



Consultants | Engineers | Scientists

July 11, 2018

Via Electronic Mail: NPDES.Generalpermits@epa.gov

U.S. Environmental Protection Agency
Remediation General Permit NOI Processing
5 Post Office Square, Suite 100
Mail Code OEP06-4
Boston, Massachusetts 02109-3912

**RE: EPA Remediation General Permit Notice of Intent
Sunoco Station
266 Massachusetts Avenue
Cambridge, Massachusetts
MADEP RTN 3-1559
CEA File No. 6196-06**

To Whom It May Concern:

On behalf of Sunoco (R&M), LLC (Sunoco), Corporate Environmental Advisors (CEA) respectfully submits this EPA Remediation General Permit (RGP) Notice of Intent (NOI) submittal for the above-referenced location (the "Site" or "subject property"). The RGP NOI submittal is provided as **Attachment A**. The site property consists of an approximate 0.139 acre (6,079 square feet) lot that includes a single story convenience store building located on the west side of the site constructed in 1995 on a concrete slab on grade foundation. One (1) 12,000-gallon capacity gasoline underground storage tank (UST) and one (1) 6,000-gallon gasoline UST, are located on the north side of the subject property. Three (3) dispensers located across two (2) dispenser islands are located at the center and east side of the site. The subject property located in a commercial area is bordered to the northeast/east by Massachusetts Avenue, and to the south by Landsdowne Street. A residential apartment building abuts the site property to the northwest. Novartis Institutes for BioMedical Research is located to the immediate southeast across Landsdowne Street.

Soil and groundwater beneath the site have been impacted by a historic release of petroleum. The site property has historically been occupied by an automotive repair facility and/or petroleum service station since 1924. In 1988, the Massachusetts Department of Environmental Protection (MADEP) identified the site as a Location to be Investigated (LTBI) and assigned LTBI File # 3-1559. In April 1988, MADEP issued a Notice of Responsibility (NOR) to Best Petroleum

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Company, Inc. (Best). According to a Class A-3 Response Action Outcome (RAO) Statement and Activity and Use Limitation (AUL) filed with MADEP in September 2000 for RTN 3-1559, a total of 1,376 tons of petroleum impacted soil was excavated during UST removal and replacement activities between October 1994 and September 1995 when the current USTs were installed.

Excavation of petroleum impacted soil is proposed during UST removal and replacement activities at the site. It is anticipated that proposed excavation and temporary dewatering and groundwater treatment activities will be initiated at the Site in July 2018. Proposed remediation activities are being performed at the site historically assigned MADEP Release Tracking Number (RTN) 3-1559 under a Release Abatement Measure (RAM) Plan, in accordance with the Massachusetts Contingency Plan (MCP) 310 CMR 40.0000.

This Notice of Intent is being submitted in order to obtain a permit for the short term (temporary) discharge of treated groundwater to surface water. Based on available information groundwater has been measured at the Site at depths ranging from approximately 9 feet to 11 feet below grade. Therefore, it is anticipated that dewatering activities and corresponding treatment of such using a temporary groundwater treatment system will be necessary to depress the groundwater table at the Site during subsurface excavation activities. A Site Locus is provided as **Figure 1** and a Site Layout is provided as **Figure 2**. The attached Site Locus (**Figure 1**) depicts the subject property with respect to surrounding topography and the Site Layout (**Figure 2**) depicts pertinent Site features. The attached MADEP Bureau of Waste Site Cleanup (BWSC) Phase 1 Site Assessment Map provided as **Figure 3** depicts surface water features and sensitive receptors located within an approximate 500 foot radius and half-mile radius of the site.

GROUNDWATER TREATMENT SYSTEM DESIGN

The proposed groundwater treatment system to be located on-site shall consist of an electric submersible pump which will pump groundwater from a temporary dewatering sump or well set within the excavation area to a 21,000-gallon fractation (frac) tank for settling and temporary storage. Recovered groundwater shall be pumped from the frac tank using a submersible pump through bag filters to remove particulates and then through two (2) 2,000-pound capacity liquid phase granular activated carbon adsorption (LGACA) vessels plumbed in series. The treated groundwater will pass through a flow meter and flow totalizer prior to being discharged to a storm drain catch basin located to the immediate northeast along Massachusetts Avenue or a storm drain catch basin located to the immediate southeast along Landsdowne Street. Information provided by the City of Cambridge Department of Public Works (DPW) indicates that both of these storm drain catch basins are connected to the underground stormwater drainage system beneath Massachusetts Avenue and Memorial Drive roadways and discharges to the Charles River freshwater surface water, located approximately a half-mile southeast of the Site.



A process and instrumentation diagram (P&ID) of the proposed groundwater treatment system is provided as **Figure 4**. The proposed treated water discharge location is shown on **Figure 2**.

The average flow rate of the treated water discharge from the system to the storm drain system is anticipated to be 50 to 100 gallons per minute (gpm). The pumping capacity of the groundwater treatment system is 100 gpm based upon the capacity of the submersible pumps. The groundwater treatment system shall be inspected, monitored and sampled by a Grade II Wastewater Treatment Plant Operator as required in accordance with the RGP. Groundwater samples shall be collected from the influent and effluent (treated water) prior to discharge for analysis by a Massachusetts-certified laboratory for contaminants of concern and any additional monitoring parameters required by the RGP. In addition, groundwater samples shall also be collected from the midpoint (between LGAC units) for analysis by a Massachusetts-certified laboratory to further monitor the groundwater treatment system for potential break through of the liquid phase carbon.

GROUNDWATER AND SURFACE WATER PRE-CHARACTERIZATION ANALYSIS

A composite groundwater sample was collected on June 20, 2018 from recently installed on-site monitoring wells MW-1 and MW-2 for RGP parameters. The June 2018 samples were submitted to Eurofins Spectrum Analytical (Spectrum) under chain-of-custody protocol and analyzed for select RGP parameters including ammonia, chloride, total suspended solids (TSS), total residual chlorine (TRC), hardness, total metals, cyanide, volatile organic compounds (VOCs), semi-VOCs (SVOCs)/ polycyclic aromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs), and total petroleum hydrocarbons (TPH) via the corresponding EPA methodologies. Refer to the laboratory analytical report included in **Attachment B** for details of the RGP parameters, EPA methodologies and groundwater analytical results. The temperature of the untreated groundwater (sample GW-RGP) was field measured at 17 degrees Celsius, and pH was field measured at 6.8 standard units (SU). In addition, a surface water sample identified as SW-1 was collected from the receiving water in the Charles River at the storm drain outfall. The surface water sample SW-1 was submitted to Spectrum under chain-of-custody for select RGP parameters including total metals, ammonia and hardness. The temperature of the surface water was field measured at 24 degrees Celsius, and pH was field measured at 6.9 SU.

The June 20, 2018 groundwater gauging data is summarized on **Table 1** attached. The groundwater analytical results for untreated/ unfiltered groundwater samples collected from monitoring wells MW-1 and MW-2 on June 20, 2018 for RGP parameters are summarized in the enclosed RGP NOI data summary section (Pages 18 to 20 in the NOI, **Attachment A**). The June 2018 laboratory analytical results for the untreated groundwater sample (GW-RGP) are compared to the corresponding RGP effluent limitations summarized in the enclosed NOI data summary. The RGP effluent limitations were obtained from the RGP Table 2 Chemical-Specific Effluent Limitations for Category I – Petroleum Related Site Remediation, found at



(<https://www3.epa.gov/region1/npdes/rgp.html>). The surface water sample SW-1 analytical results are presented in the laboratory analytical report (**Attachment B**).

Referring to the NOI data summary included in **Attachment A**, the analytical results for the untreated/ unfiltered groundwater sample (GW-RGP) detected TSS, arsenic, copper, hexavalent chromium, total iron, lead, nickel, and total benzene, toluene, ethylbenzene and xylenes (BTEX) concentrations above the corresponding EPA RGP technology-based effluent limitation (TBEL) and/or water quality-based effluent limitation (WQBEL) available for this report. These exceedances of RGP effluent limitations in the untreated groundwater sample (GW-RGP) are most likely attributable to silt in the unfiltered groundwater sample and not representative of actual groundwater (soluble) concentrations. However, it is anticipated that the proposed groundwater treatment system will reduce concentrations of TSS, benzene, total BTEX, total metals (arsenic, copper, lead, nickel and iron), and hexavalent chromium below available RGP effluent limitations in treated groundwater prior to discharge. Based on available information, TSS, benzene, total BTEX, total metals (arsenic, copper, lead, nickel and iron), and/or hexavalent chromium should be subject to monitoring requirements.

RECEIVING WATERS INFORMATION

The receiving water for the treated groundwater discharge is the Charles River freshwater surface water, located approximately one-half mile southeast of the Site. CEA consulted the United States Geological Survey (USGS) StreamStats program (http://streamstatsags.cr.usgs.gov/v3_beta/BCreport.htm) and USGS and MADEP personnel to determine the 7Q10 flow rate at the discharge location. USGS provided the enclosed StreamStats Report for the proposed discharge point (located at 42.35487N, -71.09109W) at the drainage system outfall in the Charles River located to the southeast of the site in Cambridge, MA. Data obtained from the StreamStats Flow Statistics Report indicates that the calculated 7Q10 flow rate for this area basin is 29.2 cubic feet per second (cfs). A copy of the USGS StreamStats Report is provided in **Attachment C**.

RECEIVING WATER CLASSIFICATION

According to 314 CMR 4.06, the Charles River surface water where the proposed drainage system outfall is located is designated as Class B surface water. The Charles River is not an Outstanding Resource Water according information provided by the MADEP.

THREATENED OR ENDANGERED SPECIES OR CRITICAL HABITAT

According to the Massachusetts Geographic Information Systems (MassGIS) and online MassDEP Phase 1 Site Assessment Map (<http://maps.massgis.state.ma.us/images/dep/mcp/mcp.htm>) and Natural Heritage Endangered Species Program (NHESP) online maps, no Priority Habitat of Rare Species or Estimated



Habitats of Rare Wildlife are located within the work area or at the proposed groundwater discharge location. Also, the MassGIS map does not depict any Areas of Critical Environmental Concern on the Site or within one-half mile of the Site. Copies of the MADEP Phase 1 Site Assessment Map (**Figure 3**) is attached and the NHESP maps are provided as **Attachment D**.

As part of the Endangered Species Act eligibility determination CEA contacted the United States Department of the Interior, Fish and Wildlife Services (FWS) and requested a list of threatened and endangered species that may occur in the proposed project location and/or that may be affected by the proposed project. The FWS provided the requested list which indicates that threatened or endangered species were not identified. Therefore, the proposed project discharge meets FWS Criterion A. A copy of the FWS letter is included in **Attachment E**.

REVIEW OF NATIONAL REGISTER OF HISTORIC PLACES

A listing of all Historic Places within the City of Cambridge was obtained from the Massachusetts Cultural Resources Information System (MACRIS) online database at <http://mhc-macris.net/> on June 28, 2018. A copy of the MACRIS historic places report is provided as **Attachment F**. The database indicates that numerous historic places are located in the City of Cambridge. Referring to **Attachment F**, the 250 Massachusetts Avenue property located across Landsdowne Street to the southeast of the site is a historic property. The 250 Massachusetts Avenue historic property appears to be the closest historic property to the site. However, the project does not involve the demolition or rehabilitation of any of the historic places identified in the database. Also, historic properties are not affected by the discharge or identified in the path of the discharges regulated by this permit, and are not identified where installation or construction of treatment systems or best management practices to control such discharges are planned.



If you have any questions or require additional information, please do not hesitate to contact either of the undersigned via telephone at (508) 835-8822.

Sincerely,
Corporate Environmental Advisors



Phil Olson
Senior Environmental Geologist



Scott E. VanderSea, LSP, LEP
Principal Hydrogeologist

Attachments: RGP NOI Submittal, Figures, Laboratory Analytical Report, Tables, StreamStats Flow Statics Report, NHESP Maps, FWS Endangered Species Determination, MACRIS Historic Places Report

cc: Ms. Shelley Puleo (via email: puleo.shelley@epa.gov)
Ms. Shauna Little (via email: little.shauna@epa.gov)
Ms. Cathy Vakalopoulos (via email: Catherine.Vakalopoulos@state.ma.us)
Mr. Xiaodan Ruan (via email: xiaodan.ruan@state.ma.us)
Mr. Bill Brochu, Sunoco (R&M) LLC, via electronical submittal



ATTACHMENT A

**EPA Remediation General Permit (RGP)
Notice of Intent (NOI) Submittal**

II. Suggested Format for the Remediation General Permit Notice of Intent (NOI)

A. General site information:

1. Name of site: Sunoco Station	Site address: 266 Massachusetts Avenue Street:		
2. Site owner Sunoco (R&M), LLC Owner is (check one): ☐ Federal ☐ State/Tribal ☐ Private ☒ Other; if so, specify: Commercial	City: Cambridge	State: MA	Zip: 01420
3. Site operator, if different than owner Corporate Environmental Advisors (CEA)	Contact Person: William Brochu Telephone: 508-728-0592 Email: WILLIAM.BROCHU@sunoco.com Mailing address: P.O. Box 4209 Street: City: Concord State: NH Zip: 03302		
4. NPDES permit number assigned by EPA: NPDES permit is (check all that apply): ☒ RGP ☐ DGP ☐ CGP ☐ MSGP ☐ Individual NPDES permit ☐ Other; if so, specify:	5. Other regulatory program(s) that apply to the site (check all that apply): ☒ MA Chapter 21e; list RTN(s): MassDEP RTN: 3-1559 ☐ NH Groundwater Management Permit or Groundwater Release Detection Permit: ☐ CERCLA ☐ UIC Program ☐ POTW Pretreatment ☐ CWA Section 404		

B. Receiving water information:

1. Name of receiving water(s): Charles River	Waterbody identification of receiving water(s): MA72-38	Classification of receiving water(s): Charles River is a Class B surface water
Receiving water is (check any that apply): ☐ Outstanding Resource Water ☐ Ocean Sanctuary ☐ territorial sea ☐ Wild and Scenic River		
2. Has the operator attached a location map in accordance with the instructions in B, above? (check one): ☒ Yes ☐ No Are sensitive receptors present near the site? (check one): ☐ Yes ☒ No If yes, specify:		
3. Indicate if the receiving water(s) is listed in the State's Integrated List of Waters (i.e., CWA Section 303(d)). Include which designated uses are impaired, and any pollutants indicated. Also, indicate if a final TMDL is available for any of the indicated pollutants. For more information, contact the appropriate State as noted in Part 4.6 of the RGP. Impairment cause and Pollutants; Chlorophyll-a, excess algal growth, nutrient/eutrophication biological indicators, total Phosphorus & Secchi disk transparency, taste & odor all TMDL# 33826.		
4. Indicate the seven day-ten-year low flow (7Q10) of the receiving water determined in accordance with the instructions in Appendix V for sites located in Massachusetts and Appendix VI for sites located in New Hampshire.		Charles River = 29.2 cfs
5. Indicate the requested dilution factor for the calculation of water quality-based effluent limitations (WQBELs) determined in accordance with the instructions in Appendix V for sites in Massachusetts and Appendix VI for sites in New Hampshire.		DF= 18.87 mgd + 0.1439 mgd/ 0.1439 mgd= 132.13
6. Has the operator received confirmation from the appropriate State for the 7Q10 and dilution factor indicated? (check one): ☒ Yes ☐ No If yes, indicate date confirmation received: On 6-28-2018 Xiaodan Ruan of MassDEP confirmed the 7Q10 and dilution factor.		
7. Has the operator attached a summary of receiving water sampling results as required in Part 4.2 of the RGP in accordance with the instruction in Appendix VIII? (check one): ☒ Yes ☐ No See attached laboratory analytical report and receiving water summary table for surface water sample SW-1 collected on 6-20-2018.		

C. Source water information:

1. Source water(s) is (check any that apply):			
☒ Contaminated groundwater Has the operator attached a summary of influent sampling results as required in Part 4.2 of the RGP in accordance with the instruction in Appendix VIII? (check one): ☒ Yes ☐ No	☐ Contaminated surface water Has the operator attached a summary of influent sampling results as required in Part 4.2 of the RGP in accordance with the instruction in Appendix VIII? (check one): ☐ Yes ☐ No	☒ The receiving water	☐ Potable water; if so, indicate municipality or origin: ☐ Other; if so, specify:
		☐ A surface water other than the receiving water; if so, indicate waterbody:	

2. Source water contaminants: Historic releases of petroleum from the former underground storage tank (UST) system at the gas station.

a. For source waters that are contaminated groundwater or contaminated surface water, indicate are any contaminants present that are not included in the RGP? (check one): ☐ Yes ☒ No If yes, indicate the contaminant(s) and the maximum concentration present in accordance with the instructions in Appendix VIII.

b. For a source water that is a surface water other than the receiving water, potable water or other, indicate any contaminants present at the maximum concentration in accordance with the instructions in Appendix VIII? (check one): ☐ Yes ☐ No

3. Has the source water been previously chlorinated or otherwise contains residual chlorine? (check one): ☐ Yes ☒ No

D. Discharge information

1. The discharge(s) is a(n) (check any that apply): ☐ Existing discharge ☒ New discharge ☐ New source

Outfall(s):

Proposed discharge to a catch basin that drains into the Charles River surface water located southeast of the site, near the Mass Ave bridge and Memorial Drive. See attached figure for approximate outfall location.

Outfall location(s): (Latitude, Longitude)

Approximate outfall location Latitude: 42 degrees, 21 minutes, 26.73 seconds North; Longitude: 71 degrees, 5 minutes, 29.09 seconds West.

Discharges enter the receiving water(s) via (check any that apply): ☐ Direct discharge to the receiving water ☒ Indirect discharge, if so, specify:

Discharge is proposed to a storm drain catch basin that discharges to the Charles River surface water located southeast of the site.

☐ A private storm sewer system ☒ A municipal storm sewer system

If the discharge enters the receiving water via a private or municipal storm sewer system:

Has notification been provided to the owner of this system? (check one): ☒ Yes ☐ No

Has the operator has received permission from the owner to use such system for discharges? (check one): ☐ Yes ☒ No, if so, explain, with an estimated timeframe for obtaining permission: Authorization to be obtained from the City of Cambridge DPW pending EPA RGP authorization.

Has the operator attached a summary of any additional requirements the owner of this system has specified? (check one): ☐ Yes ☒ No

On 6-11-2018 the Cambridge DPW Engineering Dept. confirmed the storm drainage system outfall location and discharges to the Charles River. A temporary DPW Dewatering Permit will be obtained for proposed groundwater treatment and discharge to the storm drain system.

Cambridge DPW dewatering discharge permit to be obtained once the RGP is approved.

Provide the expected start and end dates of discharge(s) (month/year):

Proposed for September 1, 2018 through December 31, 2018.

Indicate if the discharge is expected to occur over a duration of: ☒ less than 12 months ☐ 12 months or more ☐ is an emergency discharge

Has the operator attached a site plan in accordance with the instructions in D, above? (check one): ☒ Yes ☐ No

2. Activity Category: (check all that apply)	3. Contamination Type Category: (check all that apply)	
☒ I – Petroleum-Related Site Remediation ☐ II – Non-Petroleum-Related Site Remediation ☐ III – Contaminated Site Dewatering ☐ IV – Dewatering of Pipelines and Tanks ☐ V – Aquifer Pump Testing ☐ VI – Well Development/Rehabilitation ☐ VII – Collection Structure Dewatering/Remediation ☐ VIII – Dredge-Related Dewatering	a. If Activity Category I or II: (check all that apply) ☒ A. Inorganics ☒ B. Non-Halogenated Volatile Organic Compounds ☒ C. Halogenated Volatile Organic Compounds ☒ D. Non-Halogenated Semi-Volatile Organic Compounds ☐ E. Halogenated Semi-Volatile Organic Compounds ☒ F. Fuels Parameters See influent groundwater analytical results for the sample GW-RGP on pages 16 to 20 of the attached laboratory report	
	b. If Activity Category III, IV, V, VI, VII or VIII: (check either G or H)	
	<table border="1"> <tr> <td data-bbox="970 799 1419 873">☐ G. Sites with Known Contamination</td><td data-bbox="1419 799 2003 873">☐ H. Sites with Unknown Contamination</td></tr> </table>	☐ G. Sites with Known Contamination
☐ G. Sites with Known Contamination	☐ H. Sites with Unknown Contamination	
<table border="1"> <tr> <td data-bbox="970 873 1419 1409"> c. If Category III-G, IV-G, V-G, VI-G, VII-G or VIII-G: (check all that apply) ☐ A. Inorganics ☐ B. Non-Halogenated Volatile Organic Compounds ☐ C. Halogenated Volatile Organic Compounds ☐ D. Non-Halogenated Semi-Volatile Organic Compounds ☐ E. Halogenated Semi-Volatile Organic Compounds ☐ F. Fuels Parameters </td><td data-bbox="1419 873 2003 1409"> d. If Category III-H, IV-H, V-H, VI-H, VII-H or VIII-H Contamination Type Categories A through F apply </td></tr> </table>	c. If Category III-G, IV-G, V-G, VI-G, VII-G or VIII-G: (check all that apply) ☐ A. Inorganics ☐ B. Non-Halogenated Volatile Organic Compounds ☐ C. Halogenated Volatile Organic Compounds ☐ D. Non-Halogenated Semi-Volatile Organic Compounds ☐ E. Halogenated Semi-Volatile Organic Compounds ☐ F. Fuels Parameters	d. If Category III-H, IV-H, V-H, VI-H, VII-H or VIII-H Contamination Type Categories A through F apply
c. If Category III-G, IV-G, V-G, VI-G, VII-G or VIII-G: (check all that apply) ☐ A. Inorganics ☐ B. Non-Halogenated Volatile Organic Compounds ☐ C. Halogenated Volatile Organic Compounds ☐ D. Non-Halogenated Semi-Volatile Organic Compounds ☐ E. Halogenated Semi-Volatile Organic Compounds ☐ F. Fuels Parameters	d. If Category III-H, IV-H, V-H, VI-H, VII-H or VIII-H Contamination Type Categories A through F apply	

MAG910000
NHG910000

See influent groundwater analytical results for sample "GW-RGP" on pages 16 through 20 of the attached laboratory report

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4. Influent and Effluent Characteristics

Parameter	Known or believed absent	Known or believed present	# of samples	Test method (#)	Detection limit (µg/l)	Influent		Effluent Limitations	
						Daily maximum (µg/l)	Daily average (µg/l)	TBEL	WQBEL
A. Inorganics									
Ammonia		✓	1	E350.1	1 mg/l	1.51 mg/l		Report mg/L	---
Chloride		✓	1	300	5,960 ug/l	1,220 ug/l		Report µg/l	---
Total Residual Chlorine		✓	1	SM4500	0.006 mg/l	0.040 mg/l		0.2 mg/L	FW= 11 ug/l
Total Suspended Solids		✓	1	SM2540D	4.3 mg/L	2,000 mg/L		30 mg/L	30 mg/l
Antimony	✓		1	200.8	8.18 ug/L	<10 ug/L		206 µg/L	640 ug/l
Arsenic		✓	1	200.8	5.9 ug/L	63.9 ug/L		104 µg/L	FW=10 ug/l
Cadmium	✓		1	200.8	25 ug/L	<25 ug/L		10.2 µg/L	FW= 0.25 ug/l
Chromium III	✓		1	200.8/calc	50 ug/l	<50 ug/l		323 µg/L	FW= 74 ug/l
Chromium VI		✓	1	SM3500	21 ug/l	133 ug/l		323 µg/L	FW= 11 ug/l
Copper		✓	1	200.8	24.3 ug/l	112 ug/l		242 µg/L	FW= 9 ug/l
Iron		✓	1	200.7	20.1 ug/l	94,800 ug/l		5,000 µg/L	FW= 1,000 ug/l
Lead		✓	1	200.8	3.58 ug/l	246 ug/l		160 µg/L	FW= 2.5 ug/l
Mercury		✓	1	245.1	0.14 ug/l	0.22 ug/l		0.739 µg/L	FW= 0.77 ug/l
Nickel		✓	1	200.8	5.15 ug/l	68.8 ug/l		1,450 µg/L	FW= 52 ug/l
Selenium	✓		1	200.8	50 ug/l	<50 ug/l		235.8 µg/L	FW= 5 ug/l
Silver	✓		1	200.8	25 ug/l	<25 ug/l		35.1 µg/L	FW= 3.2 ug/l
Zinc	✓		1	200.8	250 ug.l	<250 ug/l		420 µg/L	FW= 120 ug/l
Cyanide	✓		1	335.4	0.005 mg/l	<0.005 mg/l		178 mg/L	FW= 5.2 ug/l
B. Non-Halogenated VOCs									
Total BTEX		✓	1	624	40 ug/l	1,308.8 ug/l		100 µg/L	---
Benzene		✓	1	624	20 ug/l	23.8 ug/l		5.0 µg/L	---
1,4 Dioxane	✓		1	SIM8260	50 ug/l	<50 ug/l		200 µg/L	---
Acetone	✓		1	624	0.200 mg/l	<0.200 mg/l		7.97 mg/L	---
Phenol	✓		1	625.1	5 ug/l	<5 ug/l		1,080 µg/L	300 ug/l

Parameter	Known or believed absent	Known or believed present	# of samples	Test method (#)	Detection limit (µg/l)	Influent		Effluent Limitations	
						Daily maximum (µg/l)	Daily average (µg/l)	TBEL	WQBEL
C. Halogenated VOCs									
Carbon Tetrachloride	✓		1	624	20 ug/l	<20 ug/l		4.4 µg/L	1.6 ug/l
1,2 Dichlorobenzene	✓		1	624	20 ug/l	<20 ug/l		600 µg/L	---
1,3 Dichlorobenzene	✓		1	624	20 ug/l	<20 ug/l		320 µg/L	---
1,4 Dichlorobenzene	✓		1	624	20 ug/l	<20 ug/l		5.0 µg/L	---
Total dichlorobenzene	✓		1	624	20 ug/l	<20 ug/l		763 µg/L in NH	---
1,1 Dichloroethane	✓		1	624	20 ug/l	<20 ug/l		70 µg/L	---
1,2 Dichloroethane	✓		1	624	20 ug/l	<20 ug/l		5.0 µg/L	---
1,1 Dichloroethylene	✓		1	624	20 ug/l	<20 ug/l		3.2 µg/L	---
Ethylene Dibromide	✓		1	504.1	0.01 ug/l	<0.01 ug/l		0.05 µg/L	---
Methylene Chloride	✓		1	624	200 ug/l	<200 ug/l		4.6 µg/L	---
1,1,1 Trichloroethane	✓		1	624	20 ug/l	<20 ug/l		200 µg/L	---
1,1,2 Trichloroethane	✓		1	624	20 ug/l	<20 ug/l		5.0 µg/L	---
Trichloroethylene	✓		1	624	20 ug/l	<20 ug/l		5.0 µg/L	---
Tetrachloroethylene	✓		1	624	20 ug/l	<20 ug/l		5.0 µg/L	3.3 ug/l
cis-1,2 Dichloroethylene	✓		1	624	20 ug/l	<20 ug/l		70 µg/L	---
Vinyl Chloride	✓		1	624	20 ug/l	<20 ug/l		2.0 µg/L	---
D. Non-Halogenated SVOCs									
Total Phthalates	✓		1	625	5 ug/l	<5 ug/l		190 µg/L	N/A for MA
Diethylhexyl phthalate	✓		1	625	5 ug/l	<5 ug/l		101 µg/L	2.2 ug/l
Total Group I PAHs	✓		1	625	5 ug/l	<5 ug/l		1.0 µg/L	---
Benzo(a)anthracene	✓		1	625	5 ug/l	<5 ug/l		As Total PAHs	0.0038 ug/l
Benzo(a)pyrene	✓		1	625	5 ug/l	<5 ug/l			0.0038 ug/l
Benzo(b)fluoranthene	✓		1	625	5 ug/l	<5 ug/l			0.0038 ug/l
Benzo(k)fluoranthene	✓		1	625	5 ug/l	<5 ug/l			0.0038 ug/l
Chrysene	✓		1	625	5 ug/l	<5 ug/l			0.0038 ug/l
Dibenzo(a,h)anthracene	✓		1	625	5 ug/l	<5 ug/l			0.0038 ug/l
Indeno(1,2,3-cd)pyrene	✓		1	625	5 ug/l	<5 ug/l			0.0038 ug/l

[illegible]

E. Treatment system information

1. Indicate the type(s) of treatment that will be applied to effluent prior to discharge: (check all that apply) ☐ Adsorption/Absorption ☐ Advanced Oxidation Processes ☐ Air Stripping ☒ Granulated Activated Carbon (“GAC”)/Liquid Phase Carbon Adsorption ☐ Ion Exchange ☐ Precipitation/Coagulation/Flocculation ☒ Separation/Filtration ☐ Other; if so, specify: See below written description of the proposed treatment system.	
2. Provide a written description of all treatment system(s) or processes that will be applied to the effluent prior to discharge. An electric submersible pump will pump groundwater from a temporary excavation dewatering sump to a 21,000 gallon fractation (frac) tank. Recovered groundwater shall pass through bag filters to remove particulates and two 2,000-pound liquid phase granular activated carbon (LGAC) units plumbed in series. The treated groundwater shall be discharged into a nearby storm drain catch basin located in front of the site property. The storm drain discharges to the Charles River freshwater surface water located approximately 0.5 mile to the southeast. Identify each major treatment component (check any that apply): ☒ Fractionation tanks ☐ Equalization tank ☐ Oil/water separator ☐ Mechanical filter ☐ Media filter ☐ Chemical feed tank ☐ Air stripping unit ☒ Bag filter ☒ Other; if so, specify: The proposed treatment system will also include liquid phase granular activated carbon (LGAC) units and a flow meter/ totalizer. Indicate if either of the following will occur (check any that apply): ☐ Chlorination ☐ De-chlorination	
3. Provide the design flow capacity in gallons per minute (gpm) of the most limiting component. Indicate the most limiting component: Liquid phase granular activated carbon (LGAC) design flow rate of 75 gallons per minute (gpm) & maximum rate 100 gpm. Is use of a flow meter feasible? (check one): ☒ Yes ☐ No, if so, provide justification:	
Provide the proposed maximum effluent flow in gpm.	100
Provide the average effluent flow in gpm.	50
If Activity Category IV applies, indicate the estimated total volume of water that will be discharged:	
4. Has the operator attached a schematic of flow in accordance with the instructions in E, above? (check one): ☒ Yes ☐ No	

F. Chemical and additive information

1. Indicate the type(s) of chemical or additive that will be applied to effluent prior to discharge or that may otherwise be present in the discharge(s): (check all that apply)

☐ Algaecides/biocides ☐ Antifoams ☐ Coagulants ☐ Corrosion/scale inhibitors ☐ Disinfectants ☐ Flocculants ☐ Neutralizing agents ☐ Oxidants ☐ Oxygen ☐ scavengers ☐ pH conditioners ☐ Bioremedial agents, including microbes ☐ Chlorine or chemicals containing chlorine ☐ Other; if so, specify:
Not applicable

2. Provide the following information for each chemical/additive, using attachments, if necessary:

- a. Product name, chemical formula, and manufacturer of the chemical/additive;
- b. Purpose or use of the chemical/additive or remedial agent;
- c. Material Safety Data Sheet (MSDS) and Chemical Abstracts Service (CAS) Registry number for each chemical/additive;
- d. The frequency (hourly, daily, etc.), duration (hours, days), quantity (maximum and average), and method of application for the chemical/additive;
- e. Any material compatibility risks for storage and/or use including the control measures used to minimize such risks; and
- f. If available, the vendor's reported aquatic toxicity (NOAEL and/or LC50 in percent for aquatic organism(s)).

3. Has the operator attached an explanation which demonstrates that the addition of such chemicals/additives may be authorized under this general permit in accordance with the instructions in F, above? (check one): ☐ Yes ☐ No; if no, has the operator attached data that demonstrates each of the 126 priority pollutants in CWA Section 307(a) and 40 CFR Part 423.15(j)(1) are non-detect in discharges with the addition of the proposed chemical/additive?
(check one): ☐ Yes ☐ No

G. Endangered Species Act eligibility determination

1. Indicate under which criterion the discharge(s) is eligible for coverage under this general permit:

- ☒ **FWS Criterion A:** No endangered or threatened species or critical habitat are in proximity to the discharges or related activities or come in contact with the “action area”.
- ☒ **FWS Criterion B:** Formal or informal consultation with the FWS under section 7 of the ESA resulted in either a no jeopardy opinion (formal consultation) or a written concurrence by FWS on a finding that the discharges and related activities are “not likely to adversely affect” listed species or critical habitat (informal consultation). Has the operator completed consultation with FWS? (check one): ☒ Yes ☐ No; if no, is consultation underway? (check one): ☐ Yes ☐ No
- ☐ **FWS Criterion C:** Using the best scientific and commercial data available, the effect of the discharges and related activities on listed species and critical habitat have been evaluated. Based on those evaluations, a determination is made by EPA, or by the operator and affirmed by EPA, that the discharges and related activities will have “no effect” on any federally threatened or endangered listed species or designated critical habitat under the jurisdiction of the FWS. This determination was made by: (check one) ☐ the operator ☐ EPA ☐ Other; if so, specify:

- ☐ **NMFS Criterion:** A determination made by EPA is affirmed by the operator that the discharges and related activities will have “no effect” or are “not likely to adversely affect” any federally threatened or endangered listed species or critical habitat under the jurisdiction of NMFS and will not result in any take of listed species. Has the operator previously completed consultation with NMFS? (check one): ☐ Yes ☐ No

2. Has the operator attached supporting documentation of ESA eligibility in accordance with the instructions in Appendix I, and G, above? (check one): ☒ Yes ☐ No

Does the supporting documentation include any written concurrence or finding provided by the Services? (check one): ☒ Yes ☐ No; if yes, attach.

H. National Historic Preservation Act eligibility determination

1. Indicate under which criterion the discharge(s) is eligible for coverage under this general permit:

- ☒ **Criterion A:** No historic properties are present. The discharges and discharge-related activities (e.g., BMPs) do not have the potential to cause effects on historic properties.
- ☐ **Criterion B:** Historic properties are present. Discharges and discharge related activities do not have the potential to cause effects on historic properties.
- ☐ **Criterion C:** Historic properties are present. The discharges and discharge-related activities have the potential to have an effect or will have an adverse effect on historic properties.

2. Has the operator attached supporting documentation of NHPA eligibility in accordance with the instructions in H, above? (check one): ☐ Yes ☒ No

Does the supporting documentation include any written agreement with the State Historic Preservation Officer (SHPO), Tribal Historic Preservation Officer (TPHO), or other tribal representative that outlines measures the operator will carry out to mitigate or prevent any adverse effects on historic properties? (check one): ☐ Yes ☒ No

I. Supplemental information

Describe any supplemental information being provided with the NOI. Include attachments if required or otherwise necessary.

Please see attached figures, data tables, laboratory analytical reports and supporting documentation for supplemental information.

Has the operator attached data, including any laboratory case narrative and chain of custody used to support the application? (check one): ☒ Yes ☐ No

Has the operator attached the certification requirement for the Best Management Practices Plan (BMPP)? (check one): ☒ Yes ☐ No

According to EPA a copy of a Best Management Practices Plan (BMPP) only needs to be onsite and not included in the NOI submittal to EPA.

J. Certification requirement

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I have no personal knowledge that the information submitted is other than true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

BMPP certification statement: A Best Management Practices Plan (BMPP) has been prepared and a copy will be maintained on-site.

Notification provided to the appropriate State, including a copy of this NOI, if required.

Check one: Yes ☒ No ☐

The Cambridge DPW was informed of proposed discharge to storm drain system on 6-11-2018.

Notification provided to the municipality in which the discharge is located, including a copy of this NOI, if requested.

Check one: Yes ☒ No ☐

Authorization to be obtained from the City DPW pending EPA RGP authorization anticipated for August 2018.

Notification provided to the owner of a private or municipal storm sewer system, if such system is used for site discharges, including a copy of this NOI, if requested.

Check one: Yes ☒ No ☐ NA ☐

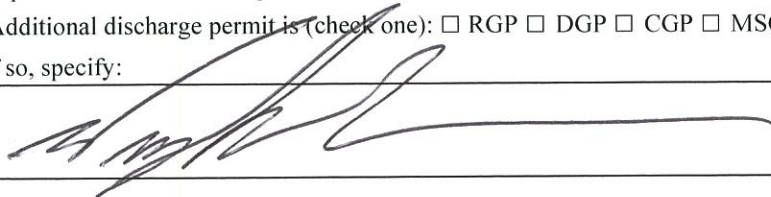
Permission obtained from the owner of a private or municipal storm sewer system, if such system is used for site discharges. If yes, attach additional conditions. If no, attach explanation and timeframe for obtaining permission.

Check one: Yes ☐ No ☐ NA ☐

Notification provided to the owner/operator of the area associated with activities covered by an additional discharge permit(s). Additional discharge permit is (check one): ☐ RGP ☐ DGP ☐ CGP ☐ MSGP ☐ Individual NPDES permit ☒ Other; if so, specify:

Check one: Yes ☐ No ☐ NA ☒

Signature:



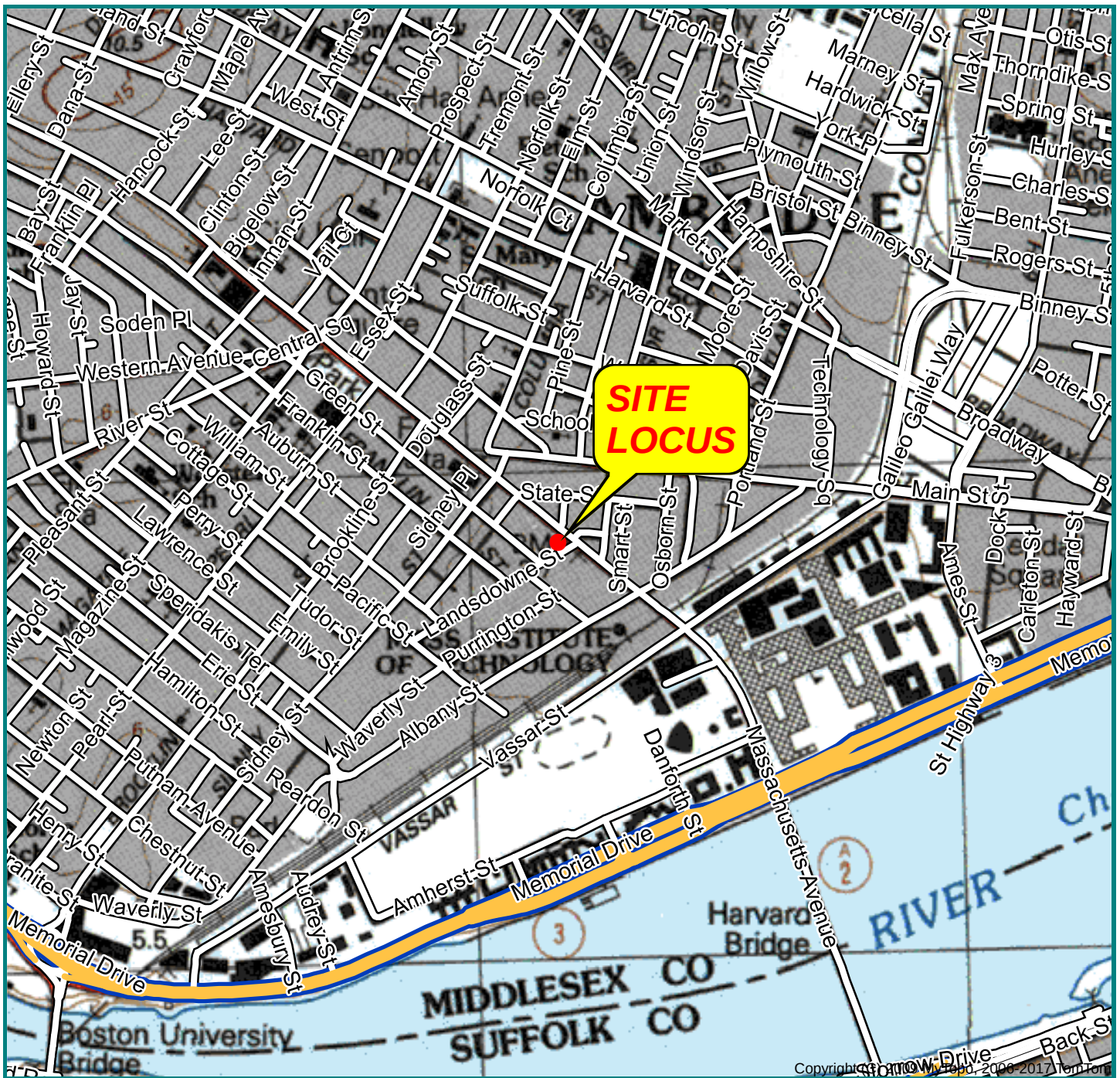
Date:

7/11/18

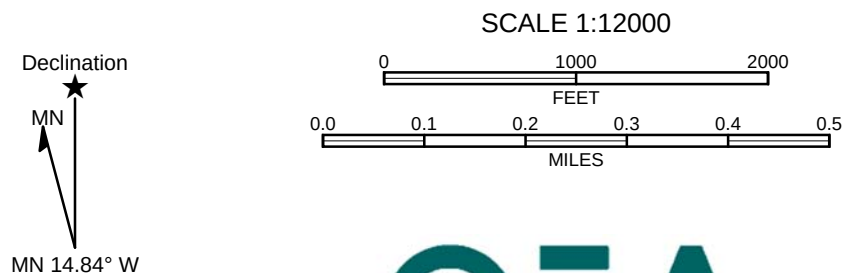
Print Name and Title: William Brochu, Environmental Engineer Sunoco (R&M), LLC

FIGURES





BOSTON SOUTH Topographic 1987 42071-C1-TM-025 National Geodetic Vertical Datum 1929



Site Coordinates:
042° 21' 41.92" N, 071°
05' 54.71" W

Site Location:
266 Massachusetts
Avenue
Boston, MA

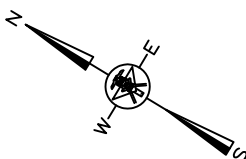


Corporate Environmental Advisors
127 Hartwell Street West Boylston, MA
1-800-358-7960

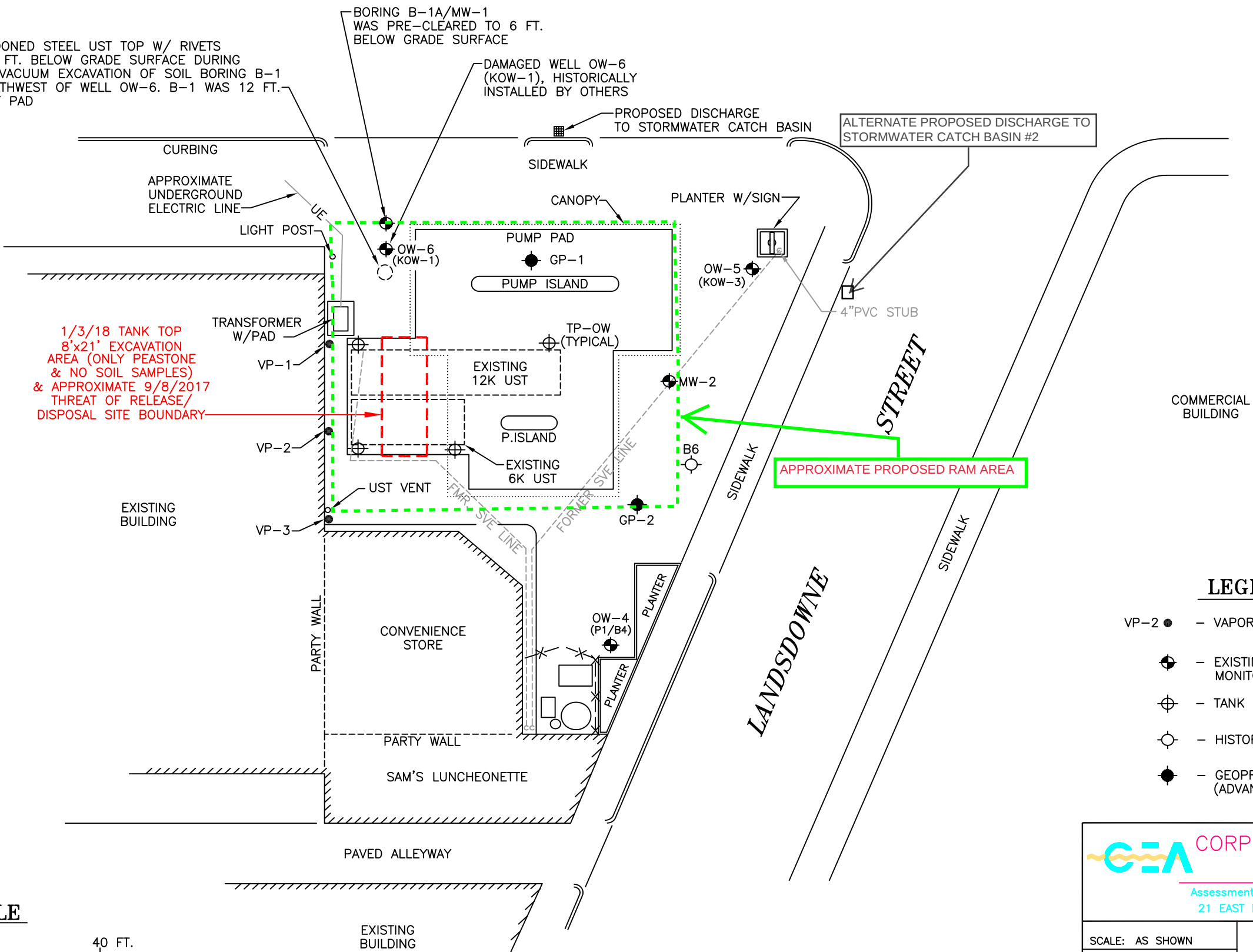
Figure-1
Site Locus Map

MASSACHUSETTS

AVENUE



A PRESUMED ABANDONED STEEL UST TOP W/ RIVETS WAS FOUND AT 3.5 FT. BELOW GRADE SURFACE DURING PRE-CLEARING W/ VACUUM EXCAVATION OF SOIL BORING B-1 APPROX. 2 FT. SOUTHWEST OF WELL OW-6. B-1 WAS 12 FT. FROM EDGE OF UST PAD



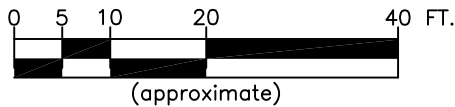
1/3/18 TANK TOP
8'x21' EXCAVATION
AREA (ONLY PEASTONE
& NO SOIL SAMPLES)
& APPROXIMATE 9/8/2017
THREAT OF RELEASE/
DISPOSAL SITE BOUNDARY

APPROXIMATE PROPOSED RAM AREA

LEGEND

- VP-2 ● - VAPOR POINT
- ⊕ - EXISTING GROUNDWATER MONITORING WELL
- ⊕ - TANK PAD OBSERVATION WELL
- ⊕ - HISTORICAL SOIL SAMPLE LOCATION
- - GEOPROBE LOCATION (ADVANCED BY HANDEX, INC. 8/12/99)

SCALE



NOTE: RECENT SOIL BORING AND FEATURES NOTED ARE APPROXIMATE LOCATIONS AND NOT TO SCALE.

CORPORATE ENVIRONMENTAL ADVISORS
Assessments - Remediation - Emergency Response
21 EAST MAIN STREET WESTBOROUGH, MA 01581

SCALE: AS SHOWN		DR. BY: K. HAZEL
DATE: 6/13/18	APP. BY: SEV	JOB NO.: 6196-06

SITE LAYOUT

SUNOCO (R&M), LLC 266 MASSACHUSETTS AVE. CAMBRIDGE, MA.	FIGURE-2
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NOTE:
THIS PLAN IS COMPILED FROM RECORD PLANS
AND FIELD MEASUREMENTS FOR THE SOLE
PURPOSE OF REPRESENTING THE APPROXIMATE
LOCATION OF SITE FEATURES AND UTILITIES.

MassDEP - Bureau of Waste Site Cleanup

Phase 1 Site Assessment Map: 500 feet & 0.5 Mile Radii

Site Information:

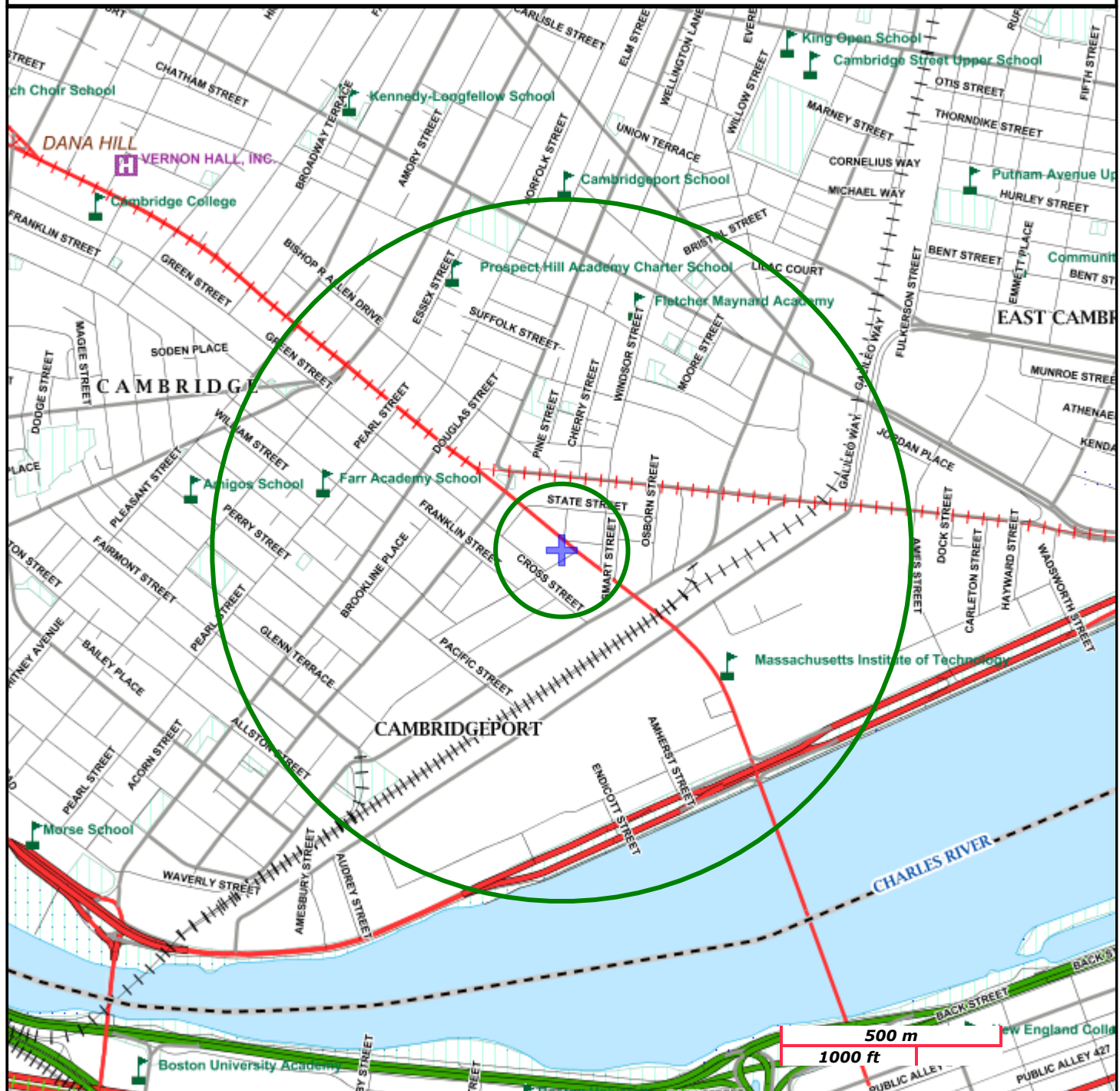
SUBJECT SITE
266 MASSACHUSETTS AVENUE CAMBRIDGE, MA
3-000034458
NAD83 UTM Meters:
4692076mN, 327232mE (Zone: 19)
November 3, 2017

The information shown is the best available at the date of printing. However, it may be incomplete. The responsible party and LSP are ultimately responsible for ascertaining the true conditions surrounding the site. Metadata for data layers shown on this map can be found at:
<http://www.mass.gov/mgis/>.



MassDEP

Commonwealth of Massachusetts
Department of Environmental Protection



Roads: Limited Access, Divided, Other Hwy, Major Road, Minor Road, Track, Trail

Boundaries: Town, County, DEP Region; Train; Powerline; Pipeline; Aqueduct

Basins: Major, PWS; Streams: Perennial, Intermittent, Man Made Shore, Dam

Aquifers: Medium Yield, High Yield, EPA Sole Source

Non Potential Drinking Water Source Area: Medium, High (Yield)

PWS Protection Areas: Zone II, IWPA, Zone A

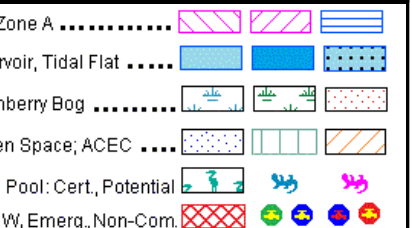
Hydrography: Open Water, PWS Reservoir, Tidal Flat

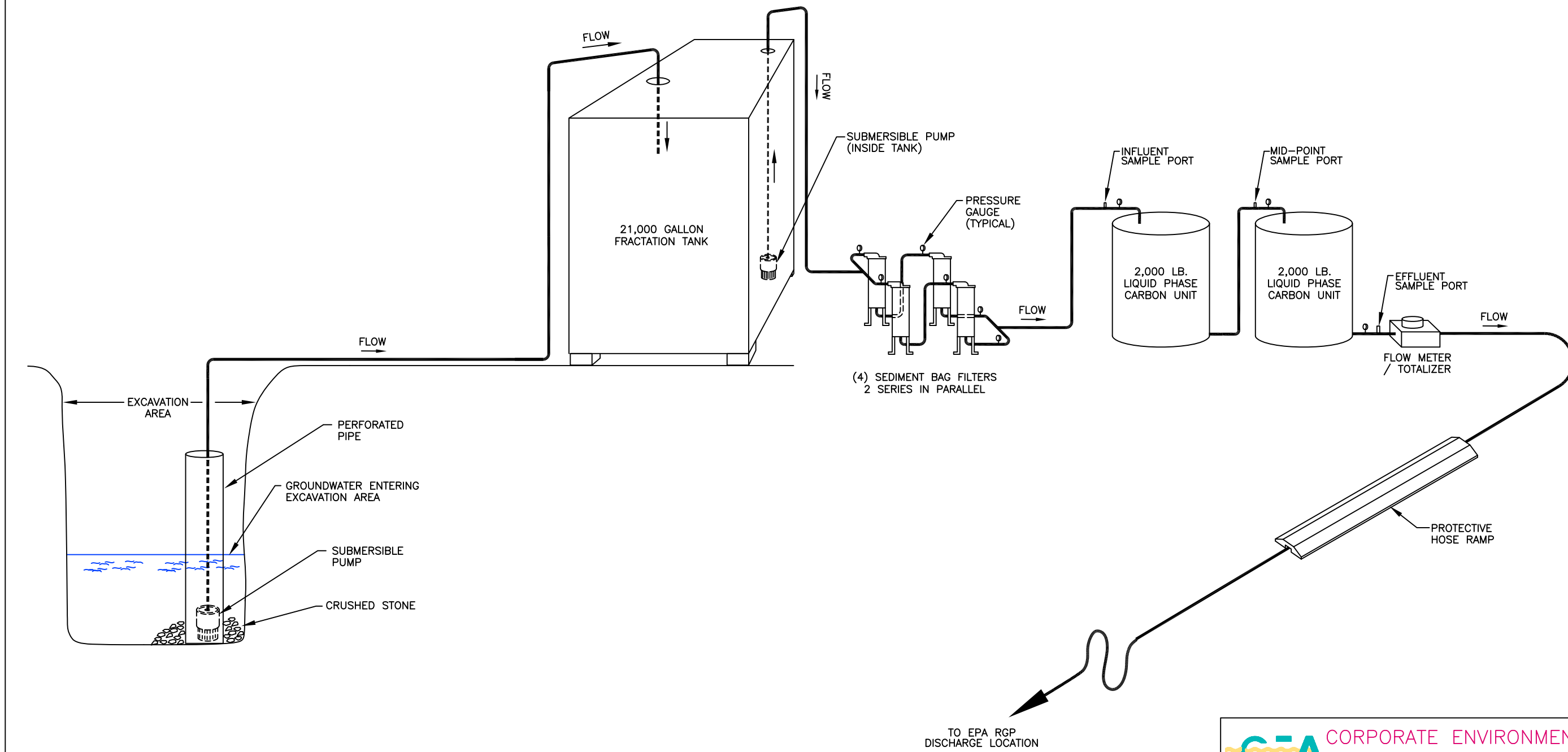
Wetlands: Freshwater, Saltwater, Cranberry Bog

FEMA 100yr Floodplain; Protected Open Space; ACEC

Est. Rare Wetland Wildlife Hab; Vernal Pool: Cert., Potential

Solid Waste Landfill; PWS: Com. GW, SW, Emerg., Non-Com.

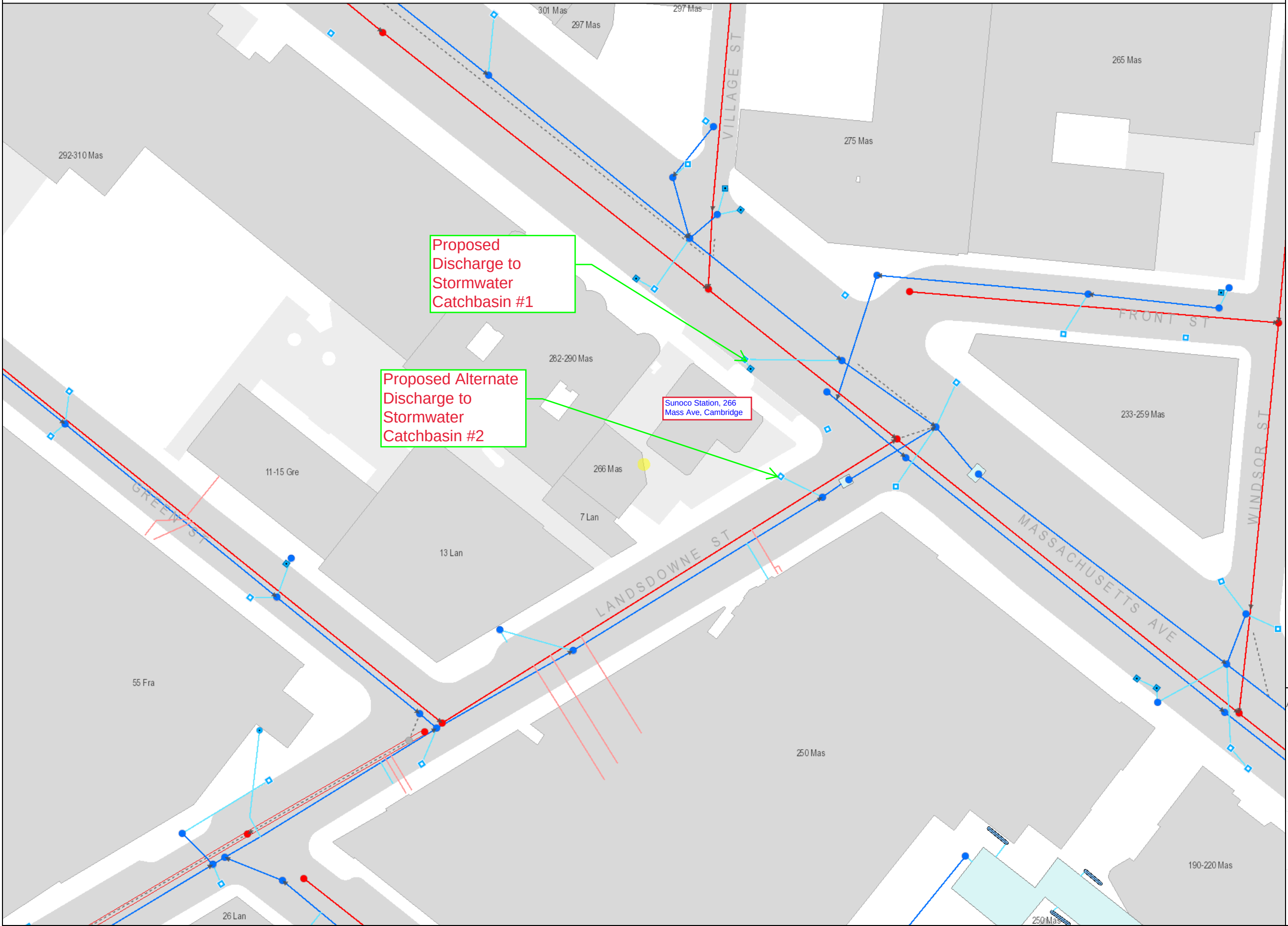





**CORPORATE ENVIRONMENTAL
ADVISORS**
Assessments — Remediation — Emergency Response
21 EAST MAIN STREET WESTBOROUGH, MA 01581

SCALE: NOT TO SCALE		DR. BY: K. HAZEL
DATE: 6/14/18	APP. BY: SEV	JOB NO.: 6196-06
EXCAVATION DEWATERING PROCESS & INSTRUMENTATION DIAGRAM		
SUNOCO (R&M), LLC 266 MASSACHUSETTS AVENUE CAMBRIDGE, MA		FIGURE—4





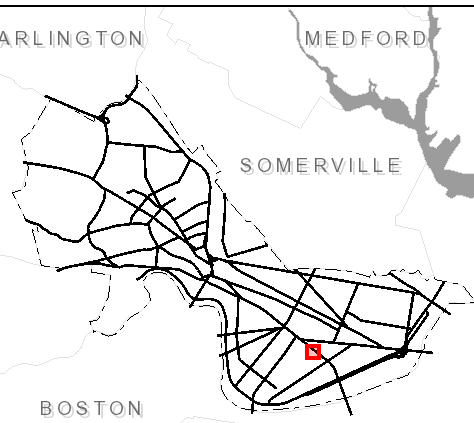
LEGEND

- Outfalls
 - Stormwater
 - Combined Sewer Overflow
 - Abandoned
- Pumping Structures
 - Pump Station
 - Lift Station
- Manholes
 - Stormwater
 - Sewage
 - Combined Sewage
 - Abandoned
- Lampholes
 - LampHole, Sewage
 - LampHole, Storm Runoff
- Catchbasins
 - Standard Sump
 - Drop Inlet
 - Area Drain
 - Drywell
 - Oil/Water Separator
 - Abandoned
- Trench Drains
- Service Laterals
 - Combined Wastewater, In
 - Stormwater
 - Sewage
 - Abandoned
- Force Mains
 - Combined Wastewater
 - Sewage
 - Storm Runoff
- MWRA Mains
 - Abandoned
 - In Service
- Underground Structures
 - Stormwater
 - Sewage
 - Combined Sewage
- Zoom Three Paved Surfaces
 - Paved Roads
 - Other Paved Surface
 - Bridges
 - Public Footpath



City of Cambridge
Massachusetts
1" = 48 ft

All data is provided for graphic representation only. The City of Cambridge expressly disclaims all warranties of any type, expressed or implied, including, but not limited to, any warranty as to the accuracy of the data, merchantability, or fitness for a particular purpose.
www.cambridgema.gov/gis



**Cambridge CityViewer**

City of Cambridge, MA

<http://www.cambridgema.gov/GIS/interactivemaps>
application=DPW&function=tab-search,selection,legend,location,markup,share)

< Legend

Refresh Map

☐ Addresses Orthos (http://www.cambridgema.gov/GIS/gisdatadictionary/Address/ADDRESS_AddressPoints)☐ Benchmarks

1

2

3

☐ GeoIndex☒ Pumping Structures

Pump Station

Lift Station

☒ Lampholes

LampHole, Sewage

LampHole, Storm Runoff

☒ Trench Drains☒ Service Laterals

Combined Wastewater, In Service

Stormwater

Sewage

Abandoned

☒ MWRA Mains

Abandoned

In Service

☒ Underground Structures

Stormwater

Sewage

Combined Sewage



100 ft

Leaflet (<http://leafletjs.com>)[GIS Homepage \(http://www.cambridgema.gov/GIS\)](http://www.cambridgema.gov/GIS) | [About GIS \(http://www.cambridgema.gov/GIS/aboutgis.aspx\)](http://www.cambridgema.gov/GIS/aboutgis.aspx) | [Contact Us](#)

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(<http://www.cambridgema.gov/GIS/privacypolicy.aspx>) | © 2018 City of Cambridge, MA

ATTACHMENT B

Laboratory Analytical Report



Report Date:
06-Jul-18 14:28**Laboratory Report**
SC47844CEA, Inc.
21 East Main Street, Suite 201
Westborough, MA 01581
Attn: Scott VanderseaProject: Sunoco - 266 Massachusetts Ave - Cambridge, MA
Project #: 6196-06

I attest that the information contained within the report has been reviewed for accuracy and checked against the quality control requirements for each method. These results relate only to the sample(s) as received.
All applicable NELAC requirements have been met.

Massachusetts # M-MA138/MA1110
Connecticut # PH-0777
Florida # E87936
Maine # MA138
New Hampshire # 2972/2538
New Jersey # MA011
New York # 11393
Pennsylvania # 68-04426/68-02924
Rhode Island # LAO00348
USDA # P330-15-00375
Vermont # VT-11393

Authorized by:

Christina White
Technical Director

A handwritten signature in black ink that reads "Christina A. White".

Eurofins Spectrum Analytical holds primary certification in the State of Massachusetts for the analytes as indicated with an X in the "Cert." column within this report. Please note that the State of Massachusetts does not offer certification for all analytes. Please refer to our website for specific certification holdings in each state.

Please note that this report contains 45 pages of analytical data plus Chain of Custody document(s). When the Laboratory Report is indicated as revised, this report supersedes any previously dated reports for the laboratory ID(s) referenced above. Where this report identifies subcontracted analyses, copies of the subcontractor's test report are available upon request. This report may not be reproduced, except in full, without written approval from Eurofins Spectrum Analytical, Inc.

Eurofins Spectrum Analytical, Inc. is a NELAC accredited laboratory organization and meets NELAC testing standards. Use of the NELAC logo however does not insure that Eurofins Spectrum Analytical, Inc. is currently accredited for the specific method or analyte indicated. Please refer to our Quality web page at www.spectrum-analytical.com for a full listing of our current certifications and fields of accreditation. States in which Eurofins Spectrum Analytical, Inc. holds NELAC certification are New York, New Hampshire, New Jersey, Pennsylvania and Florida. All analytical work for Volatile Organic and Air analysis are transferred to and conducted at our 830 Silver Street location (PA-68-04426).

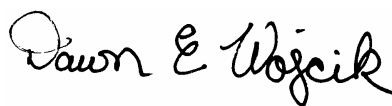
Please contact the Laboratory or Technical Director at 800-789-9115 with any questions regarding the data contained in this laboratory report.

Sample Summary

Work Order: SC47844
Project: Sunoco - 266 Massachusetts Ave - Cambridge, MA
Project Number: 6196-06

<u>Laboratory ID</u>	<u>Client Sample ID</u>	<u>Matrix</u>	<u>Date Sampled</u>	<u>Date Received</u>
SC47844-01	GW-RGP	Liquid	20-Jun-18 12:30	20-Jun-18 16:40
SC47844-02	SW-1	Liquid	20-Jun-18 13:15	20-Jun-18 16:40

MassDEP Analytical Protocol Certification Form

Laboratory Name: Eurofins Spectrum Analytical, Inc.			Project #: 6196-06		
Project Location: Sunoco - 266 Massachusetts Ave - Cambridge, MA			RTN:		
This form provides certifications for the following data set:			SC47844-01 through SC47844-02		
Matrices: Liquid					
CAM Protocol					
✓ 8260 VOC CAM II A	✓ 7470/7471 Hg CAM III B	MassDEP VPH CAM IV A	8081 Pesticides CAM V B	✓ 7196 Hex Cr CAM VI B	MassDEP APH CAM IX A
8270 SVOC CAM II B	7010 Metals CAM III C	MassDEP EPH CAM IV B	8151 Herbicides CAM V C	8330 Explosives CAM VIII A	TO-15 VOC CAM IX B
✓ 6010 Metals CAM III A	6020 Metals CAM III D	8082 PCB CAM V A	✓ 9012 Total Cyanide/PAC CAM VI A	9014 Total Cyanide/PAC CAM VI A	6860 Perchlorate CAM VIII B
<i>Affirmative responses to questions A through F are required for Presumptive Certainty's status</i>					
A	Were all samples received in a condition consistent with those described on the Chain of Custody, properly preserved (including temperature) in the field or laboratory, and prepared/analyzed within method holding times?				✓ Yes No
B	Were the analytical method(s) and all associated QC requirements specified in the selected CAM protocol(s) followed?				✓ Yes No
C	Were all required corrective actions and analytical response actions specified in the selected CAM protocol(s) implemented for all identified performance standard non-conformances?				✓ Yes No
D	Does the laboratory report comply with all the reporting requirements specified in CAM VII A, "Quality Assurance and Quality Control Guidelines for the Acquisition and Reporting of Analytical Data"?				✓ Yes No
E	a. VPH, EPH, and APH Methods only: Was each method conducted without significant modification(s)? b. APH and TO-15 Methods only: Was the complete analyte list reported for each method?				Yes No Yes No
F	Were all applicable CAM protocol QC and performance standard non-conformances identified and evaluated in a laboratory narrative (including all "No" responses to questions A through E)?				✓ Yes No
<i>Responses to questions G, H and I below are required for Presumptive Certainty's status</i>					
G	Were the reporting limits at or below all CAM reporting limits specified in the selected CAM protocol(s)?				Yes ✓ No
Data User Note: Data that achieve <i>Presumptive Certainty's status</i> may not necessarily meet the data usability and representativeness requirements described in 310 CMR 40. 1056 (2)(k) and WSC-07-350.					
H	Were all QC performance standards specified in the CAM protocol(s) achieved?				Yes ✓ No
I	Were results reported for the complete analyte list specified in the selected CAM protocol(s)?				Yes ✓ No
<i>All negative responses are addressed in a case narrative on the cover page of this report.</i>					
<i>I, the undersigned, attest under the pains and penalties of perjury that, based upon my personal inquiry of those responsible for obtaining the information, the material contained in this analytical report is, to the best of my knowledge and belief, accurate and complete.</i>  Dawn E. Wojcik Laboratory Director Date: 7/6/2018					

CASE NARRATIVE:

Data has been reported to the RDL. This report excludes estimated concentrations detected below the RDL and above the MDL (J-Flag).

All non-detects and all results below the reporting limit are reported as "<" (less than) the reporting limit in this report.

The samples were received 1.2 degrees Celsius, please refer to the Chain of Custody for details specific to temperature upon receipt. An infrared thermometer with a tolerance of +/- 1.0 degrees Celsius was used immediately upon receipt of the samples.

If a Matrix Spike (MS), Matrix Spike Duplicate (MSD) or Duplicate (DUP) was not requested on the Chain of Custody, method criteria may have been fulfilled with a source sample not of this Sample Delivery Group. If method or program required MS/MSD/Dup were not performed, sufficient sample was not provided to the laboratory.

MADEP has published a list of analytical methods (CAM) which provides a series of recommended protocols for the acquisition, analysis and reporting of analytical data in support of MCP decisions. "Presumptive Certainty" can be established only for those methods published by the MADEP in the MCP CAM. The compounds and/or elements reported were specifically requested by the client on the Chain of Custody and in some cases may not include the full analyte list as defined in the method. Regulatory limits may not be achieved if specific method and/or technique was not requested on the Chain of Custody.

According to WSC-CAM 5/2009 Rev.1, Table 11 A-1, recovery for some VOC analytes have been deemed potentially difficult. Although they may still be within the recommended recovery range, a range has been set based on historical control limits.

Some target analytes which are not listed as exceptions in the Summary of CAM Reporting Limits may exceed the recommended RL based on sample initial volume or weight provided, % moisture content, or responsiveness of a particular analyte to purge and trap instrumentation.

Analyses for Total Hardness, pH, and Total Residual Chlorine fall under the state of Pennsylvania code Chapter 252.6 accreditation by rule.

July 6, 2018 Report Revision Case Narrative:

This report has been revised to include analyses added as listed in the appendix at the end of this report.

See below for any non-conformances and issues relating to quality control samples and/or sample analysis/matrix.

EPA 200.8

Duplicates:

1808628-DUP1 *Source: SC47844-02*

The Reporting Limit has been raised to account for matrix interference.

Arsenic
Chromium
Selenium

Samples:

SC47844-01 *GW-RGP*

EPA 200.8

Samples:

SC47844-01 *GW-RGP*

The Reporting Limit has been raised to account for matrix interference.

Antimony
Arsenic
Cadmium
Chromium
Copper
Lead
Nickel
Selenium
Silver
Zinc

SC47844-02 *SW-1*

The Reporting Limit has been raised to account for matrix interference.

Arsenic
Chromium
Selenium

EPA 300.0

Samples:

SC47844-01 *GW-RGP*

Sample dilution required for high concentration of target analytes to be within the instrument calibration range.

Chloride

EPA 524.2

Samples:

S820295-CCV1

Analyte percent drift is outside individual acceptance criteria (20), but within overall method allowances.

Ethanol (26.8%)

This affected the following samples:

1808683-BLK1
1808683-BS1
1808683-BSD1
GW-RGP

SC47844-01 *GW-RGP*

Elevated Reporting Limits due to the presence of high levels of non-target analytes; sample may not meet client requested reporting limit for this reason.

EPA 624.1

Calibration:

1806025

EPA 624.1

Calibration:

1806025

Analyte quantified by quadratic equation type calibration.

2-Hexanone (MBK)
4-Methyl-2-pentanone (MIBK)
Bromodichloromethane
Bromoform
Carbon tetrachloride
cis-1,3-Dichloropropene
Dibromochloromethane
Ethylbenzene
m,p-Xylene
o-Xylene
Styrene
trans-1,3-Dichloropropene

This affected the following samples:

1808683-BLK1
1808683-BS1
1808683-BSD1
GW-RGP
S820051-ICV1
S820295-CCV1

Samples:

S820295-CCV1

Analyte percent drift is outside individual acceptance criteria (30), but within overall method allowances.

Trichlorofluoromethane (Freon 11) (32.4%)

This affected the following samples:

1808683-BLK1
1808683-BS1
1808683-BSD1
GW-RGP

SC47844-01

GW-RGP

Sample dilution required for high concentration of target analytes to be within the instrument calibration range.

EPA 625.1

Calibration:

1804057

Analyte quantified by quadratic equation type calibration.

2,4-Dinitrophenol
4,6-Dinitro-2-methylphenol
Pentachlorophenol

EPA 625.1

Calibration:

1804057

This affected the following samples:

1808587-BLK1
1808587-BS1
1808587-BSD1
1808951-BLK1
1808951-BLK3
1808951-BS1
1808951-BS3
1808951-BSD1
1808951-BSD3
GW-RGP
S818863-ICV1
S820343-CCV1
S820404-CCV1
S820477-CCV1
S820486-CCV1
S820513-CCV1

Laboratory Control Samples:

1808587 BS/BSD

Benzidine percent recoveries (16/18) are outside individual acceptance criteria, but within overall method allowances. All reported results of the following samples are considered to have a potentially low bias:

GW-RGP

Bis(2-chloroisopropyl)ether percent recoveries (57/55) are outside individual acceptance criteria, but within overall method allowances. All reported results of the following samples are considered to have a potentially low bias:

GW-RGP

N-Nitrosodimethylamine percent recoveries (46/45) are outside individual acceptance criteria, but within overall method allowances. All reported results of the following samples are considered to have a potentially low bias:

GW-RGP

Pyrene percent recoveries (72/69) are outside individual acceptance criteria, but within overall method allowances. All reported results of the following samples are considered to have a potentially low bias:

GW-RGP

1808587 BSD

Nitrobenzene RPD 25% (20%) is outside individual acceptance criteria.

1808587-BS1

Acid surrogate recovery outside of control limits. The data was accepted based on valid recovery of remaining two acid surrogates.

2,4,6-Tribromophenol

Analyte is out of acceptance range in the QC spike but the total number of out of range analytes is within overall method criteria.

Benzidine
Bis(2-chloroisopropyl)ether
N-Nitrosodimethylamine

1808587-BSD1

EPA 625.1

Laboratory Control Samples:

1808587-BSD1

Acid surrogate recovery outside of control limits. The data was accepted based on valid recovery of remaining two acid surrogates.

2,4,6-Tribromophenol

Analyte is out of acceptance range in the QC spike but the total number of out of range analytes is within overall method criteria.

Benzidine

Bis(2-chloroisopropyl)ether

N-Nitrosodimethylamine

Pyrene

RPD out of acceptance range. The batch is accepted based upon LCS and/or LCSD recovery.

Nitrobenzene

1808951 BS/BSD

1,2-Dichlorobenzene percent recoveries (56/54) are outside individual acceptance criteria, but within overall method allowances. All reported results of the following samples are considered to have a potentially low bias:

GW-RGP

1,2-Dichlorobenzene percent recoveries (57/56) are outside individual acceptance criteria, but within overall method allowances. All reported results of the following samples are considered to have a potentially low bias:

GW-RGP

1,3-Dichlorobenzene percent recoveries (53/53) are outside individual acceptance criteria, but within overall method allowances. All reported results of the following samples are considered to have a potentially low bias:

GW-RGP

1,3-Dichlorobenzene percent recoveries (53/54) are outside individual acceptance criteria, but within overall method allowances. All reported results of the following samples are considered to have a potentially low bias:

GW-RGP

1,4-Dichlorobenzene percent recoveries (57/56) are outside individual acceptance criteria, but within overall method allowances. All reported results of the following samples are considered to have a potentially low bias:

GW-RGP

1,4-Dichlorobenzene percent recoveries (59/56) are outside individual acceptance criteria, but within overall method allowances. All reported results of the following samples are considered to have a potentially low bias:

GW-RGP

2,6-Dinitrotoluene percent recoveries (62/64) are outside individual acceptance criteria, but within overall method allowances. All reported results of the following samples are considered to have a potentially low bias:

GW-RGP

2,6-Dinitrotoluene percent recoveries (64/64) are outside individual acceptance criteria, but within overall method allowances. All reported results of the following samples are considered to have a potentially low bias:

GW-RGP

4,6-Dinitro-2-methylphenol percent recoveries (43/40) are outside individual acceptance criteria, but within overall method allowances. All reported results of the following samples are considered to have a potentially low bias:

GW-RGP

EPA 625.1

Laboratory Control Samples:

1808951 BS/BSD

4,6-Dinitro-2-methylphenol percent recoveries (47/47) are outside individual acceptance criteria, but within overall method allowances. All reported results of the following samples are considered to have a potentially low bias:

GW-RGP

4-Bromophenyl phenyl ether percent recoveries (51/53) are outside individual acceptance criteria, but within overall method allowances. All reported results of the following samples are considered to have a potentially low bias:

GW-RGP

4-Bromophenyl phenyl ether percent recoveries (54/53) are outside individual acceptance criteria, but within overall method allowances. All reported results of the following samples are considered to have a potentially low bias:

GW-RGP

Acenaphthene percent recoveries (58/58) are outside individual acceptance criteria, but within overall method allowances. All reported results of the following samples are considered to have a potentially low bias:

GW-RGP

Acenaphthene percent recoveries (59/58) are outside individual acceptance criteria, but within overall method allowances. All reported results of the following samples are considered to have a potentially low bias:

GW-RGP

Benzidine percent recoveries (39/56) are outside individual acceptance criteria, but within overall method allowances. All reported results of the following samples are considered to have a potentially low bias:

GW-RGP

Benzidine percent recoveries (43/43) are outside individual acceptance criteria, but within overall method allowances. All reported results of the following samples are considered to have a potentially low bias:

GW-RGP

Bis(2-chloroethoxy)methane percent recoveries (44/43) are outside individual acceptance criteria, but within overall method allowances. All reported results of the following samples are considered to have a potentially low bias:

GW-RGP

Bis(2-chloroethoxy)methane percent recoveries (46/44) are outside individual acceptance criteria, but within overall method allowances. All reported results of the following samples are considered to have a potentially low bias:

GW-RGP

Bis(2-chloroisopropyl)ether percent recoveries (50/48) are outside individual acceptance criteria, but within overall method allowances. All reported results of the following samples are considered to have a potentially low bias:

GW-RGP

Bis(2-chloroisopropyl)ether percent recoveries (52/48) are outside individual acceptance criteria, but within overall method allowances. All reported results of the following samples are considered to have a potentially low bias:

GW-RGP

Fluorene percent recoveries (52/53) are outside individual acceptance criteria, but within overall method allowances. All reported results of the following samples are considered to have a potentially low bias:

GW-RGP

N-Nitrosodimethylamine percent recoveries (47/46) are outside individual acceptance criteria, but within overall method allowances. All reported results of the following samples are considered to have a potentially low bias:

GW-RGP

EPA 625.1

Laboratory Control Samples:

1808951 BS/BSD

N-Nitrosodimethylamine percent recoveries (49/48) are outside individual acceptance criteria, but within overall method allowances. All reported results of the following samples are considered to have a potentially low bias:

GW-RGP

N-Nitrosodiphenylamine percent recoveries (59/60) are outside individual acceptance criteria, but within overall method allowances. All reported results of the following samples are considered to have a potentially low bias:

GW-RGP

Pentachlorophenol percent recoveries (36/31) are outside individual acceptance criteria, but within overall method allowances. All reported results of the following samples are considered to have a potentially low bias:

GW-RGP

Pentachlorophenol percent recoveries (37/32) are outside individual acceptance criteria, but within overall method allowances. All reported results of the following samples are considered to have a potentially low bias:

GW-RGP

Phenanthrene percent recoveries (59/56) are outside individual acceptance criteria, but within overall method allowances. All reported results of the following samples are considered to have a potentially low bias:

GW-RGP

Phenanthrene percent recoveries (60/58) are outside individual acceptance criteria, but within overall method allowances. All reported results of the following samples are considered to have a potentially low bias:

GW-RGP

Pyrene percent recoveries (52/53) are outside individual acceptance criteria, but within overall method allowances. All reported results of the following samples are considered to have a potentially low bias:

GW-RGP

Pyrene percent recoveries (57/55) are outside individual acceptance criteria, but within overall method allowances. All reported results of the following samples are considered to have a potentially low bias:

GW-RGP

1808951 BSD

2,4-Dinitrophenol RPD 23% (20%) is outside individual acceptance criteria.

Benzidine RPD 34% (20%) is outside individual acceptance criteria.

Samples:

S820343-CCV1

Analyte percent difference is outside individual acceptance criteria (20), but within overall method allowances.

Benzidine (29.4%)

Benzo (b) fluoranthene (20.8%)

Hexachlorocyclopentadiene (33.5%)

Nitrobenzene (54.7%)

This affected the following samples:

1808587-BLK1

1808587-BS1

1808587-BSD1

EPA 625.1

Samples:

S820404-CCV1

Analyte percent difference is outside individual acceptance criteria (20), but within overall method allowances.

Benzidine (29.4%)
Benzo (b) fluoranthene (20.8%)
Hexachlorocyclopentadiene (33.5%)
Nitrobenzene (54.7%)

This affected the following samples:

GW-RGP

S820477-CCV1

Analyte percent difference is outside individual acceptance criteria (20), but within overall method allowances.

Benzidine (21.4%)
Nitrobenzene (39.7%)

This affected the following samples:

1808951-BLK1
1808951-BS1
1808951-BSD1
GW-RGP

S820486-CCV1

Analyte percent difference is outside individual acceptance criteria (20), but within overall method allowances.

3,3'-Dichlorobenzidine (21.9%)
Benzidine (89.8%)
Benzo (b) fluoranthene (22.8%)
Hexachlorocyclopentadiene (38.5%)
Nitrobenzene (49.9%)

This affected the following samples:

1808951-BLK3
1808951-BS3

S820513-CCV1

Analyte percent difference is outside individual acceptance criteria (20), but within overall method allowances.

4-Chlorophenyl phenyl ether (23.8%)
Benzidine (21.9%)
Dibenzo (a,h) anthracene (21.2%)
Diethyl phthalate (20.9%)
Hexachlorocyclopentadiene (31.5%)
Nitrobenzene (36.8%)

This affected the following samples:

1808951-BSD3

SC47844-01 *GW-RGP*

Duplicate analysis confirmed surrogate failure due to matrix effects.

2-Fluorobiphenyl
Terphenyl-dl4

SC47844-01RE1 *GW-RGP*

EPA 625.1

Samples:

SC47844-01RE1 *GW-RGP*

Duplicate analysis confirmed surrogate failure due to matrix effects.

2-Fluorobiphenyl
Terphenyl-d14

This flag indicates the concentration for this analyte is an estimated value due to exceeding the calibration range or interferences resulting in a biased final concentration.

SM3500-Cr-B (11)/7196A

Samples:

SC47844-01 *GW-RGP*

The Reporting Limit has been raised to account for matrix interference.

Hexavalent Chromium

SC47844-02 *SW-I*

The Reporting Limit has been raised to account for matrix interference.

Hexavalent Chromium

SW846 8260C SIM

Samples:

SC47844-01 *GW-RGP*

Elevated Reporting Limits due to the presence of high levels of non-target analytes; sample may not meet client requested reporting limit for this reason.

Sample Acceptance Check Form

Client: CEA, Inc. - Westborough, MA
Project: Sunoco - 266 Massachusetts Ave - Cambridge, MA / 6196-06
Work Order: SC47844
Sample(s) received on: 6/20/2018

The following outlines the condition of samples for the attached Chain of Custody upon receipt.

	<u>Yes</u>	<u>No</u>	<u>N/A</u>
Were custody seals present?	☐	☒	☐
Were custody seals intact?	☐	☐	☒
Were samples received at a temperature of $\leq 6^{\circ}\text{C}$?	☒	☐	☐
Were samples cooled on ice upon transfer to laboratory representative?	☒	☐	☐
Were sample containers received intact?	☒	☐	☐
Were samples properly labeled (labels affixed to sample containers and include sample ID, site location, and/or project number and the collection date)?	☒	☐	☐
Were samples accompanied by a Chain of Custody document?	☒	☐	☐
Does Chain of Custody document include proper, full, and complete documentation, which shall include sample ID, site location, and/or project number, date and time of collection, collector's name, preservation type, sample matrix and any special remarks concerning the sample?	☐	☒	☐
Did sample container labels agree with Chain of Custody document?	☒	☐	☐
Were samples received within method-specific holding times?	☒	☐	☐

Summary of Hits

Lab ID: SC47844-01

Client ID: GW-RGP

Parameter	Result	Flag	Reporting Limit	Units	Analytical Method
Ammonia as Nitrogen	1.51		1.00	mg/l	E350.1
Phenolics	0.082		0.015	mg/l	E420.4
Non-polar material (SGT-HEM)	3.8		1.0	mg/l	EPA 1664B
Calcium	121		0.200	mg/l	EPA 200.7
Iron	94.8		0.250	mg/l	EPA 200.7
Magnesium	31.8		0.0400	mg/l	EPA 200.7
Arsenic	0.0639	R01, D	0.0500	mg/l	EPA 200.8
Chromium	0.109	R01, D	0.0500	mg/l	EPA 200.8
Copper	0.112	R01, D	0.0250	mg/l	EPA 200.8
Lead	0.246	R01, D	0.0100	mg/l	EPA 200.8
Nickel	0.0688	R01, D	0.0250	mg/l	EPA 200.8
Mercury	0.00022		0.00020	mg/l	EPA 245.1/7470A
Chloride	1220	GS1, D	60.0	mg/l	EPA 300.0
Benzene	23.8	D	20.0	µg/l	EPA 624.1
Ethylbenzene	148	D	20.0	µg/l	EPA 624.1
m,p-Xylene	642	D	40.0	µg/l	EPA 624.1
o-Xylene	150	D	20.0	µg/l	EPA 624.1
Toluene	345	D	20.0	µg/l	EPA 624.1
Naphthalene	15.7	D	9.52	µg/l	EPA 625.1
Hardness	434		0.664	mg/l CaCO3	SM 2340B (11)
Total Suspended Solids	2000		10.0	mg/l	SM2540D (11)
Hexavalent Chromium	0.133	R01, D	0.050	mg/l	SM3500-Cr-B (11)/7196A
Total Residual Chlorine	0.040		0.020	mg/l	SM4500-Cl-G (11)

Lab ID: SC47844-01RE1

Client ID: GW-RGP

Parameter	Result	Flag	Reporting Limit	Units	Analytical Method
Naphthalene	10.2		5.00	µg/l	EPA 625.1

Lab ID: SC47844-02

Client ID: SW-1

Parameter	Result	Flag	Reporting Limit	Units	Analytical Method
Ammonia as Nitrogen	0.15		0.05	mg/l	E350.1
Calcium	29.8		0.200	mg/l	EPA 200.7
Iron	0.509		0.250	mg/l	EPA 200.7
Magnesium	14.6		0.0400	mg/l	EPA 200.7
Copper	0.00779		0.00050	mg/l	EPA 200.8
Lead	0.00259		0.00050	mg/l	EPA 200.8
Nickel	0.00139		0.00050	mg/l	EPA 200.8
Zinc	0.00567		0.00500	mg/l	EPA 200.8
Hardness	134		0.664	mg/l CaCO3	SM 2340B (11)

Please note that because there are no reporting limits associated with hazardous waste characterizations or micro analyses, this summary does not include hits from these analyses if included in this work order.

Sample Identification

GW-RGP

SC47844-01

Client Project #

6196-06

Matrix

Liquid

Collection Date/Time

20-Jun-18 12:30

Received

20-Jun-18

<i>CAS No.</i>	<i>Analyte(s)</i>	<i>Result</i>	<i>Flag</i>	<i>Units</i>	<i>*RDL</i>	<i>MDL</i>	<i>Dilution</i>	<i>Method Ref.</i>	<i>Prepared</i>	<i>Analyzed</i>	<i>Analyst</i>	<i>Batch</i>	<i>Cert.</i>
Volatile Organic Compounds													
Purgeable Organic Compounds													
			R05										
1634-04-4	Methyl tert-butyl ether	< 10.0	D	µg/l	10.0	3.06	20	EPA 524.2	22-Jun-18	22-Jun-18	GMA	1808683	
994-05-8	Tert-amyl methyl ether	< 10.0	D	µg/l	10.0	9.86	20	"	"	"	"	"	
75-65-0	Tert-Butanol / butyl alcohol	< 200	D	µg/l	200	71.1	20	"	"	"	"	"	
64-17-5	Ethanol	< 4000	D	µg/l	4000	438	20	"	"	"	"	"	
<i>Surrogate recoveries:</i>													
460-00-4	4-Bromofluorobenzene	102			80-120 %			"	"	"	"	"	
2037-26-5	Toluene-d8	109			80-120 %			"	"	"	"	"	
17060-07-0	1,2-Dichloroethane-d4	110			80-120 %			"	"	"	"	"	
1868-53-7	Dibromofluoromethane	112			80-120 %			"	"	"	"	"	
Volatile Organic Compounds by GCMS													
			GS1										
67-64-1	Acetone	< 200	D	µg/l	200	75.2	20	EPA 624.1	"	"	GMA	"	
71-43-2	Benzene	23.8	D	µg/l	20.0	6.8	20	"	"	"	"	"	X
75-27-4	Bromodichloromethane	< 20.0	D	µg/l	20.0	5.8	20	"	"	"	"	"	X
75-25-2	Bromoform	< 20.0	D	µg/l	20.0	4.8	20	"	"	"	"	"	X
74-83-9	Bromomethane	< 40.0	D	µg/l	40.0	8.9	20	"	"	"	"	"	X
78-93-3	2-Butanone (MEK)	< 200	D	µg/l	200	14.1	20	"	"	"	"	"	
75-15-0	Carbon disulfide	< 100	D	µg/l	100	14.0	20	"	"	"	"	"	
56-23-5	Carbon tetrachloride	< 20.0	D	µg/l	20.0	7.8	20	"	"	"	"	"	X
108-90-7	Chlorobenzene	< 20.0	D	µg/l	20.0	6.0	20	"	"	"	"	"	X
75-00-3	Chloroethane	< 40.0	D	µg/l	40.0	8.1	20	"	"	"	"	"	X
67-66-3	Chloroform	< 20.0	D	µg/l	20.0	5.7	20	"	"	"	"	"	X
74-87-3	Chloromethane	< 40.0	D	µg/l	40.0	7.2	20	"	"	"	"	"	X
124-48-1	Dibromochloromethane	< 20.0	D	µg/l	20.0	5.8	20	"	"	"	"	"	X
74-95-3	Dibromomethane	< 20.0	D	µg/l	20.0	5.4	20	"	"	"	"	"	
95-50-1	1,2-Dichlorobenzene	< 20.0	D	µg/l	20.0	4.9	20	"	"	"	"	"	X
541-73-1	1,3-Dichlorobenzene	< 20.0	D	µg/l	20.0	6.0	20	"	"	"	"	"	X
106-46-7	1,4-Dichlorobenzene	< 20.0	D	µg/l	20.0	5.4	20	"	"	"	"	"	X
75-34-3	1,1-Dichloroethane	< 20.0	D	µg/l	20.0	5.8	20	"	"	"	"	"	X
107-06-2	1,2-Dichloroethane	< 20.0	D	µg/l	20.0	3.6	20	"	"	"	"	"	X
75-35-4	1,1-Dichloroethene	< 20.0	D	µg/l	20.0	6.3	20	"	"	"	"	"	X
156-59-2	cis-1,2-Dichloroethene	< 20.0	D	µg/l	20.0	7.9	20	"	"	"	"	"	
156-60-5	trans-1,2-Dichloroethene	< 20.0	D	µg/l	20.0	7.6	20	"	"	"	"	"	X
78-87-5	1,2-Dichloropropane	< 20.0	D	µg/l	20.0	5.8	20	"	"	"	"	"	X
10061-01-5	cis-1,3-Dichloropropene	< 20.0	D	µg/l	20.0	6.6	20	"	"	"	"	"	X
10061-02-6	trans-1,3-Dichloropropene	< 20.0	D	µg/l	20.0	6.1	20	"	"	"	"	"	X
100-41-4	Ethylbenzene	148	D	µg/l	20.0	6.3	20	"	"	"	"	"	X
591-78-6	2-Hexanone (MBK)	< 200	D	µg/l	200	12.7	20	"	"	"	"	"	
1634-04-4	Methyl tert-butyl ether	< 20.0	D	µg/l	20.0	5.9	20	"	"	"	"	"	
108-10-1	4-Methyl-2-pentanone (MIBK)	< 200	D	µg/l	200	7.1	20	"	"	"	"	"	
75-09-2	Methylene chloride	< 200	D	µg/l	200	7.7	20	"	"	"	"	"	X
100-42-5	Styrene	< 20.0	D	µg/l	20.0	6.6	20	"	"	"	"	"	
79-34-5	1,1,2,2-Tetrachloroethane	< 20.0	D	µg/l	20.0	5.1	20	"	"	"	"	"	X
127-18-4	Tetrachloroethene	< 20.0	D	µg/l	20.0	6.2	20	"	"	"	"	"	X
108-88-3	Toluene	345	D	µg/l	20.0	5.8	20	"	"	"	"	"	X

This laboratory report is not valid without an authorized signature on the cover page.

Sample Identification

GW-RGP	<u>Client Project #</u>	<u>Matrix</u>	<u>Collection Date/Time</u>	<u>Received</u>
SC47844-01	6196-06	Liquid	20-Jun-18 12:30	20-Jun-18

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	MDL	Dilution	Method Ref.	Prepared	Analyzed	Analyst	Batch	Cert.
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Volatile Organic CompoundsVolatile Organic Compounds by GCMS

GS1

71-55-6	1,1,1-Trichloroethane	< 20.0	D	µg/l	20.0	4.9	20	EPA 624.1	22-Jun-18	22-Jun-18	GMA	1808683	X
79-00-5	1,1,2-Trichloroethane	< 20.0	D	µg/l	20.0	6.2	20	"	"	"	"	"	X
79-01-6	Trichloroethene	< 20.0	D	µg/l	20.0	7.1	20	"	"	"	"	"	X
75-69-4	Trichlorofluoromethane (Freon 11)	< 20.0	D	µg/l	20.0	5.5	20	"	"	"	"	"	X
75-01-4	Vinyl chloride	< 20.0	D	µg/l	20.0	8.0	20	"	"	"	"	"	X
179601-23-1	m,p-Xylene	642	D	µg/l	40.0	9.5	20	"	"	"	"	"	X
95-47-6	o-Xylene	150	D	µg/l	20.0	8.2	20	"	"	"	"	"	X

Surrogate recoveries:

460-00-4	4-Bromofluorobenzene	102			70-130 %			"	"	"	"	"	
2037-26-5	Toluene-d8	109			70-130 %			"	"	"	"	"	
17060-07-0	1,2-Dichloroethane-d4	110			70-130 %			"	"	"	"	"	
1868-53-7	Dibromofluoromethane	112			70-130 %			"	"	"	"	"	

1,4-Dioxane by SW846 8260 SIM

R05

Prepared by method SW846 5030 Water MS

123-91-1	1,4-Dioxane	< 50.0	D	µg/l	50.0	9.04	20	SW846 8260C SIM	03-Jul-18	03-Jul-18	GMA	1809223	
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Surrogate recoveries:

17647-74-4	1,4-Dioxane-d8	85			70-130 %			"	"	"	"	"	
460-00-4	4-Bromofluorobenzene	111			70-130 %			"	"	"	"	"	
2037-26-5	Toluene-d8	100			70-130 %			"	"	"	"	"	
17060-07-0	1,2-Dichloroethane-d4	129			70-130 %			"	"	"	"	"	
1868-53-7	Dibromofluoromethane	124			70-130 %			"	"	"	"	"	

Semivolatile Organic Compounds by GCMSSemivolatile Organic Compounds

83-32-9	Acenaphthene	< 4.76		µg/l	4.76	0.658	1	EPA 625.1	21-Jun-18	25-Jun-18	MSL	1808587	X
208-96-8	Acenaphthylene	< 9.52	D	µg/l	9.52	1.30	2	"	"	"	"	"	X
120-12-7	Anthracene	< 9.52	D	µg/l	9.52	1.16	2	"	"	"	"	"	X
92-87-5	Benzidine	< 19.0	D	µg/l	19.0	2.19	2	"	"	"	"	"	X
56-55-3	Benzo (a) anthracene	< 9.52	D	µg/l	9.52	1.02	2	"	"	"	"	"	X
50-32-8	Benzo (a) pyrene	< 9.52	D	µg/l	9.52	1.07	2	"	"	"	"	"	X
205-99-2	Benzo (b) fluoranthene	< 9.52	D	µg/l	9.52	0.832	2	"	"	"	"	"	X
191-24-2	Benzo (g,h,i) perylene	< 9.52	D	µg/l	9.52	1.01	2	"	"	"	"	"	X
207-08-9	Benzo (k) fluoranthene	< 9.52	D	µg/l	9.52	0.914	2	"	"	"	"	"	X
111-91-1	Bis(2-chloroethoxy)metha ne	< 9.52	D	µg/l	9.52	1.27	2	"	"	"	"	"	X
111-44-4	Bis(2-chloroethyl)ether	< 9.52	D	µg/l	9.52	1.40	2	"	"	"	"	"	X
108-60-1	Bis(2-chloroisopropyl)ethe r	< 9.52	D	µg/l	9.52	1.48	2	"	"	"	"	"	X
117-81-7	Bis(2-ethylhexyl)phthalate	< 9.52	D	µg/l	9.52	1.22	2	"	"	"	"	"	X
101-55-3	4-Bromophenyl phenyl ether	< 9.52	D	µg/l	9.52	1.15	2	"	"	"	"	"	X
85-68-7	Butyl benzyl phthalate	< 9.52	D	µg/l	9.52	0.834	2	"	"	"	"	"	X
59-50-7	4-Chloro-3-methylphenol	< 9.52	D	µg/l	9.52	0.954	2	"	"	"	"	"	X
91-58-7	2-Chloronaphthalene	< 9.52	D	µg/l	9.52	1.12	2	"	"	"	"	"	X
95-57-8	2-Chlorophenol	< 9.52	D	µg/l	9.52	1.42	2	"	"	"	"	"	X

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Sample Identification

GW-RGP	<u>Client Project #</u>	<u>Matrix</u>	<u>Collection Date/Time</u>	<u>Received</u>
SC47844-01	6196-06	Liquid	20-Jun-18 12:30	20-Jun-18

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	MDL	Dilution	Method Ref.	Prepared	Analyzed	Analyst	Batch	Cert.
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Semivolatile Organic Compounds by GCMSSemivolatile Organic Compounds

7005-72-3	4-Chlorophenyl phenyl ether	< 9.52	D	µg/l	9.52	1.15	2	EPA 625.1	21-Jun-18	25-Jun-18	MSL	1808587	X
218-01-9	Chrysene	< 9.52	D	µg/l	9.52	1.01	2	"	"	"	"	"	X
53-70-3	Dibenzo (a,h) anthracene	< 9.52	D	µg/l	9.52	0.857	2	"	"	"	"	"	X
95-50-1	1,2-Dichlorobenzene	< 9.52	D	µg/l	9.52	1.07	2	"	"	"	"	"	X
541-73-1	1,3-Dichlorobenzene	< 9.52	D	µg/l	9.52	1.23	2	"	"	"	"	"	X
106-46-7	1,4-Dichlorobenzene	< 9.52	D	µg/l	9.52	1.17	2	"	"	"	"	"	X
91-94-1	3,3'-Dichlorobenzidine	< 9.52	D	µg/l	9.52	3.79	2	"	"	"	"	"	X
120-83-2	2,4-Dichlorophenol	< 9.52	D	µg/l	9.52	1.01	2	"	"	"	"	"	X
84-66-2	Diethyl phthalate	< 9.52	D	µg/l	9.52	1.19	2	"	"	"	"	"	X
131-11-3	Dimethyl phthalate	< 9.52	D	µg/l	9.52	1.44	2	"	"	"	"	"	X
105-67-9	2,4-Dimethylphenol	< 9.52	D	µg/l	9.52	1.24	2	"	"	"	"	"	X
84-74-2	Di-n-butyl phthalate	< 9.52	D	µg/l	9.52	0.870	2	"	"	"	"	"	X
534-52-1	4,6-Dinitro-2-methylphenol	< 9.52	D	µg/l	9.52	0.608	2	"	"	"	"	"	X
51-28-5	2,4-Dinitrophenol	< 9.52	D	µg/l	9.52	1.07	2	"	"	"	"	"	X
121-14-2	2,4-Dinitrotoluene	< 9.52	D	µg/l	9.52	1.28	2	"	"	"	"	"	X
606-20-2	2,6-Dinitrotoluene	< 9.52	D	µg/l	9.52	1.13	2	"	"	"	"	"	X
117-84-0	Di-n-octyl phthalate	< 9.52	D	µg/l	9.52	0.773	2	"	"	"	"	"	X
206-44-0	Fluoranthene	< 9.52	D	µg/l	9.52	1.22	2	"	"	"	"	"	X
86-73-7	Fluorene	< 9.52	D	µg/l	9.52	1.17	2	"	"	"	"	"	X
118-74-1	Hexachlorobenzene	< 9.52	D	µg/l	9.52	1.09	2	"	"	"	"	"	X
87-68-3	Hexachlorobutadiene	< 9.52	D	µg/l	9.52	0.739	2	"	"	"	"	"	X
77-47-4	Hexachlorocyclopentadiene	< 9.52	D	µg/l	9.52	1.97	2	"	"	"	"	"	X
67-72-1	Hexachloroethane	< 9.52	D	µg/l	9.52	1.22	2	"	"	"	"	"	X
193-39-5	Indeno (1,2,3-cd) pyrene	< 9.52	D	µg/l	9.52	1.10	2	"	"	"	"	"	X
78-59-1	Isophorone	< 9.52	D	µg/l	9.52	1.12	2	"	"	"	"	"	X
91-20-3	Naphthalene	15.7	D	µg/l	9.52	1.30	2	"	"	"	"	"	X
98-95-3	Nitrobenzene	< 9.52	D	µg/l	9.52	1.31	2	"	"	"	"	"	X
88-75-5	2-Nitrophenol	< 9.52	D	µg/l	9.52	0.886	2	"	"	"	"	"	X
100-02-7	4-Nitrophenol	< 9.52	D	µg/l	9.52	1.60	2	"	"	"	"	"	X
62-75-9	N-Nitrosodimethylamine	< 9.52	D	µg/l	9.52	1.28	2	"	"	"	"	"	X
621-64-7	N-Nitrosodi-n-propylamine	< 9.52	D	µg/l	9.52	1.10	2	"	"	"	"	"	X
86-30-6	N-Nitrosodiphenylamine	< 9.52	D	µg/l	9.52	1.24	2	"	"	"	"	"	X
87-86-5	Pentachlorophenol	< 9.52	D	µg/l	9.52	0.710	2	"	"	"	"	"	X
85-01-8	Phenanthrene	< 9.52	D	µg/l	9.52	1.12	2	"	"	"	"	"	X
108-95-2	Phenol	< 9.52	D	µg/l	9.52	1.23	2	"	"	"	"	"	X
129-00-0	Pyrene	< 9.52	D	µg/l	9.52	1.16	2	"	"	"	"	"	X
120-82-1	1,2,4-Trichlorobenzene	< 9.52	D	µg/l	9.52	1.31	2	"	"	"	"	"	X
88-06-2	2,4,6-Trichlorophenol	< 9.52	D	µg/l	9.52	0.987	2	"	"	"	"	"	X

Surrogate recoveries:

321-60-8	2-Fluorobiphenyl	12	SDUP		30-130 %		"	"	"	"	"	"
367-12-4	2-Fluorophenol	21			15-110 %		"	"	"	"	"	"
4165-60-0	Nitrobenzene-d5	30			30-130 %		"	"	"	"	"	"
4165-62-2	Phenol-d5	15			15-110 %		"	"	"	"	"	"
1718-51-0	Terphenyl-dl4	19	SDUP		30-130 %		"	"	"	"	"	"

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Sample Identification

GW-RGP	<u>Client Project #</u>	<u>Matrix</u>	<u>Collection Date/Time</u>	<u>Received</u>
SC47844-01	6196-06	Liquid	20-Jun-18 12:30	20-Jun-18

<u>CAS No.</u>	<u>Analyte(s)</u>	<u>Result</u>	<u>Flag</u>	<u>Units</u>	<u>*RDL</u>	<u>MDL</u>	<u>Dilution</u>	<u>Method Ref.</u>	<u>Prepared</u>	<u>Analyzed</u>	<u>Analyst</u>	<u>Batch</u>	<u>Cert.</u>
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Semivolatile Organic Compounds by GCMSSemivolatile Organic Compounds

118-79-6	2,4,6-Tribromophenol	34			15-110 %			EPA 625.1	21-Jun-18	25-Jun-18	MSL	1808587	
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Re-analysis of Semivolatile Organic Compounds

E

83-32-9	Acenaphthene	< 5.00		µg/l	5.00	0.691	1	EPA 625.1	27-Jun-18	28-Jun-18	MSL	1808951	X
208-96-8	Acenaphthylene	< 5.00		µg/l	5.00	0.683	1	"	"	"	"	"	X
120-12-7	Anthracene	< 5.00		µg/l	5.00	0.608	1	"	"	"	"	"	X
92-87-5	Benzidine	< 10.0		µg/l	10.0	1.15	1	"	"	"	"	"	X
56-55-3	Benzo (a) anthracene	< 5.00		µg/l	5.00	0.536	1	"	"	"	"	"	X
50-32-8	Benzo (a) pyrene	< 5.00		µg/l	5.00	0.562	1	"	"	"	"	"	X
205-99-2	Benzo (b) fluoranthene	< 5.00		µg/l	5.00	0.437	1	"	"	"	"	"	X
191-24-2	Benzo (g,h,i) perylene	< 5.00		µg/l	5.00	0.530	1	"	"	"	"	"	X
207-08-9	Benzo (k) fluoranthene	< 5.00		µg/l	5.00	0.480	1	"	"	"	"	"	X
111-91-1	Bis(2-chloroethoxy)methane	< 5.00		µg/l	5.00	0.666	1	"	"	"	"	"	X
111-44-4	Bis(2-chloroethyl)ether	< 5.00		µg/l	5.00	0.734	1	"	"	"	"	"	X
108-60-1	Bis(2-chloroisopropyl)ether	< 5.00		µg/l	5.00	0.778	1	"	"	"	"	"	X
117-81-7	Bis(2-ethylhexyl)phthalate	< 5.00		µg/l	5.00	0.638	1	"	"	"	"	"	X
101-55-3	4-Bromophenyl phenyl ether	< 5.00		µg/l	5.00	0.602	1	"	"	"	"	"	X
85-68-7	Butyl benzyl phthalate	< 5.00		µg/l	5.00	0.438	1	"	"	"	"	"	X
59-50-7	4-Chloro-3-methylphenol	< 5.00		µg/l	5.00	0.501	1	"	"	"	"	"	X
91-58-7	2-Chloronaphthalene	< 5.00		µg/l	5.00	0.590	1	"	"	"	"	"	X
95-57-8	2-Chlorophenol	< 5.00		µg/l	5.00	0.748	1	"	"	"	"	"	X
7005-72-3	4-Chlorophenyl phenyl ether	< 5.00		µg/l	5.00	0.603	1	"	"	"	"	"	X
218-01-9	Chrysene	< 5.00		µg/l	5.00	0.532	1	"	"	"	"	"	X
53-70-3	Dibenzo (a,h) anthracene	< 5.00		µg/l	5.00	0.450	1	"	"	"	"	"	X
95-50-1	1,2-Dichlorobenzene	< 5.00		µg/l	5.00	0.562	1	"	"	"	"	"	X
541-73-1	1,3-Dichlorobenzene	< 5.00		µg/l	5.00	0.647	1	"	"	"	"	"	X
106-46-7	1,4-Dichlorobenzene	< 5.00		µg/l	5.00	0.614	1	"	"	"	"	"	X
91-94-1	3,3'-Dichlorobenzidine	< 5.00		µg/l	5.00	1.99	1	"	"	"	"	"	X
120-83-2	2,4-Dichlorophenol	< 5.00		µg/l	5.00	0.530	1	"	"	"	"	"	X
84-66-2	Diethyl phthalate	< 5.00		µg/l	5.00	0.623	1	"	"	"	"	"	X
131-11-3	Dimethyl phthalate	< 5.00		µg/l	5.00	0.758	1	"	"	"	"	"	X
105-67-9	2,4-Dimethylphenol	< 5.00		µg/l	5.00	0.653	1	"	"	"	"	"	X
84-74-2	Di-n-butyl phthalate	< 5.00		µg/l	5.00	0.457	1	"	"	"	"	"	X
534-52-1	4,6-Dinitro-2-methylphenol	< 5.00		µg/l	5.00	0.319	1	"	"	"	"	"	X
51-28-5	2,4-Dinitrophenol	< 5.00		µg/l	5.00	0.561	1	"	"	"	"	"	X
121-14-2	2,4-Dinitrotoluene	< 5.00		µg/l	5.00	0.673	1	"	"	"	"	"	X
606-20-2	2,6-Dinitrotoluene	< 5.00		µg/l	5.00	0.593	1	"	"	"	"	"	X
117-84-0	Di-n-octyl phthalate	< 5.00		µg/l	5.00	0.406	1	"	"	"	"	"	X
206-44-0	Fluoranthene	< 5.00		µg/l	5.00	0.638	1	"	"	"	"	"	X
86-73-7	Fluorene	< 5.00		µg/l	5.00	0.612	1	"	"	"	"	"	X
118-74-1	Hexachlorobenzene	< 5.00		µg/l	5.00	0.571	1	"	"	"	"	"	X
87-68-3	Hexachlorobutadiene	< 5.00		µg/l	5.00	0.388	1	"	"	"	"	"	X

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Sample Identification

GW-RGP

SC47844-01

Client Project #

6196-06

Matrix

Liquid

Collection Date/Time

20-Jun-18 12:30

Received

20-Jun-18

<i>CAS No.</i>	<i>Analyte(s)</i>	<i>Result</i>	<i>Flag</i>	<i>Units</i>	<i>*RDL</i>	<i>MDL</i>	<i>Dilution</i>	<i>Method Ref.</i>	<i>Prepared</i>	<i>Analyzed</i>	<i>Analyst</i>	<i>Batch</i>	<i>Cert.</i>
Semivolatile Organic Compounds by GCMS													
<u>Re-analysis of Semivolatile Organic Compounds</u>			E										
77-47-4	Hexachlorocyclopentadiene	< 5.00		µg/l	5.00	1.04	1	EPA 625.1	27-Jun-18	28-Jun-18	MSL	1808951	X
67-72-1	Hexachloroethane	< 5.00		µg/l	5.00	0.639	1	"	"	"	"	"	X
193-39-5	Indeno (1,2,3-cd) pyrene	< 5.00		µg/l	5.00	0.580	1	"	"	"	"	"	X
78-59-1	Isophorone	< 5.00		µg/l	5.00	0.586	1	"	"	"	"	"	X
91-20-3	Naphthalene	10.2		µg/l	5.00	0.685	1	"	"	"	"	"	X
98-95-3	Nitrobenzene	< 5.00		µg/l	5.00	0.690	1	"	"	"	"	"	X
88-75-5	2-Nitrophenol	< 5.00		µg/l	5.00	0.465	1	"	"	"	"	"	X
100-02-7	4-Nitrophenol	< 5.00		µg/l	5.00	0.838	1	"	"	"	"	"	X
62-75-9	N-Nitrosodimethylamine	< 5.00		µg/l	5.00	0.673	1	"	"	"	"	"	X
621-64-7	N-Nitrosodi-n-propylamine	< 5.00		µg/l	5.00	0.578	1	"	"	"	"	"	X
86-30-6	N-Nitrosodiphenylamine	< 5.00		µg/l	5.00	0.651	1	"	"	"	"	"	X
87-86-5	Pentachlorophenol	< 5.00		µg/l	5.00	0.373	1	"	"	"	"	"	X
85-01-8	Phenanthrene	< 5.00		µg/l	5.00	0.586	1	"	"	"	"	"	X
108-95-2	Phenol	< 5.00		µg/l	5.00	0.645	1	"	"	"	"	"	X
129-00-0	Pyrene	< 5.00		µg/l	5.00	0.610	1	"	"	"	"	"	X
120-82-1	1,2,4-Trichlorobenzene	< 5.00		µg/l	5.00	0.687	1	"	"	"	"	"	X
88-06-2	2,4,6-Trichlorophenol	< 5.00		µg/l	5.00	0.518	1	"	"	"	"	"	X

Surrogate recoveries:

321-60-8	2-Fluorobiphenyl	22	SDUP		30-130 %			"	"	"	"	"	
367-12-4	2-Fluorophenol	20			15-110 %			"	"	"	"	"	
4165-60-0	Nitrobenzene-d5	34			30-130 %			"	"	"	"	"	
4165-62-2	Phenol-d5	18			15-110 %			"	"	"	"	"	
1718-51-0	Terphenyl-d14	25	SDUP		30-130 %			"	"	"	"	"	
118-79-6	2,4,6-Tribromophenol	28			15-110 %			"	"	"	"	"	

Semivolatile Organic Compounds by GCPolychlorinated Biphenyls

12674-11-2	Aroclor-1016	< 0.192		µg/l	0.192	0.100	1	EPA 608.3	21-Jun-18	28-Jun-18	TA/	1808590	X
11104-28-2	Aroclor-1221	< 0.192		µg/l	0.192	0.111	1	"	"	"	"	"	X
11141-16-5	Aroclor-1232	< 0.192		µg/l	0.192	0.107	1	"	"	"	"	"	X
53469-21-9	Aroclor-1242	< 0.192		µg/l	0.192	0.103	1	"	"	"	"	"	X
12672-29-6	Aroclor-1248	< 0.192		µg/l	0.192	0.131	1	"	"	"	"	"	X
11097-69-1	Aroclor-1254	< 0.192		µg/l	0.192	0.112	1	"	"	"	"	"	X
11096-82-5	Aroclor-1260	< 0.192		µg/l	0.192	0.0818	1	"	"	"	"	"	X

Surrogate recoveries:

10386-84-2	4,4-DB-Octafluorobiphenyl (Sr)	140			30-150 %			"	"	"	"	"	
10386-84-2	4,4-DB-Octafluorobiphenyl (Sr) [2C]	140			30-150 %			"	"	"	"	"	
2051-24-3	Decachlorobiphenyl (Sr)	75			30-150 %			"	"	"	"	"	
2051-24-3	Decachlorobiphenyl (Sr) [2C]	75			30-150 %			"	"	"	"	"	

Extractable Petroleum HydrocarbonsPrepared by method General Preparation SVOC

	Non-polar material (SGT-HEM)	3.8		mg/l	1.0	0.9	1	EPA 1664B	22-Jun-18	25-Jun-18	SC	1808724	
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Sample Identification

GW-RGP

SC47844-01

Client Project #

6196-06

Matrix

Liquid

Collection Date/Time

20-Jun-18 12:30

Received

20-Jun-18

<u>CAS No.</u>	<u>Analyte(s)</u>	<u>Result</u>	<u>Flag</u>	<u>Units</u>	<u>*RDL</u>	<u>MDL</u>	<u>Dilution</u>	<u>Method Ref.</u>	<u>Prepared</u>	<u>Analyzed</u>	<u>Analyst</u>	<u>Batch</u>	<u>Cert.</u>
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Total Metals by EPA 200/6000 Series MethodsPrepared by method General Prep-Metal

	Preservation	Field Preserved; pH<2 confirmed		N/A			1	EPA 200/6000 methods	21-Jun-18		JS	1808651	
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Total Metals by EPA 200 Series Methods

7440-22-4	Silver	< 0.0250	R01, D	mg/l	0.0250	0.00975	50	EPA 200.8	21-Jun-18	28-Jun-18	TBC	1808628	X
7440-38-2	Arsenic	0.0639	R01, D	mg/l	0.0500	0.00590	100	"	"	28-Jun-18	"	"	X
7440-70-2	Calcium	121		mg/l	0.200	0.0679	1	EPA 200.7	"	28-Jun-18	SJR/TBC	1808632	X
7440-43-9	Cadmium	< 0.0250	R01, D	mg/l	0.0250	0.00875	50	EPA 200.8	"	28-Jun-18	TBC	1808628	X
7440-47-3	Chromium	0.109	R01, D	mg/l	0.0500	0.0138	100	"	"	28-Jun-18	"	"	X
7440-50-8	Copper	0.112	R01, D	mg/l	0.0250	0.0243	50	"	"	28-Jun-18	"	"	X
7439-89-6	Iron	94.8		mg/l	0.250	0.0201	1	EPA 200.7	"	26-Jun-18	SJR/TBC	1808632	X
7439-97-6	Mercury	0.00022		mg/l	0.00020	0.00014	1	EPA 245.1/7470A	"	26-Jun-18	TBC	1808633	X
7439-95-4	Magnesium	31.8		mg/l	0.0400	0.0147	1	EPA 200.7	"	28-Jun-18	SJR/TBC	1808632	X
7440-02-0	Nickel	0.0688	R01, D	mg/l	0.0250	0.00515	50	EPA 200.8	"	28-Jun-18	TBC	1808628	X
7439-92-1	Lead	0.246	R01, D	mg/l	0.0100	0.00358	20	"	"	28-Jun-18	"	"	X
7440-36-0	Antimony	< 0.0100	R01, D	mg/l	0.0100	0.00818	20	"	"	"	"	"	X
7782-49-2	Selenium	< 0.0500	R01, D	mg/l	0.0500	0.0149	100	"	"	28-Jun-18	"	"	X
7440-66-6	Zinc	< 0.250	R01, D	mg/l	0.250	0.0494	50	"	"	28-Jun-18	"	"	X

General Chemistry Parameters

16065-83-1	Trivalent Chromium	< 0.0500		mg/l	0.0500	0.0053	1	Calculation	21-Jun-18	29-Jun-18	TBC	1808628	
	Hardness	434	HD	mg/l CaCO3	0.664	0.230	1	SM 2340B (11)	"	28-Jun-18	SJR/TBC	[CALC]	
7782-50-5	Total Residual Chlorine	0.040	CIHT	mg/l	0.020	0.006	1	SM4500-Cl-G (11)	22-Jun-18 11:46	22-Jun-18 13:08	RLT	1808693	X
16887-00-6	Chloride	1,220	GS1, D	mg/l	60.0	5.96	60	EPA 300.0	21-Jun-18	21-Jun-18	TN	1808650	X
18540-29-9	Hexavalent Chromium	0.133	R01, D	mg/l	0.050	0.021	10	SM3500-Cr-B (11)/7196A	20-Jun-18 18:22	20-Jun-18 19:00	TN	1808581	
57-12-5	Cyanide (total)	< 0.00500		mg/l	0.00500	0.00470	1	EPA 335.4 / SW846 9012B	22-Jun-18	22-Jun-18	RLT	1808692	X
	Total Suspended Solids	2,000	LIV	mg/l	10.0	4.3	1	SM2540D (11)	21-Jun-18	22-Jun-18	CMB	1808636	X

Subcontracted AnalysesPrepared by method 436030

Analysis performed by Phoenix Environmental Labs, Inc. * - MACT007

7664-41-7	Ammonia as Nitrogen	1.51		mg/l	1.00	1.00	20	E350.1	20-Jun-18 12:30	26-Jun-18 12:48	M-CT007	436030A	
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Prepared by method 436006

Analysis performed by Phoenix Environmental Labs, Inc. * - MACT007

64743-03-9	Phenolics	0.082		mg/l	0.015	0.015	1	E420.4	25-Jun-18	26-Jun-18 08:57	M-CT007	436006A	
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Prepared by method 436137

Analysis performed by Phoenix Environmental Labs, Inc. * - MACT007

106-93-4	1,2-Dibromoethane (EDB)	< 0.01		ug/l	0.01	0.01	1	E504.1	"	26-Jun-18 18:36	M-CT007	436137A	
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Sample Identification

SW-1

SC47844-02

Client Project #

6196-06

Matrix

Liquid

Collection Date/Time

20-Jun-18 13:15

Received

20-Jun-18

<u>CAS No.</u>	<u>Analyte(s)</u>	<u>Result</u>	<u>Flag</u>	<u>Units</u>	<u>*RDL</u>	<u>MDL</u>	<u>Dilution</u>	<u>Method Ref.</u>	<u>Prepared</u>	<u>Analyzed</u>	<u>Analyst</u>	<u>Batch</u>	<u>Cert.</u>
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Total Metals by EPA 200/6000 Series MethodsPrepared by method General Prep-Metal

	Preservation	Field Preserved; pH<2 confirmed		N/A			1	EPA 200/6000 methods	21-Jun-18		JS	1808651	
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Total Metals by EPA 200 Series Methods

7440-22-4	Silver	< 0.00050		mg/l	0.00050	0.00020	1	EPA 200.8	21-Jun-18	28-Jun-18	TBC	1808628	X
7440-38-2	Arsenic	< 0.00250	R01, D	mg/l	0.00250	0.00030	5	"	"	29-Jun-18	"	"	X
7440-70-2	Calcium	29.8		mg/l	0.200	0.0679	1	EPA 200.7	"	28-Jun-18	SJR/TBC	1808632	X
7440-43-9	Cadmium	< 0.00050		mg/l	0.00050	0.00018	1	EPA 200.8	"	28-Jun-18	TBC	1808628	X
7440-47-3	Chromium	< 0.00250	R01, D	mg/l	0.00250	0.00069	5	"	"	29-Jun-18	"	"	X
7440-50-8	Copper	0.00779		mg/l	0.00050	0.00049	1	"	"	28-Jun-18	"	"	X
7439-89-6	Iron	0.509		mg/l	0.250	0.0201	1	EPA 200.7	"	26-Jun-18	SJR/TBC	1808632	X
7439-97-6	Mercury	< 0.00020		mg/l	0.00020	0.00014	1	EPA 245.1/7470A	"	26-Jun-18	TBC	1808633	X
7439-95-4	Magnesium	14.6		mg/l	0.0400	0.0147	1	EPA 200.7	"	28-Jun-18	SJR/TBC	1808632	X
7440-02-0	Nickel	0.00139		mg/l	0.00050	0.00010	1	EPA 200.8	"	28-Jun-18	TBC	1808628	X
7439-92-1	Lead	0.00259		mg/l	0.00050	0.00018	1	"	"	"	"	"	X
7440-36-0	Antimony	< 0.00050		mg/l	0.00050	0.00041	1	"	"	"	"	"	X
7782-49-2	Selenium	< 0.00250	R01, D	mg/l	0.00250	0.00074	5	"	"	29-Jun-18	"	"	X
7440-66-6	Zinc	0.00567		mg/l	0.00500	0.00099	1	"	"	28-Jun-18	"	"	X

General Chemistry Parameters

16065-83-1	Trivalent Chromium	< 0.0100		mg/l	0.0100	0.0053	1	Calculation	21-Jun-18	29-Jun-18	TBC	1808628	
	Hardness	134	HD	mg/l CaCO3	0.664	0.230	1	SM 2340B (11)	"	28-Jun-18	SJR/TBC	[CALC]	
18540-29-9	Hexavalent Chromium	< 0.050	R01, D	mg/l	0.050	0.021	10	SM3500-Cr-B (11)/7196A	20-Jun-18 18:22	20-Jun-18 19:00	TN	1808581	
	pH	7.34	pH	pH Units			1	ASTM D 1293-99B	20-Jun-18 17:30	20-Jun-18 18:00	BD	1808579	X

Subcontracted AnalysesPrepared by method 436030

Analysis performed by Phoenix Environmental Labs, Inc. * - MACT007

7664-41-7	Ammonia as Nitrogen	0.15		mg/l	0.05	0.05	1	E350.1	20-Jun-18 13:15	26-Jun-18 12:49	M-CT007	436030A	
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Volatile Organic Compounds - Quality Control

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
EPA 524.2										
Batch 1808683 - SW846 5030 Water MS										
Blank (1808683-BLK1)					<u>Prepared & Analyzed: 22-Jun-18</u>					
Methyl tert-butyl ether	< 0.50		µg/l	0.50						
Tert-amyl methyl ether	< 0.50		µg/l	0.50						
Tert-Butanol / butyl alcohol	< 10.0		µg/l	10.0						
Ethanol	< 200		µg/l	200						
Surrogate: 4-Bromofluorobenzene	47.7		µg/l		50.0		95	80-120		
Surrogate: Toluene-d8	53.3		µg/l		50.0		107	80-120		
Surrogate: 1,2-Dichloroethane-d4	58.3		µg/l		50.0		117	80-120		
Surrogate: Dibromofluoromethane	59.5		µg/l		50.0		119	80-120		
LCS (1808683-BS1)					<u>Prepared & Analyzed: 22-Jun-18</u>					
Methyl tert-butyl ether	20.7		µg/l		20.0		103	80-120		
Tert-amyl methyl ether	22.7		µg/l		20.0		114	70-130		
Tert-Butanol / butyl alcohol	206		µg/l		200		103	70-130		
Ethanol	514		µg/l		400		128	70-130		
Surrogate: 4-Bromofluorobenzene	54.2		µg/l		50.0		108	80-120		
Surrogate: Toluene-d8	52.5		µg/l		50.0		105	80-120		
Surrogate: 1,2-Dichloroethane-d4	51.4		µg/l		50.0		103	80-120		
Surrogate: Dibromofluoromethane	55.0		µg/l		50.0		110	80-120		
LCS Dup (1808683-BSD1)					<u>Prepared & Analyzed: 22-Jun-18</u>					
Methyl tert-butyl ether	21.3		µg/l		20.0		106	80-120	3	20
Tert-amyl methyl ether	23.1		µg/l		20.0		116	70-130	2	30
Tert-Butanol / butyl alcohol	212		µg/l		200		106	70-130	3	30
Ethanol	503		µg/l		400		126	70-130	2	20
Surrogate: 4-Bromofluorobenzene	54.6		µg/l		50.0		109	80-120		
Surrogate: Toluene-d8	55.6		µg/l		50.0		111	80-120		
Surrogate: 1,2-Dichloroethane-d4	53.3		µg/l		50.0		107	80-120		
Surrogate: Dibromofluoromethane	56.9		µg/l		50.0		114	80-120		
EPA 624.1										
Batch 1808683 - SW846 5030 Water MS										
Blank (1808683-BLK1)					<u>Prepared & Analyzed: 22-Jun-18</u>					
Acetone	< 10.0		µg/l	10.0						
Benzene	< 1.0		µg/l	1.0						
Bromodichloromethane	< 1.0		µg/l	1.0						
Bromoform	< 1.0		µg/l	1.0						
Bromomethane	< 2.0		µg/l	2.0						
2-Butanone (MEK)	< 10.0		µg/l	10.0						
Carbon disulfide	< 5.0		µg/l	5.0						
Carbon tetrachloride	< 1.0		µg/l	1.0						
Chlorobenzene	< 1.0		µg/l	1.0						
Chloroethane	< 2.0		µg/l	2.0						
Chloroform	< 1.0		µg/l	1.0						
Chloromethane	< 2.0		µg/l	2.0						
Dibromochloromethane	< 1.0		µg/l	1.0						
Dibromomethane	< 1.0		µg/l	1.0						
1,2-Dichlorobenzene	< 1.0		µg/l	1.0						
1,3-Dichlorobenzene	< 1.0		µg/l	1.0						
1,4-Dichlorobenzene	< 1.0		µg/l	1.0						
1,1-Dichloroethane	< 1.0		µg/l	1.0						
1,2-Dichloroethane	< 1.0		µg/l	1.0						
1,1-Dichloroethene	< 1.0		µg/l	1.0						

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Volatile Organic Compounds - Quality Control

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
EPA 624.1										
Batch 1808683 - SW846 5030 Water MS										
Blank (1808683-BLK1)					<u>Prepared & Analyzed: 22-Jun-18</u>					
cis-1,2-Dichloroethene	< 1.0		µg/l	1.0						
trans-1,2-Dichloroethene	< 1.0		µg/l	1.0						
1,2-Dichloropropane	< 1.0		µg/l	1.0						
cis-1,3-Dichloropropene	< 1.0		µg/l	1.0						
trans-1,3-Dichloropropene	< 1.0		µg/l	1.0						
Ethylbenzene	< 1.0		µg/l	1.0						
2-Hexanone (MBK)	< 10.0		µg/l	10.0						
Methyl tert-butyl ether	< 1.0		µg/l	1.0						
4-Methyl-2-pentanone (MIBK)	< 10.0		µg/l	10.0						
Methylene chloride	< 10.0		µg/l	10.0						
Styrene	< 1.0		µg/l	1.0						
1,1,2,2-Tetrachloroethane	< 1.0		µg/l	1.0						
Tetrachloroethene	< 1.0		µg/l	1.0						
Toluene	< 1.0		µg/l	1.0						
1,1,1-Trichloroethane	< 1.0		µg/l	1.0						
1,1,2-Trichloroethane	< 1.0		µg/l	1.0						
Trichloroethene	< 1.0		µg/l	1.0						
Trichlorofluoromethane (Freon 11)	< 1.0		µg/l	1.0						
Vinyl chloride	< 1.0		µg/l	1.0						
m,p-Xylene	< 2.0		µg/l	2.0						
o-Xylene	< 1.0		µg/l	1.0						
<i>Surrogate: 4-Bromofluorobenzene</i>	47.7		µg/l		50.0		95	70-130		
<i>Surrogate: Toluene-d8</i>	53.3		µg/l		50.0		107	70-130		
<i>Surrogate: 1,2-Dichloroethane-d4</i>	58.3		µg/l		50.0		117	70-130		
<i>Surrogate: Dibromofluoromethane</i>	59.5		µg/l		50.0		119	70-130		
LCS (1808683-BS1)					<u>Prepared & Analyzed: 22-Jun-18</u>					
Acetone	24.4		µg/l		20.0		122	60-140		
Benzene	23.0		µg/l		20.0		115	65-135		
Bromodichloromethane	22.2		µg/l		20.0		111	65-135		
Bromoform	21.2		µg/l		20.0		106	70-130		
Bromomethane	20.7		µg/l		20.0		104	15-185		
2-Butanone (MEK)	22.5		µg/l		20.0		112	70-130		
Carbon disulfide	23.2		µg/l		20.0		116	70-130		
Carbon tetrachloride	23.9		µg/l		20.0		120	70-130		
Chlorobenzene	20.5		µg/l		20.0		103	65-135		
Chloroethane	23.3		µg/l		20.0		116	40-160		
Chloroform	22.4		µg/l		20.0		112	70-135		
Chloromethane	21.2		µg/l		20.0		106	2-205		
Dibromochloromethane	22.9		µg/l		20.0		115	70-135		
Dibromomethane	21.6		µg/l		20.0		108	70-130		
1,2-Dichlorobenzene	19.8		µg/l		20.0		99	65-135		
1,3-Dichlorobenzene	24.0		µg/l		20.0		120	70-130		
1,4-Dichlorobenzene	18.7		µg/l		20.0		94	65-135		
1,1-Dichloroethane	23.2		µg/l		20.0		116	70-130		
1,2-Dichloroethane	22.3		µg/l		20.0		111	70-130		
1,1-Dichloroethene	25.7		µg/l		20.0		128	50-150		
cis-1,2-Dichloroethene	23.7		µg/l		20.0		118	70-130		
trans-1,2-Dichloroethene	23.8		µg/l		20.0		119	70-130		
1,2-Dichloropropane	20.5		µg/l		20.0		103	35-165		
cis-1,3-Dichloropropene	20.4		µg/l		20.0		102	25-175		

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Volatile Organic Compounds - Quality Control

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
<u>EPA 624.1</u>										
Batch 1808683 - SW846 5030 Water MS										
<u>LCS (1808683-BS1)</u>					<u>Prepared & Analyzed: 22-Jun-18</u>					
trans-1,3-Dichloropropene	21.1		µg/l		20.0		106	50-150		
Ethylbenzene	20.5		µg/l		20.0		102	60-140		
2-Hexanone (MBK)	21.1		µg/l		20.0		106	70-130		
Methyl tert-butyl ether	20.7		µg/l		20.0		103	70-130		
4-Methyl-2-pentanone (MIBK)	21.3		µg/l		20.0		106	70-130		
Methylene chloride	22.9		µg/l		20.0		115	60-140		
Styrene	20.0		µg/l		20.0		100	70-130		
1,1,2,2-Tetrachloroethane	20.1		µg/l		20.0		100	60-140		
Tetrachloroethene	22.9		µg/l		20.0		114	70-130		
Toluene	23.0		µg/l		20.0		115	70-130		
1,1,1-Trichloroethane	22.3		µg/l		20.0		111	70-130		
1,1,2-Trichloroethane	21.9		µg/l		20.0		110	70-130		
Trichloroethene	22.7		µg/l		20.0		114	65-135		
Trichlorofluoromethane (Freon 11)	26.2		µg/l		20.0		131	50-150		
Vinyl chloride	25.1		µg/l		20.0		125	5-195		
m,p-Xylene	20.3		µg/l		20.0		101	70-130		
o-Xylene	21.1		µg/l		20.0		106	70-130		
Surrogate: 4-Bromofluorobenzene	54.2		µg/l		50.0		108	70-130		
Surrogate: Toluene-d8	52.5		µg/l		50.0		105	70-130		
Surrogate: 1,2-Dichloroethane-d4	51.4		µg/l		50.0		103	70-130		
Surrogate: Dibromofluoromethane	55.0		µg/l		50.0		110	70-130		
<u>LCS Dup (1808683-BSD1)</u>					<u>Prepared & Analyzed: 22-Jun-18</u>					
Acetone	25.4		µg/l		20.0		127	60-140	4	30
Benzene	22.6		µg/l		20.0		113	65-135	2	30
Bromodichloromethane	22.7		µg/l		20.0		113	65-135	2	30
Bromoform	20.3		µg/l		20.0		102	70-130	4	30
Bromomethane	21.0		µg/l		20.0		105	15-185	2	30
2-Butanone (MEK)	23.0		µg/l		20.0		115	70-130	2	30
Carbon disulfide	22.6		µg/l		20.0		113	70-130	3	30
Carbon tetrachloride	22.5		µg/l		20.0		112	70-130	6	30
Chlorobenzene	19.2		µg/l		20.0		96	65-135	7	30
Chloroethane	22.9		µg/l		20.0		114	40-160	2	30
Chloroform	22.3		µg/l		20.0		111	70-135	0.5	30
Chloromethane	20.6		µg/l		20.0		103	2-205	3	30
Dibromochloromethane	23.4		µg/l		20.0		117	70-135	2	30
Dibromomethane	21.7		µg/l		20.0		108	70-130	0.6	30
1,2-Dichlorobenzene	19.2		µg/l		20.0		96	65-135	3	30
1,3-Dichlorobenzene	22.6		µg/l		20.0		113	70-130	6	30
1,4-Dichlorobenzene	17.8		µg/l		20.0		89	65-135	5	30
1,1-Dichloroethane	23.5		µg/l		20.0		117	70-130	1	30
1,2-Dichloroethane	22.8		µg/l		20.0		114	70-130	2	30
1,1-Dichloroethene	25.8		µg/l		20.0		129	50-150	0.5	30
cis-1,2-Dichloroethene	22.9		µg/l		20.0		114	70-130	3	30
trans-1,2-Dichloroethene	23.7		µg/l		20.0		118	70-130	0.3	30
1,2-Dichloropropane	20.1		µg/l		20.0		101	35-165	2	30
cis-1,3-Dichloropropene	20.7		µg/l		20.0		103	25-175	1	30
trans-1,3-Dichloropropene	21.2		µg/l		20.0		106	50-150	0.3	30
Ethylbenzene	18.6		µg/l		20.0		93	60-140	9	30
2-Hexanone (MBK)	21.9		µg/l		20.0		109	70-130	4	30
Methyl tert-butyl ether	21.3		µg/l		20.0		106	70-130	3	30

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Volatile Organic Compounds - Quality Control

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
EPA 624.1										
Batch 1808683 - SW846 5030 Water MS										
LCS Dup (1808683-BSD1)					<u>Prepared & Analyzed: 22-Jun-18</u>					
4-Methyl-2-pentanone (MIBK)	21.5		µg/l		20.0		107	70-130	1	30
Methylene chloride	23.0		µg/l		20.0		115	60-140	0.04	30
Styrene	18.9		µg/l		20.0		94	70-130	6	30
1,1,2,2-Tetrachloroethane	20.1		µg/l		20.0		101	60-140	0.2	30
Tetrachloroethene	22.3		µg/l		20.0		112	70-130	2	30
Toluene	22.8		µg/l		20.0		114	70-130	1	30
1,1,1-Trichloroethane	21.9		µg/l		20.0		109	70-130	2	30
1,1,2-Trichloroethane	22.2		µg/l		20.0		111	70-130	1	30
Trichloroethene	22.2		µg/l		20.0		111	65-135	2	30
Trichlorofluoromethane (Freon 11)	25.4		µg/l		20.0		127	50-150	3	30
Vinyl chloride	25.7		µg/l		20.0		129	5-195	3	30
m,p-Xylene	19.4		µg/l		20.0		97	70-130	4	30
o-Xylene	20.1		µg/l		20.0		100	70-130	5	30
Surrogate: 4-Bromofluorobenzene	54.6		µg/l		50.0		109	70-130		
Surrogate: Toluene-d8	55.6		µg/l		50.0		111	70-130		
Surrogate: 1,2-Dichloroethane-d4	53.3		µg/l		50.0		107	70-130		
Surrogate: Dibromofluoromethane	56.9		µg/l		50.0		114	70-130		
SW846 8260C SIM										
Batch 1809223 - SW846 5030 Water MS										
Blank (1809223-BLK1)					<u>Prepared & Analyzed: 03-Jul-18</u>					
1,4-Dioxane	< 2.50		µg/l	2.50						
Surrogate: 1,4-Dioxane-d8	39.0		µg/l		50.0		78	70-130		
Surrogate: 4-Bromofluorobenzene	50.2		µg/l		50.0		100	70-130		
Surrogate: Toluene-d8	48.3		µg/l		50.0		97	70-130		
Surrogate: 1,2-Dichloroethane-d4	56.1		µg/l		50.0		112	70-130		
Surrogate: Dibromofluoromethane	60.4		µg/l		50.0		121	70-130		
LCS (1809223-BS1)					<u>Prepared & Analyzed: 03-Jul-18</u>					
1,4-Dioxane	4.1		µg/l		5.00		81	70-130		
Surrogate: 1,4-Dioxane-d8	39.3		µg/l		50.0		79	70-130		
Surrogate: 4-Bromofluorobenzene	50.4		µg/l		50.0		101	70-130		
Surrogate: Toluene-d8	47.6		µg/l		50.0		95	70-130		
Surrogate: 1,2-Dichloroethane-d4	63.4		µg/l		50.0		127	70-130		
Surrogate: Dibromofluoromethane	64.6		µg/l		50.0		129	70-130		
LCS Dup (1809223-BSD1)					<u>Prepared & Analyzed: 03-Jul-18</u>					
1,4-Dioxane	4.0		µg/l		5.00		81	70-130	0.2	20
Surrogate: 1,4-Dioxane-d8	36.7		µg/l		50.0		73	70-130		
Surrogate: 4-Bromofluorobenzene	50.2		µg/l		50.0		100	70-130		
Surrogate: Toluene-d8	47.8		µg/l		50.0		96	70-130		
Surrogate: 1,2-Dichloroethane-d4	64.7		µg/l		50.0		129	70-130		
Surrogate: Dibromofluoromethane	65.0		µg/l		50.0		130	70-130		

Semivolatile Organic Compounds by GCMS - Quality Control

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
EPA 625.1										
Batch 1808587 - SW846 3510C										
Blank (1808587-BLK1)	Prepared: 21-Jun-18 Analyzed: 25-Jun-18									
Acenaphthene	< 5.00		µg/l	5.00						
Acenaphthylene	< 5.00		µg/l	5.00						
Anthracene	< 5.00		µg/l	5.00						
Benzidine	< 10.0		µg/l	10.0						
Benzo (a) anthracene	< 5.00		µg/l	5.00						
Benzo (a) pyrene	< 5.00		µg/l	5.00						
Benzo (b) fluoranthene	< 5.00		µg/l	5.00						
Benzo (g,h,i) perylene	< 5.00		µg/l	5.00						
Benzo (k) fluoranthene	< 5.00		µg/l	5.00						
Bis(2-chloroethoxy)methane	< 5.00		µg/l	5.00						
Bis(2-chloroethyl)ether	< 5.00		µg/l	5.00						
Bis(2-chloroisopropyl)ether	< 5.00		µg/l	5.00						
Bis(2-ethylhexyl)phthalate	< 5.00		µg/l	5.00						
4-Bromophenyl phenyl ether	< 5.00		µg/l	5.00						
Butyl benzyl phthalate	< 5.00		µg/l	5.00						
4-Chloro-3-methylphenol	< 5.00		µg/l	5.00						
2-Chloronaphthalene	< 5.00		µg/l	5.00						
2-Chlorophenol	< 5.00		µg/l	5.00						
4-Chlorophenyl phenyl ether	< 5.00		µg/l	5.00						
Chrysene	< 5.00		µg/l	5.00						
Dibenzo (a,h) anthracene	< 5.00		µg/l	5.00						
1,2-Dichlorobenzene	< 5.00		µg/l	5.00						
1,3-Dichlorobenzene	< 5.00		µg/l	5.00						
1,4-Dichlorobenzene	< 5.00		µg/l	5.00						
3,3'-Dichlorobenzidine	< 5.00		µg/l	5.00						
2,4-Dichlorophenol	< 5.00		µg/l	5.00						
Diethyl phthalate	< 5.00		µg/l	5.00						
Dimethyl phthalate	< 5.00		µg/l	5.00						
2,4-Dimethylphenol	< 5.00		µg/l	5.00						
Di-n-butyl phthalate	< 5.00		µg/l	5.00						
4,6-Dinitro-2-methylphenol	< 5.00		µg/l	5.00						
2,4-Dinitrophenol	< 5.00		µg/l	5.00						
2,4-Dinitrotoluene	< 5.00		µg/l	5.00						
2,6-Dinitrotoluene	< 5.00		µg/l	5.00						
Di-n-octyl phthalate	< 5.00		µg/l	5.00						
Fluoranthene	< 5.00		µg/l	5.00						
Fluorene	< 5.00		µg/l	5.00						
Hexachlorobenzene	< 5.00		µg/l	5.00						
Hexachlorobutadiene	< 5.00		µg/l	5.00						
Hexachlorocyclopentadiene	< 5.00		µg/l	5.00						
Hexachloroethane	< 5.00		µg/l	5.00						
Indeno (1,2,3-cd) pyrene	< 5.00		µg/l	5.00						
Isophorone	< 5.00		µg/l	5.00						
Naphthalene	< 5.00		µg/l	5.00						
Nitrobenzene	< 5.00		µg/l	5.00						
2-Nitrophenol	< 5.00		µg/l	5.00						
4-Nitrophenol	< 5.00		µg/l	5.00						
N-Nitrosodimethylamine	< 5.00		µg/l	5.00						
N-Nitrosodi-n-propylamine	< 5.00		µg/l	5.00						
N-Nitrosodiphenylamine	< 5.00		µg/l	5.00						

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Semivolatile Organic Compounds by GCMS - Quality Control

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
EPA 625.1										
Batch 1808587 - SW846 3510C										
Blank (1808587-BLK1)					<u>Prepared: 21-Jun-18 Analyzed: 25-Jun-18</u>					
Pentachlorophenol	< 5.00		µg/l	5.00						
Phenanthrene	< 5.00		µg/l	5.00						
Phenol	< 5.00		µg/l	5.00						
Pyrene	< 5.00		µg/l	5.00						
1,2,4-Trichlorobenzene	< 5.00		µg/l	5.00						
2,4,6-Trichlorophenol	< 5.00		µg/l	5.00						
Surrogate: 2-Fluorobiphenyl	28.2		µg/l		50.0		56	30-130		
Surrogate: 2-Fluorophenol	28.2		µg/l		50.0		56	15-110		
Surrogate: Nitrobenzene-d5	29.7		µg/l		50.0		59	30-130		
Surrogate: Phenol-d5	23.0		µg/l		50.0		46	15-110		
Surrogate: Terphenyl-d14	32.8		µg/l		50.0		66	30-130		
Surrogate: 2,4,6-Tribromophenol	33.4		µg/l		50.0		67	15-110		
LCS (1808587-BS1)					<u>Prepared: 21-Jun-18 Analyzed: 25-Jun-18</u>					
Acenaphthene	36.4		µg/l	5.05	50.5		72	60-132		
Acenaphthylene	34.6		µg/l	5.05	50.5		68	54-126		
Anthracene	34.4		µg/l	5.05	50.5		68	43-120		
Benidine	8.22	QC6	µg/l	10.1	50.5		16	60-140		
Benzo (a) anthracene	38.5		µg/l	5.05	50.5		76	42-133		
Benzo (a) pyrene	38.3		µg/l	5.05	50.5		76	32-148		
Benzo (b) fluoranthene	45.6		µg/l	5.05	50.5		90	42-140		
Benzo (g,h,i) perylene	38.9		µg/l	5.05	50.5		77	1-195		
Benzo (k) fluoranthene	31.6		µg/l	5.05	50.5		63	25-145		
Bis(2-chloroethoxy)methane	26.7		µg/l	5.05	50.5		53	49-165		
Bis(2-chloroethyl)ether	25.1		µg/l	5.05	50.5		50	43-126		
Bis(2-chloroisopropyl)ether	28.7	QC6	µg/l	5.05	50.5		57	63-139		
Bis(2-ethylhexyl)phthalate	33.8		µg/l	5.05	50.5		67	29-137		
4-Bromophenyl phenyl ether	35.1		µg/l	5.05	50.5		70	65-120		
Butyl benzyl phthalate	35.4		µg/l	5.05	50.5		70	1-140		
4-Chloro-3-methylphenol	35.5		µg/l	5.05	50.5		70	41-128		
2-Chloronaphthalene	41.8		µg/l	5.05	50.5		83	65-120		
2-Chlorophenol	34.5		µg/l	5.05	50.5		68	36-120		
4-Chlorophenyl phenyl ether	40.3		µg/l	5.05	50.5		80	38-145		
Chrysene	40.2		µg/l	5.05	50.5		80	44-140		
Dibenzo (a,h) anthracene	42.8		µg/l	5.05	50.5		85	1-200		
1,2-Dichlorobenzene	36.8		µg/l	5.05	50.5		73	60-140		
1,3-Dichlorobenzene	36.1		µg/l	5.05	50.5		71	60-140		
1,4-Dichlorobenzene	38.5		µg/l	5.05	50.5		76	60-140		
3,3'-Dichlorobenzidine	54.1		µg/l	5.05	50.5		107	8-213		
2,4-Dichlorophenol	37.8		µg/l	5.05	50.5		75	53-122		
Diethyl phthalate	36.4		µg/l	5.05	50.5		72	1-120		
Dimethyl phthalate	32.3		µg/l	5.05	50.5		64	1-120		
2,4-Dimethylphenol	32.8		µg/l	5.05	50.5		65	42-120		
Di-n-butyl phthalate	40.9		µg/l	5.05	50.5		81	8-120		
4,6-Dinitro-2-methylphenol	34.6		µg/l	5.05	50.5		69	53-130		
2,4-Dinitrophenol	23.6		µg/l	5.05	50.5		47	1-173		
2,4-Dinitrotoluene	38.4		µg/l	5.05	50.5		76	48-127		
2,6-Dinitrotoluene	38.1		µg/l	5.05	50.5		75	68-137		
Di-n-octyl phthalate	37.4		µg/l	5.05	50.5		74	19-132		
Fluoranthene	42.2		µg/l	5.05	50.5		84	43-121		
Fluorene	35.3		µg/l	5.05	50.5		70	70-120		

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Semivolatile Organic Compounds by GCMS - Quality Control

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
EPA 625.1										
Batch 1808587 - SW846 3510C										
LCS (1808587-BS1)										
						Prepared: 21-Jun-18 Analyzed: 25-Jun-18				
Hexachlorobenzene	51.2		µg/l	5.05	50.5		101	8-142		
Hexachlorobutadiene	38.0		µg/l	5.05	50.5		75	38-120		
Hexachlorocyclopentadiene	52.6		µg/l	5.05	50.5		104	60-140		
Hexachloroethane	40.4		µg/l	5.05	50.5		80	55-120		
Indeno (1,2,3-cd) pyrene	41.1		µg/l	5.05	50.5		81	1-151		
Isophorone	32.2		µg/l	5.05	50.5		64	47-180		
Naphthalene	33.5		µg/l	5.05	50.5		66	36-120		
Nitrobenzene	49.6		µg/l	5.05	50.5		98	54-158		
2-Nitrophenol	33.3		µg/l	5.05	50.5		66	45-167		
4-Nitrophenol	17.8		µg/l	5.05	50.5		35	13-129		
N-Nitrosodimethylamine	23.1	QC6	µg/l	5.05	50.5		46	60-140		
N-Nitrosodi-n-propylamine	32.2		µg/l	5.05	50.5		64	14-198		
N-Nitrosodiphenylamine	44.3		µg/l	5.05	50.5		88	60-140		
Pentachlorophenol	30.2		µg/l	5.05	50.5		60	38-152		
Phenanthrene	40.2		µg/l	5.05	50.5		80	65-120		
Phenol	15.1		µg/l	5.05	50.5		30	17-120		
Pyrene	36.6		µg/l	5.05	50.5		72	70-120		
1,2,4-Trichlorobenzene	42.2		µg/l	5.05	50.5		84	57-130		
2,4,6-Trichlorophenol	36.9		µg/l	5.05	50.5		73	52-129		
Surrogate: 2-Fluorobiphenyl	44.5		µg/l		50.5		88	30-130		
Surrogate: 2-Fluorophenol	27.5		µg/l		50.5		54	15-110		
Surrogate: Nitrobenzene-d5	48.4		µg/l		50.5		96	30-130		
Surrogate: Phenol-d5	23.7		µg/l		50.5		47	15-110		
Surrogate: Terphenyl-d14	54.5		µg/l		50.5		108	30-130		
Surrogate: 2,4,6-Tribromophenol	61.1	SAC	µg/l		50.5		121	15-110		
LCS Dup (1808587-BSD1)										
						Prepared: 21-Jun-18 Analyzed: 25-Jun-18				
Acenaphthene	38.9		µg/l	5.00	50.0		78	60-132	7	20
Acenaphthylene	36.7		µg/l	5.00	50.0		73	54-126	6	20
Anthracene	32.9		µg/l	5.00	50.0		66	43-120	4	20
Benzidine	9.20	QC6	µg/l	10.0	50.0		18	60-140	11	20
Benzo (a) anthracene	38.7		µg/l	5.00	50.0		77	42-133	0.4	20
Benzo (a) pyrene	37.8		µg/l	5.00	50.0		76	32-148	1	20
Benzo (b) fluoranthene	45.4		µg/l	5.00	50.0		91	42-140	0.4	20
Benzo (g,h,i) perylene	38.5		µg/l	5.00	50.0		77	1-195	1	20
Benzo (k) fluoranthene	31.8		µg/l	5.00	50.0		64	25-145	0.6	20
Bis(2-chloroethoxy)methane	24.9		µg/l	5.00	50.0		50	49-165	7	20
Bis(2-chloroethyl)ether	25.3		µg/l	5.00	50.0		51	43-126	1	20
Bis(2-chloroisopropyl)ether	27.7	QC6	µg/l	5.00	50.0		55	63-139	4	20
Bis(2-ethylhexyl)phthalate	35.3		µg/l	5.00	50.0		71	29-137	4	20
4-Bromophenyl phenyl ether	34.9		µg/l	5.00	50.0		70	65-120	0.7	20
Butyl benzyl phthalate	34.4		µg/l	5.00	50.0		69	1-140	3	20
4-Chloro-3-methylphenol	37.3		µg/l	5.00	50.0		75	41-128	5	20
2-Chloronaphthalene	47.0		µg/l	5.00	50.0		94	65-120	12	20
2-Chlorophenol	35.6		µg/l	5.00	50.0		71	36-120	3	20
4-Chlorophenyl phenyl ether	39.4		µg/l	5.00	50.0		79	38-145	2	20
Chrysene	38.1		µg/l	5.00	50.0		76	44-140	5	20
Dibenzo (a,h) anthracene	42.5		µg/l	5.00	50.0		85	1-200	0.7	20
1,2-Dichlorobenzene	36.6		µg/l	5.00	50.0		73	60-140	0.4	20
1,3-Dichlorobenzene	35.9		µg/l	5.00	50.0		72	60-140	0.5	20
1,4-Dichlorobenzene	38.6		µg/l	5.00	50.0		77	60-140	0.2	20

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Semivolatile Organic Compounds by GCMS - Quality Control

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
EPA 625.1										
Batch 1808587 - SW846 3510C										
LCS Dup (1808587-BSD1)					Prepared: 21-Jun-18 Analyzed: 25-Jun-18					
3,3'-Dichlorobenzidine	52.8		µg/l	5.00	50.0		106	8-213	2	20
2,4-Dichlorophenol	34.7		µg/l	5.00	50.0		69	53-122	8	20
Diethyl phthalate	35.6		µg/l	5.00	50.0		71	1-120	2	20
Dimethyl phthalate	34.2		µg/l	5.00	50.0		68	1-120	6	20
2,4-Dimethylphenol	31.9		µg/l	5.00	50.0		64	42-120	3	20
Di-n-butyl phthalate	36.1		µg/l	5.00	50.0		72	8-120	12	20
4,6-Dinitro-2-methylphenol	35.1		µg/l	5.00	50.0		70	53-130	1	20
2,4-Dinitrophenol	25.2		µg/l	5.00	50.0		50	1-173	6	20
2,4-Dinitrotoluene	39.9		µg/l	5.00	50.0		80	48-127	4	20
2,6-Dinitrotoluene	37.8		µg/l	5.00	50.0		76	68-137	0.6	20
Di-n-octyl phthalate	36.7		µg/l	5.00	50.0		73	19-132	2	20
Fluoranthene	37.4		µg/l	5.00	50.0		75	43-121	12	20
Fluorene	34.8		µg/l	5.00	50.0		70	70-120	1	20
Hexachlorobenzene	45.6		µg/l	5.00	50.0		91	8-142	12	20
Hexachlorobutadiene	39.9		µg/l	5.00	50.0		80	38-120	5	20
Hexachlorocyclopentadiene	57.8		µg/l	5.00	50.0		116	60-140	9	20
Hexachloroethane	40.3		µg/l	5.00	50.0		81	55-120	0.08	20
Indeno (1,2,3-cd) pyrene	40.7		µg/l	5.00	50.0		81	1-151	1	20
Isophorone	30.0		µg/l	5.00	50.0		60	47-180	7	20
Naphthalene	34.6		µg/l	5.00	50.0		69	36-120	3	20
Nitrobenzene	38.6	QR9	µg/l	5.00	50.0		77	54-158	25	20
2-Nitrophenol	29.8		µg/l	5.00	50.0		60	45-167	11	20
4-Nitrophenol	20.0		µg/l	5.00	50.0		40	13-129	12	20
N-Nitrosodimethylamine	22.7	QC6	µg/l	5.00	50.0		45	60-140	2	20
N-Nitrosodi-n-propylamine	31.1		µg/l	5.00	50.0		62	14-198	3	20
N-Nitrosodiphenylamine	43.6		µg/l	5.00	50.0		87	60-140	2	20
Pentachlorophenol	28.8		µg/l	5.00	50.0		58	38-152	5	20
Phenanthrene	41.1		µg/l	5.00	50.0		82	65-120	2	20
Phenol	15.7		µg/l	5.00	50.0		31	17-120	4	20
Pyrene	34.3	QC6	µg/l	5.00	50.0		69	70-120	6	20
1,2,4-Trichlorobenzene	38.8		µg/l	5.00	50.0		78	57-130	8	20
2,4,6-Trichlorophenol	39.8		µg/l	5.00	50.0		80	52-129	8	20
Surrogate: 2-Fluorobiphenyl	49.9		µg/l		50.0		100	30-130		
Surrogate: 2-Fluorophenol	26.6		µg/l		50.0		53	15-110		
Surrogate: Nitrobenzene-d5	48.6		µg/l		50.0		97	30-130		
Surrogate: Phenol-d5	24.3		µg/l		50.0		49	15-110		
Surrogate: Terphenyl-dl4	52.4		µg/l		50.0		105	30-130		
Surrogate: 2,4,6-Tribromophenol	58.6	SAC	µg/l		50.0		117	15-110		
Batch 1808951 - SW846 3510C										
Blank (1808951-BLK1)					Prepared: 27-Jun-18 Analyzed: 28-Jun-18					
Acenaphthene	< 5.00		µg/l	5.00						
Acenaphthylene	< 5.00		µg/l	5.00						
Anthracene	< 5.00		µg/l	5.00						
Benzidine	< 10.0		µg/l	10.0						
Benzo (a) anthracene	< 5.00		µg/l	5.00						
Benzo (a) pyrene	< 5.00		µg/l	5.00						
Benzo (b) fluoranthene	< 5.00		µg/l	5.00						
Benzo (g,h,i) perylene	< 5.00		µg/l	5.00						
Benzo (k) fluoranthene	< 5.00		µg/l	5.00						
Bis(2-chloroethoxy)methane	< 5.00		µg/l	5.00						

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Semivolatile Organic Compounds by GCMS - Quality Control

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
EPA 625.1										
Batch 1808951 - SW846 3510C										
Blank (1808951-BLK1)	<u>Prepared: 27-Jun-18 Analyzed: 28-Jun-18</u>									
Bis(2-chloroethyl)ether	< 5.00		µg/l	5.00						
Bis(2-chloroisopropyl)ether	< 5.00		µg/l	5.00						
Bis(2-ethylhexyl)phthalate	< 5.00		µg/l	5.00						
4-Bromophenyl phenyl ether	< 5.00		µg/l	5.00						
Butyl benzyl phthalate	< 5.00		µg/l	5.00						
4-Chloro-3-methylphenol	< 5.00		µg/l	5.00						
2-Chloronaphthalene	< 5.00		µg/l	5.00						
2-Chlorophenol	< 5.00		µg/l	5.00						
4-Chlorophenyl phenyl ether	< 5.00		µg/l	5.00						
Chrysene	< 5.00		µg/l	5.00						
Dibenzo (a,h) anthracene	< 5.00		µg/l	5.00						
1,2-Dichlorobenzene	< 5.00		µg/l	5.00						
1,3-Dichlorobenzene	< 5.00		µg/l	5.00						
1,4-Dichlorobenzene	< 5.00		µg/l	5.00						
3,3'-Dichlorobenzidine	< 5.00		µg/l	5.00						
2,4-Dichlorophenol	< 5.00		µg/l	5.00						
Diethyl phthalate	< 5.00		µg/l	5.00						
Dimethyl phthalate	< 5.00		µg/l	5.00						
2,4-Dimethylphenol	< 5.00		µg/l	5.00						
Di-n-butyl phthalate	< 5.00		µg/l	5.00						
4,6-Dinitro-2-methylphenol	< 5.00		µg/l	5.00						
2,4-Dinitrophenol	< 5.00		µg/l	5.00						
2,4-Dinitrotoluene	< 5.00		µg/l	5.00						
2,6-Dinitrotoluene	< 5.00		µg/l	5.00						
Di-n-octyl phthalate	< 5.00		µg/l	5.00						
Fluoranthene	< 5.00		µg/l	5.00						
Fluorene	< 5.00		µg/l	5.00						
Hexachlorobenzene	< 5.00		µg/l	5.00						
Hexachlorobutadiene	< 5.00		µg/l	5.00						
Hexachlorocyclopentadiene	< 5.00		µg/l	5.00						
Hexachloroethane	< 5.00		µg/l	5.00						
Indeno (1,2,3-cd) pyrene	< 5.00		µg/l	5.00						
Isophorone	< 5.00		µg/l	5.00						
Naphthalene	< 5.00		µg/l	5.00						
Nitrobenzene	< 5.00		µg/l	5.00						
2-Nitrophenol	< 5.00		µg/l	5.00						
4-Nitrophenol	< 5.00		µg/l	5.00						
N-Nitrosodimethylamine	< 5.00		µg/l	5.00						
N-Nitrosodi-n-propylamine	< 5.00		µg/l	5.00						
N-Nitrosodiphenylamine	< 5.00		µg/l	5.00						
Pentachlorophenol	< 5.00		µg/l	5.00						
Phenanthrene	< 5.00		µg/l	5.00						
Phenol	< 5.00		µg/l	5.00						
Pyrene	< 5.00		µg/l	5.00						
1,2,4-Trichlorobenzene	< 5.00		µg/l	5.00						
2,4,6-Trichlorophenol	< 5.00		µg/l	5.00						
Surrogate: 2-Fluorobiphenyl	23.5		µg/l		50.0		47	30-130		
Surrogate: 2-Fluorophenol	18.0		µg/l		50.0		36	15-110		
Surrogate: Nitrobenzene-d5	25.2		µg/l		50.0		50	30-130		
Surrogate: Phenol-d5	11.6		µg/l		50.0		23	15-110		

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Semivolatile Organic Compounds by GCMS - Quality Control

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
EPA 625.1										
Batch 1808951 - SW846 3510C										
Blank (1808951-BLK1)					<u>Prepared: 27-Jun-18 Analyzed: 28-Jun-18</u>					
Surrogate: Terphenyl-d14	31.6		µg/l		50.0		63	30-130		
Surrogate: 2,4,6-Tribromophenol	24.6		µg/l		50.0		49	15-110		
Blank (1808951-BLK3)					<u>Prepared: 27-Jun-18 Analyzed: 28-Jun-18</u>					
Acenaphthene	< 5.00		µg/l	5.00						
Acenaphthylene	< 5.00		µg/l	5.00						
Anthracene	< 5.00		µg/l	5.00						
Benzdine	< 10.0		µg/l	10.0						
Benzo (a) anthracene	< 5.00		µg/l	5.00						
Benzo (a) pyrene	< 5.00		µg/l	5.00						
Benzo (b) fluoranthene	< 5.00		µg/l	5.00						
Benzo (g,h,i) perylene	< 5.00		µg/l	5.00						
Benzo (k) fluoranthene	< 5.00		µg/l	5.00						
Bis(2-chloroethoxy)methane	< 5.00		µg/l	5.00						
Bis(2-chloroethyl)ether	< 5.00		µg/l	5.00						
Bis(2-chloroisopropyl)ether	< 5.00		µg/l	5.00						
Bis(2-ethylhexyl)phthalate	< 5.00		µg/l	5.00						
4-Bromophenyl phenyl ether	< 5.00		µg/l	5.00						
Butyl benzyl phthalate	< 5.00		µg/l	5.00						
4-Chloro-3-methylphenol	< 5.00		µg/l	5.00						
2-Chloronaphthalene	< 5.00		µg/l	5.00						
2-Chlorophenol	< 5.00		µg/l	5.00						
4-Chlorophenyl phenyl ether	< 5.00		µg/l	5.00						
Chrysene	< 5.00		µg/l	5.00						
Dibenzo (a,h) anthracene	< 5.00		µg/l	5.00						
1,2-Dichlorobenzene	< 5.00		µg/l	5.00						
1,3-Dichlorobenzene	< 5.00		µg/l	5.00						
1,4-Dichlorobenzene	< 5.00		µg/l	5.00						
3,3'-Dichlorobenzidine	< 5.00		µg/l	5.00						
2,4-Dichlorophenol	< 5.00		µg/l	5.00						
Diethyl phthalate	< 5.00		µg/l	5.00						
Dimethyl phthalate	< 5.00		µg/l	5.00						
2,4-Dimethylphenol	< 5.00		µg/l	5.00						
Di-n-butyl phthalate	< 5.00		µg/l	5.00						
4,6-Dinitro-2-methylphenol	< 5.00		µg/l	5.00						
2,4-Dinitrophenol	< 5.00		µg/l	5.00						
2,4-Dinitrotoluene	< 5.00		µg/l	5.00						
2,6-Dinitrotoluene	< 5.00		µg/l	5.00						
Di-n-octyl phthalate	< 5.00		µg/l	5.00						
Fluoranthene	< 5.00		µg/l	5.00						
Fluorene	< 5.00		µg/l	5.00						
Hexachlorobenzene	< 5.00		µg/l	5.00						
Hexachlorobutadiene	< 5.00		µg/l	5.00						
Hexachlorocyclopentadiene	< 5.00		µg/l	5.00						
Hexachloroethane	< 5.00		µg/l	5.00						
Indeno (1,2,3-cd) pyrene	< 5.00		µg/l	5.00						
Isophorone	< 5.00		µg/l	5.00						
Naphthalene	< 5.00		µg/l	5.00						
Nitrobenzene	< 5.00		µg/l	5.00						
2-Nitrophenol	< 5.00		µg/l	5.00						
4-Nitrophenol	< 5.00		µg/l	5.00						

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Semivolatile Organic Compounds by GCMS - Quality Control

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
EPA 625.1										
Batch 1808951 - SW846 3510C										
Blank (1808951-BLK3)					<u>Prepared: 27-Jun-18 Analyzed: 28-Jun-18</u>					
N-Nitrosodimethylamine	< 5.00		µg/l	5.00						
N-Nitrosodi-n-propylamine	< 5.00		µg/l	5.00						
N-Nitrosodiphenylamine	< 5.00		µg/l	5.00						
Pentachlorophenol	< 5.00		µg/l	5.00						
Phenanthrene	< 5.00		µg/l	5.00						
Phenol	< 5.00		µg/l	5.00						
Pyrene	< 5.00		µg/l	5.00						
1,2,4-Trichlorobenzene	< 5.00		µg/l	5.00						
2,4,6-Trichlorophenol	< 5.00		µg/l	5.00						
<i>Surrogate: 2-Fluorobiphenyl</i>	22.5		µg/l		50.0		45	30-130		
<i>Surrogate: 2-Fluorophenol</i>	18.2		µg/l		50.0		36	15-110		
<i>Surrogate: Nitrobenzene-d5</i>	25.3		µg/l		50.0		51	30-130		
<i>Surrogate: Phenol-d5</i>	12.3		µg/l		50.0		25	15-110		
<i>Surrogate: Terphenyl-d14</i>	34.6		µg/l		50.0		69	30-130		
<i>Surrogate: 2,4,6-Tribromophenol</i>	25.8		µg/l		50.0		52	15-110		
LCS (1808951-BS1)					<u>Prepared: 27-Jun-18 Analyzed: 28-Jun-18</u>					
Acenaphthene	29.2		µg/l	5.00	50.0		58	60-132		
Acenaphthylene	28.3		µg/l	5.00	50.0		57	54-126		
Anthracene	28.1		µg/l	5.00	50.0		56	43-120		
Benzidine	19.3		µg/l	10.0	50.0		39	60-140		
Benzo (a) anthracene	30.7		µg/l	5.00	50.0		61	42-133		
Benzo (a) pyrene	32.0		µg/l	5.00	50.0		64	32-148		
Benzo (b) fluoranthene	33.5		µg/l	5.00	50.0		67	42-140		
Benzo (g,h,i) perylene	34.1		µg/l	5.00	50.0		68	1-195		
Benzo (k) fluoranthene	32.1		µg/l	5.00	50.0		64	25-145		
Bis(2-chloroethoxy)methane	23.0		µg/l	5.00	50.0		46	49-165		
Bis(2-chloroethyl)ether	23.3		µg/l	5.00	50.0		47	43-126		
Bis(2-chloroisopropyl)ether	26.0		µg/l	5.00	50.0		52	63-139		
Bis(2-ethylhexyl)phthalate	29.7		µg/l	5.00	50.0		59	29-137		
4-Bromophenyl phenyl ether	26.9		µg/l	5.00	50.0		54	65-120		
Butyl benzyl phthalate	27.4		µg/l	5.00	50.0		55	1-140		
4-Chloro-3-methylphenol	32.2		µg/l	5.00	50.0		64	41-128		
2-Chloronaphthalene	33.6		µg/l	5.00	50.0		67	65-120		
2-Chlorophenol	28.6		µg/l	5.00	50.0		57	36-120		
4-Chlorophenyl phenyl ether	30.8		µg/l	5.00	50.0		62	38-145		
Chrysene	30.0		µg/l	5.00	50.0		60	44-140		
Dibenzo (a,h) anthracene	36.8		µg/l	5.00	50.0		74	1-200		
1,2-Dichlorobenzene	28.4		µg/l	5.00	50.0		57	60-140		
1,3-Dichlorobenzene	26.5		µg/l	5.00	50.0		53	60-140		
1,4-Dichlorobenzene	29.3		µg/l	5.00	50.0		59	60-140		
3,3'-Dichlorobenzidine	39.0		µg/l	5.00	50.0		78	8-213		
2,4-Dichlorophenol	28.5		µg/l	5.00	50.0		57	53-122		
Diethyl phthalate	30.1		µg/l	5.00	50.0		60	1-120		
Dimethyl phthalate	27.6		µg/l	5.00	50.0		55	1-120		
2,4-Dimethylphenol	27.8		µg/l	5.00	50.0		56	42-120		
Di-n-butyl phthalate	28.4		µg/l	5.00	50.0		57	8-120		
4,6-Dinitro-2-methylphenol	21.3		µg/l	5.00	50.0		43	53-130		
2,4-Dinitrophenol	18.5		µg/l	5.00	50.0		37	1-173		
2,4-Dinitrotoluene	31.3		µg/l	5.00	50.0		63	48-127		
2,6-Dinitrotoluene	30.9		µg/l	5.00	50.0		62	68-137		

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Semivolatile Organic Compounds by GCMS - Quality Control

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
<u>EPA 625.1</u>										
Batch 1808951 - SW846 3510C										
<u>LCS (1808951-BS1)</u>					<u>Prepared: 27-Jun-18 Analyzed: 28-Jun-18</u>					
Di-n-octyl phthalate	31.5		µg/l	5.00	50.0		63	19-132		
Fluoranthene	30.3		µg/l	5.00	50.0		61	43-121		
Fluorene	26.1		µg/l	5.00	50.0		52	70-120		
Hexachlorobenzene	35.9		µg/l	5.00	50.0		72	8-142		
Hexachlorobutadiene	31.1		µg/l	5.00	50.0		62	38-120		
Hexachlorocyclopentadiene	39.1		µg/l	5.00	50.0		78	60-140		
Hexachloroethane	30.6		µg/l	5.00	50.0		61	55-120		
Indeno (1,2,3-cd) pyrene	32.6		µg/l	5.00	50.0		65	1-151		
Isophorone	27.2		µg/l	5.00	50.0		54	47-180		
Naphthalene	25.9		µg/l	5.00	50.0		52	36-120		
Nitrobenzene	42.7		µg/l	5.00	50.0		85	54-158		
2-Nitrophenol	26.4		µg/l	5.00	50.0		53	45-167		
4-Nitrophenol	15.2		µg/l	5.00	50.0		30	13-129		
N-Nitrosodimethylamine	23.4		µg/l	5.00	50.0		47	60-140		
N-Nitrosodi-n-propylamine	28.7		µg/l	5.00	50.0		57	14-198		
N-Nitrosodiphenylamine	32.3		µg/l	5.00	50.0		65	60-140		
Pentachlorophenol	18.0		µg/l	5.00	50.0		36	38-152		
Phenanthrene	29.8		µg/l	5.00	50.0		60	65-120		
Phenol	16.1		µg/l	5.00	50.0		32	17-120		
Pyrene	28.5		µg/l	5.00	50.0		57	70-120		
1,2,4-Trichlorobenzene	30.4		µg/l	5.00	50.0		61	57-130		
2,4,6-Trichlorophenol	29.8		µg/l	5.00	50.0		60	52-129		
Surrogate: 2-Fluorobiphenyl	25.1		µg/l		50.0		50	30-130		
Surrogate: 2-Fluorophenol	22.5		µg/l		50.0		45	15-110		
Surrogate: Nitrobenzene-d5	30.8		µg/l		50.0		62	30-130		
Surrogate: Phenol-d5	20.6		µg/l		50.0		41	15-110		
Surrogate: Terphenyl-d14	22.3		µg/l		50.0		45	30-130		
Surrogate: 2,4,6-Tribromophenol	34.4		µg/l		50.0		69	15-110		
<u>LCS (1808951-BS3)</u>					<u>Prepared: 27-Jun-18 Analyzed: 28-Jun-18</u>					
Acenaphthene	29.3		µg/l	5.00	50.0		59	60-132		
Acenaphthylene	29.0		µg/l	5.00	50.0		58	54-126		
Anthracene	27.5		µg/l	5.00	50.0		55	43-120		
Benzidine	21.6		µg/l	10.0	50.0		43	60-140		
Benzo (a) anthracene	30.0		µg/l	5.00	50.0		60	42-133		
Benzo (a) pyrene	33.3		µg/l	5.00	50.0		67	32-148		
Benzo (b) fluoranthene	35.9		µg/l	5.00	50.0		72	42-140		
Benzo (g,h,i) perylene	35.5		µg/l	5.00	50.0		71	1-195		
Benzo (k) fluoranthene	29.7		µg/l	5.00	50.0		59	25-145		
Bis(2-chloroethoxy)methane	22.1		µg/l	5.00	50.0		44	49-165		
Bis(2-chloroethyl)ether	23.1		µg/l	5.00	50.0		46	43-126		
Bis(2-chloroisopropyl)ether	25.0		µg/l	5.00	50.0		50	63-139		
Bis(2-ethylhexyl)phthalate	28.9		µg/l	5.00	50.0		58	29-137		
4-Bromophenyl phenyl ether	25.5		µg/l	5.00	50.0		51	65-120		
Butyl benzyl phthalate	26.8		µg/l	5.00	50.0		54	1-140		
4-Chloro-3-methylphenol	30.6		µg/l	5.00	50.0		61	41-128		
2-Chloronaphthalene	32.6		µg/l	5.00	50.0		65	65-120		
2-Chlorophenol	28.3		µg/l	5.00	50.0		57	36-120		
4-Chlorophenyl phenyl ether	29.9		µg/l	5.00	50.0		60	38-145		
Chrysene	31.1		µg/l	5.00	50.0		62	44-140		
Dibenzo (a,h) anthracene	37.6		µg/l	5.00	50.0		75	1-200		

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Semivolatile Organic Compounds by GCMS - Quality Control

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
EPA 625.1										
Batch 1808951 - SW846 3510C										
LCS (1808951-BS3)					Prepared: 27-Jun-18 Analyzed: 28-Jun-18					
1,2-Dichlorobenzene	28.1		µg/l	5.00	50.0		56	60-140		
1,3-Dichlorobenzene	26.6		µg/l	5.00	50.0		53	60-140		
1,4-Dichlorobenzene	28.4		µg/l	5.00	50.0		57	60-140		
3,3'-Dichlorobenzidine	41.6		µg/l	5.00	50.0		83	8-213		
2,4-Dichlorophenol	28.8		µg/l	5.00	50.0		58	53-122		
Diethyl phthalate	29.5		µg/l	5.00	50.0		59	1-120		
Dimethyl phthalate	28.2		µg/l	5.00	50.0		56	1-120		
2,4-Dimethylphenol	27.3		µg/l	5.00	50.0		55	42-120		
Di-n-butyl phthalate	26.3		µg/l	5.00	50.0		53	8-120		
4,6-Dinitro-2-methylphenol	23.4		µg/l	5.00	50.0		47	53-130		
2,4-Dinitrophenol	21.3		µg/l	5.00	50.0		43	1-173		
2,4-Dinitrotoluene	31.1		µg/l	5.00	50.0		62	48-127		
2,6-Dinitrotoluene	32.0		µg/l	5.00	50.0		64	68-137		
Di-n-octyl phthalate	31.8		µg/l	5.00	50.0		64	19-132		
Fluoranthene	27.6		µg/l	5.00	50.0		55	43-121		
Fluorene	26.0		µg/l	5.00	50.0		52	70-120		
Hexachlorobenzene	32.0		µg/l	5.00	50.0		64	8-142		
Hexachlorobutadiene	28.8		µg/l	5.00	50.0		58	38-120		
Hexachlorocyclopentadiene	42.2		µg/l	5.00	50.0		84	60-140		
Hexachloroethane	29.0		µg/l	5.00	50.0		58	55-120		
Indeno (1,2,3-cd) pyrene	35.5		µg/l	5.00	50.0		71	1-151		
Isophorone	25.8		µg/l	5.00	50.0		52	47-180		
Naphthalene	25.8		µg/l	5.00	50.0		52	36-120		
Nitrobenzene	42.9		µg/l	5.00	50.0		86	54-158		
2-Nitrophenol	26.4		µg/l	5.00	50.0		53	45-167		
4-Nitrophenol	16.3		µg/l	5.00	50.0		33	13-129		
N-Nitrosodimethylamine	24.6		µg/l	5.00	50.0		49	60-140		
N-Nitrosodi-n-propylamine	27.0		µg/l	5.00	50.0		54	14-198		
N-Nitrosodiphenylamine	29.4		µg/l	5.00	50.0		59	60-140		
Pentachlorophenol	18.7		µg/l	5.00	50.0		37	38-152		
Phenanthrene	29.3		µg/l	5.00	50.0		59	65-120		
Phenol	15.8		µg/l	5.00	50.0		32	17-120		
Pyrene	26.0		µg/l	5.00	50.0		52	70-120		
1,2,4-Trichlorobenzene	30.6		µg/l	5.00	50.0		61	57-130		
2,4,6-Trichlorophenol	29.5		µg/l	5.00	50.0		59	52-129		
Surrogate: 2-Fluorobiphenyl	24.7		µg/l		50.0		49	30-130		
Surrogate: 2-Fluorophenol	21.4		µg/l		50.0		43	15-110		
Surrogate: Nitrobenzene-d5	29.9		µg/l		50.0		60	30-130		
Surrogate: Phenol-d5	19.8		µg/l		50.0		40	15-110		
Surrogate: Terphenyl-d14	20.5		µg/l		50.0		41	30-130		
Surrogate: 2,4,6-Tribromophenol	31.5		µg/l		50.0		63	15-110		
LCS Dup (1808951-BSD1)					Prepared: 27-Jun-18 Analyzed: 28-Jun-18					
Acenaphthene	28.0		µg/l	4.85	48.5		58	60-132	4	20
Acenaphthylene	27.6		µg/l	4.85	48.5		57	54-126	3	20
Anthracene	26.6		µg/l	4.85	48.5		55	43-120	5	20
Benzidine	27.3		µg/l	9.71	48.5		56	60-140	34	20
Benzo (a) anthracene	28.9		µg/l	4.85	48.5		60	42-133	6	20
Benzo (a) pyrene	30.7		µg/l	4.85	48.5		63	32-148	4	20
Benzo (b) fluoranthene	31.4		µg/l	4.85	48.5		65	42-140	7	20
Benzo (g,h,i) perylene	30.1		µg/l	4.85	48.5		62	1-195	12	20

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Semivolatile Organic Compounds by GCMS - Quality Control

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
EPA 625.1										
Batch 1808951 - SW846 3510C										
LCS Dup (1808951-BSD1)					Prepared: 27-Jun-18 Analyzed: 28-Jun-18					
Benzo (k) fluoranthene	27.2		µg/l	4.85	48.5		56	25-145	16	20
Bis(2-chloroethoxy)methane	21.3		µg/l	4.85	48.5		44	49-165	8	20
Bis(2-chloroethyl)ether	22.3		µg/l	4.85	48.5		46	43-126	4	20
Bis(2-chloroisopropyl)ether	23.3		µg/l	4.85	48.5		48	63-139	11	20
Bis(2-ethylhexyl)phthalate	27.8		µg/l	4.85	48.5		57	29-137	7	20
4-Bromophenyl phenyl ether	25.5		µg/l	4.85	48.5		53	65-120	5	20
Butyl benzyl phthalate	26.4		µg/l	4.85	48.5		54	1-140	4	20
4-Chloro-3-methylphenol	28.1		µg/l	4.85	48.5		58	41-128	14	20
2-Chloronaphthalene	32.1		µg/l	4.85	48.5		66	65-120	5	20
2-Chlorophenol	25.5		µg/l	4.85	48.5		53	36-120	11	20
4-Chlorophenyl phenyl ether	29.3		µg/l	4.85	48.5		60	38-145	5	20
Chrysene	28.5		µg/l	4.85	48.5		59	44-140	5	20
Dibenzo (a,h) anthracene	30.6		µg/l	4.85	48.5		63	1-200	18	20
1,2-Dichlorobenzene	27.2		µg/l	4.85	48.5		56	60-140	4	20
1,3-Dichlorobenzene	25.9		µg/l	4.85	48.5		53	60-140	2	20
1,4-Dichlorobenzene	27.1		µg/l	4.85	48.5		56	60-140	8	20
3,3'-Dichlorobenzidine	37.7		µg/l	4.85	48.5		78	8-213	3	20
2,4-Dichlorophenol	27.1		µg/l	4.85	48.5		56	53-122	5	20
Diethyl phthalate	29.8		µg/l	4.85	48.5		61	1-120	1	20
Dimethyl phthalate	27.2		µg/l	4.85	48.5		56	1-120	1	20
2,4-Dimethylphenol	25.7		µg/l	4.85	48.5		53	42-120	8	20
Di-n-butyl phthalate	26.9		µg/l	4.85	48.5		55	8-120	6	20
4,6-Dinitro-2-methylphenol	19.2		µg/l	4.85	48.5		40	53-130	10	20
2,4-Dinitrophenol	14.6		µg/l	4.85	48.5		30	1-173	23	20
2,4-Dinitrotoluene	30.8		µg/l	4.85	48.5		63	48-127	2	20
2,6-Dinitrotoluene	31.1		µg/l	4.85	48.5		64	68-137	0.8	20
Di-n-octyl phthalate	29.1		µg/l	4.85	48.5		60	19-132	8	20
Fluoranthene	27.1		µg/l	4.85	48.5		56	43-121	11	20
Fluorene	25.8		µg/l	4.85	48.5		53	70-120	1	20
Hexachlorobenzene	32.4		µg/l	4.85	48.5		67	8-142	10	20
Hexachlorobutadiene	27.9		µg/l	4.85	48.5		58	38-120	11	20
Hexachlorocyclopentadiene	34.2		µg/l	4.85	48.5		70	60-140	13	20
Hexachloroethane	27.1		µg/l	4.85	48.5		56	55-120	12	20
Indeno (1,2,3-cd) pyrene	27.8		µg/l	4.85	48.5		57	1-151	16	20
Isophorone	23.8		µg/l	4.85	48.5		49	47-180	13	20
Naphthalene	24.4		µg/l	4.85	48.5		50	36-120	6	20
Nitrobenzene	36.8		µg/l	4.85	48.5		76	54-158	15	20
2-Nitrophenol	22.8		µg/l	4.85	48.5		47	45-167	15	20
4-Nitrophenol	14.2		µg/l	4.85	48.5		29	13-129	7	20
N-Nitrosodimethylamine	22.4		µg/l	4.85	48.5		46	60-140	4	20
N-Nitrosodi-n-propylamine	25.4		µg/l	4.85	48.5		52	14-198	12	20
N-Nitrosodiphenylamine	30.4		µg/l	4.85	48.5		63	60-140	6	20
Pentachlorophenol	15.3		µg/l	4.85	48.5		31	38-152	17	20
Phenanthrene	28.1		µg/l	4.85	48.5		58	65-120	6	20
Phenol	14.8		µg/l	4.85	48.5		30	17-120	8	20
Pyrene	26.8		µg/l	4.85	48.5		55	70-120	6	20
1,2,4-Trichlorobenzene	29.5		µg/l	4.85	48.5		61	57-130	3	20
2,4,6-Trichlorophenol	28.3		µg/l	4.85	48.5		58	52-129	5	20
Surrogate: 2-Fluorobiphenyl	24.3		µg/l		48.5		50	30-130		
Surrogate: 2-Fluorophenol	19.7		µg/l		48.5		41	15-110		

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Semivolatile Organic Compounds by GCMS - Quality Control

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
EPA 625.1										
Batch 1808951 - SW846 3510C										
LCS Dup (1808951-BSD1)					Prepared: 27-Jun-18 Analyzed: 28-Jun-18					
Surrogate: Nitrobenzene-d5	25.2		µg/l		48.5		52	30-130		
Surrogate: Phenol-d5	18.3		µg/l		48.5		38	15-110		
Surrogate: Terphenyl-d14	20.7		µg/l		48.5		43	30-130		
Surrogate: 2,4,6-Tribromophenol	31.1		µg/l		48.5		64	15-110		
LCS Dup (1808951-BSD3)					Prepared: 27-Jun-18 Analyzed: 29-Jun-18					
Acenaphthene	28.2		µg/l	4.85	48.5		58	60-132	4	20
Acenaphthylene	27.5		µg/l	4.85	48.5		57	54-126	5	20
Anthracene	27.0		µg/l	4.85	48.5		56	43-120	2	20
Benidine	21.0		µg/l	9.71	48.5		43	60-140	3	20
Benzo (a) anthracene	28.4		µg/l	4.85	48.5		58	42-133	6	20
Benzo (a) pyrene	30.7		µg/l	4.85	48.5		63	32-148	8	20
Benzo (b) fluoranthene	30.1		µg/l	4.85	48.5		62	42-140	17	20
Benzo (g,h,i) perylene	30.7		µg/l	4.85	48.5		63	1-195	14	20
Benzo (k) fluoranthene	33.1		µg/l	4.85	48.5		68	25-145	11	20
Bis(2-chloroethoxy)methane	21.0		µg/l	4.85	48.5		43	49-165	5	20
Bis(2-chloroethyl)ether	22.2		µg/l	4.85	48.5		46	43-126	4	20
Bis(2-chloroisopropyl)ether	23.2		µg/l	4.85	48.5		48	63-139	7	20
Bis(2-ethylhexyl)phthalate	28.3		µg/l	4.85	48.5		58	29-137	2	20
4-Bromophenyl phenyl ether	25.5		µg/l	4.85	48.5		53	65-120	0.1	20
Butyl benzyl phthalate	26.0		µg/l	4.85	48.5		54	1-140	3	20
4-Chloro-3-methylphenol	29.1		µg/l	4.85	48.5		60	41-128	5	20
2-Chloronaphthalene	32.0		µg/l	4.85	48.5		66	65-120	2	20
2-Chlorophenol	26.4		µg/l	4.85	48.5		54	36-120	7	20
4-Chlorophenyl phenyl ether	29.9		µg/l	4.85	48.5		62	38-145	0.02	20
Chrysene	29.2		µg/l	4.85	48.5		60	44-140	6	20
Dibenzo (a,h) anthracene	33.0		µg/l	4.85	48.5		68	1-200	13	20
1,2-Dichlorobenzene	26.1		µg/l	4.85	48.5		54	60-140	7	20
1,3-Dichlorobenzene	26.0		µg/l	4.85	48.5		54	60-140	2	20
1,4-Dichlorobenzene	27.3		µg/l	4.85	48.5		56	60-140	4	20
3,3'-Dichlorobenzidine	38.8		µg/l	4.85	48.5		80	8-213	7	20
2,4-Dichlorophenol	27.3		µg/l	4.85	48.5		56	53-122	5	20
Diethyl phthalate	29.7		µg/l	4.85	48.5		61	1-120	0.8	20
Dimethyl phthalate	27.4		µg/l	4.85	48.5		57	1-120	3	20
2,4-Dimethylphenol	26.1		µg/l	4.85	48.5		54	42-120	5	20
Di-n-butyl phthalate	27.9		µg/l	4.85	48.5		58	8-120	6	20
4,6-Dinitro-2-methylphenol	23.0		µg/l	4.85	48.5		47	53-130	2	20
2,4-Dinitrophenol	17.8		µg/l	4.85	48.5		37	1-173	18	20
2,4-Dinitrotoluene	30.2		µg/l	4.85	48.5		62	48-127	3	20
2,6-Dinitrotoluene	30.9		µg/l	4.85	48.5		64	68-137	4	20
Di-n-octyl phthalate	30.4		µg/l	4.85	48.5		63	19-132	4	20
Fluoranthene	29.6		µg/l	4.85	48.5		61	43-121	7	20
Fluorene	25.8		µg/l	4.85	48.5		53	70-120	0.4	20
Hexachlorobenzene	34.1		µg/l	4.85	48.5		70	8-142	7	20
Hexachlorobutadiene	28.4		µg/l	4.85	48.5		59	38-120	1	20
Hexachlorocyclopentadiene	37.7		µg/l	4.85	48.5		78	60-140	11	20
Hexachloroethane	28.2		µg/l	4.85	48.5		58	55-120	3	20
Indeno (1,2,3-cd) pyrene	30.6		µg/l	4.85	48.5		63	1-151	15	20
Isophorone	25.3		µg/l	4.85	48.5		52	47-180	2	20
Naphthalene	24.7		µg/l	4.85	48.5		51	36-120	4	20
Nitrobenzene	40.8		µg/l	4.85	48.5		84	54-158	5	20

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Semivolatile Organic Compounds by GCMS - Quality Control

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
EPA 625.1										
Batch 1808951 - SW846 3510C										
LCS Dup (1808951-BSD3)	Prepared: 27-Jun-18 Analyzed: 29-Jun-18									
2-Nitrophenol	25.0		µg/l	4.85	48.5		51	45-167	5	20
4-Nitrophenol	14.6		µg/l	4.85	48.5		30	13-129	11	20
N-Nitrosodimethylamine	23.5		µg/l	4.85	48.5		48	60-140	5	20
N-Nitrosodi-n-propylamine	25.6		µg/l	4.85	48.5		53	14-198	5	20
N-Nitrosodiphenylamine	29.2		µg/l	4.85	48.5		60	60-140	0.6	20
Pentachlorophenol	15.6		µg/l	4.85	48.5		32	38-152	19	20
Phenanthrene	27.2		µg/l	4.85	48.5		56	65-120	7	20
Phenol	14.8		µg/l	4.85	48.5		30	17-120	7	20
Pyrene	25.8		µg/l	4.85	48.5		53	70-120	1	20
1,2,4-Trichlorobenzene	29.4		µg/l	4.85	48.5		61	57-130	4	20
2,4,6-Trichlorophenol	28.6		µg/l	4.85	48.5		59	52-129	3	20
Surrogate: 2-Fluorobiphenyl	24.1		µg/l		48.5		50	30-130		
Surrogate: 2-Fluorophenol	20.3		µg/l		48.5		42	15-110		
Surrogate: Nitrobenzene-d5	30.3		µg/l		48.5		62	30-130		
Surrogate: Phenol-d5	18.8		µg/l		48.5		39	15-110		
Surrogate: Terphenyl-dl4	20.2		µg/l		48.5		42	30-130		
Surrogate: 2,4,6-Tribromophenol	32.3		µg/l		48.5		66	15-110		

Semivolatile Organic Compounds by GC - Quality Control

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
EPA 608.3										
Batch 1808590 - SW846 3510C										
Blank (1808590-BLK1)					<u>Prepared: 21-Jun-18 Analyzed: 28-Jun-18</u>					
Aroclor-1016	< 0.206		µg/l	0.206						
Aroclor-1016 [2C]	< 0.206		µg/l	0.206						
Aroclor-1221	< 0.206		µg/l	0.206						
Aroclor-1221 [2C]	< 0.206		µg/l	0.206						
Aroclor-1232	< 0.206		µg/l	0.206						
Aroclor-1232 [2C]	< 0.206		µg/l	0.206						
Aroclor-1242	< 0.206		µg/l	0.206						
Aroclor-1242 [2C]	< 0.206		µg/l	0.206						
Aroclor-1248	< 0.206		µg/l	0.206						
Aroclor-1248 [2C]	< 0.206		µg/l	0.206						
Aroclor-1254	< 0.206		µg/l	0.206						
Aroclor-1254 [2C]	< 0.206		µg/l	0.206						
Aroclor-1260	< 0.206		µg/l	0.206						
Aroclor-1260 [2C]	< 0.206		µg/l	0.206						
Aroclor-1262	< 0.206		µg/l	0.206						
Aroclor-1262 [2C]	< 0.206		µg/l	0.206						
Aroclor-1268	< 0.206		µg/l	0.206						
Aroclor-1268 [2C]	< 0.206		µg/l	0.206						
Surrogate: 4,4-DB-Octafluorobiphenyl (Sr)	0.289		µg/l		0.206		140	30-150		
Surrogate: 4,4-DB-Octafluorobiphenyl (Sr) [2C]	0.299		µg/l		0.206		145	30-150		
Surrogate: Decachlorobiphenyl (Sr)	0.247		µg/l		0.206		120	30-150		
Surrogate: Decachlorobiphenyl (Sr) [2C]	0.278		µg/l		0.206		135	30-150		
LCS (1808590-BS1)					<u>Prepared: 21-Jun-18 Analyzed: 28-Jun-18</u>					
Aroclor-1016	1.71		µg/l	0.206	2.58		66	40-140		
Aroclor-1016 [2C]	1.63		µg/l	0.206	2.58		63	40-140		
Aroclor-1260	1.43		µg/l	0.206	2.58		56	40-140		
Aroclor-1260 [2C]	1.44		µg/l	0.206	2.58		56	40-140		
Surrogate: 4,4-DB-Octafluorobiphenyl (Sr)	0.268		µg/l		0.206		130	30-150		
Surrogate: 4,4-DB-Octafluorobiphenyl (Sr) [2C]	0.268		µg/l		0.206		130	30-150		
Surrogate: Decachlorobiphenyl (Sr)	0.227		µg/l		0.206		110	30-150		
Surrogate: Decachlorobiphenyl (Sr) [2C]	0.247		µg/l		0.206		120	30-150		
LCS Dup (1808590-BSD1)					<u>Prepared: 21-Jun-18 Analyzed: 28-Jun-18</u>					
Aroclor-1016	1.48		µg/l	0.206	2.58		58	40-140	14	20
Aroclor-1016 [2C]	1.59		µg/l	0.206	2.58		62	40-140	3	20
Aroclor-1260	1.40		µg/l	0.206	2.58		54	40-140	2	20
Aroclor-1260 [2C]	1.41		µg/l	0.206	2.58		55	40-140	2	20
Surrogate: 4,4-DB-Octafluorobiphenyl (Sr)	0.258		µg/l		0.206		125	30-150		
Surrogate: 4,4-DB-Octafluorobiphenyl (Sr) [2C]	0.268		µg/l		0.206		130	30-150		
Surrogate: Decachlorobiphenyl (Sr)	0.237		µg/l		0.206		115	30-150		
Surrogate: Decachlorobiphenyl (Sr) [2C]	0.247		µg/l		0.206		120	30-150		

Extractable Petroleum Hydrocarbons - Quality Control

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
<u>EPA 1664B</u>										
Batch 1808724 - General Preparation SVOC										
<u>Blank (1808724-BLK1)</u>					<u>Prepared: 22-Jun-18 Analyzed: 25-Jun-18</u>					
Non-polar material (SGT-HEM)	< 1.0		mg/l	1.0						
<u>LCS (1808724-BS1)</u>					<u>Prepared: 22-Jun-18 Analyzed: 25-Jun-18</u>					
Non-polar material (SGT-HEM)	29.6		mg/l	1.0	41.0		72	64-132		

Total Metals by EPA 200 Series Methods - Quality Control

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
<u>EPA 200.7</u>										
Batch 1808632 - EPA 200 Series										
<u>Blank (1808632-BLK1)</u>					<u>Prepared: 21-Jun-18 Analyzed: 26-Jun-18</u>					
Iron	< 0.250		mg/l	0.250						
Magnesium	< 0.0400		mg/l	0.0400						
Calcium	< 0.200		mg/l	0.200						
<u>LCS (1808632-BS1)</u>					<u>Prepared: 21-Jun-18 Analyzed: 26-Jun-18</u>					
Iron	2.61		mg/l	0.250	2.50		104	85-115		
Calcium	12.3		mg/l	0.200	12.5		98	85-115		
Magnesium	2.66		mg/l	0.0400	2.50		106	85-115		
<u>Duplicate (1808632-DUP1)</u>					<u>Source: SC47844-02</u>		<u>Prepared: 21-Jun-18 Analyzed: 26-Jun-18</u>			
Iron	0.497		mg/l	0.250		0.509			2	20
Calcium	30.3		mg/l	0.200		29.8			1	20
Magnesium	14.8		mg/l	0.0400		14.6			2	20
<u>Matrix Spike (1808632-MS1)</u>					<u>Source: SC47844-02</u>		<u>Prepared: 21-Jun-18 Analyzed: 26-Jun-18</u>			
Iron	3.19		mg/l	0.250	2.50	0.509	107	70-130		
Magnesium	17.8		mg/l	0.0400	2.50	14.6	130	70-130		
Calcium	43.3		mg/l	0.200	12.5	29.8	108	70-130		
<u>Post Spike (1808632-PS1)</u>					<u>Source: SC47844-02</u>		<u>Prepared: 21-Jun-18 Analyzed: 26-Jun-18</u>			
Iron	2.98		mg/l	0.250	2.50	0.509	99	85-115		
Calcium	41.4		mg/l	0.200	12.5	29.8	92	85-115		
Magnesium	17.0		mg/l	0.0400	2.50	14.6	98	85-115		
<u>EPA 200.8</u>										
Batch 1808628 - EPA 200 Series										
<u>Blank (1808628-BLK1)</u>					<u>Prepared: 21-Jun-18 Analyzed: 28-Jun-18</u>					
Selenium	< 0.00050		mg/l	0.00050						
Zinc	< 0.00500		mg/l	0.00500						
Antimony	< 0.00050		mg/l	0.00050						
Lead	< 0.00050		mg/l	0.00050						
Arsenic	< 0.00050		mg/l	0.00050						
Silver	< 0.00050		mg/l	0.00050						
Chromium	< 0.00050		mg/l	0.00050						
Copper	< 0.00050		mg/l	0.00050						
Cadmium	< 0.00050		mg/l	0.00050						
Nickel	< 0.00050		mg/l	0.00050						
<u>LCS (1808628-BS1)</u>					<u>Prepared: 21-Jun-18 Analyzed: 28-Jun-18</u>					
Zinc	0.110	D	mg/l	0.0500	0.100		110	85-115		
Antimony	0.0989	D	mg/l	0.00500	0.100		99	85-115		
Selenium	0.539	D	mg/l	0.00500	0.500		108	85-115		
Lead	0.0873	D	mg/l	0.00500	0.100		87	85-115		
Chromium	0.105	D	mg/l	0.00500	0.100		105	85-115		
Arsenic	0.101	D	mg/l	0.00500	0.100		101	85-115		
Silver	0.0969	D	mg/l	0.00500	0.100		97	85-115		
Cadmium	0.0974	D	mg/l	0.00500	0.100		97	85-115		
Copper	0.0987	D	mg/l	0.00500	0.100		99	85-115		
Nickel	0.0981	D	mg/l	0.00500	0.100		98	85-115		
<u>Duplicate (1808628-DUP1)</u>					<u>Source: SC47844-02</u>		<u>Prepared: 21-Jun-18 Analyzed: 29-Jun-18</u>			
Antimony	< 0.00050		mg/l	0.00050		0.00044				20
Zinc	0.00495	J	mg/l	0.00500		0.00567			13	20
Selenium	0.00080	J,R01, D	mg/l	0.00250		0.00083			3	20
Lead	0.00287		mg/l	0.00050		0.00259			10	20
Chromium	< 0.00250	R01, D	mg/l	0.00250		BRL				20

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Total Metals by EPA 200 Series Methods - Quality Control

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
<u>EPA 200.8</u>										
Batch 1808628 - EPA 200 Series										
<u>Duplicate (1808628-DUP1)</u>			<u>Source: SC47844-02</u>			<u>Prepared: 21-Jun-18 Analyzed: 29-Jun-18</u>				
Arsenic	< 0.00250	R01, D	mg/l	0.00250		BRL				20
Nickel	0.00131		mg/l	0.00050		0.00139			6	20
Copper	0.00727		mg/l	0.00050		0.00779			7	20
Cadmium	< 0.00050		mg/l	0.00050		BRL				20
Silver	< 0.00050		mg/l	0.00050		BRL				20
<u>Matrix Spike (1808628-MS1)</u>			<u>Source: SC47844-02</u>			<u>Prepared: 21-Jun-18 Analyzed: 28-Jun-18</u>				
Selenium	0.544	D	mg/l	0.00500	0.500	BRL	109	70-130		
Lead	0.0935	D	mg/l	0.00500	0.100	0.00259	91	70-130		
Antimony	0.101	D	mg/l	0.00500	0.100	BRL	101	70-130		
Zinc	0.119	D	mg/l	0.0500	0.100	BRL	119	70-130		
Silver	0.0959	D	mg/l	0.00500	0.100	BRL	96	70-130		
Cadmium	0.0973	D	mg/l	0.00500	0.100	BRL	97	70-130		
Copper	0.108	D	mg/l	0.00500	0.100	0.00779	100	70-130		
Nickel	0.100	D	mg/l	0.00500	0.100	0.00139	99	70-130		
Chromium	0.106	D	mg/l	0.00500	0.100	BRL	106	70-130		
Arsenic	0.102	D	mg/l	0.00500	0.100	BRL	102	70-130		
<u>Post Spike (1808628-PS1)</u>			<u>Source: SC47844-02</u>			<u>Prepared: 21-Jun-18 Analyzed: 28-Jun-18</u>				
Selenium	0.557	D	mg/l	0.00500	0.500	BRL	111	85-115		
Zinc	0.487	QM9, D	mg/l	0.0500	0.100	BRL	487	85-115		
Antimony	0.106	D	mg/l	0.00500	0.100	BRL	106	85-115		
Lead	0.0985	D	mg/l	0.00500	0.100	0.00259	96	85-115		
Copper	0.125	QM9, D	mg/l	0.00500	0.100	0.00779	117	85-115		
Cadmium	0.104	D	mg/l	0.00500	0.100	BRL	104	85-115		
Nickel	0.287	QM9, D	mg/l	0.00500	0.100	0.00139	286	85-115		
Arsenic	0.105	D	mg/l	0.00500	0.100	BRL	105	85-115		
Chromium	0.108	D	mg/l	0.00500	0.100	BRL	108	85-115		
Silver	0.104	D	mg/l	0.00500	0.100	BRL	104	85-115		
<u>EPA 245.1/7470A</u>										
Batch 1808633 - EPA200/SW7000 Series										
<u>Blank (1808633-BLK1)</u>						<u>Prepared: 21-Jun-18 Analyzed: 26-Jun-18</u>				
Mercury	< 0.00020		mg/l	0.00020						
<u>LCS (1808633-BS1)</u>						<u>Prepared: 21-Jun-18 Analyzed: 26-Jun-18</u>				
Mercury	0.00443		mg/l	0.00020	0.00500		89	85-115		
<u>Duplicate (1808633-DUP1)</u>			<u>Source: SC47844-02</u>			<u>Prepared: 21-Jun-18 Analyzed: 26-Jun-18</u>				
Mercury	< 0.00020		mg/l	0.00020		BRL				20
<u>Matrix Spike (1808633-MS1)</u>			<u>Source: SC47844-02</u>			<u>Prepared: 21-Jun-18 Analyzed: 26-Jun-18</u>				
Mercury	0.00475		mg/l	0.00020	0.00500	BRL	95	80-120		
<u>Post Spike (1808633-PS1)</u>			<u>Source: SC47844-02</u>			<u>Prepared: 21-Jun-18 Analyzed: 26-Jun-18</u>				
Mercury	0.00490		mg/l	0.00020	0.00500	BRL	98	85-115		

General Chemistry Parameters - Quality Control

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
<u>ASTM D 1293-99B</u>										
Batch 1808579 - General Preparation										
<u>Duplicate (1808579-DUP1)</u>										
pH	7.34		pH Units			7.34			0	5
<u>Reference (1808579-SRM1)</u>										
pH	6.00		pH Units		6.00		100	97.5-102.5		
<u>Reference (1808579-SRM2)</u>										
pH	6.03		pH Units		6.00		100	97.5-102.5		
<u>EPA 300.0</u>										
Batch 1808650 - General Preparation										
<u>Blank (1808650-BLK1)</u>										
Chloride	< 1.00		mg/l	1.00						
<u>LCS (1808650-BS1)</u>										
Chloride	19.9		mg/l	1.00	20.0		99	90-110		
<u>Reference (1808650-SRM1)</u>										
Chloride	25.0		mg/l	1.00	25.0		100	90-110		
<u>EPA 335.4 / SW846 9012B</u>										
Batch 1808692 - General Preparation										
<u>Blank (1808692-BLK1)</u>										
Cyanide (total)	< 0.00500		mg/l	0.00500						
<u>LCS (1808692-BS1)</u>										
Cyanide (total)	0.243		mg/l	0.00500	0.250		97	90-110		
<u>Reference (1808692-SRM1)</u>										
Cyanide (total)	0.354		mg/l	0.00500	0.347		102	76-122		
<u>SM2540D (11)</u>										
Batch 1808636 - General Preparation										
<u>Blank (1808636-BLK1)</u>										
Total Suspended Solids	< 0.5		mg/l	0.5						
<u>LCS (1808636-BS1)</u>										
Total Suspended Solids	98.0		mg/l	10.0	100		98	90-110		
<u>SM3500-Cr-B (11)/7196A</u>										
Batch 1808581 - General Preparation										
<u>Blank (1808581-BLK1)</u>										
Hexavalent Chromium	< 0.005		mg/l	0.005						
<u>LCS (1808581-BS1)</u>										
Hexavalent Chromium	0.049		mg/l	0.005	0.0500		98	90-111		
<u>Reference (1808581-SRM1)</u>										
Hexavalent Chromium	0.026		mg/l	0.005	0.0250		103	85-115		
<u>SM4500-Cl-G (11)</u>										
Batch 1808693 - General Preparation										
<u>Blank (1808693-BLK1)</u>										
Total Residual Chlorine	< 0.020		mg/l	0.020						
<u>LCS (1808693-BS1)</u>										
Total Residual Chlorine	0.048		mg/l	0.020	0.0500		95	90-110		
<u>Reference (1808693-SRM1)</u>										
Total Residual Chlorine	0.088		mg/l	0.020	0.0910		96	96-115		

Subcontracted Analyses - Quality Control

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
<u>E350.1</u>										
Batch 436030A - 436030										
<u>BLK (CA76405-BLK)</u>								Prepared: 25-Jun-18 Analyzed: 26-Jun-18		
Ammonia as Nitrogen	< 0.05		mg/l	0.05				-		
<u>DUP (CA76405-DUP)</u>				<u>Source: SC47844-02</u>				Prepared: 25-Jun-18 Analyzed: 26-Jun-18		
Ammonia as Nitrogen	0.15		mg/l	0.05				-	NC	20
<u>LCS (CA76405-LCS)</u>								Prepared: 25-Jun-18 Analyzed: 26-Jun-18		
Ammonia as Nitrogen	3.800		mg/l	0.05	3.74		102	90-110		20
<u>MS (CA76405-MS)</u>				<u>Source: SC47844-02</u>				Prepared: 25-Jun-18 Analyzed: 26-Jun-18		
Ammonia as Nitrogen	2.150		mg/l	0.05	2		100	90-110		20
<u>E420.4</u>										
Batch 436006A - 436006										
<u>BLK (CA76127-BLK)</u>								Prepared: 25-Jun-18 Analyzed: 26-Jun-18		
Phenolics	< 0.015		mg/l	0.015				-		
<u>DUP (CA76127-DUP)</u>				<u>Source: CA76127</u>				Prepared: 25-Jun-18 Analyzed: 26-Jun-18		
Phenolics	< 0.015		mg/l	0.015				-	NC	20
<u>LCS (CA76127-LCS)</u>								Prepared: 25-Jun-18 Analyzed: 26-Jun-18		
Phenolics	0.2430		mg/l	0.015	0.25		97.2	90-110		20
<u>MS (CA76127-MS)</u>				<u>Source: CA76127</u>				Prepared: 25-Jun-18 Analyzed: 26-Jun-18		
Phenolics	0.1820		mg/l	0.015	0.00000298		91.0	90-110		20

Notes and Definitions

D	Data reported from a dilution
E	This flag indicates the concentration for this analyte is an estimated value due to exceeding the calibration range or interferences resulting in a biased final concentration.
GS1	Sample dilution required for high concentration of target analytes to be within the instrument calibration range.
QC6	Analyte is out of acceptance range in the QC spike but the total number of out of range analytes is within overall method criteria.
QM9	The spike recovery for this QC sample is outside the established control limits. The sample results for the QC batch were accepted based on LCS/LCSD or SRM recoveries within the control limits.
QR2	The RPD result exceeded the QC control limits; however, both percent recoveries were acceptable. Sample results for the QC batch were accepted based on percent recoveries and completeness of QC data.
QR9	RPD out of acceptance range. The batch is accepted based upon LCS and/or LCSD recovery.
R01	The Reporting Limit has been raised to account for matrix interference.
R05	Elevated Reporting Limits due to the presence of high levels of non-target analytes; sample may not meet client requested reporting limit for this reason.
SAC	Acid surrogate recovery outside of control limits. The data was accepted based on valid recovery of remaining two acid surrogates.
SDUP	Duplicate analysis confirmed surrogate failure due to matrix effects.
dry	Sample results reported on a dry weight basis
NR	Not Reported
RPD	Relative Percent Difference
[2C]	Indicates concentration was reported from the secondary, confirmation column.
J	Detected but below the Reporting Limit; therefore, result is an estimated concentration (CLP J-Flag).
CIHT	The method for residual chlorine indicates that samples should be analyzed immediately. 40 CFR 136 specifies a holding time of 15 minutes from sampling to analysis. Therefore all aqueous residual chlorine samples not analyzed in the field are considered out of hold time at the time of sample receipt.
pH	The method for pH does not stipulate a specific holding time other than to state that the samples should be analyzed as soon as possible. For aqueous samples the 40 CFR 136 specifies a holding time of 15 minutes from sampling to analysis. Therefore all aqueous pH samples not analyzed in the field are considered out of hold time at the time of sample receipt. All soil samples are analyzed as soon as possible after sample receipt.
LIV	The initial volume for this sample has been reduced due to sample matrix and/or historical data therefore elevating the reporting limit.
HD	Total Hardness is a calculation based on the reported values of Ca and Mg.

Interpretation of Total Petroleum Hydrocarbon Report

Petroleum identification is determined by comparing the GC fingerprint obtained from the sample with a library of GC fingerprints obtained from analyses of various petroleum products. Possible match categories are as follows:

- Gasoline - includes regular, unleaded, premium, etc.
- Fuel Oil #2 - includes home heating oil, #2 fuel oil, and diesel
- Fuel Oil #4 - includes #4 fuel oil
- Fuel Oil #6 - includes #6 fuel oil and bunker "C" oil
- Motor Oil - includes virgin and waste automobile oil
- Ligroin - includes mineral spirits, petroleum naphtha, vm&p naphtha
- Aviation Fuel - includes kerosene, Jet A and JP-4
- Other Oil - includes lubricating and cutting oil, and silicon oil

At times, the unidentified petroleum product is quantified using a calibration that most closely approximates the distribution of compounds in the sample. When this occurs, the result is qualified as Calculated as.

Laboratory Control Sample (LCS): A known matrix spiked with compound(s) representative of the target analytes, which is used to document laboratory performance.

Matrix Duplicate: An intra-laboratory split sample which is used to document the precision of a method in a given sample matrix.

Matrix Spike: An aliquot of a sample spiked with a known concentration of target analyte(s). The spiking occurs prior to sample preparation and analysis. A matrix spike is used to document the bias of a method in a given sample matrix.

Method Blank: An analyte-free matrix to which all reagents are added in the same volumes or proportions as used in sample processing. The method blank should be carried through the complete sample preparation and analytical procedure. The method blank is used to document contamination resulting from the analytical process.

Method Detection Limit (MDL): The minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is greater than zero and is determined from analysis of a sample in a given matrix type containing the analyte.

Reportable Detection Limit (RDL): The lowest concentration that can be reliably achieved within specified limits of precision and accuracy during routine laboratory operating conditions. For many analytes the RDL analyte concentration is selected as the lowest non-zero standard in the calibration curve. While the RDL is approximately 5 to 10 times the MDL, the RDL for each sample takes into account the sample volume/weight, extract/digestate volume, cleanup procedures and, if applicable, dry weight correction. Sample RDLs are highly matrix-dependent.

Surrogate: An organic compound which is similar to the target analyte(s) in chemical composition and behavior in the analytical process, but which is not normally found in environmental samples. These compounds are spiked into all blanks, standards, and samples prior to analysis. Percent recoveries are calculated for each surrogate.

Continuing Calibration Verification: The calibration relationship established during the initial calibration must be verified at periodic intervals. Concentrations, intervals, and criteria are method specific.



Sunoco DUNS #: _____
Region: _____
State or Lead Regulatory Agency: _____

Chain of Custody Record
0407-8069
Northeast
MADEP
Requested Due Date (mm/dd/yy): 6/27/2018
COC Tracking Number: _____

Page 1 of 1
On-site Time: _____ Temp: _____
Off-site Time: _____ Temp: _____
Sky Conditions: _____
Meteorological Events: _____
Wind Speed: _____ Direction: _____

Lab Name: Eurofins Spectrum Analytical, Inc				Facility Address: 266 Mass Ave				Consistent/Contractor: Corporate Environmental Advisors (CEA)			
Address: 830 Silver Street				Facility City, State: Cambridge MA				Address: 21 East Main Street, Suite 201			
Lab PM: Agawam, MA 01001				Site Lat/Long: _____				Consistent/Contractor Project No.: 6196-06			
TeleFax: Rebecca Metz 413-789-9018				Sunoco PM Contact: Bill Brochu				Consistent/Contractor PM: Scott VanderSea			
Report Type & QC Level: MCP CAM				Concord, NH, 03302-4209				TeleFax: 508-835-8822 508-835-8812			
E-mail EDD To: lab.sunoco@eurofinsinc.com				TeleFax: 508-728-0592				(866) 257-9205 Invoice to: CEA			
Lab Bottle Order No: _____				Total No. of Containers				Requested Analysis			
Item No.				Sample Description				Time			
Date				Liquid				Solid			
Gas				Laboratory No.				Preservative			
Methanol VOAs on ice				Amber jars on ice				EPA RGP Parameters See Attached List			
pH, Temperature, Hardness & Ammonia				Total Recoverable Metals Detected in GW-RGP sample				Sample Point Lat/Long and Comments			
1 GW-RGP				130 6/20/18				X			
2 SW-1				131.5				X			
3				X				*X			
4											
5											
6											
7											
8											
9											
10											
Sampler's Name: Kevin H. Mark H.				Relinquished By / Affiliation: _____				Date: _____			
Sampler's Company: Corporate Environmental Advisors (CEA)				Date: _____				Accepted By / Affiliation: _____			
Shipment Method: _____				Date: _____				Date: _____			
Shipment Tracking No: _____				Date: _____				Date: _____			
Special Instructions: Email report to: svandersca@cea-inc.com and polson@cea-inc.com				Laboratory reporting limits must be less than USEPA RGP limits indicated on attached sheet.				Trip Blank Yes No			
Custody Seals in Place Yes No				Temp Blank Yes No				Cooler Temperature on Receipt: _____ °F			

1.2/01-200

**Additional Resource for Selecting Sufficiently Sensitive Test Methods
for RGP Notice of Intent (NOI) Sampling Requirements¹**

Table 1: Parameters, Required Minimum Levels (MLs), and Common Test Methods²

Parameter	Requirements	
	ML Must Be ≤	Commonly Used Test Method(s) from 40 C.F.R. Part 136 that Generally Achieves the ML Noted
A. Inorganics		
Ammonia	0.1 mg/L	SM 4500 B and D; 350.1
Chloride	230 mg/L	SM 4110 B; 300.0
Total Residual Chlorine	50 µg/L	SM 4500-Cl G and E
Total Suspended Solids	30 mg/L	SM 2540 D
Antimony	206 µg/L	200.8 and 200.9
Arsenic	FW= 10 µg/L SW= 36 µg/L	200.8 and 200.9 in FW 200.7, 200.8 and 200.9 in SW
Cadmium	FW= 0.25 µg/L SW= 8.8 µg/L in MA SW= 9.3 µg/L in NH	200.8 in FW 200.8 and 200.9 in SW
Chromium III	FW= 74 µg/L SW= 100 µg/L	200.7, 200.8 and 200.9
Chromium VI	FW= 11 µg/L SW= 50 µg/L	218.6
Copper	FW= 9 µg/L SW= 3.1 µg/L	200.8 and 200.9
Iron	FW = 1,000 µg/L	200.7 and 200.8
Lead	FW= 2.5 µg/L SW= 8.1 µg/L	200.8 and 200.9
Mercury	FW= 0.77 µg/L SW= 0.739 µg/L	245.1, 245.7 and 1631E
Nickel	FW= 52 µg/L SW= 8.2 µg/L	200.8 and 200.9
Selenium	FW= 5.0 µg/L SW= 71 µg/L	200.8 and 200.9 in FW 200.7, 200.8 and 200.9 in SW
Silver	FW= 3.2 µg/L SW= 1.9 µg/L	200.8
Zinc	FW= 120 µg/L SW= 81 µg/L	200.7 and 200.8
Cyanide	FW = 5.2 µg/L SW = 5.0 µg/L	SM 4500-CN
B. Non-Halogenated Volatile Organic Compounds		
Total BTEX ³	100 µg/L (sum of individual MLs)	624 and 1624B
Benzene	5.0 µg/L	624 and 1624B
1,4 Dioxane	50 µg/L	SIM
Acetone	7.97 mg/L	524.2
Phenol	300 µg/L	420.1 and 420.4

Parameter	Requirements	
	ML Must Be ≤	Commonly Used Test Method(s) from 40 C.F.R. Part 136 that Generally Achieves the ML Noted
C. Halogenated Volatile Organic Compounds		
Carbon Tetrachloride	1.6 µg/L in MA 4.4 µg/L in NH	624
1,2 Dichlorobenzene	600 µg/L	624
1,3 Dichlorobenzene	320 µg/L	624
1,4 Dichlorobenzene	5.0 µg/L	624
Total Dichlorobenzene ⁴	Not required in MA 763 µg/L in NH (sum of individual MLs)	624
1,1 Dichloroethane	70 µg/L	624
1,2 Dichloroethane	5.0 µg/L	624
1,1 Dichloroethylene	3.2 µg/L	624
Ethylene Dibromide	0.05 µg/L	SIM
Methylene Chloride	4.6 µg/L	624
1,1,1 Trichloroethane	200 µg/L	624
1,1,2 Trichloroethane	5.0 µg/L	624
Trichloroethylene	5.0 µg/L	624
Tetrachloroethylene	3.3 µg/L in MA 5.0 µg/L in NH	624
cis-1,2 Dichloroethylene	70 µg/L	624
Vinyl Chloride	2.0 µg/L	624
D. Non-Halogenated Semi-Volatile Organic Compounds		
Total Phthalates ⁵	190 µg/L in MA FW = 3.0 µg/L in NH SW = 3.4 µg/L in NH	625 and 1625B in MA 625 in NH
Diethylhexyl Phthalate	2.2 µg/L in MA 5.9 µg/L in NH	625 in MA 625 and 1625B in NH
Total Group I Polycyclic Aromatic Hydrocarbons ⁶	1.0 µg/L (sum of individual MLs)	SIM
Benzo(a)anthracene	0.1 µg/L	SIM
Benzo(a)pyrene	0.1 µg/L	SIM
Benzo(b)fluoranthene	0.1 µg/L	SIM
Benzo(k)fluoranthene	0.1 µg/L	SIM
Chrysene	0.1 µg/L	SIM
Dibenzo(a,h)anthracene	0.1 µg/L	SIM
Indeno(1,2,3-cd)pyrene	0.1 µg/L	SIM
Total Group II Polycyclic Aromatic Hydrocarbons ⁷	100 µg/L (sum of individual MLs)	625
Naphthalene	20 µg/L	625

Parameter	Requirements	
	ML Must Be ≤	Commonly Used Test Method(s) from 40 C.F.R. Part 136 that Generally Achieves the ML Noted
E. Halogenated Semi-Volatile Organic Compounds		
Total Polychlorinated Biphenyls ⁸	0.5 µg/L	608
Pentachlorophenol ⁹	1.0 µg/L	625
F. Fuels Parameters		
Total Petroleum Hydrocarbons	5.0 mg/L	1664A and B
Ethanol	0.4 mg/L	1666/1671/D3695
Methyl-tert-Butyl Ether	20 µg/L in MA 70 µg/L in NH	SIM
tert-Butyl Alcohol	120 µg/L in MA 40 µg/L in NH	1666
tert-Amyl Methyl Ether	90 µg/L in MA 140 µg/L in NH	624

Table 1 Footnotes:

¹ The minimum levels specified in this table will satisfy the sufficiently sensitive test method requirements for the purposes of sample analysis used to prepare a Notice of Intent (NOI) for coverage under the Remediation General Permit. Where less sensitive minimum levels (MLs) may be used upon authorization to discharge, these MLs will be noted in the written authorization to discharge for an individual site.

² The following abbreviations are used in Table 1, above:

- ^a mg/L = milligrams per liter
- ^b µg/L = micrograms per liter
- ^c FW = freshwater
- ^d SW = saltwater
- ^e SM = standard method
- ^d SIM = selected ion monitoring

³ Total BTEX is the sum of: benzene (CAS No. 71432); toluene (CAS No. 108883); ethylbenzene (CAS No. 100-41-4); and (m,p,o) xylenes (CAS Nos. 108-88-3, 106-42-3, 95-47-6, and 1330-20-7).

⁴ Total dichlorobenzene is the sum of: 1,2 dichlorobenzene (CAS No. 95-50-1); 1,3 dichlorobenzene (CAS No. 541-73-1); and 1,4 dichlorobenzene (CAS No. 106-46-7).

⁵ Total Phthalates is the sum of: diethylhexyl phthalate (CAS No. 117-81-7); butyl benzyl phthalate (CAS No. 85-68-7); di-n-butyl phthalate (CAS No. 84-74-2); diethyl phthalate (CAS No. 84-66-2); dimethyl phthalate (CAS No. 131-11-3); di-n-octyl phthalate (CAS No. 117-84-0). For the diethylhexyl phthalate in NH, EPA anticipates that the applicable ML will be revised to 2.2 µg/L, once incorporated into the RGP for sites in New Hampshire.

⁶ Total Group I PAHs is the sum of: benzo(a)anthracene (CAS No. 56-55-3); benzo(a)pyrene (CAS No. 50-32-8); benzo(b)fluoranthene (CAS No. 205-99-2); benzo(k)fluoranthene (CAS No. 207-08-9); chrysene (CAS No. 218-01); dibenzo(a,h)anthracene (CAS No. 53-70-3); indeno(1,2,3-cd)pyrene (CAS No. 193-39-5).

⁷ Total Group II PAHs is the sum of: acenaphthene (CAS No. 83-32-9); acenaphthylene (CAS No. 208-96-8); anthracene (CAS No. 120-12-7); benzo(g,h,i)perylene (CAS No. 191-24-2); fluoranthene (CAS No. 206-44-0); fluorene (CAS No. 86-73-7); naphthalene (CAS No. 91-20-3); phenanthrene (CAS No. 85-01-8); pyrene (CAS No. 129-00-0).

⁸ Total PCBs is the sum of the following aroclors: PCB-1016, PCB-1221, PCB-1232, PCB-1242, PCB-1248, PCB-1254, and PCB-1260.

⁸ The ML for analysis of pentachlorophenol must be as close to 1.0 µg/L as possible, not to exceed ≤ 5.0 µg/L.

This preceding chain of custody has been amended to include the client requested additional analyses as noted below:

<i>Laboratory ID</i>	<i>Client ID</i>	<i>Analysis</i>	<i>Added</i>
SC47844-01	GW-RGP	Purgeable Organic Compounds	6/21/2018
SC47844-01	GW-RGP	TCLP Metals Preservation	6/21/2018
SC47844-01	GW-RGP	1,4-Dioxane by SW846 8260 SIM	7/2/2018
SC47844-01	GW-RGP	Total Calcium by ICP	7/2/2018
SC47844-01	GW-RGP	Total Hardness	7/2/2018
SC47844-01	GW-RGP	Total Magnesium by ICP	7/2/2018

Batch Summary

ICALCI

General Chemistry Parameters

SC47844-01 (GW-RGP)

SC47844-02 (SW-1)

1808579

General Chemistry Parameters

1808579-DUP1

1808579-SRM1

1808579-SRM2

SC47844-02 (SW-1)

1808581

General Chemistry Parameters

1808581-BLK1

1808581-BS1

1808581-SRM1

SC47844-01 (GW-RGP)

SC47844-02 (SW-1)

1808587

Semivolatile Organic Compounds by GCMS

1808587-BLK1

1808587-BS1

1808587-BSD1

SC47844-01 (GW-RGP)

1808590

Semivolatile Organic Compounds by GC

1808590-BLK1

1808590-BS1

1808590-BSD1

SC47844-01 (GW-RGP)

1808628

Total Metals by EPA 200 Series Methods

1808628-BLK1

1808628-BS1

1808628-DUP1

1808628-MS1

1808628-PS1

SC47844-01 (GW-RGP)

SC47844-01 (GW-RGP)

SC47844-02 (SW-1)

SC47844-02 (SW-1)

1808632

Total Metals by EPA 200 Series Methods

1808632-BLK1

1808632-BS1

1808632-DUP1

1808632-MS1

1808632-PS1

SC47844-01 (GW-RGP)

SC47844-02 (SW-1)

1808633

Total Metals by EPA 200 Series Methods

1808633-BLK1

1808633-BS1

1808633-DUP1

1808633-MS1

1808633-PS1

SC47844-01 (GW-RGP)

SC47844-02 (SW-1)

1808636

General Chemistry Parameters

1808636-BLK1

1808636-BS1

SC47844-01 (GW-RGP)

1808650

General Chemistry Parameters

1808650-BLK1

1808650-BS1

1808650-SRM1

SC47844-01 (GW-RGP)

1808651

Total Metals by EPA 200/6000 Series Methods

SC47844-01 (GW-RGP)

SC47844-02 (SW-1)

1808683

Volatile Organic Compounds

1808683-BLK1

1808683-BS1

1808683-BSD1

SC47844-01 (GW-RGP)

1808692

General Chemistry Parameters

1808692-BLK1

1808692-BS1

1808692-SRM1

SC47844-01 (GW-RGP)

1808693**General Chemistry Parameters**

1808693-BLK1
1808693-BS1
1808693-SRM1
SC47844-01 (GW-RGP)

1808724**Extractable Petroleum Hydrocarbons**

1808724-BLK1
1808724-BS1
SC47844-01 (GW-RGP)

1808951**Semivolatile Organic Compounds by GCMS**

1808951-BLK1
1808951-BLK3
1808951-BS1
1808951-BS3
1808951-BSD1
1808951-BSD3
SC47844-01RE1 (GW-RGP)

1809223**Volatile Organic Compounds**

1809223-BLK1
1809223-BS1
1809223-BSD1
SC47844-01 (GW-RGP)

436006A**Subcontracted Analyses**

CA76127-BLK
CA76127-DUP
CA76127-LCS
CA76127-MS
SC47844-01 (GW-RGP)

436030A**Subcontracted Analyses**

CA76405-BLK
CA76405-DUP
CA76405-LCS
CA76405-MS
SC47844-01 (GW-RGP)
SC47844-02 (SW-1)

436137A**Subcontracted Analyses**

CA76121-BLK
CA76121-LCS
CA76121-LCSD
CA76121-MS
CA76121-MSD

SC47844-01 (GW-RGP)

S818803**Semivolatile Organic Compounds by GCMS**

S818803-CAL1
S818803-CAL2
S818803-CAL3
S818803-CAL4
S818803-CAL5
S818803-CAL6
S818803-CAL7
S818803-CAL8
S818803-CAL9
S818803-ICV1
S818803-LCV1
S818803-LCV2
S818803-TUN1

S818863**Semivolatile Organic Compounds by GCMS**

S818863-CAL1
S818863-CAL2
S818863-CAL3
S818863-CAL4
S818863-CAL5
S818863-CAL6
S818863-CAL7
S818863-CAL8
S818863-CAL9
S818863-CALA
S818863-ICV1
S818863-LCV1
S818863-LCV2
S818863-TUN1

S819055**Volatile Organic Compounds**

S819055-CAL1
S819055-CAL2
S819055-CAL3
S819055-CAL4
S819055-CAL5
S819055-CAL6
S819055-ICV1
S819055-LCV1
S819055-TUN1

S820051**Volatile Organic Compounds**

S820051-CAL1
S820051-CAL2
S820051-CAL3
S820051-CAL4
S820051-CAL5
S820051-CAL6
S820051-CAL7
S820051-CAL8
S820051-CAL9
S820051-ICV1
S820051-LCV1
S820051-LCV2
S820051-TUN1
S820051-TUN2

S820295**Volatile Organic Compounds**

S820295-CCV1
S820295-TUN1

S820307**Semivolatile Organic Compounds by GC**

S820307-CAL1
S820307-CAL2
S820307-CAL3
S820307-CAL4
S820307-CAL5
S820307-CAL6
S820307-CAL7
S820307-CAL8
S820307-CAL9
S820307-CALA
S820307-CALB
S820307-CALC
S820307-CALD
S820307-CALE
S820307-CALF
S820307-CALG
S820307-CALH
S820307-CALI
S820307-CALJ
S820307-CALK
S820307-CALL
S820307-CALM
S820307-CALN
S820307-CALO
S820307-CALP
S820307-CALQ
S820307-CALR
S820307-CALS
S820307-CALT
S820307-CALU
S820307-ICV1

S820307-ICV2
S820307-ICV3
S820307-ICV4
S820307-ICV5
S820307-ICV6
S820307-LCV1
S820307-LCV2
S820307-LCV3
S820307-LCV4
S820307-LCV5
S820307-LCV6

S820343**Semivolatile Organic Compounds by GCMS**

S820343-CCV1
S820343-TUN1

S820404**Semivolatile Organic Compounds by GCMS**

S820404-CCV1
S820404-TUN1

S820467**Semivolatile Organic Compounds by GC**

S820467-CCV1
S820467-CCV2
S820467-IBL1
S820467-IBL2

S820477**Semivolatile Organic Compounds by GCMS**

S820477-CCV1
S820477-TUN1

S820486**Semivolatile Organic Compounds by GCMS**

S820486-CCV1
S820486-TUN1

S820513**Semivolatile Organic Compounds by GCMS**

S820513-CCV1
S820513-TUN1

S820590**Volatile Organic Compounds**

S820590-CCV1
S820590-CRL1
S820590-TUN1

TABLES



Table 1
Groundwater Gauging Data
Sunoco Station
266 Massachusetts Avenue
Cambridge, MA

Sample ID	Monitoring Date	Casing Elevation (feet)	Depth to NAPL (feet)	Depth to Water (feet)	Total Well Depth (feet)	NAPL Thickness (feet)	Groundwater Elevations (feet)	Comments
MW-1	06/20/18	NA	ND	9.09	14.40			
MW-2	06/20/18	NA	ND	8.78	14.05			
OW-4	06/20/18	NA	ND	9.42	10.70			

ND = non-detect
NA= not available

Enter number values in green boxes below

Enter values in the units specified

↓	
18.87	Q _R = Enter upstream flow in MGD
0.144	Q _D = Enter discharge flow in MGD
0	Downstream 7Q10

Enter a dilution factor, if other than zero

↓
132.13

Enter values in the units specified

↓	
434	C _a = Enter influent hardness in mg/L CaCO ₃
134	C _s = Enter receiving water hardness in mg/L CaCO ₃

Enter **receiving water** concentrations in the units specified

↓	
6.9	pH in Standard Units
24	Temperature in °C
0.15	Ammonia in mg/L
134	Hardness in mg/L CaCO ₃
0	Salinity in ppt
0	Antimony in µg/L
0	Arsenic in µg/L
0	Cadmium in µg/L
0	Chromium III in µg/L
0	Chromium VI in µg/L
7.79	Copper in µg/L
509	Iron in µg/L
2.59	Lead in µg/L
0	Mercury in µg/L
1.39	Nickel in µg/L
0	Selenium in µg/L
0	Silver in µg/L
5.67	Zinc in µg/L

Notes:

Freshwater: Q_R equal to the 7Q10; enter alternate Q_R if approved by the State; enter 0 if no dilution factor approved
Saltwater (estuarine and marine): enter Q_R if approved by the State; enter 0 if no entry
Discharge flow is equal to the design flow or 1 MGD, whichever is less
Only if approved by State as the entry for Q_R; leave 0 if no entry

Saltwater (estuarine and marine): only if approved by the State
Leave 0 if no entry

Freshwater only

pH, temperature, and ammonia required for all discharges
Hardness required for freshwater
Salinity required for saltwater (estuarine and marine)
Metals required for all discharges if present and if dilution factor is > 1
Enter 0 if non-detect or testing not required

Enter **influent** concentrations in the units specified

↓	
40	TRC in µg/L
1.51	Ammonia in mg/L
0	Antimony in µg/L
63.9	Arsenic in µg/L
0	Cadmium in µg/L
0	Chromium III in µg/L
133	Chromium VI in µg/L
112	Copper in µg/L
94800	Iron in µg/L
246	Lead in µg/L
0.22	Mercury in µg/L
68.8	Nickel in µg/L
0	Selenium in µg/L
0	Silver in µg/L
0	Zinc in µg/L
0	Cyanide in µg/L
0	Phenol in µg/L
0.1	Carbon Tetrachloride in µg/L
0	Tetrachloroethylene in µg/L
0	Total Phthalates in µg/L
0	Diethylhexylphthalate in µg/L
0	Benzo(a)anthracene in µg/L
0	Benzo(a)pyrene in µg/L
0	Benzo(b)fluoranthene in µg/L
0	Benzo(k)fluoranthene in µg/L
0	Chrysene in µg/L
0	Dibenzo(a,h)anthracene in µg/L
0	Indeno(1,2,3-cd)pyrene in µg/L
0	Methyl-tert butyl ether in µg/L

if >1 sample, enter maximum

if >10 samples, may enter 95th percentile

Enter 0 if non-detect or testing not required

I. Dilution Factor Calculation Method

A. 7Q10

Refer to Appendix V for determining critical low flow; must be approved by State before use in calculations.

B. Dilution Factor

Calculated as follows:

$$Df = \frac{Q_R + Q_P}{Q_P}$$

$$Q_R = 7Q10 \text{ in MGD}$$

$$Q_P = \text{Discharge flow, in MGD}$$

II. Effluent Limitation Calculation Method

A. Calculate Water Quality Criterion:

Step 1. Downstream hardness, calculated as follows:

$$C_r = \frac{Q_d C_d + Q_s C_s}{Q_r}$$

$$C_r = \text{Downstream hardness in mg/L}$$

$$Q_d = \text{Discharge flow in MGD}$$

$$C_d = \text{Discharge hardness in mg/L}$$

$$Q_s = \text{Upstream flow (7Q10) in MGD}$$

$$C_s = \text{Upstream (receiving water) hardness in mg/L}$$

$$Q_r = \text{Downstream receiving water flow in MGD}$$

Step 2. Total recoverable water quality criteria for hardness-dependent metals, calculated as follows:

$$\text{Total Recoverable Criteria} = \exp\{m_c [\ln(h)] + b_c\}$$

m_c = Pollutant-specific coefficient (m_a for silver)

b_c = Pollutant-specific coefficient (b_a for silver)

$\ln$ = Natural logarithm

h = Hardness calculated in Step 1

Step 3. Total recoverable water quality criteria for non-hardness-dependent metals, calculated as follows:

$$\text{WQC in } \mu\text{g/L} = \frac{\text{dissolved WQC in } \mu\text{g/L}}{\text{dissolved to total recoverable factor}}$$

B. Calculate WQBEL:

Step 1. WQBEL calculated as follows for parameter sampled in and detected in the receiving water:

$$C_d = \frac{Q_r C_r - Q_s C_s}{Q_d}$$

C_r = Water quality criterion in $\mu\text{g/L}$

Q_d = Discharge flow in MGD

C_d = WQBEL in $\mu\text{g/L}$

Q_s = Upstream flow (7Q10) in MGD

C_s = Ustream (receiving water) concentration in $\mu\text{g/L}$

Q_r = Downstream receiving water flow in MGD

Step 2. WQBEL calculated as follows for parameter not sampled in or not detected in receiving water:

$$C_d = (Q_r/Q_d) \times C_r$$

C_r = Water quality criterion in $\mu\text{g/L}$

Q_d = Discharge flow in MGD

Q_r = Downstream receiving water flow in MGD

C. Determine if a WQBEL applies:

Step 1. For parameter sampled in and detected in receiving water, downstream concentrations calculated as follows:

$$C_r = \frac{Q_d C_d + Q_s C_s}{Q_r}$$

C_r = Downstream concentration in µg/L

Q_d = Discharge flow in MGD

C_d = Influent concentration in µg/L

Q_s = Upstream flow (7Q10) in MGD

C_s = Upstream (receiving water) concentration in µg/L

Q_r = Downstream receiving water flow in MGD

The WQBEL applies if:

1) the projected downstream concentration calculated in accordance with Step 1, above, and the discharge concentration of a parameter are greater than the WQC calculated for that parameter in accordance with II.A, above

AND

2) the WQBEL determined for that parameter in accordance with II.B, above, is less than the TBEL in Part 2.1.1 of the RGP for that parameter. Otherwise, the TBEL in Part 2.1.1 of the RGP for that parameter applies.

Step 2. For a parameter not sampled in or not detected in receiving water, the WQBEL applies if:

1) the discharge concentration of a parameter is greater than the WQBEL determined for that parameter in accordance with II.A or II.B, above;

AND

2) the WQBEL determined for that parameter in accordance with II.A or II.B, above is less than the TBEL in Part 2.1.1 of the RGP for that parameter. Otherwise, the TBEL in

Part 2.1.1 of the RGP for that parameter applies.

Dilution Factor	132.0					
A. Inorganics	TBEL applies if bolded		WQBEL applies if bolded		Compliance Level applies if shown	
Ammonia	Report	mg/L	---			
Chloride	Report	µg/L	---			
Total Residual Chlorine	0.2	mg/L	1452	µg/L	---	µg/L
Total Suspended Solids	30	mg/L	---			
Antimony	206	µg/L	84507	µg/L		
Arsenic	104	µg/L	1320	µg/L		
Cadmium	10.2	µg/L	44.9425	µg/L		
Chromium III	323	µg/L	14662.1	µg/L		
Chromium VI	323	µg/L	1509.8	µg/L		
Copper	242	µg/L	583.9	µg/L		
Iron	5000	µg/L	65341	µg/L		
Lead	160	µg/L	283.55	µg/L		
Mercury	0.739	µg/L	119.61	µg/L		
Nickel	1450	µg/L	8767.0	µg/L		
Selenium	235.8	µg/L	660.2	µg/L		
Silver	35.1	µg/L	850.9	µg/L		
Zinc	420	µg/L	19821.1	µg/L		
Cyanide	178	mg/L	686.6	µg/L	---	µg/L
B. Non-Halogenated VOCs						
Total BTEX	100	µg/L	---			
Benzene	5.0	µg/L	---			
1,4 Dioxane	200	µg/L	---			
Acetone	7970	µg/L	---			
Phenol	1,080	µg/L	39613	µg/L		

C. Halogenated VOCs

Carbon Tetrachloride	4.4	µg/L	211.3	µg/L
1,2 Dichlorobenzene	600	µg/L	---	
1,3 Dichlorobenzene	320	µg/L	---	
1,4 Dichlorobenzene	5.0	µg/L	---	
Total dichlorobenzene	---	µg/L	---	
1,1 Dichloroethane	70	µg/L	---	
1,2 Dichloroethane	5.0	µg/L	---	
1,1 Dichloroethylene	3.2	µg/L	---	
Ethylene Dibromide	0.05	µg/L	---	
Methylene Chloride	4.6	µg/L	---	
1,1,1 Trichloroethane	200	µg/L	---	
1,1,2 Trichloroethane	5.0	µg/L	---	
Trichloroethylene	5.0	µg/L	---	
Tetrachloroethylene	5.0	µg/L	435.7	µg/L
cis-1,2 Dichloroethylene	70	µg/L	---	
Vinyl Chloride	2.0	µg/L	---	

D. Non-Halogenated SVOCs

Total Phthalates	190	µg/L	---	µg/L		
Diethylhexyl phthalate	101	µg/L	290.5	µg/L		
Total Group I Polycyclic Aromatic Hydrocarbons	1.0	µg/L	---			
Benzo(a)anthracene	1.0	µg/L	0.5018	µg/L	---	µg/L
Benzo(a)pyrene	1.0	µg/L	0.5018	µg/L	---	µg/L
Benzo(b)fluoranthene	1.0	µg/L	0.5018	µg/L	---	µg/L
Benzo(k)fluoranthene	1.0	µg/L	0.5018	µg/L	---	µg/L
Chrysene	1.0	µg/L	0.5018	µg/L	---	µg/L
Dibenzo(a,h)anthracene	1.0	µg/L	0.5018	µg/L	---	µg/L
Indeno(1,2,3-cd)pyrene	1.0	µg/L	0.5018	µg/L	---	µg/L
Total Group II Polycyclic Aromatic Hydrocarbons	100	µg/L	---			
Naphthalene	20	µg/L	---			

E. Halogenated SVOCs

Total Polychlorinated Biphenyls	0.000064	µg/L	---	0.5	µg/L
Pentachlorophenol	1.0	µg/L	---		

F. Fuels Parameters

Total Petroleum Hydrocarbons	5.0	mg/L	---		
Ethanol	Report	mg/L	---		
Methyl-tert-Butyl Ether	70	µg/L	2641	µg/L	
tert-Butyl Alcohol	120	µg/L	---		
tert-Amyl Methyl Ether	90	µg/L	---		

ATTACHMENT C

StreamStats Flow Statics Report



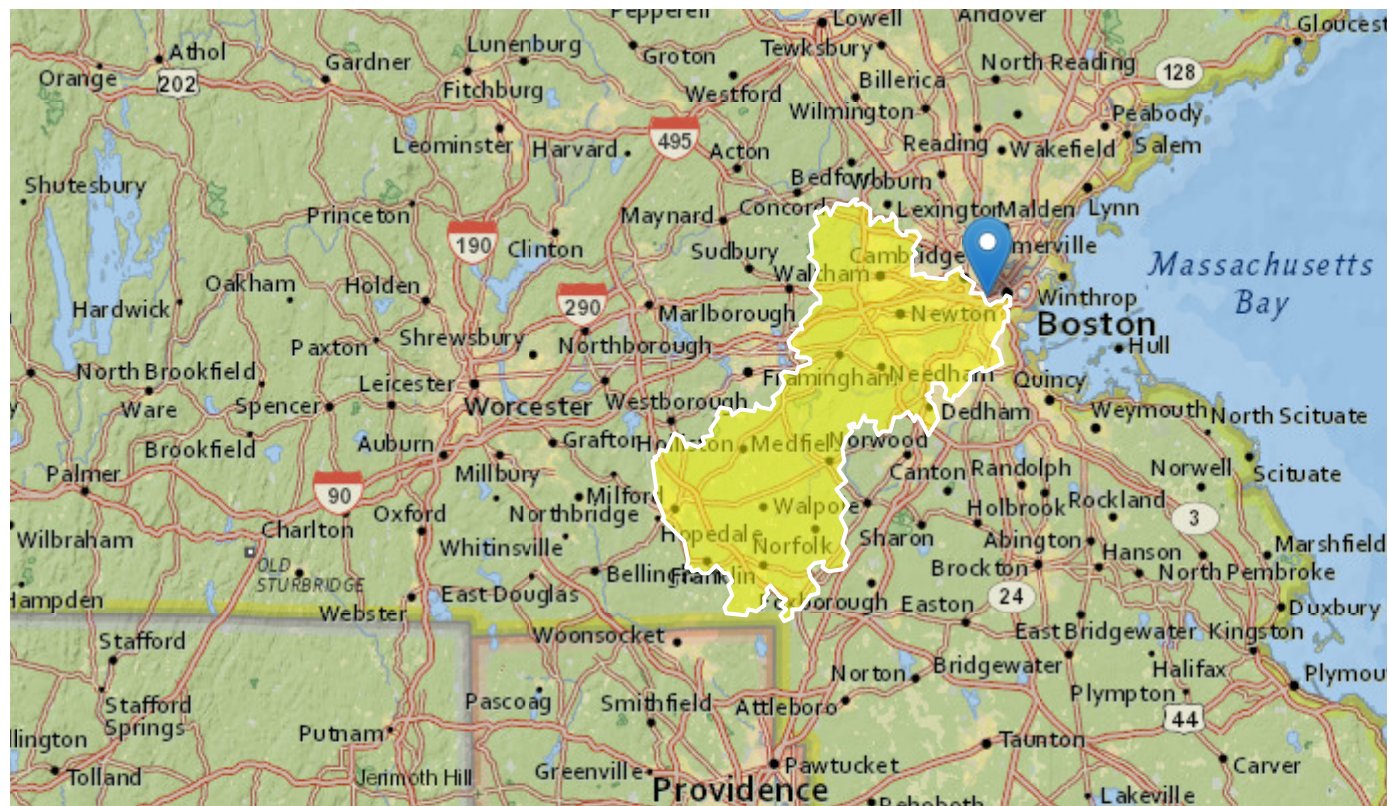
StreamStats Report

Region ID: MA

Workspace ID: MA20180620165256776000

Clicked Point (Latitude, Longitude): 42.35487, -71.09109

Time: 2018-06-20 12:53:12 -0400



Basin Characteristics

Parameter Code	Parameter Description	Value	Unit
DRNAREA	Area that drains to a point on a stream	307	square miles
BSLDEM250	Mean basin slope computed from 1:250K DEM	2.341	percent
DRFTPERSTR	Area of stratified drift per unit of stream length	0.25	square mile per mile
MAREGION	Region of Massachusetts 0 for Eastern 1 for Western	0	dimensionless

Low-Flow Statistics Parameters [Statewide Low Flow WRIR00 4135]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	307	square miles	1.61	149
BSLDEM250	Mean Basin Slope from 250K DEM	2.341	percent	0.32	24.6
DRFTPERSTR	Stratified Drift per Stream Length	0.25	square mile per mile	0	1.29
MAREGION	Massachusetts Region	0	dimensionless	0	1

Low-Flow Statistics Disclaimers [Statewide Low Flow WRIR00 4135]

One or more of the parameters is outside the suggested range. Estimates were extrapolated with unknown errors

Low-Flow Statistics Flow Report [Statewide Low Flow WRIR00 4135]

Statistic	Value	Unit
7 Day 2 Year Low Flow	57.3	ft ³ /s
7 Day 10 Year Low Flow	29.2	ft ³ /s

Low-Flow Statistics Citations

Ries, K.G., III, 2000, Methods for estimating low-flow statistics for Massachusetts streams: U.S. Geological Survey Water Resources Investigations Report 00-4135, 81 p. (<http://pubs.usgs.gov/wri/wri004135/>)

USGS Data Disclaimer: Unless otherwise stated, all data, metadata and related materials are considered to satisfy the quality standards relative to the purpose for which the data were collected. Although these data and associated metadata have been reviewed for accuracy and completeness and approved for release by the U.S. Geological Survey (USGS), no warranty expressed or implied is made regarding the display or utility of the data for other purposes, nor on all computer systems, nor shall the act of distribution constitute any such warranty.

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Application Version: 4.2.1

ATTACHMENT D

MassDEP Phase 1 Site Assessment Map and NHESP Map



MassDEP - Bureau of Waste Site Cleanup

Site Information:

Phase 1 Site Assessment Map: 500 feet & 0.5 Mile Radii

MEMORIAL DRIVE & MASS AVE BRIDGE CAMBRIDGE, MA

NAD83 UTM Meters:

4691574mN, 327771mE (Zone: 19)
June 20, 2018

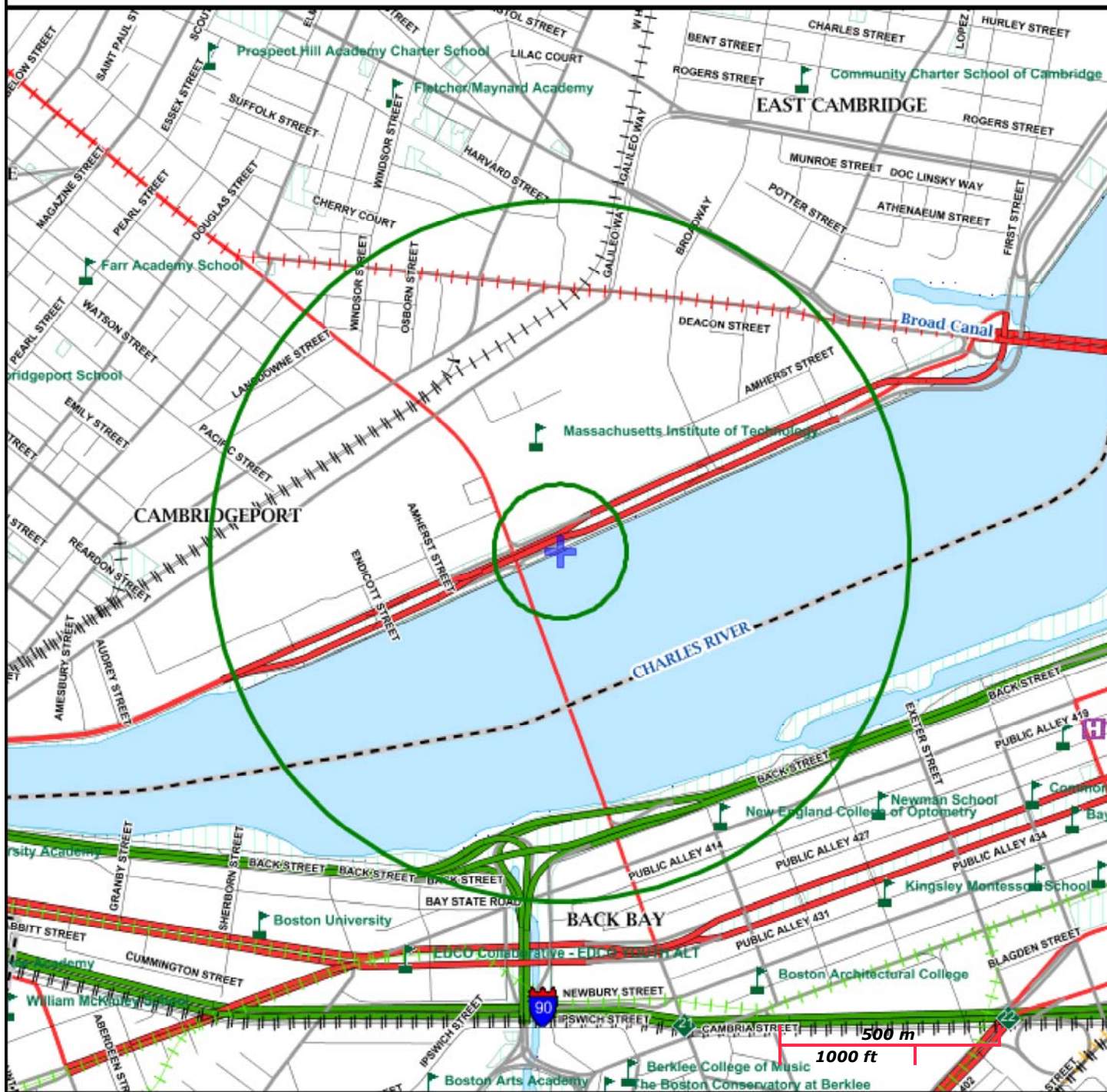
The information shown is the best available at the date of printing. However, it may be incomplete. The responsible party and LSP are ultimately responsible for ascertaining the true conditions surrounding the site. Metadata for data layers shown on this map can be found at:

<http://www.mass.gov/mgis/>.



MassDEP

Commonwealth of Massachusetts
Department of Environmental Protection



Roads: Limited Access, Divided, Other Hwy, Major Road, Minor Road, Track, Trail

Boundaries: Town, County, DEP Region; Train; Powerline; Pipeline; Aqueduct

Basins: Major, PWS; Streams: Perennial, Intermittent, Man Made Shore, Dam

Aquifers: Medium Yield, High Yield, EPA Sole Source

Non Potential Drinking Water Source Area: Medium, High (Yield)

PWS Protection Areas: Zone II, IWPA, Zone A

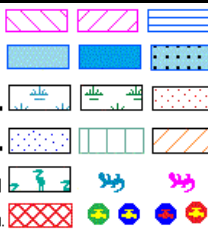
Hydrography: Open Water, PWS Reservoir, Tidal Flat

Wetlands: Freshwater, Saltwater, Cranberry Bog

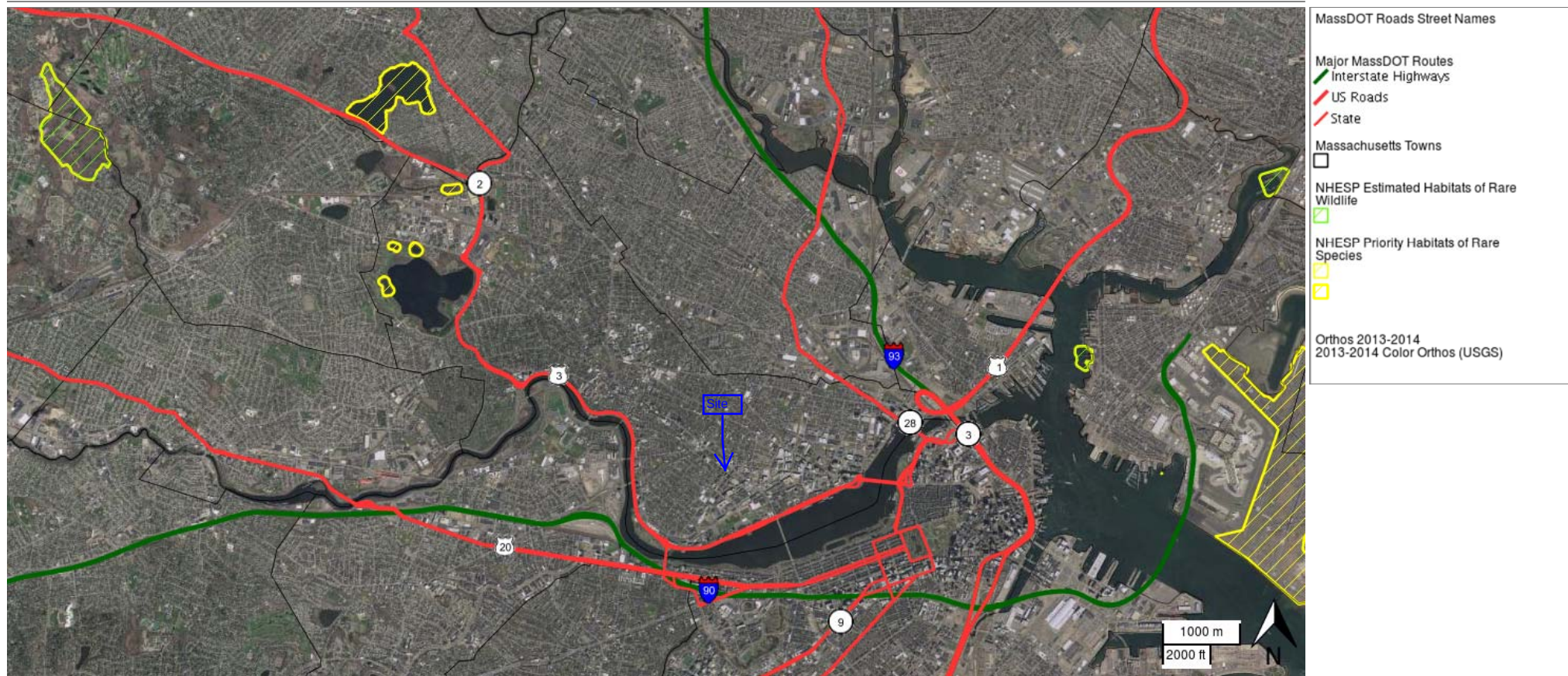
FEMA 100yr Floodplain; Protected Open Space; ACEC

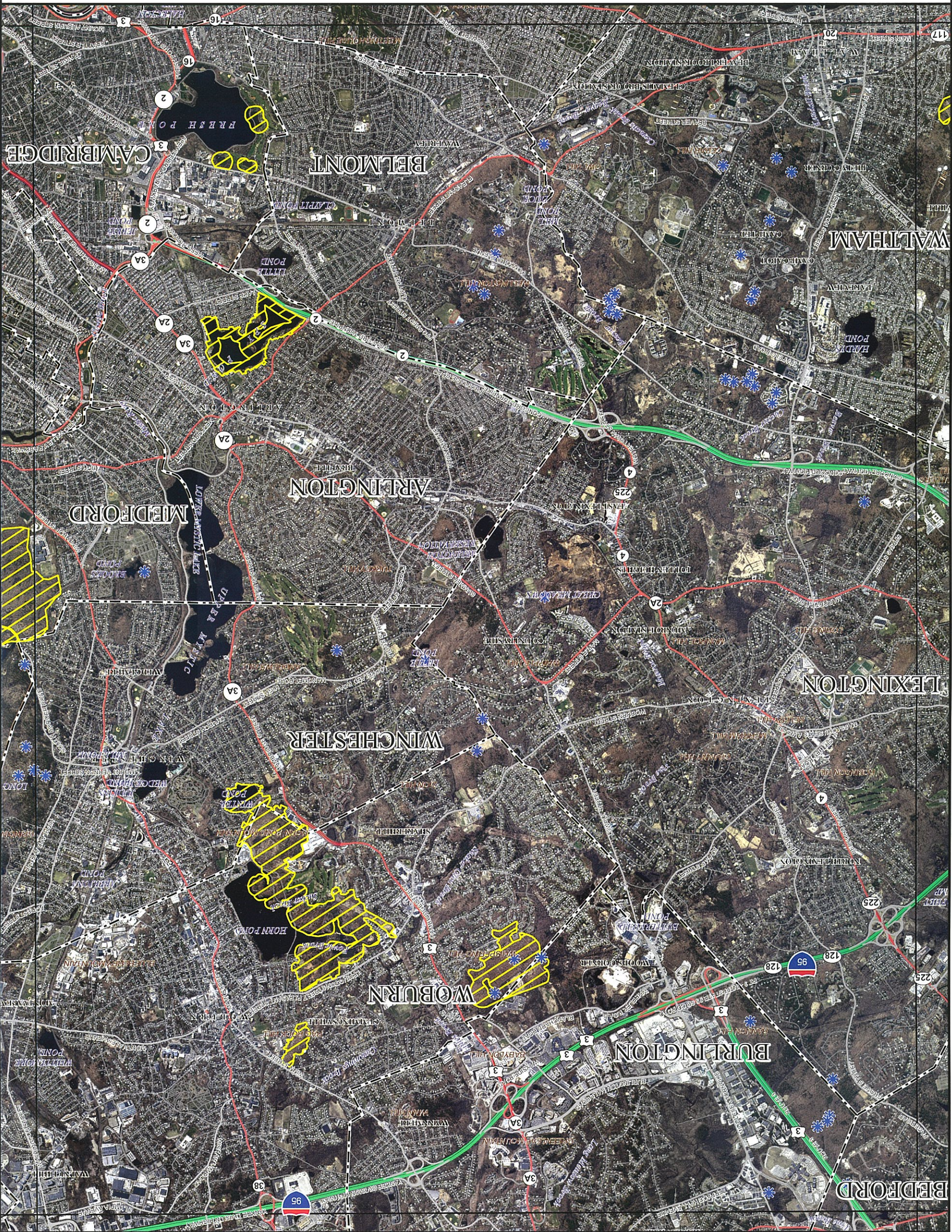
Est. Rare Wetland Wildlife Hab; Vernal Pool: Cert., Potential

Solid Waste Landfill, PWS: Com. GW, SW, Emerg., Non-Com.



Sunoco Station, 266 Massachusetts Avenue, Cambridge, MA

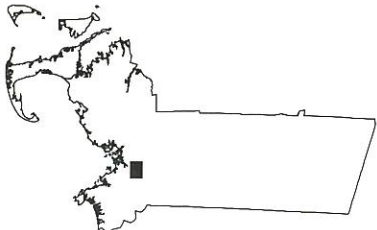




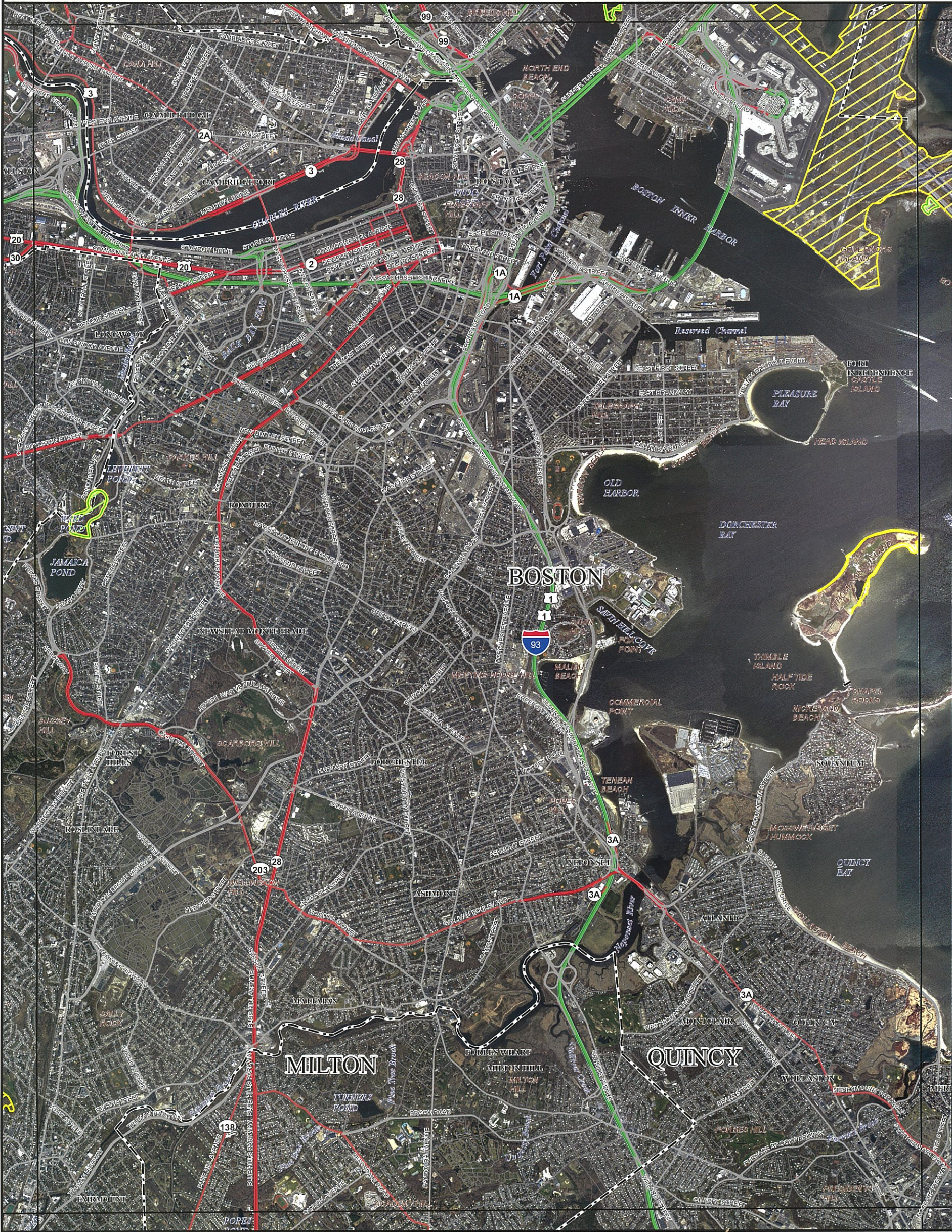
p.45	p.46	p.47	p.48	p.49
p.67	p.68		p.70	p.71
p.89	p.90	p.91	p.92	p.93

Page Index

- Priority Habitat of Rare Species
- Priority Habitat of Rare Species and also Estimated Habitat of Rare Wildlife
- Certified Vernal Pool (as of July 31, 2008)



Lexington Quad



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Priority Habitat of Rare Species

Priority Habitat of Rare Species and also
Estimated Habitat of Rare Wildlife

*

Certified Vernal Pool (as of July 31, 2008)

N



Boston South Quad



ATTACHMENT E

**United States Department of the Interior, Fish and Wildlife Services (FWS)
Threatened or Endangered Species or Critical Habitat Letter**





United States Department of the Interior

FISH AND WILDLIFE SERVICE
New England Ecological Services Field Office
70 Commercial Street, Suite 300
Concord, NH 03301-5094
Phone: (603) 223-2541 Fax: (603) 223-0104
<http://www.fws.gov/newengland>



In Reply Refer To:

June 28, 2018

Consultation Code: 05E1NE00-2018-SLI-2230

Event Code: 05E1NE00-2018-E-05209

Project Name: Sunoco Station, 266 Mass Ave, Cambridge, MA

Subject: List of threatened and endangered species that may occur in your proposed project location, and/or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the ECOS-IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the ECOS-IPaC system by completing the same process used to receive the enclosed list.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)(c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:

<http://www.fws.gov/endangered/esa-library/pdf/TOC-GLOS.PDF>

Please be aware that bald and golden eagles are protected under the Bald and Golden Eagle Protection Act (16 U.S.C. 668 *et seq.*), and projects affecting these species may require development of an eagle conservation plan (http://www.fws.gov/windenergy/eagle_guidance.html). Additionally, wind energy projects should follow the wind energy guidelines (<http://www.fws.gov/windenergy/>) for minimizing impacts to migratory birds and bats.

Guidance for minimizing impacts to migratory birds for projects including communications towers (e.g., cellular, digital television, radio, and emergency broadcast) can be found at: <http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/towers.htm>; <http://www.towerkill.com>; and <http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/comtow.html>.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Tracking Number in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment(s):

Official Species List

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

New England Ecological Services Field Office
70 Commercial Street, Suite 300
Concord, NH 03301-5094
(603) 223-2541

Project Summary

Consultation Code: 05E1NE00-2018-SLI-2230

Event Code: 05E1NE00-2018-E-05209

Project Name: Sunoco Station, 266 Mass Ave, Cambridge, MA

Project Type: SPILL / RELEASE

Project Description: Short term (less than 2 months) remediation of petroleum impacted soil and groundwater at 266 Mass Ave, Cambridge, MA, where soil excavation, dewatering, groundwater treatment and discharge is proposed to a storm drain that discharges to the Charles River under an EPA RGP. Proposed remediation and discharge is anticipated to be completed in less than 8 weeks.

Project Location:

Approximate location of the project can be viewed in Google Maps: <https://www.google.com/maps/place/42.35954287658731N71.09403935141972W>



Counties: Middlesex, MA

Endangered Species Act Species

There is a total of 0 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries¹, as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

-
1. [NOAA Fisheries](#), also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

Critical habitats

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

ATTACHMENT F

MACRIS Historic Places Report



Massachusetts Cultural Resource Information System

MACRIS

MACRIS Search Results

Search Criteria: Town(s): Cambridge; Street Name: Massachusetts Ave;

Inv. No.	Property Name	Street	Town	Year
CAM.635	Holmes Block II - Green Block	2-14 Central Sq	Cambridge	1798
CAM.102	First Parish Church, Unitarian	1-3 Church St	Cambridge	1833
CAM.910	Fitchburg Railroad Signal Bridge	Fitchburg Railroad	Cambridge	c 1930
CAM.177	Old Cambridge Baptist Church	398 Harvard St	Cambridge	1867
CAM.260	M. I. T. Alumni Swimming Pool Building	Massachusetts Ave	Cambridge	1940
CAM.261	Kresge Auditorium	Massachusetts Ave	Cambridge	1953
CAM.262	M. I. T. Chapel	Massachusetts Ave	Cambridge	1954
CAM.901	Harvard Square Subway Kiosk	Massachusetts Ave	Cambridge	1928
CAM.905	Massachusetts Avenue Bridge over Conrail	Massachusetts Ave	Cambridge	1900
CAM.916	Central Square Subway Station	Massachusetts Ave	Cambridge	1912
CAM.921	Harvard Bridge	Massachusetts Ave	Cambridge	r 1890
CAM.938	Cambridge Common	Massachusetts Ave	Cambridge	1631
CAM.939	Cambridge Common South Traffic Island	Massachusetts Ave	Cambridge	1976
CAM.945	Burying Ground Fence	Massachusetts Ave	Cambridge	1891
CAM.946	Flagstaff Park	Massachusetts Ave	Cambridge	1913
CAM.947	North Little Common	Massachusetts Ave	Cambridge	c 1858
CAM.949	Central Square Street Pattern	Massachusetts Ave	Cambridge	c 1630
CAM.334	Cambridge Armory	120 Massachusetts Ave	Cambridge	1902
CAM.332	Metropolitan Storage Warehouse	134 Massachusetts Ave	Cambridge	1895
CAM.1366	New England Confectionery Company Factory	250 Massachusetts Ave	Cambridge	1927
CAM.612	Lamson, The	351-355 Massachusetts Ave	Cambridge	1907
CAM.614	Lafayette Square Fire Station	378 Massachusetts Ave	Cambridge	1893

CAM.613	Shell Gas Station	385 Massachusetts Ave	Cambridge	1948
CAM.615	Salvation Army - Cambridge Citadel	400-402 Massachusetts Ave	Cambridge	1968
CAM.604		401-409 Massachusetts Ave	Cambridge	1966
CAM.603	Taylor, William A. House and Shop	411-413 Massachusetts Ave	Cambridge	1887
CAM.602	Barkin and Gorfinkle Building	415-429 Massachusetts Ave	Cambridge	1925
CAM.616	Kennedy, Frank A. Store	424 Massachusetts Ave	Cambridge	1896
CAM.617	Kutz, Issac Store	428 Massachusetts Ave	Cambridge	c 1910
CAM.229	Kennedy, The	430-442 Massachusetts Ave	Cambridge	1890
CAM.601	Robbins Building	433-447 Massachusetts Ave	Cambridge	1923
CAM.619	Blanchard Building	448-450 Massachusetts Ave	Cambridge	c 1886
CAM.324	South Row	452-458 Massachusetts Ave	Cambridge	1807
CAM.1393	Dana Row - South Row	452-458 Massachusetts Ave	Cambridge	2003
CAM.599	Rogers, F. W. and G. M. Building	453-457 Massachusetts Ave	Cambridge	1885
CAM.620	Freedman Building	460-464 Massachusetts Ave	Cambridge	1933
CAM.598	McDonald's Restaurant	463-467 Massachusetts Ave	Cambridge	1974
CAM.621	Central Square Realty Trust Building	468-480 Massachusetts Ave	Cambridge	1929
CAM.597	Moller's Furniture Store	485 Massachusetts Ave	Cambridge	1926
CAM.622	Longfellow, The	492-498 Massachusetts Ave	Cambridge	1893
CAM.596	Kane's Furniture Store	493-507 Massachusetts Ave	Cambridge	1916
CAM.625	Burger King Restaraunt	506 Massachusetts Ave	Cambridge	1970
CAM.1394	Hovey, Phineas Building	512-514 Massachusetts Ave	Cambridge	1842
CAM.595	Central Trust Building	515-527 Massachusetts Ave	Cambridge	1927
CAM.627	Miller Store	520 Massachusetts Ave	Cambridge	1924
CAM.628	Rosenwald Realty Corporation Building	522-526 Massachusetts Ave	Cambridge	1928
CAM.230	Odd Fellows Hall	536 Massachusetts Ave	Cambridge	1884
CAM.629	Clark - Lamb Building	546-550 Massachusetts Ave	Cambridge	c 1873
CAM.630	Albani Building	552-566 Massachusetts Ave	Cambridge	1925
CAM.592	Bullock, Charles Building	567-569 Massachusetts Ave	Cambridge	1859
CAM.591	Central Square Theater	571-577 Massachusetts Ave	Cambridge	1917
CAM.631	Ginsberg Building - Harvard Bazar	572-590 Massachusetts Ave	Cambridge	1913
CAM.590	Morse, Asa P. Building	579-587 Massachusetts Ave	Cambridge	1893
CAM.589	Cambridgeport National Bank Building	593-597 Massachusetts Ave	Cambridge	1869
CAM.632	Manhattan Market - Purity Supreme Super Market	596-610 Massachusetts Ave	Cambridge	1899
CAM.588	Morse, Asa Second Building	599-601 Massachusetts Ave	Cambridge	1905
CAM.587	Fisk and Coleman Building	603-605 Massachusetts Ave	Cambridge	1892
CAM.633	Prospect House	614-620 Massachusetts Ave	Cambridge	1869
CAM.586	Corcoran, John H. Building	615-627 Massachusetts Ave	Cambridge	1927

CAM.634	Holmes Block I	624-638 Massachusetts Ave	Cambridge	1915
CAM.1395	New Holmes Block	624-638 Massachusetts Ave	Cambridge	1998
CAM.585	Woolworth, F. W. Building	633-641 Massachusetts Ave	Cambridge	1950
CAM.584	Watriss Building	643-649 Massachusetts Ave	Cambridge	1880
CAM.583	Dowse, Thomas House	653-655 Massachusetts Ave	Cambridge	1814
CAM.581	New England Gas and Electric Association II Bldg	671-675 Massachusetts Ave	Cambridge	1966
CAM.642	Central Square Building	674 Massachusetts Ave	Cambridge	1926
CAM.643	Chamberlain - Hyde Building	684-688 Massachusetts Ave	Cambridge	1869
CAM.580	Cambridgeport Savings Bank	689 Massachusetts Ave	Cambridge	1904
CAM.644	Dana Building	692-698 Massachusetts Ave	Cambridge	1872
CAM.645	Southwick Building	700-706 Massachusetts Ave	Cambridge	1908
CAM.646	Norris Building	710-720 Massachusetts Ave	Cambridge	1916
CAM.579	Cambridge Electric Light Building	719 Massachusetts Ave	Cambridge	1912
CAM.647	Thayer Building I	722-724 Massachusetts Ave	Cambridge	1863
CAM.648	Thayer Building II	728-730 Massachusetts Ave	Cambridge	1868
CAM.578	Southwick Building	731-751 Massachusetts Ave	Cambridge	1896
CAM.649	Dobbins and Draper Store	736-750 Massachusetts Ave	Cambridge	1922
CAM.650	Dobbins and Draper Store	736-750 Massachusetts Ave	Cambridge	1922
CAM.231	Cambridge Mutual Fire Insurance Company Building	763 Massachusetts Ave	Cambridge	1888
CAM.232	Central Square Post Office	770 Massachusetts Ave	Cambridge	1933
CAM.233	Cambridge City Hall	795 Massachusetts Ave	Cambridge	1889
CAM.651	Cambridge Senior Center	800-806 Massachusetts Ave	Cambridge	1925
CAM.652	Young Men's Christian Association Building	820-830 Massachusetts Ave	Cambridge	1896
CAM.1396	Brusch Medical Center	825-831 Massachusetts Ave	Cambridge	1951
CAM.653	Saint Peter's Episcopal Church	834 Massachusetts Ave	Cambridge	1867
CAM.654	Modern Manor Apartments	842-864 Massachusetts Ave	Cambridge	1925
CAM.900	Houghton Beech Tree	1000 Massachusetts Ave	Cambridge	
CAM.1127	Brentford Hall	1137 Massachusetts Ave	Cambridge	1899
CAM.1128	Dunham, Israel Houses	1156-1166 Massachusetts Ave	Cambridge	1858
CAM.1129		1168 Massachusetts Ave	Cambridge	c 1892
CAM.1130		1170-1174 Massachusetts Ave	Cambridge	c 1849
CAM.1131	Longfellow Court	1200 Massachusetts Ave	Cambridge	1916
CAM.1132	Gulf Gas Station	1201 Massachusetts Ave	Cambridge	1940
CAM.1133		1206 Massachusetts Ave	Cambridge	1965
CAM.1134		1208-1210 Massachusetts Ave	Cambridge	1842
CAM.1135	Quincy Hall	1218 Massachusetts Ave	Cambridge	1891
CAM.1136		1230 Massachusetts Ave	Cambridge	1907

CAM.1137		1234-1238 Massachusetts Ave	Cambridge	c 1894
CAM.1138	Hamden Hall	1246-1260 Massachusetts Ave	Cambridge	1902
CAM.1139	A. D. Club	1268-1270 Massachusetts Ave	Cambridge	1899
CAM.1140	Niles Building	1280 Massachusetts Ave	Cambridge	1984
CAM.234	Fairfax, The	1300-1306 Massachusetts Ave	Cambridge	1869
CAM.1141	Fairfax - Hilton Block	1310-1312 Massachusetts Ave	Cambridge	1883
CAM.1142	Fairfax - Hilton Block	1316 Massachusetts Ave	Cambridge	1885
CAM.235	Porcellian Club	1320-1324 Massachusetts Ave	Cambridge	1890
CAM.1143	Manter Hall	1325 Massachusetts Ave	Cambridge	1885
CAM.236	Wadsworth House	1341 Massachusetts Ave	Cambridge	1726
CAM.237	Holyoke Center	1350 Massachusetts Ave	Cambridge	1961
CAM.1144	Cambridge Savings Bank	1372-1376 Massachusetts Ave	Cambridge	1923
CAM.1145	Read, Joseph Stacey House	1380-1382 Massachusetts Ave	Cambridge	c 1783
CAM.1146	Bartlett, Joseph House	1384-1392 Massachusetts Ave	Cambridge	c 1800
CAM.1147	Harvard Coop Society	1400 Massachusetts Ave	Cambridge	1924
CAM.1148	Harvard Coop Society	1408-1410 Massachusetts Ave	Cambridge	1956
CAM.1149	Harvard Trust Company	1414 Massachusetts Ave	Cambridge	1923
CAM.1150	College House	1420-1442 Massachusetts Ave	Cambridge	1832
CAM.342	Gannett House	1511 Massachusetts Ave	Cambridge	1838
CAM.343	Hemenway Gymnasium	1517 Massachusetts Ave	Cambridge	1938
CAM.344	Hastings Hall	1519 Massachusetts Ave	Cambridge	1888
CAM.345	Harvard Epworth Methodist Church	1555 Massachusetts Ave	Cambridge	1891
CAM.1334	Francis - Allyn House	1564 Massachusetts Ave	Cambridge	1831
CAM.1333	Sawin - Cobb - Wilson House	1626 Massachusetts Ave	Cambridge	1868
CAM.238	Saunders, Charles Hicks House	1627 Massachusetts Ave	Cambridge	1862
CAM.239	Montrose, The	1648 Massachusetts Ave	Cambridge	1898
CAM.240	Dunvegan, The	1654 Massachusetts Ave	Cambridge	1898
CAM.241	Worcester, Frederick House	1734 Massachusetts Ave	Cambridge	1886
CAM.242	North Avenue Congregational Church	1803 Massachusetts Ave	Cambridge	1845
CAM.243	Lovell Block	1853 Massachusetts Ave	Cambridge	1882
CAM.1385	Cambridge Masonic Temple	1950 Massachusetts Ave	Cambridge	1910
CAM.244	Saint James Episcopal Church	1991 Massachusetts Ave	Cambridge	1888
CAM.245	Henderson Carriage Repository	2067-2089 Massachusetts Ave	Cambridge	1892
CAM.246	Cornerstone Baptist Church	2114 Massachusetts Ave	Cambridge	1854
CAM.247	Mead, Alpheus House	2200 Massachusetts Ave	Cambridge	1867
CAM.248	Snow, Daniel House	2210 Massachusetts Ave	Cambridge	1868
CAM.249	McLean, Isaac House	2218 Massachusetts Ave	Cambridge	1894
CAM.250	Farwell, R. H. Double House	2222-2224 Massachusetts Ave	Cambridge	1891
CAM.251	Saint John's Roman Catholic Church	2270 Massachusetts Ave	Cambridge	1904
CAM.1390		2557 Massachusetts Ave	Cambridge	
CAM.593	Powers, Hannah - Ginsberg, Harris Building	7-15 Norfolk St	Cambridge	c 1894

Massachusetts Cultural Resource Information System

Scanned Record Cover Page

Inventory No:	CAM.1366
Historic Name:	New England Confectionery Company Factory
Common Name:	NECCO Candy Factory - Novartis Institutes Biotech
Address:	250 Massachusetts Ave
City/Town:	Cambridge
Village/Neighborhood:	Cambridgeport; Cambridgeport, South
Local No:	68-47,51
Year Constructed:	1927
Architect(s):	Harris, Hegeman Company; Lockwood, Greene and Company; Lutze, F. C.; O'Hagan, Audrey J. S.; Stubbins, Hugh and Associates; Tsoi/Kobus and Associates
Architectural Style(s):	Moderne
Use(s):	Food Processing and Packaging; Industrial Complex or District; Laboratory - Research Facility
Significance:	Architecture; Commerce; Engineering; Industry; Invention; Science; Social History
Area(s):	
Designation(s):	Nat'l Register Individual Property (11/09/2005)
Building Materials(s):	Roof: Synthetic Other Wall: Aluminum; Brick; Bronze; Cast Iron; Limestone; Stucco; Stone, Cut; Concrete, Reinforced; Stone, Veneer Foundation: Concrete, Reinforced



The Massachusetts Historical Commission (MHC) has converted this paper record to digital format as part of ongoing projects to scan records of the Inventory of Historic Assets of the Commonwealth and National Register of Historic Places nominations for Massachusetts. Efforts are ongoing and not all inventory or National Register records related to this resource may be available in digital format at this time.

The MACRIS database and scanned files are highly dynamic; new information is added daily and both database records and related scanned files may be updated as new information is incorporated into MHC files. Users should note that there may be a considerable lag time between the receipt of new or updated records by MHC and the appearance of related information in MACRIS. Users should also note that not all source materials for the MACRIS database are made available as scanned images. Users may consult the records, files and maps available in MHC's public research area at its offices at the State Archives Building, 220 Morrissey Boulevard, Boston, open M-F, 9-5.

Users of this digital material acknowledge that they have read and understood the MACRIS Information and Disclaimer (<http://mhc-macris.net/macrisdisclaimer.htm>)

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Commonwealth of Massachusetts
Massachusetts Historical Commission
220 Morrissey Boulevard, Boston, Massachusetts 02125
www.sec.state.ma.us/mhc

This file was accessed on: Thursday, June 28, 2018 at 5:22: PM

NREMS
11/9/05

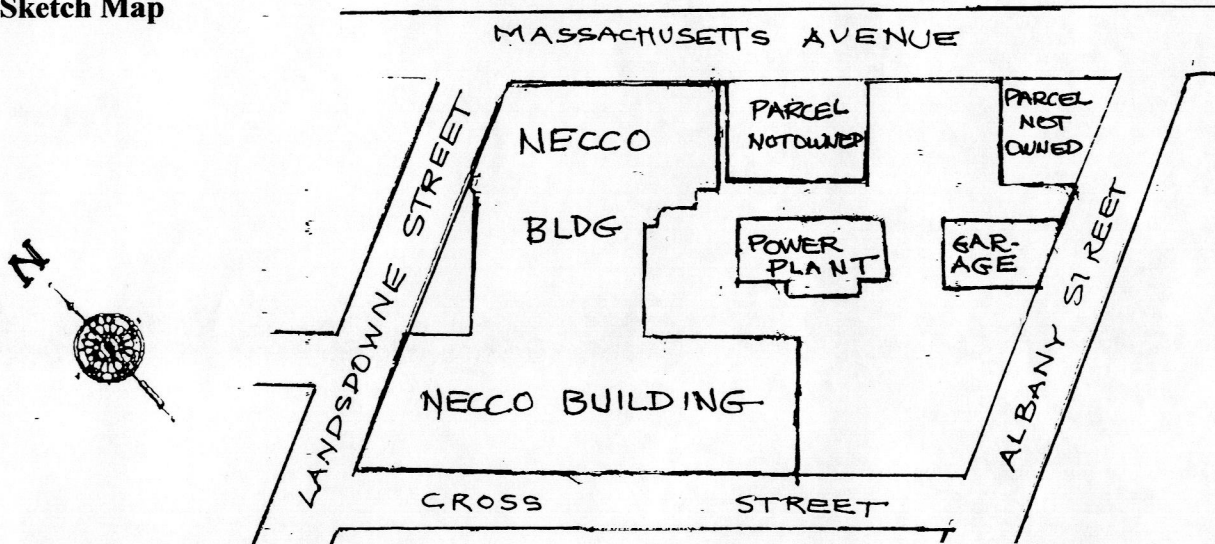
#1366

PL Cambridge
C.A.M., S
BUT, S
SET D**FORM B – BUILDING**

Massachusetts Historical Commission
 Massachusetts Archives Building
 220 Morrissey Boulevard
 Boston, Massachusetts 02125

Photograph

See attached plasticene pages with color photos for Determination of Eligibility

Sketch Map

Recorded by: Frederick W. Lyman

Organization: American Landmarks, LLC, Preservation Consultants

Date August, 2001

Assessor's Number USGS Quad Area(s) Form Number (All to be provided)

City: Cambridge, Massachusetts

Place Central Square/MIT environs

Address: 254 Massachusetts Avenue, Cambridge, MA 02139 (at Albany and Landsdowne Streets)

Historic Name: New England Confectionery Company

Uses: Present: Manufacture of Candies

Original: Manufacture of Candies

Date of Construction: 1925- 1927

Source: Building Records, City of Cambridge

RECEIVED

APR 11 2002

MASS. HIST. COMM

Style/Form Moderne (Industrial)

Architect/Builder: Architects: Lockwood, Greene & Co., Architects & Engineers
(F.C.Lutze, PE Designer)
Builders: Hegeman Harris Company, Inc., Builders

Exterior Material: Reinforced Concrete with Brick and Limestone trim

Foundation: Reinforced Concrete

Wall/Trim: Buff-colored, speckled brick with limestone relief in the form of watertable, decorative trim (e.g. door enframements) and banding .

Roof: Flat (tar and gravel)

Outbuildings/Secondary Structures: Power House; Vehicle garage (3-bay) (Altered).

Major Alterations :

There are remarkably few alterations to the factory of any note. In 1946 most rolled steel casement and hopper window sash which had been original equipment were replaced by translucent glass block in all openings except for the windows of the 6th floor executive offices (which remained 8/8 double hung wood sash with a fixed 8-pane transom sash) and the rear SW wall. That rear elevation was gradually changed over to glass block between 1985 and 1990.

A large smoke stack which once dominated the complex was torn down in three stages over a twenty year period between the 1960s and 1980s.

A three-bay garage bulding not originally part of the complex plan was added to the plan in 1927.

Condition: Excellent

Moved No. Date (not applicable)

Acreage: 3

Setting urban industrial

CAM. 1366
#1366

INVENTORY FORM CONTINUATION SHEET

City: Cambridge, Massachusetts

Property Address: 254 Massachusetts Avenue

Massachusetts Historical Commission

Area(s) Form No.

Massachusetts Archives Building
220 Morrissey Boulevard
Boston, Massachusetts 02125

Architectural Description:

Exterior:

The NECCO factory at 254 Massachusetts Avenue in Cambridge represents a rare surviving and largely unaltered Moderne style manufacturing facility located in a densely populated urban setting.

Occupying a parallelogram-shaped parcel with no setbacks on the north, west, and south sides, the structure rises 6 stories or over 65 feet from street level. The NECCO factory, although designed by an engineer (F. C. Lutze of Lockwood, Greene & Co.) shows the influence of simplified design motifs first exhibited at the Exposition des Arts Decoratifs, held in Paris in 1925. Thus, although rare to have a PE as the lead designer in the 1920s, the expression of function in overall design was not foreign to engineers as a professional group. If anything, as Alfred H. Barr observed in his 1928 article on the Necco factory for *The Arts Magazine* (too often) "*our architects dabble untidily in the past and festoon the bright stark structure of the engineer*". 1.

Constructed of reinforced concrete, the NECCO factory's public facades along Massachusetts Avenue and Landsdowne Street are sheathed principally with speckled beige brick with interspersed limestone banding and decorative trim. On the southernmost end of the Landsdowne Street facade and the entire rear of Cross Street facade this is reversed. Here the dominant surface material being limestone, and the speckled brick serving as a contrasting but less pronounced material of the facade, restricted to interfloor wall panels.

The Massachusetts Avenue facade at ground level is entirely limestone-sheathed. It is punctuated by two shallow-arch recessed openings at either end and by the name *New England Confectionery Company* in bronze letters between the two openings. The westerly of these openings, closed after hours by a handsome pair of cast iron gates, serves as the main pedestrian entrance to the factory and upper level executive offices. The easterly opening, as shown in early renderings by Lockwood Greene & Company, was originally designed and most probably used for a short time as the ceremonial entrance for automobiles and busses entering off Massachusetts Avenue, leading through

to the parking lot at the southeast corner of the complex. This vehicular entrance has for many years been blocked up and sheathed in a stucco to resemble the surrounding limestone facing material.

The factory itself is configured in a c-shape, racked slightly to the southeast to conform to its unusual parcel of land. Overall dimensions are 190' on Massachusetts Avenue, 110' along Landsdowne Street, and 340' from the southwest corner to the easterly end of the building on Cross Street at the rear.

Fenestration is a dominant feature of the c-shaped complex, with window bays on all sides measuring 20' or larger. While original renderings by the architects show a combination of window types (there were said to be twenty different window configurations in the original building). By far the dominant type was rolled steel sash with portions operable in a hopper-style inward-tilting sash. These are clearly shown in original photographs of employees at work stations. The Executive Offices were equipped with 8/8 double-hung wood sash beneath a fixed 8-pane transom. By the 1940s much of the original steel sash had been replaced by translucent glass block, meeting a need for centralized temperature and humidity control throughout the factory. Today all openings are of glass block with small, operable hopper sash at the 6th floor level to serve the Executive Offices.

The flat tar-and-gravel roof is surmounted on the north and east sections of the factory (Massachusetts Avenue and Landsdowne Street facades) by a brick parapet with limestone caps. This parapet becomes a full story at the Northwest corner where the distinctive corner tower defines the main entrance and vertical circulation system for that section of the factory. The elevator head-house is contained within this raised parapet, combining functionality with the deliberate monumentality of the tower.

Extending to the east of the northerly wing of the factory is the original powerhouse surmounted in recent years by two large metal-clad chillers. This building has smaller, vertically-oriented window openings, probably originally rolled steel - now glass block.

A small three-truck vehicular garage building, also altered by the removal of windows and pedestrian doors (similarly blocked in and stuccoed) is found at the east end of the site, its endwall facing Albany Street. It has a deteriorated concrete roof supported beneath by steel trusses and most probably covered by a tar and gravel roof surface.

Interior:

The interior of the factory is strictly utilitarian, with the only exceptions being the first floor lobby and that portion of the the upper-most 6th floor level devoted to offices. Pod-shaped concrete posts and occasional brick firewalls are the only features to interrupt the open space at all levels and all parts of the factory, except for bathrooms, canteen, and medical station. When opened, the factory was equipped with a unique gravity-driven roller belt system to move material along in the manufacturing process. This system included spiral belts between the floors. Shown in early photos, this unpowered system of moving material was long since removed.

INVENTORY FORM CONTINUATION SHEET

City: Cambridge, Massachusetts

Property Address: 254 Massachusetts Avenue

Massachusetts Historical Commission

Area(s) Form No.

Massachusetts Archives Building
220 Morrissey Boulevard
Boston, Massachusetts 02125

Significance/ Historical Narrative:

This factory complex was built to serve as the sole manufactory site for the New England Confectionery Company, commonly known as NECCO. Built between 1925 and its completion in 1927, the NECCO Building is significant on several levels, architectural, commercial and socio-economic.

In 1901 three independent candy companies merged as a State of Maine corporation to form NECCO. These were Chase & Company dating to 1847, Fobes, Hayward & Company (formerly Daniel Fobes Co.) established in 1848, and Wright & Moody, formed in 1856. Three years thereafter, in 1904 the plants were physically consolidated on Summer Street in Boston.

By 1920 the consolidated business had grown to the point that the operation needed a larger parcel of land. In 1921 some 3 acres of land bordered by Massachusetts Avenue on the north, Landsdowne Street in the west, Cross Street on the south and Albany Street on the east were acquired from one Harry F. Simpson. Soon thereafter, \$ 1 million was budgeted for a new factory complex in Cambridge and design work was begun by Lockwood, Greene & Company Architects and Engineers of Boston under the supervision of F. C. Lutze, a structural engineer. Mr Lutze proved to be the ideal designer, adapting an irregular parallelogram-shaped site to the specific industrial needs of a state-of-the art candy making process. Moreover and important, he did so in a refreshingly bold, yet understated Moderne style which met with critical acclaim. In his article entitled The NECCO Factory for The Arts Magazine in 1928, Alfred H. Barr, Jr. wrote that Lutze "*has achieved architecture positively by manipulation of proportions and masses, and by the restrained use of handsomer materials than were structurally necessary; negatively by the utmost economy in decorative motive and by the frank acknowledgement of utilitarian necessity in both plan and elevation.*"¹.

Upon its opening in 1928 the NECCO factory was the largest in the world dedicated solely to the production of candies. It remains the last and best example of pre-WWII industrial construction in Cambridge and occupies a prominent site on Massachusetts Avenue between MIT and Central Square, noticed daily by thousands.

NEECO traced its success to the invention of a lozenge cutting machine, and later the sugar pulverizing process, both patented by Oliver B. Chase of Chase & Company and demonstrated to much acclaim at the Centennial Exhibition in Philadelphia in 1876.

After a period of difficulty in the mid 20th century, NECCO was acquired in 1963 by UIS, a closely-held New York company. Under the leadership of Domenic Antonellis who took over in 1968, NECCO has regained a prominent place in the confectionery industry. Its present sales approach 100 million dollars per year.

NECCO's flagship Necco Wafers lozenge candy is one of many well-known brands produced and marketed by NECCO. Others include the Clark Bar, Mary Janes, SkyBar and Candy "Conversation" Hearts, the edible valentine routinely exchanged by children everywhere in the US.

As observed by the Cambridge Historical Commission, at the time the Cambridge NECCO factory opened in 1928 it *"included all the leading technology of the industry, including air conditioning, a rail spur to deliver sugar and other raw materials in bulk"* (therefore eliminating costly cartage fees), *"its own power plant, fire protection, laboratories, engineering office, and a staffed medical center."*²

In its heyday, NECCO was the largest of many candy manufacturers in Cambridge, which at one time boasted nearly thirty such concerns. Over the years NECCO has served as a reliable and socially-conscious employer to generations of immigrant families new to the US.

During World War II, due to its proximity to MIT and Harvard University, portions of the NECCO factory were loaned for the development of war-related technologies. In addition, the company provided candy to troops and published pamphlets saluting its own employees overseas for the war efforts in both World Wars.

1. Barr, Alfred H., Jr. The NECCO Factory", The Arts Magazine, May 1928

2. Burks, Sarah L. Memorandum to the Cambridge Historical Commission, August 2001



NORTH (CL) AND WEST (CR) FACADES FROM MASS. AVE.



MASS. AVE. FACADE (CN)



EAST AND NORTH FACADES OF NORTH WING ON MASS. AVE.



LANDSDOWNE CLS AND GROSS ST (R) (SOUTH FACADES)



SOUTH (L) AND EAST (R) FACADES FROM ALBANY ST.



EAST FACADE (L) AND POWER PLANT + GARAGE (R)



EAST FACADE WITH POWER PLANT ON RIGHT



NORTH FACADES OF SOUTH WING (REAR) AND POWER PLANT (FRONT)



6TH FL. OFFICE ROW CORRIDOR



LANDSDOWNE ST (W) FACADE
LOOKING NORTH



NW CORNER TOWER

Original yellow form: Eligibility file
Copies: Inventory form
Town file(w/corresp.)
Macris
NR director _____

*pete
add info
for NECCO
- should be
considered a
complex of 3
- Taya!*

CAM. 1366

Community: CAM

MHC OPINION: ELIGIBILITY FOR NATIONAL REGISTER

Date Received: 9/26/01 add. info.

Date Due:

Date Reviewed: 10/3/01

Type: ☒ Individual (COMPLEX) — District (Attach map indicating boundaries)

Name: New England Confectionery Company (NECCO)

Inventory Form: ~~N/A~~

Address: 254 Massachusetts Avenue

Requested by: 1366

Action: —Honor ☒ ITC —Grant —R & C —Other:

Agency:

Staff in charge of Review: TD

INDIVIDUAL PROPERTIES

☒ Eligible - AS A COMPLEX
— Eligible, also in district
— Eligible only in district
— Ineligible
— More information needed

DISTRICTS

— Eligible
— Ineligible
— More information needed

CRITERIA: ☒ A —B ☒ C —D

LEVEL: ☒ Local ☒ State —National

STATEMENT OF SIGNIFICANCE by Taya Dixon

Additional information submitted as part of the HPCA indicates that the NECCO factory consists of three buildings, the main Art Deco factory block, the power plant building, and the garage building. The power plant and the garage buildings were constructed during the same time period as the main factory block and are functionally related and contribute to the significance of the complex. Therefore, the three buildings should be addressed in a National Register nomination for the NECCO Complex.

Community: CAM

MHC OPINION: ELIGIBILITY FOR NATIONAL REGISTER

Date Received: 8/10/01

Date Due:

Date Reviewed: 8/15/01

Type: ☒ Individual ☐ District (Attach map indicating boundaries)

Name: New England Confectionery Company (NECCO)

Inventory Form: N/A

Address: 254 Massachusetts Avenue

Requested by:

Action: ☐ Honor ☒ ITC ☐ Grant ☐ R & C ☐ Other: 1366

Agency:

Staff in charge of Review: SW

INDIVIDUAL PROPERTIES

- ☒ Eligible
☐ Eligible, also in district
☐ Eligible only in district
☐ Ineligible
☐ More information needed

DISTRICTS

- ☐ Eligible
☐ Ineligible
☐ More information needed

CRITERIA: ☒ A ☐ B ☒ C ☐ D

LEVEL: ☒ Local ☒ State ☐ National

STATEMENT OF SIGNIFICANCE

The New England Confectionary Company building, commonly known as the NECCO factory, is a rare and largely unaltered surviving example of a Moderne style manufacturing facility located in a densely populated urban setting.

This 6-story reinforced concrete factory building is the home of NECCO, makers of the NECCO Wafers lozenge candy, "conversation" hearts, Clark Bar, Mary Janes and SkyBar. The Mass Ave and Landsdowne Street facades are sheathed with speckled beige brick and limestone banding and trim. The building was constructed between 1925-1927 and was designed by Lockwood, Greene & Co., an engineering firm that also designed the Schraffts candy factory in Charlestown. There have been few alterations, although the original rolled steel casement and hopper window sash were replaced in 1946 with translucent glass block in all openings except for the windows of the 6th floor executive offices that retain 8/8 wood sash with a fixed 8-pane transom. A prominent smokestack was torn down between 1960s and 1980s.

In 1901 the NECCO company was formed by a union of three firms, Chase and Company (1847), Fobes, Hayward and Company (1848) and Wright and Moody (1856). Oliver Chase, founder of Chase and Company, was the inventor of the first American candy machine, the lozenge cutter, in 1847. His brother Daniel invented the Lozenge Printing Machine, creating "Conversation Candies" a forerunner of the popular "conversation hearts," introduced in 1902. The NECCO's first building was a manufacturing plant at Summer and Melcher Streets in Boston. Some interesting facts: NECCO Wafers were brought to the Arctic by Donald MacMillan in 1913 and to the South Pole in the 1930s by Admiral Byrd; in low humidity, wintergreen NECCO wafers spark in the dark when broken; over 120 NECCO Wafers are consumed every second of every day throughout the year.

When the factory was opened in 1927, it was the largest factory in the world with its entire space devoted to the manufacture of candy. In 1942, the NECCO turns over a portion of its plant for manufacturing war materials. NECCO acquires the Stark Candy Company in 1990, makers of the Mary Jane Brand (which founded and manufactured in Paul Revere's former house in Boston). To commemorate its 150th anniversary in 1996, the company painted the water tower atop the factory in the familiar NECCO Wafer roll colors.

Retains setting, location, design, workmanship, feeling, association and materials. A and C, local and state level.