Nobis
Engineering a Sustainable Future

EPA Region 1 RAC 2 Contract No. EP-S1-06-03

September 13, 2016
Nobis Project No. 80108

Via Electronic Submittal

U.S. Environmental Protection Agency
Attention: Mr. Alan Peterson, Task Order Project Officer
5 Post Office Square, Suite 100 (OSRR07-2)
Boston, Massachusetts 02109-3912

Subject: Transmittal of Targeted Brownfields Assessment Report
Former Tombarello Property, Lawrence, Massachusetts
Targeted Brownfields Site Assessment
EPA Task Order No. 0108-SI-BZ-0100

Dear Mr. Peterson:

Enclosed is the Targeted Brownfields Assessment Report for the above referenced site. Through copy of this letter, this report is also being transmitted to the recipients listed below. Should you have any questions or comments, please contact me at (978) 703-6029 or svetere@nobiseng.com.

Sincerely,

NOBIS ENGINEERING, INC.

Stephen Vetere, PE, LSP, LEP
Senior Project Manager

Enclosure

c: Kimberly Tisa, EPA
Joanne Fagan, MassDEP
Abel Vargas, City of Lawrence
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Nobis
Engineering a Sustainable Future

Targeted Brownfields Assessment Report

Former Tombarello Property
Lawrence, Massachusetts

Targeted Brownfields Site Assessment
EPA Task Order No. 0108-SI-BZ-0100

REMEDIAL ACTION CONTRACT
No. EP-S1-06-03

FOR

US Environmental Protection Agency
Region 1

BY

Nobis Engineering, Inc.

Nobis Project No. 80108

September 2016

U.S. Environmental Protection Agency
Region 1
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Targeted Brownfields Assessment Report

Former Tombarello Property
Lawrence, Massachusetts
Targeted Brownfields Assessment
EPA Task Order No. 0108-SI-BZ-0100

REMEDIAL ACTION CONTRACT
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Stephen Vetere, PE, LSP, LEP
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EXECUTIVE SUMMARY

Nobis Engineering, Inc. (Nobis) completed a Targeted Brownfields Assessment (TBA) of the Former Tombarello Site located at 209 Marston Street, Lawrence, Massachusetts, on behalf of the U.S. Environmental Protection Agency (EPA) as a grant of service provided to the City of Lawrence under the EPA's TBA program.

The Site is located in a mixed-use area of Lawrence, Massachusetts. Historical uses of the Site have included a burn dump/landfill and a scrap metal recycling facility. Since 2001, the Site has been unoccupied and unused, with the exception of a truck-driving school which operated on the Site for a short time in 2006.

The use and storage of chemicals during historical site operations has resulted in the release of polychlorinated biphenyls (PCBs), heavy metals, and petroleum products to soil. Specific details regarding the types and extents of releases have not been documented, however it is likely that oils were released onto the ground surface from equipment in historical storage areas and process areas and soaked into the ground. Soils appear to have been relocated from these areas to the southern and eastern property boundaries, where a 10- to 20-foot high berm is located. The act of moving these soils appears to have spread contamination throughout the Site, resulting in a volume of soil containing PCBs above levels typically considered by EPA to be acceptable for unrestricted use and unlimited exposure.

The TBA consisted of a field investigation and evaluation of environmental data, and culminated in the development of potential remedial alternatives to address contaminated soils that are present on site. Nobis completed the field investigation in June 2016. The assessment included a review of historical environmental information, identification of additional data needs, and implementation of a subsurface investigation. Investigative strategies included the collection of soil cores from 76 drilling locations, construction of nine groundwater wells, excavation of 20 test pits, and collection of 20 shallow soil cores using hand tools. Investigation locations were spread throughout the Site in an effort to collect follow-up information from previously identified contaminated areas and to investigate areas not previously sampled.

In general, contamination that is released to soil often migrates to groundwater or sediment and surface water in adjacent streams or rivers. To date, no significant groundwater contamination

has been detected at the Site. Groundwater beneath the Site is not used as a source of drinking water; therefore, the cleanup requirements are less stringent and allow for some contamination to remain without treatment.

Due to the volume of contaminated soil on the Site, cleanup to levels suitable for unrestricted use is not practical, therefore the optimal remediation strategy will involve the excavation and off-site disposal of a limited volume of soil, re-grading of the Site to promote reuse, placing a clean-soil cover over contaminated soils, and placing a deed restriction on the property to place restrictions on digging and any other activity that will allow exposure to contaminated soil or cause damage to the cover. The specific requirements for off-site disposal of contaminated soil, the type of containment barrier placed over contaminated soils, and the contents of a deed restriction will need to be developed in collaboration with state and federal regulators to ensure compliance with applicable environmental regulations. The remediation of soils contaminated with PCBs will be regulated by the EPA's Toxic Substances Control Act (TSCA) program, and soil remediation will need to be conducted under an EPA-approved Risk-Based Cleanup Plan. Additional risk assessment work will likely be required to substantiate the selection of more limited soil removal actions.

Depending upon the appropriate cleanup levels agreed upon by the project stakeholders, the estimated cost of soil remediation at the Site will range from $3,000,000 to over $50,000,000. The wide range of cost is due to the high cost of transportation and disposal of PCB waste, and underscores the sensitivity of these remedial cost estimates to the volume of waste shipped off-site for disposal. The most economically feasible remedial alternative will minimize the amount of soil removed from the Site, and will utilize a soil cover to prevent direct contact with contaminated soil. This remedial strategy will require annual maintenance of the cover by the owner in perpetuity, and reporting to the Massachusetts Department of Environmental Protection (MassDEP) and EPA to verify that the soil cover continues to prevent direct contact exposure to contamination. Additional detail on the remedial alternatives considered during the assessment is provided in Section 5.0. Detailed cost estimates are provided in Appendix A.

The cost estimates developed for this TBA should be considered order-of-magnitude estimates, and are subject to variation due to fluctuations in construction costs, material costs, fuel costs, and landfill tipping fees. Additionally, the soil volumes used to estimate remedial costs are subject to refinement through additional data collection to establish the vertical and horizontal extent of

contaminated soil in areas containing few data points. Recommendations for potential future work to help refine these estimates are included in Section 6.0 of this report.

With respect to existing conditions, the presence of PCBs in surficial soils (0 to 1 foot below ground surface) at a concentration greater than 10 mg/kg would constitute an Imminent Hazard and 2-hour reporting condition if not for the presence of the chain link fence at the perimeter of the Site. It is critical that this barrier remain intact and effective to prevent access to the Site until such time that remedial actions are taken to limit potential exposure to PCB-impacted soils.

1.0 INTRODUCTION

This Targeted Brownfields Assessment (TBA) Report was prepared by Nobis Engineering, Inc. (Nobis) for the U.S. Environmental Protection Agency (EPA) under Contract No. EP-S1-06-03, Task Order No. 0108-SI-BZ-0100. This report presents the findings of subsurface investigations conducted at the Former Tombarello Property located at 207 Marston Street in Lawrence, Massachusetts (the Site) during June 2016, and presents an evaluation of historical soil and groundwater sampling data to develop potential remedial alternatives in support of site redevelopment. A Locus Plan depicting the approximate site location is included as Figure 1-1.

1.1 Work Assignment and Report Purpose

This TBA report is based on environmental data collected by Nobis in 2016, as well as data collected during historical investigations conducted by the previous property owners, the Massachusetts Department of Environmental Protection (MassDEP), and by EPA. The overall objective of the TBA is to characterize the nature and extent of contamination in soil and groundwater at the Site, estimate the potential human health risks posed by hazardous substances at the Site, and develop remedial alternatives with order-of-magnitude cost estimates. Specific objectives of this TBA were to:

- Compile and evaluate available Site data; and obtain additional data required to fill data gaps and further characterize current Site conditions;
- Where possible, delineate the extent of contamination in Site soil and groundwater;
- Evaluate risks posed by contamination using published state and federal risk-based regulatory standards;
- Develop and evaluate potential alternatives for clean-up; and
- Estimate order-of-magnitude costs of implementing the cleanup alternatives that would help support decision making concerning future redevelopment of the Site.

1.2 Report Organization

This TBA report is organized as follows:

- Section 1 provides a description of the Site and summarizes historical investigations.
- Section 2 presents details of TBA investigations performed by Nobis in June 2016.
- Section 3 presents laboratory analytical results for samples collected in June 2016.
- Section 4 summarizes the current nature and extent of contamination.
- Section 5 presents the Analysis of Brownfields Cleanup Alternatives (ABCA)
- Section 6 presents conclusions and recommendations.

1.3 Site Background

This section describes the physical characteristics of the Site and surrounding area, as well as the operational history and environmental history of the Site.

1.3.1 Site Location and Description

The Site is referred to as the Former Tombarello Property and is approximately 14 acres in size. The Site is located in a mixed-use area of Lawrence, Massachusetts, abutted to the east by Interstate 495; to the south by an automobile dealership (formerly a waste recycling facility); to the west by Marston Street, beyond which lies the Parthum Elementary and Middle School; and to the north by residential properties (Figure 1-2).

1.3.2 Site History

Historical uses of the Site have included a burn dump/landfill and a scrap metal recycling facility. The southern portion of the Site has historically been used as a soap manufacturing facility and a community landfill. The most recent use of the Site was as a metals recycling facility (John C. Tombarello & Sons and American Recycling of Massachusetts, Inc.), which operated from approximately 1941 until 2001. Since 2001, the Site has been unoccupied and unused, with the exception of a truck driving school, which operated on the Site for a short time in 2006.

Two former industrial buildings and a former residential building remain on the Site. The remains of several building foundations are located throughout the Site, and several soil piles are present

at the Site (Figure 1-2). An earthen berm ranging from approximately 10 to 20 feet high is present along the eastern and southern property boundaries. This berm was reportedly formed by pushing shallow soils from the Site toward the property boundaries.

The depth to groundwater at the Site ranges from approximately 6 to 12 feet below ground surface (bgs) and groundwater flow is to the east towards the Merrimack River, which is located approximately 400 feet from the Site.

1.4 Previous Investigations and Remedial Actions

A brief summary of historical site investigations and removal actions is provided in this section. A summary of historical sampling locations is provided on Figure 1-3.

1.4.1 May 1998 – Heat Transfer Oil Release

On May 19, 1998, approximately 20 to 30 gallons of heat transfer oil were released to soils at the Site from a scrap heat exchanger that was being delivered to the Site by Sprague Energy. MassDEP was notified within the required 2-hour window, and response actions were taken. Approximately 300 gallons of heat transfer oil were pumped from the unit and approximately 50 cubic yards of impacted soil was removed from the Site. MassDEP assigned release tracking number (RTN) 3-16817 to this release. The release was closed in July 1998 through submittal of a Class A-1 Response Action Outcome (RAO) Statement, which indicates that remedial actions were taken and cleanup activities achieved background levels.

1.4.2 August 1998 – Environmental Site Assessment

W.Z. Baumgartner and Associates, Inc. (WZB) conducted an environmental site assessment at the Site in 1998 following the closure of the scrap metal recycling facility. The assessment included advancement of nine soil borings; collection of 15 soil samples from depths ranging from 0 to 11 feet bgs; and installation of five groundwater monitoring wells. Analytical results for soil samples indicated concentrations of semi-volatile organic compounds (SVOCs), total petroleum hydrocarbons (TPH-diesel range), polychlorinated biphenyls (PCBs), and metals above Massachusetts Contingency Plan (MCP) Reportable Concentrations (RCs). Analytical results for groundwater samples indicated concentrations of arsenic, chromium, and lead above MCP RCs. This release was reported to MassDEP in 1998, and RTN 3-18126 was assigned to the Site.

1.4.3 March 1999 – Notice of Responsibility

On March 31, 1999, MassDEP issued a Notice of Responsibility (NOR) and Interim Deadline letter to Tombarello Recycling and American Recycling. MassDEP requested these parties to prepare an Imminent Hazard Evaluation to evaluate whether the detection of PCBs in surficial soil samples at the Site represented an Imminent Hazard as defined in the MCP.

1.4.4 April 1999 to June 1999 – Immediate Response Action

In April 1999, Higgins Environmental Associates, Inc. (HEA) prepared an Immediate Response Action (IRA) Plan on behalf of American Recycling outlining assessment activities designed to address potential Imminent Hazards at the Site. The IRA Plan, later revised in June 1999, included the removal of a soil stockpile contaminated with heat transfer oil (RTN 3-18126); collection and laboratory analysis of surface soil samples; installation of three additional monitoring wells; and collection and laboratory analysis of groundwater samples from both newly installed and existing monitoring wells. In addition, a barbed-wire fence was installed around the perimeter of the site to control access.

During the June 1999 investigation, laboratory analysis of 69 shallow surface soil samples (0 to 6-inches bgs) detected concentrations of extractable petroleum hydrocarbons (EPH), lead, volatile organic compounds (VOCs), and PCBs above applicable MCP standards. Groundwater samples collected from the three new monitoring wells and one existing monitoring well were submitted for laboratory analysis of VOCs, volatile petroleum hydrocarbons (VPH), EPH, and metals. Laboratory results for groundwater samples indicated concentrations of VOCs and metals above applicable MCP standards. HEA concluded that the potential Imminent Hazard Condition was mitigated by the installation of the perimeter fence.

1.4.5 June 1999 – New RTN and Additional Investigations

In June 1999, MassDEP assigned RTN 3-18431 to track the release of an oily sludge that was observed on the floor of the former baler/press area by MassDEP during a site inspection. Due to the presence of a floor drain in the room (reportedly connected to the municipal wastewater system), MassDEP issued an NOR to American Recycling for a threat of release. American Recycling performed an IRA to address the conditions identified by MassDEP in the NOR. The IRA consisted of the cleanup of the oily sludge, removal of twelve 55-gallon drums present in the

baler/press room (under a hazardous waste manifest), replacement of a seal on one of the cylinders that had been leaking hydraulic oil onto the ground, and abandonment of the floor drain by filling it with concrete to prevent further discharge of oil into the sanitary sewer system. The release was closed in August 1999. However, the closure report was later retracted in May 2001.

1.4.6 April 2000 – Tier Classification

In April 2000, the Site was classified as a Tier II site. In May 2001, the Tier Classification was changed to Tier IC and RTNs 3-18431 and 3-18126 were linked. Reclassification as Tier 1 indicates that the site was determined to pose a more significant human health or environmental risk than initially assumed, and also increases the annual compliance fees due to MassDEP by the site owner.

1.4.7 2001/2002 – Soil and Sediment Sampling Investigations

In September 2001, Haley & Aldrich, Inc. (H&A) collected 35 soil samples at depths ranging between 0 to 15 feet bgs. Soil samples were collected from the vicinity of the former baler press building and from the soil berm located along the southern and eastern site boundaries. Laboratory analytical results reported concentrations of PCBs above the MCP Reportable Concentration for Category S-1 Soil (RCS-1) and the Toxic Substance Control Act (TSCA) cleanup level for “high occupancy” areas throughout the Site. Both of these regulatory benchmarks are 1.0 milligram per kilogram (mg/kg) of total PCBs.

In September 2002, H&A collected nine sediment samples from the Merrimack River for laboratory analysis of PCBs. The concentrations of PCBs detected in two of these samples exceeded the National Ocean and Atmospheric Administration (NOAA) Threshold Effect Levels (TELs) in effect at the time (0.03 ppm). PCBs were not detected in the other seven sediment samples collected during this event.

1.4.8 2003 Phase II Comprehensive Site Assessment (CSA)

From February through September 2003 Weston Solutions, Inc. (Weston) completed an MCP Phase II CSA at the Site. The Phase II CSA included a collection of surface and subsurface soil samples, groundwater samples, and sediment samples from the Merrimack River to further delineate the extent of contamination at the Site. In February 2003, Weston collected 28 soil

samples from the Site at depths ranging from 0 to 7 feet bgs. Laboratory analysis of soil samples reported concentrations of EPH, metals, and PCBs above applicable MCP soil standards. Groundwater samples were collected from seven existing monitoring wells and submitted for laboratory analysis of VOCs and metals. Concentrations of the VOC vinyl chloride were detected in downgradient monitoring well MW-7. Three sediment samples were collected from the Merrimack River (two upstream and one downstream relative to the Site). Concentrations of PCBs were detected above NOAA TELs in samples collected from both upstream and downstream sampling locations.

In July 2003, Weston collected an additional 44 composite soil samples for laboratory analysis of PCBs. Weston also collected 33 discrete soil samples from two previously identified “hot spot” locations. Elevated concentrations of PCBs were detected in both composite and discrete soil samples.

In September 2003, Weston collected an additional 44 soil samples for laboratory analysis of PCBs. Elevated concentrations of PCBs were detected in soil samples.

As part of the Phase II CSA, Weston prepared MCP Method 3 Risk Assessment. The risk assessment assumed that under future use, the surface soil would be covered by either buildings or asphalt pavement. However, under current use scenarios, potential unacceptable risks to trespassers, site employees, and construction/utility workers were identified. Risks to construction workers were identified within “hot spots” in the vicinity of soil sampling locations WSB-6, CD-45, WSB-2, and in samples collected from deeper soils in the soil berms located on the east and southeast portions of the property. Unacceptable risk to utility workers were identified within the vicinity of “hot spots” WSB-6 and CD-45.

1.4.9 October 2010 – EPA Investigations

In October 2010, EPA established a 50 foot by 50-foot sampling grid at the Site. EPA collected 161 soil samples from accessible grids throughout the Site and submitted them for laboratory analysis of PCBs, metals, and PAHs.

1.4.10 2011 – Removal Actions

In 2011, EPA developed a removal action plan for the Site that included the removal of "hot spot" soils, and limited quantities of contaminated soil from the Site and residential properties that abut the Site to the north. An on-site soil consolidation area was constructed as a temporary staging area for excavated soils. In order to construct the soil consolidation area, excavation of apparent oil-impacted soils was required. Removal actions were performed by Charter Environmental (Charter) in May 2011. A summary of these removal actions is presented below.

Soil Consolidation Area Construction and Oil-Impacted Soil Excavation

In order to construct the soil consolidation area for the PCB-impacted soils, Charter removed soils within an approximate 35-foot by 15-foot area of the Site where an excavator was formerly stored. This area exhibited visual evidence of oil staining. The oil-impacted soils were excavated and placed on to an existing concrete foundation pad located in the northeast portion of the Site and covered with polyethylene sheeting. Management of this material was to occur during future remedial actions at the site. In addition to removing the oil-impacted soils, Charter also removed a 20-foot by 65-foot by 1-foot thick concrete slab. The concrete material was stockpiled in the central portion of the Site.

PCB-Impacted Soil Excavation

Charter excavated an approximate 600-foot by 50-foot area of PCB-impacted soils to a depth of 1 foot. The excavation was performed along the fence line of the northern property boundary with the abutting residential properties (Figure 1-2). The excavated soils were relocated to an approximate 150-foot by 150-foot area located in the southern portion of the property. Following the completion of excavation activities, Tighe & Bond personnel collected soil samples from the bottom of the excavation area. Fifteen composite soil samples were collected and analyzed for PCBs and the eight Resource Conservation and Recovery Act (RCRA) metals. Each composite soil sample represented an approximate 40-foot by 50-foot area within the excavation. Post-excavation soil sample results reported PCB concentrations ranging from 0.23 mg/kg to 14.8 mg/kg. Following receipt of analytical results, the excavation was lined with filter fabric to demarcate the bottom of the excavation and then backfilled, loamed, and seeded. Charter stabilized the excavated materials in the soil consolidation area using filter fabric, loam, and seed.

1.4.11 2012 Phase II Scope of Work

There have been no further assessment or remedial activities at the Site since the 2011 removal action. In October 2012, on behalf of First Lawrence Financial, LLC, Tighe & Bond prepared a "*Phase II Scope of Work",* dated October 2012 (Tighe & Bond, 2012). The Phase II Scope of Work described a field investigation designed to characterize the nature and extent of contamination so that potential remedial alternatives could be evaluated. Comments were provided by the EPA TSCA coordinator in January 2013 and by MassDEP in November 2012. The Phase II Scope of Work along with EPA and MassDEP comments were used by Nobis to prepare a Field Task Work Plan and Quality Assurance Project Plan Addendum (FTWP-QAPPA) dated June 3, 2016 (Nobis, 2016). This FTWP-QAPPA formed the basis of the TBA that was completed by Nobis in 2016.

2.0 TARGETED BROWNFIELDS ASSESSMENT INVESTIGATION

This section describes the environmental investigations performed by Nobis as part of the TBA. The TBA investigation included the collection of soil, groundwater, and dust samples for field screening and laboratory analysis. Descriptions of investigation methods, observations, and field screening results are presented in the sections that follow.

2.1 Field Investigations and Technical Approach

The June 2016 TBA investigations were performed to provide further delineation of the nature and extent of contamination in soil and groundwater at the Site, building on historical environmental data to address data gaps identified during previous investigations. The 2016 TBA investigation was performed in accordance with the FWTP/QAPPA (Nobis, 2016), however some proposed soil boring and test pit locations were relocated due to access limitations or property boundary limitations. 2016 sampling locations are shown on Figure 2-1.

2.2 Soil Boring Advancement and Soil Sampling

Between June 6 and June 10, 2016, Nobis supervised the advancement of 76 overburden soil borings. All depth measurements for soil borings are referenced as depth below ground surface (bgs). Soil samples were collected using 5-foot long dedicated Macro-Core® sampling sleeves, which were advanced to discrete predetermined depth intervals. Soils were visually characterized by the Nobis field geologists using the Burmister Method classification method.

The soil borings were advanced by Technical Drilling Services of Sterling, Massachusetts using a track-mounted Geoprobe 6620DT drill rig equipped with direct push technology (DPT) tooling. During drilling activities soil samples were logged for Site geology; analyzed for the presence of VOCs using head space screening methods with a MiniRAE 3000 photoionization detector (PID); and collected for laboratory analysis. Soil samples for laboratory analysis were containerized into laboratory-supplied glassware immediately from the sample sleeve. Soil samples were retained on ice, and transported via courier under chain-of-custody to Eurofins/Spectrum Analytical of North Kingstown, Rhode Island. If additional soil matrix was required for the minimum sample volume, additional soil was collected by advancing additional boring(s) within 1 foot of the initial boring to the same sampling interval and homogenized with matrix from the initial boring to form one homogenous aliquot for laboratory analysis. Soil sample results are discussed in Section 3.1.

Soil boring logs and associated monitoring well construction logs are included in Appendix B. Soil borings were backfilled using the soil cuttings. Soil boring locations are shown on Figure 2-1.

2.3 Monitoring Well Installation and Development

During the drilling investigation, nine soil borings were completed as overburden groundwater monitoring wells (MW-8 through MW-16). The monitoring wells were installed in targeted areas of the Site to evaluate potential groundwater contamination identified during previous investigations or fill data gaps where existing wells did not provide sufficient spatial coverage. The monitoring well locations were selected based a review of existing historical information and data collected during previous investigations and field observations.

Monitoring wells were installed to a maximum depth of 13 feet bgs. Monitoring wells were constructed using 2-inch diameter, Schedule 40 polyvinyl chloride (PVC) with 10-foot long 0.010-inch slotted screen. The screened porting of the monitoring wells was backfilled using clean filter sand, then approximately 2 feet of bentonite chips, then brought to grade with a combination of filter sand and soil cuttings. Each monitoring well was completed with a flush-mounted roadbox set in concrete. The approximate locations of monitoring wells are shown on Figure 2-1. A summary of monitoring well construction details is presented on Table 2-1.

The newly installed monitoring wells were developed using surge and purge techniques using a submersible Whale® pump. The Whale® pump and associated tubing were surged up and down the length of the well screen. Once surging was completed, the Whale® pump was used to purge the wells to eliminate remove fine soil materials from the well casing and surrounding filter sand. Each monitoring well was developed until the extracted groundwater was visibly clear or roughly 5 well volumes were removed. Several wells were purged dry, allowed to recharge, and then surged and purged repeatedly. All groundwater purged during well development was containerized in 55-gallon drums.

2.4 Test Pit Excavation and Soil Sampling

Between June 14 and June 16, 2016, Nobis supervised the advancement of 20 test pits at the Site. Several of the proposed test pit locations were modified due to accessibility restrictions. Ten test pits were advanced into the elevated berms located along the southeastern and eastern

property boundaries. Ten additional test pits were advanced into soil and debris stockpiles located throughout the Site. The test pits were advanced by Technical Drilling Services of Sterling, Massachusetts using a New Holland 555E backhoe. During test pitting activities, a backhoe spotter was used to assist the excavator operator and apply dust control measures (water misting) to control fugitive dust emissions. All depth measurements for the test pits are referenced to the top the highest sidewall of the excavated test pit. Soils and debris encountered were visually characterized by Nobis field geologists using the Burmister Method classification methods.

During test pit excavations, soil samples were collected for headspace screening using a PID. In accordance with the FTWP-QAPPA, soil samples were collected for laboratory analysis from the pile surface surficial (0 to 1-foot) and then from varying subsurface intervals. The subsurface intervals were selected by the field geologist based on field observations of potential contamination or fill material.

Soil samples for laboratory analysis were collected in laboratory-supplied glassware directly from the backhoe bucket. The backhoe bucket was decontaminated using a pressure washer at the completion of each test pit. Soil samples were retained on ice, and transported via courier under chain-of-custody to Eurofins/Spectrum Analytical of North Kingstown, Rhode Island and analyzed for PCBs and metals. One soil sample was analyzed for hexavalent chromium. After completion of test pit excavation and soil sample collection, each test pit was backfilled and compacted using the backhoe bucket to match the previous grade and slope. Soil sample results are discussed in Section 3.1. Test pit logs are included in Appendix C.

2.5 Groundwater Sampling

From June 13 to 17, 2016, Nobis collected groundwater samples from eight monitoring wells (seven of the new wells as well as existing MW-1). Groundwater samples were collected using the EPA low-flow groundwater sampling protocols. Two monitoring wells (MW-10 and MW-14) were dry during groundwater sampling events. Of the eight wells sampled, three monitoring wells (MW-08, MW-09, MW-11) were purged dry, and allowed to recharge until sufficient volume for sample collection was available. All samples were collected using peristaltic pumps and dedicated tubing. Groundwater geochemical parameters (i.e., pH, turbidity, temperature, etc.) were continuously monitored using an in-line YSI, Inc. water quality meter sonde and a separate HACH 2100Q turbidity meter. Low flow groundwater sampling field logs are included in Appendix D.

2.6 Catch Basin and Drainage Structure Evaluations

As part of the TBA investigation activities, Nobis evaluated three catch basins at the Site. Nobis observed free-flowing water in the bottom of each catch basin. The terminus of the catch basin and drainage system is unknown at this time.

Nobis evaluated the Furnace Building and the Metal Shop/Garage (Figure 1-2) for the presence of floor drains, sumps, and/or other drainage structures and none were noted. Nobis was unable to inspect the two remaining on-site buildings. Both buildings have sustained significant fire damage and were unsafe to enter.

2.7 Monitoring Well Elevation and Geographic Survey

On June 16, 2016 Nobis surveyed 10 monitoring wells (one existing and the nine installed by Nobis) for elevation data using a laser level. Reference point elevations of the monitoring wells (top of PVC) were surveyed relative to an arbitrary benchmark elevation of 100 feet. This survey information was used to determine groundwater elevations and create a groundwater contour map (Figure 2-2). based on the information gathered during the TBA investigation, groundwater flow appears to be to the east-northeast toward the Merrimack River.

2.8 Dust Monitoring

On June 9 and June 15, 2016, during drilling and test pitting activities, respectively, Nobis collected ambient air samples from the perimeter of the Site to verify the absence of fugitive dusts reaching the Site perimeter. The ambient air samples were submitted to Con-Test Analytical Laboratory located in East Longmeadow, Massachusetts for analysis of dust, lead, and PCBs. The ambient air samples were collected to evaluate the effectiveness of engineering controls implemented during TBA investigation activities to prevent the generation of dusts. The approximate locations of the air monitoring locations are shown on Figure 2-1.

3.0 SUMMARY OF TBA SAMPLING RESULTS

Nobis performed an initial review the soil sampling data generated during the TBA investigation by comparing the concentrations of contaminants of potential concern (COPCs) to the concentrations of COPCs detected during historical investigations. In general, the COPC concentrations detected during 2016 TBA investigations and COPCs detected during historical investigations are similar.

A more detailed review of the data was performed by comparing laboratory analytical results to MCP (310 CMR 40.0000) Method 1 risk assessment standards. Using the MCP Method 1 Risk Characterization methods, soils at the Site would be classified as S-1 due to the presence of nearby residential properties and schools. Several COPCs have been detected in soil at the Site at concentrations greatly exceeding the applicable Method 1 Standards. Furthermore, some concentrations exceed MCP Upper Concentration Limits (UCLs) (310 CMR 40.0996). UCLs in soil and groundwater are concentrations of oil and/or hazardous material which, if exceeded under certain conditions, indicate the potential for significant risk of harm to public welfare and the environment under future conditions. Additionally, concentrations of PCBs have been detected in Site soils that exceed 50 mg/kg. Therefore, remediation of PCBs at the Site is regulated under both the MCP and TSCA.

Laboratory results of soil, groundwater, and air sampling results collected during TBA investigation activities are summarized in this section. Discussions of soil data are primarily focused on COPCs that exceed established UCLs or TSCA cleanup levels.

3.1 Soil Sampling Results

The sections below present the laboratory analytical results from soil samples collected during soil boring, test pit, and hand auger activities performed during TBA investigation activities. Soil samples were collected for specific laboratory analysis and varying depths in accordance with the approved FTWP. Laboratory data reports for soil samples collected during the TBA are included in Appendix E.

3.1.1 Summary of PCB Sampling Results

During TBA investigation activities (soil borings, test pits, and hand augers) Nobis collected 214 soil samples for laboratory analysis of PCBs. The PCBs detected during TBA investigations were primarily PCB Aroclors 1248 and 1260 and concentrations vary throughout the Site ranging from below laboratory detection limits to a maximum detection of 1,300 mg/kg in a soil sample collected from 1 to 3 feet bgs at soil boring SVA-05. The table below presents a summary of TBA PCB sample results detected within select concentration ranges.

Total PCB Concentration Range	No. of Samples
non-detect	33
less than 1 mg/kg	50
1 mg/kg – 10 mg/kg	71
10 mg/kg – 50 mg/kg	41
50 mg/kg – 100 mg/kg	14
100+ mg/kg	5

A summary of TBA and historical PCB sampling results are included as Table 3-1 and 3-2, respectively. The concentrations of PCBs detected during TBA activities were generally similar to historical PCB concentrations.

3.1.2 Summary of Metals Sampling Results

Concentrations of metals were detected above applicable MCP Method 1 soil standards in numerous soil samples collected during TBA investigations. Concentrations of lead were detected above the MCP UCL (6,000 mg/kg) at the following locations: CD-45E (6,400 mg/kg), CD-45S (8,600 mg/kg), SVA-03 (6,700 mg/kg), TP-12 (6,500 mg/kg), and TP-20 (10,000 mg/kg). Concentrations of chromium were detected above the MCP UCL (2,000 mg/kg) at the following locations: SVA-06 (40,000 mg/kg), TP-05 (86,000 mg/kg), and TP-13 (14,000 mg/kg). The only other metal detected above Method 1 soil standards in soil samples collected during the TBA was arsenic. The following is a statistical summary of analytical results for arsenic, chromium, and lead collected during the TBA:

Statistic	Arsenic	Chromium	Lead
#samples	138	138	138
#detects	136	138	138
#exceed Method 1	18	35	110
#exceed UCL	0	3	5
Average Conc. (mg/kg)	14.3	1,111	1,158

A summary of TBA metal sampling results are presented in Table 3-3. A summary of historical metal sampling results is presented in Table 3-4. Concentrations of mercury exceed the MCP UCL (300 mg/kg) at historical soil sample S-04-01 (1,277 mg/kg). The concentrations of metals detected during TBA activities were generally similar to Site-wide historical metals concentrations with the exception of the UCL exceedances detected during TBA investigations.

It is likely that soils containing metals above UCLs will require excavation and off-site disposal during future remedial actions. Therefore, Nobis directed Spectrum to analyze each of the eight samples containing metals above UCLs for either lead or chromium using the toxicity characteristic leaching procedure (TCLP). The concentrations of lead detected in samples collected from CD-45E (95 mg/L) and CD-45S (28 mg/L) using TCLP methods exceed the Resource Conservation and Recovery Act (RCRA) limit of 5 mg/L, indicating that at least some of the soil in these eight locations will be considered hazardous waste upon generation. A summary of TCLP sample results is included in Table 3-5.

3.1.3 Summary of EPH and SVOC Sampling Results

Concentrations of EPH and SVOCs were detected above applicable MCP Method 1 S-1 Soil Standards in soil samples collected during TBA investigations. However, the concentrations detected do not exceed established MCP UCLs. TBA EPH and SVOC sample results are presented in Table 3-6.

3.1.4 Summary of VOC Sampling Results

Low concentrations of VOCs were detected in several soil samples collected during TBA investigation activities. There were no VOCs detected above MCP Method 1 S-1 Soil Standards or MCP UCLs. TBA VOC sample results are presented in Table 3-7.

3.1.5 Summary of Cyanide Sampling Results

Cyanide analysis was limited to soil samples collected from below the former Furnace Building. Laboratory analysis of soil samples did not detect concentrations of cyanide above laboratory reporting limits. Cyanide analytical results are presented on Table 3-3.

3.2 Groundwater Sampling Results

The sections below present the results of laboratory analytical results of groundwater samples collected during TBA investigation activities. Groundwater sampling results were evaluated by comparing them to MCP Method 1 risk assessment standards. The Site is not located in a Current or Potential Drinking Water Source Area, therefore MCP GW-1 standards do not apply to groundwater at the Site. Under future site use scenarios occupied buildings may be present on Site; therefore, GW-2 standards apply to groundwater. Since all groundwater is considered a potential source to surface water, GW-3 standards also apply to the site. Groundwater samples were collected for specific laboratory analysis in accordance with the approved FTWP.

Groundwater sampling data collected during historical investigations and during the June 2016 TBA is summarized on Table 3-8. Laboratory data reports for groundwater samples collected during the TBA are included in Appendix E.

3.2.1 Summary of VOC Sampling Results

There were no VOCs detected at concentrations above applicable Method 1 groundwater standards. Low concentrations of VOCs were detected in groundwater samples collected from MW-8, MW-9, MW-11, and MW-13. Chemicals indicative of gasoline constituents (benzene, ethylbenzene, xylene, naphthalene, MtBE) were detected in the sample collected from MW-8. Trace levels of chlorinated solvents were detected in samples collected from MW-8 and MW-11 (1,1-dichloroethane; 1,4-dioxane; vinyl chloride). The chlorinated solvent tetrachloroethene was

detected in the sample collected from MW-9. Monitoring well MW-8 is located in the southeast corner of the Site at the base of the soil berm, MW-9 and MW-11 are located in the central portion of the Site within the footprint of the former Large Shear and Baler Press Areas, respectively.

No VOCs were detected in the groundwater samples collected from MW-15 and MW-16, which are located along the northern property boundary adjacent to the residential properties along Hofmann Avenue.

3.2.2 Summary of EPH/PAH Sampling Results

There were no concentrations of EPH or PAHs detected in groundwater samples at concentrations exceeding applicable Method 1 standards.

3.2.3 Summary of Metals Sampling Results

Concentrations of lead were detected above the MCP Method 1 GW-3 standard (10 µg/L) in groundwater samples collected from MW-8 and MW-11 (69 and 25 µg/L, respectively). However, due to elevated turbidity readings observed during low flow sampling, Nobis analyzed one additional sample from MW-11 for metals analysis after filtering the sample in the field using a 0.5-micron filter. Concentrations of lead detected in the filtered sample (0.36J µg/L) were well below the MCP GW-3 standard. This result is consistent with historical metals analysis when comparing total metals versus dissolved metal concentrations. The low concentrations detected in filtered samples are likely more representative of dissolved concentrations of metals in groundwater beneath the Site.

3.2.4 Summary of PCB Sampling Results

There were no PCBs detected above laboratory reporting limits from any groundwater samples collected during the TBA investigation.

3.2.5 Summary of Cyanide Sampling Results

Cyanide was not detected above laboratory reporting limits.

3.3 Dust Monitoring Sample Results

On June 9 and 15, 2016, Nobis collected air samples from perimeter of the Site while drilling and test pitting activities were being performed. The purpose of the air samples was to evaluate if engineering controls (misting and wetting) were effective in controlling the generation of fugitive dust and eliminating the potential for contaminated soil to be transported to off-site receptors. Laboratory analysis of perimeter air samples did not detect concentrations of dust, lead, or PCBs above laboratory reporting limits for either sampling event. Dust monitoring sampling results are summarized on Table 3-9. Laboratory data reports for dust samples collected during the TBA are included in Appendix F.

3.4 Data Validation

Nobis performed a Tier I Modified data validation in accordance with the *Region I, EPA-NE Environmental Data Review Supplement for Regional Data Review Elements and Superfund Specific Guidance/Procedures* (April 2013), *USEPA National Functional Guidelines for Inorganic Superfund Data Review* (August 2014); and the *USEPA National Functional Guidelines for Superfund Organic Methods Data Review* (August 2014) for the organic and inorganic soil and groundwater samples collected at the Site by Nobis. Data validation summary memoranda are included as Appendix G. The data quality objectives for the project are to use the data to delineate the nature and extent of soil and groundwater contamination at the Site so that potential remedial alternatives can be evaluated and order-of-magnitude cost estimates can be developed. To that end, it has been determined that the data have achieved data quality objectives (DQO) have been met and the data are deemed as usable.

4.0 NATURE AND EXTENT OF CONTAMINATION

Low concentrations of VOCs, SVOCs, and dissolved metals were detected during both TBA and historical groundwater sampling events. Based these results, groundwater at the Site has not been adversely impacted by historical Site operations or historical releases. Therefore, the discussion regarding nature and extent of contamination at the Site is focused on COPCs detected in Site soils. The primary COPCs detected include PCBs, metals, and SVOCs/PAHs.

Based on the presence of soil stockpiles and the large soil berm located along the southern and eastern portions of the property it is likely that Site soils have been extensively reworked and moved to various locations throughout the Site. Fill material containing metal, brick, ash, slag, glass, and other man-made debris were encountered in nearly every soil boring and test pit performed during TBA investigations. The depth of fill material varies widely across the site ranging from 2 to 11 feet bgs. COPCs detected in Site soils are likely associated with historical operations as a burn dump/landfill and scrap metal/salvage yard. Native sands were encountered in deeper soil borings performed for monitoring well installations. The extent of contamination discussions presented in this section are based on observations made during subsurface investigations completed during the TBA as well as review of historical data.

4.1 Extent of PCB Contamination

Concentrations of PCBs have been detected throughout the Site in both surface and subsurface soils. Concentrations have ranged from non-detect to 2,700 mg/kg in soil boring WSB-6 in a sample collected from 0 to 1 foot bgs. In general, elevated concentrations (greater than 10 mg/kg) of PCBs have been detected clustered in the central, eastern, and southeastern portions of the Site. Elevated concentrations of PCBs have also been detected in deeper sampling intervals (up to 4 feet below ground surface) in western portions of the Site near the Furnace Building; in the central portion of the Site near the Baler Press Area and Small Shear (3 feet or more); and in southern and eastern areas near the Soil Consolidation Area.

Elevated concentrations of PCBs were also detected in soil samples collected from test pits (shallow and deeper intervals) and hand auger samples collected from the top of the soil berm that forms the southern and eastern boundaries of the property (Figures 3-1 and 3-2). Elevated concentrations of PCBs were detected in soil samples collected from up to 13 feet deep within the berms, suggesting PCB contamination could be present throughout the berm material.

Elevated concentrations of PCBs have also been detected in various soil stockpiles located on the eastern portion of the property.

The review of soil boring logs and test pit logs indicates that native soil materials were encountered beneath fill materials on average from 4 to 6 feet below ground surface across the Site (although specific fill depths observed in soil borings range from 2 to 10 feet). In the bermed areas, the same observation is made at the base of the berm (native material is encountered 4 to 6 feet below the base of the berm), but including the height of the berm, fill thicknesses are assumed to be up to 15 to 20 feet. Comparison of these geological observations with soil sample analytical results indicates a general pattern of the absence of PCBs in soil samples collected from materials described as native or materials not containing fill materials. This observation was used to assist with the estimation of soil volumes requiring excavation and off-site disposal.

It should be noted that the presence of PCBs in surficial soils at a concentration greater than 10 mg/kg would constitute an Imminent Hazard and 2-hour reporting condition if not for the presence of the chain link fence at the perimeter of the Site. It is critical that this barrier remain intact and effective to prevent access to the Site until such time that remedial actions are taken to limit potential exposure to PCB-impacted soils.

4.2 Extent of Metals Contamination

Concentrations of metals have been detected throughout the Site at concentrations that exceed their respective MCP Method 1 soil standards. However, only limited detections of lead, chromium, and mercury have been detected at concentrations exceeding the MCP UCLs. The elevated concentrations at these locations can likely be attributed to anthropogenic materials that became comingled with soils during historical Site operations.

4.3 Extent of SVOC/PAH Contamination

Concentrations of EPH and SVOCs have been detected throughout the Site above applicable MCP Method 1 S-1 Soil Standards in soil samples collected during TBA investigations. However, the concentrations detected do not exceed established MCP UCLs. The source of SVOCs and EPH at the Site can likely be attributed to smaller localized petroleum releases and/or anthropogenic materials that became comingled with soils during historical Site operations.

4.4 Data Gap Analysis

Based on review of historical site investigation reports and the results of recent TBA investigation activities, Nobis has identified data gaps that should be investigated during future investigation or remedial activities performed at the Site. A summary of these data gaps is presented in the sections that follow.

4.4.1 Concrete Slab PCB Sampling

PCBs may migrate into surrounding materials depending on a number of different environmental and chemical factors. Based on the concentrations of PCBs detected throughout the Site in surface and subsurface soils, Nobis recommends collecting concrete samples for PCB analysis from the slabs remaining on site. Any future redevelopment at the Site will likely require the removal and off-site disposal of the concrete slabs. If laboratory analytical results indicate that the slabs need to be managed as TSCA regulated waste, there may be significant cost implications associated with disposal of these materials. The remedial costs presented in Section 5.0 assume these slabs could be broken up and reused/disposed as uncontaminated construction debris.

4.4.2 Subsurface Drainage Structure Evaluation

The City of Lawrence is currently in the process of evaluating the subsurface drainage structures at the Site. The results of this evaluation should be used to identify outfall/discharge points to collect samples for PCB analysis. Historical sediment sampling in the Merrimack River suggests there is no adverse impact to the River from discharges originating from the Site's drainage system, however additional investigation is warranted to evaluate the fate and transport of contamination potentially leaving the Site through the drainage system or precipitation runoff events.

4.4.3 Additional PCB Delineation in Soil

Based on the projected costs of remedial actions presented Section 5.0, collection of additional soil samples for PCB analysis may be beneficial. Results from additional surface and subsurface soil sampling could be used to further refine the limits of areas requiring remediation and/or management, potentially reducing the volume of soil warranting excavation and off-site disposal. Targeted sampling at the perimeter of proposed excavation areas could help to delineate removal

areas more precisely, minimizing over-excavation of soils due to uncertainty because of the spatial distribution of soil samples.

5.0 ANALYSIS OF BROWNFIELD CLEANUP ALTERNATIVES

Based on the evaluation of soil analytical data, and geological observations made during the TBA, Nobis estimates that there is over 1,000,000 tons of contaminated soil present on the Site. Removal and off-site disposal, or even on-site treatment, of this soil to achieve contaminant levels that are suitable for unrestricted use is likely to cost hundreds of millions of dollars. Because of this exceptionally high cost, and the disruption to the community from excavating and transporting such a large volume of contaminated soil, complete excavation and off-site disposal of contaminated soils is not considered a feasible remedial alternative for the Site.

When excavation and off-site disposal of large volumes of contaminated soil is not practical or cost effective, capping of contaminated materials is often a viable remedial option. Capping is a remedial technology whereby contaminated soil would be left on site and covered with a physical barrier. The barrier typically consists of a geomembrane overlain by several feet of clean soil to establish separation between contaminated soils and the finished ground surface. The finished ground surface can be vegetated or paved, or covered by a permanent structure such as a building. The purpose of the barrier would be twofold: to prevent direct contact by humans with contaminated soils and to minimize the infiltration of precipitation through contaminated soils and reduce the potential to leach contamination into groundwater.

Considering the fact that soil contamination does not appear to have leached into groundwater at significant levels in the decades since contamination was originally released to the environment, the second objective of the cap is less critical at this site. Therefore, placement of a permeable cover would be recommended over placement of an impermeable cap. Placement of a permeable soil cover would prevent direct contact with contamination in soils and prevent contaminant migration via erosion or fugitive dust, but would permit rain water to pass through the cover and percolate through soil into the groundwater. This modification to the containment approach would save several hundred thousand dollars while still being protective of human health.

5.1 Excavation and Off-Site Disposal

EPA and MassDEP place strict limits on the concentrations of contaminants that are permitted to remain on-site, and be contained beneath a cap. Under TSCA, PCB-impacted soils beneath a cap in a “high occupancy” area must contain less than 10 mg/kg PCBs. If the capped area is within a “low occupancy” area, TSCA allows soils with up to 100 mg/kg PCBs to remain on site.

TSCA defines a high occupancy area as a site that is occupied by one or more individual for more than 6.7 hours per week. EPA may approve less restrictive requirements if the owner can demonstrate that alternative standards “will not pose an unreasonable risk of injury to health or the environment” (40 CFR 761.61[c][2]).

Under the MCP, site owners are discouraged from leaving soils with contaminants above Upper Concentration Limits (UCLs) in place, although a Permanent Solution can be achieved by leaving soils with UCL exceedances in place beneath an Engineered Barrier (e.g., cap), as long as a condition of No Significant Risk to public welfare and the environment can be demonstrated through a Method 3 risk assessment.

Under any remedial alternative, excavation and off-site disposal of contaminated soil is a significant cost driver; however, this is particularly the case where PCB contamination is present as the price per ton to dispose of soils contaminated with PCBs is typically several hundred dollars. Reducing the amount of soil requiring disposal (in other words, modifying the cleanup goal) will significantly lower the cost of remediation. To demonstrate the impact of disposal volumes on the cost of remediation, Nobis developed alternatives for three PCB cleanup goals, each with or without removal and off-site disposal of soils containing metals above UCLs.

5.2 Physical Containment Barrier

The construction details for the physical barrier overlying contaminated soils should consider the potential future use of the Site. Under TSCA, there is no distinction made between a cap and a permeable soil cover. A TSCA cap/cover with a vegetated surface is required to be comprised of at least 10 inches of compacted soil, whereas a concrete or asphalt cap/cover must have a minimum thickness of 6 inches. The cap must be designed to have sufficient strength to maintain its integrity during use of the surface, and the cap must be implemented alongside a perpetual deed restriction to prevent activities and uses that are incompatible with the objectives of the cap and might result in exposure to contaminants in the underlying soils. It is incumbent upon the owner of the site to maintain the integrity of the cap and establish a long-term maintenance and monitoring program to demonstrate the continued effectiveness of the cap.

The MassDEP requirements for a physical barrier are not as specific as TSCA. Typically, an Engineered Barrier (i.e. cap) is only required if soils exceeding UCLs are present on site and there

is no feasible alternative to treat or remove them, or if limited leachability of contaminants to groundwater can be demonstrated. If UCLs are not exceeded, and the threat of groundwater contamination from leaching is not significant, but contamination is left on site, then a soil cap without a low permeability layer may be considered.

The barrier systems proposed by Nobis meet the minimum requirements of TSCA and the MCP. As discussed above, a cap with low permeability is more robust and therefore costlier than a permeable soil cover system. Given the fact that significant leaching of contaminants into groundwater has not occurred over the years since the release of contamination to soil, a permeable soil cover system may be sufficient to protect human health and the environment. To demonstrate the cost impact of placing a soil cover instead of a low permeability cap, Nobis developed alternatives for each scenario (cap vs. cover) using each of the cleanup goals discussed in Section 5.1.

5.3 Institutional Controls

Any remedial strategy which involves in-place containment of contaminated soil would require placement of institutional controls (deed restrictions) on the property to ensure the integrity of the cap/soil cover for the long term and prevent exposure to contaminants left in place. Restrictions would likely include limits on subsurface excavation and any other activity that would compromise the integrity of the cover. The site owner would be obligated to inspect on a periodic basis and maintain the cover surface in perpetuity to ensure there is no damage that could potentially expose site occupants to the contamination contained beneath the cover. An Operations and Maintenance (O&M) Plan will be required to maintain the long-term effectiveness of the cover and institutional controls. The site owner will need to periodically provide certification to MassDEP that institutional and engineering controls are being employed as required by these plans.

O&M costs would be incurred to preserve the integrity of the cap/soil cover for the long-term, make repairs as needed based on normal wear and tear, and potentially replace the cover surface, depending upon the materials used to finish the ground surface. O&M costs are highly dependent upon the type of ground surface that is constructed, but are likely to be on the order of $10,000 to $20,000 per year.

5.4 Evaluation of Remedial Alternatives

To evaluate a range of potential remedial alternatives with varying degrees of excavation and off-site disposal, but with a cap/engineered barrier or soil cover to restrict potential exposure to contaminants, Nobis has developed cost estimates for several potential remedial scenarios. Each scenario involves excavation and off-site disposal of contaminated soil, placement of a physical barrier over contaminated soils to restrict direct exposure to contaminated soil, implementation of a deed restriction or AUL to restrict activities that might compromise the integrity of the cap/cover, and long-term maintenance and monitoring of the cap/cover to document its integrity and effectiveness. The scenarios offer potential combinations of the following three strategies:

- Target cleanup goal for soils contaminated with PCBs of 10 ppm, 50 ppm, or 100 ppm.
- Removal of soils containing metals above UCLs.
- Construction of a cap/Engineered Barrier or permeable soil cover.

The following is a tabular summary of the alternatives considered in this TBA Report.

Alternative	PCB Cleanup Goal	UCLs Removed	Soil Volume	Barrier
1A	10 mg/kg	Yes	75,000 CY	Cap
1B	10 mg/kg	Yes	75,000 CY	Cover
2A	50 mg/kg	Yes	10,000 CY	Cover
2B	50 mg/kg	No	9,000 CY	Cap
2C	50 mg/kg	No	9,000 CY	Cover
3A	100 mg/kg	Yes	4,000 CY	Cover
3B	100 mg/kg	No	2,000 CY	Cap
3C	100 mg/kg	No	2,000 CY	Cover

The following subsections provide a brief description of these alternatives with preliminary order-of-magnitude cost estimates for each alternative. The evaluation presented below assumes regulatory acceptance of the remedial approach and a Method 3 risk assessment demonstrating that the residual concentrations of contaminants left beneath the cap are protective of human health and the environment. Cost estimates do not include construction costs for redevelopment

of the property, only preparation of the property for redevelopment and establishment of institutional controls required to protect human health and the environment. Cost estimate details are provided in Appendix A.

5.4.1 Alternative 1: Off-Site Disposal of Soils with PCB>10 mg/kg

Under this alternative, all soils containing greater than 10 mg/kg PCBs, and soils containing metals above UCLs (these areas overlap), would be excavated and transported for off-site disposal. The remaining soils (including those present within the soil berms) would be reused on-site to establish lines and grades for the cap/cover.

Based on the evaluation of soil analytical data from the 2016 TBA and historical investigations, Nobis has developed an estimate of the quantity of soil containing PCBs above 10 mg/kg, or with metals exceeding UCLs. The approximate lateral extent of soils exceeding these limits is depicted on Figure 5-1, along with the assumed depths of fill within each area based on observations made during the advancement of soil borings. Based on the areas and depths shown on this figure, the estimated volume of soil requiring excavation and off-site disposal under this alternative would be 75,000 cubic yards (CY).

Soils remaining on site after removal would be regraded across the Site to eliminate the berms along the northern and eastern property boundaries, to facilitate construction of the cap/cover and provide a more desirable grade for redevelopment of the property. The extent of the cap/cover would include the entire property. For budgeting purposes, Nobis assumed the cap/cover would be finished with a combination of grass and asphalt pavement. The proportion of vegetated to paved surfaces will vary based on the ultimate redevelopment plan, but a 2:1 ratio of vegetated to paved surface was assumed for cost estimating purposes. Construction of building foundations could be incorporated into the cap/cover design or accomplished after the fact with proper engineering controls to prevent exposure to contaminants by construction workers.

Two different containment options were evaluated for this alternative. The volume of soil removed for off-site disposal would be identical for each alternative. The only difference between the two would be the composition of the physical barrier placed over the contaminated soils.

- Alternative 1A: A cap/engineered barrier consisting of 3 feet of soil and a flexible membrane liner (FML) would be constructed over the entire site to prevent direct exposure to contaminated soil. The cap would have low permeability and minimize the infiltration of precipitation into groundwater. Drainage features would need to be incorporated into the design of the cap to manage storm water on the capped area. The cap would be finished with either grass or asphalt.

- Alternative 1B: A soil cover consisting of 2 feet of soil overlying a geofabric. The purpose of the geofabric would be to provide separation between the contaminated soils and clean cover materials, while serving as a warning layer for future excavation that the limits of the cover have been reached. The soil cover and geofabric would not contain a low permeability layer, and would provide no restriction to the movement of water through the cover into the underlying soils and groundwater. The cover would be finished with either grass or asphalt.

Each alternative would require the placement of a deed restriction/AUL on the property to restrict activities and uses that might damage the cap/cover. Each alternative would also require the City to monitor and maintain the physical barrier in perpetuity to ensure and document its integrity and effectiveness.

The estimated capital cost of Alternative 1A would be $45,000,000 to $70,000,000. Annual O&M costs for Alternative 1A would be $20,000 to $25,000.

The estimated capital cost of Alternative 1B would be $45,000,000 to $65,000,000. Annual O&M costs for Alternative 1B would be $10,000 to $15,000.

5.4.2 Alternative 2: Off-Site Disposal of Soils with PCB>50 mg/kg

Under this alternative, all soils containing greater than 50 mg/kg PCBs, and soils containing metals above UCLs, would be excavated and transported for off-site disposal (Alternative 2A). Alternatives 2B and 2C were developed to evaluate remedial scenarios whereby only soils containing PCBs greater than 50 mg/kg are removed from the Site. Under each scenario, the soils remaining after removal (including those present within the soil berms) would be reused on-site to establish lines and grades for the cap/cover.

Based on the evaluation of soil analytical data from the 2016 TBA and historical investigations, Nobis has developed an estimate of the quantity of soil containing PCBs above 50 mg/kg, and an estimate of the quantity of soil containing metals above UCLs. The approximate lateral extent of soil exceeding these limits is depicted on Figure 5-2A (PCBs>50 mg/kg and UCLs) and Figure 5-2B (PCBs>50 mg/kg), along with the assumed depths of fill within each area based on observations made during the advancement of soil borings. Based on the areas and depths shown on this figure, the estimated volume of soil requiring excavation and off-site disposal under Alternative 2A would be 10,000 CY, and under Alternatives 2B and 2C would be 9,000 CY.

Similar to Alternative 1, soils remaining on site after removal would be regraded across the Site to eliminate the berms along the northern and eastern property boundaries, to facilitate construction of the cap/cover and provide a more desirable grade for redevelopment of the property. The extent of the cap/cover would include the entire property. For budgeting purposes, Nobis assumed the cap/cover would be finished with a combination of grass and asphalt pavement. The proportion of vegetated to paved surfaces will vary based on the ultimate redevelopment plan, but a 2:1 ratio of vegetated to paved surface was assumed for cost estimating purposes. Construction of building foundations could be incorporated into the cap/cover design or accomplished after the fact with proper engineering controls to prevent exposure to contaminants by construction workers.

Three different containment options were evaluated for this alternative. Alternatives 2A and 2C would include a soil cover as described in Alternative 1B, whereas Alternative 2B would include a cap/engineered barrier as described in Alternative 1A. The volume of soil removed for off-site disposal would be the same for Alternatives 2B and 2C, with a slightly larger volume of soil removal for Alternative 2A.

As above, each alternative would require the placement of a deed restriction/AUL on the property to restrict activities and uses that might damage the cap/cover. Each alternative would also require the City to monitor and maintain the physical barrier in-perpetuity to ensure and document its integrity and effectiveness.

The estimated capital cost of Alternative 2A would be $7,500,000 to $11,000,000. Annual O&M costs for Alternative 2A would be $10,000 to $15,000.

The estimated capital cost of Alternative 2B would be $9,000,000 to $13,000,000. Annual O&M costs for Alternative 2B would be $20,000 to $25,000.

The estimated capital cost of Alternative 2C would be $7,000,000 to $10,000,000. Annual O&M costs for Alternative 2C would be $10,000 to $15,000.

5.4.3 Alternative 3: Off-Site Disposal of Soils with PCB>100 mg/kg

Alternatives 3A, 3B, and 3C are identical to Alternatives 2A, 2B, and 2C except that the cleanup goal for PCBs is increased to 100 mg/kg. This result is a much smaller volume of soil requiring excavation, management, and off-site disposal, and therefore a lower remedial cost estimate.

As above, Nobis developed an estimate of the quantity of soil containing PCBs above 100 mg/kg, and an estimate of the quantity of soil containing metals above UCLs. The approximate lateral extent of soil exceeding these limits is depicted on Figure 5-3A (PCBs>100 mg/kg and UCLs) and Figure 5-3B (PCBs>100 mg/kg). Based on the areas and depths shown on this figure, the estimated volume of soil requiring excavation and off-site disposal under Alternative 3A would be 4,000 CY, and under Alternatives 3B and 3C would be 3,000 CY.

The estimated capital cost of Alternative 3A would be $4,000,000 to $6,000,000. Annual O&M costs for Alternative 3A would be $10,000 to $15,000.

The estimated capital cost of Alternative 3B would be $4,500,000 to $7,000,000. Annual O&M costs for Alternative 3B would be $20,000 to $25,000.

The estimated capital cost of Alternative 3C would be $3,000,000 to $4,500,000. Annual O&M costs for Alternative 3C would be $10,000 to $15,000.

Table 5-1 provides a summary of the capital and O&M costs for these alternatives. O&M costs are estimated for Year 1 and would increase with inflation over time. Note that these estimates do not include any additional investigation and/or risk assessment costs associated with establishing cleanup goals and remedial strategies.

6.0 SUMMARY AND CONCLUSIONS

The following is a summary of the information and conclusions presented in this TBA Report:

- The Site is located in a mixed-use (commercial, residential, and industrial) area of Lawrence, Massachusetts. Historical uses of the Site have included a burn dump/landfill and a scrap metal recycling facility. The southern portion of the Site has historically been used as a soap manufacturing facility and a community landfill. The most recent use of the Site was as a metals recycling facility (John C. Tombarello & Sons and American Recycling of Massachusetts, Inc.), which operated until 2001. Since 2001, the Site has been unoccupied and unused, with the exception of a truck driving school which operated on the Site for a short time in 2006.

- An earthen berm ranging from approximately 10 to 20 feet high is present along the eastern and southern property boundaries. This berm was reportedly formed by pushing shallow soils from the Site toward the property boundaries. Several stockpiles of soil are present throughout the Site. Nobis performed field measurements of the berm and stockpiles, and estimates that there is approximately 28,000 cubic yards of soil present above grade throughout the Site.

- The Site is abutted to the east by Route 495; to the south by an automobile dealership (formerly a waste recycling facility); to the west by Marston Street, beyond which lies the Parthum Elementary and Middle School; and to the north by residential properties. Under the MCP, soils at the Site are classified as S-1. Groundwater categories S-1/GW-2 and S-1/GW-3 apply to the Site.

- Results of environmental investigations have identified surface soil, subsurface soil, and soil stockpiles that are impacted by contaminants including PCBs, metals, and SVOCs/EPH. Concentrations of contaminants detected at the Site exceed applicable MCP Method 1 risk assessment standards and UCLs, as well as TSCA cleanup goals for high- and low-occupancy areas.

- The presence of PCBs in surficial soils at a concentration greater than 10 mg/kg would constitute an Imminent Hazard and 2-hour reporting condition if not for the presence of

the chain link fence at the perimeter of the Site. It is critical that this barrier remain intact and effective to prevent access to the Site until such time that remedial actions are taken to limit potential exposure to PCB-impacted soils.

- A limited number of detections of lead, chromium, and mercury have been detected at concentrations exceeding the MCP UCLs. The concentrations of SVOCs/EPH detected at the Site do not exceed established MCP UCLs.

- Limited removal efforts have been conducted previously to address elevated concentrations of PCBs and oil in soil. An on-site contaminated soil consolidation cell was established to temporarily store these materials until a comprehensive remedial action could be implemented.

- Due to the large volume of contaminated soil on the Site, cleanup to levels suitable for unrestricted use is not practical, therefore the optimal remediation strategy will involve the excavation and off-site disposal of a limited volume of soil, re-grading of the Site, capping or covering of contaminated soils, and placement of a deed restriction on the property.

- A range of potential remedial alternatives was evaluated to provide order-of-magnitude costs for site cleanup and analyze the cost impacts of several soil cleanup standards two different containment options. The least expensive remedial alternative includes cleanup of soils containing PCBs above 100 mg/kg, re-grading of contaminated soils, and placement of a permeable soil cover to prevent direct contact with contaminated soils. Additional risk assessment work, and collaboration with state and federal regulators, will be required to gain acceptance of this remedial approach by all stakeholders.

After review of environmental data available for the Site, Nobis identified the following data gaps. Nobis recommends additional investigations to address these data gaps, which will help to refine the remedial cost estimates provided in this TBA Report.

- Based on the concentrations of PCBs detected throughout the Site in surface and subsurface soils, samples should be collected from the concrete slabs located throughout the Site for PCB analysis to determine the proper off-site reuse/disposal options for this material.

- The results of the City's on-site drainage structure evaluation should be used identify outfall/discharge points to collect samples for PCB analysis to determine the potential for contamination to migrate off-site via drainage structures or surface runoff features.

- Based on the remedial cost estimates presented in Section 5.0, additional PCB soil sampling at the Site may be useful to refine the horizontal and vertical limits of proposed remediation areas. Additional soil analytical data may result in a reduction in the volume of soil requiring excavation and off-site disposal, as the current volume estimates are limited by the spatial distribution of sampling data and assumptions regarding the level of contamination between sampling points.

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TABLES

Table 2-1
Monitoring Well Construction Details and Groundwater Elevations
Former Tombarello Property
Lawrence, Massachusetts

Well ID	Screen Depth (ft. bgs)	Measuring Point	MP Elevation	Depth to Bottom	Depth to Water	Groundwater Elevation
MW-1 Weston	3-13	PVC	35.21	13.10	9.15	26.06
MW-08	3-13	Lip of Roadbox	35.74	12.55	11.25	24.49
MW-09	3-13	Lip of Roadbox	35.62	12.85	12.11	23.51
MW-10	2-12	Lip of Roadbox	35.62	14.30	DRY	--
MW-11	3-13	Lip of Roadbox	33.39	12.51	9.86	23.53
MW-12	3-13	Lip of Roadbox	33.37	12.02	8.11	25.26
MW-13	3-13	Lip of Roadbox	33.09	12.55	7.14	25.95
MW-14	3-13	Lip of Roadbox	38.22	--	DRY	--
MW-15	3-13	Lip of Roadbox	35.27	12.84	7.25	28.02
MW-16	5-15	Lip of Roadbox	33.98	14.55	10.73	23.25

Notes:

1. Synoptic gauging performed June 17, 2016
2. Monitoring well and groundwater elevations are based on survey data collected on June 16, 2016 and using an assumed bench mark of 100 feet.

bgs = below grade surface

Table 3-1
Summary of TBA PCB Analytical Results
Former Tombarello Property
Lawrence, Massachusetts

Sample Location		BPA-01		BPA-02			CD-34		CD-34E		CD-34N		CD-34S			CD-34W		CD-45		CD-45E		CD-45S		
Sample Depth (ft)		1 - 2	2 - 3	1 - 2	2 - 3	6 - 7	3 - 4	7 - 8	0 - 1	1 - 3	0 - 1	1 - 3	0 - 1	1 - 3		0 - 1	1 - 3	3 - 4	7 - 8	0 - 1	1 - 3	0 - 1	1 - 3	
Sample Date		06/07/16	06/07/16	06/07/16	06/07/16	06/07/16	06/06/16	06/06/16	06/06/16	06/06/16	06/06/16	06/06/16	06/06/16	06/06/16		06/06/16	06/06/16	06/06/16	06/06/16	06/06/16	06/06/16	06/06/16	06/06/16	
QC Identifier														FD	FD								FD	FD
Pesticides/PCBs	**Units**																							
Aroclor 1016	mg/kg	0.035 UJ	0.72 U	0.74 U	0.36 U	0.042 UJ	3.9 U	0.043 UJ	35 U	18 U	0.70 U	0.037 U	0.35 U	0.037 U	0.037 U	0.34 U	0.37 U	0.46 U	0.044 R	3.8 U	3.7 U	0.034 UJ	0.37 U	0.037 U
Aroclor 1221	mg/kg	0.035 UJ	0.72 U	0.74 U	0.36 U	0.042 UJ	3.9 U	0.043 UJ	35 U	18 U	0.70 U	0.037 U	0.35 U	0.037 U	0.037 U	0.34 U	0.37 U	0.46 U	0.044 U	3.8 U	3.7 U	0.034 UJ	0.37 U	0.037 U
Aroclor 1232	mg/kg	0.035 UJ	0.72 U	0.74 U	0.36 U	0.042 UJ	3.9 U	0.043 UJ	35 U	18 U	0.70 U	0.037 U	0.35 U	0.037 U	0.037 U	0.34 U	0.37 U	0.46 U	0.044 U	3.8 U	3.7 U	0.034 UJ	0.37 U	0.037 U
Aroclor 1242	mg/kg	0.035 UJ	0.72 U	0.74 U	0.36 U	0.042 UJ	3.9 U	0.043 UJ	35 U	18 U	0.70 U	0.037 U	0.35 U	0.037 U	0.037 U	0.34 U	0.37 U	0.46 U	0.044 U	3.8 U	3.7 U	0.034 UJ	0.37 U	0.037 U
Aroclor 1248	mg/kg	0.035 UJ	0.72 U	0.74 U	0.36 U	0.042 UJ	3.9 U	0.043 UJ	35 U	18 U	0.70 U	0.037 U	0.35 U	0.037 U	0.037 U	0.34 U	0.37 U	0.46 U	0.044 U	3.8 U	3.7 U	0.034 UJ	0.37 U	0.037 U
Aroclor 1254	mg/kg	0.035 UJ	0.72 U	0.74 U	0.36 U	0.042 UJ	3.9 U	0.043 UJ	35 U	18 U	0.70 U	0.037 U	0.35 U	0.037 U	0.037 U	0.34 U	0.37 U	0.46 U	0.044 U	3.8 U	3.7 U	0.034 UJ	0.37 U	0.037 U
Aroclor 1260	mg/kg	**0.064 J-**	**9.7**	**5.0**	**1.2**	0.042 UJ	**22**	**0.028 J**	**220**	**24**	**6.0**	0.037 U	**4.3**	0.037 U	0.037 U	**4.7**	**0.430 J**	**5.8**	0.044 U	**39**	**17**	0.034 UJ	**3.1 J**	0.037 UJ
Aroclor 1262	mg/kg	0.035 UJ	0.72 U	0.74 U	0.36 U	0.042 UJ	3.9 U	0.043 UJ	35 U	18 U	0.70 U	0.037 U	0.35 U	0.037 U	0.037 U	0.34 U	0.37 U	0.46 U	0.044 U	3.8 U	3.7 U	0.034 UJ	0.37 U	0.037 U
Aroclor 1268	mg/kg	0.035 UJ	0.72 U	0.74 U	0.36 U	0.042 UJ	3.9 U	0.043 UJ	35 U	18 U	0.70 U	0.037 U	0.35 U	0.037 U	0.037 U	0.34 U	0.37 U	0.46 U	0.044 U	3.8 U	3.7 U	0.034 UJ	0.37 U	0.037 U
Aroclor, Total	mg/kg	**0.064 J-**	**9.7**	**5.0**	**1.2**	0.042 UJ	**22**	**0.028 J**	**220**	**24**	**6.0**	0.037 U	**4.3**	0.037 U	0.037 U	**4.7**	**0.430 J**	**5.8**	0.044 U	**39**	**17**	0.034 UJ	**3.1 J**	0.037 UJ

Red: >100 ppm; Orange: >50 ppm; Yellow: >10 ppm; Green: >1 ppm; Bold - Detected; U - Not Detected;
J - Estimated; NA - Not Analyzed

Table 3-1
Summary of TBA PCB Analytical Results
Former Tombarello Property
Lawrence, Massachusetts

Sample Location		CD-45W		D-5			D-5E		D-5N		FB-01			FB-02		FB-03		FB-04				FG-34	
Sample Depth (ft)		0 - 1	1 - 3	0 - 2	2 - 3	6 - 7	0 - 1	1 - 3	0 - 1	1 - 3	1 - 2	2 - 3	5 - 7	1 - 2	2 - 3	1 - 2	2 - 3	1 - 2	2 - 3	5 - 7		0 - 1	1 - 3
Sample Date		06/06/16	06/06/16	06/06/16	06/06/16	06/06/16	06/06/16	06/06/16	06/06/16	06/06/16	06/06/16	06/06/16	06/06/16	06/07/16	06/07/16	06/06/16	06/06/16	06/06/16	06/06/16	06/06/16		06/07/16	06/07/16
QC Identifier																				FD	FD		
Pesticides/PCBs	**Units**																						
Aroclor 1016	mg/kg	3.5 U	0.036 U	0.19 U	3.7 U	0.043 U	1.8 U	0.037 UJ	0.36 U	0.074 U	0.035 U	0.039 U	0.043 UJ	0.18 U	0.037 UJ	0.038 U	0.035 UJ	0.035 U	0.037 UJ	0.041 U	0.042 U	7.5 U	0.21 U
Aroclor 1221	mg/kg	3.5 U	0.036 U	0.19 U	3.7 U	0.043 U	1.8 U	0.037 UJ	0.36 U	0.074 U	0.035 U	0.039 U	0.043 UJ	0.18 U	0.037 UJ	0.038 U	0.035 UJ	0.035 U	0.037 UJ	0.041 U	0.042 U	7.5 U	0.21 U
Aroclor 1232	mg/kg	3.5 U	0.036 U	0.19 U	3.7 U	0.043 U	1.8 U	0.037 UJ	0.36 U	0.074 U	0.035 U	0.039 U	0.043 UJ	0.18 U	0.037 UJ	0.038 U	0.035 UJ	0.035 U	0.037 UJ	0.041 U	0.042 U	7.5 U	0.21 U
Aroclor 1242	mg/kg	3.5 U	0.036 U	0.19 U	3.7 U	0.043 U	1.8 U	0.037 UJ	0.36 U	0.074 U	0.035 U	0.039 U	0.043 UJ	0.18 U	0.037 UJ	0.038 U	0.035 UJ	0.035 U	0.037 UJ	0.041 U	0.042 U	7.5 U	0.21 U
Aroclor 1248	mg/kg	3.5 U	0.036 U	0.19 U	3.7 U	0.043 U	1.8 U	0.037 UJ	0.36 U	0.074 U	0.035 U	0.039 U	0.043 UJ	0.18 U	0.037 UJ	0.038 U	0.035 UJ	0.035 U	0.037 UJ	0.041 U	0.042 U	7.5 U	0.21 U
Aroclor 1254	mg/kg	3.5 U	0.036 U	0.19 U	3.7 U	0.043 U	1.8 U	0.037 UJ	0.36 U	0.074 U	0.035 U	0.039 U	0.043 UJ	0.18 U	0.037 UJ	0.038 U	0.035 UJ	0.035 U	0.037 UJ	0.041 U	0.042 U	7.5 U	0.21 U
Aroclor 1260	mg/kg	**16**	0.036 U	**1.4**	**22**	0.043 U	**14**	0.037 UJ	**1.8**	**0.63**	0.035 U	**0.073**	0.043 UJ	**1.5 J**	**0.31 J-**	0.038 U	**0.033 J**	0.035 U	**0.11 J**	0.041 U	0.042 U	**67**	**1.5**
Aroclor 1262	mg/kg	3.5 U	0.036 U	0.19 U	3.7 U	0.043 U	1.8 U	0.037 UJ	0.36 U	0.074 U	0.035 U	0.039 U	0.043 UJ	0.18 U	0.037 UJ	0.038 U	0.035 UJ	0.035 U	0.037 UJ	0.041 U	0.042 U	7.5 U	0.21 U
Aroclor 1268	mg/kg	3.5 U	0.036 U	0.19 U	3.7 U	0.043 U	1.8 U	0.037 UJ	0.36 U	0.074 U	0.035 U	0.039 U	0.043 UJ	0.18 U	0.037 UJ	0.038 U	0.035 UJ	0.035 U	0.037 UJ	0.041 U	0.042 U	7.5 U	0.21 U
Aroclor, Total	mg/kg	**16**	0.036 U	**1.4**	**22**	0.043 U	**14**	0.037 UJ	**1.8**	**0.63**	0.035 U	**0.073**	0.043 UJ	**1.5 J**	**0.31 J-**	0.038 U	**0.033 J**	0.035 U	**0.11 J**	0.041 U	0.042 U	**67**	**1.5**

Red: >100 ppm; Orange: >50 ppm; Yellow: >10 ppm; Green: >1 ppm; Bold - Detected; U - Not Detected;
J - Estimated; NA - Not Analyzed

Table 3-1
Summary of TBA PCB Analytical Results
Former Tombarello Property
Lawrence, Massachusetts

Sample Location		FG-34N		FG-34S		FG-34W		FG-45E			FG-45N		FG-45S			FG-45W		G-3			G-3E		G-3N	
Sample Depth (ft)		0 - 1	1 - 3	0 - 1	1 - 3	0 - 1	1 - 3	0 - 1		1 - 3	0 - 1	1 - 3	0 - 1	1 - 3		0 - 1	1 - 3	1 - 2	2 - 3	5 - 6	0 - 2	2 - 3	0 - 1	2 - 3
Sample Date		06/07/16	06/07/16	06/07/16	06/07/16	06/07/16	06/07/16	06/08/16		06/08/16	06/08/16	06/08/16	06/08/16	06/08/16		06/08/16	06/08/16	06/07/16	06/07/16	06/07/16	06/07/16	06/07/16	06/07/16	06/07/16
QC Identifier								FD	FD					FD	FD									
Pesticides/PCBs	**Units**																							
Aroclor 1016	mg/kg	1.8 U	2.0 U	1.8 U	0.041 U	0.38 U	0.39 U	1.8 U	0.71 U	0.040 U	1.8 U	0.042 U	0.37 U	0.040 U	0.040 U	1.8 U	0.040 U	0.45 U	0.22 U	0.041 U	0.037 UJ	0.073 U	3.8 U	0.76 U
Aroclor 1221	mg/kg	1.8 U	2.0 U	1.8 U	0.041 U	0.38 U	0.39 U	1.8 U	0.71 U	0.040 U	1.8 U	0.042 U	0.37 U	0.040 U	0.040 U	1.8 U	0.040 U	0.45 U	0.22 U	0.041 U	0.037 UJ	0.073 U	3.8 U	0.76 U
Aroclor 1232	mg/kg	1.8 U	2.0 U	1.8 U	0.041 U	0.38 U	0.39 U	1.8 U	0.71 U	0.040 U	1.8 U	0.042 U	0.37 U	0.040 U	0.040 U	1.8 U	0.040 U	0.45 U	0.22 U	0.041 U	0.037 UJ	0.073 U	3.8 U	0.76 U
Aroclor 1242	mg/kg	1.8 U	2.0 U	1.8 U	0.041 U	0.38 U	0.39 U	1.8 U	0.71 U	0.040 U	1.8 U	0.042 U	0.37 U	0.040 U	0.040 U	1.8 U	0.040 U	0.45 U	0.22 U	0.041 U	0.037 UJ	0.073 U	3.8 U	0.76 U
Aroclor 1248	mg/kg	1.8 U	2.0 U	1.8 U	0.041 U	0.38 U	0.39 U	1.8 U	0.71 U	0.040 U	1.8 U	0.042 U	0.37 U	0.040 U	0.040 U	1.8 U	0.040 U	**2.6**	**1.9**	0.041 U	0.037 UJ	0.073 U	3.8 U	0.76 U
Aroclor 1254	mg/kg	1.8 U	2.0 U	1.8 U	0.041 U	0.38 U	0.39 U	1.8 U	0.71 U	0.040 U	1.8 U	0.042 U	0.37 U	0.040 U	0.040 U	1.8 U	0.040 U	0.45 U	0.22 U	0.041 U	0.037 UJ	0.073 U	3.8 U	0.76 U
Aroclor 1260	mg/kg	**13**	**20**	**24**	**0.22**	**3.2**	**3.7**	**15 J**	**8.5 J**	0.040 U	**25**	0.042 U	**1.4**	**0.18**	**0.19**	**4.6**	**0.32**	0.45 U	0.22 U	0.041 U	**0.55 J-**	**0.86**	**51**	**4.9**
Aroclor 1262	mg/kg	1.8 U	2.0 U	1.8 U	0.041 U	0.38 U	0.39 U	1.8 U	0.71 U	0.040 U	1.8 U	0.042 U	0.37 U	0.040 U	0.040 U	1.8 U	0.040 U	0.45 U	0.22 U	0.041 U	0.037 UJ	0.073 U	3.8 U	0.76 U
Aroclor 1268	mg/kg	1.8 U	2.0 U	1.8 U	0.041 U	0.38 U	0.39 U	1.8 U	0.71 U	0.040 U	1.8 U	0.042 U	0.37 U	0.040 U	0.040 U	1.8 U	0.040 U	0.45 U	0.22 U	0.041 U	0.037 UJ	0.073 U	3.8 U	0.76 U
Aroclor, Total	mg/kg	**13**	**20**	**24**	**0.22**	**3.2**	**3.7**	**15 J**	**8.5 J**	0.040 U	**25**	0.042 U	**1.4**	**0.18**	**0.19**	**4.6**	**0.32**	**2.6**	**1.9**	0.041 U	**0.55 J-**	**0.86**	**51**	**4.9**

Red: >100 ppm; Orange: >50 ppm; Yellow: >10 ppm; Green: >1 ppm; Bold - Detected; U - Not Detected;
J - Estimated; NA - Not Analyzed

Table 3-1
Summary of TBA PCB Analytical Results
Former Tombarello Property
Lawrence, Massachusetts

Sample Location		G-3S		G-3W		HA-01		HA-02	HA-03	HA-04	HA-05	HA-06	HA-07		HA-08	HA-09	HA-10	HA-11	HA-12	LS-01		LS-02	
Sample Depth (ft)		0 - 1	2 - 3	0 - 1	2 - 3	0 - 1		0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1		0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	1 - 3	7 - 8	1 - 2	2 - 3
Sample Date		06/07/16	06/07/16	06/07/16	06/07/16	06/09/16		06/09/16	06/09/16	06/09/16	06/09/16	06/09/16	06/09/16		06/09/16	06/09/16	06/09/16	06/09/16	06/09/16	06/09/16	06/09/16	06/09/16	06/09/16
QC Identifier						FD	FD						FD	FD									
Pesticides/PCBs	**Units**																						
Aroclor 1016	mg/kg	3.9 U	0.043 U	0.76 U	0.042 U	0.19 U	0.75 U	180 U	1.8 U	0.72 U	0.72 U	0.74 U	0.76 U	0.76 U	0.71 U	0.75 U	0.72 U	18 U	18 U	0.035 U	0.042 U	0.035 U	0.043 UJ
Aroclor 1221	mg/kg	3.9 U	0.043 U	0.76 U	0.042 U	0.19 U	0.75 U	180 U	1.8 U	0.72 U	0.72 U	0.74 U	0.76 U	0.76 U	0.71 U	0.75 U	0.72 U	18 U	18 U	0.035 U	0.042 U	0.035 U	0.043 UJ
Aroclor 1232	mg/kg	3.9 U	0.043 U	0.76 U	0.042 U	0.19 U	0.75 U	180 U	1.8 U	0.72 U	0.72 U	0.74 U	0.76 U	0.76 U	0.71 U	0.75 U	0.72 U	18 U	18 U	0.035 U	0.042 U	0.035 U	0.043 UJ
Aroclor 1242	mg/kg	3.9 U	0.043 U	0.76 U	0.042 U	0.19 U	0.75 U	180 U	1.8 U	0.72 U	0.72 U	0.74 U	0.76 U	0.76 U	0.71 U	0.75 U	0.72 U	18 U	18 U	0.035 U	0.042 U	0.035 U	0.043 UJ
Aroclor 1248	mg/kg	**22**	0.043 U	0.76 U	0.042 U	0.19 U	0.75 U	180 U	**18**	**1.3**	**1.3**	**2.9**	**2.9**	**3.2**	**1.2**	0.75 U	0.72 U	18 U	18 U	**0.089**	0.042 U	**0.13**	0.043 UJ
Aroclor 1254	mg/kg	3.9 U	0.043 U	0.76 U	0.042 U	0.19 U	0.75 U	180 U	1.8 U	0.72 U	0.72 U	0.74 U	0.76 U	0.76 U	0.71 U	0.75 U	0.72 U	18 U	18 U	0.035 U	0.042 U	0.035 U	0.043 UJ
Aroclor 1260	mg/kg	**20**	0.043 U	**7.9**	**0.19**	**0.88**	**0.89**	**890**	**20**	**9.3**	**6.5**	**8.4**	**10**	**10**	**4.7**	**4.2**	**6.7**	**70**	**85**	**0.32**	0.042 R	**0.40**	0.043 UJ
Aroclor 1262	mg/kg	3.9 U	0.043 U	0.76 U	0.042 U	0.19 U	0.75 U	180 U	1.8 U	0.72 U	0.72 U	0.74 U	0.76 U	0.76 U	0.71 U	0.75 U	0.72 U	18 U	18 U	0.035 U	0.042 U	0.035 U	0.043 UJ
Aroclor 1268	mg/kg	3.9 U	0.043 U	0.76 U	0.042 U	0.19 U	0.75 U	180 U	1.8 U	0.72 U	0.72 U	0.74 U	0.76 U	0.76 U	0.71 U	0.75 U	0.72 U	18 U	18 U	0.035 U	0.042 U	0.035 U	0.043 UJ
Aroclor, Total	mg/kg	**42**	0.043 U	**7.9**	**0.19**	**0.88**	**0.89**	**890**	**38**	**10.6**	**7.8**	**11.3**	**12.9**	**13.2**	**5.9**	**4.2**	**6.7**	**70**	**85**	**0.409**	0.042 U	**0.53**	0.043 UJ

Red: >100 ppm; Orange: >50 ppm; Yellow: >10 ppm; Green: >1 ppm; Bold - Detected; U - Not Detected;
J - Estimated; NA - Not Analyzed

Table 3-1
Summary of TBA PCB Analytical Results
Former Tombarello Property
Lawrence, Massachusetts

Sample Location		M-4		M-4E		M-4N		M-4S	M-4W	M-7			M-7E		M-7S		M-7W		MS-01		MS-02		MS-03	
Sample Depth (ft)		2 - 3	12 - 13	0 - 1	1 - 3	0 - 1	1 - 3	1 - 3	1 - 3	1 - 2	2 - 3	6 - 7	0 - 1	1 - 3	0 - 1	1 - 3	0 - 1	1 - 3	1 - 2	2 - 3	1 - 2	2 - 3	1 - 2	2 - 3
Sample Date		06/09/16	06/09/16	06/09/16	06/09/16	06/09/16	06/09/16	06/09/16	06/09/16	06/07/16	06/07/16	06/07/16	06/07/16	06/07/16	06/07/16	06/07/16	06/07/16	06/07/16	06/10/16	06/10/16	06/10/16	06/10/16	06/10/16	06/10/16
QC Identifier																								
Pesticides/PCBs	**Units**																							
Aroclor 1016	mg/kg	0.045 UJ	0.042 U	740 U	740 U	0.037 UJ	1.8 U	0.86 U	0.041 U	0.036 UJ	0.042 U	0.042 UJ	3.9 U	2.1 U	20 U	0.037 U	0.73 U	0.044 U	0.033 U	0.038 U	6.9 U	0.36 U	0.035 U	0.036 U
Aroclor 1221	mg/kg	0.045 UJ	0.042 U	740 U	740 U	0.037 UJ	1.8 U	0.86 U	0.041 U	0.036 UJ	0.042 U	0.042 UJ	3.9 U	2.1 U	20 U	0.037 U	0.73 U	0.044 U	0.033 U	0.038 U	6.9 U	0.36 U	0.035 U	0.036 U
Aroclor 1232	mg/kg	0.045 UJ	0.042 U	740 U	740 U	0.037 UJ	1.8 U	0.86 U	0.041 U	0.036 UJ	0.042 U	0.042 UJ	3.9 U	2.1 U	20 U	0.037 U	0.73 U	0.044 U	0.033 U	0.038 U	6.9 U	0.36 U	0.035 U	0.036 U
Aroclor 1242	mg/kg	0.045 UJ	0.042 U	740 U	740 U	0.037 UJ	1.8 U	0.86 U	0.041 U	0.036 UJ	0.042 U	0.042 UJ	3.9 U	2.1 U	20 U	0.037 U	0.73 U	0.044 U	0.033 U	0.038 U	6.9 U	0.36 U	0.035 U	0.036 U
Aroclor 1248	mg/kg	0.045 UJ	0.042 U	740 U	740 U	**0.38 J**	**5.3**	0.86 U	**0.25 J+**	**0.11 J-**	0.042 U	0.042 UJ	3.9 U	2.1 U	20 U	0.037 U	0.73 U	0.044 U	**0.029 J**	**0.23**	**13**	**1.3**	**0.23**	**0.34**
Aroclor 1254	mg/kg	0.045 UJ	0.042 U	740 U	740 U	0.037 UJ	1.8 U	0.86 U	0.041 U	0.036 UJ	0.042 U	0.042 UJ	3.9 U	2.1 U	20 U	0.037 U	0.73 U	0.044 U	0.033 U	0.038 U	6.9 U	0.36 U	0.035 U	0.036 U
Aroclor 1260	mg/kg	**0.054 J**	0.042 U	740 U	740 U	**0.13 J**	**15**	**8.2**	**0.60 J+**	0.036 UJ	0.042 U	0.042 UJ	**28**	**23**	**110**	**3.5**	**3.9**	**0.31**	**0.038**	**0.074**	**3.4 J**	**3.3**	**0.092**	**0.12**
Aroclor 1262	mg/kg	0.045 UJ	0.042 U	740 U	740 U	0.037 UJ	1.8 U	0.86 U	0.041 U	0.036 UJ	0.042 U	0.042 UJ	3.9 U	2.1 U	20 U	0.037 U	0.73 U	0.044 U	0.033 U	0.038 U	6.9 U	0.36 U	0.035 U	0.036 U
Aroclor 1268	mg/kg	0.045 UJ	0.042 U	740 U	740 U	0.037 UJ	1.8 U	0.86 U	0.041 U	0.036 UJ	0.042 U	0.042 UJ	3.9 U	2.1 U	20 U	0.037 U	0.73 U	0.044 U	0.033 U	0.038 U	6.9 U	0.36 U	0.035 U	0.036 U
Aroclor, Total	mg/kg	**0.054 J**	0.042 U	740 U	740 U	**0.51 J**	**20.3**	**8.2**	**0.85 J**	**0.11 J-**	0.042 U	0.042 UJ	**28**	**23**	**110**	**3.5**	**3.9**	**0.31**	**0.067 J**	**0.304**	**16.4 J**	**4.6**	**0.322**	**0.46**

Red: >100 ppm; Orange: >50 ppm; Yellow: >10 ppm; Green: >1 ppm; Bold - Detected; U - Not Detected;
J - Estimated; NA - Not Analyzed

Table 3-1
Summary of TBA PCB Analytical Results
Former Tombarello Property
Lawrence, Massachusetts

Sample Location		NPA-01		NPA-02		NPA-03		NPA-04		NPA-05		NPA-06		NPA-07		P-13			P-13N		P-13S		
Sample Depth (ft)		0.5 - 2	2 - 3	0.5 - 2	2 - 3	0.5 - 2	2 - 3	0.5 - 2	2 - 3	0.5 - 2	2 - 3	0.5 - 2	2 - 3	0.5 - 2	2 - 3	1 - 2	2 - 3	9 - 10	0 - 1	1 - 3	0 - 1	1 - 3	
Sample Date		06/10/16	06/10/16	06/10/16	06/10/16	06/10/16	06/10/16	06/10/16	06/10/16	06/10/16	06/10/16	06/10/16	06/10/16	06/10/16	06/10/16	06/08/16	06/08/16	06/08/16	06/08/16	06/08/16	06/08/16	06/08/16	
QC Identifier																						FD	FD
Pesticides/PCBs	**Units**																						
Aroclor 1016	mg/kg	0.071 U	0.037 U	0.037 U	7.2 U	0.35 U	0.037 U	0.035 U	0.036 UJ	0.075 U	0.038 UJ	0.37 U	0.038 UJ	0.36 U	0.034 U	0.80 U	0.81 U	0.044 U	0.80 U	0.044 UJ	1.5 U	1.5 U	0.76 U
Aroclor 1221	mg/kg	0.071 U	0.037 U	0.037 U	7.2 U	0.35 U	0.037 U	0.035 U	0.036 UJ	0.075 U	0.038 UJ	0.37 U	0.038 UJ	0.36 U	0.034 U	0.80 U	0.81 U	0.044 U	0.80 U	0.044 UJ	1.5 U	1.5 U	0.76 U
Aroclor 1232	mg/kg	0.071 U	0.037 U	0.037 U	7.2 U	0.35 U	0.037 U	0.035 U	0.036 UJ	0.075 U	0.038 UJ	0.37 U	0.038 UJ	0.36 U	0.034 U	0.80 U	0.81 U	0.044 U	0.80 U	0.044 UJ	1.5 U	1.5 U	0.76 U
Aroclor 1242	mg/kg	0.071 U	0.037 U	0.037 U	7.2 U	0.35 U	0.037 U	0.035 U	0.036 UJ	0.075 U	0.038 UJ	0.37 U	0.038 UJ	0.36 U	0.034 U	0.80 U	0.81 U	0.044 U	0.80 U	0.044 UJ	1.5 U	1.5 U	0.76 U
Aroclor 1248	mg/kg	**0.21**	0.037 U	**0.13**	**7.1 J**	0.35 U	0.037 U	**0.032 J**	0.036 UJ	**0.099**	0.038 UJ	**0.62**	0.038 UJ	**1.4**	0.034 U	0.80 U	0.81 U	0.044 U	0.80 U	0.044 UJ	**6.9**	**8.4 J**	0.76 UJ
Aroclor 1254	mg/kg	0.071 U	0.037 U	0.037 U	7.2 U	0.35 U	0.037 U	0.035 U	0.036 UJ	0.075 U	0.038 UJ	0.37 U	0.038 UJ	0.36 U	0.034 U	0.80 U	0.81 U	0.044 U	0.80 U	0.044 UJ	1.5 U	1.5 U	0.76 U
Aroclor 1260	mg/kg	0.071 U	**0.044**	0.037 U	7.2 U	**0.25 J**	0.037 U	0.035 U	**0.026 J**	0.075 U	**4.5 J**	**1.5**	0.038 UJ	0.36 U	**0.092**	**0.88**	**5.6**	0.044 U	**3.0**	**0.073 J-**	**7.0**	**9.1**	**6.1**
Aroclor 1262	mg/kg	0.071 U	0.037 U	0.037 U	7.2 U	0.35 U	0.037 U	0.035 U	0.036 UJ	0.075 U	0.038 UJ	0.37 U	0.038 UJ	0.36 U	0.034 U	0.80 U	0.81 U	0.044 U	0.80 U	0.044 UJ	1.5 U	1.5 U	0.76 U
Aroclor 1268	mg/kg	0.071 U	0.037 U	0.037 U	7.2 U	0.35 U	0.037 U	0.035 U	0.036 UJ	0.075 U	0.038 UJ	0.37 U	0.038 UJ	0.36 U	0.034 U	0.80 U	0.81 U	0.044 U	0.80 U	0.044 UJ	1.5 U	1.5 U	0.76 U
Aroclor, Total	mg/kg	**0.21**	**0.044**	**0.13**	**7.1 J**	**0.25 J**	0.037 U	**0.032 J**	**0.026 J**	**0.099**	**4.5 J**	**2.12**	0.038 UJ	**1.4**	**0.092**	**0.88**	**5.6**	0.044 U	**3.0**	**0.073 J-**	**13.9**	**17.5 J**	**6.1**

Red: >100 ppm; Orange: >50 ppm; Yellow: >10 ppm; Green: >1 ppm; Bold - Detected; U - Not Detected;
J - Estimated; NA - Not Analyzed

Table 3-1
Summary of TBA PCB Analytical Results
Former Tombarello Property
Lawrence, Massachusetts

Sample Location		P-13W		SA-01	SB-3		SB-3E		SB-3N	SB-3S		SB-3W	SBB-3W	SS-01		SVA-01		SVA-02		SVA-03		
Sample Depth (ft)		0 - 1	1 - 3	1 - 3	2 - 3	5 - 6	0 - 1	1 - 3	1 - 3	0 - 1	1 - 3	0 - 1	1 - 3	1 - 2	7 - 8	0 - 1	1 - 3	0 - 1	1 - 3	0 - 1	1 - 3	
Sample Date		06/08/16	06/08/16	06/09/16	06/09/16	06/09/16	06/09/16	06/09/16	06/09/16	06/09/16	06/09/16	06/09/16	06/09/16	06/08/16	06/08/16	06/07/16	06/07/16	06/08/16	06/08/16	06/08/16	06/08/16	
QC Identifier																					FD	FD
Pesticides/PCBs	**Units**																					
Aroclor 1016	mg/kg	3.9 U	0.052 U	0.81 U	0.038 UJ	0.040 UJ	0.034 UJ	0.38 U	0.39 U	0.72 U	3.6 U	0.034 UJ	18 U	0.73 U	0.055 U	17 U	0.041 U	3.6 U	0.40 U	0.36 U	0.43 U	0.88 U
Aroclor 1221	mg/kg	3.9 U	0.052 U	0.81 U	0.038 UJ	0.040 UJ	0.034 UJ	0.38 U	0.39 U	0.72 U	3.6 U	0.034 UJ	18 U	0.73 U	0.055 U	17 U	0.041 U	3.6 U	0.40 U	0.36 U	0.43 U	0.88 U
Aroclor 1232	mg/kg	3.9 U	0.052 U	0.81 U	0.038 UJ	0.040 UJ	0.034 UJ	0.38 U	0.39 U	0.72 U	3.6 U	0.034 UJ	18 U	0.73 U	0.055 U	17 U	0.041 U	3.6 U	0.40 U	0.36 U	0.43 U	0.88 U
Aroclor 1242	mg/kg	3.9 U	0.052 U	0.81 U	0.038 UJ	0.040 UJ	0.034 UJ	0.38 U	0.39 U	0.72 U	3.6 U	0.034 UJ	18 U	0.73 U	0.055 U	17 U	0.041 U	3.6 U	0.40 U	0.36 U	0.43 U	0.88 U
Aroclor 1248	mg/kg	**19**	**0.17**	**1.4**	**0.054 J**	0.040 UJ	0.034 UJ	**0.89**	**0.53**	**1.9**	**4.9**	0.034 UJ	18 U	0.73 U	0.055 U	17 U	0.041 U	3.6 U	0.40 U	0.36 U	0.43 U	**4.5 J**
Aroclor 1254	mg/kg	3.9 U	0.052 U	0.81 U	0.038 UJ	0.040 UJ	0.034 UJ	0.38 U	0.39 U	0.72 U	3.6 U	0.034 UJ	18 U	0.73 U	0.055 U	17 U	0.041 U	3.6 U	0.40 U	0.36 U	0.43 U	0.88 U
Aroclor 1260	mg/kg	**29**	**0.20**	**5.3**	**0.41 J**	0.040 UJ	**0.18 J**	**5.1**	**4.1**	**5.7**	**25**	0.034 UJ	**62**	**8.4**	**0.095**	**100**	**0.32**	**37**	**1.2**	**2.2**	**3.4 J**	**10 J**
Aroclor 1262	mg/kg	3.9 U	0.052 U	0.81 U	0.038 UJ	0.040 UJ	0.034 UJ	0.38 U	0.39 U	0.72 U	3.6 U	0.034 UJ	18 U	0.73 U	0.055 U	17 U	0.041 U	3.6 U	0.40 U	0.36 U	0.43 U	0.88 U
Aroclor 1268	mg/kg	3.9 U	0.052 U	0.81 U	0.038 UJ	0.040 UJ	0.034 UJ	0.38 U	0.39 U	0.72 U	3.6 U	0.034 UJ	18 U	0.73 U	0.055 U	17 U	0.041 U	3.6 U	0.40 U	0.36 U	0.43 U	0.88 U
Aroclor, Total	mg/kg	**48**	**0.37**	**6.7**	**0.46 J**	0.040 UJ	**0.18 J**	**5.99**	**4.63**	**7.6**	**29.9**	0.034 UJ	**62**	**8.4**	**0.095**	**100**	**0.32**	**37**	**1.2**	**2.2**	**3.4 J**	**14.5 J**

Red: >100 ppm; Orange: >50 ppm; Yellow: >10 ppm; Green: >1 ppm; Bold - Detected; U - Not Detected;
J - Estimated; NA - Not Analyzed

Table 3-1
Summary of TBA PCB Analytical Results
Former Tombarello Property
Lawrence, Massachusetts

Sample Location		SVA-04		SVA-05		SVA-06		SVA-07		SVA-08		TP-01		TP-02		TP-03		TP-04		TP-05		TP-06	
Sample Depth (ft)		0 - 1	1 - 3	0 - 1	1 - 3	0 - 1	1 - 3	0 - 1	1 - 3	0 - 1	1 - 3	0 - 1	2 - 3	0 - 1	3 - 4	0 - 1	4 - 5	0 - 1	5 - 6	0 - 1	4 - 5	0 - 1	9 - 10
Sample Date		06/08/16	06/08/16	06/08/16	06/08/16	06/08/16	06/08/16	06/09/16	06/09/16	06/09/16	06/09/16	06/15/16	06/15/16	06/15/16	06/15/16	06/15/16	06/15/16	06/15/16	06/15/16	06/15/16	06/15/16	06/14/16	06/14/16
QC Identifier																							
Pesticides/PCBs	**Units**																						
Aroclor 1016	mg/kg	0.36 U	0.042 U	3.8 U	190 U	0.38 U	0.73 U	0.36 U	0.37 U	0.034 UJ	0.37 U	17 U	0.36 U	18 U	18 U	0.037 U	3.8 U	0.074 U	0.38 U	0.036 U	3.9 U	19 U	7.4 U
Aroclor 1221	mg/kg	0.36 U	0.042 U	3.8 U	190 U	0.38 U	0.73 U	0.36 U	0.37 U	0.034 UJ	0.37 U	17 U	0.36 U	18 U	18 U	0.037 U	3.8 U	0.074 U	0.38 U	0.036 U	3.9 U	19 U	7.4 U
Aroclor 1232	mg/kg	0.36 U	0.042 U	3.8 U	190 U	0.38 U	0.73 U	0.36 U	0.37 U	0.034 UJ	0.37 U	17 U	0.36 U	18 U	18 U	0.037 U	3.8 U	0.074 U	0.38 U	0.036 U	3.9 U	19 U	7.4 U
Aroclor 1242	mg/kg	0.36 U	0.042 U	3.8 U	190 U	0.38 U	0.73 U	0.36 U	0.37 U	0.034 UJ	0.37 U	17 U	0.36 U	18 U	18 U	0.037 U	3.8 U	0.074 U	0.38 U	0.036 U	3.9 U	19 U	7.4 U
Aroclor 1248	mg/kg	0.36 U	0.042 U	**16**	190 U	0.38 U	**6.4**	**0.60**	**0.67**	**0.16 J**	**0.90**	**9.0 J**	**0.43**	**22**	**6.0 J**	**0.083**	**11**	**0.086**	**1.7**	**4.1**	**20**	**37**	**7.6**
Aroclor 1254	mg/kg	0.36 U	0.042 U	3.8 U	190 U	0.38 U	0.73 U	0.36 U	0.37 U	0.034 UJ	0.37 U	17 U	0.36 U	18 U	18 U	0.037 U	3.8 U	0.074 U	0.38 U	0.036 U	3.9 U	19 U	7.4 U
Aroclor 1260	mg/kg	**2.3**	**0.23**	**27**	**1300**	**1.3**	**5.0**	**1.9**	**2.3**	**0.33 J**	**2.7**	**18**	**3.8**	**62**	**22**	**2.4**	**34**	**0.28**	**4.7**	**7.9 J**	**14**	**41**	**15**
Aroclor 1262	mg/kg	0.36 U	0.042 U	3.8 U	190 U	0.38 U	0.73 U	0.36 U	0.37 U	0.034 UJ	0.37 U	17 U	0.36 U	18 U	18 U	0.037 U	3.8 U	0.074 U	0.38 U	0.036 U	3.9 U	19 U	7.4 U
Aroclor 1268	mg/kg	0.36 U	0.042 U	3.8 U	190 U	0.38 U	0.73 U	0.36 U	0.37 U	0.034 UJ	0.37 U	17 U	0.36 U	18 U	18 U	0.037 U	3.8 U	0.074 U	0.38 U	0.036 U	3.9 U	19 U	7.4 U
Aroclor, Total	mg/kg	**2.3**	**0.23**	**43**	**1300**	**1.3**	**11.4**	**2.5**	**2.97**	**0.49 J**	**3.6**	**27 J**	**4.23**	**84**	**28 J**	**2.4**	**45**	**0.366**	**6.4**	**12 J**	**34**	**78**	**22.6**

Red: >100 ppm; Orange: >50 ppm; Yellow: >10 ppm; Green: >1 ppm; Bold - Detected; U - Not Detected;
J - Estimated; NA - Not Analyzed

Table 3-1
Summary of TBA PCB Analytical Results
Former Tombarello Property
Lawrence, Massachusetts

Sample Location		TP-07		TP-08			TP-09		TP-10		TP-11		TP-12		TP-13		TP-14		TP-15		TP-16		TP-17	
Sample Depth (ft)		0 - 1	7 - 8	0 - 1	9 - 10		0 - 1	9 - 10	0 - 1	6 - 7	0 - 1	5 - 6	0 - 1	6 - 7	0 - 1	5 - 6	0 - 1	5 - 6	0 - 1	8 - 9	0 - 1	8 - 9	0 - 1	3 - 4
Sample Date		06/14/16	06/14/16	06/14/16	06/14/16		06/14/16	06/14/16	06/14/16	06/14/16	06/16/16	06/16/16	06/15/16	06/15/16	06/15/16	06/15/16	06/15/16	06/15/16	06/14/16	06/14/16	06/14/16	06/14/16	06/15/16	06/15/16
QC Identifier					FD	FD																		
Pesticides/PCBs	**Units**																							
Aroclor 1016	mg/kg	0.79 U	0.79 U	19 U	40 U	22 U	7.6 U	9.3 U	0.38 U	0.40 U	0.73 U	7.7 U	0.36 U	0.37 U	0.36 U	0.75 U	0.036 U	0.19 U	0.36 U	0.37 U	7.3 U	19 U	17 U	18 U
Aroclor 1221	mg/kg	0.79 U	0.79 U	19 U	40 U	22 U	7.6 U	9.3 U	0.38 U	0.40 U	0.73 U	7.7 U	0.36 U	0.37 U	0.36 U	0.75 U	0.036 U	0.19 U	0.36 U	0.37 U	7.3 U	19 U	17 U	18 U
Aroclor 1232	mg/kg	0.79 U	0.79 U	19 U	40 U	22 U	7.6 U	9.3 U	0.38 U	0.40 U	0.73 U	7.7 U	0.36 U	0.37 U	0.36 U	0.75 U	0.036 U	0.19 U	0.36 U	0.37 U	7.3 U	19 U	17 U	18 U
Aroclor 1242	mg/kg	0.79 U	0.79 U	19 U	40 U	22 U	7.6 U	9.3 U	0.38 U	0.40 U	0.73 U	7.7 U	0.36 U	0.37 U	0.36 U	0.75 U	0.036 U	0.19 U	0.36 U	0.37 U	7.3 U	19 U	17 U	18 U
Aroclor 1248	mg/kg	**6.1**	**8.0**	**15 J**	**26 J**	**27**	7.6 U	9.3 U	**0.64**	**2.1**	**3.9**	**36**	**2.6**	**3.2**	**2.2**	**8.0**	**2.1**	**0.97**	**2.1**	**1.9**	**47**	**19**	**8.7 J**	**6.1 J**
Aroclor 1254	mg/kg	0.79 U	0.79 U	19 U	40 U	22 U	7.6 U	9.3 U	0.38 U	0.40 U	0.73 U	7.7 U	0.36 U	0.37 U	0.36 U	0.75 U	0.036 U	0.19 U	0.36 U	0.37 U	7.3 U	19 U	17 U	18 U
Aroclor 1260	mg/kg	**2.9**	**3.1**	**54**	**50**	**81**	**12**	**16**	**3.9**	**3.1**	0.73 U	**19**	**2.1**	**2.1**	**1.3**	**4.3**	**4.3 J**	**1.3**	**3.2**	**5.1**	**23**	19 U	**57**	**73**
Aroclor 1262	mg/kg	0.79 U	0.79 U	19 U	40 U	22 U	7.6 U	9.3 U	0.38 U	0.40 U	0.73 U	7.7 U	0.36 U	0.37 U	0.36 U	0.75 U	0.036 U	0.19 U	0.36 U	0.37 U	7.3 U	19 U	17 U	18 U
Aroclor 1268	mg/kg	0.79 U	0.79 U	19 U	40 U	22 U	7.6 U	9.3 U	0.38 U	0.40 U	0.73 U	7.7 U	0.36 U	0.37 U	0.36 U	0.75 U	0.036 U	0.19 U	0.36 U	0.37 U	7.3 U	19 U	17 U	18 U
Aroclor, Total	mg/kg	**9.0**	**11.1**	**69 J**	**76 J**	**108**	**12**	**16**	**4.54**	**5.2**	**3.9**	**55**	**4.7**	**5.3**	**3.5**	**12.3**	**6.4 J**	**2.27**	**5.3**	**7.0**	**70**	**19**	**65.7 J**	**79.1 J**

Red: >100 ppm; Orange: >50 ppm; Yellow: >10 ppm; Green: >1 ppm; Bold - Detected; U - Not Detected;
J - Estimated; NA - Not Analyzed

Table 3-1
Summary of TBA PCB Analytical Results
Former Tombarello Property
Lawrence, Massachusetts

Sample Location		TP-18		TP-19		TP-20			WSB-6		WSB-6N		WSB-6W	
Sample Depth (ft)		0 - 1	3 - 4	0 - 1	6 - 7	0 - 1		5 - 6	0 - 1	1 - 3	0 - 1	1 - 3	0 - 1	1 - 3
Sample Date		06/16/16	06/16/16	06/15/16	06/15/16	06/14/16		06/14/16	06/07/16	06/07/16	06/07/16	06/07/16	06/07/16	06/07/16
QC Identifier						FD	FD							
Pesticides/PCBs	**Units**													
Aroclor 1016	mg/kg	0.36 U	0.034 U	0.36 U	0.37 U	0.35 U	0.35 U	0.36 U	0.71 U	0.039 U	0.71 U	0.040 U	0.72 U	0.044 U
Aroclor 1221	mg/kg	0.36 U	0.034 U	0.36 U	0.37 U	0.35 U	0.35 U	0.36 U	0.71 U	0.039 U	0.71 U	0.040 U	0.72 U	0.044 U
Aroclor 1232	mg/kg	0.36 U	0.034 U	0.36 U	0.37 U	0.35 U	0.35 U	0.36 U	0.71 U	0.039 U	0.71 U	0.040 U	0.72 U	0.044 U
Aroclor 1242	mg/kg	0.36 U	0.034 U	0.36 U	0.37 U	0.35 U	0.35 U	0.36 U	0.71 U	0.039 U	0.71 U	0.040 U	0.72 U	0.044 U
Aroclor 1248	mg/kg	**2.8**	0.034 U	**3.1**	**3.6**	**1.5**	**1.4**	**2.4**	0.71 U	0.039 U	0.71 U	0.040 U	0.72 U	0.044 U
Aroclor 1254	mg/kg	0.36 U	0.034 U	0.36 U	0.37 U	0.35 U	0.35 U	0.36 U	0.71 U	0.039 U	0.71 U	0.040 U	0.72 U	0.044 U
Aroclor 1260	mg/kg	**1.8**	**0.19**	**2.3**	**2.2**	**3.2**	**2.4**	**4.5**	**5.2**	**0.099**	**5.7**	**0.11**	**5.5**	0.044 U
Aroclor 1262	mg/kg	0.36 U	0.034 U	0.36 U	0.37 U	0.35 U	0.35 U	0.36 U	0.71 U	0.039 U	0.71 U	0.040 U	0.72 U	0.044 U
Aroclor 1268	mg/kg	0.36 U	0.034 U	0.36 U	0.37 U	0.35 U	0.35 U	0.36 U	0.71 U	0.039 U	0.71 U	0.040 U	0.72 U	0.044 U
Aroclor, Total	mg/kg	**4.6**	**0.19**	**5.4**	**5.8**	**4.7**	**3.8**	**6.9**	**5.2**	**0.099**	**5.7**	**0.11**	**5.5**	0.044 U

Red: >100 ppm; Orange: >50 ppm; Yellow: >10 ppm; Green: >1 ppm; Bold - Detected; U - Not Detected;
J - Estimated; NA - Not Analyzed

Table 3-2
Historical PCB Analytical Results
Former Tombarello Property
Lawrence, Massachusetts

Sample Location		A-05	A-06	A-07	AB13		AB35		B-04	B-05	B-06	B-07	B-08	B-09	B4	BC13		BC35		BLR-TP1		BLR-TP2
Sample Depth (ft)		0 - 0.5	0 - 0.5	0 - 0.5	0 - 1	1 - 3	0 - 1	1 - 3	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 1	0 - 1	1 - 3	0 - 1	1 - 3	1.5 - 2	3 - 4.5	0 - 1
Sample Date		10/01/10	10/01/10	10/01/10	07/14/03	07/14/03	07/14/03	07/14/03	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	09/01/01	07/14/03	07/14/03	07/14/03	07/14/03	09/01/01	09/01/01	09/01/01
QC Identifier																						
	Units																					
Aroclor 1016	mg/kg	ND	ND	ND	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	NA	NA	NA	NA	NA	**3.2**	**2.1**	NA
Aroclor 1242	mg/kg	ND	ND	ND	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor 1248	mg/kg	ND	ND	ND	NA	NA	NA	NA	ND	**24**	ND	ND	ND	ND	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor 1254	mg/kg	ND	ND	ND	NA	NA	NA	NA	ND	ND	ND	ND	ND	**2.0**	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor 1260	mg/kg	**19**	**0.91**	**2.1**	NA	NA	NA	NA	ND	ND	ND	**9.8**	**4.0**	**2.3**	**0.85**	NA	NA	NA	NA	**2.8**	**3.6**	**2.0**
Aroclor 1262	mg/kg	ND	ND	ND	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor 1268	mg/kg	ND	ND	ND	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor, Total	mg/kg	**19**	**0.91**	**2.1**	**1.1**	0.6 U	**17.2**	0.7 U	ND	**24**	ND	**9.8**	**4.0**	**4.3**	**0.85**	**10.2**	**1.2**	**3.9**	0.7 U	**6.0**	**5.7**	**2.0**

Red: >100 ppm; Orange: >50 ppm; Yellow: >10 ppm; Green: >1 ppm; Bold - Detected; U - Not Detected;
J - Estimated; NA - Not Analyzed

Table 3-2
Historical PCB Analytical Results
Former Tombarello Property
Lawrence, Massachusetts

Sample Location		BRM-TP1	BRM-TP3	BRM-TP4		BRM-TP5	BRM-TP6	BRM-TP7		BRM-TP8		BRM-TP10	BRM-TP9/9A	C-05	C-06	C-07	C-08	C-09	CD13		CD35		D-05	D-06
Sample Depth (ft)		4 - 6	9 - 11	3.5 - 5	6 - 7	9 - 11	11 - 13	3 - 6	12 - 15	4 - 5	5 - 6	0 - 1	4 - 6	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 1	1 - 3	0 - 1	1 - 3	0 - 0.5	0 - 0.5
Sample Date		09/01/01	09/01/01	09/01/01	09/01/01	09/01/01	09/01/01	09/01/01	09/01/01	09/01/01	09/01/01	09/01/01	09/01/01	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	07/14/03	07/14/03	07/14/03	07/14/03	10/01/10	10/01/10
QC Identifier																								
	Units																							
Aroclor 1016	mg/kg	NA	**2.6**	NA	**9.3**	**11**	**4.5**	NA	**0.37**	NA	NA	NA	NA	ND	ND	ND	ND	ND	NA	NA	NA	NA	ND	ND
Aroclor 1242	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	NA	NA	NA	NA	ND	ND
Aroclor 1248	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	NA	NA	NA	NA	ND	ND
Aroclor 1254	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	**11**	**0.68**	**0.86**	NA	ND	ND	ND	ND	ND	NA	NA	NA	NA	ND	ND
Aroclor 1260	mg/kg	**13**	**9.3**	**78**	**62**	**60**	**11**	**9.9**	**0.57**	NA	**0.47**	**1.1**	**42**	**3.5**	**3.9**	**4.5**	**9.2**	**1.4**	NA	NA	NA	NA	**2.1**	**3.9**
Aroclor 1262	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	NA	NA	NA	NA	ND	ND
Aroclor 1268	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	NA	NA	NA	NA	ND	ND
Aroclor, Total	mg/kg	**13**	**11.9**	**78**	**71.3**	**71**	**15.5**	**9.9**	**0.94**	**11**	**1.15**	**1.96**	**42**	**3.5**	**3.9**	**4.5**	**9.2**	**1.4**	**22.1**	0.6 U	**4.6**	**200**	**2.1**	**3.9**

Red: >100 ppm; Orange: >50 ppm; Yellow: >10 ppm; Green: >1 ppm; Bold - Detected; U - Not Detected;
J - Estimated; NA - Not Analyzed

Table 3-2
Historical PCB Analytical Results
Former Tombarello Property
Lawrence, Massachusetts

Sample Location		D-07	D-08	D-09	D5	DE13		DE35		E-02	E-05	E-07	E-08	E4	EF13		EF35		F-08	F2	F4	FG13	
Sample Depth (ft)		0 - 0.5	0 - 0.5	0 - 0.5	0 - 1	0 - 1	1 - 3	0 - 1	1 - 3	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 1	0 - 1	1 - 3	0 - 1	1 - 3	0 - 0.5	0 - 1	0 - 1	0 - 1	1 - 3
Sample Date		10/01/10	10/01/10	10/01/10	09/01/01	07/14/03	07/14/03	07/14/03	07/14/03	10/01/10	10/01/10	10/01/10	10/01/10	09/01/01	07/14/03	07/14/03	07/14/03	07/14/03	10/01/10	09/01/01	09/01/01	07/14/03	07/14/03
QC Identifier																							
	Units																						
Aroclor 1016	mg/kg	ND	ND	ND	NA	NA	NA	NA	NA	ND	ND	ND	ND	NA	NA	NA	NA	NA	ND	NA	NA	NA	NA
Aroclor 1242	mg/kg	ND	ND	ND	NA	NA	NA	NA	NA	ND	ND	ND	ND	NA	NA	NA	NA	NA	ND	NA	NA	NA	NA
Aroclor 1248	mg/kg	ND	ND	ND	NA	NA	NA	NA	NA	ND	ND	ND	ND	NA	NA	NA	NA	NA	ND	NA	NA	NA	NA
Aroclor 1254	mg/kg	ND	ND	ND	NA	NA	NA	NA	NA	ND	ND	ND	ND	NA	NA	NA	NA	NA	ND	NA	NA	NA	NA
Aroclor 1260	mg/kg	**4.0**	**0.9**	**1.5**	**52**	NA	NA	NA	NA	**2.2**	**1.1**	**2.4**	**1.5**	**15**	NA	NA	NA	NA	**3.4**	**15**	**26**	NA	NA
Aroclor 1262	mg/kg	ND	ND	ND	NA	NA	NA	NA	NA	ND	ND	ND	ND	NA	NA	NA	NA	NA	ND	NA	NA	NA	NA
Aroclor 1268	mg/kg	ND	ND	ND	NA	NA	NA	NA	NA	ND	ND	ND	ND	NA	NA	NA	NA	NA	ND	NA	NA	NA	NA
Aroclor, Total	mg/kg	**4.0**	**0.9**	**1.5**	**52**	**45**	0.60 U	**3.4**	0.60 U	**2.2**	**1.1**	**2.4**	**1.5**	**15**	**11**	0.60 U	**20**	**7.8**	**3.4**	**15**	**26**	**38**	0.60 U

Red: >100 ppm; Orange: >50 ppm; Yellow: >10 ppm; Green: >1 ppm; Bold - Detected; U - Not Detected;
J - Estimated; NA - Not Analyzed

Table 3-2
Historical PCB Analytical Results
Former Tombarello Property
Lawrence, Massachusetts

Sample Location		FG35			G-08	G3	G4	GH24		GH46		H-08	H-09	H2	H3	H6	HI24		HI46		I-08	I-09	I3	I4
Sample Depth (ft)		0 - 1	1 - 3		0 - 0.5	0 - 1	0 - 1	0 - 1	1 - 3	0 - 1	1 - 3	0 - 0.5	0 - 0.5	0 - 1	0 - 1	0 - 1	0 - 1	1 - 3	0 - 1	1 - 3	0 - 0.5	0 - 0.5	0 - 1	0 - 1
Sample Date		07/14/03	07/14/03	07/15/03	10/01/10	09/01/01	09/01/01	07/14/03	07/14/03	07/14/03	07/14/03	10/01/10	10/01/10	09/01/01	09/01/01	09/01/01	07/14/03	07/14/03	07/14/03	07/14/03	10/01/10	10/01/10	09/01/01	09/01/01
QC Identifier			FD	FD																				
	Units																							
Aroclor 1016	mg/kg	NA	NA	NA	ND	NA	NA	NA	NA	NA	NA	ND	ND	NA	**6.5**	**8.7**	NA	NA	NA	NA	ND	ND	NA	**0.81**
Aroclor 1242	mg/kg	NA	NA	NA	ND	**64**	NA	NA	NA	NA	NA	ND	ND	NA	NA	NA	NA	NA	NA	NA	ND	ND	NA	NA
Aroclor 1248	mg/kg	NA	NA	NA	ND	NA	NA	NA	NA	NA	NA	ND	ND	NA	NA	NA	NA	NA	NA	NA	ND	ND	NA	NA
Aroclor 1254	mg/kg	NA	NA	NA	ND	NA	NA	NA	NA	NA	NA	ND	ND	NA	NA	NA	NA	NA	NA	NA	ND	ND	NA	NA
Aroclor 1260	mg/kg	NA	NA	NA	**3.2**	NA	**21**	NA	NA	NA	NA	**2.0**	**1.7**	**11**	**37.0**	**8.2**	NA	NA	NA	NA	**4.7**	**5.6**	**43**	**2.2**
Aroclor 1262	mg/kg	NA	NA	NA	ND	NA	NA	NA	NA	NA	NA	ND	ND	NA	NA	NA	NA	NA	NA	NA	ND	ND	NA	NA
Aroclor 1268	mg/kg	NA	NA	NA	ND	NA	NA	NA	NA	NA	NA	ND	ND	NA	NA	NA	NA	NA	NA	NA	ND	ND	NA	NA
Aroclor, Total	mg/kg	**66**	**38**	0.60 U	**3.2**	**64**	**21**	**3.7**	0.60 U	**28**	0.50 U	**2.0**	**1.7**	**11**	**43.5**	**16.9**	**2.8**	0.60 U	**11.4**	**1.5**	**4.7**	**5.6**	**43**	**3.01**

Red: >100 ppm; Orange: >50 ppm; Yellow: >10 ppm; Green: >1 ppm; Bold - Detected; U - Not Detected;
J - Estimated; NA - Not Analyzed

Table 3-2
Historical PCB Analytical Results
Former Tombarello Property
Lawrence, Massachusetts

Sample Location		IJ24		IJ46		J-04	J-05	J-08	J-09	J1	J5	JK24		JK46		K-08-01	K-08-02	K-04	K-05	K-06	K-07	K-08	K-09
Sample Depth (ft)		0 - 1	1 - 3	0 - 1	1 - 3	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 1	0 - 1	0 - 1	1 - 3	0 - 1	1 - 3	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5
Sample Date		07/14/03	07/14/03	07/14/03	07/14/03	10/01/10	10/01/10	10/01/10	10/01/10	09/01/01	09/01/01	07/14/03	07/14/03	07/14/03	07/14/03	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10
QC Identifier																							
	Units																						
Aroclor 1016	mg/kg	NA	NA	NA	NA	ND	ND	ND	ND	NA	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND
Aroclor 1242	mg/kg	NA	NA	NA	NA	ND	ND	ND	ND	NA	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND
Aroclor 1248	mg/kg	NA	NA	NA	NA	ND	ND	ND	ND	NA	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND
Aroclor 1254	mg/kg	NA	NA	NA	NA	ND	ND	ND	ND	NA	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	**2.6**	ND	ND
Aroclor 1260	mg/kg	NA	NA	NA	NA	**12**	**1.5**	**5.2**	**17**	**2.6**	**0.74**	NA	NA	NA	NA	**15**	**3.4**	**27**	**2.5**	**4.1**	**9.8**	**15**	**2.2**
Aroclor 1262	mg/kg	NA	NA	NA	NA	ND	ND	ND	ND	NA	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND
Aroclor 1268	mg/kg	NA	NA	NA	NA	ND	ND	ND	ND	NA	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND
Aroclor, Total	mg/kg	**18.1**	0.60 U	**15.2**	0.60 U	**12**	**1.5**	**5.2**	**17**	**2.6**	**0.74**	**7.0**	3.5 U	**37.8**	**4.0**	**15**	**3.4**	**27**	**2.5**	**4.1**	**12.4**	**15**	**2.2**

Red: >100 ppm; Orange: >50 ppm; Yellow: >10 ppm; Green: >1 ppm; Bold - Detected; U - Not Detected;
J - Estimated; NA - Not Analyzed

Table 3-2
Historical PCB Analytical Results
Former Tombarello Property
Lawrence, Massachusetts

Sample Location		KL24		L-04	L-05	L-06	L-07	L-08	L-09	L5	LM24		M-03	M-04	M-05	M-06	M-07	M-08	M-09	M2	M3	M4	N-03	N-04
Sample Depth (ft)		0 - 1	1 - 3	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 1	0 - 1	1 - 3	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 1	0 - 1	0 - 1	0 - 0.5	0 - 0.5
Sample Date		07/14/03	07/14/03	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	09/01/01	07/14/03	07/14/03	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	09/01/01	09/01/01	09/01/01	10/01/10	10/01/10
QC Identifier																								
	Units																							
Aroclor 1016	mg/kg	NA	NA	ND	ND	ND	ND	ND	ND	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	NA	NA	NA	ND	ND
Aroclor 1242	mg/kg	NA	NA	ND	ND	ND	ND	ND	ND	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	NA	NA	**66**	ND	ND
Aroclor 1248	mg/kg	NA	NA	**0.92**	ND	ND	ND	ND	ND	NA	NA	NA	ND	ND	ND	ND	**11**	ND	ND	NA	NA	NA	**5.1**	**1.2**
Aroclor 1254	mg/kg	NA	NA	**2.5**	**1.5**	ND	ND	ND	ND	NA	NA	NA	**11**	**9.9**	**2.0**	ND	**18**	**5.1**	ND	NA	**9.2**	NA	**7.1**	**7.5**
Aroclor 1260	mg/kg	NA	NA	**3.5**	**2.2**	**16**	**25**	**40**	**7.7**	**3.8**	NA	NA	**15**	**5.9**	**3.5**	**26**	**46**	**14**	**6.1**	**1.4**	**2.4**	NA	**4.8**	**6.4**
Aroclor 1262	mg/kg	NA	NA	ND	ND	ND	ND	ND	ND	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	NA	NA	NA	ND	ND
Aroclor 1268	mg/kg	NA	NA	ND	ND	ND	ND	ND	ND	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	NA	NA	NA	ND	ND
Aroclor, Total	mg/kg	**4.9**	**5.9**	**6.92**	**3.7**	**16**	**25**	**40**	**7.7**	**3.8**	**25.7**	0.60 U	**26**	**15.8**	**5.5**	**26**	**75**	**19.1**	**6.1**	**1.4**	**11.6**	**66**	**17**	**15.1**

Red: >100 ppm; Orange: >50 ppm; Yellow: >10 ppm; Green: >1 ppm; Bold - Detected; U - Not Detected;
J - Estimated; NA - Not Analyzed

Table 3-2
Historical PCB Analytical Results
Former Tombarello Property
Lawrence, Massachusetts

Sample Location		N-05	N-07	N-08	N-09	N-10	N-11	N-12	O-03	O-04	O-05	O-06	O-07	O-08	O-09	O-10	O-11	O-12	O-13	P-03	P-04	P-05	P-06	P-10
Sample Depth (ft)		0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5
Sample Date		10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	09/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10
QC Identifier																								
	Units																							
Aroclor 1016	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Aroclor 1242	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Aroclor 1248	mg/kg	ND	**7.2**	ND	ND	ND	ND	**20**	ND	ND	ND	ND	**5.7**	ND	ND	ND	ND	**2.2**	**5.2**	ND	ND	ND	ND	**1.0**
Aroclor 1254	mg/kg	**1.4**	**4.8**	**11**	ND	**7.0**	**3.7**	**7.0**	**2.0**	**2.6**	ND	**1.1**	**14**	**6.7**	ND	**4.1**	**4.2**	**2.8**	**3.0**	**4.1**	**2.6**	**1.8**	ND	**6.5**
Aroclor 1260	mg/kg	**2.2**	**4.2**	**21**	**3.2**	**8.2**	**4.3**	**4.4**	**3.7**	**4.2**	ND	**1.8**	**6.6**	**11**	**3.7**	**3.7**	**4.4**	**3.5**	**3.5**	**6.5**	**3.7**	**3.4**	**4.2**	**17**
Aroclor 1262	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Aroclor 1268	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Aroclor, Total	mg/kg	**3.6**	**16.2**	**32**	**3.2**	**15.2**	**8.0**	**31.4**	**5.7**	**6.8**	ND	**2.9**	**26.3**	**17.7**	**3.7**	**7.8**	**8.6**	**8.5**	**11.7**	**10.6**	**6.3**	**5.2**	**4.2**	**24.5**

Red: >100 ppm; Orange: >50 ppm; Yellow: >10 ppm; Green: >1 ppm; Bold - Detected; U - Not Detected;
J - Estimated; NA - Not Analyzed

Table 3-2
Historical PCB Analytical Results
Former Tombarello Property
Lawrence, Massachusetts

Sample Location		P-11	P-12	P-13	Q-03	Q-04	Q-05	Q-06	Q-10	Q-12	Q-13	R-03	R-04	R-05	R-06	R-07	R-08	R-10	R-11	R-12	R-13	S-04-01	S-04-02	S-07-01
Sample Depth (ft)		0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5
Sample Date		10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10
QC Identifier																								
	Units																							
Aroclor 1016	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Aroclor 1242	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Aroclor 1248	mg/kg	**0.79**	**2.1**	ND	ND	ND	ND	ND	**1.2**	ND	ND	ND	ND	ND	ND	ND	ND	**4.1**	**6.9**	**8.8**	ND	ND	ND	ND
Aroclor 1254	mg/kg	**1.8**	**4.9**	**7.7**	**2.8**	**4.0**	**1.3**	**3.1**	**1.8**	**6.3**	**5.0**	**3.2**	**1.2**	**4.6**	ND	**2.1**	**3.2**	**2.7**	**4.1**	**11**	**1.5**	ND	**1.1**	**11**
Aroclor 1260	mg/kg	**2.4**	**12**	**57**	**2.6**	**4.0**	**2.1**	**4.4**	**2.1**	**4.0**	**2.2**	**3.4**	**1.1**	**5.2**	**24**	**3.4**	**2.7**	**3.3**	**4.8**	**19**	**3.3**	**1.6**	**1.3**	**7.4**
Aroclor 1262	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Aroclor 1268	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Aroclor, Total	mg/kg	**4.99**	**19**	**64.7**	**5.4**	**8.0**	**3.4**	**7.5**	**5.1**	**10.3**	**7.2**	**6.6**	**2.3**	**9.8**	**24**	**5.5**	**5.9**	**10.1**	**15.8**	**38.8**	**4.8**	**1.6**	**2.4**	**18.4**

Red: >100 ppm; Orange: >50 ppm; Yellow: >10 ppm; Green: >1 ppm; Bold - Detected; U - Not Detected;
J - Estimated; NA - Not Analyzed

Table 3-2
Historical PCB Analytical Results
Former Tombarello Property
Lawrence, Massachusetts

Sample Location		S-08-01	S-03	S-04	S-05	S-06	S-07	S-08	S-8	S-09	S-9	S-10	S-11	S-12	S-13	SB1-S1	SB1	SB2	SB3	SB4	SB5-E	SB5-N	SB5-S	SB5-W
Sample Depth (ft)		0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 2	0 - 2	0 - 2	0 - 2	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5
Sample Date		10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	07/08/98	10/01/10	07/08/98	10/01/10	10/01/10	10/01/10	10/01/10	06/02/99	07/08/98	07/08/98	07/08/98	07/08/98	04/28/99	04/28/99	04/28/99	04/28/99
QC Identifier																								
	Units																							
Aroclor 1016	mg/kg	ND	ND	ND	ND	ND	ND	ND	0.33 U	ND	0.333 U	ND	ND	ND	ND	NA	0.166 U	0.033 U	3.330 U	0.033 U	0.1 U	1 U	0.1 U	0.1 U
Aroclor 1242	mg/kg	ND	ND	ND	ND	ND	ND	ND	0.33 U	ND	0.333 U	ND	ND	ND	ND	NA	0.166 U	0.033 U	3.330 U	0.033 U	0.1 U	1 U	0.1 U	0.1 U
Aroclor 1248	mg/kg	ND	ND	ND	ND	ND	ND	**2.1**	**7.193**	ND	0.333 U	ND	**9.0**	**13**	**5.9**	0.1 U	**3.097**	**0.619**	3.330 U	0.033 U	0.2 U	1 U	0.1 U	2 U
Aroclor 1254	mg/kg	**18**	ND	ND	**2.6**	**2.0**	ND	**4.9**	0.33 U	**0.97**	0.333 U	**2.0**	**4.2**	**4.1**	**11**	NA	0.166 U	0.033 U	3.330 U	0.033 U	**2.0**	**2.1**	0.1 U	**2.3**
Aroclor 1260	mg/kg	**5.2**	**3.6**	**11**	**5.1**	**1.9**	**1.3**	**12**	**3.397**	**1.3**	0.333 U	**1.8**	**2.3**	**3.1**	**14**	0.1 U	**3.913**	**0.765**	**59.3**	**0.609**	0.1 U	0.1 U	0.1 U	0.1 U
Aroclor 1262	mg/kg	ND	ND	ND	ND	ND	ND	ND	NA	0 U	NA	ND	ND	ND	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor 1268	mg/kg	ND	ND	ND	ND	ND	ND	ND	NA	0 U	NA	ND	ND	ND	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor, Total	mg/kg	**23.2**	**3.6**	**11**	**7.7**	**3.9**	**1.3**	**19**	**10.6**	**2.27**	0.333 U	**3.8**	**15.5**	**20.2**	**30.9**	0.2 U	**7.01**	**1.385**	**59.3**	**0.609**	**2.0**	**2.1**	0.1 U	**2.3**

Red: >100 ppm; Orange: >50 ppm; Yellow: >10 ppm; Green: >1 ppm; Bold - Detected; U - Not Detected;
J - Estimated; NA - Not Analyzed

Table 3-2
Historical PCB Analytical Results
Former Tombarello Property
Lawrence, Massachusetts

Sample Location		SB6-E1	SB6-N1	SB6-SS1	SB6-SS2	SB6-W1	SB6	SCC-1	SM2-3	SS-7-E	SS-7-N	SS-7-S	SS-7-W	SS-7		SS-8		SS-9	SS8-E	SS8-N	SS8-S	SS8-W	T-11-01	T-12-01
Sample Depth (ft)		0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 2	0 - 1	0 - 1	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5		0 - 0.5		0 - 0.5	0 - 0.05	0 - 0.05	0 - 0.05	0 - 0.05	0 - 0.5	0 - 0.5
Sample Date		06/02/99	06/02/99	04/28/99	06/02/99	06/02/99	07/08/98	09/01/01	09/01/01	04/28/99	04/28/99	04/28/99	04/28/99	04/28/99		07/08/98	04/28/99	07/08/98	04/28/99	04/28/99	04/28/99	04/28/99	10/01/10	10/01/10
QC Identifier														FD	FD	FD	FD							
	Units																							
Aroclor 1016	mg/kg	NA	NA	NA	NA	NA	0.033 U	NA	NA	NA	NA	NA	NA	NA	NA	0.1 U	NA	NA	0.1 U	0.1 U	0.1 U	0.1 U	ND	ND
Aroclor 1242	mg/kg	NA	NA	NA	NA	NA	0.033 U	NA	NA	NA	NA	NA	NA	NA	NA	0.1 U	NA	NA	0.1 U	0.1 U	0.1 U	0.1 U	ND	ND
Aroclor 1248	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.033 U	NA	NA	0.1 U	0.1 U	0.1 U	0.1 U	**3.696**	0.1 U	**7.193**	0.1 U	0.33 U	0.1 U	0.1 U	0.1 U	0.1 U	ND	**5.8**
Aroclor 1254	mg/kg	NA	NA	NA	NA	NA	0.033 U	NA	NA	NA	NA	NA	NA	NA	NA	**0.95**	NA	NA	**2.3**	**3.0**	**3.4**	**2.3**	**2.6**	**8.6**
Aroclor 1260	mg/kg	**3.8**	**92**	**57**	0.1 U	0.1 U	**0.679**	**3.2**	**2.8**	**3.5**	**2.6**	**3.2**	**2.9**	**2.707**	**3.2**	**3.397**	0.1 U	0.33 U	0.1 U	0.1 U	0.1 U	0.1 U	**2.4**	**3.1**
Aroclor 1262	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	ND	ND
Aroclor 1268	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	ND	ND
Aroclor, Total	mg/kg	**3.8**	**92**	**57**	0.2 U	0.2 U	**0.679**	**3.2**	**2.8**	**3.5**	**2.6**	**3.2**	**2.9**	**6.403**	**3.2**	**10.59**	**0.95**	NA	**2.3**	**3.0**	**3.4**	**2.3**	**5.0**	**17.5**

Red: >100 ppm; Orange: >50 ppm; Yellow: >10 ppm; Green: >1 ppm; Bold - Detected; U - Not Detected;
J - Estimated; NA - Not Analyzed

Table 3-2
Historical PCB Analytical Results
Former Tombarello Property
Lawrence, Massachusetts

Sample Location		T-12-02	T-12-03	T-03	T-04	T-05	T-09	T-10	T-11	T-12	T-13	U-09-01	U-10-01	U-10-02	U-11-01	U-11-02	U-12-01	U-12-02	U-13-01	U-03	U-04	U-05	U-07	U-09
Sample Depth (ft)		0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5
Sample Date		10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10
QC Identifier																								
	Units																							
Aroclor 1016	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Aroclor 1242	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Aroclor 1248	mg/kg	**8.6**	**7.4**	ND	ND	ND	**2.2**	ND	ND	**4.5**	ND	ND	ND	ND	ND	**1.1**	**5.1**	**9.9**	**16**	ND	ND	ND	ND	**1.9**
Aroclor 1254	mg/kg	**5.1**	**6.8**	**1.8**	ND	**0.94**	**8.8**	**3.6**	**2.5**	**6.5**	**5.4**	**9.0**	**26**	**11**	**5.7**	**2.9**	**5.6**	**7.9**	**6.0**	ND	**0.93**	ND	**1.5**	**5.6**
Aroclor 1260	mg/kg	**2.5**	**2.8**	**2.6**	**1.1**	**1.6**	**4.0**	**3.5**	**2.1**	**3.2**	**7.8**	**2.5**	ND	**3.0**	**12**	**2.4**	**2.7**	**2.8**	**2.3**	**0.98**	**1.2**	ND	**1.6**	**2.0**
Aroclor 1262	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Aroclor 1268	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Aroclor, Total	mg/kg	**16.2**	**17**	**4.4**	**1.1**	**2.5**	**15**	**7.1**	**4.6**	**14.2**	**13.2**	**11.5**	**26**	**14**	**17.7**	**6.4**	**13.4**	**20.6**	**24.3**	**0.98**	**2.13**	ND	**3.1**	**9.5**

Red: >100 ppm; Orange: >50 ppm; Yellow: >10 ppm; Green: >1 ppm; Bold - Detected; U - Not Detected;
J - Estimated; NA - Not Analyzed

Table 3-2
Historical PCB Analytical Results
Former Tombarello Property
Lawrence, Massachusetts

Sample Location		U-10	U-11	U-12	U-13	V-12-01	V-12-02	V-04	V-05	V-07	V-08	V-09	V-10	V-11	V-12	V-13	W-05-01	W-06-01	W-09-01	W-09-02	W-09-03	W-04	W-05	W-06
Sample Depth (ft)		0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5
Sample Date		10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10
QC Identifier																								
	Units																							
Aroclor 1016	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Aroclor 1242	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Aroclor 1248	mg/kg	**1.5**	**4.2**	**3.7**	**18**	**4.3**	**2.1**	ND	ND	ND	ND	**4.0**	**0.91**	**1.4**	**3.2**	**30**	ND	**1.1**	**1.1**	ND	ND	ND	ND	**2.3**
Aroclor 1254	mg/kg	**1.0**	**6.9**	**4.9**	**5.4**	**4.1**	**3.7**	**1.5**	**1.0**	**1.4**	ND	**5.0**	**1.9**	**3.5**	**5.8**	**8.0**	ND	**2.3**	**2.4**	**1.5**	**1.8**	**1.8**	**1.6**	**2.2**
Aroclor 1260	mg/kg	**2.1**	**8.0**	**2.5**	**2.9**	**2.3**	**3.4**	**1.4**	**1.2**	**1.2**	**1.6**	**5.0**	**2.6**	**3.0**	**4.4**	**2.9**	**8.9**	**2.0**	**1.6**	**1.4**	**1.2**	**2.0**	**2.6**	**2.1**
Aroclor 1262	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Aroclor 1268	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Aroclor, Total	mg/kg	**4.6**	**19.1**	**11.1**	**26.3**	**10.7**	**9.2**	**2.9**	**2.2**	**2.6**	**1.6**	**14**	**5.41**	**7.9**	**13.4**	**41**	**8.9**	**5.6**	**5.1**	**2.9**	**3.0**	**3.8**	**4.2**	**6.6**

Red: >100 ppm; Orange: >50 ppm; Yellow: >10 ppm; Green: >1 ppm; Bold - Detected; U - Not Detected;
J - Estimated; NA - Not Analyzed

Table 3-2
Historical PCB Analytical Results
Former Tombarello Property
Lawrence, Massachusetts

Sample Location		W-07	W-08	W-09	W-10	W-11	W-12	WSB-1					WSB-2					WSB-3		WSB-4		WSB-5	
Sample Depth (ft)		0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	1 - 2	1 - 3	2 - 3	3 - 5	0 - 0.5	1 - 2	1 - 3	2 - 3	3 - 5	0 - 1	1 - 3	0 - 1	1 - 3	0 - 1	1 - 3
Sample Date		10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	05/02/05	05/03/05	02/01/03	05/04/05	02/01/03	05/02/05	05/02/05	02/01/03	05/02/05	02/01/03	02/01/03	02/01/03	02/01/03	02/01/03	02/01/03	02/01/03
QC Identifier																							
	Units																						
Aroclor 1016	mg/kg	ND	ND	ND	ND	ND	ND	0.054 U	0.539 U	NA	0.551 U	NA	0.27 U	0.58 U	NA	0.58 U	NA	NA	NA	NA	NA	NA	NA
Aroclor 1242	mg/kg	ND	ND	ND	ND	ND	ND	0.054 U	0.539 U	NA	0.551 U	NA	0.27 U	0.58 U	NA	0.58 U	NA	NA	NA	NA	NA	NA	NA
Aroclor 1248	mg/kg	**23**	ND	ND	**6.1**	**1.9**	**1.7**	0.054 U	0.539 U	NA	0.551 U	NA	0.27 U	0.58 U	NA	0.58 U	NA	NA	NA	NA	NA	NA	NA
Aroclor 1254	mg/kg	**6.0**	**2.1**	**0.92**	**5.0**	**4.1**	**5.5**	0.054 U	0.539 U	NA	0.551 U	NA	0.27 U	0.58 U	NA	0.58 U	NA	NA	NA	NA	NA	NA	NA
Aroclor 1260	mg/kg	**3.2**	**1.7**	**1.2**	**4.7**	**2.2**	**4.6**	**0.73**	**6.95**	NA	**2.95**	NA	**1.71**	**0.376**	NA	**0.651**	NA	NA	NA	NA	NA	NA	NA
Aroclor 1262	mg/kg	ND	ND	ND	ND	ND	ND	0.054 U	0.539 U	NA	0.551 U	NA	0.27 U	0.58 U	NA	0.58 U	NA	NA	NA	NA	NA	NA	NA
Aroclor 1268	mg/kg	ND	ND	ND	ND	ND	ND	0.054 U	0.539 U	NA	0.551 U	NA	0.27 U	0.58 U	NA	0.58 U	NA	NA	NA	NA	NA	NA	NA
Aroclor, Total	mg/kg	**32.2**	**3.8**	**2.12**	**15.8**	**8.2**	**11.8**	**0.73**	**6.95**	**1.6**	**2.95**	**0.05**	**1.71**	**0.376**	**26.4**	**0.651**	0.050 U	**0.27**	**21.8**	**9.8**	**0.25**	**1.9**	**7.0**

Red: >100 ppm; Orange: >50 ppm; Yellow: >10 ppm; Green: >1 ppm; Bold - Detected; U - Not Detected;
J - Estimated; NA - Not Analyzed

Table 3-2
Historical PCB Analytical Results
Former Tombarello Property
Lawrence, Massachusetts

Sample Location		WSB-6		WSB-7		WSB-8		WSB-9		WSB-10		WSB-11		WSB-12		WSB-14				WSB-16		
Sample Depth (ft)		0 - 1	1 - 3	0 - 1	1 - 3	1 - 3	3 - 5	0 - 1	1 - 3	0 - 1	1 - 3	0 - 1	1 - 3	0 - 1	1 - 3	0 - 1	1 - 3	3 - 5	5 - 7	0 - 1	1 - 2	2 - 3
Sample Date		02/01/03	02/01/03	02/01/03	02/01/03	02/01/03	02/01/03	02/01/03	02/01/03	02/01/03	02/01/03	02/01/03	02/01/03	02/01/03	02/01/03	02/01/03	02/01/03	02/01/03	02/01/03	07/14/03	07/14/03	07/15/03
QC Identifier																						
	Units																					
Aroclor 1016	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor 1242	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor 1248	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor 1254	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor 1260	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor 1262	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor 1268	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor, Total	mg/kg	**2700**	**34**	**0.8**	**7.1**	**7.3**	0.040 U	**0.36**	**0.04**	**4.8**	**26**	**0.45**	**4.5**	**7.1**	**0.09**	**0.15**	**7.85**	0.040 U	0.040 U	**3.1**	0.50 U	0.60 U

Red: >100 ppm; Orange: >50 ppm; Yellow: >10 ppm; Green: >1 ppm; Bold - Detected; U - Not Detected;
J - Estimated; NA - Not Analyzed

Table 3-2
Historical PCB Analytical Results
Former Tombarello Property
Lawrence, Massachusetts

Sample Location		WSB-17				WSB-18			WSB-21			WSB-22			WSB-25			WSB-26				WSB-27		
Sample Depth (ft)		0 - 1		1 - 2	2 - 3	0 - 1	1 - 2	2 - 3	0 - 1	1 - 2	2 - 3	0 - 1	1 - 2	2 - 3	0 - 1	1 - 2	2 - 3	0 - 1		1 - 2	2 - 3	0 - 1	1 - 2	2 - 3
Sample Date		07/14/03	07/16/03	07/14/03	07/14/03	07/14/03	07/14/03	07/14/03	07/14/03	07/14/03	07/14/03	07/14/03	07/14/03	07/14/03	07/14/03	07/14/03	07/14/03	07/14/03		07/14/03	07/14/03	07/14/03	07/14/03	07/14/03
QC Identifier																		FD	FD					
	Units																							
Aroclor 1016	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor 1242	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor 1248	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor 1254	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor 1260	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor 1262	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor 1268	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor, Total	mg/kg	**2.5**	**3.7**	0.60 U	0.60 U	**1.7**	0.60 U	0.60 U	**18.2**	0.60 U	0.60 U	**17**	0.60 U	0.60 U	**14.9**	0.60 U	0.60 U	**39**	**50**	**510**	**7.1**	**24**	0.60 U	0.60 U

Red: >100 ppm; Orange: >50 ppm; Yellow: >10 ppm; Green: >1 ppm; Bold - Detected; U - Not Detected;
J - Estimated; NA - Not Analyzed

Table 3-2
Historical PCB Analytical Results
Former Tombarello Property
Lawrence, Massachusetts

Sample Location		WSB-30			WSB-31			WSB-32			X-05-01	X-07-01	X-07-02	X-07-03	X-10-01	X-10-02	X-10-03	X-10-04	X-11-01	X-11-02	X-11-03	X-04	X-05	X-06
Sample Depth (ft)		0 - 1	1 - 2	2 - 3	0 - 1	1 - 2	2 - 3	0 - 1	1 - 2	2 - 3	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5
Sample Date		07/14/03	07/14/03	07/14/03	07/14/03	07/14/03	07/14/03	07/14/03	07/14/03	07/14/03	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10
QC Identifier																								
	Units																							
Aroclor 1016	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Aroclor 1242	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Aroclor 1248	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	ND	ND	ND	ND	**1.5**	**4.0**	**7.7**	**11**	ND	ND	**1.7**	ND	ND	**1.0**
Aroclor 1254	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	**10**	**1.9**	ND	**1.8**	**7.5**	**8.6**	**7.8**	**13**	**21**	**4.9**	**4.1**	**2.1**	ND	**2.7**
Aroclor 1260	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	**16**	**0.86**	ND	**0.83**	**3.4**	**4.3**	**4.3**	**4.4**	**4.9**	**3.4**	**1.9**	**6.5**	**8.1**	**3.9**
Aroclor 1262	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Aroclor 1268	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Aroclor, Total	mg/kg	**20**	**20**	0.60 U	**13000**	**2.7**	0.60 U	3.00 U	3.00 U	0.60 U	**26**	**2.76**	ND	**2.63**	**12.4**	**16.9**	**19.7**	**28.4**	**25.9**	**8.3**	**7.7**	**8.6**	**8.1**	**7.6**

Red: >100 ppm; Orange: >50 ppm; Yellow: >10 ppm; Green: >1 ppm; Bold - Detected; U - Not Detected;
J - Estimated; NA - Not Analyzed

Table 3-2
Historical PCB Analytical Results
Former Tombarello Property
Lawrence, Massachusetts

Sample Location		X-07	X-08	X-10	X-11	X-12	Z-00	Z-01	Z-02	Z-03	Z-04	Z-05	Z-06	Z-07	Z-08	Z-09
Sample Depth (ft)		0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5
Sample Date		10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10
QC Identifier																
	Units															
Aroclor 1016	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Aroclor 1242	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Aroclor 1248	mg/kg	**1.2**	ND	**4.5**	**0.85**	**2.0**	ND	ND	ND	ND	ND	ND	ND	ND	ND	**6.0**
Aroclor 1254	mg/kg	**2.3**	**3.0**	**7.3**	**5.0**	**5.4**	ND	ND	ND	ND	ND	**1.9**	**3.7**	**17**	**7.3**	**9.0**
Aroclor 1260	mg/kg	**1.2**	**1.1**	**5.2**	**2.2**	**3.8**	ND	**3.0**	**3.6**	**12**	**15**	**2.6**	**6.6**	**3.1**	**11**	**3.5**
Aroclor 1262	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Aroclor 1268	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Aroclor, Total	mg/kg	**4.7**	**4.1**	**17**	**8.05**	**11.2**	ND	**3.0**	**3.6**	**12**	**15**	**4.5**	**10.3**	**20.1**	**18.3**	**18.5**

Red: >100 ppm; Orange: >50 ppm; Yellow: >10 ppm; Green: >1 ppm; Bold - Detected; U - Not Detected;
J - Estimated; NA - Not Analyzed

Table 3-3
Summary of TBA Metals and Cyanide Soil Sample Results
Former Tombarello Property
Lawrence, Massachusetts

Sample Location						BPA-01		BPA-02			CD-34		CD-34E		CD-34N		CD-34S			CD-34W		CD-45	
Sample Depth (ft)						1 - 2	2 - 3	1 - 2	2 - 3	6 - 7	3 - 4	7 - 8	0 - 1	1 - 3	0 - 1	1 - 3	0 - 1	1 - 3		0 - 1	1 - 3	3 - 4	7 - 8
Sample Date						06/07/16	06/07/16	06/07/16	06/07/16	06/07/16	06/06/16	06/06/16	06/06/16	06/06/16	06/06/16	06/06/16	06/06/16	06/06/16		06/06/16	06/06/16	06/06/16	06/06/16
QC Identifier																		FD	FD				
	Units	**S-1/GW-1**	**S-1/GW-2**	**S-1/GW-3**	**Soil UCL**																		
Metals																							
Arsenic	mg/kg	20	20	20	500	**7.6**	**8.1**	**13**	**6.9**	**7.0**	NA	NA	NA	NA	NA	**20**	**5.5**	NA	NA	NA	NA	**11**	**6.2**
Barium	mg/kg	1000	1000	1000	10000	**22**	**150**	**970**	**310**	**23**	NA	NA	NA	NA	NA	**140**	**50**	NA	NA	NA	NA	**170**	**25**
Cadmium	mg/kg	70	70	70	1000	**8.8**	**2.6**	**22**	**7.0**	0.24 U	NA	NA	NA	NA	NA	**0.97**	**1.1**	NA	NA	NA	NA	**11**	0.23 U
Chromium	mg/kg	100	100	100	2000	**25**	**33**	**99**	**32**	**11**	NA	NA	NA	NA	NA	**38**	**100**	NA	NA	NA	NA	**55**	**13**
Chromium-Hexavalent	mg/kg	100	100	100	2000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lead	mg/kg	200	200	200	6000	**18**	**240**	**5300**	**590**	**5.7**	NA	NA	NA	NA	NA	**650**	**280**	NA	NA	NA	NA	**3700**	**5.0**
Mercury	mg/kg	20	20	20	300	**0.013 J**	**0.42**	**2.8**	**0.88**	0.05 U	NA	NA	NA	NA	NA	**0.34**	**0.18**	NA	NA	NA	NA	**0.73**	**0.008 J**
Selenium	mg/kg	400	400	400	7000	**1.4**	**2.1**	**5.4**	**3.5**	**2.8**	NA	NA	NA	NA	NA	**3.2**	**1.2**	NA	NA	NA	NA	**4.0**	**1.1 J**
Silver	mg/kg	100	100	100	2000	**0.21 J**	**0.27 J**	**3.7**	**1.3**	1.5 U	NA	NA	NA	NA	NA	**0.39 J**	**0.42 J**	NA	NA	NA	NA	**1.4 J**	1.4 U
General Chemistry																							
Cyanide	mg/kg	30	30	30	5000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cyanide (PAC)	mg/kg	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Percent Moisture	%	--	--	--	--	**4.5 J**	**8.4 J**	**10**	**10**	**23**	**15**	**24**	**6.3 J**	**9.9 J**	**6 J**	**12**	**5.7 J**	**11**	**9.7 J**	**5.7 J**	**11**	**30**	**25**

Red Shading - UCL Exceeded; Black Shading - Method 1 Std Exceeded; Bold - Detected; U - Not Detected;
J - Estimated; NA - Not Analyzed

Table 3-3
Summary of TBA Metals and Cyanide Soil Sample Results
Former Tombarello Property
Lawrence, Massachusetts

Sample Location						CD-45E		CD-45N		CD-45S			CD-45W		D-5			D-5E		D-5N		FB-01		
Sample Depth (ft)						0 - 1	1 - 3	0 - 1	1 - 3	0 - 1	1 - 3		0 - 1	1 - 3	0 - 2	2 - 3	6 - 7	0 - 1	1 - 3	0 - 1	1 - 3	1 - 2	2 - 3	5 - 7
Sample Date						06/06/16	06/06/16	06/06/16	06/06/16	06/06/16	06/06/16		06/06/16	06/06/16	06/06/16	06/06/16	06/06/16	06/06/16	06/06/16	06/06/16	06/06/16	06/06/16	06/06/16	06/06/16
QC Identifier											FD	FD												
	Units	**S-1/GW-1**	**S-1/GW-2**	**S-1/GW-3**	**Soil UCL**																			
Metals																								
Arsenic	mg/kg	20	20	20	500	NA	**20**	NA	NA	NA	**16**	**12**	NA	NA	NA	NA	NA	NA	**5.1**	**8.5**	NA	**5.8**	**7.5**	**8.7**
Barium	mg/kg	1000	1000	1000	10000	NA	**1700**	NA	NA	NA	**530**	**460**	NA	NA	NA	NA	NA	NA	**98**	**100**	NA	**36**	**51**	**29**
Cadmium	mg/kg	70	70	70	1000	NA	**37**	NA	NA	NA	**14**	**10**	NA	NA	NA	NA	NA	NA	**0.61**	**2.2**	NA	**0.13 J**	**0.84**	0.24 U
Chromium	mg/kg	100	100	100	2000	NA	**110**	NA	NA	NA	**90**	**130**	NA	NA	NA	NA	NA	NA	**19**	**49**	NA	**22**	**24**	**16**
Chromium-Hexavalent	mg/kg	100	100	100	2000	NA	NA	NA	NA	NA	**0.749**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lead	mg/kg	200	200	200	6000	NA	**6400**	NA	NA	NA	**8600 J**	**2300 J**	NA	NA	NA	NA	NA	NA	**180**	**370**	NA	**38**	**350**	**15**
Mercury	mg/kg	20	20	20	300	NA	**6.5**	NA	NA	NA	**4.7**	**5.8**	NA	NA	NA	NA	NA	NA	**0.32**	**0.72**	NA	**0.037 J**	**0.14**	**0.019 J**
Selenium	mg/kg	400	400	400	7000	NA	1.6 U	NA	NA	NA	**3.2 J**	**1.8 J**	NA	NA	NA	NA	NA	NA	**0.91 J**	**1.6**	NA	**1 J**	**0.99 J**	**1.7**
Silver	mg/kg	100	100	100	2000	NA	**3.0**	NA	NA	NA	**5.9 J**	**1.9 J**	NA	NA	NA	NA	NA	NA	**0.28 J**	**0.85 J**	NA	**0.15 J**	**0.2 J**	**0.15 J**
General Chemistry																								
Cyanide	mg/kg	30	30	30	5000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.397 U	0.465 U	0.643 U
Cyanide (PAC)	mg/kg	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.05 U	1.18 U	1.3 U
Percent Moisture	%	--	--	--	--	**14**	**11**	**6.7 J**	**14**	**5.5 J**	**11**	**13**	**8.1 J**	**8.1 J**	**13**	**11**	**25**	**7.1 J**	**12**	**9.2 J**	**11**	**7.7 J**	**15**	**23**

Red Shading - UCL Exceeded; Black Shading - Method 1 Std Exceeded; Bold - Detected; U - Not Detected;
J - Estimated; NA - Not Analyzed

Table 3-3
Summary of TBA Metals and Cyanide Soil Sample Results
Former Tombarello Property
Lawrence, Massachusetts

Sample Location						FB-02		FB-03		FB-04				FG-34		FG-34N		FG-34S		FG-34W		FG-45E	
Sample Depth (ft)						1 - 2	2 - 3	1 - 2	2 - 3	1 - 2	2 - 3	5 - 7		0 - 1	1 - 3	0 - 1	1 - 3	0 - 1	1 - 3	0 - 1	1 - 3	0 - 1	1 - 3
Sample Date						06/07/16	06/07/16	06/06/16	06/06/16	06/06/16	06/06/16	06/06/16		06/07/16	06/07/16	06/07/16	06/07/16	06/07/16	06/07/16	06/07/16	06/07/16	06/08/16	06/08/16
QC Identifier												FD	FD									FD	FD
	Units	**S-1/GW-1**	**S-1/GW-2**	**S-1/GW-3**	**Soil UCL**																		
Metals																							
Arsenic	mg/kg	20	20	20	500	**8.8 J**	**10 J**	**4.5**	**5.4**	**7.3**	**6.9**	**7.5**	**7.2**	NA	NA	NA	NA	**14**	NA	NA	**10**	NA	NA	**5.2**
Barium	mg/kg	1000	1000	1000	10000	**54**	**50**	**18**	**30**	**33**	**52**	**74**	**62**	NA	NA	NA	NA	**140**	NA	NA	**250**	NA	NA	**20**
Cadmium	mg/kg	70	70	70	1000	**0.76**	**0.64**	0.24 U	**0.12 J**	**0.052 J**	**0.36**	**0.8**	**0.56**	NA	NA	NA	NA	**2.7**	NA	NA	**6.4**	NA	NA	0.23 U
Chromium	mg/kg	100	100	100	2000	**35**	**37**	**8.6**	**20**	**27**	**29**	**26**	**38**	NA	NA	NA	NA	**91**	NA	NA	**51**	NA	NA	**12**
Chromium-Hexavalent	mg/kg	100	100	100	2000	NA	NA	NA	0.53 U	0.533 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lead	mg/kg	200	200	200	6000	**46 J**	**120 J**	**7.6**	**76**	**29**	**35**	**110**	**130**	NA	NA	NA	NA	**720**	NA	NA	**1000**	NA	NA	**12**
Mercury	mg/kg	20	20	20	300	**0.084 J-**	**0.08 J-**	**0.014 J**	**0.17**	**0.055**	**0.027 J**	**0.088**	**0.15**	NA	NA	NA	NA	**1.2**	NA	NA	**0.44**	NA	NA	**0.015 J**
Selenium	mg/kg	400	400	400	7000	**0.71 J**	**1.8**	**0.76 J**	1.4 U	**0.68 J**	1.3 U	**1.2**	**1.3 J**	NA	NA	NA	NA	**3.2**	NA	NA	**4.7**	NA	NA	**2.7**
Silver	mg/kg	100	100	100	2000	**0.22 J**	**0.2 J**	1.5 U	**0.11 J**	**0.18 J**	**0.13 J**	**0.24 J**	**0.33 J**	NA	NA	NA	NA	**0.9 J**	NA	NA	**0.95 J**	NA	NA	**0.12 J**
General Chemistry																							
Cyanide	mg/kg	30	30	30	5000	0.54 U	0.547 U	0.526 U	0.499 U	0.453 U	0.571 U	0.539 U	0.555 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cyanide (PAC)	mg/kg	--	--	--	--	1.07 U	1.11 U	1.14 U	1.07 U	1.07 U	1.13 U	1.24 U	1.26 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Percent Moisture	%	--	--	--	--	**7.9 J**	**10**	**12**	**7.1 J**	**6.3 J**	**10**	**20**	**22**	**12**	**22**	**11**	**18**	**9.6 J**	**20**	**13**	**17**	**8 J**	**7.7 J**	**18**

Red Shading - UCL Exceeded; Black Shading - Method 1 Std Exceeded; Bold - Detected; U - Not Detected;
J - Estimated; NA - Not Analyzed

Table 3-3
Summary of TBA Metals and Cyanide Soil Sample Results
Former Tombarello Property
Lawrence, Massachusetts

Sample Location						FG-45N		FG-45S			FG-45W		G-3			G-3E		G-3N		G-3S		G-3W	
Sample Depth (ft)						0 - 1	1 - 3	0 - 1	1 - 3		0 - 1	1 - 3	1 - 2	2 - 3	5 - 6	0 - 2	2 - 3	0 - 1	2 - 3	0 - 1	2 - 3	0 - 1	2 - 3
Sample Date						06/08/16	06/08/16	06/08/16	06/08/16		06/08/16	06/08/16	06/07/16	06/07/16	06/07/16	06/07/16	06/07/16	06/07/16	06/07/16	06/07/16	06/07/16	06/07/16	06/07/16
QC Identifier									FD	FD													
	Units	**S-1/GW-1**	**S-1/GW-2**	**S-1/GW-3**	**Soil UCL**																		
Metals																							
Arsenic	mg/kg	20	20	20	500	NA	NA	NA	NA	NA	**9.4**	NA	NA	NA	NA	NA	NA	**10**	NA	NA	**10 J**	NA	NA
Barium	mg/kg	1000	1000	1000	10000	NA	NA	NA	NA	NA	**99**	NA	NA	NA	NA	NA	NA	**220**	NA	NA	**320 J**	NA	NA
Cadmium	mg/kg	70	70	70	1000	NA	NA	NA	NA	NA	**2.0**	NA	NA	NA	NA	NA	NA	**5.5**	NA	NA	**2.7 J**	NA	NA
Chromium	mg/kg	100	100	100	2000	NA	NA	NA	NA	NA	**37**	NA	NA	NA	NA	NA	NA	**47**	NA	NA	**23 J**	NA	NA
Chromium-Hexavalent	mg/kg	100	100	100	2000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lead	mg/kg	200	200	200	6000	NA	NA	NA	NA	NA	**310**	NA	NA	NA	NA	NA	NA	**2100**	NA	NA	**290 J**	NA	NA
Mercury	mg/kg	20	20	20	300	NA	NA	NA	NA	NA	**0.49**	NA	NA	NA	NA	NA	NA	**0.94**	NA	NA	**0.18**	NA	NA
Selenium	mg/kg	400	400	400	7000	NA	NA	NA	NA	NA	**3.7**	NA	NA	NA	NA	NA	NA	**5.4**	NA	NA	**4.1**	NA	NA
Silver	mg/kg	100	100	100	2000	NA	NA	NA	NA	NA	**1.6**	NA	NA	NA	NA	NA	NA	**1.5**	NA	NA	**0.39 J**	NA	NA
General Chemistry																							
Cyanide	mg/kg	30	30	30	5000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cyanide (PAC)	mg/kg	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Percent Moisture	%	--	--	--	--	**7.1 J**	**22**	**12**	**17**	**19**	**11**	**17**	**26**	**23**	**20**	**11**	**11**	**12**	**14**	**16**	**24**	**14**	**21**

Red Shading - UCL Exceeded; Black Shading - Method 1 Std Exceeded; Bold - Detected; U - Not Detected;
J - Estimated; NA - Not Analyzed

Table 3-3
Summary of TBA Metals and Cyanide Soil Sample Results
Former Tombarello Property
Lawrence, Massachusetts

Sample Location						HA-01		HA-02	HA-03	HA-04	HA-05	HA-06	HA-07		HA-08	HA-09	HA-10	HA-11	HA-12	LS-01		LS-02	
Sample Depth (ft)						0 - 1		0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1		0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	1 - 3	7 - 8	1 - 2	2 - 3
Sample Date						06/09/16		06/09/16	06/09/16	06/09/16	06/09/16	06/09/16	06/09/16		06/09/16	06/09/16	06/09/16	06/09/16	06/09/16	06/09/16	06/09/16	06/09/16	06/09/16
QC Identifier						FD	FD						FD	FD									
	Units	**S-1/GW-1**	**S-1/GW-2**	**S-1/GW-3**	**Soil UCL**																		
Metals																							
Arsenic	mg/kg	20	20	20	500	**40 J**	**16 J**	**17**	**11**	**13**	**17**	**27**	**16**	**18**	**11**	**12**	**11**	**13**	**20**	**5.9**	**5.8**	**11**	**22**
Barium	mg/kg	1000	1000	1000	10000	**480**	**480**	**450**	**150**	**310**	**300**	**370**	**450**	**520**	**260 J**	**170**	**320**	**300**	**370**	**23**	**31**	**70**	**850**
Cadmium	mg/kg	70	70	70	1000	**9.6**	**9.3**	**15**	**5.6**	**5.8**	**7.7**	**14**	**12**	**14**	**4.8 J**	**7.3**	**3.8**	**11**	**13**	**0.16 J**	0.25 U	**0.65**	**5.8**
Chromium	mg/kg	100	100	100	2000	**92**	**74**	**120**	**55 J**	**54**	**310**	**180**	**93**	**92**	**47 J**	**51**	**38**	**68**	**230**	**13**	**12**	**44**	**55**
Chromium-Hexavalent	mg/kg	100	100	100	2000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lead	mg/kg	200	200	200	6000	**5700 J**	**910 J**	**1200**	**810 J**	**940**	**730**	**860**	**1500**	**2000**	**1600 J**	**310**	**720**	**1100**	**1400**	**15**	**5.5**	**67**	**1400**
Mercury	mg/kg	20	20	20	300	**0.43**	**0.38**	**4.0**	**1.7**	**1.8**	**1.1**	**1.8**	**2.3 J**	**2.9**	**1.4**	**0.38**	**1.1**	**4.1**	**4.9**	**0.037 J**	0.05 U	**0.1**	**3.6**
Selenium	mg/kg	400	400	400	7000	**2.8**	**2.5**	**1.5**	**2.0**	**1.5**	1.3 U	1.2 U	1.2 U	**1.1 J**	**1.6**	**2.9**	**2.9**	1.1 U	1.4 U	**1 J**	**1.5 J**	**1.5**	1.6 U
Silver	mg/kg	100	100	100	2000	**1.4**	1.4 U	1.5 U	1.4 U	**2.6**	1.3 U	1.2 U	**1.6**	**1.8**	**1.4**	1.3 U	1.4 U	**2.0**	**1.6**	1 U	1.5 U	1 U	1.6 U
General Chemistry																							
Cyanide	mg/kg	30	30	30	5000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cyanide (PAC)	mg/kg	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Percent Moisture	%	--	--	--	--	**12**	**12**	**8.3 J**	**7.2 J**	**9.2 J**	**8.8 J**	**11**	**13**	**13**	**7.7 J**	**12**	**9 J**	**9.1 J**	**8.2 J**	**6.3 J**	**22**	**5.5 J**	**24**

Red Shading - UCL Exceeded; Black Shading - Method 1 Std Exceeded; Bold - Detected; U - Not Detected;
J - Estimated; NA - Not Analyzed

Table 3-3
Summary of TBA Metals and Cyanide Soil Sample Results
Former Tombarello Property
Lawrence, Massachusetts

Sample Location						M-4		M-4E		M-4N		M-4S	M-4W	M-7			M-7E		M-7S		M-7W	
Sample Depth (ft)						2 - 3	12 - 13	0 - 1	1 - 3	0 - 1	1 - 3	1 - 3	1 - 3	1 - 2	2 - 3	6 - 7	0 - 1	1 - 3	0 - 1	1 - 3	0 - 1	1 - 3
Sample Date						06/09/16	06/09/16	06/09/16	06/09/16	06/09/16	06/09/16	06/09/16	06/09/16	06/07/16	06/07/16	06/07/16	06/07/16	06/07/16	06/07/16	06/07/16	06/07/16	06/07/16
QC Identifier																						
	Units	**S-1/GW-1**	**S-1/GW-2**	**S-1/GW-3**	**Soil UCL**																	
Metals																						
Arsenic	mg/kg	20	20	20	500	NA	NA	NA	NA	NA	**35**	**15**	NA	NA	**4.5**	NA	NA	**21**	NA	NA	NA	NA
Barium	mg/kg	1000	1000	1000	10000	NA	NA	NA	NA	NA	**610**	**1100**	NA	NA	**23**	NA	NA	**950**	NA	NA	NA	NA
Cadmium	mg/kg	70	70	70	1000	NA	NA	NA	NA	NA	**11**	**3.9**	NA	NA	0.25 U	NA	NA	**16**	NA	NA	NA	NA
Chromium	mg/kg	100	100	100	2000	NA	NA	NA	NA	NA	**54**	**66**	NA	NA	**14**	NA	NA	**81**	NA	NA	NA	NA
Chromium-Hexavalent	mg/kg	100	100	100	2000	NA	NA	NA	NA	NA	NA	6.61 UJ	NA	NA	NA	NA	NA	NA	NA	NA	0.588 U	NA
Lead	mg/kg	200	200	200	6000	NA	NA	NA	NA	NA	**1400**	**1300**	NA	NA	**14**	NA	NA	**1800**	NA	NA	NA	NA
Mercury	mg/kg	20	20	20	300	NA	NA	NA	NA	NA	**1.2**	**3.8 J**	NA	NA	**0.055**	NA	NA	**2.8**	NA	NA	NA	NA
Selenium	mg/kg	400	400	400	7000	NA	NA	NA	NA	NA	0.87 U	1.8 U	NA	NA	**2.6**	NA	NA	**7.2**	NA	NA	NA	NA
Silver	mg/kg	100	100	100	2000	NA	NA	NA	NA	NA	0.87 U	1.8 U	NA	NA	**0.11 J**	NA	NA	**2.0**	NA	NA	NA	NA
General Chemistry																						
Cyanide	mg/kg	30	30	30	5000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cyanide (PAC)	mg/kg	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Percent Moisture	%	--	--	--	--	**28**	**22**	**12**	**12**	**13**	**11**	**23**	**19**	**8.9 J**	**23**	**22**	**14**	**20**	**16**	**13**	**9.9 J**	**25**

Red Shading - UCL Exceeded; Black Shading - Method 1 Std Exceeded; Bold - Detected; U - Not Detected;
J - Estimated; NA - Not Analyzed

Table 3-3
Summary of TBA Metals and Cyanide Soil Sample Results
Former Tombarello Property
Lawrence, Massachusetts

Sample Location						MS-01		MS-02		MS-03		NPA-01		NPA-02		NPA-03		NPA-04		NPA-05		NPA-06	
Sample Depth (ft)						1 - 2	2 - 3	1 - 2	2 - 3	1 - 2	2 - 3	0.5 - 2	2 - 3	0.5 - 2	2 - 3	0.5 - 2	2 - 3	0.5 - 2	2 - 3	0.5 - 2	2 - 3	0.5 - 2	2 - 3
Sample Date						06/10/16	06/10/16	06/10/16	06/10/16	06/10/16	06/10/16	06/10/16	06/10/16	06/10/16	06/10/16	06/10/16	06/10/16	06/10/16	06/10/16	06/10/16	06/10/16	06/10/16	06/10/16
QC Identifier																							
	Units	**S-1/GW-1**	**S-1/GW-2**	**S-1/GW-3**	**Soil UCL**																		
Metals																							
Arsenic	mg/kg	20	20	20	500	**9.4**	**9.6**	**8.7**	**8.9**	**8.1**	**8.3**	**5.1**	**8.9**	**6.2 J**	**8.4 J**	**9.3**	**4.9**	**7.0**	**8.5**	**8.6**	**13**	**18**	**9.8**
Barium	mg/kg	1000	1000	1000	10000	**190**	**85**	**120**	**210**	**130**	**110**	**87**	**32**	**58**	**49**	**91**	**91**	**65**	**39**	**97**	**66**	**140**	**450**
Cadmium	mg/kg	70	70	70	1000	**0.37**	**1.0**	**2.0**	**4.9**	**2.0**	**1.4**	**0.61**	**0.2**	**0.63**	**0.15 J**	**0.33**	**0.19 J**	**0.46**	**1.1**	**0.62**	**9**	**0.74**	**5.8**
Chromium	mg/kg	100	100	100	2000	**44**	**26**	**45**	**45**	**21**	**26**	**18**	**13**	**21**	**17**	**32**	**10**	**26**	**15**	**15**	**25**	**56**	**43**
Chromium-Hexavalent	mg/kg	100	100	100	2000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lead	mg/kg	200	200	200	6000	**230**	**190**	**160**	**490**	**190**	**210**	**350**	**100**	**230**	**160**	**390**	**600**	**450**	**250**	**270**	**370**	**320**	**750**
Mercury	mg/kg	20	20	20	300	**0.076**	**1.2**	**0.21**	**0.38**	**0.11**	**0.18**	**0.83**	**0.27**	**0.12**	**0.12**	**0.18**	**0.21**	**0.37**	**0.15**	**0.31**	**0.95**	**0.32**	**0.22**
Selenium	mg/kg	400	400	400	7000	**0.88 J**	**1.1 J**	**1 J**	**0.79 J**	**0.71 J**	**0.78 J**	**0.83 J**	**0.73 J**	**0.75 J**	1.4 U	**1.3 J**	1.5 U	1.3 U	1.4 U	1.6 U	**0.68 J**	**2.0**	1.3 U
Silver	mg/kg	100	100	100	2000	1.4 U	1.3 U	**0.32 J**	**0.13 J**	1.5 U	**0.078 J**	1.2 U	1 U	1.4 U	1.4 U	1.4 U	1.5 U	1.3 U	1.4 U	1.6 U	**0.21 J**	**0.18 J**	**0.15 J**
General Chemistry																							
Cyanide	mg/kg	30	30	30	5000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cyanide (PAC)	mg/kg	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Percent Moisture	%	--	--	--	--	**2.3 J**	**15**	**5 J**	**9.6 J**	**6.4 J**	**7.4 J**	**8.1 J**	**10**	**11**	**9 J**	**8.2 J**	**12**	**6.2 J**	**8.4 J**	**13**	**13**	**11**	**13**

Red Shading - UCL Exceeded; Black Shading - Method 1 Std Exceeded; Bold - Detected; U - Not Detected;
J - Estimated; NA - Not Analyzed

Table 3-3
Summary of TBA Metals and Cyanide Soil Sample Results
Former Tombarello Property
Lawrence, Massachusetts

Sample Location						NPA-07		P-13			P-13N		P-13S			P-13W		SA-01	SB-3		SB-3E		SB-3N
Sample Depth (ft)						0.5 - 2	2 - 3	1 - 2	2 - 3	9 - 10	0 - 1	1 - 3	0 - 1	1 - 3		0 - 1	1 - 3	1 - 3	2 - 3	5 - 6	0 - 1	1 - 3	1 - 3
Sample Date						06/10/16	06/10/16	06/08/16	06/08/16	06/08/16	06/08/16	06/08/16	06/08/16	06/08/16		06/08/16	06/08/16	06/09/16	06/09/16	06/09/16	06/09/16	06/09/16	06/09/16
QC Identifier														FD	FD								
	Units	**S-1/GW-1**	**S-1/GW-2**	**S-1/GW-3**	**Soil UCL**																		
Metals																							
Arsenic	mg/kg	20	20	20	500	**8.4**	**9.9**	**42**	NA	NA	NA	NA	**14**	NA	NA	NA	NA	**29 J**	NA	NA	NA	NA	**21**
Barium	mg/kg	1000	1000	1000	10000	**120**	**140**	**600**	NA	NA	NA	NA	**350**	NA	NA	NA	NA	**880 J**	NA	NA	NA	NA	**3400**
Cadmium	mg/kg	70	70	70	1000	**1.3**	**0.45**	**9.8**	NA	NA	NA	NA	**13**	NA	NA	NA	NA	**8.6**	NA	NA	NA	NA	**5.3**
Chromium	mg/kg	100	100	100	2000	**32**	**22**	**130**	NA	NA	NA	NA	**200**	NA	NA	NA	NA	**90 J+**	NA	NA	NA	NA	**31**
Chromium-Hexavalent	mg/kg	100	100	100	2000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lead	mg/kg	200	200	200	6000	**450**	**710**	**2400**	NA	NA	NA	NA	**1700**	NA	NA	NA	NA	**1400 J**	NA	NA	NA	NA	**3800**
Mercury	mg/kg	20	20	20	300	**1.3**	**0.5**	**5.3**	NA	NA	NA	NA	**4.1**	NA	NA	NA	NA	**5.0**	NA	NA	NA	NA	**5.4**
Selenium	mg/kg	400	400	400	7000	1.5 U	**0.52 J**	1.3 U	NA	NA	NA	NA	**2.4**	NA	NA	NA	NA	1.4 UJ	NA	NA	NA	NA	**2.5**
Silver	mg/kg	100	100	100	2000	**0.1 J**	**0.12 J**	**2.5**	NA	NA	NA	NA	**4.2**	NA	NA	NA	NA	**0.35 J**	NA	NA	NA	NA	**1.3 J**
General Chemistry																							
Cyanide	mg/kg	30	30	30	5000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cyanide (PAC)	mg/kg	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Percent Moisture	%	--	--	--	--	**11**	**3.2 J**	**18**	**19**	**25**	**18**	**25**	**13**	**13**	**14**	**14**	**37**	**19**	**14**	**18**	**3.9 J**	**14**	**15**

Red Shading - UCL Exceeded; Black Shading - Method 1 Std Exceeded; Bold - Detected; U - Not Detected;
J - Estimated; NA - Not Analyzed

Table 3-3
Summary of TBA Metals and Cyanide Soil Sample Results
Former Tombarello Property
Lawrence, Massachusetts

Sample Location						SB-3S		SB-3W	SBB-3W	SS-01		SVA-01		SVA-02		SVA-03			SVA-04		SVA-05		SVA-06	
Sample Depth (ft)						0 - 1	1 - 3	0 - 1	1 - 3	1 - 2	7 - 8	0 - 1	1 - 3	0 - 1	1 - 3	0 - 1	1 - 3		0 - 1	1 - 3	0 - 1	1 - 3	0 - 1	1 - 3
Sample Date						06/09/16	06/09/16	06/09/16	06/09/16	06/08/16	06/08/16	06/07/16	06/07/16	06/08/16	06/08/16	06/08/16	06/08/16		06/08/16	06/08/16	06/08/16	06/08/16	06/08/16	06/08/16
QC Identifier																	FD	FD						
	Units	**S-1/GW-1**	**S-1/GW-2**	**S-1/GW-3**	**Soil UCL**																			
Metals																								
Arsenic	mg/kg	20	20	20	500	**50**	NA	NA	NA	**8.9**	**20**	**8.9**	**7.7**	**19**	**15**	**11 J**	**28 J**	**53 J**	**11**	**16**	**12**	**13**	0.72 U	**10**
Barium	mg/kg	1000	1000	1000	10000	**150**	NA	NA	NA	**110**	**1600**	**120**	**57**	**350**	**480**	**120**	**1200**	**1100**	**270**	**520**	**270**	**250**	**170**	**160**
Cadmium	mg/kg	70	70	70	1000	**4.1**	NA	NA	NA	**1.3**	**4.6**	**1.9**	**0.48**	**6.2**	**5.6**	**2.7**	**6.7**	**7.8**	**4.2**	**3.1**	**13**	**12**	**24**	**6.2**
Chromium	mg/kg	100	100	100	2000	**83**	NA	NA	NA	**51**	**46**	**42**	**18**	**61**	**42**	**57 J**	**440 J**	**450 J**	**50**	**48**	**110**	**120**	**40000**	**100**
Chromium-Hexavalent	mg/kg	100	100	100	2000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.605 U	3.09 U	NA	NA	NA	NA	NA	NA
Lead	mg/kg	200	200	200	6000	**500**	NA	NA	NA	**210**	**3100**	**740**	**38**	**1000**	**1200**	**380 J**	**6700 J**	**5400 J**	**1400**	**2900**	**1400**	**1100**	**680**	**930**
Mercury	mg/kg	20	20	20	300	**0.92**	NA	NA	NA	**0.49**	**0.91**	**0.49**	**0.071**	**1.8**	**0.99**	**1.5 J**	**0.48 J**	**0.57 J**	**2.6**	**1.9**	**4.4**	**4.8**	**11**	**2.4**
Selenium	mg/kg	400	400	400	7000	**3.6**	NA	NA	NA	**2.1**	**11**	**3.2**	**3.2**	**5.7**	**5.2**	**4.9 J**	**9.7 J**	**4 J**	**5.6**	**8.5**	**3.8**	**5.1**	1.1 U	**5.6**
Silver	mg/kg	100	100	100	2000	**1.4**	NA	NA	NA	**0.8 J**	**2.4**	**2.7**	**0.22 J**	**2.0**	**1.4 J**	**1.6**	**2.7**	**2.7**	**1.4**	**8.0**	**3.1**	**3.0**	**1.7**	**2.2**
General Chemistry																								
Cyanide	mg/kg	30	30	30	5000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cyanide (PAC)	mg/kg	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Percent Moisture	%	--	--	--	--	**8.8 J**	**8.6 J**	**3.4 J**	**8.3 J**	**10**	**41**	**6.6 J**	**21**	**9.2 J**	**17**	**8.4 J**	**23**	**26**	**11**	**23**	**13**	**15**	**15**	**11**

Red Shading - UCL Exceeded; Black Shading - Method 1 Std Exceeded; Bold - Detected; U - Not Detected;
J - Estimated; NA - Not Analyzed

Table 3-3
Summary of TBA Metals and Cyanide Soil Sample Results
Former Tombarello Property
Lawrence, Massachusetts

Sample Location						SVA-07		SVA-08		TP-01		TP-02		TP-03		TP-04		TP-05		TP-06		TP-07	
Sample Depth (ft)						0 - 1	1 - 3	0 - 1	1 - 3	0 - 1	2 - 3	0 - 1	3 - 4	0 - 1	4 - 5	0 - 1	5 - 6	0 - 1	4 - 5	0 - 1	9 - 10	0 - 1	7 - 8
Sample Date						06/09/16	06/09/16	06/09/16	06/09/16	06/15/16	06/15/16	06/15/16	06/15/16	06/15/16	06/15/16	06/15/16	06/15/16	06/15/16	06/15/16	06/14/16	06/14/16	06/14/16	06/14/16
QC Identifier																							
	Units	**S-1/GW-1**	**S-1/GW-2**	**S-1/GW-3**	**Soil UCL**																		
Metals																							
Arsenic	mg/kg	20	20	20	500	**9.2**	**15**	**12**	**28**	**13**	**8.9**	**12**	**17**	**6.9**	**12**	**9.6**	**11**	**13 J**	0.78 UJ	**15**	**9.1**	**9.3**	**14**
Barium	mg/kg	1000	1000	1000	10000	**170**	**360**	**110**	**440**	**260**	**97**	**250**	**380**	**41**	**260**	**110**	**210**	**300 J**	**210 J**	**270**	**190**	**120**	**260**
Cadmium	mg/kg	70	70	70	1000	**4.2**	**4.8**	**1.5**	**3.7**	**8.7**	**1.8**	**7.8**	**17**	**0.14 J**	**5.9**	**1.2**	**2.1**	**4.8 J**	**29 J**	**17**	**3.2**	**8.2**	**25**
Chromium	mg/kg	100	100	100	2000	**57**	**44**	**87**	**74**	**260**	**38**	**61**	**74**	**18**	**77**	**53**	**34**	**160 J**	**86000 J**	**230**	**100**	**55**	**100**
Chromium-Hexavalent	mg/kg	100	100	100	2000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lead	mg/kg	200	200	200	6000	**610**	**1200**	**240**	**800**	**760**	**150**	**660**	**1400**	**64**	**550**	**210**	**510**	**660 J**	**1200 J**	**1200**	**430**	**510 J**	**1000**
Mercury	mg/kg	20	20	20	300	**2.7**	**2.7**	**0.6**	**1.5**	**1.4**	**0.4**	**1.1**	**3.6**	**0.093**	**1.2**	**0.2**	**1.4**	**2.2 J**	**2.6 J**	**6.9**	**1.3**	**13**	**14**
Selenium	mg/kg	400	400	400	7000	**3.0**	**1.4**	**1.1 J**	**1.7**	**5.6**	**4.2**	**6.0**	**2.8**	**3.0**	**4.5**	**5.3**	**4.3**	**3.4**	1.2 U	1.3 U	**1.2 J**	**5.4**	1.3 U
Silver	mg/kg	100	100	100	2000	**0.55 J**	**0.57 J**	**0.18 J**	**0.55 J**	**1.1 J**	1.5 U	**0.5 J**	**0.76 J**	1.6 U	**0.51 J**	1.5 U	**0.33 J**	**1.1 J**	1.2 U	**2.0**	**0.45 J**	**0.95 J**	**2.3**
General Chemistry																							
Cyanide	mg/kg	30	30	30	5000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cyanide (PAC)	mg/kg	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Percent Moisture	%	--	--	--	--	**8.7 J**	**13**	**5.8 J**	**11**	**6.1 J**	**9.3 J**	**8.7 J**	**10**	**12**	**12**	**11**	**13**	**10**	**15**	**14**	**11**	**16**	**17**

Red Shading - UCL Exceeded; Black Shading - Method 1 Std Exceeded; Bold - Detected; U - Not Detected;
J - Estimated; NA - Not Analyzed

Table 3-3
Summary of TBA Metals and Cyanide Soil Sample Results
Former Tombarello Property
Lawrence, Massachusetts

Sample Location						TP-08			TP-09		TP-10		TP-11		TP-12		TP-13		TP-14		TP-15		TP-16	
Sample Depth (ft)						0 - 1	9 - 10		0 - 1	9 - 10	0 - 1	6 - 7	0 - 1	5 - 6	0 - 1	6 - 7	0 - 1	5 - 6	0 - 1	5 - 6	0 - 1	8 - 9	0 - 1	8 - 9
Sample Date						06/14/16	06/14/16		06/14/16	06/14/16	06/14/16	06/14/16	06/16/16	06/16/16	06/15/16	06/15/16	06/15/16	06/15/16	06/15/16	06/15/16	06/14/16	06/14/16	06/14/16	06/14/16
QC Identifier							FD	FD																
	Units	**S-1/GW-1**	**S-1/GW-2**	**S-1/GW-3**	**Soil UCL**																			
Metals																								
Arsenic	mg/kg	20	20	20	500	**15**	**14**	**15**	**22**	**20**	**18**	**12**	**15**	**16**	**65**	**20**	**17**	**41**	**21**	**26**	**15**	**15**	**13**	**13**
Barium	mg/kg	1000	1000	1000	10000	**350**	**320**	**320**	**290**	**390**	**250**	**340**	**330**	**360**	**400**	**390**	**210**	**260**	**230**	**280**	**280**	**280**	**240**	**230**
Cadmium	mg/kg	70	70	70	1000	**12**	**11**	**15**	**19**	**16**	**26**	**3.2**	**18**	**26**	**18**	**20**	**16**	**27**	**11**	**15**	**11**	**15**	**21**	**12**
Chromium	mg/kg	100	100	100	2000	**140 J**	**62**	**71 J**	**150**	**95**	**130**	**44**	**150**	**170**	**91**	**260**	**270**	**14000**	**1400**	**290**	**120**	**230**	**120**	**170**
Chromium-Hexavalent	mg/kg	100	100	100	2000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lead	mg/kg	200	200	200	6000	**1400**	**1300**	**1400 J**	**1200**	**2000**	**1000**	**1000**	**1300**	**1500**	**790**	**6500**	**740**	**1100**	**1100**	**1700**	**700**	**1500**	**820**	**740**
Mercury	mg/kg	20	20	20	300	**3.1**	**2.5**	**2.1**	**6.3**	**2.4**	**3.2**	**0.96**	**14**	**18**	**4.8**	**5.7**	**6.4**	**6.1**	**4.2**	**4.1**	**3.4**	**2.1**	**16**	**12**
Selenium	mg/kg	400	400	400	7000	1.3 U	1.4 U	**1.7**	1.5 U	1.6 U	1.6 U	**1.6**	1 U	1.5 U	0.87 U	1.4 U	1.1 U	1.1 U	1.1 U	1.5 U	1.6 U	1.2 U	1.5 U	1.2 U
Silver	mg/kg	100	100	100	2000	**1.8**	**2.1**	**1.9**	**2.7**	**2.3**	**0.83 J**	**2.6**	**1.6**	**0.55 J**	**3.1**	**4.3**	**2.9**	**6.9**	**1.4**	**3.1**	**1.8**	**2.0**	**11**	**3.1**
General Chemistry																								
Cyanide	mg/kg	30	30	30	5000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cyanide (PAC)	mg/kg	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Percent Moisture	%	--	--	--	--	**14**	**18**	**25**	**15**	**29**	**15**	**17**	**9.6 J**	**14**	**8.8 J**	**12**	**9.5 J**	**12**	**9.5 J**	**13**	**8.9 J**	**12**	**10**	**12**

Red Shading - UCL Exceeded; Black Shading - Method 1 Std Exceeded; Bold - Detected; U - Not Detected;
J - Estimated; NA - Not Analyzed

Table 3-3
Summary of TBA Metals and Cyanide Soil Sample Results
Former Tombarello Property
Lawrence, Massachusetts

Sample Location						TP-17		TP-18		TP-19		TP-20			WSB-6		WSB-6N		WSB-6W	
Sample Depth (ft)						0 - 1	3 - 4	0 - 1	3 - 4	0 - 1	6 - 7	0 - 1		5 - 6	0 - 1	1 - 3	0 - 1	1 - 3	0 - 1	1 - 3
Sample Date						06/15/16	06/15/16	06/16/16	06/16/16	06/15/16	06/15/16	06/14/16		06/14/16	06/07/16	06/07/16	06/07/16	06/07/16	06/07/16	06/07/16
QC Identifier												FD	FD							
	Units	**S-1/GW-1**	**S-1/GW-2**	**S-1/GW-3**	**Soil UCL**															
Metals																				
Arsenic	mg/kg	20	20	20	500	**15**	**17**	**10**	**5.6**	**29**	**16**	NA	**12**	**18**	NA	NA	NA	NA	NA	NA
Barium	mg/kg	1000	1000	1000	10000	**280**	**300**	**240**	**34**	**370**	**280**	NA	**170**	**140**	NA	NA	NA	NA	NA	NA
Cadmium	mg/kg	70	70	70	1000	**6.9**	**6.3**	**9.9**	**0.32**	**19**	**12**	NA	**16**	**6.7**	NA	NA	NA	NA	NA	NA
Chromium	mg/kg	100	100	100	2000	**160**	**100**	**79**	**28**	**1200**	**130**	NA	**120**	**55**	NA	NA	NA	NA	NA	NA
Chromium-Hexavalent	mg/kg	100	100	100	2000	NA	NA	NA	NA	NA	0.568 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lead	mg/kg	200	200	200	6000	**780**	**920**	**690**	**26**	**2000**	**1200**	NA	**610**	**10000**	NA	NA	NA	NA	NA	NA
Mercury	mg/kg	20	20	20	300	**0.81**	**0.65**	**12**	**0.091**	**7.1**	**7.2**	NA	**0.86**	**1.2**	NA	NA	NA	NA	NA	NA
Selenium	mg/kg	400	400	400	7000	**4.7**	**4.2**	**2.7**	**0.71 J**	1.1 U	1.4 U	NA	**180**	**2.4**	NA	NA	NA	NA	NA	NA
Silver	mg/kg	100	100	100	2000	**0.34 J**	**1.3**	**2.7**	1.1 U	**2.2**	**1.6**	NA	**1.7**	**1.2 J**	NA	NA	NA	NA	NA	NA
General Chemistry																				
Cyanide	mg/kg	30	30	30	5000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cyanide (PAC)	mg/kg	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Percent Moisture	%	--	--	--	--	**6.7 J**	**7.7 J**	**8.1 J**	**4.2 J**	**7.8 J**	**10**	**6 J**	**6.6 J**	**11**	**7.5 J**	**17**	**7.2 J**	**19**	**7.8 J**	**26**

Red Shading - UCL Exceeded; Black Shading - Method 1 Std Exceeded; Bold - Detected; U - Not Detected;
J - Estimated; NA - Not Analyzed

Table 3-4
Historical Metals Soil Sample Results
Former Tombarello Property
Lawrence, Massachusetts

					Sample Location	A-05	A-06	A-07	B-04	B-05	B-06	B-07	B-08	B-09	C-05	C-06	C-07	C-08	C-09	D-05	D-06	D-07	D-08	D-09	E-02
					Sample Depth (ft)	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5
					Sample Date	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10
					QC Identifier																			
Metals	**Units**	**S-1/GW-1**	**S-1/GW-2**	**S-1/GW-3**	**Soil UCL**																			
Arsenic	mg/kg	20	20	20	500	**50**	ND	**95**	ND	ND	**64**	**94**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	**25**	**33**	ND
Barium	mg/kg	1000	1000	1000	10000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cadmium	mg/kg	70	70	70	1000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	**20**	ND	ND	ND	ND	ND	ND	ND
Chromium	mg/kg	100	100	100	2000	**94**	ND	**80**	**82**	**40**	**66**	ND	**65**	**135**	**143**	**43**	**36**	**79**	**58**	**58**	**54**	**92**	ND	**36**	**52**
Lead	mg/kg	200	200	200	6000	**557**	**248**	**1192**	**275**	**717**	**1210**	**3186**	**771**	**1129**	**1351**	**632**	**920**	**1051**	**503**	**164**	**267**	**981**	**226**	**299**	**180**
Mercury	mg/kg	20	20	20	300	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Selenium	mg/kg	400	400	400	7000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Silver	mg/kg	100	100	100	2000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

Red Shading - UCL Exceeded; Black Shading - Method 1 Std Exceeded; Bold - Detected; U - Not Detected;
J - Estimated; NA - Not Analyzed

Table 3-4
Historical Metals Soil Sample Results
Former Tombarello Property
Lawrence, Massachusetts

					Sample Location	E-05	E-07	E-08	F-08	G-08	H-08	H-09	I-08	I-09	J-04	J-05	J-08	J-09	K-08-01	K-08-02	K-04	K-05	K-06	K-07	K-08
					Sample Depth (ft)	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5
					Sample Date	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10
					QC Identifier																				
Metals	**Units**	**S-1/GW-1**	**S-1/GW-2**	**S-1/GW-3**	**Soil UCL**																				
Arsenic	mg/kg	20	20	20	500	**47**	ND	ND	ND	**42**	ND	ND	**45**	ND	ND	ND	**71**	ND	ND	ND	ND	ND	**48**	**41**	ND
Barium	mg/kg	1000	1000	1000	10000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cadmium	mg/kg	70	70	70	1000	ND	ND	ND	ND	ND	ND	ND	**40**	ND	ND	ND	**14**	ND	ND	**11.45**	ND	ND	ND	ND	ND
Chromium	mg/kg	100	100	100	2000	**75**	ND	**45**	ND	**80**	**29**	ND	**88**	ND	**72**	**83**	**98**	**52**	**55**	**71**	**64**	**52**	**196**	**55**	**69**
Lead	mg/kg	200	200	200	6000	**679**	**338**	**271**	**423**	**533**	**296**	**290**	**886**	**607**	**368**	**328**	**929**	**395**	**658**	**626**	**659**	**395**	**515**	**629**	**693**
Mercury	mg/kg	20	20	20	300	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Selenium	mg/kg	400	400	400	7000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Silver	mg/kg	100	100	100	2000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

Red Shading - UCL Exceeded; Black Shading - Method 1 Std Exceeded; Bold - Detected; U - Not Detected;
J - Estimated; NA - Not Analyzed

Table 3-4
Historical Metals Soil Sample Results
Former Tombarello Property
Lawrence, Massachusetts

					Sample Location	K-09	L-04	L-05	L-06	L-07	L-08	L-09	M-03	M-04	M-05	M-06	M-07	M-08	M-09	N-03	N-04	N-05	N-07	N-08	N-09
					Sample Depth (ft)	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5
					Sample Date	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10
					QC Identifier																			
Metals	**Units**	**S-1/GW-1**	**S-1/GW-2**	**S-1/GW-3**	**Soil UCL**																			
Arsenic	mg/kg	20	20	20	500	**55**	ND	ND	**87**	**57**	**58**	**45**	**53**	ND	ND	ND	**89**	ND	**38**	ND	**77**	**34**	**48**	**100**	**78**
Barium	mg/kg	1000	1000	1000	10000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cadmium	mg/kg	70	70	70	1000	ND	ND	ND	ND	ND	**14**	**16**	ND	**16**	ND	ND	**35**	ND	ND	**18**	**15**	ND	ND	**25**	ND
Chromium	mg/kg	100	100	100	2000	ND	**188**	**77**	**114**	**90**	**61**	**47**	**101**	**119**	**76**	**65**	**137**	**59**	**57**	**57**	**410**	**73**	**151**	**102**	**105**
Lead	mg/kg	200	200	200	6000	**447**	**2256**	**305**	**820**	**548**	**613**	**671**	**771**	**1896**	**403**	**605**	**1553**	**704**	**435**	**370**	**524**	**379**	**1117**	**1479**	**687**
Mercury	mg/kg	20	20	20	300	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Selenium	mg/kg	400	400	400	7000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Silver	mg/kg	100	100	100	2000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

Red Shading - UCL Exceeded; Black Shading - Method 1 Std Exceeded; Bold - Detected; U - Not Detected;
J - Estimated; NA - Not Analyzed

Table 3-4
Historical Metals Soil Sample Results
Former Tombarello Property
Lawrence, Massachusetts

				Sample Location		N-10	N-11	N-12	O-03	O-04	O-05	O-06	O-07	O-08	O-09	O-10	O-11	O-12	O-13	P-03	P-04	P-05	P-06	P-10	P-11
				Sample Depth (ft)		0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5
				Sample Date		10/01/10	10/01/10	10/01/10	09/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10
				QC Identifier																					
Metals	**Units**	**S-1/GW-1**	**S-1/GW-2**	**S-1/GW-3**	**Soil UCL**																				
Arsenic	mg/kg	20	20	20	500	**91**	ND	ND	ND	**45**	ND	ND	**61**	**65**	ND	ND	ND	ND	ND	**41**	ND	**33**	ND	ND	**74**
Barium	mg/kg	1000	1000	1000	10000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cadmium	mg/kg	70	70	70	1000	**23.1**	ND	ND	ND	ND	**13**	**17**	**15**	**14**	**33**	ND	ND	ND	**49**	ND	ND	ND	ND	ND	ND
Chromium	mg/kg	100	100	100	2000	**114**	**157**	**251**	**156**	**303**	**64**	**189**	**221**	**160**	**146**	**179**	**653**	**251**	**293**	**69**	**71**	**61**	**75**	**114**	**154**
Lead	mg/kg	200	200	200	6000	**1858**	**1535**	**1457**	**277**	**341**	**560**	**985**	**1095**	**937**	**798**	**1300**	**1348**	**1139**	**1143**	**484**	**486**	**425**	**377**	**1448**	**1283**
Mercury	mg/kg	20	20	20	300	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Selenium	mg/kg	400	400	400	7000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Silver	mg/kg	100	100	100	2000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

Red Shading - UCL Exceeded; Black Shading - Method 1 Std Exceeded; Bold - Detected; U - Not Detected;
J - Estimated; NA - Not Analyzed

Table 3-4
Historical Metals Soil Sample Results
Former Tombarello Property
Lawrence, Massachusetts

					Sample Location	P-12	P-13	Q-03	Q-04	Q-05	Q-06	Q-10	Q-12	Q-13	R-03	R-04	R-05	R-06	R-07	R-08	R-10	R-11	R-12	R-13	S-04-01
					Sample Depth (ft)	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5
					Sample Date	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10
					QC Identifier																				
Metals	**Units**	**S-1/GW-1**	**S-1/GW-2**	**S-1/GW-3**	**Soil UCL**																				
Arsenic	mg/kg	20	20	20	500	**63**	**74**	ND	**41**	ND	ND	**75**	**80**	**184**	ND	ND	ND	ND	**79**	**52**	ND	**63**	ND	ND	**266**
Barium	mg/kg	1000	1000	1000	10000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cadmium	mg/kg	70	70	70	1000	**22**	**40**	ND	ND	ND	ND	**22**	**23**	**29**	ND	ND	**11**	ND	**18**	ND	ND	**26**	ND	ND	ND
Chromium	mg/kg	100	100	100	2000	**122**	**261**	**65**	**62**	**92**	**125**	**159**	**99**	**152**	ND	**54**	**36**	**81**	**215**	**138**	**282**	**270**	**162**	**233**	**178**
Lead	mg/kg	200	200	200	6000	**1155**	**1566**	**486**	**515**	**294**	**900**	**1350**	**1560**	**2224**	**338**	**483**	**252**	**947**	**1646**	**848**	**1394**	**1068**	**5830**	**1565**	**415**
Mercury	mg/kg	20	20	20	300	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	**1277**
Selenium	mg/kg	400	400	400	7000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Silver	mg/kg	100	100	100	2000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

Red Shading - UCL Exceeded; Black Shading - Method 1 Std Exceeded; Bold - Detected; U - Not Detected;
J - Estimated; NA - Not Analyzed

Table 3-4
Historical Metals Soil Sample Results
Former Tombarello Property
Lawrence, Massachusetts

					Sample Location	S-04-02	S-07-01	S-08-01	S-03	S-04	S-05	S-06	S-07	S-08	S-8	S-09	S-9	S-10	S-11	S-12	S-13	SB1		SB2	
					Sample Depth (ft)	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0 - 2	2 - 4	0 - 2	2 - 4
					Sample Date	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	07/08/98	10/01/10	07/08/98	10/01/10	10/01/10	10/01/10	10/01/10	07/08/98	07/08/98	07/08/98	07/08/98
					QC Identifier																				
Metals	**Units**	**S-1/GW-1**	**S-1/GW-2**	**S-1/GW-3**	**Soil UCL**																				
Arsenic	mg/kg	20	20	20	500	ND	ND	ND	**27**	ND	ND	**47**	**64**	ND	**11.8**	**36**	**4.98**	ND	ND	ND	**58**	**4.76**	**3.22**	**2.74**	**3.18**
Barium	mg/kg	1000	1000	1000	10000	ND	ND	ND	ND	ND	ND	ND	ND	ND	**552**	ND	**52.9**	ND	ND	ND	ND	**45.5**	**25.6**	**13.3**	**16.7**
Cadmium	mg/kg	70	70	70	1000	ND	**58**	ND	ND	ND	ND	**16**	ND	**36**	**4.95**	ND	0.96 U	ND	ND	ND	ND	**1.9**	**2.62**	0.98 U	0.99 U
Chromium	mg/kg	100	100	100	2000	**48**	ND	**147**	**76**	**64**	**57**	**103**	**41**	**174**	**64**	**1265**	**38.3**	**239**	**151**	**1240**	**278**	**15.2**	**10.1**	**6.46**	**8.55**
Lead	mg/kg	200	200	200	6000	**604**	**244**	**716**	**297**	**415**	**469**	**918**	**1159**	**2053**	**1110**	**484**	**172**	**2178**	**971**	**1398**	**1468**	**146**	**712**	**26.8**	**9.74**
Mercury	mg/kg	20	20	20	300	ND	ND	ND	ND	ND	ND	ND	ND	ND	**7.13**	ND	**1.06**	ND	ND	ND	ND	**0.32**	0.1 U	**0.43**	0.1 U
Selenium	mg/kg	400	400	400	7000	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.95 U	ND	0.96 U	ND	ND	ND	ND	0.95 U	1.01 U	0.98 U	0.99 U
Silver	mg/kg	100	100	100	2000	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.95 U	ND	0.96 U	ND	ND	ND	ND	0.95 U	**2.21**	0.98 U	0.99 U

Red Shading - UCL Exceeded; Black Shading - Method 1 Std Exceeded; Bold - Detected; U - Not Detected;
J - Estimated; NA - Not Analyzed

Table 3-4
Historical Metals Soil Sample Results
Former Tombarello Property
Lawrence, Massachusetts

				Sample Location		SB3		SB4	SB5-E	SB5-N	SB5-S	SB5-W	SB5		SB6-SS1	SB6		SS-7	SS-8		SS-9	SS8-E	SS8-N	SS8-S	SS8-W
				Sample Depth (ft)		0 - 2	2 - 4	0 - 2	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 2	4 - 6	0 - 0.5	0 - 2	4 - 6	0 - 0.5	0 - 0.5		0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5
				Sample Date		07/08/98	07/08/98	07/08/98	04/28/99	04/28/99	04/28/99	04/28/99	07/08/98	07/08/98	04/28/99	07/08/98	07/08/98	04/28/99	07/08/98	04/28/99	07/08/98	04/28/99	04/28/99	04/28/99	04/28/99
				QC Identifier															FD	FD					
Metals	**Units**	**S-1/GW-1**	**S-1/GW-2**	**S-1/GW-3**	**Soil UCL**																				
Arsenic	mg/kg	20	20	20	500	**9.52**	**4.04**	**5.73**	NA	NA	NA	NA	**13.3**	**3.99**	NA	**3.62**	**4.2**	**10.7**	**11.8**	NA	**4.98**	NA	NA	NA	NA
Barium	mg/kg	1000	1000	1000	10000	**333**	**12.5**	**54**	NA	NA	NA	NA	**197**	**16.4**	NA	**44.3**	**19.8**	**141**	**552**	NA	**52.9**	NA	NA	NA	NA
Cadmium	mg/kg	70	70	70	1000	**2.67**	1.01 U	0.99 U	**5.45**	**6.6**	**0.59**	**5.4**	**5.78**	1 U	**8.21**	1.01 U	0.95 U	**8.19**	**4.95**	**2.72**	0.96 U	**3.36**	**4.58**	**3.42**	**2.98**
Chromium	mg/kg	100	100	100	2000	**60.4**	**8.69**	**33**	NA	NA	NA	NA	**57.4**	**7.19**	NA	**14.5**	**7.63**	**62.3**	**64**	NA	**38.3**	NA	NA	NA	NA
Lead	mg/kg	200	200	200	6000	**918**	**5.45**	**106**	**980**	**550**	**100**	**670**	**3470**	**8.58**	**790**	**37.4**	**4.01**	**672**	**1110**	**270**	**172**	**490**	**500**	**310**	**330**
Mercury	mg/kg	20	20	20	300	**0.97**	0.1 U	**0.5**	NA	NA	NA	NA	**2.13**	0.1 U	NA	0.1 U	0.1 U	**4.19**	**7.13**	NA	**1.06**	NA	NA	NA	NA
Selenium	mg/kg	400	400	400	7000	0.95 U	1.01 U	0.99 U	NA	NA	NA	NA	0.096 U	1 U	NA	1.01 U	0.95 U	0.95 U	0.95 U	NA	0.96 U	NA	NA	NA	NA
Silver	mg/kg	100	100	100	2000	**1.71**	1.01 U	0.99 U	NA	NA	NA	NA	0.096 U	1 U	NA	1.01 U	0.95 U	**20.8**	0.95 U	NA	0.96 U	NA	NA	NA	NA

Red Shading - UCL Exceeded; Black Shading - Method 1 Std Exceeded; Bold - Detected; U - Not Detected;
J - Estimated; NA - Not Analyzed

Table 3-4
Historical Metals Soil Sample Results
Former Tombarello Property
Lawrence, Massachusetts

					Sample Location	T-11-01	T-12-01	T-12-02	T-12-03	T-03	T-04	T-05	T-09	T-10	T-11	T-12	T-13	U-09-01	U-10-01	U-10-02	U-11-01	U-11-02	U-12-01	U-12-02	U-13-01
					Sample Depth (ft)	0.0 - 0.5	0.0 - 0.5	0.0 - 0.5	0.0 - 0.5	0.0 - 0.5	0.0 - 0.5	0.0 - 0.5	0.0 - 0.5	0.0 - 0.5	0.0 - 0.5	0.0 - 0.5	0.0 - 0.5	0.0 - 0.5	0.0 - 0.5	0.0 - 0.5	0.0 - 0.5	0.0 - 0.5	0.0 - 0.5	0.0 - 0.5
					Sample Date	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10
					QC Identifier																			
Metals	**Units**	**S-1/GW-1**	**S-1/GW-2**	**S-1/GW-3**	**Soil UCL**																			
Arsenic	mg/kg	20	20	20	500	**54**	ND	ND	ND	**88**	ND	**31**	**176**	ND	ND	**83**	ND	**135**	**102**	**235**	**60**	ND	ND	ND	ND
Barium	mg/kg	1000	1000	1000	10000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cadmium	mg/kg	70	70	70	1000	ND	ND	ND	ND	ND	ND	ND	**37**	ND	**20**	**25**	ND	**32**	**34**	**31**	ND	ND	ND	ND	ND
Chromium	mg/kg	100	100	100	2000	**236**	**204**	**216**	**179**	**133**	**84**	**41**	**291**	**38**	**185**	**110**	**116**	**237**	**255**	**223**	**195**	**288**	**254**	**322**	**224**
Lead	mg/kg	200	200	200	6000	**1012**	**1542**	**1347**	**1289**	**852**	**409**	**369**	**4992**	**512**	**1359**	**1897**	**1604**	**3133**	**2151**	**4332**	**1184**	**1092**	**1377**	**2016**	**1537**
Mercury	mg/kg	20	20	20	300	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Selenium	mg/kg	400	400	400	7000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Silver	mg/kg	100	100	100	2000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

Red Shading - UCL Exceeded; Black Shading - Method 1 Std Exceeded; Bold - Detected; U - Not Detected;
J - Estimated; NA - Not Analyzed

Table 3-4
Historical Metals Soil Sample Results
Former Tombarello Property
Lawrence, Massachusetts

				Sample Location		U-03	U-04	U-05	U-07	U-09	U-10	U-11	U-12	U-13	V-12-01	V-12-02	V-04	V-05	V-07	V-08	V-09	V-10	V-11	V-12	V-13
				Sample Depth (ft)		0.0 - 0.5	0.0 - 0.5	0.0 - 0.5	0.0 - 0.5	0.0 - 0.5	0.0 - 0.5	0.0 - 0.5	0.0 - 0.5	0.0 - 0.5	0.0 - 0.5	0.0 - 0.5	0.0 - 0.5	0.0 - 0.5	0.0 - 0.5	0.0 - 0.5	0.0 - 0.5	0.0 - 0.5	0.0 - 0.5	0.0 - 0.5	0.0 - 0.5
				Sample Date		10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10
				QC Identifier																					
Metals	**Units**	**S-1/GW-1**	**S-1/GW-2**	**S-1/GW-3**	**Soil UCL**																				
Arsenic	mg/kg	20	20	20	500	ND	ND	ND	ND	**168**	ND	ND	**52**	**76**	**50**	ND	**40**	**32**	ND	ND	**117**	ND	**69**	**92**	**49**
Barium	mg/kg	1000	1000	1000	10000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cadmium	mg/kg	70	70	70	1000	ND	ND	ND	ND	**42**	ND	**20**	ND	ND	ND	ND	ND	ND	ND	**25**	**20**	ND	**23**	ND	ND
Chromium	mg/kg	100	100	100	2000	**40**	**87**	**35**	**74**	**324**	**273**	**102**	**185**	**174**	**499**	**482**	**87**	**116**	**124**	**198**	**201**	**179**	**162**	**147**	**207**
Lead	mg/kg	200	200	200	6000	**357**	**369**	**177**	**528**	**2328**	**1797**	**1091**	**900**	**920**	**1247**	**1478**	**445**	**390**	**746**	**1624**	**1997**	**730**	**902**	**1191**	**1176**
Mercury	mg/kg	20	20	20	300	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Selenium	mg/kg	400	400	400	7000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Silver	mg/kg	100	100	100	2000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

Red Shading - UCL Exceeded; Black Shading - Method 1 Std Exceeded; Bold - Detected; U - Not Detected;
J - Estimated; NA - Not Analyzed

Table 3-4
Historical Metals Soil Sample Results
Former Tombarello Property
Lawrence, Massachusetts

					Sample Location	W-05-01	W-06-01	W-09-01	W-09-02	W-09-03	W-04	W-05	W-06	W-07	W-08	W-09	W-10	W-11	W-12	WSB-1		WSB-2		WSB-3	
					Sample Depth (ft)	0.0 - 0.5	0.0 - 0.5	0.0 - 0.5	0.0 - 0.5	0.0 - 0.5	0.0 - 0.5	0.0 - 0.5	0.0 - 0.5	0.0 - 0.5	0.0 - 0.5	0.0 - 0.5	0.0 - 0.5	0.0 - 0.5	0.0 - 0.5	1 - 3	3 - 5	1 - 3	3 - 5	0 - 1	1 - 3
					Sample Date	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	02/01/03	02/01/03	02/01/03	02/01/03	02/01/03	02/01/03
					QC Identifier																			
Metals	**Units**	**S-1/GW-1**	**S-1/GW-2**	**S-1/GW-3**	**Soil UCL**																			
Arsenic	mg/kg	20	20	20	500	ND	**75**	ND	ND	**101**	**54**	ND	**48**	**115**	ND	ND	**97**	ND	ND	**6.1**	**5.88**	**7.42**	**11**	**5.49**	**6.75**
Barium	mg/kg	1000	1000	1000	10000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	**106**	**64**	**107**	**166**	**74.4**	**142**
Cadmium	mg/kg	70	70	70	1000	ND	ND	ND	ND	ND	ND	ND	ND	**23**	ND	**17**	**35**	**27**	**25**	**4.01**	0.796 U	**716**	**20**	**1.82**	**3.86**
Chromium	mg/kg	100	100	100	2000	**64**	**103**	**230**	**190**	**577**	**192**	**36**	**106**	**128**	**107**	**125**	**258**	**194**	**826**	**23.2**	**12.4**	**34.4**	**220**	**27.5**	**30.7**
Lead	mg/kg	200	200	200	6000	**490**	**906**	**1234**	**895**	**1267**	**572**	**451**	**900**	**1319**	**1374**	**877**	**1624**	**1562**	**1027**	**1180**	**159**	**1330**	**168**	**389**	**563**
Mercury	mg/kg	20	20	20	300	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	**2.71**	**0.145**	**1.17**	0.367 U	**3.07**	**2.42**
Selenium	mg/kg	400	400	400	7000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	7.1 U	7.96 U	6.89 U	10.7 U	7.94 U	7.12 U
Silver	mg/kg	100	100	100	2000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.71 U	0.796 U	0.689 U	1.07 U	0.794 U	0.712 U

Red Shading - UCL Exceeded; Black Shading - Method 1 Std Exceeded; Bold - Detected; U - Not Detected;
J - Estimated; NA - Not Analyzed

Table 3-4
Historical Metals Soil Sample Results
Former Tombarello Property
Lawrence, Massachusetts

					Sample Location	WSB-4		WSB-5		WSB-6		WSB-7		WSB-8		WSB-9		WSB-10		WSB-11		WSB-12	
					Sample Depth (ft)	0 - 1	1 - 3	0 - 1	1 - 3	0 - 1	1 - 3	0 - 1	1 - 3	1 - 3	3 - 5	0 - 1	1 - 3	0 - 1	1 - 3	0 - 1	1 - 3	0 - 1	1 - 3
					Sample Date	02/01/03	02/01/03	02/01/03	02/01/03	02/01/03	02/01/03	02/01/03	02/01/03	02/01/03	02/01/03	02/01/03	02/01/03	02/01/03	02/01/03	02/01/03	02/01/03	02/01/03	02/01/03
					QC Identifier																		
Metals	**Units**	**S-1/GW-1**	**S-1/GW-2**	**S-1/GW-3**	**Soil UCL**																		
Arsenic	mg/kg	20	20	20	500	**8.97**	**15.6**	**13.6**	**14.2**	**17.9**	**8.52**	**9.89**	**6.13**	**4.49**	**8.1**	**7.33**	**5.56**	**69.4**	**10.8**	**6.04**	**14.3**	**8.51**	3.91 U
Barium	mg/kg	1000	1000	1000	10000	**156**	**52.9**	**344**	**867**	**55.8**	**19.4**	**70.6**	**197**	**35.3**	**184**	**228**	**18.9**	**195**	**526**	**82.3**	**176**	**376**	**46.6**
Cadmium	mg/kg	70	70	70	1000	**2.88**	0.796 U	**3.75**	**5.77**	**1.61**	0.801 U	**2.3**	**3.07**	0.669 U	**3.55**	**1.42**	0.866 U	**0.977**	**4.1**	**1.68**	**12.5**	**10.6**	0.782 U
Chromium	mg/kg	100	100	100	2000	**29.1**	**15.5**	**40**	**52.2**	**29.6**	**12.6**	**48.6**	**28.9**	**15.5**	**35.5**	**20.6**	**12.6**	**40.1**	**47**	**28.7**	**57.9**	**40.7**	**10.1**
Lead	mg/kg	200	200	200	6000	**381**	**30.2**	**2700**	**1260**	**92.2**	8.01 U	**215**	**517**	**99.2**	**464**	**94.9**	8.66 U	**789**	**1320**	**216**	**709**	**652**	**13.7**
Mercury	mg/kg	20	20	20	300	**0.912**	0.0392 U	**1.07**	1.86 U	**0.327**	0.0414 U	**1.39**	**0.535**	**0.401**	**1.29**	**0.174**	0.0433 U	**0.323**	**2.08**	**0.661**	**2.26**	**0.751**	0.0382 U
Selenium	mg/kg	400	400	400	7000	6.87 U	7.96 U	7.48 U	8.66 U	6.89 U	8.01 U	7.12 U	7.2 U	6.69 U	7.58 U	8.38 U	8.66 U	7.18 U	7.41 U	7.51 U	7.51 U	7.33 U	7.82 U
Silver	mg/kg	100	100	100	2000	0.687 U	0.796 U	0.748 U	0.866 U	0.689 U	0.801 U	0.712 U	1.62 U	0.669 U	0.758 U	0.838 U	0.866 U	0.718 U	0.741 U	0.751 U	0.751 U	0.733 U	0.782 U

Red Shading - UCL Exceeded; Black Shading - Method 1 Std Exceeded; Bold - Detected; U - Not Detected;
J - Estimated; NA - Not Analyzed

Table 3-4
Historical Metals Soil Sample Results
Former Tombarello Property
Lawrence, Massachusetts

					Sample Location	WSB-14				X-05-01	X-07-01	X-07-02	X-07-03	X-10-01	X-10-02	X-10-03	X-10-04	X-11-01	X-11-02	X-11-03	X-04	X-05	X-06
					Sample Depth (ft)	0 - 1	1 - 3	3 - 5	5 - 7	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5
					Sample Date	02/01/03	02/01/03	02/01/03	02/01/03	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10
					QC Identifier																		
Metals	**Units**	**S-1/GW-1**	**S-1/GW-2**	**S-1/GW-3**	**Soil UCL**																		
Arsenic	mg/kg	20	20	20	500	3.69 U	**14.05**	**10.7**	**4.66**	ND	**123**	**152**	**110**	ND	**77**	ND	ND	**83**	ND	**64**	ND	**51**	ND
Barium	mg/kg	1000	1000	1000	10000	**45.8**	**765**	**1480**	**18.1**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cadmium	mg/kg	70	70	70	1000	**2.11**	**6.245**	0.808 U	0.786 U	ND	ND	**40**	**41**	ND	ND	ND	ND	ND	ND	ND	**18**	ND	ND
Chromium	mg/kg	100	100	100	2000	**24.6**	**52.15**	**15.1**	**8.34**	**94**	**366**	**241**	**355**	**440**	**453**	**300**	**386**	**218**	**178**	**270**	**122**	**121**	**100**
Lead	mg/kg	200	200	200	6000	**115**	**1240**	**2230**	7.86 U	**611**	**2155**	**1896**	**1904**	**1397**	**1294**	**1415**	**1885**	**1457**	**1110**	**1391**	**1108**	**590**	**3476**
Mercury	mg/kg	20	20	20	300	**1.28**	**1.41**	**0.28**	0.0398 U	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Selenium	mg/kg	400	400	400	7000	7.38 U	7.7 U	8.08 U	7.86 U	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Silver	mg/kg	100	100	100	2000	0.738 U	**0.99**	0.808 U	0.786 U	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

Red Shading - UCL Exceeded; Black Shading - Method 1 Std Exceeded; Bold - Detected; U - Not Detected;
J - Estimated; NA - Not Analyzed

Table 3-4
Historical Metals Soil Sample Results
Former Tombarello Property
Lawrence, Massachusetts

					Sample Location	X-07	X-08	X-10	X-11	X-12	Z-00	Z-01	Z-02	Z-03	Z-04	Z-05	Z-06	Z-07	Z-08	Z-09
					Sample Depth (ft)	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5
					Sample Date	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10	10/01/10
					QC Identifier															
Metals	**Units**	**S-1/GW-1**	**S-1/GW-2**	**S-1/GW-3**	**Soil UCL**															
Arsenic	mg/kg	20	20	20	500	**206**	ND	**97**	ND	ND	ND	ND	ND	ND	ND	ND	**82**	ND	ND	ND
Barium	mg/kg	1000	1000	1000	10000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cadmium	mg/kg	70	70	70	1000	ND	ND	**21**	ND	**17**	ND	ND	ND	ND	ND	ND	ND	**51**	ND	ND
Chromium	mg/kg	100	100	100	2000	**339**	**142**	**363**	**52**	**143**	**75**	ND	**50**	**86**	**104**	**143**	**82**	**358**	**153**	**175**
Lead	mg/kg	200	200	200	6000	**4415**	**1027**	**1241**	**411**	**1306**	**412**	**543**	**473**	**398**	**1921**	**728**	**505**	**3279**	**1256**	**1037**
Mercury	mg/kg	20	20	20	300	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Selenium	mg/kg	400	400	400	7000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Silver	mg/kg	100	100	100	2000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

Red Shading - UCL Exceeded; Black Shading - Method 1 Std Exceeded; Bold - Detected; U - Not Detected;
J - Estimated; NA - Not Analyzed

Table 3-5
Summary of TCLP Metals Soil Sampling Results
Former Tombarello Property
Lawrence, Massachusetts

		Sample Location	CD-45E	CD-45S	SVA-03	SVA-06	TP-20	TP-05	TP-13	TP-12
		Sample Depth (ft)	1-3	1-3	1-3	0-1	5-6	4-5	5-6	6-7
		Sample Date	06/06/16	06/06/16	06/08/16	06/08/16	06/14/16	06/15/16	06/15/16	06/15/16
TCLP Metals (mg/L)	**Units**	**RCRA Limits**								
Chromium	mg/L	5	NA	NA	NA	0.0059 J	NA	0.0189	0.0038 J	NA
Lead	mg/L	5	**95**	**28**	4.73	NA	3.2	NA	NA	1.58

U – not detected; J – estimated value; UJ – not detected, reporting limit estimated

Table 3-6
Summary of TBA EPH and SVOC Soil Sample Results
Former Tombarello Property
Lawrence, Massachusetts

					Sample Location	BPA-01	BPA-02	CD-34E	CD-34W	CD-45E	CD-45N		CD-45W	FB-01	FB-02		FB-04	FG-34	FG-34N	FG-45N
					Sample Depth (ft)	2 - 3	2 - 3	1 - 3	0 - 1	0 - 1	0 - 1	1 - 3	1 - 3	1 - 2	1 - 2	2 - 3	1 - 2	0 - 1	1 - 3	0 - 1
					Sample Date	06/07/16	06/07/16	06/06/16	06/06/16	06/06/16	06/06/16	06/06/16	06/06/16	06/06/16	06/07/16	06/07/16	06/06/16	06/07/16	06/07/16	06/08/16
					QC Identifier															
Semivolatiles	**Units**	**S-1/GW-1**	**S-1/GW-2**	**S-1/GW-3**	**Soil UCL**															
2-Methylnaphthalene	ug/kg	700	80000	300000	5000000	**1500**	370 U	**4000 J+**	**2200 J+**	**3900**	**970**	**11000 J**	**1800**	350 U	**310 J**	**380**	**3200**	**2200**	**210 J**	**270 J**
Acenaphthene	ug/kg	4000	1000000	1000000	10000000	**3700**	370 U	**22000 J**	**16000 J**	**17000 J**	**470**	**64000**	**5000**	**150 J**	**620**	**940**	**8100 J**	**2500**	**880**	**430**
Acenaphthylene	ug/kg	1000	600000	10000	10000000	**930**	370 U	**3600 J+**	**970 J+**	**1800**	**1200**	**5600 J-**	**7600 J**	**72 J**	**81 J**	**120 J**	**750**	**2200**	**390 J**	**880**
Anthracene	ug/kg	1000000	1000000	1000000	10000000	**10000**	**310 J**	**63000 J**	**30000 J**	**36000**	**1800**	**150000**	**23000**	**400**	**1800**	**2700**	**27000**	**6800**	**2100**	**1400**
Benzo(a)anthracene	ug/kg	7000	7000	7000	3000000	**17000**	**630**	**110000**	**69000 J**	**86000**	**5500**	**240000**	**37000**	**1000**	**2400**	**3800**	**33000**	**14000**	**4900**	**5300**
Benzo(a)pyrene	ug/kg	2000	2000	2000	300000	**15000**	**690**	**110000**	**61000 J**	**72000**	**5300**	**210000**	**37000**	**710 J-**	**2200**	**3100**	**29000**	**13000**	**4700**	**4400**
Benzo(b)fluoranthene	ug/kg	7000	7000	7000	3000000	**19000**	**940**	**140000**	**84000**	**98000**	**11000**	**250000**	**45000**	**1500**	**3000**	**4400**	**36000**	**16000**	**6000**	**9000**
Benzo(g,h,i)perylene	ug/kg	1000000	1000000	1000000	10000000	**8000**	**830**	**62000 J**	**35000 J**	**46000**	**5000**	**99000**	**23000**	**530**	**1200**	**1800**	**14000**	**7800**	**3600**	**5300**
Benzo(k)fluoranthene	ug/kg	70000	70000	70000	10000000	**5200**	**380**	**53000 J**	**430 J+**	**42000**	**1800**	**92000**	**18000**	**590**	**1200**	**1500**	**15000**	**5000**	**2700**	**3300**
Chrysene	ug/kg	70000	70000	70000	10000000	**17000**	**630**	**120000**	**66000 J**	**85000**	**7000**	**1400 J-**	**35000**	**1000**	**2200**	**3300**	**31000**	**14000**	**4300**	**5100**
Dibenz(a,h)anthracene	ug/kg	700	700	700	300000	**2100**	**120 J**	360 U	350 U	380 U	350 U	380 UJ	350 U	350 U	**320 J**	**460**	340 U	**2200**	**880**	**1400**
Fluoranthene	ug/kg	1000000	1000000	1000000	10000000	**37000**	**1200**	**300000**	**500 J+**	**190000**	**10000**	**460000**	**79000**	**2100**	**5000**	**9200**	**80000**	**30000**	**11000**	**9300**
Fluorene	ug/kg	1000000	1000000	1000000	10000000	**4400**	370 U	**33000 J**	**17000 J**	**19000 J**	**1100**	**97000**	**13000**	**160 J**	**920**	**1500**	**14000**	**4400**	**940**	**570**
Indeno(1,2,3-cd)pyrene	ug/kg	7000	7000	7000	3000000	**9500**	**630**	**70000 J**	**40000 J**	**49000**	**5400**	**110000**	**25000**	**620**	**1300**	**1900**	**16000**	**8800**	**3800**	**5300**
Naphthalene	ug/kg	4000	20000	500000	10000000	**2900**	370 U	90000 U	**4300 J+**	**10000 J**	**930**	**30000 J**	**2800**	350 U	**450**	**660**	**5200**	**3600**	**400**	**270 J**
Phenanthrene	ug/kg	10000	500000	500000	10000000	**38000**	**820**	**260000**	**120000**	**170000**	**5200**	**430000**	**71000**	**1600**	**5300**	**9400**	**76000**	**27000**	**8200**	**4500**
Pyrene	ug/kg	1000000	1000000	1000000	10000000	**28000**	**1100**	**210000**	**110000**	**140000**	**9500**	**390000**	**59000**	**1900**	**4200**	**5900**	**54000**	**23000**	**8400**	**8000**

Shading - UCL Exceeded; Bold - Detected; U - Not Detected;
J - Estimated; R - Rejected; NA - Not Analyzed

Table 3-6
Summary of TBA EPH and SVOC Soil Sample Results
Former Tombarello Property
Lawrence, Massachusetts

					Sample Location	BPA-01	BPA-02	CD-34E	CD-34W	CD-45E	CD-45N		CD-45W	FB-01	FB-02		FB-04	FG-34	FG-34N	FG-45N
					Sample Depth (ft)	2 - 3	2 - 3	1 - 3	0 - 1	0 - 1	0 - 1	1 - 3	1 - 3	1 - 2	1 - 2	2 - 3	1 - 2	0 - 1	1 - 3	0 - 1
					Sample Date	06/07/16	06/07/16	06/06/16	06/06/16	06/06/16	06/06/16	06/06/16	06/06/16	06/06/16	06/07/16	06/07/16	06/06/16	06/07/16	06/07/16	06/08/16
					QC Identifier															
EPH	**Units**	**S-1/GW-1**	**S-1/GW-2**	**S-1/GW-3**	**Soil UCL**															
C11-C22 Aromatics	mg/kg	1000	1000	1000	10000	**417**	**514**	NA	NA	NA	NA	NA	NA	**15.1**	**313**	**204**	**199 J**	NA	NA	NA
C19-C36 Aliphatics	mg/kg	3000	3000	3000	20000	**277**	**2160 J**	NA	NA	NA	NA	NA	NA	10.5 U	**741 J**	**544**	10.4 U	NA	NA	NA
C9-C18 Aliphatics	mg/kg	1000	1000	1000	20000	27.4 U	**752 J**	NA	NA	NA	NA	NA	NA	10.5 U	**49.8**	**33.9**	10.4 UJ	NA	NA	NA
2-Methylnaphthalene	mg/kg	0.7	80	300	5000	0.911 U	0.358 U	NA	NA	NA	NA	NA	NA	0.35 U	**1.07**	0.352 U	**0.935 J**	NA	NA	NA
Acenaphthene	mg/kg	4	1000	1000	10000	**2.57**	0.358 U	NA	NA	NA	NA	NA	NA	0.35 U	**1.95**	**0.851**	**2.51 J**	NA	NA	NA
Acenaphthylene	mg/kg	1	600	10	10000	0.911 U	0.358 U	NA	NA	NA	NA	NA	NA	0.35 U	0.352 U	0.352 U	0.695 UJ	NA	NA	NA
Anthracene	mg/kg	1000	1000	1000	10000	**7.18**	0.358 U	NA	NA	NA	NA	NA	NA	**0.518**	**6.77**	**2.83**	**9.72 J**	NA	NA	NA
Benzo(a)anthracene	mg/kg	7	7	7	3000	**15.9**	**0.606**	NA	NA	NA	NA	NA	NA	**1.11**	**8.02**	**5.59**	**13.2 J**	NA	NA	NA
Benzo(a)pyrene	mg/kg	2	2	2	300	**13.4**	**0.714**	NA	NA	NA	NA	NA	NA	**1.14**	**6.9**	**4.77**	**9.77 J**	NA	NA	NA
Benzo(b)fluoranthene	mg/kg	7	7	7	3000	**9.57**	**0.46**	NA	NA	NA	NA	NA	NA	**0.672**	**4.6**	**3.09**	**6.37 J**	NA	NA	NA
Benzo(g,h,i)perylene	mg/kg	1000	1000	1000	10000	**5.56**	**0.559**	NA	NA	NA	NA	NA	NA	**0.493**	**2.95**	**2.4**	**3.95 J**	NA	NA	NA
Benzo(k)fluoranthene	mg/kg	70	70	70	10000	**10.8**	**0.646**	NA	NA	NA	NA	NA	NA	**1.1**	**6.01**	**3.67**	**7.77 J**	NA	NA	NA
Chrysene	mg/kg	70	70	70	10000	**13.7**	**0.635**	NA	NA	NA	NA	NA	NA	**1.2**	**6.9**	**4.84**	**10.7 J**	NA	NA	NA
Dibenz(a,h)anthracene	mg/kg	0.7	0.7	0.7	300	**1.73**	0.358 U	NA	NA	NA	NA	NA	NA	0.35 U	**0.872**	**0.703**	**1.11 J**	NA	NA	NA
Fluoranthene	mg/kg	1000	1000	1000	10000	**31.7**	**1.16**	NA	NA	NA	NA	NA	NA	**2.65**	**17.2**	**11.5**	**31.2 J**	NA	NA	NA
Fluorene	mg/kg	1000	1000	1000	10000	**3.71**	**0.403**	NA	NA	NA	NA	NA	NA	0.35 U	**4**	**1.22**	**4.92 J**	NA	NA	NA
Indeno(1,2,3-cd)pyrene	mg/kg	7	7	7	3000	**5.82**	**0.476**	NA	NA	NA	NA	NA	NA	**0.406**	**2.93**	**2.34**	**3.82 J**	NA	NA	NA
Naphthalene	mg/kg	4	20	500	10000	**2.03**	0.358 U	NA	NA	NA	NA	NA	NA	0.35 U	**1.2**	**0.421**	**1.48 J**	NA	NA	NA
Phenanthrene	mg/kg	10	500	500	10000	**33.1**	**0.86**	NA	NA	NA	NA	NA	NA	**2.0**	**19.8**	**10.8**	**33.2 J**	NA	NA	NA
Pyrene	mg/kg	1000	1000	1000	10000	**26.6**	**1.13**	NA	NA	NA	NA	NA	NA	**2.26**	**13.3**	**9.18**	**24.2 J**	NA	NA	NA

Shading - UCL Exceeded; Bold - Detected; U - Not Detected;
J - Estimated; R - Rejected; NA - Not Analyzed

Table 3-6
Summary of TBA EPH and SVOC Soil Sample Results
Former Tombarello Property
Lawrence, Massachusetts

					Sample Location	FG-45S		LS-01	LS-02	MS-01	MS-02	NPA-01	NPA-03	NPA-04	NPA-05	NPA-06	NPA-07	P-13N	P-13W	SA-01
					Sample Depth (ft)	1 - 3		7 - 8	2 - 3	2 - 3	2 - 3	0.5 - 2	0.5 - 2	2 - 3	0.5 - 2	0.5 - 2	0.5 - 2	0 - 1	1 - 3	1 - 3
					Sample Date	06/08/16		06/09/16	06/09/16	06/10/16	06/10/16	06/10/16	06/10/16	06/10/16	06/10/16	06/10/16	06/10/16	06/08/16	06/08/16	06/09/16
					QC Identifier	FD	FD													
Semivolatiles	**Units**	**S-1/GW-1**	**S-1/GW-2**	**S-1/GW-3**	**Soil UCL**															
2-Methylnaphthalene	ug/kg	700	80000	300000	5000000	400 U	400 U	410 U	430 U	**120 J**	**360 J**	1400 U	35000 U	**370**	**1200**	**24000 J**	360 U	**140 J**	510 U	**1700**
Acenaphthene	ug/kg	4000	1000000	1000000	10000000	**180 J**	400 U	410 U	430 U	**520**	**1800**	**370 J**	**25000 J**	**1400**	**5900**	**59000 J**	**110 J**	**290 J**	510 U	**560**
Acenaphthylene	ug/kg	1000	600000	10000	10000000	400 U	400 U	410 U	430 U	**210 J**	**370**	**560 J**	35000 U	**410**	**830**	71000 U	**230 J**	**410**	**620**	**190 J**
Anthracene	ug/kg	1000000	1000000	1000000	10000000	**400**	**190 J**	410 U	430 U	**1700**	**6800**	**1200 J**	**58000**	**4900**	**15000**	**160000**	**480**	**1200**	**1900**	**1700**
Benzo(a)anthracene	ug/kg	7000	7000	7000	3000000	**840 J**	**450 J**	410 U	430 U	**3600**	**12000**	**3400 J**	**120000**	**11000**	**29000**	**280000**	**1400**	**3700**	**5000**	**2300**
Benzo(a)pyrene	ug/kg	2000	2000	2000	300000	**780**	**470**	410 U	430 U	**3400**	**12000**	**3300 J**	**100000**	**10000**	**24000**	**250000**	**1500**	**2900**	**4300**	**2500**
Benzo(b)fluoranthene	ug/kg	7000	7000	7000	3000000	**1100 J**	**640 J**	410 U	430 U	**4600**	**15000**	**4400 J**	**130000**	**12000**	**32000**	**330000**	**1900**	**5200**	**6300**	**3400**
Benzo(g,h,i)perylene	ug/kg	1000000	1000000	1000000	10000000	**450**	**360 J**	410 U	430 U	**2000**	**7200**	**1700 J**	**44000**	**4900**	**12000**	**110000**	**1100**	**4200**	**3200**	**1100**
Benzo(k)fluoranthene	ug/kg	70000	70000	70000	10000000	**460**	**230 J**	410 U	430 U	**1800**	**4000 J**	**1800 J**	**61000**	**4800**	**5900**	**130000**	**900**	**2100**	**2900**	**1200**
Chrysene	ug/kg	70000	70000	70000	10000000	**860 J**	**470 J**	410 U	430 U	**3300**	**11000**	**3000 J**	**120000**	**10000**	**28000**	**250000**	**1400**	**3400**	**4500**	**2200**
Dibenz(a,h)anthracene	ug/kg	700	700	700	300000	**120 J**	**100 J**	410 U	430 U	**530**	**1800 J**	**480 J**	**16000 J**	**1700**	**4400**	**36000 J**	**280 J**	**930**	**760**	**310 J**
Fluoranthene	ug/kg	1000000	1000000	1000000	10000000	**1800 J**	**930 J**	410 U	430 U	**8500**	**30000**	**8000 J**	**280000**	**23000**	**68000**	**750000**	**2800**	**5500**	**12000**	**5500**
Fluorene	ug/kg	1000000	1000000	1000000	10000000	**180 J**	400 U	410 U	430 U	**670**	**2500**	**410 J**	**27000 J**	**2100**	**7200 J**	**68000 J**	**150 J**	**340 J**	**200 J**	**1000**
Indeno(1,2,3-cd)pyrene	ug/kg	7000	7000	7000	3000000	**440**	**380 J**	410 U	430 U	**2100**	**8200**	**1900 J**	**51000**	**5400**	**15000**	**130000**	**990**	**4100**	**3500**	**1300**
Naphthalene	ug/kg	4000	20000	500000	10000000	**160 J**	400 U	410 U	430 U	**200 J**	**470**	1400 U	35000 U	**760**	**2100**	**39000 J**	360 U	**190 J**	510 U	**1500**
Phenanthrene	ug/kg	10000	500000	500000	10000000	**1700 J**	**670 J**	410 U	430 U	**5700**	**22000**	**4300 J**	**230000**	**15000**	**58000**	**660000**	**1800**	**3300**	**6300**	**5700**
Pyrene	ug/kg	1000000	1000000	1000000	10000000	**1500 J**	**860 J**	410 U	430 U	**5800**	**20000**	**4900 J**	**200000**	**15000**	**46000**	**480000**	**2400**	**6000**	**8600**	**4600**

Shading - UCL Exceeded; Bold - Detected; U - Not Detected;
J - Estimated; R - Rejected; NA - Not Analyzed

Table 3-6
Summary of TBA EPH and SVOC Soil Sample Results
Former Tombarello Property
Lawrence, Massachusetts

					Sample Location	FG-45S		LS-01	LS-02	MS-01	MS-02	NPA-01	NPA-03	NPA-04	NPA-05	NPA-06	NPA-07	P-13N	P-13W	SA-01
					Sample Depth (ft)	1 - 3		7 - 8	2 - 3	2 - 3	2 - 3	0.5 - 2	0.5 - 2	2 - 3	0.5 - 2	0.5 - 2	0.5 - 2	0 - 1	1 - 3	1 - 3
					Sample Date	06/08/16		06/09/16	06/09/16	06/10/16	06/10/16	06/10/16	06/10/16	06/10/16	06/10/16	06/10/16	06/10/16	06/08/16	06/08/16	06/09/16
					QC Identifier	FD	FD													
EPH	**Units**	**S-1/GW-1**	**S-1/GW-2**	**S-1/GW-3**	**Soil UCL**															
C11-C22 Aromatics	mg/kg	1000	1000	1000	10000	NA	NA	12.6 U	13.1 U	NA	**347**	NA	NA	NA	NA	NA	NA	NA	NA	**347**
C19-C36 Aliphatics	mg/kg	3000	3000	3000	20000	NA	NA	12.6 U	13.1 U	NA	53.8 U	NA	NA	NA	NA	NA	NA	NA	NA	**847 J**
C9-C18 Aliphatics	mg/kg	1000	1000	1000	20000	NA	NA	12.6 U	13.1 U	NA	53.8 U	NA	NA	NA	NA	NA	NA	NA	NA	**135**
2-Methylnaphthalene	mg/kg	0.7	80	300	5000	NA	NA	0.418 U	0.435 U	NA	1.79 U	NA	NA	NA	NA	NA	NA	NA	NA	**1.69**
Acenaphthene	mg/kg	4	1000	1000	10000	NA	NA	0.418 U	0.435 U	NA	1.79 U	NA	NA	NA	NA	NA	NA	NA	NA	0.396 U
Acenaphthylene	mg/kg	1	600	10	10000	NA	NA	0.418 U	0.435 U	NA	1.79 U	NA	NA	NA	NA	NA	NA	NA	NA	0.396 U
Anthracene	mg/kg	1000	1000	1000	10000	NA	NA	0.418 U	0.435 U	NA	**6.48**	NA	NA	NA	NA	NA	NA	NA	NA	**0.838**
Benzo(a)anthracene	mg/kg	7	7	7	3000	NA	NA	0.418 U	0.435 U	NA	**13.9**	NA	NA	NA	NA	NA	NA	NA	NA	**2.17**
Benzo(a)pyrene	mg/kg	2	2	2	300	NA	NA	0.418 U	0.435 U	NA	**13.1**	NA	NA	NA	NA	NA	NA	NA	NA	**2.5**
Benzo(b)fluoranthene	mg/kg	7	7	7	3000	NA	NA	0.418 U	0.435 U	NA	**7.31**	NA	NA	NA	NA	NA	NA	NA	NA	**1.8**
Benzo(g,h,i)perylene	mg/kg	1000	1000	1000	10000	NA	NA	0.418 U	0.435 U	NA	**8.3**	NA	NA	NA	NA	NA	NA	NA	NA	**1.64**
Benzo(k)fluoranthene	mg/kg	70	70	70	10000	NA	NA	0.418 U	0.435 U	NA	**10.1**	NA	NA	NA	NA	NA	NA	NA	NA	**1.76**
Chrysene	mg/kg	70	70	70	10000	NA	NA	0.418 U	0.435 U	NA	**11.8**	NA	NA	NA	NA	NA	NA	NA	NA	**1.96**
Dibenz(a,h)anthracene	mg/kg	0.7	0.7	0.7	300	NA	NA	0.418 U	0.435 U	NA	**2.11**	NA	NA	NA	NA	NA	NA	NA	NA	**0.417**
Fluoranthene	mg/kg	1000	1000	1000	10000	NA	NA	0.418 U	0.435 U	NA	**29.5**	NA	NA	NA	NA	NA	NA	NA	NA	**3.71**
Fluorene	mg/kg	1000	1000	1000	10000	NA	NA	0.418 U	0.435 U	NA	**2.37**	NA	NA	NA	NA	NA	NA	NA	NA	**0.511**
Indeno(1,2,3-cd)pyrene	mg/kg	7	7	7	3000	NA	NA	0.418 U	0.435 U	NA	**7.48**	NA	NA	NA	NA	NA	NA	NA	NA	**1.48**
Naphthalene	mg/kg	4	20	500	10000	NA	NA	0.418 U	0.435 U	NA	1.79 U	NA	NA	NA	NA	NA	NA	NA	NA	**1.23**
Phenanthrene	mg/kg	10	500	500	10000	NA	NA	0.418 U	0.435 U	NA	**22.9**	NA	NA	NA	NA	NA	NA	NA	NA	**3.13**
Pyrene	mg/kg	1000	1000	1000	10000	NA	NA	0.418 U	0.435 U	NA	**23.1**	NA	NA	NA	NA	NA	NA	NA	NA	**3.42**

Shading - UCL Exceeded; Bold - Detected; U - Not Detected;
J - Estimated; R - Rejected; NA - Not Analyzed

Table 3-6
Summary of TBA EPH and SVOC Soil Sample Results
Former Tombarello Property
Lawrence, Massachusetts

					Sample Location	SB-3E	SBB-3W	SS-01		SVA-01	SVA-02	SVA-03		SVA-04	SVA-05	SVA-06	SVA-07	SVA-08
					Sample Depth (ft)	0 - 1	1 - 3	1 - 2	7 - 8	0 - 1	1 - 3	1 - 3		1 - 3	1 - 3	1 - 3	1 - 3	1 - 3
					Sample Date	06/09/16	06/09/16	06/08/16	06/08/16	06/07/16	06/08/16	06/08/16		06/08/16	06/08/16	06/08/16	06/09/16	06/09/16
					QC Identifier							FD	FD					
Semivolatiles	**Units**	**S-1/GW-1**	**S-1/GW-2**	**S-1/GW-3**	**Soil UCL**													
2-Methylnaphthalene	ug/kg	700	80000	300000	5000000	330 U	350 U	370 U	550 U	**160 J**	**150 J**	**130 J**	**140 J**	**110 J**	**670**	**2300**	**180 J**	**130 J**
Acenaphthene	ug/kg	4000	1000000	1000000	10000000	330 U	**240 J**	**260 J**	**150 J**	**550**	**180 J**	**130 J**	**140 J**	**420**	**1900**	**3700**	**190 J**	**330 J**
Acenaphthylene	ug/kg	1000	600000	10000	10000000	330 U	**240 J**	**180 J**	**430 J**	**380**	**460**	**150 J**	**350 J**	**230 J**	**850**	**2600**	**460**	**1000**
Anthracene	ug/kg	1000000	1000000	1000000	10000000	330 U	**990**	**1600**	**1100**	**2400**	**970**	**280 J**	**650**	**1000**	**5700**	**13000**	**1200**	**3700**
Benzo(a)anthracene	ug/kg	7000	7000	7000	3000000	**130 J**	**3400**	**3800**	**3300**	**4700**	**2500**	**790**	**1600**	**2700**	**11000**	**20000**	**3200**	**12000**
Benzo(a)pyrene	ug/kg	2000	2000	2000	300000	**150 J**	**3500**	**2300**	**2000**	**5200**	**2900**	**730**	**1300**	**2600**	**10000**	**18000**	**3500 J**	**11000**
Benzo(b)fluoranthene	ug/kg	7000	7000	7000	3000000	**200 J**	**5100**	**4300**	**4200**	**7600**	**3800**	**1400**	**2400**	**3400**	**14000**	**24000**	**4600 J**	**14000**
Benzo(g,h,i)perylene	ug/kg	1000000	1000000	1000000	10000000	**120 J**	**2500**	**2400**	**2100**	**5200**	**2100**	**1000**	**1800**	**1600**	**5600**	**8900**	**3100 J**	**6400**
Benzo(k)fluoranthene	ug/kg	70000	70000	70000	10000000	**84 J**	**1900**	**2000**	**1500**	**2800**	**1500**	**370 J**	**820**	**1400**	**4200**	**11000**	**1800 J**	**5100 J**
Chrysene	ug/kg	70000	70000	70000	10000000	**130 J**	**2800**	**3100**	**2900**	**4000**	**2400**	**850**	**1500**	**2700**	**10000**	**19000**	**2800**	**12000**
Dibenz(a,h)anthracene	ug/kg	700	700	700	300000	330 U	**630**	**640**	**560**	**1100**	**510**	**190 J**	**440**	**430**	**1900**	**2900**	**750 J**	**1900 J**
Fluoranthene	ug/kg	1000000	1000000	1000000	10000000	**220 J**	**5400**	**8100**	**5100**	**9500**	**3900**	**1400**	**2800**	**4600**	**24000**	**47000**	**5000**	**23000**
Fluorene	ug/kg	1000000	1000000	1000000	10000000	330 U	**270 J**	**540**	**230 J**	**630**	**380 J**	420 U	**270 J**	**540**	**2500**	**7900**	**430**	**1100**
Indeno(1,2,3-cd)pyrene	ug/kg	7000	7000	7000	3000000	**120 J**	**2600**	**2600**	**2400**	**4900**	**2200**	**970**	**1900**	**1800**	**6000**	**11000**	**3200 J**	**7400**
Naphthalene	ug/kg	4000	20000	500000	10000000	330 U	350 U	370 U	550 U	**260 J**	**280 J**	**400 J**	**480**	**120 J**	**1100**	**3400**	**170 J**	**180 J**
Phenanthrene	ug/kg	10000	500000	500000	10000000	330 U	**3200**	**4500**	**2400**	**5300**	**2800**	**980**	**2100**	**3900**	**19000**	**44000**	**3600**	**11000**
Pyrene	ug/kg	1000000	1000000	1000000	10000000	**210 J**	**5100**	**5700**	**4900**	**7800**	**3800**	**1400**	**2900**	**5000**	**17000**	**35000**	**5200**	**18000**

Shading - UCL Exceeded; Bold - Detected; U - Not Detected;
J - Estimated; R - Rejected; NA - Not Analyzed

Table 3-6
Summary of TBA EPH and SVOC Soil Sample Results
Former Tombarello Property
Lawrence, Massachusetts

					Sample Location	SB-3E	SBB-3W	SS-01		SVA-01	SVA-02	SVA-03		SVA-04	SVA-05	SVA-06	SVA-07	SVA-08
					Sample Depth (ft)	0 - 1	1 - 3	1 - 2	7 - 8	0 - 1	1 - 3	1 - 3		1 - 3	1 - 3	1 - 3	1 - 3	1 - 3
					Sample Date	06/09/16	06/09/16	06/08/16	06/08/16	06/07/16	06/08/16	06/08/16		06/08/16	06/08/16	06/08/16	06/09/16	06/09/16
					QC Identifier							FD	FD					
EPH	**Units**	**S-1/GW-1**	**S-1/GW-2**	**S-1/GW-3**	**Soil UCL**													
C11-C22 Aromatics	mg/kg	1000	1000	1000	10000	NA	NA	**55.9**	**67.9**	**135**	**101**	**286**	**295**	**107**	**156**	**465**	**145**	**285**
C19-C36 Aliphatics	mg/kg	3000	3000	3000	20000	NA	NA	**177**	**20.7**	**148**	**423**	**1030 J**	**847 J**	**318**	**433**	**1430 J**	**396**	**266**
C9-C18 Aliphatics	mg/kg	1000	1000	1000	20000	NA	NA	**17.4**	15.6 U	**10.5**	**23.2**	**227 J**	**93.9 J**	**26.1**	**29.3**	**232**	**43.1**	**27.9**
2-Methylnaphthalene	mg/kg	0.7	80	300	5000	NA	NA	0.347 U	0.52 U	0.347 U	0.398 U	0.397 U	0.398 U	0.406 U	0.371 U	**0.748**	0.379 U	0.37 U
Acenaphthene	mg/kg	4	1000	1000	10000	NA	NA	0.347 U	0.52 U	**0.696**	0.398 U	0.397 U	0.398 U	0.406 U	**0.598**	**1.26**	0.379 U	0.37 U
Acenaphthylene	mg/kg	1	600	10	10000	NA	NA	0.347 U	0.52 U	0.347 U	0.398 U	0.397 U	0.398 U	0.406 U	0.371 U	**0.413**	0.379 U	0.37 U
Anthracene	mg/kg	1000	1000	1000	10000	NA	NA	**0.44**	**0.719**	**3.2**	**0.477**	0.397 U	0.398 U	**0.505**	**2.18**	**4.38**	**0.438**	**1.66**
Benzo(a)anthracene	mg/kg	7	7	7	3000	NA	NA	**1.08**	**2.92**	**6.05**	**1.28**	**0.464**	**0.574**	**1.46**	**4.08**	**9.93**	**1.14**	**7.89**
Benzo(a)pyrene	mg/kg	2	2	2	300	NA	NA	**1.34**	**3.12**	**5.33**	**1.56**	**0.424**	**0.528**	**1.39**	**3.58**	**8.75**	**1.48**	**6.25**
Benzo(b)fluoranthene	mg/kg	7	7	7	3000	NA	NA	**0.865**	**2.73**	**3.89**	**1.24**	**0.423**	**0.469**	**0.908**	**2.09**	**9.21**	**0.827**	**5.77**
Benzo(g,h,i)perylene	mg/kg	1000	1000	1000	10000	NA	NA	**0.761**	**1.47**	**2.92**	**0.941**	0.397 U	0.398 U	**0.778**	**1.97**	**4.05**	**0.98**	**3.35**
Benzo(k)fluoranthene	mg/kg	70	70	70	10000	NA	NA	**0.952**	**2.39**	**4.81**	**1.31**	**0.434**	**0.515**	**1.21**	**3.39**	**6.28**	**1.3**	**5.5**
Chrysene	mg/kg	70	70	70	10000	NA	NA	**1.01**	**2.72**	**5.14**	**1.34**	**0.545**	**0.612**	**1.4**	**3.58**	**8.43**	**1.25**	**6.95**
Dibenz(a,h)anthracene	mg/kg	0.7	0.7	0.7	300	NA	NA	0.347 U	0.52 U	**0.911**	0.398 U	0.397 U	0.398 U	0.406 U	**0.618**	**1.36**	0.379 U	**0.918**
Fluoranthene	mg/kg	1000	1000	1000	10000	NA	NA	**1.98**	**4.74**	**12.5**	**2.22**	**0.752**	**0.864**	**2.45**	**8.11**	**18.3**	**2.29**	**12.4**
Fluorene	mg/kg	1000	1000	1000	10000	NA	NA	0.347 U	0.52 U	**1.12**	0.398 U	0.397 U	0.398 U	0.406 U	**1.04**	**2.38**	0.379 U	**0.507**
Indeno(1,2,3-cd)pyrene	mg/kg	7	7	7	3000	NA	NA	**0.743**	**1.54**	**2.75**	**0.855**	0.397 U	0.398 U	**0.74**	**1.86**	**4.28**	**0.896**	**3.28**
Naphthalene	mg/kg	4	20	500	10000	NA	NA	0.347 U	0.52 U	0.347 U	0.398 U	**0.474**	**0.418**	0.406 U	0.371 U	**0.727**	0.379 U	0.37 U
Phenanthrene	mg/kg	10	500	500	10000	NA	NA	**1.28**	**1.62**	**10.8**	**1.28**	**0.475**	**0.544**	**1.41**	**7.54**	**15.5**	**1.59**	**5.84**
Pyrene	mg/kg	1000	1000	1000	10000	NA	NA	**1.59**	**3.82**	**10.2**	**2.04**	**0.688**	**0.804**	**2.31**	**6.56**	**15**	**2.28**	**11.3**

Shading - UCL Exceeded; Bold - Detected; U - Not Detected;
J - Estimated; R - Rejected; NA - Not Analyzed

Table 3-7
Summary of TBA VOC Soil Sample Results
Former Tombarello Property
Lawrence, Massachusetts

					Sample Location	BPA-01	BPA-02	FB-01	FB-02		FB-03	FB-04	LS-01	LS-02	M-7E	MS-01	NPA-02
					Sample Depth (ft)	2 - 3	2 - 3	5 - 7	1 - 2	2 - 3	2 - 3	1 - 2	7 - 8	2 - 3	1 - 3	12 - 13	6 - 7
					Sample Date	06/07/16	06/07/16	06/06/16	06/07/16	06/07/16	06/06/16	06/06/16	06/09/16	06/09/16	06/07/16	06/10/16	06/10/16
					QC Identifier												
Volatiles	**Units**	**S-1/GW-1**	**S-1/GW-2**	**S-1/GW-3**	**Soil UCL**												
1,1,1,2-Tetrachloroethane	ug/kg	100	100	80000	5000000	5.9 U	5.3 U	6.2 U	4.6 U	3 U	4.1 U	5 U	5.1 U	7.8 U	4.2 U	4.5 U	4.2 U
1,1,1-Trichloroethane	ug/kg	30000	500000	500000	10000000	5.9 U	5.3 U	6.2 U	4.6 U	3 U	4.1 U	5 U	5.1 U	7.8 U	4.2 U	4.5 U	4.2 U
1,1,2,2-Tetrachloroethane	ug/kg	5	20	10000	4000000	5.9 U	5.3 U	6.2 U	4.6 U	3 U	4.1 U	5 U	5.1 U	7.8 U	4.2 U	4.5 U	4.2 U
1,1,2-Trichloroethane	ug/kg	100	2000	40000	5000000	5.9 U	5.3 U	6.2 U	4.6 U	3 U	4.1 U	5 U	5.1 U	7.8 U	4.2 U	4.5 U	4.2 U
1,1-Dichloroethane	ug/kg	400	9000	500000	10000000	5.9 U	5.3 U	6.2 U	4.6 U	3 U	4.1 U	5 U	5.1 U	**2.4 J**	4.2 U	4.5 U	4.2 U
1,1-Dichloroethene	ug/kg	3000	40000	500000	10000000	5.9 U	5.3 U	6.2 U	4.6 U	3 U	4.1 U	5 U	5.1 U	7.8 U	4.2 U	4.5 U	4.2 U
1,1-Dichloropropene	ug/kg	--	--	--	--	5.9 U	5.3 U	6.2 U	4.6 U	3 U	4.1 U	5 U	5.1 U	7.8 U	4.2 U	4.5 U	4.2 U
1,2,3-Trichlorobenzene	ug/kg	--	--	--	--	5.9 U	5.3 U	6.2 U	4.6 U	3 U	4.1 U	5 U	5.1 U	7.8 U	4.2 U	4.5 U	4.2 U
1,2,3-Trichloropropane	ug/kg	--	--	--	--	5.9 U	5.3 U	6.2 U	4.6 U	3 U	4.1 U	5 U	5.1 U	7.8 U	4.2 U	4.5 U	4.2 U
1,2,4-Trichlorobenzene	ug/kg	2000	6000	700000	10000000	5.9 U	5.3 U	6.2 U	4.6 U	3 U	4.1 U	5 U	5.1 U	7.8 U	4.2 U	4.5 U	4.2 U
1,2,4-Trimethylbenzene	ug/kg	--	--	--	--	**4.3 J**	5.3 U	6.2 U	4.6 U	3 U	4.1 U	5 U	5.1 U	7.8 U	**57**	4.5 U	4.2 U
1,2-Dibromo-3-chloropropane	ug/kg	--	--	--	--	5.9 U	5.3 U	6.2 U	4.6 U	3 U	4.1 U	5 U	5.1 U	7.8 U	4.2 U	4.5 U	4.2 U
1,2-Dibromoethane	ug/kg	100	100	1000	400000	5.9 U	5.3 U	6.2 U	4.6 U	3 U	4.1 U	5 U	5.1 U	7.8 U	4.2 U	4.5 U	4.2 U
1,2-Dichlorobenzene	ug/kg	9000	100000	300000	10000000	5.9 U	5.3 U	6.2 U	4.6 U	3 U	4.1 U	5 U	5.1 U	7.8 U	**1 J**	4.5 U	4.2 U
1,2-Dichloroethane	ug/kg	100	100	20000	9000000	5.9 U	5.3 U	6.2 U	4.6 U	3 U	4.1 U	5 U	5.1 U	7.8 U	4.2 U	4.5 U	4.2 U
1,2-Dichloropropane	ug/kg	100	100	30000	10000000	5.9 U	5.3 U	6.2 U	4.6 U	3 U	4.1 U	5 U	5.1 U	7.8 U	4.2 U	4.5 U	4.2 U
1,3,5-Trimethylbenzene	ug/kg	--	--	--	--	5.9 U	5.3 U	6.2 U	4.6 U	3 U	4.1 U	5 U	5.1 U	7.8 U	**2.9 J**	4.5 U	4.2 U
1,3-Dichlorobenzene	ug/kg	3000	100000	100000	5000000	5.9 U	5.3 U	6.2 U	4.6 U	3 U	4.1 U	5 U	5.1 U	7.8 U	4.2 U	4.5 U	4.2 U
1,3-Dichloropropane	ug/kg	--	--	--	--	5.9 U	5.3 U	6.2 U	4.6 U	3 U	4.1 U	5 U	5.1 U	7.8 U	4.2 U	4.5 U	4.2 U
1,4-Dichlorobenzene	ug/kg	700	1000	80000	10000000	5.9 U	5.3 U	6.2 U	4.6 U	3 U	4.1 U	5 U	5.1 U	7.8 U	4.2 U	4.5 U	4.2 U
1,4-Dioxane	ug/kg	200	6000	20000	5000000	120 U	110 U	120 U	92 U	59 U	83 U	100 U	100 U	160 U	85 U	91 U	83 U
2,2-Dichloropropane	ug/kg	--	--	--	--	5.9 U	5.3 U	6.2 U	4.6 U	3 U	4.1 U	5 U	5.1 U	7.8 U	4.2 U	4.5 U	4.2 U
2-Butanone	ug/kg	4000	50000	400000	10000000	**41**	**6.4**	6.2 U	4.6 U	3 U	4.1 U	5 U	5.1 U	7.8 U	**10**	4.5 U	4.2 U
2-Chlorotoluene	ug/kg	--	--	--	--	5.9 U	5.3 U	6.2 U	4.6 U	3 U	4.1 U	5 U	5.1 U	7.8 U	4.2 U	4.5 U	4.2 U
2-Hexanone	ug/kg	--	--	--	--	5.9 U	5.3 U	6.2 U	4.6 U	3 U	4.1 U	5 U	5.1 U	7.8 U	4.2 U	4.5 U	4.2 U
4-Chlorotoluene	ug/kg	--	--	--	--	5.9 U	5.3 U	6.2 U	4.6 U	3 U	4.1 U	5 U	5.1 U	7.8 U	4.2 U	4.5 U	4.2 U
4-Isopropyltoluene	ug/kg	--	--	--	--	5.9 U	5.3 U	6.2 U	4.6 U	3 U	4.1 U	5 U	5.1 U	7.8 U	4.2 U	4.5 U	4.2 U
4-Methyl-2-pentanone	ug/kg	400	50000	400000	10000000	5.9 U	5.3 U	6.2 U	4.6 U	3 U	4.1 U	5 U	5.1 U	7.8 U	4.2 U	4.5 U	4.2 U
Acetone	ug/kg	6000	50000	400000	10000000	**140**	**17**	**17**	**14**	3 U	4.1 U	5 U	5.1 U	**6.3 J**	**44**	4.5 U	4.2 U
Benzene	ug/kg	2000	40000	40000	10000000	**8.6**	5.3 U	6.2 U	4.6 U	3 U	4.1 U	5 U	5.1 U	7.8 U	**13**	4.5 U	4.2 U
Bromobenzene	ug/kg	--	--	--	--	5.9 U	5.3 U	6.2 U	4.6 U	3 U	4.1 U	5 U	5.1 U	7.8 U	4.2 U	4.5 U	4.2 U
Bromochloromethane	ug/kg	--	--	--	--	5.9 U	5.3 U	6.2 U	4.6 U	3 U	4.1 U	5 U	5.1 U	7.8 U	4.2 U	4.5 U	4.2 U
Bromodichloromethane	ug/kg	100	100	30000	5000000	5.9 U	5.3 U	6.2 U	4.6 U	3 U	4.1 U	5 U	5.1 U	7.8 U	4.2 U	4.5 U	4.2 U
Bromoform	ug/kg	100	1000	300000	10000000	5.9 U	5.3 U	6.2 U	4.6 U	3 U	4.1 U	5 U	5.1 U	7.8 U	4.2 U	4.5 U	4.2 U
Bromomethane	ug/kg	500	500	30000	6000000	5.9 U	5.3 U	6.2 U	4.6 U	3 U	4.1 U	5 U	5.1 U	7.8 U	4.2 U	4.5 U	4.2 U
Carbon disulfide	ug/kg	--	--	--	--	5.9 U	5.3 U	6.2 U	4.6 U	3 U	4.1 U	5 U	5.1 U	7.8 U	4.2 U	4.5 U	4.2 U

Red Shading - UCL Exceeded; Black Shading - Method 1 Std Exeeded; Bold - Detected; U - Not Detected;
J - Estimated; R - Rejected; NA - Not Analyzed

Table 3-7
Summary of TBA VOC Soil Sample Results
Former Tombarello Property
Lawrence, Massachusetts

Sample Location						SA-01	SS-01		SVA-01	SVA-02	SVA-03		SVA-04	SVA-05	SVA-06	SVA-07	SVA-08
Sample Depth (ft)						1 - 3	1 - 2	7 - 8	0 - 1	1 - 3	1 - 3		1 - 3	1 - 3	1 - 3	1 - 3	1 - 3
Sample Date						06/09/16	06/08/16	06/08/16	06/07/16	06/08/16	06/08/16		06/08/16	06/08/16	06/08/16	06/09/16	06/09/16
QC Identifier											FD	FD					
Volatiles	**Units**	**S-1/GW-1**	**S-1/GW-2**	**S-1/GW-3**	**Soil UCL**												
1,1,1,2-Tetrachloroethane	ug/kg	100	100	80000	5000000	7.1 U	4.6 U	9.2 U	5.4 U	5.6 U	5.1 U	9.1 U	6.6 U	4.1 U	3.7 U	5.9 U	7.6 U
1,1,1-Trichloroethane	ug/kg	30000	500000	500000	10000000	7.1 U	4.6 U	9.2 U	5.4 U	5.6 U	5.1 U	9.1 U	6.6 U	4.1 U	3.7 U	5.9 U	7.6 U
1,1,2,2-Tetrachloroethane	ug/kg	5	20	10000	4000000	7.1 U	4.6 U	9.2 U	5.4 U	5.6 U	5.1 U	9.1 U	6.6 U	4.1 U	3.7 U	5.9 U	7.6 U
1,1,2-Trichloroethane	ug/kg	100	2000	40000	5000000	7.1 U	4.6 U	9.2 U	5.4 U	5.6 U	5.1 U	9.1 U	6.6 U	4.1 U	3.7 U	5.9 U	7.6 U
1,1-Dichloroethane	ug/kg	400	9000	500000	10000000	7.1 U	4.6 U	**130**	5.4 U	**4.4 J**	**1 J**	**3.3 J**	6.6 U	4.1 U	3.7 U	5.9 U	7.6 U
1,1-Dichloroethene	ug/kg	3000	40000	500000	10000000	7.1 U	4.6 U	9.2 U	5.4 U	5.6 U	5.1 U	9.1 U	6.6 U	4.1 U	3.7 U	5.9 U	7.6 U
1,1-Dichloropropene	ug/kg	--	--	--	--	7.1 U	4.6 U	9.2 U	5.4 U	5.6 U	5.1 U	9.1 U	6.6 U	4.1 U	3.7 U	5.9 U	7.6 U
1,2,3-Trichlorobenzene	ug/kg	--	--	--	--	7.1 U	4.6 U	9.2 U	5.4 U	5.6 U	5.1 U	9.1 U	6.6 U	4.1 U	3.7 U	5.9 U	7.6 U
1,2,3-Trichloropropane	ug/kg	--	--	--	--	7.1 U	4.6 U	9.2 U	5.4 U	5.6 U	5.1 U	9.1 U	6.6 U	4.1 U	3.7 U	5.9 U	7.6 U
1,2,4-Trichlorobenzene	ug/kg	2000	6000	700000	10000000	7.1 U	4.6 U	9.2 U	5.4 U	5.6 U	5.1 U	9.1 U	6.6 U	4.1 U	3.7 U	5.9 U	7.6 U
1,2,4-Trimethylbenzene	ug/kg	--	--	--	--	**21**	4.6 U	9.2 U	5.4 U	5.6 U	**2.4 J**	**8 J**	6.6 U	4.1 U	**87**	5.9 U	7.6 U
1,2-Dibromo-3-chloropropane	ug/kg	--	--	--	--	7.1 U	4.6 U	9.2 U	5.4 U	5.6 U	5.1 U	9.1 U	6.6 U	4.1 U	3.7 U	5.9 U	7.6 U
1,2-Dibromoethane	ug/kg	100	100	1000	400000	7.1 U	4.6 U	9.2 U	5.4 U	5.6 U	5.1 U	9.1 U	6.6 U	4.1 U	3.7 U	5.9 U	7.6 U
1,2-Dichlorobenzene	ug/kg	9000	100000	300000	10000000	7.1 U	4.6 U	9.2 U	5.4 U	5.6 U	5.1 U	9.1 U	6.6 U	4.1 U	3.7 U	5.9 U	7.6 U
1,2-Dichloroethane	ug/kg	100	100	20000	9000000	**4.9 J**	4.6 U	9.2 U	5.4 U	5.6 U	5.1 U	9.1 U	6.6 U	4.1 U	3.7 U	5.9 U	7.6 U
1,2-Dichloropropane	ug/kg	100	100	30000	10000000	7.1 U	4.6 U	9.2 U	5.4 U	5.6 U	5.1 U	9.1 U	6.6 U	4.1 U	3.7 U	5.9 U	7.6 U
1,3,5-Trimethylbenzene	ug/kg	--	--	--	--	**4.1 J**	4.6 U	9.2 U	5.4 U	5.6 U	**1.3 J**	**3.8 J**	6.6 U	4.1 U	**11**	5.9 U	7.6 U
1,3-Dichlorobenzene	ug/kg	3000	100000	100000	5000000	7.1 U	4.6 U	9.2 U	5.4 U	5.6 U	5.1 U	9.1 U	6.6 U	4.1 U	3.7 U	5.9 U	7.6 U
1,3-Dichloropropane	ug/kg	--	--	--	--	7.1 U	4.6 U	9.2 U	5.4 U	5.6 U	5.1 U	9.1 U	6.6 U	4.1 U	3.7 U	5.9 U	7.6 U
1,4-Dichlorobenzene	ug/kg	700	1000	80000	10000000	7.1 U	4.6 U	9.2 U	5.4 U	5.6 U	5.1 U	9.1 U	6.6 U	4.1 U	3.7 U	5.9 U	7.6 U
1,4-Dioxane	ug/kg	200	6000	20000	5000000	140 U	91 U	180 U	110 U	110 U	100 U	180 U	130 U	81 U	74 U	120 U	150 U
2,2-Dichloropropane	ug/kg	--	--	--	--	7.1 U	4.6 U	9.2 U	5.4 U	5.6 U	5.1 U	9.1 U	6.6 U	4.1 U	3.7 U	5.9 U	7.6 U
2-Butanone	ug/kg	4000	50000	400000	10000000	**18**	4.6 U	9.2 U	5.4 U	5.6 U	5.1 U	**18**	**24**	4.1 U	3.7 U	5.9 U	7.6 U
2-Chlorotoluene	ug/kg	--	--	--	--	7.1 U	4.6 U	9.2 U	5.4 U	5.6 U	5.1 U	9.1 U	6.6 U	4.1 U	3.7 U	5.9 U	7.6 U
2-Hexanone	ug/kg	--	--	--	--	**15**	4.6 U	9.2 U	5.4 U	5.6 U	5.1 U	9.1 U	6.6 U	4.1 U	3.7 U	5.9 U	7.6 U
4-Chlorotoluene	ug/kg	--	--	--	--	7.1 U	4.6 U	9.2 U	5.4 U	5.6 U	5.1 U	9.1 U	6.6 U	4.1 U	3.7 U	5.9 U	7.6 U
4-Isopropyltoluene	ug/kg	--	--	--	--	**2.6 J**	4.6 U	9.2 U	5.4 U	5.6 U	5.1 U	**3.2 J**	6.6 U	4.1 U	**1.2 J**	5.9 U	7.6 U
4-Methyl-2-pentanone	ug/kg	400	50000	400000	10000000	7.1 U	4.6 U	9.2 U	5.4 U	5.6 U	5.1 U	9.1 U	6.6 U	4.1 U	3.7 U	5.9 U	7.6 U
Acetone	ug/kg	6000	50000	400000	10000000	**63**	4.6 U	9.2 U	5.4 U	**7.4**	**23 J**	**92 J**	**88**	4.1 U	**13**	**23**	**27**
Benzene	ug/kg	2000	40000	40000	10000000	**17**	4.6 U	9.2 U	5.4 U	5.6 U	**1.1 J**	9.1 U	6.6 U	4.1 U	**4.1**	**1.3 J**	**3.4 J**
Bromobenzene	ug/kg	--	--	--	--	7.1 U	4.6 U	9.2 U	5.4 U	5.6 U	5.1 U	9.1 U	6.6 U	4.1 U	3.7 U	5.9 U	7.6 U
Bromochloromethane	ug/kg	--	--	--	--	7.1 U	4.6 U	9.2 U	5.4 U	5.6 U	5.1 U	9.1 U	6.6 U	4.1 U	3.7 U	5.9 U	7.6 U
Bromodichloromethane	ug/kg	100	100	30000	5000000	7.1 U	4.6 U	9.2 U	5.4 U	5.6 U	5.1 U	9.1 U	6.6 U	4.1 U	3.7 U	5.9 U	7.6 U
Bromoform	ug/kg	100	1000	300000	10000000	7.1 U	4.6 U	9.2 U	5.4 U	5.6 U	5.1 U	9.1 U	6.6 U	4.1 U	3.7 U	5.9 U	7.6 U
Bromomethane	ug/kg	500	500	30000	6000000	7.1 U	4.6 U	9.2 U	5.4 U	5.6 U	5.1 U	9.1 U	6.6 U	4.1 U	3.7 U	5.9 U	7.6 U
Carbon disulfide	ug/kg	--	--	--	--	7.1 U	4.6 U	9.2 U	5.4 U	5.6 U	5.1 U	9.1 U	6.6 U	4.1 U	3.7 U	5.9 U	7.6 U

Red Shading - UCL Exceeded; Black Shading - Method 1 Std Exeeded; Bold - Detected; U - Not Detected;
J - Estimated; R - Rejected; NA - Not Analyzed

Table 3-7
Summary of TBA VOC Soil Sample Results
Former Tombarello Property
Lawrence, Massachusetts

					Sample Location	BPA-01	BPA-02	FB-01	FB-02		FB-03	FB-04	LS-01	LS-02	M-7E	MS-01	NPA-02
					Sample Depth (ft)	2 - 3	2 - 3	5 - 7	1 - 2	2 - 3	2 - 3	1 - 2	7 - 8	2 - 3	1 - 3	12 - 13	6 - 7
					Sample Date	06/07/16	06/07/16	06/06/16	06/07/16	06/07/16	06/06/16	06/06/16	06/09/16	06/09/16	06/07/16	06/10/16	06/10/16
					QC Identifier												
Volatiles (cont.)	**Units**	**S-1/GW-1**	**S-1/GW-2**	**S-1/GW-3**	**Soil UCL**												
Carbon tetrachloride	ug/kg	10000	5000	30000	10000000	5.9 U	5.3 U	6.2 U	4.6 U	3 U	4.1 U	5 U	5.1 U	7.8 U	4.2 U	4.5 U	4.2 U
Chlorobenzene	ug/kg	1000	3000	100000	10000000	5.9 U	5.3 U	6.2 U	4.6 U	3 U	4.1 U	5 U	5.1 U	7.8 U	**2.2 J**	4.5 U	4.2 U
Chloroethane	ug/kg	--	--	--	--	5.9 U	5.3 U	6.2 U	4.6 U	3 U	4.1 U	5 U	5.1 U	7.8 U	4.2 U	4.5 U	4.2 U
Chloroform	ug/kg	400	200	500000	10000000	5.9 U	5.3 U	6.2 U	4.6 U	3 U	4.1 U	5 U	5.1 U	7.8 U	4.2 U	4.5 U	4.2 U
Chloromethane	ug/kg	--	--	--	--	5.9 U	5.3 U	6.2 U	4.6 U	3 U	4.1 U	5 U	5.1 U	7.8 U	4.2 U	4.5 U	4.2 U
cis-1,2-Dichloroethene	ug/kg	300	100	100000	5000000	5.9 U	5.3 U	6.2 U	4.6 U	3 U	4.1 U	5 U	5.1 U	7.8 U	4.2 U	4.5 U	**0.89 J**
cis-1,3-Dichloropropene	ug/kg	--	--	--	--	5.9 U	5.3 U	6.2 U	4.6 U	3 U	4.1 U	5 U	5.1 U	7.8 U	4.2 U	4.5 U	4.2 U
Dibromochloromethane	ug/kg	5	30	20000	5000000	5.9 U	5.3 U	6.2 U	4.6 U	3 U	4.1 U	5 U	5.1 U	7.8 U	4.2 U	4.5 U	4.2 U
Dibromomethane	ug/kg	--	--	--	--	5.9 U	5.3 U	6.2 U	4.6 U	3 U	4.1 U	5 U	5.1 U	7.8 U	4.2 U	4.5 U	4.2 U
Dichlorodifluoromethane	ug/kg	--	--	--	--	5.9 U	5.3 U	6.2 U	4.6 U	3 U	4.1 U	5 U	5.1 U	7.8 U	4.2 U	4.5 U	4.2 U
Diethyl ether	ug/kg	--	--	--	--	5.9 U	5.3 U	6.2 U	4.6 U	3 U	4.1 U	5 U	5.1 U	7.8 U	4.2 U	4.5 U	4.2 U
Diisopropyl Ether	ug/kg	--	--	--	--	5.9 U	5.3 U	6.2 U	4.6 U	3 U	4.1 U	5 U	5.1 U	7.8 U	4.2 U	4.5 U	4.2 U
Ethylbenzene	ug/kg	40000	500000	500000	10000000	5.9 U	5.3 U	6.2 U	4.6 U	3 U	4.1 U	5 U	5.1 U	7.8 U	**6.5**	4.5 U	4.2 U
Hexachlorobutadiene	ug/kg	30000	30000	30000	1000000	5.9 U	5.3 U	6.2 U	4.6 U	3 U	4.1 U	5 U	5.1 U	7.8 U	4.2 U	4.5 U	4.2 U
Isopropylbenzene	ug/kg	--	--	--	--	**2.5 J**	5.3 U	6.2 U	4.6 U	3 U	4.1 U	5 U	5.1 U	7.8 U	**2.8 J**	4.5 U	4.2 U
m,p-Xylene	ug/kg	--	--	--	--	5.9 U	5.3 U	6.2 U	4.6 U	3 U	4.1 U	5 U	5.1 U	7.8 U	**18**	4.5 U	4.2 U
Methyl tert-butyl ether	ug/kg	100	100000	100000	5000000	5.9 U	5.3 U	6.2 U	4.6 U	3 U	4.1 U	5 U	5.1 U	**6.4 J**	4.2 U	4.5 U	4.2 U
Methylene chloride	ug/kg	100	4000	400000	7000000	5.9 U	5.3 U	6.2 U	4.6 U	3 U	4.1 U	5 U	5.1 U	7.8 U	4.2 U	4.5 U	4.2 U
Naphthalene	ug/kg	4000	20000	500000	10000000	**23**	5.3 U	6.2 U	4.6 U	3 U	4.1 U	**7.8**	5.1 U	7.8 U	**4.1 J**	4.5 U	4.2 U
n-Butylbenzene	ug/kg	--	--	--	--	5.9 U	5.3 U	6.2 U	4.6 U	3 U	4.1 U	5 U	5.1 U	7.8 U	4.2 U	4.5 U	4.2 U
n-Propylbenzene	ug/kg	--	--	--	--	5.9 U	5.3 U	6.2 U	4.6 U	3 U	4.1 U	5 U	5.1 U	7.8 U	**3.4 J**	4.5 U	4.2 U
o-Xylene	ug/kg	--	--	--	--	**2.8 J**	5.3 U	6.2 U	4.6 U	3 U	4.1 U	5 U	5.1 U	7.8 U	**3.1 J**	4.5 U	4.2 U
sec-Butylbenzene	ug/kg	--	--	--	--	5.9 U	5.3 U	6.2 U	4.6 U	3 U	4.1 U	5 U	5.1 U	7.8 U	4.2 U	4.5 U	4.2 U
Styrene	ug/kg	3000	4000	70000	10000000	5.9 U	5.3 U	6.2 U	4.6 U	3 U	4.1 U	5 U	5.1 U	7.8 U	4.2 U	4.5 U	4.2 U
tert-Amyl methyl ether	ug/kg	--	--	--	--	5.9 U	5.3 U	6.2 U	4.6 U	3 U	4.1 U	5 U	5.1 U	7.8 U	4.2 U	4.5 U	4.2 U
Tert-Butyl Ethyl Ether	ug/kg	--	--	--	--	5.9 U	5.3 U	6.2 U	4.6 U	3 U	4.1 U	5 U	5.1 U	7.8 U	4.2 U	4.5 U	4.2 U
tert-Butylbenzene	ug/kg	--	--	--	--	5.9 U	5.3 U	6.2 U	4.6 U	3 U	4.1 U	5 U	5.1 U	7.8 U	4.2 U	4.5 U	4.2 U
Tetrachloroethene	ug/kg	1000	10000	30000	10000000	5.9 U	5.3 U	6.2 U	4.6 U	3 U	4.1 U	5 U	**2.9 J**	7.8 U	4.2 U	4.5 U	4.2 U
Tetrahydrofuran	ug/kg	--	--	--	--	12 U	11 U	12 U	9.2 U	5.9 U	8.3 U	10 U	10 U	16 U	8.5 U	9.1 U	8.3 U
Toluene	ug/kg	30000	500000	500000	10000000	5.9 U	5.3 U	6.2 U	4.6 U	3 U	4.1 U	5 U	5.1 U	7.8 U	**2.8 J**	4.5 U	4.2 U
trans-1,2-Dichloroethene	ug/kg	1000	1000	500000	10000000	5.9 U	5.3 U	6.2 U	4.6 U	3 U	4.1 U	5 U	5.1 U	7.8 U	4.2 U	4.5 U	4.2 U
trans-1,3-Dichloropropene	ug/kg	--	--	--	--	5.9 U	5.3 U	6.2 U	4.6 U	3 U	4.1 U	5 U	5.1 U	7.8 U	4.2 U	4.5 U	4.2 U
Trichloroethene	ug/kg	300	300	30000	600000	5.9 U	5.3 U	6.2 U	4.6 U	3 U	4.1 U	5 U	5.1 U	7.8 U	4.2 U	4.5 U	**1.8 J**
Trichlorofluoromethane	ug/kg	--	--	--	--	5.9 U	5.3 U	6.2 U	4.6 U	3 U	4.1 U	5 U	5.1 U	7.8 U	4.2 U	4.5 U	4.2 U
Vinyl chloride	ug/kg	900	700	1000	600000	5.9 U	5.3 U	6.2 U	4.6 U	3 U	4.1 U	5 U	5.1 U	7.8 U	4.2 U	4.5 U	4.2 U
Xylene (total)	ug/kg	400000	100000	500000	10000000	**2.8 J**	5.3 U	6.2 U	4.6 U	3 U	4.1 U	5 U	5.1 U	7.8 U	**21**	4.5 U	4.2 U

Red Shading - UCL Exceeded; Black Shading - Method 1 Std Exeeded; Bold - Detected; U - Not Detected;
J - Estimated; R - Rejected; NA - Not Analyzed

Table 3-7
Summary of TBA VOC Soil Sample Results
Former Tombarello Property
Lawrence, Massachusetts

					Sample Location	SA-01	SS-01		SVA-01	SVA-02	SVA-03		SVA-04	SVA-05	SVA-06	SVA-07	SVA-08
					Sample Depth (ft)	1 - 3	1 - 2	7 - 8	0 - 1	1 - 3	1 - 3		1 - 3	1 - 3	1 - 3	1 - 3	1 - 3
					Sample Date	06/09/16	06/08/16	06/08/16	06/07/16	06/08/16	06/08/16		06/08/16	06/08/16	06/08/16	06/09/16	06/09/16
					QC Identifier						FD	FD					
Volatiles (cont.)	**Units**	**S-1/GW-1**	**S-1/GW-2**	**S-1/GW-3**	**Soil UCL**												
Carbon tetrachloride	ug/kg	10000	5000	30000	10000000	7.1 U	4.6 U	9.2 U	5.4 U	5.6 U	5.1 U	9.1 U	6.6 U	4.1 U	3.7 U	5.9 U	7.6 U
Chlorobenzene	ug/kg	1000	3000	100000	10000000	7.1 U	4.6 U	9.2 U	5.4 U	5.6 U	5.1 U	9.1 U	6.6 U	4.1 U	3.7 U	5.9 U	7.6 U
Chloroethane	ug/kg	--	--	--	--	7.1 U	4.6 U	9.2 U	5.4 U	5.6 U	5.1 U	9.1 U	6.6 U	4.1 U	3.7 U	5.9 U	7.6 U
Chloroform	ug/kg	400	200	500000	10000000	7.1 U	4.6 U	9.2 U	5.4 U	5.6 U	5.1 U	9.1 U	6.6 U	4.1 U	3.7 U	5.9 U	7.6 U
Chloromethane	ug/kg	--	--	--	--	7.1 U	4.6 U	9.2 U	5.4 U	5.6 U	5.1 U	9.1 U	6.6 U	4.1 U	3.7 U	5.9 U	7.6 U
cis-1,2-Dichloroethene	ug/kg	300	100	100000	5000000	7.1 U	4.6 U	**27**	5.4 U	5.6 U	5.1 U	9.1 U	**6.5 J**	4.1 U	3.7 U	5.9 U	7.6 U
cis-1,3-Dichloropropene	ug/kg	--	--	--	--	7.1 U	4.6 U	9.2 U	5.4 U	5.6 U	5.1 U	9.1 U	6.6 U	4.1 U	3.7 U	5.9 U	7.6 U
Dibromochloromethane	ug/kg	5	30	20000	5000000	7.1 U	4.6 U	9.2 U	5.4 U	5.6 U	5.1 U	9.1 U	6.6 U	4.1 U	3.7 U	5.9 U	7.6 U
Dibromomethane	ug/kg	--	--	--	--	7.1 U	4.6 U	9.2 U	5.4 U	5.6 U	5.1 U	9.1 U	6.6 U	4.1 U	3.7 U	5.9 U	7.6 U
Dichlorodifluoromethane	ug/kg	--	--	--	--	7.1 U	4.6 U	9.2 U	5.4 U	5.6 U	5.1 U	9.1 U	6.6 U	4.1 U	3.7 U	5.9 U	7.6 U
Diethyl ether	ug/kg	--	--	--	--	7.1 U	4.6 U	9.2 U	5.4 U	5.6 U	5.1 U	9.1 U	6.6 U	4.1 U	3.7 U	5.9 U	7.6 U
Diisopropyl Ether	ug/kg	--	--	--	--	7.1 U	4.6 U	9.2 U	5.4 U	5.6 U	5.1 U	9.1 U	6.6 U	4.1 U	3.7 U	5.9 U	7.6 U
Ethylbenzene	ug/kg	40000	500000	500000	10000000	**11**	4.6 U	9.2 U	5.4 U	5.6 U	5.1 U	9.1 U	6.6 U	4.1 U	**22**	5.9 U	7.6 U
Hexachlorobutadiene	ug/kg	30000	30000	30000	1000000	7.1 U	4.6 U	9.2 U	5.4 U	5.6 U	5.1 U	9.1 U	6.6 U	4.1 U	3.7 U	5.9 U	7.6 U
Isopropylbenzene	ug/kg	--	--	--	--	**7.2**	4.6 U	9.2 U	5.4 U	5.6 U	5.1 U	**5 J**	6.6 U	4.1 U	**3.4 J**	5.9 U	7.6 U
m,p-Xylene	ug/kg	--	--	--	--	**18**	4.6 U	9.2 U	5.4 U	5.6 U	5.1 U	**6.8 J**	6.6 U	4.1 U	**11**	5.9 U	7.6 U
Methyl tert-butyl ether	ug/kg	100	100000	100000	5000000	7.1 U	4.6 U	**3.2 J**	5.4 U	5.6 U	5.1 U	9.1 U	6.6 U	4.1 U	3.7 U	5.9 U	7.6 U
Methylene chloride	ug/kg	100	4000	400000	7000000	7.1 U	4.6 U	9.2 U	5.4 U	5.6 U	5.1 U	9.1 U	6.6 U	4.1 U	3.7 U	5.9 U	7.6 U
Naphthalene	ug/kg	4000	20000	500000	10000000	**280**	4.6 U	9.2 U	5.4 U	5.6 U	**3.9 J**	**9.3**	6.6 U	**0.88 J**	**7.2**	5.9 U	7.6 U
n-Butylbenzene	ug/kg	--	--	--	--	**43**	4.6 U	9.2 U	5.4 U	5.6 U	5.1 U	**7.5 J**	6.6 U	4.1 U	**3.6 J**	5.9 U	7.6 U
n-Propylbenzene	ug/kg	--	--	--	--	**23**	4.6 U	9.2 U	5.4 U	5.6 U	5.1 U	**5 J**	6.6 U	4.1 U	**6.1**	5.9 U	7.6 U
o-Xylene	ug/kg	--	--	--	--	**6.8 J**	4.6 U	9.2 U	5.4 U	5.6 U	**1.3 J**	**2.8 J**	6.6 U	4.1 U	**2.4 J**	5.9 U	7.6 U
sec-Butylbenzene	ug/kg	--	--	--	--	**17**	4.6 U	9.2 U	5.4 U	5.6 U	5.1 U	**12**	6.6 U	4.1 U	**1 J**	5.9 U	7.6 U
Styrene	ug/kg	3000	4000	70000	10000000	7.1 U	4.6 U	9.2 U	5.4 U	5.6 U	5.1 U	9.1 U	6.6 U	4.1 U	3.7 U	5.9 U	7.6 U
tert-Amyl methyl ether	ug/kg	--	--	--	--	7.1 U	4.6 U	9.2 U	5.4 U	5.6 U	5.1 U	9.1 U	6.6 U	4.1 U	3.7 U	5.9 U	7.6 U
Tert-Butyl Ethyl Ether	ug/kg	--	--	--	--	7.1 U	4.6 U	9.2 U	5.4 U	5.6 U	5.1 U	9.1 U	6.6 U	4.1 U	3.7 U	5.9 U	7.6 U
tert-Butylbenzene	ug/kg	--	--	--	--	7.1 U	4.6 U	9.2 U	5.4 U	5.6 U	5.1 U	**2.5 J**	6.6 U	4.1 U	3.7 U	5.9 U	7.6 U
Tetrachloroethene	ug/kg	1000	10000	30000	10000000	7.1 U	4.6 U	9.2 U	**1.8 J**	5.6 U	5.1 U	9.1 U	6.6 U	**1.5 J**	3.7 U	5.9 U	7.6 U
Tetrahydrofuran	ug/kg	--	--	--	--	14 U	9.1 U	18 U	11 U	11 U	10 U	18 U	13 U	8.1 U	7.4 U	12 U	15 U
Toluene	ug/kg	30000	500000	500000	10000000	**22**	4.6 U	9.2 U	5.4 U	5.6 U	5.1 U	9.1 U	6.6 U	4.1 U	**1.7 J**	**1.2 J**	7.6 U
trans-1,2-Dichloroethene	ug/kg	1000	1000	500000	10000000	7.1 U	4.6 U	9.2 U	5.4 U	5.6 U	5.1 U	9.1 U	6.6 U	4.1 U	3.7 U	5.9 U	7.6 U
trans-1,3-Dichloropropene	ug/kg	--	--	--	--	7.1 U	4.6 U	9.2 U	5.4 U	5.6 U	5.1 U	9.1 U	6.6 U	4.1 U	3.7 U	5.9 U	7.6 U
Trichloroethene	ug/kg	300	300	30000	600000	7.1 U	4.6 U	**2.5 J**	5.4 U	5.6 U	5.1 U	9.1 U	6.6 U	**1 J**	3.7 U	5.9 U	7.6 U
Trichlorofluoromethane	ug/kg	--	--	--	--	7.1 U	4.6 U	9.2 U	5.4 U	5.6 U	5.1 U	9.1 U	6.6 U	**4.6**	3.7 U	5.9 U	7.6 U
Vinyl chloride	ug/kg	900	700	1000	600000	7.1 U	4.6 U	9.2 U	5.4 U	5.6 U	5.1 U	9.1 U	6.6 U	4.1 U	3.7 U	5.9 U	7.6 U
Xylene (total)	ug/kg	400000	100000	500000	10000000	**25**	4.6 U	9.2 U	5.4 U	5.6 U	**1.3 J**	**9.6**	6.6 U	4.1 U	**13**	5.9 U	7.6 U

Red Shading - UCL Exceeded; Black Shading - Method 1 Std Exeeded; Bold - Detected; U - Not Detected;
J - Estimated; R - Rejected; NA - Not Analyzed

Table 3-8
Summary of Historical and TBA Groundwater Analytical Results
Former Tombarello Property
Lawrence, Massachusetts

Sample Location					MW-1				MW-2	MW-2A	MW-3	MW-3A	MW-4	MW-5		MW-6	
Sample Date					07/09/98	06/10/99	02/13/03	06/16/16	07/09/98	07/30/98	07/09/98	07/30/98	07/09/98	06/10/99	02/13/03	06/10/99	02/13/03
QC Identifier																	
Volatiles	**Units**	**GW-2**	**GW-3**	**GW UCL**													
1,1,1,2-Tetrachloroethane	ug/L	10	50000	100000	NA	NA	NA	1 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,1,1-Trichloroethane	ug/L	4000	20000	100000	NA	NA	NA	1 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,1,2,2-Tetrachloroethane	ug/L	9	50000	100000	NA	NA	NA	1 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,1,2-Trichloroethane	ug/L	900	50000	100000	NA	NA	NA	1 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,1-Dichloroethane	ug/L	2000	20000	100000	NA	NA	NA	1 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,1-Dichloroethene	ug/L	80	30000	100000	NA	NA	NA	1 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,1-Dichloropropene	ug/L	--	--	--	NA	NA	NA	1 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2,3-Trichlorobenzene	ug/L	--	--	--	NA	NA	NA	1 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2,3-Trichloropropane	ug/L	--	--	--	NA	NA	NA	1 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2,4-Trichlorobenzene	ug/L	200	50000	100000	NA	NA	NA	1 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2,4-Trimethylbenzene	ug/L	--	--	--	NA	NA	NA	1 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dibromo-3-chloropropane	ug/L	--	--	--	NA	NA	NA	1 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dibromoethane	ug/L	2	50000	100000	NA	NA	NA	1 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dichlorobenzene	ug/L	8000	2000	80000	NA	NA	NA	1 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dichloroethane	ug/L	5	20000	100000	NA	NA	NA	1 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dichloropropane	ug/L	3	50000	100000	NA	NA	NA	1 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,3,5-Trimethylbenzene	ug/L	--	--	--	NA	NA	NA	1 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,3-Dichlorobenzene	ug/L	6000	50000	100000	NA	NA	NA	1 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,3-Dichloropropane	ug/L	--	--	--	NA	NA	NA	1 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,4-Dichlorobenzene	ug/L	60	8000	80000	NA	NA	NA	1 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,4-Dioxane	ug/L	6000	50000	100000	NA	NA	NA	100 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,2-Dichloropropane	ug/L	--	--	--	NA	NA	NA	1 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Butanone	ug/L	50000	50000	100000	NA	NA	NA	5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Chlorotoluene	ug/L	--	--	--	NA	NA	NA	1 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Hexanone	ug/L	--	--	--	NA	NA	NA	5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Chlorotoluene	ug/L	--	--	--	NA	NA	NA	1 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Isopropyltoluene	ug/L	--	--	--	NA	NA	NA	5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Methyl-2-pentanone	ug/L	50000	50000	100000	NA	NA	NA	5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acetone	ug/L	50000	50000	100000	NA	NA	NA	5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzene	ug/L	1000	10000	100000	NA	NA	NA	1 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bromobenzene	ug/L	--	--	--	NA	NA	NA	1 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bromochloromethane	ug/L	--	--	--	NA	NA	NA	1 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bromodichloromethane	ug/L	6	50000	100000	NA	NA	NA	1 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bromoform	ug/L	700	50000	100000	NA	NA	NA	1 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bromomethane	ug/L	7	800	8000	NA	NA	NA	1 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Carbon disulfide	ug/L	--	--	--	NA	NA	NA	1 U	NA	NA	NA	NA	NA	NA	NA	NA	NA

Red Shading - UCL Exceeded; Black Shading - Method 1 Std Exceeded; Bold - Detected; U - Not Detected;
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Table 3-8
Summary of Historical and TBA Groundwater Analytical Results
Former Tombarello Property
Lawrence, Massachusetts

Sample Location					MW-7		MW-8	MW-9	MW-11	MW-11F	MW-12	MW-13		MW-15	MW-16
Sample Date					06/10/99	02/13/03	06/13/16	06/13/16	06/13/16	06/17/16	06/14/16	06/14/16		06/16/16	06/13/16
QC Identifier												FD	FD		
Volatiles	**Units**	**GW-2**	**GW-3**	**GW UCL**											
1,1,1,2-Tetrachloroethane	ug/L	10	50000	100000	NA	NA	1 U	1 U	1 U	NA	1 U	1 U	1 U	1 U	1 U
1,1,1-Trichloroethane	ug/L	4000	20000	100000	NA	NA	1 U	1 U	1 U	NA	1 U	1 U	1 U	1 U	1 U
1,1,2,2-Tetrachloroethane	ug/L	9	50000	100000	NA	NA	1 U	1 U	1 U	NA	1 U	1 U	1 U	1 U	1 U
1,1,2-Trichloroethane	ug/L	900	50000	100000	NA	NA	1 U	1 U	1 U	NA	1 U	1 U	1 U	1 U	1 U
1,1-Dichloroethane	ug/L	2000	20000	100000	NA	NA	1 U	1 U	**2.3**	NA	1 U	1 U	1 U	1 U	1 U
1,1-Dichloroethene	ug/L	80	30000	100000	NA	NA	1 U	1 U	1 U	NA	1 U	1 U	1 U	1 U	1 U
1,1-Dichloropropene	ug/L	--	--	--	NA	NA	1 U	1 U	1 U	NA	1 U	1 U	1 U	1 U	1 U
1,2,3-Trichlorobenzene	ug/L	--	--	--	NA	NA	1 U	1 U	1 U	NA	1 U	1 U	1 U	1 U	1 U
1,2,3-Trichloropropane	ug/L	--	--	--	NA	NA	1 U	1 U	1 U	NA	1 U	1 U	1 U	1 U	1 U
1,2,4-Trichlorobenzene	ug/L	200	50000	100000	NA	NA	1 U	1 U	1 U	NA	1 U	1 U	1 U	1 U	1 U
1,2,4-Trimethylbenzene	ug/L	--	--	--	NA	NA	**10**	1 U	1 U	NA	1 U	1 U	1 U	1 U	1 U
1,2-Dibromo-3-chloropropane	ug/L	--	--	--	NA	NA	1 U	1 U	1 U	NA	1 U	1 U	1 U	1 U	1 U
1,2-Dibromoethane	ug/L	2	50000	100000	NA	NA	1 U	1 U	1 U	NA	1 U	1 U	1 U	1 U	1 U
1,2-Dichlorobenzene	ug/L	8000	2000	80000	NA	NA	1 U	1 U	1 U	NA	1 U	1 U	1 U	1 U	1 U
1,2-Dichloroethane	ug/L	5	20000	100000	NA	NA	1 U	1 U	1 U	NA	1 U	1 U	1 U	1 U	1 U
1,2-Dichloropropane	ug/L	3	50000	100000	NA	NA	1 U	1 U	1 U	NA	1 U	1 U	1 U	1 U	1 U
1,3,5-Trimethylbenzene	ug/L	--	--	--	NA	NA	**2.5**	1 U	1 U	NA	1 U	1 U	1 U	1 U	1 U
1,3-Dichlorobenzene	ug/L	6000	50000	100000	NA	NA	1 U	1 U	1 U	NA	1 U	1 U	1 U	1 U	1 U
1,3-Dichloropropane	ug/L	--	--	--	NA	NA	1 U	1 U	1 U	NA	1 U	1 U	1 U	1 U	1 U
1,4-Dichlorobenzene	ug/L	60	8000	80000	NA	NA	1 U	1 U	1 U	NA	1 U	1 U	1 U	1 U	1 U
1,4-Dioxane	ug/L	6000	50000	100000	NA	NA	100 U	100 U	100 U	NA	100 U	100 U	100 U	100 U	100 U
2,2-Dichloropropane	ug/L	--	--	--	NA	NA	1 U	1 U	1 U	NA	1 U	1 U	1 U	1 U	1 U
2-Butanone	ug/L	50000	50000	100000	NA	NA	5 U	5 U	5 U	NA	5 U	5 U	5 U	5 U	5 U
2-Chlorotoluene	ug/L	--	--	--	NA	NA	1 U	1 U	1 U	NA	1 U	1 U	1 U	1 U	1 U
2-Hexanone	ug/L	--	--	--	NA	NA	5 U	5 U	5 U	NA	5 U	5 U	5 U	5 U	5 U
4-Chlorotoluene	ug/L	--	--	--	NA	NA	1 U	1 U	1 U	NA	1 U	1 U	1 U	1 U	1 U
4-Isopropyltoluene	ug/L	--	--	--	NA	NA	5 U	5 U	5 U	NA	5 U	5 U	5 U	5 U	5 U
4-Methyl-2-pentanone	ug/L	50000	50000	100000	NA	NA	5 U	5 U	5 U	NA	5 U	5 U	5 U	5 U	5 U
Acetone	ug/L	50000	50000	100000	NA	NA	5 U	5 U	5 U	NA	5 U	5 U	5 U	5 U	5 U
Benzene	ug/L	1000	10000	100000	NA	NA	**1.9**	1 U	**1.3**	NA	1 U	**1.8**	**1.9**	1 U	1 U
Bromobenzene	ug/L	--	--	--	NA	NA	1 U	1 U	1 U	NA	1 U	1 U	1 U	1 U	1 U
Bromochloromethane	ug/L	--	--	--	NA	NA	1 U	1 U	1 U	NA	1 U	1 U	1 U	1 U	1 U
Bromodichloromethane	ug/L	6	50000	100000	NA	NA	1 U	1 U	1 U	NA	1 U	1 U	1 U	1 U	1 U
Bromoform	ug/L	700	50000	100000	NA	NA	1 U	1 U	1 U	NA	1 U	1 U	1 U	1 U	1 U
Bromomethane	ug/L	7	800	8000	NA	NA	1 U	1 U	1 U	NA	1 U	1 U	1 U	1 U	1 U
Carbon disulfide	ug/L	--	--	--	NA	NA	1 U	1 U	1 U	NA	1 U	1 U	1 U	1 U	1 U

Red Shading - UCL Exceeded; Black Shading - Method 1 Std Exceeded; Bold - Detected; U - Not Detected;
J - Estimated; R - Rejected; NA - Not Analyzed

Table 3-8
Summary of Historical and TBA Groundwater Analytical Results
Former Tombarello Property
Lawrence, Massachusetts

				Sample Location	MW-1				MW-2	MW-2A	MW-3	MW-3A	MW-4	MW-5		MW-6	
				Sample Date	07/09/98	06/10/99	02/13/03	06/16/16	07/09/98	07/30/98	07/09/98	07/30/98	07/09/98	06/10/99	02/13/03	06/10/99	02/13/03
				QC Identifier													
Volatiles (cont.)	**Units**	**GW-2**	**GW-3**	**GW UCL**													
Carbon tetrachloride	ug/L	2	5000	50000	NA	NA	NA	1 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chlorobenzene	ug/L	200	1000	10000	NA	NA	NA	1 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chloroethane	ug/L	--	--	--	NA	NA	NA	1 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chloroform	ug/L	50	20000	100000	NA	NA	NA	1 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chloromethane	ug/L	--	--	--	NA	NA	NA	1 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
cis-1,2-Dichloroethene	ug/L	20	50000	100000	NA	NA	NA	1 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
cis-1,3-Dichloropropene	ug/L	--	--	--	NA	NA	NA	1 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibromochloromethane	ug/L	20	50000	100000	NA	NA	NA	1 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibromomethane	ug/L	--	--	--	NA	NA	NA	1 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dichlorodifluoromethane	ug/L	--	--	--	NA	NA	NA	1 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Diethyl ether	ug/L	--	--	--	NA	NA	NA	1 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Diisopropyl Ether	ug/L	--	--	--	NA	NA	NA	1 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ethylbenzene	ug/L	20000	5000	100000	NA	NA	NA	1 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Hexachlorobutadiene	ug/L	50	3000	30000	NA	NA	NA	1 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Isopropylbenzene	ug/L	--	--	--	NA	NA	NA	1 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
m,p-Xylene	ug/L	--	--	--	NA	NA	NA	1 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methyl tert-butyl ether	ug/L	50000	50000	100000	NA	NA	NA	1 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methylene chloride	ug/L	2000	50000	100000	NA	NA	NA	1 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Naphthalene	ug/L	700	20000	100000	NA	NA	NA	1 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
n-Butylbenzene	ug/L	--	--	--	NA	NA	NA	1 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
n-Propylbenzene	ug/L	--	--	--	NA	NA	NA	1 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
o-Xylene	ug/L	--	--	--	NA	NA	NA	1 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
sec-Butylbenzene	ug/L	--	--	--	NA	NA	NA	1 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Styrene	ug/L	100	6000	60000	NA	NA	NA	1 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
tert-Amyl methyl ether	ug/L	--	--	--	NA	NA	NA	1 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Tert-Butyl Ethyl Ether	ug/L	--	--	--	NA	NA	NA	1 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
tert-Butylbenzene	ug/L	--	--	--	NA	NA	NA	1 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Tetrachloroethene	ug/L	50	30000	100000	NA	NA	NA	1 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Tetrahydrofuran	ug/L	--	--	--	NA	NA	NA	5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Toluene	ug/L	50000	40000	100000	NA	NA	NA	1 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
trans-1,2-Dichloroethene	ug/L	80	50000	100000	NA	NA	NA	1 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
trans-1,3-Dichloropropene	ug/L	--	--	--	NA	NA	NA	1 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Trichloroethene	ug/L	5	5000	50000	NA	NA	NA	1 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Trichlorofluoromethane	ug/L	--	--	--	NA	NA	NA	1 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vinyl chloride	ug/L	2	50000	100000	NA	NA	NA	1 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Xylene (total)	ug/L	3000	5000	100000	NA	NA	NA	5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA

Red Shading - UCL Exceeded; Black Shading - Method 1 Std Exceeded; Bold - Detected; U - Not Detected;
J - Estimated; R - Rejected; NA - Not Analyzed

Table 3-8
Summary of Historical and TBA Groundwater Analytical Results
Former Tombarello Property
Lawrence, Massachusetts

Sample Location					MW-7		MW-8	MW-9	MW-11	MW-11F	MW-12	MW-13		MW-15	MW-16
Sample Date					06/10/99	02/13/03	06/13/16	06/13/16	06/13/16	06/17/16	06/14/16	06/14/16		06/16/16	06/13/16
QC Identifier												FD	FD		
Volatiles (cont.)	**Units**	**GW-2**	**GW-3**	**GW UCL**											
Carbon tetrachloride	ug/L	2	5000	50000	NA	NA	1 U	1 U	1 U	NA	1 U	1 U	1 U	1 U	1 U
Chlorobenzene	ug/L	200	1000	10000	NA	NA	1 U	1 U	1 U	NA	1 U	**140**	**150**	1 U	1 U
Chloroethane	ug/L	--	--	--	NA	NA	1 U	1 U	1 U	NA	1 U	1 U	1 U	1 U	1 U
Chloroform	ug/L	50	20000	100000	NA	NA	1 U	1 U	1 U	NA	1 U	1 U	1 U	1 U	1 U
Chloromethane	ug/L	--	--	--	NA	NA	1 U	1 U	1 U	NA	1 U	1 U	1 U	1 U	1 U
cis-1,2-Dichloroethene	ug/L	20	50000	100000	NA	NA	**1.6**	1 U	1 U	NA	1 U	1 U	1 U	1 U	1 U
cis-1,3-Dichloropropene	ug/L	--	--	--	NA	NA	1 U	1 U	1 U	NA	1 U	1 U	1 U	1 U	1 U
Dibromochloromethane	ug/L	20	50000	100000	NA	NA	1 U	1 U	1 U	NA	1 U	1 U	1 U	1 U	1 U
Dibromomethane	ug/L	--	--	--	NA	NA	1 U	1 U	1 U	NA	1 U	1 U	1 U	1 U	1 U
Dichlorodifluoromethane	ug/L	--	--	--	NA	NA	1 U	**17**	1 U	NA	1 U	1 U	1 U	1 U	1 U
Diethyl ether	ug/L	--	--	--	NA	NA	1 U	1 U	1 U	NA	1 U	1 U	1 U	1 U	1 U
Diisopropyl Ether	ug/L	--	--	--	NA	NA	1 U	1 U	1 U	NA	1 U	1 U	1 U	1 U	1 U
Ethylbenzene	ug/L	20000	5000	100000	NA	NA	**2.6**	1 U	1 U	NA	1 U	1 U	1 U	1 U	1 U
Hexachlorobutadiene	ug/L	50	3000	30000	NA	NA	1 U	1 U	1 U	NA	1 U	1 U	1 U	1 U	1 U
Isopropylbenzene	ug/L	--	--	--	NA	NA	1 U	1 U	1 U	NA	1 U	1 U	1 U	1 U	1 U
m,p-Xylene	ug/L	--	--	--	NA	NA	**10**	1 U	1 U	NA	1 U	1 U	1 U	1 U	1 U
Methyl tert-butyl ether	ug/L	50000	50000	100000	NA	NA	**4.6**	**1.6**	1 U	NA	1 U	1 U	1 U	1 U	1 U
Methylene chloride	ug/L	2000	50000	100000	NA	NA	1 U	1 U	1 U	NA	1 U	1 U	1 U	1 U	1 U
Naphthalene	ug/L	700	20000	100000	NA	NA	**3.1**	1 U	1 U	NA	1 U	1 U	1 U	1 U	1 U
n-Butylbenzene	ug/L	--	--	--	NA	NA	1 U	1 U	1 U	NA	1 U	1 U	1 U	1 U	1 U
n-Propylbenzene	ug/L	--	--	--	NA	NA	**1.5**	1 U	1 U	NA	1 U	1 U	1 U	1 U	1 U
o-Xylene	ug/L	--	--	--	NA	NA	**5.3**	1 U	1 U	NA	1 U	1 U	1 U	1 U	1 U
sec-Butylbenzene	ug/L	--	--	--	NA	NA	1 U	1 U	1 U	NA	1 U	1 U	1 U	1 U	1 U
Styrene	ug/L	100	6000	60000	NA	NA	1 U	1 U	1 U	NA	1 U	1 U	1 U	1 U	1 U
tert-Amyl methyl ether	ug/L	--	--	--	NA	NA	1 U	1 U	1 U	NA	1 U	1 U	1 U	1 U	1 U
Tert-Butyl Ethyl Ether	ug/L	--	--	--	NA	NA	1 U	1 U	1 U	NA	1 U	1 U	1 U	1 U	1 U
tert-Butylbenzene	ug/L	--	--	--	NA	NA	1 U	1 U	1 U	NA	1 U	1 U	1 U	1 U	1 U
Tetrachloroethene	ug/L	50	30000	100000	NA	NA	1 U	**10**	1 U	NA	1 U	1 U	1 U	1 U	1 U
Tetrahydrofuran	ug/L	--	--	--	NA	NA	5 U	5 U	5 U	NA	5 U	5 U	5 U	5 U	5 U
Toluene	ug/L	50000	40000	100000	NA	NA	**3.6**	1 U	1 U	NA	1 U	1 U	1 U	1 U	1 U
trans-1,2-Dichloroethene	ug/L	80	50000	100000	NA	NA	1 U	1 U	1 U	NA	1 U	1 U	1 U	1 U	1 U
trans-1,3-Dichloropropene	ug/L	--	--	--	NA	NA	1 U	1 U	1 U	NA	1 U	1 U	1 U	1 U	1 U
Trichloroethene	ug/L	5	5000	50000	NA	NA	**2.7**	1 U	1 U	NA	1 U	1 U	1 U	1 U	1 U
Trichlorofluoromethane	ug/L	--	--	--	NA	NA	1 U	1 U	1 U	NA	1 U	1 U	1 U	1 U	1 U
Vinyl chloride	ug/L	2	50000	100000	NA	NA	**1**	1 U	1 U	NA	1 U	1 U	1 U	1 U	1 U
Xylene (total)	ug/L	3000	5000	100000	NA	NA	**15**	5 U	5 U	NA	5 U	5 U	5 U	5 U	5 U

Red Shading - UCL Exceeded; Black Shading - Method 1 Std Exceeded; Bold - Detected; U - Not Detected;
J - Estimated; R - Rejected; NA - Not Analyzed

Table 3-8
Summary of Historical and TBA Groundwater Analytical Results
Former Tombarello Property
Lawrence, Massachusetts

				Sample Location	MW-1				MW-2	MW-2A	MW-3	MW-3A	MW-4	MW-5		MW-6	
				Sample Date	07/09/98	06/10/99	02/13/03	06/16/16	07/09/98	07/30/98	07/09/98	07/30/98	07/09/98	06/10/99	02/13/03	06/10/99	02/13/03
				QC Identifier													
PAHs	**Units**	**GW-2**	**GW-3**	**GW UCL**													
1,4-Dioxane	ug/L	6000	50000	100000	NA	NA	NA	0.1 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	ug/L	2000	20000	100000	NA	NA	NA	0.1 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acenaphthene	ug/L	--	10000	100000	NA	NA	NA	0.1 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acenaphthylene	ug/L	10000	40	100000	NA	NA	NA	0.1 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Anthracene	ug/L	--	30	600	NA	NA	NA	0.1 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)anthracene	ug/L	--	1000	10000	NA	NA	NA	0.1 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)pyrene	ug/L	--	500	5000	NA	NA	NA	0.1 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(b)fluoranthene	ug/L	--	400	4000	NA	NA	NA	0.1 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(g,h,i)perylene	ug/L	--	20	500	NA	NA	NA	0.1 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	ug/L	--	100	1000	NA	NA	NA	0.1 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chrysene	ug/L	--	70	700	NA	NA	NA	0.1 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibenz(a,h)anthracene	ug/L	--	40	400	NA	NA	NA	0.1 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fluoranthene	ug/L	--	200	2000	NA	NA	NA	0.1 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fluorene	ug/L	--	40	400	NA	NA	NA	0.1 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	ug/L	--	100	1000	NA	NA	NA	0.1 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Naphthalene	ug/L	700	20000	100000	NA	NA	NA	0.1 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Phenanthrene	ug/L	--	10000	100000	NA	NA	NA	**0.17**	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pyrene	ug/L	--	20	600	NA	NA	NA	0.1 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
EPH																	
2-Methylnaphthalene	ug/L	2000	20000	100000	NA	NA	NA	6.25 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acenaphthene	ug/L	--	10000	100000	NA	NA	NA	6.25 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acenaphthylene	ug/L	10000	40	100000	NA	NA	NA	6.25 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Anthracene	ug/L	--	30	600	NA	NA	NA	6.25 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)anthracene	ug/L	--	1000	10000	NA	NA	NA	6.25 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)pyrene	ug/L	--	500	5000	NA	NA	NA	6.25 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(b)fluoranthene	ug/L	--	400	4000	NA	NA	NA	6.25 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(g,h,i)perylene	ug/L	--	20	500	NA	NA	NA	6.25 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	ug/L	--	100	1000	NA	NA	NA	6.25 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
C11-C22 Aromatics	ug/L	50000	5000	100000	NA	NA	NA	125 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
C19-C36 Aliphatics	ug/L	--	50000	100000	NA	NA	NA	125 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
C9-C18 Aliphatics	ug/L	5000	50000	100000	NA	NA	NA	125 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chrysene	ug/L	--	70	700	NA	NA	NA	6.25 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibenz(a,h)anthracene	ug/L	--	40	400	NA	NA	NA	6.25 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fluoranthene	ug/L	--	200	2000	NA	NA	NA	6.25 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fluorene	ug/L	--	40	400	NA	NA	NA	6.25 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	ug/L	--	100	1000	NA	NA	NA	6.25 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Naphthalene	ug/L	700	20000	100000	NA	NA	NA	6.25 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Phenanthrene	ug/L	--	10000	100000	NA	NA	NA	6.25 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pyrene	ug/L	--	20	600	NA	NA	NA	6.25 U	NA	NA	NA	NA	NA	NA	NA	NA	NA

Red Shading - UCL Exceeded; Black Shading - Method 1 Std Exceeded; Bold - Detected; U - Not Detected;
J - Estimated; R - Rejected; NA - Not Analyzed

Table 3-8
Summary of Historical and TBA Groundwater Analytical Results
Former Tombarello Property
Lawrence, Massachusetts

Sample Location					MW-7		MW-8	MW-9	MW-11	MW-11F	MW-12	MW-13		MW-15	MW-16
Sample Date					06/10/99	02/13/03	06/13/16	06/13/16	06/13/16	06/17/16	06/14/16	06/14/16		06/16/16	06/13/16
QC Identifier												FD	FD		
PAHs	**Units**	**GW-2**	**GW-3**	**GW UCL**											
1,4-Dioxane	ug/L	6000	50000	100000	NA	NA	0.1 U	0.1 U	**0.26**	NA	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
2-Methylnaphthalene	ug/L	2000	20000	100000	NA	NA	**0.67**	0.1 U	0.1 U	NA	**0.25**	0.1 U	0.1 U	0.1 U	0.1 U
Acenaphthene	ug/L	--	10000	100000	NA	NA	**0.16**	0.1 U	0.1 U	NA	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Acenaphthylene	ug/L	10000	40	100000	NA	NA	0.1 U	0.1 U	0.1 U	NA	**0.19**	0.1 U	0.1 U	0.1 U	0.1 U
Anthracene	ug/L	--	30	600	NA	NA	**0.13**	0.1 U	0.1 U	NA	**0.14**	**0.13**	**0.12**	0.1 U	0.1 U
Benzo(a)anthracene	ug/L	--	1000	10000	NA	NA	**0.12**	0.1 U	0.1 U	NA	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Benzo(a)pyrene	ug/L	--	500	5000	NA	NA	**0.17**	0.1 U	0.1 U	NA	0.1 U	0.1 U	0.1 U	**0.13**	0.1 U
Benzo(b)fluoranthene	ug/L	--	400	4000	NA	NA	**0.14**	0.1 U	0.1 U	NA	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Benzo(g,h,i)perylene	ug/L	--	20	500	NA	NA	**0.11**	0.1 U	0.1 U	NA	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Benzo(k)fluoranthene	ug/L	--	100	1000	NA	NA	0.1 U	0.1 U	0.1 U	NA	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Chrysene	ug/L	--	70	700	NA	NA	**0.11**	0.1 U	0.1 U	NA	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Dibenz(a,h)anthracene	ug/L	--	40	400	NA	NA	0.1 U	0.1 U	0.1 U	NA	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Fluoranthene	ug/L	--	200	2000	NA	NA	**0.31**	0.1 U	0.1 U	NA	**0.11**	0.1 U	0.1 U	**0.19**	0.1 U
Fluorene	ug/L	--	40	400	NA	NA	**0.13**	0.1 U	0.1 U	NA	**0.1**	0.1 U	0.1 U	0.1 U	0.1 U
Indeno(1,2,3-cd)pyrene	ug/L	--	100	1000	NA	NA	0.1 U	0.1 U	0.1 U	NA	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Naphthalene	ug/L	700	20000	100000	NA	NA	**1.4**	0.1 U	0.1 U	NA	**0.67**	**0.64**	**0.77**	0.1 U	0.1 U
Phenanthrene	ug/L	--	10000	100000	NA	NA	**0.37**	0.1 U	0.1 U	NA	**0.36**	0.1 U	0.1 U	**0.19**	**0.16**
Pyrene	ug/L	--	20	600	NA	NA	**0.25**	0.1 U	0.1 U	NA	0.1 U	0.1 U	0.1 U	**0.14**	0.1 U
EPH															
2-Methylnaphthalene	ug/L	2000	20000	100000	NA	NA	6.33 U	6.76 U	6.49 U	NA	5.88 UJ	6.17 U	6.58 U	5.62 U	6.25 U
Acenaphthene	ug/L	--	10000	100000	NA	NA	6.33 U	6.76 U	6.49 U	NA	5.88 UJ	6.17 U	6.58 U	5.62 U	6.25 U
Acenaphthylene	ug/L	10000	40	100000	NA	NA	6.33 U	6.76 U	6.49 U	NA	5.88 UJ	6.17 U	6.58 U	5.62 U	6.25 U
Anthracene	ug/L	--	30	600	NA	NA	6.33 U	6.76 U	6.49 U	NA	5.88 U	6.17 U	6.58 U	5.62 U	6.25 U
Benzo(a)anthracene	ug/L	--	1000	10000	NA	NA	6.33 U	6.76 U	6.49 U	NA	5.88 U	6.17 U	6.58 U	5.62 U	6.25 U
Benzo(a)pyrene	ug/L	--	500	5000	NA	NA	6.33 U	6.76 U	6.49 U	NA	5.88 UJ	6.17 U	6.58 U	5.62 U	6.25 U
Benzo(b)fluoranthene	ug/L	--	400	4000	NA	NA	6.33 U	6.76 U	6.49 U	NA	5.88 UJ	6.17 U	6.58 U	5.62 U	6.25 U
Benzo(g,h,i)perylene	ug/L	--	20	500	NA	NA	6.33 U	6.76 U	6.49 U	NA	5.88 U	6.17 U	6.58 U	5.62 U	6.25 U
Benzo(k)fluoranthene	ug/L	--	100	1000	NA	NA	6.33 U	6.76 U	6.49 U	NA	5.88 U	6.17 U	6.58 U	5.62 U	6.25 U
C11-C22 Aromatics	ug/L	50000	5000	100000	NA	NA	127 U	135 U	130 U	NA	118 U	123 U	132 U	112 U	125 U
C19-C36 Aliphatics	ug/L	--	50000	100000	NA	NA	127 U	135 U	130 U	NA	118 U	123 U	132 U	112 U	125 U
C9-C18 Aliphatics	ug/L	5000	50000	100000	NA	NA	127 U	135 U	130 U	NA	118 UJ	123 U	132 U	112 U	125 U
Chrysene	ug/L	--	70	700	NA	NA	6.33 U	6.76 U	6.49 U	NA	5.88 U	6.17 U	6.58 U	5.62 U	6.25 U
Dibenz(a,h)anthracene	ug/L	--	40	400	NA	NA	6.33 U	6.76 U	6.49 U	NA	5.88 UJ	6.17 U	6.58 U	5.62 U	6.25 U
Fluoranthene	ug/L	--	200	2000	NA	NA	6.33 U	6.76 U	6.49 U	NA	5.88 U	6.17 U	6.58 U	5.62 U	6.25 U
Fluorene	ug/L	--	40	400	NA	NA	6.33 U	6.76 U	6.49 U	NA	5.88 UJ	6.17 U	6.58 U	5.62 U	6.25 U
Indeno(1,2,3-cd)pyrene	ug/L	--	100	1000	NA	NA	6.33 U	6.76 U	6.49 U	NA	5.88 UJ	6.17 U	6.58 U	5.62 U	6.25 U
Naphthalene	ug/L	700	20000	100000	NA	NA	6.33 U	6.76 U	6.49 U	NA	5.88 UJ	6.17 U	6.58 U	5.62 U	6.25 U
Phenanthrene	ug/L	--	10000	100000	NA	NA	6.33 U	6.76 U	6.49 U	NA	5.88 U	6.17 U	6.58 U	5.62 U	6.25 U
Pyrene	ug/L	--	20	600	NA	NA	6.33 U	6.76 U	6.49 U	NA	5.88 U	6.17 U	6.58 U	5.62 U	6.25 U

Red Shading - UCL Exceeded; Black Shading - Method 1 Std Exceeded; Bold - Detected; U - Not Detected;
J - Estimated; R - Rejected; NA - Not Analyzed

Table 3-8
Summary of Historical and TBA Groundwater Analytical Results
Former Tombarello Property
Lawrence, Massachusetts

				Sample Location	MW-1				MW-2	MW-2A	MW-3	MW-3A	MW-4	MW-5		MW-6	
				Sample Date	07/09/98	06/10/99	02/13/03	06/16/16	07/09/98	07/30/98	07/09/98	07/30/98	07/09/98	06/10/99	02/13/03	06/10/99	02/13/03
				QC Identifier													
Metals	**Units**	**GW-2**	**GW-3**	**GW UCL**													
Arsenic	ug/L	--	900	9000	**6**	10 U	NA	**0.05 J**	5 U	**53**	**24**	**143**	**21**	10 U	NA	10 U	NA
Barium	ug/L	--	50000	100000	**54**	NA	NA	**14.5 J**	**177**	**329**	**180**	**915**	**996**	NA	NA	NA	NA
Cadmium	ug/L	--	4	50	1 U	NA	NA	**0.042 J**	1 U	1 U	1 U	**1**	**3.6**	NA	NA	NA	NA
Chromium	ug/L	--	300	3000	5 U	NA	NA	5.2 U	5 U	**145**	**33**	**477**	**27**	NA	NA	**13**	NA
Lead	ug/L	--	10	150	**5**	5 U	NA	0.5 U	**5**	**25**	**31**	**58**	**1560**	5 U	NA	5 U	NA
Mercury	ug/L	--	20	200	2 U	NA	NA	NA	0.2 U	0.2 U	0.2 U	0.2 U	**0.64**	NA	NA	NA	NA
Selenium	ug/L	--	100	1000	5 U	NA	NA	**0.44 J**	5 U	5 U	**9**	**6**	5 U	NA	NA	NA	NA
Silver	ug/L	--	7	1000	5 U	NA	NA	0.5 U	5 U	5 U	5 U	5 U	5 U	NA	NA	NA	NA
Dissolved Metals																	
Arsenic	ug/L	--	900	9000	5 U	NA	50 U	NA	5 U	5 U	5 U	5 U	5 U	NA	50 U	NA	50 U
Barium	ug/L	--	50000	100000	**39**	NA	50 U	NA	**177**	**49**	**70**	**48**	**108**	NA	**70**	NA	**70**
Cadmium	ug/L	--	4	50	1 U	NA	50 U	NA	1 U	1 U	1 U	1 U	1 U	NA	50 U	NA	50 U
Chromium	ug/L	--	300	3000	5 U	NA	20 U	NA	5 U	5 U	5 U	5 U	5 U	NA	20 U	NA	20 U
Lead	ug/L	--	10	150	3 U	NA	5 U	NA	5 U	3 U	3 U	3 U	**6**	NA	**6**	NA	5 U
Mercury	ug/L	--	20	200	2 U	NA	0.5 U	NA	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	NA	0.5 U	NA	0.5 U
Selenium	ug/L	--	100	1000	5 U	NA	10 U	NA	5 U	5 U	5 U	5 U	5 U	NA	10 U	NA	10 U
Silver	ug/L	--	7	1000	5 U	NA	5 U	NA	5 U	5 U	5 U	5 U	5 U	NA	5 U	NA	5 U
Pesticides/PCBs																	
Aroclor 1016	ug/L	5	10	100	NA	NA	NA	0.5 UJ	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor 1221	ug/L	5	10	100	NA	NA	NA	0.5 UJ	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor 1232	ug/L	5	10	100	NA	NA	NA	0.5 UJ	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor 1242	ug/L	5	10	100	NA	NA	NA	0.5 UJ	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor 1248	ug/L	5	10	100	NA	NA	NA	0.5 UJ	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor 1254	ug/L	5	10	100	NA	NA	NA	0.5 UJ	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor 1260	ug/L	5	10	100	NA	NA	NA	0.5 UJ	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor 1262	ug/L	5	10	100	NA	NA	NA	0.5 UJ	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor 1268	ug/L	5	10	100	NA	NA	NA	0.5 UJ	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor, Total	ug/L	5	10	100	3.6 U	NA	NA	0.5 UJ	3.6 U	3.6 U	3.6 U	3.6 U	3.5 U	NA	NA	NA	NA
General Chemistry																	
Cyanide	ug/L	--	30	2000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cyanide (PAC)	ug/L	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Red Shading - UCL Exceeded; Black Shading - Method 1 Std Exceeded; Bold - Detected; U - Not Detected;
J - Estimated; R - Rejected; NA - Not Analyzed

Table 3-8
Summary of Historical and TBA Groundwater Analytical Results
Former Tombarello Property
Lawrence, Massachusetts

				Sample Location	MW-7		MW-8	MW-9	MW-11	MW-11F	MW-12	MW-13		MW-15	MW-16
				Sample Date	06/10/99	02/13/03	06/13/16	06/13/16	06/13/16	06/17/16	06/14/16	06/14/16		06/16/16	06/13/16
				QC Identifier								FD	FD		
Metals	**Units**	**GW-2**	**GW-3**	**GW UCL**											
Arsenic	ug/L	--	900	9000	10 U	NA	**12**	**3.3**	**10**	**2.4**	0.5 U	**5.44**	**5.13**	**1.78**	**0.32 J**
Barium	ug/L	--	50000	100000	NA	NA	**100**	**40**	**1400**	**100**	**45.2**	**46.3**	**46.2**	**24.4 J**	**36**
Cadmium	ug/L	--	4	50	NA	NA	**0.53 J**	1 U	**2.2**	**0.31 J**	**0.049 J**	**0.061 J**	**0.063 J**	**0.049 J**	1 U
Chromium	ug/L	--	300	3000	**16**	NA	**0.6 J**	2 U	**0.62 J**	2 U	5.2 U	5.2 U	5.2 U	5.2 U	2 U
Lead	ug/L	--	10	150	5 U	NA	**69**	**0.4 J**	**25**	**0.36 J**	0.5 U	0.5 U	0.5 U	**1.31**	**0.29 J**
Mercury	ug/L	--	20	200	NA	NA	0.2 U	0.2 U	0.2 U	**0.03 J**	0.2 U	**0.031 J**	0.2 U	NA	0.2 U
Selenium	ug/L	--	100	1000	NA	NA	**0.39 J**	**0.74 J**	**1.9 J**	5 U	0.5 U	**0.23 J**	0.5 U	0.5 U	5 U
Silver	ug/L	--	7	1000	NA	NA	**0.046 J**	**0.051 J**	**0.029 J**	1 U	0.5 U	0.5 U	0.5 U	**0.03 J**	**0.059 J**
Dissolved Metals															
Arsenic	ug/L	--	900	9000	NA	50 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Barium	ug/L	--	50000	100000	NA	50 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cadmium	ug/L	--	4	50	NA	50 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chromium	ug/L	--	300	3000	NA	20 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lead	ug/L	--	10	150	NA	5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Mercury	ug/L	--	20	200	NA	0.5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Selenium	ug/L	--	100	1000	NA	10 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Silver	ug/L	--	7	1000	NA	5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pesticides/PCBs															
Aroclor 1016	ug/L	5	10	100	NA	NA	0.5 UJ	0.5 UJ	0.5 U	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ
Aroclor 1221	ug/L	5	10	100	NA	NA	0.5 UJ	0.5 UJ	0.5 U	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ
Aroclor 1232	ug/L	5	10	100	NA	NA	0.5 UJ	0.5 UJ	0.5 U	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ
Aroclor 1242	ug/L	5	10	100	NA	NA	0.5 UJ	0.5 UJ	0.5 U	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ
Aroclor 1248	ug/L	5	10	100	NA	NA	0.5 UJ	0.5 UJ	0.5 U	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ
Aroclor 1254	ug/L	5	10	100	NA	NA	0.5 UJ	0.5 UJ	0.5 U	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ
Aroclor 1260	ug/L	5	10	100	NA	NA	0.5 UJ	0.5 UJ	0.5 U	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ
Aroclor 1262	ug/L	5	10	100	NA	NA	0.5 UJ	0.5 UJ	0.5 U	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ
Aroclor 1268	ug/L	5	10	100	NA	NA	0.5 UJ	0.5 UJ	0.5 U	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ
Aroclor, Total	ug/L	5	10	100	NA	NA	0.5 UJ	0.5 UJ	0.5 U	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ
General Chemistry															
Cyanide	ug/L	--	30	2000	NA	NA	NA	NA	NA	NA	5 U	5 U	5 U	NA	NA
Cyanide (PAC)	ug/L	--	--	--	NA	NA	NA	NA	NA	NA	5 U	5 U	5 U	NA	NA

Red Shading - UCL Exceeded; Black Shading - Method 1 Std Exceeded; Bold - Detected; U - Not Detected;
J - Estimated; R - Rejected; NA - Not Analyzed

Table 3-9
Summary of Dust Monitoring Sample Results
Former Tombarello Property
Lawrence, Massachusetts
1 of 4

	Sample Location	AMS-1	AMS-1	AMS-1	AMS-01	AMS-01	AMS-01	AMS-2	AMS-2
	Sample Date	06/09/2016	06/09/2016	06/09/2016	06/15/2016	06/15/2016	06/15/2016	06/09/2016	06/09/2016
Analysis									
NIOSH 0500	**Units**								
DUST	Total mg	0.05 U	NT	NT	0.05 U	NT	NT	0.05 U	NT
NIOSH 5503									
PCB 1016	Total µg	NT	0.1 U	NT	NT	0.1 U	NT	NT	0.1 U
PCB 1221	Total µg	NT	0.1 U	NT	NT	0.1 U	NT	NT	0.1 U
PCB 1232	Total µg	NT	0.1 U	NT	NT	0.1 U	NT	NT	0.1 U
PCB 1242	Total µg	NT	0.1 U	NT	NT	0.1 U	NT	NT	0.1 U
PCB 1248	Total µg	NT	0.1 U	NT	NT	0.1 U	NT	NT	0.1 U
PCB 1254	Total µg	NT	0.1 U	NT	NT	0.1 U	NT	NT	0.1 U
PCB 1260	Total µg	NT	0.1 U	NT	NT	0.1 U	NT	NT	0.1 U
PCB 1262	Total µg	NT	0.1 U	NT	NT	0.1 U	NT	NT	0.1 U
PCB 1268	Total µg	NT	0.1 U	NT	NT	0.1 U	NT	NT	0.1 U
NIOSH 7303									
LEAD	Total µg	NT	NT	1.2 U	NT	NT	1.2 U	NT	NT

NOTES:

1. U = Not detected above the lab reporting limits shown in parenthesis.
2. NT = Not tested.
3. mg = milligram
4. µg = microgram

Table 3-9
Summary of Dust Monitoring Sample Results
Former Tombarello Property
Lawrence, Massachusetts
2 of 4

	Sample Location	AMS-2	AMS-02	AMS-02	AMS-02	AMS-3	AMS-3	AMS-3	AMS-03
	Sample Date	06/09/2016	06/15/2016	06/15/2016	06/15/2016	06/09/2016	06/09/2016	06/09/2016	06/15/2016
Analysis									
NIOSH 0500	**Units**								
DUST	Total mg	NT	0.05 U	NT	NT	0.05 U	NT	NT	0.05 U
NIOSH 5503									
PCB 1016	Total µg	NT	NT	0.1 U	NT	NT	0.1 U	NT	NT
PCB 1221	Total µg	NT	NT	0.1 U	NT	NT	0.1 U	NT	NT
PCB 1232	Total µg	NT	NT	0.1 U	NT	NT	0.1 U	NT	NT
PCB 1242	Total µg	NT	NT	0.1 U	NT	NT	0.1 U	NT	NT
PCB 1248	Total µg	NT	NT	0.1 U	NT	NT	0.1 U	NT	NT
PCB 1254	Total µg	NT	NT	0.1 U	NT	NT	0.1 U	NT	NT
PCB 1260	Total µg	NT	NT	0.1 U	NT	NT	0.1 U	NT	NT
PCB 1262	Total µg	NT	NT	0.1 U	NT	NT	0.1 U	NT	NT
PCB 1268	Total µg	NT	NT	0.1 U	NT	NT	0.1 U	NT	NT
NIOSH 7303									
LEAD	Total µg	1.2 U	NT	NT	1.2 U	NT	NT	1.2 U	NT

NOTES:

1. U = Not detected above the lab reporting limits shown in parenthesis.
2. NT = Not tested.
3. mg = milligram
4. µg = microgram

Table 3-9
Summary of Dust Monitoring Sample Results
Former Tombarello Property
Lawrence, Massachusetts
3 of 4

	Sample Location	AMS-03	AMS-03	AMS-4	AMS-04	AMS-5	AMS-5	AMS-5	AMS-06
	Sample Date	06/15/2016	06/15/2016	06/09/2016	06/15/2016	06/09/2016	06/09/2016	06/09/2016	06/15/2016
Analysis									
NIOSH 0500	**Units**								
DUST	Total mg	NT	NT	NT	NT	0.05 U	NT	NT	0.05 U
NIOSH 5503									
PCB 1016	Total µg	0.1 U	NT	0.1 U	0.1 U	NT	0.1 U	NT	NT
PCB 1221	Total µg	0.1 U	NT	0.1 U	0.1 U	NT	0.1 U	NT	NT
PCB 1232	Total µg	0.1 U	NT	0.1 U	0.1 U	NT	0.1 U	NT	NT
PCB 1242	Total µg	0.1 U	NT	0.1 U	0.1 U	NT	0.1 U	NT	NT
PCB 1248	Total µg	0.1 U	NT	0.1 U	0.1 U	NT	0.1 U	NT	NT
PCB 1254	Total µg	0.1 U	NT	0.1 U	0.1 U	NT	0.1 U	NT	NT
PCB 1260	Total µg	0.1 U	NT	0.1 U	0.1 U	NT	0.1 U	NT	NT
PCB 1262	Total µg	0.1 U	NT	0.1 U	0.1 U	NT	0.1 U	NT	NT
PCB 1268	Total µg	0.1 U	NT	0.1 U	0.1 U	NT	0.1 U	NT	NT
NIOSH 7303									
LEAD	Total µg	NT	1.2 U	NT	NT	NT	NT	1.2 U	NT

NOTES:

1. U = Not detected above the lab reporting limits shown in parenthesis.
2. NT = Not tested.
3. mg = milligram
4. µg = microgram

Table 3-9
Summary of Dust Monitoring Sample Results
Former Tombarello Property
Lawrence, Massachusetts
4 of 4

	Sample Location	AMS-06	AMS-06	Blank-061516	Dust 1	Dust 2	Lead 1	Lead 2
	Sample Date	06/15/2016	06/15/2016	06/15/2016	06/15/2016	06/15/2016	06/15/2016	06/15/2016
Analysis								
NIOSH 0500	**Units**							
DUST	Total mg	NT	NT	NT	0.05 U	0.05 U	NT	NT
NIOSH 5503								
PCB 1016	Total µg	0.1 U	NT	0.1 U	NT	NT	NT	NT
PCB 1221	Total µg	0.1 U	NT	0.1 U	NT	NT	NT	NT
PCB 1232	Total µg	0.1 U	NT	0.1 U	NT	NT	NT	NT
PCB 1242	Total µg	0.1 U	NT	0.1 U	NT	NT	NT	NT
PCB 1248	Total µg	0.1 U	NT	0.1 U	NT	NT	NT	NT
PCB 1254	Total µg	0.1 U	NT	0.1 U	NT	NT	NT	NT
PCB 1260	Total µg	0.1 U	NT	0.1 U	NT	NT	NT	NT
PCB 1262	Total µg	0.1 U	NT	0.1 U	NT	NT	NT	NT
PCB 1268	Total µg	0.1 U	NT	0.1 U	NT	NT	NT	NT
NIOSH 7303								
LEAD	Total µg	NT	1.2 U	NT	NT	NT	1.2 U	1.2 U

NOTES:

1. U = Not detected above the lab reporting limits shown in parenthesis.
2. NT = Not tested.
3. mg = milligram
4. µg = microgram

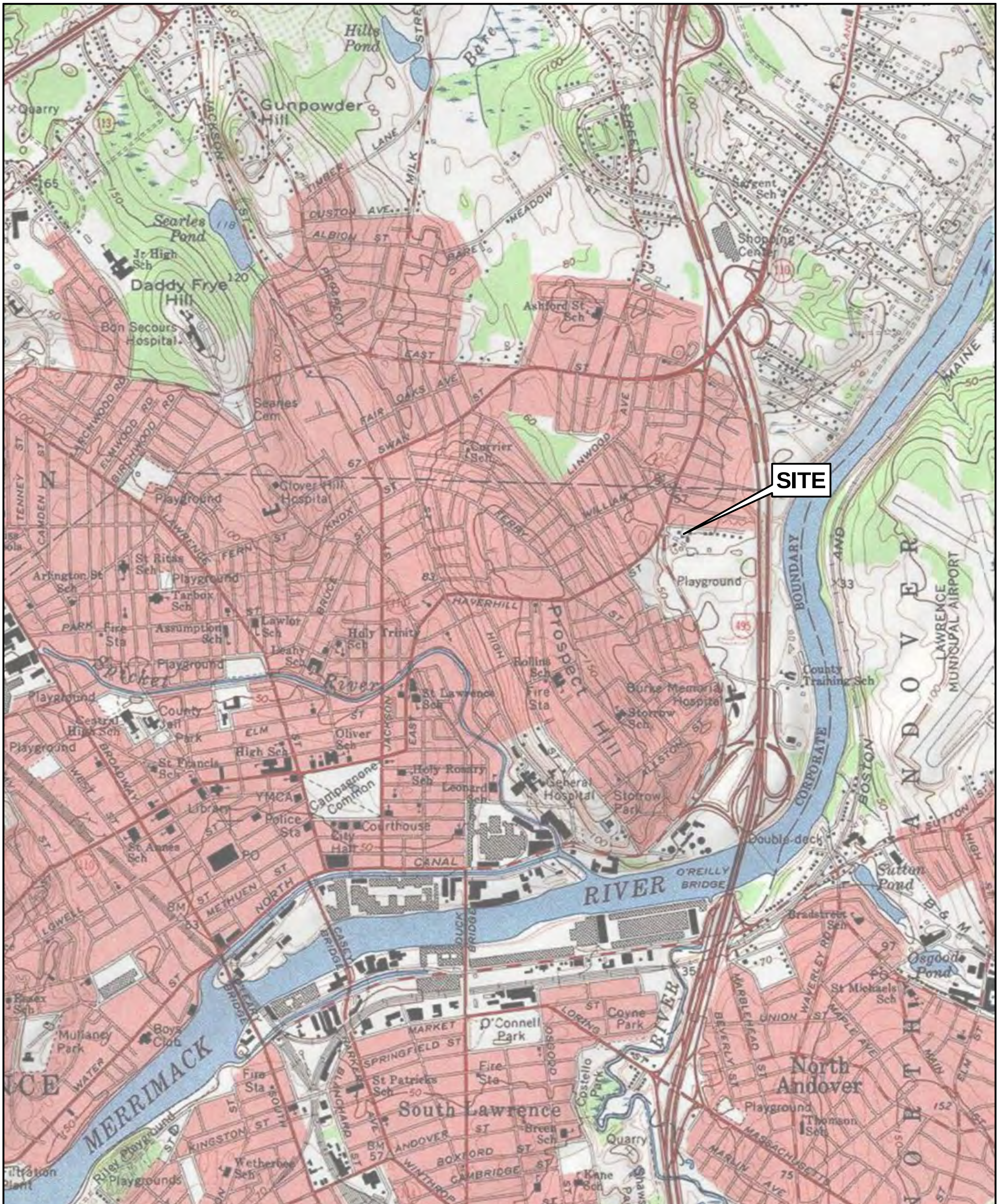
Table 5-1
Summary of Capital and O/M Costs for Remedial Alternatives
Former Tombarello Property
Lawrence, Massachusetts

Alternative	PCB Cleanup Goal	UCLs Removed	Soil Volume	Barrier	Capital Cost Range	Annual O&M Cost Range
1A	10 mg/kg	Yes	75,000 CY	Cap	$45M to $70M	$20K to $25K
1B	10 mg/kg	Yes	75,000 CY	Cover	$45M to $65M	$10K to $15K
2A	50 mg/kg	Yes	10,000 CY	Cover	$7.5M to $11M	$10K to $15K
2B	50 mg/kg	No	9,000 CY	Cap	$9M to $13M	$20K to $25K
2C	50 mg/kg	No	9,000 CY	Cover	$7M to $10M	$10K to $15K
3A	100 mg/kg	Yes	4,000 CY	Cover	$4M to $6M	$10K to $15K
3B	100 mg/kg	No	2,000 CY	Cap	$4.5M to $7M	$20K to $25K
3C	100 mg/kg	No	2,000 CY	Cover	$3M to $4M	$10K to $15K

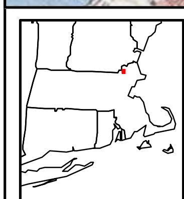
Note:

O&M Costs based on Year 1 estimates. Costs expected to increase with inflation.

FIGURES



Path: R:\80000 Task Orders\80108 Brownfields Multi-Site\GIS\MLRR\Figures\Figure 1-1 Tombarello Locus.mxd **Date Printed:** 8/18/2016



USGS Topographic Map
Lawrence, Mass. - N.H.
Revised 1966

0 500 1,000 2,000
Feet
1 inch = 2,000 feet

N

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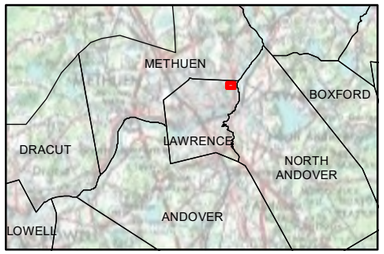
FIGURE 1-1

LOCUS MAP
FORMER TOMBARELLO PROPERTY
LAWRENCE, MASSACHUSETTS

PREPARED BY: JH	CHECKED BY: SV
PROJECT NO. 80108.04	DATE: AUGUST 2016



Map Location

Notes:

1. Source: Figure 4, Comprehensive Phase II Site Investigation Services, Former Tombarello Property, by Tighe & Bond.

2. Property lines from MassGIS, Aerial photo from MassGIS, 2013.

3. Location of site features depicted hereon is approximate and given for illustrative purposes only.

Legend

- 2011 Excavation Area
- Soil Consolidation Area
- Existing Building
- Former Building
- Property Lines

N

0 50 100 200

Feet

1 inch = 100 feet

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FIGURE 1-2

SITE PLAN
FORMER TOMBARELLO PROPERTY
LAWRENCE, MASSACHUSETTS

PREPARED BY: JH	CHECKED BY: SV
PROJECT NO. 80108.04	DATE: AUGUST 2016

Path: R:\80000 Task Orders\80108 Brownfields Multi-Site\GIS\MLRR\Figures\Figure 1-2 Tombarello Site Plan.mxd Date Printed: 8/18/2016

HOFMANN AVE

MARSTON ST

Metal Shop / Garage

Furnace Building

Baler Press Area

Small Shear

Large Shear

Notes:

1. Source: Figure 4, Comprehensive Phase II Site Investigation Services, Former Tombarello Property, by Tighe & Bond.

2. Property lines from MassGIS, Aerial photo from MassGIS, 2013.

3. Locations of site features depicted hereon are approximate and given for illustrative purposes only.

Legend

- Soil Boring
- Soil Sample, EPA 2010
- Test Pit

Historical Monitoring Wells

- HEA June 1999
- Weston Feb 2003
- Weston July 2003
- Property Lines
- Existing Building
- Former Building
- 2011 Excavation Area
- Soil Consolidation Area

N

0 50 100 200

Feet

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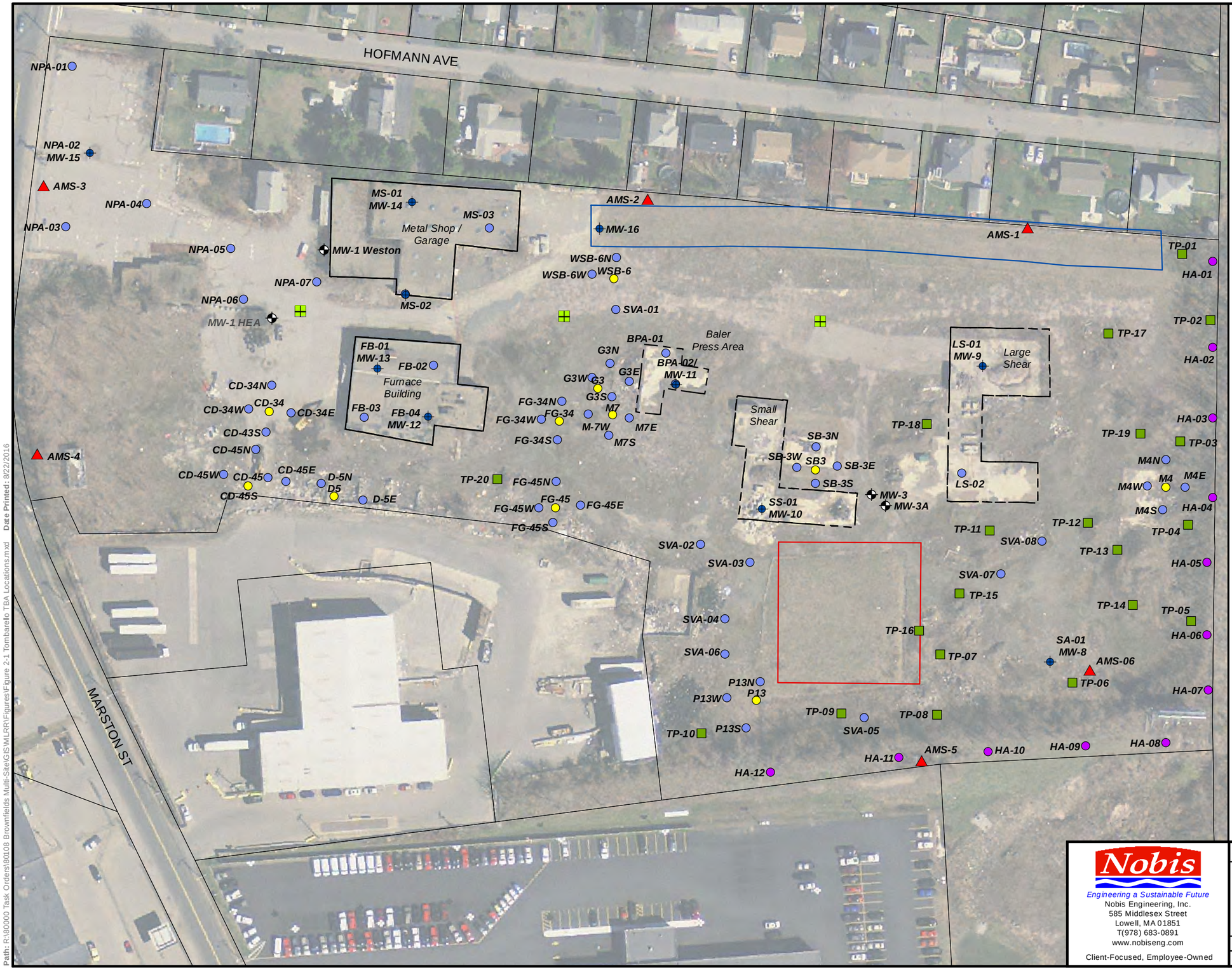
FIGURE 1-3

HISTORICAL SAMPLE LOCATIONS
FORMER TOMBARELLO PROPERTY
LAWRENCE, MASSACHUSETTS

PREPARED BY: JH	CHECKED BY: AR
PROJECT NO. 80108.04	DATE: JULY 2016

Path: R:\80000 Task Orders\80108 Brownfields Multi-Site\GIS\MLRR\Figures\Figure 1-3 TombarelloHistorical Sample Locations.mxd Date Printed: 8/1/2016



Notes:

1. Source: Figure 4, Comprehensive Phase II Site Investigation Services, Former Tombarello Property, by Tighe & Bond, And Nobis survey, June 2016.

2. Property lines from MassGIS, Aerial photo from MassGIS, 2013.

3. Locations of site features depicted hereon are approximate and given for illustrative purposes only.

Legend

- Air Monitoring Location
- June 2016 Soil Borings
- Hand Auger Borings
- Monitoring Well
- Test Pit Location
- Existing Borings
- Existing Monitoring Wells
- Catch Basin
- Property Lines
- Existing Building
- Former Building
- 2011 Excavation Area
- Soil Consolidation Area

N

0 50 100 200

Feet

1 inch = 100 feet

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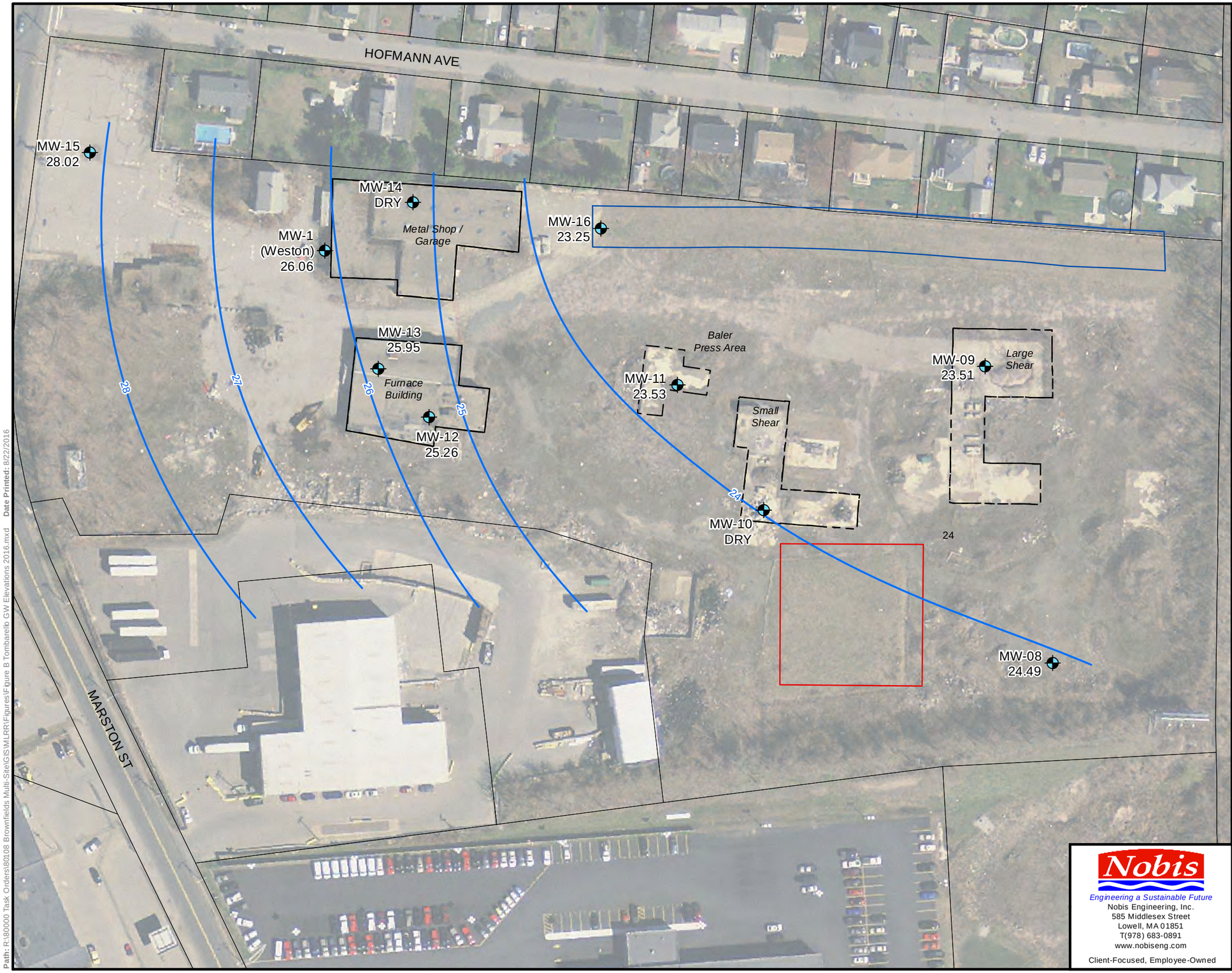
FIGURE 2-1

TBA SAMPLE LOCATIONS
FORMER TOMBARELLO PROPERTY
LAWRENCE, MASSACHUSETTS

PREPARED BY: JH	CHECKED BY: SV
PROJECT NO. 80108.04	DATE: JULY 2016

Path: R:\80000 Task Orders\80108 Brownfields Multi-Site\GIS\MLRR\Figures\Figure 2-1 TombarelloTBA Locations.mxd Date Printed: 8/22/2016



Notes:

1. Groundwater contours are interpolated based on elevation data obtained on the dates indicated. Other interpretations are possible.

2. Source: Figure 4, Comprehensive Phase II Site Investigation Services, Former Tombarello Property, by Tighe & Bond, And Nobis survey, June 2016.

3. Property lines from MassGIS, Aerial photo from MassGIS, 2013.

4. Locations of site features depicted hereon are approximate and given for illustrative purposes only.

Legend

- Monitoring Well with Groundwater Elevation (6/17/16)
- Groundwater Contours (6/17/16)
- Property Lines
- Existing Building
- Former Building
- 2011 Excavation Area
- Soil Consolidation Area

N

0 50 100 200

Feet

1 inch = 100 feet

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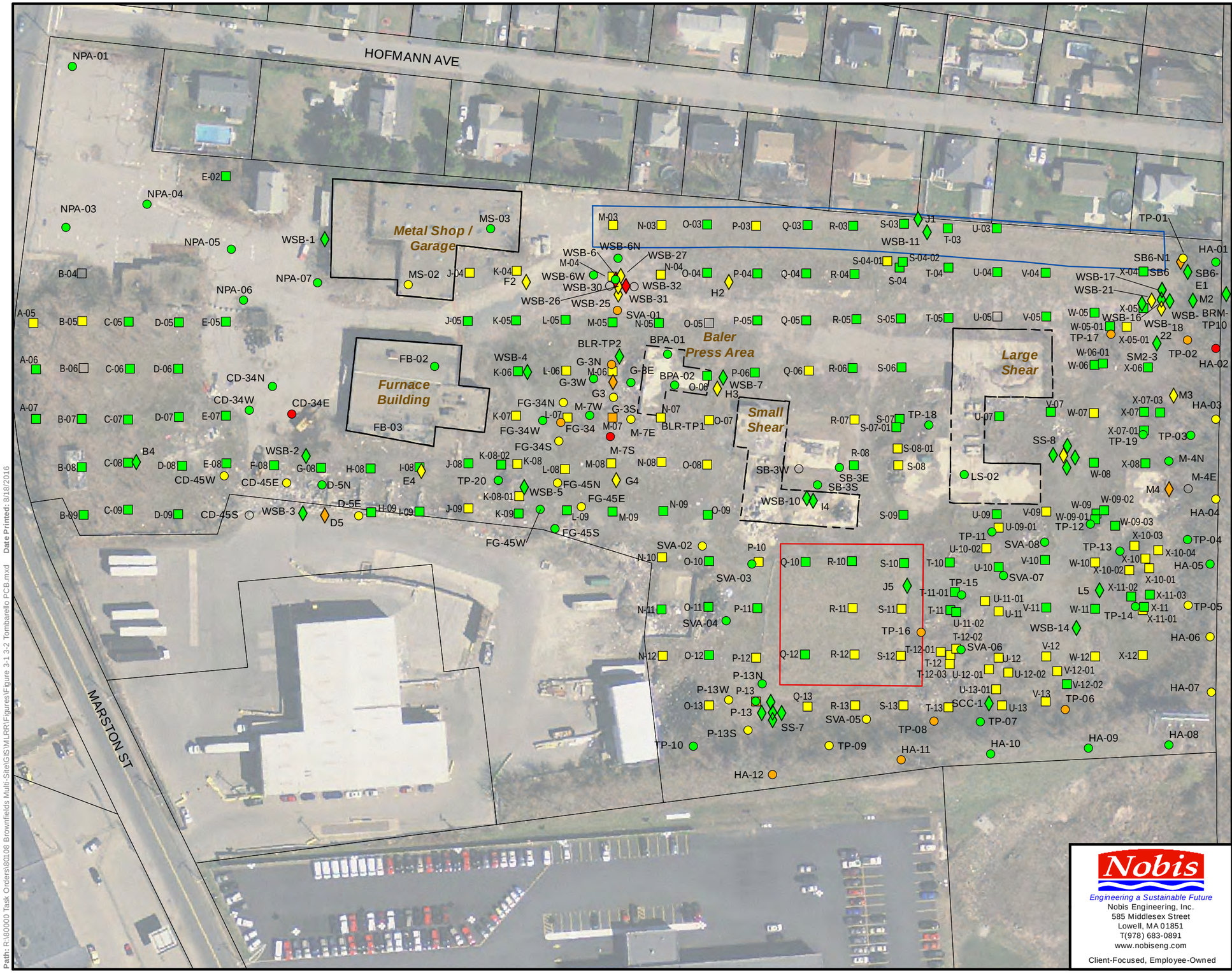
FIGURE 2-2

GROUNDWATER
POTENTIOMETRIC SURFACE
FORMER TOMBARELLO PROPERTY
LAWRENCE, MASSACHUSETTS

PREPARED BY: JH	CHECKED BY: AR
PROJECT NO. 80108.04	DATE: AUGUST 2016

Path: R:\80000 Task Orders\80108 Brownfields Multi-Site\GIS\MLRR\Figures\Figure B Tombarello GW Elevations 2016.mxd **Date Printed:** 8/22/2016



Notes:

1. Soil samples are from multiple events from 1998-2016. PCB results are total Aroclors, in milligrams per Kilogram (mg/Kg), Where duplicate/multiple samples occur, the higher result is shown.

2. Samples within the range 0 to 2 feet bgs by Nobis, 2016 are included in the surface soil results.

3. Source: Figure 4, Comprehensive Phase II Site Investigation Services, Former Tombarello Property, by Tighe & Bond.

4. Property lines from MassGIS, Aerial photo from MassGIS, 2013.

5. Locations of site features depicted hereon are approximate and given for illustrative purposes only.

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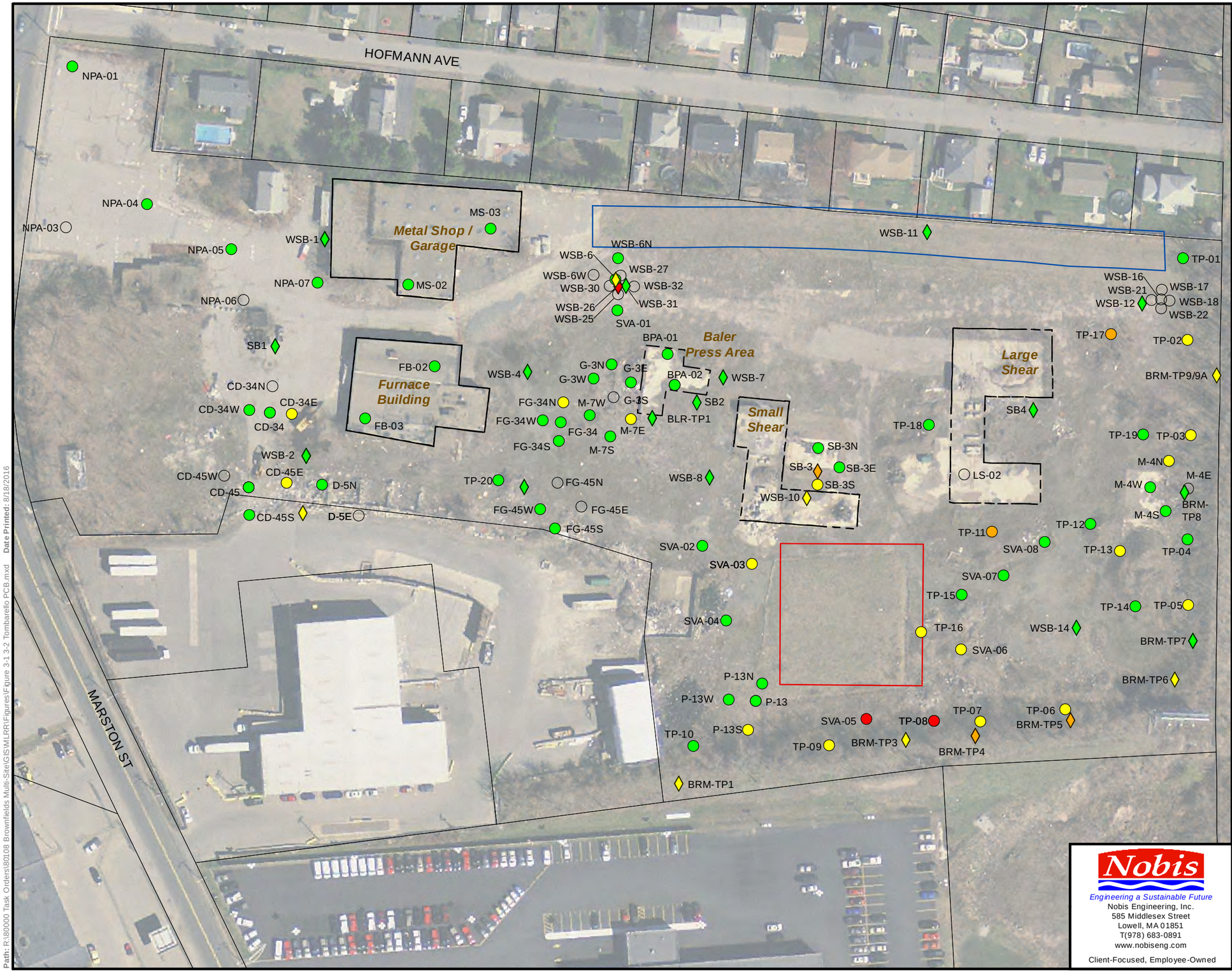
FIGURE 3-1

SUMMARY OF SURFACE SOIL
PCB SAMPLE RESULTS
FORMER TOMBARELLO PROPERTY
LAWRENCE, MASSACHUSETTS

PREPARED BY: JH	CHECKED BY: AR
PROJECT NO. 80108.04	DATE: AUGUST 2016

Path: R:\80000 Task Orders\80108 Brownfields Multi-Site\GIS\MLRR\Figures\Figure 3-1 3-2 Tombarello PCB.mxd Date Printed: 8/18/2016



Notes:

1. Soil samples are from multiple events from 1998-2016. PCB results are total Aroclors, in milligrams per Kilogram (mg/Kg), Where duplicate/multiple samples occur, the higher result is shown.

2. Samples within the range 0 to 2 feet bgs by Nobis, 2016 are included in the surface soil results.

3. Source: Figure 4, Comprehensive Phase II Site Investigation Services, Former Tombarello Property, by Tighe & Bond.

4. Property lines from MassGIS, Aerial photo from MassGIS, 2013.

5. Locations of site features depicted hereon are approximate and given for illustrative purposes only.

Legend

Subsurface Soil PCB (>1 ft bgs, ppm)[2]

- > 100
- 50 - 100
- 10 - 50
- < 10

Shape Indicator

- Sampled by Nobis, 2016
- Sampled by others, prior to 2010
- Property Lines
- Existing Building
- Former Building
- 2011 Excavation Area
- Soil Consolidation Area

N

0 50 100 200

Feet

1 inch = 100 feet

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FIGURE 3-2

SUMMARY OF SUBSURFACE SOIL
PCB SAMPLE RESULTS
FORMER TOMBARELLO PROPERTY
LAWRENCE, MASSACHUSETTS

PREPARED BY: JH	CHECKED BY: AR
PROJECT NO. 80108.04	DATE: AUGUST 2016

Path: R:\80000 Task Orders\80108 Brownfields Multi-Site\GIS\MLRR\Figures\Figure 3-1 3-2 Tombarello PCB.mxd Date Printed: 8/18/2016

HOFMANN AVE

MARSTON ST

Metal Shop / Garage

Furnace Building

Baler Press Area

Small Shear

Large Shear

Alternative	PCB Cleanup Goal	UCLs Removed?	Soil Volume	Barrier	Capital Cost Range
1A	10 mg/kg	Yes	75,000 CY	Cap	$45M to $70M
1B	10 mg/kg	Yes	75,000 CY	Cover	$45M to $65M

Notes:

1. Source: Figure 4, Comprehensive Phase II Site Investigation Services, Former Tombarello Property, by Tighe & Bond.

2. Property lines from MassGIS, Aerial photo from MassGIS, 2013.

3. Locations of site features depicted hereon are approximate and given for illustrative purposes only.

Legend

Surface Soil PCB (0-2 ft bgs, ppm)

- > 100
- 50 - 100
- 10 - 50
- < 10
- No PCBs Detected

Shape Indicator

- Sampled by Nobis, 2016
- Sampled by EPA, 2010
- Sampled by others, Prior to 2010
- Proposed Excavation Area
- Extent of Cap/Cover
- 2011 Excavation Area
- Soil Consolidation Area
- Property Lines
- Existing Building
- Former Building

N

0 50 100 200

Feet

1 inch = 100 feet

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FIGURE 5-1

ALTERNATIVES 1A & 1B
PROPOSED SOIL REMOVAL AREAS
FORMER TOMBARELLO PROPERTY
LAWRENCE, MASSACHUSETTS

PREPARED BY: JH	CHECKED BY: SV
PROJECT NO. 80108.04	DATE: AUGUST 2016

Path: R:\80000 Task Orders\80108 Brownfields Multi-Site\GIS\MLRR\Figures\Figure 5-1 Tombarello Removal Areas.mxd Date Printed: 8/12/2016

HOFMANN AVE

MARSTON ST

Metal Shop / Garage

Furnace Building

Baler Press Area

Small Shear

Large Shear

Alternative	PCB Cleanup Goal	UCLs Removed?	Soil Volume	Barrier	Capital Cost Range
2A	50 mg/kg	Yes	10,000 CY	Cover	$7.5M to $11M

Notes:

1. Source: Figure 4, Comprehensive Phase II Site Investigation Services, Former Tombarello Property, by Tighe & Bond.

2. Property lines from MassGIS, Aerial photo from MassGIS, 2013.

3. Locations of site features depicted hereon are approximate and given for illustrative purposes only.

Legend

Surface Soil PCB (0-2 ft bgs, ppm)

- > 100
- 50 - 100
- 10 - 50
- < 10
- No PCBs Detected

Shape Indicator

- Sampled by Nobis, 2016
- Sampled by EPA, 2010
- Sampled by others, Prior to 2010
- Proposed Excavation Area
- Extent of Cap/Cover
- 2011 Excavation Area
- Soil Consolidation Area
- Property Lines
- Existing Building
- Former Building

N

0 50 100 200

Feet

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FIGURE 5-2 A

ALTERNATIVE 2A
PROPOSED SOIL REMOVAL AREAS
FORMER TOMBARELLO PROPERTY
LAWRENCE, MASSACHUSETTS

PREPARED BY: JH	CHECKED BY: SV
PROJECT NO. 80108.04	DATE: AUGUST 2016

Path: R:\80000 Task Orders\80108 Brownfields Multi-Site\GIS\MLRR\Figures\Figure 5-1 Tombarello Removal Areas.mxd Date Printed: 8/12/2016

HOFMANN AVE

MARSTON ST

Metal Shop / Garage

Furnace Building

Baler Press Area

Small Shear

Large Shear

Alternative	PCB Cleanup Goal	UCLs Removed?	Soil Volume	Barrier	Capital Cost Range
2B	50 mg/kg	No	9,000 CY	Cap	$9M to $13M
2C	50 mg/kg	No	9,000 CY	Cover	$7M to $10M

Notes:

1. Source: Figure 4, Comprehensive Phase II Site Investigation Services, Former Tombarello Property, by Tighe & Bond.

2. Property lines from MassGIS, Aerial photo from MassGIS, 2013.

3. Locations of site features depicted hereon are approximate and given for illustrative purposes only.

Legend

Surface Soil PCB (0-2 ft bgs, ppm)

- > 100
- 50 - 100
- 10 - 50
- < 10
- No PCBs Detected

Shape Indicator

- Sampled by Nobis, 2016
- Sampled by EPA, 2010
- Sampled by others, Prior to 2010
- Proposed Excavation Area
- Extent of Cap/Cover
- 2011 Excavation Area
- Soil Consolidation Area
- Property Lines
- Existing Building
- Former Building

N

0 50 100 200

Feet

1 inch = 100 feet

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FIGURE 5-2 B

ALTERNATIVES 2B & 2C
PROPOSED SOIL REMOVAL AREAS
FORMER TOMBARELLO PROPERTY
LAWRENCE, MASSACHUSETTS

PREPARED BY: JH	CHECKED BY: SV
PROJECT NO. 80108.04	DATE: AUGUST 2016

Path: R:\80000 Task Orders\80108 Brownfields Multi-Site\GIS\MLRR\Figures\Figure 5-1 Tombarello Removal Areas.mxd Date Printed: 8/12/2016

HOFMANN AVE

MARSTON ST

Metal Shop / Garage

Furnace Building

Baler Press Area

Small Shear

Large Shear

Alternative	PCB Cleanup Goal	UCLs Removed?	Soil Volume	Barrier	Capital Cost Range
3A	100 mg/kg	Yes	4,000 CY	Cover	$4M to $6M

Notes:

1. Source: Figure 4, Comprehensive Phase II Site Investigation Services, Former Tombarello Property, by Tighe & Bond.

2. Property lines from MassGIS, Aerial photo from MassGIS, 2013.

3. Locations of site features depicted hereon are approximate and given for illustrative purposes only.

Legend

Surface Soil PCB (0-2 ft bgs, ppm)

- > 100
- 50 - 100
- 10 - 50
- < 10
- No PCBs Detected

Shape Indicator

- Sampled by Nobis, 2016
- Sampled by EPA, 2010
- Sampled by others, Prior to 2010
- Proposed Excavation Area
- Extent of Cap/Cover
- 2011 Excavation Area
- Soil Consolidation Area
- Property Lines
- Existing Building
- Former Building

N

0 50 100 200

Feet

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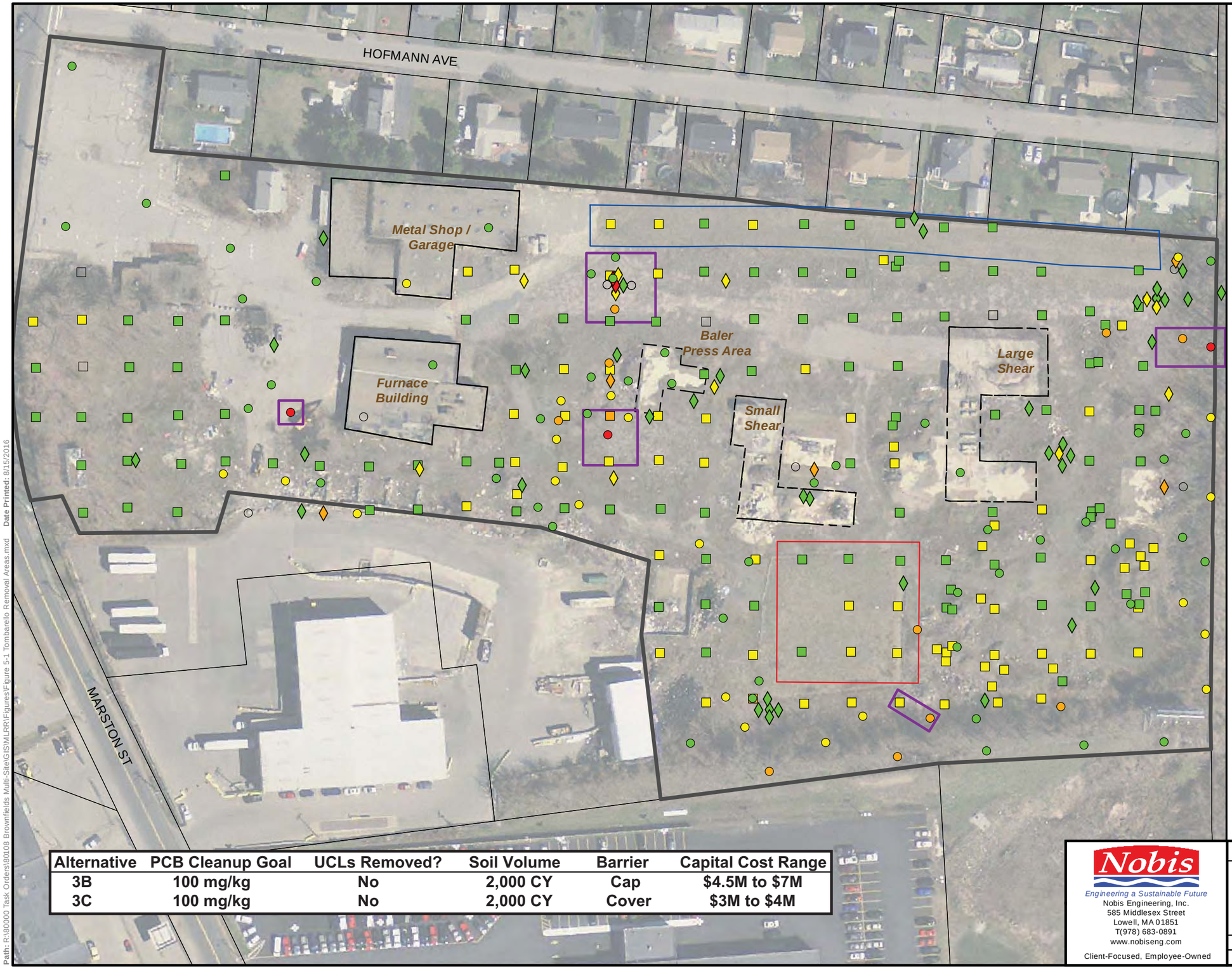
FIGURE 5-3 A

ALTERNATIVE 3A
PROPOSED SOIL REMOVAL AREAS
FORMER TOMBARELLO PROPERTY
LAWRENCE, MASSACHUSETTS

PREPARED BY: JH	CHECKED BY: SV
PROJECT NO. 80108.04	DATE: AUGUST 2016

Path: R:\80000 Task Orders\80108 Brownfields Multi-Site\GIS\MLRR\Figures\Figure 5-1 Tombarello Removal Areas.mxd Date Printed: 8/15/2016



Alternative	PCB Cleanup Goal	UCLs Removed?	Soil Volume	Barrier	Capital Cost Range
3B	100 mg/kg	No	2,000 CY	Cap	$4.5M to $7M
3C	100 mg/kg	No	2,000 CY	Cover	$3M to $4M

Notes:

1. Source: Figure 4, Comprehensive Phase II Site Investigation Services, Former Tombarello Property, by Tighe & Bond.

2. Property lines from MassGIS, Aerial photo from MassGIS, 2013.

3. Locations of site features depicted hereon are approximate and given for illustrative purposes only.

Legend

Surface Soil PCB (0-2 ft bgs, ppm)

- > 100
- 50 - 100
- 10 - 50
- < 10
- No PCBs Detected

Shape Indicator

- Sampled by Nobis, 2016
- Sampled by EPA, 2010
- Sampled by others, Prior to 2010
- Proposed Excavation Area
- Extent of Cap/Cover
- 2011 Excavation Area
- Soil Consolidation Area
- Property Lines
- Existing Building
- Former Building

N

0 50 100 200

Feet

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FIGURE 5-3 B

ALTERNATIVES 3B & 3C
PROPOSED SOIL REMOVAL AREAS
FORMER TOMBARELLO PROPERTY
LAWRENCE, MASSACHUSETTS

PREPARED BY: JH	CHECKED BY: SV
PROJECT NO. 80108.04	DATE: AUGUST 2016

Date Printed: 8/15/2016
Path: R:\80000 Task Orders\80108 Brownfields Multi-Site\GIS\MLRR\Figures\Figure 5-1 Tombarello Removal Areas.mxd

APPENDICES

APPENDIX A

Table A-1
Alternative 1A Cost Estimate - Capital Costs
Excavation and Off-Site Disposal of Soils (10 mg/kg PCBs), Construction of Engineered Barrier
Former Tombarello Site TBA
Lawrence, Massachusetts

	DESCRIPTION	UNIT	UNIT COST [1]	QUANTITY	TOTAL COST	SOURCE (cost - base year)
1.0	**Mobilization/Demobilization**					
1.1	Equipment Mobilization/Demobilization	LS	$6,877	1	$6,877	
1.2	Field Support Facilities	LS	$100,000	1	$5,000	
	Subtotal				**$11,877**	
2.0	**Site Preparation/Restoration**					
2.1	Clear and Grub (cut and chip light trees to 6" diameter)	ACRE	$4,775	3	$14,325	Means 2015 HC, 31 11 10.10 0020
2.2	Clear and Grub (grub stumps and remove)	ACRE	$2,125	3	$6,375	Means 2015 HC, 31 11 10.10 0150
2.3	Prepare Soil Stockpile Areas (rough grading 10,000 SF)	LS	$1,375	2	$2,750	Means 2015 HC, 31 22 13.20 0170
2.4	Prepare Soil Stockpile Areas (place geotextile)	SY	$2.46	2,222	$5,466	Means 2015 HC, 31 32 19.16 1500
2.5	Install Erosion and Sedimentation Controls	LF	$13.56	800	$10,848	Means 2015 HC, 31 25 14.16 1000 & 1250
2.6	Prepare Construction Entrance	LS	$4,000	1	$4,000	
2.7	Prepare Equipment Decontamination Area	LS	$6,000	1	$6,000	
	Subtotal				**$49,764**	
3.0	**Demolish Existing Structures**					
3.1	Hazardous Materials Inspection	LS	$20,000	1	$20,000	
3.2	Hazardous Materials Abatement	LS	$50,000	1	$50,000	
3.3	Demolish Wood-Framed House	EA	$5,825	1	$5,825	Means 2015 HC, 02 41 16.13 1000
3.4	Demolish Concrete Block Buildings	CF	$0.51	200,000	$102,000	Means 2015 HC, 02 41 16.13 0050
3.5	Demolish Concrete Slabs	SF	$1.10	30,000	$33,000	Means 2015 HC, 02 41 16.17 0420
3.6	Reuse/Disposal of Demolition Debris	CY	$19.25	3,000	$57,750	Means 2015 HC, 02 41 16.17 4250
	Subtotal				**$233,589**	
4.0	**Excavate Fill and Transport to Disposal Facility**					
4.1	Excavate Contaminated Soil	CY	$2.48	75,000	$186,000	Means 2015 HC, 31 23 16.42 0200
4.2	Haul Contaminated Soil to Disposal Facility	TON	$75.00	112,500	$8,437,500	Means 2015 HC, 31 23 23.20 1478
4.3	Hazardous Waste Landfill Disposal	TON	$300.00	112,500	$33,750,000	
4.4	Watering with 3,000 gallon Tank truck, per Pass	ACRE	$84.63	260	$22,004	Means 2005 ER, 18 05 0413, cost adjusted to 2016
4.5	Perimeter Air Sampling	EA	$300.00	160	$48,000	
	Subtotal				**$42,443,504**	
5.0	**Regrading and Cap Construction**					
5.1	Regrading of Site/Berms	LS	$31,500	1	$31,500	Means 2015 HC, 31 22 13.20 0280
5.2	Place 12" Low Conductivity Layer	CY	$14.55	20,370	$296,389	Means 2015 HC, 31 23 23.15 6050
5.3	Compact 12" Low Conductivity Layer	CY	$0.77	20,370	$15,685	Means 2015 HC, 31 23 23.23 5040
5.4	Place 60 mil Flexible Membrane Liner	SF	$3.27	550,000	$1,798,500	Means 2005 ER, 33 08 0572, cost adjusted to 2016
5.5	Place 12" Drainage Layer	CY	$23.50	20,370	$478,704	Means 2015 HC, 31 23 23.15 5080
5.6	Compact 12" Drainage Layer	CY	$0.48	20,370	$9,778	Means 2015 HC, 31 23 23.23 5000
5.7	Place Geofabric Defining Layer	SY	$3.68	61,111	$224,889	Means 2005 ER, 33 08 0535, cost adjusted to 2016
5.8	Place 6" Gravel Layer	CY	$14.55	10,185	$148,194	Means 2015 HC, 31 23 23.15 6050
5.9	Asphalt Pavement, 4" thick	SY	$20.60	20,370	$419,630	Means 2015 HC, 32 12 16.13 0120 & 0380
5.10	Furnish, Place, and Spread Topsoil (6")	CY	$28.00	6,790	$190,123	Means 2015 HC, 31 23 23.15 7080
5.11	Hydroseeding with Mulch and Fertilizer	MSF	$68.00	367	$24,933	Means 2015 HC, 32 92 19.14 5400
	Subtotal				**$3,638,325**	
TOTAL DIRECT COSTS					**$46,377,059**	

Table A-1
Alternative 1A Cost Estimate - Capital Costs
Excavation and Off-Site Disposal of Soils (10 mg/kg PCBs), Construction of Engineered Barrier
Former Tombarello Site TBA
Lawrence, Massachusetts

	DESCRIPTION	UNIT	UNIT COST [1]	QUANTITY	TOTAL COST	SOURCE (cost - base year)
6.0	**Other Costs**					
6.1	Engineering and Design (6% direct costs)				$2,782,624	OSWER 9355.0-75
6.2	Construction management (6% of direct costs)				$2,782,624	OSWER 9355.0-75
6.3	Location Adjustment (15.3%)				$7,095,690	Means 2015 HC
6.4	Contingency (20%)				$9,275,412	OSWER 9355.0-75
6.5	Deed Restriction Transactional Fees				$50,000	
TOTAL OTHER COSTS					**$21,986,349**	
TOTAL CAPITAL COST FOR ALTERNATIVE					**$68,363,408**	

Notes:
1. Assume no fill material required to be placed prior to cap/cover construction.
2. A conversion factor of 1.5 was used to convert CY to TON.

LS = lump sum
HR = hour
EA = each
MSF = thousand square feet
SF = square feet
LF = linear foot
CY = cubic yard
SY = square yard
Actual volumes may vary during implementation based upon the final extent of excavation.
There would be no impacts to floodplains or wetlands.

Table A-2
Alternative 1B Cost Estimate - Capital Costs
Excavation and Off-Site Disposal of Soils (10 mg/kg PCBs), Construction of Permeable Soil Cover
Former Tombarello Site TBA
Lawrence, Massachusetts

	DESCRIPTION	UNIT	UNIT COST [1]	QUANTITY	TOTAL COST	SOURCE (cost - base year)
1.0	**Mobilization/Demobilization**					
1.1	Equipment Mobilization/Demobilization	LS	$6,877	1	$6,877	
1.2	Field Support Facilities	LS	$5,000	1	$5,000	
	Subtotal				**$11,877**	
2.0	**Site Preparation/Restoration**					
2.1	Clear and Grub (cut and chip light trees to 6" diameter)	ACRE	$4,775	3	$14,325	Means 2015 HC, 31 11 10.10 0020
2.2	Clear and Grub (grub stumps and remove)	ACRE	$2,125	3	$6,375	Means 2015 HC, 31 11 10.10 0150
2.3	Prepare Soil Stockpile Areas (rough grading 10,000 SF)	LS	$1,375	2	$2,750	Means 2015 HC, 31 22 13.20 0170
2.4	Prepare Soil Stockpile Areas (place geotextile)	SY	$2.46	2,222	$5,466	Means 2015 HC, 31 32 19.16 1500
2.5	Install Erosion and Sedimentation Controls	LF	$13.56	800	$10,848	Means 2015 HC, 31 25 14.16 1000 & 1250
2.6	Prepare Construction Entrance	LS	$4,000	1	$4,000	
2.7	Prepare Equipment Decontamination Area	LS	$6,000	1	$6,000	
	Subtotal				**$49,764**	
3.0	**Demolish Existing Structures**					
3.1	Hazardous Materials Inspection	LS	$20,000	1	$20,000	
3.2	Hazardous Materials Abatement	LS	$50,000	1	$50,000	
3.3	Demolish Wood-Framed House	EA	$5,825	1	$5,825	Means 2015 HC, 02 41 16.13 1000
3.4	Demolish Concrete Block Buildings	CF	$0.51	200,000	$102,000	Means 2015 HC, 02 41 16.13 0050
3.5	Demolish Concrete Slabs	SF	$1.10	30,000	$33,000	Means 2015 HC, 02 41 16.17 0420
3.6	Reuse/Disposal of Demolition Debris	CY	$19.25	3,000	$57,750	Means 2015 HC, 02 41 16.17 4250
	Subtotal				**$233,589**	
4.0	**Excavate Fill and Transport to Disposal Facility**					
4.1	Excavate Contaminated Soil	CY	$2.48	75,000	$186,000	Means 2015 HC, 31 23 16.42 0200
4.2	Haul Contaminated Soil to Disposal Facility	TON	$75.00	112,500	$8,437,500	Means 2015 HC, 31 23 23.20 1478
4.3	Hazardous Waste Landfill Disposal	TON	$300.00	112,500	$33,750,000	
4.4	Watering with 3,000 gallon Tank truck, per Pass	ACRE	$84.63	260	$22,004	Means 2005 ER, 18 05 0413, cost adjusted to 2016
4.5	Perimeter Air Sampling	EA	$300.00	160	$48,000	
	Subtotal				**$42,443,504**	
5.0	**Regrading and Placement of Soil Cover**					
5.1	Regrading of Site/Berms	LS	$31,500	1	$31,500	Means 2015 HC, 31 22 13.20 0280
5.2	Place 12" Drainage Layer	CY	$23.50	20,370	$478,704	Means 2015 HC, 31 23 23.15 5080
5.3	Compact 12" Drainage Layer	CY	$0.48	20,370	$9,778	Means 2015 HC, 31 23 23.23 5000
5.4	Place Geofabric Defining Layer	SY	$3.68	61,111	$224,889	Means 2005 ER, 33 08 0535, cost adjusted to 2016
5.5	Place 6" Gravel Layer	CY	$14.55	10,185	$148,194	Means 2015 HC, 31 23 23.15 6050
5.6	Asphalt Pavement, 4" thick	SY	$20.60	20,370	$419,630	Means 2015 HC, 32 12 16.13 0120 & 0380
5.7	Furnish, Place, and Spread Topsoil (6")	CY	$28.00	6,790	$190,123	Means 2015 HC, 31 23 23.15 7080
5.8	Hydroseeding with Mulch and Fertilizer	MSF	$68.00	550	$37,400	Means 2015 HC, 32 92 19.14 5400
	Subtotal				**$1,540,218**	
TOTAL DIRECT COSTS					**$44,278,952**	

Table A-2
Alternative 1B Cost Estimate - Capital Costs
Excavation and Off-Site Disposal of Soils (10 mg/kg PCBs), Construction of Permeable Soil Cover
Former Tombarello Site TBA
Lawrence, Massachusetts

	DESCRIPTION	UNIT	UNIT COST [1]	QUANTITY	TOTAL COST	SOURCE (cost - base year)
6.0	**Other Costs**					
6.1	Engineering and Design (6% direct costs)				$2,656,737	OSWER 9355.0-75
6.2	Construction management (6% of direct costs)				$2,656,737	OSWER 9355.0-75
6.3	Location Adjustment (15.3%)				$6,774,680	Means 2015 HC
6.4	Contingency (20%)				$8,855,790	OSWER 9355.0-75
6.5	Deed Restriction Transactional Fees				$50,000	
TOTAL OTHER COSTS					**$20,993,944**	
TOTAL CAPITAL COST FOR ALTERNATIVE					**$65,272,896**	

Notes:
1. Assume no fill material required to be placed prior to cap/cover construction.
2. A conversion factor of 1.5 was used to convert CY to TON.

LS = lump sum
HR = hour
EA = each
MSF = thousand square feet
SF = square feet
LF = linear foot
CY = cubic yard
SY = square yard
Actual volumes may vary during implementation based upon the final extent of excavation.
There would be no impacts to floodplains or wetlands.

Table A-3
Alternative 2A Cost Estimate - Capital Costs
Excavation and Off-Site Disposal of Soils (50 mg/kg PCBs and UCL Exceedances), Construction of Permeable Soil Cover
Former Tombarello Site TBA
Lawrence, Massachusetts

	DESCRIPTION	UNIT	UNIT COST [1]	QUANTITY	TOTAL COST	SOURCE (cost - base year)
1.0	**Mobilization/Demobilization**					
1.1	Equipment Mobilization/Demobilization	LS	$6,877	1	$6,877	
1.2	Field Support Facilities	LS	$5,000	1	$5,000	
	Subtotal				**$11,877**	
2.0	**Site Preparation/Restoration**					
2.1	Clear and Grub (cut and chip light trees to 6" diameter)	ACRE	$4,775	3	$14,325	Means 2015 HC, 31 11 10.10 0020
2.2	Clear and Grub (grub stumps and remove)	ACRE	$2,125	3	$6,375	Means 2015 HC, 31 11 10.10 0150
2.3	Prepare Soil Stockpile Areas (rough grading 10,000 SF)	LS	$1,375	2	$2,750	Means 2015 HC, 31 22 13.20 0170
2.4	Prepare Soil Stockpile Areas (place geotextile)	SY	$2.46	2,222	$5,466	Means 2015 HC, 31 32 19.16 1500
2.5	Install Erosion and Sedimentation Controls	LF	$13.56	800	$10,848	Means 2015 HC, 31 25 14.16 1000 & 1250
2.6	Prepare Construction Entrance	LS	$4,000	1	$4,000	
2.7	Prepare Equipment Decontamination Area	LS	$6,000	1	$6,000	
	Subtotal				**$49,764**	
3.0	**Demolish Existing Structures**					
3.1	Hazardous Materials Inspection	LS	$20,000	1	$20,000	
3.2	Hazardous Materials Abatement	LS	$50,000	1	$50,000	
3.3	Demolish Wood-Framed House	EA	$5,825	1	$5,825	Means 2015 HC, 02 41 16.13 1000
3.4	Demolish Concrete Block Buildings	CF	$0.51	200,000	$102,000	Means 2015 HC, 02 41 16.13 0050
3.5	Demolish Concrete Slabs	SF	$1.10	30,000	$33,000	Means 2015 HC, 02 41 16.17 0420
3.6	Reuse/Disposal of Demolition Debris	CY	$19.25	3,000	$57,750	Means 2015 HC, 02 41 16.17 4250
	Subtotal				**$233,589**	
4.0	**Excavate Fill and Transport to Disposal Facility**					
4.1	Excavate Contaminated Soil	CY	$2.48	10,000	$24,800	Means 2015 HC, 31 23 16.42 0200
4.2	Haul Contaminated Soil to Disposal Facility	TON	$75.00	15,000	$1,125,000	Means 2015 HC, 31 23 23.20 1478
4.3	Hazardous Waste Landfill Disposal	TON	$300.00	15,000	$4,500,000	
4.4	Watering with 3,000 gallon Tank truck, per Pass	ACRE	$84.63	260	$22,004	Means 2005 ER, 18 05 0413, cost adjusted to 2016
4.5	Perimeter Air Sampling	EA	$300.00	40	$12,000	
	Subtotal				**$5,683,804**	
5.0	**Regrading and Placement of Soil Cover**					
5.1	Regrading of Site/Berms	LS	$31,500	1	$31,500	Means 2015 HC, 31 22 13.20 0280
5.2	Place 12" Drainage Layer	CY	$23.50	20,370	$478,704	Means 2015 HC, 31 23 23.15 5080
5.3	Compact 12" Drainage Layer	CY	$0.48	20,370	$9,778	Means 2015 HC, 31 23 23.23 5000
5.4	Place Geofabric Defining Layer	SY	$3.68	61,111	$224,889	Means 2005 ER, 33 08 0535, cost adjusted to 2016
5.5	Place 6" Gravel Layer	CY	$14.55	10,185	$148,194	Means 2015 HC, 31 23 23.15 6050
5.6	Asphalt Pavement, 4" thick	SY	$20.60	20,370	$419,630	Means 2015 HC, 32 12 16.13 0120 & 0380
5.7	Furnish, Place, and Spread Topsoil (6")	CY	$28.00	6,790	$190,123	Means 2015 HC, 31 23 23.15 7080
5.8	Hydroseeding with Mulch and Fertilizer	MSF	$68.00	550	$37,400	Means 2015 HC, 32 92 19.14 5400
	Subtotal				**$1,540,218**	
TOTAL DIRECT COSTS					**$7,519,252**	

Table A-3
Alternative 2A Cost Estimate - Capital Costs
Excavation and Off-Site Disposal of Soils (50 mg/kg PCBs and UCL Exceedances), Construction of Permeable Soil Cover
Former Tombarello Site TBA
Lawrence, Massachusetts

DESCRIPTION		UNIT	UNIT COST [1]	QUANTITY	TOTAL COST	SOURCE (cost - base year)
6.0 Other Costs						
6.1	Engineering and Design (6% direct costs)				$451,155	OSWER 9355.0-75
6.2	Construction management (6% of direct costs)				$451,155	OSWER 9355.0-75
6.3	Location Adjustment (15.3%)				$1,150,446	Means 2015 HC
6.4	Contingency (20%)				$1,503,850	OSWER 9355.0-75
6.5	Deed Restriction Transactional Fees				$50,000	
TOTAL OTHER COSTS					**$3,606,606**	
TOTAL CAPITAL COST FOR ALTERNATIVE					**$11,125,858**	

Notes:
1. Assume no fill material required to be placed prior to cap/cover construction.
2. A conversion factor of 1.5 was used to convert CY to TON.

LS = lump sum
HR = hour
EA = each
MSF = thousand square feet
SF = square feet
LF = linear foot
CY = cubic yard
SY = square yard
Actual volumes may vary during implementation based upon the final extent of excavation.
There would be no impacts to floodplains or wetlands.

Table A-4
Alternative 2B Cost Estimate - Capital Costs
Excavation and Off-Site Disposal of Soils (50 mg/kg PCBs), Construction of Engineered Barrier
Former Tombarello Site TBA
Lawrence, Massachusetts

	DESCRIPTION	UNIT	UNIT COST [1]	QUANTITY	TOTAL COST	SOURCE (cost - base year)
1.0	**Mobilization/Demobilization**					
1.1	Equipment Mobilization/Demobilization	LS	$6,877	1	$6,877	
1.2	Field Support Facilities	LS	$5,000	1	$5,000	
	Subtotal				**$11,877**	
2.0	**Site Preparation/Restoration**					
2.1	Clear and Grub (cut and chip light trees to 6" diameter)	ACRE	$4,775	3	$14,325	Means 2015 HC, 31 11 10.10 0020
2.2	Clear and Grub (grub stumps and remove)	ACRE	$2,125	3	$6,375	Means 2015 HC, 31 11 10.10 0150
2.3	Prepare Soil Stockpile Areas (rough grading 10,000 SF)	LS	$1,375	2	$2,750	Means 2015 HC, 31 22 13.20 0170
2.4	Prepare Soil Stockpile Areas (place geotextile)	SY	$2.46	2,222	$5,466	Means 2015 HC, 31 32 19.16 1500
2.5	Install Erosion and Sedimentation Controls	LF	$13.56	800	$10,848	Means 2015 HC, 31 25 14.16 1000 & 1250
2.6	Prepare Construction Entrance	LS	$4,000	1	$4,000	
2.7	Prepare Equipment Decontamination Area	LS	$6,000	1	$6,000	
	Subtotal				**$49,764**	
3.0	**Demolish Existing Structures**					
3.1	Hazardous Materials Inspection	LS	$20,000	1	$20,000	
3.2	Hazardous Materials Abatement	LS	$50,000	1	$50,000	
3.3	Demolish Wood-Framed House	EA	$5,825	1	$5,825	Means 2015 HC, 02 41 16.13 1000
3.4	Demolish Concrete Block Buildings	CF	$0.51	200,000	$102,000	Means 2015 HC, 02 41 16.13 0050
3.5	Demolish Concrete Slabs	SF	$1.10	30,000	$33,000	Means 2015 HC, 02 41 16.17 0420
3.6	Reuse/Disposal of Demolition Debris	CY	$19.25	3,000	$57,750	Means 2015 HC, 02 41 16.17 4250
	Subtotal				**$233,589**	
4.0	**Excavate Fill and Transport to Disposal Facility**					
4.1	Excavate Contaminated Soil	CY	$2.48	9,000	$22,320	Means 2015 HC, 31 23 16.42 0200
4.2	Haul Contaminated Soil to Disposal Facility	TON	$75.00	13,500	$1,012,500	Means 2015 HC, 31 23 23.20 1478
4.3	Hazardous Waste Landfill Disposal	TON	$300.00	13,500	$4,050,000	
4.4	Watering with 3,000 gallon Tank truck, per Pass	ACRE	$84.63	260	$22,004	Means 2005 ER, 18 05 0413, cost adjusted to 2016
4.5	Perimeter Air Sampling	EA	$300.00	40	$12,000	
	Subtotal				**$5,118,824**	
5.0	**Regrading and Cap Construction**					
5.1	Regrading of Site/Berms	LS	$31,500	1	$31,500	Means 2015 HC, 31 22 13.20 0280
5.2	Place 12" Low Conductivity Layer	CY	$14.55	20,370	$296,389	Means 2015 HC, 31 23 23.15 6050
5.3	Compact 12" Low Conductivity Layer	CY	$0.77	20,370	$15,685	Means 2015 HC, 31 23 23.23 5040
5.4	Place 60 mil Flexible Membrane Liner	SF	$3.27	550,000	$1,798,500	Means 2005 ER, 33 08 0572, cost adjusted to 2016
5.5	Place 12" Drainage Layer	CY	$23.50	20,370	$478,704	Means 2015 HC, 31 23 23.15 5080
5.6	Compact 12" Drainage Layer	CY	$0.48	20,370	$9,778	Means 2015 HC, 31 23 23.23 5000
5.7	Place Geofabric Defining Layer	SY	$3.68	61,111	$224,889	Means 2005 ER, 33 08 0535, cost adjusted to 2016
5.8	Place 6" Gravel Layer	CY	$14.55	10,185	$148,194	Means 2015 HC, 31 23 23.15 6050
5.9	Asphalt Pavement, 4" thick	SY	$20.60	20,370	$419,630	Means 2015 HC, 32 12 16.13 0120 & 0380
5.10	Furnish, Place, and Spread Topsoil (6")	CY	$28.00	6,790	$190,123	Means 2015 HC, 31 23 23.15 7080
5.11	Hydroseeding with Mulch and Fertilizer	MSF	$68.00	367	$24,933	Means 2015 HC, 32 92 19.14 5400
	Subtotal				**$3,638,325**	
TOTAL DIRECT COSTS					**$9,052,379**	

Table A-4
Alternative 2B Cost Estimate - Capital Costs
Excavation and Off-Site Disposal of Soils (50 mg/kg PCBs), Construction of Engineered Barrier
Former Tombarello Site TBA
Lawrence, Massachusetts

	DESCRIPTION	UNIT	UNIT COST [1]	QUANTITY	TOTAL COST	SOURCE (cost - base year)
6.0	**Other Costs**					
6.1	Engineering and Design (6% direct costs)				$543,143	OSWER 9355.0-75
6.2	Construction management (6% of direct costs)				$543,143	OSWER 9355.0-75
6.3	Location Adjustment (15.3%)				$1,385,014	Means 2015 HC
6.4	Contingency (20%)				$1,810,476	OSWER 9355.0-75
6.5	Deed Restriction Transactional Fees				$50,000	
TOTAL OTHER COSTS					**$4,331,775**	
TOTAL CAPITAL COST FOR ALTERNATIVE					**$13,384,155**	

Notes:
1. Assume no fill material required to be placed prior to cap/cover construction.
2. A conversion factor of 1.5 was used to convert CY to TON.

LS = lump sum
HR = hour
EA = each
MSF = thousand square feet
SF = square feet
LF = linear foot
CY = cubic yard
SY = square yard
Actual volumes may vary during implementation based upon the final extent of excavation.
There would be no impacts to floodplains or wetlands.

Table A-5
Alternative 2C Cost Estimate - Capital Costs
Excavation and Off-Site Disposal of Soils (50 mg/kg PCBs), Construction of Permeable Soil Cover
Former Tombarello Site TBA
Lawrence, Massachusetts

	DESCRIPTION	UNIT	UNIT COST [1]	QUANTITY	TOTAL COST	SOURCE (cost - base year)
1.0	**Mobilization/Demobilization**					
1.1	Equipment Mobilization/Demobilization	LS	$6,877	1	$6,877	
1.2	Field Support Facilities	LS	$5,000	1	$5,000	
	Subtotal				**$11,877**	
2.0	**Site Preparation/Restoration**					
2.1	Clear and Grub (cut and chip light trees to 6" diameter)	ACRE	$4,775	3	$14,325	Means 2015 HC, 31 11 10.10 0020
2.2	Clear and Grub (grub stumps and remove)	ACRE	$2,125	3	$6,375	Means 2015 HC, 31 11 10.10 0150
2.3	Prepare Soil Stockpile Areas (rough grading 10,000 SF)	LS	$1,375	2	$2,750	Means 2015 HC, 31 22 13.20 0170
2.4	Prepare Soil Stockpile Areas (place geotextile)	SY	$2.46	2,222	$5,466	Means 2015 HC, 31 32 19.16 1500
2.5	Install Erosion and Sedimentation Controls	LF	$13.56	800	$10,848	Means 2015 HC, 31 25 14.16 1000 & 1250
2.6	Prepare Construction Entrance	LS	$4,000	1	$4,000	
2.7	Prepare Equipment Decontamination Area	LS	$6,000	1	$6,000	
	Subtotal				**$49,764**	
3.0	**Demolish Existing Structures**					
3.1	Hazardous Materials Inspection	LS	$20,000	1	$20,000	
3.2	Hazardous Materials Abatement	LS	$50,000	1	$50,000	
3.3	Demolish Wood-Framed House	EA	$5,825	1	$5,825	Means 2015 HC, 02 41 16.13 1000
3.4	Demolish Concrete Block Buildings	CF	$0.51	200,000	$102,000	Means 2015 HC, 02 41 16.13 0050
3.5	Demolish Concrete Slabs	SF	$1.10	30,000	$33,000	Means 2015 HC, 02 41 16.17 0420
3.6	Reuse/Disposal of Demolition Debris	CY	$19.25	3,000	$57,750	Means 2015 HC, 02 41 16.17 4250
	Subtotal				**$233,589**	
4.0	**Excavate Fill and Transport to Disposal Facility**					
4.1	Excavate Contaminated Soil	CY	$2.48	9,000	$22,320	Means 2015 HC, 31 23 16.42 0200
4.2	Haul Contaminated Soil to Disposal Facility	TON	$75.00	13,500	$1,012,500	Means 2015 HC, 31 23 23.20 1478
4.3	Hazardous Waste Landfill Disposal	TON	$300.00	13,500	$4,050,000	
4.4	Watering with 3,000 gallon Tank truck, per Pass	ACRE	$84.63	260	$22,004	Means 2005 ER, 18 05 0413, cost adjusted to 2016
4.5	Perimeter Air Sampling	EA	$300.00	40	$12,000	
	Subtotal				**$5,118,824**	
5.0	**Regrading and Placement of Soil Cover**					
5.1	Regrading of Site/Berms	LS	$31,500	1	$31,500	Means 2015 HC, 31 22 13.20 0280
5.2	Place 12" Drainage Layer	CY	$23.50	20,370	$478,704	Means 2015 HC, 31 23 23.15 5080
5.3	Compact 12" Drainage Layer	CY	$0.48	20,370	$9,778	Means 2015 HC, 31 23 23.23 5000
5.4	Place Geofabric Defining Layer	SY	$3.68	61,111	$224,889	Means 2005 ER, 33 08 0535, cost adjusted to 2016
5.5	Place 6" Gravel Layer	CY	$14.55	10,185	$148,194	Means 2015 HC, 31 23 23.15 6050
5.6	Asphalt Pavement, 4" thick	SY	$20.60	20,370	$419,630	Means 2015 HC, 32 12 16.13 0120 & 0380
5.7	Furnish, Place, and Spread Topsoil (6")	CY	$28.00	6,790	$190,123	Means 2015 HC, 31 23 23.15 7080
5.8	Hydroseeding with Mulch and Fertilizer	MSF	$68.00	550	$37,400	Means 2015 HC, 32 92 19.14 5400
	Subtotal				**$1,540,218**	
TOTAL DIRECT COSTS					**$6,954,272**	

Table A-5
Alternative 2C Cost Estimate - Capital Costs
Excavation and Off-Site Disposal of Soils (50 mg/kg PCBs), Construction of Permeable Soil Cover
Former Tombarello Site TBA
Lawrence, Massachusetts

	DESCRIPTION	UNIT	UNIT COST [1]	QUANTITY	TOTAL COST	SOURCE (cost - base year)
6.0	**Other Costs**					
6.1	Engineering and Design (6% direct costs)				$417,256	OSWER 9355.0-75
6.2	Construction management (6% of direct costs)				$417,256	OSWER 9355.0-75
6.3	Location Adjustment (15.3%)				$1,064,004	Means 2015 HC
6.4	Contingency (20%)				$1,390,854	OSWER 9355.0-75
6.5	Deed Restriction Transactional Fees				$50,000	
TOTAL OTHER COSTS					**$3,339,371**	
TOTAL CAPITAL COST FOR ALTERNATIVE					**$10,293,643**	

Notes:
1. Assume no fill material required to be placed prior to cap/cover construction.
2. A conversion factor of 1.5 was used to convert CY to TON.

LS = lump sum
HR = hour
EA = each
MSF = thousand square feet
SF = square feet
LF = linear foot
CY = cubic yard
SY = square yard
Actual volumes may vary during implementation based upon the final extent of excavation.
There would be no impacts to floodplains or wetlands.

Table A-6
Alternative 3A Cost Estimate - Capital Costs
Excavation and Off-Site Disposal of Soils (100 mg/kg PCBs and UCL Exceedances), Construction of Permeable Soil Cover
Former Tombarello Site TBA
Lawrence, Massachusetts

	DESCRIPTION	UNIT	UNIT COST [1]	QUANTITY	TOTAL COST	SOURCE (cost - base year)
1.0	**Mobilization/Demobilization**					
1.1	Equipment Mobilization/Demobilization	LS	$6,877	1	$6,877	
1.2	Field Support Facilities	LS	$5,000	1	$5,000	
	Subtotal				**$11,877**	
2.0	**Site Preparation/Restoration**					
2.1	Clear and Grub (cut and chip light trees to 6" diameter)	ACRE	$4,775	3	$14,325	Means 2015 HC, 31 11 10.10 0020
2.2	Clear and Grub (grub stumps and remove)	ACRE	$2,125	3	$6,375	Means 2015 HC, 31 11 10.10 0150
2.3	Prepare Soil Stockpile Areas (rough grading 10,000 SF)	LS	$1,375	2	$2,750	Means 2015 HC, 31 22 13.20 0170
2.4	Prepare Soil Stockpile Areas (place geotextile)	SY	$2.46	2,222	$5,466	Means 2015 HC, 31 32 19.16 1500
2.5	Install Erosion and Sedimentation Controls	LF	$13.56	800	$10,848	Means 2015 HC, 31 25 14.16 1000 & 1250
2.6	Prepare Construction Entrance	LS	$4,000	1	$4,000	
2.7	Prepare Equipment Decontamination Area	LS	$6,000	1	$6,000	
	Subtotal				**$49,764**	
3.0	**Demolish Existing Structures**					
3.1	Hazardous Materials Inspection	LS	$20,000	1	$20,000	
3.2	Hazardous Materials Abatement	LS	$50,000	1	$50,000	
3.3	Demolish Wood-Framed House	EA	$5,825	1	$5,825	Means 2015 HC, 02 41 16.13 1000
3.4	Demolish Concrete Block Buildings	CF	$0.51	200,000	$102,000	Means 2015 HC, 02 41 16.13 0050
3.5	Demolish Concrete Slabs	SF	$1.10	30,000	$33,000	Means 2015 HC, 02 41 16.17 0420
3.6	Reuse/Disposal of Demolition Debris	CY	$19.25	3,000	$57,750	Means 2015 HC, 02 41 16.17 4250
	Subtotal				**$233,589**	
4.0	**Excavate Fill and Transport to Disposal Facility**					
4.1	Excavate Contaminated Soil	CY	$2.48	4,000	$9,920	Means 2015 HC, 31 23 16.42 0200
4.2	Haul Contaminated Soil to Disposal Facility	TON	$75.00	6,000	$450,000	Means 2015 HC, 31 23 23.20 1478
4.3	Hazardous Waste Landfill Disposal	TON	$300.00	6,000	$1,800,000	
4.4	Watering with 3,000 gallon Tank truck, per Pass	ACRE	$84.63	260	$22,004	Means 2005 ER, 18 05 0413, cost adjusted to 2016
4.5	Perimeter Air Sampling	EA	$300.00	40	$12,000	
	Subtotal				**$2,293,924**	
5.0	**Regrading and Placement of Soil Cover**					
5.1	Regrading of Site/Berms	LS	$31,500	1	$31,500	Means 2015 HC, 31 22 13.20 0280
5.2	Place 12" Drainage Layer	CY	$23.50	20,370	$478,704	Means 2015 HC, 31 23 23.15 5080
5.3	Compact 12" Drainage Layer	CY	$0.48	20,370	$9,778	Means 2015 HC, 31 23 23.23 5000
5.4	Place Geofabric Defining Layer	SY	$3.68	61,111	$224,889	Means 2005 ER, 33 08 0535, cost adjusted to 2016
5.5	Place 6" Gravel Layer	CY	$14.55	10,185	$148,194	Means 2015 HC, 31 23 23.15 6050
5.6	Asphalt Pavement, 4" thick	SY	$20.60	20,370	$419,630	Means 2015 HC, 32 12 16.13 0120 & 0380
5.7	Furnish, Place, and Spread Topsoil (6")	CY	$28.00	6,790	$190,123	Means 2015 HC, 31 23 23.15 7080
5.8	Hydroseeding with Mulch and Fertilizer	MSF	$68.00	550	$37,400	Means 2015 HC, 32 92 19.14 5400
	Subtotal				**$1,540,218**	
TOTAL DIRECT COSTS					**$4,129,372**	

Table A-6
Alternative 3A Cost Estimate - Capital Costs
Excavation and Off-Site Disposal of Soils (100 mg/kg PCBs and UCL Exceedances), Construction of Permeable Soil Cover
Former Tombarello Site TBA
Lawrence, Massachusetts

	DESCRIPTION	UNIT	UNIT COST [1]	QUANTITY	TOTAL COST	SOURCE (cost - base year)
6.0	**Other Costs**					
6.1	Engineering and Design (6% direct costs)				$247,762	OSWER 9355.0-75
6.2	Construction management (6% of direct costs)				$247,762	OSWER 9355.0-75
6.3	Location Adjustment (15.3%)				$631,794	Means 2015 HC
6.4	Contingency (20%)				$825,874	OSWER 9355.0-75
6.5	Deed Restriction Transactional Fees				$50,000	
TOTAL OTHER COSTS					**$2,003,193**	
TOTAL CAPITAL COST FOR ALTERNATIVE					**$6,132,565**	

Notes:
1. Assume no fill material required to be placed prior to cap/cover construction.
2. A conversion factor of 1.5 was used to convert CY to TON.

LS = lump sum
HR = hour
EA = each
MSF = thousand square feet
SF = square feet
LF = linear foot
CY = cubic yard
SY = square yard
Actual volumes may vary during implementation based upon the final extent of excavation.
There would be no impacts to floodplains or wetlands.

Table A-7
Alternative 3B Cost Estimate - Capital Costs
Excavation and Off-Site Disposal of Soils (100 mg/kg PCBs), Construction of Engineered Barrier
Former Tombarello Site TBA
Lawrence, Massachusetts

	DESCRIPTION	UNIT	UNIT COST [1]	QUANTITY	TOTAL COST	SOURCE (cost - base year)
1.0	**Mobilization/Demobilization**					
1.1	Equipment Mobilization/Demobilization	LS	$6,877	1	$6,877	
1.2	Field Support Facilities	LS	$5,000	1	$5,000	
	Subtotal				**$11,877**	
2.0	**Site Preparation/Restoration**					
2.1	Clear and Grub (cut and chip light trees to 6" diameter)	ACRE	$4,775	3	$14,325	Means 2015 HC, 31 11 10.10 0020
2.2	Clear and Grub (grub stumps and remove)	ACRE	$2,125	3	$6,375	Means 2015 HC, 31 11 10.10 0150
2.3	Prepare Soil Stockpile Areas (rough grading 10,000 SF)	LS	$1,375	2	$2,750	Means 2015 HC, 31 22 13.20 0170
2.4	Prepare Soil Stockpile Areas (place geotextile)	SY	$2.46	2,222	$5,466	Means 2015 HC, 31 32 19.16 1500
2.5	Install Erosion and Sedimentation Controls	LF	$13.56	800	$10,848	Means 2015 HC, 31 25 14.16 1000 & 1250
2.6	Prepare Construction Entrance	LS	$4,000	1	$4,000	
2.7	Prepare Equipment Decontamination Area	LS	$6,000	1	$6,000	
	Subtotal				**$49,764**	
3.0	**Demolish Existing Structures**					
3.1	Hazardous Materials Inspection	LS	$20,000	1	$20,000	
3.2	Hazardous Materials Abatement	LS	$50,000	1	$50,000	
3.3	Demolish Wood-Framed House	EA	$5,825	1	$5,825	Means 2015 HC, 02 41 16.13 1000
3.4	Demolish Concrete Block Buildings	CF	$0.51	200,000	$102,000	Means 2015 HC, 02 41 16.13 0050
3.5	Demolish Concrete Slabs	SF	$1.10	30,000	$33,000	Means 2015 HC, 02 41 16.17 0420
3.6	Reuse/Disposal of Demolition Debris	CY	$19.25	3,000	$57,750	Means 2015 HC, 02 41 16.17 4250
	Subtotal				**$233,589**	
4.0	**Excavate Fill and Transport to Disposal Facility**					
4.1	Excavate Contaminated Soil	CY	$2.48	2,000	$4,960	Means 2015 HC, 31 23 16.42 0200
4.2	Haul Contaminated Soil to Disposal Facility	TON	$75.00	3,000	$225,000	Means 2015 HC, 31 23 23.20 1478
4.3	Hazardous Waste Landfill Disposal	TON	$300.00	3,000	$900,000	
4.4	Watering with 3,000 gallon Tank truck, per Pass	ACRE	$84.63	260	$22,004	Means 2005 ER, 18 05 0413, cost adjusted to 2016
4.5	Perimeter Air Sampling	EA	$300.00	20	$6,000	
	Subtotal				**$1,157,964**	
5.0	**Regrading and Cap Construction**					
5.1	Regrading of Site/Berms	LS	$31,500	1	$31,500	Means 2015 HC, 31 22 13.20 0280
5.2	Place 12" Low Conductivity Layer	CY	$14.55	20,370	$296,389	Means 2015 HC, 31 23 23.15 6050
5.3	Compact 12" Low Conductivity Layer	CY	$0.77	20,370	$15,685	Means 2015 HC, 31 23 23.23 5040
5.4	Place 60 mil Flexible Membrane Liner	SF	$3.27	550,000	$1,796,922	Means 2005 ER, 33 08 0572, cost adjusted to 2016
5.5	Place 12" Drainage Layer	CY	$23.50	20,370	$478,704	Means 2015 HC, 31 23 23.15 5080
5.6	Compact 12" Drainage Layer	CY	$0.48	20,370	$9,778	Means 2015 HC, 31 23 23.23 5000
5.7	Place Geofabric Defining Layer	SY	$3.68	61,111	$224,720	Means 2005 ER, 33 08 0535, cost adjusted to 2016
5.8	Place 6" Gravel Layer	CY	$14.55	10,185	$148,194	Means 2015 HC, 31 23 23.15 6050
5.9	Furnish, Place, and Spread Topsoil (6")	CY	$28.00	10,185	$285,185	Means 2015 HC, 31 23 23.15 7080
5.10	Hydroseeding with Mulch and Fertilizer	MSF	$68.00	550	$37,400	Means 2015 HC, 32 92 19.14 5400
	Subtotal				**$3,324,476**	
TOTAL DIRECT COSTS					**$4,777,670**	

Table A-7
Alternative 3B Cost Estimate - Capital Costs
Excavation and Off-Site Disposal of Soils (100 mg/kg PCBs), Construction of Engineered Barrier
Former Tombarello Site TBA
Lawrence, Massachusetts

	DESCRIPTION	UNIT	UNIT COST [1]	QUANTITY	TOTAL COST	SOURCE (cost - base year)
6.0	**Other Costs**					
6.1	Engineering and Design (6% direct costs)				$286,660	OSWER 9355.0-75
6.2	Construction management (6% of direct costs)				$286,660	OSWER 9355.0-75
6.3	Location Adjustment (15.3%)				$730,984	Means 2015 HC
6.4	Contingency (20%)				$955,534	OSWER 9355.0-75
6.5	Deed Restriction Transactional Fees				$50,000	
TOTAL OTHER COSTS					**$2,309,838**	
TOTAL CAPITAL COST FOR ALTERNATIVE					**$7,087,508**	

Notes:
1. Assume no fill material required to be placed prior to cap/cover construction.
2. A conversion factor of 1.5 was used to convert CY to TON.

LS = lump sum
HR = hour
EA = each
MSF = thousand square feet
SF = square feet
LF = linear foot
CY = cubic yard
SY = square yard
Actual volumes may vary during implementation based upon the final extent of excavation.
There would be no impacts to floodplains or wetlands.

Table A-8
Alternative 3C Cost Estimate - Capital Costs
Excavation and Off-Site Disposal of Soils (100 mg/kg PCBs), Construction of Permeable Soil Cover
Former Tombarello Site TBA
Lawrence, Massachusetts

	DESCRIPTION	UNIT	UNIT COST [1]	QUANTITY	TOTAL COST	SOURCE (cost - base year)
1.0	**Mobilization/Demobilization**					
1.1	Equipment Mobilization/Demobilization	LS	$6,877	1	$6,877	
1.2	Field Support Facilities	LS	$5,000	1	$5,000	
	Subtotal				**$11,877**	
2.0	**Site Preparation/Restoration**					
2.1	Clear and Grub (cut and chip light trees to 6" diameter)	ACRE	$4,775	3	$14,325	Means 2015 HC, 31 11 10.10 0020
2.2	Clear and Grub (grub stumps and remove)	ACRE	$2,125	3	$6,375	Means 2015 HC, 31 11 10.10 0150
2.3	Prepare Soil Stockpile Areas (rough grading 10,000 SF)	LS	$1,375	2	$2,750	Means 2015 HC, 31 22 13.20 0170
2.4	Prepare Soil Stockpile Areas (place geotextile)	SY	$2.46	2,222	$5,466	Means 2015 HC, 31 32 19.16 1500
2.5	Install Erosion and Sedimentation Controls	LF	$13.56	800	$10,848	Means 2015 HC, 31 25 14.16 1000 & 1250
2.6	Prepare Construction Entrance	LS	$4,000	1	$4,000	
2.7	Prepare Equipment Decontamination Area	LS	$6,000	1	$6,000	
	Subtotal				**$49,764**	
3.0	**Demolish Existing Structures**					
3.1	Hazardous Materials Inspection	LS	$20,000	1	$20,000	
3.2	Hazardous Materials Abatement	LS	$50,000	1	$50,000	
3.3	Demolish Wood-Framed House	EA	$5,825	1	$5,825	Means 2015 HC, 02 41 16.13 1000
3.4	Demolish Concrete Block Buildings	CF	$0.51	200,000	$102,000	Means 2015 HC, 02 41 16.13 0050
3.5	Demolish Concrete Slabs	SF	$1.10	30,000	$33,000	Means 2015 HC, 02 41 16.17 0420
3.6	Reuse/Disposal of Demolition Debris	CY	$19.25	3,000	$57,750	Means 2015 HC, 02 41 16.17 4250
	Subtotal				**$233,589**	
4.0	**Excavate Fill and Transport to Disposal Facility**					
4.1	Excavate Contaminated Soil	CY	$2.48	2,000	$4,960	Means 2015 HC, 31 23 16.42 0200
4.2	Haul Contaminated Soil to Disposal Facility	TON	$75.00	3,000	$225,000	Means 2015 HC, 31 23 23.20 1478
4.3	Hazardous Waste Landfill Disposal	TON	$300.00	3,000	$900,000	
4.4	Watering with 3,000 gallon Tank truck, per Pass	ACRE	$84.63	260	$22,004	Means 2005 ER, 18 05 0413, cost adjusted to 2016
4.5	Perimeter Air Sampling	EA	$300.00	20	$6,000	
	Subtotal				**$1,157,964**	
5.0	**Regrading and Cap Construction**					
5.1	Regrading of Site/Berms	LS	$31,500	1	$31,500	Means 2015 HC, 31 22 13.20 0280
5.2	Place 12" Drainage Layer	CY	$23.50	20,370	$478,704	Means 2015 HC, 31 23 23.15 5080
5.3	Compact 12" Drainage Layer	CY	$0.48	20,370	$9,778	Means 2015 HC, 31 23 23.23 5000
5.4	Place Geofabric Defining Layer	SY	$3.68	61,111	$224,889	Means 2005 ER, 33 08 0535, cost adjusted to 2016
5.5	Place 6" Gravel Layer	CY	$14.55	10,185	$148,194	Means 2015 HC, 31 23 23.15 6050
5.6	Asphalt Pavement, 4" thick	SY	$20.60	20,370	$419,630	Means 2015 HC, 32 12 16.13 0120 & 0380
5.7	Furnish, Place, and Spread Topsoil (6")	CY	$28.00	6,790	$190,123	Means 2015 HC, 31 23 23.15 7080
5.8	Hydroseeding with Mulch and Fertilizer	MSF	$68.00	550	$37,400	Means 2015 HC, 32 92 19.14 5400
	Subtotal				**$1,540,218**	
TOTAL DIRECT COSTS					**$2,993,412**	

Table A-8
Alternative 3C Cost Estimate - Capital Costs
Excavation and Off-Site Disposal of Soils (100 mg/kg PCBs), Construction of Permeable Soil Cover
Former Tombarello Site TBA
Lawrence, Massachusetts

	DESCRIPTION	UNIT	UNIT COST [1]	QUANTITY	TOTAL COST	SOURCE (cost - base year)
6.0	**Other Costs**					
6.1	Engineering and Design (6% direct costs)				$179,605	OSWER 9355.0-75
6.2	Construction management (6% of direct costs)				$179,605	OSWER 9355.0-75
6.3	Location Adjustment (15.3%)				$457,992	Means 2015 HC
6.4	Contingency (20%)				$598,682	OSWER 9355.0-75
6.5	Deed Restriction Transactional Fees				$50,000	
TOTAL OTHER COSTS					**$1,465,884**	
TOTAL CAPITAL COST FOR ALTERNATIVE					**$4,459,296**	

Notes:
1. Assume no fill material required to be placed prior to cap/cover construction.
2. A conversion factor of 1.5 was used to convert CY to TON.

LS = lump sum
HR = hour
EA = each
MSF = thousand square feet
SF = square feet
LF = linear foot
CY = cubic yard
SY = square yard
Actual volumes may vary during implementation based upon the final extent of excavation.
There would be no impacts to floodplains or wetlands.

APPENDIX B

BORING LOG

Nobis — Engineering a Sustainable Future

Project: Former Tombarello Facility TBA

Location: 207 Marston Street, Lawrence, MA

Nobis Project No.: 80108.04

Boring No.: **BPA-01**

Boring Location: See Site Plan

Checked by: E. Johnson

Date Start: June 7, 2016

Date Finish: June 7, 2016

Contractor: Technical Drilling Services

Driller: T. Newton

Nobis Rep.: E. Johnson

Rig Type / Model: Geoprobe 6620DT

Hammer Type: N/A

Hammer Hoist: N/A

Ground Surface Elev.:

Datum:

	Drilling Method	Sampler
Type	Geoprobe	Macro-Core Liners
Size ID (in.)		1.75 x 60
Advancement	Direct Push	Push

Groundwater Observations

Date	Time	Depth Below Ground (ft.)	Depth of Casing (ft.)	Depth to Bottom of Hole (ft.)	Stabilization Time

Depth (ft.)	Sample Info: Type & No.	Rec (in.)	Depth (ft.)	Blows/ 6 in.	PID (ppm)	Ground Water	Lithology: Graphic	Stratum Elev. / Depth (ft.)	Sample Description and Remarks (Classification System: Modified Burmister)	Notes
1								CONCRETE / 1.0	12" Concrete.	
2	S-1	8	1-2		4.7			FILL	S-1: Brown to gray, medium to coarse SAND, little Gravel, little concrete fragments. dry. Slight odor.	
3	S-2	18	2-3		3.5			/ 3.0	S-2: Gray to black, fine to coarse SAND, some concrete fragments, little Gravel, trace brick fragments, trace metal. dry.	
4									Boring terminated at 3 feet.	
5										
6										
7										
8										
9										
10										

Soil	Percentage	Non-Soil
trace	5 - 10	very few
little	10 - 20	few
some	20 - 35	several
and	35 - 50	numerous

NOTES:

Soil descriptions are based on visual classifications and should be considered approximate. Stratification lines are approximate boundaries between stratums; transitions may be gradual.

BORING LOG

Nobis — Engineering a Sustainable Future

Project: Former Tombarello Facility TBA

Location: 207 Marston Street, Lawrence, MA

Nobis Project No.: 80108.04

Boring No.: **BPA-02 / MW-11**

Boring Location: See Site Plan

Checked by: E. Johnson

Date Start: June 7, 2016

Date Finish: June 7, 2016

Contractor: Technical Drilling Services

Driller: T. Newton

Nobis Rep.: E. Johnson

Rig Type / Model: Geoprobe 6620DT

Hammer Type: N/A

Hammer Hoist: N/A

Ground Surface Elev.:

Datum:

	Drilling Method	Sampler
Type	Geoprobe	Macro-Core Liners
Size ID (in.)		1.75 x 60
Advancement	Direct Push	Push

Groundwater Observations

Date	Time	Depth Below Ground (ft.)	Depth of Casing (ft.)	Depth to Bottom of Hole (ft.)	Stabilization Time

Depth (ft.)	SAMPLE INFORMATION Type & No.	Rec (in.)	Depth (ft.)	Blows/ 6 in.	PID (ppm)	Ground Water	LITHOLOGY Graphic	Stratum Elev. / Depth (ft.)	SAMPLE DESCRIPTION AND REMARKS (Classification System: Modified Burmister)
1									Dark gray to brown, fine to medium SAND, little Gravel, trace glass, trace slag, trace metal fragments. moist.
2	S-1	11	1-2		4.0				S-1: Dark brown to black, medium to coarse SAND, little Gravel, little Asphalt, trace brick fragments. moist. Slight petroleum odor.
3	S-2	13	2-3		25.8			FILL	S-2: Gray to black, fine to medium SAND, little Gravel, some brick fragments, little coal, trace glass. Petroleum odor.
4	S-3	60	3-8		0.0				S-3A (18"): Black to dark brown, fine SAND and Silt, little medium Sand, trace brick fragments. dry.
5								/ 4.5	S-3B (42"): Grayish tan, fine SAND, some Silt. moist. Sample becomes wet at approximately 6.5 ft bgs.
6									
7								SILTY SAND	
8								/ 8.0	
9	S-4	60	8-13						S-4: Tan, fine SAND, little Silt, trace medium Sand. wet.
10								SAND	

WELL DETAIL: Riser; Bentonite; Sand; Screen

NOTES

Soil	Percentage	Non-Soil
trace	5 - 10	very few
little	10 - 20	few
some	20 - 35	several
and	35 - 50	numerous

NOTES:

Soil descriptions are based on visual classifications and should be considered approximate. Stratification lines are approximate boundaries between stratums; transitions may be gradual.

BORING LOG

Nobis — Engineering a Sustainable Future

Project: Former Tombarello Facility TBA

Location: 207 Marston Street, Lawrence, MA

Nobis Project No.: 80108.04

Boring No.: **BPA-02 / MW-11**

Boring Location: See Site Plan

Checked by: E. Johnson

Date Start: June 7, 2016

Date Finish: June 7, 2016

Contractor: Technical Drilling Services

Driller: T. Newton

Nobis Rep.: E. Johnson

Rig Type / Model: Geoprobe 6620DT

Hammer Type: N/A

Hammer Hoist: N/A

Ground Surface Elev.:

Datum:

	Drilling Method	Sampler
Type	Geoprobe	Macro-Core Liners
Size ID (in.)		1.75 x 60
Advancement	Direct Push	Push

Groundwater Observations

Date	Time	Depth Below Ground (ft.)	Depth of Casing (ft.)	Depth to Bottom of Hole (ft.)	Stabilization Time

Depth (ft.)	SAMPLE INFORMATION: Type & No.	Rec (in.)	Depth (ft.)	Blows/ 6 in.	PID (ppm)	Ground Water	LITHOLOGY: Graphic	Stratum Elev. / Depth (ft.)	SAMPLE DESCRIPTION AND REMARKS (Classification System: Modified Burmister)	WELL DETAIL	NOTES
11								SAND			
12											
13									Boring terminated at 13 feet.		
14											
15											
16											
17											
18											
19											
20											

Soil	Percentage	Non-Soil
trace	5 - 10	very few
little	10 - 20	few
some	20 - 35	several
and	35 - 50	numerous

NOTES:

Soil descriptions are based on visual classifications and should be considered approximate. Stratification lines are approximate boundaries between stratums; transitions may be gradual.

BORING LOG

Nobis — Engineering a Sustainable Future

Project: Former Tombarello Facility TBA

Location: 207 Marston Street, Lawrence, MA

Nobis Project No.: 80108.04

Boring No.: **CD-34**

Boring Location: See Site Plan

Checked by: E. Johnson

Date Start: June 6, 2016

Date Finish: June 6, 2016

Contractor: Technical Drilling Services

Driller: T. Newton

Nobis Rep.: E. Johnson

Rig Type / Model: Geoprobe 6620DT

Hammer Type: N/A

Hammer Hoist: N/A

Ground Surface Elev.:

Datum:

	Drilling Method	Sampler
Type	Geoprobe	Macro-Core Liners
Size ID (in.)		1.75 x 60
Advancement	Direct Push	Push

Groundwater Observations

Date	Time	Depth Below Ground (ft.)	Depth of Casing (ft.)	Depth to Bottom of Hole (ft.)	Stabilization Time
▽ 06/06/16	09:45	4.5		9	

Depth (ft.)	Type & No.	Rec (in.)	Depth (ft.)	Blows/ 6 in.	PID (ppm)	Ground Water	Graphic	Stratum Elev. / Depth (ft.)	SAMPLE DESCRIPTION AND REMARKS (Classification System: Modified Burmister)	NOTES
1	S-1	32	0-3		1.7			/ 0.2 ASPHALT	S-1A (2"): Asphalt. S-1B (30"): Dark gray/black and brown, fine to medium SAND, some coarse Gravel. dry.	
2										
3					0.3			FILL		
4	S-2	6	3-4						S-2: Gray to brown, fine to medium SAND, some fine Gravel, trace metal fragments. dry.	
5	S-3	38	4-9		0.7	▽		/ 4.8	S-3A (8"): Black, fine to medium SAND, some fine Gravel, little Wood, trace metal fragments. moist. S-3B (30"): Olive brown, fine SAND, trace Silt. wet.	
6										
7								SAND		
8										
9										
10									Boring terminated at 9 feet.	

Soil	Percentage	Non-Soil
trace	5 - 10	very few
little	10 - 20	few
some	20 - 35	several
and	35 - 50	numerous

NOTES:

1) S-1 Sample collected at 940 (PCBs)
2) S-3 Sample collected at 945 (PCBs)

Soil descriptions are based on visual classifications and should be considered approximate. Stratification lines are approximate boundaries between stratums; transitions may be gradual.

BORING LOG

Nobis — Engineering a Sustainable Future

Project: Former Tombarello Facility TBA

Location: 207 Marston Street, Lawrence, MA

Nobis Project No.: 80108.04

Boring No.: **CD-34E**

Boring Location: See Site Plan

Checked by: E. Johnson

Date Start: June 6, 2016

Date Finish: June 6, 2016

Contractor: Technical Drilling Services

Driller: T. Newton

Nobis Rep.: E. Johnson

Rig Type / Model: Geoprobe 6620DT

Hammer Type: N/A

Hammer Hoist: N/A

Ground Surface Elev.:

Datum:

	Drilling Method	Sampler
Type	Geoprobe	Macro-Core Liners
Size ID (in.)		1.75 x 60
Advancement	Direct Push	Push

Groundwater Observations

Date	Time	Depth Below Ground (ft.)	Depth of Casing (ft.)	Depth to Bottom of Hole (ft.)	Stabilization Time

Depth (ft.)	SAMPLE INFORMATION Type & No.	Rec (in.)	Depth (ft.)	Blows/ 6 in.	PID (ppm)	Ground Water	LITHOLOGY Graphic	Stratum Elev. / Depth (ft.)	SAMPLE DESCRIPTION AND REMARKS (Classification System: Modified Burmister)	NOTES
1	S-1	12	0-1		0.4				S-1: Dark brown/black, fine to coarse SAND and Gravel. moist.	
2	S-2	18	1-3		0.4			FILL	S-2: Gray to dark brown/black, fine to coarse SAND, some Gravel, little brick, ash fragments observed at 2 feet bgs. dry.	
3								/ 3.0		
4									Boring terminated at 3 feet.	
5										
6										
7										
8										
9										
10										

Soil	Percentage	Non-Soil
trace	5 - 10	very few
little	10 - 20	few
some	20 - 35	several
and	35 - 50	numerous

NOTES:

1) S-1 Sample collected at 905 (PCBs)
2) S-2 Sample collected at 910 (PCBs & PAHs)

Soil descriptions are based on visual classifications and should be considered approximate. Stratification lines are approximate boundaries between stratums; transitions may be gradual.

BORING LOG

Nobis — Engineering a Sustainable Future

Project: Former Tombarello Facility TBA

Location: 207 Marston Street, Lawrence, MA

Nobis Project No.: 80108.04

Boring No.: **CD-34N**

Boring Location: See Site Plan

Checked by: E. Johnson

Date Start: June 6, 2016

Date Finish: June 6, 2016

Contractor: Technical Drilling Services

Driller: T. Newton

Nobis Rep.: E. Johnson

Rig Type / Model: Geoprobe 6620DT

Hammer Type: N/A

Hammer Hoist: N/A

Ground Surface Elev.:

Datum:

	Drilling Method	Sampler
Type	Geoprobe	Macro-Core Liners
Size ID (in.)		1.75 x 60
Advancement	Direct Push	Push

Groundwater Observations

Date	Time	Depth Below Ground (ft.)	Depth of Casing (ft.)	Depth to Bottom of Hole (ft.)	Stabilization Time

Depth (ft.)	Sample Info: Type & No.	Rec (in.)	Depth (ft.)	Blows/ 6 in.	PID (ppm)	Ground Water	Lithology: Graphic	Lithology: Stratum Elev. / Depth (ft.)	Sample Description and Remarks (Classification System: Modified Burmister)	Notes
1	S-1	9	0-1		0			/ 0.2 ASPHALT	S-1A (2"): Asphalt. S-1B (7"): Dark brown/black, medium to coarse SAND and Gravel. dry.	
2	S-2	16	1-3		0.6			FILL	S-2: Dark brown/black, medium to coarse SAND and Gravel. little coal, little ash. dry.	
3								/ 3.0		
4									Boring terminated at 3 feet.	
5										
6										
7										
8										
9										
10										

Soil	Percentage	Non-Soil
trace	5 - 10	very few
little	10 - 20	few
some	20 - 35	several
and	35 - 50	numerous

NOTES:

1) S-1 Sample collected at 915 (PCBs)
2) S-2 Sample collected at 920 (PCBs & Metals)

Soil descriptions are based on visual classifications and should be considered approximate. Stratification lines are approximate boundaries between stratums; transitions may be gradual.

BORING LOG

Nobis — Engineering a Sustainable Future

Project: Former Tombarello Facility TBA

Location: 207 Marston Street, Lawrence, MA

Nobis Project No.: 80108.04

Boring No.: **CD-34S**

Boring Location: See Site Plan

Checked by: E. Johnson

Date Start: June 6, 2016

Date Finish: June 6, 2016

Contractor: Technical Drilling Services

Driller: T. Newton

Nobis Rep.: E. Johnson

Rig Type / Model: Geoprobe 6620DT

Hammer Type: N/A

Hammer Hoist: N/A

Ground Surface Elev.:

Datum:

	Drilling Method	Sampler
Type	Geoprobe	Macro-Core Liners
Size ID (in.)		1.75 x 60
Advancement	Direct Push	Push

Groundwater Observations

Date	Time	Depth Below Ground (ft.)	Depth of Casing (ft.)	Depth to Bottom of Hole (ft.)	Stabilization Time

Depth (ft.)	Sample Info: Type & No.	Rec (in.)	Depth (ft.)	Blows/ 6 in.	PID (ppm)	Ground Water	Lithology: Graphic	Lithology: Stratum Elev. / Depth (ft.)	Sample Description and Remarks (Classification System: Modified Burmister)	Notes
1	S-1	11	0-1		0			/ 0.2 ASPHALT	2" Asphalt at surface. S-1: Dark gray, fine to coarse SAND and Gravel. dry.	
2	S-2	18	1-3		0.1			FILL	S-2: Dark gray to black, fine to medium SAND, some Gravel. dry.	
3								/ 3.0		
4									Boring terminated at 3 feet.	
5										
6										
7										
8										
9										
10										

Soil	Percentage	Non-Soil
trace	5 - 10	very few
little	10 - 20	few
some	20 - 35	several
and	35 - 50	numerous

NOTES:

1) S-1 Sample collected at 930 (PCBs)
2) S-2 Sample collected at 935 (PCBs)
3) FD-01 Collected for S-2

Soil descriptions are based on visual classifications and should be considered approximate. Stratification lines are approximate boundaries between stratums; transitions may be gradual.

BORING LOG

Nobis — Engineering a Sustainable Future

Project: Former Tombarello Facility TBA

Location: 207 Marston Street, Lawrence, MA

Nobis Project No.: 80108.04

Boring No.: **CD-34W**

Boring Location: See Site Plan

Checked by: E. Johnson

Date Start: June 6, 2016

Date Finish: June 6, 2016

Contractor: Technical Drilling Services

Driller: T. Newton

Nobis Rep.: E. Johnson

Rig Type / Model: Geoprobe 6620DT

Hammer Type: N/A

Hammer Hoist: N/A

Ground Surface Elev.:

Datum:

	Drilling Method	Sampler
Type	Geoprobe	Macro-Core Liners
Size ID (in.)		1.75 x 60
Advancement	Direct Push	Push

Groundwater Observations

Date	Time	Depth Below Ground (ft.)	Depth of Casing (ft.)	Depth to Bottom of Hole (ft.)	Stabilization Time

Depth (ft.)	Sample Info: Type & No.	Rec (in.)	Depth (ft.)	Blows/ 6 in.	PID (ppm)	Ground Water	Lithology: Graphic	Lithology: Stratum Elev. / Depth (ft.)	Sample Description and Remarks (Classification System: Modified Burmister)	Notes
	S-1	10	0-1		0.9			/ 0.2 ASPHALT	S-1A (2"): Asphalt. S-1B (10"): Black, GRAVEL, some fine to coarse Sand. dry.	
1										
2	S-2	20	1-3		6.6			FILL	S-2: Black, fine SAND, little medium to coarse Sand, little Gravel, trace brick, trace ash. No odor. dry.	
3								/ 3.0		
4									Boring terminated at 3 feet.	
5										
6										
7										
8										
9										
10										

Soil	Percentage	Non-Soil
trace	5 - 10	very few
little	10 - 20	few
some	20 - 35	several
and	35 - 50	numerous

NOTES:

1) S-1 Sample collected at 925 (PCBs & PAHs)
2) S-2 Sample collected at 930 (PCBs)
3) MS/MSD Sample collected for S-2

Soil descriptions are based on visual classifications and should be considered approximate. Stratification lines are approximate boundaries between stratums; transitions may be gradual.

BORING LOG

Nobis — Engineering a Sustainable Future

Project:	Former Tombarello Facility TBA
Location:	207 Marston Street, Lawrence, MA
Nobis Project No.:	80108.04
Boring No.:	CD-45
Boring Location:	See Site Plan
Checked by:	
Date Start:	June 6, 2016
Date Finish:	June 6, 2016
Contractor:	Technical Drilling Services
Driller:	T. Newton
Nobis Rep.:	E. Johnson
Rig Type / Model:	Geoprobe 6620DT
Hammer Type:	N/A
Hammer Hoist:	N/A
Ground Surface Elev.:	
Datum:	

	Drilling Method	Sampler
Type	Geoprobe	Macro-Core Liners
Size ID (in.)		1.75 x 60
Advancement	Direct Push	Push

Groundwater Observations

Date	Time	Depth Below Ground (ft.)	Depth of Casing (ft.)	Depth to Bottom of Hole (ft.)	Stabilization Time

Depth (ft.)	SAMPLE INFORMATION Type & No.	Rec (in.)	Depth (ft.)	Blows/ 6 in.	PID (ppm)	Ground Water	LITHOLOGY Graphic	Stratum Elev. / Depth (ft.)	SAMPLE DESCRIPTION AND REMARKS (Classification System: Modified Burmister)	NOTES
	S-1	28	0-3		0.2			/ 0.2 ASPHALT	Asphalt at surface. S-1: Dark gray, fine to coarse SAND, some Gravel. dry.	
1										
2										
3								FILL		
	S-2	12	3-4		0.2				S-2A (6"): Tan to black, fine to medium SAND. moist.	
4									S-2B (6"): Black, fine to medium SAND, some Silt, some Wood. moist.	
	S-3	46	4-9		0.2				S-3A (15"): Black, fine to medium SAND, trace Gravel. moist. Old gasoline odor noted.	
5										
6								/ 5.5	S-3B (31"): Olive brown, fine SAND, trace Silt. moist. Old petroleum odor noted.	
7								SAND		
8										
9									Boring terminated at 9 feet.	
10										

Soil	Percentage	Non-Soil
trace	5 - 10	very few
little	10 - 20	few
some	20 - 35	several
and	35 - 50	numerous

NOTES:
1) S-2 Sample collected at 1030 (PCBs & Metals)
2) S-3 Sample collected at 1035 (PCBs & Metals)
3) MS/MSD Collected for S-3

Soil descriptions are based on visual classifications and should be considered approximate. Stratification lines are approximate boundaries between stratums; transitions may be gradual.

BORING LOG

Nobis — Engineering a Sustainable Future

Project: Former Tombarello Facility TBA

Location: 207 Marston Street, Lawrence, MA

Nobis Project No.: 80108.04

Boring No.: **CD-45E**

Boring Location: See Site Plan

Checked by:

Date Start: June 6, 2016

Date Finish: June 6, 2016

Contractor: Technical Drilling Services

Driller: T. Newton

Nobis Rep.: E. Johnson

Rig Type / Model: Geoprobe 6620DT

Hammer Type: N/A

Hammer Hoist: N/A

Ground Surface Elev.:

Datum:

	Drilling Method	Sampler
Type	Geoprobe	Macro-Core Liners
Size ID (in.)		1.75 x 60
Advancement	Direct Push	Push

Groundwater Observations

Date	Time	Depth Below Ground (ft.)	Depth of Casing (ft.)	Depth to Bottom of Hole (ft.)	Stabilization Time

Depth (ft.)	SAMPLE INFORMATION: Type & No.	Rec (in.)	Depth (ft.)	Blows/ 6 in.	PID (ppm)	Ground Water	LITHOLOGY: Graphic	Stratum Elev. / Depth (ft.)	SAMPLE DESCRIPTION AND REMARKS (Classification System: Modified Burmister)	NOTES
1	S-1	10	0-1		0				S-1: Dark brown/black, fine to coarse SAND, some Gravel. moist.	
2	S-2	10	1-3		0.1			BRICK FRAGMENTS AND SAND	S-2: Black, medium to coarse SAND and brick fragments, little Gravel, trace metal fragments. moist.	
3								/ 3.0		
4									Boring terminated at 3 feet.	
5										
6										
7										
8										
9										
10										

Soil	Percentage	Non-Soil
trace	5 - 10	very few
little	10 - 20	few
some	20 - 35	several
and	35 - 50	numerous

NOTES:

1) S-1 Sample collected at 1000 (PCBs & PAHs)
2) S-2 Sample collected at 1002 (PCBs & Metals)

Soil descriptions are based on visual classifications and should be considered approximate. Stratification lines are approximate boundaries between stratums; transitions may be gradual.

BORING LOG

Nobis — Engineering a Sustainable Future

Project: Former Tombarello Facility TBA

Location: 207 Marston Street, Lawrence, MA

Nobis Project No.: 80108.04

Boring No.: **CD-45N**

Boring Location: See Site Plan

Checked by:

Date Start: June 6, 2016

Date Finish: June 6, 2016

Contractor: Technical Drilling Services

Driller: T. Newton

Nobis Rep.: E. Johnson

Rig Type / Model: Geoprobe 6620DT

Hammer Type: N/A

Hammer Hoist: N/A

Ground Surface Elev.:

Datum:

	Drilling Method	Sampler
Type	Geoprobe	Macro-Core Liners
Size ID (in.)		1.75 x 60
Advancement	Direct Push	Push

Groundwater Observations

Date	Time	Depth Below Ground (ft.)	Depth of Casing (ft.)	Depth to Bottom of Hole (ft.)	Stabilization Time

Depth (ft.)	SAMPLE INFORMATION Type & No.	Rec (in.)	Depth (ft.)	Blows/ 6 in.	PID (ppm)	Ground Water	LITHOLOGY Graphic	Stratum Elev. / Depth (ft.)	SAMPLE DESCRIPTION AND REMARKS (Classification System: Modified Burmister)	NOTES
1	S-1	12	0-1		1.8				S-1: Dark brown, fine to medium SAND, some Gravel. dry.	
2	S-2	20	1-3		0.5			FILL	S-2: Black, medium to coarse SAND, some Gravel, trace glass fragments, trace coal fragments. dry.	
3								/ 3.0		
4									Boring terminated at 3 feet.	
5										
6										
7										
8										
9										
10										

Soil	Percentage	Non-Soil
trace	5 - 10	very few
little	10 - 20	few
some	20 - 35	several
and	35 - 50	numerous

NOTES:

1) S-1 Sample collected at 1050 (PCBs & PAHs)
2) S-2 Sample collected at 1055 (PCBs & PAHs)

Soil descriptions are based on visual classifications and should be considered approximate. Stratification lines are approximate boundaries between stratums; transitions may be gradual.

BORING LOG

Nobis — Engineering a Sustainable Future

Project: Former Tombarello Facility TBA

Location: 207 Marston Street, Lawrence, MA

Nobis Project No.: 80108.04

Boring No.: **CD-45S**

Boring Location: See Site Plan

Checked by:

Date Start: June 6, 2016

Date Finish: June 6, 2016

Contractor: Technical Drilling Services

Driller: T. Newton

Nobis Rep.: E. Johnson

Rig Type / Model: Geoprobe 6620DT

Hammer Type: N/A

Hammer Hoist: N/A

Ground Surface Elev.:

Datum:

	Drilling Method	Sampler
Type	Geoprobe	Macro-Core Liners
Size ID (in.)		1.75 x 60
Advancement	Direct Push	Push

Groundwater Observations

Date	Time	Depth Below Ground (ft.)	Depth of Casing (ft.)	Depth to Bottom of Hole (ft.)	Stabilization Time

Depth (ft.)	SAMPLE INFORMATION: Type & No.	Rec (in.)	Depth (ft.)	Blows/ 6 in.	PID (ppm)	Ground Water	LITHOLOGY: Graphic	Stratum Elev. / Depth (ft.)	SAMPLE DESCRIPTION AND REMARKS (Classification System: Modified Burmister)	NOTES
1	S-1	12	0-1		0.1			/ 0.2 ASPHALT	Asphalt at surface. S-1: Tan to black, fine to coarse SAND and fine Gravel. dry.	
2	S-2	20	1-3		3.7			FILL	S-2: Black, fine to coarse SAND, some Gravel, little metal fragments, little glass fragments. moist.	
3								/ 3.0		
4									Boring terminated at 3 feet.	
5										
6										
7										
8										
9										
10										

Soil	Percentage	Non-Soil
trace	5 - 10	very few
little	10 - 20	few
some	20 - 35	several
and	35 - 50	numerous

NOTES:

1) S-1 Sample collected at 1010 (PCBs)
2) S-2 Sample collected at 1015 (PCBs & Metals)
3) FD-02 Collected for S-2

Soil descriptions are based on visual classifications and should be considered approximate. Stratification lines are approximate boundaries between stratums; transitions may be gradual.

BORING LOG

Nobis — Engineering a Sustainable Future

Project: Former Tombarello Facility TBA

Location: 207 Marston Street, Lawrence, MA

Nobis Project No.: 80108.04

Boring No.: **CD-45W**

Boring Location: See Site Plan

Checked by:

Date Start: June 6, 2016

Date Finish: June 6, 2016

Contractor: Technical Drilling Services

Driller: T. Newton

Nobis Rep.: E. Johnson

Rig Type / Model: Geoprobe 6620DT

Hammer Type: N/A

Hammer Hoist: N/A

Ground Surface Elev.:

Datum:

	Drilling Method	Sampler
Type	Geoprobe	Macro-Core Liners
Size ID (in.)		1.75 x 60
Advancement	Direct Push	Push

Groundwater Observations

Date	Time	Depth Below Ground (ft.)	Depth of Casing (ft.)	Depth to Bottom of Hole (ft.)	Stabilization Time

Depth (ft.)	SAMPLE INFORMATION: Type & No.	Rec (in.)	Depth (ft.)	Blows/ 6 in.	PID (ppm)	Ground Water	LITHOLOGY: Graphic	Stratum Elev. / Depth (ft.)	SAMPLE DESCRIPTION AND REMARKS (Classification System: Modified Burmister)	NOTES
1	S-1	10	0-1		0.1				S-1: Brown, fine to medium SAND, some Gravel. dry.	
2	S-2	16	1-3		1.1			FILL	S-2: Dark brown/black, fine to coarse SAND, some Gravel, trace glass fragments. moist.	
3								/ 3.0		
4									Boring terminated at 3 feet.	
5										
6										
7										
8										
9										
10										

Soil	Percentage	Non-Soil
trace	5 - 10	very few
little	10 - 20	few
some	20 - 35	several
and	35 - 50	numerous

NOTES:

1) S-1 Sample collected at 1020 (PCBs)
2) S-2 Sample collected at 1025 (PCBs & PAHs)

Soil descriptions are based on visual classifications and should be considered approximate. Stratification lines are approximate boundaries between stratums; transitions may be gradual.

BORING LOG

Nobis — Engineering a Sustainable Future

Project: Former Tombarello Facility TBA

Location: 207 Marston Street, Lawrence, MA

Nobis Project No.: 80108.04

Boring No.: **D-5**

Boring Location: See Site Plan

Checked by:

Date Start: June 6, 2016

Date Finish: June 6, 2016

Contractor: Technical Drilling Services

Driller: T. Newton

Nobis Rep.: E. Johnson

Rig Type / Model: Geoprobe 6620DT

Hammer Type: N/A

Hammer Hoist: N/A

Ground Surface Elev.:

Datum:

	Drilling Method	Sampler
Type	Geoprobe	Macro-Core Liners
Size ID (in.)		1.75 x 60
Advancement	Direct Push	Push

Groundwater Observations

Date	Time	Depth Below Ground (ft.)	Depth of Casing (ft.)	Depth to Bottom of Hole (ft.)	Stabilization Time

Depth (ft.)	SAMPLE INFORMATION: Type & No.	Rec (in.)	Depth (ft.)	Blows/ 6 in.	PID (ppm)	Ground Water	LITHOLOGY: Graphic	Stratum Elev. / Depth (ft.)	SAMPLE DESCRIPTION AND REMARKS (Classification System: Modified Burmister)	NOTES
1	S-1	22	0-2		0.1				S-1: Tan to brown, fine to medium SAND, little brick.. Concrete fragments in top 6" of sample. Little organic fragments at the surface.	
2								FILL		
3	S-2	10	2-3		0.1				S-2: Tan to brown, fine to medium SAND, trace fine Gravel, trace brick fragments.	
4	S-3	50	3-8		0.1				S-3A (14"): Brown to olive brown, fine to medium SAND.	
5									S-3B (36"): Olive brown, fine SAND. moist. Iron banding noted. Wet at approximately 5'.	
6								SAND		
7										
8								/ 8.0		
9									Boring terminated at 8 feet.	
10										

Soil	Percentage	Non-Soil
trace	5 - 10	very few
little	10 - 20	few
some	20 - 35	several
and	35 - 50	numerous

NOTES:

1) S-1 Sample collected at 1205 (PCBs)
2) S-2 Sample collected at 1210 (PCBs)
3) S-3 Sample collected at 1215 (PCBs)

Soil descriptions are based on visual classifications and should be considered approximate. Stratification lines are approximate boundaries between stratums; transitions may be gradual.

BORING LOG

Nobis — Engineering a Sustainable Future

Project: Former Tombarello Facility TBA

Location: 207 Marston Street, Lawrence, MA

Nobis Project No.: 80108.04

Boring No.: **D-5E**

Boring Location: See Site Plan

Checked by:

Date Start: June 6, 2016

Date Finish: June 6, 2016

Contractor: Technical Drilling Services

Driller: T. Newton

Nobis Rep.: E. Johnson

Rig Type / Model: Geoprobe 6620DT

Hammer Type: N/A

Hammer Hoist: N/A

Ground Surface Elev.:

Datum:

	Drilling Method	Sampler
Type	Geoprobe	Macro-Core Liners
Size ID (in.)		1.75 x 60
Advancement	Direct Push	Push

Groundwater Observations

Date	Time	Depth Below Ground (ft.)	Depth of Casing (ft.)	Depth to Bottom of Hole (ft.)	Stabilization Time

Depth (ft.)	SAMPLE INFORMATION: Type & No.	Rec (in.)	Depth (ft.)	Blows/ 6 in.	PID (ppm)	Ground Water	LITHOLOGY: Graphic	Stratum Elev. / Depth (ft.)	SAMPLE DESCRIPTION AND REMARKS (Classification System: Modified Burmister)	NOTES
1	S-1	12	0-1		0.1				S-1: Dark brown, fine to coarse SAND, some Gravel, trace Silt, trace Organics. dry.	
2	S-2	21	1-3		0.3			FILL	S-2: Gray to dark gray, fine to medium SAND, little Gravel, little glass, little concrete, little brick fragments. dry.	
3								/ 3.0		
4									Boring terminated at 3 feet.	
5										
6										
7										
8										
9										
10										

Soil	Percentage	Non-Soil
trace	5 - 10	very few
little	10 - 20	few
some	20 - 35	several
and	35 - 50	numerous

NOTES:

1) S-1 Sample collected at 1150 (PCBs)
2) S-2 Sample collected at 1155 (PCBs & Metals)

Soil descriptions are based on visual classifications and should be considered approximate. Stratification lines are approximate boundaries between stratums; transitions may be gradual.

BORING LOG

Nobis — Engineering a Sustainable Future

Project: Former Tombarello Facility TBA

Location: 207 Marston Street, Lawrence, MA

Nobis Project No.: 80108.04

Boring No.: **D-5N**

Boring Location: See Site Plan

Checked by:

Date Start: June 6, 2016

Date Finish: June 6, 2016

Contractor: Technical Drilling Services

Driller: T. Newton

Nobis Rep.: E. Johnson

Rig Type / Model: Geoprobe 6620DT

Hammer Type: N/A

Hammer Hoist: N/A

Ground Surface Elev.:

Datum:

	Drilling Method	Sampler
Type	Geoprobe	Macro-Core Liners
Size ID (in.)		1.75 x 60
Advancement	Direct Push	Push

Groundwater Observations

Date	Time	Depth Below Ground (ft.)	Depth of Casing (ft.)	Depth to Bottom of Hole (ft.)	Stabilization Time

Depth (ft.)	SAMPLE INFORMATION Type & No.	Rec (in.)	Depth (ft.)	Blows/ 6 in.	PID (ppm)	Ground Water	LITHOLOGY Graphic	Stratum Elev. / Depth (ft.)	SAMPLE DESCRIPTION AND REMARKS (Classification System: Modified Burmister)	NOTES
1	S-1	8	0-1		0.1				S-1: Dark brown, fine to coarse SAND, some Gravel. dry.	
2	S-2	16	1-3		0.4			FILL	S-2: Black, fine to coarse SAND and Gravel. fine some concrete fragments, trace brick. No odor. dry.	
3								/ 3.0		
4									Boring terminated at 3 feet.	
5										
6										
7										
8										
9										
10										

Soil	Percentage	Non-Soil
trace	5 - 10	very few
little	10 - 20	few
some	20 - 35	several
and	35 - 50	numerous

NOTES:

1) S-1 Sample collected at 1140 (PCBs & Metals)
2) S-2 Sample collected at 1145 (PCBs)

Soil descriptions are based on visual classifications and should be considered approximate. Stratification lines are approximate boundaries between stratums; transitions may be gradual.

BORING LOG

Nobis — Engineering a Sustainable Future

Project: Former Tombarello Facility TBA

Location: 207 Marston Street, Lawrence, MA

Nobis Project No.: 80108.04

Boring No.: **FB-01 / MW-13**

Boring Location: See Site Plan

Checked by:

Date Start: June 6, 2016

Date Finish: June 6, 2016

Contractor: Technical Drilling Services

Driller: T. Newton

Nobis Rep.: E. Johnson

Rig Type / Model: Geoprobe 6620DT

Hammer Type: N/A

Hammer Hoist: N/A

Ground Surface Elev.:

Datum:

	Drilling Method	Sampler
Type	Geoprobe	Macro-Core Liners
Size ID (in.)		1.75 x 60
Advancement	Direct Push	Push

Groundwater Observations

Date	Time	Depth Below Ground (ft.)	Depth of Casing (ft.)	Depth to Bottom of Hole (ft.)	Stabilization Time

Depth (ft.)	Sample Info: Type & No.	Rec (in.)	Depth (ft.)	Blows/ 6 in.	PID (ppm)	Ground Water	Lithology: Graphic	Lithology: Stratum Elev. / Depth (ft.)	Sample Description and Remarks (Classification System: Modified Burmister)	Well Detail	Notes
1								/ 0.2 ASPHALT	Asphalt.		
								SAND			
2	S-1	10	1-2		0.8				S-1A (8"): Tan, fine SAND.		
									S-1B (2"): Brown to dark brown, fine SAND and Silt, trace coal. dry.	Riser / Bentonite	
3	S-2	12	2-3		0.7				S-2: Brown, fine to medium SAND and Silt, trace Gravel. dry.		
4	S-3	48	3-8					FILL	S-3A (12"): Brown, fine to medium SAND and Silt, trace Gravel. dry.		
5									S-3B (20"): Dark brown, fine to medium SAND, little Silt, little Gravel, little ash, little coal, little brick. dry.		
6					0.8			/ 5.5			
7									S-3C (16"): Brown, fine SAND, little Silt. wet. Sample becomes wet at approximately 6 ft bgs.		
8								SAND		Sand	
9	S-4	60	8-13						S-4: Brown to olive brown, fine to coarse SAND, trace Silt, trace Gravel. wet. No odor. Black, ashen band observed at approximately 8.5 ft bgs.	Screen	
								/ 9.0			
10											

Soil	Percentage	Non-Soil
trace	5 - 10	very few
little	10 - 20	few
some	20 - 35	several
and	35 - 50	numerous

NOTES:

Soil descriptions are based on visual classifications and should be considered approximate. Stratification lines are approximate boundaries between stratums; transitions may be gradual.

BORING LOG

Nobis — Engineering a Sustainable Future

Project: Former Tombarello Facility TBA

Location: 207 Marston Street, Lawrence, MA

Nobis Project No.: 80108.04

Boring No.: **FB-01 / MW-13**

Boring Location: See Site Plan

Checked by:

Date Start: June 6, 2016

Date Finish: June 6, 2016

Contractor: Technical Drilling Services

Driller: T. Newton

Nobis Rep.: E. Johnson

Rig Type / Model: Geoprobe 6620DT

Hammer Type: N/A

Hammer Hoist: N/A

Ground Surface Elev.:

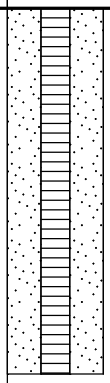
Datum:

	Drilling Method	Sampler
Type	Geoprobe	Macro-Core Liners
Size ID (in.)		1.75 x 60
Advancement	Direct Push	Push

Groundwater Observations

Date	Time	Depth Below Ground (ft.)	Depth of Casing (ft.)	Depth to Bottom of Hole (ft.)	Stabilization Time

Depth (ft.)	SAMPLE INFORMATION: Type & No.	Rec (in.)	Depth (ft.)	Blows/ 6 in.	PID (ppm)	Ground Water	LITHOLOGY: Graphic	Stratum Elev. / Depth (ft.)	SAMPLE DESCRIPTION AND REMARKS (Classification System: Modified Burmister)	WELL DETAIL	NOTES
11					0.7						
12											
13									Boring terminated at 13 feet.		
14											
15											
16											
17											
18											
19											
20											



Soil	Percentage	Non-Soil
trace	5 - 10	very few
little	10 - 20	few
some	20 - 35	several
and	35 - 50	numerous

NOTES:

Soil descriptions are based on visual classifications and should be considered approximate. Stratification lines are approximate boundaries between stratums; transitions may be gradual.

BORING LOG

Nobis — Engineering a Sustainable Future

Project: Former Tombarello Facility TBA

Location: 207 Marston Street, Lawrence, MA

Nobis Project No.: 80108.04

Boring No.: **FB-02**

Boring Location: See Site Plan

Checked by:

Date Start: June 7, 2016

Date Finish: June 7, 2016

Contractor: Technical Drilling Services

Driller: T. Newton

Nobis Rep.: E. Johnson

Rig Type / Model: Geoprobe 6620DT

Hammer Type: N/A

Hammer Hoist: N/A

Ground Surface Elev.:

Datum:

	Drilling Method	Sampler
Type	Geoprobe	Macro-Core Liners
Size ID (in.)		1.75 x 60
Advancement	Direct Push	Push

Groundwater Observations

Date	Time	Depth Below Ground (ft.)	Depth of Casing (ft.)	Depth to Bottom of Hole (ft.)	Stabilization Time

Depth (ft.)	SAMPLE INFORMATION Type & No.	Rec (in.)	Depth (ft.)	Blows/ 6 in.	PID (ppm)	Ground Water	LITHOLOGY Graphic	Stratum Elev. / Depth (ft.)	SAMPLE DESCRIPTION AND REMARKS (Classification System: Modified Burmister)	NOTES
								ASPHALT / 0.5	Asphalt 0-6".	
1								CONCRETE / 1.0	Concrete 6-10".	
	S-1	10	1-2		1.8				S-1: Dark gray, GRAVEL, some fine to coarse Sand, some concrete fragments.	
2								FILL		
	S-2	7	2-3		0.2				S-2: Dark brown, medium to coarse SAND, some Gravel, little concrete fragments, trace asphalt. Sample becomes wet at approximately 2.5 ft bgs.	
3								/ 3.0		
									Boring terminated at 3 feet.	
4										
5										
6										
7										
8										
9										
10										

Soil	Percentage	Non-Soil
trace	5 - 10	very few
little	10 - 20	few
some	20 - 35	several
and	35 - 50	numerous

NOTES:

1) Drilled three times to collect suffient volume.

Soil descriptions are based on visual classifications and should be considered approximate. Stratification lines are approximate boundaries between stratums; transitions may be gradual.

BORING LOG

Nobis — Engineering a Sustainable Future

Project: Former Tombarello Facility TBA

Location: 207 Marston Street, Lawrence, MA

Nobis Project No.: 80108.04

Boring No.: **FB-03**

Boring Location: See Site Plan

Checked by:

Date Start: June 6, 2016

Date Finish: June 6, 2016

Contractor: Technical Drilling Services

Driller: T. Newton

Nobis Rep.: E. Johnson

Rig Type / Model: Geoprobe 6620DT

Hammer Type: N/A

Hammer Hoist: N/A

Ground Surface Elev.:

Datum:

	Drilling Method	Sampler
Type	Geoprobe	Macro-Core Liners
Size ID (in.)		1.75 x 60
Advancement	Direct Push	Push

Groundwater Observations

Date	Time	Depth Below Ground (ft.)	Depth of Casing (ft.)	Depth to Bottom of Hole (ft.)	Stabilization Time

Depth (ft.)	SAMPLE INFORMATION Type & No.	Rec (in.)	Depth (ft.)	Blows/ 6 in.	PID (ppm)	Ground Water	LITHOLOGY Graphic	Stratum Elev. / Depth (ft.)	SAMPLE DESCRIPTION AND REMARKS (Classification System: Modified Burmister)	NOTES
								ASPHALT / 0.3	3" Asphalt.	
1										
	S-1	12	1-2		0.1				S-1: Dark brown to brown, fine SAND. dry.	
2								FILL		
	S-2	11	2-3		0.1				S-2: Dark grayish brown, fine to coarse SAND, little Gravel, little concrete fragments. dry.	
3								/ 3.0		
									Boring terminated at 3 feet.	
4										
5										
6										
7										
8										
9										
10										

Soil	Percentage	Non-Soil
trace	5 - 10	very few
little	10 - 20	few
some	20 - 35	several
and	35 - 50	numerous

NOTES:

Soil descriptions are based on visual classifications and should be considered approximate. Stratification lines are approximate boundaries between stratums; transitions may be gradual.

BORING LOG

Nobis — Engineering a Sustainable Future

Project: Former Tombarello Facility TBA

Location: 207 Marston Street, Lawrence, MA

Nobis Project No.: 80108.04

Boring No.: **FB-04 / MW-12**

Boring Location: See Site Plan

Checked by:

Date Start: June 6, 2016

Date Finish: June 6, 2016

Contractor: Technical Drilling Services

Driller: T. Newton

Nobis Rep.: E. Johnson

Rig Type / Model: Geoprobe 6620DT

Hammer Type: N/A

Hammer Hoist: N/A

Ground Surface Elev.:

Datum:

	Drilling Method	Sampler
Type	Geoprobe	Macro-Core Liners
Size ID (in.)		1.75 x 60
Advancement	Direct Push	Push

Groundwater Observations

Date	Time	Depth Below Ground (ft.)	Depth of Casing (ft.)	Depth to Bottom of Hole (ft.)	Stabilization Time

Depth (ft.)	SAMPLE INFORMATION Type & No.	Rec (in.)	Depth (ft.)	Blows/ 6 in.	PID (ppm)	Ground Water	LITHOLOGY Graphic	Stratum Elev. / Depth (ft.)	SAMPLE DESCRIPTION AND REMARKS (Classification System: Modified Burmister)	WELL DETAIL	NOTES
1								CONCRETE / 0.3	3" Concrete.		
2	S-1	10	1-2		0.7				S-1: Brown, fine to coarse SAND, some Gravel.	Riser, Bentonite	
3	S-2	12	2-3		0.3			FILL	S-2: Brownish gray, fine to coarse SAND and Gravel. dry. No odor noted.		
4	S-3	40	3-8						S-3: Brown to dark brown, fine to medium SAND, little Silt, little Gravel, trace brick fragments. dry. Coal and bricks observed from 3-5 ft bgs. Sample becomes wet at approximately 6 ft bgs.		
5								/ 5.0			
6					0.7						
7								SAND		Sand	
8										Screen	
9	S-4	54	8-13						S-4: Olive gray to tan, fine SAND, little medium Sand, some Silt. wet.		
10											

Soil	Percentage	Non-Soil
trace	5 - 10	very few
little	10 - 20	few
some	20 - 35	several
and	35 - 50	numerous

NOTES:

Soil descriptions are based on visual classifications and should be considered approximate. Stratification lines are approximate boundaries between stratums; transitions may be gradual.

BORING LOG

Nobis — Engineering a Sustainable Future

Project: Former Tombarello Facility TBA

Location: 207 Marston Street, Lawrence, MA

Nobis Project No.: 80108.04

Boring No.: **FB-04 / MW-12**

Boring Location: See Site Plan

Checked by:

Date Start: June 6, 2016

Date Finish: June 6, 2016

Contractor: Technical Drilling Services

Driller: T. Newton

Nobis Rep.: E. Johnson

Rig Type / Model: Geoprobe 6620DT

Hammer Type: N/A

Hammer Hoist: N/A

Ground Surface Elev.:

Datum:

	Drilling Method	Sampler
Type	Geoprobe	Macro-Core Liners
Size ID (in.)		1.75 x 60
Advancement	Direct Push	Push

Groundwater Observations

Date	Time	Depth Below Ground (ft.)	Depth of Casing (ft.)	Depth to Bottom of Hole (ft.)	Stabilization Time

Depth (ft.)	SAMPLE INFORMATION: Type & No.	Rec (in.)	Depth (ft.)	Blows/ 6 in.	PID (ppm)	Ground Water	LITHOLOGY: Graphic	Stratum Elev. / Depth (ft.)	SAMPLE DESCRIPTION AND REMARKS (Classification System: Modified Burmister)	WELL DETAIL	NOTES
11					0.7			SAND			
12											
13								/ 13.0			
14									Boring terminated at 13 feet.		
15											
16											
17											
18											
19											
20											

Soil	Percentage	Non-Soil
trace	5 - 10	very few
little	10 - 20	few
some	20 - 35	several
and	35 - 50	numerous

NOTES:

Soil descriptions are based on visual classifications and should be considered approximate. Stratification lines are approximate boundaries between stratums; transitions may be gradual.

BORING LOG

Nobis — Engineering a Sustainable Future

Project: Former Tombarello Facility TBA

Location: 207 Marston Street, Lawrence, MA

Nobis Project No.: 80108.04

Boring No.: **FG-34**

Boring Location: See Site Plan

Checked by:

Date Start: June 7, 2016

Date Finish: June 7, 2016

Contractor: Technical Drilling Services

Driller: T. Newton

Nobis Rep.: E. Johnson

Rig Type / Model: Geoprobe 6620DT

Hammer Type: N/A

Hammer Hoist: N/A

Ground Surface Elev.:

Datum:

	Drilling Method	Sampler
Type	Geoprobe	Macro-Core Liners
Size ID (in.)		1.75 x 60
Advancement	Direct Push	Push

Groundwater Observations

Date	Time	Depth Below Ground (ft.)	Depth of Casing (ft.)	Depth to Bottom of Hole (ft.)	Stabilization Time

Depth (ft.)	SAMPLE INFORMATION: Type & No.	Rec (in.)	Depth (ft.)	Blows/ 6 in.	PID (ppm)	Ground Water	LITHOLOGY: Graphic	Stratum Elev. / Depth (ft.)	SAMPLE DESCRIPTION AND REMARKS (Classification System: Modified Burmister)	NOTES
1	S-1	11	0-1		0.1			FILL	S-1: Brown to black, fine to coarse SAND, little Gravel, little glass fragments, trace brick, trace coal, trace metal, trace ash. dry.	
2	S-2	17	1-3		0			/ 2.0	S-2A (9"): Black/red, fine to medium SAND, little Gravel, little brick, trace metal fragments. dry. S-2B (8"): Olive brown, fine SAND. moist.	
3								SAND / 3.0		
4									Boring terminated at 3 feet.	
5										
6										
7										
8										
9										
10										

Soil	Percentage	Non-Soil
trace	5 - 10	very few
little	10 - 20	few
some	20 - 35	several
and	35 - 50	numerous

NOTES:

1) S-1 Sample collected at 1425 (PCBs & PAHs)
2) S-2 Sample collected at 1430 (PCBs)

Soil descriptions are based on visual classifications and should be considered approximate. Stratification lines are approximate boundaries between stratums; transitions may be gradual.

BORING LOG

Nobis — Engineering a Sustainable Future

Project: Former Tombarello Facility TBA

Location: 207 Marston Street, Lawrence, MA

Nobis Project No.: 80108.04

Boring No.: **FG-34N**

Boring Location: See Site Plan

Checked by:

Date Start: June 7, 2016

Date Finish: June 7, 2016

Contractor: Technical Drilling Services

Driller: T. Newton

Nobis Rep.: E. Johnson

Rig Type / Model: Geoprobe 6620DT

Hammer Type: N/A

Hammer Hoist: N/A

Ground Surface Elev.:

Datum:

	Drilling Method	Sampler
Type	Geoprobe	Macro-Core Liners
Size ID (in.)		1.75 x 60
Advancement	Direct Push	Push

Groundwater Observations

Date	Time	Depth Below Ground (ft.)	Depth of Casing (ft.)	Depth to Bottom of Hole (ft.)	Stabilization Time

Depth (ft.)	SAMPLE INFORMATION: Type & No.	Rec (in.)	Depth (ft.)	Blows/ 6 in.	PID (ppm)	Ground Water	LITHOLOGY: Graphic	Stratum Elev. / Depth (ft.)	SAMPLE DESCRIPTION AND REMARKS (Classification System: Modified Burmister)	NOTES
1	S-1	6	0-1		0				S-1: Gray to brown, fine to coarse SAND, little Gravel, little Silt, trace organics, trace coal, trace metal fragments. dry.	
2	S-2	18	1-3		0			FILL	S-2A (4"): Black, fine to coarse SAND, some Gravel, trace brick, trace glass fragments. moist. S-2B (10"): Brown, fine SAND and Silt. moist.	
3								/ 3.0	S-2C (4"): Black/brown, fine to medium SAND, little Silt. moist.	
4									Boring terminated at 3 feet.	
5										
6										
7										
8										
9										
10										

Soil	Percentage	Non-Soil
trace	5 - 10	very few
little	10 - 20	few
some	20 - 35	several
and	35 - 50	numerous

NOTES:

1) S-1 Sample collected at 1345 (PCBs)
2) S-2 Sample collected at 1350 (PCBs & PAHs)

Soil descriptions are based on visual classifications and should be considered approximate. Stratification lines are approximate boundaries between stratums; transitions may be gradual.

BORING LOG

Nobis — Engineering a Sustainable Future

Project: Former Tombarello Facility TBA

Location: 207 Marston Street, Lawrence, MA

Nobis Project No.: 80108.04

Boring No.: **FG-34S**

Boring Location: See Site Plan

Checked by:

Date Start: June 7, 2016

Date Finish: June 7, 2016

Contractor: Technical Drilling Services

Driller: T. Newton

Nobis Rep.: E. Johnson

Rig Type / Model: Geoprobe 6620DT

Hammer Type: N/A

Hammer Hoist: N/A

Ground Surface Elev.:

Datum:

	Drilling Method	Sampler
Type	Geoprobe	Macro-Core Liners
Size ID (in.)		1.75 x 60
Advancement	Direct Push	Push

Groundwater Observations

Date	Time	Depth Below Ground (ft.)	Depth of Casing (ft.)	Depth to Bottom of Hole (ft.)	Stabilization Time

Depth (ft.)	SAMPLE INFORMATION: Type & No.	Rec (in.)	Depth (ft.)	Blows/ 6 in.	PID (ppm)	Ground Water	LITHOLOGY: Graphic	Stratum Elev. / Depth (ft.)	SAMPLE DESCRIPTION AND REMARKS (Classification System: Modified Burmister)	NOTES
1	S-1	13	0-1		0			/ 0.2 ORGANICS	S-1A (2"): Organics. S-1B (11"): Brown to black, fine to coarse SAND, some Gravel, trace brick, trace glass fragments, trace slag. dry.	
2	S-2	21	1-3		0			FILL / 1.8	S-2A (9"): Black/rusty red and white, fine to medium SAND, little Gravel, little brick fragments, trace ash.	
3								SAND / 3.0	S-2B (12"): Brown, fine SAND, trace Silt.	
4									Boring terminated at 3 feet.	
5										
6										
7										
8										
9										
10										

Soil	Percentage	Non-Soil
trace	5 - 10	very few
little	10 - 20	few
some	20 - 35	several
and	35 - 50	numerous

NOTES:

1) S-1 Sample collected at 1435 (PCBs & Metals)
2) S-2 Sample collected at 1440 (PCBs)

Soil descriptions are based on visual classifications and should be considered approximate. Stratification lines are approximate boundaries between stratums; transitions may be gradual.

BORING LOG

Nobis — Engineering a Sustainable Future

Project: Former Tombarello Facility TBA

Location: 207 Marston Street, Lawrence, MA

Nobis Project No.: 80108.04

Boring No.: **FG-34W**

Boring Location: See Site Plan

Checked by:

Date Start: June 7, 2016

Date Finish: June 7, 2016

Contractor: Technical Drilling Services

Driller: T. Newton

Nobis Rep.: E. Johnson

Rig Type / Model: Geoprobe 6620DT

Hammer Type: N/A

Hammer Hoist: N/A

Ground Surface Elev.:

Datum:

	Drilling Method	Sampler
Type	Geoprobe	Macro-Core Liners
Size ID (in.)		1.75 x 60
Advancement	Direct Push	Push

Groundwater Observations

Date	Time	Depth Below Ground (ft.)	Depth of Casing (ft.)	Depth to Bottom of Hole (ft.)	Stabilization Time

Depth (ft.)	SAMPLE INFORMATION: Type & No.	Rec (in.)	Depth (ft.)	Blows/ 6 in.	PID (ppm)	Ground Water	LITHOLOGY: Graphic	Stratum Elev. / Depth (ft.)	SAMPLE DESCRIPTION AND REMARKS (Classification System: Modified Burmister)	NOTES
1	S-1	12	0-1		0				S-1: Olive brown to brown, fine SAND and Silt, some Gravel, some ash, trace organics.	
2	S-2	16	1-3		0			FILL	S-2: Brown/dark brown and black, fine to medium SAND, some Silt, little Gravel, trace brick, trace metal fragments, trace glass fragments.	
3								/ 3.0		
4									Boring terminated at 3 feet.	
5										
6										
7										
8										
9										
10										

Soil	Percentage	Non-Soil
trace	5 - 10	very few
little	10 - 20	few
some	20 - 35	several
and	35 - 50	numerous

NOTES:

1) S-1 Sample collected at 1355 (PCBs)
2) S-2 Sample collected at 1400 (PCBs & Metals)

Soil descriptions are based on visual classifications and should be considered approximate. Stratification lines are approximate boundaries between stratums; transitions may be gradual.

BORING LOG

Nobis — Engineering a Sustainable Future

Project: Former Tombarello Facility TBA

Location: 207 Marston Street, Lawrence, MA

Nobis Project No.: 80108.04

Boring No.: **FG-45E**

Boring Location: See Site Plan

Checked by:

Date Start: June 8, 2016

Date Finish: June 8, 2016

Contractor: Technical Drilling Services

Driller: T. Newton

Nobis Rep.: E. Johnson

Rig Type / Model: Geoprobe 6620DT

Hammer Type: N/A

Hammer Hoist: N/A

Ground Surface Elev.:

Datum:

	Drilling Method	Sampler
Type	Geoprobe	Macro-Core Liners
Size ID (in.)		1.75 x 60
Advancement	Direct Push	Push

Groundwater Observations

Date	Time	Depth Below Ground (ft.)	Depth of Casing (ft.)	Depth to Bottom of Hole (ft.)	Stabilization Time

Depth (ft.)	SAMPLE INFORMATION: Type & No.	Rec (in.)	Depth (ft.)	Blows/ 6 in.	PID (ppm)	Ground Water	LITHOLOGY: Graphic	Stratum Elev. / Depth (ft.)	SAMPLE DESCRIPTION AND REMARKS (Classification System: Modified Burmister)	NOTES
1	S-1	12	0-1		3.6			FILL / 1.0	S-1: Brown to black, fine to coarse SAND, some Gravel, little brick, little coal, trace concrete, trace organics. Slight petroleum odor. dry.	
2	S-2	19	1-3		0.3			SAND / 3.0	S-2: Dark brown to brown, fine SAND, trace Silt. dry. Top 1" collapse from above.	
3										
4									Boring terminated at 3 feet.	
5										
6										
7										
8										
9										
10										

Soil	Percentage	Non-Soil
trace	5 - 10	very few
little	10 - 20	few
some	20 - 35	several
and	35 - 50	numerous

NOTES:

1) S-1 Sample collected at 855 (PCBs)
2) S-2 Sample collected at 900 (PCBs & Metals)
3) FD-05 collected

Soil descriptions are based on visual classifications and should be considered approximate. Stratification lines are approximate boundaries between stratums; transitions may be gradual.

BORING LOG

Nobis — Engineering a Sustainable Future

Project: Former Tombarello Facility TBA

Location: 207 Marston Street, Lawrence, MA

Nobis Project No.: 80108.04

Boring No.: **FG-45N**

Boring Location: See Site Plan

Checked by:

Date Start: June 8, 2016

Date Finish: June 8, 2016

Contractor: Technical Drilling Services

Driller: T. Newton

Nobis Rep.: E. Johnson

Rig Type / Model: Geoprobe 6620DT

Hammer Type: N/A

Hammer Hoist: N/A

Ground Surface Elev.:

Datum:

	Drilling Method	Sampler
Type	Geoprobe	Macro-Core Liners
Size ID (in.)		1.75 x 60
Advancement	Direct Push	Push

Groundwater Observations

Date	Time	Depth Below Ground (ft.)	Depth of Casing (ft.)	Depth to Bottom of Hole (ft.)	Stabilization Time

Depth (ft.)	SAMPLE INFORMATION: Type & No.	Rec (in.)	Depth (ft.)	Blows/ 6 in.	PID (ppm)	Ground Water	LITHOLOGY: Graphic	Stratum Elev. / Depth (ft.)	SAMPLE DESCRIPTION AND REMARKS (Classification System: Modified Burmister)	NOTES
1	S-1	6	0-1		0.1			FILL / 1.0	Top 1" Organics. S-1: Brown, fine to coarse SAND, little Gravel, trace brick, trace ceramic, trace ash. dry.	
2	S-2	20	1-3		0.2			SAND	S-2A (2"): Black, fine to coarse SAND, little Gravel, little brick fragments, trace cermanic, trace ash. dry. S-2B (16"): Olive brown, fine SAND, little Silt. dry.	
3								/ 3.0		
4									Boring terminated at 3 feet.	
5										
6										
7										
8										
9										
10										

Soil	Percentage	Non-Soil
trace	5 - 10	very few
little	10 - 20	few
some	20 - 35	several
and	35 - 50	numerous

NOTES:

1) S-1 Sample collected at 815 (PCBs & PAHs)
2) S-2 Sample collected at 820 (PCBs)
3) MSD Sample collected for S-2

Soil descriptions are based on visual classifications and should be considered approximate. Stratification lines are approximate boundaries between stratums; transitions may be gradual.

BORING LOG

Nobis — Engineering a Sustainable Future

Project: Former Tombarello Facility TBA

Location: 207 Marston Street, Lawrence, MA

Nobis Project No.: 80108.04

Boring No.: **FG-45S**

Boring Location: See Site Plan

Checked by:

Date Start: June 8, 2016

Date Finish: June 8, 2016

Contractor: Technical Drilling Services

Driller: T. Newton

Nobis Rep.: E. Johnson

Rig Type / Model: Geoprobe 6620DT

Hammer Type: N/A

Hammer Hoist: N/A

Ground Surface Elev.:

Datum:

	Drilling Method	Sampler
Type	Geoprobe	Macro-Core Liners
Size ID (in.)		1.75 x 60
Advancement	Direct Push	Push

Groundwater Observations

Date	Time	Depth Below Ground (ft.)	Depth of Casing (ft.)	Depth to Bottom of Hole (ft.)	Stabilization Time

Depth (ft.)	SAMPLE INFORMATION: Type & No.	Rec (in.)	Depth (ft.)	Blows/ 6 in.	PID (ppm)	Ground Water	LITHOLOGY: Graphic	Stratum Elev. / Depth (ft.)	SAMPLE DESCRIPTION AND REMARKS (Classification System: Modified Burmister)	NOTES
	S-1	10	0-1		0			/ 0.2 ORGANICS	S-1A (2"): Organics. S-1B (8"): Brown, fine to coarse SAND, little Gravel, trace brick, trace concrete, trace ash. dry.	
1								FILL		
	S-2	22	1-3		0.1			/ 1.5	S-2A (5"): Dark brown to black, fine to medium SAND, trace Gravel, little coal, little slag, little ash, little brick fragments. moist. S-2B (17"): Dark brown to brown, fine SAND, trace Silt. dry.	
2										
3								SAND / 3.0		
4									Boring terminated at 3 feet.	
5										
6										
7										
8										
9										
10										

Soil	Percentage	Non-Soil
trace	5 - 10	very few
little	10 - 20	few
some	20 - 35	several
and	35 - 50	numerous

NOTES:

Soil descriptions are based on visual classifications and should be considered approximate. Stratification lines are approximate boundaries between stratums; transitions may be gradual.

BORING LOG

Nobis — Engineering a Sustainable Future

Project: Former Tombarello Facility TBA

Location: 207 Marston Street, Lawrence, MA

Nobis Project No.: 80108.04

Boring No.: **FG-45W**

Boring Location: See Site Plan

Checked by:

Date Start: June 8, 2016

Date Finish: June 8, 2016

Contractor: Technical Drilling Services

Driller: T. Newton

Nobis Rep.: E. Johnson

Rig Type / Model: Geoprobe 6620DT

Hammer Type: N/A

Hammer Hoist: N/A

Ground Surface Elev.:

Datum:

	Drilling Method	Sampler
Type	Geoprobe	Macro-Core Liners
Size ID (in.)		1.75 x 60
Advancement	Direct Push	Push

Groundwater Observations

Date	Time	Depth Below Ground (ft.)	Depth of Casing (ft.)	Depth to Bottom of Hole (ft.)	Stabilization Time

Depth (ft.)	SAMPLE INFORMATION Type & No.	Rec (in.)	Depth (ft.)	Blows/ 6 in.	PID (ppm)	Ground Water	LITHOLOGY Graphic	Stratum Elev. / Depth (ft.)	SAMPLE DESCRIPTION AND REMARKS (Classification System: Modified Burmister)	NOTES
1	S-1	12	0-1		11.6			FILL	S-1A (2"): Brown, fine SAND and SILT, some Organics. S-1B (10"): Gray to black, fine to coarse SAND, some Gravel, little coal, trace ash. dry. Slight petroleum odor noted.	
2	S-2	21	1-3		0.4			/ 1.8	S-2A (8"): Dark brown, fine to coarse SAND, some brick fragments, little Gravel. dry.	
3								SAMD / 3.0	S-2B (13"): Brown, fine SAND, trace Silt.	
4									Boring terminated at 3 feet.	
5										
6										
7										
8										
9										
10										

Soil	Percentage	Non-Soil
trace	5 - 10	very few
little	10 - 20	few
some	20 - 35	several
and	35 - 50	numerous

NOTES:

Soil descriptions are based on visual classifications and should be considered approximate. Stratification lines are approximate boundaries between stratums; transitions may be gradual.

BORING LOG

Nobis — Engineering a Sustainable Future

Project: Former Tombarello Facility TBA

Location: 207 Marston Street, Lawrence, MA

Nobis Project No.: 80108.04

Boring No.: G-3

Boring Location: See Site Plan

Checked by:

Date Start: June 7, 2016

Date Finish: June 7, 2016

Contractor: Technical Drilling Services

Driller: T. Newton

Nobis Rep.: E. Johnson

Rig Type / Model: Geoprobe 6620DT

Hammer Type: N/A

Hammer Hoist: N/A

Ground Surface Elev.:

Datum:

	Drilling Method	Sampler
Type	Geoprobe	Macro-Core Liners
Size ID (in.)		1.75 x 60
Advancement	Direct Push	Push

Groundwater Observations

Date	Time	Depth Below Ground (ft.)	Depth of Casing (ft.)	Depth to Bottom of Hole (ft.)	Stabilization Time
▽ 06/07/16	11:55	5			

Depth (ft.)	Type & No.	Rec (in.)	Depth (ft.)	Blows/ 6 in.	PID (ppm)	Ground Water	Graphic	Stratum Elev. / Depth (ft.)	SAMPLE DESCRIPTION AND REMARKS (Classification System: Modified Burmister)	NOTES
1	S-1	16	0-2		0			FILL / 1.5	S-1A (7"): Brown/gray, fine to coarse SAND, some Gravel, trace brick, trace organics at surface. S-1B (5"): Black, fine to medium SAND and Silt. dry. S-1C (4"): Brown, fine to medium SAND and Silt. dry.	
2								SAND AND SILT / 2.0		
3	S-2	10	2-3		0				S-2A (3"): Brown, fine to medium SAND and Silt. dry. S-2B (8"): Tan, fine SAND, some Silt. dry.	
4	S-3	44	3-8						S-3: Tan, fine to medium SAND, some Silt. moist. Wet at 5'.	
5						▽		SAND		
6										
7										
8								/ 8.0		
9									Boring terminated at 8 feet.	
10										

Soil	Percentage	Non-Soil
trace	5 - 10	very few
little	10 - 20	few
some	20 - 35	several
and	35 - 50	numerous

NOTES:

1) S-1 Sample collected at 1145 (PCBs)
2) S-2 Sample collected at 1150 (PCBs)
3) S-3 Sample collected at 1155 (PCBs)

Soil descriptions are based on visual classifications and should be considered approximate. Stratification lines are approximate boundaries between stratums; transitions may be gradual.

BORING LOG

Nobis — Engineering a Sustainable Future

Project: Former Tombarello Facility TBA

Location: 207 Marston Street, Lawrence, MA

Nobis Project No.: 80108.04

Boring No.: **G-3E**

Boring Location: See Site Plan

Checked by:

Date Start: June 7, 2016

Date Finish: June 7, 2016

Contractor: Technical Drilling Services

Driller: T. Newton

Nobis Rep.: E. Johnson

Rig Type / Model: Geoprobe 6620DT

Hammer Type: N/A

Hammer Hoist: N/A

Ground Surface Elev.:

Datum:

	Drilling Method	Sampler
Type	Geoprobe	Macro-Core Liners
Size ID (in.)		1.75 x 60
Advancement	Direct Push	Push

Groundwater Observations

Date	Time	Depth Below Ground (ft.)	Depth of Casing (ft.)	Depth to Bottom of Hole (ft.)	Stabilization Time

Depth (ft.)	SAMPLE INFORMATION: Type & No.	Rec (in.)	Depth (ft.)	Blows/ 6 in.	PID (ppm)	Ground Water	LITHOLOGY: Graphic	Stratum Elev. / Depth (ft.)	SAMPLE DESCRIPTION AND REMARKS (Classification System: Modified Burmister)	NOTES
1										
2	S-1	8	1-2		0.1			FILL	S-1: Dark brown to brown, fine to medium SAND, little Gravel, little wood fragments, trace organics.	
3	S-2	6	2-3		0			/ 3.0	S-2: Brown, medium to coarse SAND, some wood fragments, trace Gravel, trace concrete, trace brick. dry.	
4									Boring terminated at 3 feet.	
5										
6										
7										
8										
9										
10										

Soil	Percentage	Non-Soil
trace	5 - 10	very few
little	10 - 20	few
some	20 - 35	several
and	35 - 50	numerous

NOTES:

1) S-1 Sample collected at 1050 (PCBs)
2) S-2 Sample collected at 1055 (PCBs)
3) S-1 modified to (0-2'), minimal recovery on pile at all depths. Clearly debris pile.

Soil descriptions are based on visual classifications and should be considered approximate. Stratification lines are approximate boundaries between stratums; transitions may be gradual.

BORING LOG

Nobis — Engineering a Sustainable Future

Project: Former Tombarello Facility TBA

Location: 207 Marston Street, Lawrence, MA

Nobis Project No.: 80108.04

Boring No.: **G-3N**

Boring Location: See Site Plan

Checked by:

Date Start: June 7, 2016

Date Finish: June 7, 2016

Contractor: Technical Drilling Services

Driller: T. Newton

Nobis Rep.: E. Johnson

Rig Type / Model: Geoprobe 6620DT

Hammer Type: N/A

Hammer Hoist: N/A

Ground Surface Elev.:

Datum:

	Drilling Method	Sampler
Type	Geoprobe	Macro-Core Liners
Size ID (in.)		1.75 x 60
Advancement	Direct Push	Push

Groundwater Observations

Date	Time	Depth Below Ground (ft.)	Depth of Casing (ft.)	Depth to Bottom of Hole (ft.)	Stabilization Time

Depth (ft.)	SAMPLE INFORMATION Type & No.	Rec (in.)	Depth (ft.)	Blows/ 6 in.	PID (ppm)	Ground Water	LITHOLOGY Graphic	Stratum Elev. / Depth (ft.)	SAMPLE DESCRIPTION AND REMARKS (Classification System: Modified Burmister)	NOTES
1	S-1	13	0-2		0				S-1A (6"): Dark brown, fine to coarse SAND, little Gravel, little Organics, trace Silt. moist. S-1B (7"): Brown, medium to coarse SAND, little Gravel. moist.	
2								FILL		
3	S-2	10	2-3		0			/ 3.0	S-2: Gray to tan, fine to coarse SAND, some Gravel, trace coal fragments. moist.	
4									Boring terminated at 3 feet.	
5										
6										
7										
8										
9										
10										

Soil	Percentage	Non-Soil
trace	5 - 10	very few
little	10 - 20	few
some	20 - 35	several
and	35 - 50	numerous

NOTES:

1) S-1 Sample collected at 1125 (PCBs & Metals)
2) S-2 Sample collected at 1130 (PCBs)

Soil descriptions are based on visual classifications and should be considered approximate. Stratification lines are approximate boundaries between stratums; transitions may be gradual.

BORING LOG

Nobis — Engineering a Sustainable Future

Project: Former Tombarello Facility TBA

Location: 207 Marston Street, Lawrence, MA

Nobis Project No.: 80108.04

Boring No.: **G-3S**

Boring Location: See Site Plan

Checked by:

Date Start: June 7, 2016

Date Finish: June 7, 2016

Contractor: Technical Drilling Services

Driller: T. Newton

Nobis Rep.: E. Johnson

Rig Type / Model: Geoprobe 6620DT

Hammer Type: N/A

Hammer Hoist: N/A

Ground Surface Elev.:

Datum:

	Drilling Method	Sampler
Type	Geoprobe	Macro-Core Liners
Size ID (in.)		1.75 x 60
Advancement	Direct Push	Push

Groundwater Observations

Date	Time	Depth Below Ground (ft.)	Depth of Casing (ft.)	Depth to Bottom of Hole (ft.)	Stabilization Time

Depth (ft.)	SAMPLE INFORMATION: Type & No.	Rec (in.)	Depth (ft.)	Blows/ 6 in.	PID (ppm)	Ground Water	LITHOLOGY: Graphic	Stratum Elev. / Depth (ft.)	SAMPLE DESCRIPTION AND REMARKS (Classification System: Modified Burmister)	NOTES
1	S-1	10	0-1		0				S-1: Tan to black, fine to coarse SAND, some Gravel, some glass fragments, trace wood. dry.	
2	S-2	20	1-3		0.1			FILL	S-2A (9"): Mottled brown/dark brown, fine to coarse SAND, trace Silt, trace coal, trace brick, trace glass fragments.	
3								/ 3.0	S-2B (11"): Brown, fine SAND, some Silt, trace white tile.	
4									Boring terminated at 3 feet.	
5										
6										
7										
8										
9										
10										

Soil	Percentage	Non-Soil
trace	5 - 10	very few
little	10 - 20	few
some	20 - 35	several
and	35 - 50	numerous

NOTES:

1) S-1 Sample collected at 1230 (PCBs)
2) S-2 Sample collected at 1235 (PCBs & Metals)

Soil descriptions are based on visual classifications and should be considered approximate. Stratification lines are approximate boundaries between stratums; transitions may be gradual.

BORING LOG

Nobis — Engineering a Sustainable Future

Project: Former Tombarello Facility TBA

Location: 207 Marston Street, Lawrence, MA

Nobis Project No.: 80108.04

Boring No.: **G-3W**

Boring Location: See Site Plan

Checked by:

Date Start: June 7, 2016

Date Finish: June 7, 2016

Contractor: Technical Drilling Services

Driller: T. Newton

Nobis Rep.: E. Johnson

Rig Type / Model: Geoprobe 6620DT

Hammer Type: N/A

Hammer Hoist: N/A

Ground Surface Elev.:

Datum:

	Drilling Method	Sampler
Type	Geoprobe	Macro-Core Liners
Size ID (in.)		1.75 x 60
Advancement	Direct Push	Push

Groundwater Observations

Date	Time	Depth Below Ground (ft.)	Depth of Casing (ft.)	Depth to Bottom of Hole (ft.)	Stabilization Time

Depth (ft.)	SAMPLE INFORMATION Type & No.	Rec (in.)	Depth (ft.)	Blows/ 6 in.	PID (ppm)	Ground Water	LITHOLOGY Graphic	Stratum Elev. / Depth (ft.)	SAMPLE DESCRIPTION AND REMARKS (Classification System: Modified Burmister)	NOTES
1	S-1	18	0-2		0			FILL / 2.0	S-1A: Dark brown, fine to medium SAND, some Silt, trace Gravel, trace Organics, trace brick, trace glass. dry. S-1B: Dark brown to gray, medium to coarse SAND, some Gravel, little brick, little coal. dry.	
2										
3	S-2	12	2-3		0			SAND / 3.0	S-2A: Dark brown to gray, medium to coarse SAND, some Gravel, little brick, little coal. dry. S-2B: Tan, fine SAND, some Silt.	
4									Boring terminated at 3 feet.	
5										
6										
7										
8										
9										
10										

Soil	Percentage	Non-Soil
trace	5 - 10	very few
little	10 - 20	few
some	20 - 35	several
and	35 - 50	numerous

NOTES:

1) S-1 Sample collected at 1135 (PCBs)
2) S-2 Sample collected at 1140 (PCBs)

Soil descriptions are based on visual classifications and should be considered approximate. Stratification lines are approximate boundaries between stratums; transitions may be gradual.

BORING LOG

Nobis — Engineering a Sustainable Future

Project: Former Tombarello Facility TBA

Location: 207 Marston Street, Lawrence, MA

Nobis Project No.: 80108.04

Boring No.: **HA-01**

Boring Location: See Site Plan

Checked by:

Date Start: June 9, 2016

Date Finish: June 9, 2016

Contractor: Nobis

Driller:

Nobis Rep.: E. Johnson

Rig Type / Model:

Hammer Type: N/A

Hammer Hoist: N/A

Ground Surface Elev.:

Datum:

	Drilling Method	Sampler
Type	Hand Auger	N/A
Size ID (in.)		N/A
Advancement	Augered	N/A

Groundwater Observations

Date	Time	Depth Below Ground (ft.)	Depth of Casing (ft.)	Depth to Bottom of Hole (ft.)	Stabilization Time

Depth (ft.)	SAMPLE INFORMATION: Type & No.	Rec (in.)	Depth (ft.)	Blows/ 6 in.	PID (ppm)	Ground Water	LITHOLOGY: Graphic	Stratum Elev. / Depth (ft.)	SAMPLE DESCRIPTION AND REMARKS (Classification System: Modified Burmister)	NOTES
1	S-1		0-1		1.1			FILL / 1.0	S-1 (12"): Very dark brown, SILT and fine Sand, little fine Gravel, little Organics, trace glass fragments.	
2									Boring terminated at 1 feet.	
3										
4										
5										
6										
7										
8										
9										
10										

Soil	Percentage	Non-Soil
trace	5 - 10	very few
little	10 - 20	few
some	20 - 35	several
and	35 - 50	numerous

NOTES:

1) Sample collected at 11:20 for Metals and PCBs. Field duplicate FD-08 collected at 11:25

Soil descriptions are based on visual classifications and should be considered approximate. Stratification lines are approximate boundaries between stratums; transitions may be gradual.

BORING LOG

Nobis
Engineering a Sustainable Future

Project: Former Tombarello Facility TBA
Location: 207 Marston Street, Lawrence, MA
Nobis Project No.: 80108.04

Boring No.: **HA-02**
Boring Location: See Site Plan
Checked by:
Date Start: June 9, 2016
Date Finish: June 9, 2016

Contractor: Nobis
Driller:
Nobis Rep.: E. Johnson

Rig Type / Model:
Hammer Type: N/A
Hammer Hoist: N/A

Ground Surface Elev.:
Datum:

	Drilling Method	Sampler
Type	Hand Auger	N/A
Size ID (in.)		N/A
Advancement	Augered	N/A

Groundwater Observations

Date	Time	Depth Below Ground (ft.)	Depth of Casing (ft.)	Depth to Bottom of Hole (ft.)	Stabilization Time

Depth (ft.)	SAMPLE INFORMATION: Type & No.	Rec (in.)	Depth (ft.)	Blows/ 6 in.	PID (ppm)	Ground Water	LITHOLOGY: Graphic	Stratum Elev. / Depth (ft.)	SAMPLE DESCRIPTION AND REMARKS (Classification System: Modified Burmister)	NOTES
1	S-1		0-1		1.2			FILL / 1.0	S-1 (12"): Dark brown, SILT, little fine Sand, trace Organics, trace glass fragments.	
2									Boring terminated at 1 feet.	
3										
4										
5										
6										
7										
8										
9										
10										

Soil	Percentage	Non-Soil
trace	5 - 10	very few
little	10 - 20	few
some	20 - 35	several
and	35 - 50	numerous

NOTES:
1) Sample collected at 11:45 for Metals and PCBs

Soil descriptions are based on visual classifications and should be considered approximate. Stratification lines are approximate boundaries between stratums; transitions may be gradual.

BORING LOG

Nobis — Engineering a Sustainable Future

Project: Former Tombarello Facility TBA

Location: 207 Marston Street, Lawrence, MA

Nobis Project No.: 80108.04

Boring No.: **HA-03**

Boring Location: See Site Plan

Checked by:

Date Start: June 9, 2016

Date Finish: June 9, 2016

Contractor: Nobis

Driller:

Nobis Rep.: E. Johnson

Rig Type / Model:

Hammer Type: N/A

Hammer Hoist: N/A

Ground Surface Elev.:

Datum:

	Drilling Method	Sampler
Type	Hand Auger	N/A
Size ID (in.)		N/A
Advancement	Augered	N/A

Groundwater Observations

Date	Time	Depth Below Ground (ft.)	Depth of Casing (ft.)	Depth to Bottom of Hole (ft.)	Stabilization Time

Depth (ft.)	SAMPLE INFORMATION: Type & No.	Rec (in.)	Depth (ft.)	Blows/ 6 in.	PID (ppm)	Ground Water	LITHOLOGY: Graphic	Stratum Elev. / Depth (ft.)	SAMPLE DESCRIPTION AND REMARKS (Classification System: Modified Burmister)	NOTES
1	S-1		0-1		2.2			FILL / 1.0	S-1: Tan to light brown, SILT, little fine Sand, trace fine Gravel, trace Organics, trace metal fragments.	
2									Boring terminated at 1 feet.	
3										
4										
5										
6										
7										
8										
9										
10										

Soil	Percentage	Non-Soil
trace	5 - 10	very few
little	10 - 20	few
some	20 - 35	several
and	35 - 50	numerous

NOTES:

1) Sample collected at 12:05 for Metals and PCBs; MS/MSD

Soil descriptions are based on visual classifications and should be considered approximate. Stratification lines are approximate boundaries between stratums; transitions may be gradual.

BORING LOG

Nobis — Engineering a Sustainable Future

Project: Former Tombarello Facility TBA

Location: 207 Marston Street, Lawrence, MA

Nobis Project No.: 80108.04

Boring No.: **HA-04**

Boring Location: See Site Plan

Checked by:

Date Start: June 9, 2016

Date Finish: June 9, 2016

Contractor: Nobis

Driller:

Nobis Rep.: E. Johnson

Rig Type / Model:

Hammer Type: N/A

Hammer Hoist: N/A

Ground Surface Elev.:

Datum:

	Drilling Method	Sampler
Type	Hand Auger	N/A
Size ID (in.)		N/A
Advancement	Augered	N/A

Groundwater Observations

Date	Time	Depth Below Ground (ft.)	Depth of Casing (ft.)	Depth to Bottom of Hole (ft.)	Stabilization Time

Depth (ft.)	SAMPLE INFORMATION: Type & No.	Rec (in.)	Depth (ft.)	Blows/ 6 in.	PID (ppm)	Ground Water	LITHOLOGY: Graphic	Stratum Elev. / Depth (ft.)	SAMPLE DESCRIPTION AND REMARKS (Classification System: Modified Burmister)	NOTES
1	S-1		0-1		0.6			FILL / 1.0	S-1: Brown, SILT, some fine Sand, little fine to coarse Gravel, little Organics.	
2									Boring terminated at 1 feet.	
3										
4										
5										
6										
7										
8										
9										
10										

Soil	Percentage	Non-Soil
trace	5 - 10	very few
little	10 - 20	few
some	20 - 35	several
and	35 - 50	numerous

NOTES:

1) Sample collected at 14:20 for Metals and PCBs

Soil descriptions are based on visual classifications and should be considered approximate. Stratification lines are approximate boundaries between stratums; transitions may be gradual.

BORING LOG

Nobis — Engineering a Sustainable Future

Project: Former Tombarello Facility TBA

Location: 207 Marston Street, Lawrence, MA

Nobis Project No.: 80108.04

Boring No.: **HA-05**

Boring Location: See Site Plan

Checked by:

Date Start: June 9, 2016

Date Finish: June 9, 2016

Contractor: Nobis

Driller:

Nobis Rep.: E. Johnson

Rig Type / Model:

Hammer Type: N/A

Hammer Hoist: N/A

Ground Surface Elev.:

Datum:

	Drilling Method	Sampler
Type	Hand Auger	N/A
Size ID (in.)		N/A
Advancement	Augered	N/A

Groundwater Observations

Date	Time	Depth Below Ground (ft.)	Depth of Casing (ft.)	Depth to Bottom of Hole (ft.)	Stabilization Time

Depth (ft.)	SAMPLE INFORMATION: Type & No.	Rec (in.)	Depth (ft.)	Blows/ 6 in.	PID (ppm)	Ground Water	LITHOLOGY: Graphic	Stratum Elev. / Depth (ft.)	SAMPLE DESCRIPTION AND REMARKS (Classification System: Modified Burmister)	NOTES
1	S-1		0-1		0.7			FILL / 1.0	S-1: Brown, SILT, some fine Sand, little Gravel, little Organics, trace glass, trace ceramic fragments.	
2									Boring terminated at 1 feet.	
3										
4										
5										
6										
7										
8										
9										
10										

Soil	Percentage	Non-Soil
trace	5 - 10	very few
little	10 - 20	few
some	20 - 35	several
and	35 - 50	numerous

NOTES:

1) Sample collected at 14:30 for Metals and PCBs

Soil descriptions are based on visual classifications and should be considered approximate. Stratification lines are approximate boundaries between stratums; transitions may be gradual.

BORING LOG

Nobis — Engineering a Sustainable Future

Project: Former Tombarello Facility TBA

Location: 207 Marston Street, Lawrence, MA

Nobis Project No.: 80108.04

Boring No.: **HA-06**

Boring Location: See Site Plan

Checked by:

Date Start: June 9, 2016

Date Finish: June 9, 2016

Contractor: Nobis

Driller:

Nobis Rep.: E. Johnson

Rig Type / Model:

Hammer Type: N/A

Hammer Hoist: N/A

Ground Surface Elev.:

Datum:

	Drilling Method	Sampler
Type	Hand Auger	N/A
Size ID (in.)		N/A
Advancement	Augered	N/A

Groundwater Observations

Date	Time	Depth Below Ground (ft.)	Depth of Casing (ft.)	Depth to Bottom of Hole (ft.)	Stabilization Time

Depth (ft.)	SAMPLE INFORMATION: Type & No.	Rec (in.)	Depth (ft.)	Blows/ 6 in.	PID (ppm)	Ground Water	LITHOLOGY: Graphic	Stratum Elev. / Depth (ft.)	SAMPLE DESCRIPTION AND REMARKS (Classification System: Modified Burmister)	NOTES
1	S-1	12	0-1		0.5			FILL / 1.0	S-1: Brown, SILT, some fine to coarse Sand, little fine to coarse Gravel, little Organics, trace glass fragments.	
2									Boring terminated at 1 feet.	
3										
4										
5										
6										
7										
8										
9										
10										

Soil	Percentage	Non-Soil
trace	5 - 10	very few
little	10 - 20	few
some	20 - 35	several
and	35 - 50	numerous

NOTES:

1) Sample collected at 14:40 for Metals and PCBs

Soil descriptions are based on visual classifications and should be considered approximate. Stratification lines are approximate boundaries between stratums; transitions may be gradual.

BORING LOG

Nobis
Engineering a Sustainable Future

Project: Former Tombarello Facility TBA

Location: 207 Marston Street, Lawrence, MA

Nobis Project No.: 80108.04

Boring No.: **HA-07**

Boring Location: See Site Plan

Checked by:

Date Start: June 9, 2016

Date Finish: June 9, 2016

Contractor: Nobis

Driller:

Nobis Rep.: E. Johnson

Rig Type / Model:

Hammer Type: N/A

Hammer Hoist: N/A

Ground Surface Elev.:

Datum:

	Drilling Method	Sampler
Type	Hand Auger	N/A
Size ID (in.)		N/A
Advancement	Augered	N/A

Groundwater Observations

Date	Time	Depth Below Ground (ft.)	Depth of Casing (ft.)	Depth to Bottom of Hole (ft.)	Stabilization Time

Depth (ft.)	SAMPLE INFORMATION: Type & No.	Rec (in.)	Depth (ft.)	Blows/ 6 in.	PID (ppm)	Ground Water	LITHOLOGY: Graphic	Stratum Elev. / Depth (ft.)	SAMPLE DESCRIPTION AND REMARKS (Classification System: Modified Burmister)	NOTES
1	S-1	12	0-1		1.1			FILL / 1.0	S-1 (12"): Brown, SILT and fine Sand, some Gravel, little Organics, trace plastic fragments, trace glass fragments, trace brick fragments. dry.	
2									Boring terminated at 1 feet.	
3										
4										
5										
6										
7										
8										
9										
10										

Soil	Percentage	Non-Soil
trace	5 - 10	very few
little	10 - 20	few
some	20 - 35	several
and	35 - 50	numerous

NOTES:

1) Sample collected at 15:00 for Metals and PCBs. Field duplicate FD-09 collected at 15:05

Soil descriptions are based on visual classifications and should be considered approximate. Stratification lines are approximate boundaries between stratums; transitions may be gradual.

BORING LOG

Nobis — Engineering a Sustainable Future

Project: Former Tombarello Facility TBA

Location: 207 Marston Street, Lawrence, MA

Nobis Project No.: 80108.04

Boring No.: **HA-08**

Boring Location: See Site Plan

Checked by:

Date Start: June 9, 2016

Date Finish: June 9, 2016

Contractor: Nobis

Driller:

Nobis Rep.: E. Johnson

Rig Type / Model:

Hammer Type: N/A

Hammer Hoist: N/A

Ground Surface Elev.:

Datum:

	Drilling Method	Sampler
Type	Hand Auger	N/A
Size ID (in.)		N/A
Advancement	Augered	N/A

Groundwater Observations

Date	Time	Depth Below Ground (ft.)	Depth of Casing (ft.)	Depth to Bottom of Hole (ft.)	Stabilization Time

Depth (ft.)	SAMPLE INFORMATION: Type & No.	Rec (in.)	Depth (ft.)	Blows/ 6 in.	PID (ppm)	Ground Water	LITHOLOGY: Graphic	Stratum Elev. / Depth (ft.)	SAMPLE DESCRIPTION AND REMARKS (Classification System: Modified Burmister)	NOTES
1	S-1	12	0-1		0.9			FILL / 1.0	S-1: Brown, SILT, little coarse Sand, little Organics, trace plastic fragments. dry.	
2									Boring terminated at 1 feet.	
3										
4										
5										
6										
7										
8										
9										
10										

Soil	Percentage	Non-Soil
trace	5 - 10	very few
little	10 - 20	few
some	20 - 35	several
and	35 - 50	numerous

NOTES:

1) Sample collected at 15:15 for Metals and PCBs; MS/MSD

Soil descriptions are based on visual classifications and should be considered approximate. Stratification lines are approximate boundaries between stratums; transitions may be gradual.

BORING LOG

Nobis
Engineering a Sustainable Future

Project: Former Tombarello Facility TBA

Location: 207 Marston Street, Lawrence, MA

Nobis Project No.: 80108.04

Boring No.: **HA-09**

Boring Location: See Site Plan

Checked by:

Date Start: June 9, 2016

Date Finish: June 9, 2016

Contractor: Nobis

Driller:

Nobis Rep.: E. Johnson

Rig Type / Model:

Hammer Type: N/A

Hammer Hoist: N/A

Ground Surface Elev.:

Datum:

	Drilling Method	Sampler
Type	Hand Auger	N/A
Size ID (in.)		N/A
Advancement	Augered	N/A

Groundwater Observations

Date	Time	Depth Below Ground (ft.)	Depth of Casing (ft.)	Depth to Bottom of Hole (ft.)	Stabilization Time

Depth (ft.)	SAMPLE INFORMATION: Type & No.	Rec (in.)	Depth (ft.)	Blows/ 6 in.	PID (ppm)	Ground Water	LITHOLOGY: Graphic	Stratum Elev. / Depth (ft.)	SAMPLE DESCRIPTION AND REMARKS (Classification System: Modified Burmister)	NOTES
1	S-1	12	0-1		1.1			FILL / 1.0	S-1: Light brown, SILT, trace fine Sand, trace Gravel, trace Organics.	
2									Boring terminated at 1 feet.	
3										
4										
5										
6										
7										
8										
9										
10										

Soil	Percentage	Non-Soil
trace	5 - 10	very few
little	10 - 20	few
some	20 - 35	several
and	35 - 50	numerous

NOTES:

1) Sample collected at 15:25 for Metals and PCBs

Soil descriptions are based on visual classifications and should be considered approximate. Stratification lines are approximate boundaries between stratums; transitions may be gradual.

BORING LOG

Nobis — Engineering a Sustainable Future

Project: Former Tombarello Facility TBA

Location: 207 Marston Street, Lawrence, MA

Nobis Project No.: 80108.04

Boring No.: **HA-10**

Boring Location: See Site Plan

Checked by:

Date Start: June 9, 2016

Date Finish: June 9, 2016

Contractor: Nobis

Driller:

Nobis Rep.: E. Johnson

Rig Type / Model:

Hammer Type: N/A

Hammer Hoist: N/A

Ground Surface Elev.:

Datum:

	Drilling Method	Sampler
Type	Hand Auger	N/A
Size ID (in.)		N/A
Advancement	Augered	N/A

Groundwater Observations

Date	Time	Depth Below Ground (ft.)	Depth of Casing (ft.)	Depth to Bottom of Hole (ft.)	Stabilization Time

Depth (ft.)	SAMPLE INFORMATION: Type & No.	Rec (in.)	Depth (ft.)	Blows/ 6 in.	PID (ppm)	Ground Water	LITHOLOGY: Graphic	Stratum Elev. / Depth (ft.)	SAMPLE DESCRIPTION AND REMARKS (Classification System: Modified Burmister)	NOTES
1	S-1	12	0-1		2.2			FILL / 1.0	S-1: Brown, SILT, some fine to coarse Sand, little fine to coarse Gravel, little Organics, trace glass.	
2									Boring terminated at 1 feet.	
3										
4										
5										
6										
7										
8										
9										
10										

Soil	Percentage	Non-Soil
trace	5 - 10	very few
little	10 - 20	few
some	20 - 35	several
and	35 - 50	numerous

NOTES:

1) Sample collected at 15:50 for Metals and PCBs

Soil descriptions are based on visual classifications and should be considered approximate. Stratification lines are approximate boundaries between stratums; transitions may be gradual.

BORING LOG

Nobis — Engineering a Sustainable Future

Project: Former Tombarello Facility TBA

Location: 207 Marston Street, Lawrence, MA

Nobis Project No.: 80108.04

Boring No.: **HA-11**

Boring Location: See Site Plan

Checked by:

Date Start: June 9, 2016

Date Finish: June 9, 2016

Contractor: Nobis

Driller:

Nobis Rep.: E. Johnson

Rig Type / Model:

Hammer Type: N/A

Hammer Hoist: N/A

Ground Surface Elev.:

Datum:

	Drilling Method	Sampler
Type	Hand Auger	N/A
Size ID (in.)		N/A
Advancement	Augered	N/A

Groundwater Observations

Date	Time	Depth Below Ground (ft.)	Depth of Casing (ft.)	Depth to Bottom of Hole (ft.)	Stabilization Time

Depth (ft.)	SAMPLE INFORMATION: Type & No.	Rec (in.)	Depth (ft.)	Blows/ 6 in.	PID (ppm)	Ground Water	LITHOLOGY: Graphic	Stratum Elev. / Depth (ft.)	SAMPLE DESCRIPTION AND REMARKS (Classification System: Modified Burmister)	NOTES
1	S-1	12	0-1		1.4			FILL / 1.0	S-1: Brown, SILT, some fine Sand, some Gravel, trace glass and ceramic fragments, trace Organics. dry.	
2									Boring terminated at 1 feet.	
3										
4										
5										
6										
7										
8										
9										
10										

Soil	Percentage	Non-Soil
trace	5 - 10	very few
little	10 - 20	few
some	20 - 35	several
and	35 - 50	numerous

NOTES:

1) Sample collected at 16:05 for Metals and PCBs

Soil descriptions are based on visual classifications and should be considered approximate. Stratification lines are approximate boundaries between stratums; transitions may be gradual.

BORING LOG

Nobis
Engineering a Sustainable Future

Project: Former Tombarello Facility TBA

Location: 207 Marston Street, Lawrence, MA

Nobis Project No.: 80108.04

Boring No.: **HA-12**

Boring Location: See Site Plan

Checked by:

Date Start: June 9, 2016

Date Finish: June 9, 2016

Contractor: Nobis

Driller:

Nobis Rep.: E. Johnson

Rig Type / Model:

Hammer Type: N/A

Hammer Hoist: N/A

Ground Surface Elev.:

Datum:

	Drilling Method	Sampler
Type	Hand Auger	N/A
Size ID (in.)		N/A
Advancement	Augered	N/A

Groundwater Observations

Date	Time	Depth Below Ground (ft.)	Depth of Casing (ft.)	Depth to Bottom of Hole (ft.)	Stabilization Time

Depth (ft.)	SAMPLE INFORMATION: Type & No.	Rec (in.)	Depth (ft.)	Blows/ 6 in.	PID (ppm)	Ground Water	LITHOLOGY: Graphic	Stratum Elev. / Depth (ft.)	SAMPLE DESCRIPTION AND REMARKS (Classification System: Modified Burmister)	NOTES
1	S-1	12	0-1		0.8			FILL / 1.0	S-1: Brown, SILT, some fine to coarse Sand, some Gravel, some Organics, trace glass. dry.	
2									Boring terminated at 1 feet.	
3										
4										
5										
6										
7										
8										
9										
10										

Soil	Percentage	Non-Soil
trace	5 - 10	very few
little	10 - 20	few
some	20 - 35	several
and	35 - 50	numerous

NOTES:

1) Sample collected at 16:30 for Metals and PCBs

Soil descriptions are based on visual classifications and should be considered approximate. Stratification lines are approximate boundaries between stratums; transitions may be gradual.

BORING LOG

Nobis — Engineering a Sustainable Future

Project: Former Tombarello Facility TBA

Location: 207 Marston Street, Lawrence, MA

Nobis Project No.: 80108.04

Boring No.: **LS-01 / MW-09**

Boring Location: See Site Plan

Checked by:

Date Start: June 9, 2016

Date Finish: June 9, 2016

Contractor: Technical Drilling Services

Driller: T. Newton

Nobis Rep.: E. Johnson

Rig Type / Model: Geoprobe 6620DT

Hammer Type: N/A

Hammer Hoist: N/A

Ground Surface Elev.:

Datum:

	Drilling Method	Sampler
Type	Geoprobe	Macro-Core Liners
Size ID (in.)		1.75 x 60
Advancement	Direct Push	Push

Groundwater Observations

Date	Time	Depth Below Ground (ft.)	Depth of Casing (ft.)	Depth to Bottom of Hole (ft.)	Stabilization Time

Depth (ft.)	SAMPLE INFORMATION: Type & No.	Rec (in.)	Depth (ft.)	Blows/ 6 in.	PID (ppm)	Ground Water	LITHOLOGY: Graphic	Stratum Elev. / Depth (ft.)	SAMPLE DESCRIPTION AND REMARKS (Classification System: Modified Burmister)	WELL DETAIL	NOTES
1	S-1	27	0-3					CONCRETE	Concrete.	Concrete/Sand	
2					0.2			/ 1.5	S-1: Tan-brown, fine SAND, trace Silt, trace Gravel. dry.	Riser, Bentonite	
3											
4	S-2	48	3-8						S-2A (6"): Tan-brown, fine SAND, trace Silt, trace Gravel. dry. Collapse from above. S-2B (42"): Brown, fine SAND, trace Silt. moist.		
5											
6								SAND			
7											
8					0.2					Sand, Screen	
9	S-3	52	8-13						S-3: Brown, fine to coarse SAND, trace Silt. moist. Sample becomes wet at approximately 9 ft bgs.		
10											

Soil	Percentage	Non-Soil
trace	5 - 10	very few
little	10 - 20	few
some	20 - 35	several
and	35 - 50	numerous

NOTES:

Soil descriptions are based on visual classifications and should be considered approximate. Stratification lines are approximate boundaries between stratums; transitions may be gradual.

BORING LOG

Nobis — Engineering a Sustainable Future

Project: Former Tombarello Facility TBA

Location: 207 Marston Street, Lawrence, MA

Nobis Project No.: 80108.04

Boring No.: **LS-01 / MW-09**

Boring Location: See Site Plan

Checked by:

Date Start: June 9, 2016

Date Finish: June 9, 2016

Contractor: Technical Drilling Services

Driller: T. Newton

Nobis Rep.: E. Johnson

Rig Type / Model: Geoprobe 6620DT

Hammer Type: N/A

Hammer Hoist: N/A

Ground Surface Elev.:

Datum:

	Drilling Method	Sampler
Type	Geoprobe	Macro-Core Liners
Size ID (in.)		1.75 x 60
Advancement	Direct Push	Push

Groundwater Observations

Date	Time	Depth Below Ground (ft.)	Depth of Casing (ft.)	Depth to Bottom of Hole (ft.)	Stabilization Time

Depth (ft.)	SAMPLE INFORMATION: Type & No.	Rec (in.)	Depth (ft.)	Blows/ 6 in.	PID (ppm)	Ground Water	LITHOLOGY: Graphic	Stratum Elev. / Depth (ft.)	SAMPLE DESCRIPTION AND REMARKS (Classification System: Modified Burmister)	WELL DETAIL	NOTES
11								SAND			
12											
13								/ 13.0	Boring terminated at 13 feet.		
14											
15											
16											
17											
18											
19											
20											

Soil	Percentage	Non-Soil
trace	5 - 10	very few
little	10 - 20	few
some	20 - 35	several
and	35 - 50	numerous

NOTES:

Soil descriptions are based on visual classifications and should be considered approximate. Stratification lines are approximate boundaries between stratums; transitions may be gradual.

BORING LOG

Nobis — Engineering a Sustainable Future

Project: Former Tombarello Facility TBA

Location: 207 Marston Street, Lawrence, MA

Nobis Project No.: 80108.04

Boring No.: **LS-02**

Boring Location: See Site Plan

Checked by:

Date Start: June 9, 2016

Date Finish: June 9, 2016

Contractor: Technical Drilling Services

Driller: T. Newton

Nobis Rep.: E. Johnson

Rig Type / Model: Geoprobe 6620DT

Hammer Type: N/A

Hammer Hoist: N/A

Ground Surface Elev.:

Datum:

	Drilling Method	Sampler
Type	Geoprobe	Macro-Core Liners
Size ID (in.)		1.75 x 60
Advancement	Direct Push	Push

Groundwater Observations

Date	Time	Depth Below Ground (ft.)	Depth of Casing (ft.)	Depth to Bottom of Hole (ft.)	Stabilization Time

Depth (ft.)	SAMPLE INFORMATION Type & No.	Rec (in.)	Depth (ft.)	Blows/ 6 in.	PID (ppm)	Ground Water	LITHOLOGY Graphic	Stratum Elev. / Depth (ft.)	SAMPLE DESCRIPTION AND REMARKS (Classification System: Modified Burmister)	NOTES
1	S-1	20	0-2					CONCRETE	S-1A (17"): Concrete.	
2					1.6			/ 1.4	S-1B (3"): Grayish brown, fine to coarse SAND, little Gravel. dry.	
3	S-2	13	2-3		1.3			FILL / 3.0	S-2A (4"): Concrete collapse. S-2B (9"): Black, fine to coarse SAND, little Gravel, little Silt, little slag, little coal, trace glass. moist to wet.	
4									Boring terminated at 3 feet.	
5										
6										
7										
8										
9										
10										

Soil	Percentage	Non-Soil
trace	5 - 10	very few
little	10 - 20	few
some	20 - 35	several
and	35 - 50	numerous

NOTES:

Soil descriptions are based on visual classifications and should be considered approximate. Stratification lines are approximate boundaries between stratums; transitions may be gradual.

BORING LOG

Nobis — Engineering a Sustainable Future

Project: Former Tombarello Facility TBA

Location: 207 Marston Street, Lawrence, MA

Nobis Project No.: 80108.04

Boring No.: **M-4**

Boring Location: See Site Plan

Checked by:

Date Start: June 9, 2016

Date Finish: June 9, 2016

Contractor: Technical Drilling Services

Driller: T. Newton

Nobis Rep.: E. Johnson

Rig Type / Model: Geoprobe 6620DT

Hammer Type: N/A

Hammer Hoist: N/A

Ground Surface Elev.:

Datum:

	Drilling Method	Sampler
Type	Geoprobe	Macro-Core Liners
Size ID (in.)		1.75 x 60
Advancement	Direct Push	Push

Groundwater Observations

Date	Time	Depth Below Ground (ft.)	Depth of Casing (ft.)	Depth to Bottom of Hole (ft.)	Stabilization Time

Depth (ft.)	SAMPLE INFORMATION: Type & No.	Rec (in.)	Depth (ft.)	Blows/ 6 in.	PID (ppm)	Ground Water	LITHOLOGY: Graphic	Stratum Elev. / Depth (ft.)	SAMPLE DESCRIPTION AND REMARKS (Classification System: Modified Burmister)	NOTES
1	S-1	17	0-2					CONCRETE / 1.0	S-1A (12"): Concrete.	
2					0.5				S-1B (5"): Brown to gray, fine to medium SAND, some Silt, little Gravel, trace coal. moist.	
3	S-2	11	2-3		0.5				S-2: Gray-red-black, fine to coarse SAND, little Gravel, little Silt, trace slag, trace coal, trace ash. moist.	
4	S-3	34	3-8		0.8				S-3: Reddish brown to black, fine to medium SAND, some Silt, little Gravel, trace brick, trace ash, trace coal, trace glass, trace slag. moist. Sample becomes wet at approximately 6.5 ft bgs.	
5										
6								FILL		
7										
8										
9	S-4	40	8-13						S-4A (27"): Reddish brown to black, fine to medium SAND, some Silt, little Gravel, trace brick, trace ash, trace coal, trace glass, trace slag, trace ceramic fragments. wet.	
10										

Soil	Percentage	Non-Soil
trace	5 - 10	very few
little	10 - 20	few
some	20 - 35	several
and	35 - 50	numerous

NOTES:

Soil descriptions are based on visual classifications and should be considered approximate. Stratification lines are approximate boundaries between stratums; transitions may be gradual.

BORING LOG

Nobis — Engineering a Sustainable Future

Project: Former Tombarello Facility TBA

Location: 207 Marston Street, Lawrence, MA

Nobis Project No.: 80108.04

Boring No.: **M-4**

Boring Location: See Site Plan

Checked by:

Date Start: June 9, 2016

Date Finish: June 9, 2016

Contractor: Technical Drilling Services

Driller: T. Newton

Nobis Rep.: E. Johnson

Rig Type / Model: Geoprobe 6620DT

Hammer Type: N/A

Hammer Hoist: N/A

Ground Surface Elev.:

Datum:

	Drilling Method	Sampler
Type	Geoprobe	Macro-Core Liners
Size ID (in.)		1.75 x 60
Advancement	Direct Push	Push

Groundwater Observations

Date	Time	Depth Below Ground (ft.)	Depth of Casing (ft.)	Depth to Bottom of Hole (ft.)	Stabilization Time

Depth (ft.)	SAMPLE INFORMATION: Type & No.	Rec (in.)	Depth (ft.)	Blows/ 6 in.	PID (ppm)	Ground Water	LITHOLOGY: Graphic	Stratum Elev. / Depth (ft.)	SAMPLE DESCRIPTION AND REMARKS (Classification System: Modified Burmister)	NOTES
11								FILL / 11.0	S-4B (13"): Brown, fine SAND, trace Silt. wet.	
12					0.5			SAND		
13								/ 13.0		
14									Boring terminated at 13 feet.	
15										
16										
17										
18										
19										
20										

Soil	Percentage	Non-Soil
trace	5 - 10	very few
little	10 - 20	few
some	20 - 35	several
and	35 - 50	numerous

NOTES:

Soil descriptions are based on visual classifications and should be considered approximate. Stratification lines are approximate boundaries between stratums; transitions may be gradual.

BORING LOG

Nobis — Engineering a Sustainable Future

Project: Former Tombarello Facility TBA

Location: 207 Marston Street, Lawrence, MA

Nobis Project No.: 80108.04

Boring No.: **M-4E**

Boring Location: See Site Plan

Checked by:

Date Start: June 9, 2016

Date Finish: June 9, 2016

Contractor: Technical Drilling Services

Driller: T. Newton

Nobis Rep.: E. Johnson

Rig Type / Model: Geoprobe 6620DT

Hammer Type: N/A

Hammer Hoist: N/A

Ground Surface Elev.:

Datum:

	Drilling Method	Sampler
Type	Geoprobe	Macro-Core Liners
Size ID (in.)		1.75 x 60
Advancement	Direct Push	Push

Groundwater Observations

Date	Time	Depth Below Ground (ft.)	Depth of Casing (ft.)	Depth to Bottom of Hole (ft.)	Stabilization Time

Depth (ft.)	SAMPLE INFORMATION: Type & No.	Rec (in.)	Depth (ft.)	Blows/ 6 in.	PID (ppm)	Ground Water	LITHOLOGY: Graphic	Stratum Elev. / Depth (ft.)	SAMPLE DESCRIPTION AND REMARKS (Classification System: Modified Burmister)	NOTES
1	S-1	8	0-1		0.3				S-1: Brown, fine to coarse SAND, little Gravel, trace Silt, trace glass, trace ash, trace ceramic, trace metal. dry.	
2	S-2	17	1-3		3.4			FILL	S-2: Grayish brown, fine to medium SAND, some Gravel, little Silt, trace glass. Moldy odor.	
3								/ 3.0		
4									Boring terminated at 3 feet.	
5										
6										
7										
8										
9										
10										

Soil	Percentage	Non-Soil
trace	5 - 10	very few
little	10 - 20	few
some	20 - 35	several
and	35 - 50	numerous

NOTES:

Soil descriptions are based on visual classifications and should be considered approximate. Stratification lines are approximate boundaries between stratums; transitions may be gradual.

BORING LOG

Nobis — Engineering a Sustainable Future

Project: Former Tombarello Facility TBA

Location: 207 Marston Street, Lawrence, MA

Nobis Project No.: 80108.04

Boring No.: **M-4N**

Boring Location: See Site Plan

Checked by:

Date Start: June 9, 2016

Date Finish: June 9, 2016

Contractor: Technical Drilling Services

Driller: T. Newton

Nobis Rep.: E. Johnson

Rig Type / Model: Geoprobe 6620DT

Hammer Type: N/A

Hammer Hoist: N/A

Ground Surface Elev.:

Datum:

	Drilling Method	Sampler
Type	Geoprobe	Macro-Core Liners
Size ID (in.)		1.75 x 60
Advancement	Direct Push	Push

Groundwater Observations

Date	Time	Depth Below Ground (ft.)	Depth of Casing (ft.)	Depth to Bottom of Hole (ft.)	Stabilization Time

Depth (ft.)	SAMPLE INFORMATION: Type & No.	Rec (in.)	Depth (ft.)	Blows/ 6 in.	PID (ppm)	Ground Water	LITHOLOGY: Graphic	Stratum Elev. / Depth (ft.)	SAMPLE DESCRIPTION AND REMARKS (Classification System: Modified Burmister)	NOTES
1	S-1	5	0-1		0.5				S-1: Brown, fine to coarse SAND, little Organics, trace Silt, trace metal, trace glass. dry.	
2	S-2	15	1-3		0.1			FILL	S-2A (4"): Cobble/gravel. S-2B (11"): Dark brown to black, fine to medium SAND, some Silt, little Gravel, trace glass, trace coal, trace slag, trace brick, trace ceramic. dry.	
3								/ 3.0		
4									Boring terminated at 3 feet.	
5										
6										
7										
8										
9										
10										

Soil	Percentage	Non-Soil
trace	5 - 10	very few
little	10 - 20	few
some	20 - 35	several
and	35 - 50	numerous

NOTES:

Soil descriptions are based on visual classifications and should be considered approximate. Stratification lines are approximate boundaries between stratums; transitions may be gradual.

BORING LOG

Nobis — Engineering a Sustainable Future

Project: Former Tombarello Facility TBA

Location: 207 Marston Street, Lawrence, MA

Nobis Project No.: 80108.04

Boring No.: **M-4S**

Boring Location: See Site Plan

Checked by:

Date Start: June 9, 2016

Date Finish: June 9, 2016

Contractor: Technical Drilling Services

Driller: T. Newton

Nobis Rep.: E. Johnson

Rig Type / Model: Geoprobe 6620DT

Hammer Type: N/A

Hammer Hoist: N/A

Ground Surface Elev.:

Datum:

	Drilling Method	Sampler
Type	Geoprobe	Macro-Core Liners
Size ID (in.)		1.75 x 60
Advancement	Direct Push	Push

Groundwater Observations

Date	Time	Depth Below Ground (ft.)	Depth of Casing (ft.)	Depth to Bottom of Hole (ft.)	Stabilization Time

Depth (ft.)	SAMPLE INFORMATION Type & No.	Rec (in.)	Depth (ft.)	Blows/ 6 in.	PID (ppm)	Ground Water	LITHOLOGY Graphic	Stratum Elev. / Depth (ft.)	SAMPLE DESCRIPTION AND REMARKS (Classification System: Modified Burmister)	NOTES
1	S-1	9	0-1					CONCRETE	S-1: Concrete.	
2	S-2	18	1-3		5.7			/ 1.3	S-2A (3"): Concrete. S-2B (15"): Gray to black, fine to coarse SAND, little Gravel, little Silt, little coal, little glass, trace brick. moist. Heavy petroleum odor.	
3								FILL / 3.0		
4									Boring terminated at 3 feet.	
5										
6										
7										
8										
9										
10										

Soil	Percentage	Non-Soil
trace	5 - 10	very few
little	10 - 20	few
some	20 - 35	several
and	35 - 50	numerous

NOTES:

Soil descriptions are based on visual classifications and should be considered approximate. Stratification lines are approximate boundaries between stratums; transitions may be gradual.

BORING LOG

Nobis — Engineering a Sustainable Future

Project: Former Tombarello Facility TBA

Location: 207 Marston Street, Lawrence, MA

Nobis Project No.: 80108.04

Boring No.: **M-4W**

Boring Location: See Site Plan

Checked by:

Date Start: June 9, 2016

Date Finish: June 9, 2016

Contractor: Technical Drilling Services

Driller: T. Newton

Nobis Rep.: E. Johnson

Rig Type / Model: Geoprobe 6620DT

Hammer Type: N/A

Hammer Hoist: N/A

Ground Surface Elev.:

Datum:

	Drilling Method	Sampler
Type	Geoprobe	Macro-Core Liners
Size ID (in.)		1.75 x 60
Advancement	Direct Push	Push

Groundwater Observations

Date	Time	Depth Below Ground (ft.)	Depth of Casing (ft.)	Depth to Bottom of Hole (ft.)	Stabilization Time

Depth (ft.)	SAMPLE INFORMATION: Type & No.	Rec (in.)	Depth (ft.)	Blows/ 6 in.	PID (ppm)	Ground Water	LITHOLOGY: Graphic	Stratum Elev. / Depth (ft.)	SAMPLE DESCRIPTION AND REMARKS (Classification System: Modified Burmister)	NOTES
1	S-1	12	0-1					CONCRETE / 1.5	S-1: Concrete. S-2A (6"): Concrete.	
2	S-2	19	1-3		0.2			FILL / 3.0	S-2B (13"): Coppery brown to gray and black, fine to medium SAND, little Gravel, trace Silt, trace coal, trace ash, trace glass, trace brick, trace slag. dry.	
3										
4									Boring terminated at 3 feet.	
5										
6										
7										
8										
9										
10										

Soil	Percentage	Non-Soil
trace	5 - 10	very few
little	10 - 20	few
some	20 - 35	several
and	35 - 50	numerous

NOTES:

Soil descriptions are based on visual classifications and should be considered approximate. Stratification lines are approximate boundaries between stratums; transitions may be gradual.

BORING LOG

Nobis — Engineering a Sustainable Future

Project: Former Tombarello Facility TBA

Location: 207 Marston Street, Lawrence, MA

Nobis Project No.: 80108.04

Boring No.: **M-7**

Boring Location: See Site Plan

Checked by:

Date Start: June 7, 2016

Date Finish: June 7, 2016

Contractor: Technical Drilling Services

Driller: T. Newton

Nobis Rep.: E. Johnson

Rig Type / Model: Geoprobe 6620DT

Hammer Type: N/A

Hammer Hoist: N/A

Ground Surface Elev.:

Datum:

	Drilling Method	Sampler
Type	Geoprobe	Macro-Core Liners
Size ID (in.)		1.75 x 60
Advancement	Direct Push	Push

Groundwater Observations

Date	Time	Depth Below Ground (ft.)	Depth of Casing (ft.)	Depth to Bottom of Hole (ft.)	Stabilization Time
▽ 06/07/16	12:15	6.5			

Depth (ft.)	SAMPLE INFORMATION Type & No.	Rec (in.)	Depth (ft.)	Blows/ 6 in.	PID (ppm)	Ground Water	LITHOLOGY Graphic	Stratum Elev. / Depth (ft.)	SAMPLE DESCRIPTION AND REMARKS (Classification System: Modified Burmister)	NOTES
1	S-1	20	0-2						S-1: Black to tan, fine SAND, some Gravel, some brick, trace metals, trace organics, trace glass fragments.	
2					0.4			FILL / 2.0		
3	S-2	12	2-3		0				S-2A (2"): Black to tan, fine SAND, some Gravel, some brick, trace metal, trace organics, trace glass fragments. S-2B (10"): Brownish gray, fine SAND, some Silt, trace brick. 0-2" collapse, S.A.A..	
4	S-3	50	3-8						S-3: Brownish gray, fine SAND, some Silt. moist. Sample wet at 6.5'.	
5								SAND		
6										
7					0	▽				
8								/ 8.0		
9									Boring terminated at 8 feet.	
10										

Soil	Percentage	Non-Soil
trace	5 - 10	very few
little	10 - 20	few
some	20 - 35	several
and	35 - 50	numerous

NOTES:

1) S-1 Sample collected at 1210 (PCBs)
2) S-2 Sample collected at 1215 (PCBs & Metals)
3) S-3 Sample collected at 1435 (PCBs)

Soil descriptions are based on visual classifications and should be considered approximate. Stratification lines are approximate boundaries between stratums; transitions may be gradual.

BORING LOG

Nobis — Engineering a Sustainable Future

Project: Former Tombarello Facility TBA

Location: 207 Marston Street, Lawrence, MA

Nobis Project No.: 80108.04

Boring No.: **M-7E**

Boring Location: See Site Plan

Checked by:

Date Start: June 7, 2016

Date Finish: June 7, 2016

Contractor: Technical Drilling Services

Driller: T. Newton

Nobis Rep.: E. Johnson

Rig Type / Model: Geoprobe 6620DT

Hammer Type: N/A

Hammer Hoist: N/A

Ground Surface Elev.:

Datum:

	Drilling Method	Sampler
Type	Geoprobe	Macro-Core Liners
Size ID (in.)		1.75 x 60
Advancement	Direct Push	Push

Groundwater Observations

Date	Time	Depth Below Ground (ft.)	Depth of Casing (ft.)	Depth to Bottom of Hole (ft.)	Stabilization Time

Depth (ft.)	SAMPLE INFORMATION: Type & No.	Rec (in.)	Depth (ft.)	Blows/ 6 in.	PID (ppm)	Ground Water	LITHOLOGY: Graphic	Stratum Elev. / Depth (ft.)	SAMPLE DESCRIPTION AND REMARKS (Classification System: Modified Burmister)	NOTES
1	S-1	10	0-1		0.4				Brown, fine to medium SAND, little Gravel, some glass fragments, little ceramic/metal/coal fragments. dry.	
2	S-2	21	1-3		77.1			FILL	Black, fine to coarse SAND, little coal, little ash, little slag, little metal, little glass fragments, trace Gravel. moist. Petroleum odor noted.	
3								/ 3.0		
4									Boring terminated at 3 feet.	
5										
6										
7										
8										
9										
10										

Soil	Percentage	Non-Soil
trace	5 - 10	very few
little	10 - 20	few
some	20 - 35	several
and	35 - 50	numerous

NOTES:

1) S-1 Sample collected at 1325 (PCBs)
2) S-2 Sample collected at 1330 (PCBs, Metals & VOCs)

Soil descriptions are based on visual classifications and should be considered approximate. Stratification lines are approximate boundaries between stratums; transitions may be gradual.

BORING LOG

Nobis — Engineering a Sustainable Future

Project: Former Tombarello Facility TBA

Location: 207 Marston Street, Lawrence, MA

Nobis Project No.: 80108.04

Boring No.: **M-7S**

Boring Location: See Site Plan

Checked by:

Date Start: June 7, 2016

Date Finish: June 7, 2016

Contractor: Technical Drilling Services

Driller: T. Newton

Nobis Rep.: E. Johnson

Rig Type / Model: Geoprobe 6620DT

Hammer Type: N/A

Hammer Hoist: N/A

Ground Surface Elev.:

Datum:

	Drilling Method	Sampler
Type	Geoprobe	Macro-Core Liners
Size ID (in.)		1.75 x 60
Advancement	Direct Push	Push

Groundwater Observations

Date	Time	Depth Below Ground (ft.)	Depth of Casing (ft.)	Depth to Bottom of Hole (ft.)	Stabilization Time

Depth (ft.)	SAMPLE INFORMATION: Type & No.	Rec (in.)	Depth (ft.)	Blows/ 6 in.	PID (ppm)	Ground Water	LITHOLOGY: Graphic	Stratum Elev. / Depth (ft.)	SAMPLE DESCRIPTION AND REMARKS (Classification System: Modified Burmister)	NOTES
1	S-1	9	0-1		0.1				S-1: Brown, fine to coarse SAND, little Gravel, trace glass, trace ceramic, trace coal, trace ash. Gray-bleu ash observed in last 1" of sample.	
2	S-2	21	1-3		0.2			FILL	S-2A (15"): Dark brown/black, fine to medium SAND, little Silt, little Gravel, little brick. dry.	
3								/ 2.5	S-2B (6"): Brown, fine SAND, little Silt. moist.	
								SAND / 3.0		
4									Boring terminated at 3 feet.	
5										
6										
7										
8										
9										
10										

Soil	Percentage	Non-Soil
trace	5 - 10	very few
little	10 - 20	few
some	20 - 35	several
and	35 - 50	numerous

NOTES:

1) S-1 Sample collected at 1335 (PCBs)
2) S-2 Sample collected at 1340 (PCBs)

Soil descriptions are based on visual classifications and should be considered approximate. Stratification lines are approximate boundaries between stratums; transitions may be gradual.

BORING LOG

Nobis — Engineering a Sustainable Future

Project: Former Tombarello Facility TBA

Location: 207 Marston Street, Lawrence, MA

Nobis Project No.: 80108.04

Boring No.: **M-7W**

Boring Location: See Site Plan

Checked by:

Date Start: June 7, 2016

Date Finish: June 7, 2016

Contractor: Technical Drilling Services

Driller: T. Newton

Nobis Rep.: E. Johnson

Rig Type / Model: Geoprobe 6620DT

Hammer Type: N/A

Hammer Hoist: N/A

Ground Surface Elev.:

Datum:

	Drilling Method	Sampler
Type	Geoprobe	Macro-Core Liners
Size ID (in.)		1.75 x 60
Advancement	Direct Push	Push

Groundwater Observations

Date	Time	Depth Below Ground (ft.)	Depth of Casing (ft.)	Depth to Bottom of Hole (ft.)	Stabilization Time

Depth (ft.)	SAMPLE INFORMATION: Type & No.	Rec (in.)	Depth (ft.)	Blows/ 6 in.	PID (ppm)	Ground Water	LITHOLOGY: Graphic	Stratum Elev. / Depth (ft.)	SAMPLE DESCRIPTION AND REMARKS (Classification System: Modified Burmister)	NOTES
1	S-1	9	0-1		0.1			FILL / 2.0	S-1: Tan to black, fine to coarse SAND, little Gravel, trace brick, trace glass fragments.	
2	S-2	21	1-3		0.3				S-2A (8"): Tan/black, fine to coarse SAND, little coal, little brick, little glass, little clinkers, little slag, little metal. S-2B (13"): Brown, fine SAND, trace Silt. moist.	
3								SAND / 3.0		
4									Boring terminated at 3 feet.	
5										
6										
7										
8										
9										
10										

Soil	Percentage	Non-Soil
trace	5 - 10	very few
little	10 - 20	few
some	20 - 35	several
and	35 - 50	numerous

NOTES:

1) S-1 Sample collected at 1200 (PCBs & Hevavalent Chromium)
2) S-2 Sample collected at 1205 (PCBs)

Soil descriptions are based on visual classifications and should be considered approximate. Stratification lines are approximate boundaries between stratums; transitions may be gradual.

BORING LOG

Nobis — Engineering a Sustainable Future

Project: Former Tombarello Facility TBA

Location: 207 Marston Street, Lawrence, MA

Nobis Project No.: 80108.04

Boring No.: **MS-01 / MW-14**

Boring Location: See Site Plan

Checked by:

Date Start: June 10, 2016

Date Finish: June 10, 2016

Contractor: Technical Drilling Services

Driller: T. Newton

Nobis Rep.: E. Johnson

Rig Type / Model: Geoprobe 6620DT

Hammer Type: N/A

Hammer Hoist: N/A

Ground Surface Elev.:

Datum:

	Drilling Method	Sampler
Type	Geoprobe	Macro-Core Liners
Size ID (in.)		1.75 x 60
Advancement	Direct Push	Push

Groundwater Observations

Date	Time	Depth Below Ground (ft.)	Depth of Casing (ft.)	Depth to Bottom of Hole (ft.)	Stabilization Time

Depth (ft.)	SAMPLE INFORMATION: Type & No.	Rec (in.)	Depth (ft.)	Blows/ 6 in.	PID (ppm)	Ground Water	LITHOLOGY: Graphic	Stratum Elev. / Depth (ft.)	SAMPLE DESCRIPTION AND REMARKS (Classification System: Modified Burmister)	WELL DETAIL	NOTES
1	S-1	20	0-2					ASPHALT / 0.5	S-1A (12"): Concrete.	Riser	
2					0.1				S-1B (8"): Brown, fine to coarse SAND, little Gravel. dry.	Bentonite	
3	S-2	13	2-3		1.9				S-2: Dark brown, fine to coarse SAND, little Gravel, trace Silt, trace coal fragments. dry.		
4	S-3	39	3-8		0.3				S-3: Dark brown to brown, fine to medium SAND, little Silt, little Gravel, trace cobble, trace brick fragments. dry.		
5								FILL			
6											
7										Sand	
8								/ 8.0		Screen	
9	S-4	44	8-13					SAND AND GRAVEL	S-4: Very dense, brown to olive gray, fine to medium SAND, some Gravel, little Silt, little cobbles. moist. Potential glacial till. Bottom of sample is wet.		
10											

Soil	Percentage	Non-Soil
trace	5 - 10	very few
little	10 - 20	few
some	20 - 35	several
and	35 - 50	numerous

NOTES:

Soil descriptions are based on visual classifications and should be considered approximate. Stratification lines are approximate boundaries between stratums; transitions may be gradual.

BORING LOG

Nobis — Engineering a Sustainable Future

Project: Former Tombarello Facility TBA

Location: 207 Marston Street, Lawrence, MA

Nobis Project No.: 80108.04

Boring No.: **MS-01 / MW-14**

Boring Location: See Site Plan

Checked by:

Date Start: June 10, 2016

Date Finish: June 10, 2016

Contractor: Technical Drilling Services

Driller: T. Newton

Nobis Rep.: E. Johnson

Rig Type / Model: Geoprobe 6620DT

Hammer Type: N/A

Hammer Hoist: N/A

Ground Surface Elev.:

Datum:

	Drilling Method	Sampler
Type	Geoprobe	Macro-Core Liners
Size ID (in.)		1.75 x 60
Advancement	Direct Push	Push

Groundwater Observations

Date	Time	Depth Below Ground (ft.)	Depth of Casing (ft.)	Depth to Bottom of Hole (ft.)	Stabilization Time

Depth (ft.)	SAMPLE INFORMATION Type & No.	Rec (in.)	Depth (ft.)	Blows/ 6 in.	PID (ppm)	Ground Water	LITHOLOGY Graphic	Stratum Elev. / Depth (ft.)	SAMPLE DESCRIPTION AND REMARKS (Classification System: Modified Burmister)	WELL DETAIL	NOTES
11					0.3			SAND AND GRAVEL			
12											
13								/ 13.0			
	S-5	0	13-13.5					WEATHERED ROCK / 13.5	S-5: Refusal on dense glacial till or weathered rock.		
14									Boring terminated at 13.5 feet.		
15											
16											
17											
18											
19											
20											

Soil	Percentage	Non-Soil
trace	5 - 10	very few
little	10 - 20	few
some	20 - 35	several
and	35 - 50	numerous

NOTES:

Soil descriptions are based on visual classifications and should be considered approximate. Stratification lines are approximate boundaries between stratums; transitions may be gradual.

BORING LOG

Nobis — Engineering a Sustainable Future

Project: Former Tombarello Facility TBA

Location: 207 Marston Street, Lawrence, MA

Nobis Project No.: 80108.04

Boring No.: **MS-02**

Boring Location: See Site Plan

Checked by:

Date Start: June 10, 2016

Date Finish: June 10, 2016

Contractor: Technical Drilling Services

Driller: T. Newton

Nobis Rep.: E. Johnson

Rig Type / Model: Geoprobe 6620DT

Hammer Type: N/A

Hammer Hoist: N/A

Ground Surface Elev.:

Datum:

	Drilling Method	Sampler
Type	Geoprobe	Macro-Core Liners
Size ID (in.)		1.75 x 60
Advancement	Direct Push	Push

Groundwater Observations

Date	Time	Depth Below Ground (ft.)	Depth of Casing (ft.)	Depth to Bottom of Hole (ft.)	Stabilization Time

Depth (ft.)	SAMPLE INFORMATION Type & No.	Rec (in.)	Depth (ft.)	Blows/ 6 in.	PID (ppm)	Ground Water	LITHOLOGY Graphic	Stratum Elev. / Depth (ft.)	SAMPLE DESCRIPTION AND REMARKS (Classification System: Modified Burmister)	NOTES
1	S-1	20	0-2		0.3			FILL	S-1: Brown and black, fine to medium SAND, little Gravel, trace cobble, trace glass, trace metal. dry. Little organics at the surface.	
2										
3	S-2	11	2-3		0.9			/ 3.0	S-2: Brown to black, fine to coarse SAND, little Silt, little Gravel, trace Organics. dry.	
4									Boring terminated at 3 feet.	
5										
6										
7										
8										
9										
10										

Soil	Percentage	Non-Soil
trace	5 - 10	very few
little	10 - 20	few
some	20 - 35	several
and	35 - 50	numerous

NOTES:

Soil descriptions are based on visual classifications and should be considered approximate. Stratification lines are approximate boundaries between stratums; transitions may be gradual.

BORING LOG

Nobis — Engineering a Sustainable Future

Project: Former Tombarello Facility TBA

Location: 207 Marston Street, Lawrence, MA

Nobis Project No.: 80108.04

Boring No.: **MS-03**

Boring Location: See Site Plan

Checked by:

Date Start: June 10, 2016

Date Finish: June 10, 2016

Contractor: Technical Drilling Services

Driller: T. Newton

Nobis Rep.: E. Johnson

Rig Type / Model: Geoprobe 6620DT

Hammer Type: N/A

Hammer Hoist: N/A

Ground Surface Elev.:

Datum:

	Drilling Method	Sampler
Type	Geoprobe	Macro-Core Liners
Size ID (in.)		1.75 x 60
Advancement	Direct Push	Push

Groundwater Observations

Date	Time	Depth Below Ground (ft.)	Depth of Casing (ft.)	Depth to Bottom of Hole (ft.)	Stabilization Time

Depth (ft.)	SAMPLE INFORMATION Type & No.	Rec (in.)	Depth (ft.)	Blows/ 6 in.	PID (ppm)	Ground Water	LITHOLOGY Graphic	Stratum Elev. / Depth (ft.)	SAMPLE DESCRIPTION AND REMARKS (Classification System: Modified Burmister)	NOTES
	S-1	21	0-2					CONCRETE / 0.8	S-1A (9"): Concrete.	
1									S-1B (12"): Brown, fine to coarse SAND, little Gravel, trace Silt. dry.	
2					1.1			SAND		
	S-2	12	2-3		0.7				S-2A (1"): Concrete collapse. S-2B (11"): Dark brown, fine to medium SAND, little Gravel. moist.	
3								/ 3.0		
4									Boring terminated at 3 feet.	
5										
6										
7										
8										
9										
10										

Soil	Percentage	Non-Soil
trace	5 - 10	very few
little	10 - 20	few
some	20 - 35	several
and	35 - 50	numerous

NOTES:

Soil descriptions are based on visual classifications and should be considered approximate. Stratification lines are approximate boundaries between stratums; transitions may be gradual.

BORING LOG

Nobis — Engineering a Sustainable Future

Project: Former Tombarello Facility TBA

Location: 207 Marston Street, Lawrence, MA

Nobis Project No.: 80108.04

Boring No.: **MW-16**

Boring Location: See Site Plan

Checked by:

Date Start: June 9, 2016

Date Finish: June 9, 2016

Contractor: Technical Drilling Services

Driller: T. Newton

Nobis Rep.: E. Johnson

Rig Type / Model: Geoprobe 6620DT

Hammer Type: N/A

Hammer Hoist: N/A

Ground Surface Elev.:

Datum:

	Drilling Method	Sampler
Type	Geoprobe	Macro-Core Liners
Size ID (in.)		1.75 x 60
Advancement	Direct Push	Push

Groundwater Observations

Date	Time	Depth Below Ground (ft.)	Depth of Casing (ft.)	Depth to Bottom of Hole (ft.)	Stabilization Time

Depth (ft.)	SAMPLE INFORMATION Type & No.	Rec (in.)	Depth (ft.)	Blows/ 6 in.	PID (ppm)	Ground Water	LITHOLOGY Graphic	Stratum Elev. / Depth (ft.)	SAMPLE DESCRIPTION AND REMARKS (Classification System: Modified Burmister)	WELL DETAIL	NOTES
	S-1	54	0-5		0.5			ASPHALT / 0.5	S-1A (6"): Asphalt.	Concrete	
1									S-1B (10"): Gray to brown, medium SAND, some Gravel, trace brick, concrete. dry.		
2								FILL / 2.0	S-1C (38"): Light brown to tan, fine SAND, little Silt. dry. No odor observed.	Sand	
3										Riser	
4										Bentonite	
5											
	S-2	48	5-10						S-2: Light grayish brown to tan, interbedded layers of fine to medium SAND and layers of Silty Sand. Cobble at approximately 8 ft bgs.		
6								SAND			
7											
8											
9											
10										Sand	

Soil	Percentage	Non-Soil
trace	5 - 10	very few
little	10 - 20	few
some	20 - 35	several
and	35 - 50	numerous

NOTES:

Soil descriptions are based on visual classifications and should be considered approximate. Stratification lines are approximate boundaries between stratums; transitions may be gradual.

BORING LOG

Nobis — Engineering a Sustainable Future

Project: Former Tombarello Facility TBA

Location: 207 Marston Street, Lawrence, MA

Nobis Project No.: 80108.04

Boring No.: **MW-16**

Boring Location: See Site Plan

Checked by:

Date Start: June 9, 2016

Date Finish: June 9, 2016

Contractor: Technical Drilling Services

Driller: T. Newton

Nobis Rep.: E. Johnson

Rig Type / Model: Geoprobe 6620DT

Hammer Type: N/A

Hammer Hoist: N/A

Ground Surface Elev.:

Datum:

	Drilling Method	Sampler
Type	Geoprobe	Macro-Core Liners
Size ID (in.)		1.75 x 60
Advancement	Direct Push	Push

Groundwater Observations

Date	Time	Depth Below Ground (ft.)	Depth of Casing (ft.)	Depth to Bottom of Hole (ft.)	Stabilization Time

Depth (ft.)	SAMPLE INFORMATION Type & No.	Rec (in.)	Depth (ft.)	Blows/ 6 in.	PID (ppm)	Ground Water	LITHOLOGY Graphic	Stratum Elev. / Depth (ft.)	SAMPLE DESCRIPTION AND REMARKS (Classification System: Modified Burmister)	WELL DETAIL	NOTES
	S-3	24	10-13					SAND / 10.5	S-3A (6"): Gray to olive, fine SAND, some Silt. moist.	Screen	
11									S-3B (12"): Very dense, gray, GRAVEL and fine to medium Sand, little Clayey Silt. (GLACIAL TILL). Bottom 8 inches of sample is wet. Refusal on rock. Rig mobilizes 12 feet SSE to advance again. Material from 0 to 12 ft appears similar.		
12								GLACIAL TILL			
	S-4		12-15						S-4: Gray, WEATHERED BEDROCK. wet. Potentially glacial till/bedrock interface.		
13											
14								WEATHERED BEDROCK			
15											
									Boring terminated at 13 feet.		
16											
17											
18											
19											
20											

Soil	Percentage	Non-Soil
trace	5 - 10	very few
little	10 - 20	few
some	20 - 35	several
and	35 - 50	numerous

NOTES:

Soil descriptions are based on visual classifications and should be considered approximate. Stratification lines are approximate boundaries between stratums; transitions may be gradual.

BORING LOG

Nobis — Engineering a Sustainable Future

Project: Former Tombarello Facility TBA

Location: 207 Marston Street, Lawrence, MA

Nobis Project No.: 80108.04

Boring No.: **NPA-01**

Boring Location: See Site Plan

Checked by:

Date Start: June 10, 2016

Date Finish: June 10, 2016

Contractor: Technical Drilling Services

Driller: T. Newton

Nobis Rep.: E. Johnson

Rig Type / Model: Geoprobe 6620DT

Hammer Type: N/A

Hammer Hoist: N/A

Ground Surface Elev.:

Datum:

	Drilling Method	Sampler
Type	Geoprobe	Macro-Core Liners
Size ID (in.)		1.75 x 60
Advancement	Direct Push	Push

Groundwater Observations

Date	Time	Depth Below Ground (ft.)	Depth of Casing (ft.)	Depth to Bottom of Hole (ft.)	Stabilization Time

Depth (ft.)	SAMPLE INFORMATION Type & No.	Rec (in.)	Depth (ft.)	Blows/ 6 in.	PID (ppm)	Ground Water	LITHOLOGY Graphic	Stratum Elev. / Depth (ft.)	SAMPLE DESCRIPTION AND REMARKS (Classification System: Modified Burmister)	NOTES
	S-1	20	0-2					ASPHALT / 0.5	S-1A (6"): Asphalt.	
1					1.5				S-1B (14"): Brown to black, fine to coarse SAND, some Gravel, trace Silt, trace coal, trace brick, trace glass. dry.	
2								FILL		
	S-2	12	2-3		0.1				S-2: Dark brown, fine to medium SAND, little Gravel, trace coal fragments. moist.	
3								/ 3.0		
4									Boring terminated at 3 feet.	
5										
6										
7										
8										
9										
10										

Soil	Percentage	Non-Soil
trace	5 - 10	very few
little	10 - 20	few
some	20 - 35	several
and	35 - 50	numerous

NOTES:

Soil descriptions are based on visual classifications and should be considered approximate. Stratification lines are approximate boundaries between stratums; transitions may be gradual.

BORING LOG

Nobis — Engineering a Sustainable Future

Project: Former Tombarello Facility TBA

Location: 207 Marston Street, Lawrence, MA

Nobis Project No.: 80108.04

Boring No.: **NPA-02 / MW-15**

Boring Location: See Site Plan

Checked by:

Date Start: June 10, 2016

Date Finish: June 10, 2016

Contractor: Technical Drilling Services

Driller: T. Newton

Nobis Rep.: E. Johnson

Rig Type / Model: Geoprobe 6620DT

Hammer Type: N/A

Hammer Hoist: N/A

Ground Surface Elev.:

Datum:

	Drilling Method	Sampler
Type	Geoprobe	Macro-Core Liners
Size ID (in.)		1.75 x 60
Advancement	Direct Push	Push

Groundwater Observations

Date	Time	Depth Below Ground (ft.)	Depth of Casing (ft.)	Depth to Bottom of Hole (ft.)	Stabilization Time

Depth (ft.)	SAMPLE INFORMATION Type & No.	Rec (in.)	Depth (ft.)	Blows/ 6 in.	Ground Water	LITHOLOGY Graphic	Stratum Elev. / Depth (ft.)	SAMPLE DESCRIPTION AND REMARKS (Classification System: Modified Burmister)	WELL DETAIL	NOTES
	S-1	18	0-2				ASPHALT / 0.5	S-1A (6"): Asphalt.		
1								S-1B (12"): Dark brown to black, fine to coarse SAND, little Gravel, little coal, trace Silt, trace slag. dry.		
2									Riser Bentonite	
	S-2	12	2-3					S-2: Brown to black, medium to coarse SAND, little Gravel, trace ash, trace coal, trace brick fragments. moist.		
3										
	S-3	31	3-8					S-3A (6"): Beige to brown, fine to coarse SAND, trace concrete. moist.		
4								S-3B (25"): Brown to black, fine SAND, little Silt, little Gravel, trace slag, trace coal. wet. Water encountered at approximately 6.5 feet.		
5							FILL			
6										
7										
8							/ 8.0		Sand Screen	
	S-4	48	8-13					S-4A (24"): Black to tan, fine to coarse SAND, trace Gravel. wet.		
9							SAND			
10										

Soil	Percentage	Non-Soil
trace	5 - 10	very few
little	10 - 20	few
some	20 - 35	several
and	35 - 50	numerous

NOTES:

Soil descriptions are based on visual classifications and should be considered approximate. Stratification lines are approximate boundaries between stratums; transitions may be gradual.

BORING LOG

Nobis — Engineering a Sustainable Future

Project: Former Tombarello Facility TBA

Location: 207 Marston Street, Lawrence, MA

Nobis Project No.: 80108.04

Boring No.: **NPA-02 / MW-15**

Boring Location: See Site Plan

Checked by:

Date Start: June 10, 2016

Date Finish: June 10, 2016

Contractor: Technical Drilling Services

Driller: T. Newton

Nobis Rep.: E. Johnson

Rig Type / Model: Geoprobe 6620DT

Hammer Type: N/A

Hammer Hoist: N/A

Ground Surface Elev.:

Datum:

	Drilling Method	Sampler
Type	Geoprobe	Macro-Core Liners
Size ID (in.)		1.75 x 60
Advancement	Direct Push	Push

Groundwater Observations

Date	Time	Depth Below Ground (ft.)	Depth of Casing (ft.)	Depth to Bottom of Hole (ft.)	Stabilization Time

Depth (ft.)	Sample Info: Type & No.	Rec (in.)	Depth (ft.)	Blows/ 6 in.	Ground Water	Lithology: Graphic	Stratum Elev. / Depth (ft.)	Sample Description and Remarks (Classification System: Modified Burmister)	Well Detail	Notes
11								S-4B (12"): Black, fine SAND, little Silt. wet.		
12							SAND	S-4C (12"): Black to copper, fine to coarse SAND, some Gravel. wet.		
13							/ 13.0			
14								Boring terminated at 13 feet.		
15										
16										
17										
18										
19										
20										

Soil	Percentage	Non-Soil
trace	5 - 10	very few
little	10 - 20	few
some	20 - 35	several
and	35 - 50	numerous

NOTES:

Soil descriptions are based on visual classifications and should be considered approximate. Stratification lines are approximate boundaries between stratums; transitions may be gradual.

BORING LOG

Nobis — Engineering a Sustainable Future

Project: Former Tombarello Facility TBA

Location: 207 Marston Street, Lawrence, MA

Nobis Project No.: 80108.04

Boring No.: **NPA-03**

Boring Location: See Site Plan

Checked by:

Date Start: June 10, 2016

Date Finish: June 10, 2016

Contractor: Technical Drilling Services

Driller: T. Newton

Nobis Rep.: E. Johnson

Rig Type / Model: Geoprobe 6620DT

Hammer Type: N/A

Hammer Hoist: N/A

Ground Surface Elev.:

Datum:

	Drilling Method	Sampler
Type	Geoprobe	Macro-Core Liners
Size ID (in.)		1.75 x 60
Advancement	Direct Push	Push

Groundwater Observations

Date	Time	Depth Below Ground (ft.)	Depth of Casing (ft.)	Depth to Bottom of Hole (ft.)	Stabilization Time

Depth (ft.)	SAMPLE INFORMATION: Type & No.	Rec (in.)	Depth (ft.)	Blows/ 6 in.	PID (ppm)	Ground Water	LITHOLOGY: Graphic	Stratum Elev. / Depth (ft.)	SAMPLE DESCRIPTION AND REMARKS (Classification System: Modified Burmister)	NOTES
1	S-1	19	0-2		1.5			ASPHALT / 0.5	S-1A (5"): Asphalt. S-1B (14"): Brown to black, fine to coarse SAND, some Gravel, some coal. dry. Slight odor.	
2								FILL		
3	S-2	10	2-3		1.2			/ 3.0	S-2A (5"): Brown to black, fine to coarse SAND, some Gravel, some coal. dry. Slight odor. S-2B (5"): Tan, medium to coarse SAND, trace Gravel, trace ash, trace brick fragments. dry.	
4									Boring terminated at 3 feet.	
5										
6										
7										
8										
9										
10										

Soil	Percentage	Non-Soil
trace	5 - 10	very few
little	10 - 20	few
some	20 - 35	several
and	35 - 50	numerous

NOTES:

Soil descriptions are based on visual classifications and should be considered approximate. Stratification lines are approximate boundaries between stratums; transitions may be gradual.

BORING LOG

Nobis
Engineering a Sustainable Future

Project: Former Tombarello Facility TBA

Location: 207 Marston Street, Lawrence, MA

Nobis Project No.: 80108.04

Boring No.: **NPA-04**

Boring Location: See Site Plan

Checked by:

Date Start: June 10, 2016

Date Finish: June 10, 2016

Contractor: Technical Drilling Services

Driller: T. Newton

Nobis Rep.: E. Johnson

Rig Type / Model: Geoprobe 6620DT

Hammer Type: N/A

Hammer Hoist: N/A

Ground Surface Elev.:

Datum:

	Drilling Method	Sampler
Type	Geoprobe	Macro-Core Liners
Size ID (in.)		1.75 x 60
Advancement	Direct Push	Push

Groundwater Observations

Date	Time	Depth Below Ground (ft.)	Depth of Casing (ft.)	Depth to Bottom of Hole (ft.)	Stabilization Time

Depth (ft.)	SAMPLE INFORMATION Type & No.	Rec (in.)	Depth (ft.)	Blows/ 6 in.	PID (ppm)	Ground Water	LITHOLOGY Graphic	Stratum Elev. / Depth (ft.)	SAMPLE DESCRIPTION AND REMARKS (Classification System: Modified Burmister)	NOTES
	S-1	15	0-2					ASPHALT / 0.5	S-1A (6"): Asphalt.	
1					0.2				S-1B (9"): Brown to black, fine to coarse SAND, some Gravel, little coal, trace glass, trace brick fragments.	
2								FILL		
	S-2	12	2-3		0.2				S-2: Brown to black, fine SAND, trace Silt.	
3								/ 3.0		
4									Boring terminated at 3 feet.	
5										
6										
7										
8										
9										
10										

Soil	Percentage	Non-Soil
trace	5 - 10	very few
little	10 - 20	few
some	20 - 35	several
and	35 - 50	numerous

NOTES:

Soil descriptions are based on visual classifications and should be considered approximate. Stratification lines are approximate boundaries between stratums; transitions may be gradual.

BORING LOG

Nobis — Engineering a Sustainable Future

Project: Former Tombarello Facility TBA

Location: 207 Marston Street, Lawrence, MA

Nobis Project No.: 80108.04

Boring No.: **NPA-05**

Boring Location: See Site Plan

Checked by:

Date Start: June 10, 2016

Date Finish: June 10, 2016

Contractor: Technical Drilling Services

Driller: T. Newton

Nobis Rep.: E. Johnson

Rig Type / Model: Geoprobe 6620DT

Hammer Type: N/A

Hammer Hoist: N/A

Ground Surface Elev.:

Datum:

	Drilling Method	Sampler
Type	Geoprobe	Macro-Core Liners
Size ID (in.)		1.75 x 60
Advancement	Direct Push	Push

Groundwater Observations

Date	Time	Depth Below Ground (ft.)	Depth of Casing (ft.)	Depth to Bottom of Hole (ft.)	Stabilization Time

Depth (ft.)	SAMPLE INFORMATION Type & No.	Rec (in.)	Depth (ft.)	Blows/ 6 in.	PID (ppm)	Ground Water	LITHOLOGY Graphic	Stratum Elev. / Depth (ft.)	SAMPLE DESCRIPTION AND REMARKS (Classification System: Modified Burmister)	NOTES
	S-1	16	0-2					ASPHALT / 0.5	S-1A (6"): Asphalt.	
1					0.2				S-1B (10"): Brown to black, fine to coarse SAND, little Gravel, trace Silt, trace brick, trace glass, trace coal. dry.	
2								FILL		
	S-2	7	2-3		0.2				S-2: Brown to black, fine to coarse SAND, some brick, some coal, trace Gravel. dry. Slight petroleum odor.	
3								/ 3.0		
4									Boring terminated at 3 feet.	
5										
6										
7										
8										
9										
10										

Soil	Percentage	Non-Soil
trace	5 - 10	very few
little	10 - 20	few
some	20 - 35	several
and	35 - 50	numerous

NOTES:

Soil descriptions are based on visual classifications and should be considered approximate. Stratification lines are approximate boundaries between stratums; transitions may be gradual.

BORING LOG

Nobis — Engineering a Sustainable Future

Project: Former Tombarello Facility TBA

Location: 207 Marston Street, Lawrence, MA

Nobis Project No.: 80108.04

Boring No.: **NPA-06**

Boring Location: See Site Plan

Checked by:

Date Start: June 10, 2016

Date Finish: June 10, 2016

Contractor: Technical Drilling Services

Driller: T. Newton

Nobis Rep.: E. Johnson

Rig Type / Model: Geoprobe 6620DT

Hammer Type: N/A

Hammer Hoist: N/A

Ground Surface Elev.:

Datum:

	Drilling Method	Sampler
Type	Geoprobe	Macro-Core Liners
Size ID (in.)		1.75 x 60
Advancement	Direct Push	Push

Groundwater Observations

Date	Time	Depth Below Ground (ft.)	Depth of Casing (ft.)	Depth to Bottom of Hole (ft.)	Stabilization Time

Depth (ft.)	SAMPLE INFORMATION: Type & No.	Rec (in.)	Depth (ft.)	Blows/ 6 in.	PID (ppm)	Ground Water	LITHOLOGY: Graphic	Stratum Elev. / Depth (ft.)	SAMPLE DESCRIPTION AND REMARKS (Classification System: Modified Burmister)	NOTES
	S-1	16	0-2					ASPHALT / 0.3	S-1A (4"): Asphalt.	
1					0.2				S-1B (12"): Black, fine to coarse SAND, trace Gravel, trace coal, trace brick. dry.	
2								FILL		
	S-2	10	2-3		0.2				S-2: Brown to black, fine to coarse SAND, some Gravel, trace coal, trace brick, trace Organics. dry.	
3								/ 3.0		
4									Boring terminated at 3 feet.	
5										
6										
7										
8										
9										
10										

Soil	Percentage	Non-Soil
trace	5 - 10	very few
little	10 - 20	few
some	20 - 35	several
and	35 - 50	numerous

NOTES:

Soil descriptions are based on visual classifications and should be considered approximate. Stratification lines are approximate boundaries between stratums; transitions may be gradual.

BORING LOG

Nobis — Engineering a Sustainable Future

Project: Former Tombarello Facility TBA

Location: 207 Marston Street, Lawrence, MA

Nobis Project No.: 80108.04

Boring No.: **NPA-07**

Boring Location: See Site Plan

Checked by:

Date Start: June 10, 2016

Date Finish: June 10, 2016

Contractor: Technical Drilling Services

Driller: T. Newton

Nobis Rep.: E. Johnson

Rig Type / Model: Geoprobe 6620DT

Hammer Type: N/A

Hammer Hoist: N/A

Ground Surface Elev.:

Datum:

	Drilling Method	Sampler
Type	Geoprobe	Macro-Core Liners
Size ID (in.)		1.75 x 60
Advancement	Direct Push	Push

Groundwater Observations

Date	Time	Depth Below Ground (ft.)	Depth of Casing (ft.)	Depth to Bottom of Hole (ft.)	Stabilization Time

Depth (ft.)	SAMPLE INFORMATION: Type & No.	Rec (in.)	Depth (ft.)	Blows/ 6 in.	PID (ppm)	Ground Water	LITHOLOGY: Graphic	Stratum Elev. / Depth (ft.)	SAMPLE DESCRIPTION AND REMARKS (Classification System: Modified Burmister)	NOTES
0	S-1	14	0-2		0.3			ASPHALT / 0.3	S-1A (3"): Asphalt. S-1B (11"): Brown to dark brown-black, fine to coarse SAND, little Silt, little Gravel, trace coal fragments. moist.	
1										
2								FILL / 2.0		
3	S-2	6	2-3		0.1			SAND / 3.0	S-2: Brown, fine to coarse SAND, some Gravel. dry.	
4									Boring terminated at 3 feet.	
5										
6										
7										
8										
9										
10										

Soil	Percentage	Non-Soil
trace	5 - 10	very few
little	10 - 20	few
some	20 - 35	several
and	35 - 50	numerous

NOTES:

Soil descriptions are based on visual classifications and should be considered approximate. Stratification lines are approximate boundaries between stratums; transitions may be gradual.

BORING LOG

Nobis — Engineering a Sustainable Future

Project: Former Tombarello Facility TBA

Location: 207 Marston Street, Lawrence, MA

Nobis Project No.: 80108.04

Boring No.: **P-13**

Boring Location: See Site Plan

Checked by:

Date Start: June 8, 2016

Date Finish: June 8, 2016

Contractor: Technical Drilling Services

Driller: T. Newton

Nobis Rep.: E. Johnson

Rig Type / Model: Geoprobe 6620DT

Hammer Type: N/A

Hammer Hoist: N/A

Ground Surface Elev.:

Datum:

	Drilling Method	Sampler
Type	Geoprobe	Macro-Core Liners
Size ID (in.)		1.75 x 60
Advancement	Direct Push	Push

Groundwater Observations

Date	Time	Depth Below Ground (ft.)	Depth of Casing (ft.)	Depth to Bottom of Hole (ft.)	Stabilization Time

Depth (ft.)	SAMPLE INFORMATION Type & No.	Rec (in.)	Depth (ft.)	Blows/ 6 in.	PID (ppm)	Ground Water	LITHOLOGY Graphic	Stratum Elev. / Depth (ft.)	SAMPLE DESCRIPTION AND REMARKS (Classification System: Modified Burmister)	NOTES
1	S-1	13	0-2						S-1: Brown, fine to coarse SAND, little Gravel, trace metal, trace wood, trace glass, trace coal.	
2					0.3					
3	S-2	6	2-3		0.3				S-2: Brown to dark brown, fine to medium SAND, little Silt, trace Gravel, trace metal fragments, trace glass.	
4	S-3	6	3-8		0.7				S-3: Brown and black, fine to medium SAND and Gravel, some coal, some slag, some glass, some ash debris. dry.	
5								FILL		
6										
7										
8										
9	S-4	51	8-13					/ 8.5	S-4A (5"): Brown and black, fine to medium SAND and Gravel, some coal, some slag, some glass, some ash debris, some brick fragments. dry. S-4B (31"): Mottled/varved, black and tan, fine SAND, trace Silt. moist to wet.	
10					1.2			SAND		

Soil	Percentage	Non-Soil
trace	5 - 10	very few
little	10 - 20	few
some	20 - 35	several
and	35 - 50	numerous

NOTES:

Soil descriptions are based on visual classifications and should be considered approximate. Stratification lines are approximate boundaries between stratums; transitions may be gradual.

BORING LOG

Nobis — Engineering a Sustainable Future

Project: Former Tombarello Facility TBA

Location: 207 Marston Street, Lawrence, MA

Nobis Project No.: 80108.04

Boring No.: **P-13**

Boring Location: See Site Plan

Checked by:

Date Start: June 8, 2016

Date Finish: June 8, 2016

Contractor: Technical Drilling Services

Driller: T. Newton

Nobis Rep.: E. Johnson

Rig Type / Model: Geoprobe 6620DT

Hammer Type: N/A

Hammer Hoist: N/A

Ground Surface Elev.:

Datum:

	Drilling Method	Sampler
Type	Geoprobe	Macro-Core Liners
Size ID (in.)		1.75 x 60
Advancement	Direct Push	Push

Groundwater Observations

Date	Time	Depth Below Ground (ft.)	Depth of Casing (ft.)	Depth to Bottom of Hole (ft.)	Stabilization Time

Depth (ft.)	SAMPLE INFORMATION: Type & No.	Rec (in.)	Depth (ft.)	Blows/ 6 in.	PID (ppm)	Ground Water	LITHOLOGY: Graphic	Stratum Elev. / Depth (ft.)	SAMPLE DESCRIPTION AND REMARKS (Classification System: Modified Burmister)	NOTES
11								SAND	S-4C (15"): Olive gray to tan, fine SAND. wet.	
12										
13								/ 13.0		
14									Boring terminated at 13 feet.	
15										
16										
17										
18										
19										
20										

Soil	Percentage	Non-Soil
trace	5 - 10	very few
little	10 - 20	few
some	20 - 35	several
and	35 - 50	numerous

NOTES:

Soil descriptions are based on visual classifications and should be considered approximate. Stratification lines are approximate boundaries between stratums; transitions may be gradual.

BORING LOG

Nobis — Engineering a Sustainable Future

Project: Former Tombarello Facility TBA

Location: 207 Marston Street, Lawrence, MA

Nobis Project No.: 80108.04

Boring No.: **P-13N**

Boring Location: See Site Plan

Checked by:

Date Start: June 8, 2016

Date Finish: June 8, 2016

Contractor: Technical Drilling Services

Driller: T. Newton

Nobis Rep.: E. Johnson

Rig Type / Model: Geoprobe 6620DT

Hammer Type: N/A

Hammer Hoist: N/A

Ground Surface Elev.:

Datum:

	Drilling Method	Sampler
Type	Geoprobe	Macro-Core Liners
Size ID (in.)		1.75 x 60
Advancement	Direct Push	Push

Groundwater Observations

Date	Time	Depth Below Ground (ft.)	Depth of Casing (ft.)	Depth to Bottom of Hole (ft.)	Stabilization Time

Depth (ft.)	SAMPLE INFORMATION Type & No.	Rec (in.)	Depth (ft.)	Blows/ 6 in.	PID (ppm)	Ground Water	LITHOLOGY Graphic	Stratum Elev. / Depth (ft.)	SAMPLE DESCRIPTION AND REMARKS (Classification System: Modified Burmister)	NOTES
1	S-1	7	0-1		0.3			/ 0.2 ORGANICS	S-1A (2"): Organics. S-1B (5"): Tan to brown, fine to medium SAND, trace Gravel, trace ash, trace brick. dry.	
2	S-2	9	1-3		0.4			FILL	S-2 (9"): Brown to dark brown, fine to coarse SAND, little Gravel, trace Silt, trace Organics, trace glass, trace brick, trace coal.	
3								/ 3.0		
4									Boring terminated at 3 feet.	
5										
6										
7										
8										
9										
10										

Soil	Percentage	Non-Soil
trace	5 - 10	very few
little	10 - 20	few
some	20 - 35	several
and	35 - 50	numerous

NOTES:

Soil descriptions are based on visual classifications and should be considered approximate. Stratification lines are approximate boundaries between stratums; transitions may be gradual.

BORING LOG

Nobis — Engineering a Sustainable Future

Project: Former Tombarello Facility TBA

Location: 207 Marston Street, Lawrence, MA

Nobis Project No.: 80108.04

Boring No.: **P-13S**

Boring Location: See Site Plan

Checked by:

Date Start: June 8, 2016

Date Finish: June 8, 2016

Contractor: Technical Drilling Services

Driller: T. Newton

Nobis Rep.: E. Johnson

Rig Type / Model: Geoprobe 6620DT

Hammer Type: N/A

Hammer Hoist: N/A

Ground Surface Elev.:

Datum:

	Drilling Method	Sampler
Type	Geoprobe	Macro-Core Liners
Size ID (in.)		1.75 x 60
Advancement	Direct Push	Push

Groundwater Observations

Date	Time	Depth Below Ground (ft.)	Depth of Casing (ft.)	Depth to Bottom of Hole (ft.)	Stabilization Time

Depth (ft.)	SAMPLE INFORMATION Type & No.	Rec (in.)	Depth (ft.)	Blows/ 6 in.	PID (ppm)	Ground Water	LITHOLOGY Graphic	Stratum Elev. / Depth (ft.)	SAMPLE DESCRIPTION AND REMARKS (Classification System: Modified Burmister)	NOTES
1	S-1	10	0-1		0.2			/ 0.2 ORGANICS	S-1A (2"): Organics. S-1B (8"): Brown, fine to coarse SAND, some Gravel, trace glass, trace metal, trace ash. dry.	
2	S-2	12	1-3		1.4			FILL	S-2: Dark brown, fine to coarse SAND, little Gravel, trace metal fragments. dry.	
3								/ 3.0		
4									Boring terminated at 3 feet.	
5										
6										
7										
8										
9										
10										

Soil	Percentage	Non-Soil
trace	5 - 10	very few
little	10 - 20	few
some	20 - 35	several
and	35 - 50	numerous

NOTES:

Soil descriptions are based on visual classifications and should be considered approximate. Stratification lines are approximate boundaries between stratums; transitions may be gradual.

BORING LOG

Nobis — Engineering a Sustainable Future

Project: Former Tombarello Facility TBA

Location: 207 Marston Street, Lawrence, MA

Nobis Project No.: 80108.04

Boring No.: **P-13W**

Boring Location: See Site Plan

Checked by:

Date Start: June 8, 2016

Date Finish: June 8, 2016

Contractor: Technical Drilling Services

Driller: T. Newton

Nobis Rep.: E. Johnson

Rig Type / Model: Geoprobe 6620DT

Hammer Type: N/A

Hammer Hoist: N/A

Ground Surface Elev.:

Datum:

	Drilling Method	Sampler
Type	Geoprobe	Macro-Core Liners
Size ID (in.)		1.75 x 60
Advancement	Direct Push	Push

Groundwater Observations

Date	Time	Depth Below Ground (ft.)	Depth of Casing (ft.)	Depth to Bottom of Hole (ft.)	Stabilization Time

Depth (ft.)	SAMPLE INFORMATION: Type & No.	Rec (in.)	Depth (ft.)	Blows/ 6 in.	PID (ppm)	Ground Water	LITHOLOGY: Graphic	Stratum Elev. / Depth (ft.)	SAMPLE DESCRIPTION AND REMARKS (Classification System: Modified Burmister)	NOTES
1	S-1	7	0-1		0.5				S-1: Brown, fine to coarse SAND, little Gravel, little Organics, little glass. dry.	
2	S-2	12	1-3		0.1			FILL	S-2A (9"): Dark brown to black, fine to medium SAND, some coal, some ash, little Gravel, trace glass.	
3								/ 3.0	S-2B (3"): Black, Clayey SILT, trace rubber scraps. wet.	
4									Boring terminated at 3 feet.	
5										
6										
7										
8										
9										
10										

Soil	Percentage	Non-Soil
trace	5 - 10	very few
little	10 - 20	few
some	20 - 35	several
and	35 - 50	numerous

NOTES:

Soil descriptions are based on visual classifications and should be considered approximate. Stratification lines are approximate boundaries between stratums; transitions may be gradual.

BORING LOG

Nobis — Engineering a Sustainable Future

Project: Former Tombarello Facility TBA

Location: 207 Marston Street, Lawrence, MA

Nobis Project No.: 80108.04

Boring No.: **SA-01 / MW-08**

Boring Location: See Site Plan

Checked by:

Date Start: June 9, 2016

Date Finish: June 9, 2016

Contractor: Technical Drilling Services

Driller: T. Newton

Nobis Rep.: E. Johnson

Rig Type / Model: Geoprobe 6620DT

Hammer Type: N/A

Hammer Hoist: N/A

Ground Surface Elev.:

Datum:

	Drilling Method	Sampler
Type	Geoprobe	Macro-Core Liners
Size ID (in.)		1.75 x 60
Advancement	Direct Push	Push

Groundwater Observations

Date	Time	Depth Below Ground (ft.)	Depth of Casing (ft.)	Depth to Bottom of Hole (ft.)	Stabilization Time

Depth (ft.)	SAMPLE INFORMATION Type & No.	Rec (in.)	Depth (ft.)	Blows/ 6 in.	PID (ppm)	Ground Water	LITHOLOGY Graphic	Stratum Elev. / Depth (ft.)	SAMPLE DESCRIPTION AND REMARKS (Classification System: Modified Burmister)
1	S-1	29	0-3						S-1A (18"): Brown to dark brown, fine to coarse SAND, some Gravel, little concrete, trace Silt, trace metal, trace glass.
2					77.8				S-1B (11"): Dark brown to black, fine to medium SAND, little Gravel, little coal fragments, trace Silt, trace plastic. moist. Slight petroleum odor.
3									
4	S-2	18	3-8					FILL	S-2A (16"): Stratified brown-black-gray-rusty white, fine to coarse SAND, little Silt, trace Gravel, trace ash, trace slag. moist. Sample becomes wet at 6.5 ft bgs.
5					0.3				S-2B (2"): Dark olive brown, fine SAND. wet. No odor observed.
6									
7									
8									
9	S-3	50	8-13					SAND	S-3: Olive gray to light brown, fine SAND, trace Silt. wet.
10									

WELL DETAIL: Concrete/Sand; Riser; Bentonite; Sand; Screen

NOTES

Soil	Percentage	Non-Soil
trace	5 - 10	very few
little	10 - 20	few
some	20 - 35	several
and	35 - 50	numerous

NOTES:

Soil descriptions are based on visual classifications and should be considered approximate. Stratification lines are approximate boundaries between stratums; transitions may be gradual.

BORING LOG

Nobis — Engineering a Sustainable Future

Project: Former Tombarello Facility TBA

Location: 207 Marston Street, Lawrence, MA

Nobis Project No.: 80108.04

Boring No.: **SA-01 / MW-08**

Boring Location: See Site Plan

Checked by:

Date Start: June 9, 2016

Date Finish: June 9, 2016

Contractor: Technical Drilling Services

Driller: T. Newton

Nobis Rep.: E. Johnson

Rig Type / Model: Geoprobe 6620DT

Hammer Type: N/A

Hammer Hoist: N/A

Ground Surface Elev.:

Datum:

	Drilling Method	Sampler
Type	Geoprobe	Macro-Core Liners
Size ID (in.)		1.75 x 60
Advancement	Direct Push	Push

Groundwater Observations

Date	Time	Depth Below Ground (ft.)	Depth of Casing (ft.)	Depth to Bottom of Hole (ft.)	Stabilization Time

Depth (ft.)	SAMPLE INFORMATION: Type & No.	Rec (in.)	Depth (ft.)	Blows/ 6 in.	PID (ppm)	Ground Water	LITHOLOGY: Graphic	Stratum Elev. / Depth (ft.)	SAMPLE DESCRIPTION AND REMARKS (Classification System: Modified Burmister)	WELL DETAIL	NOTES
11					0.1			SAND			
12											
13								/ 13.0			
14									Boring terminated at 13 feet.		
15											
16											
17											
18											
19											
20											

Soil	Percentage	Non-Soil
trace	5 - 10	very few
little	10 - 20	few
some	20 - 35	several
and	35 - 50	numerous

NOTES:

Soil descriptions are based on visual classifications and should be considered approximate. Stratification lines are approximate boundaries between stratums; transitions may be gradual.

BORING LOG

Nobis — Engineering a Sustainable Future

Project: Former Tombarello Facility TBA

Location: 207 Marston Street, Lawrence, MA

Nobis Project No.: 80108.04

Boring No.: **SB-3**

Boring Location: See Site Plan

Checked by:

Date Start: June 9, 2016

Date Finish: June 9, 2016

Contractor: Technical Drilling Services

Driller: T. Newton

Nobis Rep.: E. Johnson

Rig Type / Model: Geoprobe 6620DT

Hammer Type: N/A

Hammer Hoist: N/A

Ground Surface Elev.:

Datum:

	Drilling Method	Sampler
Type	Geoprobe	Macro-Core Liners
Size ID (in.)		1.75 x 60
Advancement	Direct Push	Push

Groundwater Observations

Date	Time	Depth Below Ground (ft.)	Depth of Casing (ft.)	Depth to Bottom of Hole (ft.)	Stabilization Time

Depth (ft.)	SAMPLE INFORMATION: Type & No.	Rec (in.)	Depth (ft.)	Blows/ 6 in.	PID (ppm)	Ground Water	LITHOLOGY: Graphic	Stratum Elev. / Depth (ft.)	SAMPLE DESCRIPTION AND REMARKS (Classification System: Modified Burmister)	NOTES
1	S-1	20	0-2					/ 0.1 ASPHALT	S-1A (1"): Asphalt. S-1B (19"): Dark brown to black to brown, fine to coarse SAND, little Gravel, trace brick, trace coal.	
2								FILL		
3	S-2	13	2-3		0.3			/ 3.0	S-2: Dark brown to brown, fine SAND, trace Silt, trace brick, trace glass fragments.	
4	S-3	54	3-8						S-3: Light brown, fine SAND, trace Silt. dry. Water observed at approximately 7-feet bgs.	
5										
6					0.1			SAND		
7										
8								/ 8.0		
9									Boring terminated at 8 feet.	
10										

Soil	Percentage	Non-Soil
trace	5 - 10	very few
little	10 - 20	few
some	20 - 35	several
and	35 - 50	numerous

NOTES:

Soil descriptions are based on visual classifications and should be considered approximate. Stratification lines are approximate boundaries between stratums; transitions may be gradual.

BORING LOG

Nobis — Engineering a Sustainable Future

Project: Former Tombarello Facility TBA

Location: 207 Marston Street, Lawrence, MA

Nobis Project No.: 80108.04

Boring No.: **SB-3E**

Boring Location: See Site Plan

Checked by:

Date Start: June 9, 2016

Date Finish: June 9, 2016

Contractor: Technical Drilling Services

Driller: T. Newton

Nobis Rep.: E. Johnson

Rig Type / Model: Geoprobe 6620DT

Hammer Type: N/A

Hammer Hoist: N/A

Ground Surface Elev.:

Datum:

	Drilling Method	Sampler
Type	Geoprobe	Macro-Core Liners
Size ID (in.)		1.75 x 60
Advancement	Direct Push	Push

Groundwater Observations

Date	Time	Depth Below Ground (ft.)	Depth of Casing (ft.)	Depth to Bottom of Hole (ft.)	Stabilization Time

Depth (ft.)	SAMPLE INFORMATION: Type & No.	Rec (in.)	Depth (ft.)	Blows/ 6 in.	PID (ppm)	Ground Water	LITHOLOGY: Graphic	Stratum Elev. / Depth (ft.)	SAMPLE DESCRIPTION AND REMARKS (Classification System: Modified Burmister)	NOTES
	S-1	10	0-1		0.3			ASPHALT / 0.5	S-1A (6"): Asphalt.	
1								FILL / 1.5	S-1B (4"): Brown, fine to coarse SAND, some Gravel. dry.	
	S-2	20	1-3		0.6				S-2A (6"): Gray and black, fine to coarse SAND, trace coal, trace glass.	
2									S-2B (6"): Dark brown, fine SAND, little Silt.	
3								SAND / 3.0	S-2C (8"): Olive, fine SAND, trace Silt.	
4									Boring terminated at 3 feet.	
5										
6										
7										
8										
9										
10										

Soil	Percentage	Non-Soil
trace	5 - 10	very few
little	10 - 20	few
some	20 - 35	several
and	35 - 50	numerous

NOTES:

Soil descriptions are based on visual classifications and should be considered approximate. Stratification lines are approximate boundaries between stratums; transitions may be gradual.

BORING LOG

Nobis — Engineering a Sustainable Future

Project: Former Tombarello Facility TBA

Location: 207 Marston Street, Lawrence, MA

Nobis Project No.: 80108.04

Boring No.: **SB-3N**

Boring Location: See Site Plan

Checked by:

Date Start: June 9, 2016

Date Finish: June 9, 2016

Contractor: Technical Drilling Services

Driller: T. Newton

Nobis Rep.: E. Johnson

Rig Type / Model: Geoprobe 6620DT

Hammer Type: N/A

Hammer Hoist: N/A

Ground Surface Elev.:

Datum:

	Drilling Method	Sampler
Type	Geoprobe	Macro-Core Liners
Size ID (in.)		1.75 x 60
Advancement	Direct Push	Push

Groundwater Observations

Date	Time	Depth Below Ground (ft.)	Depth of Casing (ft.)	Depth to Bottom of Hole (ft.)	Stabilization Time

Depth (ft.)	SAMPLE INFORMATION: Type & No.	Rec (in.)	Depth (ft.)	Blows/ 6 in.	PID (ppm)	Ground Water	LITHOLOGY: Graphic	Stratum Elev. / Depth (ft.)	SAMPLE DESCRIPTION AND REMARKS (Classification System: Modified Burmister)	NOTES
1	S-1	12	0-1					CONCRETE / 1.2	S-1: Concrete. S-2A (2"): Concrete.	
2	S-2	20	1-3		8.4			FILL / 2.0	S-2B (8"): Black, fine to coarse SAND, little Gravel, little metal fragments, trace brick, trace ash.	
3								SAND / 3.0	S-2C (10"): Dark brown to olive, fine SAND, trace Silt.	
4									Boring terminated at 3 feet.	
5										
6										
7										
8										
9										
10										

Soil	Percentage	Non-Soil
trace	5 - 10	very few
little	10 - 20	few
some	20 - 35	several
and	35 - 50	numerous

NOTES:

Soil descriptions are based on visual classifications and should be considered approximate. Stratification lines are approximate boundaries between stratums; transitions may be gradual.

BORING LOG

Nobis — Engineering a Sustainable Future

Project: Former Tombarello Facility TBA

Location: 207 Marston Street, Lawrence, MA

Nobis Project No.: 80108.04

Boring No.: **SB-3S**

Boring Location: See Site Plan

Checked by:

Date Start: June 9, 2016

Date Finish: June 9, 2016

Contractor: Technical Drilling Services

Driller: T. Newton

Nobis Rep.: E. Johnson

Rig Type / Model: Geoprobe 6620DT

Hammer Type: N/A

Hammer Hoist: N/A

Ground Surface Elev.:

Datum:

	Drilling Method	Sampler
Type	Geoprobe	Macro-Core Liners
Size ID (in.)		1.75 x 60
Advancement	Direct Push	Push

Groundwater Observations

Date	Time	Depth Below Ground (ft.)	Depth of Casing (ft.)	Depth to Bottom of Hole (ft.)	Stabilization Time

Depth (ft.)	SAMPLE INFORMATION: Type & No.	Rec (in.)	Depth (ft.)	Blows/ 6 in.	PID (ppm)	Ground Water	LITHOLOGY: Graphic	Stratum Elev. / Depth (ft.)	SAMPLE DESCRIPTION AND REMARKS (Classification System: Modified Burmister)	NOTES
1	S-1	8	0-1		0.1			/ 0.1 ORGANICS	S-1A (1"): Organics. S-1B (7"): Brown to light brown, fine to coarse SAND, little Gravel, trace Organics, trace glass. dry.	
2	S-2	21	1-3		0			FILL / 2.0	S-2A (9"): Dark brown, fine to coarse SAND, some Silt, little Gravel, trace glass, trace coal. S-2B (12"): Dark brown-black to tan, fine SAND, trace Silt. dry.	
3								SAND / 3.0		
4									Boring terminated at 3 feet.	
5										
6										
7										
8										
9										
10										

Soil	Percentage	Non-Soil
trace	5 - 10	very few
little	10 - 20	few
some	20 - 35	several
and	35 - 50	numerous

NOTES:

Soil descriptions are based on visual classifications and should be considered approximate. Stratification lines are approximate boundaries between stratums; transitions may be gradual.

BORING LOG

Nobis — Engineering a Sustainable Future

Project: Former Tombarello Facility TBA

Location: 207 Marston Street, Lawrence, MA

Nobis Project No.: 80108.04

Boring No.: **SB-3W**

Boring Location: See Site Plan

Checked by:

Date Start: June 9, 2016

Date Finish: June 9, 2016

Contractor: Technical Drilling Services

Driller: T. Newton

Nobis Rep.: E. Johnson

Rig Type / Model: Geoprobe 6620DT

Hammer Type: N/A

Hammer Hoist: N/A

Ground Surface Elev.:

Datum:

	Drilling Method	Sampler
Type	Geoprobe	Macro-Core Liners
Size ID (in.)		1.75 x 60
Advancement	Direct Push	Push

Groundwater Observations

Date	Time	Depth Below Ground (ft.)	Depth of Casing (ft.)	Depth to Bottom of Hole (ft.)	Stabilization Time

Depth (ft.)	SAMPLE INFORMATION Type & No.	Rec (in.)	Depth (ft.)	Blows/ 6 in.	PID (ppm)	Ground Water	LITHOLOGY Graphic	Stratum Elev. / Depth (ft.)	SAMPLE DESCRIPTION AND REMARKS (Classification System: Modified Burmister)	NOTES
1	S-1	11	0-1		0				S-1: Dark brown to brown, fine to coarse SAND, some Gravel. Layer of asphalt at 6-9" bgs.	
2	S-2	20	1-3		0			FILL / 2.0	S-2A (12"): Dark brown to black, medium to coarse SAND, some Gravel, little brick, little concrete, little ash. dry.	
3								SAND / 3.0	S-2B (8"): Light brown, fine to medium SAND, trace Gravel.	
4									Boring terminated at 3 feet.	
5										
6										
7										
8										
9										
10										

Soil	Percentage	Non-Soil
trace	5 - 10	very few
little	10 - 20	few
some	20 - 35	several
and	35 - 50	numerous

NOTES:

Soil descriptions are based on visual classifications and should be considered approximate. Stratification lines are approximate boundaries between stratums; transitions may be gradual.

BORING LOG

Nobis — Engineering a Sustainable Future

Project: Former Tombarello Facility TBA

Location: 207 Marston Street, Lawrence, MA

Nobis Project No.: 80108.04

Boring No.: **SS-01 / MW-10**

Boring Location: See Site Plan

Checked by:

Date Start: June 8, 2016

Date Finish: June 8, 2016

Contractor: Technical Drilling Services

Driller: T. Newton

Nobis Rep.: E. Johnson

Rig Type / Model: Geoprobe 6620DT

Hammer Type: N/A

Hammer Hoist: N/A

Ground Surface Elev.:

Datum:

	Drilling Method	Sampler
Type	Geoprobe	Macro-Core Liners
Size ID (in.)		1.75 x 60
Advancement	Direct Push	Push

Groundwater Observations

Date	Time	Depth Below Ground (ft.)	Depth of Casing (ft.)	Depth to Bottom of Hole (ft.)	Stabilization Time

Depth (ft.)	SAMPLE INFORMATION Type & No.	Rec (in.)	Depth (ft.)	Blows/ 6 in.	PID (ppm)	Ground Water	LITHOLOGY Graphic	Stratum Elev. / Depth (ft.)	SAMPLE DESCRIPTION AND REMARKS (Classification System: Modified Burmister)	NOTES
1	S-1	22	0-2					CONCRETE / 1.0	S-1A (12"): Concrete slab with rebar.	
2					2.6				S-1B (10"): Medium to coarse SAND, some Gravel, trace brick fragments.	
3	S-2	45	2-7						S-2: Dark red-brown to black, fine to coarse SAND, some Silt, little Gravel, little coal fragments (from 5 to 6 ft) and ash (at 6.5 ft), trace plastic. moist. Slight petroleum odor.	
4										
5										
6								FILL		
7										
8	S-3	28	7-12		1.0				S-3A (12"): Dark red-brown to black, fine to coarse SAND, some Silt, little Gravel, little coal fragments. dry.	
9									S-3B (16"): Dark red-brown to brown, fine to medium SAND, some glass, trace ash. wet. Material becomes well sorted fine to medium SAND from 10 to 12 ft bgs.	
10								/ 10.0		

Soil	Percentage	Non-Soil
trace	5 - 10	very few
little	10 - 20	few
some	20 - 35	several
and	35 - 50	numerous

NOTES:

Soil descriptions are based on visual classifications and should be considered approximate. Stratification lines are approximate boundaries between stratums; transitions may be gradual.

BORING LOG

Nobis — Engineering a Sustainable Future

Project: Former Tombarello Facility TBA

Location: 207 Marston Street, Lawrence, MA

Nobis Project No.: 80108.04

Boring No.: **SS-01 / MW-10**

Boring Location: See Site Plan

Checked by:

Date Start: June 8, 2016

Date Finish: June 8, 2016

Contractor: Technical Drilling Services

Driller: T. Newton

Nobis Rep.: E. Johnson

Rig Type / Model: Geoprobe 6620DT

Hammer Type: N/A

Hammer Hoist: N/A

Ground Surface Elev.:

Datum:

	Drilling Method	Sampler
Type	Geoprobe	Macro-Core Liners
Size ID (in.)		1.75 x 60
Advancement	Direct Push	Push

Groundwater Observations

Date	Time	Depth Below Ground (ft.)	Depth of Casing (ft.)	Depth to Bottom of Hole (ft.)	Stabilization Time

Depth (ft.)	SAMPLE INFORMATION: Type & No.	Rec (in.)	Depth (ft.)	Blows/ 6 in.	PID (ppm)	Ground Water	LITHOLOGY: Graphic	Stratum Elev. / Depth (ft.)	SAMPLE DESCRIPTION AND REMARKS (Classification System: Modified Burmister)	NOTES
11								SAND		
12								/ 12.0		
13									Boring terminated at 12 feet.	
14										
15										
16										
17										
18										
19										
20										

Soil	Percentage	Non-Soil
trace	5 - 10	very few
little	10 - 20	few
some	20 - 35	several
and	35 - 50	numerous

NOTES:

Soil descriptions are based on visual classifications and should be considered approximate. Stratification lines are approximate boundaries between stratums; transitions may be gradual.

BORING LOG

Nobis — Engineering a Sustainable Future

Project: Former Tombarello Facility TBA

Location: 207 Marston Street, Lawrence, MA

Nobis Project No.: 80108.04

Boring No.: **SVA-01**

Boring Location: See Site Plan

Checked by:

Date Start: June 7, 2016

Date Finish: June 7, 2016

Contractor: Technical Drilling Services

Driller: T. Newton

Nobis Rep.: E. Johnson

Rig Type / Model: Geoprobe 6620DT

Hammer Type: N/A

Hammer Hoist: N/A

Ground Surface Elev.:

Datum:

	Drilling Method	Sampler
Type	Geoprobe	Macro-Core Liners
Size ID (in.)		1.75 x 60
Advancement	Direct Push	Push

Groundwater Observations

Date	Time	Depth Below Ground (ft.)	Depth of Casing (ft.)	Depth to Bottom of Hole (ft.)	Stabilization Time

Depth (ft.)	SAMPLE INFORMATION: Type & No.	Rec (in.)	Depth (ft.)	Blows/ 6 in.	PID (ppm)	Ground Water	LITHOLOGY: Graphic	Stratum Elev. / Depth (ft.)	SAMPLE DESCRIPTION AND REMARKS (Classification System: Modified Burmister)	NOTES
1	S-1	12	0-1		0.1			FILL / 1.0	S-1A (2"): Dark brown, fine SAND and Silt. some Organics. S-1B (10"): Light brown to dark brown, fine to coarse SAND, some Gravel, possible coal observed.	
2	S-2	21	1-3		0			SAND AND SILT / 3.0	S-2: Light brown, fine SAND and Silt.	
3										
4									Boring terminated at 3 feet.	
5										
6										
7										
8										
9										
10										

Soil	Percentage	Non-Soil
trace	5 - 10	very few
little	10 - 20	few
some	20 - 35	several
and	35 - 50	numerous

NOTES:

Soil descriptions are based on visual classifications and should be considered approximate. Stratification lines are approximate boundaries between stratums; transitions may be gradual.

BORING LOG

Nobis — Engineering a Sustainable Future

Project: Former Tombarello Facility TBA

Location: 207 Marston Street, Lawrence, MA

Nobis Project No.: 80108.04

Boring No.: **SVA-02**

Boring Location: See Site Plan

Checked by:

Date Start: June 8, 2016

Date Finish: June 8, 2016

Contractor: Technical Drilling Services

Driller: T. Newton

Nobis Rep.: E. Johnson

Rig Type / Model: Geoprobe 6620DT

Hammer Type: N/A

Hammer Hoist: N/A

Ground Surface Elev.:

Datum:

	Drilling Method	Sampler
Type	Geoprobe	Macro-Core Liners
Size ID (in.)		1.75 x 60
Advancement	Direct Push	Push

Groundwater Observations

Date	Time	Depth Below Ground (ft.)	Depth of Casing (ft.)	Depth to Bottom of Hole (ft.)	Stabilization Time

Depth (ft.)	SAMPLE INFORMATION: Type & No.	Rec (in.)	Depth (ft.)	Blows/ 6 in.	PID (ppm)	Ground Water	LITHOLOGY: Graphic	Stratum Elev. / Depth (ft.)	SAMPLE DESCRIPTION AND REMARKS (Classification System: Modified Burmister)	NOTES
1	S-1	12	0-1		0.1				S-1: Brown, fine to coarse SAND, little Gravel, trace Organics, trace glass, trace brick, trace concrete. dry.	
2	S-2	21	1-3		10.3			FILL	S-2: Dark brown to black, fine to medium SAND and ash debris, some coal, some brick, some slag, some glass. dry. Diesel odor noted.	
3								/ 3.0		
4									Boring terminated at 3 feet.	
5										
6										
7										
8										
9										
10										

Soil	Percentage	Non-Soil
trace	5 - 10	very few
little	10 - 20	few
some	20 - 35	several
and	35 - 50	numerous

NOTES:

Soil descriptions are based on visual classifications and should be considered approximate. Stratification lines are approximate boundaries between stratums; transitions may be gradual.

BORING LOG

Nobis — Engineering a Sustainable Future

Project: Former Tombarello Facility TBA

Location: 207 Marston Street, Lawrence, MA

Nobis Project No.: 80108.04

Boring No.: **SVA-03**

Boring Location: See Site Plan

Checked by:

Date Start: June 8, 2016

Date Finish: June 8, 2016

Contractor: Technical Drilling Services

Driller: T. Newton

Nobis Rep.: E. Johnson

Rig Type / Model: Geoprobe 6620DT

Hammer Type: N/A

Hammer Hoist: N/A

Ground Surface Elev.:

Datum:

	Drilling Method	Sampler
Type	Geoprobe	Macro-Core Liners
Size ID (in.)		1.75 x 60
Advancement	Direct Push	Push

Groundwater Observations

Date	Time	Depth Below Ground (ft.)	Depth of Casing (ft.)	Depth to Bottom of Hole (ft.)	Stabilization Time

Depth (ft.)	SAMPLE INFORMATION: Type & No.	Rec (in.)	Depth (ft.)	Blows/ 6 in.	PID (ppm)	Ground Water	LITHOLOGY: Graphic	Stratum Elev. / Depth (ft.)	SAMPLE DESCRIPTION AND REMARKS (Classification System: Modified Burmister)	NOTES
1	S-1	11	0-1		0.1				S-1: Brown, fine to coarse SAND, some Gravel, trace concrete, trace coal fragments. dry.	
2	S-2	21	1-3		7.7			FILL	S-2: Dark brown-black, medium to coarse SAND and Gravel, little Clay, little brick, little coal, little ceramic fragments.	
3								/ 3.0		
4									Boring terminated at 3 feet.	
5										
6										
7										
8										
9										
10										

Soil	Percentage	Non-Soil
trace	5 - 10	very few
little	10 - 20	few
some	20 - 35	several
and	35 - 50	numerous

NOTES:

Soil descriptions are based on visual classifications and should be considered approximate. Stratification lines are approximate boundaries between stratums; transitions may be gradual.

BORING LOG

Nobis — Engineering a Sustainable Future

Project: Former Tombarello Facility TBA

Location: 207 Marston Street, Lawrence, MA

Nobis Project No.: 80108.04

Boring No.: **SVA-04**

Boring Location: See Site Plan

Checked by:

Date Start: June 8, 2016

Date Finish: June 8, 2016

Contractor: Technical Drilling Services

Driller: T. Newton

Nobis Rep.: E. Johnson

Rig Type / Model: Geoprobe 6620DT

Hammer Type: N/A

Hammer Hoist: N/A

Ground Surface Elev.:

Datum:

	Drilling Method	Sampler
Type	Geoprobe	Macro-Core Liners
Size ID (in.)		1.75 x 60
Advancement	Direct Push	Push

Groundwater Observations

Date	Time	Depth Below Ground (ft.)	Depth of Casing (ft.)	Depth to Bottom of Hole (ft.)	Stabilization Time

Depth (ft.)	SAMPLE INFORMATION Type & No.	Rec (in.)	Depth (ft.)	Blows/ 6 in.	PID (ppm)	Ground Water	LITHOLOGY Graphic	Stratum Elev. / Depth (ft.)	SAMPLE DESCRIPTION AND REMARKS (Classification System: Modified Burmister)	NOTES
1	S-1	12	0-1		0			/ 0.2 ORGANICS	S-1A (2"): Organics. S-1B (10"): Brown, fine to coarse SAND, little Gravel, some brick fragments, trace coal, trace slag, trace glass. dry.	
2	S-2	16	1-3		1.7			FILL	S-2: Black, fine to coarse SAND, some slag, some ash, little Gravel, little Clay, trace brick, trace glass. moist.	
3								/ 3.0		
4									Boring terminated at 3 feet.	
5										
6										
7										
8										
9										
10										

Soil	Percentage	Non-Soil
trace	5 - 10	very few
little	10 - 20	few
some	20 - 35	several
and	35 - 50	numerous

NOTES:

Soil descriptions are based on visual classifications and should be considered approximate. Stratification lines are approximate boundaries between stratums; transitions may be gradual.

BORING LOG

Nobis — Engineering a Sustainable Future

Project: Former Tombarello Facility TBA

Location: 207 Marston Street, Lawrence, MA

Nobis Project No.: 80108.04

Boring No.: **SVA-05**

Boring Location: See Site Plan

Checked by:

Date Start: June 8, 2016

Date Finish: June 8, 2016

Contractor: Technical Drilling Services

Driller: T. Newton

Nobis Rep.: E. Johnson

Rig Type / Model: Geoprobe 6620DT

Hammer Type: N/A

Hammer Hoist: N/A

Ground Surface Elev.:

Datum:

	Drilling Method	Sampler
Type	Geoprobe	Macro-Core Liners
Size ID (in.)		1.75 x 60
Advancement	Direct Push	Push

Groundwater Observations

Date	Time	Depth Below Ground (ft.)	Depth of Casing (ft.)	Depth to Bottom of Hole (ft.)	Stabilization Time

Depth (ft.)	SAMPLE INFORMATION: Type & No.	Rec (in.)	Depth (ft.)	Blows/ 6 in.	PID (ppm)	Ground Water	LITHOLOGY: Graphic	Stratum Elev. / Depth (ft.)	SAMPLE DESCRIPTION AND REMARKS (Classification System: Modified Burmister)	NOTES
1	S-1	9	0-1		0.3				S-1: Brown, fine to medium SAND, some Silt, little Organics, trace glass, trace ceramics. dry.	
2	S-2	12	1-3		2.0			FILL	S-2: Brown, fine to medium SAND, some Silt, little Gravel, trace Organics, trace glass. moist.	
3								/ 3.0		
4									Boring terminated at 3 feet.	
5										
6										
7										
8										
9										
10										

Soil	Percentage	Non-Soil
trace	5 - 10	very few
little	10 - 20	few
some	20 - 35	several
and	35 - 50	numerous

NOTES:

Soil descriptions are based on visual classifications and should be considered approximate. Stratification lines are approximate boundaries between stratums; transitions may be gradual.

BORING LOG

Nobis — Engineering a Sustainable Future

Project: Former Tombarello Facility TBA

Location: 207 Marston Street, Lawrence, MA

Nobis Project No.: 80108.04

Boring No.: **SVA-06**

Boring Location: See Site Plan

Checked by:

Date Start: June 8, 2016

Date Finish: June 8, 2016

Contractor: Technical Drilling Services

Driller: T. Newton

Nobis Rep.: E. Johnson

Rig Type / Model: Geoprobe 6620DT

Hammer Type: N/A

Hammer Hoist: N/A

Ground Surface Elev.:

Datum:

	Drilling Method	Sampler
Type	Geoprobe	Macro-Core Liners
Size ID (in.)		1.75 x 60
Advancement	Direct Push	Push

Groundwater Observations

Date	Time	Depth Below Ground (ft.)	Depth of Casing (ft.)	Depth to Bottom of Hole (ft.)	Stabilization Time

Depth (ft.)	SAMPLE INFORMATION: Type & No.	Rec (in.)	Depth (ft.)	Blows/ 6 in.	PID (ppm)	Ground Water	LITHOLOGY: Graphic	Stratum Elev. / Depth (ft.)	SAMPLE DESCRIPTION AND REMARKS (Classification System: Modified Burmister)	NOTES
1	S-1	6	0-1		0.4				S-1: Brown, fine to coarse SAND, little organics, little metal, little brick fragments, little concrete. dry.	
2	S-2	20	1-3		10.8			FILL	S-2: Dark brown-black, fine to coarse SAND, some Gravel, little fire brick, little glass, little coal, little ash, little metal fragments. dry. Petroleum odor noted.	
3								/ 3.0		
4									Boring terminated at 3 feet.	
5										
6										
7										
8										
9										
10										

Soil	Percentage	Non-Soil
trace	5 - 10	very few
little	10 - 20	few
some	20 - 35	several
and	35 - 50	numerous

NOTES:

Soil descriptions are based on visual classifications and should be considered approximate. Stratification lines are approximate boundaries between stratums; transitions may be gradual.

BORING LOG

Nobis — Engineering a Sustainable Future

Project: Former Tombarello Facility TBA

Location: 207 Marston Street, Lawrence, MA

Nobis Project No.: 80108.04

Boring No.: **SVA-07**

Boring Location: See Site Plan

Checked by:

Date Start: June 9, 2016

Date Finish: June 9, 2016

Contractor: Technical Drilling Services

Driller: T. Newton

Nobis Rep.: E. Johnson

Rig Type / Model: Geoprobe 6620DT

Hammer Type: N/A

Hammer Hoist: N/A

Ground Surface Elev.:

Datum:

	Drilling Method	Sampler
Type	Geoprobe	Macro-Core Liners
Size ID (in.)		1.75 x 60
Advancement	Direct Push	Push

Groundwater Observations

Date	Time	Depth Below Ground (ft.)	Depth of Casing (ft.)	Depth to Bottom of Hole (ft.)	Stabilization Time

Depth (ft.)	SAMPLE INFORMATION: Type & No.	Rec (in.)	Depth (ft.)	Blows/ 6 in.	PID (ppm)	Ground Water	LITHOLOGY: Graphic	Stratum Elev. / Depth (ft.)	SAMPLE DESCRIPTION AND REMARKS (Classification System: Modified Burmister)	NOTES
1	S-1	10	0-1		0.1			/ 0.1 ORGANICS	S-1A (1"): Organics. S-1B (9"): Brown, fine to medium SAND, little glass, trace Gravel, trace Silt, trace Organics. dry.	
2	S-2	16	1-3		1.2			FILL	S-2: Dark brown to black, fine to coarse SAND, little Gravel, trace brick, trace glass, trace concrete, trace coal, trace ash. dry.	
3								/ 3.0		
4									Boring terminated at 3 feet.	
5										
6										
7										
8										
9										
10										

Soil	Percentage	Non-Soil
trace	5 - 10	very few
little	10 - 20	few
some	20 - 35	several
and	35 - 50	numerous

NOTES:

Soil descriptions are based on visual classifications and should be considered approximate. Stratification lines are approximate boundaries between stratums; transitions may be gradual.

BORING LOG

Nobis — Engineering a Sustainable Future

Project: Former Tombarello Facility TBA

Location: 207 Marston Street, Lawrence, MA

Nobis Project No.: 80108.04

Boring No.: **SVA-08**

Boring Location: See Site Plan

Checked by:

Date Start: June 9, 2016

Date Finish: June 9, 2016

Contractor: Technical Drilling Services

Driller: T. Newton

Nobis Rep.: E. Johnson

Rig Type / Model: Geoprobe 6620DT

Hammer Type: N/A

Hammer Hoist: N/A

Ground Surface Elev.:

Datum:

	Drilling Method	Sampler
Type	Geoprobe	Macro-Core Liners
Size ID (in.)		1.75 x 60
Advancement	Direct Push	Push

Groundwater Observations

Date	Time	Depth Below Ground (ft.)	Depth of Casing (ft.)	Depth to Bottom of Hole (ft.)	Stabilization Time

Depth (ft.)	SAMPLE INFORMATION: Type & No.	Rec (in.)	Depth (ft.)	Blows/ 6 in.	PID (ppm)	Ground Water	LITHOLOGY: Graphic	Stratum Elev. / Depth (ft.)	SAMPLE DESCRIPTION AND REMARKS (Classification System: Modified Burmister)	NOTES
1	S-1	11	0-1		0.1				S-1: Brown to gray, fine to coarse SAND, little Gravel, some concrete fragments, trace brick, trace glass. dry.	
2	S-2	22	1-3		0.6			FILL	S-2A (15"): Gray to brown, fine to coarse SAND, little Gravel, little Silt, some concrete fragments. dry.	
3								/ 3.0	S-2B (7"): Black, fine to coarse SAND, little Gravel, little coal, trace glass, trace metal, trace brick.	
4									Boring terminated at 3 feet.	
5										
6										
7										
8										
9										
10										

Soil	Percentage	Non-Soil
trace	5 - 10	very few
little	10 - 20	few
some	20 - 35	several
and	35 - 50	numerous

NOTES:

Soil descriptions are based on visual classifications and should be considered approximate. Stratification lines are approximate boundaries between stratums; transitions may be gradual.

BORING LOG

Nobis — Engineering a Sustainable Future

Project: Former Tombarello Facility TBA

Location: 207 Marston Street, Lawrence, MA

Nobis Project No.: 80108.04

Boring No.: **WSB-6**

Boring Location: See Site Plan

Checked by:

Date Start: June 7, 2016

Date Finish: June 7, 2016

Contractor: Technical Drilling Services

Driller: T. Newton

Nobis Rep.: E. Johnson

Rig Type / Model: Geoprobe 6620DT

Hammer Type: N/A

Hammer Hoist: N/A

Ground Surface Elev.:

Datum:

	Drilling Method	Sampler
Type	Geoprobe	Macro-Core Liners
Size ID (in.)		1.75 x 60
Advancement	Direct Push	Push

Groundwater Observations

Date	Time	Depth Below Ground (ft.)	Depth of Casing (ft.)	Depth to Bottom of Hole (ft.)	Stabilization Time

Depth (ft.)	SAMPLE INFORMATION: Type & No.	Rec (in.)	Depth (ft.)	Blows/ 6 in.	PID (ppm)	Ground Water	LITHOLOGY: Graphic	Stratum Elev. / Depth (ft.)	SAMPLE DESCRIPTION AND REMARKS (Classification System: Modified Burmister)	NOTES
1	S-1	10	0-1		0			FILL / 1.0	S-1A (2"): Dark brown, fine SAND and Silt. some Organics. S-1B (8"): Light brown to dark brown, fine to coarse SAND, some Gravel, possible coal observed.	
2	S-2	22	1-3		0			SAND AND SILT / 3.0	S-2: Light brown, fine SAND and Silt.	
3										
4									Boring terminated at 3 feet.	
5										
6										
7										
8										
9										
10										

Soil	Percentage	Non-Soil
trace	5 - 10	very few
little	10 - 20	few
some	20 - 35	several
and	35 - 50	numerous

NOTES:

1) S-1 Sample collected at 900 (PCBs)
2) S-2 Sample collected at 905 (PCBs)
3) Geoprobe pulled down dark brown/black fine SAND along the edges and at the top of the sleeve

Soil descriptions are based on visual classifications and should be considered approximate. Stratification lines are approximate boundaries between stratums; transitions may be gradual.

BORING LOG

Nobis — Engineering a Sustainable Future

Project: Former Tombarello Facility TBA

Location: 207 Marston Street, Lawrence, MA

Nobis Project No.: 80108.04

Boring No.: **WSB-6N**

Boring Location: See Site Plan

Checked by:

Date Start: June 7, 2016

Date Finish: June 7, 2016

Contractor: Technical Drilling Services

Driller: T. Newton

Nobis Rep.: E. Johnson

Rig Type / Model: Geoprobe 6620DT

Hammer Type: N/A

Hammer Hoist: N/A

Ground Surface Elev.:

Datum:

	Drilling Method	Sampler
Type	Geoprobe	Macro-Core Liners
Size ID (in.)		1.75 x 60
Advancement	Direct Push	Push

Groundwater Observations

Date	Time	Depth Below Ground (ft.)	Depth of Casing (ft.)	Depth to Bottom of Hole (ft.)	Stabilization Time

Depth (ft.)	SAMPLE INFORMATION: Type & No.	Rec (in.)	Depth (ft.)	Blows/ 6 in.	PID (ppm)	Ground Water	LITHOLOGY: Graphic	Stratum Elev. / Depth (ft.)	SAMPLE DESCRIPTION AND REMARKS (Classification System: Modified Burmister)	NOTES
1	S-1	9	0-1		0			FILL / 1.0	S-1: Light brown to dark brown, fine to coarse SAND, some Gravel, trace concrete fragments, trace Organics, trace metal. dry.	
2	S-2	21	1-3		0			SAND AND SILT	S-2A (2"): Rusty dark brown, medium to coarse SAND, little Gravel. moist. S-2B (19"): Light brown, fine SAND and Silt. moist.	
3								/ 3.0		
4									Boring terminated at 3 feet.	
5										
6										
7										
8										
9										
10										

Soil	Percentage	Non-Soil
trace	5 - 10	very few
little	10 - 20	few
some	20 - 35	several
and	35 - 50	numerous

NOTES:

1) S-1 Sample collected at 850 (PCBs)
2) S-2 Sample collected at 855 (PCBs)

Soil descriptions are based on visual classifications and should be considered approximate. Stratification lines are approximate boundaries between stratums; transitions may be gradual.

BORING LOG

Nobis — Engineering a Sustainable Future

Project: Former Tombarello Facility TBA

Location: 207 Marston Street, Lawrence, MA

Nobis Project No.: 80108.04

Boring No.: **WSB-6W**

Boring Location: See Site Plan

Checked by:

Date Start: June 7, 2016

Date Finish: June 7, 2016

Contractor: Technical Drilling Services

Driller: T. Newton

Nobis Rep.: E. Johnson

Rig Type / Model: Geoprobe 6620DT

Hammer Type: N/A

Hammer Hoist: N/A

Ground Surface Elev.:

Datum:

	Drilling Method	Sampler
Type	Geoprobe	Macro-Core Liners
Size ID (in.)		1.75 x 60
Advancement	Direct Push	Push

Groundwater Observations

Date	Time	Depth Below Ground (ft.)	Depth of Casing (ft.)	Depth to Bottom of Hole (ft.)	Stabilization Time

Depth (ft.)	SAMPLE INFORMATION Type & No.	Rec (in.)	Depth (ft.)	Blows/ 6 in.	PID (ppm)	Ground Water	LITHOLOGY Graphic	Stratum Elev. / Depth (ft.)	SAMPLE DESCRIPTION AND REMARKS (Classification System: Modified Burmister)	NOTES
1	S-1	10	0-1		0			FILL / 1.2	S-1: Light brown to dark brown, fine to coarse SAND, some Gravel, trace concrete fragments, trace Organics. dry.	
2	S-2	21	1-3		0.1			SAND AND SILT / 3.0	S-2A (2"): Rusty dark brown, medium to coarse SAND, little Gravel. moist. S-2B (19"): Light brown, fine SAND and Silt. moist.	
3										
4									Boring terminated at 3 feet.	
5										
6										
7										
8										
9										
10										

Soil	Percentage	Non-Soil
trace	5 - 10	very few
little	10 - 20	few
some	20 - 35	several
and	35 - 50	numerous

NOTES:

1) S-1 Sample collected at 840 (PCBs)
2) S-2 Sample collected at 845 (PCBs)
3) MS/MSD Sample collected for S-2

Soil descriptions are based on visual classifications and should be considered approximate. Stratification lines are approximate boundaries between stratums; transitions may be gradual.

APPENDIX C

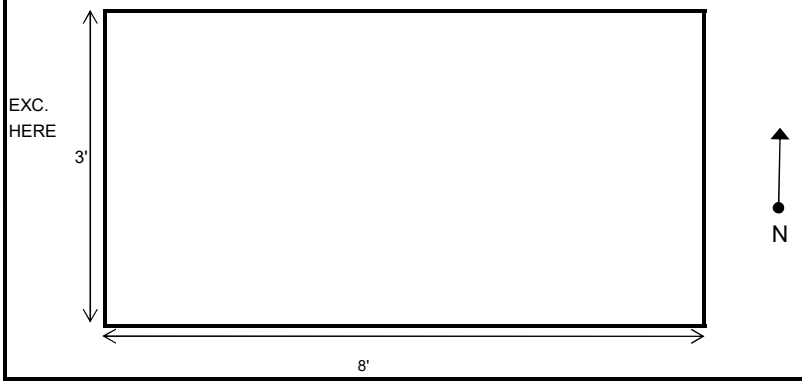
Nobis
Engineering a Sustainable Future

PROJECT		TEST PIT NO.:	TP-01
Former Tombarello Site TBA		SHEET:	of
207 Marston Street		FILE NO.:	80108.04
Lawrence, MA		CHKD. BY:	A. Roy

Contractor:	Technical Drilling Services	Test Pit Location:	See Boring Location Plan		
Operator:	Mark Zork	Ground Surface El.:		Datum:	
Nobis Rep.:	Erik Johnson	Date Start:	6/15/2016	Date End:	6/15/2016

Depth Below Grade (ft.)	PID (ppm)	Subsurface Description	Excavation Effort	Boulder Class
1	0.5	0' - 1' : Brown, fine SAND and SILT, trace Gravel, little Debris, dry. Material sampled from 0' - 1' at 1410 for PCBs and Metals analysis.	E	A
2		1' - 4' : Dark brown, fine SAND and SILT, trace Gravel, little Debris, dry.	E	A
3	0.5		E	A
4		Material sampled from 2' - 3' at 1415 for PCBs and Metals analysis.	E	A
5		4' - 5' : Orangish yellow fine SAND, some Silt, dry. Native material. Test pit terminated at 5' below top of far sidewall, roughly 2' below surface on which excavator is positioned.	E	A
6				
7				
8				
9				
10		Test pit terminated at 9' from top of far sidewall.		
11				
12				
13				
14				

TEST PIT SKETCH (NOT TO SCALE) DIMENSIONS AND SAMPLING LOCATIONS	E = Easy M = Moderate D = Difficult	A = 6"-8" B = 18"-36" C = >36"



Note: All depth measurements refer to distance from top of headwall unless otherwise noted.

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Nobis
Engineering a Sustainable Future

PROJECT		TEST PIT NO.:	TP-02
Former Tombarello Site TBA		SHEET:	of
207 Marston Street		FILE NO.:	80108.04
Lawrence, MA		CHKD. BY:	A. Roy

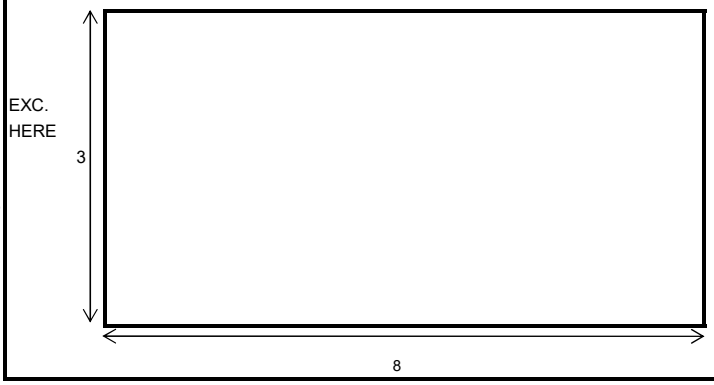
Contractor:	Technical Drilling Services	Test Pit Location:	See Boring Location Plan		
Operator:	Mark Zork	Ground Surface El.:		Datum:	
Nobis Rep.:	Erik Johnson	Date Start:	6/15/2016	Date End:	6/15/2016

Depth Below Grade (ft.)	PID (ppm)	Subsurface Description	Excavation Effort	Boulder Class
1	0.7	0' - 3' :Brown to light brown fine SAND and SILT, little Organics (roots), trace Gravel, trace Debris (coal, bricks, wood fragments), dry.	E	A
2		Material sampled from 0' - 1' at 1340 for PCBs and Metals analysis.	E	A
3			E	A
4	0.9	3' - 4' : Dark brown fine SAND, some Silt, little Gravel, little Debris (glass, ash, metal fragments), dry. Material sampled from 3' - 4' at 1350 for PCBs and Metals analysis.	E	A
5		4' - 6' : Yellow, fine SAND and SILT, dry. Material appears native.	E	A
6			E	A
7		Test pit terminated at 6' below top of far sidewall.		
8				
9				
10		Test pit terminated at 9' from top of far sidewall.		
11				
12				
13				
14				

TEST PIT SKETCH (NOT TO SCALE)
DIMENSIONS AND SAMPLING LOCATIONS

E = Easy
M = Moderate
D = Difficult

A = 6"-8"
B = 18"-36"
C = >36"



Note: All depth measurements refer to distance from top of headwall unless otherwise noted.

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Nobis
Engineering a Sustainable Future

PROJECT		TEST PIT NO.:	TP-03
Former Tombarello Site TBA		SHEET:	of
207 Marston Street		FILE NO.:	80108.04
Lawrence, MA		CHKD. BY:	A. Roy

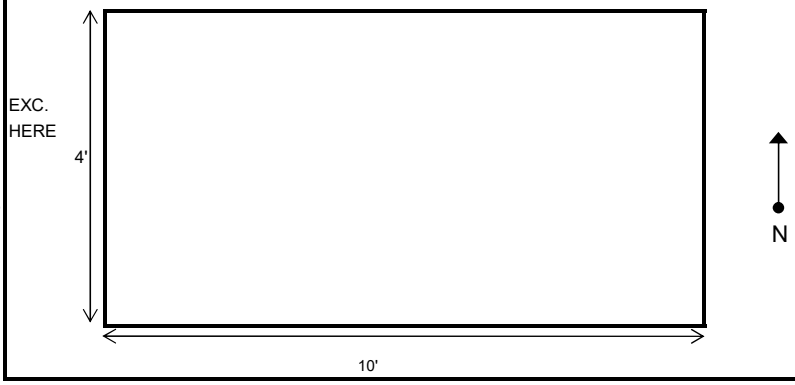
Contractor:	Technical Drilling Services	Test Pit Location:	See Boring Location Plan		
Operator:	Mark Zork	Ground Surface El.:		Datum:	
Nobis Rep.:	Erik Johnson	Date Start:	6/15/2016	Date End:	6/15/2016

Depth Below Grade (ft.)	PID (ppm)	Subsurface Description	Excavation Effort	Boulder Class
1	0.5	Organics observed at surface of berm. 0' - 4' : Light brown SILT and fine Sand, trace Gravel, trace Debris at surface, dry.	E	A
2		Material sampled 0' - 1' at 1200 for PCBs and Metals analysis.	E	A
3			E	A
4			E	A
5	0.7	4' - 6' : Dark reddish brown fine SAND and SILT, trace Debris (ash material, glass, cobble), dry. Material sampled 4' - 5' at 1200 for PCBs and Metals analysis.	E / M	A
6			E	A
7		6' - 9' : Yellow fine SAND and SILT, moist. Appears native.	E	A
8			E	A
9			E	A
10		Test pit terminated at 9' from top of far sidewall.		
11				
12				
13				
14				

TEST PIT SKETCH (NOT TO SCALE)
DIMENSIONS AND SAMPLING LOCATIONS

E = Easy
M = Moderate
D = Difficult

A = 6"-8"
B = 18"-36"
C = >36"



Note: All depth measurements refer to distance from top of headwall unless otherwise noted.

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Nobis
Engineering a Sustainable Future

PROJECT		TEST PIT NO.:	TP-04
Former Tombarello Site TBA		SHEET:	of
207 Marston Street		FILE NO.:	80108.04
Lawrence, MA		CHKD. BY:	A. Roy

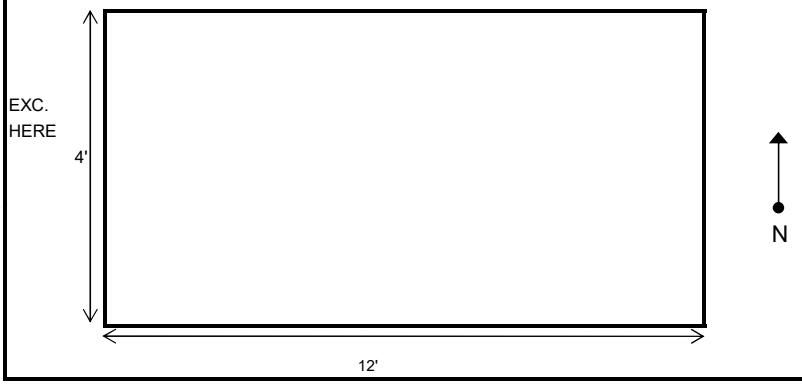
Contractor:	Technical Drilling Services	Test Pit Location:	See Boring Location Plan		
Operator:	Mark Zork	Ground Surface El.:		Datum:	
Nobis Rep.:	Erik Johnson	Date Start:	6/15/2016	Date End:	6/15/2016

Depth Below Grade (ft.)	PID (ppm)	Subsurface Description	Excavation Effort	Boulder Class
1	0.5	Debris litters ground at test pit location. Debris includes machinery parts/equipment, concrete, hubcaps, bricks, glass, plastic. 0' - 8' : Grayish brown SILT, some fine to medium Sand, little Gravel, little Organics, little debris, dry.	E	A
2		Material sampled 0' - 1' bgs at 1100 for PCBs and Metals analysis.	E	A
3			E	A
4		Same material observed as test pit is excavated. Darker brown color change is observed, but material continues to remain Sandy SILT with less debris than many of the southern property boundary berm test pits.	E	A
5			E	A / B
6	0.8	Material sampled 5' - 6' bgs at 1115 for PCBs and Metals analysis. This interval just above grade at which excavator is positioned.	E	A
7			E	A
8			E	A
9		8' - 11' : Dark brown, medium to coarse SAND and GRAVEL, some Debris (scrap metal, plastic, slag), little ash, mo	E	A
10			E	A
11			E	A
12		Test pit still is in debris fill by 11' below top of far sidewall. Test pit terminated at 11'.		
13				
14				

TEST PIT SKETCH (NOT TO SCALE)
DIMENSIONS AND SAMPLING LOCATIONS

E = Easy
M = Moderate
D = Difficult

A = 6"-8"
B = 18"-36"
C = >36"



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Nobis
Engineering a Sustainable Future

PROJECT		TEST PIT NO.:	TP-05
Former Tombarello Site TBA		SHEET:	of
207 Marston Street		FILE NO.:	80108.04
Lawrence, MA		CHKD. BY:	A. Roy

Contractor:	Technical Drilling Services	Test Pit Location:	See Boring Location Plan		
Operator:	Mark Zork	Ground Surface El.:		Datum:	
Nobis Rep.:	Erik Johnson	Date Start:	6/15/2016	Date End:	6/15/2016

Depth Below Grade (ft.)	PID (ppm)	Subsurface Description	Excavation Effort	Boulder Class
1	0	0 - 2' : Brown fine to medium SAND and SILT, little Gravel, little Debris (glass, metal, rubber, wood fragments), little Organics, dry.	E	A
2		Sample collected from 0' - 1' bgs at 0840 for PCB and Metals analysis.	E	A
3		~2' - 3' : Material transitions to fine to coarse SAND and GRAVEL, some Debris (metal scraps, chain, slag, wood, glass), trace Silt, trace ash, dry. Very large concrete or granite block observed.	E	A / B
4			E / M	A / B
5	0.4	Sample collected from 4' - 5' bgs at 0845 for PCB and Metals analysis.	E / M	A / C
6			E / M	A / B
7			M	A
8			M	A / B
9		Material continues to approximately 13 ' below far sidewall. Copious metal debris, glass, ceramic shards, some Sand and Gravel.	M	A / B
10			M	A / B
11		Ash pocket observed ~10' - 11', more ashen color at depth.	M / D	A / B
12			M	A / B
13			M	A / B
14		Test pit terminated at 13'.		

TEST PIT SKETCH (NOT TO SCALE)
DIMENSIONS AND SAMPLING LOCATIONS

E = Easy
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D = Difficult

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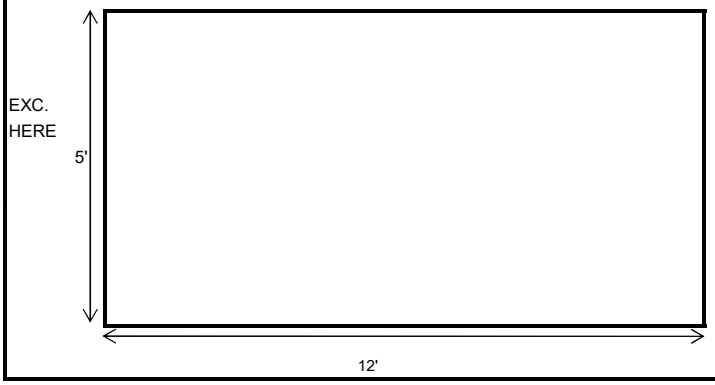
B = 18"-36"
C = >36"



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Nobis
Engineering a Sustainable Future

PROJECT			
Former Tombarello Site TBA		TEST PIT NO.:	TP-06
207 Marston Street		SHEET:	of
		FILE NO.:	80108.04
Lawrence, MA		CHKD. BY:	A. Roy

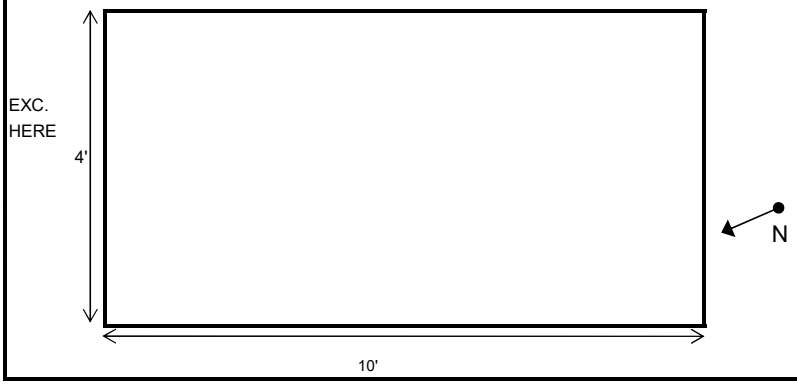
Contractor:	Technical Drilling Services	Test Pit Location:	See Boring Location Plan		
Operator:	Mark Zork	Ground Surface El.:		Datum:	
Nobis Rep.:	Erik Johnson	Date Start:	6/14/2016	Date End:	6/14/2016

Depth Below Grade (ft.)	PID (ppm)	Subsurface Description	Excavation Effort	Boulder Class
1	1.2	0' - 8' : Brown, fine to coarse SAND, some Gravel, some Debris (metal scraps, brick, glass, coal fragments, rubber), little Silt, little Organics, dry.	E	A
2		Material samples 0' - 1' at 1240 for PCBs and Metals analysis.	E	A
3			E	A
4			E	A
5			E	A / B
6			E	A
7			E	A
8			E / M	A
9		8' - 11' : Dark grayish brown to black, fine to coarse SAND, little Gravel, little Debris (metal scraps, brick, glass, coal fragments, rubber, tires), trace odor, moist.	M	B
10	26.4		M	A
11		Test pit terminated at 10' below top of far sidewall of berm.	E / M	A
12		11' : Well sorted olive brown fien SAND, trace Debris (brick). Roughly 1' below grade on which excavator is positioned. Test pit terminated at ~11.5-12' below top of far sidewall.	E	A
13				
14				

TEST PIT SKETCH (NOT TO SCALE)
DIMENSIONS AND SAMPLING LOCATIONS

E = Easy
M = Moderate
D = Difficult

A = 6"-8"
B = 18"-36"
C = >36"



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Nobis
Engineering a Sustainable Future

PROJECT		TEST PIT NO.:	TP-07
Former Tombarello Site TBA		SHEET:	of
207 Marston Street		FILE NO.:	80108.04
Lawrence, MA		CHKD. BY:	A. Roy

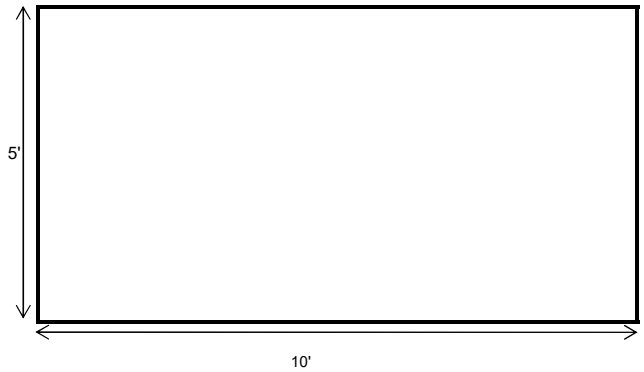
Contractor:	Technical Drilling Services	Test Pit Location:	See Boring Location Plan		
Operator:	Mark Zork	Ground Surface El.:		Datum:	
Nobis Rep.:	Erik Johnson	Date Start:	6/14/2016	Date End:	6/14/2016

Depth Below Grade (ft.)	PID (ppm)	Subsurface Description	Excavation Effort	Boulder Class
1	0.8	0' - 7' : Brown, fine to medium SAND, some Silt, some Debris (metal, glass, computer parts, rebar, concrete, plastic) little Gravel, dry.	E	A
2		Material sampled from 0' - 1' at 1320 for PCBs and Metals analysis.	E	A
3			E	A
4			E	A
5			E	A
6			E / M	A
7			E / M	A
8	2.3	7' - 8' : Brown fine to coarse SAND and GRAVEL, some Debris (metal, wires, wood, glass, a bumper), dry. Material sampled from 7' - 8' below top of far sidewall at 1330 for PCBs and Metals analysis.	E / M	A / B
9		Test pit terminated at 8' below top of far sidewall, at similar elevation as grade on which excavator is positioned.		
10				
11				
12				
13				
14				

TEST PIT SKETCH (NOT TO SCALE)
DIMENSIONS AND SAMPLING LOCATIONS

E = Easy
M = Moderate
D = Difficult

A = 6"-8"
B = 18"-36"
C = >36"



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Nobis
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PROJECT		TEST PIT NO.:	TP-08
Former Tombarello Site TBA		SHEET:	of
207 Marston Street		FILE NO.:	80108.04
Lawrence, MA		CHKD. BY:	A. Roy

Contractor:	Technical Drilling Services	Test Pit Location:	See Boring Location Plan		
Operator:	Mark Zork	Ground Surface El.:		Datum:	
Nobis Rep.:	Erik Johnson	Date Start:	6/14/2016	Date End:	6/14/2016

Depth Below Grade (ft.)	PID (ppm)	Subsurface Description	Excavation Effort	Boulder Class
1	2.1	0' - 6' : Dark brown fine to medium SAND, some Silt, little Gravel, little Debris (metal, glass, ash, coal, brick, plastic, computer parts, springs, trash), dry.	E	A
2		Material samples 0' - 1' at 1240 for PCBs and Metals analysis.	E	A
3			E	A
4			E	A
5			E	A
6			E	A / B
7		6' - 10' : Black, fine to coarse SAND, some Gravel, some Debris (wood, glass, coal, ash, metal, piping), little Silt, moist. Old petroleum odor detected.	M	A / B
8			M	A / B
9			M	A / B
10	43.2	Material samples from 9' - 10' below top of far sidewall at 1300 for PCBs and Metals analysis. FD-11 also collected (1305).	M	A / B
11		Test pit terminated at 10' below top of far sidewall of berm.	M	A / B
12				
13				
14				

TEST PIT SKETCH (NOT TO SCALE)
DIMENSIONS AND SAMPLING LOCATIONS

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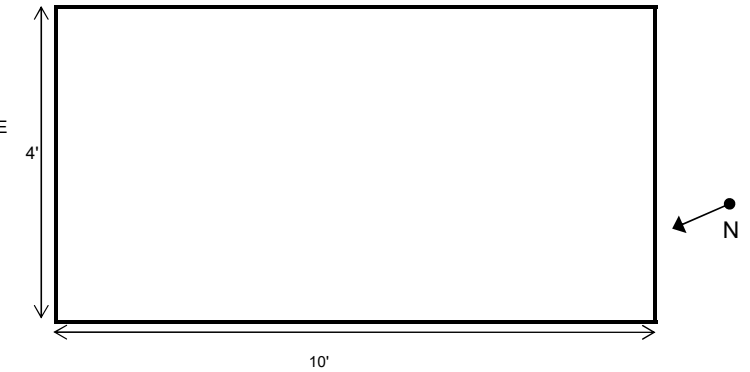
M = Moderate
D = Difficult

A = 6"-8"
B = 18"-36"
C = >36"



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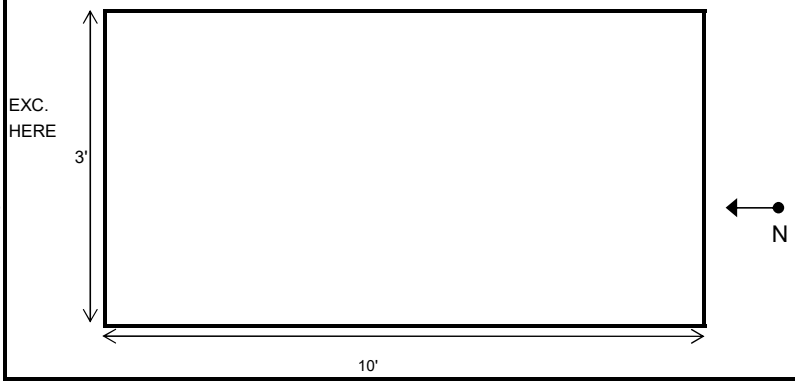
Nobis
Engineering a Sustainable Future

PROJECT		TEST PIT NO.:	TP-09
Former Tombarello Site TBA		SHEET:	of
207 Marston Street		FILE NO.:	80108.04
Lawrence, MA		CHKD. BY:	A. Roy

Contractor:	Technical Drilling Services	Test Pit Location:	See Boring Location Plan		
Operator:	Mark Zork	Ground Surface El.:		Datum:	
Nobis Rep.:	Erik Johnson	Date Start:	6/14/2016	Date End:	6/14/2016

Depth Below Grade (ft.)	PID (ppm)	Subsurface Description	Excavation Effort	Boulder Class
1	0.2	0' - 1' : Brown, fine to medium SAND, some Silt, little Gravel, little Debris (glass, coal, brick, metal scraps), moist. Organics and loam observed at the surface of the berm slope.	E	A
2		Material sampled from 0' - 1' at 1020 for PCBs and Metals analysis. 1' - 5' : Brown, fine to medium SAND, some Silt, little Gravel, trace Debris (metal scraps, glass). Uniform in color, appears very similar to topsoil or loam.	E	A
3			E	A
4			E	A
5			E	A
6		5' - 10' : Brown, fine to medium SAND, some Debris (metal scraps, wood, glass, rebar, wiring, granite block, concrete), some Silt, little Gravel, moist.	M	A / B
7			M	A / B
8			M	A / B
9			E / M	A / B
10	0.1	Material sampled from 9' - 10' at 1035 for PCBs and Metals analysis.	E / M	A / B
11		Test pit terminated at 10' below far sidewall.		
12				
13				
14				

TEST PIT SKETCH (NOT TO SCALE) DIMENSIONS AND SAMPLING LOCATIONS	E = Easy M = Moderate D = Difficult	A = 6"-8" B = 18"-36" C = >36"



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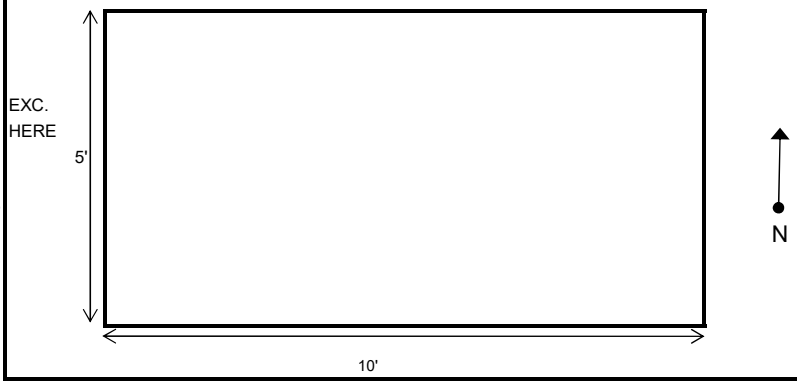
Nobis
Engineering a Sustainable Future

PROJECT			
Former Tombarello Site TBA		TEST PIT NO.:	TP-10
207 Marston Street		SHEET:	of
Lawrence, MA		FILE NO.:	80108.04
		CHKD. BY:	A. Roy

Contractor:	Technical Drilling Services	Test Pit Location:	See Boring Location Plan		
Operator:	Mark Zork	Ground Surface El.:		Datum:	
Nobis Rep.:	Erik Johnson	Date Start:	6/14/2016	Date End:	6/14/2016

Depth Below Grade (ft.)	PID (ppm)	Subsurface Description	Excavation Effort	Boulder Class
1	0.1	0' - 0.5' Organics (roots, leaves, grasses) 0.5' - 1' : Dark brown fine SAND, some Silt, some Debris, dry.	E	A
2		Material samples from 0' - 1' at 0930 for PCBs and Metals analysis. 1' - 5' : Dark brown fine SAND and DEBRIS (rusty metal scrap/piping, rubber scraps, glass, ash), some Silt, dry.	E	A
3			E	A / B
4			M / D	A / B
5			M / D	A / B
6		5' - 7' : Dark brown medium to coarse SAND and DEBRIS (metal scraps, some slag, glass, coal).	M	A
7	1.8	Material samples from 6' - 7' at 0950 for PCBs and Metals analysis.	M	A
8		7' : Brown to tan medium SAND, rusty iron banding, moist. Potentially native.	E / M	A
9		Test pit terminated at 8', native material observed.		
10				
11				
12				
13				
14				

TEST PIT SKETCH (NOT TO SCALE) DIMENSIONS AND SAMPLING LOCATIONS	E = Easy M = Moderate D = Difficult	A = 6"-8" B = 18"-36" C = >36"



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Nobis
Engineering a Sustainable Future

PROJECT			
Former Tombarello Site TBA		TEST PIT NO.:	TP-11
207 Marston Street		SHEET:	of
Lawrence, MA		FILE NO.:	80108.04
		CHKD. BY:	A. Roy

Contractor:	Technical Drilling Services	Test Pit Location:	See Boring Location Plan		
Operator:	Mark Zork	Ground Surface El.:		Datum:	
Nobis Rep.:	Erik Johnson	Date Start:	6/16/2016	Date End:	6/16/2016

Depth Below Grade (ft.)	PID (ppm)	Subsurface Description	Excavation Effort	Boulder Class
1	0.1	Organics (grass, roots) at surface. 0' - 1' : Dark brown fine to coarse SAND, some Silt, little Gravel, little Debris (plastic, metal fragments), little Organics, dry.	E	A
2		Sampled 0' - 1' bgs at 0820 for PCBs and Metals analysis.	E	A
3			E	A
4	0.4	Soil characteristics appear similar, however larger proportion of Debris (metal scraps and wiring) observed.	M	A
5		4' - 6' : DEBRIS (scrap metal, slag), some fine to medium SAND, some Gravel, little Silt, dry. Sampled 5' - 6' bgs at 0830 for PCBs and Metals analysis.	M / D	A
6		6' : Material appears to have been compacted, significantly more challenging excavation.	M / D	A
7		6.5' - 7' : Concrete slab. Excavator continues to scrape through slab.	D	A
8			D	A
9		8.5' : Test pit terminated, excavator still excavating through what appears to be concrete slab.	D	A
10				
11				
12				
13				
14				

TEST PIT SKETCH (NOT TO SCALE)
DIMENSIONS AND SAMPLING LOCATIONS

E = Easy
M = Moderate
D = Difficult

A = 6"-8"
B = 18"-36"
C = >36"

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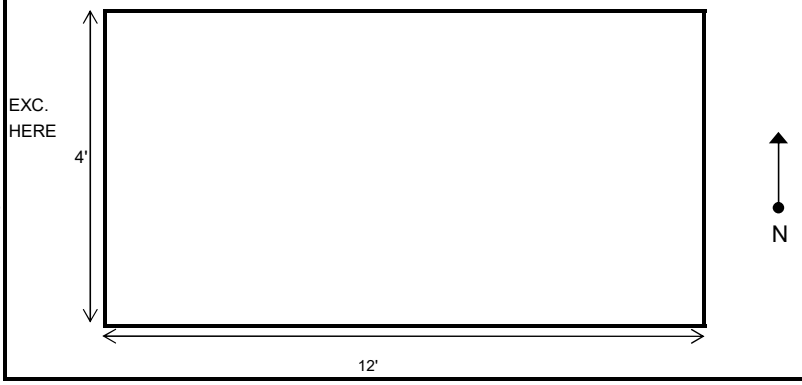
Nobis
Engineering a Sustainable Future

PROJECT			
Former Tombarello Site TBA		TEST PIT NO.:	TP-12
207 Marston Street		SHEET:	of
		FILE NO.:	80108.04
Lawrence, MA		CHKD. BY:	A. Roy

Contractor:	Technical Drilling Services	Test Pit Location:	See Boring Location Plan		
Operator:	Mark Zork	Ground Surface El.:		Datum:	
Nobis Rep.:	Erik Johnson	Date Start:	6/15/2016	Date End:	6/15/2016

Depth Below Grade (ft.)	PID (ppm)	Subsurface Description	Excavation Effort	Boulder Class
1	0.5	0 - 5' : Brown, fine to medium SAND, some Silt, little Debris (metal, wood, glass, plastic), little Gravel, dry. Materal sampled from 0 - 1' bgs at 1015 for PCBs and Metals analysis.	E	A
2			E	A
3			E	A
4		Tires, large pieces of concrete/granite observed. Metal pipe fragment protruding from northern sidewall.	E	A
5			M / D	A
6		Brown, fine to medium SAND, some Silt, some Gravel, little Debris, dry.	M / D	A / B
7	0.7	Material sampled from 6' - 7' at 1025 for PCBs and Metals analysis.	M / D	C
8		Concrete or potentially granite slab encountered at 7' below top of far sidewall. Test pit terminated at 7'.		
9				
10				
11				
12				
13				
14				

TEST PIT SKETCH (NOT TO SCALE) DIMENSIONS AND SAMPLING LOCATIONS	E = Easy M = Moderate D = Difficult	A = 6"-8" B = 18"-36" C = >36"



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Nobis
Engineering a Sustainable Future

PROJECT		TEST PIT NO.:	TP-13
Former Tombarello Site TBA		SHEET:	of
207 Marston Street		FILE NO.:	80108.04
Lawrence, MA		CHKD. BY:	A. Roy

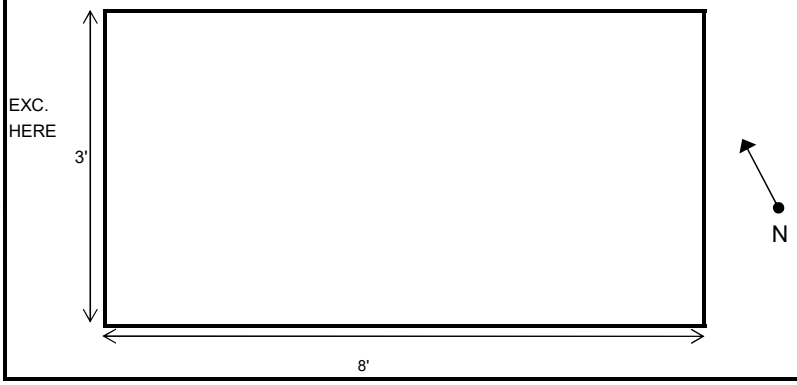
Contractor:	Technical Drilling Services	Test Pit Location:	See Boring Location Plan		
Operator:	Mark Zork	Ground Surface El.:		Datum:	
Nobis Rep.:	Erik Johnson	Date Start:	6/15/2016	Date End:	6/15/2016

Depth Below Grade (ft.)	PID (ppm)	Subsurface Description	Excavation Effort	Boulder Class
1	0.5	0 - 6' Brown, fine SAND and SILT, some Debris (metal fragments, wood, brick, plastic, slag), some Gravel, little Organics, dry.	E	A
2		Material sampled 0' - 1' bgs at 0950 for PCBs and Metals analysis.	E	A
3			E	A
4			E	A
5			E	A
6	0.4	Material sampled 5' - 6' bgs at 1000 for PCBs and Metals analysis.	D	A
7		6' : Concrete slab, at same grade as concrete slab at grade further to the north of TP-13. Test pit terminated at 6' below top of far sidewall, even with grade at which excavator is positioned.		
8				
9				
10				
11				
12				
13				
14				

TEST PIT SKETCH (NOT TO SCALE)
DIMENSIONS AND SAMPLING LOCATIONS

E = Easy
M = Moderate
D = Difficult

A = 6"-8"
B = 18"-36"
C = >36"



Note: All depth measurements refer to distance from top of headwall unless otherwise noted.

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Nobis
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PROJECT		TEST PIT NO.:	TP-14
Former Tombarello Site TBA		SHEET:	of
207 Marston Street		FILE NO.:	80108.04
Lawrence, MA		CHKD. BY:	A. Roy

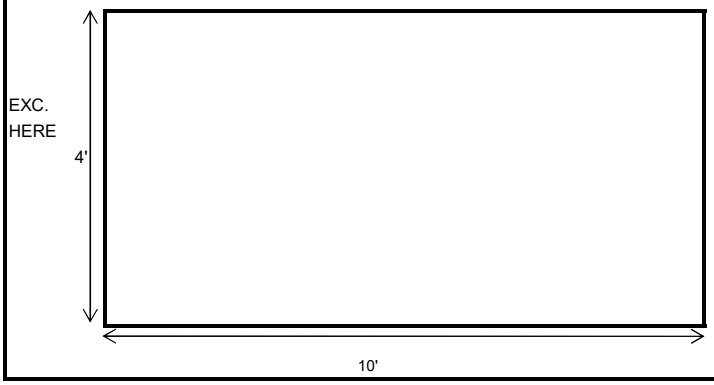
Contractor:	Technical Drilling Services	Test Pit Location:	See Boring Location Plan		
Operator:	Mark Zork	Ground Surface El.:		Datum:	
Nobis Rep.:	Erik Johnson	Date Start:	6/15/2016	Date End:	6/15/2016

Depth Below Grade (ft.)	PID (ppm)	Subsurface Description	Excavation Effort	Boulder Class
1		Organics observed at surface of stockpile. 0' - 5' : Brown fine to medium SAND, some Silt, little Gravel, trace Debris (metal, brick, glass), dry.	E	A
2		Material sampled from 0' - 1' bgs at 0920 for PCBs and Metals analysis.	E	A
3		Quantity of debris increases with depth.	E	A
4			E	A
5			E	A
6	1.1	5' - 7' : Dark ashy gray/black fine to coarse SAND, some Gravel, little Debris (glass, brick, slag, metal), dry. Material sampled from 5' - 6' bgs at 0930 for PCBs and Metals analysis.	E	A
7		7' : Thin lense of tan fine SAND, dry.	E	A
8		Comingled brown and gray fine to coarse SAND, little Gravel, little Debris, dry.	E	A
9		Test pit terminated at 8' bgs (from top of far sidewall), roughly 2' bgs on which excavator is positioned.		
10				
11				
12				
13				
14				

TEST PIT SKETCH (NOT TO SCALE)
DIMENSIONS AND SAMPLING LOCATIONS

E = Easy
M = Moderate
D = Difficult

A = 6"-8"
B = 18"-36"
C = >36"



Note: All depth measurements refer to distance from top of headwall unless otherwise noted.

R:\Standard Operating Procedures\Field Forms\Sampling\2011_Test_Pit_Worksheet.xlsx

Nobis
Engineering a Sustainable Future

PROJECT		TEST PIT NO.:	TP-15
Former Tombarello Site TBA		SHEET:	of
207 Marston Street		FILE NO.:	80108.04
Lawrence, MA		CHKD. BY:	A. Roy

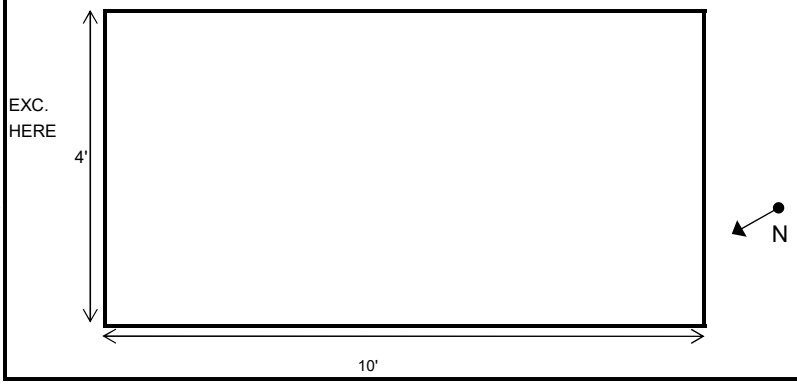
Contractor:	Technical Drilling Services	Test Pit Location:	See Boring Location Plan		
Operator:	Mark Zork	Ground Surface El.:		Datum:	
Nobis Rep.:	Erik Johnson	Date Start:	6/14/2016	Date End:	6/14/2016

Depth Below Grade (ft.)	PID (ppm)	Subsurface Description	Excavation Effort	Boulder Class
1	1.8	0' - 1' : Brown, fine to coarse SAND, some Gravel, little Debris (glass, scrap metal, brick fragments), little Silt, dry. Little Organics observed at the surface of the stockpile.	E	A
2		Material sampled from 0' - 1' at 1420 for PCBs and metals analysis.	E	A
3			E	A
4			E	A
5			E	A
6		Material continues to appear the same; Brown, fine to coarse SAND, some Gravel, little Debris (brick fragments, concrete, metal scraps, plastic, glass, styrafoam), little Silt, dry.	E	A / B
7			E	A / B
8			E	A / B
9	2.1	Material sampled from 8' - 9' at 1430 for PCBs and Metals analysis.	E	A / B
10			E	A / B
11		Test pit terminated at 10' below far sidewall.		
12				
13				
14				

TEST PIT SKETCH (NOT TO SCALE)
DIMENSIONS AND SAMPLING LOCATIONS

E = Easy
M = Moderate
D = Difficult

A = 6"-8"
B = 18"-36"
C = >36"



Note: All depth measurements refer to distance from top of headwall unless otherwise noted.

R:\Standard Operating Procedures\Field Forms\Sampling\2011_Test_Pit_Worksheet.xlsx

Nobis
Engineering a Sustainable Future

PROJECT		TEST PIT NO.:	TP-16
Former Tombarello Site TBA		SHEET:	of
207 Marston Street		FILE NO.:	80108.04
Lawrence, MA		CHKD. BY:	A. Roy

Contractor:	Technical Drilling Services	Test Pit Location:	See Boring Location Plan		
Operator:	Mark Zork	Ground Surface El.:		Datum:	
Nobis Rep.:	Erik Johnson	Date Start:	6/14/2016	Date End:	6/14/2016

Depth Below Grade (ft.)	PID (ppm)	Subsurface Description	Excavation Effort	Boulder Class
1	0.9	0' - 1' : Brown, fine to medium SAND, little Gravel, little Silt, little Debris (glass, metal, brick, plastic, rubber), dry. Material sampled from 0' - 1' at 1350 for PCBs and Metals analysis.	E	A
2			E	A
3			E	A
4			E	A
5			E	A
6		Material continues to appear the same, debris continues to be observed.	E	A
7			E	A
8			E	A
9	0.3	Material sampled from 8' - 9' below top of far sidewall, just above grade on which excavator is positioned. Sampled is collected at 1400 for PCBs and Metals analysis.	E	A
10		Test pit terminated at 9' below top of far sidewall. Debris continues to be observed, including brick, gravel, metal scraps, wires.		
11				
12				
13				
14				

TEST PIT SKETCH (NOT TO SCALE)
DIMENSIONS AND SAMPLING LOCATIONS

E = Easy
M = Moderate
D = Difficult

A = 6"-8"
B = 18"-36"
C = >36"

Note: All depth measurements refer to distance from top of headwall unless otherwise noted.

R:\Standard Operating Procedures\Field Forms\Sampling\2011_Test_Pit_Worksheet.xlsx

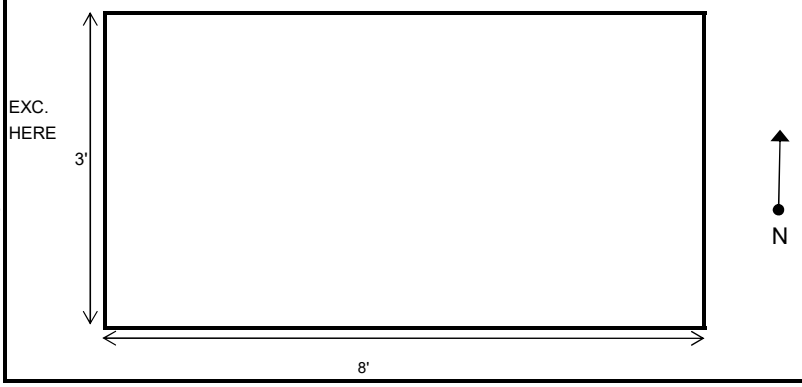
Nobis
Engineering a Sustainable Future

PROJECT		TEST PIT NO.:	TP-17
Former Tombarello Site TBA		SHEET:	of
207 Marston Street		FILE NO.:	80108.04
Lawrence, MA		CHKD. BY:	A. Roy

Contractor:	Technical Drilling Services	Test Pit Location:	See Boring Location Plan		
Operator:	Mark Zork	Ground Surface El.:		Datum:	
Nobis Rep.:	Erik Johnson	Date Start:	6/15/2016	Date End:	6/15/2016

Depth Below Grade (ft.)	PID (ppm)	Subsurface Description	Excavation Effort	Boulder Class
1	1.5	0' - 3' : Dark brown fine SAND and SILT, some Debris (metal, cloth, bubblewrap, glass fragments), trace Organics (at surface), dry.	E	A / B
2		Material sampled from 0' - 1' at 1440 for PCBs and Metals analysis.	E	A / B
3		Considerably more debris observed by 2' below top of far sidewall.	E	A / B
4		3' - 4': Dark brown DEBRIS (steel grate, metal scraps) and fine SAND and SILT, trace ash, dry. Material sampled from 3' - 4' at 1450 for PCBs and Metals analysis.	E	A / B
5		4.5' : Reworked native material consisting of light brown fine SAND and SILT, dry.	E	A / B
6		Test pit terminated at approximately 5' due to potential subsurface utility running through the vicinity.		
7				
8				
9				
10		Test pit terminated at 9' from top of far sidewall.		
11				
12				
13				
14				

TEST PIT SKETCH (NOT TO SCALE) DIMENSIONS AND SAMPLING LOCATIONS	E = Easy M = Moderate D = Difficult	A = 6"-8" B = 18"-36" C = >36"



Note: All depth measurements refer to distance from top of headwall unless otherwise noted.

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Nobis
Engineering a Sustainable Future

PROJECT			
Former Tombarello Site TBA		TEST PIT NO.:	TP-18
207 Marston Street		SHEET:	of
		FILE NO.:	80108.04
Lawrence, MA		CHKD. BY:	A. Roy

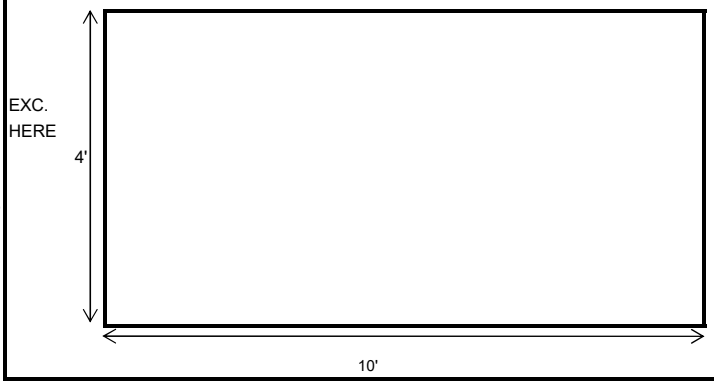
Contractor:	Technical Drilling Services	Test Pit Location:	See Boring Location Plan		
Operator:	Mark Zork	Ground Surface El.:		Datum:	
Nobis Rep.:	Erik Johnson	Date Start:	6/16/2016	Date End:	6/16/2016

Depth Below Grade (ft.)	PID (ppm)	Subsurface Description	Excavation Effort	Boulder Class
1	0.7	0"-6": Brown fine to coarse SAND and Silt, some organics, little debris, little gravel	E	A
2		Material sampled 0' - 1' at 0930 for PCBs and Metals analysis.	E	A
3		6"-3': Light brown fine SAND and Silt, some debris.	E	A
4	0.4	3'-5': Dark olive medium to coarse SAND and GRAVEL, trace debris, moist.	E	A
5		Material sampled 3-4' at 0940 for PCBs and Metals analysis.	E	A
6		5'-7': tan, fine SAND and SILT, no debris, potentially native material	E	A
7			E	A
8		Test pit terminated at 7' from top of far sidewall. Potential utility encountered and native material observed.		
9				
10				
11				
12				
13				
14				

TEST PIT SKETCH (NOT TO SCALE)
DIMENSIONS AND SAMPLING LOCATIONS

E = Easy
M = Moderate
D = Difficult

A = 6"-8"
B = 18"-36"
C = >36"



Note: All depth measurements refer to distance from top of headwall unless otherwise noted.

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Nobis
Engineering a Sustainable Future

PROJECT		TEST PIT NO.:	TP-19
Former Tombarello Site TBA		SHEET:	of
207 Marston Street		FILE NO.:	80108.04
Lawrence, MA		CHKD. BY:	A. Roy

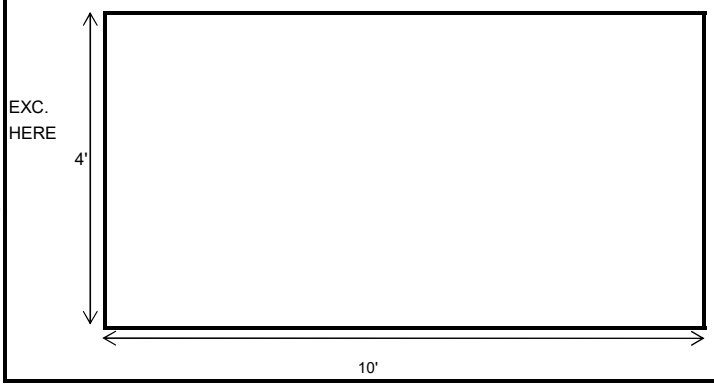
Contractor:	Technical Drilling Services	Test Pit Location:	See Boring Location Plan		
Operator:	Mark Zork	Ground Surface El.:		Datum:	
Nobis Rep.:	Erik Johnson	Date Start:	6/15/2016	Date End:	6/15/2016

Depth Below Grade (ft.)	PID (ppm)	Subsurface Description	Excavation Effort	Boulder Class
1	0.5	Organics observed at surface of stockpile. 0' - 9' : Brown fine to medium SAND and GRAVEL, little Silt, little Debris (metal scraps, glass, tires), dry.	E	A / B
2		Material sampled 0' - 1' at 1230 for PCBs and Metals analysis.	E	A / B
3		Material looks similar throughout, comparable amounts of debris.	E	A
4			E	A
5			E	A
6			E	A
7	1.3	Material sampled 6' - 7' at 1240 for PCBs, Metals, and Hexavalent Chromium analysis.	E	A
8			E	A
9			E	A
10		Test pit terminated at 9' from top of far sidewall.		
11				
12				
13				
14				

TEST PIT SKETCH (NOT TO SCALE)
DIMENSIONS AND SAMPLING LOCATIONS

E = Easy
M = Moderate
D = Difficult

A = 6"-8"
B = 18"-36"
C = >36"



Note: All depth measurements refer to distance from top of headwall unless otherwise noted.

R:\Standard Operating Procedures\Field Forms\Sampling\2011_Test_Pit_Worksheet.xlsx

Nobis
Engineering a Sustainable Future

PROJECT		TEST PIT NO.:	TP-20
Former Tombarello Site TBA		SHEET:	of
207 Marston Street		FILE NO.:	80108.04
Lawrence, MA		CHKD. BY:	A. Roy

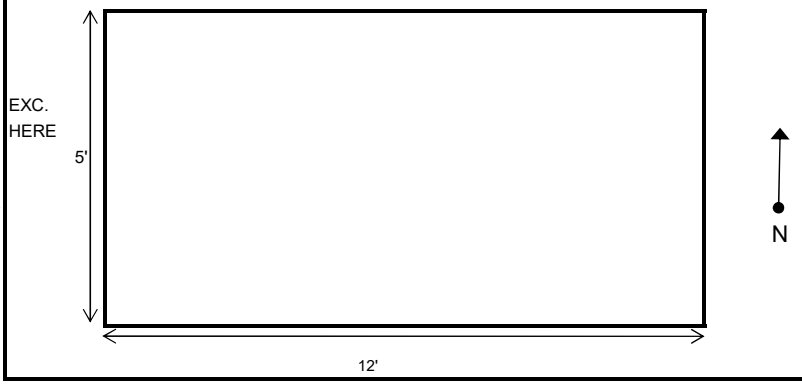
Contractor:	Technical Drilling Services	Test Pit Location:	See Boring Location Plan		
Operator:	Mark Zork	Ground Surface El.:		Datum:	
Nobis Rep.:	Erik Johnson	Date Start:	6/15/2016	Date End:	6/15/2016

Depth Below Grade (ft.)	PID (ppm)	Subsurface Description	Excavation Effort	Boulder Class
1	0.1	Organics (trees, roots, shrubs) at surface. 0' - 6' : Brown fine SAND, trace medium to coarse Sand, some Silt, some Debris, little Organics, little Gravel, dry.	E	A
2		Material sampled from 0' - 1' at 0840 (and FD-10) for PCBs and Metals analysis.	E	A
3		Material becomes darker in color with depth, similar grain size distributions and debris.	E	A
4			E	A
5			E	B
6	0.1	Material sampled from 5' - 6' at 0855 for PCBs and Metals analysis.	M	A
7		Excavation becomes more challenging, roughly at elevation of grade on which excavator is positioned. Debris encountered in test pit includes metal scraps, plastic scraps, wires, hair, wood fragments, glass, tires, brick,	M	A
8		concrete, rubber scraps, and wiring.	M	A
9			M	A
10		9' - 11' : Black/dark brown fine to coarse SAND, little Gravel, some Debris (glass, coal, brick, ash), moist.	M	A
11				
12		11': Test pit terminated, material color change to brown.		
13				
14				

TEST PIT SKETCH (NOT TO SCALE)
DIMENSIONS AND SAMPLING LOCATIONS

E = Easy
M = Moderate
D = Difficult

A = 6"-8"
B = 18"-36"
C = >36"



Note: All depth measurements refer to distance from top of headwall unless otherwise noted.

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APPENDIX D

Low-Flow Field Log

Nobis — Engineering a Sustainable Future

Site Name: Former Tombarello Site
Job Number: 80108.04
Sampler: AG

Date: 6/16/16

Well ID: MW-1
Sample ID: MW-1-061616
Reviewed By: EHJ

Measurement Reference Point (MP): PVC (PVC, Casing, Ground, etc.)
Depth to GW: 9.11 (ft from MP)
Depth to Bottom: 13.4 (ft from MP)
Pump Intake Depth: 12 (ft from MP)
Well depth as installed: 13 (ft bgs)
Screen interval (range): 3 to 13 (ft bgs)

Purging start time: 8:01
Parameter stabalization (Y/N): Yes
Two hour time limit reached (Y/N): Yes
Sample time: 9:05
Total volume purged (gals): 2.5
Time at purge completion: 10:00

Equipment Vendor: Us Environmental
Pump Type: Peristaltic

Turbidity Meter: Hach2100Q
Serial #: 13100C028843

Multimeter: 600XL
Serial #: 08B101377

Notes (Initial PID reading, SOP deviations, etc.):

Lab Analyses: VOC, PCB, PAH, EPH, METALS
QC Info (Duplicate, MS/MSD): None

Clock Time	Bladder Pump Discharge/ Refill	Purge Rate	Depth to Water	Draw down	Cum. Draw down	Temp ±3%	Spec. Cond. ±3%	pH ±0.1	ORP ±10	DO ±10% if >0.5 mg/L	Turbidity ±10% if >5 NTU	Comments/Gas Pressure/Observations	Stability Calculator (auto)
HHMM	sec./sec. or setting	ml/min	ft. below MP	ft.	ft.	oC	µS/cmc		mV	mg/L	NTU		
8:01		100	9.11	0.00	0.00								
8:08		100	9.50	0.39	0.39	13.73	332	7.31	46.5	1.69	48.4		
8:13		100	9.54	0.04	0.43	13.70	327	6.85	25.3	3.05	39.4		
8:18		100	9.55	0.01	0.44	13.68	328	6.69	15.3	3.28	24.8		Not Stable
8:23		100	9.55	0.00	0.44	13.68	327	6.60	19.0	3.59	21.4		Not Stable
8:28		100	9.60	0.05	0.49	13.56	323	6.57	26.6	3.83	25.0		Not Stable
8:33		100	9.55	-0.05	0.44	13.72	324	6.55	31.5	3.87	22.4		Not Stable
8:38		100	9.55	0.00	0.44	13.73	321	6.53	37.7	3.99	19.2		Not Stable
8:43		100	9.55	0.00	0.44	13.77	320	6.53	43.1	4.07	13.2		Not Stable
8:48		100	9.55	0.00	0.44	13.83	319	6.52	48.1	4.10	12.6		Not Stable
8:53		100	9.58	0.03	0.47	13.74	318	6.51	52.7	4.16	11.5		Not Stable
8:58		100	9.60	0.02	0.49	13.77	318	6.51	56.7	4.15	12.6		Stable

Low-Flow Field Log

Nobis — Engineering a Sustainable Future

Site Name: Former Tombarello Site
Job Number: 80108.04
Sampler: AG

Date: 6/13/16

Well ID: MW-8
Sample ID: MW-8-061316
Reviewed By: EHJ

Measurement Reference Point (MP): Casing (PVC, Casing, Ground, etc.)
Depth to GW: 11.15 (ft from MP)
Depth to Bottom: 13 (ft from MP)
Pump Intake Depth: 13 (ft from MP)
Well depth as installed: 13 (ft bgs)
Screen interval (range): 3/13/2016 (ft bgs)

Purging start time: 9:57
Parameter stabalization (Y/N): No
Two hour time limit reached (Y/N): Yes
Sample time: 10:50
Total volume purged (gals): 2 gallons
Time at purge completion: 13:06

Equipment Vendor: US Environmental
Pump Type: Peristaltic
Turbidity Meter: HACH2100
Serial #: 13100C028843
Multimeter: YSI 600XL
Serial #: 04C2866AD

Notes (Initial PID reading, SOP deviations, etc.):

Lab Analyses: PAH, EPH, VOCs, PCBs, total metals
QC Info (Duplicate, MS/MSD): No

Clock Time	Bladder Pump Discharge/ Refill	Purge Rate	Depth to Water	Draw down	Cum. Draw down	Temp ±3%	Spec. Cond. ±3%	pH ±0.1	ORP ±10	DO ±10% if >0.5 mg/L	Turbidity ±10% if >5 NTU	Comments/Gas Pressure/Observations	Stability Calculator (auto)
HHMM	sec./sec. or setting	ml/min	ft. below MP	ft.	ft.	oC	µS/cmc		mV	mg/L	NTU		
			11.15	0.00	0.00								
		100	11.15	0.00	0.00								
10:01		100	12.00	0.85	0.85	11.86	962	6.62	-83.1	1.41	424		
10:06		100	12.48	0.48	1.33	12.54	957	6.57	-83.2	1.13	530		Not Stable
10:11												Dry. Turn pump off to take water levels of recharge	
10:19		0	12.46	12.46	12.46							Start sampling	
10:22		0	12.40	-0.06	12.40								
10:34		0	11.91	-0.49	11.91								
10:41		0	11.69	-0.22	11.69								

SOP No: SA-003 Draft Revision: 4

Low-Flow Field Log

Nobis — Engineering a Sustainable Future

Site Name: Former Tombarello Site
Job Number: 80108.04
Sampler: EHJ

Date: 06/13/16

Well ID: MW-09
Sample ID: MW-09-061316
Reviewed By: EHJ

Measurement Reference Point (MP): Lip of roadbox (PVC, Casing, Ground, etc.)
Depth to GW: 12.04 (ft from MP)
Depth to Bottom: 13.02 (ft from MP)
Pump Intake Depth: 13 (ft from MP)
Well depth as installed: 13 (ft bgs)
Screen interval (range): 3-13 (ft bgs)

Purging start time: 950
Parameter stabalization (Y/N): N
Two hour time limit reached (Y/N): N
Sample time: 10:40
Total volume purged (gals): <500 ml
Time at purge completion: 12:50

Equipment Vendor: US Environmental
Pump Type: Peristaltic
Turbidity Meter: HACH 2100Q
Serial #: 13100C028809
Multimeter: YSI 600 XL
Serial #: 08B101377

Notes (Initial PID reading, SOP deviations, etc.):

Lab Analyses:
QC Info (Duplicate, MS/MSD): N/A

Clock Time	Bladder Pump Discharge/ Refill	Purge Rate	Depth to Water	Draw down	Cum. Draw down	Temp ±3%	Spec. Cond. ±3%	pH ±0.1	ORP ±10	DO ±10% if >0.5 mg/L	Turbidity ±10% if >5 NTU	Comments/Gas Pressure/Observations	Stability Calculator (auto)
HHMM	sec./sec. or setting	ml/min	ft. below MP	ft.	ft.	oC	µS/cmc		mV	mg/L	NTU		
0955		90	12.71	0.67	0.67								
0955		90	12.71	0.00	0.67	14.13	445	7.76	99	3.16	34		
0958		90	13.02	0.31	0.98	14.51	462	8.61	57	2.82	NM	Dry, to allow recharge	

SOP No: SA-003 Draft Revision: 4

Low-Flow Field Log

Engineering a Sustainable Future

Site Name: Former Tombarello Site
Job Number: 80108.04
Sampler: EHJ

Date: 6/13/16

Well ID: MW-11
Sample ID: MW-11-061316
Reviewed By: EHJ

Measurement Reference Point (MP): Edge lip of roa (PVC, Casing, Ground, etc.)
Depth to GW: 9.56 (ft from MP)
Depth to Bottom: 12.43 (ft from MP)
Pump Intake Depth: 12 (ft from MP)
Well depth as installed: 13 (ft bgs)
Screen interval (range): 3-13' (ft bgs)

Purging start time: 13:25
Parameter stabalization (Y/N): N
Two hour time limit reached (Y/N): N
Sample time: 1515
Total volume purged (gals): 2
Time at purge completion: 16:05

Equipment Vendor: US Environmental
Pump Type: Peristaltic
Turbidity Meter: HACH 2100Q
Serial #: 13100C028809
Multimeter: YSI 600 XL
Serial #: 08B101377

Notes (Initial PID reading, SOP deviations, etc.): No readings in last 45-60 min bc sample tubing and YSI flow through cell completely filled with silt. Well ran dry and was allowed to recharge before sampling.

Lab Analyses:
QC Info (Duplicate, MS/MSD): N/A

Clock Time	Bladder Pump Discharge/ Refill	Purge Rate	Depth to Water	Draw down	Cum. Draw down	Temp ±3%	Spec. Cond. ±3%	pH ±0.1	ORP ±10	DO ±10% if >0.5 mg/L	Turbidity ±10% if >5 NTU	Comments/Gas Pressure/Observations	Stability Calculator (auto)
HHMM	sec./sec. or setting	ml/min	ft. below MP	ft.	ft.	oC	µS/cmc		mV	mg/L	NTU		
1325		100	10.40	0.84	0.84								
1330		100	10.80	0.40	1.24	12.07	795	7.81	-90.3	2.35	O.R.	Very silty purge water	
1335		100	11.27	0.47	1.71	12.24	789	7.51	-129.9	1.00	O.R.		
1340		100	11.63	0.36	2.07	12.34	655	7.31	-132.4	0.87	NM		
1345		90	11.79	0.16	2.23	12.94	461	7.17	-128.3	0.65	NM		
1350		90	11.42	-0.37	1.86	13.01	476	7.09	-124.5	0.63	O.R.		
1355		80	11.43	0.01	1.87	12.54	515	7.03	-129.5	0.56	O.R.		
1400		80	11.40	-0.03	1.84	12.60	506	6.98	-126.1	0.58	O.R.		
1405		80	11.42	0.02	1.86	12.47	524	6.95	-121.1	0.64	O.R.		
1415		80	11.56	0.14	2.00	12.30	513	6.91	-117.3	0.75	O.R.		
												Flowthrough cell completely clogged w silt. Ej ttempts to cl	
												Well dry. EJ allows recharge prior to collecting sample	

SOP No: SA-003 Draft Revision: 4

Low-Flow Field Log

Engineering a Sustainable Future

Site Name: Former Tombarello Site
Job Number: 80108.04
Sampler: AG

Date: 6/14/16

Well ID: MW-12
Sample ID: MW-12-061416
Reviewed By: EHJ

Measurement Reference Point (MP): Casing (PVC, Casing, Ground, etc.)
Depth to GW: 7.98 (ft from MP)
Depth to Bottom: 13 (ft from MP)
Pump Intake Depth: 12 (ft from MP)
Well depth as installed: 13 (ft bgs)
Screen interval (range): 3 to 13 (ft bgs)

Purging start time: 11:56
Parameter stabalization (Y/N): Yes
Two hour time limit reached (Y/N): Yes
Sample time: 13:05
Total volume purged (gals): 4.5
Time at purge completion: 15:35

Equipment Vendor: US Environmental
Pump Type: Peristaltic

Turbidity Meter: Hach 2100Q
Serial #: 13100C028843

Multimeter: YSI 600XL
Serial #: 04C2866AD

Notes (Initial PID reading, SOP deviations, etc.):

Lab Analyses: PAH, PCB, VOC, EPH, TOTAL METALS, CYANIDE, PAC
QC Info (Duplicate, MS/MSD): MS/MSD

Clock Time	Bladder Pump Discharge/ Refill	Purge Rate	Depth to Water	Draw down	Cum. Draw down	Temp ±3%	Spec. Cond. ±3%	pH ±0.1	ORP ±10	DO ±10% if >0.5 mg/L	Turbidity ±10% if >5 NTU	Comments/Gas Pressure/Observations	Stability Calculator (auto)
HHMM	sec./sec. or setting	ml/min	ft. below MP	ft.	ft.	oC	µS/cmc		mV	mg/L	NTU		
		200	7.98	0.00	0.00								
12:03		200	8.21	0.23	0.23	11.28	580	7.31	-71.8	0.75	73.6		
12:08		200	8.21	0.00	0.23	11.65	618	6.93	-45.6	0.57	57.8		
12:13		200	8.21	0.00	0.23	11.51	621	6.79	-44.9	0.54	52.3		Not Stable
12:18		200	8.21	0.00	0.23	11.64	645	6.68	-42.1	0.50	44.7		Not Stable
12:23		200	8.21	0.00	0.23	11.96	652	6.63	-40.5	0.52	31.8		Not Stable
12:33		200	8.21	0.00	0.23	12.07	671	6.53	-31.9	0.50	20.3		Not Stable
12:38		200	8.21	0.00	0.23	12.18	676	6.51	-31.0	0.50	13.7		Not Stable
12:43		200	8.21	0.00	0.23	11.49	684	6.50	-33.2	0.46	19.4		Not Stable
12:48		200	8.21	0.00	0.23	11.76	683	6.47	-28.7	0.43	12.7		Not Stable
12:53		200	8.21	0.00	0.23	11.66	674	6.47	-29.1	0.47	12.8		Not Stable
12:58		200	8.21	0.00	0.23	11.87	681	6.45	-27.3	0.45	13.2		Stable

Low-Flow Field Log

Nobis — Engineering a Sustainable Future

Site Name: Former Tombarello Site
Job Number: 80108.04
Sampler: AG

Date: 6/14/16

Well ID: MW-13
Sample ID: MW-13-061416; GW-FD-01
Reviewed By: EHJ

Measurement Reference Point (MP): Casing (PVC, Casing, Ground, etc.)
Depth to GW: 7.04 (ft from MP)
Depth to Bottom: 13 (ft from MP)
Pump Intake Depth: 12 (ft from MP)
Well depth as installed: 13 (ft bgs)
Screen interval (range): 3 to 13 (ft bgs)

Purging start time: 8:18
Parameter stabalization (Y/N): Yes
Two hour time limit reached (Y/N): Yes
Sample time: 9:55:00 AM; 20:00
Total volume purged (gals): 5
Time at purge completion: 11:17

Equipment Vendor: US Environmental
Pump Type: Peristaltic

Turbidity Meter: Hach 2100Q
Serial #: 13100C028843

Multimeter: YSI 600XL
Serial #: 04C2866AD

Notes (Initial PID reading, SOP deviations, etc.):

Lab Analyses: PAH, PCB, VOCs, EPH, Total metals, cyanide, PAC
QC Info (Duplicate, MS/MSD): Duplicate (FD)

Clock Time	Bladder Pump Discharge/ Refill	Purge Rate	Depth to Water	Draw down	Cum. Draw down	Temp ±3%	Spec. Cond. ±3%	pH ±0.1	ORP ±10	DO ±10% if >0.5 mg/L	Turbidity ±10% if >5 NTU	Comments/Gas Pressure/Observations	Stability Calculator (auto)
HHMM	sec./sec. or setting	ml/min	ft. below MP	ft.	ft.	oC	µS/cmc		mV	mg/L	NTU		
			7.04	0.00	0.00								
8:22		125	7.14	0.10	0.10	11.77	1219	6.46	-76.6	0.64	75.1		
8:27		125	7.15	0.01	0.11	11.90	1229	6.45	-86.6	0.48	37.5		
8:32		125	7.15	0.00	0.11	11.79	1237	6.48	-90.1	0.43	21.6		Not Stable
8:37		125	7.15	0.00	0.11	11.81	1232	6.52	-95.0	0.41	21.8		Not Stable
8:42		125	7.15	0.00	0.11	11.71	1232	6.53	-96.3	0.41	18.0		Not Stable
8:47		125	7.15	0.00	0.11	11.78	1226	6.55	-96.7	0.45	21.2		Not Stable
8:52		125	7.18	0.03	0.14	11.55	1223	6.55	-99.1	0.48	33.0		Not Stable
8:57		125	7.18	0.00	0.14	11.69	1224	6.55	-105.0	0.49	27.9		Not Stable
9:02		125	7.19	0.01	0.15	11.56	1235	6.56	-103.3	0.52	27.4		Not Stable
9:07		125	7.19	0.00	0.15	11.58	1232	6.57	-103.3	0.59	21.4		Not Stable
9:12		125	7.19	0.00	0.15	11.67	1231	6.57	-105.5	0.59	27.2		Not Stable
9:17		125	7.19	0.00	0.15	11.62	1239	6.57	-105.6	0.61	16.1		Not Stable
9:22		125	7.19	0.00	0.15	11.70	1233	6.57	-106.9	0.49	12.3		Not Stable
9:27		125	7.19	0.00	0.15	11.65	1232	6.58	-105.6	0.50	9.2		Not Stable
9:32		125	7.19	0.00	0.15	11.83	1235	6.58	-104	0.50	7.29		Not Stable
9:37		125	7.19	0.00	0.15	12.01	1233	6.58	-102.5	0.45	7.27		Not Stable
9:42		125	7.19	0.00	0.15	11.89	1234	6.58	-102.9	0.47	5.35		Not Stable
9:47		125	7.19	0.00	0.15	11.95	1233	6.58	-100.6	0.47	5.63		Not Stable
9:52		125	7.19	0.00	0.15	11.77	1226	6.58	-103.6	0.44	5.8		Stable

Low-Flow Field Log

Nobis — Engineering a Sustainable Future

Site Name: Former Tombarello Site
Job Number: 80108.04
Sampler: AG

Date: 6/16/2006

Well ID: MW-15
Sample ID: MW-15-061616
Reviewed By: EHJ

Measurement Reference Point (MP): Casing (PVC, Casing, Ground, etc.)
Depth to GW: 7.2 (ft from MP)
Depth to Bottom: 13 (ft from MP)
Pump Intake Depth: 12 (ft from MP)
Well depth as installed: 13 (ft bgs)
Screen interval (range): 3 to 13 (ft bgs)

Purging start time: 10:16
Parameter stabalization (Y/N): Yes
Two hour time limit reached (Y/N): 10
Sample time: 12:25
Total volume purged (gals): 6
Time at purge completion: 13:06

Equipment Vendor: US Environmental
Pump Type: Peristaltic
Turbidity Meter: Hach 2100Q
Serial #: 13100C028843
Multimeter: YSI 600XL
Serial #: 08B101377

Notes (Initial PID reading, SOP deviations, etc.):

Lab Analyses: VOC, PCB, PAH, EPH, Metals
QC Info (Duplicate, MS/MSD): None

Clock Time	Bladder Pump Discharge/ Refill	Purge Rate	Depth to Water	Draw down	Cum. Draw down	Temp ±3%	Spec. Cond. ±3%	pH ±0.1	ORP ±10	DO ±10% if >0.5 mg/L	Turbidity ±10% if >5 NTU	Comments/Gas Pressure/Observations	Stability Calculator (auto)
HHMM	sec./sec. or setting	ml/min	ft. below MP	ft.	ft.	oC	µS/cmc		mV	mg/L	NTU		
10:16		150	7.20	0.00	0.00								
10:25		150	7.35	0.15	0.15	14.88	578	6.39	27.7	0.72	65.6		
10:30		150	7.35	0.00	0.15	14.82	561	6.32	29.1	0.62	191		
10:35		150	7.35	0.00	0.15	14.76	560	6.32	25.6	0.78	568		Not Stable
10:40		150	7.36	0.01	0.16	14.85	571	6.30	21.0	0.58	315		Not Stable
10:45		150	7.36	0.00	0.16	14.71	568	6.31	18.9	0.51	384		Not Stable
10:50		150	7.36	0.00	0.16	14.84	571	6.32	15.9	0.49	251		Not Stable
10:55		150	7.37	0.01	0.17	14.81	572	6.33	13.3	0.46	275		Not Stable
11:05		150	7.37	0.00	0.17	14.69	576	6.34	7.3	0.42	216		Not Stable
11:15		150	7.38	0.01	0.18	14.98	574	6.35	4.9	0.42	225		Not Stable
11:20		150	7.38	0.00	0.18	14.94	571	6.35	4.1	0.42	206	Readings stable, waiting until turbidity clears up	Stable
11:25		150	7.39	0.01	0.19	14.71	567	6.35	3.1	0.43	181		Not Stable
11:30		150	7.39	0.00	0.19	14.85	567	6.33	3.2	0.46	212		Not Stable
11:35		150	7.39	0.00	0.19	14.99	570	6.33	3.2	0.47	123		Not Stable
11:40		150	7.39	0.00	0.19	14.99	570	6.33	2.8	0.46	140		Not Stable
11:44		150	7.39	0.00	0.19	14.98	566	6.35	2.2	0.58	138		Not Stable
11:50		150	7.39	0.00	0.19	15.16	571	6.35	0.4	0.61	215		Not Stable
11:55		150	7.39	0.00	0.19	15.14	573	6.35	0.7	0.56	235		Not Stable
12:00		150	7.39	0.00	0.19	15.09	573	6.35	1.1	0.53	214		Not Stable
12:05		150	7.39	0.00	0.19	15.17	573	6.36	0.6	0.58	217		Stable
12:15		150	7.39	0.00	0.19	15.01	570	6.36	0.3	0.60	177		Not Stable
12:20		150	7.39	0.00	0.19	15.11	570	6.36	0.3	0.62	124		Not Stable

Low-Flow Field Log

Nobis — Engineering a Sustainable Future

Site Name: Former Tombarello Site
Job Number: 80108.04
Sampler: AG

Date: 6/13/16

Well ID: MW-16
Sample ID: MW-16-061316
Reviewed By: EHJ

Measurement Reference Point (MP): Casing (PVC, Casing, Ground, etc.)
Depth to GW: 10.68 (ft from MP)
Depth to Bottom: 13 (ft from MP)
Pump Intake Depth: 13 (ft from MP)
Well depth as installed: 13 (ft bgs)
Screen interval (range): 3-13' (ft bgs)

Purging start time: 13:26
Parameter stabalization (Y/N): Yes
Two hour time limit reached (Y/N): Yes
Sample time: 14:30
Total volume purged (gals): 3.5
Time at purge completion: 15:30

Equipment Vendor: US Environmental
Pump Type: Peristaltic
Turbidity Meter: Hach 2100Q
Serial #: 13100C028843
Multimeter: YSI 600XL
Serial #: 04C2866AD

Notes (Initial PID reading, SOP deviations, etc.):

Lab Analyses: VOCS, PAH, EPH, PCBS, total metals
QC Info (Duplicate, MS/MSD): No

Clock Time	Bladder Pump Discharge/ Refill	Purge Rate	Depth to Water	Draw down	Cum. Draw down	Temp ±3%	Spec. Cond. ±3%	pH ±0.1	ORP ±10	DO ±10% if >0.5 mg/L	Turbidity ±10% if >5 NTU	Comments/Gas Pressure/Observations	Stability Calculator (auto)
HHMM	sec./sec. or setting	ml/min	ft. below MP	ft.	ft.	oC	µS/cmc		mV	mg/L	NTU		
			10.68	0.00	0.00								
13:25		100	10.70	0.02	0.02	13.56	685	7.61	-116.7	4.41	93.4		
13:30		100	10.70	0.00	0.02	13.31	679	7.15	-79.5	4.19	49.2		
13:35		100	10.70	0.00	0.02	13.72	679	6.93	-50.8	4.47	15.1		Not Stable
13:40		100	10.70	0.00	0.02	13.48	674	6.73	-27.2	4.85	9.52		Not Stable
13:45		100	10.70	0.00	0.02	13.00	672	6.58	-8.3	5.02	5.90		Not Stable
13:50		100	10.70	0.00	0.02	13.52	671	6.45	5.6	5.13	4.38		Not Stable
13:55		100	10.70	0.00	0.02	13.33	668	6.35	17.8	5.25	4.34		Not Stable
14:00		100	10.70	0.00	0.02	13.64	670	6.30	28.3	5.37	2.49		Not Stable
14:10		100	10.70	0.00	0.02	13.65	669	6.18	45.2	5.53	1.44		Not Stable
14:15		100	10.70	0.00	0.02	13.72	671	6.12	54.2	5.62	1.36		Not Stable
14:20		100	10.70	0.00	0.02	13.62	671	6.11	57.0	5.63	1.26		Not Stable
14:25		100	10.70	0.00	0.02	13.59	671	6.11	60.7	5.64	1.51		Stable

APPENDIX E

APPENDIX F

APPENDIX G

Nobis
Engineering a Sustainable Future

July 6, 2016
Nobis File No. 80108

Mr. Alan Peterson
EPA-New England Region I
5 Post Office Square
Suite 100, Mailcode OSRR07-4
Boston, MA 02109-3912

Re: Contract No.: EP-S1-06-03
Task Order No. 0108-SI-BZ-0100
Case No. 0163S, Laboratory Report No.: R0508
Eurofins Spectrum Analytical, North Kingston, Rhode Island
Former Tombarello Property
Lawrence, Massachusetts

Tier 1 Modified Organic and Inorganic Data Review

VOCs, PAHs, EPH, PCBs, Metals, Cyanide, PAC, and Hexavalent Chromium:
38/Soils: See attached sample ID list
3/Field Duplicates: (FD-01/CD-34S-0103); (FD-02/CD-45S-0103); (FD-03/FB-04-04-0507)

Dear Mr. Peterson:

Nobis Engineering, Inc. performed a Tier 1 Modified data review on the organic and inorganic analytical data for the samples listed in the attached sample listing. The samples were collected by Nobis at the Former Tombarello Property located in Lawrence, Massachusetts. The samples were analyzed for volatile organic compounds (VOCs), polycyclic aromatic hydrocarbons (PAHs), Resource Conservation and Recovery Act (RCRA) metals, extractable petroleum hydrocarbons (EPH), polychlorinated biphenyls (PCBs), cyanide, physiologically available cyanide (PAC), and hexavalent chromium. See the included Data Summary Table and chain-of-custody for samples selected for each analysis. The laboratory performed testing according to Massachusetts Contingency Plan (MCP) Compendium of Analytical Methods (CAM) and to Nobis technical specification RAC2-087.

The Tier 1 Modified data review was performed in accordance with the EPA New England Environmental Data Review Supplement for Regional Data Review Elements and Superfund Specific Guidance/Procedures (April 2013); USEPA National Functional Guidelines for Inorganic Superfund Data Review (August 2014); USEPA National Functional Guidelines for Superfund Organic Methods Data Review (August 2014) and the Field Task Work Plan (FTWP) and Quality Assurance Project Plan Addendum (QAPPA) for the Targeted Brownfields Assessment (TBA) for the Former Tombarello Property (June 2016).

The data were evaluated based on the following parameters:

* • Overall Evaluation of Data and Potential Usability Issues

Nobis Engineering, Inc.
585 Middlesex Street
Lowell, MA 01851
T (978) 683-0891

*	•	Data Completeness
	•	Preservation and Technical Holding Times
*	•	Instrument Calibration
*	•	Blanks
*	•	Laboratory Control Samples (LCS)
*	•	Laboratory Duplicates
	•	Field Duplicates
	•	Matrix Spike Analysis
	•	Surrogate Compounds
	•	Internal Standards
NA	•	Performance Evaluation Sample Results
*	•	Reported Quantitation Limits

* All criteria were met for this parameter.
NA – Not applicable.

Overall Evaluation of Data and Potential Usability Issues
The objectives of the investigation activities at the site are to delineate the nature and extent of soil and groundwater contamination on the Site so that potential remedial alternatives can be evaluated and order-of-magnitude cost estimates can be developed. Analytical and hydrogeological data collected during the investigation will be compiled and reduced to develop a conceptual site model to support the estimation of human health risks and development of remedial alternatives.

The data meet the project quality criteria and can be used without restriction except as summarized below. The attachments provide details and supporting documentation.

VOCs:
Results did not require qualification.

PAHs:
Results were estimated for surrogate and matrix spike failures and internal standard criteria failures.

EPH:
One result was estimated due to low matrix spike recovery.

PCBs:
Results were estimated for surrogate and matrix spike failures and field duplicate imprecision.

One sample (CD-45-0708) had Aroclor-1016 results rejected (R) due to zero percent recovery in matrix spikes.

Metals:
Lead, silver, and selenium results were qualified as estimated due to field duplicate imprecision.

Hexavalent Chromium, Cyanide, and PAC:
Results did not require qualification. However, pH and ORP are analyzed to support hexavalent chromium. These tests were qualified as estimated due to exceeded holding time.

Please contact Gail DeRuzzo at (978) 703-6021 or gderuzzo@nobiseng.com should you have any questions or comments regarding this information.

Sincerely,

NOBIS ENGINEERING, INC.

Gail DeRuzzo
Lead Chemist

Tables: Data Summary Table – Tier 1 Mod Data Review
Data Qualification Actions Table

Attachments: Sample ID List
Data Review Checklist
COCs

DATA SUMMARY TABLE

Lab Sample ID	R0508-01	R0508-02	R0508-03	R0508-04	R0508-05	R0508-06	R0508-07	R0508-08	R0508-09	R0508-10	R0508-11
Field Sample ID	CD-34E-0001	CD-34E-0103	CD-34N-0001	CD-34N-0103	CD-34W-0001	CD-34W-0103	CD-34S-0001	CD-34S-0103	CD-34-0304	CD-34-0708	CD-45E-0001
Sample Location	CD-34E	CD-34E	CD-34N	CD-34N	CD-34W	CD-34W	CD-34S	CD-34S	CD-34	CD-34	CD-45E
Sample Date	06/06/16	06/06/16	06/06/16	06/06/16	06/06/16	06/06/16	06/06/16	06/06/16	06/06/16	06/06/16	06/06/16
PCBs (ug/kg)											
Aroclor 1016	35000 U	18000 U	700 U	37 U	340 U	370 U	350 U	37 U	3900 U	43 UJ	3800 U
Aroclor 1221	35000 U	18000 U	700 U	37 U	340 U	370 U	350 U	37 U	3900 U	43 UJ	3800 U
Aroclor 1232	35000 U	18000 U	700 U	37 U	340 U	370 U	350 U	37 U	3900 U	43 UJ	3800 U
Aroclor 1242	35000 U	18000 U	700 U	37 U	340 U	370 U	350 U	37 U	3900 U	43 UJ	3800 U
Aroclor 1248	35000 U	18000 U	700 U	37 U	340 U	370 U	350 U	37 U	3900 U	43 UJ	3800 U
Aroclor 1254	35000 U	18000 U	700 U	37 U	340 U	370 U	350 U	37 U	3900 U	43 UJ	3800 U
Aroclor 1260	220000	24000	6000	37 U	4700	430 J	4300	37 U	22000	28 J	39000
Aroclor 1262	35000 U	18000 U	700 U	37 U	340 U	370 U	350 U	37 U	3900 U	43 UJ	3800 U
Aroclor 1268	35000 U	18000 U	700 U	37 U	340 U	370 U	350 U	37 U	3900 U	43 UJ	3800 U

U – not detected; J – estimated value; UJ – not detected, reporting limit estimated; R – rejected

DATA SUMMARY TABLE

Lab Sample ID	R0508-12	R0508-13	R0508-14	R0508-15	R0508-16	R0508-17	R0508-18	R0508-21	R0508-22	R0508-23	R0508-24	R0508-25
Field Sample ID	CD-45E-0103	CD-45S-0001	CD-45S-0103	CD-45W-0001	CD-45W-0103	CD-45-0304	CD-45-0708	D-5N-0001	D-5N-0103	D-5E-0001	D-5E-0103	D-5-0002
Sample Location	CD-45E	CD-45S	CD-45S	CD-45W	CD-45W	CD-45	CD-45	D-5N	D-5N	D-5E	D-5E	D-5
Sample Date	06/06/16	06/06/16	06/06/16	06/06/16	06/06/16	06/06/16	06/06/16	06/06/16	06/06/16	06/06/16	06/06/16	06/06/16
PCBs (ug/kg)												
Aroclor 1016	3700 U	34 UJ	370 U	3500 U	36 U	460 U	44 R	360 U	74 U	1800 U	37 UJ	190 U
Aroclor 1221	3700 U	34 UJ	370 U	3500 U	36 U	460 U	44 U	360 U	74 U	1800 U	37 UJ	190 U
Aroclor 1232	3700 U	34 UJ	370 U	3500 U	36 U	460 U	44 U	360 U	74 U	1800 U	37 UJ	190 U
Aroclor 1242	3700 U	34 UJ	370 U	3500 U	36 U	460 U	44 U	360 U	74 U	1800 U	37 UJ	190 U
Aroclor 1248	3700 U	34 UJ	370 U	3500 U	36 U	460 U	44 U	360 U	74 U	1800 U	37 UJ	190 U
Aroclor 1254	3700 U	34 UJ	370 U	3500 U	36 U	460 U	44 U	360 U	74 U	1800 U	37 UJ	190 U
Aroclor 1260	17000	34 UJ	3100 J	16000	36 U	5800	44 U	1800	630	14000	37 UJ	1400
Aroclor 1262	3700 U	34 UJ	370 U	3500 U	36 U	460 U	44 U	360 U	74 U	1800 U	37 UJ	190 U
Aroclor 1268	3700 U	34 UJ	370 U	3500 U	36 U	460 U	44 U	360 U	74 U	1800 U	37 UJ	190 U

U – not detected; J – estimated value; UJ – not detected, reporting limit estimated; R – rejected

DATA SUMMARY TABLE

Lab Sample ID	R0508-26	R0508-27	R0508-28	R0508-29	R0508-30	R0508-31	R0508-32	R0508-33	R0508-34	R0508-35	R0508-36	R0508-37	R0508-38
Field Sample ID	D-5-0203	D-5-0607	FB-03-0102	FB-03-0203	FB-04-0102	FB-04-0203	FB-04-0507	FB-01-0102	FB-01-0203	FB-01-0507	FD-01	FD-02	FD-03
Sample Location	D-5	D-5	FB-03	FB-03	FB-04	FB-04	FB-04	FB-01	FB-01	FB-01	CD-34S	CD-45S	FB-04
Sample Date	06/06/16	06/06/16	06/06/16	06/06/16	06/06/16	06/06/16	06/06/16	06/06/16	06/06/16	06/06/16	06/06/16	06/06/16	06/06/16
PCBs (ug/kg)													
Aroclor 1016	3700 U	43 U	38 U	35 UJ	35 U	37 UJ	41 U	35 U	39 U	43 UJ	37 UJ	37 U	42 U
Aroclor 1221	3700 U	43 U	38 U	35 UJ	35 U	37 UJ	41 U	35 U	39 U	43 UJ	37 UJ	37 U	42 U
Aroclor 1232	3700 U	43 U	38 U	35 UJ	35 U	37 UJ	41 U	35 U	39 U	43 UJ	37 UJ	37 U	42 U
Aroclor 1242	3700 U	43 U	38 U	35 UJ	35 U	37 UJ	41 U	35 U	39 U	43 UJ	37 UJ	37 U	42 U
Aroclor 1248	3700 U	43 U	38 U	35 UJ	35 U	37 UJ	41 U	35 U	39 U	43 UJ	37 UJ	37 U	42 U
Aroclor 1254	3700 U	43 U	38 U	35 UJ	35 U	37 UJ	41 U	35 U	39 U	43 UJ	37 UJ	37 U	42 U
Aroclor 1260	22000	43 U	38 U	33 J	35 U	110 J	41 U	35 U	73	43 UJ	37 UJ	37 UJ	42 U
Aroclor 1262	3700 U	43 U	38 U	35 UJ	35 U	37 UJ	41 U	35 U	39 U	43 UJ	37 UJ	37 U	42 U
Aroclor 1268	3700 U	43 U	38 U	35 UJ	35 U	37 UJ	41 U	35 U	39 U	43 UJ	37 UJ	37 U	42 U

U – not detected; J – estimated value; UJ – not detected, reporting limit estimated; R – rejected

DATA SUMMARY TABLE

Lab Sample ID	R0508-04	R0508-07	R0508-12	R0508-14	R0508-17	R0508-18	R0508-21	R0508-24	R0508-28	R0508-29	R0508-30	R0508-31
Field Sample ID	CD-34N-0103	CD-34S-0001	CD-45E-0103	CD-45S-0103	CD-45-0304	CD-45-0708	D-5N-0001	D-5E-0103	FB-03-0102	FB-03-0203	FB-04-0102	FB-04-0203
Sample Location	CD-34N	CD-34S	CD-45E	CD-45S	CD-45	CD-45	D-5N	D-5E	FB-03	FB-03	FB-04	FB-04
Sample Date	06/06/16	06/06/16	06/06/16	06/06/16	06/06/16	06/06/16	06/06/16	06/06/16	06/06/16	06/06/16	06/06/16	06/06/16
Metals (mg/kg)												
Arsenic	20	5.5	20	16	11	6.2	8.5	5.1	4.5	5.4	7.3	6.9
Barium	140	50	1700	530	170	25	100	98	18	30	33	52
Cadmium	0.97	1.1	37	14	11	0.23 U	2.2	0.61	0.24 U	0.12 J	0.052 J	0.36
Chromium	38	100	110	90	55	13	49	19	8.6	20	27	29
Lead	650	280	6400	8600 J	3700	5	370	180	7.6	76	29	35
Mercury	0.34	0.18	6.5	4.7	0.73	0.008 J	0.72	0.32	0.014 J	0.17	0.055	0.027 J
Selenium	3.2	1.2	1.6 U	3.2 J	4	1.1 J	1.6	0.91 J	0.76 J	1.4 U	0.68 J	1.3 U
Silver	0.39 J	0.42 J	3	5.9 J	1.4 J	1.4 U	0.85 J	0.28 J	1.5 U	0.11 J	0.18 J	0.13 J
Chromium-Hexavalent	NA	NA	NA	0.749	NA	NA	NA	NA	NA	0.53 U	0.533 U	NA
Cyanide (total)	NA	NA	NA	NA	NA	NA	NA	NA	0.526 U	0.499 U	0.453 U	0.571 U
Cyanide (PAC)	NA	NA	NA	NA	NA	NA	NA	NA	1.14 U	1.07 U	1.07 U	1.13 U

U – not detected; J – estimated value; UJ – not detected, reporting limit estimated; R – rejected

DATA SUMMARY TABLE

Lab Sample ID	R0508-32	R0508-33	R0508-34	R0508-35	R0508-37	R0508-38
Field Sample ID	FB-04-0507	FB-01-0102	FB-01-0203	FB-01-0507	FD-02	FD-03
Sample Location	FB-04	FB-01	FB-01	FB-01	CD-45S	FB-04
Sample Date	06/06/16	06/06/16	06/06/16	06/06/16	06/06/16	06/06/16
Metals (mg/kg)						
Arsenic	7.5	5.8	7.5	8.7	12	7.2
Barium	74	36	51	29	460	62
Cadmium	0.8	0.13 J	0.84	0.24 U	10	0.56
Chromium	26	22	24	16	130	38
Lead	110	38	350	15	2300 J	130
Mercury	0.088	0.037 J	0.14	0.019 J	5.8	0.15
Selenium	1.2	1 J	0.99 J	1.7	1.8 J	1.3 J
Silver	0.24 J	0.15 J	0.2 J	0.15 J	1.9 J	0.33 J
Chromium-Hexavalent	NA	NA	NA	NA	NA	NA
Cyanide (total)	0.539 U	0.397 U	0.485 U	0.643 U	NA	0.555 U
Cyanide (PAC)	1.24 U	1.05 U	1.18 U	1.3 U	NA	1.26 U

U – not detected; J – estimated value; UJ – not detected, reporting limit estimated; R – rejected

DATA SUMMARY TABLE

Lab Sample ID	R0508-29	R0508-30	R0508-35
Field Sample ID	FB-03-0203	FB-04-0102	FB-01-0507
Sample Location	FB-03	FB-04	FB-01
Sample Date	06/06/16	06/06/16	06/06/16
Volatiles (ug/kg)			
1,1,1,2-Tetrachloroethane	4.1 U	5 U	6.2 U
1,1,1-Trichloroethane	4.1 U	5 U	6.2 U
1,1,2,2-Tetrachloroethane	4.1 U	5 U	6.2 U
1,1,2-Trichloroethane	4.1 U	5 U	6.2 U
1,1-Dichloroethane	4.1 U	5 U	6.2 U
1,1-Dichloroethene	4.1 U	5 U	6.2 U
1,1-Dichloropropene	4.1 U	5 U	6.2 U
1,2,3-Trichlorobenzene	4.1 U	5 U	6.2 U
1,2,3-Trichloropropane	4.1 U	5 U	6.2 U
1,2,4-Trichlorobenzene	4.1 U	5 U	6.2 U
1,2,4-Trimethylbenzene	4.1 U	5 U	6.2 U
1,2-Dibromo-3-chloropropane	4.1 U	5 U	6.2 U
1,2-Dibromoethane	4.1 U	5 U	6.2 U
1,2-Dichlorobenzene	4.1 U	5 U	6.2 U
1,2-Dichloroethane	4.1 U	5 U	6.2 U
1,2-Dichloropropane	4.1 U	5 U	6.2 U
1,3,5-Trimethylbenzene	4.1 U	5 U	6.2 U
1,3-Dichlorobenzene	4.1 U	5 U	6.2 U
1,3-Dichloropropane	4.1 U	5 U	6.2 U
1,4-Dichlorobenzene	4.1 U	5 U	6.2 U
1,4-Dioxane	83 U	100 U	120 U
2,2-Dichloropropane	4.1 U	5 U	6.2 U
2-Butanone	4.1 U	5 U	6.2 U
2-Chlorotoluene	4.1 U	5 U	6.2 U
2-Hexanone	4.1 U	5 U	6.2 U
4-Chlorotoluene	4.1 U	5 U	6.2 U
4-Isopropyltoluene	4.1 U	5 U	6.2 U
4-Methyl-2-pentanone	4.1 U	5 U	6.2 U
Acetone	4.1 U	5 U	17
Benzene	4.1 U	5 U	6.2 U
Bromobenzene	4.1 U	5 U	6.2 U
Bromochloromethane	4.1 U	5 U	6.2 U

U – not detected; J – estimated value; UJ – not detected, reporting limit estimated; R – rejected

DATA SUMMARY TABLE

Lab Sample ID	R0508-29	R0508-30	R0508-35
Field Sample ID	FB-03-0203	FB-04-0102	FB-01-0507
Sample Location	FB-03	FB-04	FB-01
Sample Date	06/06/16	06/06/16	06/06/16
Bromodichloromethane	4.1 U	5 U	6.2 U
Bromoform	4.1 U	5 U	6.2 U
Bromomethane	4.1 U	5 U	6.2 U
Carbon disulfide	4.1 U	5 U	6.2 U
Carbon tetrachloride	4.1 U	5 U	6.2 U
Chlorobenzene	4.1 U	5 U	6.2 U
Chloroethane	4.1 U	5 U	6.2 U
Chloroform	4.1 U	5 U	6.2 U
Chloromethane	4.1 U	5 U	6.2 U
cis-1,2-Dichloroethene	4.1 U	5 U	6.2 U
cis-1,3-Dichloropropene	4.1 U	5 U	6.2 U
Dibromochloromethane	4.1 U	5 U	6.2 U
Dibromomethane	4.1 U	5 U	6.2 U
Dichlorodifluoromethane	4.1 U	5 U	6.2 U
Diethyl ether	4.1 U	5 U	6.2 U
Diisopropyl Ether	4.1 U	5 U	6.2 U
Ethylbenzene	4.1 U	5 U	6.2 U
Hexachlorobutadiene	4.1 U	5 U	6.2 U
Isopropylbenzene	4.1 U	5 U	6.2 U
m,p-Xylene	4.1 U	5 U	6.2 U
Methyl tert-butyl ether	4.1 U	5 U	6.2 U
Methylene chloride	4.1 U	5 U	6.2 U
Naphthalene	4.1 U	7.8	6.2 U
n-Butylbenzene	4.1 U	5 U	6.2 U
n-Propylbenzene	4.1 U	5 U	6.2 U
o-Xylene	4.1 U	5 U	6.2 U
sec-Butylbenzene	4.1 U	5 U	6.2 U
Styrene	4.1 U	5 U	6.2 U
tert-Amyl methyl ether	4.1 U	5 U	6.2 U
Tert-Butyl Ethyl Ether	4.1 U	5 U	6.2 U
tert-Butylbenzene	4.1 U	5 U	6.2 U
Tetrachloroethene	4.1 U	5 U	6.2 U
Tetrahydrofuran	8.3 U	10 U	12 U

U – not detected; J – estimated value; UJ – not detected, reporting limit estimated; R – rejected

DATA SUMMARY TABLE

Lab Sample ID	R0508-29	R0508-30	R0508-35
Field Sample ID	FB-03-0203	FB-04-0102	FB-01-0507
Sample Location	FB-03	FB-04	FB-01
Sample Date	06/06/16	06/06/16	06/06/16
Toluene	4.1 U	5 U	6.2 U
trans-1,2-Dichloroethene	4.1 U	5 U	6.2 U
trans-1,3-Dichloropropene	4.1 U	5 U	6.2 U
Trichloroethene	4.1 U	5 U	6.2 U
Trichlorofluoromethane	4.1 U	5 U	6.2 U
Vinyl chloride	4.1 U	5 U	6.2 U
Xylene (total)	4.1 U	5 U	6.2 U

U – not detected; J – estimated value; UJ – not detected, reporting limit estimated; R – rejected

DATA SUMMARY TABLE

Lab Sample ID	R0508-02	R0508-05	R0508-11	R0508-16	R0508-19	R0508-20	R0508-30	R0508-33
Field Sample ID	CD-34E-0103	CD-34W-0001	CD-45E-0001	CD-45W-0103	CD-45N-0001	CD-45N-0103	FB-04-0102	FB-01-0102
Sample Location	CD-34E	CD-34W	CD-45E	CD-45W	CD-45N	CD-45N	FB-04	FB-01
Sample Date	06/06/16	06/06/16	06/06/16	06/06/16	06/06/16	06/06/16	06/06/16	06/06/16
PAHs (ug/kg)								
2-Methylnaphthalene	4000 J+	2200 J+	3900	1800	970	11000 J	3200	350 U
Acenaphthene	22000 J	16000 J	17000 J	5000	470	64000	8100 J	150 J
Acenaphthylene	3600 J+	970 J+	1800	7600 J	1200	5600 J-	750	72 J
Anthracene	63000 J	30000 J	36000	23000	1800	150000	27000	400
Benzo(a)anthracene	110000	69000 J	86000	37000	5500	240000	33000	1000
Benzo(a)pyrene	110000	61000 J	72000	37000	5300	210000	29000	710 J-
Benzo(b)fluoranthene	140000	84000	98000	45000	11000	250000	36000	1500
Benzo(g,h,i)perylene	62000 J	35000 J	46000	23000	5000	99000	14000	530
Benzo(k)fluoranthene	53000 J	430 J+	42000	18000	1800	92000	15000	590
Chrysene	120000	66000 J	85000	35000	7000	1400 J-	31000	1000
Dibenz(a,h)anthracene	360 U	350 U	380 U	350 U	350 U	380 UJ	340 U	350 U
Fluoranthene	300000	500 J+	190000	79000	10000	460000	80000	2100
Fluorene	33000 J	17000 J	19000 J	13000	1100	97000	14000	160 J
Indeno(1,2,3-cd)pyrene	70000 J	40000 J	49000	25000	5400	110000	16000	620
Naphthalene	90000 U	4300 J+	10000 J	2800	930	30000 J	5200	350 U
Phenanthrene	260000	120000	170000	71000	5200	430000	76000	1600
Pyrene	210000	110000	140000	59000	9500	390000	54000	1900

DATA SUMMARY TABLE

Lab Sample ID	R0508-30	R0508-33
Field Sample ID	FB-04-0102	FB-01-0102
Sample Location	FB-04	FB-01
Sample Date	06/06/16	06/06/16
EPH (mg/kg)		
2-Methylnaphthalene	0.935 J	0.35 U
Acenaphthene	2.51 J	0.35 U
Acenaphthylene	0.695 UJ	0.35 U
Anthracene	9.72 J	0.518
Benzo(a)anthracene	13.2 J	1.11
Benzo(a)pyrene	9.77 J	1.14
Benzo(b)fluoranthene	6.37 J	0.672
Benzo(g,h,i)perylene	3.95 J	0.493
Benzo(k)fluoranthene	7.77 J	1.1
C11-C22 Aromatics	199 J	15.1
C19-C36 Aliphatics	10.4 U	10.5 U
C9-C18 Aliphatics	10.4 UJ	10.5 U
Chrysene	10.7 J	1.2
Dibenz(a,h)anthracene	1.11 J	0.35 U
Fluoranthene	31.2 J	2.65
Fluorene	4.92 J	0.35 U
Indeno(1,2,3-cd)pyrene	3.82 J	0.406
Naphthalene	1.48 J	0.35 U
Phenanthrene	33.2 J	2
Pyrene	24.2 J	2.26

U – not detected; J – estimated value; UJ – not detected, reporting limit estimated; R – rejected

Data Review Qualification Actions
Case: 0163S
SDG: R0508

Parameter	Analyte	Samples: R0508-#	Evaluation Criteria	Action Needed	Comments
Metals	Chromium	04, 07, 12, 14, 17, 18, 21, 24, 28, 29, 30, 31, 32, 33, 34, 35, 37, 38	Lab Blank	Remove B	result >RL
Metals	Lead, Selenium, Silver	14, 37	Field Dup	J	>50% RPD
PAHs	Benzo(a)pyrene	33	MS	J-	low bias
PAHs	All positives	02, 05	surrogates	J+	high recovery of terphenyl-d14 (undiluted)
PAHs	All	20	surrogates	J-/UJ	low recoveries for all 3 surrogates (undiluted)
PAHs	Pyrene, Benzo(a)anthracene, Chrysene	02, 05, 11, 16, 20	ISTD	J/UJ	bias unknown (undiluted)
PAHs	Benzo(b)fluoranthene, Benzo(k)fluoranthene, Benzo(a)pyrene, Indeno(1,2,3-cd)pyrene, Dibenzo(a,h)anthracene, Benzo(g,h,i)perylene and Pentachlorophenol, Phenanthrene, Anthracene, Fluoranthene.	20	ISTD	J/UJ	bias unknown (undiluted)
PCBs	Arochlor-1260	14, 37	Field Dup	J/UJ	>50% RPD
PCBs	Arochlor-1260	06	MS	J	high recovery
PCBs	Arochlor-1016	18 (CD-45-0708)	MS	R	0% recovery
PCBs	All	10, 13, 24, 29, 31, 35, 36	surrogates	J-/UJ	low recoeveries of DCB
EPH	C9-C18 aliphatics	30	MS	UJ	low recovery
pH/ORP	pH/ORP	14, 29, 30	HT	J-	5 days

eurofins | Spectrum Analytical

☑ Final Report
☐ Re-Issued Report
☐ Revised Report
Report Date:
24-Jun-16 11:43

Laboratory Report

Nobis Engineering, Inc
585 Middlesex Street
Lowell, MA 01851

Work Order: R0508
Project : Lawrence, MA site
Project #:

Attn: Gail DeRuzzo

Laboratory ID	Client Sample ID	Matrix	Date Sampled	Date Received
R0508-01	CD-34E-0001	Soil	06-Jun-16 09:05	08-Jun-16 11:50
R0508-02	CD-34E-0103	Soil	06-Jun-16 09:10	08-Jun-16 11:50
R0508-03	CD-34N-0001	Soil	06-Jun-16 09:15	08-Jun-16 11:50
R0508-04	CD-34N-0103	Soil	06-Jun-16 09:20	08-Jun-16 11:50
R0508-05	CD-34W-0001	Soil	06-Jun-16 09:25	08-Jun-16 11:50
R0508-06	CD-34W-0103	Soil	06-Jun-16 09:30	08-Jun-16 11:50
R0508-07	CD-34S-0001	Soil	06-Jun-16 09:31	08-Jun-16 11:50
R0508-08	CD-34S-0103	Soil	06-Jun-16 09:35	08-Jun-16 11:50
R0508-09	CD-34-0304	Soil	06-Jun-16 09:40	08-Jun-16 11:50
R0508-10	CD-34-0708	Soil	06-Jun-16 09:45	08-Jun-16 11:50
R0508-11	CD-45E-0001	Soil	06-Jun-16 10:00	08-Jun-16 11:50
R0508-12	CD-45E-0103	Soil	06-Jun-16 10:02	08-Jun-16 11:50
R0508-13	CD-45S-0001	Soil	06-Jun-16 10:10	08-Jun-16 11:50
R0508-14	CD-45S-0103	Soil	06-Jun-16 10:15	08-Jun-16 11:50
R0508-15	CD-45W-0001	Soil	06-Jun-16 10:20	08-Jun-16 11:50
R0508-16	CD-45W-0103	Soil	06-Jun-16 10:25	08-Jun-16 11:50
R0508-17	CD-45-0304	Soil	06-Jun-16 10:30	08-Jun-16 11:50
R0508-18	CD-45-0708	Soil	06-Jun-16 10:35	08-Jun-16 11:50
R0508-19	CD-45N-0001	Soil	06-Jun-16 10:50	08-Jun-16 11:50
R0508-20	CD-45N-0103	Soil	06-Jun-16 10:55	08-Jun-16 11:50
R0508-21	D-5N-0001	Soil	06-Jun-16 11:40	08-Jun-16 11:50
R0508-22	D-5N-0103	Soil	06-Jun-16 11:45	08-Jun-16 11:50
R0508-23	D-5E-0001	Soil	06-Jun-16 11:50	08-Jun-16 11:50
R0508-24	D-5E-0103	Soil	06-Jun-16 11:55	08-Jun-16 11:50
R0508-25	D-5-0002	Soil	06-Jun-16 12:05	08-Jun-16 11:50
R0508-26	D-5-0203	Soil	06-Jun-16 12:10	08-Jun-16 11:50
R0508-27	D-5-0607	Soil	06-Jun-16 12:15	08-Jun-16 11:50
R0508-28	FB-03-0102	Soil	06-Jun-16 13:10	08-Jun-16 11:50
R0508-29	FB-03-0203	Soil	06-Jun-16 13:15	08-Jun-16 11:50
R0508-30	FB-04-0102	Soil	06-Jun-16 13:25	08-Jun-16 11:50
R0508-31	FB-04-0203	Soil	06-Jun-16 13:30	08-Jun-16 11:50
R0508-32	FB-04-0507	Soil	06-Jun-16 13:35	08-Jun-16 11:50
R0508-33	FB-01-0102	Soil	06-Jun-16 14:25	08-Jun-16 11:50
R0508-34	FB-01-0203	Soil	06-Jun-16 14:30	08-Jun-16 11:50
R0508-35	FB-01-0507	Soil	06-Jun-16 14:35	08-Jun-16 11:50
R0508-36	FD-01	Soil	06-Jun-16 20:00	08-Jun-16 11:50
R0508-37	FD-02	Soil	06-Jun-16 20:05	08-Jun-16 11:50
R0508-38	FD-03	Soil	06-Jun-16 20:10	08-Jun-16 11:50

Engineering a Sustainable Future

Generic Data Review Checklist

Project: **Lawrence**
Project #: **80108**
Case#: **0163S**
Date: **7/5/16**
Methods: **VOCs-8260, PAHs – 8270, EPH plus targets, PCBs 8082, RCRA metals 6010, 7471/, Hex Cr – 7196A (3060A), Cyanide and PAC 9012 – MCP methods**
Laboratory: **Eurofins Spectrum Analytical**
SDG: **see below**
Reviewer: **Gail DeRuzzo**

1. Case Narrative and Data Package Completeness (COC and Analyte List Review)

SOILS:	GW:	IDW:
R0508 – 38 soils	R0536 – 4 GW	R0562
R0516 – 43 soils	R0545 – 3 GW	1 SO/1 AQ
R0521 – 33 soils	R0561 – 2 GW	not evaluated
R0526 – 40 soils		
R0530 – 22 soils + TB		
R0545 – 11 soils + TB		
R0555 – 20 soils		
R0561 – 4 soils		

Sample IDs printed separately.

2. Holding Time and Sample Preservation Compliance

R0508 - ORP in samples analyzed outside 24 hr HT – samples CD-45S-0103, FB-03-0203, and FB-04-0102 – sampled 6/6 – delivered to lab 6/7, shipped to RI lab then back to MA lab – received 6/10. Analyzed 6/11. Estimate J-

3. Lab and Field Blanks

R0508 – Metals – trace level of Cr (<RL) 0.02567 mg/kg. sample results <RL, U at RL, otherwise remove B.

4. Laboratory Control Samples

OK

5. Field Duplicate Precision

R0508

FD-01 – CD-34S-0103 – PCBs (36/08) – in control
FD-02 – CD-45S-0103 – PCBs and metals (37/14) – PCBs-1260, Pb, Se, and Ag – J/UJ
FD-03 – FB-04-0507 - PCBs, metals, CN/PAC (38/32) – in control

6. Laboratory Duplicate Precision

ok

7. Matrix Spikes

R0508 – PAHs FB-01-0102 (R0508-33AMS), recovery is above criteria for

Benzo(b)fluoranthene at 115% with criteria of (45-115), recovery is below criteria for Benzo(a)pyrene at 18% with criteria of (50-110). FB-01-0102 (R0508-33AMSD), recovery is below criteria for Benzo(a)pyrene at 15% with criteria of (50-110). J- BAP

R0508 – PCBs - CD-34W-0103 (R0508-06AMS), recovery is above criteria for Aroclor-1016 on front column at 142% with criteria of (40-140), ND no action Aroclor-1260 on rear column at 155% with criteria of (60-130) and Aroclor-1260 on front column at 312% with criteria of (60-130). J CD-34W-0103 (R0508-06AMSD), recovery is above criteria for Aroclor-1016 on rear column at 186% with criteria of (40-140), ND no action Aroclor-1016 on front column at 295% with criteria of (40-140), Aroclor-1260 on rear column at 212% with criteria of (60-130) and Aroclor-1260 on front column at 2036% with criteria of (60-130). J CD-45-0708 (R0508-18AMS), recovery is below criteria for Aroclor-1016 on rear column at 0% with criteria of (40-140) and Aroclor-1016 on front column at 0% with criteria of (40-140). R CD-45-0708 (R0508-18AMSD), recovery is below criteria for Aroclor-1016 on rear column at 0% with criteria of (40-140) and Aroclor-1016 on front column at 0% with criteria of (40-140). R

R0508 – EPH
n-Decane
n-Dodecane
n-Nonane (C9) – outside low acceptance limits – components of C9-C18 aliphatics – sample FB-01-0102 – UJ non-detect

R0508 – Hex Cr
FB-04-0102 – out high due to matrix – ND no action.

8. Surrogate Spikes

R0508 – **PAHs** - CD-34E-0103 (R0508-02A), recovery is above criteria for Terphenyld14 at 517% with criteria of (30-125). J+ CD-34E-0103 (R0508-02ADL) Surrogate outside of QC limit due to dilution, no action.
CD-34W-0001 (R0508-05A), recovery is above criteria for Terphenyld14 at 374% with criteria of (30-125). J+ CD-34W-0001 (R0508-05ADL) Surrogate outside of QC limit due to dilution, no action.
CD-45E-0001 (R0508-11ADL) Surrogate outside of QC limit due to dilution, no action.
CD-45N-0103 (R0508-20A), recovery is below criteria for 2-Fluorobiphenyl at 32% with criteria of (45-105), Nitrobenzene-d5 at 29% with criteria of (35-100) and Terphenyl-d14 at 2% with criteria of (30-125). J-/UJ CD-45N-0103 (R0508-20ADL) Surrogate outside of QC limit due to dilution, no action.

R0508 – PCBs - Surrogate outside of QC limit due to dilution, no action. CD-34E-0001 (R0508-01A), CD-34E-0103 (R0508-02A), CD-34W-0001 (R0508-05A), CD-34W-0103

(R0508-06A), CD-34S-0001 (R0508-07A), CD-34-0304 (R0508-09A), CD-45E-0001 (R0508-11A), CD-45E-0103 (R0508-12A), CD-45S-0103 (R0508-14A), CD-45W-0001 (R0508-15A), D-5N-0001 (R0508-21A), D-5N-0103 (R0508-22A), D-5E-0001 (R0508-23A), D-5-0002 (R0508-25A), D-5-0203 (R0508-26A).

CD-34N-0103 (R0508-04A), recovery is above criteria for Decachlorobiphenyl on rear column at 385% with criteria of (60-125). ND no action.
CD-34S-0103 (R0508-08A), recovery is above criteria for Decachlorobiphenyl on rear column at 312% with criteria of (60-125). ND no action.
CD-34-0708 (R0508-10A), recovery is above criteria for Decachlorobiphenyl on front column at 1131% with criteria of (60-125), recovery is below criteria for and Decachlorobiphenyl on rear column at 33% with criteria of (60-125). J-/UJ
CD-45S-0001 (R0508-13A), recovery is below criteria for Decachlorobiphenyl on front column at 53% with criteria of (60-125). J-/UJ
CD-45W-0103 (R0508-16A), recovery is above criteria for Decachlorobiphenyl on front column at 1493% with criteria of (60-125). ND no action.
CD-45-0708 (R0508-18A), recovery is above criteria for Decachlorobiphenyl on rear column at 133% with criteria of (60-125). ND no action.
D-5E-0103 (R0508-24A), recovery is below criteria for Decachlorobiphenyl on rear column at 51% with criteria of (60-125). J-/UJ
FB-03-0203 (R0508-29A), recovery is above criteria for Decachlorobiphenyl on front column at 529% with criteria of (60-125), recovery is below criteria for and Decachlorobiphenyl on rear column at 24% with criteria of (60-125). J-/UJ
FB-04-0203 (R0508-31A), recovery is below criteria for Decachlorobiphenyl on rear column at 58% with criteria of (60-125). J-/UJ
FB-04-0507 (R0508-32A), recovery is above criteria for Decachlorobiphenyl on rear column at 136% with criteria of (60-125). ND no action.
FB-01-0507 (R0508-35A), recovery is below criteria for Decachlorobiphenyl on rear column at 53% with criteria of (60-125). J-/UJ
FD-01 (R0508-36A), recovery is above criteria for Decachlorobiphenyl on rear column at 456% with criteria of (60-125), recovery is below criteria for and Decachlorobiphenyl on front column at 52% with criteria of (60-125). J-UJ

9. **Internal Standards**

R0508 – PAHs CD-34E-0103 (R0508-02A), Peak area is outside QC Limits for Chrysene-d12. CD-34W-0001 (R0508-05A), Peak area is outside QC Limits for Chrysene-d12. CD-45E-0001 (R0508-11A), Peak area is outside QC Limits for Chrysene-d12. CD-45W-0103 (R0508-16A), Peak area is outside QC Limits for Chrysene-d12. CD-45N-0103 (R0508-20A), Peak area is outside QC Limits for Chrysene-d12, Perylene-d12 and Phenanthrene-d10.
All samples listed above estimate Pyrene, Benzo(a)anthracene, Chrysene. For CD-45N-0103 also estimate Benzo(b)fluoranthene, Benzo(k)fluoranthene, Benzo(a)pyrene, Indeno(1,2,3-cd)pyrene, Dibenzo(a,h)anthracene, Benzo(g,h,i)perylene and Pentachlorophenol, Phenanthrene, Anthracene, Fluoranthene.

10. Performance Evaluation Samples

NA

11. Reporting Limits

R0508-PAHs:

CD-34E-0103 (R0508-02ADL) : Dilution Factor: 250
CD-34W-0001 (R0508-05ADL) : Dilution Factor: 200
CD-45E-0001 (R0508-11ADL) : Dilution Factor: 50
CD-45W-0103 (R0508-16ADL) : Dilution Factor: 25
CD-45N-0001 (R0508-19ADL) : Dilution Factor: 5
CD-45N-0103 (R0508-20ADL) : Dilution Factor: 100
FB-04-0102 (R0508-30ADL) : Dilution Factor: 25

R0508 – PCBs:

CD-34E-0001 (R0508-01A) : Dilution Factor: 1000
CD-34E-0103 (R0508-02A) : Dilution Factor: 500
CD-34N-0001 (R0508-03A) : Dilution Factor: 20
CD-34W-0001 (R0508-05A) : Dilution Factor: 10
CD-34W-0103 (R0508-06A) : Dilution Factor: 10
CD-34W-0103 (R0508-06AMS) : Dilution Factor: 10
CD-34W-0103 (R0508-06AMSD) : Dilution Factor: 10
CD-34S-0001 (R0508-07A) : Dilution Factor: 10
CD-34-0304 (R0508-09A) : Dilution Factor: 100
CD-45E-0001 (R0508-11A) : Dilution Factor: 100
CD-45E-0103 (R0508-12A) : Dilution Factor: 100
CD-45S-0103 (R0508-14A) : Dilution Factor: 10
CD-45W-0001 (R0508-15A) : Dilution Factor: 100
CD-45-0304 (R0508-17A) : Dilution Factor: 10
D-5N-0001 (R0508-21A) : Dilution Factor: 10
D-5N-0103 (R0508-22A) : Dilution Factor: 2
D-5E-0001 (R0508-23A) : Dilution Factor: 50
D-5-0002 (R0508-25A) : Dilution Factor: 5
D-5-0203 (R0508-26A) : Dilution Factor: 100

R0508 – EPH

FB-040102 – diluted due to high conc.

12. Calibration Issues

ok

13. Other

Analyte lists and RLs were verified per the FTWP/QAPPA.

R0508

SPECTRUM ANALYTICAL, INC.
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CHAIN OF CUSTODY RECORD

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☐ 8405 Benjamin Road, Ste A, Tampa, FL 33634, (813) 888-9507
☐ 646 Camp Avenue, N Kingstown, RI 02852, (401) 732-3400

Special Handling:

TAT- Ind icate Date Needed: _____
- All TATs subject to laboratory approval. Min. 24-hour notification needed for rushes.
- Samples disposed of after 60 days unless otherwise instructed.

Report To: NOBIS ENGINEERING
Telephone #:
Project Mgr. A. ROY / S. VETERE

Invoice To:
P.O. No.: RQN:

Project No.: 80108.04
Site Name: LAWRENCE TBA
Location: LAWRENCE State: MA
Sampler(s): EHJ / AG

1=Na_2S2O_3 2=HCl 3=H_2SO_4 4=HNO_3 5=NaOH 6=Ascorbic Acid 7=CH_3OH
8= $NaHSO_4$ 9= Deionized Water 10=H_3PO_4 11= _____ 12= _____

List preservative code below:

QA/QC Reporting Notes:

DW=Drinking Water GW=Groundwater WW=Wastewater
O=Oil SW= Surface Water SO=Soil SL=Sludge A=Air
X1= _____ X2= _____ X3= _____

G=Grab C=Composite

Lab Id:	Sample Id:	Date:	Time:	Type	Matrix	# of VOA Vials	# of Amber Glass	# of Clear Glass	# of Plastic	PCBs	RCRA 8 Metals	PAHs	Hex Chromium	Cyanide	P.A.C.	VOCs	EPH	
	CD-34E-0001	6/6/16	905	G	SO		1			X								
	CD-34E-0103	↓	910	↓	↓		1			X		X						
	CD-34N-0001		915				1			X								
	CD-34N-0103		920				1			X	X							
	CD-34W-0001		925				1			X		X						
	CD-34W-0103		930				3			X								MS/MSD
	CD-345-0001		931				1			X	X							
	CD-345-0103		935				1			X								
	CD-34-0304		940				1			X								
	CD-34-0708	↓	945	↓	↓		1			X								

Relinquished by:	Received by:	Date:	Time:	Temp°C
	NOBIS COLD STORAGE	6/6/16	1800	4.5°
		6/7/16	1119	0
	John Short	6/7/16	1620	4.5°
8:45		6/8/16	11:50	a1

☐ EDD Format _____
☐ E-mail to _____

Condition upon receipt: Custody Seals: ☐ Present ☐ Intact ☐ Broken
☐ Ambient ☐ Iced ☑ Refrigerated ☑ DI VOA Frozen ☐ Soil Jar Frozen

QA/QC Reporting Level
☐ Level I ☐ Level II
☐ Level III ☐ Level IV
☐ Other _____
State-specific reporting standards:

2.0°C IR 4.1°C IR

R0508

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☐ 646 Camp Avenue, N Kingstown, RI 02852, (401) 732-3400

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Report To: NOBIS ENGINEERING
Telephone #:
Project Mgr. A. ROY / S. VETERE

Invoice To:
P.O. No.: RQN:

Project No.: 80108.04
Site Name: LAWRENCE TBA
Location: LAWRENCE State: MA
Sampler(s): EHJ / AG

1=Na_2S2O_3 2=HCl 3=H_2SO_4 4=HNO_3 5=NaOH 6=Ascorbic Acid 7=CH_3OH
8= $NaHSO_4$ 9= Deionized Water 10=H_3PO_4 11= _____ 12= _____

List preservative code below:

QA/QC Reporting Notes:

DW=Drinking Water GW=Groundwater WW=Wastewater
O=Oil SW= Surface Water SO=Soil SL=Sludge A=Air
X1= _____ X2= _____ X3= _____

G=Grab C=Composite

Containers: # of VOA Vials | # of Amber Glass | # of Clear Glass | # of Plastic

Analyses: PCBs | RCRA 8 Metals | PAHs | Hex Chromium

QA/QC Reporting Level
☐ Level I ☐ Level II
☐ Level III ☐ Level IV
☐ Other _____

State-specific reporting standards: _____

Lab Id:	Sample Id:	Date:	Time:	Type	Matrix	# of VOA Vials	# of Amber Glass	# of Clear Glass	# of Plastic	PCBs	RCRA 8 Metals	PAHs	Hex Chromium	
	CD-45E-0001	6/6/16	1000	G	SO		1			X		X		
	CD-45E-0103		1002				1			X	X			
	CD-45S-0001		1010				1			X				
	CD-45S-0103		1015				3			X	X	X	X	NO PAHs EJ
	CD-45W-0001		1020				1			X				
	CD-45W-0103		1025				1			X		X		
	CD-45-0304		1030				1			X	X			
	CD-45-0708		1035				3			X	X			MS/MSD
	CD-45N-0001		1050				1					X		
	CD-45N-0103		1055				1					X		

Relinquished by:	Received by:	Date:	Time:	Temp°C
	NOBIS COLD STORAGE	6/6/16	1800	4.5
DSC	DSC	6/7/16	1119	0
		6/7/16	1620	4.3
8:45 6/8/16		6/8/16	11:50	01

☐ EDD Format _____
☐ E-mail to _____

Condition upon receipt: Custody Seals: ☐ Present ☐ Intact ☐ Broken
☐ Ambient ☐ Iced ☑ Refrigerated ☑ DI VOA Frozen ☐ Soil Jar Frozen

2.0°C IR 4.1°C IR

Revised Feb 2013

R0508

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Special Handling:

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- All TATs subject to laboratory approval. Min. 24-hour notification needed for rushes.
- Samples disposed of after 60 days unless otherwise instructed.

Report To: NOBIS ENGINEERING

Telephone #: ________

Project Mgr. A. ROY / S. VETERE

Invoice To: ________

P.O. No.: ________ RQN: ________

Project No.: 80108.04

Site Name: LAWRENCE TBA

Location: LAWRENCE State: MA

Sampler(s): EHJ / AG

1=$Na_2S_2O_3$ 2=HCl 3=H_2SO_4 4=HNO_3 5=NaOH 6=Ascorbic Acid 7=CH_3OH
8= $NaHSO_4$ 9= Deionized Water 10=H_3PO_4 11=________ 12=________

List preservative code below:

QA/QC Reporting Notes:

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O=Oil SW= Surface Water SO=Soil SL=Sludge A=Air
X1=________ X2=________ X3=________

G=Grab C=Composite

QA/QC Reporting Level
☐ Level I ☐ Level II
☐ Level III ☐ Level IV
☐ Other ________

State-specific reporting standards: ________

Lab Id:	Sample Id:	Date:	Time:	Type	Matrix	# of VOA Vials	# of Amber Glass	# of Clear Glass	# of Plastic	PCBs	RCRA 8 METALS	PAHs	CYANIDE	PAC	VOCs	HEX CHROMIUM	EPH
	D-SN-0001	6/6/16	1140	G	SO		1			X	X						
	D-SN-0103	↓	1145	↓	↓		1			X							
	D-SE-0001		1150				1			X							
	D-SE-0103		1155				1			X	X						
	D-S-0002		1205				1			X							
	D-S-0203		1210				1			X							
	D-S-0607		1215				1			X							
	FB-03-0102		1310				2			X	X		X	X			
	FB-03-0203		1315			3	2			X	X		X	X	X		
	FB-04-0102	↓	1325	↓	↓	3	8			X	X	X	X	X	X	X	X

VOCs frozen on 6/6 @ 18:00 (AG)

MS/MSD ONLY FOR CYANIDE, PAC, HEX CR (EJ)

MS/MSD (NOT FOR EPH, ~~PAHS or~~ ~~or VOCS~~) (EJ)

Relinquished by:	Received by:	Date:	Time:	Temp°C
Eric Johnson	NOBIS COLD STORAGE	6/6/16	1800	4.5
[signature]	[signature]	6/7/16	1119	0
[signature]	[signature]	6/7/16	1620	4.5
[signature] 6-8-16 8:45	[signature]	6/8/16	1150	0.1

☐ EDD Format ________

☐ E-mail to ________

Condition upon receipt: Custody Seals: ☐ Present ☐ Intact ☐ Broken
☐ Ambient ☐ Iced ☒ Refrigerated ☒ DI VOA Frozen ☐ Soil Jar Frozen

www.spectrum-analytical.com 2.0°C IR 4.1°C IR Revised Feb 2013

R0508

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Special Handling:

TAT- Ind icate Date Needed: _____
- All TATs subject to laboratory approval. Min. 24-hour notification needed for rushes.
- Samples disposed of after 60 days unless otherwise instructed.

Report To: NOBIS ENGINEERING
Telephone #:
Project Mgr. A. ROY / S. VETERE

Invoice To:
P.O. No.: RQN:

Project No.: 80108.04
Site Name: LAWRENCE TBA
Location: LAWRENCE State: MA
Sampler(s): EHJ / AG

1=Na_2S2O_3 2=HCl 3=H_2SO_4 4=HNO_3 5=NaOH 6=Ascorbic Acid 7=CH_3OH
8= $NaHSO_4$ 9= Deionized Water 10=H_3PO_4 11= 12=

List preservative code below:

QA/QC Reporting Notes:

DW=Drinking Water GW=Groundwater WW=Wastewater
O=Oil SW= Surface Water SO=Soil SL=Sludge A=Air
X1= X2= X3=

G=Grab C=Composite

Lab Id:	Sample Id:	Date:	Time:	Type	Matrix	Containers: # of VOA Vials	# of Amber Glass	# of Clear Glass	# of Plastic	Analyses: PCBs	RCRA 8 METALS	CYANIDE	PAC	EPH	PAHs	VOCs	
	FB-04-0203	6/6/16	1330				2			X	X	X	X				
	FB-04-0507	6/6/16	1335				2			X	X	X	X				
	FB-01-0102		1425				5			X	X	X	X	X	X		MS/MSD FOR EPH, PAHs
	FB-01-0203		1430				2			X	X	X	X				
	FB-01-0507		1435			3	2			X	X	X	X			X	VOCs FROZEN on 6/10 @ 1800
	FD-01		2000				1			X							
	FD-02		2005				1			X	X						
	FD-03		2010				2			X	X	X	X				

Relinquished by:	Received by:	Date:	Time:	Temp°C
	NOBIS COLD STORAGE	6/6/16	1800	4.5
DSR	DSR	6/7/16	1419	0
		6/7/16	1420	4.5
6-8-16 8:45		6/9/16	11:50	0.1

☐ EDD Format
☐ E-mail to

Condition upon receipt: Custody Seals: ☐ Present ☐ Intact ☐ Broken
☐ Ambient ☒ Iced ☒ Refrigerated ☒ DI VOA Frozen ☐ Soil Jar Frozen

www.spectrum-analytical.com

2.0°C IR
DSR 6-7-16
4.1°C IR

Revised Feb 2013

Nobis
Engineering a Sustainable Future

July 6, 2016
Nobis File No. 80108

Mr. Alan Peterson
EPA-New England Region I
5 Post Office Square
Suite 100, Mailcode OSRR07-4
Boston, MA 02109-3912

Re: Contract No.: EP-S1-06-03
Task Order No. 0108-SI-BZ-0100
Case No. 0163S, Laboratory Report No.: R0516
Eurofins Spectrum Analytical, North Kingston, Rhode Island
Former Tombarello Property
Lawrence, Massachusetts

Tier 1 Modified Organic and Inorganic Data Review

VOCs, PAHs, EPH, PCBs, Metals, Cyanide, PAC, and Hexavalent Chromium:
43/Soils: See attached sample ID list

Dear Mr. Peterson:

Nobis Engineering, Inc. performed a Tier 1 Modified data review on the organic and inorganic analytical data for the samples listed in the attached sample listing. The samples were collected by Nobis at the Former Tombarello Property located in Lawrence, Massachusetts. The samples were analyzed for volatile organic compounds (VOCs), polycyclic aromatic hydrocarbons (PAHs), Resource Conservation and Recovery Act (RCRA) metals, extractable petroleum hydrocarbons (EPH), polychlorinated biphenyls (PCBs), cyanide, physiologically available cyanide (PAC), and hexavalent chromium. See the included Data Summary Table and chain-of-custody for samples selected for each analysis. The laboratory performed testing according to Massachusetts Contingency Plan (MCP) Compendium of Analytical Methods (CAM) and to Nobis technical specification RAC2-087.

The Tier 1 Modified data review was performed in accordance with the EPA New England Environmental Data Review Supplement for Regional Data Review Elements and Superfund Specific Guidance/Procedures (April 2013); USEPA National Functional Guidelines for Inorganic Superfund Data Review (August 2014); USEPA National Functional Guidelines for Superfund Organic Methods Data Review (August 2014) and the Field Task Work Plan (FTWP) and Quality Assurance Project Plan Addendum (QAPPA) for the Targeted Brownfields Assessment (TBA) for the Former Tombarello Property (June 2016).

The data were evaluated based on the following parameters:

* • Overall Evaluation of Data and Potential Usability Issues
* • Data Completeness
• Preservation and Technical Holding Times

Nobis Engineering, Inc.
585 Middlesex Street
Lowell, MA 01851
T (978) 683-0891

*	•	Instrument Calibration
*	•	Blanks
*	•	Laboratory Control Samples (LCS)
	•	Laboratory Duplicates
NA	•	Field Duplicates
	•	Matrix Spike Analysis
	•	Surrogate Compounds
*	•	Internal Standards
NA	•	Performance Evaluation Sample Results
*	•	Reported Quantitation Limits

* All criteria were met for this parameter.
NA – Not applicable.

Overall Evaluation of Data and Potential Usability Issues
The objectives of the investigation activities at the site are to delineate the nature and extent of soil and groundwater contamination on the Site so that potential remedial alternatives can be evaluated and order-of-magnitude cost estimates can be developed. Analytical and hydrogeological data collected during the investigation will be compiled and reduced to develop a conceptual site model to support the estimation of human health risks and development of remedial alternatives.

The data meet the project quality criteria and can be used without restriction except as summarized below. The attachments provide details and supporting documentation.

VOCs:
Results did not require qualification.

PAHs:
Results did not require qualification.

EPH:
Results did not require qualification.

PCBs:
Results were estimated for surrogate and matrix spike failures.

Metals:
Arsenic, barium, cadmium, chromium, and Lead results were qualified as estimated due to laboratory duplicate imprecision. Lead and mercury results were qualified due to low matrix spike recoveries.

Hexavalent Chromium, Cyanide, and PAC:
Results did not require qualification. However, pH and ORP are analyzed to support hexavalent chromium. These tests were qualified as estimated due to exceeded holding time.

Please contact Gail DeRuzzo at (978) 703-6021 or gderuzzo@nobiseng.com should you have any questions or comments regarding this information.

Sincerely,

NOBIS ENGINEERING, INC.

Gail DeRuzzo
Lead Chemist

Tables: Data Summary Table – Tier 1 Mod Data Review
Data Qualification Actions Table

Attachments: Sample ID List
Data Review Checklist
COCs

DATA SUMMARY TABLE

Lab Sample ID	R0516-01	R0516-02	R0516-03	R0516-04	R0516-05	R0516-06	R0516-07	R0516-08	R0516-09	R0516-10
Field Sample ID	FB-02-0102	FB-02-0203	WSB-6W-0001	WSB-6W-0103	WSB-6N-0001	WSB-6N-0103	WSB-6-0001	WSB-6-0103	SVA-01-001	SVA-01-0103
Sample Location	FB-02	FB-02	WSB-6W	WSB-6W	WSB-6N	WSB-6N	WSB-6	WSB-6	SVA-01	SVA-01
Sample Date	06/07/16	06/07/16	06/07/16	06/07/16	06/07/16	06/07/16	06/07/16	06/07/16	06/07/16	06/07/16
PCBs (ug/kg)										
Aroclor 1016	180 U	37 UJ	720 U	44 U	710 U	40 U	710 U	39 U	17000 U	41 U
Aroclor 1221	180 U	37 UJ	720 U	44 U	710 U	40 U	710 U	39 U	17000 U	41 U
Aroclor 1232	180 U	37 UJ	720 U	44 U	710 U	40 U	710 U	39 U	17000 U	41 U
Aroclor 1242	180 U	37 UJ	720 U	44 U	710 U	40 U	710 U	39 U	17000 U	41 U
Aroclor 1248	180 U	37 UJ	720 U	44 U	710 U	40 U	710 U	39 U	17000 U	41 U
Aroclor 1254	180 U	37 UJ	720 U	44 U	710 U	40 U	710 U	39 U	17000 U	41 U
Aroclor 1260	1500 J	310 J-	5500	44 U	5700	110	5200	99	100000	320
Aroclor 1262	180 U	37 UJ	720 U	44 U	710 U	40 U	710 U	39 U	17000 U	41 U
Aroclor 1268	180 U	37 UJ	720 U	44 U	710 U	40 U	710 U	39 U	17000 U	41 U

U – not detected; J – estimated value; UJ – not detected, reporting limit estimated; R – rejected

DATA SUMMARY TABLE

Lab Sample ID	R0516-11	R0516-12	R0516-13	R0516-14	R0516-15	R0516-16	R0516-17	R0516-18	R0516-19	R0516-20
Field Sample ID	BPA-02-0102	BPA-02-0203	BPA-02-0607	BPA-01-0102	BPA-01-0203	G-3E-0002	G-3E-0203	G-3N-0001	G-3N-0203	G-3W-0001
Sample Location	BPA-02	BPA-02	BPA-02	BPA-01	BPA-01	G-3E	G-3E	G-3N	G-3N	G-3W
Sample Date	06/07/16	06/07/16	06/07/16	06/07/16	06/07/16	06/07/16	06/07/16	06/07/16	06/07/16	06/07/16
PCBs (ug/kg)										
Aroclor 1016	740 U	360 U	42 UJ	35 UJ	720 U	37 UJ	73 U	3800 U	760 U	760 U
Aroclor 1221	740 U	360 U	42 UJ	35 UJ	720 U	37 UJ	73 U	3800 U	760 U	760 U
Aroclor 1232	740 U	360 U	42 UJ	35 UJ	720 U	37 UJ	73 U	3800 U	760 U	760 U
Aroclor 1242	740 U	360 U	42 UJ	35 UJ	720 U	37 UJ	73 U	3800 U	760 U	760 U
Aroclor 1248	740 U	360 U	42 UJ	35 UJ	720 U	37 UJ	73 U	3800 U	760 U	760 U
Aroclor 1254	740 U	360 U	42 UJ	35 UJ	720 U	37 UJ	73 U	3800 U	760 U	760 U
Aroclor 1260	5000	1200	42 UJ	64 J-	9700	550 J-	860	51000	4900	7900
Aroclor 1262	740 U	360 U	42 UJ	35 UJ	720 U	37 UJ	73 U	3800 U	760 U	760 U
Aroclor 1268	740 U	360 U	42 UJ	35 UJ	720 U	37 UJ	73 U	3800 U	760 U	760 U

U – not detected; J – estimated value; UJ – not detected, reporting limit estimated; R – rejected

DATA SUMMARY TABLE

Lab Sample ID	R0516-21	R0516-22	R0516-23	R0516-24	R0516-25	R0516-26	R0516-27	R0516-28	R0516-29	R0516-30
Field Sample ID	G-3W-0203	G-3-0102	G-3-0203	G-3-0506	G-3S-0001	G-3S-0203	M-7W-0001	M-7W-0103	M-7-0102	M-7-0203
Sample Location	G-3W	G-3	G-3	G-3	G-3S	G-3S	M-7W	M-7W	M-7	M-7
Sample Date	06/07/16	06/07/16	06/07/16	06/07/16	06/07/16	06/07/16	06/07/16	06/07/16	06/07/16	06/07/16
PCBs (ug/kg)										
Aroclor 1016	42 U	450 U	220 U	41 U	3900 U	43 U	730 U	44 U	36 UJ	42 U
Aroclor 1221	42 U	450 U	220 U	41 U	3900 U	43 U	730 U	44 U	36 UJ	42 U
Aroclor 1232	42 U	450 U	220 U	41 U	3900 U	43 U	730 U	44 U	36 UJ	42 U
Aroclor 1242	42 U	450 U	220 U	41 U	3900 U	43 U	730 U	44 U	36 UJ	42 U
Aroclor 1248	42 U	2600	1900	41 U	22000	43 U	730 U	44 U	110 J-	42 U
Aroclor 1254	42 U	450 U	220 U	41 U	3900 U	43 U	730 U	44 U	36 UJ	42 U
Aroclor 1260	190	450 U	220 U	41 U	20000	43 U	3900	310	36 UJ	42 U
Aroclor 1262	42 U	450 U	220 U	41 U	3900 U	43 U	730 U	44 U	36 UJ	42 U
Aroclor 1268	42 U	450 U	220 U	41 U	3900 U	43 U	730 U	44 U	36 UJ	42 U

U – not detected; J – estimated value; UJ – not detected, reporting limit estimated; R – rejected

DATA SUMMARY TABLE

Lab Sample ID	R0516-31	R0516-32	R0516-33	R0516-34	R0516-35	R0516-36	R0516-37	R0516-38	R0516-39	R0516-40
Field Sample ID	M-7-0607	M-7E-0001	M-7E-0103	M-7S-0001	M-7S-0103	FG-34N-0001	FG-34N-0103	FG-34W-0001	FG-34W-0103	FG-34-0001
Sample Location	M-7	M-7E	M-7E	M-7S	M-7S	FG-34N	FG-34N	FG-34W	FG-34W	FG-34
Sample Date	06/07/16	06/07/16	06/07/16	06/07/16	06/07/16	06/07/16	06/07/16	06/07/16	06/07/16	06/07/16
PCBs (ug/kg)										
Aroclor 1016	42 UJ	3900 U	2100 U	20000 U	37 U	1800 U	2000 U	380 U	390 U	7500 U
Aroclor 1221	42 UJ	3900 U	2100 U	20000 U	37 U	1800 U	2000 U	380 U	390 U	7500 U
Aroclor 1232	42 UJ	3900 U	2100 U	20000 U	37 U	1800 U	2000 U	380 U	390 U	7500 U
Aroclor 1242	42 UJ	3900 U	2100 U	20000 U	37 U	1800 U	2000 U	380 U	390 U	7500 U
Aroclor 1248	42 UJ	3900 U	2100 U	20000 U	37 U	1800 U	2000 U	380 U	390 U	7500 U
Aroclor 1254	42 UJ	3900 U	2100 U	20000 U	37 U	1800 U	2000 U	380 U	390 U	7500 U
Aroclor 1260	42 UJ	28000	23000	110000	350	13000	20000	3200	3700	67000
Aroclor 1262	42 UJ	3900 U	2100 U	20000 U	37 U	1800 U	2000 U	380 U	390 U	7500 U
Aroclor 1268	42 UJ	3900 U	2100 U	20000 U	37 U	1800 U	2000 U	380 U	390 U	7500 U

U – not detected; J – estimated value; UJ – not detected, reporting limit estimated; R – rejected

DATA SUMMARY TABLE

Lab Sample ID	R0516-41	R0516-42	R0516-43
Field Sample ID	FG-34-0103	FG-34S-0001	FG-34S-0103
Sample Location	FG-34	FG-34S	FG-34S
Sample Date	06/07/16	06/07/16	06/07/16
PCBs (ug/kg)			
Aroclor 1016	210 U	1800 U	41 U
Aroclor 1221	210 U	1800 U	41 U
Aroclor 1232	210 U	1800 U	41 U
Aroclor 1242	210 U	1800 U	41 U
Aroclor 1248	210 U	1800 U	41 U
Aroclor 1254	210 U	1800 U	41 U
Aroclor 1260	1500	24000	220
Aroclor 1262	210 U	1800 U	41 U
Aroclor 1268	210 U	1800 U	41 U

U – not detected; J – estimated value; UJ – not detected, reporting limit estimated; R – rejected

DATA SUMMARY TABLE

Lab Sample ID	R0516-01	R0516-02	R0516-09	R0516-10	R0516-11	R0516-12	R0516-13	R0516-14	R0516-15	R0516-18	R0516-26	R0516-27
Field Sample ID	FB-02-0102	FB-02-0203	SVA-01-001	SVA-01-0103	BPA-02-0102	BPA-02-0203	BPA-02-0607	BPA-01-0102	BPA-01-0203	G-3N-0001	G-3S-0203	M-7W-0001
Sample Location	FB-02	FB-02	SVA-01	SVA-01	BPA-02	BPA-02	BPA-02	BPA-01	BPA-01	G-3N	G-3S	M-7W
Sample Date	06/07/16	06/07/16	06/07/16	06/07/16	06/07/16	06/07/16	06/07/16	06/07/16	06/07/16	06/07/16	06/07/16	06/07/16
Metals (mg/kg)												
Arsenic	8.8 J	10 J	8.9	7.7	13	6.9	7	7.6	8.1	10	10 J	NA
Barium	54	50	120	57	970	310	23	22	150	220	320 J	NA
Cadmium	0.76	0.64	1.9	0.48	22	7	0.24 U	8.8	2.6	5.5	2.7 J	NA
Chromium	35	37	42	18	99	32	11	25	33	47	23 J	NA
Lead	46 J	120 J	740	38	5300	590	5.7	18	240	2100	290 J	NA
Mercury	0.084 J-	0.08 J-	0.49	0.071	2.8	0.88	0.05 U	0.013 J	0.42	0.94	0.18	NA
Selenium	0.71 J	1.8	3.2	3.2	5.4	3.5	2.8	1.4	2.1	5.4	4.1	NA
Silver	0.22 J	0.2 J	2.7	0.22 J	3.7	1.3	1.5 U	0.21 J	0.27 J	1.5	0.39 J	NA
Chromium-Hexavalent	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.588 U
Cyanide (PAC)	1.07 U	1.11 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cyanide (total)	0.54 U	0.547 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

U – not detected; J – estimated value; UJ – not detected, reporting limit estimated; R – rejected

DATA SUMMARY TABLE

Lab Sample ID	R0516-30	R0516-33	R0516-39	R0516-42
Field Sample ID	M-7-0203	M-7E-0103	FG-34W-0103	FG-34S-0001
Sample Location	M-7	M-7E	FG-34W	FG-34S
Sample Date	06/07/16	06/07/16	06/07/16	06/07/16
Metals (mg/kg)				
Arsenic	4.5	21	10	14
Barium	23	950	250	140
Cadmium	0.25 U	16	6.4	2.7
Chromium	14	81	51	91
Lead	14	1800	1000	720
Mercury	0.055	2.8	0.44	1.2
Selenium	2.6	7.2	4.7	3.2
Silver	0.11 J	2	0.95 J	0.9 J
Chromium-Hexavalent	NA	NA	NA	NA
Cyanide (PAC)	NA	NA	NA	NA
Cyanide (total)	NA	NA	NA	NA

U – not detected; J – estimated value; UJ – not detected, reporting limit estimated; R – rejected

DATA SUMMARY TABLE

Lab Sample ID	R0516-01	R0516-02	R0516-09	R0516-12	R0516-15	R0516-33
Field Sample ID	FB-02-0102	FB-02-0203	SVA-01-001	BPA-02-0203	BPA-01-0203	M-7E-0103
Sample Location	FB-02	FB-02	SVA-01	BPA-02	BPA-01	M-7E
Sample Date	06/07/16	06/07/16	06/07/16	06/07/16	06/07/16	06/07/16
Volatiles (ug/kg)						
1,1,1,2-Tetrachloroethane	4.6 U	3 U	5.4 U	5.3 U	5.9 U	4.2 U
1,1,1-Trichloroethane	4.6 U	3 U	5.4 U	5.3 U	5.9 U	4.2 U
1,1,2,2-Tetrachloroethane	4.6 U	3 U	5.4 U	5.3 U	5.9 U	4.2 U
1,1,2-Trichloroethane	4.6 U	3 U	5.4 U	5.3 U	5.9 U	4.2 U
1,1-Dichloroethane	4.6 U	3 U	5.4 U	5.3 U	5.9 U	4.2 U
1,1-Dichloroethene	4.6 U	3 U	5.4 U	5.3 U	5.9 U	4.2 U
1,1-Dichloropropene	4.6 U	3 U	5.4 U	5.3 U	5.9 U	4.2 U
1,2,3-Trichlorobenzene	4.6 U	3 U	5.4 U	5.3 U	5.9 U	4.2 U
1,2,3-Trichloropropane	4.6 U	3 U	5.4 U	5.3 U	5.9 U	4.2 U
1,2,4-Trichlorobenzene	4.6 U	3 U	5.4 U	5.3 U	5.9 U	4.2 U
1,2,4-Trimethylbenzene	4.6 U	3 U	5.4 U	5.3 U	4.3 J	57
1,2-Dibromo-3-chloropropane	4.6 U	3 U	5.4 U	5.3 U	5.9 U	4.2 U
1,2-Dibromoethane	4.6 U	3 U	5.4 U	5.3 U	5.9 U	4.2 U
1,2-Dichlorobenzene	4.6 U	3 U	5.4 U	5.3 U	5.9 U	1 J
1,2-Dichloroethane	4.6 U	3 U	5.4 U	5.3 U	5.9 U	4.2 U
1,2-Dichloropropane	4.6 U	3 U	5.4 U	5.3 U	5.9 U	4.2 U
1,3,5-Trimethylbenzene	4.6 U	3 U	5.4 U	5.3 U	5.9 U	2.9 J
1,3-Dichlorobenzene	4.6 U	3 U	5.4 U	5.3 U	5.9 U	4.2 U
1,3-Dichloropropane	4.6 U	3 U	5.4 U	5.3 U	5.9 U	4.2 U
1,4-Dichlorobenzene	4.6 U	3 U	5.4 U	5.3 U	5.9 U	4.2 U
1,4-Dioxane	92 U	59 U	110 U	110 U	120 U	85 U
2,2-Dichloropropane	4.6 U	3 U	5.4 U	5.3 U	5.9 U	4.2 U
2-Butanone	4.6 U	3 U	5.4 U	6.4	41	10
2-Chlorotoluene	4.6 U	3 U	5.4 U	5.3 U	5.9 U	4.2 U
2-Hexanone	4.6 U	3 U	5.4 U	5.3 U	5.9 U	4.2 U
4-Chlorotoluene	4.6 U	3 U	5.4 U	5.3 U	5.9 U	4.2 U
4-Isopropyltoluene	4.6 U	3 U	5.4 U	5.3 U	5.9 U	4.2 U
4-Methyl-2-pentanone	4.6 U	3 U	5.4 U	5.3 U	5.9 U	4.2 U
Acetone	14	3 U	5.4 U	17	140	44
Benzene	4.6 U	3 U	5.4 U	5.3 U	8.6	13
Bromobenzene	4.6 U	3 U	5.4 U	5.3 U	5.9 U	4.2 U
Bromochloromethane	4.6 U	3 U	5.4 U	5.3 U	5.9 U	4.2 U

U – not detected; J – estimated value; UJ – not detected, reporting limit estimated; R – rejected

DATA SUMMARY TABLE

Lab Sample ID	R0516-01	R0516-02	R0516-09	R0516-12	R0516-15	R0516-33
Field Sample ID	FB-02-0102	FB-02-0203	SVA-01-001	BPA-02-0203	BPA-01-0203	M-7E-0103
Sample Location	FB-02	FB-02	SVA-01	BPA-02	BPA-01	M-7E
Sample Date	06/07/16	06/07/16	06/07/16	06/07/16	06/07/16	06/07/16
Bromodichloromethane	4.6 U	3 U	5.4 U	5.3 U	5.9 U	4.2 U
Bromoform	4.6 U	3 U	5.4 U	5.3 U	5.9 U	4.2 U
Bromomethane	4.6 U	3 U	5.4 U	5.3 U	5.9 U	4.2 U
Carbon disulfide	4.6 U	3 U	5.4 U	5.3 U	5.9 U	4.2 U
Carbon tetrachloride	4.6 U	3 U	5.4 U	5.3 U	5.9 U	4.2 U
Chlorobenzene	4.6 U	3 U	5.4 U	5.3 U	5.9 U	2.2 J
Chloroethane	4.6 U	3 U	5.4 U	5.3 U	5.9 U	4.2 U
Chloroform	4.6 U	3 U	5.4 U	5.3 U	5.9 U	4.2 U
Chloromethane	4.6 U	3 U	5.4 U	5.3 U	5.9 U	4.2 U
cis-1,2-Dichloroethene	4.6 U	3 U	5.4 U	5.3 U	5.9 U	4.2 U
cis-1,3-Dichloropropene	4.6 U	3 U	5.4 U	5.3 U	5.9 U	4.2 U
Dibromochloromethane	4.6 U	3 U	5.4 U	5.3 U	5.9 U	4.2 U
Dibromomethane	4.6 U	3 U	5.4 U	5.3 U	5.9 U	4.2 U
Dichlorodifluoromethane	4.6 U	3 U	5.4 U	5.3 U	5.9 U	4.2 U
Diethyl ether	4.6 U	3 U	5.4 U	5.3 U	5.9 U	4.2 U
Diisopropyl Ether	4.6 U	3 U	5.4 U	5.3 U	5.9 U	4.2 U
Ethylbenzene	4.6 U	3 U	5.4 U	5.3 U	5.9 U	6.5
Hexachlorobutadiene	4.6 U	3 U	5.4 U	5.3 U	5.9 U	4.2 U
Isopropylbenzene	4.6 U	3 U	5.4 U	5.3 U	2.5 J	2.8 J
m,p-Xylene	4.6 U	3 U	5.4 U	5.3 U	5.9 U	18
Methyl tert-butyl ether	4.6 U	3 U	5.4 U	5.3 U	5.9 U	4.2 U
Methylene chloride	4.6 U	3 U	5.4 U	5.3 U	5.9 U	4.2 U
Naphthalene	4.6 U	3 U	5.4 U	5.3 U	23	4.1 J
n-Butylbenzene	4.6 U	3 U	5.4 U	5.3 U	5.9 U	4.2 U
n-Propylbenzene	4.6 U	3 U	5.4 U	5.3 U	5.9 U	3.4 J
o-Xylene	4.6 U	3 U	5.4 U	5.3 U	2.8 J	3.1 J
sec-Butylbenzene	4.6 U	3 U	5.4 U	5.3 U	5.9 U	4.2 U
Styrene	4.6 U	3 U	5.4 U	5.3 U	5.9 U	4.2 U
tert-Amyl methyl ether	4.6 U	3 U	5.4 U	5.3 U	5.9 U	4.2 U
Tert-Butyl Ethyl Ether	4.6 U	3 U	5.4 U	5.3 U	5.9 U	4.2 U
tert-Butylbenzene	4.6 U	3 U	5.4 U	5.3 U	5.9 U	4.2 U
Tetrachloroethene	4.6 U	3 U	1.8 J	5.3 U	5.9 U	4.2 U
Tetrahydrofuran	9.2 U	5.9 U	11 U	11 U	12 U	8.5 U

DATA SUMMARY TABLE

Lab Sample ID	R0516-01	R0516-02	R0516-09	R0516-12	R0516-15	R0516-33
Field Sample ID	FB-02-0102	FB-02-0203	SVA-01-001	BPA-02-0203	BPA-01-0203	M-7E-0103
Sample Location	FB-02	FB-02	SVA-01	BPA-02	BPA-01	M-7E
Sample Date	06/07/16	06/07/16	06/07/16	06/07/16	06/07/16	06/07/16
Toluene	4.6 U	3 U	5.4 U	5.3 U	5.9 U	2.8 J
trans-1,2-Dichloroethene	4.6 U	3 U	5.4 U	5.3 U	5.9 U	4.2 U
trans-1,3-Dichloropropene	4.6 U	3 U	5.4 U	5.3 U	5.9 U	4.2 U
Trichloroethene	4.6 U	3 U	5.4 U	5.3 U	5.9 U	4.2 U
Trichlorofluoromethane	4.6 U	3 U	5.4 U	5.3 U	5.9 U	4.2 U
Vinyl chloride	4.6 U	3 U	5.4 U	5.3 U	5.9 U	4.2 U
Xylene (total)	4.6 U	3 U	5.4 U	5.3 U	2.8 J	21

U – not detected; J – estimated value; UJ – not detected, reporting limit estimated; R – rejected

DATA SUMMARY TABLE

Lab Sample ID	R0516-01	R0516-02	R0516-09	R0516-12	R0516-15	R0516-37	R0516-40
Field Sample ID	FB-02-0102	FB-02-0203	SVA-01-001	BPA-02-0203	BPA-01-0203	FG-34N-0103	FG-34-0001
Sample Location	FB-02	FB-02	SVA-01	BPA-02	BPA-01	FG-34N	FG-34
Sample Date	06/07/16	06/07/16	06/07/16	06/07/16	06/07/16	06/07/16	06/07/16
PAHs (ug/kg)							
2-Methylnaphthalene	310 J	380	160 J	370 U	1500	210 J	2200
Acenaphthene	620	940	550	370 U	3700	880	2500
Acenaphthylene	81 J	120 J	380	370 U	930	390 J	2200
Anthracene	1800	2700	2400	310 J	10000	2100	6800
Benzo(a)anthracene	2400	3800	4700	630	17000	4900	14000
Benzo(a)pyrene	2200	3100	5200	690	15000	4700	13000
Benzo(b)fluoranthene	3000	4400	7600	940	19000	6000	16000
Benzo(g,h,i)perylene	1200	1800	5200	830	8000	3600	7800
Benzo(k)fluoranthene	1200	1500	2800	380	5200	2700	5000
Chrysene	2200	3300	4000	630	17000	4300	14000
Dibenz(a,h)anthracene	320 J	460	1100	120 J	2100	880	2200
Fluoranthene	5000	9200	9500	1200	37000	11000	30000
Fluorene	920	1500	630	370 U	4400	940	4400
Indeno(1,2,3-cd)pyrene	1300	1900	4900	630	9500	3800	8800
Naphthalene	450	660	260 J	370 U	2900	400	3600
Phenanthrene	5300	9400	5300	820	38000	8200	27000
Pyrene	4200	5900	7800	1100	28000	8400	23000

DATA SUMMARY TABLE

Lab Sample ID	R0516-01	R0516-02	R0516-09	R0516-12	R0516-15
Field Sample ID	FB-02-0102	FB-02-0203	SVA-01-001	BPA-02-0203	BPA-01-0203
Sample Location	FB-02	FB-02	SVA-01	BPA-02	BPA-01
Sample Date	06/07/16	06/07/16	06/07/16	06/07/16	06/07/16
EPH (mg/kg)					
2-Methylnaphthalene	1.07	0.352 U	0.347 U	0.358 U	0.911 U
Acenaphthene	1.95	0.851	0.696	0.358 U	2.57
Acenaphthylene	0.352 U	0.352 U	0.347 U	0.358 U	0.911 U
Anthracene	6.77	2.83	3.2	0.358 U	7.18
Benzo(a)anthracene	8.02	5.59	6.05	0.606	15.9
Benzo(a)pyrene	6.9	4.77	5.33	0.714	13.4
Benzo(b)fluoranthene	4.6	3.09	3.89	0.46	9.57
Benzo(g,h,i)perylene	2.95	2.4	2.92	0.559	5.56
Benzo(k)fluoranthene	6.01	3.67	4.81	0.646	10.8
C11-C22 Aromatics	313	204	135	514	417
C19-C36 Aliphatics	741 J	544	148	2160 J	277
C9-C18 Aliphatics	49.8	33.9	10.5	752 J	27.4 U
Chrysene	6.9	4.84	5.14	0.635	13.7
Dibenz(a,h)anthracene	0.872	0.703	0.911	0.358 U	1.73
Fluoranthene	17.2	11.5	12.5	1.16	31.7
Fluorene	4	1.22	1.12	0.403	3.71
Indeno(1,2,3-cd)pyrene	2.93	2.34	2.75	0.476	5.82
Naphthalene	1.2	0.421	0.347 U	0.358 U	2.03
Phenanthrene	19.8	10.8	10.8	0.86	33.1
Pyrene	13.3	9.18	10.2	1.13	26.6

Data Review Qualification Actions

Case: 0163S

SDG: R0516

Parameter	Analyte	Samples: R0516-#	Evaluation Criteria	Action Needed	Comments
Metals	Chromium, Lead	01, 02, 09, 10-15, 18, 26, 30, 33, 39, 42	Lab Blank	Remove B	result >RL
Metals	Arsenic	01 and 02	Lab Dup	J	RPD>20 in sample 01
Metals	As, Ba, Cd, Cr, Pb	26	Lab Dup	J	RPD>20 in sample 26
Metals	Lead	01 and 02	MS	J	low recovery in 01
Metals	Mercury	01 and 02 (FB-02-0102 and FB-02-0203)	MS	J-	<30% recovery in 01
PCBs	Aroclor-1260	01 (FB-02-0102)	MS	J	0% recovery, RPD out
PCBs	All	02, 13, 14, 16, 29, 31	surrogates	J-/UJ	low recoveries
pH/ORP	pH/ORP	27	HT	J-	4 days

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☑ Final Report
☐ Re-Issued Report
☐ Revised Report
Report Date:
01-Jul-16 09:11

Laboratory Report

Nobis Engineering, Inc
585 Middlesex Street
Lowell, MA 01851

Work Order: R0516
Project : Lawrence, MA site
Project #:

Attn: Gail DeRuzzo

Laboratory ID	Client Sample ID	Matrix	Date Sampled	Date Received
R0516-01	FB-02-0102	Soil	07-Jun-16 08:30	09-Jun-16 12:40
R0516-02	FB-02-0203	Soil	07-Jun-16 08:35	09-Jun-16 12:40
R0516-03	WSB-6W-0001	Soil	07-Jun-16 08:40	09-Jun-16 12:40
R0516-04	WSB-6W-0103	Soil	07-Jun-16 08:45	09-Jun-16 12:40
R0516-05	WSB-6N-0001	Soil	07-Jun-16 08:50	09-Jun-16 12:40
R0516-06	WSB-6N-0103	Soil	07-Jun-16 08:55	09-Jun-16 12:40
R0516-07	WSB-6-0001	Soil	07-Jun-16 09:00	09-Jun-16 12:40
R0516-08	WSB-6-0103	Soil	07-Jun-16 09:05	09-Jun-16 12:40
R0516-09	SVA-01-001	Soil	07-Jun-16 09:10	09-Jun-16 12:40
R0516-10	SVA-01-0103	Soil	07-Jun-16 09:15	09-Jun-16 12:40
R0516-11	BPA-02-0102	Soil	07-Jun-16 09:35	09-Jun-16 12:40
R0516-12	BPA-02-0203	Soil	07-Jun-16 09:40	09-Jun-16 12:40
R0516-13	BPA-02-0607	Soil	07-Jun-16 10:10	09-Jun-16 12:40
R0516-14	BPA-01-0102	Soil	07-Jun-16 09:45	09-Jun-16 12:40
R0516-15	BPA-01-0203	Soil	07-Jun-16 09:50	09-Jun-16 12:40
R0516-16	G-3E-0002	Soil	07-Jun-16 10:50	09-Jun-16 12:40
R0516-17	G-3E-0203	Soil	07-Jun-16 10:55	09-Jun-16 12:40
R0516-18	G-3N-0001	Soil	07-Jun-16 11:25	09-Jun-16 12:40
R0516-19	G-3N-0203	Soil	07-Jun-16 11:30	09-Jun-16 12:40
R0516-20	G-3W-0001	Soil	07-Jun-16 11:35	09-Jun-16 12:40
R0516-21	G-3W-0203	Soil	07-Jun-16 11:40	09-Jun-16 12:40
R0516-22	G-3-0102	Soil	07-Jun-16 11:45	09-Jun-16 12:40
R0516-23	G-3-0203	Soil	07-Jun-16 11:50	09-Jun-16 12:40
R0516-24	G-3-0506	Soil	07-Jun-16 11:55	09-Jun-16 12:40
R0516-25	G-3S-0001	Soil	07-Jun-16 12:30	09-Jun-16 12:40
R0516-26	G-3S-0203	Soil	07-Jun-16 12:35	09-Jun-16 12:40
R0516-27	M-7W-0001	Soil	07-Jun-16 12:00	09-Jun-16 12:40
R0516-28	M-7W-0103	Soil	07-Jun-16 12:05	09-Jun-16 12:40
R0516-29	M-7-0102	Soil	07-Jun-16 12:10	09-Jun-16 12:40
R0516-30	M-7-0203	Soil	07-Jun-16 12:15	09-Jun-16 12:40
R0516-31	M-7-0607	Soil	07-Jun-16 12:20	09-Jun-16 12:40
R0516-32	M-7E-0001	Soil	07-Jun-16 13:25	09-Jun-16 12:40
R0516-33	M-7E-0103	Soil	07-Jun-16 13:30	09-Jun-16 12:40
R0516-34	M-7S-0001	Soil	07-Jun-16 13:35	09-Jun-16 12:40
R0516-35	M-7S-0103	Soil	07-Jun-16 13:40	09-Jun-16 12:40
R0516-36	FG-34N-0001	Soil	07-Jun-16 13:45	09-Jun-16 12:40
R0516-37	FG-34N-0103	Soil	07-Jun-16 13:50	09-Jun-16 12:40
R0516-38	FG-34W-0001	Soil	07-Jun-16 13:55	09-Jun-16 12:40
R0516-39	FG-34W-0103	Soil	07-Jun-16 14:00	09-Jun-16 12:40
R0516-40	FG-34-0001	Soil	07-Jun-16 14:25	09-Jun-16 12:40
R0516-41	FG-34-0103	Soil	07-Jun-16 14:30	09-Jun-16 12:40
R0516-42	FG-34S-0001	Soil	07-Jun-16 14:35	09-Jun-16 12:40
R0516-43	FG-34S-0103	Soil	07-Jun-16 14:40	09-Jun-16 12:40

Engineering a Sustainable Future

Generic Data Review Checklist

Project: **Lawrence**
Project #: **80108**
Case#: **0163S**
Date: **7/6/16**
Methods: **VOCs-8260, PAHs – 8270, EPH plus targets, PCBs 8082, RCRA metals 6010, 7471/, Hex Cr – 7196A (3060A), Cyanide and PAC 9012 – MCP methods**
Laboratory: **Eurofins Spectrum Analytical**
SDG: **see below**
Reviewer: **Gail DeRuzzo**

1. Case Narrative and Data Package Completeness (COC and Analyte List Review)

SOILS:	GW:	IDW:
R0508 – 38 soils	R0536 – 4 GW	R0562
R0516 – 43 soils	R0545 – 3 GW	1 SO/1 AQ
R0521 – 33 soils	R0561 – 2 GW	not evaluated
R0526 – 40 soils		
R0530 – 22 soils + TB		
R0545 – 11 soils + TB		
R0555 – 20 soils		
R0561 – 4 soils		

Sample IDs printed separately.

2. Holding Time and Sample Preservation Compliance

ORP – M-7W-001 – HT of 24 hrs exceeded. sampled 6/7 – delivered to lab 6/8, shipped to RI lab then back to MA lab – received 6/10. Analyzed 6/11. Estimate J-

3. Lab and Field Blanks

Cr (.03618 (RL 1)) and Pb (.2412 (RL .5)) – B flag data – samples >RL – remove B's

4. Laboratory Control Samples

PAH – RPD outside control limits in all analytes – indicates some variability in detections or a bad standard or injection. No action taken.

5. Field Duplicate Precision

NA

6. Laboratory Duplicate Precision

Metals – Dup on 01 – As -RPD> 20 J/UJ – qual 01 and 02 (same location)
Dup on 26 – As, Ba, Cd, Cr, Se, Ag, Pb – RPD>20 – J/UJ As, Ba, Cd, Cr, Pb (Se and Ag <5x RL) samples 26

7. Matrix Spikes

PCBs:

FB-02-0102 (R0516-01AMS), recovery is below criteria for Aroclor-1260 on rear column at 0% with criteria of (60-130) and Aroclor-1260 on front column at 0% with criteria of (60-130).
FB-02-0102 (R0516-01AMSD), recovery is below criteria for Aroclor-1260 on rear column at 0% with criteria of (60-130) and Aroclor-1260 on front column at 0% with criteria of (60-130). J/R – sample detected - J

G-3S-0203 (R0516-26AMS), recovery is above criteria for Aroclor-1016 on front column at 171% with criteria of (40-140) and Aroclor-1260 on front column at 149% with criteria of (60-130).
G-3S-0203 (R0516-26AMSD), recovery is above criteria for Aroclor-1016 on front column at 146% with criteria of (40-140) and Aroclor-1260 on front column at 143% with criteria of (60-130). J – but ND – no action.

FB-02-0102 (R0516-01AMSD), Relative Percent Difference is greater than reported RPD limit for Aroclor-1260 on front column. J

Metals:
Lead were outside of the QC limits (low) in sample FB-02-0102 (R0516-01AMS). J/UJ
Barium and Lead were outside of the QC limits in sample G-3S-0203 (R0516-26AMS), however the sample concentration is greater than 4 times the spike concentration and no corrective action is required.
Mercury outside limits low in sample 01. <30% J-/R

8. Surrogate Spikes
PCBs:
FB-02-0203 (R0516-02A), recovery is below criteria for Decachlorobiphenyl on rear column at 52% with criteria of (60-125) and Decachlorobiphenyl on front column at 51% with criteria of (60-125). J-/UJ
BPA-02-0607 (R0516-13A), recovery is below criteria for Decachlorobiphenyl on rear column at 57% with criteria of (60-125) and Decachlorobiphenyl on front column at 59% with criteria of (60-125). J-/UJ
BPA-01-0102 (R0516-14A), recovery is below criteria for Decachlorobiphenyl on rear column at 45% with criteria of (60-125) and Decachlorobiphenyl on front column at 49% with criteria of (60-125). J-/UJ
G-3E-0002 (R0516-16A), recovery is above criteria for Decachlorobiphenyl on rear column at 442% with criteria of (60-125), recovery is below criteria for Decachlorobiphenyl on front column at 35% with criteria of (60-125) and Tetrachloro-m-xylene on front column at 25% with criteria of (34-147). J-/UJ
G-3E-0203 (R0516-17) recovery is below criteria for Tetrachloro-m-xylene on front column at 26% with criteria of (34-147). J-/UJ
M-7-0102 (R0516-29A), recovery is below criteria for Decachlorobiphenyl on rear column at 15% with criteria of (60-125), Decachlorobiphenyl on front column at 28% with criteria of (60-125), Tetrachloro-m-xylene on rear column at 17% with criteria of (34-147) and Tetrachloro-m-xylene on front column at 17% with criteria of (34-147). J-/UJ

M-7-0607 (R0516-31A), recovery is below criteria for Decachlorobiphenyl on rear column at 56% with criteria of (60-125) and Decachlorobiphenyl on front column at 55% with criteria of (60-125). J-/UJ

9. Internal Standards

OK

10. Performance Evaluation Samples

NA

11. Reporting Limits

PAHs:

FB-02-0203 (R0516-02ADL) : Dilution Factor: 4
SVA-01-001 (R0516-09ADL) : Dilution Factor: 4
BPA-01-0203 (R0516-15ADL) : Dilution Factor: 10
FG-34N-0103 (R0516-37ADL) : Dilution Factor: 4
FG-34-0001 (R0516-40ADL) : Dilution Factor: 10

PCBs:

FB-02-0102 (R0516-01A) : Dilution Factor: 5
FB-02-0102 (R0516-01AMS) : Dilution Factor: 5
FB-02-0102 (R0516-01AMSD) : Dilution Factor: 5
WSB-6W-0001 (R0516-03A) : Dilution Factor: 20
WSB-6N-0001 (R0516-05A) : Dilution Factor: 20
WSB-6-0001 (R0516-07A) : Dilution Factor: 20
SVA-01-001 (R0516-09A) : Dilution Factor: 500
BPA-02-0102 (R0516-11A) : Dilution Factor: 20
BPA-02-0203 (R0516-12A) : Dilution Factor: 10
BPA-01-0203 (R0516-15A) : Dilution Factor: 20
G-3E-0203 (R0516-17A) : Dilution Factor: 2
G-3N-0001 (R0516-18A) : Dilution Factor: 100
G-3N-0203 (R0516-19A) : Dilution Factor: 20
G-3W-0001 (R0516-20A) : Dilution Factor: 20
G-3-0102 (R0516-22A) : Dilution Factor: 10
G-3-0203 (R0516-23A) : Dilution Factor: 5
G-3S-0001 (R0516-25A) : Dilution Factor: 100
M-7W-0001 (R0516-27A) : Dilution Factor: 20
M-7E-0001 (R0516-32A) : Dilution Factor: 100
M-7E-0103 (R0516-33A) : Dilution Factor: 50
M-7S-0001 (R0516-34A) : Dilution Factor: 500
FG-34N-0001 (R0516-36A) : Dilution Factor: 50
FG-34N-0103 (R0516-37A) : Dilution Factor: 50
FG-34W-0001 (R0516-38A) : Dilution Factor: 10
FG-34W-0103 (R0516-39A) : Dilution Factor: 10
FG-34-0001 (R0516-40A) : Dilution Factor: 200
FG-34-0103 (R0516-41A) : Dilution Factor: 5

FG-34S-0001 (R0516-42A) : Dilution Factor: 50

12. Calibration Issues

ok

13. Other

Analyte lists and RLs were verified per the FTWP/QAPPA.

R0516

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☐ 646 Camp Avenue, N Kingstown, RI 02852, (401) 732-3400

Special Handling:
TAT- Ind icate Date Needed: _____
· All TATs subject to laboratory approval. Min. 24-hour notification needed for rushes.
· Samples disposed of after 60 days unless otherwise instructed.

Report To: NOBIS ENGINEERING
Telephone #:
Project Mgr. A. ROY / S. VETERE

Invoice To:
P.O. No.: RQN:

Project No.: 80108.04
Site Name: LAWRENCE TSA
Location: LAWRENCE State: MA
Sampler(s): EHJ / AG

1=Na_2S2O_3 2=HCl 3=H_2SO_4 4=HNO_3 5=NaOH 6=Ascorbic Acid 7=CH_3OH
8= $NaHSO_4$ 9= Deionized Water 10=H_3PO_4 11= MeOH 12=

List preservative code below: 9/11

QA/QC Reporting Notes:

DW=Drinking Water GW=Groundwater WW=Wastewater
O=Oil SW= Surface Water SO=Soil SL=Sludge A=Air
X1= X2= X3=

G=Grab C=Composite

Lab Id:	Sample Id:	Date:	Time:	Type	Matrix	# of VOA Vials	# of Amber Glass	# of Clear Glass	# of Plastic	PCBs	RCRA 8 METALS	CYANIDE	P.A.C.	PAHs	EPH	VOCs
	FB-02-0102	6/7/16	830	G	SO	3	3			X	X	X	X	X	X	X
	FB-02-0203		835			3	3			X	X	X	X	X	X	X
	WSB-6W-0001		840				1			X						
	WSB-6W-0103		845				2			X						
	WSB-6N-0001		850				1			X						
	WSB-6N-0103		855				1			X						
	WSB-6-0001		900				1			X						
	WSB-6-0103		905				1			X						
	SVA-01-0001		910			3	2			X	X			X	X	X
	SVA-01-0103		915				1			X	X					

MS/MSD

QA/QC Reporting Level
☐ Level I ☐ Level II
☐ Level III ☐ Level IV
☐ Other
State-specific reporting standards:

Relinquished by:	Received by:	Date:	Time:	Temp°C
	NOBIS COLD STORAGE	6/7/16	1730	5.4
	DSR	6-8-16	1253	0
	SUB OUT	6/8/16	1700	5.4
		6/9/16	1240	01

☐ EDD Format
☐ E-mail to

Condition upon receipt: Custody Seals: ☐ Present ☐ Intact ☐ Broken
☐ Ambient ☐ Iced ☒ Refrigerated ☐ DI VOA Frozen ☐ Soil Jar Frozen

2.1°C/0/21°C IR

R0516

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Telephone #:
Project Mgr. A. ROY / S. VETERE

Invoice To:
P.O. No.: RQN:

Project No.: 80108.04
Site Name: LAWRENCE TBA
Location: LAWRENCE State: MA
Sampler(s): EHJ / AG

1=Na_2S2O_3 2=HCl 3=H_2SO_4 4=HNO_3 5=NaOH 6=Ascorbic Acid 7=CH_3OH
8= $NaHSO_4$ 9= Deionized Water 10=H_3PO_4 11= MeOH 12=

List preservative code below: 9/11

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O=Oil SW= Surface Water SO=Soil SL=Sludge A=Air
X1= X2= X3=

G=Grab C=Composite

Lab Id:	Sample Id:	Date:	Time:	Type	Matrix	# of VOA Vials	# of Amber Glass	# of Clear Glass	# of Plastic	PCBs	RCRA 8 METALS	PAHs	EPH	VOCs
	BPA-02-0102	6/7/16	935	G	SO		1			X	X			
	BPA-02-0203		940			3	2			X	X	X	X	X
	BPA-02-0607		1010				1			X	X			
	BPA-01-0102		945				1			X	X			
	BPA-01-0203		950			3	2			X	X	X	X	X
	G-3E-0002		1050				1			X				
	G-3E-0203		1055				1			X				
	G-3N-0001		1125				1			X	X			
	G-3N-0203		1130				1			X				
	G-3W-0001		1135				1			X				

Containers: # of VOA Vials; # of Amber Glass; # of Clear Glass; # of Plastic
Analyses: PCBs; RCRA 8 METALS; PAHs; EPH; VOCs

QA/QC Reporting Level
☐ Level I ☐ Level II
☐ Level III ☐ Level IV
☐ Other
State-specific reporting standards:

Relinquished by:	Received by:	Date:	Time:	Temp°C
	NOBIS COLD STORAGE	6/7/16	1730	5.4
	DSC	6-8-16	1253	0
	SUBAR	6/8/16	1700	5.4
		6/9/16	12:40	01

☐ EDD Format
☐ E-mail to

Condition upon receipt: Custody Seals: ☐ Present ☐ Intact ☐ Broken
☐ Ambient ☐ Iced ☒ Refrigerated ☐ DI VOA Frozen ☐ Soil Jar Frozen

2.1°C/0/2.1°C IR

R0516

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Telephone #:
Project Mgr. A. ROY / S. VETERE

Invoice To:
P.O. No.: RQN:

Project No.: 80108.04
Site Name: LAWRENCE TBA
Location: LAWRENCE State: MA
Sampler(s): EHJ / AG

1=Na_2S2O_3 2=HCl 3=H_2SO_4 4=HNO_3 5=NaOH 6=Ascorbic Acid 7=CH_3OH
8=$NaHSO_4$ 9= Deionized Water 10=H_3PO_4 11= 12=

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O=Oil SW= Surface Water SO=Soil SL=Sludge A=Air
X1= X2= X3=

G=Grab C=Composite

Lab Id:	Sample Id:	Date:	Time:	Type	Matrix	# of VOA Vials	# of Amber Glass	# of Clear Glass	# of Plastic	PCBs	RCRA 8 METALS	HEX CHROMIUM						Containers: / Analyses:
	G-3W-0203	6/7/16	1140	G	SO		1			X								
	G-3-0102		1145				1			X								
	G-3-0203		1150				1			X								
	G-3-0506		1155				1			X								
	G-35-0001		1230				1			X								
	G-35-0203		1235				2			X	X							MS/MSD
	M-7W-0001		1200				3			X		X						
	M-7W-0103		1205				1			X								
	M-7-0102		1210				1			X								
	M-7-0203		1215				1			X	X							

QA/QC Reporting Level
☐ Level I ☐ Level II
☐ Level III ☐ Level IV
☐ Other

State-specific reporting standards:

Relinquished by:	Received by:	Date:	Time:	Temp°C
	NOBIS COLD STORAGE	6/7/16	1730	5.4
	DSR	6-8-16	1253	0
	FED EX	6/8/16	1700	5.4
		6/9/16	12:40	0 1

☐ EDD Format
☐ E-mail to

Condition upon receipt: Custody Seals: ☐ Present ☐ Intact ☐ Broken
☐ Ambient ☐ Iced ☑ Refrigerated ☐ DI VOA Frozen ☐ Soil Jar Frozen

2.1°C/0/2.1°C IR

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X1= X2= X3=

G=Grab C=Composite

Lab Id:	Sample Id:	Date:	Time:	Type	Matrix	# of VOA Vials	# of Amber Glass	# of Clear Glass	# of Plastic	PCBs	RCRA 8 METALS	VOCs	PAHs
	M-7-0607	6/7/16	1220	G	SO		1			X			
	M-7E-0001	↓	1325	↓	↓		1			X			
	M-7E-0103		1330			3	1			X	X	X	
	M-7S-0001		1335				1			X			
	M-7S-0103		1340				1			X			
	FG-34N-0001		1345				1			X			
	FG-34N-0103		1350				1			X			X
	FG-34W-0001		1355				1			X			
	FG-34W-0103		1400				1			X	X		
	FG-34-0001		1425				1			X			X

QA/QC Reporting Level
☐ Level I ☐ Level II
☐ Level III ☐ Level IV
☐ Other ________

State-specific reporting standards:

Relinquished by:	Received by:	Date:	Time:	Temp°C
Eric Johnson	NOBIS COLD STORAGE	6/7/16	1730	5.4
[signature]	[signature]	6-8-16	1253	0
[signature]	SUB OUT	6/8/16	1700	5.4
[signature]	[signature]	6/9/16	12:40P	0

☐ EDD Format
☐ E-mail to

Condition upon receipt: Custody Seals: ☐ Present ☐ Intact ☐ Broken
☐ Ambient ☐ Iced ☒ Refrigerated ☐ DI VOA Frozen ☐ Soil Jar Frozen

www.spectrum-analytical.com

2.1°C / 0 / 2.1°C IR

Revised Feb 2013

R0516

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8=$NaHSO_4$ 9=Deionized Water 10=H_3PO_4 11= _____ 12= _____

List preservative code below:

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DW=Drinking Water GW=Groundwater WW=Wastewater
O=Oil SW=Surface Water SO=Soil SL=Sludge A=Air
X1= _____ X2= _____ X3= _____

G=Grab C=Composite

Lab Id:	Sample Id:	Date:	Time:	Type	Matrix	Containers: # of VOA Vials	# of Amber Glass	# of Clear Glass	# of Plastic	Analyses: PCBs	RCRA 8 METALS
	FG-34-0103	6/7/16	1430	G	SO		1			X	
	FG-345-0001	↓	1435	↓	↓		1			X	X
	FG-345-0103	↓	1440	↓	↓		1			X	

QA/QC Reporting Level
☐ Level I ☐ Level II
☐ Level III ☐ Level IV
☐ Other _____

State-specific reporting standards:

Relinquished by:	Received by:	Date:	Time:	Temp°C
	NOBIS COLD STORAGE	6/7/16	1730	5.0
		6/8/16	1253	0
	SUB OUT	6/8/16	1700	5.0
	Fed Ex	6/9/16	12:40p	01

☐ EDD Format _____
☐ E-mail to _____

Condition upon receipt: Custody Seals: ☐ Present ☐ Intact ☐ Broken
☐ Ambient ☐ Iced ☑ Refrigerated ☐ DI VOA Frozen ☐ Soil Jar Frozen

2.1°C/0/2.1°C IR

Revised Feb 2013

Nobis
Engineering a Sustainable Future

July 7, 2016
Nobis File No. 80108

Mr. Alan Peterson
EPA-New England Region I
5 Post Office Square
Suite 100, Mailcode OSRR07-4
Boston, MA 02109-3912

Re: Contract No.: EP-S1-06-03
Task Order No. 0108-SI-BZ-0100
Case No. 0163S, Laboratory Report No.: R0521
Eurofins Spectrum Analytical, North Kingston, Rhode Island
Former Tombarello Property
Lawrence, Massachusetts

Tier 1 Modified Organic and Inorganic Data Review

VOCs, PAHs, EPH, PCBs, Metals, and Hexavalent Chromium:
33/Soils: See attached sample ID list
4/Field Duplicates: (FD-04/FG-45S-0103); (FD-05/FG-45E-0001); (FD-06/SVA-03-0103); (FD-07/P-13S-0103)

Dear Mr. Peterson:

Nobis Engineering, Inc. performed a Tier 1 Modified data review on the organic and inorganic analytical data for the samples listed in the attached sample listing. The samples were collected by Nobis at the Former Tombarello Property located in Lawrence, Massachusetts. The samples were analyzed for volatile organic compounds (VOCs), polycyclic aromatic hydrocarbons (PAHs), Resource Conservation and Recovery Act (RCRA) metals, extractable petroleum hydrocarbons (EPH), polychlorinated biphenyls (PCBs), and hexavalent chromium. See the included Data Summary Table and chain-of-custody for samples selected for each analysis. The laboratory performed testing according to Massachusetts Contingency Plan (MCP) Compendium of Analytical Methods (CAM) and to Nobis technical specification RAC2-087.

The Tier 1 Modified data review was performed in accordance with the EPA New England Environmental Data Review Supplement for Regional Data Review Elements and Superfund Specific Guidance/Procedures (April 2013); USEPA National Functional Guidelines for Inorganic Superfund Data Review (August 2014); USEPA National Functional Guidelines for Superfund Organic Methods Data Review (August 2014) and the Field Task Work Plan (FTWP) and Quality Assurance Project Plan Addendum (QAPPA) for the Targeted Brownfields Assessment (TBA) for the Former Tombarello Property (June 2016).

The data were evaluated based on the following parameters:

* • Overall Evaluation of Data and Potential Usability Issues
* • Data Completeness

Nobis Engineering, Inc.
585 Middlesex Street
Lowell, MA 01851
T (978) 683-0891

	•	Preservation and Technical Holding Times
*	•	Instrument Calibration
*	•	Blanks
*	•	Laboratory Control Samples (LCS)
	•	Laboratory Duplicates
	•	Field Duplicates
*	•	Matrix Spike Analysis
	•	Surrogate Compounds
*	•	Internal Standards
NA	•	Performance Evaluation Sample Results
*	•	Reported Quantitation Limits

* All criteria were met for this parameter.
NA – Not applicable.

Overall Evaluation of Data and Potential Usability Issues
The objectives of the investigation activities at the site are to delineate the nature and extent of soil and groundwater contamination on the Site so that potential remedial alternatives can be evaluated and order-of-magnitude cost estimates can be developed. Analytical and hydrogeological data collected during the investigation will be compiled and reduced to develop a conceptual site model to support the estimation of human health risks and development of remedial alternatives.

The data meet the project quality criteria and can be used without restriction except as summarized below. The attachments provide details and supporting documentation.

VOCs:
Acetone results were qualified as estimated due to field duplicate imprecision.

PAHs:
PAH results were qualified as estimated due to field duplicate imprecision.

EPH:
C9-C18 aliphatic results were qualified as estimated due to field duplicate imprecision.

PCBs:
Results were qualified as estimated for surrogate recovery failures and field duplicate imprecision.

Metals:
Arsenic, chromium, Lead, mercury, and selenium results were qualified as estimated due to laboratory duplicate imprecision. Arsenic and selenium results were qualified as estimated due to field duplicate imprecision.

Hexavalent Chromium:
Results did not require qualification. However, pH and ORP are analyzed to support hexavalent chromium. These tests were qualified as estimated due to exceeded holding time.

Please contact Gail DeRuzzo at (978) 703-6021 or gderuzzo@nobiseng.com should you have any questions or comments regarding this information.

Sincerely,

NOBIS ENGINEERING, INC.

Gail DeRuzzo
Lead Chemist

Tables: Data Summary Table – Tier 1 Mod Data Review
Data Qualification Actions Table

Attachments: Sample ID List
Data Review Checklist
COCs

DATA SUMMARY TABLE

Lab Sample ID	R0521-01	R0521-02	R0521-03	R0521-04	R0521-05	R0521-06	R0521-07	R0521-08	R0521-09	R0521-10	R0521-11
Field Sample ID	FG-45N-0001	FG-45N-0103	FG-45W-0001	FG-45W-0103	FG-45S-0001	FG-45S-0103	FG-45E-0001	FG-45E-0103	SVA-02-0001	SVA-02-0103	SVA-03-0001
Sample Location	FG-45N	FG-45N	FG-45W	FG-45W	FG-45S	FG-45S	FG-45E	FG-45E	SVA-02	SVA-02	SVA-03
Sample Date	06/08/16	06/08/16	06/08/16	06/08/16	06/08/16	06/08/16	06/08/16	06/08/16	06/08/16	06/08/16	06/08/16
PCBs (ug/kg)											
Aroclor 1016	1800 U	42 U	1800 U	40 U	370 U	40 U	1800 U	40 U	3600 U	400 U	360 U
Aroclor 1221	1800 U	42 U	1800 U	40 U	370 U	40 U	1800 U	40 U	3600 U	400 U	360 U
Aroclor 1232	1800 U	42 U	1800 U	40 U	370 U	40 U	1800 U	40 U	3600 U	400 U	360 U
Aroclor 1242	1800 U	42 U	1800 U	40 U	370 U	40 U	1800 U	40 U	3600 U	400 U	360 U
Aroclor 1248	1800 U	42 U	1800 U	40 U	370 U	40 U	1800 U	40 U	3600 U	400 U	360 U
Aroclor 1254	1800 U	42 U	1800 U	40 U	370 U	40 U	1800 U	40 U	3600 U	400 U	360 U
Aroclor 1260	25000	42 U	4600	320	1400	180	15000 J	40 U	37000	1200	2200
Aroclor 1262	1800 U	42 U	1800 U	40 U	370 U	40 U	1800 U	40 U	3600 U	400 U	360 U
Aroclor 1268	1800 U	42 U	1800 U	40 U	370 U	40 U	1800 U	40 U	3600 U	400 U	360 U

U – not detected; J – estimated value; UJ – not detected, reporting limit estimated; R – rejected

DATA SUMMARY TABLE

Lab Sample ID	R0521-12	R0521-13	R0521-14	R0521-15	R0521-16	R0521-17	R0521-18	R0521-19	R0521-20	R0521-21	R0521-22	R0521-23
Field Sample ID	SVA-03-0103	SVA-04-0001	SVA-04-0103	SVA-06-0001	SVA-06-0103	P-13W-0001	P-13W-0103	P-13-0102	P-13-0203	P-13-0910	P-13S-0001	P-13S-0103
Sample Location	SVA-03	SVA-04	SVA-04	SVA-06	SVA-06	P-13W	P-13W	P-13	P-13	P-13	P-13S	P-13S
Sample Date	06/08/16	06/08/16	06/08/16	06/08/16	06/08/16	06/08/16	06/08/16	06/08/16	06/08/16	06/08/16	06/08/16	06/08/16
PCBs (ug/kg)												
Aroclor 1016	430 U	360 U	42 U	380 U	730 U	3900 U	52 U	800 U	810 U	44 U	1500 U	1500 U
Aroclor 1221	430 U	360 U	42 U	380 U	730 U	3900 U	52 U	800 U	810 U	44 U	1500 U	1500 U
Aroclor 1232	430 U	360 U	42 U	380 U	730 U	3900 U	52 U	800 U	810 U	44 U	1500 U	1500 U
Aroclor 1242	430 U	360 U	42 U	380 U	730 U	3900 U	52 U	800 U	810 U	44 U	1500 U	1500 U
Aroclor 1248	430 UJ	360 U	42 U	380 U	6400	19000	170	800 U	810 U	44 U	6900	8400 J
Aroclor 1254	430 U	360 U	42 U	380 U	730 U	3900 U	52 U	800 U	810 U	44 U	1500 U	1500 U
Aroclor 1260	3400 J	2300	230	1300	5000	29000	200	880	5600	44 U	7000	9100
Aroclor 1262	430 U	360 U	42 U	380 U	730 U	3900 U	52 U	800 U	810 U	44 U	1500 U	1500 U
Aroclor 1268	430 U	360 U	42 U	380 U	730 U	3900 U	52 U	800 U	810 U	44 U	1500 U	1500 U

U – not detected; J – estimated value; UJ – not detected, reporting limit estimated; R – rejected

DATA SUMMARY TABLE

Lab Sample ID	R0521-24	R0521-25	R0521-26	R0521-27	R0521-28	R0521-29	R0521-30	R0521-31	R0521-32	R0521-33
Field Sample ID	P-13N-0001	P-13N-0103	SVA-05-0001	SVA-05-0103	SS-01-0102	SS-01-0708	FD-04	FD-05	FD-06	FD-07
Sample Location	P-13N	P-13N	SVA-05	SVA-05	SS-01	SS-01	FG-45S	FG-45E	SVA-03	P-13S
Sample Date	06/08/16	06/08/16	06/08/16	06/08/16	06/08/16	06/08/16	06/08/16	06/08/16	06/08/16	06/08/16
PCBs (ug/kg)										
Aroclor 1016	800 U	44 UJ	3800 U	190000 U	730 U	55 U	40 U	710 U	880 U	760 U
Aroclor 1221	800 U	44 UJ	3800 U	190000 U	730 U	55 U	40 U	710 U	880 U	760 U
Aroclor 1232	800 U	44 UJ	3800 U	190000 U	730 U	55 U	40 U	710 U	880 U	760 U
Aroclor 1242	800 U	44 UJ	3800 U	190000 U	730 U	55 U	40 U	710 U	880 U	760 U
Aroclor 1248	800 U	44 UJ	16000	190000 U	730 U	55 U	40 U	710 U	4500 J	760 UJ
Aroclor 1254	800 U	44 UJ	3800 U	190000 U	730 U	55 U	40 U	710 U	880 U	760 U
Aroclor 1260	3000	73 J-	27000	1300000	8400	95	190	8500 J	10000 J	6100
Aroclor 1262	800 U	44 UJ	3800 U	190000 U	730 U	55 U	40 U	710 U	880 U	760 U
Aroclor 1268	800 U	44 UJ	3800 U	190000 U	730 U	55 U	40 U	710 U	880 U	760 U

U – not detected; J – estimated value; UJ – not detected, reporting limit estimated; R – rejected

DATA SUMMARY TABLE

Lab Sample ID	R0521-03	R0521-08	R0521-09	R0521-10	R0521-11	R0521-12	R0521-13	R0521-14	R0521-15	R0521-16	R0521-19	R0521-22
Field Sample ID	FG-45W-0001	FG-45E-0103	SVA-02-0001	SVA-02-0103	SVA-03-0001	SVA-03-0103	SVA-04-0001	SVA-04-0103	SVA-06-0001	SVA-06-0103	P-13-0102	P-13S-0001
Sample Location	FG-45W	FG-45E	SVA-02	SVA-02	SVA-03	SVA-03	SVA-04	SVA-04	SVA-06	SVA-06	P-13	P-13S
Sample Date	06/08/16	06/08/16	06/08/16	06/08/16	06/08/16	06/08/16	06/08/16	06/08/16	06/08/16	06/08/16	06/08/16	06/08/16
Metals (mg/kg)												
Arsenic	9.4	5.2	19	15	11 J	28 J	11	16	0.72 U	10	42	14
Barium	99	20	350	480	120	1200	270	520	170	160	600	350
Cadmium	2	0.23 U	6.2	5.6	2.7	6.7	4.2	3.1	24	6.2	9.8	13
Chromium	37	12	61	42	57 J	440 J	50	48	40000	100	130	200
Lead	310	12	1000	1200	380 J	6700 J	1400	2900	680	930	2400	1700
Mercury	0.49	0.015 J	1.8	0.99	1.5 J	0.48 J	2.6	1.9	11	2.4	5.3	4.1
Selenium	3.7	2.7	5.7	5.2	4.9 J	9.7 J	5.6	8.5	1.1 U	5.6	1.3 U	2.4
Silver	1.6	0.12 J	2	1.4 J	1.6	2.7	1.4	8	1.7	2.2	2.5	4.2
Chromium-Hexavalent	NA	NA	NA	NA	NA	0.605 U	NA	NA	NA	NA	NA	NA

U – not detected; J – estimated value; UJ – not detected, reporting limit estimated; R – rejected

DATA SUMMARY TABLE

Lab Sample ID	R0521-26	R0521-27	R0521-28	R0521-29	R0521-32
Field Sample ID	SVA-05-0001	SVA-05-0103	SS-01-0102	SS-01-0708	FD-06
Sample Location	SVA-05	SVA-05	SS-01	SS-01	SVA-03
Sample Date	06/08/16	06/08/16	06/08/16	06/08/16	06/08/16
Metals (mg/kg)					
Arsenic	12	13	8.9	20	53 J
Barium	270	250	110	1600	1100
Cadmium	13	12	1.3	4.6	7.8
Chromium	110	120	51	46	450 J
Lead	1400	1100	210	3100	5400 J
Mercury	4.4	4.8	0.49	0.91	0.57 J
Selenium	3.8	5.1	2.1	11	4 J
Silver	3.1	3	0.8 J	2.4	2.7
Chromium-Hexavalent	NA	NA	NA	NA	3.09 U

U – not detected; J – estimated value; UJ – not detected, reporting limit estimated; R – rejected

DATA SUMMARY TABLE

Lab Sample ID	R0521-10	R0521-12	R0521-14	R0521-16	R0521-27	R0521-28	R0521-29	R0521-32
Field Sample ID	SVA-02-0103	SVA-03-0103	SVA-04-0103	SVA-06-0103	SVA-05-0103	SS-01-0102	SS-01-0708	FD-06
Sample Location	SVA-02	SVA-03	SVA-04	SVA-06	SVA-05	SS-01	SS-01	SVA-03
Sample Date	06/08/16	06/08/16	06/08/16	06/08/16	06/08/16	06/08/16	06/08/16	06/08/16
Volatiles (ug/kg)								
1,1,1,2-Tetrachloroethane	5.6 U	5.1 U	6.6 U	3.7 U	4.1 U	4.6 U	9.2 U	9.1 U
1,1,1-Trichloroethane	5.6 U	5.1 U	6.6 U	3.7 U	4.1 U	4.6 U	9.2 U	9.1 U
1,1,2,2-Tetrachloroethane	5.6 U	5.1 U	6.6 U	3.7 U	4.1 U	4.6 U	9.2 U	9.1 U
1,1,2-Trichloroethane	5.6 U	5.1 U	6.6 U	3.7 U	4.1 U	4.6 U	9.2 U	9.1 U
1,1-Dichloroethane	4.4 J	1 J	6.6 U	3.7 U	4.1 U	4.6 U	130	3.3 J
1,1-Dichloroethene	5.6 U	5.1 U	6.6 U	3.7 U	4.1 U	4.6 U	9.2 U	9.1 U
1,1-Dichloropropene	5.6 U	5.1 U	6.6 U	3.7 U	4.1 U	4.6 U	9.2 U	9.1 U
1,2,3-Trichlorobenzene	5.6 U	5.1 U	6.6 U	3.7 U	4.1 U	4.6 U	9.2 U	9.1 U
1,2,3-Trichloropropane	5.6 U	5.1 U	6.6 U	3.7 U	4.1 U	4.6 U	9.2 U	9.1 U
1,2,4-Trichlorobenzene	5.6 U	5.1 U	6.6 U	3.7 U	4.1 U	4.6 U	9.2 U	9.1 U
1,2,4-Trimethylbenzene	5.6 U	2.4 J	6.6 U	87	4.1 U	4.6 U	9.2 U	8 J
1,2-Dibromo-3-chloropropane	5.6 U	5.1 U	6.6 U	3.7 U	4.1 U	4.6 U	9.2 U	9.1 U
1,2-Dibromoethane	5.6 U	5.1 U	6.6 U	3.7 U	4.1 U	4.6 U	9.2 U	9.1 U
1,2-Dichlorobenzene	5.6 U	5.1 U	6.6 U	3.7 U	4.1 U	4.6 U	9.2 U	9.1 U
1,2-Dichloroethane	5.6 U	5.1 U	6.6 U	3.7 U	4.1 U	4.6 U	9.2 U	9.1 U
1,2-Dichloropropane	5.6 U	5.1 U	6.6 U	3.7 U	4.1 U	4.6 U	9.2 U	9.1 U
1,3,5-Trimethylbenzene	5.6 U	1.3 J	6.6 U	11	4.1 U	4.6 U	9.2 U	3.8 J
1,3-Dichlorobenzene	5.6 U	5.1 U	6.6 U	3.7 U	4.1 U	4.6 U	9.2 U	9.1 U
1,3-Dichloropropane	5.6 U	5.1 U	6.6 U	3.7 U	4.1 U	4.6 U	9.2 U	9.1 U
1,4-Dichlorobenzene	5.6 U	5.1 U	6.6 U	3.7 U	4.1 U	4.6 U	9.2 U	9.1 U
1,4-Dioxane	110 U	100 U	130 U	74 U	81 U	91 U	180 U	180 U
2,2-Dichloropropane	5.6 U	5.1 U	6.6 U	3.7 U	4.1 U	4.6 U	9.2 U	9.1 U
2-Butanone	5.6 U	5.1 U	24	3.7 U	4.1 U	4.6 U	9.2 U	18
2-Chlorotoluene	5.6 U	5.1 U	6.6 U	3.7 U	4.1 U	4.6 U	9.2 U	9.1 U
2-Hexanone	5.6 U	5.1 U	6.6 U	3.7 U	4.1 U	4.6 U	9.2 U	9.1 U
4-Chlorotoluene	5.6 U	5.1 U	6.6 U	3.7 U	4.1 U	4.6 U	9.2 U	9.1 U
4-Isopropyltoluene	5.6 U	5.1 U	6.6 U	1.2 J	4.1 U	4.6 U	9.2 U	3.2 J
4-Methyl-2-pentanone	5.6 U	5.1 U	6.6 U	3.7 U	4.1 U	4.6 U	9.2 U	9.1 U
Acetone	7.4	23 J	88	13	4.1 U	4.6 U	9.2 U	92 J
Benzene	5.6 U	1.1 J	6.6 U	4.1	4.1 U	4.6 U	9.2 U	9.1 U
Bromobenzene	5.6 U	5.1 U	6.6 U	3.7 U	4.1 U	4.6 U	9.2 U	9.1 U
Bromochloromethane	5.6 U	5.1 U	6.6 U	3.7 U	4.1 U	4.6 U	9.2 U	9.1 U

U – not detected; J – estimated value; UJ – not detected, reporting limit estimated; R – rejected

DATA SUMMARY TABLE

Lab Sample ID	R0521-10	R0521-12	R0521-14	R0521-16	R0521-27	R0521-28	R0521-29	R0521-32
Field Sample ID	SVA-02-0103	SVA-03-0103	SVA-04-0103	SVA-06-0103	SVA-05-0103	SS-01-0102	SS-01-0708	FD-06
Sample Location	SVA-02	SVA-03	SVA-04	SVA-06	SVA-05	SS-01	SS-01	SVA-03
Sample Date	06/08/16	06/08/16	06/08/16	06/08/16	06/08/16	06/08/16	06/08/16	06/08/16
Bromodichloromethane	5.6 U	5.1 U	6.6 U	3.7 U	4.1 U	4.6 U	9.2 U	9.1 U
Bromoform	5.6 U	5.1 U	6.6 U	3.7 U	4.1 U	4.6 U	9.2 U	9.1 U
Bromomethane	5.6 U	5.1 U	6.6 U	3.7 U	4.1 U	4.6 U	9.2 U	9.1 U
Carbon disulfide	5.6 U	5.1 U	6.6 U	3.7 U	4.1 U	4.6 U	9.2 U	9.1 U
Carbon tetrachloride	5.6 U	5.1 U	6.6 U	3.7 U	4.1 U	4.6 U	9.2 U	9.1 U
Chlorobenzene	5.6 U	5.1 U	6.6 U	3.7 U	4.1 U	4.6 U	9.2 U	9.1 U
Chloroethane	5.6 U	5.1 U	6.6 U	3.7 U	4.1 U	4.6 U	9.2 U	9.1 U
Chloroform	5.6 U	5.1 U	6.6 U	3.7 U	4.1 U	4.6 U	9.2 U	9.1 U
Chloromethane	5.6 U	5.1 U	6.6 U	3.7 U	4.1 U	4.6 U	9.2 U	9.1 U
cis-1,2-Dichloroethene	5.6 U	5.1 U	6.5 J	3.7 U	4.1 U	4.6 U	27	9.1 U
cis-1,3-Dichloropropene	5.6 U	5.1 U	6.6 U	3.7 U	4.1 U	4.6 U	9.2 U	9.1 U
Dibromochloromethane	5.6 U	5.1 U	6.6 U	3.7 U	4.1 U	4.6 U	9.2 U	9.1 U
Dibromomethane	5.6 U	5.1 U	6.6 U	3.7 U	4.1 U	4.6 U	9.2 U	9.1 U
Dichlorodifluoromethane	5.6 U	5.1 U	6.6 U	3.7 U	4.1 U	4.6 U	9.2 U	9.1 U
Diethyl ether	5.6 U	5.1 U	6.6 U	3.7 U	4.1 U	4.6 U	9.2 U	9.1 U
Diisopropyl Ether	5.6 U	5.1 U	6.6 U	3.7 U	4.1 U	4.6 U	9.2 U	9.1 U
Ethylbenzene	5.6 U	5.1 U	6.6 U	22	4.1 U	4.6 U	9.2 U	9.1 U
Hexachlorobutadiene	5.6 U	5.1 U	6.6 U	3.7 U	4.1 U	4.6 U	9.2 U	9.1 U
Isopropylbenzene	5.6 U	5.1 U	6.6 U	3.4 J	4.1 U	4.6 U	9.2 U	5 J
m,p-Xylene	5.6 U	5.1 U	6.6 U	11	4.1 U	4.6 U	9.2 U	6.8 J
Methyl tert-butyl ether	5.6 U	5.1 U	6.6 U	3.7 U	4.1 U	4.6 U	3.2 J	9.1 U
Methylene chloride	5.6 U	5.1 U	6.6 U	3.7 U	4.1 U	4.6 U	9.2 U	9.1 U
Naphthalene	5.6 U	3.9 J	6.6 U	7.2	0.88 J	4.6 U	9.2 U	9.3
n-Butylbenzene	5.6 U	5.1 U	6.6 U	3.6 J	4.1 U	4.6 U	9.2 U	7.5 J
n-Propylbenzene	5.6 U	5.1 U	6.6 U	6.1	4.1 U	4.6 U	9.2 U	5 J
o-Xylene	5.6 U	1.3 J	6.6 U	2.4 J	4.1 U	4.6 U	9.2 U	2.8 J
sec-Butylbenzene	5.6 U	5.1 U	6.6 U	1 J	4.1 U	4.6 U	9.2 U	12
Styrene	5.6 U	5.1 U	6.6 U	3.7 U	4.1 U	4.6 U	9.2 U	9.1 U
tert-Amyl methyl ether	5.6 U	5.1 U	6.6 U	3.7 U	4.1 U	4.6 U	9.2 U	9.1 U
Tert-Butyl Ethyl Ether	5.6 U	5.1 U	6.6 U	3.7 U	4.1 U	4.6 U	9.2 U	9.1 U
tert-Butylbenzene	5.6 U	5.1 U	6.6 U	3.7 U	4.1 U	4.6 U	9.2 U	2.5 J
Tetrachloroethene	5.6 U	5.1 U	6.6 U	3.7 U	1.5 J	4.6 U	9.2 U	9.1 U
Tetrahydrofuran	11 U	10 U	13 U	7.4 U	8.1 U	9.1 U	18 U	18 U

U – not detected; J – estimated value; UJ – not detected, reporting limit estimated; R – rejected

DATA SUMMARY TABLE

Lab Sample ID	R0521-10	R0521-12	R0521-14	R0521-16	R0521-27	R0521-28	R0521-29	R0521-32
Field Sample ID	SVA-02-0103	SVA-03-0103	SVA-04-0103	SVA-06-0103	SVA-05-0103	SS-01-0102	SS-01-0708	FD-06
Sample Location	SVA-02	SVA-03	SVA-04	SVA-06	SVA-05	SS-01	SS-01	SVA-03
Sample Date	06/08/16	06/08/16	06/08/16	06/08/16	06/08/16	06/08/16	06/08/16	06/08/16
Toluene	5.6 U	5.1 U	6.6 U	1.7 J	4.1 U	4.6 U	9.2 U	9.1 U
trans-1,2-Dichloroethene	5.6 U	5.1 U	6.6 U	3.7 U	4.1 U	4.6 U	9.2 U	9.1 U
trans-1,3-Dichloropropene	5.6 U	5.1 U	6.6 U	3.7 U	4.1 U	4.6 U	9.2 U	9.1 U
Trichloroethene	5.6 U	5.1 U	6.6 U	3.7 U	1 J	4.6 U	2.5 J	9.1 U
Trichlorofluoromethane	5.6 U	5.1 U	6.6 U	3.7 U	4.6	4.6 U	9.2 U	9.1 U
Vinyl chloride	5.6 U	5.1 U	6.6 U	3.7 U	4.1 U	4.6 U	9.2 U	9.1 U
Xylene (total)	5.6 U	1.3 J	6.6 U	13	4.1 U	4.6 U	9.2 U	9.6

U – not detected; J – estimated value; UJ – not detected, reporting limit estimated; R – rejected

DATA SUMMARY TABLE

Lab Sample ID	R0521-01	R0521-06	R0521-10	R0521-12	R0521-14	R0521-16	R0521-18	R0521-24	R0521-27	R0521-28	R0521-29	R0521-30
Field Sample ID	FG-45N-0001	FG-45S-0103	SVA-02-0103	SVA-03-0103	SVA-04-0103	SVA-06-0103	P-13W-0103	P-13N-0001	SVA-05-0103	SS-01-0102	SS-01-0708	FD-04
Sample Location	FG-45N	FG-45S	SVA-02	SVA-03	SVA-04	SVA-06	P-13W	P-13N	SVA-05	SS-01	SS-01	UNKNOWN
Sample Date	06/08/16	06/08/16	06/08/16	06/08/16	06/08/16	06/08/16	06/08/16	06/08/16	06/08/16	06/08/16	06/08/16	06/08/16
PAHs (ug/kg)												
2-Methylnaphthalene	270 J	400 U	150 J	130 J	110 J	2300	510 U	140 J	670	370 U	550 U	400 U
Acenaphthene	430	180 J	180 J	130 J	420	3700	510 U	290 J	1900	260 J	150 J	400 U
Acenaphthylene	880	400 U	460	150 J	230 J	2600	620	410	850	180 J	430 J	400 U
Anthracene	1400	400	970	280 J	1000	13000	1900	1200	5700	1600	1100	190 J
Benzo(a)anthracene	5300	840 J	2500	790	2700	20000	5000	3700	11000	3800	3300	450 J
Benzo(a)pyrene	4400	780	2900	730	2600	18000	4300	2900	10000	2300	2000	470
Benzo(b)fluoranthene	9000	1100 J	3800	1400	3400	24000	6300	5200	14000	4300	4200	640 J
Benzo(g,h,i)perylene	5300	450	2100	1000	1600	8900	3200	4200	5600	2400	2100	360 J
Benzo(k)fluoranthene	3300	460	1500	370 J	1400	11000	2900	2100	4200	2000	1500	230 J
Chrysene	5100	860 J	2400	850	2700	19000	4500	3400	10000	3100	2900	470 J
Dibenz(a,h)anthracene	1400	120 J	510	190 J	430	2900	760	930	1900	640	560	100 J
Fluoranthene	9300	1800 J	3900	1400	4600	47000	12000	5500	24000	8100	5100	930 J
Fluorene	570	180 J	380 J	420 U	540	7900	200 J	340 J	2500	540	230 J	400 U
Indeno(1,2,3-cd)pyrene	5300	440	2200	970	1800	11000	3500	4100	6000	2600	2400	380 J
Naphthalene	270 J	160 J	280 J	400 J	120 J	3400	510 U	190 J	1100	370 U	550 U	400 U
Phenanthrene	4500	1700 J	2800	980	3900	44000	6300	3300	19000	4500	2400	670 J
Pyrene	8000	1500 J	3800	1400	5000	35000	8600	6000	17000	5700	4900	860 J

U – not detected; J – estimated value; UJ – not detected, reporting limit estimated; R – rejected

DATA SUMMARY TABLE

Lab Sample ID	R0521-32
Field Sample ID	FD-06
Sample Location	UNKNOWN
Sample Date	06/08/16
PAHs (ug/kg)	
2-Methylnaphthalene	140 J
Acenaphthene	140 J
Acenaphthylene	350 J
Anthracene	650
Benzo(a)anthracene	1600
Benzo(a)pyrene	1300
Benzo(b)fluoranthene	2400
Benzo(g,h,i)perylene	1800
Benzo(k)fluoranthene	820
Chrysene	1500
Dibenz(a,h)anthracene	440
Fluoranthene	2800
Fluorene	270 J
Indeno(1,2,3-cd)pyrene	1900
Naphthalene	480
Phenanthrene	2100
Pyrene	2900

DATA SUMMARY TABLE

Lab Sample ID	R0521-10	R0521-12	R0521-14	R0521-16	R0521-27	R0521-28	R0521-29	R0521-32
Field Sample ID	SVA-02-0103	SVA-03-0103	SVA-04-0103	SVA-06-0103	SVA-05-0103	SS-01-0102	SS-01-0708	FD-06
Sample Location	SVA-02	SVA-03	SVA-04	SVA-06	SVA-05	SS-01	SS-01	SVA-03
Sample Date	06/08/16	06/08/16	06/08/16	06/08/16	06/08/16	06/08/16	06/08/16	06/08/16
EPH (mg/kg)								
2-Methylnaphthalene	0.398 U	0.397 U	0.406 U	0.748	0.371 U	0.347 U	0.52 U	0.398 U
Acenaphthene	0.398 U	0.397 U	0.406 U	1.26	0.598	0.347 U	0.52 U	0.398 U
Acenaphthylene	0.398 U	0.397 U	0.406 U	0.413	0.371 U	0.347 U	0.52 U	0.398 U
Anthracene	0.477	0.397 U	0.505	4.38	2.18	0.44	0.719	0.398 U
Benzo(a)anthracene	1.28	0.464	1.46	9.93	4.08	1.08	2.92	0.574
Benzo(a)pyrene	1.56	0.424	1.39	8.75	3.58	1.34	3.12	0.528
Benzo(b)fluoranthene	1.24	0.423	0.908	9.21	2.09	0.865	2.73	0.469
Benzo(g,h,i)perylene	0.941	0.397 U	0.778	4.05	1.97	0.761	1.47	0.398 U
Benzo(k)fluoranthene	1.31	0.434	1.21	6.28	3.39	0.952	2.39	0.515
C11-C22 Aromatics	101	286	107	465	156	55.9	67.9	295
C19-C36 Aliphatics	423	1030 J	318	1430 J	433	177	20.7	847 J
C9-C18 Aliphatics	23.2	227 J	26.1	232	29.3	17.4	15.6 U	93.9 J
Chrysene	1.34	0.545	1.4	8.43	3.58	1.01	2.72	0.612
Dibenz(a,h)anthracene	0.398 U	0.397 U	0.406 U	1.36	0.618	0.347 U	0.52 U	0.398 U
Fluoranthene	2.22	0.752	2.45	18.3	8.11	1.98	4.74	0.864
Fluorene	0.398 U	0.397 U	0.406 U	2.38	1.04	0.347 U	0.52 U	0.398 U
Indeno(1,2,3-cd)pyrene	0.855	0.397 U	0.74	4.28	1.86	0.743	1.54	0.398 U
Naphthalene	0.398 U	0.474	0.406 U	0.727	0.371 U	0.347 U	0.52 U	0.418
Phenanthrene	1.28	0.475	1.41	15.5	7.54	1.28	1.62	0.544
Pyrene	2.04	0.688	2.31	15	6.56	1.59	3.82	0.804

Data Review Qualification Actions
Case: 0163S
SDG: R0521

Parameter	Analyte	Samples: R0521-#	Evaluation Criteria	Action Needed	Comments
Metals	Barium, Chromium, Lead	03, 08-16, 19, 22, 26-29, 32	Lab Blank	Remove B	result >RL
Metals	As, Cr, Se, Pb, Hg	11, 12, 32	Lab Dup	J	RPD>20%
Metals	Arsenic and Selenium	11, 12, and 32	Field Dup	J	RPD > 50%
PAHs	Phenanthrene, Fluoranthene, Pyrene, Benzo(a)anthracene, Chrysene, Benzo(b)fluoranthene	06 and 30	Field Dup	J	RPD > 50%
PCBs	All	25	surrogates	J-/UJ	low bias
PCBs	Aroclor-1260	07 and 31, 12 and 32	Field Dup	J	RPD > 50%
PCBs	Aroclor-1248	12 and 32, 23 and 33	Field Dup	J/UJ	RPD > 50%
VOCs	Acetone	12 and 32	Field Dup	J	RPD > 50%
EPH	C9-C18 aliphatic	12 and 32	Field Dup	J	RPD > 50%
pH/ORP	pH/ORP	12 and 32	HT	J-	5 days

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☑ Final Report
☐ Re-Issued Report
☐ Revised Report
Report Date:
01-Jul-16 09:14

Laboratory Report

Nobis Engineering, Inc
585 Middlesex Street
Lowell, MA 01851

Work Order: R0521
Project : Lawrence, MA site
Project #:

Attn: Gail DeRuzzo

Laboratory ID	Client Sample ID	Matrix	Date Sampled	Date Received
R0521-01	FG-45N-0001	Soil	08-Jun-16 08:15	10-Jun-16 11:50
R0521-02	FG-45N-0103	Soil	08-Jun-16 08:20	10-Jun-16 11:50
R0521-03	FG-45W-0001	Soil	08-Jun-16 08:30	10-Jun-16 11:50
R0521-04	FG-45W-0103	Soil	08-Jun-16 08:35	10-Jun-16 11:50
R0521-05	FG-45S-0001	Soil	08-Jun-16 08:40	10-Jun-16 11:50
R0521-06	FG-45S-0103	Soil	08-Jun-16 08:45	10-Jun-16 11:50
R0521-07	FG-45E-0001	Soil	08-Jun-16 08:55	10-Jun-16 11:50
R0521-08	FG-45E-0103	Soil	08-Jun-16 09:00	10-Jun-16 11:50
R0521-09	SVA-02-0001	Soil	08-Jun-16 09:10	10-Jun-16 11:50
R0521-10	SVA-02-0103	Soil	08-Jun-16 09:15	10-Jun-16 11:50
R0521-11	SVA-03-0001	Soil	08-Jun-16 09:55	10-Jun-16 11:50
R0521-12	SVA-03-0103	Soil	08-Jun-16 10:00	10-Jun-16 11:50
R0521-13	SVA-04-0001	Soil	08-Jun-16 10:25	10-Jun-16 11:50
R0521-14	SVA-04-0103	Soil	08-Jun-16 10:30	10-Jun-16 11:50
R0521-15	SVA-06-0001	Soil	08-Jun-16 10:55	10-Jun-16 11:50
R0521-16	SVA-06-0103	Soil	08-Jun-16 11:00	10-Jun-16 11:50
R0521-17	P-13W-0001	Soil	08-Jun-16 11:20	10-Jun-16 11:50
R0521-18	P-13W-0103	Soil	08-Jun-16 11:25	10-Jun-16 11:50
R0521-19	P-13-0102	Soil	08-Jun-16 11:45	10-Jun-16 11:50
R0521-20	P-13-0203	Soil	08-Jun-16 11:50	10-Jun-16 11:50
R0521-21	P-13-0910	Soil	08-Jun-16 12:05	10-Jun-16 11:50
R0521-22	P-13S-0001	Soil	08-Jun-16 12:20	10-Jun-16 11:50
R0521-23	P-13S-0103	Soil	08-Jun-16 12:25	10-Jun-16 11:50
R0521-24	P-13N-0001	Soil	08-Jun-16 12:30	10-Jun-16 11:50
R0521-25	P-13N-0103	Soil	08-Jun-16 12:35	10-Jun-16 11:50
R0521-26	SVA-05-0001	Soil	08-Jun-16 13:40	10-Jun-16 11:50
R0521-27	SVA-05-0103	Soil	08-Jun-16 13:45	10-Jun-16 11:50
R0521-28	SS-01-0102	Soil	08-Jun-16 14:00	10-Jun-16 11:50
R0521-29	SS-01-0708	Soil	08-Jun-16 14:05	10-Jun-16 11:50
R0521-30	FD-04	Soil	08-Jun-16 20:15	10-Jun-16 11:50
R0521-31	FD-05	Soil	08-Jun-16 20:20	10-Jun-16 11:50
R0521-32	FD-06	Soil	08-Jun-16 20:25	10-Jun-16 11:50
R0521-33	FD-07	Soil	08-Jun-16 20:30	10-Jun-16 11:50

Engineering a Sustainable Future

Generic Data Review Checklist

Project: **Lawrence**
Project #: **80108**
Case#: **0163S**
Date: **7/6/16**
Methods: **VOCs-8260, PAHs – 8270, EPH plus targets, PCBs 8082, RCRA metals 6010, 7471/, Hex Cr – 7196A (3060A), Cyanide and PAC 9012 – MCP methods**
Laboratory: **Eurofins Spectrum Analytical**
SDG: **see below**
Reviewer: **Gail DeRuzzo**

1. Case Narrative and Data Package Completeness (COC and Analyte List Review)

SOILS:	GW:	IDW:
R0508 – 38 soils	R0536 – 4 GW	R0562
R0516 – 43 soils	R0545 – 3 GW	1 SO/1 AQ
R0521 – 33 soils	R0561 – 2 GW	not evaluated
R0526 – 40 soils		
R0530 – 22 soils + TB		
R0545 – 11 soils + TB		
R0555 – 20 soils		
R0561 – 4 soils		

Sample IDs printed separately.

2. Holding Time and Sample Preservation Compliance

ORP – SVA-03-0103, FD-06 – HT of 24 hrs exceeded. sampled 6/8 – delivered to lab 6/9, shipped to RI lab then back to MA lab – received 6/13. Analyzed 6/13. Estimate J-

3. Lab and Field Blanks

Ba (.06278 (RL 10)), Cr (.04406 (RL 1)), and Pb (.4002 (RL .5)) – B flag data – samples (3, 8-16, 19, 22, 26-29, 32) >RL – remove B's

4. Laboratory Control Samples

VOCs: 1,4-dioxane high in LCSD batch 84798 – samples ND – no action.
PCBs: RPD out for batch 84769, 1016 and 1260 – indicates some variability, bad std or bad injection. No action taken. RPD out for batch 84782 for 1016. MS/MSDs in control.

5. Field Duplicate Precision

FD-04 = FG-45S-0103 – PCBs, PAHs – J several PAHs outside 50% RPD
FD-05 = FG-45E-0001 – PCBs – J Aroclor-1260
FD-06 = SVA-03-0103 – PCBs – J/UJ Aroclor-1248, Metals – J/UJ As and Se in samples 11, 12, 32, EPH – J C9-C18 aliphatics, VOCs – J acetone, Hex. Cr
FD-07 = P-13S-0103 – PCBs – J/UJ Aroclor 1248

6. Laboratory Duplicate Precision

Metals: sample 32 As, Cr, Se, Pb, Hg out J/UJ (samples 32, 12, 11)

7. Matrix Spikes

Metals:
Percent recoveries were within the QC limits with the exception of Arsenic, Cadmium, Selenium, Lead and Chromium. Lead and Chromium were present in the native sample at levels above 4 times the spike and do not require corrective action.

8. Surrogate Spikes

PCBs:
FG-45S-0103 (R0521-06A), recovery is above criteria for Decachlorobiphenyl on front column at 130% with criteria of (60-125). Result not reported. No action.
P-13N-0103 (R0521-25A), recovery is below criteria for Decachlorobiphenyl on rear column at 53% with criteria of (60-125). J-/UJ
FD-04 (R0521-30A), recovery is above criteria for Decachlorobiphenyl on front column at 141% with criteria of (60-125). Result not reported. No action.

9. Internal Standards

OK

10. Performance Evaluation Samples

NA

11. Reporting Limits

PAHs:
FG-45N-0001 (R0521-01ADL) : Dilution Factor: 4
SVA-06-0103 (R0521-16ADL) : Dilution Factor: 20
P-13W-0103 (R0521-18ADL) : Dilution Factor: 4
SVA-05-0103 (R0521-27ADL) : Dilution Factor: 10
SS-01-0102 (R0521-28ADL) : Dilution Factor: 4

PCBs:
FG-45N-0001 (R0521-01A) : Dilution Factor: 50
FG-45W-0001 (R0521-03A) : Dilution Factor: 50
FG-45S-0001 (R0521-05A) : Dilution Factor: 10
FG-45E-0001 (R0521-07A) : Dilution Factor: 50
SVA-02-0001 (R0521-09A) : Dilution Factor: 100
SVA-02-0103 (R0521-10A) : Dilution Factor: 10
SVA-03-0001 (R0521-11A) : Dilution Factor: 10
SVA-03-0103 (R0521-12A) : Dilution Factor: 10
SVA-04-0001 (R0521-13A) : Dilution Factor: 10
SVA-06-0001 (R0521-15A) : Dilution Factor: 10
SVA-06-0103 (R0521-16A) : Dilution Factor: 20
P-13W-0001 (R0521-17A) : Dilution Factor: 100
P-13-0102 (R0521-19A) : Dilution Factor: 20
P-13-0203 (R0521-20A) : Dilution Factor: 20

P-13S-0001 (R0521-22A) : Dilution Factor: 40
P-13S-0103 (R0521-23A) : Dilution Factor: 40
P-13N-0001 (R0521-24A) : Dilution Factor: 20
SVA-05-0001 (R0521-26A) : Dilution Factor: 100
SVA-05-0103 (R0521-27A) : Dilution Factor: 5000
SS-01-0102 (R0521-28A) : Dilution Factor: 20
FD-05 (R0521-31A) : Dilution Factor: 20
FD-06 (R0521-32A) : Dilution Factor: 20
FD-07 (R0521-33A) : Dilution Factor: 20

Hex. Cr:
FD-06 – raised due to matrix

12. Calibration Issues

ok

13. Other

Analyte lists and RLs were verified per the FTWP/QAPPA.

R0521

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CHAIN OF CUSTODY RECORD

Page 1 of 4

Special Handling:
- ☐ Standard TAT - 7 to 10 business days
- ☐ Rush TAT - Date Needed: _____

All TATs subject to laboratory approval
Min. 24-hr notification needed for rushes
Samples disposed after 60 days unless otherwise instructed.

Report To: NOBIS ENGINEERING
Telephone #:
Project Mgr: A. ROY / S. VETERE

Invoice To:
P.O No.: Quote #:

Project No: 80108.04
Site Name: LAWRENCE TBA
Location: LAWRENCE State: MA
Sampler(s): EHJ AG

F=Field Filtered 1=$Na_2S_2O_3$ 2=HCl 3=H_2SO_4 4=HNO_3 5=NaOH 6=Ascorbic Acid
7=CH_3OH 8=$NaHSO_4$ 9=Deionized Water 10=H_3PO_4 11= MeOH 12= _____

DW=Dinking Water GW=Groundwater SW=Surface Water WW=Waste Water
O=Oil SO=Soil SL=Sludge A=Indoor/Ambient Air SG=Soil Gas
X1= _____ X2= _____ X3= _____

G= Grab C=Compsite

Lab ID:	Sample ID:	Date:	Time:	Type	Matrix	Containers: # of VOA Vials	# of Amber Glass	# of Clear Glass	# of Plastic	Analysis: PCBs	RCRA 8 METALS	PAHs	EPH	VOCs	Check if chlorinated
	FG-45N-0001	6/8/16	815	G	SO		1			X		X			☐
	FG-45N-0103	6/8/16	820				2			X					☐
	FG-45W-0001		830				1			X	X				☐
	FG-45W-0103		835				1			X					☐
	FG-455-0001		840				1			X					☐
	FG-455-0103		845				1			X		X			☐
	FG-45E-0001		855				1			X					☐
	FG-45E-0103		900				1			X	X				☐
	SVA-02-0001		910				1			X	X				☐
	SVA-02-0103	↓	915	↓	↓	3	2			X	X	X	X	X	☐

List Preservative Code below: 9/11

QA/QC Reporting Notes:
* additional charges may appply

MA DEP MCP CAM Report? ☐ Yes ☐ No
CT DPH RCP Report? ☐ Yes ☐ No
☐ Standard ☐ No QC ☐ DQA*
☐ ASP A* ☐ ASP B*
☐ NJ Reduced* ☐ NJ Full*
☐ Tier II* ☐ Tier IV*
☐ Other: _____
State-specific reporting standards:

Relinquished by:	Received by:	Date:	Time:	Temp °C
Eric Johnson	NOBIS COLD STORAGE	6/8/16	1715	Observed 0.0
James Harrington		6/9/16 6/10/16	1105	Correction Factor 0
	SUB OUT	6/9/16	1742	Corrected 0.0
Kristin Lee 6/10/16 8:25		6/10/16	11:50am	IR ID # 01

☐ EDD format: _____
☐ E-mail to: _____

Condition upon receipt: Custody Seals: ☐ Present ☐ Intact ☐ Broken
☐ Ambient ☐ Iced ☒ Refrigerated ☒ DI VOA Frozen ☐ Soil Jar Frozen

Sample shipping address: 11 Almgren Drive • Agawam, MA 01001 • 413-789-9018 • www.EurofinsUS.com/Spectrum 2.5°C/0/2.5 Rev. Sep 2015 MR

R0521

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CHAIN OF CUSTODY RECORD

Page 2 of 4

Special Handling:

☐ Standard TAT - 7 to 10 business days

☐ Rush TAT - Date Needed: _____

All TATs subject to laboratory approval
Min. 24-hr notification needed for rushes
Samples disposed after 60 days unless otherwise instructed.

Report To: NOBIS ENGINEERING

Invoice To:

Project No: 80108.04

Site Name: LAWRENCE TBA

Location: LAWRENCE State: MA

Telephone #:

Project Mgr: A. ROY / S. VETERE

P.O No.: Quote #:

Sampler(s): EHJ AG

F=Field Filtered 1=$Na_2S_2O_3$ 2=HCl 3=H_2SO_4 4=HNO_3 5=NaOH 6=Ascorbic Acid
7=CH3OH 8=$NaHSO_4$ 9=Deionized Water 10=H_3PO_4 11= MeOH 12= _____

List Preservative Code below: 9/11

QA/QC Reporting Notes:
* additional charges may appply

DW=Dinking Water GW=Groundwater SW=Surface Water WW=Waste Water
O=Oil SO=Soil SL=Sludge A=Indoor/Ambient Air SG=Soil Gas
X1= X2= X3=

G= Grab C=Compsite

Lab ID:	Sample ID:	Date:	Time:	Type	Matrix	Containers: # of VOA Vials	# of Amber Glass	# of Clear Glass	# of Plastic	Analysis: PCBs	RCRA 8 METALS	PAHs	EPH	VOCs	HEX CHR. Mw.s			Check if chlorinated
	SVA-03-0001	6/8/16	955	G	SO		1			X	X							☐
	SVA-03-0103		1000			3	4			X	X	X	X	X	X			☐
	SVA-04-0001		1025				1			X	X							☐
	SVA-04-0103		1030			3	2			X	X	X	X	X				☐
	SVA-06-0001		1055				1			X	X							☐
	SVA-06-0103		1100			3	2			X	X	X	X	X				☐
	P-13W-0001		1120				1			X								☐
	P-13W-0103		1125				1			X		X						☐
	P-13-0102		1145				1			X	X							☐
	P-13-0203	↓	1150	↓	↓		1			X								☐

Relinquished by:	Received by:	Date:	Time:	Temp °C
	NOBIS COLD STORAGE	6/8/16	1715	Observed 0.0
	DSR	6-10-16	1105	Correction Factor 0
DSR	SUBOUT	6/9/16	1712	Corrected 0.0
6/10/16 8:25		6/10/16	11:50 am	IR ID# 01

☐ EDD format:

☐ E-mail to:

Condition upon receipt: Custody Seals: ☐ Present ☐ Intact ☐ Broken

☐ Ambient ☐ Iced ☑ Refrigerated ☐ DI VOA Frozen ☐ Soil Jar Frozen

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R0321

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CHAIN OF CUSTODY RECORD

Page 3 of 4

Special Handling:

☐ Standard TAT - 7 to 10 business days

☐ Rush TAT - Date Needed: _____

All TATs subject to laboratory approval
Min. 24-hr notification needed for rushes
Samples disposed after 60 days unless otherwise instructed.

Report To: NOBIS ENGINEERING

Telephone #:

Project Mgr: A. ROY / S. VETERE

Invoice To:

P.O No.: Quote #:

Project No: 80108.04

Site Name: LAWRENCE TBA

Location: LAWRENCE State: MA

Sampler(s): EHJ
AG

F=Field Filtered 1=Na_2S2O_3 2=HCl 3=H_2SO_4 4=HNO_3 5=NaOH 6=Ascorbic Acid
7=CH3OH 8=$NaHSO_4$ 9=Deionized Water 10=H_3PO_4 11= MeOH 12=

DW=Dinking Water GW=Groundwater SW=Surface Water WW=Waste Water
O=Oil SO=Soil SL=Sludge A=Indoor/Ambient Air SG=Soil Gas
X1= X2= X3=

G= Grab C=Compsite

Lab ID:	Sample ID:	Date:	Time:	Type	Matrix	Containers: # of VOA Vials	# of Amber Glass	# of Clear Glass	# of Plastic	List Preservative Code below:	Analysis: PCBs*	RCRA 8 METALS	PAHs	EPH	VOCs	Check if chlorinated
	P-13-0910	6/8/16	1205	G	SO		2			9/11	X					☐
	P-135-0001		1220				1				X	X				☐
	P-135-0103		1225				1				X					☐
	P-13N-0001		1230				1				X		X			☐
	P-13N-0103		1235				1				X					☐
	SVA-05-0001		1340				1				X	X				☐
	SVA-05-0103		1345			3	2				X	X	X	X	X	☐
	SS-01-0102		1400			3	2				X	X	X	X	X	☐
	SS-01-0708		1405			3	2				X	X	X	X	X	☐
	FD-04		2015				1				X		X			☐

QA/QC Reporting Notes:
* additional charges may appply

MA DEP MCP CAM Report? ☐ Yes ☐ No
CT DPH RCP Report? ☐ Yes ☐ No
☐ Standard ☐ No QC ☐ DQA*
☐ ASP A* ☐ ASP B*
☐ NJ Reduced* ☐ NJ Full*
☐ Tier II* ☐ Tier IV*
☐ Other:
State-specific reporting standards:

MS/MSD

Relinquished by:	Received by:	Date:	Time:
Eric Johnson	NOBIS COLD STORAGE	6/8/16	1715
Laura Harrington		6/9/16	1105
DHL		6/9/16	1742
DHL Dec'd 6/10/16 8:25		6/10/16	11:50 am

Temp °C: Observed 0.0; Correction Factor 0; Corrected 0.0; IR ID# 01

☐ EDD format:
☐ E-mail to:

Condition upon receipt: Custody Seals: ☐ Present ☐ Intact ☐ Broken
☐ Ambient ☐ Iced ☒ Refrigerated ☒ DI VOA Frozen ☐ Soil Jar Frozen

Sample shipping address: 11 Almgren Drive • Agawam, MA 01001 • 413-789-9018 • www.EurofinsUS.com/Spectrum

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eurofins | Spectrum Analytical

CHAIN OF CUSTODY RECORD

Page 4 of 4

Special Handling:
- ☐ Standard TAT - 7 to 10 business days
- ☐ Rush TAT - Date Needed: ______

All TATs subject to laboratory approval
Min. 24-hr notification needed for rushes
Samples disposed after 60 days unless otherwise instructed.

Report To: NOBIS ENGINEERING
Telephone #:
Project Mgr: A. ROY / S. VETERE

Invoice To:
P.O No.: Quote #:

Project No: 80108.04
Site Name: LAWRENCE TBA
Location: LAWRENCE State: MA
Sampler(s): EHJ AG

F=Field Filtered 1=$Na_2S_2O_3$ 2=HCl 3=H_2SO_4 4=HNO_3 5=NaOH 6=Ascorbic Acid
7=CH_3OH 8=$NaHSO_4$ 9=Deionized Water 10=H_3PO_4 11= MeOH 12=

List Preservative Code below: 9/11

QA/QC Reporting Notes:
* additional charges may appply

DW=Dinking Water GW=Groundwater SW=Surface Water WW=Waste Water
O=Oil SO=Soil SL=Sludge A=Indoor/Ambient Air SG=Soil Gas
X1= X2= X3=

G= Grab C=Compsite

Lab ID:	Sample ID:	Date:	Time:	Type	Matrix	# of VOA Vials	# of Amber Glass	# of Clear Glass	# of Plastic	PCBs	RCRA 8 METALS	PAHs	EPH	VOCs	HEX CHROMIUM		Check if chlorinated
	FD-05	6/8/16	2020	G	SO		1			X							☐
	FD-06	↓	2025	↓	↓	3	4			X	X	X	X	X	X		☐
	FD-07	↓	2030	↓	↓		1			X							☐
																	☐
																	☐
																	☐
																	☐
																	☐
																	☐
																	☐

MA DEP MCP CAM Report? ☐ Yes ☐ No
CT DPH RCP Report? ☐ Yes ☐ No
☐ Standard ☐ No QC ☐ DQA*
☐ ASP A* ☐ ASP B*
☐ NJ Reduced* ☐ NJ Full*
☐ Tier II* ☐ Tier IV*
☐ Other:
State-specific reporting standards:

Relinquished by:	Received by:	Date:	Time:	Temp °C
Eric John [signature]	NOBIS COLD STORAGE	6/8/16	1715	Observed 6.0
James Hamp[signature]	[signature]	6/9/16	1105	Correction Factor 0
[signature]	[signature]	6/9/16	1742	Corrected 6.0
[signature] 6/10/16 8:25	[signature]	6/10/16	11:50 am	IR ID # 01

☐ EDD format:
☐ E-mail to:

Condition upon receipt: Custody Seals: ☐ Present ☐ Intact ☐ Broken
☐ Ambient ☐ Iced ☒ Refrigerated ☒ DI VOA Frozen ☐ Soil Jar Frozen

Rev. Sep 2015

Nobis
Engineering a Sustainable Future

July 7, 2016
Nobis File No. 80108

Mr. Alan Peterson
EPA-New England Region I
5 Post Office Square
Suite 100, Mailcode OSRR07-4
Boston, MA 02109-3912

Re: Contract No.: EP-S1-06-03
Task Order No. 0108-SI-BZ-0100
Case No. 0163S, Laboratory Report No.: R0526
Eurofins Spectrum Analytical, North Kingston, Rhode Island
Former Tombarello Property
Lawrence, Massachusetts

Tier 1 Modified Organic and Inorganic Data Review

VOCs, PAHs, EPH, PCBs, Metals, and Hexavalent Chromium:
40/Soils: See attached sample ID list
2/Field Duplicates: (FD-08/HA-01-0001); (FD-09/HA-07-0001)

Dear Mr. Peterson:

Nobis Engineering, Inc. performed a Tier 1 Modified data review on the organic and inorganic analytical data for the samples listed in the attached sample listing. The samples were collected by Nobis at the Former Tombarello Property located in Lawrence, Massachusetts. The samples were analyzed for volatile organic compounds (VOCs), polycyclic aromatic hydrocarbons (PAHs), Resource Conservation and Recovery Act (RCRA) metals, extractable petroleum hydrocarbons (EPH), polychlorinated biphenyls (PCBs), and hexavalent chromium. See the included Data Summary Table and chain-of-custody for samples selected for each analysis. The laboratory performed testing according to Massachusetts Contingency Plan (MCP) Compendium of Analytical Methods (CAM) and to Nobis technical specification RAC2-087.

The Tier 1 Modified data review was performed in accordance with the EPA New England Environmental Data Review Supplement for Regional Data Review Elements and Superfund Specific Guidance/Procedures (April 2013); USEPA National Functional Guidelines for Inorganic Superfund Data Review (August 2014); USEPA National Functional Guidelines for Superfund Organic Methods Data Review (August 2014) and the Field Task Work Plan (FTWP) and Quality Assurance Project Plan Addendum (QAPPA) for the Targeted Brownfields Assessment (TBA) for the Former Tombarello Property (June 2016).

The data were evaluated based on the following parameters:

* • Overall Evaluation of Data and Potential Usability Issues
* • Data Completeness
• Preservation and Technical Holding Times

Nobis Engineering, Inc.
585 Middlesex Street
Lowell, MA 01851
T (978) 683-0891

*	•	Instrument Calibration
	•	Blanks
*	•	Laboratory Control Samples (LCS)
	•	Laboratory Duplicates
	•	Field Duplicates
	•	Matrix Spike Analysis
	•	Surrogate Compounds
	•	Internal Standards
NA	•	Performance Evaluation Sample Results
*	•	Reported Quantitation Limits
	•	Other

* All criteria were met for this parameter.
NA – Not applicable.

Overall Evaluation of Data and Potential Usability Issues

The objectives of the investigation activities at the site are to delineate the nature and extent of soil and groundwater contamination on the Site so that potential remedial alternatives can be evaluated and order-of-magnitude cost estimates can be developed. Analytical and hydrogeological data collected during the investigation will be compiled and reduced to develop a conceptual site model to support the estimation of human health risks and development of remedial alternatives.

The data meet the project quality criteria and can be used without restriction except as summarized below. The attachments provide details and supporting documentation.

VOCs:

Results did not require qualification.

PAHs:

PAH results were qualified as estimated due to internal standard area criteria non-conformances.

EPH:

Results did not require qualification.

PCBs:

Results were qualified as estimated for surrogate and matrix spike recovery failures and compound quantitation variance between columns.

One sample (LS-01-0708) had Aroclor-1260 non-detect result rejected (R) due to zero percent matrix spike recovery.

Metals:

Results were qualified for laboratory blank contamination, laboratory and field duplicate imprecision, matrix spike recovery failures, serial dilution exceedances, and calibration range exceedances.

Hexavalent Chromium:

Results did not require qualification. However, pH and ORP are analyzed to support hexavalent chromium. These tests were qualified as estimated due to exceeded holding time.

Please contact Gail DeRuzzo at (978) 703-6021 or gderuzzo@nobiseng.com should you have any questions or comments regarding this information.

Sincerely,

NOBIS ENGINEERING, INC.

Gail DeRuzzo
Lead Chemist

Tables: Data Summary Table – Tier 1 Mod Data Review
Data Qualification Actions Table

Attachments: Sample ID List
Data Review Checklist
COCs

DATA SUMMARY TABLE

Lab Sample ID	R0526-01	R0526-02	R0526-03	R0526-04	R0526-05	R0526-06	R0526-07	R0526-08	R0526-09	R0526-10	R0526-11
Field Sample ID	SB-3S-0001	SB-3S-0103	SB-3W-0001	SBB-3W-0103	SB-3N-0103	SB-3E-0001	SB-3E-0103	SB-3-0203	SB-3-0506	SVA-07-0001	SVA-07-0103
Sample Location	SB-3S	SB-3S	SB-3W	SBB-3W	SB-3N	SB-3E	SB-3E	SB-3	SB-3	SVA-07	SVA-07
Sample Date	06/09/16	06/09/16	06/09/16	06/09/16	06/09/16	06/09/16	06/09/16	06/09/16	06/09/16	06/09/16	06/09/16
PCBs (ug/kg)											
Aroclor 1016	720 U	3600 U	34 UJ	18000 U	390 U	34 UJ	380 U	38 UJ	40 UJ	360 U	370 U
Aroclor 1221	720 U	3600 U	34 UJ	18000 U	390 U	34 UJ	380 U	38 UJ	40 UJ	360 U	370 U
Aroclor 1232	720 U	3600 U	34 UJ	18000 U	390 U	34 UJ	380 U	38 UJ	40 UJ	360 U	370 U
Aroclor 1242	720 U	3600 U	34 UJ	18000 U	390 U	34 UJ	380 U	38 UJ	40 UJ	360 U	370 U
Aroclor 1248	1900	4900	34 UJ	18000 U	530	34 UJ	890	54 J	40 UJ	600	670
Aroclor 1254	720 U	3600 U	34 UJ	18000 U	390 U	34 UJ	380 U	38 UJ	40 UJ	360 U	370 U
Aroclor 1260	5700	25000	34 UJ	62000	4100	180 J	5100	410 J	40 UJ	1900	2300
Aroclor 1262	720 U	3600 U	34 UJ	18000 U	390 U	34 UJ	380 U	38 UJ	40 UJ	360 U	370 U
Aroclor 1268	720 U	3600 U	34 UJ	18000 U	390 U	34 UJ	380 U	38 UJ	40 UJ	360 U	370 U

DATA SUMMARY TABLE

Lab Sample ID	R0526-12	R0526-13	R0526-14	R0526-15	R0526-16	R0526-17	R0526-18	R0526-19	R0526-20	R0526-21	R0526-22	R0526-23	R0526-24
Field Sample ID	SVA-08-0001	SVA-08-0103	SA-01-0103	M-4S-0103	M-4E-0001	M-4E-0103	M-4W-0103	M-4N-0001	M-4N-0103	M-4-0203	M-4-1213	LS-02-0102	LS-02-0203
Sample Location	SVA-08	SVA-08	SA-01	M-4S	M-4E	M-4E	M-4W	M-4N	M-4N	M-4	M-4	LS-02	LS-02
Sample Date	06/09/16	06/09/16	06/09/16	06/09/16	06/09/16	06/09/16	06/09/16	06/09/16	06/09/16	06/09/16	06/09/16	06/09/16	06/09/16
PCBs (ug/kg)													
Aroclor 1016	34 UJ	370 U	810 U	860 U	740000 U	740000 U	41 U	37 UJ	1800 U	45 UJ	42 U	35 U	43 UJ
Aroclor 1221	34 UJ	370 U	810 U	860 U	740000 U	740000 U	41 U	37 UJ	1800 U	45 UJ	42 U	35 U	43 UJ
Aroclor 1232	34 UJ	370 U	810 U	860 U	740000 U	740000 U	41 U	37 UJ	1800 U	45 UJ	42 U	35 U	43 UJ
Aroclor 1242	34 UJ	370 U	810 U	860 U	740000 U	740000 U	41 U	37 UJ	1800 U	45 UJ	42 U	35 U	43 UJ
Aroclor 1248	160 J	900	1400	860 U	740000 U	740000 U	250 J+	380 J	5300	45 UJ	42 U	130	43 UJ
Aroclor 1254	34 UJ	370 U	810 U	860 U	740000 U	740000 U	41 U	37 UJ	1800 U	45 UJ	42 U	35 U	43 UJ
Aroclor 1260	330 J	2700	5300	8200	740000 U	740000 U	600 J+	130 J	15000	54 J	42 U	400	43 UJ
Aroclor 1262	34 UJ	370 U	810 U	860 U	740000 U	740000 U	41 U	37 UJ	1800 U	45 UJ	42 U	35 U	43 UJ
Aroclor 1268	34 UJ	370 U	810 U	860 U	740000 U	740000 U	41 U	37 UJ	1800 U	45 UJ	42 U	35 U	43 UJ

DATA SUMMARY TABLE

Lab Sample ID	R0526-25	R0526-26	R0526-27	R0526-28	R0526-29	R0526-30	R0526-31	R0526-32	R0526-33	R0526-34	R0526-35	R0526-36
Field Sample ID	LS-01-0103	LS-01-0708	HA-01-0001	HA-02-0001	HA-03-0001	HA-04-0001	HA-05-0001	HA-06-0001	HA-07-0001	HA-08-0001	HA-09-0001	HA-10-0001
Sample Location	LS-01	LS-01	HA-01	HA-02	HA-03	HA-04	HA-05	HA-06	HA-07	HA-08	HA-09	HA-10
Sample Date	06/09/16	06/09/16	06/09/16	06/09/16	06/09/16	06/09/16	06/09/16	06/09/16	06/09/16	06/09/16	06/09/16	06/09/16
PCBs (ug/kg)												
Aroclor 1016	35 U	42 U	190 U	180000 U	1800 U	720 U	720 U	740 U	760 U	710 U	750 U	720 U
Aroclor 1221	35 U	42 U	190 U	180000 U	1800 U	720 U	720 U	740 U	760 U	710 U	750 U	720 U
Aroclor 1232	35 U	42 U	190 U	180000 U	1800 U	720 U	720 U	740 U	760 U	710 U	750 U	720 U
Aroclor 1242	35 U	42 U	190 U	180000 U	1800 U	720 U	720 U	740 U	760 U	710 U	750 U	720 U
Aroclor 1248	89	42 U	190 U	180000 U	18000	1300	1300	2900	2900	1200	750 U	720 U
Aroclor 1254	35 U	42 U	190 U	180000 U	1800 U	720 U	720 U	740 U	760 U	710 U	750 U	720 U
Aroclor 1260	320	42 R	880	890000	20000	9300	6500	8400	10000	4700	4200	6700
Aroclor 1262	35 U	42 U	190 U	180000 U	1800 U	720 U	720 U	740 U	760 U	710 U	750 U	720 U
Aroclor 1268	35 U	42 U	190 U	180000 U	1800 U	720 U	720 U	740 U	760 U	710 U	750 U	720 U

DATA SUMMARY TABLE

Lab Sample ID	R0526-37	R0526-38	R0526-39	R0526-40
Field Sample ID	HA-11-0001	HA-12-0001	FD-08	FD-09
Sample Location	HA-11	HA-12	HA-01	HA-07
Sample Date	06/09/16	06/09/16	06/09/16	06/09/16
PCBs (ug/kg)				
Aroclor 1016	18000 U	18000 U	750 U	760 U
Aroclor 1221	18000 U	18000 U	750 U	760 U
Aroclor 1232	18000 U	18000 U	750 U	760 U
Aroclor 1242	18000 U	18000 U	750 U	760 U
Aroclor 1248	18000 U	18000 U	750 U	3200
Aroclor 1254	18000 U	18000 U	750 U	760 U
Aroclor 1260	70000	85000	890	10000
Aroclor 1262	18000 U	18000 U	750 U	760 U
Aroclor 1268	18000 U	18000 U	750 U	760 U

DATA SUMMARY TABLE

Lab Sample ID	R0526-01	R0526-05	R0526-10	R0526-11	R0526-12	R0526-13	R0526-14	R0526-15	R0526-20	R0526-23	R0526-24	R0526-25	R0526-26
Field Sample ID	SB-3S-0001	SB-3N-0103	SVA-07-0001	SVA-07-0103	SVA-08-0001	SVA-08-0103	SA-01-0103	M-4S-0103	M-4N-0103	LS-02-0102	LS-02-0203	LS-01-0103	LS-01-0708
Sample Location	SB-3S	SB-3N	SVA-07	SVA-07	SVA-08	SVA-08	SA-01	M-4S	M-4N	LS-02	LS-02	LS-01	LS-01
Sample Date	06/09/16	06/09/16	06/09/16	06/09/16	06/09/16	06/09/16	06/09/16	06/09/16	06/09/16	06/09/16	06/09/16	06/09/16	06/09/16
Metals (mg/kg)													
Arsenic	50	21	9.2	15	12	28	29 J	15	35	11	22	5.9	5.8
Barium	150	3400	170	360	110	440	880 J	1100	610	70	850	23	31
Cadmium	4.1	5.3	4.2	4.8	1.5	3.7	8.6	3.9	11	0.65	5.8	0.16 J	0.25 U
Chromium	83	31	57	44	87	74	90 J+	66	54	44	55	13	12
Lead	500	3800	610	1200	240	800	1400 J	1300	1400	67	1400	15	5.5
Mercury	0.92	5.4	2.7	2.7	0.6	1.5	5	3.8 J	1.2	0.1	3.6	0.037 J	0.05 U
Selenium	3.6	2.5	3	1.4	1.1 J	1.7	1.4 UJ	1.8 U	0.87 U	1.5	1.6 U	1 J	1.5 J
Silver	1.4	1.3 J	0.55 J	0.57 J	0.18 J	0.55 J	0.35 J	1.8 U	0.87 U	1 U	1.6 U	1 U	1.5 U
Chromium-Hexavalent	NA	NA	NA	NA	NA	NA	NA	6.61 UJ	NA	NA	NA	NA	NA

U – not detected; J – estimated value; UJ – not detected, reporting limit estimated; R – rejected

DATA SUMMARY TABLE

Lab Sample ID	R0526-27	R0526-28	R0526-29	R0526-30	R0526-31	R0526-32	R0526-33	R0526-34	R0526-35	R0526-36	R0526-37	R0526-38	R0526-39
Field Sample ID	HA-01-0001	HA-02-0001	HA-03-0001	HA-04-0001	HA-05-0001	HA-06-0001	HA-07-0001	HA-08-0001	HA-09-0001	HA-10-0001	HA-11-0001	HA-12-0001	FD-08
Sample Location	HA-01	HA-02	HA-03	HA-04	HA-05	HA-06	HA-07	HA-08	HA-09	HA-10	HA-11	HA-12	HA-01
Sample Date	06/09/16	06/09/16	06/09/16	06/09/16	06/09/16	06/09/16	06/09/16	06/09/16	06/09/16	06/09/16	06/09/16	06/09/16	06/09/16
Metals (mg/kg)													
Arsenic	40 J	17	11	13	17	27	16	11	12	11	13	20	16 J
Barium	480	450	150	310	300	370	450	260 J	170	320	300	370	480
Cadmium	9.6	15	5.6	5.8	7.7	14	12	4.8 J	7.3	3.8	11	13	9.3
Chromium	92	120	55 J	54	310	180	93	47 J	51	38	68	230	74
Lead	5700 J	1200	810 J	940	730	860	1500	1600 J	310	720	1100	1400	910 J
Mercury	0.43	4	1.7	1.8	1.1	1.8	2.3 J	1.4	0.38	1.1	4.1	4.9	0.38
Selenium	2.8	1.5	2	1.5	1.3 U	1.2 U	1.2 U	1.6	2.9	2.9	1.1 U	1.4 U	2.5
Silver	1.4	1.5 U	1.4 U	2.6	1.3 U	1.2 U	1.6	1.4	1.3 U	1.4 U	2	1.6	1.4 U
Chromium-Hexavalent	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

U – not detected; J – estimated value; UJ – not detected, reporting limit estimated; R – rejected

DATA SUMMARY TABLE

Lab Sample ID	R0526-40
Field Sample ID	FD-09
Sample Location	HA-07
Sample Date	06/09/16
Metals (mg/kg)	
Arsenic	18
Barium	520
Cadmium	14
Chromium	92
Lead	2000
Mercury	2.9
Selenium	1.1 J
Silver	1.8
Chromium-Hexavalent	NA

U – not detected; J – estimated value; UJ – not detected, reporting limit estimated; R – rejected

DATA SUMMARY TABLE

Lab Sample ID	R0526-11	R0526-13	R0526-14	R0526-24	R0526-26
Field Sample ID	SVA-07-0103	SVA-08-0103	SA-01-0103	LS-02-0203	LS-01-0708
Sample Location	SVA-07	SVA-08	SA-01	LS-02	LS-01
Sample Date	06/09/16	06/09/16	06/09/16	06/09/16	06/09/16
Volatiles (ug/kg)					
1,1,1,2-Tetrachloroethane	5.9 U	7.6 U	7.1 U	7.8 U	5.1 U
1,1,1-Trichloroethane	5.9 U	7.6 U	7.1 U	7.8 U	5.1 U
1,1,2,2-Tetrachloroethane	5.9 U	7.6 U	7.1 U	7.8 U	5.1 U
1,1,2-Trichloroethane	5.9 U	7.6 U	7.1 U	7.8 U	5.1 U
1,1-Dichloroethane	5.9 U	7.6 U	7.1 U	2.4 J	5.1 U
1,1-Dichloroethene	5.9 U	7.6 U	7.1 U	7.8 U	5.1 U
1,1-Dichloropropene	5.9 U	7.6 U	7.1 U	7.8 U	5.1 U
1,2,3-Trichlorobenzene	5.9 U	7.6 U	7.1 U	7.8 U	5.1 U
1,2,3-Trichloropropane	5.9 U	7.6 U	7.1 U	7.8 U	5.1 U
1,2,4-Trichlorobenzene	5.9 U	7.6 U	7.1 U	7.8 U	5.1 U
1,2,4-Trimethylbenzene	5.9 U	7.6 U	21	7.8 U	5.1 U
1,2-Dibromo-3-chloropropane	5.9 U	7.6 U	7.1 U	7.8 U	5.1 U
1,2-Dibromoethane	5.9 U	7.6 U	7.1 U	7.8 U	5.1 U
1,2-Dichlorobenzene	5.9 U	7.6 U	7.1 U	7.8 U	5.1 U
1,2-Dichloroethane	5.9 U	7.6 U	4.9 J	7.8 U	5.1 U
1,2-Dichloropropane	5.9 U	7.6 U	7.1 U	7.8 U	5.1 U
1,3,5-Trimethylbenzene	5.9 U	7.6 U	4.1 J	7.8 U	5.1 U
1,3-Dichlorobenzene	5.9 U	7.6 U	7.1 U	7.8 U	5.1 U
1,3-Dichloropropane	5.9 U	7.6 U	7.1 U	7.8 U	5.1 U
1,4-Dichlorobenzene	5.9 U	7.6 U	7.1 U	7.8 U	5.1 U
1,4-Dioxane	120 U	150 U	140 U	160 U	100 U
2,2-Dichloropropane	5.9 U	7.6 U	7.1 U	7.8 U	5.1 U
2-Butanone	5.9 U	7.6 U	18	7.8 U	5.1 U
2-Chlorotoluene	5.9 U	7.6 U	7.1 U	7.8 U	5.1 U
2-Hexanone	5.9 U	7.6 U	15	7.8 U	5.1 U
4-Chlorotoluene	5.9 U	7.6 U	7.1 U	7.8 U	5.1 U
4-Isopropyltoluene	5.9 U	7.6 U	2.6 J	7.8 U	5.1 U
4-Methyl-2-pentanone	5.9 U	7.6 U	7.1 U	7.8 U	5.1 U
Acetone	23	27	63	6.3 J	5.1 U
Benzene	1.3 J	3.4 J	17	7.8 U	5.1 U
Bromobenzene	5.9 U	7.6 U	7.1 U	7.8 U	5.1 U
Bromochloromethane	5.9 U	7.6 U	7.1 U	7.8 U	5.1 U

U – not detected; J – estimated value; UJ – not detected, reporting limit estimated; R – rejected

DATA SUMMARY TABLE

Lab Sample ID	R0526-11	R0526-13	R0526-14	R0526-24	R0526-26
Field Sample ID	SVA-07-0103	SVA-08-0103	SA-01-0103	LS-02-0203	LS-01-0708
Sample Location	SVA-07	SVA-08	SA-01	LS-02	LS-01
Sample Date	06/09/16	06/09/16	06/09/16	06/09/16	06/09/16
Bromodichloromethane	5.9 U	7.6 U	7.1 U	7.8 U	5.1 U
Bromoform	5.9 U	7.6 U	7.1 U	7.8 U	5.1 U
Bromomethane	5.9 U	7.6 U	7.1 U	7.8 U	5.1 U
Carbon disulfide	5.9 U	7.6 U	7.1 U	7.8 U	5.1 U
Carbon tetrachloride	5.9 U	7.6 U	7.1 U	7.8 U	5.1 U
Chlorobenzene	5.9 U	7.6 U	7.1 U	7.8 U	5.1 U
Chloroethane	5.9 U	7.6 U	7.1 U	7.8 U	5.1 U
Chloroform	5.9 U	7.6 U	7.1 U	7.8 U	5.1 U
Chloromethane	5.9 U	7.6 U	7.1 U	7.8 U	5.1 U
cis-1,2-Dichloroethene	5.9 U	7.6 U	7.1 U	7.8 U	5.1 U
cis-1,3-Dichloropropene	5.9 U	7.6 U	7.1 U	7.8 U	5.1 U
Dibromochloromethane	5.9 U	7.6 U	7.1 U	7.8 U	5.1 U
Dibromomethane	5.9 U	7.6 U	7.1 U	7.8 U	5.1 U
Dichlorodifluoromethane	5.9 U	7.6 U	7.1 U	7.8 U	5.1 U
Diethyl ether	5.9 U	7.6 U	7.1 U	7.8 U	5.1 U
Diisopropyl Ether	5.9 U	7.6 U	7.1 U	7.8 U	5.1 U
Ethylbenzene	5.9 U	7.6 U	11	7.8 U	5.1 U
Hexachlorobutadiene	5.9 U	7.6 U	7.1 U	7.8 U	5.1 U
Isopropylbenzene	5.9 U	7.6 U	7.2	7.8 U	5.1 U
m,p-Xylene	5.9 U	7.6 U	18	7.8 U	5.1 U
Methyl tert-butyl ether	5.9 U	7.6 U	7.1 U	6.4 J	5.1 U
Methylene chloride	5.9 U	7.6 U	7.1 U	7.8 U	5.1 U
Naphthalene	5.9 U	7.6 U	280	7.8 U	5.1 U
n-Butylbenzene	5.9 U	7.6 U	43	7.8 U	5.1 U
n-Propylbenzene	5.9 U	7.6 U	23	7.8 U	5.1 U
o-Xylene	5.9 U	7.6 U	6.8 J	7.8 U	5.1 U
sec-Butylbenzene	5.9 U	7.6 U	17	7.8 U	5.1 U
Styrene	5.9 U	7.6 U	7.1 U	7.8 U	5.1 U
tert-Amyl methyl ether	5.9 U	7.6 U	7.1 U	7.8 U	5.1 U
Tert-Butyl Ethyl Ether	5.9 U	7.6 U	7.1 U	7.8 U	5.1 U
tert-Butylbenzene	5.9 U	7.6 U	7.1 U	7.8 U	5.1 U
Tetrachloroethene	5.9 U	7.6 U	7.1 U	7.8 U	2.9 J
Tetrahydrofuran	12 U	15 U	14 U	16 U	10 U

U – not detected; J – estimated value; UJ – not detected, reporting limit estimated; R – rejected

DATA SUMMARY TABLE

Lab Sample ID	R0526-11	R0526-13	R0526-14	R0526-24	R0526-26
Field Sample ID	SVA-07-0103	SVA-08-0103	SA-01-0103	LS-02-0203	LS-01-0708
Sample Location	SVA-07	SVA-08	SA-01	LS-02	LS-01
Sample Date	06/09/16	06/09/16	06/09/16	06/09/16	06/09/16
Toluene	1.2 J	7.6 U	22	7.8 U	5.1 U
trans-1,2-Dichloroethene	5.9 U	7.6 U	7.1 U	7.8 U	5.1 U
trans-1,3-Dichloropropene	5.9 U	7.6 U	7.1 U	7.8 U	5.1 U
Trichloroethene	5.9 U	7.6 U	7.1 U	7.8 U	5.1 U
Trichlorofluoromethane	5.9 U	7.6 U	7.1 U	7.8 U	5.1 U
Vinyl chloride	5.9 U	7.6 U	7.1 U	7.8 U	5.1 U
Xylene (total)	5.9 U	7.6 U	25	7.8 U	5.1 U

U – not detected; J – estimated value; UJ – not detected, reporting limit estimated; R – rejected

DATA SUMMARY TABLE

Lab Sample ID	R0526-04	R0526-06	R0526-11	R0526-13	R0526-14	R0526-24	R0526-26
Field Sample ID	SBB-3W-0103	SB-3E-0001	SVA-07-0103	SVA-08-0103	SA-01-0103	LS-02-0203	LS-01-0708
Sample Location	SBB-3W	SB-3E	SVA-07	SVA-08	SA-01	LS-02	LS-01
Sample Date	06/09/16	06/09/16	06/09/16	06/09/16	06/09/16	06/09/16	06/09/16
PAHs (ug/kg)							
2-Methylnaphthalene	350 U	330 U	180 J	130 J	1700	430 U	410 U
Acenaphthene	240 J	330 U	190 J	330 J	560	430 U	410 U
Acenaphthylene	240 J	330 U	460	1000	190 J	430 U	410 U
Anthracene	990	330 U	1200	3700	1700	430 U	410 U
Benzo(a)anthracene	3400	130 J	3200	12000	2300	430 U	410 U
Benzo(a)pyrene	3500	150 J	3500 J	11000	2500	430 U	410 U
Benzo(b)fluoranthene	5100	200 J	4600 J	14000	3400	430 U	410 U
Benzo(g,h,i)perylene	2500	120 J	3100 J	6400	1100	430 U	410 U
Benzo(k)fluoranthene	1900	84 J	1800 J	5100 J	1200	430 U	410 U
Chrysene	2800	130 J	2800	12000	2200	430 U	410 U
Dibenz(a,h)anthracene	630	330 U	750 J	1900 J	310 J	430 U	410 U
Fluoranthene	5400	220 J	5000	23000	5500	430 U	410 U
Fluorene	270 J	330 U	430	1100	1000	430 U	410 U
Indeno(1,2,3-cd)pyrene	2600	120 J	3200 J	7400	1300	430 U	410 U
Naphthalene	350 U	330 U	170 J	180 J	1500	430 U	410 U
Phenanthrene	3200	330 U	3600	11000	5700	430 U	410 U
Pyrene	5100	210 J	5200	18000	4600	430 U	410 U

U – not detected; J – estimated value; UJ – not detected, reporting limit estimated; R – rejected

DATA SUMMARY TABLE

Lab Sample ID	R0526-11	R0526-13	R0526-14	R0526-24	R0526-26
Field Sample ID	SVA-07-0103	SVA-08-0103	SA-01-0103	LS-02-0203	LS-01-0708
Sample Location	SVA-07	SVA-08	SA-01	LS-02	LS-01
Sample Date	06/09/16	06/09/16	06/09/16	06/09/16	06/09/16
EPH (mg/kg)					
2-Methylnaphthalene	0.379 U	0.37 U	1.69	0.435 U	0.418 U
Acenaphthene	0.379 U	0.37 U	0.396 U	0.435 U	0.418 U
Acenaphthylene	0.379 U	0.37 U	0.396 U	0.435 U	0.418 U
Anthracene	0.438	1.66	0.838	0.435 U	0.418 U
Benzo(a)anthracene	1.14	7.89	2.17	0.435 U	0.418 U
Benzo(a)pyrene	1.48	6.25	2.5	0.435 U	0.418 U
Benzo(b)fluoranthene	0.827	5.77	1.8	0.435 U	0.418 U
Benzo(g,h,i)perylene	0.98	3.35	1.64	0.435 U	0.418 U
Benzo(k)fluoranthene	1.3	5.5	1.76	0.435 U	0.418 U
C11-C22 Aromatics	145	285	347	13.1 U	12.6 U
C19-C36 Aliphatics	396	266	847 J	13.1 U	12.6 U
C9-C18 Aliphatics	43.1	27.9	135	13.1 U	12.6 U
Chrysene	1.25	6.95	1.96	0.435 U	0.418 U
Dibenz(a,h)anthracene	0.379 U	0.918	0.417	0.435 U	0.418 U
Fluoranthene	2.29	12.4	3.71	0.435 U	0.418 U
Fluorene	0.379 U	0.507	0.511	0.435 U	0.418 U
Indeno(1,2,3-cd)pyrene	0.896	3.28	1.48	0.435 U	0.418 U
Naphthalene	0.379 U	0.37 U	1.23	0.435 U	0.418 U
Phenanthrene	1.59	5.84	3.13	0.435 U	0.418 U
Pyrene	2.28	11.3	3.42	0.435 U	0.418 U

Data Review Qualification Actions
Case: 0163S
SDG: R0526

Parameter	Analyte	Samples: R0526-#	Evaluation Criteria	Action Needed	Comments
Metals	Barium, Chromium, Lead	15, 20, 23-40	Lab Blank	Remove B	result >RL
Metals	Barium, Chromium	01, 05, 10-14	Lab Blank	Remove B	result >RL
Metals	Silver	27, 30, 33, 34, 37, 38, 40	Lab Blank	Remove B	result >RL
Metals	Silver	15, 20, 24, 28, 29, 31, 32, 35, 36, 39	Lab Blank	U at RL	sample <RL
Metals	Barium, Cadmium, Chromium, Lead	34 (HA-08-0001)	Lab Dup	J	RPD > 20%
Metals	Chromium and Lead	29 (HA-03-0001)	Lab Dup	J	RPD > 20%
Metals	Mercury	15 (M-4S-0103)	Lab Dup	J	RPD > 20%
Metals	Arsenic and Lead	14 (SA-01-0103)	Lab Dup	J	RPD > 20%
Metals	Arsenic and Lead	27 and 39	Field Dup	J	RPD > 50%
Metals	Chromium	29 (HA-03-0001)	MS	J	low recovery
Metals	Chromium and Barium	34 (HA-08-0001)	MS	J+	high recovery
Metals	Arsenic and Selenium	14 (SA-01-0103)	MS	J/UJ	low recovery
Metals	Chromium	14 (SA-01-0103)	MS	J+	high recovery
Metals	Chromium and Lead	29 and 34	serial dilutions	J	%D exceedance
Metals	Barium, Chromium, and Lead	14	serial dilutions	J	%D exceedance
Metals	Mercury	15 (M-4S-0103)	serial dilutions	J	%D exceedance
Metals	Mercury	33 (HA-07-0001)	calibration exceedance	J	E flag data
PAHs	Benzo(b)fluoranthene, Benzo(k)fluoranthene, Benzo(a)pyrene, Indeno(1,2,3-cd)pyrene, Dibenzo(a,h)anthracene, Benzo(g,h,i)perylene	11 and 13	ISTD	J/UJ	Peak areas outside control limits for perylene-d12 (undiluted)
PCBs	Aroclor-1260	26 (LS-01-0708)	MS	J/R	0% recovery
PCBs	All	03, 06, 08, 09, 12, 19, 21, and 24	surrogates	J/UJ	low recoveries
PCBs	All detects	18 (M-4W-01013)	surrogates	J+	high recovery
PCBs	Aroclor-1248	19 (M-4N-0001)	compound quant	J	P flag data
pH/ORP	pH/ORP	15 (M-4S-0103)	HT	J-	5 days

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☑ Final Report
☐ Re-Issued Report
☐ Revised Report
Report Date:
01-Jul-16 16:27

Laboratory Report

Nobis Engineering, Inc
585 Middlesex Street
Lowell, MA 01851

Work Order: R0526
Project : Lawrence, MA site
Project #:

Attn: Gail DeRuzzo

Laboratory ID	Client Sample ID	Matrix	Date Sampled	Date Received
R0526-01	SB-3S-0001	Soil	09-Jun-16 08:15	13-Jun-16 10:45
R0526-02	SB-3S-0103	Soil	09-Jun-16 08:20	13-Jun-16 10:45
R0526-03	SB-3W-0001	Soil	09-Jun-16 08:25	13-Jun-16 10:45
R0526-04	SBB-3W-0103	Soil	09-Jun-16 08:30	13-Jun-16 10:45
R0526-05	SB-3N-0103	Soil	09-Jun-16 08:35	13-Jun-16 10:45
R0526-06	SB-3E-0001	Soil	09-Jun-16 08:40	13-Jun-16 10:45
R0526-07	SB-3E-0103	Soil	09-Jun-16 08:45	13-Jun-16 10:45
R0526-08	SB-3-0203	Soil	09-Jun-16 08:50	13-Jun-16 10:45
R0526-09	SB-3-0506	Soil	09-Jun-16 08:55	13-Jun-16 10:45
R0526-10	SVA-07-0001	Soil	09-Jun-16 09:05	13-Jun-16 10:45
R0526-11	SVA-07-0103	Soil	09-Jun-16 09:10	13-Jun-16 10:45
R0526-12	SVA-08-0001	Soil	09-Jun-16 09:15	13-Jun-16 10:45
R0526-13	SVA-08-0103	Soil	09-Jun-16 09:20	13-Jun-16 10:45
R0526-14	SA-01-0103	Soil	09-Jun-16 09:45	13-Jun-16 10:45
R0526-15	M-4S-0103	Soil	09-Jun-16 10:45	13-Jun-16 10:45
R0526-16	M-4E-0001	Soil	09-Jun-16 10:50	13-Jun-16 10:45
R0526-17	M-4E-0103	Soil	09-Jun-16 10:55	13-Jun-16 10:45
R0526-18	M-4W-0103	Soil	09-Jun-16 11:00	13-Jun-16 10:45
R0526-19	M-4N-0001	Soil	09-Jun-16 11:10	13-Jun-16 10:45
R0526-20	M-4N-0103	Soil	09-Jun-16 11:15	13-Jun-16 10:45
R0526-21	M-4-0203	Soil	09-Jun-16 11:30	13-Jun-16 10:45
R0526-22	M-4-1213	Soil	09-Jun-16 11:35	13-Jun-16 10:45
R0526-23	LS-02-0102	Soil	09-Jun-16 11:55	13-Jun-16 10:45
R0526-24	LS-02-0203	Soil	09-Jun-16 12:00	13-Jun-16 10:45
R0526-25	LS-01-0103	Soil	09-Jun-16 13:00	13-Jun-16 10:45
R0526-26	LS-01-0708	Soil	09-Jun-16 13:05	13-Jun-16 10:45
R0526-27	HA-01-0001	Soil	09-Jun-16 11:20	13-Jun-16 10:45
R0526-28	HA-02-0001	Soil	09-Jun-16 11:45	13-Jun-16 10:45
R0526-29	HA-03-0001	Soil	09-Jun-16 12:05	13-Jun-16 10:45
R0526-30	HA-04-0001	Soil	09-Jun-16 14:20	13-Jun-16 10:45
R0526-31	HA-05-0001	Soil	09-Jun-16 14:30	13-Jun-16 10:45
R0526-32	HA-06-0001	Soil	09-Jun-16 14:40	13-Jun-16 10:45
R0526-33	HA-07-0001	Soil	09-Jun-16 15:00	13-Jun-16 10:45
R0526-34	HA-08-0001	Soil	09-Jun-16 15:15	13-Jun-16 10:45
R0526-35	HA-09-0001	Soil	09-Jun-16 15:25	13-Jun-16 10:45
R0526-36	HA-10-0001	Soil	09-Jun-16 15:50	13-Jun-16 10:45
R0526-37	HA-11-0001	Soil	09-Jun-16 16:05	13-Jun-16 10:45
R0526-38	HA-12-0001	Soil	09-Jun-16 16:30	13-Jun-16 10:45
R0526-39	FD-08	Soil	09-Jun-16 11:25	13-Jun-16 10:45
R0526-40	FD-09	Soil	09-Jun-16 15:05	13-Jun-16 10:45

Engineering a Sustainable Future

Generic Data Review Checklist

Project: **Lawrence**
Project #: **80108**
Case#: **0163S**
Date: **7/7/16**
Methods: **VOCs-8260, PAHs – 8270, EPH plus targets, PCBs 8082, RCRA metals 6010, 7471/, Hex Cr – 7196A (3060A), Cyanide and PAC 9012 – MCP methods**
Laboratory: **Eurofins Spectrum Analytical**
SDG: **see below**
Reviewer: **Gail DeRuzzo**

1. **Case Narrative and Data Package Completeness (COC and Analyte List Review)**

SOILS:	GW:	IDW:
R0508 – 38 soils	R0536 – 4 GW	R0562
R0516 – 43 soils	R0545 – 3 GW	1 SO/1 AQ
R0521 – 33 soils	R0561 – 2 GW	not evaluated
R0526 – 40 soils		
R0530 – 22 soils + TB		
R0545 – 18 soils + TB		
R0555 – 20 soils		
R0561 – 4 soils		

Sample IDs printed separately.

2. **Holding Time and Sample Preservation Compliance**
ORP, pH – MS-4S-01013 – HT of 24 hrs exceeded. sampled 6/9 – delivered to lab 6/10, shipped to RI lab then back to MA lab – received 6/14. Analyzed 6/14. Estimate J-

3. **Lab and Field Blanks**
Ba (.03182 (RL 10)), Cr (.03833 (RL 1)), Pb (.2288 (RL .5)), Ag (.08536 (RL1.5)) batch 84812 – samples (5, 10-14); Ba (.04482), Cr (.02892) batch 84813 – B flag data – samples (15, 20, 23-40) >RL – remove B's; Ag U at RL for samples 15, 20, 24, 28, 29, 31, 32, 35, 36, 39)

4. **Laboratory Control Samples**
VOCs: LCSD batch 84798 high for 1,4-dioxane – ND no action

PCBs: LCSD batch 84782 – Aroclor-1016 RPD out high (48.6% vs 30) – no action.
EPH: LCSD C9-C18 aliphatics RPD out high (29% vs. 25%) – no action.

5. **Field Duplicate Precision**
FD-08 = HA-01-0001 – PCBs, Metals – As and Pb exceed RPD, J flag 27 only.
FD-09 = HA-07-0001 – PCBs, Metals – in control.

6. **Laboratory Duplicate Precision**
Metals:
HA-08-0001 (R0526-34ADUP): Barium, Cadmium, Chromium, and Lead did not meet maximum RPD limit. Flag Ba, Cd, Cr, and Pb in 34 J/UJ

HA-03-0001 (R0526-29ADUP): Chromium and Lead did not meet maximum RPD limit. Flag Cr and Pb in 29 J/UJ.
M-4S-0103 (R0526-15ADUP): Mercury did not meet maximum RPD limit. Flag Hg in 15 J/UJ
SA-01-0103 (R0526-14ADUP): Arsenic and Lead did not meet maximum RPD limit. Flag As and Pb in 14 J/UJ

7. **Matrix Spikes**

PCBs:
LS-01-0708 (R0526-26AMS), recovery is below criteria for Aroclor-1260 on rear column at 0% with criteria of (60-130).
LS-01-0708 (R0526-26AMSD), recovery is below criteria for Aroclor-1260 on rear column at 0% with criteria of (60-130). J/R

Metals:
HA-03-0001 (R0526-29AMS): Chromium was outside low J/UJ of the recovery control limits. Lead was also outside the recovery limits but was present in the native sample at concentrations above 4times the spike and do not require a PDS.
HA-08-0001 (R0526-34AMS): Chromium and Barium were outside high J+ of the recovery control limits. Lead was also outside the recovery limits but was present in the native sample at concentrations above 4times the spike and do not require a PDS.
SA-01-0103 (R0526-14AMS): Arsenic (low) J/UJ, Selenium (low) – PSD low J-/UJ and Chromium (high) J+ were outside of the recovery control limits. Lead was also outside the recovery limits but was present in the native sample at concentrations above 4times the spike and do not require a PDS.

8. **Surrogate Spikes**

PCBs:
SB-3W-0001 (R0526-03A), recovery is below criteria for Decachlorobiphenyl on rear column at 21% with criteria of (60-125) and Decachlorobiphenyl on front column at 26% with criteria of (60-125). UJ
SB-3E-0001 (R0526-06A), recovery is below criteria for Decachlorobiphenyl on rear column at 37% with criteria of (60-125) and Decachlorobiphenyl on front column at 41% with criteria of (60-125). J-/UJ
SB-3-0203 (R0526-08A), recovery is below criteria for Decachlorobiphenyl on rear column at 55% with criteria of (60-125). J-/UJ
SB-3-0506 (R0526-09A), recovery is below criteria for Decachlorobiphenyl on rear column at 56% with criteria of (60-125) and Decachlorobiphenyl on front column at 50% with criteria of (60-125). J-/UJ
SVA-08-0001 (R0526-12A), recovery is below criteria for Decachlorobiphenyl on rear column at 50% with criteria of (60-125) and Decachlorobiphenyl on front column at 57% with criteria of (60-125). J-/UJ
M-4W-0103 (R0526-18A), recovery is above criteria for Decachlorobiphenyl on rear column at 145% with criteria of (60-125) and Decachlorobiphenyl on front column at 171% with criteria of (60-125). J+

M-4N-0001 (R0526-19A), recovery is below criteria for Decachlorobiphenyl on rear column at 34% with criteria of (60-125) and Decachlorobiphenyl on front column at 53% with criteria of (60-125). J-/UJ
M-4-0203 (R0526-21A), recovery is above criteria for Decachlorobiphenyl on rear column at 154% with criteria of (60-125), Decachlorobiphenyl on front column at 147% with criteria of (60-125), recovery is below criteria for Tetrachloro-m-xylene on rear column at 20% with criteria of (34-147) and Tetrachloro-m-xylene on front column at 27% with criteria of (34-147). J/UJ
LS-02-0203 (R0526-24A), recovery is below criteria for Tetrachlorom-xylene on rear column at 32% with criteria of (34-147). UJ

9. Internal Standards

PAHs:

SVA-07-0103 (R0526-11A), Peak area is outside QC Limits for Perylene-d12.
SVA-08-0103 (R0526-13A), Peak area is outside QC Limits for Perylene-d12.
Benzo(b)fluoranthene, Benzo(k)fluoranthene, Benzo(a)pyrene, Indeno(1,2,3-cd)pyrene, Dibenzo(a,h)anthracene, Benzo(g,h,i)perylene J/UJ

10. Performance Evaluation Samples

NA

11. Reporting Limits

PAHs:

SVA-07-0103 (R0526-11ADL) : Dilution Factor: 2
SVA-08-0103 (R0526-13ADL) : Dilution Factor: 10

PCBs:

SB-3S-0001 (R0526-01A) : Dilution Factor: 20
SB-3S-0103 (R0526-02A) : Dilution Factor: 100
SBB-3W-0103 (R0526-04A) : Dilution Factor: 500
SB-3N-0103 (R0526-05A) : Dilution Factor: 10
SB-3E-0103 (R0526-07A) : Dilution Factor: 10
SVA-07-0001 (R0526-10A) : Dilution Factor: 10
SVA-07-0103 (R0526-11A) : Dilution Factor: 10
SVA-08-0103 (R0526-13A) : Dilution Factor: 10
SA-01-0103 (R0526-14A) : Dilution Factor: 20
M-4S-0103 (R0526-15A) : Dilution Factor: 20
M-4E-0001 (R0526-16A) : Dilution Factor: 20000
M-4E-0103 (R0526-17A) : Dilution Factor: 20000
M-4N-0103 (R0526-20A) : Dilution Factor: 50
HA-01-0001 (R0526-27A) : Dilution Factor: 5
HA-02-0001 (R0526-28A) : Dilution Factor: 5000
HA-03-0001 (R0526-29A) : Dilution Factor: 50
HA-04-0001 (R0526-30A) : Dilution Factor: 20
HA-05-0001 (R0526-31A) : Dilution Factor: 20

HA-06-0001 (R0526-32A) : Dilution Factor: 20
HA-07-0001 (R0526-33A) : Dilution Factor: 20
HA-08-0001 (R0526-34A) : Dilution Factor: 20
HA-09-0001 (R0526-35A) : Dilution Factor: 20
HA-10-0001 (R0526-36A) : Dilution Factor: 20
HA-11-0001 (R0526-37A) : Dilution Factor: 500
HA-12-0001 (R0526-38A) : Dilution Factor: 500
FD-08 (R0526-39A) : Dilution Factor: 20
FD-09 (R0526-40A) : Dilution Factor: 20

Hex. Cr
M-4S-0103 – raised RL due to matrix

12. Calibration Issues

ok

13. Other

Serial Dilution - Metals
HA-03-0001 (R0526-29ADUP): Chromium and Lead did not meet maximum %D limit. J/UJ
HA-08-0001 (R0526-34ADUP): Chromium and Lead did not meet maximum %D limit. J/UJ
M-4S-0103 (R0526-15ADUP): Mercury did not meet maximum %D limit. J/UJ
SA-01-0103 (R0526-14ADUP): Barium, Chromium and Lead did not meet maximum %D limit. J/UJ

P flags – PCBs:
19 – Aroclor 1248 – P – change to J

Metals: E flag on mercury on sample 33 **–** over calibration range – change to J

Analyte lists and RLs were verified per the FTWP/QAPPA.

R0526

CHAIN OF CUSTODY RECORD

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☐ 646 Camp Avenue, N Kingstown, RI 02852, (401) 732-3400

Special Handling:

TAT- Indicate Date Needed: ________
- All TATs subject to laboratory approval. Min. 24-hour notification needed for rushes.
- Samples disposed of after 60 days unless otherwise instructed.

Report To: NOBIS ENGINEERING

Telephone #:

Project Mgr. A. ROY / S. VETERE

Invoice To:

P.O. No.: RQN:

Project No.: 80108.04
Site Name: LAWRENCE TBA
Location: LAWRENCE State: MA
Sampler(s): EHJ, AG

1=$Na_2S_2O_3$ 2=HCl 3=H_2SO_4 4=HNO_3 5=NaOH 6=Ascorbic Acid 7=CH_3OH
8=$NaHSO_4$ 9=Deionized Water 10=H_3PO_4 11= MeOH 12=

List preservative code below:

QA/QC Reporting Notes:

DW=Drinking Water GW=Groundwater WW=Wastewater
O=Oil SW=Surface Water SO=Soil SL=Sludge A=Air
X1= X2= X3=

G=Grab C=Composite

QA/QC Reporting Level
☐ Level I ☐ Level II
☐ Level III ☐ Level IV
☐ Other

State-specific reporting standards:

Lab Id:	Sample Id:	Date:	Time:	Type	Matrix	# of VOA Vials	# of Amber Glass	# of Clear Glass	# of Plastic		PCBs	RCRA 8 METALS	PAHs
	SB-3S-0001	6/9/16	815	G	SO		1				X	X	
	SB-~~$~~3S-0103	↓	820	G	SO		1				X		
	SB-3W-0001		825	↓	↓		1				X		
	SB-3W-0103		830				1				X		X
	SB-3N-0103		835				1				X	X	
	SB-3E-0001		840				1				X		X
	SB-3E-0103		845				1				X		
	SB-3-0203		850				1				X		
	SB-3-0506		855				1				X		
	SVA-07-0001	↓	905	↓	↓		1				X	X	

Relinquished by:	Received by:	Date:	Time:	Temp°C
Eric Johnson	NOBIS COLD STORAGE	6/9/16	1850	5.3
James Hampton	DSR	6/10/16	1200	0
DSR	SUBOUT	6/10/16	1620	5.3
Subout	[signature]	6-13-16	800	02
[signature]	[signature] 6/13/16 10:45am			(4.0°C/0/4.0°C IR)

☐ EDD Format
☐ E-mail to

Condition upon receipt: Custody Seals: ☐ Present ☐ Intact ☐ Broken
☐ Ambient ☐ Iced ☒ Refrigerated ☒ DI VOA Frozen ☐ Soil Jar Frozen

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Revised Feb 2013

R0526

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☐ 646 Camp Avenue, N Kingstown, RI 02852, (401) 732-3400

Special Handling:

TAT- Indicate Date Needed: _____
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- Samples disposed of after 60 days unless otherwise instructed.

Report To: NOBIS ENGINEERING
Telephone #:
Project Mgr. A. ROY / S. VETERE

Invoice To:
P.O. No.: RQN:

Project No.: 80108.04
Site Name: LAWRENCE TBA
Location: LAWRENCE State: MA
Sampler(s): EHJ, AG

1=Na_2S2O_3 2=HCl 3=H_2SO_4 4=HNO_3 5=NaOH 6=Ascorbic Acid 7=CH_3OH
8=$NaHSO_4$ 9=Deionized Water 10=H_3PO_4 11= MeOH 12=

List preservative code below: 9/11

QA/QC Reporting Notes:

DW=Drinking Water GW=Groundwater WW=Wastewater
O=Oil SW=Surface Water SO=Soil SL=Sludge A=Air
X1= X2= X3=

G=Grab C=Composite

Lab Id:	Sample Id:	Date:	Time:	Type	Matrix	Containers: # of VOA Vials	# of Amber Glass	# of Clear Glass	# of Plastic	Analyses: PCBs	RCRA 8 METALS	EPH	PAHs	VOCs	HEX CHROMIUM			
	SVA-07-0103	6/9/16	910	G	SO	3	2			X	X	X	X	X				
	SVA-08-0001		915				1			X	X							
	SVA-08-0103		920			3	2			X	X	X	X	X				
	SA-01-0103		945			3	2			X	X	X	X	X				
	M-45-0103		1045				3			X	X				X			
	M-4E-0001		1050				1			X								
	M-4E-0103		1055				1			X								
	M-4W-0103		1100				1			X								
	M-4N-0001		1110				1			X								
	M-4N-0103		1115				1			X	X							

QA/QC Reporting Level
☐ Level I ☐ Level II
☐ Level III ☐ Level IV
☐ Other _____
State-specific reporting standards:

Relinquished by:	Received by:	Date:	Time:	Temp°C
Eric Johnson	NOBIS COLD STORAGE	6/9/16	1850	5.3
James Harrington DSC	DSC	6/10/16	1200	0
subout	SUBOUT	6/10/16	1620	5.3
Tim Potter	Tim Potter	6-13-16	800	0.2

☐ EDD Format _____
☐ E-mail to _____

Condition upon receipt: Custody Seals: ☐ Present ☐ Intact ☐ Broken
☐ Ambient ☐ Iced ☑ Refrigerated ☐ DI VOA Frozen ☐ Soil Jar Frozen

6/13/16 10:45am 4.0°C / 0 / 4.0°C IR

R0526

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☐ 646 Camp Avenue, N Kingstown, RI 02852, (401) 732-3400

Special Handling:

TAT- Indicate Date Needed: ________
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- Samples disposed of after 60 days unless otherwise instructed.

Report To: NOBIS ENGINEERING

Telephone #:

Project Mgr. A. ROY / S. VETERE

Invoice To:

P.O. No.: RQN:

Project No.: 80108.04
Site Name: LAWRENCE TBA
Location: LAWRENCE State: MA
Sampler(s): EHJ, AG

1=$Na_2S_2O_3$ 2=HCl 3=H_2SO_4 4=HNO_3 5=NaOH 6=Ascorbic Acid 7=CH_3OH
8=$NaHSO_4$ 9=Deionized Water 10=H_3PO_4 11= MeOH 12=

DW=Drinking Water GW=Groundwater WW=Wastewater
O=Oil SW=Surface Water SO=Soil SL=Sludge A=Air
X1= X2= X3=

G=Grab C=Composite

List preservative code below: 9/11 (VOCs)

QA/QC Reporting Notes:

QA/QC Reporting Level: ☐ Level I ☐ Level II ☐ Level III ☐ Level IV ☐ Other ________

State-specific reporting standards:

Lab Id	Sample Id	Date	Time	Type	Matrix	# of VOA Vials	# of Amber Glass	# of Clear Glass	# of Plastic	PCBs	RCRA 8 METALS	PAHs	EPH	VOCs	QA/QC Notes
	M-4-0203	6/9/16	1130	G	SO		1			X					
	M-4-1213	↓	1135	↓	↓		1			X					
	LS-02-0102		1155				1			X	X				
	LS-02-0203		1200			3	2			X	X	X	X	X	
	~~LS-01 LS-01-0103~~		~~1300~~			~~9~~	~~4~~			~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~MS/MSD~~ EJ
	LS-01-0103		1300				1			X	X				
	LS-01-0708		1305			9	4			X	X	X	X	X	MS/MSD FOR PCBs, METALS PAHs, AND VOCs
	HA-01-0001		~~1145~~ 1120				1			X	X				
	HA-02-0001		1145				1			X	X				
	HA-03-0001	↓	1205	↓	↓		2			X	X				MS/MSD

Relinquished by:	Received by:	Date:	Time:	Temp°C
Eric Johnson	NOBIS COLD STORAGE	6/9/16	1850	5.3
James Harrington	DSC	6/10/16	1200	0
DSC	SUBOUT	6/10/16	1620	5.3
subout	[signature]	6-13-16	800	OC
[signature]	[signature]	6/13/16 10:45am		4.0/0/4.0°C IR

☐ EDD Format
☐ E-mail to

Condition upon receipt: Custody Seals: ☐ Present ☐ Intact ☐ Broken
☐ Ambient ☐ Iced ☑ Refrigerated ☑ DI VOA Frozen ☐ Soil Jar Frozen

Revised Feb 2013

R0526

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☐ 646 Camp Avenue, N Kingstown, RI 02852, (401) 732-3400

Special Handling:

TAT- Indicate Date Needed: _____
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- Samples disposed of after 60 days unless otherwise instructed.

Report To: NOBIS ENGINEERING
Telephone #:
Project Mgr. A. Roy / S. VETERE

Invoice To:
P.O. No.: RQN:

Project No.: 80108.04
Site Name: LAWRENCE TBA
Location: LAWRENCE State: MA
Sampler(s): EHJ, AG, ER

1=Na_2S2O_3 2=HCl 3=H_2SO_4 4=HNO_3 5=NaOH 6=Ascorbic Acid 7=CH_3OH
8=$NaHSO_4$ 9=Deionized Water 10=H_3PO_4 11= 12=

List preservative code below:

QA/QC Reporting Notes:

DW=Drinking Water GW=Groundwater WW=Wastewater
O=Oil SW=Surface Water SO=Soil SL=Sludge A=Air
X1= X2= X3=

G=Grab C=Composite

Lab Id:	Sample Id:	Date:	Time:	Type	Matrix	Containers: # of VOA Vials	# of Amber Glass	# of Clear Glass	# of Plastic	Analyses: PCBs	RCRA 8 METALS	QA/QC Reporting Notes
	HA-04-0001	6/9/16	1420	G	SO		1			X	X	
	HA-05-0001		1430				1			X	X	
	HA-06-0001		1440				1			X	X	
	HA-07-0001		1500				1			X	X	
	HA-08-0001		1515				2			X	X	MS/MSD
	HA-09-0001		1525				1			X	X	
	HA-10-0001		1550				1			X	X	
	HA-11-0001		1605				1			X	X	
	HA-12-0001		1630				1			X	X	
	FD-08		1125				1			X	X	

QA/QC Reporting Level
☐ Level I ☐ Level II
☐ Level III ☐ Level IV
☐ Other _____

State-specific reporting standards:

Relinquished by:	Received by:	Date:	Time:	Temp°C
Eric Johnson	NOBIS COLD STORAGE	6/9/16	1850	5.3
James Harrington DSC	DSC	6/10/16	1200	0
		6/10/16	1620	5.3
S. Vetere		6-13-16	800	02

☐ EDD Format _____
☐ E-mail to _____

Condition upon receipt: Custody Seals: ☐ Present ☐ Intact ☐ Broken
☐ Ambient ☐ Iced ☑ Refrigerated ☑ DI VOA Frozen ☐ Soil Jar Frozen

6/13/16 10:45am

4.0c/0/4.0°C IR

R0526

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☐ 646 Camp Avenue, N Kingstown, RI 02852, (401) 732-3400

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- Samples disposed of after 60 days unless otherwise instructed.

Report To: NOBIS ENGINEERING
Telephone #:
Project Mgr. A. ROY / S. VETERE

Invoice To:
P.O. No.: RQN:

Project No.: 80168.04
Site Name: LAWRENCE TBA
Location: LAWRENCE State: MA
Sampler(s): EHJ, AG, ER

1=Na_2S2O_3 2=HCl 3=H_2SO_4 4=HNO_3 5=NaOH 6=Ascorbic Acid 7=CH_3OH
8= $NaHSO_4$ 9= Deionized Water 10=H_3PO_4 11= _____ 12= _____

List preservative code below:

QA/QC Reporting Notes:

DW=Drinking Water GW=Groundwater WW=Wastewater
O=Oil SW= Surface Water SO=Soil SL=Sludge A=Air
X1= _____ X2= _____ X3= _____

G=Grab C=Composite

Lab Id:	Sample Id:	Date:	Time:	Type	Matrix	Containers: # of VOA Vials	# of Amber Glass	# of Clear Glass	# of Plastic	Analyses: PCBs	RCRA 8 METALS
	FD-09	6/9/16	1505	G	SO		1			X	X

Analyses:

QA/QC Reporting Level
☐ Level I ☐ Level II
☐ Level III ☐ Level IV
☐ Other _____
State-specific reporting standards:

Relinquished by:	Received by:	Date:	Time:	Temp°C
Emily Johnson	NOBIS COLD STORAGE	6/9/16	1850	5.3
James Hamilton DSR	DSR	6/10/16	1200	0
		6/10/16	1670	5.3
submit	Tim Sutton	6-13-16	800	0C
Tim Sutton	Scott A Bot	6/13/16	10:45 am	4.0C/0/4.0C IR

☐ EDD Format _____
☐ E-mail to _____

Condition upon receipt: Custody Seals: ☐ Present ☐ Intact ☐ Broken
☐ Ambient ☐ Iced ☑ Refrigerated ☑ DI VOA Frozen ☐ Soil Jar Frozen

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Nobis
Engineering a Sustainable Future

July 7, 2016
Nobis File No. 80108

Mr. Alan Peterson
EPA-New England Region I
5 Post Office Square
Suite 100, Mailcode OSRR07-4
Boston, MA 02109-3912

Re: Contract No.: EP-S1-06-03
Task Order No. 0108-SI-BZ-0100
Case No. 0163S, Laboratory Report No.: R0530
Eurofins Spectrum Analytical, North Kingston, Rhode Island
Former Tombarello Property
Lawrence, Massachusetts

Tier 1 Modified Organic and Inorganic Data Review

VOCs, PAHs, EPH, PCBs, and Metals:
22/Soils: See attached sample ID list
1/Soil Trip Blank: TB-01

Dear Mr. Peterson:

Nobis Engineering, Inc. performed a Tier 1 Modified data review on the organic and inorganic analytical data for the samples listed in the attached sample listing. The samples were collected by Nobis at the Former Tombarello Property located in Lawrence, Massachusetts. The samples were analyzed for volatile organic compounds (VOCs), polycyclic aromatic hydrocarbons (PAHs), Resource Conservation and Recovery Act (RCRA) metals, extractable petroleum hydrocarbons (EPH), and polychlorinated biphenyls (PCBs). See the included Data Summary Table and chain-of-custody for samples selected for each analysis. The laboratory performed testing according to Massachusetts Contingency Plan (MCP) Compendium of Analytical Methods (CAM) and to Nobis technical specification RAC2-087.

The Tier 1 Modified data review was performed in accordance with the EPA New England Environmental Data Review Supplement for Regional Data Review Elements and Superfund Specific Guidance/Procedures (April 2013); USEPA National Functional Guidelines for Inorganic Superfund Data Review (August 2014); USEPA National Functional Guidelines for Superfund Organic Methods Data Review (August 2014) and the Field Task Work Plan (FTWP) and Quality Assurance Project Plan Addendum (QAPPA) for the Targeted Brownfields Assessment (TBA) for the Former Tombarello Property (June 2016).

The data were evaluated based on the following parameters:

* • Overall Evaluation of Data and Potential Usability Issues
* • Data Completeness
• Preservation and Technical Holding Times

Nobis Engineering, Inc.
585 Middlesex Street
Lowell, MA 01851
T (978) 683-0891

*	•	Instrument Calibration
*	•	Blanks
*	•	Laboratory Control Samples (LCS)
	•	Laboratory Duplicates
NA	•	Field Duplicates
*	•	Matrix Spike Analysis
	•	Surrogate Compounds
	•	Internal Standards
NA	•	Performance Evaluation Sample Results
*	•	Reported Quantitation Limits

* All criteria were met for this parameter.
NA – Not applicable.

Overall Evaluation of Data and Potential Usability Issues
The objectives of the investigation activities at the site are to delineate the nature and extent of soil and groundwater contamination on the Site so that potential remedial alternatives can be evaluated and order-of-magnitude cost estimates can be developed. Analytical and hydrogeological data collected during the investigation will be compiled and reduced to develop a conceptual site model to support the estimation of human health risks and development of remedial alternatives.

The data meet the project quality criteria and can be used without restriction except as summarized below. The attachments provide details and supporting documentation.

VOCs:
Results did not require qualification.

PAHs:
PAH results were qualified as estimated due to internal standard area criteria non-conformance and holding time exceedance on a re-extraction due to surrogate recovery exceedance.

EPH:
Results did not require qualification.

PCBs:
Results were qualified as estimated for surrogate spike recovery failures.

Metals:
Results were qualified for laboratory duplicate imprecision.

Please contact Gail DeRuzzo at (978) 703-6021 or gderuzzo@nobiseng.com should you have any questions or comments regarding this information.

Sincerely,

NOBIS ENGINEERING, INC.

Gail DeRuzzo
Lead Chemist

Tables: Data Summary Table – Tier 1 Mod Data Review
Data Qualification Actions Table

Attachments: Sample ID List
Data Review Checklist
COCs

DATA SUMMARY TABLE

Lab Sample ID	R0530-01	R0530-02	R0530-03	R0530-04	R0530-05	R0530-06	R0530-07	R0530-08	R0530-10	R0530-11	R0530-12	R0530-13
Field Sample ID	MS-02-0102	MS-02-0203	NPA-07-0.502	NPA-07-0203	MS-03-0102	MS-03-0203	MS-01-0102	MS-01-0203	NPA-06-0.502	NPA-06-0203	NPA-05-0.502	NPA-05-0203
Sample Location	MS-02	MS-02	NPA-07	NPA-07	MS-03	MS-03	MS-01	MS-01	NPA-06	NPA-06	NPA-05	NPA-05
Sample Date	06/10/16	06/10/16	06/10/16	06/10/16	06/10/16	06/10/16	06/10/16	06/10/16	06/10/16	06/10/16	06/10/16	06/10/16
PCBs (ug/kg)												
Aroclor 1016	6900 U	360 U	360 U	34 U	35 U	36 U	33 U	38 U	370 U	38 UJ	75 U	38 UJ
Aroclor 1221	6900 U	360 U	360 U	34 U	35 U	36 U	33 U	38 U	370 U	38 UJ	75 U	38 UJ
Aroclor 1232	6900 U	360 U	360 U	34 U	35 U	36 U	33 U	38 U	370 U	38 UJ	75 U	38 UJ
Aroclor 1242	6900 U	360 U	360 U	34 U	35 U	36 U	33 U	38 U	370 U	38 UJ	75 U	38 UJ
Aroclor 1248	13000	1300	1400	34 U	230	340	29 J	230	620	38 UJ	99	38 UJ
Aroclor 1254	6900 U	360 U	360 U	34 U	35 U	36 U	33 U	38 U	370 U	38 UJ	75 U	38 UJ
Aroclor 1260	3400 J	3300	360 U	92	92	120	38	74	1500	38 UJ	75 U	450 J
Aroclor 1262	6900 U	360 U	360 U	34 U	35 U	36 U	33 U	38 U	370 U	38 UJ	75 U	38 UJ
Aroclor 1268	6900 U	360 U	360 U	34 U	35 U	36 U	33 U	38 U	370 U	38 UJ	75 U	38 UJ

U – not detected; J – estimated value; UJ – not detected, reporting limit estimated; R – rejected

DATA SUMMARY TABLE

Lab Sample ID	R0530-14	R0530-15	R0530-16	R0530-17	R0530-18	R0530-19	R0530-20	R0530-21
Field Sample ID	NPA-04-0.502	NPA-04-0203	NPA-03-0.502	NPA-03-0203	NPA-01-0.502	NPA-01-0203	NPA-02-0.502	NPA-02-0203
Sample Location	NPA-04	NPA-04	NPA-03	NPA-03	NPA-01	NPA-01	NPA-02	NPA-02
Sample Date	06/10/16	06/10/16	06/10/16	06/10/16	06/10/16	06/10/16	06/10/16	06/10/16
PCBs (ug/kg)								
Aroclor 1016	35 U	36 UJ	350 U	37 U	71 U	37 U	37 U	7200 U
Aroclor 1221	35 U	36 UJ	350 U	37 U	71 U	37 U	37 U	7200 U
Aroclor 1232	35 U	36 UJ	350 U	37 U	71 U	37 U	37 U	7200 U
Aroclor 1242	35 U	36 UJ	350 U	37 U	71 U	37 U	37 U	7200 U
Aroclor 1248	32 J	36 UJ	350 U	37 U	210	37 U	130	7100 J
Aroclor 1254	35 U	36 UJ	350 U	37 U	71 U	37 U	37 U	7200 U
Aroclor 1260	35 U	26 J	250 J	37 U	71 U	44	37 U	7200 U
Aroclor 1262	35 U	36 UJ	350 U	37 U	71 U	37 U	37 U	7200 U
Aroclor 1268	35 U	36 UJ	350 U	37 U	71 U	37 U	37 U	7200 U

U – not detected; J – estimated value; UJ – not detected, reporting limit estimated; R – rejected

DATA SUMMARY TABLE

Lab Sample ID	R0530-01	R0530-02	R0530-03	R0530-04	R0530-05	R0530-06	R0530-07	R0530-08	R0530-10	R0530-11	R0530-12	R0530-13
Field Sample ID	MS-02-0102	MS-02-0203	NPA-07-0.502	NPA-07-0203	MS-03-0102	MS-03-0203	MS-01-0102	MS-01-0203	NPA-06-0.502	NPA-06-0203	NPA-05-0.502	NPA-05-0203
Sample Location	MS-02	MS-02	NPA-07	NPA-07	MS-03	MS-03	MS-01	MS-01	NPA-06	NPA-06	NPA-05	NPA-05
Sample Date	06/10/16	06/10/16	06/10/16	06/10/16	06/10/16	06/10/16	06/10/16	06/10/16	06/10/16	06/10/16	06/10/16	06/10/16
Metals (mg/kg)												
Arsenic	8.7	8.9	8.4	9.9	8.1	8.3	9.4	9.6	18	9.8	8.6	13
Barium	120	210	120	140	130	110	190	85	140	450	97	66
Cadmium	2	4.9	1.3	0.45	2	1.4	0.37	1	0.74	5.8	0.62	9
Chromium	45	45	32	22	21	26	44	26	56	43	15	25
Lead	160	490	450	710	190	210	230	190	320	750	270	370
Mercury	0.21	0.38	1.3	0.5	0.11	0.18	0.076	1.2	0.32	0.22	0.31	0.95
Selenium	1 J	0.79 J	1.5 U	0.52 J	0.71 J	0.78 J	0.88 J	1.1 J	2	1.3 U	1.6 U	0.68 J
Silver	0.32 J	0.13 J	0.1 J	0.12 J	1.5 U	0.078 J	1.4 U	1.3 U	0.18 J	0.15 J	1.6 U	0.21 J

U – not detected; J – estimated value; UJ – not detected, reporting limit estimated; R – rejected

DATA SUMMARY TABLE

Lab Sample ID	R0530-14	R0530-15	R0530-16	R0530-17	R0530-18	R0530-19	R0530-20	R0530-21
Field Sample ID	NPA-04-0.502	NPA-04-0203	NPA-03-0.502	NPA-03-0203	NPA-01-0.502	NPA-01-0203	NPA-02-0.502	NPA-02-0203
Sample Location	NPA-04	NPA-04	NPA-03	NPA-03	NPA-01	NPA-01	NPA-02	NPA-02
Sample Date	06/10/16	06/10/16	06/10/16	06/10/16	06/10/16	06/10/16	06/10/16	06/10/16
Metals (mg/kg)								
Arsenic	7	8.5	9.3	4.9	5.1	8.9	6.2 J	8.4 J
Barium	65	39	91	91	87	32	58	49
Cadmium	0.46	1.1	0.33	0.19 J	0.61	0.2	0.63	0.15 J
Chromium	26	15	32	10	18	13	21	17
Lead	450	250	390	600	350	100	230	160
Mercury	0.37	0.15	0.18	0.21	0.83	0.27	0.12	0.12
Selenium	1.3 U	1.4 U	1.3 J	1.5 U	0.83 J	0.73 J	0.75 J	1.4 U
Silver	1.3 U	1.4 U	1.4 U	1.5 U	1.2 U	1 U	1.4 U	1.4 U

U – not detected; J – estimated value; UJ – not detected, reporting limit estimated; R – rejected

DATA SUMMARY TABLE

Lab Sample ID	R0530-09	R0530-22	R0530-23
Field Sample ID	MS-01-1213	NPA-02-0607	TB-01
Sample Location	MS-01	NPA-02	Trip Blank
Sample Date	06/10/16	06/10/16	06/10/16
Volatiles (ug/kg)			
1,1,1,2-Tetrachloroethane	4.5 U	4.2 U	5 U
1,1,1-Trichloroethane	4.5 U	4.2 U	5 U
1,1,2,2-Tetrachloroethane	4.5 U	4.2 U	5 U
1,1,2-Trichloroethane	4.5 U	4.2 U	5 U
1,1-Dichloroethane	4.5 U	4.2 U	5 U
1,1-Dichloroethene	4.5 U	4.2 U	5 U
1,1-Dichloropropene	4.5 U	4.2 U	5 U
1,2,3-Trichlorobenzene	4.5 U	4.2 U	5 U
1,2,3-Trichloropropane	4.5 U	4.2 U	5 U
1,2,4-Trichlorobenzene	4.5 U	4.2 U	5 U
1,2,4-Trimethylbenzene	4.5 U	4.2 U	5 U
1,2-Dibromo-3-chloropropane	4.5 U	4.2 U	5 U
1,2-Dibromoethane	4.5 U	4.2 U	5 U
1,2-Dichlorobenzene	4.5 U	4.2 U	5 U
1,2-Dichloroethane	4.5 U	4.2 U	5 U
1,2-Dichloropropane	4.5 U	4.2 U	5 U
1,3,5-Trimethylbenzene	4.5 U	4.2 U	5 U
1,3-Dichlorobenzene	4.5 U	4.2 U	5 U
1,3-Dichloropropane	4.5 U	4.2 U	5 U
1,4-Dichlorobenzene	4.5 U	4.2 U	5 U
1,4-Dioxane	91 U	83 U	100 U
2,2-Dichloropropane	4.5 U	4.2 U	5 U
2-Butanone	4.5 U	4.2 U	5 U
2-Chlorotoluene	4.5 U	4.2 U	5 U
2-Hexanone	4.5 U	4.2 U	5 U
4-Chlorotoluene	4.5 U	4.2 U	5 U
4-Isopropyltoluene	4.5 U	4.2 U	5 U
4-Methyl-2-pentanone	4.5 U	4.2 U	5 U
Acetone	4.5 U	4.2 U	5 U
Benzene	4.5 U	4.2 U	5 U
Bromobenzene	4.5 U	4.2 U	5 U

U – not detected; J – estimated value; UJ – not detected, reporting limit estimated; R – rejected

DATA SUMMARY TABLE

Lab Sample ID	R0530-09	R0530-22	R0530-23
Field Sample ID	MS-01-1213	NPA-02-0607	TB-01
Sample Location	MS-01	NPA-02	Trip Blank
Sample Date	06/10/16	06/10/16	06/10/16
Bromochloromethane	4.5 U	4.2 U	5 U
Bromodichloromethane	4.5 U	4.2 U	5 U
Bromoform	4.5 U	4.2 U	5 U
Bromomethane	4.5 U	4.2 U	5 U
Carbon disulfide	4.5 U	4.2 U	5 U
Carbon tetrachloride	4.5 U	4.2 U	5 U
Chlorobenzene	4.5 U	4.2 U	5 U
Chloroethane	4.5 U	4.2 U	5 U
Chloroform	4.5 U	4.2 U	5 U
Chloromethane	4.5 U	4.2 U	5 U
cis-1,2-Dichloroethene	4.5 U	0.89 J	5 U
cis-1,3-Dichloropropene	4.5 U	4.2 U	5 U
Dibromochloromethane	4.5 U	4.2 U	5 U
Dibromomethane	4.5 U	4.2 U	5 U
Dichlorodifluoromethane	4.5 U	4.2 U	5 U
Diethyl ether	4.5 U	4.2 U	5 U
Diisopropyl Ether	4.5 U	4.2 U	5 U
Ethylbenzene	4.5 U	4.2 U	5 U
Hexachlorobutadiene	4.5 U	4.2 U	5 U
Isopropylbenzene	4.5 U	4.2 U	5 U
m,p-Xylene	4.5 U	4.2 U	5 U
Methyl tert-butyl ether	4.5 U	4.2 U	5 U
Methylene chloride	4.5 U	4.2 U	5 U
Naphthalene	4.5 U	4.2 U	5 U
n-Butylbenzene	4.5 U	4.2 U	5 U
n-Propylbenzene	4.5 U	4.2 U	5 U
o-Xylene	4.5 U	4.2 U	5 U
sec-Butylbenzene	4.5 U	4.2 U	5 U
Styrene	4.5 U	4.2 U	5 U
tert-Amyl methyl ether	4.5 U	4.2 U	5 U
Tert-Butyl Ethyl Ether	4.5 U	4.2 U	5 U
tert-Butylbenzene	4.5 U	4.2 U	5 U

U – not detected; J – estimated value; UJ – not detected, reporting limit estimated; R – rejected

DATA SUMMARY TABLE

Lab Sample ID	R0530-09	R0530-22	R0530-23
Field Sample ID	MS-01-1213	NPA-02-0607	TB-01
Sample Location	MS-01	NPA-02	Trip Blank
Sample Date	06/10/16	06/10/16	06/10/16
Tetrachloroethene	4.5 U	4.2 U	5 U
Tetrahydrofuran	9.1 U	8.3 U	10 U
Toluene	4.5 U	4.2 U	5 U
trans-1,2-Dichloroethene	4.5 U	4.2 U	5 U
trans-1,3-Dichloropropene	4.5 U	4.2 U	5 U
Trichloroethene	4.5 U	1.8 J	5 U
Trichlorofluoromethane	4.5 U	4.2 U	5 U
Vinyl chloride	4.5 U	4.2 U	5 U
Xylene (total)	4.5 U	4.2 U	5 U

U – not detected; J – estimated value; UJ – not detected, reporting limit estimated; R – rejected

DATA SUMMARY TABLE

Lab Sample ID	R0530-02	R0530-03	R0530-08	R0530-10	R0530-12	R0530-15	R0530-16	R0530-18
Field Sample ID	MS-02-0203	NPA-07-0.502	MS-01-0203	NPA-06-0.502	NPA-05-0.502	NPA-04-0203	NPA-03-0.502	NPA-01-0.502
Sample Location	MS-02	NPA-07	MS-01	NPA-06	NPA-05	NPA-04	NPA-03	NPA-01
Sample Date	06/10/16	06/10/16	06/10/16	06/10/16	06/10/16	06/10/16	06/10/16	06/10/16
PAHs (ug/kg)								
2-Methylnaphthalene	360 J	360 U	120 J	24000 J	1200	370	35000 U	1400 U
Acenaphthene	1800	110 J	520	59000 J	5900	1400	25000 J	370 J
Acenaphthylene	370	230 J	210 J	71000 U	830	410	35000 U	560 J
Anthracene	6800	480	1700	160000	15000	4900	58000	1200 J
Benzo(a)anthracene	12000	1400	3600	280000	29000	11000	120000	3400 J
Benzo(a)pyrene	12000	1500	3400	250000	24000	10000	100000	3300 J
Benzo(b)fluoranthene	15000	1900	4600	330000	32000	12000	130000	4400 J
Benzo(g,h,i)perylene	7200	1100	2000	110000	12000	4900	44000	1700 J
Benzo(k)fluoranthene	4000 J	900	1800	130000	5900	4800	61000	1800 J
Chrysene	11000	1400	3300	250000	28000	10000	120000	3000 J
Dibenz(a,h)anthracene	1800 J	280 J	530	36000 J	4400	1700	16000 J	480 J
Fluoranthene	30000	2800	8500	750000	68000	23000	280000	8000 J
Fluorene	2500	150 J	670	68000 J	7200 J	2100	27000 J	410 J
Indeno(1,2,3-cd)pyrene	8200	990	2100	130000	15000	5400	51000	1900 J
Naphthalene	470	360 U	200 J	39000 J	2100	760	35000 U	1400 U
Phenanthrene	22000	1800	5700	660000	58000	15000	230000	4300 J
Pyrene	20000	2400	5800	480000	46000	15000	200000	4900 J

U – not detected; J – estimated value; UJ – not detected, reporting limit estimated; R – rejected

DATA SUMMARY TABLE

Lab Sample ID	R0530-02
Field Sample ID	MS-02-0203
Sample Location	MS-02
Sample Date	06/10/16
EPH (mg/kg)	
2-Methylnaphthalene	1.79 U
Acenaphthene	1.79 U
Acenaphthylene	1.79 U
Anthracene	6.48
Benzo(a)anthracene	13.9
Benzo(a)pyrene	13.1
Benzo(b)fluoranthene	7.31
Benzo(g,h,i)perylene	8.3
Benzo(k)fluoranthene	10.1
C11-C22 Aromatics	347
C19-C36 Aliphatics	53.8 U
C9-C18 Aliphatics	53.8 U
Chrysene	11.8
Dibenz(a,h)anthracene	2.11
Fluoranthene	29.5
Fluorene	2.37
Indeno(1,2,3-cd)pyrene	7.48
Naphthalene	1.79 U
Phenanthrene	22.9
Pyrene	23.1

Data Review Qualification Actions

Case: 0163S

SDG: R0530

Parameter	Analyte	Samples: R0530-#	Evaluation Criteria	Action Needed	Comments
Metals	Chromium and Lead	01-08, 10-21	Lab Blank	Remove B	result >RL
Metals	Arsenic	20, 21	Lab Dup	J	RPD > 20%
PAHs	All positive results	18RE (NPA-01-0.502)	HT	J	re-extracted 3 days outside HT. Original analysis in HT. Re-extracted due to surrogate issues.
PAHs	Benzo(k)fluoranthene, Dibenzo(a,h)anthracene	02 (MS-02-0203)	ISTD	J	undiluted run only.
PCBs	All aroclors	11, 13, 15	surrogates	J/UJ	low recoveries

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☑ Final Report
☐ Re-Issued Report
☐ Revised Report
Report Date:
01-Jul-16 11:09

Laboratory Report

Nobis Engineering, Inc
585 Middlesex Street
Lowell, MA 01851

Work Order: R0530
Project : Lawrence, MA site
Project #:

Attn: Gail DeRuzzo

Laboratory ID	Client Sample ID	Matrix	Date Sampled	Date Received
R0530-01	MS-02-0102	Soil	10-Jun-16 08:00	14-Jun-16 11:03
R0530-02	MS-02-0203	Soil	10-Jun-16 08:05	14-Jun-16 11:03
R0530-03	NPA-07-0.502	Soil	10-Jun-16 08:15	14-Jun-16 11:03
R0530-04	NPA-07-0203	Soil	10-Jun-16 08:20	14-Jun-16 11:03
R0530-05	MS-03-0102	Soil	10-Jun-16 08:45	14-Jun-16 11:03
R0530-06	MS-03-0203	Soil	10-Jun-16 08:50	14-Jun-16 11:03
R0530-07	MS-01-0102	Soil	10-Jun-16 09:05	14-Jun-16 11:03
R0530-08	MS-01-0203	Soil	10-Jun-16 09:10	14-Jun-16 11:03
R0530-09	MS-01-1213	Soil	10-Jun-16 09:15	14-Jun-16 11:03
R0530-10	NPA-06-0.502	Soil	10-Jun-16 10:00	14-Jun-16 11:03
R0530-11	NPA-06-0203	Soil	10-Jun-16 10:05	14-Jun-16 11:03
R0530-12	NPA-05-0.502	Soil	10-Jun-16 10:10	14-Jun-16 11:03
R0530-13	NPA-05-0203	Soil	10-Jun-16 10:15	14-Jun-16 11:03
R0530-14	NPA-04-0.502	Soil	10-Jun-16 10:20	14-Jun-16 11:03
R0530-15	NPA-04-0203	Soil	10-Jun-16 10:25	14-Jun-16 11:03
R0530-16	NPA-03-0.502	Soil	10-Jun-16 10:40	14-Jun-16 11:03
R0530-17	NPA-03-0203	Soil	10-Jun-16 10:45	14-Jun-16 11:03
R0530-18	NPA-01-0.502	Soil	10-Jun-16 10:55	14-Jun-16 11:03
R0530-19	NPA-01-0203	Soil	10-Jun-16 11:00	14-Jun-16 11:03
R0530-20	NPA-02-0.502	Soil	10-Jun-16 11:20	14-Jun-16 11:03
R0530-21	NPA-02-0203	Soil	10-Jun-16 11:25	14-Jun-16 11:03
R0530-22	NPA-02-0607	Soil	10-Jun-16 11:30	14-Jun-16 11:03
R0530-23	TB-01	Soil	10-Jun-16 08:00	14-Jun-16 11:03

I attest that the information contained within the report has been reviewed for accuracy and checked against the quality control requirements for each method. The results relate only to the samples(s) as received. This report may not be reproduced, except in full, without written approval from Eurofins Spectrum Analytical, Inc.

All applicable NELAC or USEPA CLP requirements have been met.

Use of the NELAP logo does not insure that Eurofins Spectrum Analytical is currently accredited for the specific test method or analyte. Please refer to our Quality page of our web site at www.spectrum-analytical.com for the current list of certifications and fields of accreditation.

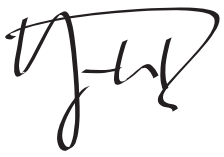
Please contact the Laboratory or Technical Director at 401-732-3400 with any questions regarding the data contained in the laboratory report.

Connecticut	PH-0153
Florida	E87664
Massachusetts	M-RI907
New Hampshire	2060
New Jersey	RI001
New York	11522
Rhode Island	LAI00349
USDA	P330-16-00031
USEPA - ISM	EP-W-14-032
USEPA - SOM	EP-W-14-032
Dod ELAP	L2247

NELAP ACCREDITED TNI LABORATORY

LABORATORY ACCREDITATION BUREAU ACCREDITED
Certificate # L2247 Testing

Authorized by:



Yihai Ding
Laboratory Director

Engineering a Sustainable Future

Generic Data Review Checklist

Project: **Lawrence**
Project #: **80108**
Case#: **0163S**
Date: **7/7/16**
Methods: **VOCs-8260, PAHs – 8270, EPH plus targets, PCBs 8082, RCRA metals 6010, 7471/, Hex Cr – 7196A (3060A), Cyanide and PAC 9012 – MCP methods**
Laboratory: **Eurofins Spectrum Analytical**
SDG: **see below**
Reviewer: **Gail DeRuzzo**

1. **Case Narrative and Data Package Completeness (COC and Analyte List Review)**

SOILS:	GW:	IDW:
R0508 – 38 soils	R0536 – 4 GW	R0562
R0516 – 43 soils	R0545 – 3 GW	1 SO/1 AQ
R0521 – 33 soils	R0561 – 2 GW	not evaluated
R0526 – 40 soils		
R0530 – 22 soils + TB		
R0545 – 18 soils + TB		
R0555 – 20 soils		
R0561 – 4 soils		

Sample IDs printed separately.

2. **Holding Time and Sample Preservation Compliance**

PAHs: NPA-07-0.502 (R0530-03ARE) exceed by 3 Days – J – not reporting; Reporting first set only.
NPA-01-0.502 (R0530-18ARE) exceed by 3 Days J positive results. (Note: QC samples for this batch not shown in the report.)
Please note these samples were initially extracted within holding times. They were re-extracted due to surrogate failures. Both sets of data are included.

3. **Lab and Field Blanks**
VOCs: TB ND

Cr (.02016 (RL 1)), Pb (.2822 (RL .5)) batch 84852 – samples (1-8, 10-21); – B flag data >RL – remove B's

4. **Laboratory Control Samples**
VOCs: LCSD batch 84798 recovery high for 1,4-dioxane – samples ND – no action.

EPH:
C9-C18 aliphatic RPD (29% vs 25) – recoveries in control, no action.

5. **Field Duplicate Precision**
NA

6. Laboratory Duplicate Precision

Metals:

NPA-02-0203 (R0530-21) As exceeds %RPD J/UJ (samples 20, 21, 22)

7. Matrix Spikes

ok

8. Surrogate Spikes

PAHs:

NPA-07-0.502 (R0530-03A), recovery is below criteria for 2-Fluorobiphenyl at 28% with criteria of (45-105), Nitrobenzene-d5 at 26% with criteria of (35-100) and Terphenyl-d14 at 28% with criteria of (30-125). J-/UJ. Note: sample was re-extracted outside of HT with similar results. Report first set of results only.

NPA-04-0203 (R0530-15A), recovery is below criteria for 2-Fluorobiphenyl at 44% with criteria of (45-105). Most compounds reporting from diluted run. Only out by 1 %. No action.

NPA-01-0.502 (R0530-18A), recovery is below criteria for 2-Fluorobiphenyl at 30% with criteria of (45-105) and Nitrobenzene-d5 at 26% with criteria of (35-100). Sample re-extracted outside HT and reanalyzed with dilution to eliminate the matrix issues. Report re-extraction.

PCBs:

NPA-06-0203 (R0530-11A), recovery is above criteria for Decachlorobiphenyl on rear column at 166% with criteria of (60-125), recovery is below criteria for and Decachlorobiphenyl on front column at 46% with criteria of (60-125). J/UJ

NPA-05-0203 (R0530-13A), recovery is above criteria for Decachlorobiphenyl on rear column at 294% with criteria of (60-125), recovery is below criteria for and Decachlorobiphenyl on front column at 39% with criteria of (60-125). J/UJ

NPA-04-0203 (R0530-15A), recovery is below criteria for Decachlorobiphenyl on rear column at 60% with criteria of (60-125) and Decachlorobiphenyl on front column at 60% with criteria of (60-125). J/UJ

NPA-02-0.502 (R0530-20A), recovery is above criteria for Decachlorobiphenyl on rear column at 343% with criteria of (60-125). Not reported – no action.

9. Internal Standards

PAHs:

MS-02-0203 (R0530-02A), Peak area is outside QC Limits for Perylene-d12. Please note the internal standard peak areas were within the QC limits in the dilution analysis. Benzo(k)fluoranthene, Dibenzo(a,h)anthracene, J/UJ in un-diluted run.

10. Performance Evaluation Samples

NA

11. Reporting Limits

PAHs:

MS-02-0203 (R0530-02ADL) : Dilution Factor: 10
NPA-07-0.502 (R0530-03ARE) : Dilution Factor: 5
MS-01-0203 (R0530-08ADL) : Dilution Factor: 4
NPA-06-0.502 (R0530-10A) : Dilution Factor: 200
NPA-05-0.502 (R0530-12ADL) : Dilution Factor: 20
NPA-04-0203 (R0530-15ADL) : Dilution Factor: 10
NPA-03-0.502 (R0530-16A) : Dilution Factor: 100
NPA-01-0.502 (R0530-18ARE) : Dilution Factor: 4

PCBs:

MS-02-0102 (R0530-01A) : Dilution Factor: 200
MS-02-0203 (R0530-02A) : Dilution Factor: 10
NPA-07-0.502 (R0530-03A) : Dilution Factor: 10
NPA-06-0.502 (R0530-10A) : Dilution Factor: 10
NPA-05-0.502 (R0530-12A) : Dilution Factor: 2
NPA-03-0.502 (R0530-16A) : Dilution Factor: 10
NPA-01-0.502 (R0530-18A) : Dilution Factor: 2
NPA-02-0203 (R0530-21A) : Dilution Factor: 200

12. Calibration Issues

ok

13. Other

Analyte lists and RLs were verified per the FTWP/QAPPA.

R0530

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CHAIN OF CUSTODY RECORD

Page 1 of 3

Special Handling:

☐ Standard TAT - 7 to 10 business days

☐ Rush TAT - Date Needed: _____

All TATs subject to laboratory approval
Min. 24-hr notification needed for rushes
Samples disposed after 60 days unless otherwise instructed.

Report To: NOBIS ENGINEERING

Invoice To: _____

Project No: 80108.04

Site Name: LAWRENCE TBA

Location: LAWRENCE State: MA

Sampler(s): EHJ, AG

Telephone #:

Project Mgr: A. ROY / S. VETERE

P.O No.: _____ Quote #: _____

F=Field Filtered 1=Na_2S2O_3 2=HCl 3=H_2SO_4 4=HNO_3 5=NaOH 6=Ascorbic Acid
7=CH3OH 8=$NaHSO_4$ 9=Deionized Water 10=H_3PO_4 11= MeOH 12= _____

List Preservative Code below: 9/11

QA/QC Reporting Notes:
* additional charges may appply

DW=Dinking Water GW=Groundwater SW=Surface Water WW=Waste Water
O=Oil SO=Soil SL=Sludge A=Indoor/Ambient Air SG=Soil Gas
X1= _____ X2= _____ X3= _____

G= Grab C=Compsite

Lab ID:	Sample ID:	Date:	Time:	Type	Matrix	Containers: # of VOA Vials	# of Amber Glass	# of Clear Glass	# of Plastic	Analysis: PCBs	RCRA 8 METALS	PAHs	EPH	VOCs				Check if chlorinated	
	MS-02-0102	6/10/16	800	G	SO		1			X	X							☐	
	MS-02-0203		805				2			X	X	X	X					☐	
	NPA-07-0.502		815				2			X	X	X						☐	
	NPA-07-0203		820				1			X	X							☐	
	MS-03-0102		845				1			X	X							☐	
	MS-03-0203		850				1			X	X							☐	
	MS-01-0102		905				1			X	X							☐	
	MS-01-0203		910				2			X	X	X						☐	
	MS-01-1213		915			3								X				☐	
	NPA-06-0.502		1000				2			X	X	X						☐	

MA DEP MCP CAM Report? ☐ Yes ☐ No
CT DPH RCP Report? ☐ Yes ☐ No
☐ Standard ☐ No QC ☐ DQA*
☐ ASP A* ☐ ASP B*
☐ NJ Reduced* ☐ NJ Full*
☐ Tier II* ☐ Tier IV*
☐ Other: _____
State-specific reporting standards:

Relinquished by:	Received by:	Date:	Time:
	Nobis Fridge	6/10/16	16:25
	DSC	6/13/16	13:4
DSC	SUBOUT	6/13/16	
DSC 107476 8:25		6/14/16	11:03

Temp °C: Observed 1.4; Correction Factor 0; Corrected 1.4; IR ID # 01

☐ EDD format: _____

☐ E-mail to: _____

Condition upon receipt: Custody Seals: ☐ Present ☐ Intact ☐ Broken

☐ Ambient ☐ Iced ☒ Refrigerated ☒ DI VOA Frozen ☐ Soil Jar Frozen

Sample shipping address: 11 Almgren Drive • Agawam, MA 01001 • 413-789-9018 • www.EurofinsUS.com/Spectrum

2.0°C IR

Rev. Sep 2015

R0530

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CHAIN OF CUSTODY RECORD

Page 2 of 3

Special Handling:

☐ Standard TAT - 7 to 10 business days

☐ Rush TAT - Date Needed: _____

All TATs subject to laboratory approval
Min. 24-hr notification needed for rushes
Samples disposed after 60 days unless otherwise instructed.

Report To: NOBIS ENGINEERING

Telephone #:

Project Mgr: A. ROY / S. VETERE

Invoice To:

P.O No.: _____ Quote #: _____

Project No: 80108.04

Site Name: LAWRENCE TBA

Location: LAWRENCE State: MA

Sampler(s): EJ
AG

F=Field Filtered 1=Na_2S2O_3 2=HCl 3=H_2SO_4 4=HNO_3 5=NaOH 6=Ascorbic Acid
7=CH_3OH 8=$NaHSO_4$ 9=Deionized Water 10=H_3PO_4 11=_____ 12=_____

List Preservative Code below:

QA/QC Reporting Notes:
* additional charges may appply

DW=Dinking Water GW=Groundwater SW=Surface Water WW=Waste Water
O=Oil SO=Soil SL=Sludge A=Indoor/Ambient Air SG=Soil Gas
X1=_____ X2=_____ X3=_____

G= Grab C=Compsite

Lab ID:	Sample ID:	Date:	Time:	Type	Matrix	Containers: # of VOA Vials	# of Amber Glass	# of Clear Glass	# of Plastic	Analysis: PCBs	RCRA 8 METALS	PAHs	Check if chlorinated
	NPA-06-0203	6/10/16	1005	G	SO		1			X	X		☐
	NPA-05-0.5O2		1010				2			X	X	X	☐
	NPA-05-0203		1015				1			X	X		☐
	NPA-04-0.502		1020				1			X	X		☐
	NPA-04-0203		1025				2			X	X	X	☐
	NPA-03-0.502		1040				2			X	X	X	☐
	NPA-03-0203		1045				1			X	X		☐
	NPA-01-0.502		1055				2			X	X	X	☐
	NPA-01-0203		1100				1			X	X		☐
	NPA-02-0.502		1120				1			X	X		☐

MA DEP MCP CAM Report? ☐ Yes ☐ No
CT DPH RCP Report? ☐ Yes ☐ No
☐ Standard ☐ No QC ☐ DQA*
☐ ASP A* ☐ ASP B*
☐ NJ Reduced* ☐ NJ Full*
☐ Tier II* ☐ Tier IV*
☐ Other: _____
State-specific reporting standards:

Relinquished by:	Received by:	Date:	Time:	Temp °C
	Nobis fridge	6/10/16	10:30	Observed 1.4
	DSC	6/13/16	1314	Correction Factor 0
	SUBCAT	6/13/16		Corrected 1.4
8:25		6/14/16	11:03	IR ID# 01

☐ EDD format: _____

☐ E-mail to: _____

Condition upon receipt: Custody Seals: ☐ Present ☐ Intact ☐ Broken

☐ Ambient ☐ Iced ☒ Refrigerated ☐ DI VOA Frozen ☐ Soil Jar Frozen

Sample shipping address: 11 Almgren Drive • Agawam, MA 01001 • 413-789-9018 • www.EurofinsUS.com/Spectrum

2.0°C IR

Rev. Sep 2015

R0530

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CHAIN OF CUSTODY RECORD

Page 3 of 3

Special Handling:

☐ Standard TAT - 7 to 10 business days

☐ Rush TAT - Date Needed: _____

All TATs subject to laboratory approval
Min. 24-hr notification needed for rushes
Samples disposed after 60 days unless otherwise instructed.

Report To: NOBIS ENGINEERING

Invoice To:

Project No: 80108.04

Site Name: LAWRENCE TBA

Location: LAWRENCE State: MA

Sampler(s): EJ / AG

Telephone #:

Project Mgr: A. ROY / S. VETERE

P.O No.: Quote #:

F=Field Filtered 1=Na_2S2O_3 2=HCl 3=H_2SO_4 4=HNO_3 5=NaOH 6=Ascorbic Acid
7=CH3OH 8=$NaHSO_4$ 9=Deionized Water 10=H_3PO_4 11= MeOH 12=

DW=Dinking Water GW=Groundwater SW=Surface Water WW=Waste Water
O=Oil SO=Soil SL=Sludge A=Indoor/Ambient Air SG=Soil Gas
X1= X2= X3=

G= Grab C=Compsite

Lab ID:	Sample ID:	Date:	Time:	Type	Matrix	# of VOA Vials	# of Amber Glass	# of Clear Glass	# of Plastic	List Preservative Code below: 3/11	Analysis: PCBs	Analysis: RCRA 8 METALS	Analysis: VOCs	Check if chlorinated
	NPA-02-0203	6/10/16	1125	G	SO		1				X	X		☐
	NPA-02-0607	↓	1130	↓	↓	3							X	☐
	TB-01	6/10/16	0800	↓	↓	2							X	☐
														☐
														☐
														☐
														☐
														☐
														☐
														☐
														☐

QA/QC Reporting Notes:
* additional charges may appply

MA DEP MCP CAM Report? ☐ Yes ☐ No
CT DPH RCP Report? ☐ Yes ☐ No
☐ Standard ☐ No QC ☐ DQA*
☐ ASP A* ☐ ASP B*
☐ NJ Reduced* ☐ NJ Full*
☐ Tier II* ☐ Tier IV*
☐ Other:
State-specific reporting standards:

Relinquished by:	Received by:	Date:	Time:	Temp °C
	Nobis fridge	6/10/16	16:35	Observed 1.4
	DSC	6/13/16	1314	Correction Factor 0
	SUB OUT	6/13/16		Corrected 1.4
		6/13/16	11:03	IR ID # 01

☐ EDD format:

☐ E-mail to:

Condition upon receipt: Custody Seals: ☐ Present ☐ Intact ☐ Broken

☐ Ambient ☐ Iced ☒ Refrigerated ☒ DI VOA Frozen ☐ Soil Jar Frozen

Sample shipping address: 11 Almgren Drive • Agawam, MA 01001 • 413-789-9018 • www.EurofinsUS.com/Spectrum

2.0°C IR

Rev. Sep 2015

Nobis
Engineering a Sustainable Future

July 11, 2016
Nobis File No. 80108

Mr. Alan Peterson
EPA-New England Region I
5 Post Office Square
Suite 100, Mailcode OSRR07-4
Boston, MA 02109-3912

Re: Contract No.: EP-S1-06-03
Task Order No. 0108-SI-BZ-0100
Case No. 0163S, Laboratory Report No.: R0536
Eurofins Spectrum Analytical, North Kingston, Rhode Island
Former Tombarello Property
Lawrence, Massachusetts

Tier 1 Modified Organic and Inorganic Data Review

VOCs, PCBs, PAHs, EPH, and Metals:
4/Groundwater Samples: MW-09-061316, MW-08-061316, MW-16-061316, and MW-11-061316

Dear Mr. Peterson:

Nobis Engineering, Inc. performed a Tier 1 Modified data review on the organic and inorganic analytical data for the samples listed in the attached sample listing. The samples were collected by Nobis at the Former Tombarello Property located in Lawrence, Massachusetts. The groundwater samples were analyzed for volatile organic compounds (VOCs), polycyclic aromatic hydrocarbons (PAHs), Resource Conservation and Recovery Act (RCRA) metals, extractable petroleum hydrocarbons (EPH), and polychlorinated biphenyls (PCBs). See the included Data Summary Table and chain-of-custody for samples selected for each analysis. The laboratory performed testing according to Massachusetts Contingency Plan (MCP) Compendium of Analytical Methods (CAM) and to Nobis technical specification RAC2-087.

The Tier 1 Modified data review was performed in accordance with the EPA New England Environmental Data Review Supplement for Regional Data Review Elements and Superfund Specific Guidance/Procedures (April 2013); USEPA National Functional Guidelines for Inorganic Superfund Data Review (August 2014); USEPA National Functional Guidelines for Superfund Organic Methods Data Review (August 2014) and the Field Task Work Plan (FTWP) and Quality Assurance Project Plan Addendum (QAPPA) for the Targeted Brownfields Assessment (TBA) for the Former Tombarello Property (June 2016).

The data were evaluated based on the following parameters:

* • Overall Evaluation of Data and Potential Usability Issues
* • Data Completeness
* • Preservation and Technical Holding Times

Nobis Engineering, Inc.
585 Middlesex Street
Lowell, MA 01851
T (978) 683-0891

*	•	Instrument Calibration
*	•	Blanks
*	•	Laboratory Control Samples (LCS)
	•	Laboratory Duplicates
NA	•	Field Duplicates
*	•	Matrix Spike Analysis
	•	Surrogate Compounds
*	•	Internal Standards
NA	•	Performance Evaluation Sample Results
*	•	Reported Quantitation Limits

* All criteria were met for this parameter.
NA – Not applicable.

Overall Evaluation of Data and Potential Usability Issues
The objectives of the investigation activities at the site are to delineate the nature and extent of soil and groundwater contamination on the Site so that potential remedial alternatives can be evaluated and order-of-magnitude cost estimates can be developed. Analytical and hydrogeological data collected during the investigation will be compiled and reduced to develop a conceptual site model to support the estimation of human health risks and development of remedial alternatives.

The data meet the project quality criteria and can be used without restriction except as summarized below. The attachments provide details and supporting documentation.

VOCs:
Results did not require qualification.

PAHs:
Results did not require qualification.

EPH:
Results did not require qualification.

PCBs:
Results were qualified for surrogate spike recovery failures.

Metals:
Results were qualified for laboratory duplicate imprecision.

Please contact Gail DeRuzzo at (978) 703-6021 or gderuzzo@nobiseng.com should you have any questions or comments regarding this information.

Sincerely,

NOBIS ENGINEERING, INC.

Gail DeRuzzo
Lead Chemist

Tables: Data Summary Table – Tier 1 Mod Data Review
Data Qualification Actions Table

Attachments: Sample ID List
Data Review Checklist
COCs

DATA SUMMARY TABLE

Lab Sample ID	R0536-01	R0536-02	R0536-03	R0536-04
Field Sample ID	MW-09-061316	MW-08-061316	MW-16-061316	MW-11-061316
Sample Location	MW-09	MW-08	MW-16	MW-11
Sample Date	06/13/16	06/13/16	06/13/16	06/13/16
PCBs (ug/L)				
Aroclor 1016	0.5 UJ	0.5 UJ	0.5 UJ	0.5 U
Aroclor 1221	0.5 UJ	0.5 UJ	0.5 UJ	0.5 U
Aroclor 1232	0.5 UJ	0.5 UJ	0.5 UJ	0.5 U
Aroclor 1242	0.5 UJ	0.5 UJ	0.5 UJ	0.5 U
Aroclor 1248	0.5 UJ	0.5 UJ	0.5 UJ	0.5 U
Aroclor 1254	0.5 UJ	0.5 UJ	0.5 UJ	0.5 U
Aroclor 1260	0.5 UJ	0.5 UJ	0.5 UJ	0.5 U
Aroclor 1262	0.5 UJ	0.5 UJ	0.5 UJ	0.5 U
Aroclor 1268	0.5 UJ	0.5 UJ	0.5 UJ	0.5 U

U – not detected; J – estimated value; UJ – not detected, reporting limit estimated; R – rejected

DATA SUMMARY TABLE

Lab Sample ID	R0536-01	R0536-02	R0536-03	R0536-04
Field Sample ID	MW-09-061316	MW-08-061316	MW-16-061316	MW-11-061316
Sample Location	MW-09	MW-08	MW-16	MW-11
Sample Date	06/13/16	06/13/16	06/13/16	06/13/16
Metals (ug/L)				
Arsenic	3.3	12	0.32 J	10
Barium	40	100	36	1400
Cadmium	1 U	0.53 J	1 U	2.2
Chromium	2 U	0.6 J	2 U	0.62 J
Lead	0.4 J	69	0.29 J	25
Mercury	0.2 U	0.2 U	0.2 U	0.2 U
Selenium	0.74 J	0.39 J	5 U	1.9 J
Silver	0.051 J	0.046 J	0.059 J	0.029 J

U – not detected; J – estimated value; UJ – not detected, reporting limit estimated; R – rejected

DATA SUMMARY TABLE

Lab Sample ID	R0536-01	R0536-02	R0536-03	R0536-04
Field Sample ID	MW-09-061316	MW-08-061316	MW-16-061316	MW-11-061316
Sample Location	MW-09	MW-08	MW-16	MW-11
Sample Date	06/13/16	06/13/16	06/13/16	06/13/16
Volatiles (ug/L)				
1,1,1,2-Tetrachloroethane	1 U	1 U	1 U	1 U
1,1,1-Trichloroethane	1 U	1 U	1 U	1 U
1,1,2,2-Tetrachloroethane	1 U	1 U	1 U	1 U
1,1,2-Trichloroethane	1 U	1 U	1 U	1 U
1,1-Dichloroethane	1 U	1 U	1 U	2.3
1,1-Dichloroethene	1 U	1 U	1 U	1 U
1,1-Dichloropropene	1 U	1 U	1 U	1 U
1,2,3-Trichlorobenzene	1 U	1 U	1 U	1 U
1,2,3-Trichloropropane	1 U	1 U	1 U	1 U
1,2,4-Trichlorobenzene	1 U	1 U	1 U	1 U
1,2,4-Trimethylbenzene	1 U	10	1 U	1 U
1,2-Dibromo-3-chloropropane	1 U	1 U	1 U	1 U
1,2-Dibromoethane	1 U	1 U	1 U	1 U
1,2-Dichlorobenzene	1 U	1 U	1 U	1 U
1,2-Dichloroethane	1 U	1 U	1 U	1 U
1,2-Dichloropropane	1 U	1 U	1 U	1 U
1,3,5-Trimethylbenzene	1 U	2.5	1 U	1 U
1,3-Dichlorobenzene	1 U	1 U	1 U	1 U
1,3-Dichloropropane	1 U	1 U	1 U	1 U
1,4-Dichlorobenzene	1 U	1 U	1 U	1 U
1,4-Dioxane[1]	100 U	100 U	100 U	100 U
2,2-Dichloropropane	1 U	1 U	1 U	1 U
2-Butanone	5 U	5 U	5 U	5 U
2-Chlorotoluene	1 U	1 U	1 U	1 U
2-Hexanone	5 U	5 U	5 U	5 U
4-Chlorotoluene	1 U	1 U	1 U	1 U
4-Isopropyltoluene	5 U	5 U	5 U	5 U
4-Methyl-2-pentanone	5 U	5 U	5 U	5 U
Acetone	5 U	5 U	5 U	5 U
Benzene	1 U	1.9	1 U	1.3
Bromobenzene	1 U	1 U	1 U	1 U
Bromochloromethane	1 U	1 U	1 U	1 U

U – not detected; J – estimated value; UJ – not detected, reporting limit estimated; R – rejected

DATA SUMMARY TABLE

Lab Sample ID	R0536-01	R0536-02	R0536-03	R0536-04
Field Sample ID	MW-09-061316	MW-08-061316	MW-16-061316	MW-11-061316
Sample Location	MW-09	MW-08	MW-16	MW-11
Sample Date	06/13/16	06/13/16	06/13/16	06/13/16
Bromodichloromethane	1 U	1 U	1 U	1 U
Bromoform	1 U	1 U	1 U	1 U
Bromomethane	1 U	1 U	1 U	1 U
Carbon disulfide	1 U	1 U	1 U	1 U
Carbon tetrachloride	1 U	1 U	1 U	1 U
Chlorobenzene	1 U	1 U	1 U	1 U
Chloroethane	1 U	1 U	1 U	1 U
Chloroform	1 U	1 U	1 U	1 U
Chloromethane	1 U	1 U	1 U	1 U
cis-1,2-Dichloroethene	1 U	1.6	1 U	1 U
cis-1,3-Dichloropropene	1 U	1 U	1 U	1 U
Dibromochloromethane	1 U	1 U	1 U	1 U
Dibromomethane	1 U	1 U	1 U	1 U
Dichlorodifluoromethane	17	1 U	1 U	1 U
Diethyl ether	1 U	1 U	1 U	1 U
Diisopropyl Ether	1 U	1 U	1 U	1 U
Ethylbenzene	1 U	2.6	1 U	1 U
Hexachlorobutadiene	1 U	1 U	1 U	1 U
Isopropylbenzene	1 U	1 U	1 U	1 U
m,p-Xylene	1 U	10	1 U	1 U
Methyl tert-butyl ether	1.6	4.6	1 U	1 U
Methylene chloride	1 U	1 U	1 U	1 U
Naphthalene	1 U	3.1	1 U	1 U
n-Butylbenzene	1 U	1 U	1 U	1 U
n-Propylbenzene	1 U	1.5	1 U	1 U
o-Xylene	1 U	5.3	1 U	1 U
sec-Butylbenzene	1 U	1 U	1 U	1 U
Styrene	1 U	1 U	1 U	1 U
tert-Amyl methyl ether	1 U	1 U	1 U	1 U
Tert-Butyl Ethyl Ether	1 U	1 U	1 U	1 U
tert-Butylbenzene	1 U	1 U	1 U	1 U
Tetrachloroethene	10	1 U	1 U	1 U
Tetrahydrofuran	5 U	5 U	5 U	5 U

U – not detected; J – estimated value; UJ – not detected, reporting limit estimated; R – rejected

DATA SUMMARY TABLE

Lab Sample ID	R0536-01	R0536-02	R0536-03	R0536-04
Field Sample ID	MW-09-061316	MW-08-061316	MW-16-061316	MW-11-061316
Sample Location	MW-09	MW-08	MW-16	MW-11
Sample Date	06/13/16	06/13/16	06/13/16	06/13/16
Toluene	1 U	3.6	1 U	1 U
trans-1,2-Dichloroethene	1 U	1 U	1 U	1 U
trans-1,3-Dichloropropene	1 U	1 U	1 U	1 U
Trichloroethene	1 U	2.7	1 U	1 U
Trichlorofluoromethane	1 U	1 U	1 U	1 U
Vinyl chloride	1 U	1	1 U	1 U
Xylene (total)	5 U	15	5 U	5 U

1 - see SVOC analysis for lower reporting limits for this analyte.

DATA SUMMARY TABLE

Lab Sample ID	R0536-01	R0536-02	R0536-03	R0536-04
Field Sample ID	MW-09-061316	MW-08-061316	MW-16-061316	MW-11-061316
Sample Location	MW-09	MW-08	MW-16	MW-11
Sample Date	06/13/16	06/13/16	06/13/16	06/13/16
Semivolatiles (ug/L)				
1,4-Dioxane	0.1 U	0.1 U	0.1 U	0.26
2-Methylnaphthalene	0.1 U	0.67	0.1 U	0.1 U
Acenaphthene	0.1 U	0.16	0.1 U	0.1 U
Acenaphthylene	0.1 U	0.1 U	0.1 U	0.1 U
Anthracene	0.1 U	0.13	0.1 U	0.1 U
Benzo(a)anthracene	0.1 U	0.12	0.1 U	0.1 U
Benzo(a)pyrene	0.1 U	0.17	0.1 U	0.1 U
Benzo(b)fluoranthene	0.1 U	0.14	0.1 U	0.1 U
Benzo(g,h,i)perylene	0.1 U	0.11	0.1 U	0.1 U
Benzo(k)fluoranthene	0.1 U	0.1 U	0.1 U	0.1 U
Chrysene	0.1 U	0.11	0.1 U	0.1 U
Dibenz(a,h)anthracene	0.1 U	0.1 U	0.1 U	0.1 U
Fluoranthene	0.1 U	0.31	0.1 U	0.1 U
Fluorene	0.1 U	0.13	0.1 U	0.1 U
Indeno(1,2,3-cd)pyrene	0.1 U	0.1 U	0.1 U	0.1 U
Naphthalene	0.1 U	1.4	0.1 U	0.1 U
Phenanthrene	0.1 U	0.37	0.16	0.1 U
Pyrene	0.1 U	0.25	0.1 U	0.1 U

DATA SUMMARY TABLE

Lab Sample ID	R0536-01	R0536-02	R0536-03	R0536-04
Field Sample ID	MW-09-061316	MW-08-061316	MW-16-061316	MW-11-061316
Sample Location	MW-09	MW-08	MW-16	MW-11
Sample Date	06/13/16	06/13/16	06/13/16	06/13/16
EPH (ug/L)				
2-Methylnaphthalene	6.76 U	6.33 U	6.25 U	6.49 U
Acenaphthene	6.76 U	6.33 U	6.25 U	6.49 U
Acenaphthylene	6.76 U	6.33 U	6.25 U	6.49 U
Anthracene	6.76 U	6.33 U	6.25 U	6.49 U
Benzo(a)anthracene	6.76 U	6.33 U	6.25 U	6.49 U
Benzo(a)pyrene	6.76 U	6.33 U	6.25 U	6.49 U
Benzo(b)fluoranthene	6.76 U	6.33 U	6.25 U	6.49 U
Benzo(g,h,i)perylene	6.76 U	6.33 U	6.25 U	6.49 U
Benzo(k)fluoranthene	6.76 U	6.33 U	6.25 U	6.49 U
C11-C22 Aromatics	135 U	127 U	125 U	130 U
C19-C36 Aliphatics	135 U	127 U	125 U	130 U
C9-C18 Aliphatics	135 U	127 U	125 U	130 U
Chrysene	6.76 U	6.33 U	6.25 U	6.49 U
Dibenz(a,h)anthracene	6.76 U	6.33 U	6.25 U	6.49 U
Fluoranthene	6.76 U	6.33 U	6.25 U	6.49 U
Fluorene	6.76 U	6.33 U	6.25 U	6.49 U
Indeno(1,2,3-cd)pyrene	6.76 U	6.33 U	6.25 U	6.49 U
Naphthalene	6.76 U	6.33 U	6.25 U	6.49 U
Phenanthrene	6.76 U	6.33 U	6.25 U	6.49 U
Pyrene	6.76 U	6.33 U	6.25 U	6.49 U

Data Review Qualification Actions

Case: 0163S

SDG: R0536

Parameter	Analyte	Samples: R0536-#	Evaluation Criteria	Action Needed	Comments
Metals	Chromium	04 (MW-11-061316)	Lab Dup	J	RPD >20%
PCBs	All	GW 01, 02, 03	surrogates	UJ	low recoveries

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☑ Final Report
☐ Re-Issued Report
☐ Revised Report
Report Date:
01-Jul-16 09:28

Laboratory Report

Nobis Engineering, Inc
585 Middlesex Street
Lowell, MA 01851

Work Order: R0536
Project : Lawrence, MA site
Project #:

Attn: Gail DeRuzzo

Laboratory ID	Client Sample ID	Matrix	Date Sampled	Date Received
R0536-01	MW-09-061316	Aqueous	13-Jun-16 10:40	15-Jun-16 11:42
R0536-02	MW-08-061316	Aqueous	13-Jun-16 10:50	15-Jun-16 11:42
R0536-03	MW-16-061316	Aqueous	13-Jun-16 14:30	15-Jun-16 11:42
R0536-04	MW-11-061316	Aqueous	13-Jun-16 15:15	15-Jun-16 11:42

I attest that the information contained within the report has been reviewed for accuracy and checked against the quality control requirements for each method. The results relate only to the samples(s) as received. This report may not be reproduced, except in full, without written approval from Eurofins Spectrum Analytical, Inc.

All applicable NELAC or USEPA CLP requirements have been met.

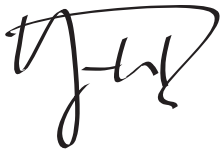
Use of the NELAP logo does not insure that Eurofins Spectrum Analytical is currently accredited for the specific test method or analyte. Please refer to our Quality page of our web site at www.spectrum-analytical.com for the current list of certifications and fields of accreditation.

Please contact the Laboratory or Technical Director at 401-732-3400 with any questions regarding the data contained in the laboratory report.

Connecticut	PH-0153
Florida	E87664
Massachusetts	M-RI907
New Hampshire	2060
New Jersey	RI001
New York	11522
Rhode Island	LAI00349
USDA	P330-16-00031
USEPA - ISM	EP-W-14-032
USEPA - SOM	EP-W-14-032
Dod ELAP	L2247

Certificate # L2247 Testing

Authorized by:



Yihai Ding
Laboratory Director

Engineering a Sustainable Future

Generic Data Review Checklist

Project: **Lawrence**
Project #: **80108**
Case#: **0163S**
Date: **7/11/16**
Methods: **VOCs-8260, PAHs – 8270, EPH plus targets, PCBs 8082, RCRA metals 6010, 7471/, Hex Cr – 7196A (3060A), Cyanide and PAC 9012 – MCP methods**
Laboratory: **Eurofins Spectrum Analytical**
SDG: **see below**
Reviewer: **Gail DeRuzzo**

1. Case Narrative and Data Package Completeness (COC and Analyte List Review)

SOILS:	GW:	IDW:
R0508 – 38 soils	R0536 – 4 GW	R0562
R0516 – 43 soils	R0545 – 3 GW + TB	1 SO/1 AQ
R0521 – 33 soils	R0561 – 2 GW	not evaluated
R0526 – 40 soils		
R0530 – 22 soils + TB		
R0545 – 18 soils		
R0555 – 20 soils		
R0561 – 4 soils		

Sample IDs printed separately.

1,4-dioxane reported in SIM run to report to lower RL of 0.1 ppb.
Also reported in VOC run.

2. Holding Time and Sample Preservation Compliance

ok

3. Lab and Field Blanks

ok

4. Laboratory Control Samples

VOCs: batch 84807, 1,4-dioxane high (157% vs 130) – samples ND – no action.

5. Field Duplicate Precision

NA

6. Laboratory Duplicate Precision

Cr in sample MW-11-061316 (04) – J/UJ

7. Matrix Spikes

ok

8. Surrogate Spikes

PCBs:
MW-09-061316 (R0536-01A), recovery is below criteria for Decachlorobiphenyl on rear column at 29% with criteria of (40-135) and Decachlorobiphenyl on front column at 30% with criteria of (40-135). UJ
MW-08-061316 (R0536-02A), recovery is below criteria for Decachlorobiphenyl on rear column at 29% with criteria of (40-135) and Decachlorobiphenyl on front column at 30% with criteria of (40-135). UJ
MW-16-061316 (R0536-03A), recovery is below criteria for Decachlorobiphenyl on rear column at 27% with criteria of (40-135) and Decachlorobiphenyl on front column at 28% with criteria of (40-135). UJ

9. Internal Standards
ok

10. Performance Evaluation Samples
NA

11. Reporting Limits

EPH: All samples elevated due to limited sample volume
Instead of 100 ppb, 125-135

12. Calibration Issues
ok

13. Other

Analyte lists and RLs were verified per the FTWP/QAPPA.

R0536

eurofins | Spectrum Analytical

CHAIN OF CUSTODY RECORD

Page 1 of 1

Special Handling:

☐ Standard TAT - 7 to 10 business days

☐ Rush TAT - Date Needed: _____

All TATs subject to laboratory approval
Min. 24-hr notification needed for rushes
Samples disposed after 60 days unless otherwise instructed.

Report To: NOBIS ENGINEERING

Invoice To:

Telephone #:

Project Mgr: A. ROY / S. VETERE

P.O No.: _____ Quote #: _____

Project No: 80108.04

Site Name: LAWRENCE TBA

Location: LAWRENCE State: MA

Sampler(s): EHJ AG

F=Field Filtered 1=Na_2S2O_3 2=HCl 3=H_2SO_4 4=HNO_3 5=NaOH 6=Ascorbic Acid
7=CH3OH 8=$NaHSO_4$ 9=Deionized Water 10=H_3PO_4 11=_____ 12=_____

DW=Dinking Water GW=Groundwater SW=Surface Water WW=Waste Water
O=Oil SO=Soil SL=Sludge A=Indoor/Ambient Air SG=Soil Gas
X1=_____ X2=_____ X3=_____

G= Grab C=Compsite

Lab ID:	Sample ID:	Date:	Time:	Type	Matrix	Containers: # of VOA Vials	# of Amber Glass	# of Clear Glass	# of Plastic	Analysis: VOCs	METALS	PCBs	PAHs	EPH				Check if chlorinated
										List Preservative Code below: 2	4			2				
	MW-09-061316	6/13/16	1040	G	GW	3	6		1	X	X	X	X	X				☐
	MW-08-061316		1050			3	6		1	X	X	X	X	X				☐
	MW-16-061316		1430			3	6		1	X	X	X	X	X				☐
	MW-11-061316		1515			3	6		1	X	X	X	X	X				☐
																		☐
																		☐
																		☐
																		☐
																		☐
																		☐

QA/QC Reporting Notes:
* additional charges may appply

MA DEP MCP CAM Report? ☐ Yes ☐ No
CT DPH RCP Report? ☐ Yes ☐ No
☐ Standard ☐ No QC ☐ DQA*
☐ ASP A* ☐ ASP B*
☐ NJ Reduced* ☐ NJ Full*
☐ Tier II* ☐ Tier IV*
☐ Other: _____
State-specific reporting standards:

Relinquished by:	Received by:	Date:	Time:
	NOBIS COLD STORAGE	6/13/16	1715
	DSC	6/14/16	11:11
		6/14/16	1758
6/15/16 8:30		6/15/16	11:42

Temp °C: Observed -1.6; Correction Factor 0; Corrected -1.6; IR ID # 02

☐ EDD format: _____

☐ E-mail to: _____

Condition upon receipt: Custody Seals: ☐ Present ☐ Intact ☐ Broken

☐ Ambient ☐ Iced ☒ Refrigerated ☐ DI VOA Frozen ☐ Soil Jar Frozen

5.4°C IR

5.2°C

Nobis
Engineering a Sustainable Future

July 7, 2016
Nobis File No. 80108

Mr. Alan Peterson
EPA-New England Region I
5 Post Office Square
Suite 100, Mailcode OSRR07-4
Boston, MA 02109-3912

Re: Contract No.: EP-S1-06-03
Task Order No. 0108-SI-BZ-0100
Case No. 0163S, Laboratory Report No.: R0545
Eurofins Spectrum Analytical, North Kingston, Rhode Island
Former Tombarello Property
Lawrence, Massachusetts

Tier 1 Modified Organic and Inorganic Data Review

PCBs and Metals:
18/Soils: See attached sample ID list
2/Field Duplicates: (FD-10/TP-20-0001); (FD-11/TP-08-0910)

VOCs, PCBs, PAHs, EPH, Metals, Cyanide, and PAC:
3/Groundwater Samples: MW-12-061416, MW-13-061416, and GW-FD-01
1/Field Duplicate: (GW-FD-01/MW-13-061416)
1/Trip Blank: TB-02

Dear Mr. Peterson:

Nobis Engineering, Inc. performed a Tier 1 Modified data review on the organic and inorganic analytical data for the samples listed in the attached sample listing. The samples were collected by Nobis at the Former Tombarello Property located in Lawrence, Massachusetts. The soil samples were analyzed for Resource Conservation and Recovery Act (RCRA) metals and polychlorinated biphenyls (PCBs). The groundwater samples were analyzed for volatile organic compounds (VOCs), polycyclic aromatic hydrocarbons (PAHs), RCRA metals, extractable petroleum hydrocarbons (EPH), PCBs, cyanide, and physiologically available cyanide (PAC). See the included Data Summary Table and chain-of-custody for samples selected for each analysis. The laboratory performed testing according to Massachusetts Contingency Plan (MCP) Compendium of Analytical Methods (CAM) and to Nobis technical specification RAC2-087.

The Tier 1 Modified data review was performed in accordance with the EPA New England Environmental Data Review Supplement for Regional Data Review Elements and Superfund Specific Guidance/Procedures (April 2013); USEPA National Functional Guidelines for Inorganic Superfund Data Review (August 2014); USEPA National Functional Guidelines for Superfund Organic Methods Data Review (August 2014) and the Field Task Work Plan (FTWP) and Quality Assurance Project Plan Addendum (QAPPA) for the Targeted Brownfields Assessment (TBA) for the Former Tombarello Property (June 2016).

Nobis Engineering, Inc.
585 Middlesex Street
Lowell, MA 01851
T (978) 683-0891

The data were evaluated based on the following parameters:

*	• Overall Evaluation of Data and Potential Usability Issues
*	• Data Completeness
*	• Preservation and Technical Holding Times
*	• Instrument Calibration
	• Blanks
*	• Laboratory Control Samples (LCS)
*	• Laboratory Duplicates
*	• Field Duplicates
	• Matrix Spike Analysis
*	• Surrogate Compounds
*	• Internal Standards
NA	• Performance Evaluation Sample Results
*	• Reported Quantitation Limits
	• Other

* All criteria were met for this parameter.
NA – Not applicable.

Overall Evaluation of Data and Potential Usability Issues
The objectives of the investigation activities at the site are to delineate the nature and extent of soil and groundwater contamination on the Site so that potential remedial alternatives can be evaluated and order-of-magnitude cost estimates can be developed. Analytical and hydrogeological data collected during the investigation will be compiled and reduced to develop a conceptual site model to support the estimation of human health risks and development of remedial alternatives.

The data meet the project quality criteria and can be used without restriction except as summarized below. The attachments provide details and supporting documentation.

VOCs:
Results did not require qualification.

PAHs:
Results did not require qualification.

EPH:
Results were qualified due to matrix spike recovery failures.

PCBs:
Results did not require qualification.

Metals:
Results were qualified for laboratory blank contamination and serial dilution non-conformances.

Cyanide and PAC:
Results did not require qualification.

Please contact Gail DeRuzzo at (978) 703-6021 or gderuzzo@nobiseng.com should you have any questions or comments regarding this information.

Sincerely,

NOBIS ENGINEERING, INC.

Gail DeRuzzo
Lead Chemist

Tables: Data Summary Table – Tier 1 Mod Data Review
Data Qualification Actions Table

Attachments: Sample ID List
Data Review Checklist
COCs

DATA SUMMARY TABLE

Lab Sample ID	R0545-04	R0545-05	R0545-06	R0545-07	R0545-08	R0545-09	R0545-10	R0545-11	R0545-12	R0545-13
Field Sample ID	TP-20-0001	TP-20-0506	TP-10-0001	TP-10-0607	TP-09-0001	TP-09-0910	TP-08-0001	TP-08-0910	TP-07-0001	TP-07-0708
Sample Location	TP-20	TP-20	TP-10	TP-10	TP-09	TP-09	TP-08	TP-08	TP-07	TP-07
Sample Date	06/14/16	06/14/16	06/14/16	06/14/16	06/14/16	06/14/16	06/14/16	06/14/16	06/14/16	06/14/16
PCBs (ug/kg)										
Aroclor 1016	350 U	360 U	380 U	400 U	7600 U	9300 U	19000 U	22000 U	790 U	790 U
Aroclor 1221	350 U	360 U	380 U	400 U	7600 U	9300 U	19000 U	22000 U	790 U	790 U
Aroclor 1232	350 U	360 U	380 U	400 U	7600 U	9300 U	19000 U	22000 U	790 U	790 U
Aroclor 1242	350 U	360 U	380 U	400 U	7600 U	9300 U	19000 U	22000 U	790 U	790 U
Aroclor 1248	1400	2400	640	2100	7600 U	9300 U	15000 J	27000	6100	8000
Aroclor 1254	350 U	360 U	380 U	400 U	7600 U	9300 U	19000 U	22000 U	790 U	790 U
Aroclor 1260	2400	4500	3900	3100	12000	16000	54000	81000	2900	3100
Aroclor 1262	350 U	360 U	380 U	400 U	7600 U	9300 U	19000 U	22000 U	790 U	790 U
Aroclor 1268	350 U	360 U	380 U	400 U	7600 U	9300 U	19000 U	22000 U	790 U	790 U

U – not detected; J – estimated value; UJ – not detected, reporting limit estimated; R – rejected

DATA SUMMARY TABLE

Lab Sample ID	R0545-14	R0545-15	R0545-16	R0545-17	R0545-18	R0545-19	R0545-20	R0545-21
Field Sample ID	TP-16-0001	TP-16-0809	TP-15-0001	TP-15-0809	TP-06-0001	TP-06-0910	FD-10	FD-11
Sample Location	TP-16	TP-16	TP-15	TP-15	TP-06	TP-06	TP-20-0001	TP-08
Sample Date	06/14/16	06/14/16	06/14/16	06/14/16	06/14/16	06/14/16	06/14/16	06/14/16
PCBs (ug/kg)								
Aroclor 1016	7300 U	19000 U	360 U	370 U	19000 U	7400 U	350 U	40000 U
Aroclor 1221	7300 U	19000 U	360 U	370 U	19000 U	7400 U	350 U	40000 U
Aroclor 1232	7300 U	19000 U	360 U	370 U	19000 U	7400 U	350 U	40000 U
Aroclor 1242	7300 U	19000 U	360 U	370 U	19000 U	7400 U	350 U	40000 U
Aroclor 1248	47000	19000	2100	1900	37000	7600	1500	26000 J
Aroclor 1254	7300 U	19000 U	360 U	370 U	19000 U	7400 U	350 U	40000 U
Aroclor 1260	23000	19000 U	3200	5100	41000	15000	3200	50000
Aroclor 1262	7300 U	19000 U	360 U	370 U	19000 U	7400 U	350 U	40000 U
Aroclor 1268	7300 U	19000 U	360 U	370 U	19000 U	7400 U	350 U	40000 U

U – not detected; J – estimated value; UJ – not detected, reporting limit estimated; R – rejected

DATA SUMMARY TABLE

Lab Sample ID	R0545-04	R0545-05	R0545-06	R0545-07	R0545-08	R0545-09	R0545-10	R0545-11	R0545-12	R0545-13	R0545-14	R0545-15	R0545-16	R0545-17
Field Sample ID	TP-20-0001	TP-20-0506	TP-10-0001	TP-10-0607	TP-09-0001	TP-09-0910	TP-08-0001	TP-08-0910	TP-07-0001	TP-07-0708	TP-16-0001	TP-16-0809	TP-15-0001	TP-15-0809
Sample Location	TP-20	TP-20	TP-10	TP-10	TP-09	TP-09	TP-08	TP-08	TP-07	TP-07	TP-16	TP-16	TP-15	TP-15
Sample Date	06/14/16	06/14/16	06/14/16	06/14/16	06/14/16	06/14/16	06/14/16	06/14/16	06/14/16	06/14/16	06/14/16	06/14/16	06/14/16	06/14/16
Metals (mg/kg)														
Arsenic	12	18	18	12	22	20	15	15	9.3	14	13	13	15	15
Barium	170	140	250	340	290	390	350	320	120	260	240	230	280	280
Cadmium	16	6.7	26	3.2	19	16	12	15	8.2	25	21	12	11	15
Chromium	120	55	130	44	150	95	140 J	71 J	55	100	120	170	120	230
Lead	610	10000	1000	1000	1200	2000	1400 J	1400 J	510	1000	820	740	700	1500
Mercury	0.86	1.2	3.2	0.96	6.3	2.4	3.1	2.1	13	14	16	12	3.4	2.1
Selenium	180	2.4	1.6 U	1.6	1.5 U	1.6 U	1.3 U	1.7	5.4	1.3 U	1.5 U	1.2 U	1.6 U	1.2 U
Silver	1.7	1.2 J	0.83 J	2.6	2.7	2.3	1.8	1.9	0.95 J	2.3	11	3.1	1.8	2

U – not detected; J – estimated value; UJ – not detected, reporting limit estimated; R – rejected

DATA SUMMARY TABLE

Lab Sample ID	R0545-18	R0545-19	R0545-21
Field Sample ID	TP-06-0001	TP-06-0910	FD-11
Sample Location	TP-06	TP-06	TP-08
Sample Date	06/14/16	06/14/16	06/14/16
Metals (mg/kg)			
Arsenic	15	9.1	14
Barium	270	190	320
Cadmium	17	3.2	11
Chromium	230	100	62
Lead	1200	430	1300
Mercury	6.9	1.3	2.5
Selenium	1.3 U	1.2 J	1.4 U
Silver	2	0.45 J	2.1

U – not detected; J – estimated value; UJ – not detected, reporting limit estimated; R – rejected

DATA SUMMARY TABLE

Lab Sample ID	R0545-01	R0545-02	R0545-03
Field Sample ID	MW-12-061416	MW-13-061416	GW-FD-01
Sample Location	MW-12	MW-13	MW-13
Sample Date	06/14/16	06/14/16	06/14/16
PCBs (ug/L)			
Aroclor 1016	0.5 U	0.5 U	0.5 U
Aroclor 1221	0.5 U	0.5 U	0.5 U
Aroclor 1232	0.5 U	0.5 U	0.5 U
Aroclor 1242	0.5 U	0.5 U	0.5 U
Aroclor 1248	0.5 U	0.5 U	0.5 U
Aroclor 1254	0.5 U	0.5 U	0.5 U
Aroclor 1260	0.5 U	0.5 U	0.5 U
Aroclor 1262	0.5 U	0.5 U	0.5 U
Aroclor 1268	0.5 U	0.5 U	0.5 U

U – not detected; J – estimated value; UJ – not detected, reporting limit estimated; R – rejected

DATA SUMMARY TABLE

Lab Sample ID	R0545-01	R0545-02	R0545-03
Field Sample ID	MW-12-061416	MW-13-061416	GW-FD-01
Sample Location	MW-12	MW-13	MW-13
Sample Date	06/14/16	06/14/16	06/14/16
Metals (mg/L)			
Arsenic	0.0005 U	0.00544	0.00513
Barium	0.0452	0.0463	0.0462
Cadmium	0.000049 J	0.000061 J	0.000063 J
Chromium	0.0052 U	0.0052 U	0.0052 U
Lead	0.0005 U	0.0005 U	0.0005 U
Selenium	0.0005 U	0.00023 J	0.0005 U
Silver	0.0005 U	0.0005 U	0.0005 U
Cyanide (PAC)	0.005 U	0.005 U	0.005 U
Cyanide (total)	0.005 U	0.005 U	0.005 U
Metals (ug/L)			
Mercury	0.2 U	0.031 J	0.2 U

U – not detected; J – estimated value; UJ – not detected, reporting limit estimated; R – rejected

DATA SUMMARY TABLE

Lab Sample ID	R0545-01	R0545-02	R0545-03	R0545-22
Field Sample ID	MW-12-061416	MW-13-061416	GW-FD-01	TB-02
Sample Location	MW-12	MW-13	MW-13	Trip Blank
Sample Date	06/14/16	06/14/16	06/14/16	06/14/16
Volatiles (ug/L)				
1,1,1,2-Tetrachloroethane	1 U	1 U	1 U	1 U
1,1,1-Trichloroethane	1 U	1 U	1 U	1 U
1,1,2,2-Tetrachloroethane	1 U	1 U	1 U	1 U
1,1,2-Trichloroethane	1 U	1 U	1 U	1 U
1,1-Dichloroethane	1 U	1 U	1 U	1 U
1,1-Dichloroethene	1 U	1 U	1 U	1 U
1,1-Dichloropropene	1 U	1 U	1 U	1 U
1,2,3-Trichlorobenzene	1 U	1 U	1 U	1 U
1,2,3-Trichloropropane	1 U	1 U	1 U	1 U
1,2,4-Trichlorobenzene	1 U	1 U	1 U	1 U
1,2,4-Trimethylbenzene	1 U	1 U	1 U	1 U
1,2-Dibromo-3-chloropropane	1 U	1 U	1 U	1 U
1,2-Dibromoethane	1 U	1 U	1 U	1 U
1,2-Dichlorobenzene	1 U	1 U	1 U	1 U
1,2-Dichloroethane	1 U	1 U	1 U	1 U
1,2-Dichloropropane	1 U	1 U	1 U	1 U
1,3,5-Trimethylbenzene	1 U	1 U	1 U	1 U
1,3-Dichlorobenzene	1 U	1 U	1 U	1 U
1,3-Dichloropropane	1 U	1 U	1 U	1 U
1,4-Dichlorobenzene	1 U	1 U	1 U	1 U
1,4-Dioxane	100 U	100 U	100 U	100 U
2,2-Dichloropropane	1 U	1 U	1 U	1 U
2-Butanone	5 U	5 U	5 U	5 U
2-Chlorotoluene	1 U	1 U	1 U	1 U
2-Hexanone	5 U	5 U	5 U	5 U
4-Chlorotoluene	1 U	1 U	1 U	1 U
4-Isopropyltoluene	5 U	5 U	5 U	5 U
4-Methyl-2-pentanone	5 U	5 U	5 U	5 U
Acetone	5 U	5 U	5 U	16
Benzene	1 U	1.8	1.9	1 U
Bromobenzene	1 U	1 U	1 U	1 U

DATA SUMMARY TABLE

Lab Sample ID	R0545-01	R0545-02	R0545-03	R0545-22
Field Sample ID	MW-12-061416	MW-13-061416	GW-FD-01	TB-02
Sample Location	MW-12	MW-13	MW-13	Trip Blank
Sample Date	06/14/16	06/14/16	06/14/16	06/14/16
Bromochloromethane	1 U	1 U	1 U	1 U
Bromodichloromethane	1 U	1 U	1 U	1 U
Bromoform	1 U	1 U	1 U	1 U
Bromomethane	1 U	1 U	1 U	1 U
Carbon disulfide	1 U	1 U	1 U	1 U
Carbon tetrachloride	1 U	1 U	1 U	1 U
Chlorobenzene	1 U	140	150	1 U
Chloroethane	1 U	1 U	1 U	1 U
Chloroform	1 U	1 U	1 U	1 U
Chloromethane	1 U	1 U	1 U	1 U
cis-1,2-Dichloroethene	1 U	1 U	1 U	1 U
cis-1,3-Dichloropropene	1 U	1 U	1 U	1 U
Dibromochloromethane	1 U	1 U	1 U	1 U
Dibromomethane	1 U	1 U	1 U	1 U
Dichlorodifluoromethane	1 U	1 U	1 U	1 U
Diethyl ether	1 U	1 U	1 U	1 U
Diisopropyl Ether	1 U	1 U	1 U	1 U
Ethylbenzene	1 U	1 U	1 U	1 U
Hexachlorobutadiene	1 U	1 U	1 U	1 U
Isopropylbenzene	1 U	1 U	1 U	1 U
m,p-Xylene	1 U	1 U	1 U	1 U
Methyl tert-butyl ether	1 U	1 U	1 U	1 U
Methylene chloride	1 U	1 U	1 U	1 U
Naphthalene	1 U	1 U	1 U	1 U
n-Butylbenzene	1 U	1 U	1 U	1 U
n-Propylbenzene	1 U	1 U	1 U	1 U
o-Xylene	1 U	1 U	1 U	1 U
sec-Butylbenzene	1 U	1 U	1 U	1 U
Styrene	1 U	1 U	1 U	1 U
tert-Amyl methyl ether	1 U	1 U	1 U	1 U
Tert-Butyl Ethyl Ether	1 U	1 U	1 U	1 U
tert-Butylbenzene	1 U	1 U	1 U	1 U

U – not detected; J – estimated value; UJ – not detected, reporting limit estimated; R – rejected

DATA SUMMARY TABLE

Lab Sample ID	R0545-01	R0545-02	R0545-03	R0545-22
Field Sample ID	MW-12-061416	MW-13-061416	GW-FD-01	TB-02
Sample Location	MW-12	MW-13	MW-13	Trip Blank
Sample Date	06/14/16	06/14/16	06/14/16	06/14/16
Tetrachloroethene	1 U	1 U	1 U	1 U
Tetrahydrofuran	5 U	5 U	5 U	5 U
Toluene	1 U	1 U	1 U	1 U
trans-1,2-Dichloroethene	1 U	1 U	1 U	1 U
trans-1,3-Dichloropropene	1 U	1 U	1 U	1 U
Trichloroethene	1 U	1 U	1 U	1 U
Trichlorofluoromethane	1 U	1 U	1 U	1 U
Vinyl chloride	1 U	1 U	1 U	1 U
Xylene (total)	5 U	5 U	5 U	5 U

U – not detected; J – estimated value; UJ – not detected, reporting limit estimated; R – rejected

DATA SUMMARY TABLE

Lab Sample ID	R0545-01	R0545-02	R0545-03
Field Sample ID	MW-12-061416	MW-13-061416	GW-FD-01
Sample Location	MW-12	MW-13	MW-13
Sample Date	06/14/16	06/14/16	06/14/16
Semivolatiles (ug/L)			
1,4-Dioxane	0.1 U	0.1 U	0.1 U
2-Methylnaphthalene	0.25	0.1 U	0.1 U
Acenaphthene	0.1 U	0.1 U	0.1 U
Acenaphthylene	0.19	0.1 U	0.1 U
Anthracene	0.14	0.13	0.12
Benzo(a)anthracene	0.1 U	0.1 U	0.1 U
Benzo(a)pyrene	0.1 U	0.1 U	0.1 U
Benzo(b)fluoranthene	0.1 U	0.1 U	0.1 U
Benzo(g,h,i)perylene	0.1 U	0.1 U	0.1 U
Benzo(k)fluoranthene	0.1 U	0.1 U	0.1 U
Chrysene	0.1 U	0.1 U	0.1 U
Dibenz(a,h)anthracene	0.1 U	0.1 U	0.1 U
Fluoranthene	0.11	0.1 U	0.1 U
Fluorene	0.1	0.1 U	0.1 U
Indeno(1,2,3-cd)pyrene	0.1 U	0.1 U	0.1 U
Naphthalene	0.67	0.64	0.77
Phenanthrene	0.36	0.1 U	0.1 U
Pyrene	0.1 U	0.1 U	0.1 U

DATA SUMMARY TABLE

Lab Sample ID	R0545-01	R0545-02	R0545-03
Field Sample ID	MW-12-061416	MW-13-061416	GW-FD-01
Sample Location	MW-12	MW-13	MW-13
Sample Date	06/14/16	06/14/16	06/14/16
EPH (ug/L)			
2-Methylnaphthalene	5.88 UJ	6.17 U	6.58 U
Acenaphthene	5.88 UJ	6.17 U	6.58 U
Acenaphthylene	5.88 UJ	6.17 U	6.58 U
Anthracene	5.88 U	6.17 U	6.58 U
Benzo(a)anthracene	5.88 U	6.17 U	6.58 U
Benzo(a)pyrene	5.88 UJ	6.17 U	6.58 U
Benzo(b)fluoranthene	5.88 UJ	6.17 U	6.58 U
Benzo(g,h,i)perylene	5.88 U	6.17 U	6.58 U
Benzo(k)fluoranthene	5.88 U	6.17 U	6.58 U
C11-C22 Aromatics	118 U	123 U	132 U
C19-C36 Aliphatics	118 U	123 U	132 U
C9-C18 Aliphatics	118 UJ	123 U	132 U
Chrysene	5.88 U	6.17 U	6.58 U
Dibenz(a,h)anthracene	5.88 UJ	6.17 U	6.58 U
Fluoranthene	5.88 U	6.17 U	6.58 U
Fluorene	5.88 UJ	6.17 U	6.58 U
Indeno(1,2,3-cd)pyrene	5.88 UJ	6.17 U	6.58 U
Naphthalene	5.88 UJ	6.17 U	6.58 U
Phenanthrene	5.88 U	6.17 U	6.58 U
Pyrene	5.88 U	6.17 U	6.58 U

U – not detected; J – estimated value; UJ – not detected, reporting limit estimated; R – rejected

Data Review Qualification Actions
Case: 0163S
SDG: R0545

Parameter	Analyte	Samples: R0545-#	Evaluation Criteria	Action Needed	Comments
Metals	Chromium and Lead	04-21	Lab Blank	Remove B	result >RL
Metals	Chromium and Lead	10 and 11	serial dilution	J/UJ	%D >10%
Metals	Chromium and Lead	GW 01, 02, 03	Lab Blank	U at RL	blank trace levels
EPH	2-Methylnaphthalene, acenaphthene, acenaphthylene, anthracene, benzo(a)pyrene, benzo(b)fluoranthene, dibenzo(a,h)anthracene, fluorene, indeno(1,2,3-cd)pyrene, naphthalene, C9-C18 aliphatics, Unadjusted C11-C22 aromatics	GW 01	MS	J/UJ	low recoveries

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☑ Final Report
☐ Re-Issued Report
☐ Revised Report
Report Date:
06-Jul-16 09:00

Laboratory Report

Nobis Engineering, Inc
585 Middlesex Street
Lowell, MA 01851

Work Order: R0545
Project : Lawrence, MA site
Project #:

Attn: Gail DeRuzzo

Laboratory ID	Client Sample ID	Matrix	Date Sampled	Date Received
R0545-01	MW-12-061416	Aqueous	14-Jun-16 13:05	16-Jun-16 12:10
R0545-02	MW-13-061416	Aqueous	14-Jun-16 09:55	16-Jun-16 12:10
R0545-03	GW-FD-01	Aqueous	14-Jun-16 20:00	16-Jun-16 12:10
R0545-04	TP-20-0001	Soil	14-Jun-16 08:40	16-Jun-16 12:10
R0545-05	TP-20-0506	Soil	14-Jun-16 08:55	16-Jun-16 12:10
R0545-06	TP-10-0001	Soil	14-Jun-16 09:30	16-Jun-16 12:10
R0545-07	TP-10-0607	Soil	14-Jun-16 09:50	16-Jun-16 12:10
R0545-08	TP-09-0001	Soil	14-Jun-16 10:20	16-Jun-16 12:10
R0545-09	TP-09-0910	Soil	14-Jun-16 10:35	16-Jun-16 12:10
R0545-10	TP-08-0001	Soil	14-Jun-16 12:40	16-Jun-16 12:10
R0545-11	TP-08-0910	Soil	14-Jun-16 13:00	16-Jun-16 12:10
R0545-12	TP-07-0001	Soil	14-Jun-16 13:20	16-Jun-16 12:10
R0545-13	TP-07-0708	Soil	14-Jun-16 13:30	16-Jun-16 12:10
R0545-14	TP-16-0001	Soil	14-Jun-16 13:50	16-Jun-16 12:10
R0545-15	TP-16-0809	Soil	14-Jun-16 14:00	16-Jun-16 12:10
R0545-16	TP-15-0001	Soil	14-Jun-16 14:20	16-Jun-16 12:10
R0545-17	TP-15-0809	Soil	14-Jun-16 14:30	16-Jun-16 12:10
R0545-18	TP-06-0001	Soil	14-Jun-16 14:55	16-Jun-16 12:10
R0545-19	TP-06-0910	Soil	14-Jun-16 15:05	16-Jun-16 12:10
R0545-20	FD-10	Soil	14-Jun-16 08:45	16-Jun-16 12:10
R0545-21	FD-11	Soil	14-Jun-16 13:05	16-Jun-16 12:10
R0545-22	TB-02	Aqueous	14-Jun-16 07:00	16-Jun-16 12:10

I attest that the information contained within the report has been reviewed for accuracy and checked against the quality control requirements for each method. The results relate only to the samples(s) as received. This report may not be reproduced, except in full, without written approval from Eurofins Spectrum Analytical, Inc.

All applicable NELAC or USEPA CLP requirements have been met.

Use of the NELAP logo does not insure that Eurofins Spectrum Analytical is currently accredited for the specific test method or analyte. Please refer to our Quality page of our web site at www.spectrum-analytical.com for the current list of certifications and fields of accreditation.

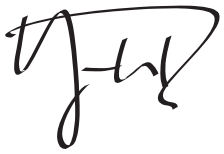
Please contact the Laboratory or Technical Director at 401-732-3400 with any questions regarding the data contained in the laboratory report.

Connecticut	PH-0153
Florida	E87664
Massachusetts	M-RI907
New Hampshire	2060
New Jersey	RI001
New York	11522
Rhode Island	LAI00349
USDA	P330-16-00031
USEPA - ISM	EP-W-14-032
USEPA - SOM	EP-W-14-032
Dod ELAP	L2247

NELAP ACCREDITED TNI LABORATORY

LABORATORY ACCREDITATION BUREAU ACCREDITED
Certificate # L2247 Testing

Authorized by:



Yihai Ding
Laboratory Director

Engineering a Sustainable Future

Generic Data Review Checklist

Project: Lawrence
Project #: 80108
Case#: 0163S
Date: 7/11/16
Methods: VOCs-8260, PAHs – 8270, EPH plus targets, PCBs 8082, RCRA metals 6010, 7471/, Hex Cr – 7196A (3060A), Cyanide and PAC 9012 – MCP methods
Laboratory: Eurofins Spectrum Analytical
SDG: see below
Reviewer: Gail DeRuzzo

1. Case Narrative and Data Package Completeness (COC and Analyte List Review)

SOILS:
R0508 – 38 soils
R0516 – 43 soils
R0521 – 33 soils
R0526 – 40 soils
R0530 – 22 soils + TB
R0545 – 18 soils
R0555 – 20 soils
R0561 – 4 soils

GW:
R0536 – 4 GW
R0545 – 3 GW + TB
R0561 – 2 GW

IDW:
R0562
1 SO/1 AQ
not evaluated

Sample IDs printed separately.

NOTE: Metals for GW analyzed for this SDG at MA lab. RLs reported different than in FTWP/QAPPA:

Element	Action Limit	FTWP/QAPP (ug/L)	Report (ug/L)
Arsenic	**10**	**2**	**0.5**
Barium	**2000**	**10**	**25**
Cadmium	**5**	**1**	**0.5**
Chromium	**100**	**2**	**5.2**
Lead	**15**	**1**	**0.5**
Selenium	**50**	**5**	**0.5**
Silver	**100**	**1**	**0.5**

Barium and Chromium RLs are higher at MA lab but still are below the action limit.

2. Holding Time and Sample Preservation Compliance

ok

3. Lab and Field Blanks

VOCs: TB - ND

Metals soil:
Cr (0.02799 (RL 1)); Pb (0.3233 (RL 0.5) – B flag data – remove B's samples 04-21
Metals GW:

Cr (0.29 (RL 5.2)), Pb (0.02 (RL 0.05)), Ag (0.02 (RL 0.5)), Cr, Pb – samples 01, 02, 03 - U at RL

4. **Laboratory Control Samples**
   EPH:
   C19-C36 Aliphatic Hydrocarbons RPD 34% (25%) is outside individual acceptance criteria. – LCS recovery in control – no action.

5. **Field Duplicate Precision**

FD-10 = TP-20-0001 – PCBs – in control
FD-11 = TP-08-0910 – PCBs and Metals – in control
GW-FD-01 = MW-13 – all tests – in control

6. **Laboratory Duplicate Precision**
   ok

7. **Matrix Spikes**
   VOCs:

MW-12-061416 (R0545-01EMS), recovery is above criteria for 1,4-Dioxane at 197% with criteria of (70-130), Chloromethane at 130% with criteria of (40-125), Tetrahydrofuran at 136% with criteria of (76-126) and Trichloroethene at 126% with criteria of (70-125).
MW-12-061416 (R0545-01EMSD), recovery is above criteria for 1,4-Dioxane at 196% with criteria of (70-130), Acetone at 141% with criteria of (40-140), Chloromethane at 126% with criteria of (40-125), Tetrahydrofuran at 136% with criteria of (76-126) and Trichloroethene at 125% with criteria of (70-125). Analytes ND – no action.

EPH:

MS:
2-Methylnaphthalene
Acenaphthene
Acenaphthylene
Benzo (b) fluoranthene
Dibenzo (a,h) anthracene
Fluorene
Indeno (1,2,3-cd) pyrene
Naphthalene
n-Decane
n-Dodecane
n-Nonane (C9)
n-Tetradecane
Unadjusted C11-C22 Aromatic Hydrocarbons

MSD:
2-Methylnaphthalene
Acenaphthene
Acenaphthylene
Anthracene

Benzo (a) pyrene
Benzo (b) fluoranthene
Dibenzo (a,h) anthracene
Fluorene
Indeno (1,2,3-cd) pyrene
Naphthalene
n-Decane
n-Dodecane
n-Nonane (C9)
n-Tetradecane
Unadjusted C11-C22 Aromatic Hydrocarbons

J/UJ sample 01

8. Surrogate Spikes
PCBs:

9. Internal Standards
ok

10. Performance Evaluation Samples
NA

11. Reporting Limits
PCBs:
TP-20-0001 (R0545-04A) : Dilution Factor: 10
TP-20-0506 (R0545-05A) : Dilution Factor: 10
TP-10-0001 (R0545-06A) : Dilution Factor: 10
TP-10-0607 (R0545-07A) : Dilution Factor: 10
TP-09-0001 (R0545-08A) : Dilution Factor: 200
TP-09-0910 (R0545-09A) : Dilution Factor: 200
TP-08-0001 (R0545-10A) : Dilution Factor: 500
TP-08-0910 (R0545-11A) : Dilution Factor: 500
TP-07-0001 (R0545-12A) : Dilution Factor: 20
TP-07-0708 (R0545-13A) : Dilution Factor: 20
TP-16-0001 (R0545-14A) : Dilution Factor: 200
TP-16-0809 (R0545-15A) : Dilution Factor: 500
TP-15-0001 (R0545-16A) : Dilution Factor: 10
TP-15-0809 (R0545-17A) : Dilution Factor: 10
TP-06-0001 (R0545-18A) : Dilution Factor: 500
TP-06-0910 (R0545-19A) : Dilution Factor: 200
FD-10 (R0545-20A) : Dilution Factor: 10
FD-11 (R0545-21A) : Dilution Factor: 1000

12. Calibration Issues
ok

13. Other

Metals SD: Cr and Pb on TP-08-0001 (10) – J/UJ on 10 and 11

Analyte lists and RLs were verified per the FTWP/QAPPA.

R0545

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CHAIN OF CUSTODY RECORD

Page 1 of 3

Special Handling:

☐ Standard TAT - 7 to 10 business days

☐ Rush TAT - Date Needed: _____

All TATs subject to laboratory approval
Min. 24-hr notification needed for rushes
Samples disposed after 60 days unless otherwise instructed.

Report To: NOBIS ENGINEERING

Invoice To:

Project No: 80108.04

Site Name: LAWRENCE TBA

Location: LAWRENCE State: MA

Telephone #:

Project Mgr: A. ROY / S. VETERE

P.O No.: Quote #:

Sampler(s): EHJ AG

F=Field Filtered 1=Na_2S2O_3 2=HCl 3=H_2SO_4 4=HNO_3 5=NaOH 6=Ascorbic Acid
7=CH3OH 8=$NaHSO_4$ 9=Deionized Water 10=H_3PO_4 11=_____ 12=_____

DW=Dinking Water GW=Groundwater SW=Surface Water WW=Waste Water
O=Oil SO=Soil SL=Sludge A=Indoor/Ambient Air SG=Soil Gas
X1=_____ X2=_____ X3=_____

G= Grab C=Compsite

Lab ID:	Sample ID:	Date:	Time:	Type	Matrix	Containers: # of VOA Vials	# of Amber Glass	# of Clear Glass	# of Plastic	List Preservative Code below: 2			2	4	5	5	Check if chlorinated	QA/QC Reporting Notes: * additional charges may appply
													Analysis:					
										VOCs	PCBs	PAHs	EPH	METALS	CYANIDE	P.A.C.		
	MW-12-061416	6/14/16	1305	G	GW	9	18		9	X	X	X	X	X	X	X	☐	MS/MSD
	MW-13-061416		955	G	GW	3	6		3	X	X	X	X	X	X	X	☐	
	GW-FD-01		2000	G	GW	3	6		3	X	X	X	X	X	X	X	☐	
	TP-20-0001		840	G	S		1				X			X			☐	
	TP-20-0506		855	G	S		1				X			X			☐	
	TP-10-0001		930	G	S		1				X			X			☐	
	TP-10-0607		950	G	S		1				X			X			☐	
	TP-09-0001		1020	G	S		1				X			X			☐	
	TP-09-0910		1035	G	S		1				X			X			☐	
	TP-08-0001		1240	G	S		1				X			X			☐	

MA DEP MCP CAM Report? ☐ Yes ☐ No
CT DPH RCP Report? ☐ Yes ☐ No
☐ Standard ☐ No QC ☐ DQA*
☐ ASP A* ☐ ASP B*
☐ NJ Reduced* ☐ NJ Full*
☐ Tier II* ☐ Tier IV*
☐ Other: _____
State-specific reporting standards:

Relinquished by:	Received by:	Date:	Time:	Temp °C
	NOBIS COLD STORAGE	6/14/16	1740	Observed 3.4
		6/15/16	1200	Correction Factor 0
	SUB OUT	6/15/16	1822	Corrected 3.4
Dec 6/16/16		6/16/16	1210	IR ID # 07

☐ EDD format: _____

☐ E-mail to: _____

Condition upon receipt: Custody Seals: ☐ Present ☐ Intact ☐ Broken

☐ Ambient ☐ Iced ☒ Refrigerated ☐ DI VOA Frozen ☐ Soil Jar Frozen

R0845

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CHAIN OF CUSTODY RECORD

Page 2 of 3

Special Handling:

☐ Standard TAT - 7 to 10 business days

☐ Rush TAT - Date Needed: _____

All TATs subject to laboratory approval
Min. 24-hr notification needed for rushes
Samples disposed after 60 days unless otherwise instructed.

Report To: NOBIS ENGINEERING

Telephone #:

Project Mgr: A. ROY / S. VETERE

Invoice To:

P.O No.: Quote #:

Project No: 80108.04

Site Name: LAWRENCE TBA

Location: LAWRENCE State: MA

Sampler(s): EHJ AG

F=Field Filtered 1=Na_2S2O_3 2=HCl 3=H_2SO_4 4=HNO_3 5=NaOH 6=Ascorbic Acid
7=CH3OH 8=$NaHSO_4$ 9=Deionized Water 10=H_3PO_4 11= 12=

DW=Dinking Water GW=Groundwater SW=Surface Water WW=Waste Water
O=Oil SO=Soil SL=Sludge A=Indoor/Ambient Air SG=Soil Gas
X1= X2= X3=

G= Grab C=Compsite

Lab ID:	Sample ID:	Date:	Time:	Type	Matrix	Containers: # of VOA Vials	# of Amber Glass	# of Clear Glass	# of Plastic	Analysis: PCBs	METALS	Check if chlorinated
	TP-08-0910	6/14/16	1300	G	S		1			X	X	☐
	TP-07-0001		1320				1			X	X	☐
	TP-07-0708		1330				1			X	X	☐
	TP-16-0001		1350				1			X	X	☐
	TP-16-0809		1400				1			X	X	☐
	TP-15-0001		1420				1			X	X	☐
	TP-15-0809		1430				1			X	X	☐
	TP-06-0001		1455				1			X	X	☐
	TP-06-0910		1505				1			X	X	☐
	FD-10		845				1			X		☐

List Preservative Code below:

QA/QC Reporting Notes:
* additional charges may appply

MA DEP MCP CAM Report? ☐ Yes ☐ No
CT DPH RCP Report? ☐ Yes ☐ No
☐ Standard ☐ No QC ☐ DQA*
☐ ASP A* ☐ ASP B*
☐ NJ Reduced* ☐ NJ Full*
☐ Tier II* ☐ Tier IV*
☐ Other: _____
State-specific reporting standards:

Relinquished by:	Received by:	Date:	Time:	Temp °C
	NOBIS COLD STORAGE	6/14/16	1740	Observed 3.4
	DSR	6/15/16	1200	Correction Factor 0
	SUB OUT	6/15/16	1822	Corrected 3.4
		6/16/16	12:10	IR ID # 02

☐ EDD format:
☐ E-mail to:

Condition upon receipt: Custody Seals: ☐ Present ☐ Intact ☐ Broken
☐ Ambient ☐ Iced ☒ Refrigerated ☐ DI VOA Frozen ☐ Soil Jar Frozen

R0645

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CHAIN OF CUSTODY RECORD

Page 3 of 3

Special Handling:

☐ Standard TAT - 7 to 10 business days

☐ Rush TAT - Date Needed: _____

All TATs subject to laboratory approval
Min. 24-hr notification needed for rushes
Samples disposed after 60 days unless otherwise instructed.

Report To: NOBIS ENGINEERING

Telephone #: 978-683-0891

Project Mgr: A. ROTISSERE

Invoice To: _____

P.O No.: _____ Quote #: _____

Project No: 80108.04

Site Name: LAWRENCE TBA

Location: LAWRENCE State: MA

Sampler(s): EHJ
AG

F=Field Filtered 1=Na_2S2O_3 2=HCl 3=H_2SO_4 4=HNO_3 5=NaOH 6=Ascorbic Acid
7=CH3OH 8=$NaHSO_4$ 9=Deionized Water 10=H_3PO_4 11=_____ 12=_____

DW=Dinking Water GW=Groundwater SW=Surface Water WW=Waste Water
O=Oil SO=Soil SL=Sludge A=Indoor/Ambient Air SG=Soil Gas
X1=_____ X2=_____ X3=_____

G= Grab C=Compsite

Lab ID:	Sample ID:	Date:	Time:	Type	Matrix	Containers: # of VOA Vials	# of Amber Glass	# of Clear Glass	# of Plastic	Analysis: PCBs	METALS	VOCs	List Preservative Code below:	Check if chlorinated
	FD-11	6/14/16	1305	G	S		1			X	X			☐
	~~VOCs~~ TB-02	6/14/16	700	G	W	3						X		☐
														☐
														☐
														☐
														☐
														☐
														☐
														☐
														☐
														☐

QA/QC Reporting Notes:
* additional charges may appply

MA DEP MCP CAM Report? ☐ Yes ☐ No
CT DPH RCP Report? ☐ Yes ☐ No
☐ Standard ☐ No QC ☐ DQA*
☐ ASP A* ☐ ASP B*
☐ NJ Reduced* ☐ NJ Full*
☐ Tier II* ☐ Tier IV*
☐ Other: _____
State-specific reporting standards:

Relinquished by:	Received by:	Date:	Time:	Temp °C
	NOBIS COLD STORAGE	6/14/16	1740	Observed 3.4
		6/15/16	1200	Correction Factor 0
	SUB CUT	6/15/16	1522	Corrected 3.4
6/16/16 8:35		6/16/16	12:10	IR ID # 02

☐ EDD format: _____

☐ E-mail to: _____

Condition upon receipt: Custody Seals: ☐ Present ☐ Intact ☐ Broken

☐ Ambient ☐ Iced ☒ Refrigerated ☐ DI VOA Frozen ☐ Soil Jar Frozen

Nobis
Engineering a Sustainable Future

July 11, 2016
Nobis File No. 80108

Mr. Alan Peterson
EPA-New England Region I
5 Post Office Square
Suite 100, Mailcode OSRR07-4
Boston, MA 02109-3912

Re: Contract No.: EP-S1-06-03
Task Order No. 0108-SI-BZ-0100
Case No. 0163S, Laboratory Report No.: R0555
Eurofins Spectrum Analytical, North Kingston, Rhode Island
Former Tombarello Property
Lawrence, Massachusetts

Tier 1 Modified Organic and Inorganic Data Review

PCBs, Metals, and Hexavalent Chromium:
20/Soils: See attached sample ID list

Dear Mr. Peterson:

Nobis Engineering, Inc. performed a Tier 1 Modified data review on the organic and inorganic analytical data for the samples listed in the attached sample listing. The samples were collected by Nobis at the Former Tombarello Property located in Lawrence, Massachusetts. The samples were analyzed for Resource Conservation and Recovery Act (RCRA) metals, polychlorinated biphenyls (PCBs), and hexavalent chromium. See the included Data Summary Table and chain-of-custody for samples selected for each analysis. The laboratory performed testing according to Massachusetts Contingency Plan (MCP) Compendium of Analytical Methods (CAM) and to Nobis technical specification RAC2-087.

The Tier 1 Modified data review was performed in accordance with the EPA New England Environmental Data Review Supplement for Regional Data Review Elements and Superfund Specific Guidance/Procedures (April 2013); USEPA National Functional Guidelines for Inorganic Superfund Data Review (August 2014); USEPA National Functional Guidelines for Superfund Organic Methods Data Review (August 2014) and the Field Task Work Plan (FTWP) and Quality Assurance Project Plan Addendum (QAPPA) for the Targeted Brownfields Assessment (TBA) for the Former Tombarello Property (June 2016).

The data were evaluated based on the following parameters:

* • Overall Evaluation of Data and Potential Usability Issues
* • Data Completeness
• Preservation and Technical Holding Times

Nobis Engineering, Inc.
585 Middlesex Street
Lowell, MA 01851
T (978) 683-0891

*	•	Instrument Calibration
*	•	Blanks
*	•	Laboratory Control Samples (LCS)
	•	Laboratory Duplicates
NA	•	Field Duplicates
	•	Matrix Spike Analysis
*	•	Surrogate Compounds
NA	•	Internal Standards
NA	•	Performance Evaluation Sample Results
*	•	Reported Quantitation Limits
	•	Other

* All criteria were met for this parameter.
NA – Not applicable.

Overall Evaluation of Data and Potential Usability Issues
The objectives of the investigation activities at the site are to delineate the nature and extent of soil and groundwater contamination on the Site so that potential remedial alternatives can be evaluated and order-of-magnitude cost estimates can be developed. Analytical and hydrogeological data collected during the investigation will be compiled and reduced to develop a conceptual site model to support the estimation of human health risks and development of remedial alternatives.

The data meet the project quality criteria and can be used without restriction except as summarized below. The attachments provide details and supporting documentation.

PCBs:
Results were qualified as estimated for matrix spike recovery failures.

Metals:
Results were qualified for laboratory duplicate imprecision, matrix spike recovery failures, and serial dilution exceedances.

Hexavalent Chromium:
Results did not require qualification. However, pH and ORP are analyzed to support hexavalent chromium. These tests were qualified as estimated due to exceeded holding time.

Please contact Gail DeRuzzo at (978) 703-6021 or gderuzzo@nobiseng.com should you have any questions or comments regarding this information.

Sincerely,

NOBIS ENGINEERING, INC.

Gail DeRuzzo
Lead Chemist

Tables: Data Summary Table – Tier 1 Mod Data Review
Data Qualification Actions Table

Attachments: Sample ID List
Data Review Checklist
COCs

DATA SUMMARY TABLE

Lab Sample ID	R0555-01	R0555-02	R0555-03	R0555-04	R0555-05	R0555-06	R0555-07	R0555-08	R0555-09	R0555-10	R0555-11	R0555-12
Field Sample ID	TP-05-0001	TP-05-0405	TP-14-0001	TP-14-0506	TP-13-0001	TP-13-0506	TP-12-0001	TP-12-0607	TP-04-0001	TP-04-0506	TP-03-0001	TP-03-0405
Sample Location	TP-05	TP-05	TP-14	TP-14	TP-13	TP-13	TP-12	TP-12	TP-04	TP-04	TP-03	TP-03
Sample Date	06/15/16	06/15/16	06/15/16	06/15/16	06/15/16	06/15/16	06/15/16	06/15/16	06/15/16	06/15/16	06/15/16	06/15/16
PCBs (ug/kg)												
Aroclor 1016	36 U	3900 U	36 U	190 U	360 U	750 U	360 U	370 U	74 U	380 U	37 U	3800 U
Aroclor 1221	36 U	3900 U	36 U	190 U	360 U	750 U	360 U	370 U	74 U	380 U	37 U	3800 U
Aroclor 1232	36 U	3900 U	36 U	190 U	360 U	750 U	360 U	370 U	74 U	380 U	37 U	3800 U
Aroclor 1242	36 U	3900 U	36 U	190 U	360 U	750 U	360 U	370 U	74 U	380 U	37 U	3800 U
Aroclor 1248	4100	20000	2100	970	2200	8000	2600	3200	86	1700	83	11000
Aroclor 1254	36 U	3900 U	36 U	190 U	360 U	750 U	360 U	370 U	74 U	380 U	37 U	3800 U
Aroclor 1260	7900 J	14000	4300 J	1300	1300	4300	2100	2100	280	4700	240	34000
Aroclor 1262	36 U	3900 U	36 U	190 U	360 U	750 U	360 U	370 U	74 U	380 U	37 U	3800 U
Aroclor 1268	36 U	3900 U	36 U	190 U	360 U	750 U	360 U	370 U	74 U	380 U	37 U	3800 U

U – not detected; J – estimated value; UJ – not detected, reporting limit estimated; R – rejected

DATA SUMMARY TABLE

Lab Sample ID	R0555-13	R0555-14	R0555-15	R0555-16	R0555-17	R0555-18	R0555-19	R0555-20
Field Sample ID	TP-19-0001	TP-19-0607	TP-02-0001	TP-02-0304	TP-01-0001	TP-01-0203	TP-17-0001	TP-17-0304
Sample Location	TP-19	TP-19	TP-02	TP-02	TP-01	TP-01	TP-17	TP-17
Sample Date	06/15/16	06/15/16	06/15/16	06/15/16	06/15/16	06/15/16	06/15/16	06/15/16
PCBs (ug/kg)								
Aroclor 1016	360 U	370 U	18000 U	18000 U	17000 U	360 U	17000 U	18000 U
Aroclor 1221	360 U	370 U	18000 U	18000 U	17000 U	360 U	17000 U	18000 U
Aroclor 1232	360 U	370 U	18000 U	18000 U	17000 U	360 U	17000 U	18000 U
Aroclor 1242	360 U	370 U	18000 U	18000 U	17000 U	360 U	17000 U	18000 U
Aroclor 1248	3100	3600	22000	6000 J	9000 J	430	8700 J	6100 J
Aroclor 1254	360 U	370 U	18000 U	18000 U	17000 U	360 U	17000 U	18000 U
Aroclor 1260	2300	2200	62000	22000	18000	3800	57000	73000
Aroclor 1262	360 U	370 U	18000 U	18000 U	17000 U	360 U	17000 U	18000 U
Aroclor 1268	360 U	370 U	18000 U	18000 U	17000 U	360 U	17000 U	18000 U

U – not detected; J – estimated value; UJ – not detected, reporting limit estimated; R – rejected

DATA SUMMARY TABLE

Lab Sample ID	R0555-01	R0555-02	R0555-03	R0555-04	R0555-05	R0555-06	R0555-07	R0555-08	R0555-09	R0555-10	R0555-11
Field Sample ID	TP-05-0001	TP-05-0405	TP-14-0001	TP-14-0506	TP-13-0001	TP-13-0506	TP-12-0001	TP-12-0607	TP-04-0001	TP-04-0506	TP-03-0001
Sample Location	TP-05	TP-05	TP-14	TP-14	TP-13	TP-13	TP-12	TP-12	TP-04	TP-04	TP-03
Sample Date	06/15/16	06/15/16	06/15/16	06/15/16	06/15/16	06/15/16	06/15/16	06/15/16	06/15/16	06/15/16	06/15/16
Metals (mg/kg)											
Arsenic	13 J	0.78 UJ	21	26	17	41	65	20	9.6	11	6.9
Barium	300 J	210 J	230	280	210	260	400	390	110	210	41
Cadmium	4.8 J	29 J	11	15	16	27	18	20	1.2	2.1	0.14 J
Chromium	160 J	86000 J	1400	290	270	14000	91	260	53	34	18
Lead	660 J	1200 J	1100	1700	740	1100	790	6500	210	510	64
Mercury	2.2 J	2.6 J	4.2	4.1	6.4	6.1	4.8	5.7	0.2	1.4	0.093
Selenium	3.4	1.2 U	1.1 U	1.5 U	1.1 U	1.1 U	0.87 U	1.4 U	5.3	4.3	3
Silver	1.1 J	1.2 U	1.4	3.1	2.9	6.9	3.1	4.3	1.5 U	0.33 J	1.6 U
Chromium-Hexavalent	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

U – not detected; J – estimated value; UJ – not detected, reporting limit estimated; R – rejected

DATA SUMMARY TABLE

Lab Sample ID	R0555-12	R0555-13	R0555-14	R0555-15	R0555-16	R0555-17	R0555-18	R0555-19	R0555-20
Field Sample ID	TP-03-0405	TP-19-0001	TP-19-0607	TP-02-0001	TP-02-0304	TP-01-0001	TP-01-0203	TP-17-0001	TP-17-0304
Sample Location	TP-03	TP-19	TP-19	TP-02	TP-02	TP-01	TP-01	TP-17	TP-17
Sample Date	06/15/16	06/15/16	06/15/16	06/15/16	06/15/16	06/15/16	06/15/16	06/15/16	06/15/16
Metals (mg/kg)									
Arsenic	12	29	16	12	17	13	8.9	15	17
Barium	260	370	280	250	380	260	97	280	300
Cadmium	5.9	19	12	7.8	17	8.7	1.8	6.9	6.3
Chromium	77	1200	130	61	74	260	38	160	100
Lead	550	2000	1200	660	1400	760	150	780	920
Mercury	1.2	7.1	7.2	1.1	3.6	1.4	0.4	0.81	0.65
Selenium	4.5	1.1 U	1.4 U	6	2.8	5.6	4.2	4.7	4.2
Silver	0.51 J	2.2	1.6	0.5 J	0.76 J	1.1 J	1.5 U	0.34 J	1.3
Chromium-Hexavalent	NA	NA	0.568 U	NA	NA	NA	NA	NA	NA

U – not detected; J – estimated value; UJ – not detected, reporting limit estimated; R – rejected

Data Review Qualification Actions
Case: 0163S
SDG: R0555

Parameter	Analyte	Samples: R0555-#	Evaluation Criteria	Action Needed	Comments
Metals	Barium,Chromium and Lead	01-20	Lab Blank	Remove B	result >RL
Metals	Arsenic, Cadmium, Chromium, Lead, Mercury	01 and 02	Lab Dup	J/UJ	RPD >20%
Metals	Chromium	01 and 02	MS	J/UJ	low recoveries; PDS in control
Metals	Barium	01 and 02	MS	J	high recoveries
Metals	Mercury	01 and 02	MS	J-/UJ	low recoveries
Metals	Barium and Chromium	01 and 02	serial dilution	J/UJ	%D >10%
PCBs	Aroclor-1016 and 1260	03 (TP-14-0001)	MS	J	Aroclor 1016 - high recoveries; Aroclor-1260 high and low recoveries
PCBs	Aroclor-1016 and 1260	01 (TP-05-0001)	MS	J	Aroclor 1016 - high recoveries; Aroclor-1260 low recoveries
pH/ORP	pH/ORP	14 (TP-19-0607)	HT	J-	7 days

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☑ Final Report
☐ Re-Issued Report
☐ Revised Report
Report Date:
07-Jul-16 14:40

Laboratory Report

Nobis Engineering, Inc
585 Middlesex Street
Lowell, MA 01851

Work Order: R0561
Project : Lawrence, MA site
Project #:

Attn: Gail DeRuzzo

Laboratory ID	Client Sample ID	Matrix	Date Sampled	Date Received
R0561-01	TP-11-0001	Soil	16-Jun-16 08:20	20-Jun-16 12:20
R0561-02	TP-11-0506	Soil	16-Jun-16 08:30	20-Jun-16 12:20
R0561-03	TP-18-0001	Soil	16-Jun-16 09:30	20-Jun-16 12:20
R0561-04	TP-18-0304	Soil	16-Jun-16 09:40	20-Jun-16 12:20
R0561-05	MW-1-061616	Aqueous	16-Jun-16 09:05	20-Jun-16 12:20
R0561-06	MW-15-061616	Aqueous	16-Jun-16 12:25	20-Jun-16 12:20

I attest that the information contained within the report has been reviewed for accuracy and checked against the quality control requirements for each method. The results relate only to the samples(s) as received. This report may not be reproduced, except in full, without written approval from Eurofins Spectrum Analytical, Inc.

All applicable NELAC or USEPA CLP requirements have been met.

Use of the NELAP logo does not insure that Eurofins Spectrum Analytical is currently accredited for the specific test method or analyte. Please refer to our Quality page of our web site at www.spectrum-analytical.com for the current list of certifications and fields of accreditation.

Please contact the Laboratory or Technical Director at 401-732-3400 with any questions regarding the data contained in the laboratory report.

Connecticut	PH-0153
Florida	E87664
Massachusetts	M-RI907
New Hampshire	2060
New Jersey	RI001
New York	11522
Rhode Island	LAI00349
USDA	P330-16-00031
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USEPA - SOM	EP-W-14-032
Dod ELAP	L2247

NELAP ACCREDITED TNI LABORATORY

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DoD ELAP
Certificate # L2247 Testing

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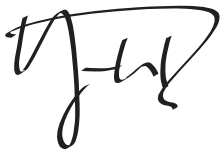

Yihai Ding
Laboratory Director

Engineering a Sustainable Future

Generic Data Review Checklist

Project: **Lawrence**
Project #: **80108**
Case#: **0163S**
Date: **7/11/16**
Methods: **VOCs-8260, PAHs – 8270, EPH plus targets, PCBs 8082, RCRA metals 6010, 7471/, Hex Cr – 7196A (3060A), Cyanide and PAC 9012 – MCP methods**
Laboratory: **Eurofins Spectrum Analytical**
SDG: **see below**
Reviewer: **Gail DeRuzzo**

1. Case Narrative and Data Package Completeness (COC and Analyte List Review)

SOILS:	GW:	IDW:
R0508 – 38 soils	R0536 – 4 GW	R0562
R0516 – 43 soils	R0545 – 3 GW	1 SO/1 AQ
R0521 – 33 soils	R0561 – 2 GW	not evaluated
R0526 – 40 soils		
R0530 – 22 soils + TB		
R0545 – 18 soils + TB		
R0555 – 20 soils		
R0561 – 4 soils		

Sample IDs printed separately.

2. Holding Time and Sample Preservation Compliance

ORP – TP-19-0607 – HT of 24 hrs exceeded. sampled 6/15 – delivered to lab 6/16, shipped to RI lab then back to MA lab – received 6/20. Analyzed 6/22. Estimate J-

3. Lab and Field Blanks

Ba (0.03457 (RL 10)); Cr (0.07967 (RL 1)), Pb (0.3508 (RL 0.5)) batch 84893 – samples (1-20); – B flag data >RL – remove B's

4. Laboratory Control Samples

OK

5. Field Duplicate Precision

NA

6. Laboratory Duplicate Precision

Metals:
As, Cd, Cr, Pb, Hg >20% in sample 01 (TP-05-0001) – J/UJ sample 01 and 02

7. Matrix Spikes

PCBs:

TP-05-0001 (R0555-01AMS), recovery is above criteria for Aroclor-1016 on rear column at 819% with criteria of (40-140), Aroclor-1016 on front column at 455% with criteria of (40-140), recovery is below criteria for Aroclor-1260 on rear column at 0% with criteria of (60-130) and Aroclor-1260 on front column at 0% with criteria of (60-130).
TP-05-0001 (R0555-01AMSD), recovery is above criteria forAroclor-1016 on rear column at 688% with criteria of (40-140), Aroclor-1016 on front column at 349% with criteria of (40-140), recovery is below criteria for Aroclor-1260 on rear column at 0% with criteria of (60-130) and Aroclor-1260 on front column at 0%with criteria of (60-130). J both Aroclor 1016 and 1260

TP-14-0001 (R0555-03AMS), recovery is above criteria for Aroclor-1016 on rear column at 305% with criteria of (40-140), Aroclor-1260 on rear column at 504% with criteria of (60-130) and Aroclor-1260 on front column at 186% with criteria of (60-130).
TP-14-0001 (R0555-03AMSD), recovery is below criteria for Aroclor-1016 on front column at 0% with criteria of (40-140), Aroclor-1260 on rear column at 0% with criteria of (60-130) and Aroclor-1260 on front column at 0% with criteria of (60-130).
TP-14-0001 (R0555-03AMSD), Relative Percent Difference is greater than reported RPD limit for Aroclor-1016 on rear column, Aroclor-1016 on front column, Aroclor-1260 on rear column, Aroclor-1260 on front column. J both Aroclor 1016 and 1260

Metals:
Ba (high), Cr (low 0%) out in sample 01 (TP-05-0001). PDS in control. (Note: Pb also out high but sample conc >4x spike amount). J/UJ 01 and 02 for Cr. J 01 and 02 for Ba.
Hg low in sample 01 (TP-05-0001) – J-/UJ 01 and 02

8. Surrogate Spikes
PCBs:
TP-05-0001 (R0555-01A), recovery is above criteria for Decachlorobiphenyl on rear column at 156% with criteria of (60-125) and Decachlorobiphenyl on front column at 186% with criteria of (60-125). Over cal – reanalyzed at dilution. This run not reported – no action.

9. Internal Standards
NA

10. Performance Evaluation Samples
NA

11. Reporting Limits
PCBs:
TP-05-0001 (R0555-01ADL) : Dilution Factor: 20
TP-05-0405 (R0555-02A) : Dilution Factor: 100
TP-14-0001 (R0555-03ADL) : Dilution Factor: 10
TP-14-0506 (R0555-04A) : Dilution Factor: 5
TP-13-0001 (R0555-05A) : Dilution Factor: 10
TP-13-0506 (R0555-06A) : Dilution Factor: 20

TP-12-0001 (R0555-07A) : Dilution Factor: 10
TP-12-0607 (R0555-08A) : Dilution Factor: 10
TP-04-0001 (R0555-09A) : Dilution Factor: 2
TP-04-0506 (R0555-10A) : Dilution Factor: 10
TP-03-0405 (R0555-12A) : Dilution Factor: 100
TP-19-0001 (R0555-13A) : Dilution Factor: 10
TP-19-0607 (R0555-14A) : Dilution Factor: 10
TP-02-0001 (R0555-15A) : Dilution Factor: 500
TP-02-0304 (R0555-16A) : Dilution Factor: 500
TP-01-0001 (R0555-17A) : Dilution Factor: 500
TP-01-0203 (R0555-18A) : Dilution Factor: 10
TP-17-0001 (R0555-19A) : Dilution Factor: 500
TP-17-0304 (R0555-20A) : Dilution Factor: 500

12. Calibration Issues

ok

13. Other

High concentrations of Iron in these samples caused interferences, especially with Selenium response. Samples TP-05-0405 and TP-13-0506 were highly contaminated with Chromium which makes trace levels of Arsenic and Selenium difficult to interpret.

Serial dilutions: Ba and Cr – 50x MDL, >10%D, J/UJ 01 and 02

Analyte lists and RLs were verified per the FTWP/QAPPA.

R0561

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CHAIN OF CUSTODY RECORD

Page 1 of 1

Special Handling:

☐ Standard TAT - 7 to 10 business days

☐ Rush TAT - Date Needed: _____

All TATs subject to laboratory approval
Min. 24-hr notification needed for rushes
Samples disposed after 60 days unless otherwise instructed.

Report To: NOBIS ENGINEERING

Telephone #:

Project Mgr: A. ROY / S. VETERE

Invoice To:

P.O No.: _____ Quote #: _____

Project No: 80108.04

Site Name: LAWRENCE TBA

Location: LAWRENCE State: MA

Sampler(s): EHJ
AG

F=Field Filtered 1=Na_2S2O_3 2=HCl 3=H_2SO_4 4=HNO_3 5=NaOH 6=Ascorbic Acid
7=CH_3OH 8=$NaHSO_4$ 9=Deionized Water 10=H_3PO_4 11= _____ 12= _____

DW=Dinking Water GW=Groundwater SW=Surface Water WW=Waste Water
O=Oil SO=Soil SL=Sludge A=Indoor/Ambient Air SG=Soil Gas
X1= _____ X2= _____ X3= _____

G= Grab C=Compsite

Lab ID:	Sample ID:	Date:	Time:	Type	Matrix	Containers: # of VOA Vials	# of Amber Glass	# of Clear Glass	# of Plastic	List Preservative Code below:		2			2	4		Check if chlorinated
												Analysis: PCBs	RCRA 8 METALS	VOCs	PCBs	PAHs	EPH	Metals		
	TP-11-0001	6/16/16	820	G	SO		1					X	X							☐
	TP-11-0506		830	G	SO		1					X	X							☐
	TP-18-0001		930	G	SO		1					X	X							☐
	TP-18-0304		940	G	SO		1					X	X							☐
	MW-1-061616		905	G	GW	3	6		1					X	X	X	X	X		☐
	MW-15-061616		1225	G	GW	3	6		1					X	X	X	X	X		☐
																				☐
																				☐
																				☐
																				☐

QA/QC Reporting Notes:
* additional charges may appply

MA DEP MCP CAM Report? ☐ Yes ☐ No
CT DPH RCP Report? ☐ Yes ☐ No
☐ Standard ☐ No QC ☐ DQA*
☐ ASP A* ☐ ASP B*
☐ NJ Reduced* ☐ NJ Full*
☐ Tier II* ☐ Tier IV*
☐ Other: _____
State-specific reporting standards:

Relinquished by:	Received by:	Date:	Time:	Temp °C
	NOBIS COLD STORAGE	6/16/16	1730	Observed 0.1
		6-17-16	1324	Correction Factor 0
	SUBCONT	6/17/16	1835	Corrected 0.1
SUBCONT		6-20-16	9:00	IR ID # 01
	Scott & USA	6/20/16	12:20 PM	3.5°C IR

☐ EDD format: _____

☐ E-mail to: _____

Condition upon receipt: Custody Seals: ☐ Present ☐ Intact ☐ Broken

☐ Ambient ☐ Iced ☒ Refrigerated ☒ ~~DI VOA Frozen~~ DT ☐ Soil Jar Frozen

Nobis
Engineering a Sustainable Future

July 11, 2016
Nobis File No. 80108

Mr. Alan Peterson
EPA-New England Region I
5 Post Office Square
Suite 100, Mailcode OSRR07-4
Boston, MA 02109-3912

Re: Contract No.: EP-S1-06-03
Task Order No. 0108-SI-BZ-0100
Case No. 0163S, Laboratory Report No.: R0561
Eurofins Spectrum Analytical, North Kingston, Rhode Island
Former Tombarello Property
Lawrence, Massachusetts

Tier 1 Modified Organic and Inorganic Data Review

PCBs and Metals:
4/Soils: TP-11-0001, TP-11-0506, TP-18-0001, TP-18-0304

VOCs, PCBs, PAHs, EPH, and Metals:
2/Groundwater Samples: MW-1-061616 and MW-15-061616

Dear Mr. Peterson:

Nobis Engineering, Inc. performed a Tier 1 Modified data review on the organic and inorganic analytical data for the samples listed in the attached sample listing. The samples were collected by Nobis at the Former Tombarello Property located in Lawrence, Massachusetts. The soil samples were analyzed for Resource Conservation and Recovery Act (RCRA) metals and polychlorinated biphenyls (PCBs). The groundwater samples were analyzed for volatile organic compounds (VOCs), polycyclic aromatic hydrocarbons (PAHs), RCRA metals, extractable petroleum hydrocarbons (EPH), and PCBs. See the included Data Summary Table and chain-of-custody for samples selected for each analysis. The laboratory performed testing according to Massachusetts Contingency Plan (MCP) Compendium of Analytical Methods (CAM) and to Nobis technical specification RAC2-087.

The Tier 1 Modified data review was performed in accordance with the EPA New England Environmental Data Review Supplement for Regional Data Review Elements and Superfund Specific Guidance/Procedures (April 2013); USEPA National Functional Guidelines for Inorganic Superfund Data Review (August 2014); USEPA National Functional Guidelines for Superfund Organic Methods Data Review (August 2014) and the Field Task Work Plan (FTWP) and Quality Assurance Project Plan Addendum (QAPPA) for the Targeted Brownfields Assessment (TBA) for the Former Tombarello Property (June 2016).

The data were evaluated based on the following parameters:

Nobis Engineering, Inc.
585 Middlesex Street
Lowell, MA 01851
T (978) 683-0891

*	•	Overall Evaluation of Data and Potential Usability Issues
*	•	Data Completeness
*	•	Preservation and Technical Holding Times
*	•	Instrument Calibration
	•	Blanks
*	•	Laboratory Control Samples (LCS)
*	•	Laboratory Duplicates
NA	•	Field Duplicates
NA	•	Matrix Spike Analysis
	•	Surrogate Compounds
*	•	Internal Standards
NA	•	Performance Evaluation Sample Results
*	•	Reported Quantitation Limits

* All criteria were met for this parameter.
NA – Not applicable.

Overall Evaluation of Data and Potential Usability Issues

The objectives of the investigation activities at the site are to delineate the nature and extent of soil and groundwater contamination on the Site so that potential remedial alternatives can be evaluated and order-of-magnitude cost estimates can be developed. Analytical and hydrogeological data collected during the investigation will be compiled and reduced to develop a conceptual site model to support the estimation of human health risks and development of remedial alternatives.

The data meet the project quality criteria and can be used without restriction except as summarized below. The attachments provide details and supporting documentation.

VOCs:

Results did not require qualification.

PAHs:

Results did not require qualification.

EPH:

Results did not require qualification.

PCBs:

Results were qualified for surrogate spike recovery failures.

Metals:

Results were qualified for laboratory blank contamination.

Please contact Gail DeRuzzo at (978) 703-6021 or gderuzzo@nobiseng.com should you have any questions or comments regarding this information.

Sincerely,

NOBIS ENGINEERING, INC.

Gail DeRuzzo
Lead Chemist

Tables: Data Summary Table – Tier 1 Mod Data Review
Data Qualification Actions Table

Attachments: Sample ID List
Data Review Checklist
COCs

DATA SUMMARY TABLE

Lab Sample ID	R0561-01	R0561-02	R0561-03	R0561-04
Field Sample ID	TP-11-0001	TP-11-0506	TP-18-0001	TP-18-0304
Sample Location	TP-11	TP-11	TP-18	TP-18
Sample Date	06/16/16	06/16/16	06/16/16	06/16/16
PCBs (ug/kg)				
Aroclor 1016	730 U	7700 U	360 U	34 U
Aroclor 1221	730 U	7700 U	360 U	34 U
Aroclor 1232	730 U	7700 U	360 U	34 U
Aroclor 1242	730 U	7700 U	360 U	34 U
Aroclor 1248	3900	36000	2800	34 U
Aroclor 1254	730 U	7700 U	360 U	34 U
Aroclor 1260	730 U	19000	1800	190
Aroclor 1262	730 U	7700 U	360 U	34 U
Aroclor 1268	730 U	7700 U	360 U	34 U

U – not detected; J – estimated value; UJ – not detected, reporting limit estimated; R – rejected

DATA SUMMARY TABLE

Lab Sample ID	R0561-01	R0561-02	R0561-03	R0561-04
Field Sample ID	TP-11-0001	TP-11-0506	TP-18-0001	TP-18-0304
Sample Location	TP-11	TP-11	TP-18	TP-18
Sample Date	06/16/16	06/16/16	06/16/16	06/16/16
Metals (mg/kg)				
Arsenic	15	16	10	5.6
Barium	330	360	240	34
Cadmium	18	26	9.9	0.32
Chromium	150	170	79	28
Lead	1300	1500	690	26
Mercury	14	18	12	0.091
Selenium	1 U	1.5 U	2.7	0.71 J
Silver	1.6	0.55 J	2.7	1.1 U

U – not detected; J – estimated value; UJ – not detected, reporting limit estimated; R – rejected

DATA SUMMARY TABLE

Lab Sample ID	R0561-05	R0561-06
Field Sample ID	MW-1-061616	MW-15-061616
Sample Location	MW-01	MW-15
Sample Date	06/16/16	06/16/16
PCBs (ug/L)		
Aroclor 1016	0.5 UJ	0.5 U
Aroclor 1221	0.5 UJ	0.5 U
Aroclor 1232	0.5 UJ	0.5 U
Aroclor 1242	0.5 UJ	0.5 U
Aroclor 1248	0.5 UJ	0.5 U
Aroclor 1254	0.5 UJ	0.5 U
Aroclor 1260	0.5 UJ	0.5 U
Aroclor 1262	0.5 UJ	0.5 U
Aroclor 1268	0.5 UJ	0.5 U

U – not detected; J – estimated value; UJ – not detected, reporting limit estimated; R – rejected

DATA SUMMARY TABLE

Lab Sample ID	R0561-05	R0561-06
Field Sample ID	MW-1-061616	MW-15-061616
Sample Location	MW-01	MW-15
Sample Date	06/16/16	06/16/16
Metals (mg/L)		
Arsenic	0.00005 J	0.00178
Barium	0.0145 J	0.0244 J
Cadmium	0.000042 J	0.000049 J
Chromium	0.0052 U	0.0052 U
Lead	0.0005 U	0.00131
Selenium	0.00044 J	0.0005 U
Silver	0.0005 U	0.00003 J

U – not detected; J – estimated value; UJ – not detected, reporting limit estimated; R – rejected

DATA SUMMARY TABLE

Lab Sample ID	R0561-05	R0561-06
Field Sample ID	MW-1-061616	MW-15-061616
Sample Location	MW-01	MW-15
Sample Date	06/16/16	06/16/16
Volatiles (ug/L)		
1,1,1,2-Tetrachloroethane	1 U	1 U
1,1,1-Trichloroethane	1 U	1 U
1,1,2,2-Tetrachloroethane	1 U	1 U
1,1,2-Trichloroethane	1 U	1 U
1,1-Dichloroethane	1 U	1 U
1,1-Dichloroethene	1 U	1 U
1,1-Dichloropropene	1 U	1 U
1,2,3-Trichlorobenzene	1 U	1 U
1,2,3-Trichloropropane	1 U	1 U
1,2,4-Trichlorobenzene	1 U	1 U
1,2,4-Trimethylbenzene	1 U	1 U
1,2-Dibromo-3-chloropropane	1 U	1 U
1,2-Dibromoethane	1 U	1 U
1,2-Dichlorobenzene	1 U	1 U
1,2-Dichloroethane	1 U	1 U
1,2-Dichloropropane	1 U	1 U
1,3,5-Trimethylbenzene	1 U	1 U
1,3-Dichlorobenzene	1 U	1 U
1,3-Dichloropropane	1 U	1 U
1,4-Dichlorobenzene	1 U	1 U
1,4-Dioxane	100 U	100 U
2,2-Dichloropropane	1 U	1 U
2-Butanone	5 U	5 U
2-Chlorotoluene	1 U	1 U
2-Hexanone	5 U	5 U
4-Chlorotoluene	1 U	1 U
4-Isopropyltoluene	5 U	5 U
4-Methyl-2-pentanone	5 U	5 U
Acetone	5 U	5 U
Benzene	1 U	1 U
Bromobenzene	1 U	1 U
Bromochloromethane	1 U	1 U

U – not detected; J – estimated value; UJ – not detected, reporting limit estimated; R – rejected

DATA SUMMARY TABLE

Lab Sample ID	R0561-05	R0561-06
Field Sample ID	MW-1-061616	MW-15-061616
Sample Location	MW-01	MW-15
Sample Date	06/16/16	06/16/16
Bromodichloromethane	1 U	1 U
Bromoform	1 U	1 U
Bromomethane	1 U	1 U
Carbon disulfide	1 U	1 U
Carbon tetrachloride	1 U	1 U
Chlorobenzene	1 U	1 U
Chloroethane	1 U	1 U
Chloroform	1 U	1 U
Chloromethane	1 U	1 U
cis-1,2-Dichloroethene	1 U	1 U
cis-1,3-Dichloropropene	1 U	1 U
Dibromochloromethane	1 U	1 U
Dibromomethane	1 U	1 U
Dichlorodifluoromethane	1 U	1 U
Diethyl ether	1 U	1 U
Diisopropyl Ether	1 U	1 U
Ethylbenzene	1 U	1 U
Hexachlorobutadiene	1 U	1 U
Isopropylbenzene	1 U	1 U
m,p-Xylene	1 U	1 U
Methyl tert-butyl ether	1 U	1 U
Methylene chloride	1 U	1 U
Naphthalene	1 U	1 U
n-Butylbenzene	1 U	1 U
n-Propylbenzene	1 U	1 U
o-Xylene	1 U	1 U
sec-Butylbenzene	1 U	1 U
Styrene	1 U	1 U
tert-Amyl methyl ether	1 U	1 U
Tert-Butyl Ethyl Ether	1 U	1 U
tert-Butylbenzene	1 U	1 U
Tetrachloroethene	1 U	1 U
Tetrahydrofuran	5 U	5 U

U – not detected; J – estimated value; UJ – not detected, reporting limit estimated; R – rejected

DATA SUMMARY TABLE

Lab Sample ID	R0561-05	R0561-06
Field Sample ID	MW-1-061616	MW-15-061616
Sample Location	MW-01	MW-15
Sample Date	06/16/16	06/16/16
Toluene	1 U	1 U
trans-1,2-Dichloroethene	1 U	1 U
trans-1,3-Dichloropropene	1 U	1 U
Trichloroethene	1 U	1 U
Trichlorofluoromethane	1 U	1 U
Vinyl chloride	1 U	1 U
Xylene (total)	5 U	5 U

U – not detected; J – estimated value; UJ – not detected, reporting limit estimated; R – rejected

DATA SUMMARY TABLE

Lab Sample ID	R0561-05	R0561-06
Field Sample ID	MW-1-061616	MW-15-061616
Sample Location	MW-01	MW-15
Sample Date	06/16/16	06/16/16
Semivolatiles (ug/L)		
1,4-Dioxane	0.1 U	0.1 U
2-Methylnaphthalene	0.1 U	0.1 U
Acenaphthene	0.1 U	0.1 U
Acenaphthylene	0.1 U	0.1 U
Anthracene	0.1 U	0.1 U
Benzo(a)anthracene	0.1 U	0.1 U
Benzo(a)pyrene	0.1 U	0.13
Benzo(b)fluoranthene	0.1 U	0.1 U
Benzo(g,h,i)perylene	0.1 U	0.1 U
Benzo(k)fluoranthene	0.1 U	0.1 U
Chrysene	0.1 U	0.1 U
Dibenz(a,h)anthracene	0.1 U	0.1 U
Fluoranthene	0.1 U	0.19
Fluorene	0.1 U	0.1 U
Indeno(1,2,3-cd)pyrene	0.1 U	0.1 U
Naphthalene	0.1 U	0.1 U
Phenanthrene	0.17	0.19
Pyrene	0.1 U	0.14

DATA SUMMARY TABLE

Lab Sample ID	R0561-05	R0561-06
Field Sample ID	MW-1-061616	MW-15-061616
Sample Location	MW-01	MW-15
Sample Date	06/16/16	06/16/16
EPH (ug/L)		
2-Methylnaphthalene	6.25 U	5.62 U
Acenaphthene	6.25 U	5.62 U
Acenaphthylene	6.25 U	5.62 U
Anthracene	6.25 U	5.62 U
Benzo(a)anthracene	6.25 U	5.62 U
Benzo(a)pyrene	6.25 U	5.62 U
Benzo(b)fluoranthene	6.25 U	5.62 U
Benzo(g,h,i)perylene	6.25 U	5.62 U
Benzo(k)fluoranthene	6.25 U	5.62 U
C11-C22 Aromatics	125 U	112 U
C19-C36 Aliphatics	125 U	112 U
C9-C18 Aliphatics	125 U	112 U
Chrysene	6.25 U	5.62 U
Dibenz(a,h)anthracene	6.25 U	5.62 U
Fluoranthene	6.25 U	5.62 U
Fluorene	6.25 U	5.62 U
Indeno(1,2,3-cd)pyrene	6.25 U	5.62 U
Naphthalene	6.25 U	5.62 U
Phenanthrene	6.25 U	5.62 U
Pyrene	6.25 U	5.62 U

Data Review Qualification Actions

Case: 0163S

SDG: R0561

Parameter	Analyte	Samples: R0561-#	Evaluation Criteria	Action Needed	Comments
Metals	Chromium and Lead	01-04	Lab Blank	Remove B	result >RL
Metals	Chromium and Lead	GW 05	Lab Blank	U at RL	blank trace levels
Metals	Chromium	GW 06	Lab Blank	U at RL	blank trace levels
PCBs	All	05 (MW-1-061616)	surrogates	UJ	low recoveries

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☑ Final Report
☐ Re-Issued Report
☐ Revised Report
Report Date:
07-Jul-16 14:40

Laboratory Report

Nobis Engineering, Inc
585 Middlesex Street
Lowell, MA 01851

Work Order: R0561
Project : Lawrence, MA site
Project #:

Attn: Gail DeRuzzo

Laboratory ID	Client Sample ID	Matrix	Date Sampled	Date Received
R0561-01	TP-11-0001	Soil	16-Jun-16 08:20	20-Jun-16 12:20
R0561-02	TP-11-0506	Soil	16-Jun-16 08:30	20-Jun-16 12:20
R0561-03	TP-18-0001	Soil	16-Jun-16 09:30	20-Jun-16 12:20
R0561-04	TP-18-0304	Soil	16-Jun-16 09:40	20-Jun-16 12:20
R0561-05	MW-1-061616	Aqueous	16-Jun-16 09:05	20-Jun-16 12:20
R0561-06	MW-15-061616	Aqueous	16-Jun-16 12:25	20-Jun-16 12:20

I attest that the information contained within the report has been reviewed for accuracy and checked against the quality control requirements for each method. The results relate only to the samples(s) as received. This report may not be reproduced, except in full, without written approval from Eurofins Spectrum Analytical, Inc.

All applicable NELAC or USEPA CLP requirements have been met.

Use of the NELAP logo does not insure that Eurofins Spectrum Analytical is currently accredited for the specific test method or analyte. Please refer to our Quality page of our web site at www.spectrum-analytical.com for the current list of certifications and fields of accreditation.

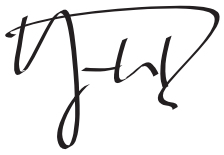
Please contact the Laboratory or Technical Director at 401-732-3400 with any questions regarding the data contained in the laboratory report.

Connecticut	PH-0153
Florida	E87664
Massachusetts	M-RI907
New Hampshire	2060
New Jersey	RI001
New York	11522
Rhode Island	LAI00349
USDA	P330-16-00031
USEPA - ISM	EP-W-14-032
USEPA - SOM	EP-W-14-032
Dod ELAP	L2247

NELAP ACCREDITED TNI LABORATORY

LABORATORY ACCREDITATION BUREAU ACCREDITED
DoD ELAP
Certificate # L2247 Testing

Authorized by:



Yihai Ding
Laboratory Director

Engineering a Sustainable Future

Generic Data Review Checklist

Project: **Lawrence**
Project #: **80108**
Case#: **0163S**
Date: **7/11/16**
Methods: **VOCs-8260, PAHs – 8270, EPH plus targets, PCBs 8082, RCRA metals 6010, 7471/, Hex Cr – 7196A (3060A), Cyanide and PAC 9012 – MCP methods**
Laboratory: **Eurofins Spectrum Analytical**
SDG: **see below**
Reviewer: **Gail DeRuzzo**

1. Case Narrative and Data Package Completeness (COC and Analyte List Review)

SOILS:
R0508 – 38 soils
R0516 – 43 soils
R0521 – 33 soils
R0526 – 40 soils
R0530 – 22 soils + TB
R0545 – 18 soils
R0555 – 20 soils
R0561 – 4 soils

GW:
R0536 – 4 GW
R0545 – 3 GW + TB
R0561 – 2 GW

IDW:
R0562
1 SO/1 AQ
not evaluated

Sample IDs printed separately.

NOTE: Metals for GW analyzed for this SDG at MA lab. Results reported in SDG R0545. RLs reported different than in FTWP/QAPPA:

Element	Action Limit	FTWP/QAPP (ug/L)	Report (ug/L)
Arsenic	**10**	**2**	**0.5**
Barium	**2000**	**10**	**25**
Cadmium	**5**	**1**	**0.5**
Chromium	**100**	**2**	**5.2**
Lead	**15**	**1**	**0.5**
Selenium	**50**	**5**	**0.5**
Silver	**100**	**1**	**0.5**

Barium and Chromium RLs are higher at MA lab but still are below the action limit.

2. Holding Time and Sample Preservation Compliance

ok

3. Lab and Field Blanks

Metals soil:
Cr (0.03107 (RL 1)); Hg (0.002854 (RL 0.033) – B flag data – remove B's samples 01-04
Metals GW:
Cr (0.29 (RL 5.2)), Pb (0.02 (RL 0.05)), Ag (0.02 (RL 0.5)), Cr, Pb – sample 05 and Cr for 06 - U at RL

4. **Laboratory Control Samples**
   VOCs: batch 84842 1,4-dioxane high (139% vs 130) – samples ND – no action.

5. **Field Duplicate Precision**
   NA

6. **Laboratory Duplicate Precision**
   OK

7. **Matrix Spikes**
   NA

8. **Surrogate Spikes**
   PCBs:

MW-1-061616 (R0561-05A), recovery is below criteria for Decachlorobiphenyl on rear column at 33% with criteria of (40-135) and Decachlorobiphenyl on front column at 35% with criteria of (40-135). UJ

9. **Internal Standards**
   ok

10. **Performance Evaluation Samples**
    NA

11. **Reporting Limits**

PCBs:

TP-11-0001 (R0561-01A) : Dilution Factor: 20
TP-11-0506 (R0561-02A) : Dilution Factor: 200
TP-18-0001 (R0561-03A) : Dilution Factor: 10

12. **Calibration Issues**
    ok

13. **Other**

Analyte lists and RLs were verified per the FTWP/QAPPA.

R0561

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CHAIN OF CUSTODY RECORD

Page 1 of 1

Special Handling:

☐ Standard TAT - 7 to 10 business days

☐ Rush TAT - Date Needed: _____

All TATs subject to laboratory approval
Min. 24-hr notification needed for rushes
Samples disposed after 60 days unless otherwise instructed.

Report To: NOBIS ENGINEERING

Telephone #:

Project Mgr: A. ROY / S. VETERE

Invoice To:

P.O No.: _____ Quote #: _____

Project No: 80108.04

Site Name: LAWRENCE TBA

Location: LAWRENCE State: MA

Sampler(s): EHJ
AG

F=Field Filtered 1=Na_2S2O_3 2=HCl 3=H_2SO_4 4=HNO_3 5=NaOH 6=Ascorbic Acid
7=CH_3OH 8=$NaHSO_4$ 9=Deionized Water 10=H_3PO_4 11= _____ 12= _____

DW=Dinking Water GW=Groundwater SW=Surface Water WW=Waste Water
O=Oil SO=Soil SL=Sludge A=Indoor/Ambient Air SG=Soil Gas
X1= _____ X2= _____ X3= _____

G= Grab C=Compsite

Lab ID:	Sample ID:	Date:	Time:	Type	Matrix	Containers: # of VOA Vials	# of Amber Glass	# of Clear Glass	# of Plastic	List Preservative Code below:		2			2	4		Check if chlorinated
												Analysis: PCBs	RCRA 8 METALS	VOCs	PCBs	PAHs	EPH	Metals		
	TP-11-0001	6/16/16	820	G	SO		1					X	X							☐
	TP-11-0506		830	G	SO		1					X	X							☐
	TP-18-0001		930	G	SO		1					X	X							☐
	TP-18-0304		940	G	SO		1					X	X							☐
	MW-1-061616		905	G	GW	3	6		1					X	X	X	X	X		☐
	MW-15-061616		1225	G	GW	3	6		1					X	X	X	X	X		☐
																				☐
																				☐
																				☐
																				☐

QA/QC Reporting Notes:
* additional charges may appply

MA DEP MCP CAM Report? ☐ Yes ☐ No
CT DPH RCP Report? ☐ Yes ☐ No
☐ Standard ☐ No QC ☐ DQA*
☐ ASP A* ☐ ASP B*
☐ NJ Reduced* ☐ NJ Full*
☐ Tier II* ☐ Tier IV*
☐ Other: _____
State-specific reporting standards:

Relinquished by:	Received by:	Date:	Time:	Temp °C
	NOBIS COLD STORAGE	6/16/16	1730	Observed 0.1
		6-17-16	1324	Correction Factor 0
	SUBCONT	6/17/16	1835	Corrected 0.1
SUBCONT		6-20-16	9:00	IR ID # 01
	Scott & USA	6/20/16	12:20 PM	3.5°C IR

☐ EDD format: _____

☐ E-mail to: _____

Condition upon receipt: Custody Seals: ☐ Present ☐ Intact ☐ Broken

☐ Ambient ☐ Iced ☒ Refrigerated ☒ ~~DI VOA Frozen~~ DT ☐ Soil Jar Frozen

Nobis
Engineering a Sustainable Future

July 11, 2016
Nobis File No. 80108

Mr. Alan Peterson
EPA-New England Region I
5 Post Office Square
Suite 100, Mailcode OSRR07-4
Boston, MA 02109-3912

Re: Contract No.: EP-S1-06-03
Task Order No. 0108-SI-BZ-0100
Case No. 0163S, Laboratory Report No.: R0570
Eurofins Spectrum Analytical, North Kingston, Rhode Island
Former Tombarello Property
Lawrence, Massachusetts

Tier 1 Modified Inorganic Data Review

Dissolved Metals:
1/Groundwater Sample: MW-11-F-061716

Dear Mr. Peterson:

Nobis Engineering, Inc. performed a Tier 1 Modified data review on the inorganic analytical data for the sample listed in the attached sample listing. The sample was collected by Nobis at the Former Tombarello Property located in Lawrence, Massachusetts. The groundwater sample was analyzed for dissolved RCRA metals. The laboratory performed testing according to Massachusetts Contingency Plan (MCP) Compendium of Analytical Methods (CAM) and to Nobis technical specification RAC2-087.

The Tier 1 Modified data review was performed in accordance with the EPA New England Environmental Data Review Supplement for Regional Data Review Elements and Superfund Specific Guidance/Procedures (April 2013); USEPA National Functional Guidelines for Inorganic Superfund Data Review (August 2014); USEPA National Functional Guidelines for Superfund Organic Methods Data Review (August 2014) and the Field Task Work Plan (FTWP) and Quality Assurance Project Plan Addendum (QAPPA) for the Targeted Brownfields Assessment (TBA) for the Former Tombarello Property (June 2016).

The data were evaluated based on the following parameters:

* • Overall Evaluation of Data and Potential Usability Issues
* • Data Completeness
* • Preservation and Technical Holding Times

Nobis Engineering, Inc.
585 Middlesex Street
Lowell, MA 01851
T (978) 683-0891

*	•	Instrument Calibration
*	•	Blanks
*	•	Laboratory Control Samples (LCS)
*	•	Laboratory Duplicates
NA	•	Field Duplicates
*	•	Matrix Spike Analysis
NA	•	Surrogate Compounds
NA	•	Internal Standards
NA	•	Performance Evaluation Sample Results
*	•	Reported Quantitation Limits

* All criteria were met for this parameter.
NA – Not applicable.

Overall Evaluation of Data and Potential Usability Issues

The objectives of the investigation activities at the site are to delineate the nature and extent of soil and groundwater contamination on the Site so that potential remedial alternatives can be evaluated and order-of-magnitude cost estimates can be developed. Analytical and hydrogeological data collected during the investigation will be compiled and reduced to develop a conceptual site model to support the estimation of human health risks and development of remedial alternatives.

The data meet the project quality criteria and can be used without restriction except as summarized below. The attachments provide details and supporting documentation.

Metals:

Results did not require qualification.

Please contact Gail DeRuzzo at (978) 703-6021 or gderuzzo@nobiseng.com should you have any questions or comments regarding this information.

Sincerely,

NOBIS ENGINEERING, INC.

Gail DeRuzzo
Lead Chemist

Tables: Data Summary Table – Tier 1 Mod Data Review
Data Qualification Actions Table

Attachments: Sample ID List
Data Review Checklist
COCs

DATA SUMMARY TABLE

Lab Sample ID	R0570-01
Field Sample ID	MW-11-F-061716
Sample Location	MW-11F
Sample Date	06/17/16
Dissolved Metals (ug/L)	
Arsenic	2.4
Barium	100
Cadmium	0.31 J
Chromium	2 U
Lead	0.36 J
Mercury	0.03 J
Selenium	5 U
Silver	1 U

U – not detected; J – estimated value; UJ – not detected, reporting limit estimated; R – rejected

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☑ Final Report
☐ Re-Issued Report
☐ Revised Report
Report Date:
11-Jul-16 10:25

Laboratory Report

Nobis Engineering, Inc
585 Middlesex Street
Lowell, MA 01851

Work Order: R0570
Project : Lawrence, MA site
Project #:

Attn: Gail DeRuzzo

Laboratory ID	Client Sample ID	Matrix	Date Sampled	Date Received
R0570-01	MW-11-F-061716	Aqueous	17-Jun-16 08:00	22-Jun-16 11:00

I attest that the information contained within the report has been reviewed for accuracy and checked against the quality control requirements for each method. The results relate only to the samples(s) as received. This report may not be reproduced, except in full, without written approval from Eurofins Spectrum Analytical, Inc.

All applicable NELAC or USEPA CLP requirements have been met.

Use of the NELAP logo does not insure that Eurofins Spectrum Analytical is currently accredited for the specific test method or analyte. Please refer to our Quality page of our web site at www.spectrum-analytical.com for the current list of certifications and fields of accreditation.

Please contact the Laboratory or Technical Director at 401-732-3400 with any questions regarding the data contained in the laboratory report.

Connecticut	PH-0153
Florida	E87664
Massachusetts	M-RI907
New Hampshire	2060
New Jersey	RI001
New York	11522
Rhode Island	LAI00349
USDA	P330-16-00031
USEPA - ISM	EP-W-14-032
USEPA - SOM	EP-W-14-032
Dod ELAP	L2247

Engineering a Sustainable Future

Generic Data Review Checklist

Project: **Lawrence**
Project #: **80108**
Case#: **0163S**
Date: **7/11/16**
Methods: **VOCs-8260, PAHs – 8270, EPH plus targets, PCBs 8082, RCRA metals 6010, 7471/, Hex Cr – 7196A (3060A), Cyanide and PAC 9012 – MCP methods**
Laboratory: **Eurofins Spectrum Analytical**
SDG: **see below**
Reviewer: **Gail DeRuzzo**

1. Case Narrative and Data Package Completeness (COC and Analyte List Review)

SOILS:	GW:	IDW:
R0508 – 38 soils	R0536 – 4 GW	R0562
R0516 – 43 soils	R0545 – 3 GW + TB	1 SO/1 AQ
R0521 – 33 soils	R0561 – 2 GW	not evaluated
R0526 – 40 soils	R0570 – 1 GW – dissolved metals only	
R0530 – 22 soils + TB	no issues	
R0545 – 18 soils		
R0555 – 20 soils		
R0561 – 4 soils		

Sample IDs printed separately.

2. Holding Time and Sample Preservation Compliance

ok

3. Lab and Field Blanks

ok

4. Laboratory Control Samples

OK

5. Field Duplicate Precision

NA

6. Laboratory Duplicate Precision

OK

7. Matrix Spikes

ok

8. Surrogate Spikes

NA

9. Internal Standards

NA

10. Performance Evaluation Samples

NA

11. Reporting Limits

12. Calibration Issues

ok

13. Other

Analyte lists and RLs were verified per the FTWP/QAPPA.

R0570

eurofins | Spectrum Analytical

CHAIN OF CUSTODY RECORD

Page 1 of 1

Special Handling:

☐ Standard TAT - 7 to 10 business days

☐ Rush TAT - Date Needed: _____

All TATs subject to laboratory approval
Min. 24-hr notification needed for rushes
Samples disposed after 60 days unless otherwise instructed.

Report To: Nobis Engineering

Telephone #:

Project Mgr: A. Roy / S. Vetere

Invoice To:

P.O No.: Quote #:

Project No: 80108-09

Site Name: Lawrence TBA

Location: Lawrence State: MA

Sampler(s): AG

F=Field Filtered 1=Na_2S2O_3 2=HCl 3=H_2SO_4 4=HNO_3 5=NaOH 6=Ascorbic Acid
7=CH3OH 8=$NaHSO_4$ 9=Deionized Water 10=H_3PO_4 11= ~~HEXANE~~ 12= _____

DW=Dinking Water GW=Groundwater SW=Surface Water WW=Waste Water
O=Oil SO=Soil SL=Sludge A=Indoor/Ambient Air SG=Soil Gas
X1= _____ X2= _____ X3= _____

G= Grab C=Compsite

List Preservative Code below: 4 6 4

QA/QC Reporting Notes:
* additional charges may appply

MA DEP MCP CAM Report? ☐ Yes ☐ No
CT DPH RCP Report? ☐ Yes ☐ No
☐ Standard ☐ No QC ☐ DQA*
☐ ASP A* ☐ ASP B*
☐ NJ Reduced* ☐ NJ Full*
☐ Tier II* ☐ Tier IV*
☐ Other: _____
State-specific reporting standards:

Lab ID:	Sample ID:	Date:	Time:	Type	Matrix	Containers: # of VOA Vials	# of Amber Glass	# of Clear Glass	# of Plastic	Analysis: Dissolved metals	Check if chlorinated
	MW-11-F-061716	6/17/16	08:00	G	W				1	X	☐
											☐
											☐
											☐
											☐
											☐
											☐
											☐
											☐
											☐

Relinquished by:	Received by:	Date:	Time:	Temp °C
	Nobis cold storage	6/17/16	14:00	Observed 1.3
		6-21-16	1127	Correction Factor 0
		6/21/16	1835	Corrected 1.3
7:55 6/22/16		6/22/16	11:00 am	IR-10 02

☐ EDD format: _____

☐ E-mail to: _____

Condition upon receipt: Custody Seals: ☐ Present ☐ Intact ☐ Broken

☐ Ambient ☐ Iced ☒ Refrigerated ☐ DI VOA Frozen ☐ Soil Jar Frozen

Sample shipping address: 11 Almgren Drive • Agawam, MA 01001 • 413-789-9018 • www.EurofinsUS.com/Spectrum

3.5C/0/3.5C

Nobis
Engineering a Sustainable Future

July 21, 2016
Nobis File No. 80108

Mr. Alan Peterson
EPA-New England Region I
5 Post Office Square
Suite 100, Mailcode OSRR07-4
Boston, MA 02109-3912

Re: Contract No.: EP-S1-06-03
Task Order No. 0108-SI-BZ-0100
Case No. 0163S, Laboratory Report No.: R0640
Eurofins Spectrum Analytical, North Kingston, Rhode Island
Former Tombarello Property
Lawrence, Massachusetts

Tier 1 Modified Inorganic Data Review

TCLP Metals:
8/Soils: CD-45E-0103, CD-45S-0103, SVA-03-0103, SVA-06-0001, TP-20-0506, TP-05-0405, TP-13-0506, TP-12-0607

Dear Mr. Peterson:

Nobis Engineering, Inc. performed a Tier 1 Modified data review on the inorganic analytical data for the samples listed in the attached sample listing. The samples were collected by Nobis at the Former Tombarello Property located in Lawrence, Massachusetts. The samples were analyzed for toxicity characteristic leaching procedure (TCLP) metals. The laboratory performed testing according to Massachusetts Contingency Plan (MCP) Compendium of Analytical Methods (CAM) and to Nobis technical specification RAC2-087.

The Tier 1 Modified data review was performed in accordance with the EPA New England Environmental Data Review Supplement for Regional Data Review Elements and Superfund Specific Guidance/Procedures (April 2013); USEPA National Functional Guidelines for Inorganic Superfund Data Review (August 2014); and the Field Task Work Plan (FTWP) and Quality Assurance Project Plan Addendum (QAPPA) for the Targeted Brownfields Assessment (TBA) for the Former Tombarello Property (June 2016).

The data were evaluated based on the following parameters:

* • Overall Evaluation of Data and Potential Usability Issues
* • Data Completeness
* • Preservation and Technical Holding Times

Nobis Engineering, Inc.
585 Middlesex Street
Lowell, MA 01851
T (978) 683-0891

*	•	Instrument Calibration
*	•	Blanks
*	•	Laboratory Control Samples (LCS)
NA	•	Laboratory Duplicates
NA	•	Field Duplicates
NA	•	Matrix Spike Analysis
NA	•	Surrogate Compounds
NA	•	Internal Standards
NA	•	Performance Evaluation Sample Results
*	•	Reported Quantitation Limits

* All criteria were met for this parameter.
NA – Not applicable.

Overall Evaluation of Data and Potential Usability Issues

The objectives of the investigation activities at the site are to delineate the nature and extent of soil and groundwater contamination on the Site so that potential remedial alternatives can be evaluated and order-of-magnitude cost estimates can be developed. Analytical and hydrogeological data collected during the investigation will be compiled and reduced to develop a conceptual site model to support the estimation of human health risks and development of remedial alternatives.

The data meet the project quality criteria and can be used without restriction except as summarized below. The attachments provide details and supporting documentation.

TCLP Metals:

Results did not require qualification.

Please contact Gail DeRuzzo at (978) 703-6021 or gderuzzo@nobiseng.com should you have any questions or comments regarding this information.

Sincerely,

NOBIS ENGINEERING, INC.

Gail DeRuzzo
Lead Chemist

Tables: Data Summary Table – Tier 1 Mod Data Review

Attachments: Sample ID List
Data Review Checklist
COC

DATA SUMMARY TABLE

Lab Sample ID	R0640-01	R0640-02	R0640-03	R0640-04	R0640-05	R0640-06	R0640-07	R0640-08
Field Sample ID	CD-45E-0103	CD-45S-0103	SVA-03-0103	SVA-06-0001	TP-20-0506	TP-05-0405	TP-13-0506	TP-12-0607
Sample Location	CD-45E	CD-45S	SVA-03	SVA-06	TP-20	TP-05	TP-13	TP-12
Sample Date	06/06/16	06/06/16	06/08/16	06/08/16	06/14/16	06/15/16	06/15/16	06/15/16
TCLP Metals (mg/L)								
Chromium	NA	NA	NA	0.0059 J	NA	0.0189	0.0038 J	NA
Lead	95	28	4.73	NA	3.2	NA	NA	1.58

U – not detected; J – estimated value; UJ – not detected, reporting limit estimated; R – rejected

Engineering a Sustainable Future

Generic Data Review Checklist

Project: Lawrence
Project #: 80108
Case#: 0163S
Date: 7/21/16
Methods: TCLP Metals (1311/6010C)
Laboratory: Eurofins Spectrum Analytical
SDG: R0640
Reviewer: Gail DeRuzzo

1. **Case Narrative and Data Package Completeness (COC and Analyte List Review)**
R0640 – 8 soils selected for TCLP Pb or Cr based on total results from previous SDGs (see COC).

Sample IDs printed separately.

Samples CD-45E and CD-45S exceeded the TCLP Pb regulatory limit.

2. **Holding Time and Sample Preservation Compliance**
ok

3. **Lab and Field Blanks**
ok

4. **Laboratory Control Samples**
OK

5. **Field Duplicate Precision**
NA

6. **Laboratory Duplicate Precision**
NA

7. **Matrix Spikes**
NA

8. **Surrogate Spikes**
NA

9. **Internal Standards**
NA

10. **Performance Evaluation Samples**
NA

11. **Reporting Limits**
TCLP Pb RL is 15 ug/L instead of 10 as listed in FTWP/QAPPA.
TCLP Cr RL is 10 ug/L instead of 20 as listed in FTWP/QAPPA.

RLs are below the action limits.

12. Calibration Issues

ok

13. Other

eurofins | Spectrum Analytical

☑ Final Report
☐ Re-Issued Report
☐ Revised Report
Report Date:
21-Jul-16 13:03

Laboratory Report

Nobis Engineering, Inc
585 Middlesex Street
Lowell, MA 01851

Work Order: R0640
Project : Lawrence, MA site
Project #:

Attn: Gail DeRuzzo

Laboratory ID	Client Sample ID	Matrix	Date Sampled	Date Received
R0640-01	CD-45E-0103	Soil	06-Jun-16 10:02	14-Jul-16 10:59
R0640-02	CD-45S-0103	Soil	06-Jun-16 10:15	14-Jul-16 10:59
R0640-03	SVA-03-0103	Soil	08-Jun-16 10:00	14-Jul-16 10:59
R0640-04	SVA-06-0001	Soil	08-Jun-16 10:55	14-Jul-16 10:59
R0640-05	TP-20-0506	Soil	14-Jun-16 08:55	14-Jul-16 10:59
R0640-06	TP-05-0405	Soil	15-Jun-16 08:45	14-Jul-16 10:59
R0640-07	TP-13-0506	Soil	15-Jun-16 10:00	14-Jul-16 10:59
R0640-08	TP-12-0607	Soil	15-Jun-16 10:25	14-Jul-16 10:59

I attest that the information contained within the report has been reviewed for accuracy and checked against the quality control requirements for each method. The results relate only to the samples(s) as received. This report may not be reproduced, except in full, without written approval from Eurofins Spectrum Analytical, Inc.

All applicable NELAC or USEPA CLP requirements have been met.

Use of the NELAP logo does not insure that Eurofins Spectrum Analytical is currently accredited for the specific test method or analyte. Please refer to our Quality page of our web site at www.EurofinsUS.com for the current list of certifications and fields of accreditation.

Please contact the Laboratory or Technical Director at 401-732-3400 with any questions regarding the data contained in the laboratory report.

Certification List:

Connecticut	PH-0153
Florida	E87664
Massachusetts	M-RI907
New Hampshire	2060
New Jersey	RI001
New York	11522
Rhode Island	LAI00349
USDA	P330-16-00031
USEPA - ISM	EP-W-14-032
USEPA - SOM	EP-W-14-032
Dod ELAP	L2247

NELAP ACCREDITED TNI LABORATORY

LABORATORY ACCREDITATION BUREAU ACCREDITED
Certificate # L2247 Testing

Authorized by:

Dawn Wojcik
Laboratory Director

SDG	Lab ID	Field ID	Analyte	Result
R0508	R0508-12	CD-45E-0103	Lead	6400
R0508	R0508-14	CD-45S-0103	Lead	8600
R0521	R0521-12	SVA-03-0103	Lead	6700
R0521	R0521-15	SVA-06-0001	Chromium	40000
R0545	R0545-05	TP-20-0506	Lead	10000
R0555	R0555-02	TP-05-0405	Chromium	86000
R0555	R0555-06	TP-13-0506	Chromium	14000
R0555	R0555-08	TP-12-0607	Lead	6500

Edward Lawler

From: Gail DeRuzzo <GDeruzzo@nobiseng.com>
Sent: Thursday, July 14, 2016 10:55 AM
To: Edward Lawler
Subject: RE: Lawrence Project

Thanks, Ed!

From: Edward Lawler [mailto:EdwardLawler@eurofinsUS.com]
Sent: Thursday, July 14, 2016 10:51 AM
To: Gail DeRuzzo <GDeruzzo@nobiseng.com>
Subject: RE: Lawrence Project

Hi Gail--

No problem. The cost for TCLP for a single metal is $38 per sample.

We are having some issue with TCLP at the RI lab right now, so I'll have these done at the Agawam, MA lab. The TAT should not be any problem.

--Ed

From: Gail DeRuzzo [mailto:GDeruzzo@nobiseng.com]
Sent: Thursday, July 14, 2016 10:23 AM
To: Edward Lawler
Cc: Adam Roy
Subject: Lawrence Project

Hi, Ed!
We'd like to get the attached samples analyzed for TCLP metals. The table indicates the elements that we would like specifically tested. No need for the full TCLP list. I know you provided us with a TCLP metals unit price of $75 for the full TCLP list. What is the cost for one TCLP metal? Also, what kind of TAT can we get for these samples? We would like to get 5 BD if possible.
Thanks,
Gail

Gail DeRuzzo
Lead Chemist
GDeruzzo@nobiseng.com

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