

Mr. Tucker Kelton  
ND Acquisitions LLC  
2310 Washington Street  
Newton Lower Falls, MA 02462

August 20, 2015  
File No. 3888.00

Re: Phase I Environmental Site Assessment with Subsurface Investigation  
Raytheon Facility, 528 Boston Post Road  
Sudbury, Massachusetts  
RTN 3-27243

Dear Mr. Kelton:

Sanborn, Head & Associates, Inc. (Sanborn Head) is pleased to submit to ND Acquisitions LLC our Phase I Environmental Site Assessment with Subsurface Investigation Report for the above-referenced property.

Thank you for the opportunity to work with you on this project. Please call us with any questions you may have.

Very truly yours,  
SANBORN, HEAD & ASSOCIATES, INC.



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Encl. Phase I Environmental Site Assessment with Subsurface Investigation

cc: Ed Marsteiner, National Development

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## EXECUTIVE SUMMARY

On behalf of ND Acquisitions LLC (Client), Sanborn, Head & Associates, Inc. (Sanborn Head) has prepared this Phase I Environmental Site Assessment (ESA) with Subsurface Investigations for the property located at 528 Boston Post Road in Sudbury, Massachusetts (Site).

This Phase I ESA was performed in substantial conformance with the scope and limitations of the *Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process* (ASTM E 1527-13) and the U.S. Environmental Protection Agency's (USEPA) "All Appropriate Inquiry" Final Rule, 40 C.F.R. Part 312 (AAI). Sanborn Head's services and this report are subject to the limitations provided in Appendix A.

Based on the services summarized herein, this Phase I ESA with Subsurface Investigation has revealed no evidence of Recognized Environmental Conditions (RECs) in connection with the Site except for the following:

- A Massachusetts Contingency Plan (MCP) disposal site is present at the Site. The release, known by Release Tracking Numbers (RTNs) 3-27243 and 3-3037, is related to the presence of chlorinated volatile organic compounds (CVOCs) in groundwater in the northeastern portion of the property. The presence of CVOCs in groundwater was first identified between 1990 and 1991, and the Site was initially assigned RTN 3-3037. The initial investigations were requested by Massachusetts Department of Environmental Protection (DEP) as part of a regional investigation for the source of CVOCs in the Town of Sudbury's Raymond Road well field. Following initial investigations, a Consultant of Record/Affirmation Statement was submitted to DEP for RTN 3-3037 in 1993. RTN 3-3037 is listed as "Pending No Further Action" in DEP's database. Raytheon continued to monitor groundwater quality at the Site, and in 2007 provided notification to DEP under the MCP. While the groundwater concentrations have remained consistent with those detected during earlier studies, Raytheon elected to provide notification based on updated reporting requirements under the MCP. That notification was assigned RTN 3-27243. Raytheon has continued to perform groundwater quality monitoring at the Site since that time. A well-defined on-Site source of the CVOCs in groundwater has not been identified. In November 2008, Raytheon submitted a Class C Response Action Outcome (RAO) for RTN 3-27243, which concluded that a Temporary Solution has been achieved and that monitored natural attenuation (MNA) and periodic groundwater monitoring may continue for the release. The presence of CVOCs in groundwater at the Site is considered a REC.

Three historical recognized environmental conditions (HRECs) were also noted in connection with past releases of oil and/or hazardous materials (OHM) at the Site:

- A 1987 spill of about 35 gallons of no. 2 heating oil occurred during filling of a UST associated with the former Boresite Building in the west-central portion of the Site. Documentation of the cleanup activities was provided in the DEP files for RTN 3-3037. However, due to the age of the release, it does not appear that a separate RTN was created for this release. The UST and impacted soil near the tank were removed for off-

Site disposal. Low-level petroleum hydrocarbon concentrations remain in soil following the remediation activities, but a UST closure report states that DEP concurred that sufficient soil removal had been performed and the report concluded that the site did not necessitate being listed on DEP's Location to be Investigated list for potential disposal sites in 1990. This prior release is considered to be an HREC.

- A 1998 spill of 15 to 20 gallons of hydraulic oil, resulting from an overturned crane, was assigned RTN 3-17106. Absorbent materials were applied to remediate the spill, and approximately 1.5 cubic yards of impacted soil were also removed for off-site disposal. A Class A-2 RAO was filed for the release in September 1998, demonstrating that a Permanent Solution has been achieved for this release. This prior release is considered to be an HREC.
- Three smaller releases of ethylene glycol from facility or vehicle heating/cooling systems occurred at the Site between 1993 and 1994. These minor spills (between 1 and 4 gallons) were reportedly remediated with sorbent materials. These prior minor spills are considered to be an HREC.

## **1.0 INTRODUCTION**

This report documents the results of a Phase I Environmental Site Assessment (ESA) with Subsurface Investigation performed by Sanborn, Head & Associates, Inc. (Sanborn Head) on behalf of ND Acquisitions LLC (Client) for the property located at 528 Boston Post Road in Sudbury, Massachusetts (Site) and shown on the Locus Plan provided as Figure 1. The objective of the ESA portion of our work was to identify "Recognized Environmental Conditions" (RECs) associated with the Site. As defined by ASTM E 1527-13<sup>1</sup> a REC is the presence or likely presence of hazardous substances or petroleum products in, on, or at a Site: (1) due to release to the environment; (2) under conditions indicative of a release to the environment; or (3) under conditions that pose a material threat of a future release to the environment.

The Site consists of approximately 50 acres and has been owned and operated by the Raytheon Company (Raytheon) since 1958. The Site has reportedly been used primarily for office space, although some research and development of microwave and radar components and limited scale manufacturing for prototype development has been performed. The on-site employee population has been as high as nearly 2,000 individuals historically, but is currently reported to be about 1,200 individuals. There is an active wastewater treatment plant (WWTP) for domestic wastes with three leaching beds located in the northern portion of the Site. Chemical usage at the Site has included chlorinated solvents, plating chemicals, and petroleum products.

### **1.1 Scope of Services**

The Phase I ESA portion of our work was performed in substantial conformance with the scope and limitations of ASTM E 1527-13 and the U.S. Environmental Protection Agency's (USEPA) "All Appropriate Inquiry" Final Rule, 40 C.F.R. Part 312 (AAI). The term "Phase I"

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<sup>1</sup> ASTM International. "Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process"

as used in this report is defined in ASTM E 1527-13 and should not be considered equivalent to the use of the same term in various state regulatory programs. The Scope of Services to perform the Phase I ESA portion of our work was outlined in Sanborn Head's Proposal for Services dated April 27, 2015, which was accepted by the Client. The scope of services consisted of four main components:

- A review of physical setting, historical use records, and reasonably ascertainable records relative to environmental conditions at the Site;
- A Site reconnaissance visit of readily-accessible interior and exterior portions of the Site;
- Interviews with Site personnel and select local government representatives regarding environmental conditions at the Site; and
- Preparation of this report to document Sanborn Head's findings, opinions, and conclusions regarding potential RECs in connection with the Site.

In addition to the Phase I ESA services described herein, Sanborn Head also performed a subsurface investigation program to evaluate soil and groundwater quality at the Site.

Sanborn Head's services did not include non-scope considerations listed in ASTM E 1527-13, such as the presence of asbestos-containing building materials, lead based paint, polychlorinated biphenyl's (PCBs) in building materials, biological agents, cultural and historic resources, ecological resources, endangered species, health and safety, indoor air quality unrelated to releases of hazardous substances or petroleum products into the environment, industrial hygiene, lead in drinking water, mold, radon, regulatory compliance, or wetlands. It is our understanding that the Client engaged a separate third party consultant to perform a hazardous building materials survey for the Site.

## **1.2 Limitations, Deviations, and Limiting Conditions**

As stated in ASTM E 1527-13, Section 4.5.1, uncertainty regarding the potential for RECs at the Site cannot be wholly eliminated through completion of Phase I ESA services. Conducting this Phase I ESA is intended to reduce, but not eliminate, uncertainty regarding the potential for RECs in connection with the Site, recognizing reasonable limits of time and cost. A subsurface investigation was performed to supplement the Phase I ESA to mitigate some of these limitations. However, it is assumed that this Phase I ESA with Subsurface Investigations may not identify latent environmental conditions potentially related to or arising out of undocumented past uses of the Site or neighboring properties. Sanborn Head's services and this report are subject to the limitations provided in Appendix A.

In our opinion, no deviations or exceptions to the scope of work outlined in ASTM E 1527-13 have been made.

Limiting conditions of this ESA included the following:

- During the Site reconnaissance, access to certain interior spaces was not provided either because active testing was underway, or due to confidentiality considerations. Photographs were also not permitted in the interior areas of the Site building. As discussed further in Section 6.2, it is our opinion that these limitations during the Site reconnaissance do not represent a significant data gap.

### **1.3 Terms, Conditions and User Reliance**

This Phase I ESA with Subsurface Investigation was conducted pursuant to the accepted Proposal for Services, Contract Addendum, and the Terms and Conditions established therein between the Client and Sanborn Head. This report was prepared for the exclusive use of the Client in connection with potential purchase of the Site. No other party is entitled to rely on this document without the prior express written consent of Sanborn Head and the Client. Upon request, terms and conditions under which reliance can be extended to other parties will be reviewed with the Client.

## **2.0 RECORDS REVIEW**

Sanborn Head reviewed reasonably ascertainable (as defined in ASTM E 1527-13) records to:

- Identify characteristics of the Site's physical setting;
- Establish whether the Site or nearby properties are identified on lists (databases) maintained by government agencies for the presence or potential presence of RECs;
- Identify whether documents provided by the User, Owner, or Key Site Manager provide information relative to the physical setting of the Site and/or indicate the presence of RECs;
- Establish whether information maintained by the State and local regulatory agencies and supplemental to what is included in the environmental database search report provides evidence related to potential RECs; and
- Establish a historical record of prior Site use.

In our opinion, the information obtained from the files/records review is sufficient to meet the evaluation criteria specified in ASTM E 1527-13.

### **2.1 Physical Setting**

Records related to the physical setting of the Site reviewed for this ESA included topographic maps, aerial photographs, and the Physical Setting Addendum provided by EDR, copies of which are provided in Appendix B, as well as information documented in hydrogeologic studies and environmental site investigation reports (see Section 2.3). Based on the review of these records, a physical setting description of the Site and vicinity is provided in the table below. A Site Plan showing key Site features is provided as Figure 2.



<i>Site Topography and Drainage</i>	The Site consists of two lots, totaling about 50 acres. The topography of the Site is relatively flat with a typical elevation of about 150 feet above mean sea level.
<i>Site Vicinity Topography</i>	The topography of the immediate Site vicinity is also relatively flat, sloping gently to the east and southeast. Topographically higher features (Tippling Rock and Nobscot Hill) are located to the southwest of the Site.
<i>Nearest Water Body, Direction and Distance</i>	The Site is located in the Sudbury River Basin, about 2.5 miles west of the Sudbury River. An unnamed brook passing through the Site discharges to Landham Brook (also known as Allowance Brook), which converges with Hop Brook to form Wash Brook, before discharging to the Sudbury River.
<i>Site Stormwater</i>	Stormwater runoff collected in the facility's stormwater conveyance system reportedly discharges to drainage lines located under Boston Post Road. Runoff from the majority of the Site (i.e., northern half and southwestern quarter) is directed first to a stormwater retention pond located in the central portion of the Site, before discharging to the Boston Post Road drainage system. Runoff from the southeast quarter is conveyed directly to the Boston Post Road drainage system.
<i>Site Geology</i>	Site hydrogeologic studies and environmental site investigation reports indicate area geology is characterized by Quaternary Period (Wisconsin Age) glacial deposits (till, ice-contact deposits, stratified melt water stream deposits, and stratified lake bottom deposits) overlying Salem Gabbro-Diorite bedrock. Bedrock was reportedly encountered at depths ranging from 38 feet to greater than 100 feet below ground surface during previous subsurface investigations. A bedrock outcrop was also reported to have been encountered during the foundation construction of Building 5.
<i>Inferred Depth to Groundwater</i>	Site hydrogeologic studies and environmental site investigation reports indicate the depth to groundwater at the Site ranges from about 5 to 10 feet below ground surface (bgs).
<i>Inferred Direction of Groundwater Flow</i>	Groundwater below the Site has been reported to flow generally to the east, with southeasterly flow components in portions of the Site. <sup>2</sup>
<i>Flood Zone Designation</i>	The Site is located outside the 500-year flood zone.
<i>Sensitive Human Receptors</i>	The Site is located within the Zone II Public Water Supply Protection Area for the Town of Sudbury Raymond Road water supply well field. The nearest public water supply well is located less than ½-mile southeast of the Site. The nearest residential properties are located about 1,000 feet southwest and southeast of the Site.
<i>Sensitive Environmental Receptors</i>	Mapped wetlands are located on-Site and immediately south (across Boston Post Road/Route 20) and east of the Site. Areas of Critical Environmental Concern are not identified in the immediate Site vicinity.

## 2.2 Environmental Database Search

### 2.2.1 Methodology

Sanborn Head contracted EDR to perform a database search on April 29, 2015. The database search reviews federal and state standard environmental record sources in accordance with ASTM E 1527-13 search distances.

<sup>2</sup> We note that subsurface conditions, the presence of subsurface utilities, faults and fractures in the underlying rocks, groundwater extraction, and other factors may influence the direction of groundwater flow. Additionally, groundwater flow direction can fluctuate seasonally.



Information related to properties identified in standard environmental sources and located within the approximate minimum search distances was reviewed to assess the likelihood of an impact to Site soil, groundwater, or vapor from migrating hazardous substances or petroleum products. The information used in this assessment included:

- Distance from the Site boundary<sup>3</sup>;
- Anticipated direction of groundwater flow;
- Regional and local geologic conditions;
- Anticipated stormwater and surface water flow directions;
- Presence of utilities or other subsurface structures;
- The presence/absence of documented contaminant releases at the identified sites; and
- The regulatory status of the documented releases;

A summary of our search findings is included herein, and a copy the EDR report is provided in Appendix C.

### 2.2.2 Results

Several listings were identified for the Site, as described in the table below.

Summary of On-Site Database Listings	
Key Database <sup>4</sup>	Summary
RGA HWS, SHWS, RELEASE, SPILLS, ERNS	<p>The Raytheon Company is identified in historical hazardous waste site databases from 1991 through 2012. The following specific spills/releases were identified:</p> <ul style="list-style-type: none"><li>• Release Tracking Number (RTN) 3-3037- A release of CVOCs to groundwater identified as a result of DEP requesting that groundwater at the Site be tested in 1990. The RTN status is identified as "Pending No Further Action".</li><li>• RTN 3-17106 - A release of hydraulic oil (35 gallons) from a tipped crane was reported in 1998. A Permanent Solution (Class A-2 RAO) has been achieved.</li><li>• RTN 3- 27243 – The same release of CVOCs in groundwater as RTN 3-3037, but reported again under newer MCP regulations. A Temporary Solution (Class C RAO) has been filed for this release.</li></ul> <p>Other reports of minor spills include:</p> <ul style="list-style-type: none"><li>• 1993 - Release to soil of ethylene glycol mixture (2 gallons) resulting from cooling skid/equipment rupture following contact with snow plow. Release reportedly controlled with sorbent material.</li><li>• 1994 - Release to soil of ethylene glycol solution (4 gallons) resulting from air conditioning unit equipment failure. Release reportedly controlled with sorbent material and containerized.</li></ul>

<sup>3</sup> For potential to impact Site soil vapor, listings that indicated releases of petroleum products and non-petroleum chemicals of concern located within 0.1 and 0.3 miles of the Site, respectively, were considered.

<sup>4</sup> A list of databases and acronyms can be found in the EDR Radius Map™ Report in Appendix B.

	<ul style="list-style-type: none"> <li>• 1994 - Release to soil of ethylene glycol (1 gallon) resulting from motor vehicle radiator/equipment failure. Release reportedly controlled with sorbent material.</li> </ul> <p>Refer to the table in Section 2.4 for additional information from State file review.</p>
HW GEN, RCRA-SQG, MLTS, TIER 2	<p>The Site is listed as a Resource Conservation and Recovery Act (RCRA) small quantity generator (SQG) (formerly large quantity generator [LQG]) of hazardous wastes (EPA ID No. MAD001410539), including:</p> <ul style="list-style-type: none"> <li>• chromium, lead, mercury, silver;</li> <li>• methyl ethyl ketone (MEK);</li> <li>• D-listed wastes (ignitable, reactive, corrosive wastes);</li> <li>• F001, F002 (halogenated solvents);</li> <li>• F003, F005 (non-halogenated solvents);</li> <li>• F007, F009, P030, P074 (plating wastes, cyanides);</li> <li>• various U-listed wastes (e.g., laboratory packs);</li> <li>• PCB wastes; and</li> <li>• waste oil</li> </ul> <p>Several informal, written violations were noted in the early 1990s, but appear to have been addressed quickly once identified.</p> <p>In addition, the facility is indentified as a user of radioactive materials (License No. 20-01102-07, expired 08/31/04; and, License No. 20-01102-06, expired 3/31/05).</p> <p>Diesel oil, transformer oil, sulfuric acid, lead, and lead acid batteries are also identified as being used/storage at the Site in quantities greater than Tier II reporting thresholds.</p>
FINDS, GWDP, NPDES, US AIRS	<p>The Site also maintains a National Pollutant Discharge Elimination System (NPDES) permit (permit no.23-4; expires 3/12/2019) for a 50,000 gallon per day (gpd) discharge to groundwater. The Site is also identified as a historical minor source of air pollutants, including carbon monoxide, sulfur dioxide, total hydrocarbons, and volatile organic compounds (VOCs).</p>

Based on the database search results and subsequent review of DEP files (see Sections 2.3 and 2.4), the release of CVOCs to groundwater identified by RTNs 3-3037 and 3-27243 is considered to be a REC. The prior release of hydraulic oil known as RTN 3-17106 is considered to be an HREC because a Permanent Solution has been achieved for that release. The minor spills of ethylene glycol are also considered to be an HREC.

EDR identified numerous listings for surrounding properties in various databases within the minimum search distances from the Site. Listings for adjoining properties and/or properties that represent a potential migration risk to the Site are summarized in the table below. The remaining listings are not considered likely to have releases of hazardous substances and/or petroleum products with the potential to migrate to the Site property.

Summary of Key Off-Site Database Listings	
Facility Name, Location and Anticipated Hydrogeologic Location Relative to Site <sup>5</sup>	Summary
<p>Sudbury Fire Dept</p> <p>Adjoining property to the South</p> <p>Cross-gradient</p>	<p>Financial Assurance, HW GEN, UST</p> <p>The Sudbury Fire Department is listed as a Massachusetts very small quantity hazardous waste generator. Two gasoline underground storage tanks (USTs) are identified as having been removed from the site.</p> <p>These listings are not indicative of a release; thus, impact to subject Site subsurface is considered unlikely.</p>
<p>Sunrise Cleaners</p> <p>Adjoining property to the South</p> <p>Cross-gradient</p>	<p>RCRA NonGen / NLR, FINDS, SHWS, RELEASE, ENF</p> <p>The primary RTN of 3-4339 is associated with a release of tetrachloroethene from a commercial dry cleaning operation at Sudbury Plaza, south of the Site. The site status is identified as Phase V (Operation, Maintenance, and/or Monitoring), with a Class C-1 RAO (a Temporary Solution). A secondary RTN (3-15591) associated with the site has been closed.</p> <p>Based on this information, State files were reviewed for the site; refer to the table in Section 2.4 for additional information from State file review.</p>
<p>Shaws 7571</p> <p>Adjoining property to the South</p> <p>Cross-gradient</p>	<p>HW GEN</p> <p>The Shaws grocery store located in the commercial plaza to the south of the subject Site is listed as a Massachusetts very small quantity hazardous waste generator.</p> <p>This listing is not indicative of a release; thus, impact to subject Site subsurface is considered unlikely.</p>
<p>Hour Photo Inc</p> <p>Adjoining property to the south</p> <p>Cross-gradient</p>	<p>RCRA NonGen / NLR, FINDS</p> <p>The Hour Photo Inc store located in Sudbury Plaza to the south of the subject Site is listed as a former RCRA hazardous waste generator; no violations were identified.</p> <p>These listings are not indicative of a release; thus, impact to subject Site subsurface is considered unlikely.</p>

<sup>5</sup> The identification of a surrounding Site as potentially up-gradient, cross-gradient and down-gradient assumes the direction of groundwater provided in Section 2.1 of this report.

Summary of Key Off-Site Database Listings	
Facility Name, Location and Anticipated Hydrogeologic Location Relative to Site <sup>6</sup>	Summary
Coatings Engr Corp  Adjoining property to the East  Downgradient	RCRA NonGen / NLR, SHWS, UST, RELEASE, ENF, TIER 2, HW GEN, Financial Assurance  RTN 3-0074 is associated with a release of unknown hazardous material/ VOCs from an industrial/manufacturing operation (potentially via a leach field). The site status is identified as Phase V (Operation, Maintenance, and/or Monitoring), with a Class C-2 RAO (a Temporary Solution).  Based on this information, State files were reviewed for the site; refer to the table in Section 2.4 for additional information from State file review.
Former Chiswick Properties  Adjoining property to the East  Downgradient	SHWS, RELEASE  RTN 3-0020 is associated with a release of unknown hazardous material/ VOCs from an unknown source at a commercial property. The site status is identified as Phase V (Operation, Maintenance, and/or Monitoring), with a Class C-1 RAO (a Temporary Solution).  Based on this information, State files were reviewed for the site; refer to the table in Section 2.4 for additional information from State file review.
17 Howell St  Approximately 0.5 miles to the west  Upgradient	HWS, RELEASE, LAST  RTN 3-25370 is associated with a release of 20 gallons of No. 2 fuel oil from a residential aboveground storage tank (AST) and pipe in 2005. The site status is identified as Class A-2 RAO (i.e., a Permanent Solution has been achieved).  Based on this information, State files were reviewed for the site; refer to the table in Section 2.4 for additional information from State file review (note: this site is identified as 17 Howell Road, in State files).

Based on the information available from EDR, additional files were reviewed for several listings, as summarized in Section 2.4.

### 2.3 Owner Provided Documents

Documents were provided during the course of this assessment by the Site owner/Key Site Manager. Key findings are summarized in the table below. Copies of relevant documents are provided in Appendix D.

<sup>6</sup> The identification of a surrounding Site as potentially up-gradient, cross-gradient and down-gradient assumes the direction of groundwater provided in Section 2.1 of this report.

Document Name	Key Information
<i>UST Site Assessment and Closure Report</i> , Raytheon Boresite Building, Sudbury, Massachusetts. Weston Geophysical, February 1990.	This report summarizes the clean up and site assessment activities completed following a spill of No. 2 fuel oil in February 1987. About 35 gallons of oil were spilled during filling of a UST, which supplied fuel to the Boresite Building heating system. Multiple site investigations including soil sampling and analysis, and soil removal efforts occurred between February 1987 and January 1990. Ultimately, the UST, which passed tightness testing conducted after the spill, was decommissioned and removed from the Site. The DEP reportedly approved the response actions at that time. A review of confirmatory soil sampling data indicates that low-level concentrations of TPH remain in the subsurface. The site was not included on the Locations to Be Investigated list, nor was a separate RTN assigned for this release. Based on the information reviewed, it is our opinion that this prior release represents an HREC.
<i>Hydrologic Study</i> , Raytheon Company Equipment Division Laboratories, 528 Boston Post Road, Sudbury Massachusetts. Goldberg-Zoino & Associates, May 1990.	This report presents the results of a hydrogeologic study that was undertaken at the request of DEP as part of a regional groundwater study to identify possible sources of contamination found in the Town of Sudbury Raymond Road well field. This issue was assigned RTN 3-3037. The investigation included: installation of 10 monitoring wells; collection and field screening of soil samples; hydraulic conductivity testing; groundwater level gauging; and, collection and analysis of groundwater samples. Low levels (less than 50 micrograms per liter) of trichlorethene (TCE) were detected in groundwater samples collected from two monitoring wells in the vicinity of Building 5. Investigators concluded that the levels of TCE observed on Site were unlikely to result in measurable impacts to the Raymond Road well field.
<i>Additional Hydrogeologic Studies</i> , Raytheon Company's Equipment Development Laboratories (EDL) Sudbury, Massachusetts. GZA GeoEnvironmental, Inc., November 1991.	This report presents additional hydrogeologic studies undertaken to supplement previous work performed in 1990 related to RTN 3-3037. The investigation included: soil gas testing; additional monitoring well installations; and soil and groundwater sampling. Investigation findings were generally consistent with those from previous work (i.e., low-levels of TCE were documented in shallow and deep groundwater). Investigators concluded the levels of TCE documented at the Site were unlikely to be the source of the contamination found in the public well field.
<i>Response Action Outcome Statement</i> , Raytheon Company, 528 Boston Post Road, Sudbury, MA 01776. Clean Harbors Environmental Services, September 1998. Release Notification and Retraction Form (BWSC-103) included.	This report summarizes the clean up and site assessment activities performed following a spill of hydraulic oil from an overturned crane in July 1998. About 15 to 20 gallons of oil were spilled when a crane overturned at the Site. This issue was assigned RTN 3-17106. Investigators concluded that the Site met the requirements for achieving a Class A-2 RAO. It is our opinion that this previous release represents a HREC.
<i>Phase I Initial Site Investigation, Phase II Comprehensive Site Assessment, Phase III Remedial Action Plan, and Class C Response Action Outcome Statement</i> , 528 Boston Post Road, Sudbury,	This report summarizes investigation and assessment activities conducted pursuant to the MCP, following groundwater monitoring conducted at the Site in 2007, which again identified low levels of TCE in groundwater. Because of the uncertainty of the Site status relative to RTN 3-3037 (identified as "Pending No Further Action"), Raytheon elected to notify DEP of the groundwater conditions, and subsequently RTN 3-27243 was assigned to the known CVOC contamination in Site groundwater. Investigators concluded that the Site met the requirements

Document Name	Key Information
Massachusetts. GZA GeoEnvironmental, Inc., November 2008.	for achieving a Temporary Solution and a Class C RAO was filed. Groundwater monitoring is periodically performed to support periodic reviews of the Class C RAO.
<i>Periodic Review of the Temporary Solution, Class C Response Action Outcome</i> , Raytheon Facility, 528 Boston Post Road, Sudbury, Massachusetts, Release Tracking Number 3-27243. GZA GeoEnvironmental, Inc., November 2013.	This report summarizes the most recent periodic review of the Site's temporary solution. Investigators concluded that the temporary solution is still effective at maintaining a condition of No Substantial Hazard (NSH) based on the continued commercial/industrial use of the Site. Due to low concentrations of TCE present, active remediation is not feasible to achieve target cleanup goals for the Site. Periodic review of the temporary solution and associated groundwater monitoring continues to be performed.
<i>2015 Assessment Data Report</i> , Raytheon Sudbury Facility, 528 Boston Post Road, Sudbury, Massachusetts. GZA GeoEnvironmental, Inc., April 2015.	This report summarizes groundwater sampling and a soil gas survey that were recently completed at the Site. The 2015 groundwater sampling results showed consistent Site monitoring data compared to historical results since the 1990's. The soil gas survey results indicated TCE is present above DEP's commercial/industrial soil gas screening value in one sample.
Field Reports and Correspondence during the construction of Building 5, The Geotechnical Group, Inc. (GGI), February to July 1985.	Sanborn Head reviewed field reports and correspondence prepared by GGI related to the construction of Building No. 5 in 1985. The former septic system leaching field for the facility was previously located within the Building No. 5 footprint. According to the documentation, bedrock blasting was required during construction due to the presence of shallow bedrock within the western portion of Building No. 5. During construction, soils and blast rock from the area of Building No. 5 were used as fill to construct additional parking north of Building No. 4. The approximate location of fill placement from Building No. 5 is shown on Figure 4. Also noted in the documentation, fill soil with varying amounts of debris was encountered during the construction of the parking lot north of Building No. 4. The approximate location of fill containing trash and debris is shown on Figure 4. It was unclear from the documentation if this fill with debris was left in place or removed. The presence of fill soil from these prior operations was evaluated as part of the subsurface investigations described in Section 5.0.

Based on the information reviewed, it is our opinion that the presence of CVOCs in groundwater related to RTNs 3-3037 and 3-27243 represents a REC. In addition, the prior release related to the Bore-site Building UST and the crane release (RTN 3-17106) are both HRECs, in our opinion.

## 2.4 State/Federal Regulatory Agency Documents

Sanborn Head reviewed documents available from DEP for the Site and adjoining properties identified in the EDR Radius Map Report, or through other on-line search methods. Off-site files were reviewed if the site was adjoining the subject Site, or if we identified the potential for hazardous substance or petroleum migration from these sites to the Site based on our understanding of hydrogeologic or geologic conditions and/or the potential for vapor migration. Select information obtained during the regulatory agency file review is provided in Appendix E. Key findings from our review of this information are



summarized below. The approximate locations of the off-Site releases are shown on Figure 3.

Facility Name and Address	Key Information
Raytheon Company, 528 Boston Post Road (RTN 3-3037, RTN 3-17106, RTN 3-27243)	Information available from the DEP was generally consistent with Owner Provided Information; refer to Section 2.3 for additional details.
Sudbury Plaza – Sunrise Cleaners; 505-525 Boston Post Road (RTN 3-4339, RTN 3-15591)	According to DEP files, initial MCP response actions performed at the site between 1993 and 1995 identified dissolved concentrations of tetrachloroethene that had been migrating in groundwater in an east/northeasterly direction from the former Sunrise Cleaners. These initial response actions were performed at the request of DEP as part of a regional study to identify the source of CVOCs in the Raymond Road well field. MCP response actions completed at the site to date have included: soil excavations; groundwater extraction and treatment; vapor extraction, vapor intrusion mitigation; installation of a permeable reactive barrier; and various monitoring programs. Low-levels of chlorinated solvents remain in groundwater. The site has achieved a Class C-1 RAO (a Temporary Solution). Given the significant level of investigation and remediation undertaken at the site, the relatively low-levels of chlorinated VOCs (CVOCs) remaining in groundwater, and the documented direction of groundwater flow in the area, it is unlikely that environmental conditions at this property have significantly impacted the subject Site.
Former Coatings Engineering Corporation Property; 33 Union Avenue (RTN 3-0074)	According to DEP files, subsurface investigations dating back to 1986 identified elevated concentrations of VOCs in groundwater at the site, likely related to wastewater discharges to the on-site leach fields. Pursuant to the site's Phase IV – Remedy Implementation Plan (RIP), monitored natural attenuation (MNA) was implemented from 2002 to 2011. A bioaugmentation pilot test was conducted in 2013; results, however, were not favorable for full-scale operation. The site achieved a Class C-1 RAO (a Temporary Solution) in 2014. In January 2015, subslab soil gas sampling was conducted in response to a single GW-2 exceedence for TCE. The results indicated that vapor intrusion was not a concern at the property. Given the results of recent vapor intrusion assessment, the relatively low-levels of CVOCs remaining in groundwater, and the documented direction of groundwater flow in the area, it is unlikely that environmental conditions at this property have significantly impacted the subject Site.
Former Chiswick Properties; Boston Post Road/Union Street (RTN 3-0020)	According to DEP files, subsurface investigations dating back to the early 1990s identified elevated concentrations of TCE in groundwater at the site. Because an on-site source has not been identified, investigators have suggested the source is likely off-site/upgradient. The site achieved a Class C-1 RAO (a Temporary Solution) in 1996; periodic monitoring has been ongoing since that time. As a result of changes to the MCP Method 1 GW-2 standards, concentrations of TCE in groundwater at the site now exceed the applicable TCE GW-2 standard. Vapor intrusion assessment was recommended in the most recent Periodic Evaluation (August 13, 2014). Given the documented direction of groundwater flow in the area, the relatively low-levels of CVOCs remaining in groundwater, and the distance of GW-2 exceedences from subject Site buildings, it is unlikely that environmental conditions at this property have significantly impacted the subject Site.



Facility Name and Address	Key Information
17 Howell Road Sudbury, Massachusetts (RTN 3- 25370)	According to DEP files, a release of about 20 gallons of No. 2 fuel oil occurred following maintenance of a filter assembly associated with an aboveground storage tank (AST) and pipe at a residential property in October 2005. It was determined that some oil had migrated over the concrete portion of the floor to exposed soil within the basement/crawlspace where the AST was located. Initial response actions included application of absorbent materials, which were later followed by a series of small soil excavations. Following the Immediate Response Action (IRA), the site achieved at Class A2 RAO (i.e., a Permanent Solution has been achieved) in October 2006. Based on size/nature of release, current site status, and distance from the subject Site, this release is not anticipated to impact the subject Site.

Consistent with the environmental database review, information obtained as part of our State file review is considered to indicate a REC (RTNs 3-3037 and 3-27243) and HRECs (RTN 3-17106 and UST spill) associated with the Site. For the reasons outlined above, none of the information reviewed for the off-site properties is considered to indicate a REC in connection with the Site property.

## 2.5 Local File Review

The findings of our local file review are summarized below. Select information obtained during the local file review is included in Appendix E.

Office	Types of Information Available	Summary of Available Information
Assessor's Office	Tax cards, Deeds	Copies of tax cards and deeds showing dates that Raytheon purchased each of the lots are provided in Appendix E. The Director of Assessing was not familiar with the Site's environmental condition or aware of environmental liens associated with the property.
Board of Health	Supply Well, Septic/Sewer Information	The Health Coordinator was not familiar with the Site's environmental condition; there were no files pertaining to the Site in the Board's general files.
Fire Department	UST Information, Fires, Releases	Copies of numerous reports and other correspondence dated generally between 1980 and 2014 were in the Site file. Subject matter included the 1987 heating oil spill, as well as the 1998 hydraulic oil spill (RTN 3-17106). Copies of permits and related information pertaining to interior improvements including work on fire suppression system, storage of flammable materials (copy of 2014 flammables, combustibles inventory provided in Appendix E), and asbestos abatement activities were present in the file.
Town Clerk	UST Information, Permits	Site file contained various notices/correspondence related to site improvements (e.g., radar tower, building connectors) generally between the 1960s and 1980s; no environmental issues were identified. The Town Clerk stated there are no USTs at the Site.

Office	Types of Information Available	Summary of Available Information
Building Department	Permits	The earliest building permit, dated 1942, in the Site file was for the construction of two silos on the property, which was owned by H.P. Hood & Sons at that time. The earliest building permit associated with present day operations (i.e., Raytheon Company) was dated 1952 for the Environmental Testing Building. A 1958 permit was associated with the demolition of the Hood buildings. Various other building permits were noted from the 1960s through 2014; no environmental issues were identified.
Department of Public Works	Water Supply Information	According to the Director of Department of Public Works (DPW) & Engineering, the water is supplied to the Site by Sudbury Water District, an independent municipal entity not affiliated with DPW; The director was not aware of environmental issues at the Site.
Conservation Commission	Wetlands; Applications	Wetlands are present on the Site. Various applications/ permits, reports and other correspondence pertaining to the maintenance/improvements to the Site stormwater retention pond were present in the Site file. Sediment characterization sampling conducted as part of this effort did not indicate the presence of significant levels (e.g., above background) of oil or hazardous materials.
Planning/Zoning	Zoning Map, Applications	The Site is zoned for light industrial use. The Assistant Planner was not aware of environmental issues at the Site. He indicated that some work/upgrades to the on-site wastewater treatment plant had been undertaken 3 to 4 years ago, and suggested that the Conservation Commission would have more information.

None of the information reviewed is considered to indicate a REC in connection with the Site property, with the exception of the documented subsurface contamination previously discussed in Section 2.3.

## 2.6 Historical Use Information

Sanborn Head reviewed historical mapping (e.g., fire insurance and USGS topographic maps) and aerial photographs. Historical topographic maps and aerial photographs were available for the Site and vicinity spanning from 1894 to the present. Other historical sources reviewed as part of this assessment included an EDR City Directory report and a Sanborn Fire Insurance Map report. Sanborn Fire Insurance maps were not available for the Site (unmapped property).

The following key information was available in our review of the historical sources:

- **Site:** Based on the earliest historical information reviewed for this ESA, the Site was undeveloped wooded land prior to the turn of the 20<sup>th</sup> century. Initial development of the Site, possibly for residential and/or agricultural uses, appears to have occurred by 1915. The Site appears to have been used for residential/agricultural purposes throughout the first half of the 20<sup>th</sup> century, with additional structures (outbuildings) constructed in the 1940s and 1950s. By 1963, industrial redevelopment of the Site had

occurred, with the construction of Building 1 and paved parking areas north and west of the building. Buildings 2 and 3, as well as several small buildings in the northwest corner of the property were constructed by 1969. Building 4, as well as the current WWTP and associated leaching beds are present by 1980. Additional development, including construction of Building 5 and additional structures in the northwestern portion of the Site continued throughout the early 1990s. The Site appears to be relatively unchanged since the 1990s.

- **Adjoining Properties:** With the exception of the presence of the Massachusetts Central Railroad along the north side of the property, the adjoining properties appear undeveloped (largely wooded land) prior to the turn of the 20<sup>th</sup> century. Similar to the Site history, the portions of the adjoining properties appear to be used for residential and/or agricultural purposes during the first half of the 20<sup>th</sup> century, with initial commercial development to the south and east generally beginning in the 1960s to 1970s. The Sudbury Plaza was constructed by 1965. The adjoining properties appear to be relatively unchanged since the 1990s.
- **Surrounding Area:** Although the area appears largely undeveloped prior to the 20<sup>th</sup> century, Boston Post Road, Dudley Road, and Framingham Road are all present in the earliest historical information reviewed as part of this ESA. At this time, South Sudbury appears more densely developed than the Site vicinity. Additional development, possibly residential/agricultural in nature, occurred along Boston Post Road during the first half of the 20<sup>th</sup> century. Similar to the Site history, commercial/industrial development, as well as denser residential development, occurred during the 1960s and 1970s. The surrounding areas appear to be relatively unchanged since the 1990s.

None of the information reviewed is considered to indicate a REC in connection with the Site property. Copies of documentation obtained during the Site history review are provided in Appendix B.

## 2.7 User Provided Information

Sanborn Head requested the information specified in ASTM E 1527-13 from the User of this Phase I ESA with Subsurface Investigation report (Client), in the form of a User Questionnaire. As of the date of this report, Sanborn Head has not received a copy of the completed questionnaire. In the course of this assessment, Sanborn Head was not informed by the User or Site personnel of environmental liens or activity/use limitations in place for the Site. During Sanborn Head's review of local/state files, we did not identify environmental liens or use restrictions in place for the Site.

## 3.0 SITE RECONNAISSANCE

Sanborn Head representatives performed a Site reconnaissance to obtain evidence of RECs potentially present in connection with the Site, as summarized in the table below.

<i>Date of Site Visit</i>	April 30, 2015
<i>Sanborn Head Representative(s)</i>	Patricia M. Pinto, P.E., LSP Rene E. Nahlik

<i>Accompanying Facility Individual(s)</i>	Mary M. Strzempko, CSP	Russ Hughes, MBA
<i>Title(s)</i>	Env. Health & Safety Manager	Marlborough/Sudbury Operations Manager
<i>Tenure at Facility</i>	13 years	2 years
<i>Limiting Conditions</i>	Interior reconnaissance was generally limited to 1 <sup>st</sup> floor of Buildings 1 through 5; photographs were not permitted to be taken in interior areas due to the nature of Site operations. Exterior areas were generally observed from paved driveways and parking areas. Interior of Bore-site Building and Test Area Buildings were not observed due to active testing and for confidentiality reasons.	

A photograph log from the Site reconnaissance is included in Appendix F. A summary of the Site reconnaissance findings is presented below.

Information about the key structures and improvements at the property are described in the table below. A Site Plan, showing key Site features, is provided as Figure 2.

<i>On-Site Structures</i>	Buildings 1 through 5 (primarily used as office space, although some research and development of microwave and radar equipment/ components has historically been performed at the Site); WWTP; Former Bore-site Building (currently used for storage and maintenance activities); Former Radar Tower (not in use); Former Test Area Building(s) located in northwestern portion of Site. Refer to Figure 2.
<i>Number of Stories, Mezzanine Levels</i>	Varies; primary occupied spaces (i.e., Buildings 1 through 5) are generally 1 to 2 stories.
<i>Basements/Crawl Spaces</i>	None reported/observed
<i>Structure Size (square feet)</i>	522,948 square feet (finished)
<i>General Construction</i>	Slab-on-grade, steel frame buildings with brick veneer exterior and tar and gravel roof covering.
<i>Date of Construction</i>	1950s to 1980s
<i>Roads, Streets, Parking Facilities on the Site</i>	Paved driveways and parking areas cover much of the northwestern and northeaster portions of the Site; paved driveways also encircle Buildings 1 through 5 located on the southern half of the Site; Refer to Figure 2.
<i>Roads Adjoining the Site</i>	Site is located on the north side of Boston Post Road (Route 20); Refer to Figure 3.
<i>Railroad Lines /Spurs On or Adjacent to the Site</i>	Inactive railroad, formerly operated by Boston and Maine Corporation, abuts the Site to the north; Refer to Figure 2.

Land uses in the area of the Site include a mix of residential, commercial, and light industrial. The abutting properties include:

<i>North</i>	Massachusetts Bay Transportation Railway (inactive)
<i>South</i>	Town of Sudbury Fire Station No. 2; Sudbury Plaza (retail shopping center), including Shaw's, Starbucks, restaurants, etc.
<i>East</i>	Chiswick Park, a commercial/light industrial development, including Harvard Vanguard Medical Associates, UV Tech Systems, DJ DevCorp, Pure Encapsulations, Little Hands Academy, etc.
<i>West</i>	J.P. Bartlett Co., Inc. (commercial greenhouse); residential properties and farmland

Key observations from the Site are included in the table below.

<b>Observation</b>	<b>Observed or Suspected</b>
<i>Areas of OHM product storage and use / Drums / Hazardous Substance and Petroleum Products Containers</i>	Areas of oil and hazardous material (OHM) product storage and/or use observed during Site reconnaissance included the facility boiler rooms, as well as select facility contractor areas/storage rooms. The concrete floor and secondary containment berm were observed to be in good condition; good housekeeping was noted in this area. A chemical inventory provided by Raytheon documenting Site OHM storage and associated areas is provided in Appendix D.
<i>Above Ground Storage Tanks (ASTs)</i>	One 1,000-gallon AST supplies diesel fuel to an emergency generator located outside of Building 1. A second 800-gallon AST supplies diesel fuel to an emergency generator located outside of the Wastewater Treatment Plant (WWTP). The ASTs and associated secondary containment appeared to be in good condition; spillage/staining were not observed in the vicinity of the ASTs.
<i>Underground Storage Tanks (USTs)</i>	One heating oil UST was formerly associated with the former Boresite Building; this UST was reportedly removed following a spill during loading operations in 1989. Refer to Section 2.3 for additional details. Evidence of USTs was not observed during the Site reconnaissance.
<i>Odors</i>	None observed.
<i>Pools of liquid</i>	None observed.
<i>Unidentified Substance Containers</i>	None observed.
<i>Transformers and any identified PCB-containing equipment</i>	Numerous transformers are located on-Site. Staining and leakage were not observed in the vicinity of the units observed along the western and eastern sides of Buildings 1-5 (other transformers in the vicinity of the former Boresite Building, Radar Tower, and Test Area Buildings were not observed directly). Although labeling was not observed on the exterior of the transformer housing, facility representatives indicated that the transformer oil does not contain PCBs.
<i>Heating/Cooling system</i>	Natural gas-fired boilers/forced hot water; air conditioned.
<i>Interior stains or corrosion</i>	None observed.
<i>Interior drains, sumps, and below grade conveyances</i>	Interior floor drains/trenches were observed in certain areas, including the cafeteria and boiler rooms. Facility representatives report that all below grade conveyances have been closed/sealed.
<i>Exterior pits/ponds/lagoons</i>	Stormwater retention pond receives stormwater runoff from developed portions of the Site.
<i>Pesticide use</i>	None observed/reported.
<i>Stained soil or pavement</i>	None observed.
<i>Stressed vegetation</i>	None observed.
<i>Evidence of solid waste disposal on the Site</i>	None observed.
<i>Evidence of fill materials</i>	None observed.
<i>Wastewater discharges</i>	Wastewater discharges, including sanitary wastewaters, are treated via the on-site WWTP. WWTP effluent is discharged to several leaching beds located in the north central portion of the Site, under a groundwater discharge permit.
<i>Wells</i>	Numerous monitoring wells have been installed at the Site as part of various subsurface investigations; a sub-set of these wells continue to be monitored on a periodic basis pursuant to the Class C RAO associated with RTN 3-27243.

Observation	Observed or Suspected
<i>Septic systems</i>	Because municipal wastewater service is not available in the Town of Sudbury, it is assumed that wastewater generated at the Site has been disposed of on-Site since its initial development. As noted above, the current WWTP effluent is discharged to several leaching beds located in the north central portion of the Site. Former leach fields include those associated with the former Site wastewater treatment system (i.e., located north of Building 1, before Building 5 was constructed) and the former Boresite Building.
<i>Evidence of spills/releases</i>	None observed.
<i>Hazardous waste</i>	Hazardous wastes are initially stored at satellite accumulation areas near the point of generation; they are then moved to the 90-day accumulation area located along the eastern side of Building 1. The concrete floor and secondary containment berm were observed to be in good condition; good housekeeping was noted in this area.
<i>Non-Hazardous waste</i>	Excess solid waste/debris was not observed; good housekeeping was generally noted in interior/exterior areas.
<i>Air Emissions</i>	As noted previously, the Site is identified as a historical minor source of air pollutants, including carbon monoxide, sulfur dioxide, total hydrocarbons, and VOCs; based on information available from the DEP the Site does not currently hold air pollution control permits or approvals for facility emissions. Process emissions sources were not observed during the site reconnaissance.

Current and former utilities that service the Site include the following:

<i>Electricity</i>	NSTAR Electric
<i>Natural Gas</i>	Keyspan
<i>Water</i>	Sudbury Water District
<i>Sewer/Wastewater</i>	On-site wastewater treatment with permitted discharge to groundwater

## 4.0 INTERVIEWS

### 4.1 Interview with Site Owner/Key Site Manager

The following individuals were interviewed for this ESA:

<i>Individual(s)</i>	Mary M. Strzempko, CSP	Russ Hughes, MBA	Chip Burkhardt, P.G.	Charles A. Lindberg
<i>Title(s)</i>	Env. Health & Safety Manager	Marlborough/Sudbury Operations Manager	Manager, Environmental Programs	Licensed Site Professional (LSP) with GZA Geo-Environmental, Inc.
<i>Tenure at Facility</i>	13 years	2 years	Not reported	25 years

None of the individuals interviewed had knowledge of releases of OHM or other environmental issues that would potentially constitute a REC, with the exception of the documented subsurface contamination previously discussed in Section 2.3.

Relevant information provided during the interviews is presented throughout this report, where appropriate.



## 4.2 Interviews with Local Government Officials

The following individuals were interviewed for this ESA:

Name	Title	Agency
Rosemary B. Harvell	Town Clerk	Town Clerk's Office
James S. Kupfer, MPA	Assistant Planner	Planning and Community Development
Cynthia Gerry	Director of Assessing	Assessor's Office
Michelle Korman	Health Coordinator	Board of Health
Bill Place	Director of DPW & Engineering	Department of Public Works
Kimberly W. Polcari	Office Supervisor	Fire Department

Relevant information obtained from local officials is presented throughout this report, where applicable.

## 5.0 SUBSURFACE INVESTIGATION

A subsurface investigation was performed to evaluate potential impacts to soil and groundwater related to prior use of OHM at the Site. The exploration locations, as shown on Figure 4, were generally selected to target areas where investigations have not been performed previously. Specifically, the exploration locations were chosen to evaluate potential impacts from the former UST near the Boresite Building, to evaluate potential impacts from the fill soil placed in the northwestern parking lot, and to evaluate potential impacts in the vicinity of the test area buildings. In addition, select existing monitoring wells were also sampled for parameters other than VOCs to evaluate whether other OHM used at the Site may have impacted Site groundwater quality. Certain explorations were also completed by Sanborn Head for geotechnical due diligence purposes. A summary of the scope of investigation and key findings from the subsurface investigation are provided below.

### 5.1 Scope of Subsurface Investigation

The subsurface investigation activities were completed between May 15 and June 1, 2015, and consisted of the following:

- Pre-clearing for utility avoidance purposes, followed by advancing seven soil borings (designated SH-1 through SH-7), using hollow stem auger and/or drive and wash casing drilling methods to depths of approximately 14 to 26 ft bgs;
- Collecting soil samples from three of the borings (SH-1, SH-2, and SH-4) for laboratory analysis of VOCs, volatile petroleum hydrocarbons (VPH), extractable petroleum hydrocarbons (EPH), select metals (i.e., chromium, lead, mercury, nickel, silver), and PCBs;
- Completing soil borings SH-1 and SH-2 as groundwater monitoring wells (designated SH-1W and SH-2W);



- Collecting three shallow soil samples (designated SH-8 through SH-10) at locations within identified soil fill areas for laboratory analysis of VOCs, VPH, EPH, select metals (i.e., chromium, lead, mercury, nickel, silver), and PCBs;
- Developing the two newly installed monitoring wells (SH-1W and SH-2W), and three existing Site monitoring wells (GZ-102, GZ-108, and W-1), which had not been sampled in recent years; and
- Collecting groundwater samples using a modified low-flow purging/sampling technique from the two newly installed monitoring wells (SH-1W and SH-2W), and five existing Site monitoring wells (GZ-102, GZ-103, GZ-108, W-1, and W-4) for laboratory analysis of VOCs, VPH, EPH, select metals (i.e., chromium, lead, mercury, nickel, silver), and physiological available cyanide (PAC).

Additional details pertaining to the field investigation methods and supporting field documentation, including soil boring/monitoring well construction logs, monitoring well development forms, and low-flow sampling summary forms are provided in Appendix G. Laboratory analytical reports are provided in Appendix H.

## **5.2 Summary of Soil Investigation Results**

In general, surface materials generally consist of an approximately 1 to 3-foot thick layer of inorganic granular fill, underlain by a natural sand stratum. The natural sand generally consists of a light brown, fine to medium sand with varying amounts of silt. Visual/olfactory observation and field screening did not indicate the presence of contamination.

Soil analytical data are summarized in Table 1. For reference, data are compared to the MCP Reportable Concentrations for RCS-1 areas (RCS-1). No target analytes were detected in Site soil at concentrations greater than the aforementioned thresholds. EPH fractions (C<sub>19</sub>-C<sub>36</sub> aliphatics, and C<sub>11</sub>-C<sub>22</sub> aromatics) were detected slightly above laboratory reporting levels in the sample collected from soil boring SH-4, located in the parking lot north of Building 4. Detectable concentrations of chromium, nickel, and/or lead were also reported in each of the soil samples collected from both the soil borings and shallow sampling locations. The metals concentrations are below DEP published background concentrations for natural soil. Based on the soil sampling results, no additional RECs were identified.

## **5.3 Summary of Groundwater Investigation Results**

Groundwater was generally encountered between approximately 3 to 5 feet bgs based on stabilized groundwater monitoring well readings and observations made during the subsurface exploration program. We note variations in groundwater levels can occur due to variations in season, precipitation, temperature, runoff, and other factors.

Groundwater analytical data are summarized in Table 2. For reference, data are compared to the MCP Reportable Concentrations for category RCGW-1 groundwater (RCGW-1). No target analytes were documented in Site soils at concentrations greater than the

aforementioned thresholds. Only cyanide (measured as PAC) was detected above the laboratory reporting level in the groundwater sample collected from existing Site monitoring well W-4, located in the vicinity of the leaching beds. The concentration of PAC detected was well below the applicable MCP Method 1 standards. Based on the groundwater sampling results, no additional RECs were identified.

## **6.0 EVALUATION**

### **6.1 Findings, Opinion, and Conclusions**

We have performed a Phase I Environmental Site Assessment with Subsurface Investigation in substantial conformance with the scope and limitations of ASTM Practice E 1527-13 of 528 Boston Post Road, Sudbury, Massachusetts. Any exceptions to, or deletions from, this practice are described in Section 1.3 of this report. This assessment has revealed no evidence of RECs in connection with the Site except for the following:

- A MCP disposal site is present at the Site. The release, known by RTNs 3-27243 and 3-3037, is related to the presence of CVOCs in groundwater in the northeastern portion of the property. The presence of CVOCs in groundwater was first identified between 1990 and 1991, and the Site was initially assigned RTN 3-3037. The initial investigations were requested by DEP as part of a regional investigation for the source of CVOCs in the Town of Sudbury's Raymond Road well field. Following initial investigations, a Consultant of Record/Affirmation Statement was submitted to DEP for RTN 3-3037 in 1993. RTN 3-3037 is listed as "Pending No Further Action" in DEP's database. Raytheon continued to monitor groundwater quality at the Site, and in 2007 provided notification to DEP under the MCP. While the groundwater concentrations have remained consistent with those detected during earlier studies, Raytheon elected to provide notification based on updated reporting requirements under the MCP. That notification was assigned RTN 3-27243. Raytheon has continued to perform groundwater quality monitoring at the Site since that time. A well-defined on-Site source of the CVOCs in groundwater has not been identified. In November 2008, Raytheon submitted a Class C RAO for RTN 3-27243, which concluded that a Temporary Solution has been achieved and that MNA and periodic groundwater monitoring may continue for the release. The presence of CVOCs in groundwater at the Site is considered a REC.

Three HRECs were also noted in connection with past releases of OHM at the Site:

- A 1987 spill of about 35 gallons of no. 2 heating oil occurred during filling of a UST associated with the former Boresite Building in the west-central portion of the Site. Documentation of the cleanup activities was provided in the DEP files for RTN 3-3037. However, due to the age of the release, it does not appear that a separate RTN was created for this release. The UST and impacted soil near the tank were removed for off-Site disposal. Low-level petroleum hydrocarbon concentrations remain in soil following the remediation activities, but a UST closure report states that DEP concurred that sufficient soil removal had been performed and the report concluded that the site did not necessitate being listed on DEP's Location to be Investigated list for potential disposal sites in 1990. This prior release is considered to be an HREC.

- A 1998 spill of 15 to 20 gallons of hydraulic oil, resulting from an overturned crane, was assigned RTN 3-17106. Absorbent materials were applied to remediate the spill, and approximately 1.5 cubic yards of impacted soil were also removed for off-Site disposal. A Class A-2 RAO was filed for the release in September 1998, demonstrating that a Permanent Solution has been achieved for this release. This prior release is considered to be an HREC.
- Three smaller releases of ethylene glycol from facility or vehicle heating/cooling systems occurred at the Site between 1993 and 1994. These minor spills (between 1 and 4 gallons) were reportedly remediated with sorbent materials. These prior minor spills are considered to be an HREC.

## 6.2 Data Gaps

ASTM E 1527-13 requires that data gaps in the research performed be identified. Our assessment of identified data gaps is provided below.

Data Gap	Assessment
As of the time of this report, Sanborn Head has not received a completed User Questionnaire.	Based on the other information obtained during this Phase I ESA, it is Sanborn Head's opinion that the lack of a completed questionnaire does not materially impact our ability to identify RECs at the Site.
Sanborn Head observed interior and exterior areas of the Site, but we were not able to view certain interior areas during the Site reconnaissance due to active testing and for confidentiality reasons. Interior photographs were also not permitted.	Based on observations of the interior and exterior, information gained from Site representatives, and the nature of the use of these buildings/property, this is not considered a significant data gap.

## 6.3 References

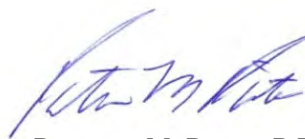
Key documents that were used in preparing this report have been referenced within the text of the report.

## 6.4 Signatures of Environmental Professionals

We declare that, to the best of our professional knowledge and belief, we meet the definition of Environmental Professional as defined in Section 312.10 of 40 C.F.R. 312. We have the specific qualifications based on education, training, and experience to assess a Site of the nature, history, and setting of the subject Site. We have developed and performed all appropriate inquiries in conformance with the standards and practices set forth in 40 C.F.R. Part 312.



Name: Rene E. Nahlik  
Position: Project Manager



Name: Patricia M. Pinto, P.E., LSP  
Position: Senior Associate/Vice President

## 7.0 QUALIFICATIONS OF ENVIRONMENTAL PROFESSIONALS

### **Rene E. Nahlik**

*Project Manager*

Rene Nahlik has over ten years of experience in the environmental consulting field. Rene's project experience ranges from initial Phase I Environmental Site Assessments (ESAs) to design and implementation of remedial actions. She has experience working on hazardous wastes sites with various types of contaminants, including chlorinated volatile organic compounds (CVOCs), petroleum-related compounds, polychlorinated biphenyls (PCBs), dioxins/furans, and radiological constituents. She has provided environmental consulting services to residential, commercial, industrial, and public sector clients at sites located through the US and internationally. She also has extensive field experience including environmental drilling/soil sampling, groundwater sampling, soil gas sampling, indoor air sampling, sediment sampling, construction oversight, and pilot testing. Rene is a New Hampshire Department of Environmental Services (NHDES) Certified Hazardous Waste Coordinator and a licensed professional engineer (P.E.) in New Hampshire.

### **Patricia M. Pinto, P.E., LSP**

*Senior Associate/Vice President*

Tricia Pinto is an environmental engineer with over sixteen years of experience in the environmental investigation, risk assessment and remediation fields. Her work experience has included preparation of numerous Phase I and II Environmental Site Assessments, risk assessments, and various regulatory documents required by Massachusetts, Connecticut, New Hampshire and Ohio state agencies and regulatory programs. She has completed environmental assessments to evaluate the nature, extent and distribution of contamination, subsurface hydrogeologic characteristics and contaminant fate and transport in commercial, industrial and redevelopment settings. She also has completed risk assessments for sites located in Massachusetts and Ohio. She has extensive experience in the field, including observation of soil borings and monitoring well installations using a variety of drilling techniques, remedial construction, environmental construction monitoring, underground storage tank and contaminated soil removal observations, environmental sampling including soil, groundwater, sediment, surface water and indoor air media. She also has experience in design and implementation of hydrogeologic tests to evaluate soil permeability and aquifer characteristics. She is a registered P.E. and Licensed Site Professional (LSP) in Massachusetts, and a Licensed Environmental Professional (LEP) in Connecticut.

## TABLES

**Table 1**  
**Summary of Soil Analytical Data**  
528 Boston Post Road  
Sudbury, Massachusetts

LOCATION	Reportable Concentrations	Units	SH-1 (2-4)	SH-2 (1-2)	SH-4 (2-4)	SH-8 (1-3)	SH-9 (1-3)	SH-10 (1-3)
SAMPLING DATE	RCS-1		5/27/2015	5/27/2015	5/27/2015	5/29/2015	5/29/2015	5/29/2015
Extractable Petroleum Hydrocarbons (EPH)								
C9-C18 Aliphatics	1000	mg/kg	<7.14	<6.94	<7.5	<6.81	<6.83	<6.72
C19-C36 Aliphatics	3000	mg/kg	<7.14	<6.94	7.99	<6.81	<6.83	<6.72
C11-C22 Aromatics, Adjusted	1000	mg/kg	<7.14	<6.94	13.5	<6.81	<6.83	<6.72
Polychlorinated Biphenyls (PCBs)								
PCBs, Total	1	mg/kg	<0.0366	<0.0349	<0.0387	<0.0327	<0.0341	<0.0336
Total Metals								
Chromium, Total	100	mg/kg	9.0	16	9.4	8	8.4	7.4
Lead, Total	200	mg/kg	2.5	<2.1	11	2.6	2.8	<2.0
Nickel, Total	600	mg/kg	5.4	9.5	5.8	8.2	5.6	4.1
Volatile Organic Compounds (VOCs)								
VOCs	Varies by Analyte	mg/kg	BDL	BDL	BDL	BDL	BDL	BDL
Volatile Petroleum Hydrocarbons (VPH)								
C9-C10 Aromatics	100	mg/kg	<3.18	<2.76	<3.48	<2.91	<2.64	<2.77
C5-C8 Aliphatics, Adjusted	1000	mg/kg	<3.18	<2.76	<3.48	<2.91	<2.64	<2.77
C9-C12 Aliphatics, Adjusted	NS	mg/kg	<3.18	<2.76	<3.48	<2.91	<2.64	<2.77

**Notes:**

1. The soil samples were collected by Sanborn, Head & Associates, Inc. (Sanborn Head) on the dates indicated and analyzed by Alpha Analytical, Inc. (Alpha) of Westborough, Massachusetts.
2. Except for EPH and VPH fractions, only compounds that were detected in one or more samples are shown. See analytical laboratory report for a complete list of analytes and detection limits.
3. The samples were compared to Massachusetts Contingency Plan (MCP) Reportable Concentrations for S-1 (RCS-1) Soil. There are no exceedances of the aforementioned threshold.
4. "<" indicates the analyte was not detected above the indicated laboratory reporting limit.  
"mg/kg" milligrams per kilogram  
"BDL" Below Detection Limit

**Table 2**  
**Summary of Groundwater Analytical Data**  
528 Boston Post Road  
Sudbury, Massachusetts

LOCATION	Reportable Concentrations	Units	SH-2	SH-1	GZ-103	W-4	W-1	GZ-108	GZ-102
SAMPLING DATE	RCGW-1		6/1/2015	6/1/2015	6/1/2015	6/1/2015	6/1/2015	6/1/2015	6/1/2015
<b>Extractable Petroleum Hydrocarbons</b>									
EPH	Varies by Analyte	ug/l	BDL	BDL	BDL	-	BDL	BDL	BDL
<b>General Chemistry</b>									
Cyanide, Physiologically Available	30	ug/l	-	-	-	5	<5	<5	<5
<b>Total Metals</b>									
Total Metals	Varies by Analyte	ug/l	BDL	BDL	BDL	BDL	BDL	BDL	BDL
<b>Volatile Organic Compounds</b>									
VOCs	Varies by Analyte	ug/l	BDL	BDL	-	-	-	-	BDL
<b>Volatile Petroleum Hydrocarbons</b>									
VPH	Varies by Analyte	ug/l	BDL	BDL	BDL	-	BDL	BDL	BDL

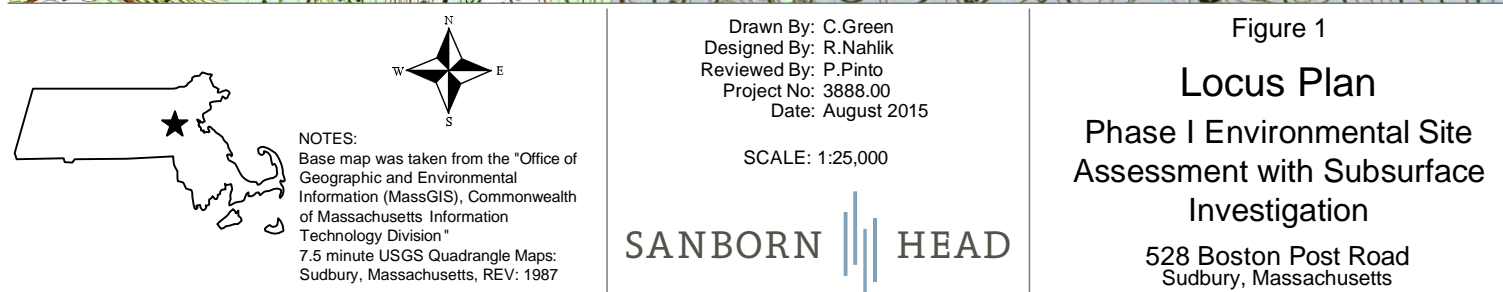
Notes:

1. Samples were collected by Sanborn, Head & Associates, Inc. (Sanborn Head) on the dates indicated and analyzed by Alpha Analytical, Inc. of Westborough, Massachusetts (Alpha).
2. Results were compared to the Massachusetts Contingency Plan (MCP) Reportable Concentrations for GW-1 (RCGW-1) Groundwater. There are no exceedances of the aforementioned threshold.
3. "<" indicates the analyte was not detected above the indicated laboratory reporting limit.  
"-" indicates the analyte was not analyzed.  
"ug/l" micrograms per liter  
"BDL" Below Detection Limit  
"NS" No Standard



## FIGURES







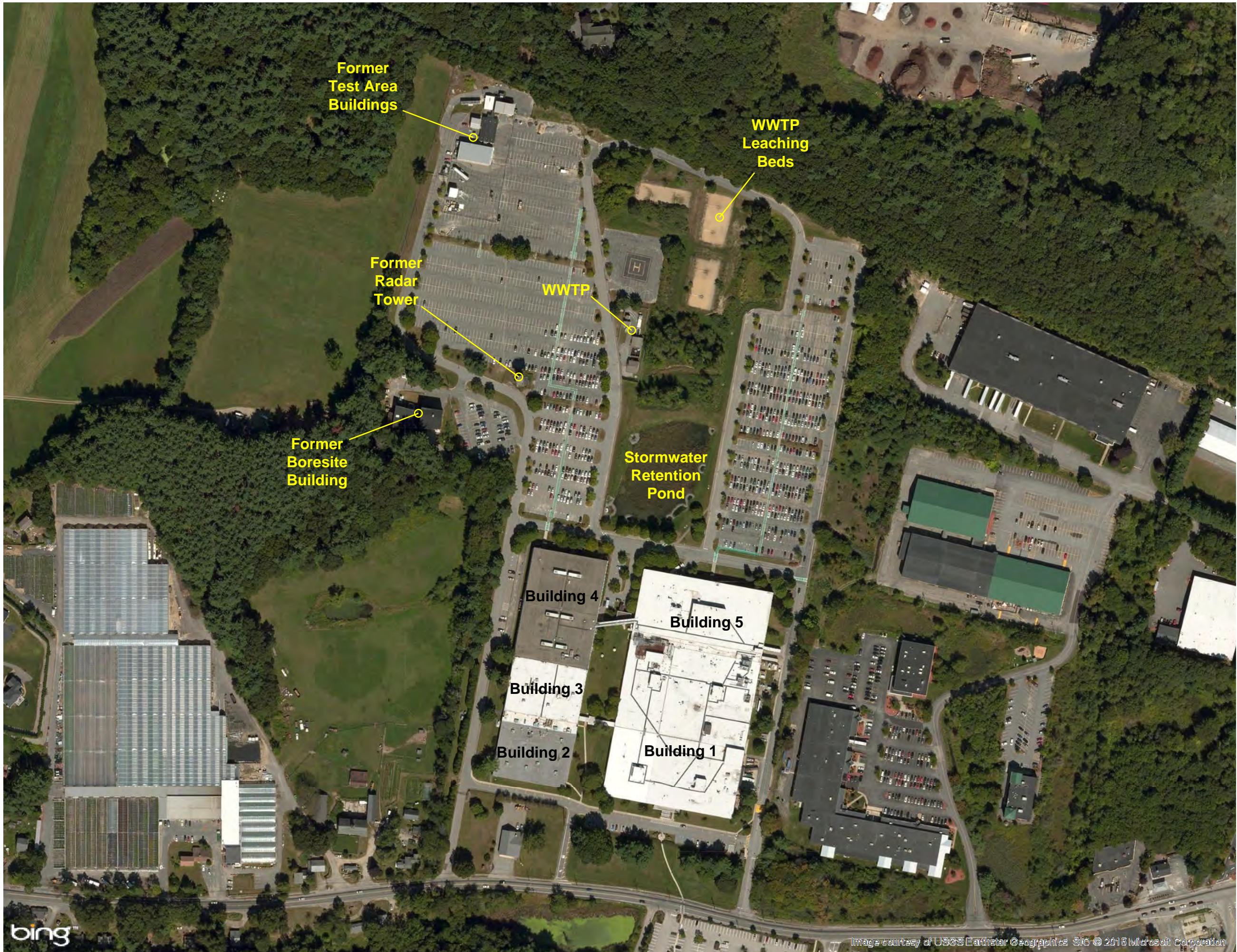


Figure 2

Site Plan

Phase I Environmental Site Assessment  
with Subsurface Investigation

528 Boston Post Road  
Sudbury, Massachusetts

Drawn By: E. Wright  
Designed By: R. Nahlik  
Reviewed By: P. Pinto  
Project No: 3888.00  
Date: August 2015

Figure Narrative

Key Site features shown are based on a Site reconnaissance performed by Sanborn, Head & Associates, Inc. on April 30, 2015 and should be considered approximate.

Notes

- 1. Aerial photograph available from bing™ through ArcGIS Online.

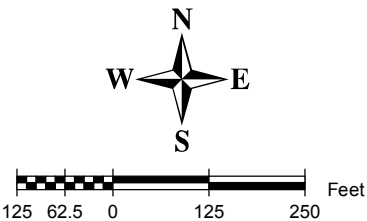






Figure 3

# Site Vicinity Plan

Phase I Environmental Site Assessment  
with Subsurface Investigation

528 Boston Post Road  
Sudbury, Massachusetts

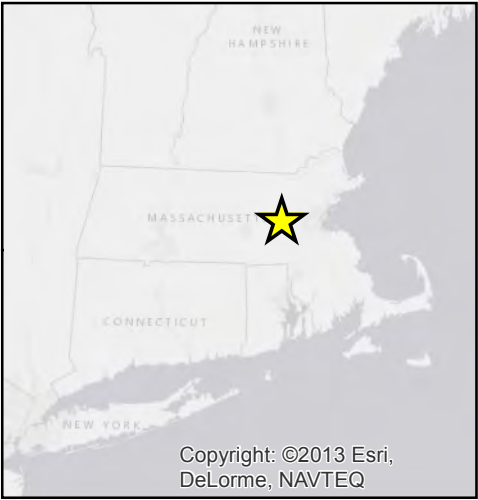
Drawn By: E. Wright  
Designed By: R. Nahlik  
Reviewed By: P. Pinto  
Project No: 3888.00  
Date: August 2015

## Figure Narrative

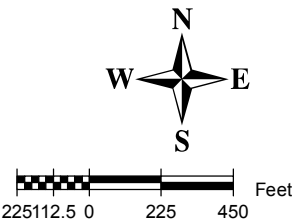
The purpose of this figure is to show the Site and its approximate boundaries (shown with red outline), the immediately adjacent properties and/or operations, and the general Site vicinity.

## Notes

1. Aerial photograph available from bing™ through ArcGIS Online.

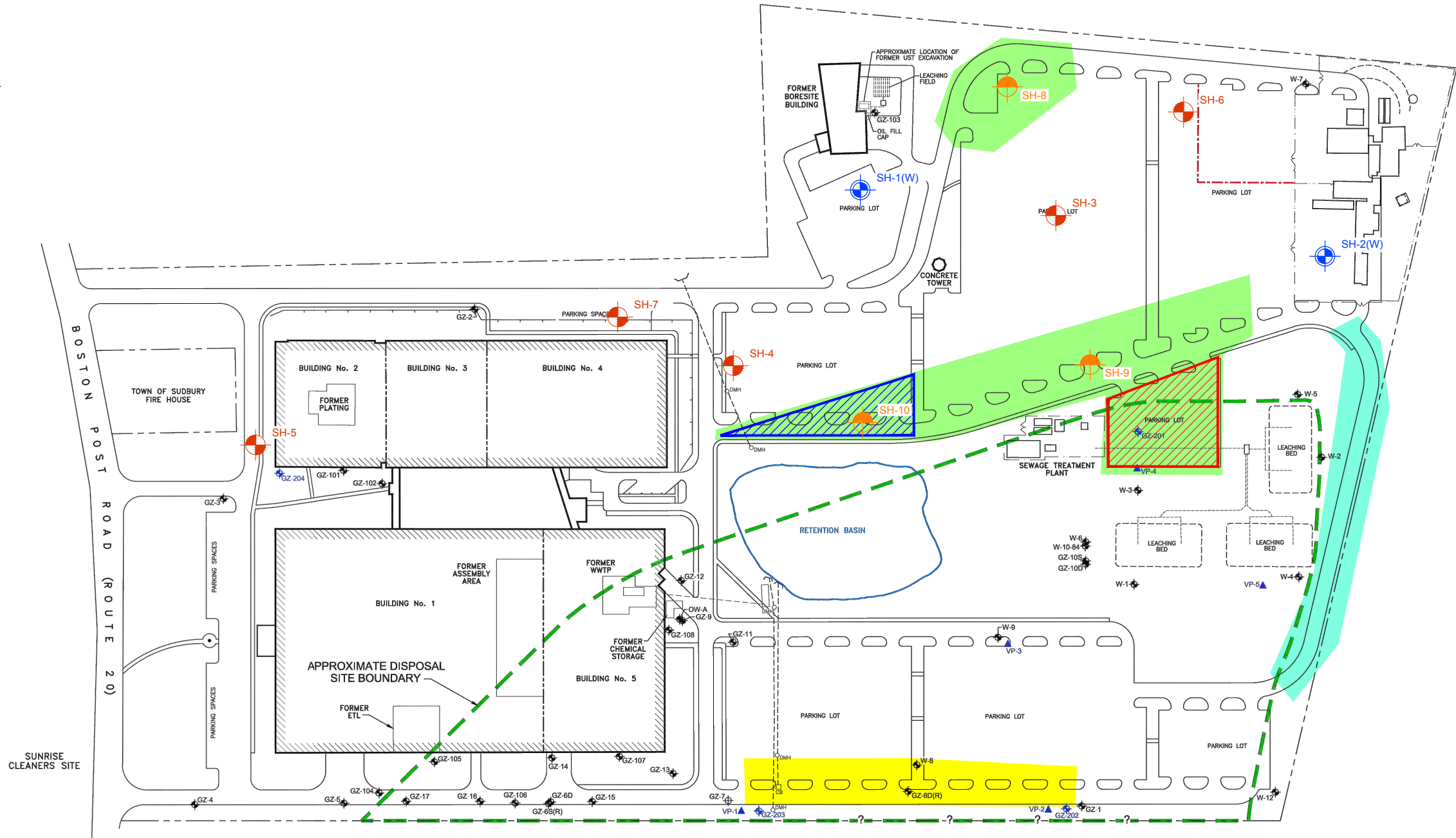


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04/15 SANBORN HEAD & ASSOCIATES, INC.  
XREFS:  
FILE: P:\PROJECTS\528 Boston Post Road\Drawings\4-EXPLORED.dwg  
LAYOUT: PLOT  
PLOT DATE: 8/13/15



LEGEND:

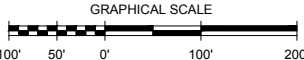
- SH-1** APPROXIMATE LOCATION AND DESIGNATION OF TEST BORING ADVANCED BY GEOSEARCH, INC. (GEOSEARCH) AND OBSERVED BY SANBORN HEAD BETWEEN MAY 27 AND 29, 2015
- SH-1W** APPROXIMATE LOCATION AND DESIGNATION OF TEST BORING COMPLETED AS A MONITORING WELL ADVANCED BY GEOSEARCH AND OBSERVED BY SANBORN HEAD BETWEEN MAY 27 AND 28, 2015
- SH-10** APPROXIMATE LOCATION AND DESIGNATION OF SHALLOW TEST BORING ADVANCED BY GEOSEARCH AND OBSERVED BY SANBORN HEAD ON MAY 29, 2015
- GZA-7** APPROXIMATE LOCATION AND DESIGNATION OF DESTROYED MONITORING WELL BY GZA
- GZ-1** APPROXIMATE LOCATION AND DESIGNATION OF PREVIOUSLY INSTALLED MONITORING WELL BY GZA
- GZ-201** APPROXIMATE LOCATION AND DESIGNATION OF MONITORING WELL INSTALLED BY GEOSEARCH IN SEPTEMBER 2008
- VP-1** APPROXIMATE LOCATION AND DESIGNATION OF VERTICAL PROFILE POINT PERFORMED BY BLUE HILL ENVIRONMENTAL BETWEEN AUGUST 5 AND 11, 2008

- APPROXIMATE DISPOSAL SITE BOUNDARY
- APPROXIMATE PROPERTY BOUNDARY
- APPROXIMATE LOCATION OF DRAIN LINE
- APPROXIMATE LOCATION OF POTENTIALLY BURIED TRASH AND DEBRIS AS NOTED BY THE GEOTECHNICAL GROUP
- APPROXIMATE LOCATION OF BURIED BOULDERS AND BLAST ROCK AS DOCUMENTED IN THE FIELD REPORTS PREPARED BY THE GEOTECHNICAL GROUP
- APPROXIMATE LOCATION OF FILL PLACEMENT FROM BUILDING NO. 5 EXCAVATION AS DOCUMENTED IN THE FIELD REPORTS PREPARED BY THE GEOTECHNICAL GROUP
- APPROXIMATE LOCATION OF BURIED ASPHALT AS DOCUMENTED IN THE FIELD REPORTS PREPARED BY THE GEOTECHNICAL GROUP
- APPROXIMATE LOCATION OF ORGANIC OVER-EXCAVATION AS DOCUMENTED IN THE FIELD REPORTS PREPARED BY THE GEOTECHNICAL GROUP

NOTES:

- THE BASE MAP, INCLUDING THE DISPOSAL SITE BOUNDARY, WAS TAKEN FROM AN ELECTRONIC PLAN ENTITLED, "SITE PLAN", PREPARED BY GEOENVIRONMENTAL, INC. (GZA) OF NORWOOD, MA, DATED APRIL 17, 2015 WITH AN ORIGINAL SCALE OF 1" = 80'.
- EXPLORATIONS DESIGNATED SH-1 THROUGH SH-10 WERE ADVANCED BY GEOSEARCH, INC. (GEOSEARCH) OF FITCHBURG, MA BETWEEN MAY 27 AND 29, 2015 AND WERE OBSERVED BY SANBORN HEAD.
- APPROXIMATE LOCATIONS OF EXPLORATIONS OBSERVED BY SANBORN HEAD ARE BASED ON TAPED MEASUREMENTS MADE IN THE FIELD RELATIVE FROM PROMINENT SITE FEATURES. THIS DATA SHOULD BE CONSIDERED ACCURATE ONLY TO THE DEGREE IMPLIED BY THE METHOD USED.
- APPROXIMATE LOCATIONS OF EXPLORATIONS BY OTHERS HAVE BEEN OBTAINED BY A PLAN ENTITLED, "SITE PLAN", PREPARED BY GZA, DATED APRIL 17, 2015. THIS DATA SHOULD BE CONSIDERED APPROXIMATE.
- AREAS OF FILL PLACEMENT, POTENTIAL BURIED TRASH AND DEBRIS, BURIED BOULDERS, BURIED ASPHALT AND ORGANIC OVER-EXCAVATION ARE BASED ON OUR INTERPRETATION OF FIELD SKETCHES BY THE GEOTECHNICAL GROUP, INC. (THE GEOTECHNICAL GROUP) OF NEEDHAM, MA BETWEEN FEBRUARY 1985 AND JULY 1985.

SANBORN HEAD



NO.	DATE	DESCRIPTION	BY

DRAWN BY: J. RALPHS/C. GREEN  
DESIGNED BY: J. FINDON-HENRY  
REVIEWED BY: P. PINTO  
PROJECT MGR: J. FINDON-HENRY  
PIC: K. STETSON  
DATE: AUGUST 2015

Phase I ESA with Subsurface Investigation  
528 Boston Post Road  
Sudbury, Massachusetts

EXPLORATION LOCATION PLAN

PROJECT NUMBER:  
3888.00

Figure 4