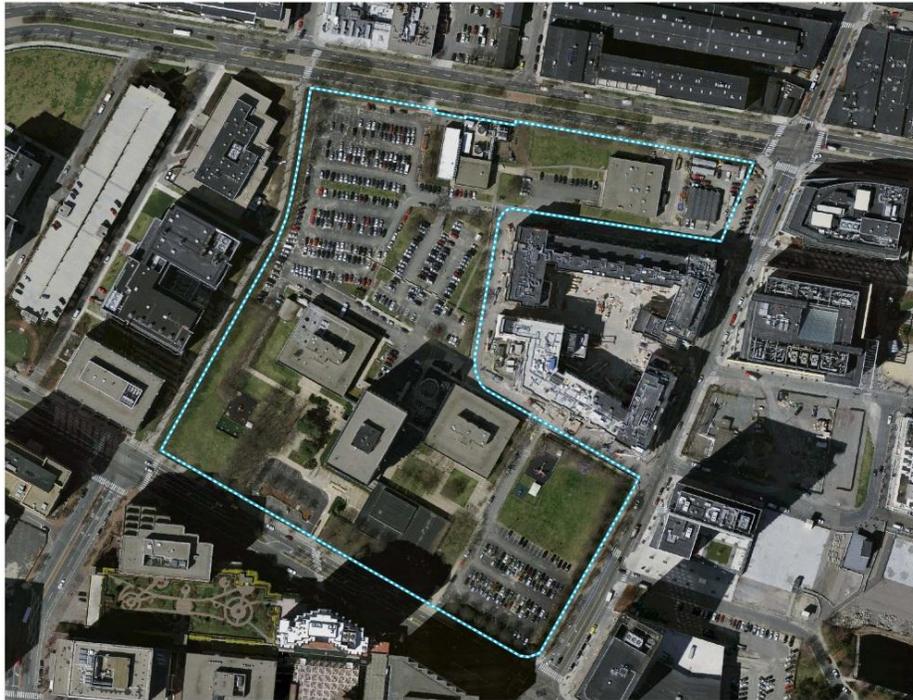


Phase I Environmental Site Assessment

55 Broadway, Cambridge Massachusetts



December 2013

Prepared for:

Volpe Development Team

US DOT Volpe Center

Prepared by:

Environmental Science and Engineering, RVT-43

US DOT Volpe Center



U.S. Department of Transportation
Research and Innovative Technology Administration
John A. Volpe National Transportation Systems Center

Volpe

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SI* (MODERN METRIC) CONVERSION FACTORS

APPROXIMATE CONVERSIONS TO SI UNITS

Symbol	When You Know	Multiply By	To Find	Symbol
LENGTH				
in	inches	25.4	millimeters	mm
ft	feet	0.305	meters	m
yd	yards	0.914	meters	m
mi	miles	1.61	kilometers	km
AREA				
in ²	square inches	645.2	square millimeters	mm ²
ft ²	square feet	0.093	square meters	m ²
yd ²	square yard	0.836	square meters	m ²
ac	acres	0.405	hectares	ha
mi ²	square miles	2.59	square kilometers	km ²
VOLUME				
fl oz	fluid ounces	29.57	milliliters	mL
gal	gallons	3.785	liters	L
ft ³	cubic feet	0.028	cubic meters	m ³
yd ³	cubic yards	0.765	cubic meters	m ³
NOTE: volumes greater than 1000 L shall be shown in m ³				
MASS				
oz	ounces	28.35	grams	g
lb	pounds	0.454	kilograms	kg
T	short tons (2000 lb)	0.907	megagrams (or "metric ton")	Mg (or "t")
oz	ounces	28.35	grams	g
TEMPERATURE (exact degrees)				
°F	Fahrenheit	5 (F-32)/9 or (F-32)/1.8	Celsius	°C
ILLUMINATION				
fc	foot-candles	10.76	lux	lx
fl	foot-Lamberts	3.426	candela/m ²	cd/m ²
FORCE and PRESSURE or STRESS				
lbf	poundforce	4.45	newtons	N
lbf/in ²	poundforce per square inch	6.89	kilopascals	kPa

APPROXIMATE CONVERSIONS FROM SI UNITS

Symbol	When You Know	Multiply By	To Find	Symbol
LENGTH				
mm	millimeters	0.039	inches	in
m	meters	3.28	feet	ft
m	meters	1.09	yards	yd
km	kilometers	0.621	miles	mi
AREA				
mm ²	square millimeters	0.0016	square inches	in ²
m ²	square meters	10.764	square feet	ft ²
m ²	square meters	1.195	square yards	yd ²
ha	hectares	2.47	acres	ac
km ²	square kilometers	0.386	square miles	mi ²
VOLUME				
mL	milliliters	0.034	fluid ounces	fl oz
L	liters	0.264	gallons	gal
m ³	cubic meters	35.314	cubic feet	ft ³
m ³	cubic meters	1.307	cubic yards	yd ³
mL	milliliters	0.034	fluid ounces	fl oz
MASS				
g	grams	0.035	ounces	oz
kg	kilograms	2.202	pounds	lb
Mg (or "t")	megagrams (or "metric ton")	1.103	short tons (2000 lb)	T
g	grams	0.035	ounces	oz
TEMPERATURE (exact degrees)				
°C	Celsius	1.8C+32	Fahrenheit	°F
ILLUMINATION				
lx	lux	0.0929	foot-candles	fc
cd/m ²	candela/m ²	0.2919	foot-Lamberts	fl
FORCE and PRESSURE or STRESS				
N	newtons	0.225	poundforce	lbf
kPa	Kilopascals	0.145	poundforce per square inch	lbf/in ²

*SI is the symbol for the International System of Units. Appropriate rounding should be made to comply with Section 4 of ASTM E380. (Revised March 2003)

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List of Abbreviations

Abbreviation	Term
AST	Aboveground storage tank
AUL	Activity and Use Limitation
bgs	Below ground surface
EDR	Environmental Data Resources Inc.
EPA	US Environmental Protection Agency
LAST	Leaking aboveground storage tank
LSP	Licensed Site Professional
LUST	Leaking underground storage tank
MassDEP	Massachusetts Department of Environmental Protection
MIT	Massachusetts Institute of Technology
msl	Mean sea level
MTBE	Methyl tertiary butyl ether
NASA	National Aeronautical and Space Agency
PAH	Polycyclic aromatic hydrocarbons
PCB	Polychlorinated biphenyls
RAM	Release Abatement Measure
RAO	Response Action Outcome
REC	Recognized environmental condition
RITA	Research and Innovative Technology Administration
RTN	Release tracking number
SVOC	Semi-volatile organic compound
TPH	Total petroleum hydrocarbons
TSC	Transportation Systems Center
URAM	Utility-related abatement measure
US DOT	United States Department of Transportation
USGS	United States Geologic Survey
UST	Underground storage tank
VOC	Volatile organic compound

Findings Summary

Site Location: 55 Broadway, Cambridge, MA

Facility Status: Building and grounds housing the United States Department of Transportation, John A. Volpe National Transportation Systems Center

Purpose of the Phase I Environmental Site Assessment (Phase I): Establish baseline environmental conditions at the Site prior to potential construction projects, and to identify recognized environmental conditions (RECs) pursuant to ASTM E1527-05. This Phase I constitutes all appropriate inquiries into the previous ownership and uses of the property consistent with good commercial or customary practice, as defined at 42 USC §9601(35)(B) and further defined in 40 CFR Part 312.

Report Date: December 2013

Preparer: Michelle Heimgartner, Environmental Engineer
US DOT Volpe Center, RVT-43, Environmental Science and Engineering Division

Findings: This Phase I found evidence of RECs at the property, due to the known presence of coal tar, arsenic, lead and petroleum products in site soil. This contamination resulted from more than 50 years of industrial occupation of the site, prior to its acquisition and development by the federal government. Future construction activity at the site is constrained by an Activity and Use Limitation recorded in association with the deed for the property.

Recommendation: We recommend pre-construction sampling and analysis of soil in any location that will be disturbed by future construction activities, to determine the nature and extent of contamination that may pose a public health risk if soils are disturbed.

Preparer: Michelle Heimgartner
Environmental Engineer
US DOT Volpe Center, RVT-43,
Environmental Science and Engineering Division

Date

Executive Summary

This report presents the results of a Phase I Environmental Site Assessment (Phase I) for the US Department of Transportation, John A. Volpe National Transportation Systems Center (the Volpe Center) at 55 Broadway, Cambridge, Massachusetts (the Site). The assessment was performed by the Volpe Center's Environmental Science and Engineering group (RVT-43).

The purpose of the assessment was to establish baseline environmental conditions at the Site prior to potential construction projects, and to identify recognized environmental conditions (RECs)¹ pursuant to ASTM E1527-05. This Phase I was completed in accordance with ASTM Standard E1527-05 which complies with the US EPA All Appropriate Inquiries Final Rule (40 CFR Part 312). To complete the Phase I, Volpe Center staff reviewed historical documents, photographs, maps, and government records; interviewed those with knowledge of the Site; obtained a regulatory database search report; and conducted a reconnaissance visit and visual survey of the Site, in accordance with the requirements of ASTM E1527-05.

The Site is located in a formerly industrial area of Cambridge. Prior to the acquisition and development of the Site by the federal government, the Site housed a paving company which used and stored coal tar, a tannery, a gasoline filling station, an industrial canal (now filled), and other manufactories. Adjacent properties were similarly industrialized.

Site reconnaissance observations showed the presence of one aboveground storage tank for diesel fuel and no indications of releases into soil or groundwater from the current facility.

The Site is listed as a Massachusetts release site: construction-related excavation in 2006 demonstrated that Site soil is contaminated with coal tar, arsenic, lead, nickel, and petroleum compounds (primarily polycyclic aromatic hydrocarbons [PAHs]). Due to this contamination, an Activity and Use Limitation (AUL) has been placed on certain portions of the property (Tracts 2B and 10) to maintain a condition of No Significant Risk during future site activities. The extent of contamination in other tracts of the Site is not known. The Site is not listed in any federal regulatory databases, and one CERCLIS site and fifteen (15) federally listed RCRA-generator properties are within ¼ mile of the Site.

This Phase I Environmental Site Assessment has found direct evidence of RECs at the Site, due to the presence of known soil contamination. We recommend pre-construction sampling and analysis of soil in any location that may be disturbed by future construction activities.

¹ "**Recognized environmental conditions** means the presence or likely presence of any hazardous substances or petroleum products on a property under conditions that indicate an existing release, a past release, or a material threat of a release of any hazardous substances or petroleum products into structures on the property or into the ground, ground water, or surface water of the property...The term is not intended to include *de minimis* conditions that generally do not present a threat to human health or the environment and that generally would not be the subject of an enforcement action if brought to the attention of appropriate governmental agencies." ASTM E1527-05.

I. Introduction

This report documents the results of a Phase I Environmental Site Assessment conducted by the Environmental Science and Engineering group at the John A. Volpe National Transportation Systems Center (the Volpe Center) of its property at 55 Broadway, Cambridge, Massachusetts (the Site). The Volpe Center is part of the Research and Innovative Technology Administration (RITA) of the United States Department of Transportation (US DOT).

This assessment was conducted in accordance with ASTM Standard E1527-05 *Phase I Environmental Site Assessments*. ASTM E1527-05 complies with the US Environmental Protection Agency (EPA) All Appropriate Inquiries Final Rule (40 CFR Part 312).

I.1 Purpose

The purpose of this Phase I Environmental Site Assessment is to review available information regarding the Volpe Center (the Site) and its immediate vicinity, to establish baseline environmental conditions prior to potential construction projects, and to identify recognized environmental conditions (RECs) pursuant to ASTM E1527-05. According to ASTM, a REC is “the presence or likely presence of any hazardous substances or petroleum products on a property under conditions that indicate an existing release, a past release, or a material threat of a release of any hazardous substances or petroleum products into structures on the property or into the ground, groundwater, or surface water of the property.” The US DOT is exploring facility redevelopment opportunities at the Volpe Center.

This Phase I Environmental Site Assessment constitutes all appropriate inquiries into the previous ownership and uses of the property consistent with good commercial or customary practice, as defined at 42 USC §9601(35)(B) and further defined in 40 CFR Part 312.

I.2 Scope of Services

The scope of services for this Phase I Environmental Site Assessment includes the following:

- A visual observation of Site conditions to identify facility infrastructure, any facility records housed at the Site, and any visible signs of environmental contamination
- Interviews with representatives of the Site owner/occupant (US DOT John A. Volpe National Transportation Systems Center) and state and local officials to inquire about environmental conditions at the Site

- Review of federal and state environmental databases for information regarding the Site and other properties within radii identified by ASTM E1527-05 Section 8.2.1
- Review of reasonably ascertainable, publicly available, and practically reviewable² environmental information maintained regarding the Site by federal, state, and local environmental agencies
- Review of available historical aerial photos and topographic maps to identify historical uses of the Site
- Preparation of this report to document our findings

1.3 Significant Assumptions

In the absence of significant surface topography, surface and groundwater flow directions have been estimated on the basis of past groundwater elevation measurements and the nearby presence of the Charles River. Groundwater flow at the Site is presumed to be east-southeast towards the Charles River, although it is suspected that the presence of extensive underground utilities, unusual fill materials, and the nearby ocean interfere with direct flow of groundwater towards the river.

1.4 Limitations

The findings presented in this report are based on an evaluation of practically reviewable information and visual observations, consistent with the requirements of ASTM E1527-05. In accordance with that standard, this report does not include investigation of the possible presence of asbestos-containing materials or lead-based paint at the Site.

The information contained in this Phase I report is based on readily available data and a level of effort as appropriate within the guidelines of ASTM E1527-05. The record search is limited by the accuracy of public sources, which are regularly changing and frequently incomplete. Information obtained from personal interviews is also limited due to the subjective nature of the sources. The findings and conclusions in this Phase I are based on RVT-43's professional judgment.

² **“Reasonably ascertainable**—information that is (1) *publicly available*, (2) obtainable from its source within reasonable time and cost constraints and (3) *practically reviewable*.” ASTM E1527-05

“Publicly available—the source of the information allows access to the information by anyone upon request.” ASTM E1527-05

“Practically reviewable—information is provided by the source in a manner and in a form that, upon examination, yields information relevant to the property without the need for extraordinary analysis of irrelevant data.” ASTM E1527-05

DISCLAIMER

The Government makes no representations, warranty or guaranty of any kind, express or implied, in connection with this Phase I Report. No entity other than the Government may rely on any information, data, opinion or conclusion contained in this Report. Without limiting the applicability of the foregoing, no investigation of subsurface conditions has been undertaken at the subject property in connection with this Report, and the Government makes no representations, express or implied, about subsurface conditions at the subject property. The Government shall not be liable under any circumstances for any claims, damages or suits based upon errors, omissions or inaccuracies in the information, data, opinions or conclusions contained in this Report, whether such errors, omissions or inaccuracies result from negligent or intentional conduct.

2. Site Description

2.1 Location and Legal Description

The Site is located in Cambridge, Massachusetts northwest and across the Charles River from the City of Boston in Middlesex County (Figure 1). It consists of approximately 14 acres including six (6) buildings and four (4) paved parking lots; approximately one-quarter of the Site is occupied by lawn and trees (Figure 2 and photographs in Appendix A). The Site has been owned by the federal government since 1966 and occupied by the Volpe Center and several transportation-related tenants since July 1, 1970. The Site is mapped on the USGS Boston South 7.5 minute topographic map (Appendix B). Its elevation and coordinates are:

Elevation	10.7 feet above mean sea level (msl)
Latitude	42.363903
Longitude	-71.085340

2.2 Site and Vicinity General Characteristics

2.2.1 General Site Setting

The Site is in a part of Cambridge that has been industrialized since the 1800s and has been converted to high-value commercial properties in recent decades. Surrounding properties include office and residential buildings as well as high-tech facilities associated with the nearby Massachusetts Institute of Technology (MIT).

2.2.2 Geology, Hydrogeology, and Soils

Soil under the site is classified as primarily *Urban Land, Wet Substratum* which is filled land covered by impervious materials. A very small sliver of soil on the property is classified as *Udorthents*, consisting of tidal marshes, river flood plains, bays, harbors, and swamps filled with rubble, refuse, and mixed soil material (see soil classification map in Appendix C). Underlying geology is expected to be tens of feet of mixed clay and glacial sediments.

Depth to groundwater at the Site is approximately 7 feet below ground surface (bgs) (F.S. Engineers, 2011; report included as Appendix D). There do not appear to be any surface water bodies or wetlands on the Site. The nearest surface water is Broad Canal (1000 feet to the east) and the Charles River (1500 feet east and south; see Figure 3).

The Site is not located within a current or potential drinking water source area (MassDEP Priority Resource Maps), and no private wells have been identified within 500 feet of the Site. Areas of

protected open space are located along the bank of the Charles River approximately 1,500 feet from the Site.

2.3 Current Use of the Site and Adjoining Properties

Site buildings house offices, computers and technical equipment, a cafeteria, and routine HVAC equipment. Building 5 contains HVAC operations containing electric and steam chillers, main electrical sub-station (13.8KV), cooling towers, and air compressors (for HVAC controls). Electricity is provided by NSTAR, steam is provided by Dalkia, and water and sewer services are provided by the City of Cambridge.

The adjoining properties consist of mixed office, commercial, and residential buildings, and associated parking structures.

2.4 Commonly Known or Reasonably Ascertainable Information

The soil in this portion of Cambridge is well-known to be generally contaminated with petroleum hydrocarbons, lead, and arsenic as a result of coal tar gasification and heavy industry that occupied the vicinity for well over 50 years. Details are provided in Section 4 below.

3. User-Provided Information

3.1 Reason for Performing the Phase I Environmental Site Assessment

This assessment was performed to document baseline environmental conditions at the US DOT Volpe Center property. This analysis is for internal use only. If any real estate transactions are considered, we recommend a third party analysis to supplement this information.

3.2 Site Development and Occupation by Federal Government

Middlesex Registry of Deeds Plan books for Tracts 1 – 10 show that ownership of the property was transferred to the United States of America from the Cambridge Redevelopment Authority in June 1966. Development activities were constrained by the Kendall Square Urban Renewal Plan, which is included in Appendix E. Chapter 4 of the Plan specifies the development restrictions. Site redevelopment and

construction of the buildings on the Site started shortly after the transfer in ownership took place. The Site was initially occupied by the National Aeronautical and Space Agency (NASA) but was transferred to US DOT on July 1, 1970 and has been occupied by the Volpe Center since that time.

Soil contamination was discovered in a section of Site soils included in an on-site playground in 2006. Investigation confirmed the presence of polycyclic aromatic hydrocarbons (PAHs), lead, nickel, and arsenic at concentrations exceeding action levels set by the Massachusetts Department of Environmental Protection (MassDEP). The top three feet (3 ft) of soil was removed from an unpaved area used as a toddler playground. Additional contamination is believed to remain in place, and a section of the Site is now restricted by an Activity and Use Limitation (see section 3.3 below). Details of the 2006-2007 Site investigation are included in Appendices D&F.

Groundwater contamination was identified in groundwater under the northwest parking lot. In 2013, a contractor for a neighboring site under redevelopment (225 Binney Street), requested to install four (4) monitoring wells in the northwest parking lot. These monitoring wells would help the property owners of 225 Binney Street determine if a plume of contamination found under their property (State CERCLIS site – see Table 1) was impacting the Volpe Center property as well. The volatile organic compound 1,2-dichloroethane was detected in concentrations exceeding MassDEP’s GW-1 and GW-2 cleanup standards. The contamination did not exceed GW-3 standards. The contamination investigation is ongoing for this neighboring site.

3.3 Title Records and Environmental Liens or Activity and Use Limitations (AUL)

The title records for this property are included in Appendix G. Due to contaminants present at depths greater than 6 inches bgs in a portion of the Site, an AUL was issued on January 29, 2009 and updated on May 13, 2011. The AUL only affects the portions of the site included in Tracts 2B and 10. This AUL is required by the state to be incorporated either in full or by reference into all future deeds, easements, mortgages, leases, licenses, occupancy agreements or any other instrument of transfer, whereby an interest in and/or a right to use the Property or a portion thereof is conveyed as stated in Section 6 of form 1075 of the AUL. The AUL is included in Appendix H. A partial listing of additional language in AUL form 1075 is as follows: n

1. Activities and Uses Consistent with the AUL Opinion. The AUL provides that a condition of No Significant Risk to health, safety, public welfare or the environment exists for any foreseeable period of time (pursuant to 310 CMR 40.00000) so long as any of the following activities and uses occur on the Property:
 - (i) Passive and active recreational activities including, but not necessarily limited to, activity in the playground and surrounding field;
 - (ii) Maintenance of the playground and surrounding grass field including but not limited to, landscaping and routine maintenance of landscaped areas which do not cause and/or

result in direct contact with, disturbance of, and/or relocation of, the contaminated soils located underneath the top six inches of topsoil;

- (iii) Excavation associated with short-term (three months or less) underground utility and/or construction which is likely to disturb contaminated soil located at depths greater than six inches below surface grade provided that it is conducted in accordance with a Soil Management Plan and a Health and Safety Plan prepared and implemented in accordance with Obligations (i) and (ii) of this Opinion prior to the commencement of such activity;
 - (iv) Non-invasive activities and uses that do not disturb the underlying contaminated soil;
 - (v) Activities and uses which are not identified in this Opinion as being inconsistent with maintaining a level of no Significant Risk; and
 - (vi) Such other activities or uses which, in the Opinion of an LSP, shall present no greater risk of harm to health, safety, public welfare or the environment than the activities and uses set forth in this Paragraph.
2. Activities and Uses Inconsistent with the AUL Opinion. Activities and uses which are inconsistent with the objectives of this Notice of Activity and Use Limitation, and which, if implemented at the Property, may result in a significant risk of harm to health, safety, public welfare or the environment or in a substantial hazard, are as follows:
- (i) Any short term (three months or less) activity including, but not limited to, excavation which is likely to disturb contaminated soil located at depths greater than six inches below surface grade without the prior development and implementation of a Soil Management Plan and a Health and Safety Plan in accordance with Obligations (i) and (ii) of this Opinion; and
 - (ii) Any long-term (greater than three months) activity which is likely to disturb contaminated soil located at depths greater than six inches below surface grade; and
 - (iii) Relocation of contaminated soil currently located at depths greater than six inches below surface grade to a shallower depth, unless such activity is first evaluated by an LSP who renders an Opinion which states that such relocation is consistent with maintaining a condition of No Significant Risk.
3. Obligations and Conditions Set Forth in the AUL Opinion. If applicable, obligations and/or conditions to be undertaken and /or maintained at the Property to maintain a condition of No Significant Risk as set forth in the AUL Opinion shall include the following:
- (i) A Soil Management Plan must be prepared by an LSP and implemented prior to the commencement of any activity which is likely to disturb the contaminated soil located at depths greater than six inches below surface grade within the AUL Area. The Soil Management Plan must be prepared in accordance with the guidelines discussed in the Activity and Use Limitation;
 - (ii) A Health and Safety Plan must be prepared and implemented prior to the commencement of any activity which is likely to disturb the contaminated soil located at depths great than six inches below surface grade within the AUL Area. The Health and Safety Plan must be prepared in accordance with the guidelines discussed in the Activity and Use Limitation Opinion attached hereto as Exhibit C; and

- (iii) The contaminated soil located at depths greater than six inches below surface grade within the AUL Area must remain at depth and may not be relocated, unless such activity is first appropriately evaluated by an LSP who renders an Opinion which states that such relocation is consistent with maintaining a condition of No Significant Risk.

3.4 Specialized Knowledge

There is no additional specialized knowledge in addition to that discussed elsewhere in this document.

4. Records Review

4.1 Standard Environmental Records Sources Reviewed

The Volpe Center retained Environmental Data Resources Inc. (EDR) to search federal, state, and tribal environmental regulatory databases to identify properties located within one mile of the Site with documented environmental releases and/or those that use, store, or dispose of regulated chemicals. The radii of database searches corresponded to those recommended in ASTM E 1527-05. The resulting FirstSearch report is included in Appendix I.

4.1.1 Federal Database Findings

The Site is not listed in any federal databases. The FirstSearch review found one federal CERCLIS site and 15 RCRA generators within ¼ mile of the Site (Table 1 - please note that Table 1 was limited to properties within 0.15 miles of the site).

4.1.2 State and Tribal Database Findings

The Site is listed by MassDEP as release site RTN 3-26067 for the 2006 discovery of PAH's in the form of coal tar in the playground area.

The FirstSearch review identified ten release sites and one leaking aboveground storage tank (LAST) within 1/8 mile of the Site. An additional 35 release sites, 3 additional LASTs, and 12 leaking underground storage tanks (LUSTs) are listed in the area between 1/8 and 1/4 mile of the Site (Table 1 - please note that Table 1 was limited to properties within 0.15 miles of the site). Locations are shown on Map C of the FirstSearch report in Appendix I.

Research by Volpe Center staff indicates that most of the surrounding contamination was found during development or utility work and consisted of heavy petroleum hydrocarbons, lead and arsenic, and

several volatile organic compounds.

4.2 Historical Information Reviewed

4.2.1 City of Cambridge Sources

The Volpe Center staff reviewed available historic information from the City of Cambridge Historical Society and Cambridge City Directories. Documentation found demonstrates a long history of use of petroleum products on and near the Site. Approximate locations of the following occupants are shown on Figures 5 and 6:

- From 1900 to 1966 the Warren Brothers Company operated a pavement manufacturing plant on Potter Street, at the north portion of the Site (Dornbusch, Erin. Warren Brothers, 2013). Specific details on this property are discussed in section 4.2.2.
- The southeastern portion of the site was occupied by Seavay Manufacturing Company in 1900, followed by the Boston Blacking and Chemical Co. (a tanner) which shows up in 1934 records, University Sign Co./Neon Products Inc. in 1950 and 1954 records, and Badger Manufacturing (a company that designed, engineered, and constructed process plants for the petroleum, chemical, and pharmaceutical industries) in 1965 and 1968 records (F.S. Engineers, 2011).
- The eastern building of the former Badger Manufacturing Company (Badger building) was not removed until sometime between 1971 and 1978. This area was then redeveloped into its current use as the northeastern portion of the open grass field (F.S. Engineers, 2011).
- The approximately 80-foot wide former Broad Canal bisected the Site parallel to Broadway, roughly midway between Potter Street and Broadway. The Canal provided shipping access for coal, coke, tar, and cinders to the Cambridge Gas Light Company, which occupied the area bound by Munroe, Potter, Fifth and Third Streets from the 1870s through the early 1950's (Dornbusch, Erin. Cambridge Gas Light, 2013). The southern portion of the grass field and northern portion of the main parking lot are situated on the site of the former Broad Canal. The canal was filled when the Site was redeveloped and brought to its current grade in 1966-1967.

4.2.2 Historic and Topographic Maps

Historic Sanborn maps and USGS topographic maps were reviewed for the Site and nearby Kendall Square area (see Appendix J). The buildings and development listed below were located within the Site footprint unless otherwise identified.

- 1900: This map shows various buildings including the beginning development of the Warren Brothers Company listed above. Their property included a Coal Tar Still and Tar Cooler located on the map. Further east bound by Third Street was Seavay Manufacturing Company – Manufacturers of Stamped Goods. On the west border of their property, it is noted that there is an oil and “naphtha” containing structure. Finally, the area bound by Fifth and Sixth Streets, and Munroe and Potter Streets was listed as R. Dreyer containing Oil, Naphtha, and Gasoline.
- 1950: This map shows a Tire Service and Filling Station containing approximately seven gasoline tanks on the southeastern corner of the property. On the southwestern corner of the property was Photoswitch, Inc. a property that contained laboratory space, assembling areas, and a machine shop. Between the two above-mentioned properties was an auto service station and The Dance Co., manufacturers of road equipment and machinery. Their property contained an office and warehouse, and machinery manufacturing and repairing shop. The Warren Brothers had additional development from the 1950’s map and was now listed as manufacturers of road paving. Their property contained machine shops, asphalt mixing plant, sand and gravel bin, boiler room, office space, asphalt tanks, gasoline tanks and fuel oil tanks. In the area bound by Fifth and Sixth Streets, and Munroe and Potter Streets was the Petroleum Heat & Power Company that contained fuel oil tanks. Finally, this 1950’s map contained the Cambridge Gas Light Co. that had a 4,000,000 CF capacity Iron Gasometer and a large fuel oil tank.

4.2.3 Historical Aerial Photographs

Available aerial photographs were reviewed for indications of past use of the Site and adjoining properties (see Appendix K). No photographs were found for years prior to 1966.

- Early 1966: The Site appears to be in the beginning stages of development for its current use. Many of the industrial buildings on the property are still in place with the exception of the Warren Brothers buildings which have been demolished, and the Broad Canal which has begun to be filled in.
- December 1966: The Broad Canal within the property is filled in from Third Street to just west of current Building #1 of the Volpe Center. It appears that all buildings in the interior of the area bound by Broadway, Sixth Street, Potter Street and Third Street have been demolished with the exception of the Badger building on the east end of the property bound by Third Street, Potter Street and the former Broad Canal.
- 1967: The Broad Canal is fully filled in and it appears that the initial stages of construction have begun on current Volpe Buildings 1 and 2.
- July 1968: Construction is continuing on current Volpe Center Buildings 1 and 2 and has begun

on current Volpe Center Building 4. It appears that the earthwork is in-progress for the foundation of current Volpe Center Building 3. The Badger building is still in place at this time.

- 2007-2008: The current Volpe Center property shows all 6 Volpe Center buildings, parking lots and green space in similar conditions as they are today. The exception is this photo shows the temporary playground in front of Building 3 that was used during the construction of the adjacent building at 303 Third Street and during the contaminated soil removal at the permanent TSC Playground location.

5. Site Reconnaissance

Evan Starr, Environmental Specialist in the Volpe Center's Environmental Science and Engineering Division, RVT-43, visited the Site on November 21st, 22nd, and December 2nd, 2013. For the interior portion, he was accompanied by the Volpe Center's Facility Department Engineer, Steve Coffey. Site observations are summarized in this section. Figure 2 provides a plan of the Site. Site visit photographs are included as Appendix A.

5.1 Methodology and Limiting Conditions

The Volpe Center staff observed the Site by walking the exterior of the property, touring the interior of the buildings, and recording observations.

5.2 Exterior Observations

The Site is in an urban environment surrounded by mostly roads and buildings. The site itself consists of green space in addition to parking lots and buildings (see Figure 2).

The Site contains six numbered buildings plus a silo-styled building (attached to, and considered part of Building 4, for storage), four parking lots, two main lawns (one to the east of Building 4 and one to the west and south of Buildings 1 and 3 respectively), and additional outdoor space. The site contains numerous manholes to access utilities and sewer. There are 12 monitoring wells on the property (see Figure 4). Nine were installed as a result of the 2006 contamination investigations; three were installed in May 2007 (one of which was subsequently destroyed by landscaping activities after samples were taken) and six were installed in March 2011. Thus, eight of the nine wells remain on the property.

- Five monitoring wells are in the lawn to the east of Building 4, down-gradient of known soil contamination in the playground

- One monitoring well is in the courtyard between Buildings 1, 2 and 4, up-gradient of the known contamination
- One monitoring well is in the grass area directly in front of the daycare in Building 4, adjacent to the contamination
- One monitoring well is next to the silo building, behind and northeast of Building 1, also up-gradient of the known contamination.

Four additional monitoring wells are located in the corner parking lot directly behind Building 3. According to Haley and Aldrich, these wells were installed during a follow-up investigation for the property at 225 Binney Street (See Appendix L).

Also in this parking lot are light posts containing rusty, chipping paint that could potentially be lead-based paint. There is a transformer north of Building 3 in the parking lot, feeding parking lot lighting, that is not labeled as containing or not-containing PCBs. According to the Office of Facilities Management, there are no PCB containing transformers currently on the site. At the time of the visit, there were three temporary and one permanent trailer at the Site, all located in paved areas.

An aboveground storage tank (AST) for diesel fuel, an emergency engine generator trailer, and six drums of propylene glycol were observed in a fenced-in area outside Building 5 which also contained electrical sub-station (13.8KV), and cooling towers. The AST is housed in a trailer with the emergency generator (see Appendix A).

5.3 Interior Observations

Volpe Center Building 1 consists of 14 floors. The first floor contains a mechanical room with two dry-type transformers and air handlers for the air on the first and second floors of Building 1. On the first floor there is also access to utility tunnels that lead to the other Volpe Center buildings and provide access to utilities such as steam lines, electrical lines, and piping.

The 13th floor contains a carpenter shop, electrician's room containing supplies, and paint and plumber's supply room. There are two dry-type transformers, electrical and breaker panels, and air handlers for the air on the 3rd through 12th floors of Building 1. There are floor drains for the condensate from the air handlers. Additionally, condensate tanks collect excess hot water from the air handlers. From the tanks, water is pumped to a steam meter that pumps water back to the steam utility company, Dalkia, located in Cambridge, MA. There are also hot and cold water pumps that provide heating and cooling, depending on the season, throughout the perimeter radiators in Building 1. Also, the 13th floor contains exhaust fans that are cut off from the system and are no longer in use.

Building 2 is a single-story building with a mechanical penthouse housing mechanical and electrical equipment, pumps, and air handlers.

Building 3 is a two story building plus a basement with two mechanical penthouses housing mechanical and electrical equipment, pumps and air handlers. These rooms also contain dry-type transformers.

Building 4 is a two-story building containing a penthouse mechanical room, electrical room, pumps for hot and cold water, and air handlers. Building 4 contains one dry-type transformer. On the first floor towards the east end of the building is the Transportation Systems Center (TSC) Childcare center which serves as a daycare for children of building occupants and other local citizens. Adjacent to the childcare center is a loading dock and mail room.

Building 5 is a single story building that houses a majority of the Site’s HVAC Operations and contains electric and steam chillers, and air compressors (for HVAC controls). This building also contains a steam chiller tank, condensate tank, and a water treatment system. The Volpe Center staff observed 4 plastic 55-gallon drums containing water treatment compounds, such as sodium hypochlorite, sodium nitrite solution, 5-chloro-2-methyl-4-isothiazolin-3-one, and 2-methyl-4-isothiazolin-3-one, for the water treatment system (see photos in Appendix A). This Building contains one dry-type transformer.

Building 6 is a two story building that contains a mechanical room, electrical space with one dry-type transformer, pumps for hot and cold water and air handlers. Additionally, Building 6 has a hazardous materials storage cabinet that houses propane canisters for use in fork-lift operations.

Table 2. Observations of Environmental Features at the Site

Feature	Observations
Fuel Storage Tanks	One 500-gallon diesel AST outside Building 5
Electrical Transformers or Equipment	One transformer (believed non-PCB containing) outside on-site
Hazardous Substances or Petroleum Products	Drums containing propylene glycol, and water treatment compounds in Building 5 Propane canisters for fork-lift use in Building 6
Stains	None observed
Stressed Vegetation	No stressed vegetation was observed
Wells, Septic, Underground Utilities	Twelve groundwater monitoring wells observed in grass, parking and other exterior areas No dry wells or septic observed or reported
Solid Waste	Observed in proper receptacles at the site
Soil/Water Sampling	No samples were obtained as part of this assessment.

6. Interviews

The Volpe Center staff interviewed the following individuals for information pertaining to the Site and reported in the sections above. Interview notes are included in Appendix M.

Owners/Occupants:

- Steve Coffey, Facility Engineer, Office of Facilities Management, Volpe Center
- David Duncan, Director, Office of Facilities Management, Volpe Center
- Christopher Zevitas, Environmental Engineer, Environmental Science and Engineering Division, Volpe Center

Local, State and Federal Government Officials:

- Sam Lipson, Director of Environmental Health, Cambridge Public Health Department
- Kyle MacAfee, Bureau of Waste Site Cleanup – Risk Reduction and Enforcement, Massachusetts Department of Environmental Protection

7. Findings

The following findings are based on Site observations, interviews, a review of available historical records, and the state and federal database search:

- The Site was acquired by the federal government in June 1966 and development for the current Site buildings began in 1966-1967. The former Badger building on the southeast portion of the Site was not demolished until sometime between 1971 and 1978.
- The Site is in an intensely developed urban area. It consists of six (6) buildings, multiple parking lots, and substantial lawn areas.
- Past uses of the Site were heavily industrial and consisted of a company storing and using coal tar and asphalt, a tannery, a filling station, a canal used to transport coal tar and coal ash, and other manufactories. Adjacent sites were heavily industrialized and included a manufactured gas plant with byproducts of coke, tar, and cinders.
- The Site is a MassDEP listed site (RTN 3-26076) and has an Activity and Use Limitation (AUL) on the property due to the known presence of high levels of lead, arsenic, PAHs and nickel remaining in soil at depths of 3 feet or more bgs.

- The Site is not listed in any federal databases. The FirstSearch review found one federal CERCLIS site and 15 RCRA generators within ¼ mile of the Site (Table 1 - please note that Table 1 was limited to properties within 0.15 miles of the site).
- The reconnaissance visit found no visual or olfactory evidence of any recent release of petroleum products or hazardous substances at the Site.
- The Site currently houses a 500-gallon diesel AST (outside Building 5) and multiple dry-type transformers. Both records research and site observations indicated that no USTs or PCB-containing transformers are currently present at the Site. However, there is an absence of records confirming or denying that PCB transformers or USTs were historically present at the site.
- Files reviewed showed numerous releases of hazardous substances or petroleum products within ¼ mile of the Site. Virtually every adjacent property has a record of contamination with naphthalene, petroleum products (TPH/PAH), cyanide, coal tar, benzene, arsenic, lead, 1,2 Dichloroethane, and methyl tertiary butyl ether (MTBE) all being found in the immediate vicinity of the site. Many releases were related to construction or underground utility work that uncovered contamination due to historic activity in the area.

8. Opinion

It is the Volpe Center staff's opinion that available information has identified the existence of recognized environmental conditions (RECs) at the Site, as defined by ASTM E1527-05, due to the presence of petroleum components and heavy metals in Site soil.

9. Conclusions

The Volpe Center has performed a Phase I Environmental Site Assessment of the USDOT Volpe Center property at 55 Broadway, Cambridge, Massachusetts, in conformance with the scope and limitations of ASTM E1527-05. Any exceptions to, or deletions from, this practice are described in Section 10 of this report.

This Phase I Environmental Site Assessment has found direct evidence of RECs, as defined by ASTM E 1527-05 at the property. Coal tar and arsenic, lead, nickel and PAHs were detected in soil beneath the TSC Childcare playground. Although surficial contaminated soil was removed and replaced with clean soil in the playground area, contamination is believed to exist on other areas of the Site. An Activity and Use Limitation (AUL) has been placed on certain portions of the property (Tracts 2B and 10) to maintain

a condition of No Significant Risk.

Substantial remediation was required at an adjacent property during their redevelopment due to historic contamination. Specifically, \$2.4 million dollars were spent during the development of 303 Third St. to handle, excavate, and dispose off-site of approximately 42,000 cubic yards of regulated soil. This soil was primarily contaminated with petroleum hydrocarbons, volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs) and metals (Charter Environmental, 2013) that were attributed to past industrial activities on the site. It is likely that a similar large-scale remediation may be required on the Volpe Center property in the event that subsurface construction activities are planned.

We recommend sampling and analysis of representative soils in any area of the Site that may be disturbed by planned construction, to determine the nature and extent of existing contamination and to protect public health during construction activities.

I 0. Deviations

No known deviations or deletions from ASTM E 1527-05 were made during preparation of this Phase I Environmental Site Assessment.

I 1. Additional Services

No additional services were provided as part of this Phase I Environmental Site Assessment.

12. References

ASTM International. 2005. Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process. Standard No. E 1527-05. West Conshohocken, PA.

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Thibault, Jonathan M. DOT Data Package, Haley and Aldridge. June 2013.

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I 3. Environmental Professional Statement, Signature, and Qualifications

I declare that, to the best of my professional knowledge and belief, I meet the definition of Environmental Professional as defined in section 312.10 of 40 CFR Part 312. I have the specific qualifications based on education, training, and experience³ to assess a property of the nature, history, and setting of the subject property. I have developed and performed all appropriate inquiries in conformance with the standards and practices set forth in 40 CFR Part 312.

My qualifications include the following:

- MS, Geotechnical/Geoenvironmental Engineering, Tufts University, 2007
- BS, Civil Engineering, University of Virginia, 1999
- Environmental Engineer, US DOT Volpe Center, 2000 – present

As a practicing environmental engineer since 2000, I have performed and managed numerous Phase I and II environmental site assessments, remedial investigations, remedial actions, and site restorations. I have also been involved in groundwater monitoring projects, removal action design activities, hazardous materials surveys, and site demolition activities.

Michelle Heimgartner
Environmental Engineer
US DOT Volpe Center
RVT-43, Environmental Science and Engineering

³ “Baccalaureate or higher degree from an accredited institution of higher education in a discipline of engineering or science and the equivalent of five (5) years of full-time relevant experience.” ASTM E1527-05.

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