phases.

Polychlorinated Biphenyls (PCBs). PCBs are a mixture of up to 209 chlorinated compounds which do not occur naturally in the environment. PCB oils were commonly used as fire-resistant dielectric fluids in high voltage transformers, and are additionally associated with hydraulic equipment and lubricants among many other uses. The manufacture of PCBs in the United States was terminated in 1977. PCBs have a very low solubility in water they strongly partition (adsorb) to soils and soil organic phases, and have a strong tendency for bioaccumulation.

Arsenic. Arsenic occurs naturally in rocks and soil, water, air, and plants and animals. It can be further released into the environment through natural activities such as volcanic action, erosion of rocks and forest fires, or through human actions. A majority of industrial arsenic is currently used as a wood preservative, but arsenic is also used in paints, dyes, metals, drugs, soaps and semi-conductors. High arsenic levels can also come from certain pesticides and animal feeding operations. Industry practices such as copper smelting, mining and coal burning also contribute to arsenic in our environment. Arsenic was one of the primary ingredients in pesticides before synthetic organic pesticides were available, and has also been found in herbicides. Arsenic has a low solubility in water and low potential for transport via groundwater in the dissolved phase.

Barium. Barium is a naturally-occurring metal in the sulfate mineral barite. Barium compounds are used by the oil and gas industry to make drilling muds. Barium compounds are used to make paint, bricks, ceramics, glass, and rubber. Some barium compounds that are released during industrial processes dissolve easily in water and can be found in lakes, rivers, and streams. Some barium compounds can spread over great distances due to their water-solubility. However, barium forms insoluble salts with components in the environment such as carbonate and sulfate; therefore, barium is not mobile and poses little risk of environmental transport from soil to groundwater.

Cadmium. Cadmium is a naturally-occurring metal and always occurs in combination with zinc. About three-fourths of cadmium is used in Ni-Cd batteries, most of the remaining one-fourth is used mainly for pigments, coatings and plating, and as stabilizers for plastics. Cadmium has a very low solubility in water and little potential for transport via dissolved phase.

Chromium. Chromium is a naturally-occurring metal and was mainly used in alloys such as stainless steel, in chrome plating and in ceramics. Chromium plating was once widely used to give steel a polished silvery mirror coating. Chromium is used in metallurgy to impart corrosion

resistance and a shiny finish; as dyes and paints, as a catalyst in dyeing and in the tanning of leather. Chromium has a very low solubility in water and little potential for transport via the dissolved phase.

Chromium is present in the environment in several different forms, the most common forms being the metal form chromium(0), chromium(III), and chromium(VI). Chromium(III) occurs naturally in the environment and is an essential nutrient. Chromium(VI) and chromium(0) are generally produced by industrial processes. The less toxic chromium(III) is far more prevalent in the environment than chromium(VI), as chromium(VI) requires extreme pH and Eh conditions that rarely exist in the natural environment to predominate over chromium(III).

Lead. Lead is a naturally-occurring metal and is also a very commonly employed industrial chemical, and has been used in gasoline, paints, solders, glazes, electronics, batteries, lead-arsenate pesticides, ammunition shot and sinkers. Lead is dispersed throughout the environment primarily as a result of human activities. Due to lead's persistence in the environment and toxicity, the use of lead has been eliminated or strictly regulated. Lead has a very low solubility in water and little potential for transport via the dissolved phase.

Mercury. Mercury is a naturally-occurring metal with very low solubility in water and a tendency to bioaccumulate. Metallic mercury is a liquid at room temperature and is used to produce chlorine gas and caustic soda, and is widely used in thermometers, dental fillings and batteries.

Nickel. Nickel is a naturally-occurring metal and the major use of nickel is in the preparation of alloys. A majority of the nickel is used to make stainless steel with other industrial uses being the manufacture of alloy steels, rechargeable batteries, catalysts and other chemicals, coinage, foundry products, and plating. Nickel has a very low solubility in water and little potential for transport via the dissolved phase.

Vanadium. Vanadium is a naturally-occurring metal with very low solubility in water. Vanadium is used in many alloys, primarily in steel used for automobile parts, springs, and ball bearings.

Zinc. Zinc is a naturally-occurring metal with very low solubility in water and a tendency to bioaccumulate. Zinc is used in paint, rubber, dyes, wood preservatives, ointments, batteries, and used in rust prevention.

5.2 Migration Pathways

Figure 5-1 presents a schematic conceptual site model that illustrates, on a site-specific basis, how contaminants entered the environment, how the contaminants were transported at the Site, and the potential for exposure to human and environmental receptors, as currently supported by the available data, information on contaminants identified at the Site, and contaminants properties. An analysis of the potential migration pathways as they relate to the contaminants identified at the Site is presented in the following sections.

5.2.1 Soil

Contaminants detected at the NBHS campus and Walsh Field portions of the Site above their applicable MCP Method 1 soil cleanup standards were PAHs, PCBs, dibenzofuran, DRO, and certain metals. All contaminants of concern identified to date tend to exhibit strong partitioning tendencies and limited potential to leach, and/or low solubility and have low likelihood of migrating with groundwater and leaching through the soil.

The contaminants of concern are also highly persistent (do not readily degrade) and contaminants like PCBs have a strong tendency for bioaccumulation. However, since the Site topography is relatively flat and there are no on-Site surface water bodies, the potential for transport of contaminated soil to surface water bodies is limited.

Future development of the Site or future maintenance activities could disturb soils making these soils available for fugitive dust transport and stormwater runoff if appropriate engineering controls and work practices are not implemented during activities that could disturb the soil.

5.2.2 Groundwater

The results of the analysis of groundwater at the NBHS portion of the Site for PAHs, PCBs, both total and dissolved MCP metals and mercury contaminants of concern did not indicate the presence of contaminants in excess of the applicable MCP Method 1 groundwater cleanup standards with the exception of total lead at monitoring well MW-5, which is located near the center of the NBHS campus portion of the Site. As discussed in Section 4.1.2.3, the total lead detected in groundwater at monitoring well MW-5 is most likely attributable to the lead being adsorbed to, or contained in, particulates in the groundwater sample, and not likely to be dissolved phase lead contamination.

Lead has a specific gravity of 11.34 but does not tend to migrate in pure phase form, which is a solid under most typical environmental conditions. Additionally, lead is nearly insoluble in water and strongly partitions to solid phases. Therefore lead is likely to be largely immobile in groundwater. Based on the nature of lead, the contaminant is not expected to migrate significantly from its current distribution.

5.2.3 Air

Contaminants of concern identified at the NBHS campus and Walsh Field portions of the Site generally exhibit relatively low vapor pressures and therefore, are not likely to migrate to air from other environmental media.

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5.2.4 Surface Water

No surface water bodies are located on the NBHS campus and Walsh Field portions of the Site or in the vicinity of the Site.

5.2.5 Sediment

No surface water bodies and associated sediment are on Site.

5.2.6 Food Chain

No ecologically viable habitats are located on the NBHS campus and Walsh Field portions of the Site. A small wooded area containing both forested upland and an isolated forested wetland is present to the north of the NBHS campus on the property of the adjacent ice rink and represents the only undeveloped habitat in the vicinity of the Site. A significant part of the NBHS portion of the Site is either paved, or under the footprint of existing structures, and the Site is in a heavily urbanized, thickly settled location.

6.0 HUMAN HEALTH RISK CHARACTERIZATION AND EXPOSURE ASSESSMENT

This section was prepared consistent with 310 CMR 40.0835(4) g and h of the MCP and Appendix F of the MassDEP *Guidance for Disposal Site Risk Characterization* (MassDEP, 1995) and provides an exposure assessment and risk characterization for Walsh Field and the NBHS campus. The risk characterization addresses human and environmental receptors reasonably expected to be at and near these areas. As discussed herein, a Method 2 approach was selected to characterize baseline risk at these areas. Supporting data tables used to evaluate potential risk at the Site are contained in Appendix E of this report. The development of applicable Method 2 standards for compounds detected at the site that lack MCP Method 1 soil cleanup standards is documented in Appendix F of this report.

6.1 Adequacy of Site Characterization

6.1.1 Impacted Media

At the NBHS campus and Walsh Field, environmental media known to be potentially impacted by contaminants include soil. As described in Sections 2 and 3, soil and groundwater contamination was evaluated during environmental investigations at the Site by BETA between 2004 and 2006 and by TRC in 2008.

In addition, as described in Section 5 and shown on the schematic conceptual site model (Figure 5-1), contaminants of concern identified at the NBHS campus and Walsh Field portions of the Site are not likely to migrate to air from other environmental media. Therefore, no soil gas or indoor air samples were collected during environmental investigations at the Site to confirm the presence of contamination in, or impact to, the air medium at significant concentrations originating from impacted environmental media. (Indoor air sampling has taken place at the NBHS building related to building materials serving as sources of airborne PCBs in a program overseen by EPA. For additional information see TRC, 2006a; TRC, 2006b; TRC, 2008c; and TRC, 2009.)

6.1.1.1 Soil

Contaminants of concern detected in soils at the NBHS campus and Walsh Field portions of the Site in excess of their MCP Method 1 soil cleanup standards include PCBs, metals (antimony, arsenic, barium, cadmium, chromium, lead, mercury, nickel, vanadium, and zinc), and various PAHs as described in Section 4.1.1.

On the NBHS campus portion of the Site, soil contaminants in excess of MCP Method 1 soil cleanup standards include PAHs [benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenz(a,h)anthracene, fluoranthene, indeno(1,2,3-cd)pyrene, 2-methylnapthalene, naphthalene, phenanthrene, and pyrene], dibenzofuran, DRO, metals (antimony, arsenic, barium, cadmium, chromium, lead, nickel, mercury, vanadium, and zinc), and PCBs.

In the Walsh Field portion of the Site soil contaminants in excess of MCP Method 1 soil cleanup standards identified include PAHs [acenaphthylene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenz(a,h)anthracene, and indeno(1,2,3-cd)pyrene] and metals (arsenic, barium, cadmium, chromium, lead, mercury, and nickel).

Tables summarizing the results of chemical analysis for soil samples collected at the NBHS campus and Walsh Field portion of the Site are provided in Tables 4-1 through Table 4-15 of this report.

6.1.1.2 Groundwater

No contaminants of concern were detected at the NBHS campus and Walsh Field portions of the Site in excess of the MCP Method 1 groundwater cleanup standards with the exception of total lead at monitoring well MW-5, which is located near the center of the NBHS campus portion of the Site as described in Section 4.1.2. As discussed in Section 4.1.2.3, the total lead concentration is most likely attributable to the lead being adsorbed to, or contained in, particulates in the groundwater sample, and not likely to be dissolved phase lead contamination.

6.1.2 Extent of Contaminant Release

The nature and extent of contamination has been analyzed and is discussed in Section 4. The nature and extent has been sufficiently delineated to support conclusions and opinions regarding the source, nature, extent, and potential impacts of the release at the NBHS campus and Walsh Field and support conceptual remedial planning. However, additional characterization may be required to refine the delineation of the extent of contamination at certain locations in order to support detailed remedial planning, remedial volume estimates, and/or comprehensive remedial action implementation.

6.1.2.1 Horizontal and Vertical Extent

The horizontal and vertical extents of soil contamination are described in Section 4. In general, the horizontal and vertical extent of PAH, metals, and PCB contamination in soil at the NBHS campus and Walsh Field portions of the Site are generally consistent with former use of the Site as a burn dump and the presence of related fill material, with the noted exception of arsenic contamination detected at Walsh Field as discussed in Section 4.2.1.1. The horizontal and vertical extent of soil contamination detected above MCP Method 1 soil cleanup standards has been characterized via laboratory analysis and field screening (visual, olfactory, jar headspace, and professional judgment). For soil from the 0 to 1 foot horizon, data indicate that the surficial soils were comparatively less impacted or un-impacted, with the arsenic exception previously noted, than the 1 to 3 feet and greater than 3 feet horizons. Soil contaminant concentrations at the NBHS campus are mapped in Figures 4-1 to 4-10 for Walsh Field and Figures 4-11 to 4-31 for the NBHS campus. Fill thickness contours are provided in Figures 3-3 and 3-4 for Walsh Field and for the NBHS campus, respectively.

The horizontal and vertical extent of groundwater contamination is described in Section 4. No contaminants of concern were detected at the NBHS campus and Walsh Field portions of the Site

in excess of the MCP Method 1 groundwater cleanup standards with the exception of total lead at MW-5, which is located near the center of the NBHS portion of the Site as described in Section 4.1.2 (and based on dissolved lead analysis appears to be associated with particulate matter). In general, the lack of groundwater impacts from contaminants of concern is consistent with the contaminant properties, namely the high sorption potential and limited potential to leach, and/or low solubility of the contaminants.

6.1.2.2 Background Concentrations

Site-specific background concentrations were not characterized in soil and groundwater.

For the purposes of this Interim Phase II CSA and risk characterization, background concentrations for VOCs, PCBs, SVOCs (other than PAHs), pesticides and herbicides are considered to be non-detect. Background concentrations for petroleum-related compounds (e.g., TPH, GRO and DRO) are also considered to be non-detect.

Even though the presence of fill containing coal, coal ash or wood ash is present at the NBHS campus and Walsh Field portions of the Site, background concentrations of metals and PAHs selected for use are MassDEP "Natural Soil" background concentrations as presented in the *Technical Update Background Levels of Polycyclic Aromatic Hydrocarbons and Metals in Soil* (MassDEP, 2002).

6.1.2.3 Existing or Potential Migration Pathways

Existing and potential migration pathways were discussed in Section 5.2. Figure 5-1 illustrates the potential migration pathways for the Site.

6.1.3 Representativeness

The nature and extent of contamination is discussed in Section 4, and is characterized sufficiently to evaluate risk and to select remedial actions for the NBHS campus and Walsh Field, and support conceptual remedial planning. However, additional characterization may be required to refine the delineation of the extent of contamination at certain locations, support detailed remedial planning and remedial volume estimation, and/or comprehensive remedial action implementation.

TRC also conducted a data usability assessment for samples collected by TRC, which is summarized in Section 7. In general, TRC concluded that the data are useable for MCP decisions based on the *Compendium of Analytical Methods* requirements for acceptable accuracy, precision, and sensitivity, with the noted exceptions. Although there were select quality control (QC) non-conformances, the data are valid as reported and may be used for decision making purposes. Data collected by BETA were utilized by TRC in this analysis as-is and will be subjected to a retrospective data usability analysis that will be reported in future submittals, with one exception noted below.

TRC performed a focused data validation review on the VOC and semivolatile organic compound (SVOC) data for select soil samples and trip blanks collected at various locations at the site by BETA. The samples were collected on December 28 through December 30, 2004, January 11, 2005, February 22, 2005, and February 21 through February 23, 2006. All samples were submitted to New England Testing Laboratory, Inc. (NETL) in North Providence, Rhode Island for analysis. The samples were analyzed for VOCs using SW-846 method 8260B and SVOCs using SW-846 method 8270C. The sample results were assessed using the *EPA New England Data Validation Functional Guidelines for Evaluating Environmental Analyses*, revised December 1996. Modification of these guidelines was performed to accommodate the non-CLP methodologies. The data validation was focused strictly on the qualification of data due to laboratory method blank or trip blank contamination. Based on this evaluation, selected data points were qualified as non-detects due to the presence of blank contamination and therefore not utilized in the risk assessment.

Acetone, chloromethane, and/or bromomethane were detected in the trip blanks and di-n-butylphthalate was detected in the laboratory method blanks. The presence of blank contamination indicates that false positives may exist for these compounds in the associated samples. The positive results for chloromethane, bromomethane, acetone, and di-n-butylphthalate were qualified as non-detects in select samples due to the blank contamination. Please refer to the focused data validation review memorandum for 2004-2006 soil samples in Appendix I for additional information and details on the affected samples.

6.1.4 Compounds of Potential Concern

Compounds of Potential Concern (COPCs) are those with individual detected concentrations in excess of applicable background concentrations or compounds for which background concentrations have not been established. The following table summarizes the COPCs at the Walsh Field and the High School areas and the media in which they were detected.

Compounds of Potential Concern	
Compounds	**Affected Media**
Acetone	Soil
Benzene	Soil
Methylene chloride	Soil
Toluene	Soil
Trimethylbenzene isomers	Soil
Xylene isomers	Soil
GRO/DRO	Soil
Polycyclic Aromatic Hydrocarbons	Soil and Groundwater
Polychlorinated Biphenyls	Soil and Groundwater
4-Bromophenyl phenyl ether	Soil
4-Methylphenol	Soil
Benzoic acid	Soil
bis(2-Ethylhexyl)phthalate	Soil
Dimethyl phthalate	Soil
Alpha-BHC	Soil

Compounds of Potential Concern	
Compounds	**Affected Media**
4,4'-DDE	Soil
4,4'-DDT	Soil
Carbazole	Soil
Dibenzofuran	Soil
Endosulfan sulfate	Soil
Heptachlor epoxide	Soil
Hexachlorobenzene	Soil
Antimony	Soil
Arsenic	Soil and Groundwater
Barium	Soil and Groundwater
Beryllium	Soil
Cadmium	Soil
Chromium	Soil and Groundwater
Lead	Soil and Groundwater
Mercury	Soil
Nickel	Soil and Groundwater
Selenium	Soil
Silver	Soil and Groundwater
Vanadium	Soil
Zinc	Soil and Groundwater

6.2 Site Activities and Uses (Current and Foreseeable Future)

6.2.1 Current Uses

Walsh Field is an active athletic complex that contains a football stadium along Maxfield Street, a soccer field that abuts the City's maintenance yard, the fenced Varsity baseball field at the corner of Parker and Hunter Streets, the JV baseball field abutting the maintenance yard between the soccer field and football stadium, and a central area used for athletic practices of various sports including softball. This practice area is located along Hunter Street, between the Varsity field and the football stadium. The former Doane Field House (currently vacant) is located at the western edge of the practice area, along Hunter Street. The Walsh Field complex serves as the primary athletic area for NBHS and also hosts semi-professional and collegiate-league baseball games at the Varsity field. The entire Walsh Field complex is surrounded by a fence to limit access by the general public in order to preserve the quality of the playing surfaces. The Varsity field is further surrounded by a second 8-foot fence. Athletic teams use the fields for practices and games between mid-March and late November each year. Playing seasons for most athletic sports are approximately 18 weeks in length which includes a 13-week season plus 5 weeks for pre-season and post-season play.

The NBHS campus is located to the north of Walsh Field, across Parker Street. Hathaway Boulevard and Liberty Street bound the campus to the west and east, respectively. An ice skating rink and isolated wetland area, located along Durfee Street, exist along the northern boundaries of the NBHS property. There are numerous paved parking areas and roadways

throughout the campus. The NBHS building is comprised of three main buildings: (1) the gym; (2) the auditorium; and (3) the "Houses". The gym building is located at the southern end of the campus. The grassy area in front (west) of the gym building is used for outdoor gym classes. Fenced playing fields (a volley ball court, baseball field, and basketball and tennis courts) are located to the rear (east) of the gym building. To the north of the gym building is the main entrance to the high school, marked by a flag pole and traffic circle. The auditorium is housed in this central portion of the NBHS building. An unfenced field, used as a practice area, is located to the rear of the auditorium. Further to the north are the classrooms, arranged as a series of four "Houses" around a central core. The grassy outdoor areas to the east of the "Houses" are used as a congregating area by the students. The grassy field to the north of the "Houses", between two large parking lots, is used as a gym class area by the KMS, located across Hathaway Boulevard. The fenced and unfenced fields are used from mid-March until late November each year, similar to Walsh Field. Other non-paved areas of the NBHS campus can also be accessed during a similar time frame, before the ground freezes and becomes snow covered.

The only occupied building on the Site is the NBHS building. However, the vapor intrusion pathway is likely to be incomplete due to the negligible levels of VOCs detected in both soil and groundwater.

Both areas of interest are located in a residential area with residential neighborhoods located within walking distance. Current potential child and adult receptors include:

- trespassers accessing the fenced areas without permission;
- students, faculty, staff and visitors at the High School;
- athletes, coaches and visitors at Walsh Field during athletic events;
- maintenance workers at the Walsh Field and High School grounds; and
- construction or utility workers.

For the purposes of the current risk characterization and consistent with the previous portions of this report, the Walsh Field area was divided into exposure points applicable to the athletic activities that occur at the field as follows:

- WF-1: Football Field
- WF-2: Soccer Field
- WF-3: Practice Area
- WF-4: Junior Varsity Baseball Field
- WF-5: Varsity Baseball Field

The NBHS campus was divided into the following exposure points based on current activities known to be occurring:

- HS-1: Children's Playground Area
- HS-2: Fenced Playing Field Area
- HS-3: Unfenced Playing Field Area

- HS-4: Gym Area
- HS-5: Flag Pole Area
- HS-6: House Area
- HS-7: Student Congregating Area
- HS-8: Junior High School Gym Class Area
- HS-9: Beneath Pavement/Building Areas
- HS-10: Tree Belts Area
- HS-11: Miscellaneous Samples of Unknown Location

Soils within the HS-9 exposure area were not evaluated for current exposures since soils within these areas are currently inaccessible due to the presence of pavement. For all other exposure points, analytical results for surface soil (generally less than 3 feet below ground surface) were combined to generate exposure point concentrations. A "hot spot" was identified at sampling location WFB-4 (1-2.5') located at the Varsity baseball field. This location was identified as a hot spot due to elevated concentrations of carcinogenic PAHs and petroleum hydrocarbons 100-fold above concentrations typically found in this area of the Site. HS-11 includes results for composite samples collected by BETA in 2006, for which the locations and depths of the individual samples have not been provided. These samples are grouped and discussed separately in relation to a potential data gap they may represent.

6.2.2 Foreseeable Future Uses

The City has no plans to change the land use of these two areas of interest in the future. Therefore, future receptors are anticipated to be the same as current receptors.

There are also no plans for development at the Site (e.g., senior housing, hospitals, etc.) that would incorporate overnight housing (in whole or in part).

There are no plans for cultivation of soil at the Site in the foreseeable future.

Although residential use is not contemplated by the City, adult and child residential receptors are evaluated in the risk characterization as part of a future unrestricted land use scenario.

There are no private drinking water wells within 500 feet of the Site and the area is serviced by the municipal water supply system. The local aquifer does not qualify as a GW-1 category groundwater resource and is therefore, unlikely to be developed as a potable supply. However, low volume irrigation use of local groundwater could occur in the foreseeable future, but is still considered unlikely due to the nature and scale of anticipated future development scenarios.

Four future exposure points were evaluated for the Site: the Walsh Field, the NBHS campus and two "hot spots". For the Walsh Field and NBHS exposure points, soil analytical results for all soils, regardless of depth or location beneath pavement or other barriers, were combined to generate exposure point concentrations. The WFB-4 "hot spot" location, identified for the current scenario is also a hot spot for the future scenario. A second future "hot spot" was identified at location SB-308 (3.5'), sampled from beneath the paved parking area to the south of

the Gym building, along Parker Street. This location was identified as a hot spot due to elevated concentrations of carcinogenic PAHs.

6.3 Imminent Hazards

An IH is not presented by the OHM that has come to be located at this Site. This determination is based on a review of criteria for releases "deemed to pose" an IH under 310 CMR 40.0321(1) and the criteria for releases that "could pose" an IH under 310 CMR 40.0321(2). IRAs conducted on Site to date are summarized in Section 3.3. The results of TRC's review of conditions "deemed to pose" or that "could pose" an IH are set forth below.

6.3.1 Criteria for Releases Deemed to Pose an Imminent Hazard – 310 CMR 40.0321(1)

The release to the environment is not known to have resulted in the presence of OHM within buildings, structures, or underground utility conduits at a concentration equal to or greater than 10-percent of the Lower Explosive Limit (LEL), as set forth in 310 CMR 40.0321(1)(a). Volatile compounds were not detected in soil and groundwater at concentrations greater than MCP Method 1 S-1 soil or GW-2 groundwater cleanup standards, respectively. Neither the City nor TRC have received reports or complaints of persistent odors in ambient or indoor air potentially attributable to the release of OHM to the environment.

The contaminants detected at the Site either do not possess reactive or explosive characteristics consistent with 310 CMR 40.0321(1)(b), or the contaminants are not present at concentrations or in situations expected to threaten safety.

The OHM detected at the Site does not appear to be related to a release to a roadway that could endanger public safety as set forth in 310 CMR 40.0321(1)(c).

The release did not result in immediate and acute adverse impacts to freshwater or saltwater fish populations consistent with 310 CMR 40.0321(e). The Site is not near a fresh or salt water waterway.

6.3.2 Criteria for Release that Could Pose an Imminent Hazard – 310 CMR 40.0321(2)

There are no reports of the contamination detected at the Site resulting in the measurement of OHM in a private drinking water supply well at a concentration equal to or greater than ten-times the GW-1 Reportable Concentration (RC), as set forth in 310 CMR 40.0321(2)(a); the GW-1 reporting category does not apply to this Site. In addition, no private drinking water supply wells are known to be present within 500 feet of the Site. The Site and surrounding area are supplied potable water by the municipality.

As discussed in Section 3.3, arsenic in surface soil at the Varsity and Junior Varsity baseball diamonds of Walsh Field triggered the "could pose" arsenic concentration regulatory IH reporting threshold established under 310 CMR 40.0321(2)(b). Notification was made to MassDEP and an IRA was implemented to remove the contaminated soil within the base paths and replace it with clean soil. To demonstrate that this IH condition no longer exists as well as to

demonstrate that no other IH conditions exist at the Site, Tables 6-1 through 6-14 summarize the surficial data soil available for each exposure point area except HS-9, where surface soils are covered by pavement or buildings. For most exposure point areas, the data are representative of the 0 to 1 foot surface interval. However, in the base paths and nearby areas at the Varsity and Junior Varsity fields at Walsh Field, at least the top six inches of arsenic contaminated soil was excavated and replaced with clean soil. The analytical results for the soils within the base paths beneath the clean soil have not been included in the data tables since the replacement soil is currently serving as a temporary protective barrier system until such time that a permanent remedy is implemented.

The data presented in Tables 6-1 through 6-14 document that exposure point concentrations for each area are less than Method 1 soil cleanup standards or, in the case of the Varsity field, less than the IH concentration calculated for arsenic. Therefore, no Imminent Hazard condition for human health exists at the Site for samples collected up to December 15, 2009. IRAs have been conducted since that time to address conditions that "could pose" an IH, as summarized in Section 3.3.

6.4 Appropriateness of the Use of Method 2

A Method 2 risk characterization approach, as described in 310 CMR 40.0980 was selected to characterize the risk of harm to health, public welfare and safety, and a Stage I environmental screening has been used to characterize risk to the environment. A Method 2 approach was applied to this Site for health, public welfare and safety for the following reasons:

- The OHM in the portion of the Site subject to this Phase II CSA is entirely limited to groundwater and soil and that the portion of the Site with sediment contamination is the subject of a class A-3 RAO and AUL.

- Since Method 1 soil cleanup standards do not exist for all the compounds detected at the Site, Method 2 soil cleanup standards have been developed for chemicals lacking Method 1 soil standards using methods and assumptions described in 310 CMR 40.0983 and 40.0884.

The use of Method 2 to develop MCP Method 1 S-1/GW-2 and S-1/GW-3 soil cleanup standards for dibenzofuran, carbazole, 1,2,3-trichlorobenzene, 4-bromophenyl phenyl ether, 4-methylphenol, alpha-BHC, benzoic acid, endosulfan sulfate, and dinoseb is documented in Appendix F.

A Stage I environmental screening has been performed to assess risk to the environment because materials with the potential to bioaccumulate (e.g., PCBs and lead) are known to be present within 2 feet of the ground surface. However, there is limited potential for environmental receptors (other than typical urban fauna such as pigeons or rodents) to be present at the Site due to the highly urbanized character of the Site location. The Stage I environmental screening is presented in Section 6.9.3.

6.5 Groundwater and Soil Categorization

The following sets forth the applicable groundwater and soil categories at the Site. This categorization was prepared consistent with 310 CMR 40.0932, 310 CMR 40.0933, and Table 40.0933(9) of the MCP.

6.5.1 Groundwater Categories

The groundwater categories for this Site were determined pursuant to 310 CMR 40.0932, research of available documentation, and through the use of MassDEP Priority Resources Map (Figure 2-1). Based on the available information, groundwater categories GW-2 and GW-3 apply to groundwater beneath this Site for the following reasons:

GW-2. Groundwater beneath the Site is located less than 15 feet bgs and, in places, is within 30 feet of existing occupied buildings. Though the Walsh Field athletic complex does not contain any currently occupied buildings, the NBHS building is currently occupied. As a result, groundwater at a portion of the Site currently meets criteria for category GW-2. Consistent with 310 CMR 40.0932(b) of the MCP, potential future development of the Walsh Field portion of the Site by the construction of a building was considered to meet the GW-2 criteria for this risk characterization because of the assumption of future unrestricted site use.

GW-3. All groundwater is thought to eventually discharge to surface water bodies per the MCP (310 CMR 40.0932 (2)); therefore, groundwater category 3 (GW-3) is also relevant to the entire Site.

6.5.2 Soil Categories

Consistent with 310 CMR 40.0933(4), the applicability of the MCP soil categories was determined based on consideration of the frequency of Site use, intensity of activities and the accessibility of the soil, as well as human receptor characteristics.

Current adult frequency of use at the Site is determined to be "High" due to the potential for adults to be working full days (8 hours or more) at the Site. Adult intensity of activity is determined to be "High" because much of the Site lacks pavement or other barriers, and soil contamination is located at depths less than three feet below grade and recreational athletic activities are known to occur at these locations. Because the Site is near residential areas and used as a school and athletic complex, children are expected to be frequent visitors to the Site under current conditions; therefore, frequency of Site use by children is determined to be "High". The intensity of use by children is also expected to be "High" because the Site is largely unpaved and is heavily used for school-related and recreational activities.

Potentially contaminated soil at the Site is present within the 0 to 3 feet depth interval as well as the 3 to 15 feet depth interval (based on field observations and sampling). Soil contamination within the top three feet is therefore considered *accessible*, consistent with 310 CMR 40.0933(4)(c)(2), and soil within the 3 to 15 foot interval is considered *potentially accessible*.

Soil contamination located beneath paved parking areas, roadways, and buildings is considered *isolated*.

Based on the above-summarized information, and Table 40.0933(9) of the MCP, soil categories S-1, S-2 and S-3 currently apply to Site soil. The Method 1 S-1 soil category will also be used to evaluate risk in an unrestricted future use scenario and to evaluate the potential need to implement an Activity and Use Limitation (AUL) or conduct additional remediation to achieve an unrestricted use condition.

6.6 Exposure Point Concentrations

Exposure point concentrations (EPCs) for soil and groundwater were determined for the Site consistent with 310 CMR 40.0926 and supporting MassDEP guidance. In addition, the potential presence of hot spots was evaluated as set forth herein.

An EPC is the measured or estimated amount of a constituent in the environmental medium of concern at the point of human contact. Based on MassDEP (1995) guidance, the EPCs for the environmental media typically correspond to the arithmetic mean of the reported results for each data set for areas of contiguous contamination that do not show evidence for the presence of hot spots. However, when soil or groundwater sample locations are not evenly distributed over the Site, or concentrations are highly variable over the Site, or where exposure frequencies are higher in some areas than others, the arithmetic mean may not represent the average exposure concentration. According to 310 CMR 40.0926(3), consideration of the observed distribution of the data, sampling strategy, graphical representation of analytical results, and/or statistical analyses with sufficient power and confidence may be used to demonstrate that the arithmetic mean concentration is unlikely to underestimate the average concentration of OHM at the exposure point.

For this Site, arithmetic average concentrations have been primarily used as EPCs; however, in those instances where individual contaminants were present at concentrations greater than ten times applicable S-1/GW-2 or S-1/GW-3 standards or where greater than 25 percent of the analytical results for an individual contaminant exceeded an applicable standard, EPCs that represent the 95-percent upper confidence limit of the arithmetic mean were calculated using USEPA's ProUCL software version 4.00.02 (USEPA, 2006). The 95-percent upper confidence limit recommended by the ProUCL software was selected as the EPC in these cases. EPCs were calculated for current use and future use scenarios. Tables provided in Appendix E present the individual samples used to generate the EPCs for each exposure point.

6.6.1 Exposure Point Concentrations for Soil

Tables 6-15 through 6-33 present the soil EPCs (i.e., maximum, arithmetic mean or 95-percent upper confidence limit on the arithmetic mean) for the current and future scenarios, used for comparison to the S-1/GW-2 and S-1/GW-3 MCP Method 1/Method 2 standards.

6.6.2 Exposure Point Concentrations for Groundwater

Each well at the Site was treated as an individual exposure point. The groundwater EPCs are based on analytical data obtained from the round of groundwater sampling conducted at the Site by TRC in August and September 2008. Locations of all groundwater monitoring wells are depicted on Figure 2-2A.

Table 6-34 summarizes analytical results representing each monitoring well exposure point location.

6.7 Identification of Method 1/Method 2 Standards

As discussed in Section 6.5.1, groundwater categories GW-2 and GW-3 apply under the current scenario depending upon location at the Site. Groundwater category GW-2 will also apply to the Site in the future if occupied buildings are constructed at the Walsh Field portion of the Site. As discussed in Section 6.5.2, soil categories S-1, S-2 and S-3 apply to Site soil under current conditions, where and when appropriate, and category S-1 applies to future Site soil. Consistent with these categorizations, tabulated soil and groundwater contaminant data from the Site have been compared to MCP Method 1 groundwater and soil cleanup standards obtained from tables in sections 310 CMR 40.0974 and 310 CMR 40.0975 of the MCP, respectively, and to Method 2 standards developed by TRC for those detected contaminants lacking Method 1 standards. Comparisons to MCP Method 1/Method 2 S-1/GW-2 and S-1/GW-3 soil cleanup standards and GW-2/GW-3 groundwater cleanup standards are presented as these standards are the most conservative of the applicable standards and appropriate to evaluate unrestricted future land use.

6.8 Method 2 Risk Characterization

The EPCs calculated for the Site soil are summarized in Tables 6-15 through 6-33 for the current and future scenarios. Groundwater EPCs are summarized in Table 6-34. As shown in these tables, the comparison of MCP Method 1/Method 2 soil cleanup standards to soil EPCs indicates that a condition of No Significant Risk has not been achieved for soil under current or future use scenarios. Groundwater analysis also indicates the presence of total lead in monitoring well MW-5 (19.2 µg/L) in excess of Method 1 GW-3 groundwater criteria (10 µg/L), though dissolved lead was not detected in MW-5 groundwater.

As shown on Tables 6-15 through 6-34 for each of the identified exposure points, the following soil contaminants exceed applicable MCP Method 1/Method 2 soil cleanup standards for current Site conditions:

- WF-1: lead
- WF-2: benzo(a)pyrene, cadmium, lead
- WF-3: cadmium, lead
- WF-4: arsenic, cadmium, lead
- WF-5: arsenic, lead
- WFB-4 hot spot: dibenzofuran, acenaphthylene, carcinogenic PAHs, DRO

- HS-1: none
- HS-2: none
- HS-3: lead
- HS-4: PCBs, cadmium, lead
- HS-5: benzo(a)pyrene, dibenz(a,h)anthracene, cadmium, chromium, lead
- HS-6: carcinogenic PAHs, PCBs, arsenic, barium, cadmium, chromium, lead
- HS-7: none
- HS-8: benzo(a)pyrene, PCBs, cadmium, chromium, lead
- HS-10: benzo(a)pyrene, PCBs, barium, cadmium, chromium, lead
- HS-11: benzo(a)pyrene, dibenz(a,h)anthracene, cadmium, lead

The following contaminants exceed applicable MCP Method 1/Method 2 soil cleanup standards for future Site conditions:

- Walsh Field: arsenic, cadmium, lead

- WFB-4 hot spot: dibenzofuran, acenaphthylene, carcinogenic PAHs, DRO

- High School: benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, PCBs, cadmium, chromium and lead

- SB-308 hot spot: benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenz(a,h)anthracene, fluoranthene, indeno(1,2,3-cd)pyrene, 2-methylnaphthalene, naphthalene, phenanthrene, pyrene, and lead.

HS-11 represents composite samples collected from the high school campus by BETA in 2006, for which depth and location are unknown. These samples clearly demonstrate that pesticides and herbicides are not of concern at the high school area, and reinforce the finding that PAHs and metals are of general concern across the high school campus. Because the locations of the PAH and metal exceedances are not known, further evaluation is planned to identify potential data gaps at the high school. These identified data gaps will be filled through further soil sampling and analysis, conducted as part of supplemental investigation efforts, the results of which will be reported in subsequent reports.

6.9 Risk of Harm to Safety, Public Welfare, and the Environment

The following sections present a characterization of risk to safety, public welfare, and an environmental risk characterization.

6.9.1 Characterization of Risk to Safety

The risk of harm to safety, as described in 310 CMR 40.0960, was evaluated for the disposal Site. The Site location does not contain the following items related to a release of OHM:

- There are no rusted or corroded drums or containers, open pits or lagoons, at the Site.

- There is no threat of fire or explosion, or the presence of explosive vapors from the release of OHM; and

- There are no uncontainerized materials exhibiting the characteristics of corrosivity, reactivity, or flammability.

Based on the above information, it was determined that the Site does not pose a risk to safety due to the presence of dangerous structures related to the release of OHM.

6.9.2 Risk to Public Welfare

A comparison of soil EPCs to MCP UCLs is presented in Table 6-35 for each exposure point area and hot spot. The benzo(a)pyrene soil EPC at "hot spot" SB-308 (3.5') exceeds the MCP UCL of 300 mg/kg. No other soil EPC exceeds its respective MCP UCLs. Individual concentrations of OHM in groundwater at the Site as measured in 2008 did not exceed MCP UCLs (Table 6-34).

With regard to public welfare, no community in the vicinity of the Site is believed to be currently experiencing, or expected to experience, significant adverse impacts as a result of the degradation of public or private resources directly attributable to the soil and groundwater contamination at the Site. No other non-pecuniary effects are known to be present, or to be accruing, due to soil and groundwater contamination at this Site. Individual concentrations of OHM in groundwater at the Site as measured in 2008 did not exceed MCP UCLs. However, benzo(a)pyrene in hot spot SB-308 soil exceeded the MCP UCL of 300 mg/kg for this contaminant. Based on this information a condition of No Significant Risk to public welfare does not exist at the Site.

6.9.3 Environmental Risk Characterization

This environmental risk characterization briefly describes the terrestrial habitat present at the NBHS and Walsh Field areas of the Site and evaluates the quality of the habitat associated with the Site. This risk assessment represents a Stage I - Method 3 Environmental Risk Characterization (ERC) under the MCP and was conducted in accordance with the *Guidance for Disposal Site Risk Characterization, Method 3 - Environmental Risk Characterization.* Massachusetts Department of Environmental Protection. Interim Final Policy WSC/ORS-95-141, April 1996. The objectives of this Stage I screening environmental risk characterization (ERC) are to determine whether significant environmental exposure exists at the Site and whether additional investigation to assess environmental risks is warranted.

The Walsh Field area consists of an active athletic complex located within an urbanized setting that provides limited terrestrial habitat for ecological receptors. The high school campus is also located within an urbanized setting that provides limited terrestrial habitat for ecological receptors. No aquatic or wetland habitats are present on the Site or in the vicinity of the Site. A small wooded area containing both forested upland and an isolated forested wetland is present to the north of the NBHS campus and represents the only undeveloped habitat in the vicinity of the

Site. Based on a review of priority habitats (Natural Heritage Atlas, 13th Edition, MassGIS, 2008), no state-listed threatened, endangered or species of special concern are present at the Site or in the vicinity. In addition, Areas of Critical Environmental Concern (ACEC) are not located in the vicinity of the Site. Furthermore, due to the nearly level conditions present at the Site, transport of surface soil contaminants to off-Site, sensitive, habitats such as ACECs or wetlands is extremely unlikely.

Walsh Field serves as the primary athletic area of the adjacent New Bedford High School and is comprised of one building, a football stadium, two baseball fields, a soccer field and a grass practice area. The fenced fields contain areas of exposed soil and grass that represent maintained, landscaped habitats that provide limited value for ecological receptors. Undeveloped land consisting of non-maintained areas of forest, scrub-shrub or grassland is not present at the field.

The existing buildings, driveways and parking areas associated with the high school (as well as additional impervious areas consisting of basketball/tennis courts) comprise a significant area of impervious surfaces that are present within the campus. Currently, vegetation comprised primarily of maintained lawn is present in scattered patches throughout most of the campus while associated landscape plantings such as ornamental trees are typically present along the edges of parking areas and adjacent to buildings. These vegetated areas represent maintained, landscaped habitats that provide limited value for ecological receptors. Undeveloped land consisting of non-maintained areas of forest, scrub-shrub or grassland is not present on the campus. Land use at the Site is not expected to change in the foreseeable future that would result in the establishment of more valuable habitat for terrestrial receptors.

Groundwater EPCs are summarized in Table 6-34. As shown in this table, the groundwater analysis indicates the presence of total lead in monitoring well MW-5 (19.2 µg/L) in excess of Method 1 GW-3 groundwater criteria (10 µg/L). However, dissolved lead was not detected in MW-5 groundwater, indicating a condition of no significant risk to the environment for groundwater exposure pathways.

Therefore, in accordance with the ERC guidance, no significant soil exposure pathways exist at the Site and groundwater data indicate a condition of no significant risk to environmental receptors. Therefore, further ecological investigation at the Site is not warranted.

6.10 Conclusions

No imminent hazard condition currently exists at Walsh Field or NBHS campus based on data collected through December 2008. However, soil EPCs for PAHs, DRO, PCBs, arsenic, barium cadmium, chromium and lead exceed applicable MCP Method 1/Method 2 S-1/GW-2 and S-1/GW-3 soil cleanup standards for current and future Site conditions. As a result, a Condition of No Significant Risk does not exist for soil contamination at the Site under current and future use scenarios.

The groundwater EPC for total lead in monitoring well MW-5 also exceeds the MCP Method 1 GW-3 groundwater cleanup standard. However, the dissolved lead result for this well did not

exceed the MCP Method 1 GW-3 groundwater cleanup standard. As a result, a Condition of No Significant Risk exists for groundwater contamination at the Site under current and future use scenarios.

With regard to public welfare, no community in the vicinity of the Site is believed to be currently experiencing, or expected to experience, significant adverse impacts as a result of the degradation of public or private resources directly attributable to the soil and groundwater contamination at the Site. No other non-pecuniary effects are known to be present, or to be accruing, due to soil and groundwater contamination at this Site. Individual concentrations of OHM in groundwater at the Site as measured in 2008 did not exceed MCP UCLs. However, benzo(a)pyrene in hot spot SB-308 soil exceeded the MCP UCL of 300 mg/kg for this contaminant. Based on this information a condition of No Significant Risk to public welfare does not exist at the Site.

A Stage I Environmental Risk Characterization indicated no significant soil exposure pathways exist at the Site and groundwater data indicate a condition of no significant risk to environmental receptors. Therefore, further ecological investigation at the Site is not warranted.

As noted herein, TRC recommends additional investigation and sampling be conducted for PAHs and metals due to elevated levels of these contaminants in composite soil samples collected at the NBHS campus, whose locations and depths are unknown, but may represent as yet uncharacterized areas of the Site.

7.0 DATA USABILITY ASSESSMENT

All TRC data associated with soil samples and groundwater samples utilized for this report were reviewed. Data from BETA sampling activities were not reviewed, except on a limited basis in order to confirm or reject certain suspect data. TRC conducted a MCP Data Usability Assessment for all analysis of soil and groundwater data with the exception of PCB Aroclors. All PCB Aroclor sample data were assessed using the *EPA New England Data Validation Functional Guidelines for Evaluating Environmental Analyses*, revised December 1996. Modification of these guidelines was performed to accommodate the non-CLP methodology.

In general, the data are usable for MCP decisions based on a review of accuracy, precision, and sensitivity of the data. Although there were select QC nonconformances, the data are valid as reported and may be used for decision-making purposes with certain cautions and/or limitations identified in the assessment and data validation reports attached in Appendix I.

Note that the assessment and data validation reports include the evaluation of data from other areas of the Site that were not utilized for this Interim Phase II CSA.

8.0 CONCLUSIONS

TRC completed this Interim Phase II CSA Report for the NBHS and Walsh Field portions of the Site, which are part of a larger disposal site under the MCP tracked under RTN 4-15685. Response actions at this Site are conducted under a Special Project designation due to logistical complexities. This Interim Phase II CSA included collection and laboratory analyses of soil and groundwater samples to characterize the nature and extent of contamination at the Site. The Interim Phase II CSA also includes an MCP Method 2 Risk Characterization to characterize the potential risk of harm to health, safety, public welfare and the environment posed by the NBHS and Walsh Field portions of the Site.

Based on the results of the Interim Phase II CSA, TRC has developed the following conclusions:

- The Site is underlain by extensive deposits of contaminated fill material associated with historical and undocumented waste management practices associated with the PSWS.

- No Imminent Hazard condition currently exists at the Walsh Field or NBHS campus based on data collected through December 2008.

- Soil EPCs for PAHs, DRO, PCBs, arsenic, barium cadmium, chromium and lead exceed applicable MCP Method 1/Method 2 S-1/GW-2 and S-1/GW-3 soil cleanup standards for current and future Site conditions. As a result, a Condition of No Significant Risk does not exist for soil contamination at the Site under current and future use scenarios. The applicable contaminants, exposure areas and time frames are summarized below:

  → Current Site Conditions

  - WF-1: lead
  - WF-2: benzo(a)pyrene, cadmium, lead
  - WF-3: cadmium, lead
  - WF-4: arsenic, cadmium, lead
  - WF-5: arsenic, lead
  - WFB-4 hot spot: dibenzofuran, acenaphthylene, carcinogenic PAHs, DRO
  - HS-1: none
  - HS-2: none
  - HS-3: lead
  - HS-4: PCBs, cadmium, lead
  - HS-5: benzo(a)pyrene, dibenz(a,h)anthracene, cadmium, chromium, lead
  - HS-6: carcinogenic PAHs, PCBs, arsenic, barium, cadmium, chromium, lead
  - HS-7: none
  - HS-8: benzo(a)pyrene, PCBs, cadmium, chromium, lead
  - HS-10: benzo(a)pyrene, PCBs, barium, cadmium, chromium, lead
  - HS-11: benzo(a)pyrene, dibenz(a,h)anthracene, cadmium, lead

→ Future Site Conditions

- Walsh Field: arsenic, cadmium, lead

- WFB-4 hot spot: dibenzofuran, acenaphthylene, carcinogenic PAHs, DRO

- High School: benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, PCBs, cadmium, chromium and lead

- SB-308 hot spot: benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenz(a,h)anthracene, fluoranthene, indeno(1,2,3-cd)pyrene, 2-methylnaphthalene, naphthalene, phenanthrene, pyrene, and lead.

- The groundwater EPC for total lead in monitoring well MW-5 also exceeds the MCP Method 1 GW-3 groundwater cleanup standard. However, the dissolved lead result for this well did not exceed the MCP Method 1 GW-3 groundwater cleanup standard. As a result, a Condition of No Significant Risk exists for groundwater contamination at the Site under current and future use scenarios.

- With regard to public welfare, benzo(a)pyrene in hot spot SB-308 soil exceeded the MCP UCL of 300 mg/kg for this contaminant. Individual concentrations of OHM in groundwater at the Site as measured in 2008 did not exceed MCP UCLs.

- With regard to public welfare, no community in the vicinity of the Site is believed to be currently experiencing, or expected to experience, significant adverse impacts as a result of the degradation of public or private resources directly attributable to the soil and groundwater contamination at the Site. No other non-pecuniary effects are known to be present, or to be accruing, due to soil and groundwater contamination at this Site. Individual concentrations of OHM in groundwater at the Site as measured in 2008 did not exceed MCP UCLs. However, benzo(a)pyrene in hot spot SB-308 soil exceeded the MCP UCL of 300 mg/kg for this contaminant. Based on this information a condition of No Significant Risk to public welfare does not exist at the Site.

- A Stage I Environmental Risk Characterization indicated no significant soil exposure pathways exist at the Site and groundwater data indicate a condition of no significant risk to environmental receptors. Therefore, further ecological investigation at the Walsh Field and NBHS campus portions of the Site is not warranted.

- Remedial actions are required to achieve Site closure.

- Additional assessment is warranted to improve the understanding of the nature and extent of soil contamination and to support remedial planning. Areas for which additional characterization appears warranted include:

- Additional characterization of the 0 to 1 foot and 1 to 3 feet soil horizons is needed to improve understanding of current risk and support remedial planning and volume estimates for a potential excavation-based remedy for all or portions of the site.
- Additional vertical characterization of the presence of contamination in discrete soil intervals to address potential data gaps between the surface soil interval and the contaminated fill.
- Additional characterization of soil "hot spots" as noted herein at:
  - WFB-4 (1-2.5')
  - SB-308 (3.5')
- Additional investigation and sampling for PAHs and metals due to elevated levels of these contaminants in composite soil samples collected at the NBHS campus, whose locations and depths are unknown, but may represent as yet uncharacterized areas of the Site (i.e., HS-11 data gap).
- Additional characterization of groundwater at Walsh Field and the NBHS campus to verify the non-leaching character of site contaminants.
- Focused sampling for arsenic at the varsity field to refine the understanding of the lateral and vertical extent of arsenic in soil at the ballfields and clarify the conceptual site model for contaminant deposition in these areas.

9.0 PHASE II OUTCOME

In accordance with 310 CMR 40.0840, the following are possible outcomes upon completion of a Phase II CSA:

1. Comprehensive Remedial Actions are necessary at the Site to achieve a Response Action Outcome; or

2. The requirements of a Class A, B, or C RAO have been met, and a Response Action Outcome Statement supported by information from the Phase II CSA report shall be submitted to the DEP.

Based on the findings of this Interim Phase II CSA, comprehensive remedial actions are required to achieve Site closure.

10.0 REFERENCES

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TRC, 2008b *Data Summary Report, Walsh Field, New Bedford, Massachusetts.* Prepared for: City of New Bedford, Department of Environmental Stewardship, 133 William Street, New Bedford, Massachusetts. Prepared by: TRC Environmental Corporation, Lowell, Massachusetts. October 2008.

TRC, 2008c *Report of Findings, New Bedford High School Polychlorinated Biphenyls Source/Sink Sampling Program*. Prepared for: City of New Bedford, Department of Environmental Stewardship, 133 William Street, New Bedford, Massachusetts. Prepared by: TRC Environmental Corporation, Lowell, Massachusetts. October 2008.

TRC, 2009 *Report of Findings Addendum, New Bedford High School Polychlorinated Biphenyls Quasi-Random Bulk Material Sampling Program.* Prepared for: City of New Bedford, 133 William Street, New Bedford, Massachusetts. Prepared by: TRC Environmental Corporation, Lowell, Massachusetts. May 2009.

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USEPA, 2006 ProUCL Version 4.00.02 Technical Guide. Prepared for USEPA by Lockheed Martin Environmental Services. April 2006. EPA/600/R04/079.

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Notification of a Non-DEP Electronic Submittal

Pursuant to 310 CMR 40.0015(7) and 310 CMR 40.0009 of the Massachusetts Contingency Plan, the following sections of this Interim Phase II Comprehensive Site Assessment Report will be submitted on a compact disk with a scanned copy of the Massachusetts Department of Environmental Protection – Bureau of Waste Site Cleanup Form BWSC125:

- Tables
- Figures
- Appendices