HALEY & ALDRICH, INC.
465 Medford Street, Suite 2200
Boston, MA 02129
(617) 886.7400

13 October 2020
File No. 134283-002

US Environmental Protection Agency
Office of Ecosystem Protection
5 Post Office Square – Suite 100 (OEP06-01)
Boston, MA 02109-3912

Attention: EPA/OEP RGP Applications Coordinator

Subject: Notice of Intent (NOI)
NPDES RGP Temporary Construction Dewatering
MIT Schwarzman College of Computing – STV-4 Steam Utility Replacement
Cambridge, Massachusetts

Ladies and Gentlemen:

On behalf of our client, Massachusetts Institute of Technology (MIT), and in accordance with the National Pollutant Discharge Elimination System (NPDES) Remediation General Permit (RGP) in Massachusetts, MAG910000, this letter submits a Notice of Intent (NOI) and the applicable documentation as required by the US Environmental Protection Agency (EPA) for temporary construction site dewatering under the RGP. Haley & Aldrich, Inc. (Haley & Aldrich) has prepared this submission to facilitate off-site discharge of temporary dewatering during the utility structure replacement work at the future Building 45 construction site. The project site ("Site") is located on Vassar Street in Cambridge, Massachusetts as shown on Figure 1. The Site is located within the MIT campus and is most recently occupied by the Building 44 (MIT Cyclotron building), which is currently undergoing demolition.

SITE CONDITIONS

The site is a paved parking area immediately north of Building 44. The site is bordered to the north by an active rail line, to the east by the Brain and Cognitive Sciences Building (Building 46), and to the west by the MIT Central Utility Plant. The site contains several utility distribution lines connecting to the Central Utility Plant. The site's ground surface is primarily flat ranging from El. 18 to El. 20 Cambridge City Base (CCB).

Proposed Development

The sitework is the replacement of a steam line that runs through the area parallel to and north of Building 44 and an associated utility structure (Figure 2). The steam utility is being replaced as part of enabling phase work for the proposed Schwarzman College of Computing Building to be constructed at

the site following the demolition of Building 44. Bottom of excavation in the work area is expected to terminate approximately 10 feet below ground surface (ft bgs), which is approximately 3 ft below anticipated groundwater level previously reported in the work area.

Historical Site Usage

Historic maps indicate the area of land now occupied by the MIT campus was previously marshland in the Charles River Basin. Plans to fill and develop this portion of the marshland began as early as 1840 with the acquisition of titles to the land and culminated in 1881. Land filling began with the construction of a portion of a granite sea wall in 1883. By 1899, filling of the entire future MIT campus had been completed. MIT purchased the land in 1912 and began construction of the Main Campus buildings in 1913. Construction of the Main Campus buildings was completed by 1916 at which time the school moved across the Charles River from its original Back Bay campus location. A campus building was present at the site beginning in 1950 until it was replaced with Building 44 in 1962 and the site has not changed in use since that time.

Site Characterization and Regulatory Status

As part of due diligence activities in preparation for site redevelopment, Haley & Aldrich conducted a subsurface investigation in July and August 2020 to assess soil and groundwater conditions. Soil and groundwater testing conducted at the site to date have indicated that low levels of total lead, and polycyclic aromatic hydrocarbons (PAHs) were identified comingled in urban fill soil in excess of applicable Massachusetts Contingency Plan (MCP) RCS-1 Reportable Concentrations. The site is underlain by urban fill, comprised of varying amounts of cinders and ash, containing chemical constituents, including petroleum hydrocarbons (TPH), metals, and PAHs, at levels typical of urban fill and this area of Cambridge. The constituents detected in site soil are attributable to historic site uses and filling consistent with the presence of coal and coal ash.

A 120-day Reportable Condition exists at the site in soil, for which a Release Notification Form (RNF) was submitted on 5 October 2020 to meet the requirements of the MCP. MassDEP subsequently assigned Release Tracking Number (RTN) 3-36513to the site. Because this site is a MCP Disposal Site, a dewatering permit from MassDEP is not required.

GROUNDWATER QUALITY DATA

Site Groundwater Quality Data

Groundwater conditions at the site were determined by measurements obtained during the groundwater sampling event from the observation well identified as HA20-E3(OW). The location of the well is shown on Figure 2. The elevation of the groundwater at the site, as measured in the HA20-E3 observation well and as estimated during boring advancement, ranged from between El. 10.4 to 9.95 (9.3 to 9.8 ft bgs). Previous test pits in the work area by others observed depth to groundwater in the work area of approximately 7 ft bgs.

Site-specific groundwater analytical data was obtained by Haley & Aldrich, Inc. from a groundwater sampling event on 10 September 2020. Observation well HA20-E3(OW) was sampled for EPA 2017 NPDES RGP parameters and submitted to Alpha Analytical Laboratories of Westborough, Massachusetts. The analytical results indicated most parameters were non-detect, including Group I PAHs, TPH, BTEX, and PCBs. Very low levels of fuel parameters and inorganic compounds were detected. The recent groundwater analyses did not detect concentrations of chemical constituents above applicable MCP reportable concentrations or NPDES RGP discharge criteria.

A summary of the groundwater chemical analytical data is provided in Table I. Copies of the laboratory data reports are provided in Appendix F.

Receiving Water Quality Information and Dilution Factor

The receiving water is the Charles River Basin which flows to the east toward the Charles River Dam. Receiving water quality data, collected by Haley & Aldrich on 10 September 2020, was used in support of this NOI. The sample, designated as "Outfall-20200910", was submitted to Alpha for analysis of hardness, total metals, and ammonia. Receiving water temperature and pH was obtained in the field and is noted on the effluent limitations input calculation page in Appendix C. The approximate location of the receiving water sample is shown on Figure 2.

The seven day-ten-year flow (7Q10) of the receiving water was established using the U.S. Geological Survey (USGS) StreamStats program and confirmed by Massachusetts Department of Environmental Protection (MassDEP) on 18 September 2020. The StreamStats Report, Dilution Factor calculations, and MassDEP confirmation of the 7Q10 and DF are included in Appendix C.

Copies of the "EnterData" and "FreshwaterResults" tabs from the excel file provided as an additional resource by EPA are included in Appendix C. The effluent limitations calculated are included for reference in Table I.

Dewatering System and Off-site Discharge

Dewatering will be conducted from sumps or well points located inside or adjacent to the excavation. Dewatering is currently anticipated to begin in October 2020 and is anticipated to be required for less than 12 months. On average, we estimate effluent discharge rates of about 25 gallons per minute (gpm), with occasional peak flows of approximately 100 gpm during significant precipitation events.

Prior to discharge, collected watering will be routed through a sedimentation tank and bag filter, at a minimum, to remove suspended solids and undissolved chemical constituents associated with the fill soils (metals and PAHs), as shown in the Proposed Treatment System Schematic included in Figure 3 herein. Construction dewatering under this RGP will include piping and discharging to storm drains located within and near the Site. The storm drains travel a short distance south and discharge directly into the Charles River. The proposed outfall location on the Charles River is a City of Cambridge Outfall #D08OF0010. The discharge route is shown on Figure 2, Proposed Dewatering Discharge Route.

A Best Management Practices Plan (BMPP), which outlines the proposed discharge operations covered under the RGP, will be available at the Site and is not being submitted with this NOI.

DETERMINATION OF ENDANGERED SPECIES ACT ELIGIBILITY

According to the guidelines outlined in Appendix I of the 2017 NPDES RGP, a preliminary determination for the action area associated with this project was established using the U.S. Fish and Wildlife Service (FWS) Information, Planning, and Conservation (IPAC) online system; a copy of the determination is attached in Appendix D. Based on the results of the determination, the project and action area are considered to meet FWS Criterion A as no listed species or critical habitat have been established to be present within the project action area.

DOCUMENTATION OF NATIONAL HISTORIC PRESERVATION ACT ELIGIBILITY REQUIREMENTS

Based on a review of the resources provided by the U.S. National Register of Historic Places and a review of the Massachusetts Cultural Resource Information System (MACRIS), no historic properties have been established to be present at the project site, and discharges and discharge-related activities are not considered to have the potential to affect historic properties. The discharge is considered to meet Criterion A. Documentation is included in Appendix E.

SUPPLEMENTAL INFORMATION

Owner and Operator Information

Owner/Operator:
Massachusetts Institute of Technology
77 Massachusetts Avenue
Building NW23-100
Cambridge, Massachusetts 02139-4307
Contact: Seth Kinderman

Appendices

The completed "Suggested Notice of Intent" (NOI) form as provided in the RGP is enclosed in Appendix A. The Site owner is MIT, who will hire a subcontractor to conduct the Site work, including the dewatering activities and will serve as the Operator. Haley & Aldrich, Inc. (Haley & Aldrich) will monitor the Contractor's dewatering activities on behalf of MIT. In accordance with the requirements for this NOI submission, MIT as owner and United Civil as the construction manager are listed as co-permittees for this NPDES RGP, and therefore both have signed the NOI form.

Discharge calculations to determine the dilution factor based on 7-day 10-year low flow values are included in Appendix B. Chemicals and additives information to be potentially used for the treatment system is included in Appendix C (pending submission of a Notice of Change for EPA review and approval). Appendices D and E include the Endangered Species Act Documentation and National Register of Historic Places, respectively. Copies of the groundwater testing laboratory results are provided in Appendix F.

CLOSING

Thank you very much for your consideration. Please feel free to contact us should you wish to discuss the information contained herein or if you need additional information.

Sincerely yours,
HALEY & ALDRICH, INC.

Kimberly Scalise	Todd R. Butler, P.E.	Joel S. Mooney, P.E., LSP
Senior Geologist	Project Manager	Principal | Senior Vice President

Attachments:

Table I – Summary of Groundwater Data
Figure 1 – Site Locus
Figure 2 – Proposed Dewatering Discharge Route
Figure 3 – Proposed Treatment System Schematic

Appendix A – Notice of Intent (NOI) for Remediation General Permit (RGP)
Appendix B – Discharge Calculations
Appendix C – Chemicals and Additives
Appendix D – Endangered Species Act Documentation
Appendix E – National Register of Historic Places and Massachusetts Historical Commission Documentation
Appendix F – Laboratory Data Reports

c: MIT Facilities: Phyllis Carter, Travis Wanat, Seth Kinderman

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TABLE I
SUMMARY OF GROUNDWATER DATA
MIT SCHWARZMAN COLLEGE OF COMPUTING
CAMBRIDGE, MA
FILE NO. 134283

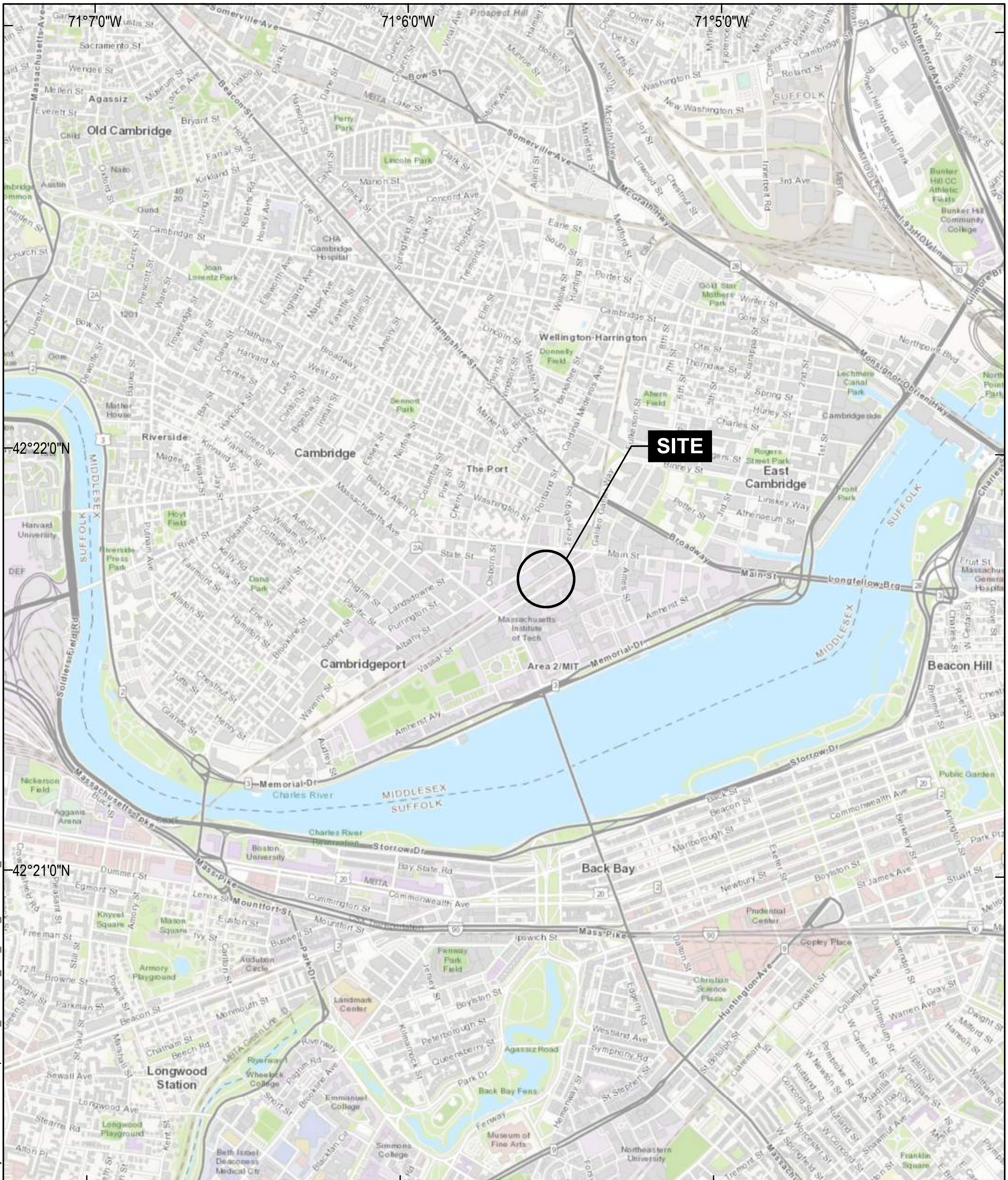
Precharacterization Grid	Action Level			
Location Name	MCP	2017 NPDES	HA20-E3	OUTFALL
Sample Name	Reportable	RGP	HA20-E3-20200910	OUTFALL-20200910
Sample Date	Concentration	Site-Specific	09/10/2020	09/10/2020
Lab Sample ID	RCGW-2	Criteria	L2037651-01	L2037651-02
Volatile Organic Compounds (ug/L)				
1,1,1-Trichloroethane	4000	200	ND (2)	-
1,1,2-Trichloroethane	900	5	ND (1.5)	-
1,1-Dichloroethane	2000	70	ND (1.5)	-
1,1-Dichloroethene	80	3.2	ND (1)	-
1,2-Dibromoethane (Ethylene Dibromide)	2	0.05	ND (0.01)	-
1,2-Dichlorobenzene	2000	600	ND (5)	-
1,2-Dichloroethane	5	5	ND (1.5)	-
1,3-Dichlorobenzene	6000	320	ND (5)	-
1,4-Dichlorobenzene	60	5	ND (5)	-
Acetone	50000	7970	ND (10)	-
Benzene	1000	5	ND (1)	-
Carbon tetrachloride	2	4.4	ND (1)	-
cis-1,2-Dichloroethene	20	70	ND (1)	-
Ethylbenzene	5000	NA	ND (1)	-
m,p-Xylenes	NA	NA	ND (2)	-
Methyl Tert Butyl Ether	5000	70	ND (10)	-
Methylene chloride	2000	4.6	ND (1)	-
o-Xylene	NA	NA	ND (1)	-
Tert-Amyl Methyl Ether (TAME)	NA	90	ND (20)	-
Tert-Butyl Alcohol (tert-Butanol)	NA	NA	ND (100)	-
Tetrachloroethene	50	5	ND (1)	-
Toluene	40000	NA	ND (1)	-
Trichloroethene	5	5	ND (1)	-
Vinyl chloride	2	2	ND (1)	-
Xylene (total)	3000	NA	ND (1)	-
Total BTEX	NA	100	ND	-
SUM of Volatile Organic Compounds	NA	NA	ND	-
Volatile Organic Compounds SIM (ug/L)				
1,4-Dioxane	6000	200	ND (50)	-
Semi-Volatile Organic Compounds (ug/L)				
bis(2-Ethylhexyl)phthalate	50000	101	ND (2.2)	-
Butyl benzylphthalate	10000	NA	ND (5)	-
Diethyl phthalate	9000	NA	ND (5)	-
Dimethyl phthalate	50000	NA	ND (5)	-
Di-n-butylphthalate	5000	NA	ND (5)	-
Di-n-octyl phthalate	100000	NA	ND (5)	-
Total Phthalates	NA	190	ND	-
Semi-Volatile Organic Compounds (SIM) (ug/L)				
Acenaphthene	6000	NA	ND (0.1)	-
Acenaphthylene	40	NA	ND (0.1)	-
Anthracene	30	NA	ND (0.1)	-
Benzo(a)anthracene	1000	1	ND (0.1)	-
Benzo(a)pyrene	500	1	ND (0.1)	-
Benzo(b)fluoranthene	400	1	ND (0.1)	-
Benzo(g,h,i)perylene	20	NA	ND (0.1)	-
Benzo(k)fluoranthene	100	1	ND (0.1)	-
Chrysene	70	1	ND (0.1)	-
Dibenz(a,h)anthracene	40	1	ND (0.1)	-
Fluoranthene	200	NA	0.1	-
Fluorene	40	NA	ND (0.1)	-
Indeno(1,2,3-cd)pyrene	100	1	ND (0.1)	-
Naphthalene	700	20	13.2	-
Pentachlorophenol	200	1	ND (1)	-
Phenanthrene	10000	NA	0.267	-
Pyrene	20	NA	ND (0.1)	-
SUM of Group I PAHs	NA	1	ND	-
SUM of Group II PAHs	NA	100	13.567	-
SUM of Semi-Volatile Organic Compounds (SIM)	NA	NA	13.567	ND
Total Petroleum Hydrocarbons (ug/L)				
Petroleum hydrocarbons	5000	5000	ND (4400)	-
Inorganic Compounds (ug/L)				
Antimony, Total	8000	206	ND (20)	ND (20)
Arsenic, Total	900	104	6.02	ND (5)
Cadmium, Total	4	10.2	ND (1)	ND (1)
Chromium, Total	300	NA	ND (5)	ND (5)
Chromium III (Trivalent)	600	323	ND (10)	ND (10)
Chromium VI (Hexavalent), Dissolved	300	323	ND (10)	ND (10)
Copper, Total	100000	242	ND (5)	ND (5)
Cyanide, Physiologically Available, Total	NA	NA	ND (5)	-
Cyanide (free), Total	NA	NA	ND (2)	-
Hardness, Total	NA	NA	159000	387000
Iron, Total	NA	5000	568	109
Lead, Total	10	160	ND (5)	ND (5)
Mercury, Total	20	0.739	ND (0.2)	ND (0.2)
Nickel, Total	200	1450	ND (10)	ND (10)
Selenium, Total	100	235.8	ND (25)	ND (25)
Silver, Total	7	35.1	ND (2)	ND (2)
Zinc, Total	900	420	ND (50)	ND (50)
Other				
pH (lab), Total (pH units)	NA	NA	7	7.9
Ammonia, Total (ug/L)	NA	Report	397	121
Chloride, Total (ug/L)	NA	Report	731000	-
Chlorine, residual, Total (ug/L)	NA	200	ND (20)	-
Cyanide, Total (ug/L)	30	178	ND (5)	-
Total Phenols (ug/L)	NA	1080	ND (30)	-
Total Suspended Solids (TSS) (ug/L)	NA	30000	6100	-
Pesticides and PCBs (ug/L)				
Aroclor-1016 (PCB-1016)	5	NA	ND (0.25)	-
Aroclor-1221 (PCB-1221)	5	NA	ND (0.25)	-
Aroclor-1232 (PCB-1232)	5	NA	ND (0.25)	-
Aroclor-1242 (PCB-1242)	5	NA	ND (0.25)	-
Aroclor-1248 (PCB-1248)	5	NA	ND (0.25)	-
Aroclor-1254 (PCB-1254)	5	NA	ND (0.25)	-
Aroclor-1260 (PCB-1260)	5	NA	ND (0.2)	-
Total PCBs	NA	0.000064	ND	-

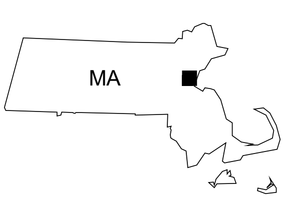
ABBREVIATIONS:

- : Not analyzed
ug/l: micrograms per liter
NA: Not Applicable
ND (2.5): Result not detected above reporting limit (shown in parentheses)
SU: Standard Units

NOTES:

1. Analytes detected in at least one sample are reported herein. For a complete list of analytes see the laboratory data sheets.
3. **Blue bold** values indicate an exceedance of the applicable site-specific 2017 RGP Criteria.
2. **Bold** values indicate an exceedance of applicable 2014 RCGW-2 Concentrations.





MAP SOURCE: ESRI
SITE COORDINATES: 42°21'42"N, 71°5'32"W

HALEY ALDRICH

THE STEPHEN A. SCHWARZMAN COLLEGE OF COMPUTING
51 VASSAR STREET
CAMBRIDGE, MASSACHUSETTS

PROJECT LOCUS

APPROXIMATE SCALE: 1 IN = 2000 FT
SEPTEMBER 2020

FIGURE 1

GIS FILE PATH: \\haleyaldrich.com\share\CF\Projects\134283\GIS\Maps\2019_10\13483_002_0001_PROJECT_LOCUS.mxd — USER: hwachholz — LAST SAVED: 10/17/2019 1:03:47 PM

LEGEND

HA20-E3 — DESIGNATION AND APPROXIMATE LOCATION OF GROUNDWATER OBSERVATION WELL HA20-E3 INSTALLED xx xx xx

ROUTE OF DISCHARGE WATER

FLOW DIRECTION

DISCHARGE LOCATION

PROJECT WORK AREA

PROPOSED DISCHARGE POINT TO STORMDRAIN SYSTEM

HA20-E3

APPROXIMATE LOCATION OF RECEIVING WATER SAMPLE COLLECTED 10 SEPTEMBER 2020

CITY OF CAMBRIDGE OUTFALL LOCATION NO. D08OF0010

30" RIVER WATER INTAKE & DISCHARGE

OUTFALL INTO THE CHARLES RIVER (TYP.)

HARVARD BRIDGE

MEMORIAL DRIVE

VASSAR STREET

AMES STREET

BROAD INSTITUTE (NE30)

MIT.nano

THE STEPHEN A. SCHWARZMAN COLLEGE OF COMPUTING
MASSACHUSETTS INSTITUTE OF TECHNOLOGY
51 VASSAR STREET
CAMBRIDGE, MASSACHUSETTS

PROPOSED DEWATERING DISCHARGE ROUTE

SCALE: AS SHOWN
SEPTEMBER 2020

FIGURE 2

FILE_ID : SS_2018-R2

Department of Facilities
Massachusetts Institute of Technology

Campus Utility Distribution

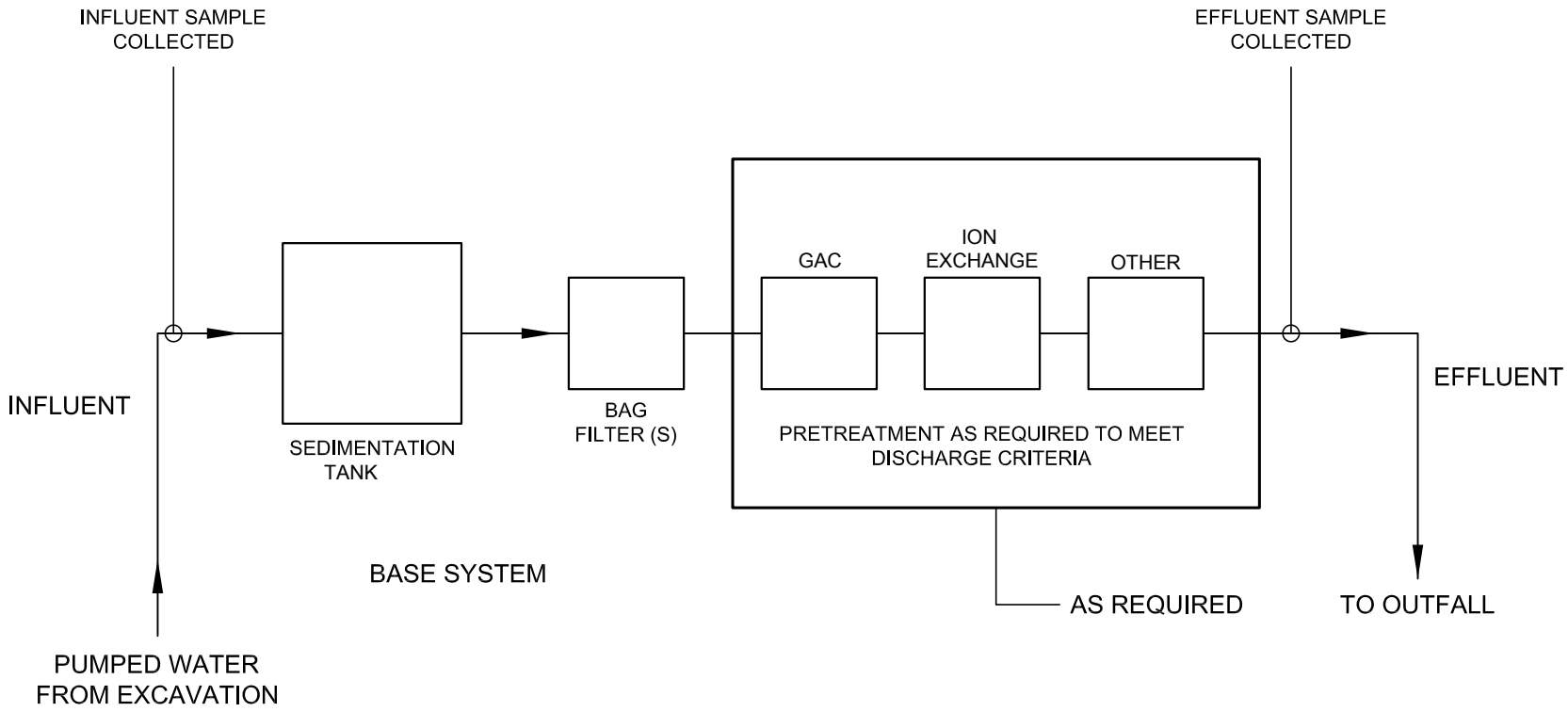
REVISIONS		
NO.	DESCRIPTION	DATE
63	CAMPUS BASEMAP UPDATE/Rem. E48; added NE36, NE103, W53C-W53G, 42C	07.12.18
64	BLDG 42C/CONSTRUCTION DOCUMENTS	07.12.18
65	MIT SITE 4 GARAGE ENABLING/GENERAL REVISIONS	07.12.18
66	CAMPUS BASEMAP UPDATE/Removed EE20, 5A-E & Added MIT.nano Landscape	10.25.18
67	BLDG W36 FIELD HOUSE AREA/GENERAL REVISIONS	10.25.18
68	BLDG 12/GENERAL REVISIONS	01.17.19

DATE : 03.16.01
DRAWN : I. Arestova
SCALE : 1" = 100'

N

Storm & Sanitary
Main Campus

SS3
SHEET 3 of 6



LEGEND:

DIRECTION OF FLOW

NOTE:

1. DETAILS OF TREATMENT SYSTEM MAY VARY FROM SYSTEM INDICATED ABOVE. SPECIFIC MEANS AND METHODS OF TREATMENT TO BE SELECTED BY CONTRACTOR. WATER WILL BE TREATED TO MEET REQUIRED EFFLUENT STANDARDS.

HALEY ALDRICH

SCHWARZMAN COLLEGE OF COMPUTING
STV-4 STEAM UTILITY REPLACEMENT
MASSACHUSETTS INSTITUTE OF TECHNOLOGY
CAMBRIDGE, MASSACHUSETTS

PROPOSED TREATMENT SYSTEM SCHEMATIC

SCALE: NONE
SEPTEMBER 2020

FIGURE 3

APPENDIX A

Notice of Intent (NOI) for Remediation General Permit (RGP)

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

A. General site information:

<table>
<tr><td rowspan="2">1. Name of site:
Massachusetts Institute of Technology - Stephen A. Schwarzman College of Computing</td><td colspan="3">Site address: 51 Vassar Street
Street:</td></tr>
<tr><td>City: Cambridge</td><td>State: MA</td><td>Zip: 02142</td></tr>
<tr><td rowspan="3">2. Site owner
Massachusetts Institute of Technology

Owner is (check one): ☐ Federal ☐ State/Tribal ■ Private
■ Other; if so, specify: Institution</td><td colspan="3">Contact Person: Seth Kinderman</td></tr>
<tr><td colspan="2">Telephone: 617-258-6221</td><td>Email: skinderm@mit.edu</td></tr>
<tr><td colspan="3">Mailing address: 77 Massachusetts Avenue, Bldg NW23-100
Street:
City: Cambridge | State: MA | Zip: 02139</td></tr>
<tr><td rowspan="3">3. Site operator, if different than owner
United Civil</td><td colspan="3">Contact Person: KYLE BOUTHILLIER</td></tr>
<tr><td colspan="2">Telephone: 978-304-1597</td><td>Email: kbouthillier@united-civil.com</td></tr>
<tr><td colspan="3">Mailing address:
Street: 30 Log Bridge Road, Bldg 100
City: Middleton | State: MA | Zip: 01949</td></tr>
<tr><td>4. NPDES permit number assigned by EPA:
N/A

NPDES permit is (check all that apply: ■ RGP ☐ DGP ☐ CGP
☐ MSGP ☐ Individual NPDES permit ☐ Other; if so, specify:</td><td colspan="3">5. Other regulatory program(s) that apply to the site (check all that apply):
■ MA Chapter 21e; list RTN(s): 3-36513
☐ NH Groundwater Management Permit or Groundwater Release Detection Permit:
☐ CERCLA
☐ UIC Program
☐ POTW Pretreatment
☐ CWA Section 404</td></tr>
</table>

B. Receiving water information:

1. Name of receiving water(s):	Waterbody identification of receiving water(s):	Classification of receiving water(s):
Charles River	MA72-38	Class B

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. The Lower Charles River is on the MA Integrated List and all uses are considered impaired. TMDL is available for Pathogens and Phosphorus.

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.	29.2
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.	132.04

6. Has the operator received confirmation from the appropriate State for the 7Q10and dilution factor indicated? (check one): ■ Yes ☐ No
If yes, indicate date confirmation received: 18 September 2020

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

C. Source water information:

1. Source water(s) is (check any that apply):

☐ Contaminated groundwater	☐ Contaminated surface water	☐ The receiving water	☐ Potable water; if so, indicate municipality or origin:
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	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	☐ A surface water other than the receiving water; if so, indicate waterbody:	■ Other; if so, specify: construction site dewatering

2. Source water contaminants: Fluoranthene, Naphthalene, phenanthrene, arsenic, iron	
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): CITY OF CAMBRIDGE OUTFALL LOCATION NO. D08OF0010	Outfall location(s): (Latitude, Longitude) Approx. 42.35509, -71.09036 (Refer to Figure 2 of Haley & Aldrich Letter)
Discharges enter the receiving water(s) via (check any that apply): ☐ Direct discharge to the receiving water ■ Indirect discharge, if so, specify: ☐ 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: City of Cambridge application for dewatering discharge submitted concurrently with NPDES NOI Has the operator attached a summary of any additional requirements the owner of this system has specified? (check one): ☐ Yes ☐ No	
Provide the expected start and end dates of discharge(s) (month/year): October 2020 - April 2021 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	

<table>
<tr><td>2. Activity Category: (check all that apply)</td><td colspan="2">3. Contamination Type Category: (check all that apply)</td></tr>
<tr><td rowspan="5">☐ 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</td><td colspan="2">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</td></tr>
<tr><td colspan="2">b. If Activity Category III, IV, V, VI, VII or VIII: (check either G or H)</td></tr>
<tr><td>■ G. Sites with Known Contamination</td><td>☐ H. Sites with Unknown Contamination</td></tr>
<tr><td>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>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>

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	4500NH3	0.075	0.397	0.397	Report mg/L	---
Chloride		✓	1	300.0	0.025	.731	.731	Report µg/l	---
Total Residual Chlorine	✓		1	4500CL-D	0.02	<0.02	<0.02	0.2 mg/L	50
Total Suspended Solids		✓	1	2540D	5	<5	<5	30 mg/L	---
Antimony	✓		1	3,200.8	20	<20	<20	206 µg/L	761
Arsenic		✓	1	3,200.8	5	6.02	6.02	104 µg/L	12
Cadmium	✓		1	3,200.8	1	<1	<1	10.2 µg/L	0.5280
Chromium III	✓		1	107,-	10	<10	<10	323 µg/L	177.2
Chromium VI	✓		1	7196A	10	<10	<10	323 µg/L	13.6
Copper	✓		1	3,200.8	5	<5	<5	242 µg/L	19.6
Iron		✓	1	3,200.8	50	568	568	5,000 µg/L	1168
Lead	✓		1	3,200.8	5	<5	<5	160 µg/L	8.86
Mercury	✓		1	3,245.1	0.2	<0.2	<0.2	0.739 µg/L	1.08
Nickel	✓		1	3,200.8	10	<10	<10	1,450 µg/L	109.2
Selenium	✓		1	3,200.8	25	<25	<25	235.8 µg/L	5.9
Silver	✓		1	3,200.8	2	<2	<2	35.1 µg/L	14.2
Zinc	✓		1	3,200.8	50	<50	<50	420 µg/L	251.0
Cyanide	✓		1	4500CN-C	0.005	<0.005	<0.005	178 mg/L	6.2
B. Non-Halogenated VOCs									
Total BTEX	✓		1	NA	NA	0	0	100 µg/L	---
Benzene	✓		1	624.1	1	<1	<1	5.0 µg/L	---
1,4 Dioxane	✓		1	624.1-SIM	50	<50	<50	200 µg/L	---
Acetone	✓		1	624.1	10	<10	<10	7.97 mg/L	---
Phenol	✓		1	4,420.1	30	<30	<30	1,080 µg/L	357

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	624.1	1.0	<1	<1	4.4 µg/L	1.9
1,2 Dichlorobenzene	✓		1	624.1	5	<5	<5	600 µg/L	---
1,3 Dichlorobenzene	✓		1	624.1	5	<5	<5	320 µg/L	---
1,4 Dichlorobenzene	✓		1	624.1	5	<5	<5	5.0 µg/L	---
Total dichlorobenzene	✓		1		5	<5	<5	763 µg/L in NH	---
1,1 Dichloroethane	✓		1	624.1	1.5	<1.5	<1.5	70 µg/L	---
1,2 Dichloroethane	✓		1	624.1	1.5	<1.5	<1.5	5.0 µg/L	---
1,1 Dichloroethylene	✓		1	624.1	1	<1	<1	3.2 µg/L	---
Ethylene Dibromide	✓		1	624.1	0.01	<0.01	<0.01	0.05 µg/L	---
Methylene Chloride	✓		1	624.1	1	<1	<1	4.6 µg/L	---
1,1,1 Trichloroethane	✓		1	624.1	2	<2	<2	200 µg/L	---
1,1,2 Trichloroethane	✓		1	624.1	1.5	<1.5	<1.5	5.0 µg/L	---
Trichloroethylene	✓		1	624.1	1	<1	<1	5.0 µg/L	---
Tetrachloroethylene	✓		1	624.1	1	<1	<1	5.0 µg/L	3.9
cis-1,2 Dichloroethylene	✓		1	624.1	1	<1	<1	70 µg/L	---
Vinyl Chloride	✓		1	624.1	1	<1	<1	2.0 µg/L	---
D. Non-Halogenated SVOCs									
Total Phthalates			1					190 µg/L	
Diethylhexyl phthalate	✓		1	625.1	2.2	<2.2	<2.2	101 µg/L	2.6
Total Group I PAHs	✓		1	625.1-SIM	0.1	<0.1	<0.1	1.0 µg/L	---
Benzo(a)anthracene	✓		1	625.1-SIM	0.1	<0.1	<0.1	As Total PAHs	0.0045
Benzo(a)pyrene	✓		1	625.1-SIM	0.1	<0.1	<0.1		0.0045
Benzo(b)fluoranthene	✓		1	625.1-SIM	0.1	<0.1	<0.1		0.0045
Benzo(k)fluoranthene	✓		1	625.1-SIM	0.1	<0.1	<0.1		0.0045
Chrysene	✓		1	625.1-SIM	0.1	<0.1	<0.1		0.0045
Dibenzo(a,h)anthracene	✓		1	625.1-SIM	0.1	<0.1	<0.1		0.0045
Indeno(1,2,3-cd)pyrene	✓		1	625.1-SIM	0.1	<0.1	<0.1		0.0045

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
Total Group II PAHs	✔		1	625.1-SIM	0.1	13.567	13.567	100 µg/L	---
Naphthalene		✔	1	625.1-SIM	0.100	13.2	13.2	20 µg/L	---
E. Halogenated SVOCs									
Total PCBs	✔		1	608.3	0.2	<0.2	<0.2	0.000064 µg/L	---
Pentachlorophenol	✔		1	625.1-SIM	0.1	<0.1	<0.1	1.0 µg/L	---
F. Fuels Parameters									
Total Petroleum Hydrocarbons	✔		1		4.4	<4.4	<4.4	5.0 mg/L	---
Ethanol	✔		1	EPA 600	20	<20	<20	Report mg/L	---
Methyl-tert-Butyl Ether	✔		1	624.1	10	<10	<10	70 µg/L	24
tert-Butyl Alcohol	✔		1	624.1	100	<100	<100	120 µg/L in MA 40 µg/L in NH	---
tert-Amyl Methyl Ether	✔		1	624.1	20	<20	<20	90 µg/L in MA 140 µg/L in NH	---
Other (i.e., pH, temperature, hardness, salinity, LC_{50}, additional pollutants present); if so, specify:									
Phenanthrene		✔	1	625.1-SIM	0.100	0.267	0.267		
Fluoranthene		✔	1	625.1-SIM	0.1	0.1	0.1		
Hardness, Total		✔	1	EPA3005	660	159000	159000		
pH		✔	1	4500H+-B	NA	7	7		
1,2,4-Trimethylbenzene		✔	54	978260C	600	0	0		
1,3,5-Trimethylbenzene		✔	54	978260C	600	0	0		
2-Butanone (Methyl Ethyl		✔	54	978260C	31	0	0		
sec-Butylbenzene		✔	54	978260C	600	0	0		
Bromodichloromethane		✔	54	978260C	600	0	0		
Cymene		✔	54	978260C	600	0	0		
n-Butylbenzene		✔	54	978260C	600	0	0		
n-Propylbenzene		✔	54	978260C	600	0	0		
Acenaphthene		✔	55	978270D	270	0	0		

soil

Detected in Soil or Groundwater?	Parameter	Known or believed absent	Known or believed present	# of samples	Test method (#)	Detection limit (ug/l)	Influent		Effluent Limitations	
							Daily Maximum (ug/l)	Daily average (ug/l)	TBEL	WQBEL
SOIL	Carbon disulfide		√	54	978260C	600	0	0		
SOIL	Barium		√	55	976010C	444	0	0		
SOIL	Beryllium		√	55	976010C	536	0	0		
SOIL	Thallium		√	55	976010C	5530	0	0		
SOIL	Vanadium		√	55	976010C	444	0	0		
SOIL	Acenaphthylene		√	55	978270D	300	0	0		
SOIL	Anthracene		√	55	978270D	220	0	0		
SOIL	2-Methylnaphthalene		√	55	18270D-SI	140	0	0		
SOIL	Sulfur		√	55	1601D	140	0	0		
SOIL	TCLP Lead		√	8	1601D	500	0	0		

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:
Applied as necessary to meet effluent discharge criteria.

2. Provide a written description of all treatment system(s) or processes that will be applied to the effluent prior to discharge.
Influent - Frac. tank - bag filters - additional treatment as needed to meet effluent discharge criteria. See attached Figure 3 for schematic drawing of treatment system

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: GAC, Ion Exchange and other treatments as needed to meet discharge criteria

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: 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.	25
If Activity Category IV applies, indicate the estimated total volume of water that will be discharged:	NA

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:
pH conditioners may be added to the treatment system if necessary to meet effluent limits, in which case a Notice of Change (NOC) will be submitted to the EPA for review and approval.

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.

Refer to attached Haley & Aldrich, Inc. letter

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

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 BMPP meeting the requirements of this general permit will be implemented at the site.	
Notification provided to the appropriate State, including a copy of this NOI, if required.	Check one: Yes ■ No ☐
Notification provided to the municipality in which the discharge is located, including a copy of this NOI, if requested.	Check one: Yes ☐ No ■
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: Kyle Bouthillier	Date: 10/08/2020
Print Name and Title: Kyle Bouthillier, Construction Manager, United Civil	

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 BMPP meeting the requirements of this general permit will be implemented at the site.

Notification provided to the appropriate State, including a copy of this NOI, if required.	Check one: Yes ■ No ☐
Notification provided to the municipality in which the discharge is located, including a copy of this NOI, if requested.	Check one: Yes ☐ No ■
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: Louis D. Berardinis Date: 10/11/20

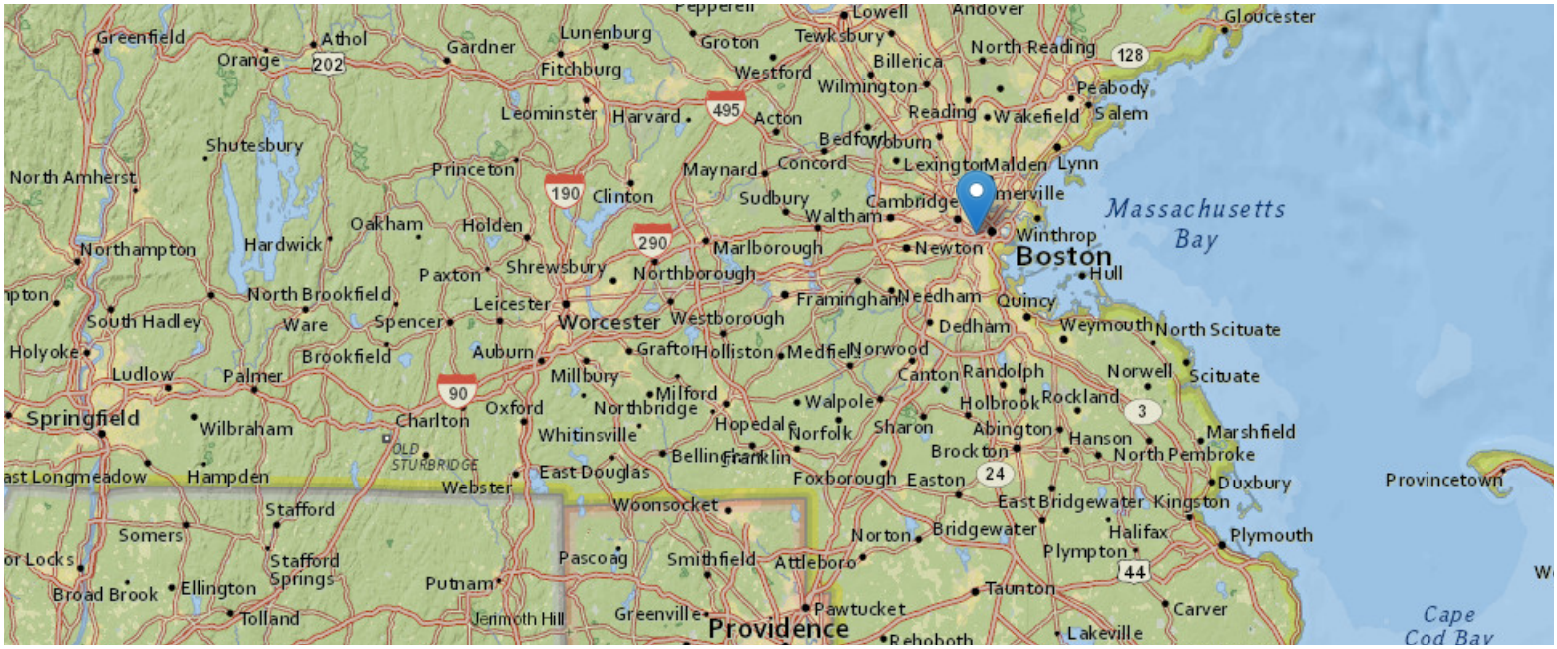
Print Name and Title: Louis DiBerardinis, Director EHS Office, MIT

APPENDIX B

Discharge Calculations

StreamStats Report-MIT SCC at Charles River

Region ID: MA
Workspace ID: MA20200917145229107000
Clicked Point (Latitude, Longitude): 42.35548, -71.08895
Time: 2020-09-17 10:52:48 -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	2.34	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	2.34	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	57.2	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/)

Application Version: 4.4.0

HALEY & ALDRICH, INC.		**CALCULATIONS**	**FILE NO.**	**134283**	
			SHEET	**1 of 1**	
CLIENT	**MASSACHUSETTS INSTITUTE OF TECHNOLOGY**		**DATE**	**17-Sep-20**	
PROJECT	**MIT SCHWARZMAN COLLEGE OF COMPUTING**		**COMPUTED BY**	**KTM**	
SUBJECT	**DILUTION FACTOR CALCULATIONS**		**CHECKED BY**	**XR**	

PURPOSE: Calculate Dilution Factor (DF) for project based on 7 Day 10 Year (7Q10) Low Flow values.

APPROACH: Calculate DF based on EPA formula $(Q_S + Q_D)/Q_D$, where Q_S is 7Q10 in million gallons per day (MGD) and Q_D is discharge flow in MGD.

ASSUMPTIONS:
1. 7Q10 is 29.2 cfs (from StreamStats 4.0)
2. A conversion of 7.48 is used to convert cubic feet to gallons
3. A discharge flowrate of 100 gpm is assumed

CALCULATIONS:

7Q10 Low Flow Value (Q_S)

$$Q_S = \frac{29.2\ ft^3}{sec} \times \frac{7.48\ gallons}{ft^3} \times \frac{86{,}400\ sec}{day} \times \frac{1\ MG}{1{,}000{,}000\ gallons}$$

Q_S = 18.87 MGD

Discharge Flowrate (Q_D)

$$Q_D = \frac{100\ gallons}{min} \times \frac{1{,}440\ min}{day} \times \frac{1\ MG}{1{,}000{,}000\ gallons}$$

Q_D = 0.144 MGD

Dilution Factor (DF)

$$DF = \frac{Q_S + Q_D}{QD} = \frac{18.87\ MGD + 0.144\ MGD}{0.144\ MGD} = \mathbf{132.04}$$

CONCLUSION: The dilution factor for this project is calculated to be **132.04** based on the provided 7Q10 low flow value and discharge flowrate.

Scalise, Kimberly

From: Ruan, Xiaodan (DEP) <xiaodan.ruan@state.ma.us>
Sent: Friday, September 18, 2020 5:21 PM
To: Munz, Keila; Vakalopoulos, Catherine (DEP)
Cc: Scalise, Kimberly
Subject: RE: NPDES RGP Application - 7Q10 + Dilution Factor - MIT SCC

CAUTION: External Email

Hi Keila,

I checked your calculation, and the 7Q10 of 29.2 cfs and the DF of 132.04 for the proposed project at MIT Stephen A. Schwarzman College of Computing in Cambridge, with a design flow of 100 gpm are correct.

Here is water quality information in assisting you in filling out the NOI:

> Waterbody and ID: Charles River (MA72-38) within Charles River Watershed
> Classification: B
> Outstanding Resource Water?: no
> State's most recent Integrated List is located here: https://www.epa.gov/sites/production/files/2020-01/documents/2016-ma-303d-list-report.pdf, search for "MA72-38" to see the causes of impairments.
> TMDLs: There are two TMDLs (pathogen and nutrient) for this segment

Also, if this is not a *current* MCP site, then in addition to submitting the NOI to EPA, you need to apply with MassDEP and submit a $500 fee (unless fee exempt, e.g., municipality). Please note that beginning on June 30, 2020, MassDEP has started using ePLACE, an online application submittal process where you will set up a user ID and be able to submit NOIs for various projects as well as pay by credit card. The instructions are located on this page: https://www.mass.gov/how-to/wm-15-npdes-general-permit-notice-of-intent. If this is your first time using ePLACE, technical assistant information is available on the ePLACE application webpage.

Please let me know if you have any questions.

Xiaodan

From: Munz, Keila <KMunz@haleyaldrich.com>
Sent: Friday, September 18, 2020 12:57 PM
To: Vakalopoulos, Catherine (DEP) <catherine.vakalopoulos@mass.gov>
Cc: Ruan, Xiaodan (DEP) <xiaodan.ruan@mass.gov>; Scalise, Kimberly <KScalise@haleyaldrich.com>
Subject: FW: NPDES RGP Application - 7Q10 + Dilution Factor - MIT SCC

CAUTION: This email originated from a sender outside of the Commonwealth of Massachusetts mail system. Do not click on links or open attachments unless you recognize the sender and know the content is safe.

Hello Cathy,

Attached here are our StreamStats reports detailing the 7 Day 10 Year (7Q10) low flow value for our project (listed below) along with the dilution factor calculations for your review and confirmation. This project is down the street from another

site, MIT Wright Brothers Wind Tunnel, that we submitted a NPDES RGP Application for last year, and discharges to the same area. The proposed maximum effluent flow is 100 gpm, however we expect closer to 50 GPM for the typical daily flow . Can you please confirm these values are appropriate for our project?

Project:
MIT Stephen A. Schwarzman College of Computing
Cambridge, MA
Discharge will be to the Charles River near the Mass. Ave Bridge, via City of Cambridge stormwater outfall

Thanks!

Keila T. Munz
Environmental Scientist

Haley & Aldrich, Inc.
465 Medford Street | Suite 2200
Boston, MA 02129

T: (617) 886-7590

www.haleyaldrich.com

Enter number values in green boxes below

Enter values in the units specified

↓

18.87	Q_R = Enter upstream flow in **MGD**
100	Q_P = Enter discharge flow in **MGD**
0	Downstream 7Q10

Enter a dilution factor, if other than zero

↓

132.04

Enter values in the units specified

↓

159	C_d = Enter influent hardness in **mg/L** $CaCO_3$
387	C_s = Enter receiving water hardness in **mg/L** $CaCO_3$

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

↓

7.9	pH in **Standard Units**
	Temperature in **^oC**
0.121	Ammonia in **mg/L**
387	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**
0	Copper in **µg/L**
109	Iron in **µg/L**
0	Lead in **µg/L**
0	Mercury in **µg/L**
0	Nickel in **µg/L**
0	Selenium in **µg/L**
0	Silver in **µg/L**
0	Zinc in **µg/L**

Enter **influent** concentrations in the units specified

↓

0	TRC in **µg/L**
0.397	Ammonia in **mg/L**
0	Antimony in **µg/L**
6.02	Arsenic in **µg/L**
0	Cadmium in **µg/L**
0	Chromium III in **µg/L**
0	Chromium VI in **µg/L**
0	Copper in **µg/L**
568	Iron in **µg/L**
0	Lead in **µg/L**
0	Mercury in **µg/L**
0	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	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**

Notes:

Freshwater: Q_R equal to the 7Q10; enter alternate Q_R if approved by the State; enter 0 if no dilution factor
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

if >1 sample, enter maximum

if >10 samples, may enter 95th percentile

Enter 0 if non-detect or testing not required

Dilution Factor	1.2			
	TBEL applies if bolded		WQBEL applies if bolded	
A. Inorganics				
Ammonia	**Report**	mg/L	---	
Chloride	**Report**	µg/L	---	
Total Residual Chlorine	0.2	mg/L	**13**	µg/L
Total Suspended Solids	**30**	mg/L	---	
Antimony	**206**	µg/L	761	µg/L
Arsenic	**104**	µg/L	12	µg/L
Cadmium	**10.2**	µg/L	0.5280	µg/L
Chromium III	**323**	µg/L	177.2	µg/L
Chromium VI	**323**	µg/L	13.6	µg/L
Copper	**242**	µg/L	19.6	µg/L
Iron	**5000**	µg/L	1168	µg/L
Lead	**160**	µg/L	8.86	µg/L
Mercury	**0.739**	µg/L	1.08	µg/L
Nickel	**1450**	µg/L	109.2	µg/L
Selenium	**235.8**	µg/L	5.9	µg/L
Silver	**35.1**	µg/L	14.2	µg/L
Zinc	**420**	µg/L	251.0	µg/L
Cyanide	**178**	mg/L	6.2	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	357	µg/L
C. Halogenated VOCs				
Carbon Tetrachloride	**4.4**	µg/L	1.9	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	3.9	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	2.6	µg/L
Total Group I Polycyclic Aromatic Hydrocarbons	**1.0**	µg/L	---	
Benzo(a)anthracene	**1.0**	µg/L	0.0045	µg/L
Benzo(a)pyrene	**1.0**	µg/L	0.0045	µg/L
Benzo(b)fluoranthene	**1.0**	µg/L	0.0045	µg/L
Benzo(k)fluoranthene	**1.0**	µg/L	0.0045	µg/L
Chrysene	**1.0**	µg/L	0.0045	µg/L
Dibenzo(a,h)anthracene	**1.0**	µg/L	0.0045	µg/L
Indeno(1,2,3-cd)pyrene	**1.0**	µg/L	0.0045	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	---	
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	24	µg/L
tert-Butyl Alcohol	**120**	µg/L	---	
tert-Amyl Methyl Ether	**90**	µg/L	---	

Compliance Level applies if shown		
50	µg/L	
---	µg/L	

---	µg/L
---	µg/L
---	µg/L
---	µg/L
---	µg/L
---	µg/L
---	µg/L

0.5	µg/L

APPENDIX C

Chemicals and Additives

89 Crawford Street
Leominster, Massachusetts 01453
Tel: 774.450.7177
Fax: 888.835.0617
www.lrt-llc.net

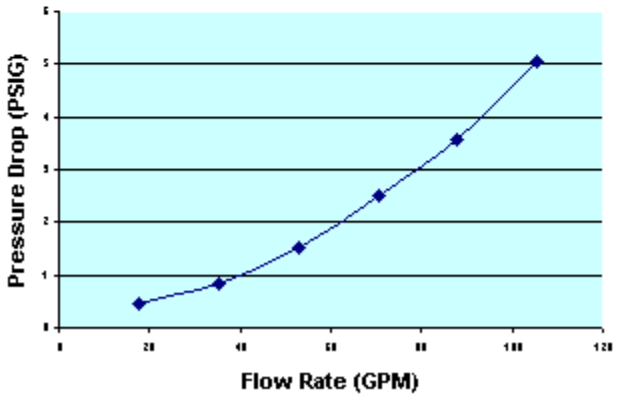
HPAF SERIES FILTERS
MODEL HPAF-2000

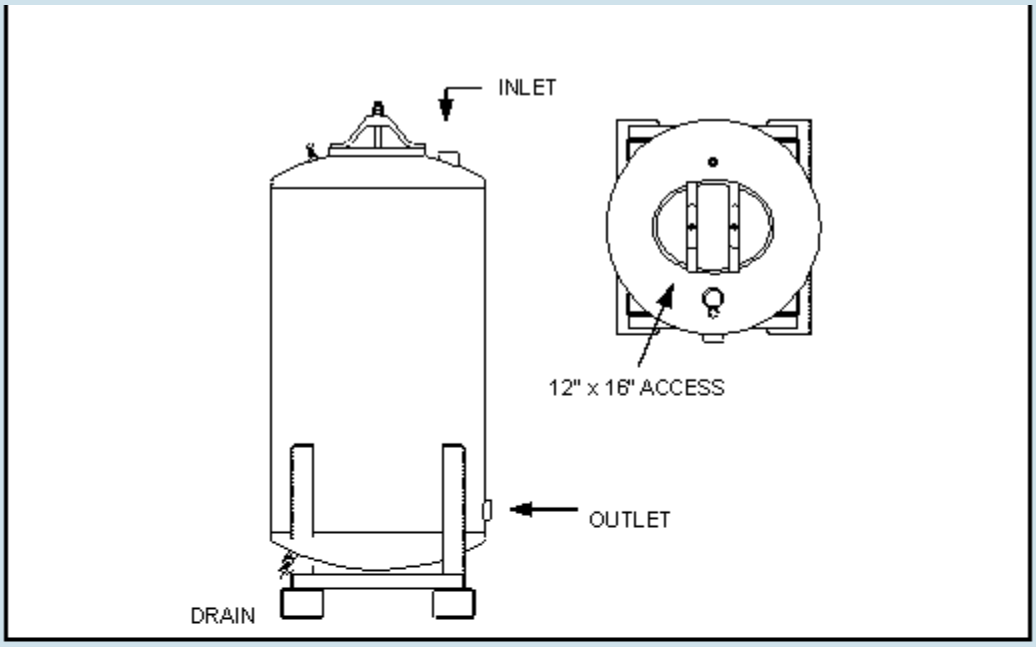
The HPAF-2000 filter is a media filter vessel designed to treat liquid streams. While the typical design application is a activated carbon adsorbtion unit, the filter can easily accommodate many medias. Some applications include:

- Dissolved Organic Removal (Activated Carbon)
- Suspended Solids Removal (Sand Filter)
- Dissolved Minerals (Softener Resin)
- Oil and Grease Removal (Organo-Clays)
- Dissolved and Precipitated Metals Removal
- Special Organics (Resin/Carbon Blend)
- Catalytic Reactor (Chlorine and Peroxide Removal)
- Bio-Remediation Contactor Unit

PRESSURE DROP GRAPH

*(As Filled - 8*30 GAC)*





HPAF-2000 SPECIFICATIONS			
Overall Height	8'6"	Vessel/Internal Piping Materials	CS (SA-36) / SCH 40 PVC
Diameter	48"	Internal Coating	Polyamide Epoxy Resin
Inlet / Outlet (FNPT)	3"	External Coating	Epoxy Mastic
Drain / Vent (FNPT)	3/4" / 1/2"	Maximum Pressure / Temp	75 PSIG / 140° F
GAC Fill (lbs)	2,000	Cross Sectional Bed Area	12.5 FT^2
Shipping / Operational Weight (lbs)	3,020/6,775	Bed Depth/Volume	5.5 FT / 68.7 FT^3

CGS

CATION EXCHANGE RESIN
SOFTENING GRADE
Na FORM

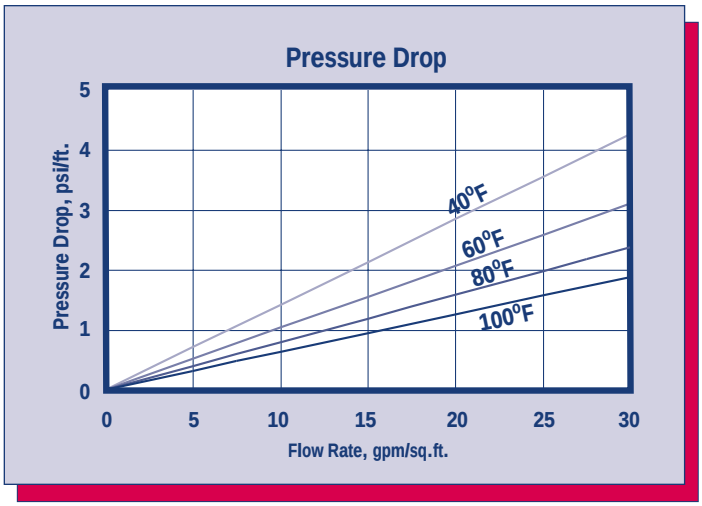
RESINTECH CGS is a high purity, light colored, high capacity, gel type sulfonated polystyrene cation resin supplied in the sodium form as moist, tough uniform spherical beads. *ResinTech CGS* specifically is intended for use in all water softening applications,including beverages, potable water and water used for food processing. It's high capacity and high DVB content provide long life and good chlorine resistance in all potable water applications. (It is also available as a dark colored product *RESINTECH CGS-BL* with identical properties.)

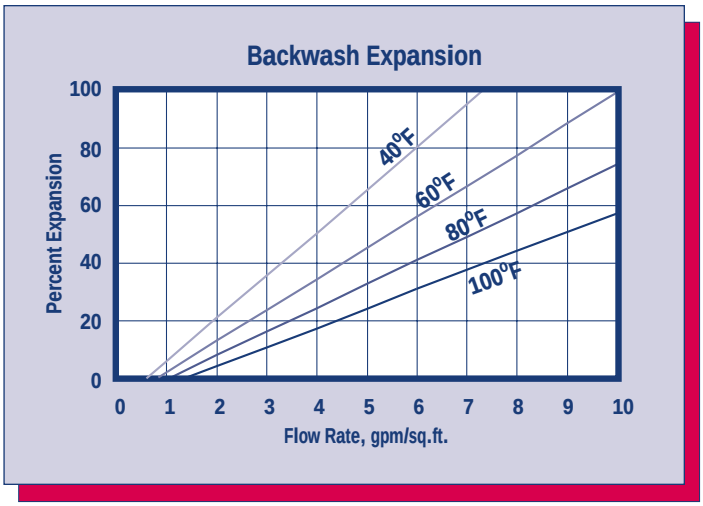
FEATURES & BENEFITS

- **COMPLIES WITH FDA REGULATIONS FOR POTABLE WATER APPLICATIONS**
  Conforms to paragraph 21CFR173.25 of the Food Additives Regulations of the F.D.A.*
- **EXCELLENT REGENERATION EFFICIENCY**
  Virtually the same operating capacity as premium grade *ResinTech CG8-BL*
- **NSF/ANSI-61 VALIDATED**
- **UNIFORM PARTICLE SIZE**
  16 to plus 50 mesh range; gives a LOWER PRESSURE DROP while maintaining SUPERIOR KINETICS.
- **SUPERIOR PHYSICAL STABILITY**
  90% plus sphericity and high crush strengths together with a very uniform particle size provide greater resistance to bead breakage while maintaining low pressure drops.
- **LOW COLOR THROW**

*For potable water applications, the resin must be properly pre-treated, usually by multiple exhaustion and regeneration cycles, to insure compliance with extractable levels.

HYDRAULIC PROPERTIES





PRESSURE DROP - The graph above shows the expected pressure loss per foot of bed depth as a function of flow rate, at various temperatures.

BACKWASH - After each cycle the resin bed should be backwashed at a rate that expands the bed 50 to 75 percent. This will remove any foreign matter and reclassify the bed. The graph above shows the expansion characteristics of *RESINTECH CGS* in the sodium form.

1 Resintech Plaza • 160 Cooper Road • West Berlin,NJ 08091 • Phone:(856)768-9600 • Fax:(856)768-9601 • E-mail:ixresin@resintech.com • Web Site:www.resintech.com

RESINTECH® CGS

PHYSICAL PROPERTIES

Polymer Structure	Styrene Crosslinked with DVB
Functional Group	$R-(SO_3)^-M^+$
Ionic Form, as shipped	Sodium
Physical Form	Tough, Spherical Beads
Screen Size Distribution	16 to 50
+16 mesh (U.S. Std)	< 5 percent
-50 mesh (U.S. Std)	< 1 percent
pH Range	0 to 14
Sphericity	90+ percent
Uniformity Coefficient	Approx. 1.6
Water Retention	
Sodium Form	48 to 54 percent
Solubility	Insoluble
Shipping Weight	
Sodium Form	48 lbs./cu.ft.
Total Capacity	
Sodium Form	1.8 meq/ml min

SUGGESTED OPERATING CONDITIONS

Maximum Temperature	
Sodium Form	250^0 F
Minimum Bed Depth	24 inches
Backwash Rate	50 to 75% Bed Expansion
Regenerant (NaCl or KCl)	
Concentration	10 to 15 percent
Flow Rate	0.5 to 1.5 gpm/cu.ft.
Contact Time	> 20 minutes
Level	4 to 15 pounds/cu.ft.
Displacement Rate	Same as Regen Flow Rate
Volume	10 to 15 gallons/cu.ft.
Fast Rinse Rate	Same as Service Flow Rate
Volume	35 to 60 gallons/cu.ft.
Service Flow Rate	2 to 10 gpm/cu.ft.

OPERATING CAPACITY

Sodium Chloride (NaCl) Regeneration

The sodium cycle operating capacity of *RESINTECH CGS* for hardness removal at various regeneration levels with an influent calcium/magnesium ratio of 2/1 and a hardness level of 500 ppm, as $CaCO_3$, is shown in the following table:

Pounds NaOH/cu.ft.	Capacity Kilograins/cu.ft.
5	20.0
7.5	25.4
10	29.0
15	33.0

Potassium Chloride (KCl) Regeneration

The potassium cycle operating capacity of *RESINTECH CGS* for hardness removal at various regeneration levels with an influent calcium/magnesium ratio of 2/1 and a hardness level of 500 ppm, as $CaCO_3$, is shown in the following table:

Pounds NaOH/cu.ft.	Capacity Kilograins/cu.ft.
5	16.6
7.5	21.8
10	26.6
15	31.2

APPLICATIONS

Softening

RESINTECH CGS is ideally suited for industrial, commercial, or residential softening applications where free chlorine is not present because of its high capacity, uniform particle size and good physical stability.

SBG1

ANION EXCHANGE RESIN TYPE ONE GEL Cl OR OH FORM

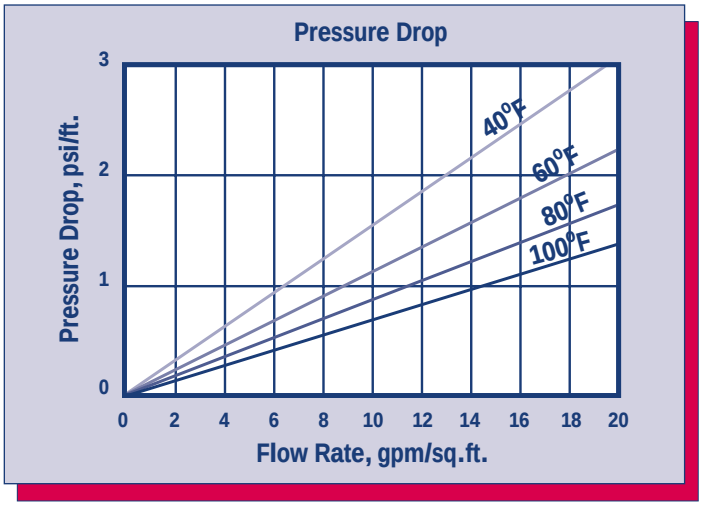
RESINTECH SBG1 is a high capacity, shock resistant, gelular, Type 1, strongly basic anion exchange resin supplied in the chloride or hydroxide form as moist, tough, uniform, spherical beads. *RESINTECH SBG1* is intended for use in all types of deionization systems and chemical processing applications. It is similar to *RESINTECH SBG1P* but has a higher volumetric capacity and exhibits lower TOC leach rates. This makes it the better performer in single use applications such as in cartridge deionization and when high levels of regeneration are used such as in polishing mixed beds. On the other hand, *RESINTECH SBG1P* is more resistant to organic fouling and gives higher operating capacities at low regeneration levels such as those used in make up demineralizers.

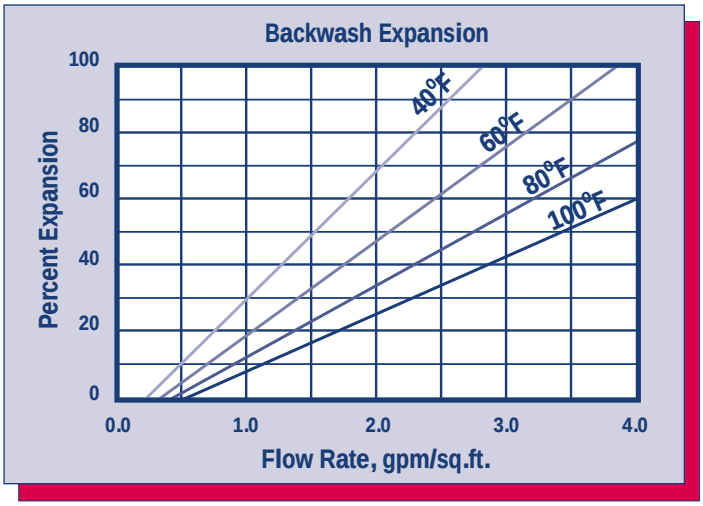
FEATURES & BENEFITS

- **COMPLIES WITH FDA REGULATIONS FOR POTABLE WATER APPLICATIONS.**
  Conforms to paragraph 21CFR173.125 of the Food Additives Regulations of the F.D.A.*
- **HIGH TOTAL CAPACITY**
  Provides longer run lengths in single use applications or where high levels of regeneration are used such as in mixed bed polishers, cartridge demineralizers.
- **UNIFORM PARTICLE SIZE**
  16 to plus 50 mesh range; gives a LOWER PRESSURE DROP while maintaining SUPERIOR KINETICS.
- **SUPERIOR PHYSICAL STABILITY**
- **LOWER TOC LEACH RATE**
  Makes it ideal for polishing mixed beds in wafer washing and other high purity water polishing applications.

*For potable water applications, the resin must be properly pre-treated, usually by multiple exhaustion and regeneration cycles, to ensure compliance with extractable levels.

HYDRAULIC PROPERTIES





PRESSURE DROP

The graph above shows the expected pressure loss per foot of bed depth as a function of flow rate, at various temperatures.

BACKWASH

After each cycle the resin bed should be backwashed at a rate that expands the bed 50 to 75 percent. This will remove any foreign matter and reclassify the bed. The graph above shows the expansion characteristics of *RESINTECH SBG1* in the sodium form.

RESINTECH® SBG1

PHYSICAL PROPERTIES

Polymer Structure	Styrene Crosslinked with DVB
Functional Group	R-N-$(CH_3)_3^+Cl^-$
Ionic Form, as shipped	Chloride or Hydroxide
Physical Form	Tough, Spherical Beads
Screen Size Distribution	16 to 50
+16 mesh (U.S. Std)	< 5 percent
-50 mesh (U.S. Std)	< 1 percent
pH Range	0 to14
Sphericity	> 93 percent
Uniformity Coefficient	Approx. 1.6
Water Retention	
Chloride Form	43 to 50 percent
Hydroxide Form	Approx. 53 to 60 percent
Solubility	Insoluble
Approximate Shipping Weight	
Cl Form	44 lbs/cu.ft.
OH Form	41 lbs/cu.ft.
Swelling Cl- to OH-	18 to 25 percent
Total Capacity	
Cl Form	1.45 meq/ml min
OH Form	1.15 meq/ml min

SUGGESTED OPERATING CONDITIONS

Maximum Continuous Temperature	
Hydroxide Form	140°F
alt Form	170°F
Minimum Bed Depth	24 inches
Backwash Rate	50 to 75 percent Bed Expansion
Regenerant Concentration*	2 to 6 percent
Regenerant Flow Rate	0.25 to 1.0 gpm/cu.ft.
Regenerant Contact Time	At least 40 Minutes
Regenerant Level	4 to 10 pounds/cu.ft.
Displacement Rinse Rate	Same as Regenerant Flow Rate
Displacement Rinse Volume	10 to 15 gals/cu.ft.
Fast Rinse Rate	Same as Service Flow Rate
Fast Rinse Volume	35 to 60 gals/cu.ft.
Service Flow Rates	
Polishing Mixed Beds	3 to 15 gpm/cu.ft.
Non-Polishing Apps.	2 to 4 gpm/cu.ft.

OPERATING CAPACITY

The operating capacity of *RESINTECH SBG1* for a variety of acids at various regeneration levels when treating an influent with a concentration 500 ppm, expressed as $CaCO_3$ is shown in the following table:

Pounds NaOH/ft³	Capacity Kilograms per cubic foot			
	HCl	H_2SO_4	H_2SiO_3	H_2CO_3
4	11.3	14.0	14.7	18.6
6	12.8	16.3	17.3	19.8
8	14.3	13.3	19.5	21.6
10	15.5	20.0	22.2	22.2

APPLICATIONS

DEMINERALIZATION – *RESINTECH SBG1* is highly recommended for use in mixed bed demineralizers, wherever complete ion removal; superior physical and osmotic stability and low TOC leachables are required such as in wafer fabrication and other ultrapure applications.

RESINTECH SBG1 has high total capacity and low swelling on regeneration and provides maximum operating capacity in cartridge deionization applications. It is ideal for single use applications such as precious metal recovery, radwaste disposal and purification of toxic waste streams.

Highly crosslinked Type 1, styrenic anion exchangers have greater thermal and oxidation resistance than other types of strong base resins. They can be operated and regenerated at higher temperatures. The combination of lower porosity, high total capacity and Type 1 functionality make *RESINTECH SBG1* the resin of choice when water temperatures exceed 85°F and where the combination of carbon dioxide, borate and silica exceed 40% of the total anions.

RESINTECH SBG1P and *RESINTECH SBG1* are quite similar; the difference between them is the degree of porosity. *RESINTECH SBG1P* has greater porosity that gives it faster kinetics, and greater ability to reversibly sorb slow moving ions such as Naturally occurring Organic Matter (NOM). At lower regeneration levels and where chlorides make up a substantial portion of the anion load, or where the removal and elution of naturally occurring organics is of concern *RESINTECH SBG1P*, SBACR or SBG2 should be considered. At the higher regeneration levels used in mixed bed polishers *RESINTECH SBG1* provides higher capacity, and the lowest possible TOC leach rates.

***CAUTION:DO NOT MIX ION EXCHANGE RESIN WITH STRONG OXIDIZING AGENTS.** Nitric acid and other strong oxidizing agents can cause explosive reactions when mixed with organic materials,such as ion exchange resins.

Material Safety Data Sheets (MSDS) are available for all ResinTech Inc.products.To obtain a copy,contact your local ResinTech sales representative or our corporate headquarters. They contain important health and safety information.That information may be needed to protect your employees and customers from any known health and safety hazards associated with our products.We recommend that you secure and study the pertinent MSDS for our products and any other products being used These suggestions and data are based on information we believe to be reliable.They are offered in good faith.However we do not make any guarantee or warranty. We caution against using these products in an unsafe manner or in violation of any patents;further we assume no liability for the consequences of any such actions.

Safety Data Sheet

Product Names: SBG1, SBG1-HP, SBG1-UPS, SBG1-C, SBG1-F, SBMP1, SBMP1-UPS, GP-SBA, SBG1P, SBG1P-UPS

(Type I Strong Base Anion Exchange Resin Chloride Form)

Effective date 31 March 2015

Section 1: Identification

1a	Product Names	ResinTech SBG1, SBG1-HP, SBG1-UPS, SBG1-C, SBG1-F, SBMP1, SBMP1-UPS, GP-SBA, SBG1P, SBG1P-UPS
1b	Common Name	Type I Strong base anion resin in the chloride form.
1c	Intended use	All general purpose anion exchanges for general use including salt form and demineralization.
1d	Manufacturer Address	ResinTech, Inc. 160 Cooper Road, West Berlin, NJ 08091 USA
	Phone Email	856-768-9600 ixresin@resintech.com

Section 2: Hazard Identification

2a Hazard classification

Not hazardous or dangerous

Product Hazard Rating	Scale
Health = 0	0 = Negligible
Fire = 1	1 = Slight
Reactivity = 0	2 = Moderate
Special – N/A	3 = High
	4 = Extreme

2b Product description

White, yellow, or orange colored solid beads approximately 0.6 mm diameter with little or no odor.

2c Precautions for use

Safety glasses and gloves recommended.
Slipping hazard if spilled.

2c Potential health effects

Will cause eye irritation.
Will cause skin skin irritation.
Ingestion is not likely to pose a health risk.

2d Environmental effects

This product may alter the pH of any water that contacts it.

Section 2A: Hazard classification UN OSHA globally harmonized system

WARNING

(contains ion exchange resin)

H320: Causes eye irritation

Precautionary Statements

P264: Wash hands thoroughly after handling.

P280: Wear protective gloves/protective clothing/eye protection/face protection

P305+351+338: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses if present and easy to do – continue rinsing.

P333+313: If skin irritation or a rash occurs: Get medical advice/attention.

P337+313: If eye irritation persists get medical advice/attention.

P403+233: Store in a well-ventilated place. Keep container tightly closed.

P411: Store at temperatures not exceeding 50 °C/ 122 °F.

Please refer to the safety data sheet for additional information regarding this product

ResinTech, Inc.
160 Cooper Road
West Berlin, NJ 08091-9234
856 768-9600
Ixresin@resintech.com

Section 3: Composition/ Information on Ingredients

3a	Chemical name	Trimethylamine functionalized chloromethylated copolymer of polystyrene in the chloride form.
3b	Ingredients	
	Trimethylamine functionalized Chloromethlyated copolymer of Styrene and divinylbenzene in the Chloride form	CAS# 60177-39-1 (35 - 65%)
	Water	CAS# 7732-18-5 (35 – 65%)

Section 4: First Aid Measures

4a	Inhalation	No adverse effects expected- normal use of product does not produce odors or vapors.
4b	Skin	Wash with soap and water- seek medical attention if a rash develops.
4c	Eye contact	Wash immediately with water-seek attention if discomfort continues.
4d	Ingestion	No adverse effects expected for small amounts, larger amounts can cause stomach irritation. Seek medical attention if discomfort occurs.

Section 5: Fire Fighting Measures

5a	Flammability	NFPA Fire rating = 1
5b	Extinguishing media	Water, CO2, foam, dry powder.
5c	Fire fighting Procedures	Follow general fire fighting procedures indicated in the work place. Seek medical attention if discomfort continues.
5d	Protective Equipment	MSHA/NIOSH approved self-contained breathing gear, full protective clothing.
5e	Combustion Products	Carbon oxides and other toxic gasses and vapors.
5f	Unusual Hazards	Product is not combustible until moisture is removed. Resin begins to burn at approximately 230º C. Auto ignition can occur above 500º C.

Section 6: Accidental Release Measures

6a	Personal Precautions	Keep people away, spilled resin can be a slipping hazard, wear gloves and safety glasses to minimize skin or eye contact.
6b	Incompatible Chemicals	Strong oxidants can create risk of combustion products similar to burning, exposure to strong bases can cause a rapid temperature increase.
6c	Environmental Precautions	Keep out of public sewers and waterways.
6d	Containment Materials	Use plastic or paper containers, unlined metal containers not recommended.
6e	Methods of Clean-up	Sweep up material and transfer to containers.

Section 7: Handling and Storage

7a	Handling	Avoid prolonged skin contact. Keep resin moist and avoid allowing resin to completely dry.
7b	Storage	Store in a cool dry place (0º to 45º C) in the original shipping container. This product is thermally sensitive and will have reduced shelf life if subjected to extended periods of time at temperatures exceeding 50º C. Although freezing does not usually damage ion exchange resins, avoid repeated freeze thaw cycles.
7c	TSCA considerations	Ion exchange resins should be listed on the TSCA Inventory in compliance with State and Federal Regulations.

Section 8: Exposure Controls/Personal Protection

8a	OSHA exposure limits	None noted.
8b	Engineering Controls	Provide adequate ventilation.
8c	Personal Protection Measures	
	Eye Protection	Safety glasses or goggles.
	Respiratory Protection	Not required for normal use.
	Protective Gloves	Not required for limited exposure but recommended for extended contact.

Section 9: Physical and Chemical Properties

Appearance	Amber, yellow, or red beads approx. 0.6 mm diameter.
Flammability or explosive limits	Flammable above 500º C
Odor	Little or no odor
Physical State	Solid
Vapor pressure	Not available
Odor threshold	Not available
Vapor density	Not available
pH	Near neutral (6 to 8 typical)
Relative density	Approx 710 grams/Liter
Melting point/freezing point	Does not melt, freezes at approx. 0 C
Solubility	Insoluble in water and most solvents
Boiling point	Does not boil
Flash point	Approx 500º C
Evaporation rate	Does not evaporate
Partition Coefficient (n-octonol/water)	Not applicable
Auto-ignition temperature	Approx 500º C
Decomposition temperature	Above 230º C
Viscosity	Not applicable

Section 10: Stability and Reactivity

10a Stability	Stable under normal conditions.
10b Conditions to Avoid	Heat, exposure to strong oxidants.
10c Hazardous by-products	Trimethylamine, charred polystyrene, aromatic acids and hydrocarbons, organic amines, nitrogen oxides, carbon oxides, chlorinated hydrocarbons.
10d Incompatible materials	Strong oxidizing agents, e.g. nitric acid (such as HNO_3)
10e Hazardous Polymerization	Does not occur

Section 11: Toxicological Information

11a Likely Routes of Exposure	Oral, skin or eye contact.
11b Effects of exposure	
Delayed	None known.
Immediate (acute)	None known.
Chronic	None known.
11c Toxicity Measures	
Skin Adsorption	Unlikely, some transfer of acidity is possible.
Ingestion	Oral toxicity believed to be low but no LD50 has been established.
Inhalation	Unknown, vapors are very unlikely due to physical properties (insoluble solid).
11d Toxicity Symptoms	
Skin Adsorption	Mild Rash.
Ingestion	Indigestion or general malaise.
Inhalation	Unknown.
11e Carcinogenicity	None known

Section 12: Ecological information

12a Eco toxicity	Not acutely harmful to plant or animal life.
12b Mobility	Insoluble, acidity or causticity may escape if wet.
12c Biodegradability	Not biodegradable.
12d Bioaccumulation	Insignificant.
12e Other adverse effects	Not Harmful to the environment.

Section 13: Disposal Considerations

13a General considerations	Material is non-hazardous. However, unused material can cause a pH change when wetted.
13b Disposal Containers	Most plastic and paper containers are suitable. Avoid use of unlined metal containers.
13c Disposal methods	No specific method necessary.
13d Sewage Disposal	Not recommended.

13e	Precautions for incineration	May release trimethylamine and toxic vapors when burned.
13f	Precautions for landfills	Resins used to remove hazardous materials may then become hazardous mixtures

Section 14: Transportation Information

14a	Transportation Class	Not classified as a dangerous good for transport by land, sea, or air.
14b	TDG	Not regulated.
14c	IATA	Not regulated.
14d	DOT (49 CFR 172.101)	Not Regulated.

Section 15: Regulatory Information

15a	CERCLA	Not regulated
15b	SARA Title III	Not regulated
15c	Clean Air act	Not regulated
15d	Clean Water Act	Not regulated
15e	TSCA	Not regulated
15f	Canadian Regulations	
	WHMIS	Not a controlled product
	TDG	Not regulated
15g	Mexican Regulations	Not Dangerous

Section 16: Other Information

This information is based on our present knowledge. However, this shall not constitute a guarantee for any specific product features. Regulatory requirements are subject to change and may differ from one location to another. It is the buyer's responsibility to ensure that their activities comply with federal, state, and local laws.

16a Date of Revision 31 March 2015

Lockwood Remediation Technologies, LLC

One Controller for the Broadest Range of Sensors.

Choose from 30 digital and analog sensor families for up to 17 di:erent parameters.

Maximum Versatility

The sc200 controller allows the use of digital and analog sensors, either alone or in combination, to provide compatibility with Hach's broad range of sensors, eliminating the need for dedicated, parameter-specific controllers.

Ease of Use and Confidence in Results

Large, high-resolution, transreflective display provides optimal viewing resolution in any lighting condition. Guided calibration procedures in 19 languages minimize complexity and reduce operator error. Password-protected SD card reader o:ers a simple solution for data download and transfer. Visual warning system provides critical alerts.

Wide Variety of Communication Options

Utilize two to five analog outputs to transmit primary and secondary values for each sensor, or integrate Hach sensors and analyzers into MODBUS RS232/RS485, Profibus® DP, and HART networks.

Password protected SD card reader offers a simple solution for data download and transfer, and sc200 and digital sensor configuration file duplication and backup.

Controller Comparison

Features	Previous Models sc100™ Controller	Previous Models GLI53 Controller	sc200™ Controller	Benefits
Display	64 x 128 pixels 33 x 66 mm (1.3 x 2.6 in.)	64 x 128 pixels 33 x 66 mm (1.3 x 2.6 in.)	160 x 240 pixels 48 x 68 mm (1.89 x 2.67 in.) Transreflective	• Improved user interface—50% bigger • Easier to read in daylight and sunlight
Data Management	irDA Port/PDA Service Cable	N/A	SD Card Service Cable	• Simplifies data transfer • Standardized accessories/max compatibility
Sensor Inputs	2 Max Direct Digital Analog via External Gateway	2 Max Analog Depending on Parameter	2 Max Digital and/or Analog with Sensor Card	• Simplifies analog sensor connections • Works with analog and digital sensors
Analog Inputs	N/A	N/A	1 Analog Input Signal Analog 4-20mA Card	• Enables non-sc analyzer monitoring • Accepts mA signals from other analyzers for local display • Consolidates analog mA signals to a digital output
4-20 mA Outputs	2 Standard	2 Standard	2 Standard Optional 3 Additional	• Total of five (5) 4-20 mA outputs allows multiple mA outputs per sensor input
Digital Communication	MODBUS RS232/RS485 Profibus DP V1.0	HART	MODBUS RS232/RS485 Profibus DP V1.0 HART 7.2	• Unprecedented combination of sensor breadth and digital communication options

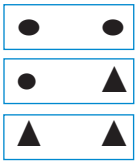
Choose from Hach's Broad Range of Digital and Analog Sensors

Parameter	Sensor	Digital or Analog
Ammonia	AMTAX™ sc, NH4D sc, AISE sc, AN-ISE sc	●
Chlorine	CLF10 sc, CLT10 sc, 9184 sc	●
Chlorine Dioxide	9185 sc	●
Conductivity	GLI 3400 Contacting, GLI 3700 Inductive	▲
Dissolved Oxygen	LDO® Model 2, 5740 sc	●
Dissolved Oxygen	5500	▲
Flow	U53, F53 Sensors	▲
Nitrate	NITRATAX™ sc, NO3D sc, NISE sc, AN-ISE sc	●
Oil in Water	FP360 sc	●
Organics	UVAS sc	●
Ozone	9187 sc	●
pH/ORP	pHD	●
pH/ORP	pHD, pH Combination, LCP	▲
Phosphate	PHOSPHAX™ sc	●
Sludge Level	SONATAX™ sc	●
Suspended Solids	SOLITAX™ sc, TSS sc	●
Turbidity	1720E, FT660 sc, SS7 sc, ULTRATURB sc, SOLITAX sc, TSS sc	●
Ultra Pure Conductivity	8310, 8311, 8312, 8315, 8316, 8317 Contacting	▲
Ultra Pure pH/ORP	8362	▲

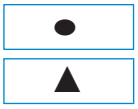
● = Digital ▲ = Analog

Connect up to two of any of the sensors listed above, in any combination, to meet your application needs. The diagrams below demonstrate the potential configurations. Operation of analog sensors requires the controller to be equipped with the appropriate sensor module. Contact Hach Technical Support for help with selecting the appropriate module.

2 Channel Configurations



1 Channel Configurations



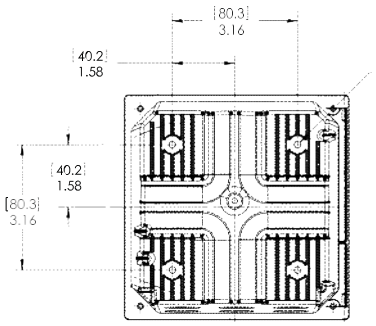
Specifications*

Dimensions (H x W x D)	5.7 in x 5.7 in x 7.1 in (144 mm x 144 mm x 181 mm)
Display	Graphic dot matrix LCD with LED backlighting, transreflective
Display Size	1.9 x 2.7 in. (48 mm x 68 mm)
Display Resolution	240 x 160 pixels
Weight	3.75 lbs. (1.70 kg)
Power Requirements (Voltage)	100 - 240 V AC, 24 V DC
Power Requirements (Hz)	50/60 Hz
Operating Temperature Range	-20 to 60 °C , 0 to 95% RH non-condensing
Analog Outputs	Two (Five with optional expansion module) to isolated current outputs, max 550 Ω , Accuracy: ± 0.1% of FS (20mA) at 25 °C, ± 0.5% of FS over -20 °C to 60 °C range Operational Mode: measurement or calculated value
Analog Output Functional Mode	Linear, Logarithmic, Bi-linear, PID
Security Levels	2 password-protected levels
Mounting Configurations	Wall, pole, and panel mounting
Enclosure Rating	NEMA 4X/IP66
Conduit Openings	1/2 in NPT Conduit
Relay: Operational Mode	Primary or secondary measurement, calculated value (dual channel only) or timer
Relay Functions	Scheduler (Timer), Alarm, Feeder Control, Event Control, Pulse Width Modulation, Frequency Control, and Warning
Relays	Four electromechanical SPDT (Form C) contacts, 1200 W, 5 A
Communication	MODBUS RS232/RS485, PROFIBUS DPV1, or HART 7.2 optional
Memory Backup	Flash memory
Electrical Certifications	EMC CE compliant for conducted and radiated emissions: - CISPR 11 (Class A limits) - EMC Immunity EN 61326-1 (Industrial limits) Safety cETLus safety mark for: - General Locations per ANSI/UL 61010-1 & CAN/CSA C22.2. No. 61010-1 - Hazardous Location Class I, Division 2, Groups A,B,C & D (Zone 2, Group IIC) per FM 3600 / FM 3611 & CSA C22.2 No. 213 M1987 with approved options and appropriately rated Class I, Division 2 or Zone 2 sensors cULus safety mark - General Locations per UL 61010-1 & CAN/CSA C22.2. No. 61010-1

**Subject to change without notice.*

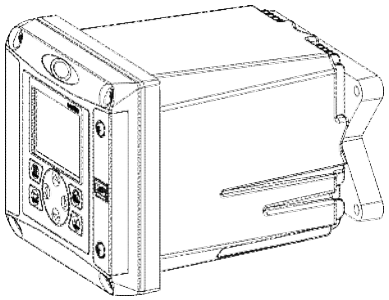
Dimensions

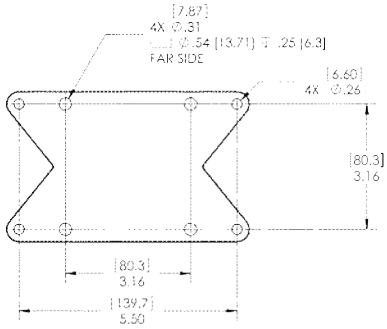
Surface Mounting Dimensions



Mounting Dimensions
(Rear View)

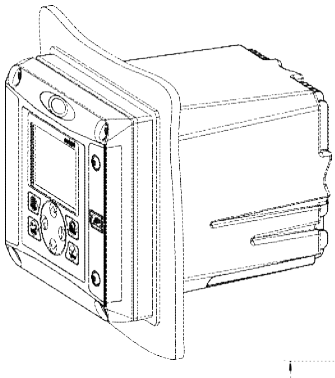
OR

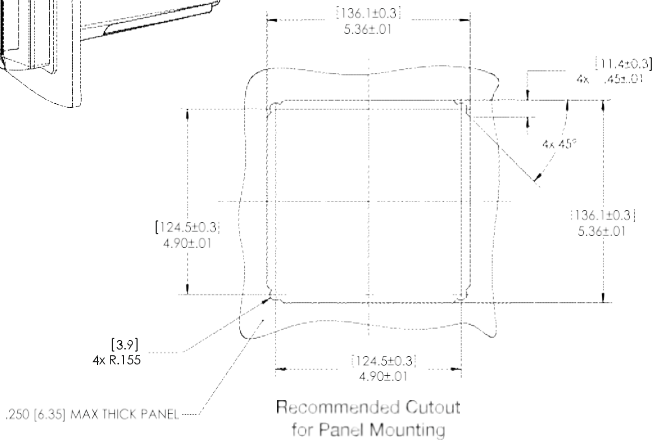




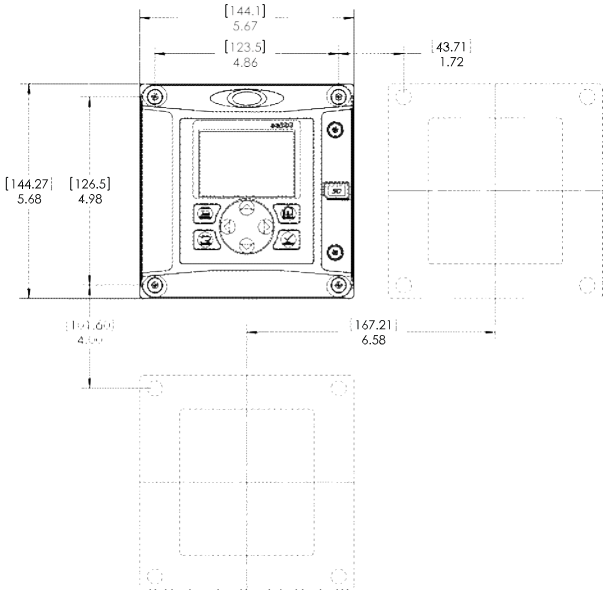
Bracket (supplied) for Surface Mounting
(Not compatible with Weather and Sun Shield
p/n 9220600 when surface mounting.)

Panel Mounting Dimensions



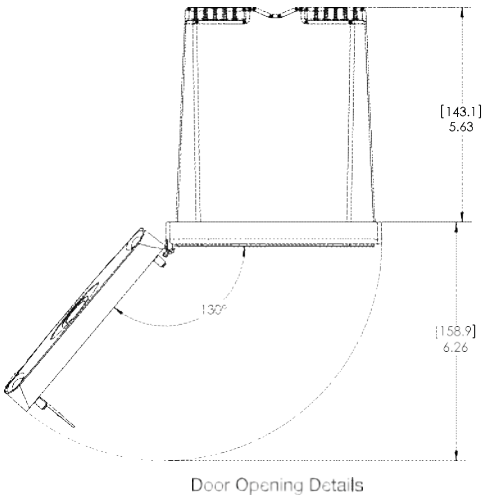


Recommended Cutout
for Panel Mounting

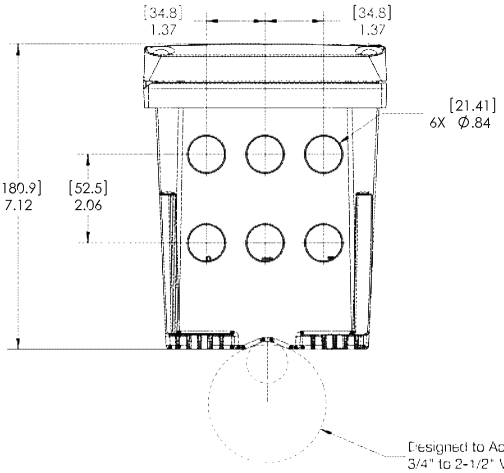


Minimum Spacing Dimensions
for Group Mounting

Top and Bottom Views

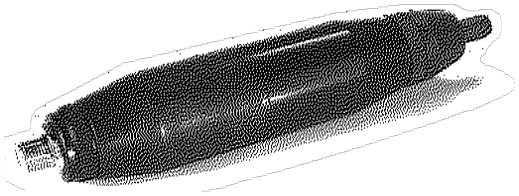


Door Opening Details

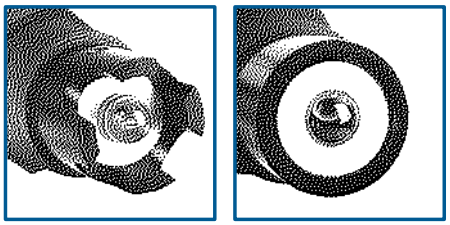


Designed to Accommodate
3/4" to 2-1/2" Vertical or Horizontal Pipe

3/4-inch Combination pH and ORP Sensor Kits



Use the Digital Gateway to make any Hach analog combination pH or ORP sensor compatible with the Hach sc1000 Controller.



Digital combination pH and ORP sensors are available in convertible, insertion, and sanitary mounting styles. Choose from rugged dome electrodes or "easy-to-clean" flat glass electrodes.

Features and Benefits

Low Price—High Performance

These combination sensors are designed for specialty applications for immersion or in-line mounting. The reference cell features a double-junction design for extended service life, and a built-in solution ground. The body is molded from chemically-resistant Ryton® or PVDF, and the reference junction is coaxial porous Teflon®. All sensors are rated 0 to 105ºC up to 100 psig, and have integral 4.5 m (15 ft.) cables with tinned leads. The PC-series (for pH) and RC-series (for ORP) combination sensors are ideal for measuring mild and aggressive media.

Special Electrode Configurations

Sensors with rugged dome electrodes, "easy-to-clean" flat glass electrodes, and even HF (hydrofluoric acid) resistant glass electrodes are available for a wide variety of process solutions.

Temperature Compensation Element Option

The PC-series combination pH sensors are available with or without a Pt 1000 ohm RTD temperature element. The RC-series combination ORP sensors are supplied without a temperature element.

Versatile Mounting Styles

Sensors are available in three mounting styles—convertible, insertion, and sanitary. Please turn to page 3 for more information.

Full-Featured "Plug and Play" Hach sc Digital Controllers

There are no complicated wiring or set up procedures with any Hach sc controller. Just plug in any combination of Hach digital sensors and it's ready to use—it's "plug and play."

One or multiple sensors—The sc controller family allows you to receive data from up to eight Hach digital sensors in any combination using a single controller.

Communications—Multiple alarm/control schemes are available using the relays and PID control outputs. Available communications include analog 4-20 mA, digital MODBUS® (RS485 and RS232) or Profibus DP protocols. (Other digital protocols are available. Contact your Hach representative for details.)

Data logger—A built-in data logger collects measurement data, calibration, verification points, and alarm history.

Specifications*

Most pH applications fall in the 2.5-12.5 pH range. General purpose pH glass electrodes perform well in this range. Some industrial applications require accurate measurements and control at pH values below 2 or above 12. Consult Hach Technical Support for details on these applications.

Combination pH Sensors

Measuring Range
0 to 14 pH

Accuracy
Less than 0.1 pH under reference conditions

Temperature Range
0 to 105ºC (32 to 221ºF)

Flow Rate
0 to 2 m/s (0 to 6.6 ft./s); non-abrasive

Pressure Range
0 to 6.9 bar at 100ºC (0 to 100 psig at 212ºF)

Signal Transmission Distance
100 m (328 ft.) when used with the Hach Digital Gateway and a Hach sc Digital Controller.

1000 m (3280 ft.) when used with the Hach Digital Gateway, Termination Box, and a Hach sc Digital Controller.

Sensor Cable
Integral coaxial cable (plus two conductors for temperature compensator option); 4.5 m (15 ft.) long

Wetted Materials

Convertible style: Ryton® body (glass filled)

Insertion style: PVDF body (Kynar®)

Sanitary style: 316 stainless steel sleeved PVDF body

Common materials for all sensor styles include PTFE Teflon double junction, glass process electrode, and Viton® O-rings

Warranty
90 days

Combination ORP Sensors

Measuring Range
-2000 to +2000 millivolts

Accuracy
Limited to calibration solution accuracy (± 20 mV)

Temperature Range
0 to 105ºC (32 to 221ºF)

Flow Rate
0 to 2 m/s (0 to 6.6 ft./s); non-abrasive

Pressure Range
0 to 6.9 bar at 100ºC (0 to 100 psig at 212ºF)

Signal Transmission Distance
100 m (328 ft.) when used with the Hach Digital Gateway and a Hach sc Digital Controller.

1000 m (3280 ft.) when used with the Hach Digital Gateway, Termination Box, and a Hach sc Digital Controller.

Sensor Cable
Integral coaxial cable; 4.5 m (15 ft.) long; terminated with stripped and tinned wires

Wetted Materials

Convertible style: Ryton® body (glass filled)

Insertion style: PVDF body (Kynar®)

Common materials for all sensor styles include PTFE Teflon double junction, glass with platinum process electrode, and Viton® O-rings

Warranty
90 days

**Specifications subject to change without notice.*

Engineering Specifications

1. The pH sensor shall be available in convertible, insertion or sanitary styles. The ORP sensor shall be available in only convertible or insertion styles.
2. The convertible style sensor shall have a Ryton® body. The insertion style sensor shall have a PVDF body. The sanitary style sensor shall have a 316 stainless steel sleeved PVDF body. Common materials for all sensor styles shall include a PTFE Teflon® double junction, and Viton® O-rings. The pH sensor shall have a glass pH electrode. The ORP sensor shall have a platinum ORP electrode.
3. The convertible style pH sensor shall be available with or without a built-in Pt 1000 ohm RTD temperature element. Insertion and sanitary style pH sensors shall have a built-in Pt 1000 ohm RTD temperature element. Convertible and insertion style ORP sensors shall not have a built-in temperature element.
4. The sensor shall communicate via MODBUS® RS-485 to a Hach sc Digital Controller.
5. The sensor shall be Hach Company Model PC sc or PC-series for pH measurement or Model PC sc or RC-series for ORP measurement.

Dimensions

Convertible Style Sensor

The convertible style sensor has a Ryton® body that features 3/4-inch NPT threads on both ends. The sensor can be directly mounted into a standard 3/4-inch pipe tee for flow-through mounting or fastened onto the end of a pipe for immersion mounting. The convertible style sensor enables inventory consolidation, thereby reducing associated costs. Mounting tees and immersion mounting hardware are offered in a variety of materials to suit application requirements.

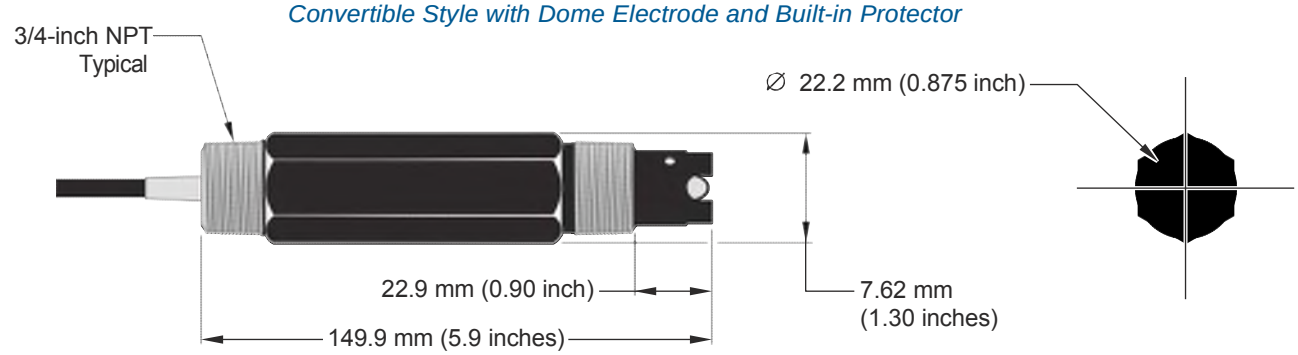
Insertion Style Sensor

Insertion style sensors feature a longer, non-threaded PVDF body with two Viton® O-rings, providing a seal when used with the optional Hach insertion mount hardware assembly. This ball valve hardware enables sensor insertion and retraction from a pipe or vessel without having to stop the process flow.

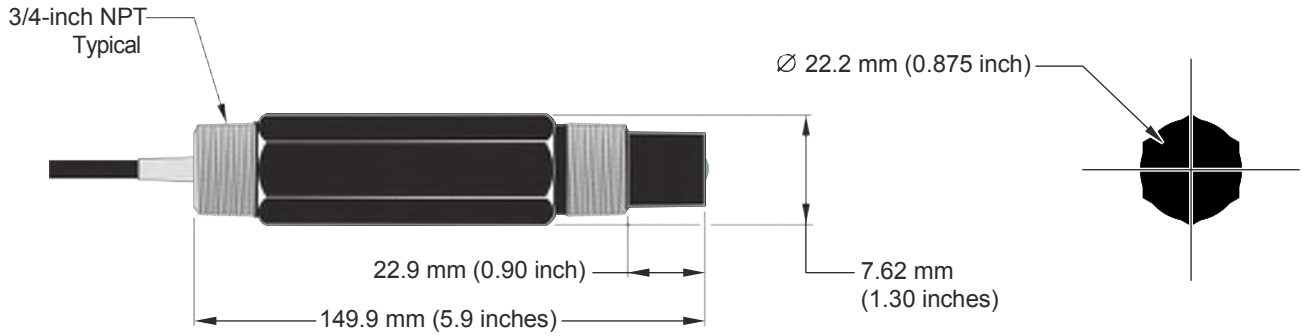
Sanitary Style Sensor

The sanitary style sensor, offered for pH measurement, has a 316 stainless steel-sleeved PVDF body with a 2-inch flange. The sensor mates to a standard 2-inch Tri-Clover fitting. The optional Hach sanitary mounting hardware includes a standard 2-inch sanitary tee, sanitary clamp, and Viton® sanitary gasket.

Convertible Style with Dome Electrode and Built-in Protector



Convertible Style with Flat Electrode



Lockwood Remediation Technologies, LLC

The Pulsatron Series A Plus offers manual function controls over stroke length and stroke rate as standard with the option to select external pace for automatic control.

Ten distinct models are available, having pressure capabilities to 250 PSIG (17 BAR) @ 12 GPO (1.9 lph), and flow capacities to 58 GPO (9.1 lph) @ 100 PSIG (7.0 BAR), with a standard turndown ratio of 100:1, and optional ratio of 1000:1. Metering performance is reproducible to within ± 3% of maximum capacity.

Features

- Manual Control by on-line adjustable stroke rate and stroke length.
- Highly Reliable timing circuit.
- Circuit Protection against voltage and current upsets.
- Solenoid Protection by thermal overload with auto-reset.
- Water Resistant, for outdoor and indoor applications.
- Internally Dampened To Reduce Noise.
- Guided Ball Check Valve Systems, to reduce back flow and enhance outstanding priming characteristics.
- Few Moving Parts and Wall Mountable.
- Safe & Easy Priming with durable leak-free bleed valve assembly (standard).
- Optional Control: External pace with auto/manual selection.

Controls

Manual Stroke Rate

Manual Stroke Length

External Pacing - Optional

External Pace With Stop - Optional (125 SPM only)

Controls Options		
Feature	Standard Configuration	Optional Configuration [1]
External Pacing	--	Auto / Manual Selection
External Pace w/ Stop (125 SPM only)	--	Auto / Manual Selection [2]
Manual Stroke Rate	10:1 Ratio	100:1 Raio
Manual Stroke Length	10:1 Ratio	10:1 Ratio
Total Turndown Ratio	100:1 Ratio	1000:1 Ratio

Note 1: On S2, S3 & S4 sizes only.

Note 2: Not available on 1000:1 turndown pumps.

Operating Benefits

- Reliable metering performance.
- Rated "hot" for continuous duty.
- High viscosity capability.
- Leak-free, sealless, liquid end.

Aftermarket

- KOPkits
- Gauges
- Dampeners
- Pressure Relief Valves
- Tanks
- Pre-Engineered Systems
- Process Controllers (PULSAblue, MicroVision)

Series A Plus
Electronic Metering Pumps

Lockwood Remediation Technologies, LLC

Series A Plus

Specifications and Model Selection

MODEL			LBC2	LB02	LBC3	LB03	LB04	LB64	LBC4	LBS2	LBS3	LBS4
Capacity nominal (max.)		GPH	0.25	0.25	0.42	0.50	1.00	1.25	2.00	0.50	1.38	2.42
		GPO	6	6	10	12	24	30	48	12	33	58
		LPH	0.9	0.9	1.6	1.9	3.8	4.7	7.6	1.9	5.2	9.14
Pressure[3] (max.)	GFPP, PVDF, 316SS or PVC <; N code) wITFE Seats)	PSIG (Bar)	250 (17)	150 (10)	250 (17)	150 (10)	100 (7)	100 (7)	50 (3.3)	250 (17)	150 (10)	100 (7)
	PVC (V code) Viton or CSPE Seats IDegas Liquid End		150 (10)							150 (10)		
Connections:		Tubina	1 14' ID X 3 8' OD						3 8' D X 1 2' OD	1 4' D X 3 8' OD		
		Pioina	1 4' FNPT									
Strokes/Minute		SPM	125							250		

Note 3: Pumps with rated pressure above 150 PSI will be de-rated to 150 PSI Max. when selecting certain valve options, see Price Book for details.

Engineering Data

Pump Head Materials Available:	GFPPL
	PVC
	PVDF
	316 SS
Diaphragm:	PTFE-faced CSPE-backed
Check Valves Materials Available:	
Seats/0-Rings:	PTFE
	CSPE
	Viton
Balls:	Ceramic
	PTFE
	316 SS
	Alloy C
Fittings Materials Available:	GFPPL
	PVC
	PVDF
Bleed Valve:	Same as fitting and check valve selected, except 316SS
Injection Valve & Foot Valve Assy:	Same as fitting and check valve selected
Tubing:	Clear PVC
	White PE

Important: Material Code - GFPPL=Glass-filled Polypropylene, PVC=Polyvinyl Chloride, PE=Polyethylene, PVDF=Polyvinylidene Fluoride, CSPE=Generic formulation of Hypalon, a registered trademark of E.I. DuPont Company. Viton is a registered trademark of E.I. DuPont Company. PVC wetted end recommended for sodium hypochlorite.

Engineering Data

Reproducibility:	+/- 3% at maximum capacity
Viscosity Max CPS:	1000 CPS
Stroke Frequency Max SPM:	125 / 250 by Model
Stroke Frequency Turn-Down Ratio:	10:1 / 100:1 by Model
Stroke Length Turn-Down Ratio:	10:1
Power Input:	115 VAC/50-60 HZ/1 ph
	230 VAC/50-60 HZ/1 ph
Average Current Draw:	
@ 115 VAC; Amps:	0.6 Amps
@ 230 VAC; Amps:	0.3 Amps
Peak hput Power:	130 Watts
Average Input Power @ Max SPM:	50 Watts

Custom Engineered Designs - Pre-Engineered Systems

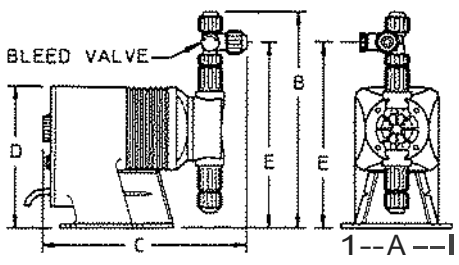
Pre-Engineered Systems

Pulsafeeder's Pre-Engineered Systems are designed to provide complete chemical feed solutions for all electronic metering applications. From stand alone simplex pH control applications to full-featured, redundant sodium hypochlorite disinfection metering, these rugged fabricated assemblies offer turn-key simplicity and industrial-grade durability. The UV-stabilized, high-grade HOPE frame offers maximum chemical compatibility and structural rigidity. Each system is factory assembled and hydrostatically tested prior to shipment.

Dimensions

Series A PLUS Dimensions (inches)						
Model No.	A	B	C	D	E	Shipping Weight
LB02 IS2	5.0	9.6	9.5	6.5	8.2	10
LBC2	5.0	9.9	9.5	6.5	8.5	10
LBC3	5.0	9.9	9.5	6.5	8.5	10
LB03 IS3	5.0	9.9	9.5	6.5	8.5	10
LB0[illegible]4	5.0	9.9	9.5	6.5	8.5	10
LB64	5.0	9.9	9.5	6.5	8.5	10
LBC4	5.0	9.9	9.5	6.5	8.5	10

NOTE: Inches X 2.54 cm



APPENDIX D

Endangered Species Act Documentation

MassDEP - Bureau of Waste Site Cleanup

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

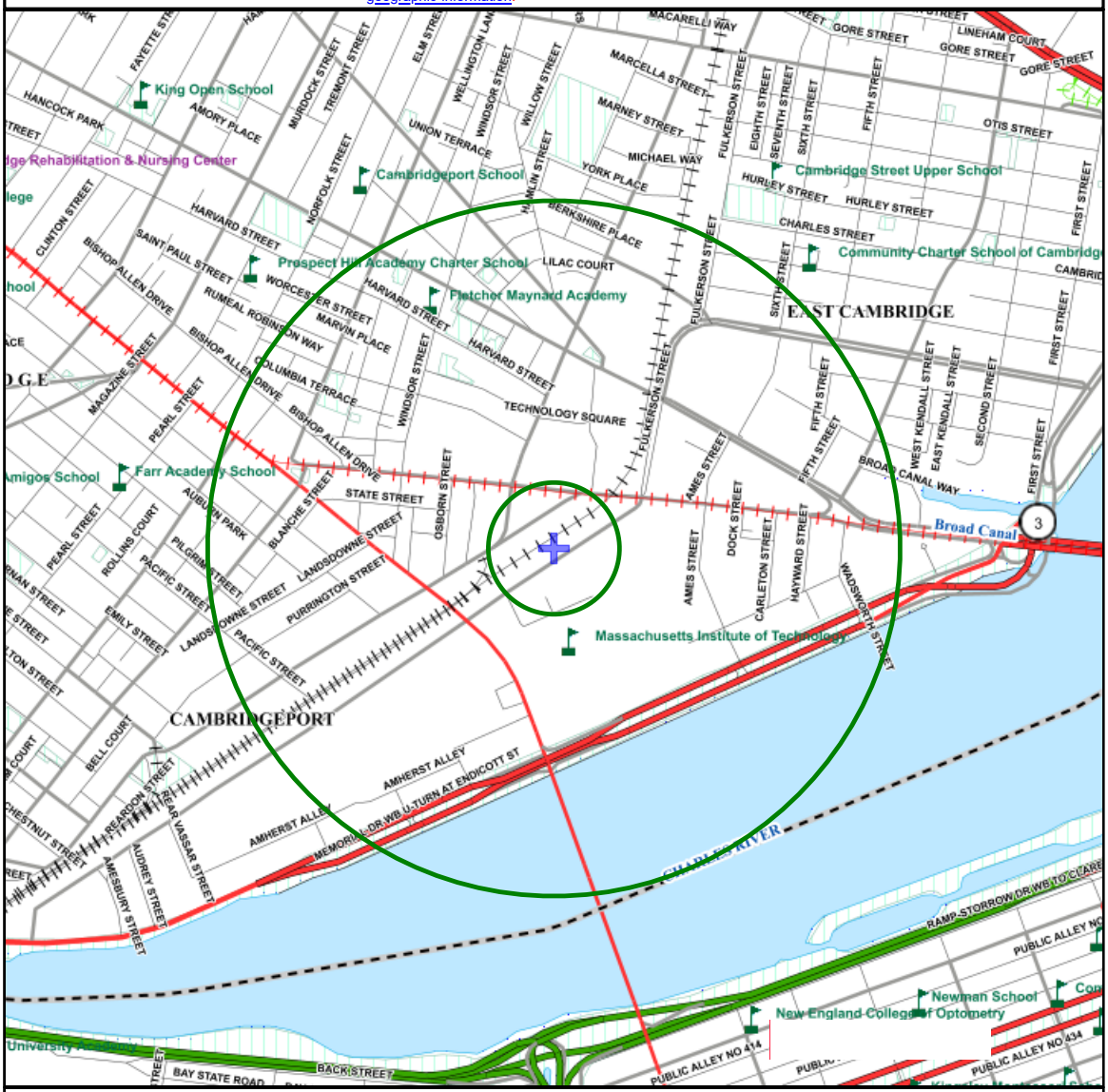
Site Information:

51 VASSAR STREET CAMBRIDGE, MA

NAD83 UTM Meters:
4692052mN , 327692mE (Zone: 19)
September 17, 2020

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: https://www.mass.gov/orgs/massgis-bureau-of-geographic-information.

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

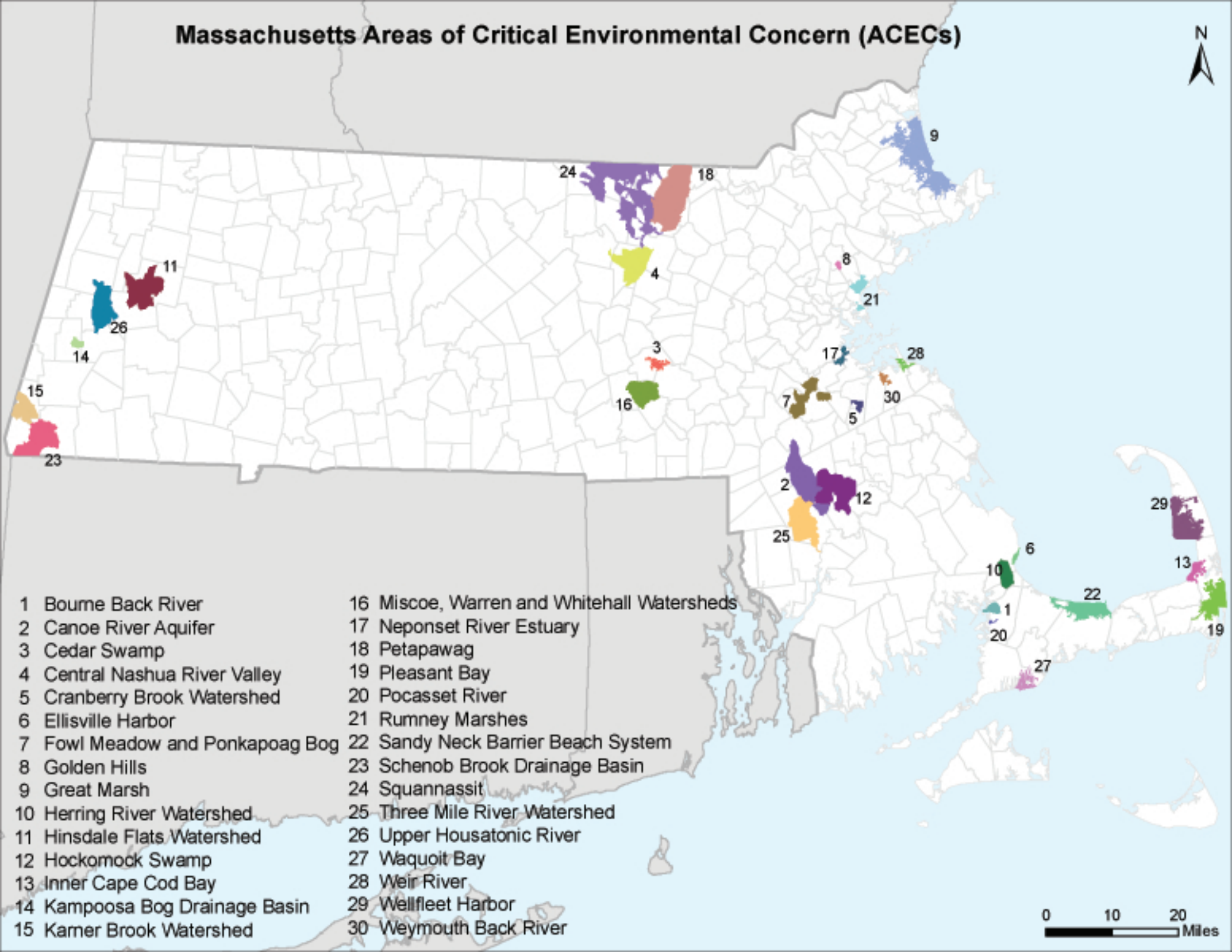
Wetlands: Freshwater, Saltwater, Cranberry Bog

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.

Massachusetts Areas of Critical Environmental Concern (ACECs)



FEDERALLY LISTED ENDANGERED AND THREATENED SPECIES IN MASSACHUSETTS

COUNTY	SPECIES	FEDERAL STATUS	GENERAL LOCATION/HABITAT	TOWNS
Barnstable	Piping Plover	Threatened	Coastal Beaches	All Towns
	Roseate Tern	Endangered	Coastal beaches and the Atlantic Ocean	All Towns
	Northeastern beach tiger beetle	Threatened	Coastal Beaches	Chatham
	Sandplain gerardia	Endangered	Open areas with sandy soils.	Sandwich and Falmouth.
	Northern Red-bellied Cooter	Endangered	Inland Ponds and Rivers	Bourne (north of the Cape Cod Canal)
	Red Knot[1]	Threatened	Coastal Beaches and Rocky Shores, sand and mud flats	Coastal Towns
	Northern Long-eared Bat	Threatened Final 4(d) Rule	Winter- mines and caves, Summer – wide variety of forested habitats	Statewide
Berkshire	Bog Turtle	Threatened	Wetlands	Egremont and Sheffield
	Northern Long-eared Bat	Threatened Final 4(d) Rule	Winter- mines and caves, Summer – wide variety of forested habitats	Statewide
Bristol	Piping Plover	Threatened	Coastal Beaches	Fairhaven, Dartmouth, Westport
	Roseate Tern	Endangered	Coastal beaches and the Atlantic Ocean	Fairhaven, New Bedford, Dartmouth, Westport
	Northern Red-bellied Cooter	Endangered	Inland Ponds and Rivers	Taunton
	Red Knot[1]	Threatened	Coastal Beaches and Rocky Shores, sand and mud flats	Coastal Towns
	Northern Long-eared Bat	Threatened Final 4(d) Rule	Winter- mines and caves, Summer – wide variety of forested habitats	Statewide
Dukes	Roseate Tern	Endangered	Coastal beaches and the Atlantic Ocean	All Towns
	Piping Plover	Threatened	Coastal Beaches	All Towns
	Northeastern beach tiger beetle	Threatened	Coastal Beaches	Aquinnah and Chilmark
	Sandplain gerardia	Endangered	Open areas with sandy soils.	West Tisbury
	Red Knot[1]	Threatened	Coastal Beaches and Rocky Shores, sand and mud flats	Coastal Towns
	Northern Long-eared Bat	Threatened Final 4(d) Rule	Winter- mines and caves, Summer – wide variety of forested habitats	Statewide

Updated 02/05/2016

FEDERALLY LISTED ENDANGERED AND THREATENED SPECIES IN MASSACHUSETTS

COUNTY	SPECIES	FEDERAL STATUS	GENERAL LOCATION/HABITAT	TOWNS
Essex	Small whorled Pogonia	Threatened	Forests with somewhat poorly drained soils and/or a seasonally high water table	Gloucester, Essex and Manchester
	Piping Plover	Threatened	Coastal Beaches	Gloucester, Essex, Ipswich, Rowley, Revere, Newbury, Newburyport and Salisbury
	Red Knot[1]	Threatened	Coastal Beaches and Rocky Shores, sand and mud flats	Coastal Towns
	Northern Long-eared Bat	Threatened Final 4(d) Rule	Winter- mines and caves, Summer – wide variety of forested habitats	Statewide
Franklin	Northeastern bulrush	Endangered	Wetlands	Montague, Warwick
	Dwarf wedgemussel	Endangered	Mill River	Whately
	Northern Long-eared Bat	Threatened Final 4(d) Rule	Winter- mines and caves, Summer – wide variety of forested habitats	Statewide
Hampshire	Small whorled Pogonia	Threatened	Forests with somewhat poorly drained soils and/or a seasonally high water table	Hadley
	Puritan tiger beetle	Threatened	Sandy beaches along the Connecticut River	Northampton and Hadley
	Dwarf wedgemussel	Endangered	Rivers and Streams.	Hatfield, Amherst and Northampton
	Northern Long-eared Bat	Threatened Final 4(d) Rule	Winter- mines and caves, Summer – wide variety of forested habitats	Statewide
Hampden	Small whorled Pogonia	Threatened	Forests with somewhat poorly drained soils and/or a seasonally high water table	Southwick
	Northern Long-eared Bat	Threatened Final 4(d) Rule	Winter- mines and caves, Summer – wide variety of forested habitats	Statewide
Middlesex	Small whorled Pogonia	Threatened	Forests with somewhat poorly drained soils and/or a seasonally high water table	Groton
	Northern Long-eared Bat	Threatened Final 4(d) Rule	Winter- mines and caves, Summer – wide variety of forested habitats	Statewide
Nantucket	Piping Plover	Threatened	Coastal Beaches	Nantucket
	Roseate Tern	Endangered	Coastal beaches and the Atlantic Ocean	Nantucket
	American burying beetle	Endangered	Upland grassy meadows	Nantucket
	Red Knot[1]	Threatened	Coastal Beaches and Rocky Shores, sand and mud flats	Coastal Towns
	Northern Long-eared Bat	Threatened Final 4(d) Rule	Winter- mines and caves, Summer – wide variety of forested habitats	Statewide

Updated 02/05/2016

FEDERALLY LISTED ENDANGERED AND THREATENED SPECIES IN MASSACHUSETTS

COUNTY	SPECIES	FEDERAL STATUS	GENERAL LOCATION/HABITAT	TOWNS
Plymouth	Piping Plover	Threatened	Coastal Beaches	Scituate, Marshfield, Duxbury, Plymouth, Wareham and Mattapoisett
	Northern Red-bellied Cooter	Endangered	Inland Ponds and Rivers	Kingston, Middleborough, Carver, Plymouth, Bourne, Wareham, Halifax, and Pembroke
	Roseate Tern	Endangered	Coastal beaches and the Atlantic Ocean	Plymouth, Marion, Wareham, and Mattapoisett.
	Red Knot[1]	Threatened	Coastal Beaches and Rocky Shores, sand and mud flats	Coastal Towns
	Northern Long-eared Bat	Threatened Final 4(d) Rule	Winter- mines and caves, Summer – wide variety of forested habitats	Statewide
Suffolk	Piping Plover	Threatened	Coastal Beaches	Revere, Winthrop
	Red Knot[1]	Threatened	Coastal Beaches and Rocky Shores, sand and mud flats	Coastal Towns
	Northern Long-eared Bat	Threatened Final 4(d) Rule	Winter- mines and caves, Summer – wide variety of forested habitats	Statewide
Worcester	Small whorled Pogonia	Threatened	Forests with somewhat poorly drained soils and/or a seasonally high water table	Leominster
	Northern Long-eared Bat	Threatened Final 4(d) Rule	Winter- mines and caves, Summer – wide variety of forested habitats	Statewide

[1]Migratory only, scattered along the coast in small numbers

-Eastern cougar and gray wolf are considered extirpated in Massachusetts.
-Endangered gray wolves are not known to be present in Massachusetts, but dispersing individuals from source populations in Canada may occur statewide.
-Critical habitat for the Northern Red-bellied Cooter is present in Plymouth County.

Updated 02/05/2016

Rare species viewer

Town	Common Name	Scientific Name	Taxonomic Group	MESA Status	Most Recent Obs.
CAMBRIDGE	American Bittern	Botaurus lentiginosus	Bird	Endangered	1906
CAMBRIDGE	American Sea-blite	Suaeda calceoliformis	Vascular Plant	Special Concern	1912
CAMBRIDGE	Andrews' Bottle Gentian	Gentiana andrewsii	Vascular Plant	Endangered	2017
CAMBRIDGE	Barn Owl	Tyto alba	Bird	Special Concern	Historic
CAMBRIDGE	Blue-spotted Salamander (complex)	Ambystoma laterale pop. 1	Amphibian	Special Concern	1917
CAMBRIDGE	Bridle Shiner	Notropis bifrenatus	Fish	Special Concern	1928
CAMBRIDGE	Britton's Violet	Viola brittoniana	Vascular Plant	Threatened	1843
CAMBRIDGE	Common Gallinule	Gallinula galeata	Bird	Special Concern	1890
CAMBRIDGE	Eastern Box Turtle	Terrapene carolina	Reptile	Special Concern	1892
CAMBRIDGE	Eastern Pondmussel	Ligumia nasuta	Mussel	Special Concern	1941
CAMBRIDGE	Eastern Spadefoot	Scaphiopus holbrookii	Amphibian	Threatened	1892
CAMBRIDGE	Engelmann's Flatsedge	Cyperus engelmannii	Vascular Plant	Threatened	2008
CAMBRIDGE	Fries' Pondweed	Potamogeton friesii	Vascular Plant	Endangered	1880
CAMBRIDGE	Imperial Moth	Eacles imperialis	Butterfly/Moth	Threatened	Historic
CAMBRIDGE	Lake Quillwort	Isoetes lacustris	Vascular Plant	Endangered	Historic
CAMBRIDGE	Least Bittern	Ixobrychus exilis	Bird	Endangered	1890
CAMBRIDGE	Long's Bulrush	Scirpus longii	Vascular Plant	Threatened	1913
CAMBRIDGE	New England Medicinal Leech	Macrobdella sestertia	Segmented Worm	Special Concern	1800s
CAMBRIDGE	Pale Green Orchid	Platanthera flava var. herbiola	Vascular Plant	Threatened	Historic
CAMBRIDGE	Peregrine Falcon	Falco peregrinus	Bird	Threatened	2019
CAMBRIDGE	Sedge Wren	Cistothorus platensis	Bird	Endangered	1840
CAMBRIDGE	Slender Woodland Sedge	Carex gracilescens	Vascular Plant	Endangered	1891
CAMBRIDGE	Twelve-spotted Tiger Beetle	Cicindela duodecimguttata	Beetle	Special Concern	1932
CAMBRIDGE	Wood Turtle	Glyptemys insculpta	Reptile	Special Concern	Historic

List provided by Mass.gov (https://www.mass.gov/service-details/rare-species-viewer), accessed 9/18/2020.

IPaC resource list

This report is an automatically generated list of species and other resources such as critical habitat (collectively referred to as *trust resources*) under the U.S. Fish and Wildlife Service's (USFWS) jurisdiction that are known or expected to be on or near the project area referenced below. The list may also include trust resources that occur outside of the project area, but that could potentially be directly or indirectly affected by activities in the project area. However, determining the likelihood and extent of effects a project may have on trust resources typically requires gathering additional site-specific (e.g., vegetation/species surveys) and project-specific (e.g., magnitude and timing of proposed activities) information.

Below is a summary of the project information you provided and contact information for the USFWS office(s) with jurisdiction in the defined project area. Please read the introduction to each section that follows (Endangered Species, Migratory Birds, USFWS Facilities, and NWI Wetlands) for additional information applicable to the trust resources addressed in that section.

Location

Middlesex County, Massachusetts

Local office

New England Ecological Services Field Office

(603) 223-2541
(603) 223-0104

70 Commercial Street, Suite 300
Concord, NH 03301-5094

http://www.fws.gov/newengland

Endangered species

This resource list is for informational purposes only and does not constitute an analysis of project level impacts.

The primary information used to generate this list is the known or expected range of each species. Additional areas of influence (AOI) for species are also considered. An AOI includes areas outside of the species range if the species could be indirectly affected by activities in that area (e.g., placing a dam upstream of a fish population, even if that fish does not occur at the dam site, may indirectly impact the species by reducing or eliminating water flow downstream). Because species can move, and site conditions can change, the species on this list are not guaranteed to be found on or near the project area. To fully determine any potential effects to species, additional site-specific and project-specific information is often required.

Section 7 of the Endangered Species Act **requires** Federal agencies to "request of the Secretary information whether any species which is listed or proposed to be listed may be present in the area of such proposed action" for any project that is conducted, permitted, funded, or licensed by any Federal agency. A letter from the local office and a species list which fulfills this requirement can **only** be obtained by requesting an official species list from either the Regulatory Review section in IPaC (see directions below) or from the local field office directly.

For project evaluations that require USFWS concurrence/review, please return to the IPaC website and request an official species list by doing the following:

1. Draw the project location and click CONTINUE.
2. Click DEFINE PROJECT.
3. Log in (if directed to do so).
4. Provide a name and description for your project.
5. Click REQUEST SPECIES LIST.

Listed species[1] and their critical habitats are managed by the Ecological Services Program of the U.S. Fish and Wildlife Service (USFWS) and the fisheries division of the National Oceanic and Atmospheric Administration (NOAA Fisheries[2]).

Species and critical habitats under the sole responsibility of NOAA Fisheries are **not** shown on this list. Please contact NOAA Fisheries for species under their jurisdiction.

1. Species listed under the Endangered Species Act are threatened or endangered; IPaC also shows species that are candidates, or proposed, for listing. See the listing status page for more information.
2. 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.

THERE ARE NO ENDANGERED SPECIES EXPECTED TO OCCUR AT THIS LOCATION.

Migratory birds

Certain birds are protected under the Migratory Bird Treaty Act[1] and the Bald and Golden Eagle Protection Act[2].

Any person or organization who plans or conducts activities that may result in impacts to migratory birds, eagles, and their habitats should follow appropriate regulations and consider implementing appropriate conservation measures, as described below.

1. The Migratory Birds Treaty Act of 1918.
2. The Bald and Golden Eagle Protection Act of 1940.

Additional information can be found using the following links:

- Birds of Conservation Concern http://www.fws.gov/birds/management/managed-species/birds-of-conservation-concern.php
- Measures for avoiding and minimizing impacts to birds http://www.fws.gov/birds/management/project-assessment-tools-and-guidance/

conservation-measures.php

- Nationwide conservation measures for birds
  http://www.fws.gov/migratorybirds/pdf/management/nationwidestandardconservationmeasures.pdf

The birds listed below are birds of particular concern either because they occur on the USFWS Birds of Conservation Concern (BCC) list or warrant special attention in your project location. To learn more about the levels of concern for birds on your list and how this list is generated, see the FAQ below. This is not a list of every bird you may find in this location, nor a guarantee that every bird on this list will be found in your project area. To see exact locations of where birders and the general public have sighted birds in and around your project area, visit the E-bird data mapping tool (Tip: enter your location, desired date range and a species on your list). For projects that occur off the Atlantic Coast, additional maps and models detailing the relative occurrence and abundance of bird species on your list are available. Links to additional information about Atlantic Coast birds, and other important information about your migratory bird list, including how to properly interpret and use your migratory bird report, can be found below.

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, click on the PROBABILITY OF PRESENCE SUMMARY at the top of your list to see when these birds are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON (IF A BREEDING SEASON IS INDICATED FOR A BIRD ON YOUR LIST, THE BIRD MAY BREED IN YOUR PROJECT AREA SOMETIME WITHIN THE TIMEFRAME SPECIFIED, WHICH IS A VERY LIBERAL ESTIMATE OF THE DATES INSIDE WHICH THE BIRD BREEDS ACROSS ITS ENTIRE RANGE. "BREEDS ELSEWHERE" INDICATES THAT THE BIRD DOES NOT LIKELY BREED IN YOUR PROJECT AREA.)
Bald Eagle *Haliaeetus leucocephalus* This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/1626	Breeds Oct 15 to Aug 31
Black-billed Cuckoo *Coccyzus erythropthalmus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9399	Breeds May 15 to Oct 10
Bobolink *Dolichonyx oryzivorus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 20 to Jul 31
Canada Warbler *Cardellina canadensis* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 20 to Aug 10
Cerulean Warbler *Dendroica cerulea* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/2974	Breeds Apr 29 to Jul 20
Dunlin *Calidris alpina arcticola* This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA	Breeds elsewhere
Evening Grosbeak *Coccothraustes vespertinus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds elsewhere

Kentucky Warbler Oporornis formosus This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds Apr 20 to Aug 20
Lesser Yellowlegs Tringa flavipes This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9679	Breeds elsewhere
Nelson's Sparrow Ammodramus nelsoni This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 15 to Sep 5
Prairie Warbler Dendroica discolor This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 1 to Jul 31
Prothonotary Warbler Protonotaria citrea This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds Apr 1 to Jul 31
Red-headed Woodpecker Melanerpes erythrocephalus This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 10 to Sep 10
Red-throated Loon Gavia stellata This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds elsewhere
Rusty Blackbird Euphagus carolinus This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds elsewhere
Semipalmated Sandpiper Calidris pusilla This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds elsewhere
Snowy Owl Bubo scandiacus This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds elsewhere
Wood Thrush Hylocichla mustelina This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 10 to Aug 31

Probability of Presence Summary

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read and understand the FAQ “Proper Interpretation and Use of Your Migratory Bird Report” before using or attempting to interpret this report.

Probability of Presence (■)

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have higher

confidence in the presence score if the corresponding survey effort is also high.

How is the probability of presence score calculated? The calculation is done in three steps:

1. The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.
2. To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is 0.25/0.25 = 1; at week 20 it is 0.05/0.25 = 0.2.
3. The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

To see a bar's probability of presence score, simply hover your mouse cursor over the bar.

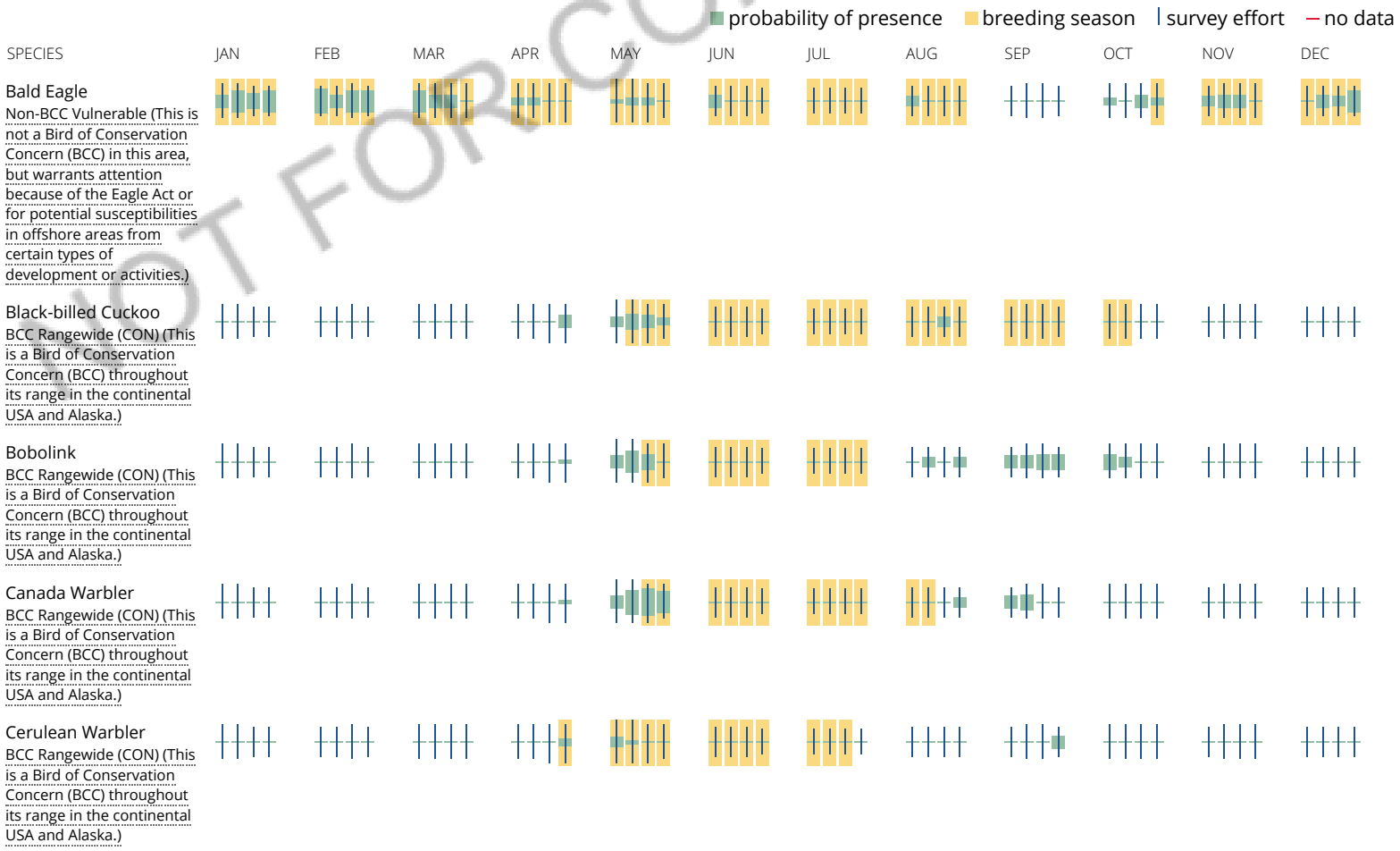
Breeding Season (▪)
Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

Survey Effort (|)
Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

To see a bar's survey effort range, simply hover your mouse cursor over the bar.

No Data (–)
A week is marked as having no data if there were no survey events for that week.

Survey Timeframe
Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.



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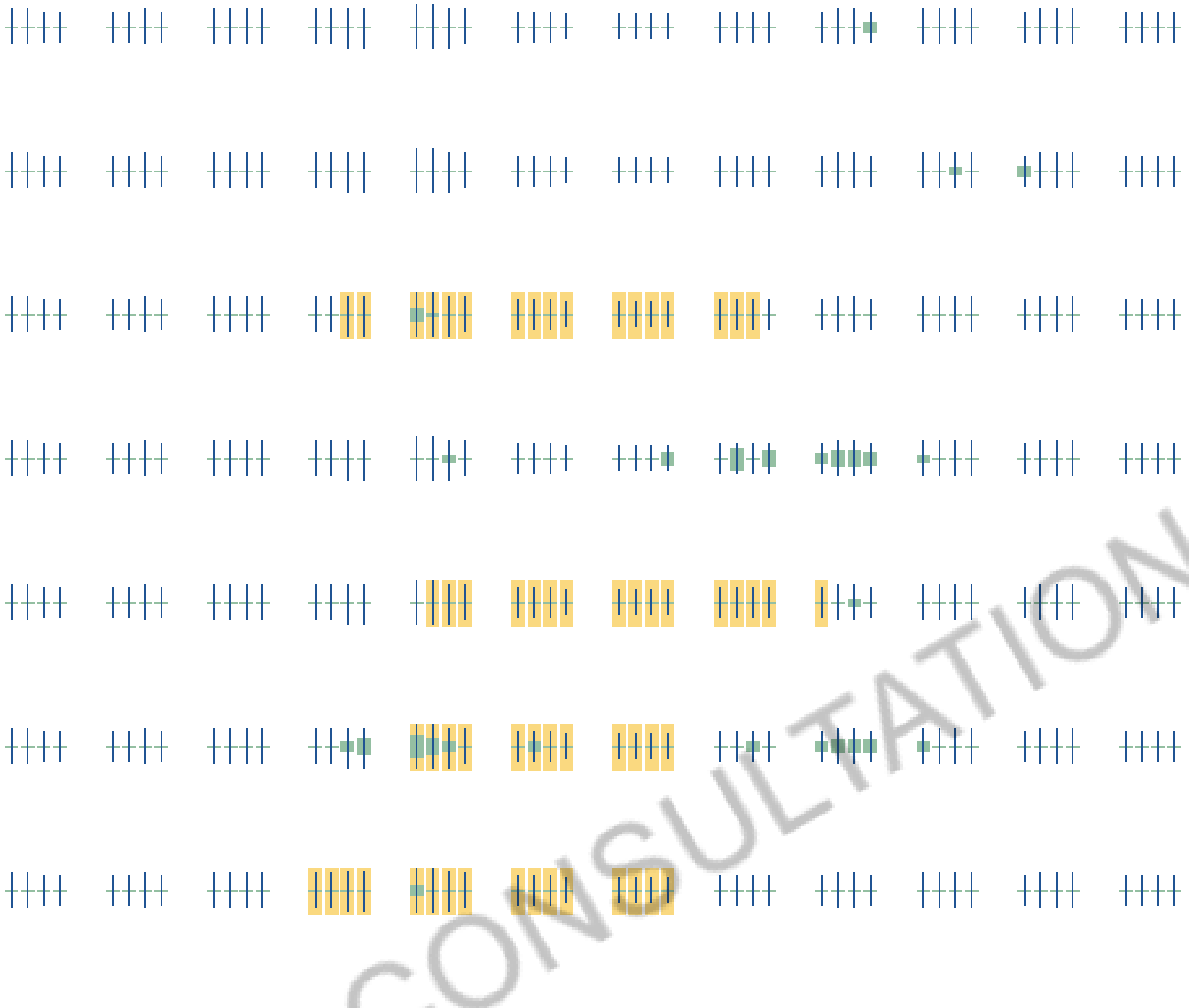
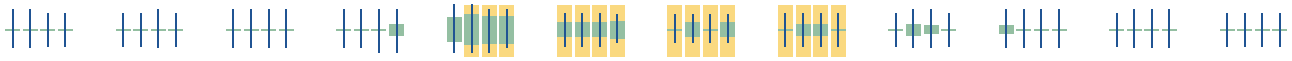


Wood Thrush
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)



Tell me more about conservation measures I can implement to avoid or minimize impacts to migratory birds.

Nationwide Conservation Measures describes measures that can help avoid and minimize impacts to all birds at any location year round. Implementation of these measures is particularly important when birds are most likely to occur in the project area. When birds may be breeding in the area, identifying the locations of any active nests and avoiding their destruction is a very helpful impact minimization measure. To see when birds are most likely to occur and be breeding in your project area, view the Probability of Presence Summary. Additional measures and/or permits may be advisable depending on the type of activity you are conducting and the type of infrastructure or bird species present on your project site.

What does IPaC use to generate the migratory birds potentially occurring in my specified location?

The Migratory Bird Resource List is comprised of USFWS Birds of Conservation Concern (BCC) and other species that may warrant special attention in your project location.

The migratory bird list generated for your project is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle (Eagle Act requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, please visit the AKN Phenology Tool.

What does IPaC use to generate the probability of presence graphs for the migratory birds potentially occurring in my specified location?

The probability of presence graphs associated with your migratory bird list are based on data provided by the Avian Knowledge Network (AKN). This data is derived from a growing collection of survey, banding, and citizen science datasets .

Probability of presence data is continuously being updated as new and better information becomes available. To learn more about how the probability of presence graphs are produced and how to interpret them, go the Probability of Presence Summary and then click on the "Tell me about these graphs" link.

How do I know if a bird is breeding, wintering, migrating or present year-round in my project area?

To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating or year-round), you may refer to the following resources: The Cornell Lab of Ornithology All About Birds Bird Guide, or (if you are unsuccessful in locating the bird of interest there), the Cornell Lab of Ornithology Neotropical Birds guide. If a bird on your migratory bird species list has a breeding season associated with it, if that bird does occur in your project area, there may be nests present at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

What are the levels of concern for migratory birds?

Migratory birds delivered through IPaC fall into the following distinct categories of concern:

1. "BCC Rangewide" birds are Birds of Conservation Concern (BCC) that are of concern throughout their range anywhere within the USA (including Hawaii, the Pacific Islands, Puerto Rico, and the Virgin Islands);
2. "BCC - BCR" birds are BCCs that are of concern only in particular Bird Conservation Regions (BCRs) in the continental USA; and
3. "Non-BCC - Vulnerable" birds are not BCC species in your project area, but appear on your list either because of the Eagle Act requirements (for eagles) or (for non-eagles) potential susceptibilities in offshore areas from certain types of development or activities (e.g. offshore energy development or longline fishing).

Although it is important to try to avoid and minimize impacts to all birds, efforts should be made, in particular, to avoid and minimize impacts to the birds on this list, especially eagles and BCC species of rangewide concern. For more information on conservation measures you can implement to help avoid and minimize migratory bird impacts and requirements for eagles, please see the FAQs for these topics.

Details about birds that are potentially affected by offshore projects

For additional details about the relative occurrence and abundance of both individual bird species and groups of bird species within your project area off the Atlantic Coast, please visit the Northeast Ocean Data Portal. The Portal also offers data and information about other taxa besides birds that may be helpful to you in your project review. Alternately, you may download the bird model results files underlying the portal maps through the NOAA NCCOS Integrative Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf project webpage.

Bird tracking data can also provide additional details about occurrence and habitat use throughout the year, including migration. Models relying on survey data may not include this information. For additional information on marine bird tracking data, see the Diving Bird Study and the nanotag studies or contact Caleb Spiegel or Pam Loring.

What if I have eagles on my list?

If your project has the potential to disturb or kill eagles, you may need to obtain a permit to avoid violating the Eagle Act should such impacts occur.

Proper Interpretation and Use of Your Migratory Bird Report

The migratory bird list generated is not a list of all birds in your project area, only a subset of birds of priority concern. To learn more about how your list is generated, and see options for identifying what other birds may be in your project area, please see the FAQ "What does IPaC use to generate the migratory birds potentially occurring in my specified location". Please be aware this report provides the "probability of presence" of birds within the 10 km grid cell(s) that overlap your project; not your exact project footprint. On the graphs provided, please also look carefully at the survey effort (indicated by the black vertical bar) and for the existence of the "no data" indicator (a red horizontal bar). A high survey effort is the key component. If the survey effort is high, then the probability of presence score can be viewed as more dependable. In contrast, a low survey effort bar or no data bar means a lack of data and, therefore, a lack of certainty about presence of the species. This list is not perfect; it is simply a starting point for identifying what birds of concern have the potential to be in your project area, when they might be there, and if they might be breeding (which means nests might be present). The list helps you know what to look for to confirm presence, and helps guide you in knowing when to implement conservation measures to avoid or minimize potential impacts from your project activities, should presence be confirmed. To learn more about conservation measures, visit the FAQ "Tell me about conservation measures I can implement to avoid or minimize impacts to migratory birds" at the bottom of your migratory bird trust resources page.

Facilities

National Wildlife Refuge lands

Any activity proposed on lands managed by the National Wildlife Refuge system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

THERE ARE NO REFUGE LANDS AT THIS LOCATION.

Fish hatcheries

THERE ARE NO FISH HATCHERIES AT THIS LOCATION.

Wetlands in the National Wetlands Inventory

Impacts to NWI wetlands and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local U.S. Army Corps of Engineers District.

THERE ARE NO KNOWN WETLANDS AT THIS LOCATION.

Data limitations

The Service's objective of mapping wetlands and deepwater habitats is to produce reconnaissance level information on the location, type and size of these resources. The maps are prepared from the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology and geography. A margin of error is inherent in the use of imagery; thus, detailed on-the-ground inspection of any particular site may result in revision of the wetland boundaries or classification established through image analysis.

The accuracy of image interpretation depends on the quality of the imagery, the experience of the image analysts, the amount and quality of the collateral data and the amount of ground truth verification work conducted. Metadata should be consulted to determine the date of the source imagery used and any mapping problems.

Wetlands or other mapped features may have changed since the date of the imagery or field work. There may be occasional differences in polygon boundaries or classifications between the information depicted on the map and the actual conditions on site.

Data exclusions

Certain wetland habitats are excluded from the National mapping program because of the limitations of aerial imagery as the primary data source used to detect wetlands. These habitats include seagrasses or submerged aquatic vegetation that are found in the intertidal and subtidal zones of estuaries and nearshore coastal waters. Some deepwater reef communities (coral or tuberficid worm reefs) have also been excluded from the inventory. These habitats, because of their depth, go undetected by aerial imagery.

Data precautions

Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either the design or products of this inventory, to define the limits of proprietary jurisdiction of any Federal, state, or local government or to establish the geographical scope of the regulatory programs of government agencies. Persons intending to engage in activities involving modifications within or adjacent to wetland areas should seek the advice of appropriate federal, state, or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.

APPENDIX E

National Register of Historic Places and Massachusetts Historical Commission Documentation

Massachusetts Cultural Resource Information System
MACRIS

Results

Get Results in Report Format
○PDF ◉Spreadsheet

Below are the results of your search, using the following search criteria:
Town(s): Cambridge
Street No: 51
Street Name: VASSAR St
Resource Type(s): Area, Building, Burial Ground, Object, Structure

For more information about this page and how to use it, click here

No Results Found.

New Search | New Search – Same Town(s) | Previous

MHC Home | MACRIS Home

Massachusetts Cultural Resource Information System

MACRIS

MACRIS Search Results

Search Criteria: Town(s): Cambridge; Street Name: VASSAR St; Resource Type(s): Area, Building, Burial Ground, Object, Structure;

Inv. No.	Property Name	Street	Town	Year
CAM.360	Metropolitan Supply Company Warehouse	269 Vassar St	Cambridge	1948
CAM.361	Hovey, F. A. and Company Warehouse	271-275 Vassar St	Cambridge	c 1940
CAM.362	Metropolitan Supply Company Warehouse	277-287 Vassar St	Cambridge	1939
CAM.363	Metropolitan Supply Company Warehouse	289-293 Vassar St	Cambridge	1939

Massachusetts Cultural Resource Information System

MACRIS

MACRIS Search Results

Search Criteria: Town(s): Cambridge; Street Name: Massachusetts Ave; Resource Type(s): Area, Building, Burial Ground, Object, Structure;

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	380 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

Inv. No.	Property Name	Street	Town	Year
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

Inv. No.	Property Name	Street	Town	Year
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

Inv. No.	Property Name	Street	Town	Year
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

APPENDIX F

Laboratory Data Reports

ANALYTICAL REPORT

Lab Number:	L2037651
Client:	Haley & Aldrich, Inc. 465 Medford Street, Suite 2200 Charlestown, MA 02129-1400
ATTN:	Todd Butler
Phone:	(617) 886-7424
Project Name:	MIT-SCC
Project Number:	134283-002
Report Date:	09/15/20

Certifications & Approvals: MA (M-MA086), NH NELAP (2064), CT (PH-0574), IL (200077), ME (MA00086), MD (348), NJ (MA935), NY (11148), NC (25700/666), PA (68-03671), RI (LAO00065), TX (T104704476), VT (VT-0935), VA (460195), USDA (Permit #P330-17-00196).

Eight Walkup Drive, Westborough, MA 01581-1019
508-898-9220 (Fax) 508-898-9193 800-624-9220 - www.alphalab.com

Project Name: MIT-SCC
Project Number: 134283-002

Lab Number: L2037651
Report Date: 09/15/20

Alpha Sample ID	Client ID	Matrix	Sample Location	Collection Date/Time	Receive Date
L2037651-01	HA20-E3	WATER	VASSAR STREET, CAMBRIDGE, MA	09/10/20 12:00	09/10/20
L2037651-02	OUTFALL	WATER	VASSAR STREET, CAMBRIDGE, MA	09/10/20 13:20	09/10/20
L2037651-03	TRIP BLANK	WATER	VASSAR STREET, CAMBRIDGE, MA	09/10/20 11:00	09/10/20

Project Name:	MIT-SCC	**Lab Number:**	L2037651
Project Number:	134283-002	**Report Date:**	09/15/20

Case Narrative

The samples were received in accordance with the Chain of Custody and no significant deviations were encountered during the preparation or analysis unless otherwise noted. Sample Receipt, Container Information, and the Chain of Custody are located at the back of the report.

Results contained within this report relate only to the samples submitted under this Alpha Lab Number and meet NELAP requirements for all NELAP accredited parameters unless otherwise noted in the following narrative. The data presented in this report is organized by parameter (i.e. VOC, SVOC, etc.). Sample specific Quality Control data (i.e. Surrogate Spike Recovery) is reported at the end of the target analyte list for each individual sample, followed by the Laboratory Batch Quality Control at the end of each parameter. Tentatively Identified Compounds (TICs), if requested, are reported for compounds identified to be present and are not part of the method/program Target Compound List, even if only a subset of the TCL are being reported. If a sample was re-analyzed or re-extracted due to a required quality control corrective action and if both sets of data are reported, the Laboratory ID of the re-analysis or re-extraction is designated with an "R" or "RE", respectively.

When multiple Batch Quality Control elements are reported (e.g. more than one LCS), the associated samples for each element are noted in the grey shaded header line of each data table. Any Laboratory Batch, Sample Specific % recovery or RPD value that is outside the listed Acceptance Criteria is bolded in the report. In reference to questions H (CAM) or 4 (RCP) when "NO" is checked, the performance criteria for CAM and RCP methods allow for some quality control failures to occur and still be within method compliance. In these instances, the specific failure is not narrated but noted in the associated QC Outlier Summary Report, located directly after the Case Narrative. QC information is also incorporated in the Data Usability Assessment table (Format 11) of our Data Merger tool, where it can be reviewed in conjunction with the sample result, associated regulatory criteria and any associated data usability implications.

Soil/sediments, solids and tissues are reported on a dry weight basis unless otherwise noted. Definitions of all data qualifiers and acronyms used in this report are provided in the Glossary located at the back of the report.

HOLD POLICY - For samples submitted on hold, Alpha's policy is to hold samples (with the exception of Air canisters) free of charge for 21 calendar days from the date the project is completed. After 21 calendar days, we will dispose of all samples submitted including those put on hold unless you have contacted your Alpha Project Manager and made arrangements for Alpha to continue to hold the samples. Air canisters will be disposed after 3 business days from the date the project is completed.

Please contact Project Management at 800-624-9220 with any questions.

Project Name:	MIT-SCC	**Lab Number:**	L2037651
Project Number:	134283-002	**Report Date:**	09/15/20

Case Narrative (continued)

Report Submission

September 15, 2020: This final report includes the results of all requested analyses.

September 14, 2020: This is a preliminary report.

The analysis of Glycol was subcontracted. A copy of the laboratory report is included as an addendum. Please note: This data is only available in PDF format and is not available on Data Merger.

Sample Receipt

L2037651-03: A sample identified as "TRIP BLANK" was received; however, analysis was not requested.

Total Metals

L2037651-01 and -02 (all samples): The sample has elevated detection limits for all elements, with the exception of iron and mercury, due to the dilution required by the high concentrations of non-target elements.

Cyanide, Total

WG1408840: A Laboratory Duplicate was prepared with the sample batch, however, the native sample required re-analysis; therefore, the result could not be reported.

I, the undersigned, attest under the pains and penalties of perjury that, to the best of my knowledge and belief and based upon my personal inquiry of those responsible for providing the information contained in this analytical report, such information is accurate and complete. This certificate of analysis is not complete unless this page accompanies any and all pages of this report.

Authorized Signature: Tiffani Morrissey - Tiffani Morrissey

Title: Technical Director/Representative Date: 09/15/20

ORGANICS

VOLATILES

Project Name: MIT-SCC
Project Number: 134283-002
Lab Number: L2037651
Report Date: 09/15/20

SAMPLE RESULTS

Lab ID: L2037651-01
Client ID: HA20-E3
Sample Location: VASSAR STREET, CAMBRIDGE, MA
Date Collected: 09/10/20 12:00
Date Received: 09/10/20
Field Prep: Refer to COC

Sample Depth:
Matrix: Water
Analytical Method: 128,624.1
Analytical Date: 09/12/20 09:29
Analyst: KJD

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by GC/MS - Westborough Lab						
Methylene chloride	ND		ug/l	1.0	--	1
1,1-Dichloroethane	ND		ug/l	1.5	--	1
Carbon tetrachloride	ND		ug/l	1.0	--	1
1,1,2-Trichloroethane	ND		ug/l	1.5	--	1
Tetrachloroethene	ND		ug/l	1.0	--	1
1,2-Dichloroethane	ND		ug/l	1.5	--	1
1,1,1-Trichloroethane	ND		ug/l	2.0	--	1
Benzene	ND		ug/l	1.0	--	1
Toluene	ND		ug/l	1.0	--	1
Ethylbenzene	ND		ug/l	1.0	--	1
Vinyl chloride	ND		ug/l	1.0	--	1
1,1-Dichloroethene	ND		ug/l	1.0	--	1
cis-1,2-Dichloroethene	ND		ug/l	1.0	--	1
Trichloroethene	ND		ug/l	1.0	--	1
1,2-Dichlorobenzene	ND		ug/l	5.0	--	1
1,3-Dichlorobenzene	ND		ug/l	5.0	--	1
1,4-Dichlorobenzene	ND		ug/l	5.0	--	1
p/m-Xylene	ND		ug/l	2.0	--	1
o-xylene	ND		ug/l	1.0	--	1
Xylenes, Total	ND		ug/l	1.0	--	1
Acetone	ND		ug/l	10	--	1
Methyl tert butyl ether	ND		ug/l	10	--	1
Tert-Butyl Alcohol	ND		ug/l	100	--	1
Tertiary-Amyl Methyl Ether	ND		ug/l	20	--	1

Project Name: MIT-SCC **Lab Number:** L2037651

Project Number: 134283-002 **Report Date:** 09/15/20

SAMPLE RESULTS

Lab ID: L2037651-01 Date Collected: 09/10/20 12:00

Client ID: HA20-E3 Date Received: 09/10/20

Sample Location: VASSAR STREET, CAMBRIDGE, MA Field Prep: Refer to COC

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by GC/MS - Westborough Lab						

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Pentafluorobenzene	100		60-140
Fluorobenzene	96		60-140
4-Bromofluorobenzene	102		60-140

Project Name: MIT-SCC **Lab Number:** L2037651

Project Number: 134283-002 **Report Date:** 09/15/20

SAMPLE RESULTS

Lab ID: L2037651-01 Date Collected: 09/10/20 12:00
Client ID: HA20-E3 Date Received: 09/10/20
Sample Location: VASSAR STREET, CAMBRIDGE, MA Field Prep: Refer to COC

Sample Depth:
Matrix: Water
Analytical Method: 128,624.1-SIM
Analytical Date: 09/12/20 09:29
Analyst: KJD

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by GC/MS-SIM - Westborough Lab						
1,4-Dioxane	ND		ug/l	50	--	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Fluorobenzene	99		60-140
4-Bromofluorobenzene	104		60-140

Project Name: MIT-SCC
Project Number: 134283-002
Lab Number: L2037651
Report Date: 09/15/20

SAMPLE RESULTS

Lab ID: L2037651-01
Client ID: HA20-E3
Sample Location: VASSAR STREET, CAMBRIDGE, MA

Date Collected: 09/10/20 12:00
Date Received: 09/10/20
Field Prep: Refer to COC

Sample Depth:
Matrix: Water
Analytical Method: 14,504.1
Analytical Date: 09/11/20 15:32
Analyst: AMM

Extraction Method: EPA 504.1
Extraction Date: 09/11/20 13:26

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
Microextractables by GC - Westborough Lab							
1,2-Dibromoethane	ND		ug/l	0.010	--	1	B

Project Name: MIT-SCC
Project Number: 134283-002

Lab Number: L2037651
Report Date: 09/15/20

Method Blank Analysis
Batch Quality Control

Analytical Method: 14,504.1
Analytical Date: 09/11/20 14:38
Analyst: AMM

Extraction Method: EPA 504.1
Extraction Date: 09/11/20 13:26

Parameter	Result	Qualifier	Units	RL	MDL	
Microextractables by GC - Westborough Lab for sample(s): 01 Batch: WG1408929-1						
1,2-Dibromoethane	ND		ug/l	0.010	--	B

Project Name: MIT-SCC
Project Number: 134283-002
Lab Number: L2037651
Report Date: 09/15/20

Method Blank Analysis
Batch Quality Control

Analytical Method: 128,624.1-SIM
Analytical Date: 09/12/20 08:52
Analyst: MKS

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by GC/MS-SIM - Westborough Lab for sample(s): 01 Batch: WG1409385-4					
1,4-Dioxane	ND		ug/l	50	--

Surrogate	%Recovery	Qualifier	Acceptance Criteria
Fluorobenzene	100		60-140
4-Bromofluorobenzene	111		60-140

Project Name: MIT-SCC
Project Number: 134283-002
Lab Number: L2037651
Report Date: 09/15/20

Method Blank Analysis
Batch Quality Control

Analytical Method: 128,624.1
Analytical Date: 09/12/20 08:52
Analyst: MKS

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by GC/MS - Westborough Lab for sample(s): 01 Batch: WG1409389-4					
Methylene chloride	ND		ug/l	1.0	--
1,1-Dichloroethane	ND		ug/l	1.5	--
Carbon tetrachloride	ND		ug/l	1.0	--
1,1,2-Trichloroethane	ND		ug/l	1.5	--
Tetrachloroethene	ND		ug/l	1.0	--
1,2-Dichloroethane	ND		ug/l	1.5	--
1,1,1-Trichloroethane	ND		ug/l	2.0	--
Benzene	ND		ug/l	1.0	--
Toluene	ND		ug/l	1.0	--
Ethylbenzene	ND		ug/l	1.0	--
Vinyl chloride	ND		ug/l	1.0	--
1,1-Dichloroethene	ND		ug/l	1.0	--
cis-1,2-Dichloroethene	ND		ug/l	1.0	--
Trichloroethene	ND		ug/l	1.0	--
1,2-Dichlorobenzene	ND		ug/l	5.0	--
1,3-Dichlorobenzene	ND		ug/l	5.0	--
1,4-Dichlorobenzene	ND		ug/l	5.0	--
p/m-Xylene	ND		ug/l	2.0	--
o-xylene	ND		ug/l	1.0	--
Xylenes, Total	ND		ug/l	1.0	--
Acetone	ND		ug/l	10	--
Methyl tert butyl ether	ND		ug/l	10	--
Tert-Butyl Alcohol	ND		ug/l	100	--
Tertiary-Amyl Methyl Ether	ND		ug/l	20	--

Project Name: MIT-SCC
Project Number: 134283-002
Lab Number: L2037651
Report Date: 09/15/20

Method Blank Analysis
Batch Quality Control

Analytical Method: 128,624.1
Analytical Date: 09/12/20 08:52
Analyst: MKS

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by GC/MS - Westborough Lab for sample(s): 01 Batch: WG1409389-4					

Surrogate	%Recovery	Qualifier	Acceptance Criteria
Pentafluorobenzene	101		60-140
Fluorobenzene	99		60-140
4-Bromofluorobenzene	97		60-140

Lab Control Sample Analysis

Batch Quality Control

Project Name: MIT-SCC

Project Number: 134283-002

Lab Number: L2037651

Report Date: 09/15/20

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits	Column
Microextractables by GC - Westborough Lab	Associated sample(s): 01		Batch: WG1408929-2						
1,2-Dibromoethane	106		-		80-120	-			B

Lab Control Sample Analysis

Batch Quality Control

Project Name: MIT-SCC
Project Number: 134283-002

Lab Number: L2037651
Report Date: 09/15/20

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by GC/MS-SIM - Westborough Lab Associated sample(s): 01 Batch: WG1409385-3								
1,4-Dioxane	110		-		60-140	-		20

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
Fluorobenzene	101				60-140
4-Bromofluorobenzene	109				60-140

Lab Control Sample Analysis

Batch Quality Control

Project Name: MIT-SCC

Project Number: 134283-002

Lab Number: L2037651

Report Date: 09/15/20

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by GC/MS - Westborough Lab Associated sample(s): 01 Batch: WG1409389-3								
Methylene chloride	95		-		60-140	-		28
1,1-Dichloroethane	95		-		50-150	-		49
Carbon tetrachloride	95		-		70-130	-		41
1,1,2-Trichloroethane	100		-		70-130	-		45
Tetrachloroethene	100		-		70-130	-		39
1,2-Dichloroethane	100		-		70-130	-		49
1,1,1-Trichloroethane	100		-		70-130	-		36
Benzene	100		-		65-135	-		61
Toluene	105		-		70-130	-		41
Ethylbenzene	100		-		60-140	-		63
Vinyl chloride	80		-		5-195	-		66
1,1-Dichloroethene	90		-		50-150	-		32
cis-1,2-Dichloroethene	110		-		60-140	-		30
Trichloroethene	90		-		65-135	-		48
1,2-Dichlorobenzene	95		-		65-135	-		57
1,3-Dichlorobenzene	90		-		70-130	-		43
1,4-Dichlorobenzene	90		-		65-135	-		57
p/m-Xylene	92		-		60-140	-		30
o-xylene	90		-		60-140	-		30
Acetone	96		-		40-160	-		30
Methyl tert butyl ether	90		-		60-140	-		30
Tert-Butyl Alcohol	100		-		60-140	-		30
Tertiary-Amyl Methyl Ether	90		-		60-140	-		30

Lab Control Sample Analysis

Batch Quality Control

Project Name: MIT-SCC
Project Number: 134283-002

Lab Number: L2037651
Report Date: 09/15/20

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by GC/MS - Westborough Lab Associated sample(s): 01 Batch: WG1409389-3								

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
Pentafluorobenzene	102				60-140
Fluorobenzene	98				60-140
4-Bromofluorobenzene	97				60-140

Matrix Spike Analysis

Batch Quality Control

Project Name: MIT-SCC

Project Number: 134283-002

Lab Number: L2037651

Report Date: 09/15/20

Parameter	*Native Sample*	*MS Added*	*MS Found*	*MS %Recovery*	*Qual*	*MSD Found*	*MSD %Recovery*	*Qual*	*Recovery Limits*	*RPD*	*Qual*	*RPD Limits*	*Column*
Microextractables by GC - Westborough Lab Associated sample(s): 01 QC Batch ID: WG1408929-3 QC Sample: L2036508-01 Client ID: MS Sample													
1,2-Dibromoethane	ND	0.244	0.301	**124**	Q	-	-		80-120	-		20	B
1,2-Dibromo-3-chloropropane	ND	0.244	0.265	109		-	-		80-120	-		20	B
1,2,3-Trichloropropane	ND	0.244	0.218	90		-	-		80-120	-		20	B

SEMIVOLATILES

Project Name: MIT-SCC
Project Number: 134283-002
Lab Number: L2037651
Report Date: 09/15/20

SAMPLE RESULTS

Lab ID: L2037651-01
Client ID: HA20-E3
Sample Location: VASSAR STREET, CAMBRIDGE, MA

Date Collected: 09/10/20 12:00
Date Received: 09/10/20
Field Prep: Refer to COC

Sample Depth:
Matrix: Water
Analytical Method: 129,625.1
Analytical Date: 09/11/20 20:34
Analyst: JG

Extraction Method: EPA 625.1
Extraction Date: 09/11/20 02:13

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Bis(2-ethylhexyl)phthalate	ND		ug/l	2.20	--	1
Butyl benzyl phthalate	ND		ug/l	5.00	--	1
Di-n-butylphthalate	ND		ug/l	5.00	--	1
Di-n-octylphthalate	ND		ug/l	5.00	--	1
Diethyl phthalate	ND		ug/l	5.00	--	1
Dimethyl phthalate	ND		ug/l	5.00	--	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	116		42-122
2-Fluorobiphenyl	85		46-121
4-Terphenyl-d14	92		47-138

Project Name: MIT-SCC
Project Number: 134283-002
Lab Number: L2037651
Report Date: 09/15/20

SAMPLE RESULTS

Lab ID: L2037651-01
Client ID: HA20-E3
Sample Location: VASSAR STREET, CAMBRIDGE, MA

Date Collected: 09/10/20 12:00
Date Received: 09/10/20
Field Prep: Refer to COC

Sample Depth:
Matrix: Water
Analytical Method: 129,625.1-SIM
Analytical Date: 09/11/20 17:30
Analyst: DV

Extraction Method: EPA 625.1
Extraction Date: 09/11/20 02:17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS-SIM - Westborough Lab						
Acenaphthene	ND		ug/l	0.100	--	1
Fluoranthene	0.100		ug/l	0.100	--	1
Naphthalene	13.2		ug/l	0.100	--	1
Benzo(a)anthracene	ND		ug/l	0.100	--	1
Benzo(a)pyrene	ND		ug/l	0.100	--	1
Benzo(b)fluoranthene	ND		ug/l	0.100	--	1
Benzo(k)fluoranthene	ND		ug/l	0.100	--	1
Chrysene	ND		ug/l	0.100	--	1
Acenaphthylene	ND		ug/l	0.100	--	1
Anthracene	ND		ug/l	0.100	--	1
Benzo(ghi)perylene	ND		ug/l	0.100	--	1
Fluorene	ND		ug/l	0.100	--	1
Phenanthrene	0.267		ug/l	0.100	--	1
Dibenzo(a,h)anthracene	ND		ug/l	0.100	--	1
Indeno(1,2,3-cd)pyrene	ND		ug/l	0.100	--	1
Pyrene	ND		ug/l	0.100	--	1
Pentachlorophenol	ND		ug/l	1.00	--	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Fluorophenol	51		25-87
Phenol-d6	39		16-65
Nitrobenzene-d5	80		42-122
2-Fluorobiphenyl	78		46-121
2,4,6-Tribromophenol	92		45-128
4-Terphenyl-d14	79		47-138

Project Name: MIT-SCC
Project Number: 134283-002

Lab Number: L2037651
Report Date: 09/15/20

Method Blank Analysis
Batch Quality Control

Analytical Method: 129,625.1
Analytical Date: 09/11/20 17:51
Analyst: JG

Extraction Method: EPA 625.1
Extraction Date: 09/11/20 02:13

Parameter	Result	Qualifier	Units	RL	MDL
Semivolatile Organics by GC/MS - Westborough Lab for sample(s): 01 Batch: WG1408646-1					
Bis(2-ethylhexyl)phthalate	ND		ug/l	2.20	--
Butyl benzyl phthalate	ND		ug/l	5.00	--
Di-n-butylphthalate	ND		ug/l	5.00	--
Di-n-octylphthalate	ND		ug/l	5.00	--
Diethyl phthalate	ND		ug/l	5.00	--
Dimethyl phthalate	ND		ug/l	5.00	--

Surrogate	%Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	112		42-122
2-Fluorobiphenyl	81		46-121
4-Terphenyl-d14	86		47-138

Project Name: MIT-SCC
Project Number: 134283-002

Lab Number: L2037651
Report Date: 09/15/20

Method Blank Analysis
Batch Quality Control

Analytical Method: 129,625.1-SIM
Analytical Date: 09/11/20 16:24
Analyst: DV

Extraction Method: EPA 625.1
Extraction Date: 09/11/20 02:17

Parameter	Result	Qualifier	Units	RL	MDL
Semivolatile Organics by GC/MS-SIM - Westborough Lab for sample(s): 01 Batch: WG1408647-1					
Acenaphthene	ND		ug/l	0.100	--
Fluoranthene	ND		ug/l	0.100	--
Naphthalene	ND		ug/l	0.100	--
Benzo(a)anthracene	ND		ug/l	0.100	--
Benzo(a)pyrene	ND		ug/l	0.100	--
Benzo(b)fluoranthene	ND		ug/l	0.100	--
Benzo(k)fluoranthene	ND		ug/l	0.100	--
Chrysene	ND		ug/l	0.100	--
Acenaphthylene	ND		ug/l	0.100	--
Anthracene	ND		ug/l	0.100	--
Benzo(ghi)perylene	ND		ug/l	0.100	--
Fluorene	ND		ug/l	0.100	--
Phenanthrene	ND		ug/l	0.100	--
Dibenzo(a,h)anthracene	ND		ug/l	0.100	--
Indeno(1,2,3-cd)pyrene	ND		ug/l	0.100	--
Pyrene	ND		ug/l	0.100	--
Pentachlorophenol	ND		ug/l	1.00	--

Surrogate	%Recovery	Qualifier	Acceptance Criteria
2-Fluorophenol	49		25-87
Phenol-d6	37		16-65
Nitrobenzene-d5	78		42-122
2-Fluorobiphenyl	77		46-121
2,4,6-Tribromophenol	86		45-128
4-Terphenyl-d14	78		47-138

Lab Control Sample Analysis

Batch Quality Control

Project Name: MIT-SCC

Project Number: 134283-002

Lab Number: L2037651

Report Date: 09/15/20

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Semivolatile Organics by GC/MS - Westborough Lab Associated sample(s): 01 Batch: WG1408646-2								
Bis(2-ethylhexyl)phthalate	105		-		29-137	-		82
Butyl benzyl phthalate	91		-		1-140	-		60
Di-n-butylphthalate	88		-		8-120	-		47
Di-n-octylphthalate	104		-		19-132	-		69
Diethyl phthalate	85		-		1-120	-		100
Dimethyl phthalate	81		-		1-120	-		183

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
Nitrobenzene-d5	113				42-122
2-Fluorobiphenyl	80				46-121
4-Terphenyl-d14	83				47-138

Lab Control Sample Analysis
Batch Quality Control

Project Name: MIT-SCC
Project Number: 134283-002

Lab Number: L2037651
Report Date: 09/15/20

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Semivolatile Organics by GC/MS-SIM - Westborough Lab Associated sample(s): 01 Batch: WG1408647-2								
Acenaphthene	75		-		60-132	-		30
Fluoranthene	80		-		43-121	-		30
Naphthalene	74		-		36-120	-		30
Benzo(a)anthracene	79		-		42-133	-		30
Benzo(a)pyrene	77		-		32-148	-		30
Benzo(b)fluoranthene	78		-		42-140	-		30
Benzo(k)fluoranthene	82		-		25-146	-		30
Chrysene	76		-		44-140	-		30
Acenaphthylene	83		-		54-126	-		30
Anthracene	80		-		43-120	-		30
Benzo(ghi)perylene	72		-		1-195	-		30
Fluorene	78		-		70-120	-		30
Phenanthrene	76		-		65-120	-		30
Dibenzo(a,h)anthracene	76		-		1-200	-		30
Indeno(1,2,3-cd)pyrene	77		-		1-151	-		30
Pyrene	80		-		70-120	-		30
Pentachlorophenol	85		-		38-152	-		30

Lab Control Sample Analysis

Batch Quality Control

Project Name: MIT-SCC

Project Number: 134283-002

Lab Number: L2037651

Report Date: 09/15/20

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Semivolatile Organics by GC/MS-SIM - Westborough Lab Associated sample(s): 01 Batch: WG1408647-2								

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
2-Fluorophenol	49				25-87
Phenol-d6	38				16-65
Nitrobenzene-d5	76				42-122
2-Fluorobiphenyl	74				46-121
2,4,6-Tribromophenol	86				45-128
4-Terphenyl-d14	75				47-138

PCBS

Project Name: MIT-SCC
Project Number: 134283-002
Lab Number: L2037651
Report Date: 09/15/20

SAMPLE RESULTS

Lab ID: L2037651-01
Client ID: HA20-E3
Sample Location: VASSAR STREET, CAMBRIDGE, MA

Date Collected: 09/10/20 12:00
Date Received: 09/10/20
Field Prep: Refer to COC

Sample Depth:
Matrix: Water
Analytical Method: 127,608.3
Analytical Date: 09/11/20 10:56
Analyst: CW

Extraction Method: EPA 608.3
Extraction Date: 09/11/20 00:32
Cleanup Method: EPA 3665A
Cleanup Date: 09/11/20
Cleanup Method: EPA 3660B
Cleanup Date: 09/11/20

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
Polychlorinated Biphenyls by GC - Westborough Lab							
Aroclor 1016	ND		ug/l	0.250	--	1	A
Aroclor 1221	ND		ug/l	0.250	--	1	A
Aroclor 1232	ND		ug/l	0.250	--	1	A
Aroclor 1242	ND		ug/l	0.250	--	1	A
Aroclor 1248	ND		ug/l	0.250	--	1	A
Aroclor 1254	ND		ug/l	0.250	--	1	A
Aroclor 1260	ND		ug/l	0.200	--	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	63		37-123	B
Decachlorobiphenyl	57		38-114	B
2,4,5,6-Tetrachloro-m-xylene	61		37-123	A
Decachlorobiphenyl	51		38-114	A

Project Name: MIT-SCC
Project Number: 134283-002

Lab Number: L2037651
Report Date: 09/15/20

Method Blank Analysis
Batch Quality Control

Analytical Method: 127,608.3
Analytical Date: 09/11/20 11:27
Analyst: CW

Extraction Method: EPA 608.3
Extraction Date: 09/11/20 00:32
Cleanup Method: EPA 3665A
Cleanup Date: 09/11/20
Cleanup Method: EPA 3660B
Cleanup Date: 09/11/20

Parameter	Result	Qualifier	Units	RL	MDL	Column
Polychlorinated Biphenyls by GC - Westborough Lab for sample(s): 01 Batch: WG1408626-1						
Aroclor 1016	ND		ug/l	0.250	--	A
Aroclor 1221	ND		ug/l	0.250	--	A
Aroclor 1232	ND		ug/l	0.250	--	A
Aroclor 1242	ND		ug/l	0.250	--	A
Aroclor 1248	ND		ug/l	0.250	--	A
Aroclor 1254	ND		ug/l	0.250	--	A
Aroclor 1260	ND		ug/l	0.200	--	A

Surrogate	%Recovery	Qualifier	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	68		37-123	B
Decachlorobiphenyl	60		38-114	B
2,4,5,6-Tetrachloro-m-xylene	65		37-123	A
Decachlorobiphenyl	55		38-114	A

Lab Control Sample Analysis

Batch Quality Control

Project Name: MIT-SCC

Project Number: 134283-002

Lab Number: L2037651

Report Date: 09/15/20

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits	Column
Polychlorinated Biphenyls by GC - Westborough Lab Associated sample(s): 01 Batch: WG1408626-2									
Aroclor 1016	73		-		50-140	-		36	A
Aroclor 1260	62		-		8-140	-		38	A

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	67				37-123	B
Decachlorobiphenyl	58				38-114	B
2,4,5,6-Tetrachloro-m-xylene	65				37-123	A
Decachlorobiphenyl	53				38-114	A

METALS

Project Name: MIT-SCC
Project Number: 134283-002
Lab Number: L2037651
Report Date: 09/15/20

SAMPLE RESULTS

Lab ID: L2037651-01
Client ID: HA20-E3
Sample Location: VASSAR STREET, CAMBRIDGE, MA
Date Collected: 09/10/20 12:00
Date Received: 09/10/20
Field Prep: Refer to COC

Sample Depth:
Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Antimony, Total	ND		mg/l	0.02000	--	5	09/11/20 12:15	09/14/20 10:37	EPA 3005A	3,200.8	AM
Arsenic, Total	0.00602		mg/l	0.00500	--	5	09/11/20 12:15	09/14/20 10:37	EPA 3005A	3,200.8	AM
Cadmium, Total	ND		mg/l	0.00100	--	5	09/11/20 12:15	09/14/20 10:37	EPA 3005A	3,200.8	AM
Chromium, Total	ND		mg/l	0.00500	--	5	09/11/20 12:15	09/14/20 10:37	EPA 3005A	3,200.8	AM
Copper, Total	ND		mg/l	0.00500	--	5	09/11/20 12:15	09/14/20 10:37	EPA 3005A	3,200.8	AM
Iron, Total	0.568		mg/l	0.050	--	1	09/11/20 12:15	09/11/20 18:34	EPA 3005A	19,200.7	GD
Lead, Total	ND		mg/l	0.00500	--	5	09/11/20 12:15	09/14/20 10:37	EPA 3005A	3,200.8	AM
Mercury, Total	ND		mg/l	0.00020	--	1	09/11/20 12:43	09/11/20 17:00	EPA 245.1	3,245.1	AL
Nickel, Total	ND		mg/l	0.01000	--	5	09/11/20 12:15	09/14/20 10:37	EPA 3005A	3,200.8	AM
Selenium, Total	ND		mg/l	0.02500	--	5	09/11/20 12:15	09/14/20 10:37	EPA 3005A	3,200.8	AM
Silver, Total	ND		mg/l	0.00200	--	5	09/11/20 12:15	09/14/20 10:37	EPA 3005A	3,200.8	AM
Zinc, Total	ND		mg/l	0.05000	--	5	09/11/20 12:15	09/14/20 10:37	EPA 3005A	3,200.8	AM
Total Hardness by SM 2340B - Mansfield Lab											
Hardness	159		mg/l	0.660	NA	1	09/11/20 12:15	09/11/20 18:34	EPA 3005A	19,200.7	GD
General Chemistry - Mansfield Lab											
Chromium, Trivalent	ND		mg/l	0.010	--	1		09/14/20 10:37	NA	107,-	

Project Name: MIT-SCC
Project Number: 134283-002
Lab Number: L2037651
Report Date: 09/15/20

SAMPLE RESULTS

Lab ID: L2037651-02
Client ID: OUTFALL
Sample Location: VASSAR STREET, CAMBRIDGE, MA
Date Collected: 09/10/20 13:20
Date Received: 09/10/20
Field Prep: Not Specified

Sample Depth:
Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Antimony, Total	ND		mg/l	0.02000	--	5	09/11/20 12:15	09/14/20 10:48	EPA 3005A	3,200.8	AM
Arsenic, Total	ND		mg/l	0.00500	--	5	09/11/20 12:15	09/14/20 10:48	EPA 3005A	3,200.8	AM
Cadmium, Total	ND		mg/l	0.00100	--	5	09/11/20 12:15	09/14/20 10:48	EPA 3005A	3,200.8	AM
Chromium, Total	ND		mg/l	0.00500	--	5	09/11/20 12:15	09/14/20 10:48	EPA 3005A	3,200.8	AM
Copper, Total	ND		mg/l	0.00500	--	5	09/11/20 12:15	09/14/20 10:48	EPA 3005A	3,200.8	AM
Iron, Total	0.109		mg/l	0.050	--	1	09/11/20 12:15	09/11/20 19:34	EPA 3005A	19,200.7	GD
Lead, Total	ND		mg/l	0.00500	--	5	09/11/20 12:15	09/14/20 10:48	EPA 3005A	3,200.8	AM
Mercury, Total	ND		mg/l	0.00020	--	1	09/11/20 12:43	09/11/20 16:47	EPA 245.1	3,245.1	AL
Nickel, Total	ND		mg/l	0.01000	--	5	09/11/20 12:15	09/14/20 10:48	EPA 3005A	3,200.8	AM
Selenium, Total	ND		mg/l	0.02500	--	5	09/11/20 12:15	09/14/20 10:48	EPA 3005A	3,200.8	AM
Silver, Total	ND		mg/l	0.00200	--	5	09/11/20 12:15	09/14/20 10:48	EPA 3005A	3,200.8	AM
Zinc, Total	ND		mg/l	0.05000	--	5	09/11/20 12:15	09/14/20 10:48	EPA 3005A	3,200.8	AM
Total Hardness by SM 2340B - Mansfield Lab											
Hardness	387		mg/l	0.660	NA	1	09/11/20 12:15	09/11/20 19:34	EPA 3005A	19,200.7	GD
General Chemistry - Mansfield Lab											
Chromium, Trivalent	ND		mg/l	0.010	--	1		09/14/20 10:48	NA	107,-	

Project Name: MIT-SCC
Project Number: 134283-002
Lab Number: L2037651
Report Date: 09/15/20

Method Blank Analysis
Batch Quality Control

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Metals - Mansfield Lab for sample(s): 01-02 Batch: WG1408831-1										
Antimony, Total	ND		mg/l	0.00400	--	1	09/11/20 12:15	09/14/20 08:56	3,200.8	AM
Arsenic, Total	ND		mg/l	0.00100	--	1	09/11/20 12:15	09/14/20 08:56	3,200.8	AM
Cadmium, Total	ND		mg/l	0.00020	--	1	09/11/20 12:15	09/14/20 08:56	3,200.8	AM
Chromium, Total	ND		mg/l	0.00100	--	1	09/11/20 12:15	09/14/20 08:56	3,200.8	AM
Copper, Total	ND		mg/l	0.00100	--	1	09/11/20 12:15	09/14/20 08:56	3,200.8	AM
Lead, Total	ND		mg/l	0.00100	--	1	09/11/20 12:15	09/14/20 08:56	3,200.8	AM
Nickel, Total	ND		mg/l	0.00200	--	1	09/11/20 12:15	09/14/20 08:56	3,200.8	AM
Selenium, Total	ND		mg/l	0.00500	--	1	09/11/20 12:15	09/14/20 08:56	3,200.8	AM
Silver, Total	ND		mg/l	0.00040	--	1	09/11/20 12:15	09/14/20 08:56	3,200.8	AM
Zinc, Total	ND		mg/l	0.01000	--	1	09/11/20 12:15	09/14/20 08:56	3,200.8	AM

Prep Information

Digestion Method: EPA 3005A

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Metals - Mansfield Lab for sample(s): 01-02 Batch: WG1408835-1										
Iron, Total	ND		mg/l	0.050	--	1	09/11/20 12:15	09/11/20 19:07	19,200.7	GD

Prep Information

Digestion Method: EPA 3005A

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Hardness by SM 2340B - Mansfield Lab for sample(s): 01-02 Batch: WG1408835-1										
Hardness	ND		mg/l	0.660	NA	1	09/11/20 12:15	09/11/20 19:07	19,200.7	GD

Prep Information

Digestion Method: EPA 3005A

Project Name: MIT-SCC
Project Number: 134283-002
Lab Number: L2037651
Report Date: 09/15/20

Method Blank Analysis
Batch Quality Control

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Metals - Mansfield Lab for sample(s): 01-02 Batch: WG1408838-1										
Mercury, Total	ND		mg/l	0.00020	--	1	09/11/20 12:43	09/11/20 16:41	3,245.1	AL

Prep Information

Digestion Method: EPA 245.1

Lab Control Sample Analysis

Batch Quality Control

Project Name: MIT-SCC

Project Number: 134283-002

Lab Number: L2037651

Report Date: 09/15/20

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 01-02 Batch: WG1408831-2								
Antimony, Total	94		-		85-115	-		
Arsenic, Total	102		-		85-115	-		
Cadmium, Total	106		-		85-115	-		
Chromium, Total	101		-		85-115	-		
Copper, Total	104		-		85-115	-		
Lead, Total	106		-		85-115	-		
Nickel, Total	95		-		85-115	-		
Selenium, Total	103		-		85-115	-		
Silver, Total	103		-		85-115	-		
Zinc, Total	110		-		85-115	-		
Total Metals - Mansfield Lab Associated sample(s): 01-02 Batch: WG1408835-2								
Iron, Total	102		-		85-115	-		
Total Hardness by SM 2340B - Mansfield Lab Associated sample(s): 01-02 Batch: WG1408835-2								
Hardness	106		-		85-115	-		
Total Metals - Mansfield Lab Associated sample(s): 01-02 Batch: WG1408838-2								
Mercury, Total	101		-		85-115	-		

Matrix Spike Analysis
Batch Quality Control

Project Name: MIT-SCC
Project Number: 134283-002

Lab Number: L2037651
Report Date: 09/15/20

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 01-02 QC Batch ID: WG1408831-3 QC Sample: L2037651-01 Client ID: HA20-E3												
Antimony, Total	ND	0.5	0.5672	113		-	-		70-130	-		20
Arsenic, Total	0.00602	0.12	0.1323	105		-	-		70-130	-		20
Cadmium, Total	ND	0.051	0.05537	108		-	-		70-130	-		20
Chromium, Total	ND	0.2	0.2020	101		-	-		70-130	-		20
Copper, Total	ND	0.25	0.2603	104		-	-		70-130	-		20
Lead, Total	ND	0.51	0.5495	108		-	-		70-130	-		20
Nickel, Total	ND	0.5	0.4888	98		-	-		70-130	-		20
Selenium, Total	ND	0.12	0.1261	105		-	-		70-130	-		20
Silver, Total	ND	0.05	0.05335	107		-	-		70-130	-		20
Zinc, Total	ND	0.5	0.5468	109		-	-		70-130	-		20
Total Metals - Mansfield Lab Associated sample(s): 01-02 QC Batch ID: WG1408835-3 QC Sample: L2037651-01 Client ID: HA20-E3												
Iron, Total	0.568	1	1.59	102		-	-		75-125	-		20
Total Hardness by SM 2340B - Mansfield Lab Associated sample(s): 01-02 QC Batch ID: WG1408835-3 QC Sample: L2037651-01 Client ID: HA20-E3												
Hardness	159	66.2	224	98		-	-		75-125	-		20
Total Metals - Mansfield Lab Associated sample(s): 01-02 QC Batch ID: WG1408838-3 QC Sample: L2037651-02 Client ID: OUTFALL												
Mercury, Total	ND	0.005	0.00488	98		-	-		70-130	-		20

Lab Duplicate Analysis

Batch Quality Control

Project Name: MIT-SCC
Project Number: 134283-002

Lab Number: L2037651
Report Date: 09/15/20

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 01-02 QC Batch ID: WG1408831-4 QC Sample: L2037651-01 Client ID: HA20-E3						
Antimony, Total	ND	ND	mg/l	NC		20
Arsenic, Total	0.00602	0.00625	mg/l	4		20
Cadmium, Total	ND	ND	mg/l	NC		20
Chromium, Total	ND	ND	mg/l	NC		20
Copper, Total	ND	ND	mg/l	NC		20
Lead, Total	ND	ND	mg/l	NC		20
Nickel, Total	ND	ND	mg/l	NC		20
Selenium, Total	ND	ND	mg/l	NC		20
Silver, Total	ND	ND	mg/l	NC		20
Zinc, Total	ND	ND	mg/l	NC		20
Total Metals - Mansfield Lab Associated sample(s): 01-02 QC Batch ID: WG1408835-4 QC Sample: L2037651-01 Client ID: HA20-E3						
Iron, Total	0.568	0.559	mg/l	2		20
Total Hardness by SM 2340B - Mansfield Lab Associated sample(s): 01-02 QC Batch ID: WG1408835-4 QC Sample: L2037651-01 Client ID: HA20-E3						
Hardness	159	156	mg/l	2		20
Total Metals - Mansfield Lab Associated sample(s): 01-02 QC Batch ID: WG1408838-4 QC Sample: L2037651-02 Client ID: OUTFALL						
Mercury, Total	ND	ND	mg/l	NC		20

INORGANICS
&
MISCELLANEOUS

Project Name: MIT-SCC
Project Number: 134283-002

Lab Number: L2037651
Report Date: 09/15/20

SAMPLE RESULTS

Lab ID: L2037651-01
Client ID: HA20-E3
Sample Location: VASSAR STREET, CAMBRIDGE, MA

Date Collected: 09/10/20 12:00
Date Received: 09/10/20
Field Prep: Refer to COC

Sample Depth:
Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total Suspended	6.1		mg/l	5.0	NA	1	-	09/11/20 07:30	121,2540D	JT
Cyanide, Total	ND		mg/l	0.005	--	1	09/11/20 11:10	09/11/20 15:49	121,4500CN-CE	AG
Cyanide, Free	ND		ug/l	2.00	--	1	09/11/20 16:00	09/11/20 22:17	109,9016	AT
Cyanide, Physiologically Available	ND		mg/l	0.005	--	1	09/14/20 10:35	09/14/20 13:20	64,9014(M)	AG
Chlorine, Total Residual	ND		mg/l	0.02	--	1	-	09/10/20 23:24	121,4500CL-D	AS
pH (H)	7.0		SU	-	NA	1	-	09/10/20 20:57	121,4500H+-B	AS
Nitrogen, Ammonia	0.397		mg/l	0.075	--	1	09/11/20 03:25	09/11/20 21:45	121,4500NH3-BH	AT
TPH, SGT-HEM	ND		mg/l	4.40	--	1.1	09/11/20 20:00	09/11/20 22:00	74,1664A	TL
Phenolics, Total	ND		mg/l	0.030	--	1	09/11/20 05:20	09/11/20 09:14	4,420.1	MV
Chromium, Hexavalent	ND		mg/l	0.010	--	1	09/10/20 22:55	09/10/20 23:24	1,7196A	CB
Anions by Ion Chromatography - Westborough Lab										
Chloride	731.		mg/l	25.0	--	50	-	09/12/20 00:21	44,300.0	SH

Project Name: MIT-SCC
Project Number: 134283-002

Lab Number: L2037651
Report Date: 09/15/20

SAMPLE RESULTS

Lab ID: L2037651-02
Client ID: OUTFALL
Sample Location: VASSAR STREET, CAMBRIDGE, MA

Date Collected: 09/10/20 13:20
Date Received: 09/10/20
Field Prep: Not Specified

Sample Depth:
Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
pH (H)	7.9		SU	-	NA	1	-	09/10/20 20:57	121,4500H+-B	AS
Nitrogen, Ammonia	0.121		mg/l	0.075	--	1	09/11/20 03:25	09/11/20 21:48	121,4500NH3-BH	AT
Chromium, Hexavalent	ND		mg/l	0.010	--	1	09/10/20 22:55	09/10/20 23:25	1,7196A	CB

Project Name: MIT-SCC
Project Number: 134283-002
Lab Number: L2037651
Report Date: 09/15/20

Method Blank Analysis
Batch Quality Control

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab for sample(s): 01-02 Batch: WG1408613-1										
Nitrogen, Ammonia	ND		mg/l	0.075	--	1	09/11/20 03:25	09/11/20 21:34	121,4500NH3-BH	AT
General Chemistry - Westborough Lab for sample(s): 01-02 Batch: WG1408614-1										
Chromium, Hexavalent	ND		mg/l	0.010	--	1	09/10/20 22:55	09/10/20 23:22	1,7196A	CB
General Chemistry - Westborough Lab for sample(s): 01 Batch: WG1408618-1										
Chlorine, Total Residual	ND		mg/l	0.02	--	1	-	09/10/20 23:24	121,4500CL-D	AS
General Chemistry - Westborough Lab for sample(s): 01 Batch: WG1408680-1										
Phenolics, Total	ND		mg/l	0.030	--	1	09/11/20 05:20	09/11/20 09:07	4,420.1	MV
General Chemistry - Westborough Lab for sample(s): 01 Batch: WG1408691-1										
Solids, Total Suspended	ND		mg/l	5.0	NA	1	-	09/11/20 07:30	121,2540D	JT
General Chemistry - Westborough Lab for sample(s): 01 Batch: WG1408840-1										
Cyanide, Total	ND		mg/l	0.005	--	1	09/10/20 18:00	09/11/20 15:38	121,4500CN-CE	AG
General Chemistry - Westborough Lab for sample(s): 01 Batch: WG1408980-1										
TPH, SGT-HEM	ND		mg/l	4.00	--	1	09/11/20 20:00	09/11/20 22:00	74,1664A	TL
General Chemistry - Westborough Lab for sample(s): 01 Batch: WG1409003-1										
Cyanide, Free	ND		ug/l	2.00	--	1	09/11/20 16:00	09/11/20 22:12	109,9016	AT
Anions by Ion Chromatography - Westborough Lab for sample(s): 01 Batch: WG1409099-1										
Chloride	ND		mg/l	0.500	--	1	-	09/11/20 17:23	44,300.0	SH
General Chemistry - Westborough Lab for sample(s): 01 Batch: WG1409554-1										
Cyanide, Physiologically Available	ND		mg/l	0.005	--	1	09/14/20 10:35	09/14/20 13:10	64,9014(M)	AG

Lab Control Sample Analysis

Batch Quality Control

Project Name: MIT-SCC
Project Number: 134283-002

Lab Number: L2037651
Report Date: 09/15/20

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 01-02 Batch: WG1408589-1								
pH	100		-		99-101	-		5
General Chemistry - Westborough Lab Associated sample(s): 01-02 Batch: WG1408613-2								
Nitrogen, Ammonia	102		-		80-120	-		20
General Chemistry - Westborough Lab Associated sample(s): 01-02 Batch: WG1408614-2								
Chromium, Hexavalent	104		-		85-115	-		20
General Chemistry - Westborough Lab Associated sample(s): 01 Batch: WG1408618-2								
Chlorine, Total Residual	104		-		90-110	-		
General Chemistry - Westborough Lab Associated sample(s): 01 Batch: WG1408680-2								
Phenolics, Total	99		-		70-130	-		
General Chemistry - Westborough Lab Associated sample(s): 01 Batch: WG1408691-2								
Solids, Total Suspended	109		-		80-120	-		
General Chemistry - Westborough Lab Associated sample(s): 01 Batch: WG1408840-2								
Cyanide, Total	97		-		90-110	-		

Lab Control Sample Analysis

Batch Quality Control

Project Name: MIT-SCC
Project Number: 134283-002

Lab Number: L2037651
Report Date: 09/15/20

Parameter	LCS %Recovery	LCSD %Recovery	%Recovery Limits	RPD	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 01 Batch: WG1408980-2					
TPH	87	-	64-132	-	34
General Chemistry - Westborough Lab Associated sample(s): 01 Batch: WG1409003-2					
Cyanide, Free	97	-	75-125	-	
Anions by Ion Chromatography - Westborough Lab Associated sample(s): 01 Batch: WG1409099-2					
Chloride	101	-	90-110	-	
General Chemistry - Westborough Lab Associated sample(s): 01 Batch: WG1409554-2					
Cyanide, Physiologically Available	90	-	80-120	-	
General Chemistry - Westborough Lab Associated sample(s): 01 Batch: WG1409554-3					
Cyanide, Physiologically Available	**1**	-	0-10	-	

Matrix Spike Analysis
Batch Quality Control

Project Name: MIT-SCC
Project Number: 134283-002

Lab Number: L2037651
Report Date: 09/15/20

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 01-02 QC Batch ID: WG1408613-4 QC Sample: L2037651-01 Client ID: HA20-E3												
Nitrogen, Ammonia	0.397	4	4.23	96		-	-		80-120	-		20
General Chemistry - Westborough Lab Associated sample(s): 01-02 QC Batch ID: WG1408614-4 QC Sample: L2037651-01 Client ID: HA20-E3												
Chromium, Hexavalent	ND	0.1	0.104	104		-	-		85-115	-		20
General Chemistry - Westborough Lab Associated sample(s): 01 QC Batch ID: WG1408618-4 QC Sample: L2037651-01 Client ID: HA20-E3												
Chlorine, Total Residual	ND	0.25	0.20	80		-	-		80-120	-		20
General Chemistry - Westborough Lab Associated sample(s): 01 QC Batch ID: WG1408680-4 QC Sample: L2037211-02 Client ID: MS Sample												
Phenolics, Total	ND	0.4	0.42	105		-	-		70-130	-		20
General Chemistry - Westborough Lab Associated sample(s): 01 QC Batch ID: WG1408840-4 QC Sample: L2037163-01 Client ID: MS Sample												
Cyanide, Total	ND	0.2	0.106	**53**	Q	-	-		90-110	-		30
General Chemistry - Westborough Lab Associated sample(s): 01 QC Batch ID: WG1408980-4 QC Sample: L2037651-01 Client ID: HA20-E3												
TPH	ND	20.6	14.4	70		-	-		64-132	-		34
General Chemistry - Westborough Lab Associated sample(s): 01 QC Batch ID: WG1409003-3 QC Sample: L2036760-09 Client ID: MS Sample												
Cyanide, Free	ND	50	37.1	74		-	-		70-130	-		20
Anions by Ion Chromatography - Westborough Lab Associated sample(s): 01 QC Batch ID: WG1409099-3 QC Sample: L2037537-03 Client ID: MS Sample												
Chloride	12.6	4	16.0	**85**	Q	-	-		90-110	-		18
General Chemistry - Westborough Lab Associated sample(s): 01 QC Batch ID: WG1409554-5 QC Sample: L2037651-01 Client ID: HA20-E3												
Cyanide, Physiologically Available	ND	0.2	0.185	92		-	-		75-125	-		20

Lab Duplicate Analysis
Batch Quality Control

Project Name: MIT-SCC
Project Number: 134283-002

Lab Number: L2037651
Report Date: 09/15/20

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 01-02 QC Batch ID: WG1408589-2 QC Sample: L2037651-02 Client ID: OUTFALL						
pH (H)	7.9	7.9	SU	0		5
General Chemistry - Westborough Lab Associated sample(s): 01-02 QC Batch ID: WG1408613-3 QC Sample: L2037651-01 Client ID: HA20-E3						
Nitrogen, Ammonia	0.397	0.404	mg/l	2		20
General Chemistry - Westborough Lab Associated sample(s): 01-02 QC Batch ID: WG1408614-3 QC Sample: L2037651-01 Client ID: HA20-E3						
Chromium, Hexavalent	ND	ND	mg/l	NC		20
General Chemistry - Westborough Lab Associated sample(s): 01 QC Batch ID: WG1408618-3 QC Sample: L2037651-01 Client ID: HA20-E3						
Chlorine, Total Residual	ND	ND	mg/l	NC		20
General Chemistry - Westborough Lab Associated sample(s): 01 QC Batch ID: WG1408680-3 QC Sample: L2037211-02 Client ID: DUP Sample						
Phenolics, Total	ND	ND	mg/l	NC		20
General Chemistry - Westborough Lab Associated sample(s): 01 QC Batch ID: WG1408691-3 QC Sample: L2037152-01 Client ID: DUP Sample						
Solids, Total Suspended	76	78	mg/l	3		29
General Chemistry - Westborough Lab Associated sample(s): 01 QC Batch ID: WG1408980-3 QC Sample: L2037039-01 Client ID: DUP Sample						
TPH	ND	ND	mg/l	NC		34
General Chemistry - Westborough Lab Associated sample(s): 01 QC Batch ID: WG1409003-4 QC Sample: L2036760-09 Client ID: DUP Sample						
Cyanide, Free	ND	ND	ug/l	NC		20
Anions by Ion Chromatography - Westborough Lab Associated sample(s): 01 QC Batch ID: WG1409099-4 QC Sample: L2037537-03 Client ID: DUP Sample						
Chloride	12.6	12.5	mg/l	1		18

Lab Duplicate Analysis

Batch Quality Control

Project Name: MIT-SCC
Project Number: 134283-002

Lab Number: L2037651
Report Date: 09/15/20

Parameter	Native Sample	Duplicate Sample	Units	RPD	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 01 QC Batch ID: WG1409554-4 QC Sample: L2037651-01 Client ID: HA20-E3					
Cyanide, Physiologically Available	ND	ND	mg/l	NC	20

Project Name: MIT-SCC
Project Number: 134283-002

Lab Number: L2037651
Report Date: 09/15/20

Sample Receipt and Container Information

Were project specific reporting limits specified? YES

Cooler Information

Cooler	Custody Seal
A	Absent

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L2037651-01A	Vial Na2S2O3 preserved	A	NA		2.5	Y	Absent		624.1-SIM-RGP(7),624.1-RGP(7)
L2037651-01A1	Vial Na2S2O3 preserved	A	NA		2.5	Y	Absent		624.1-SIM-RGP(7),624.1-RGP(7)
L2037651-01B	Vial Na2S2O3 preserved	A	NA		2.5	Y	Absent		624.1-SIM-RGP(7),624.1-RGP(7)
L2037651-01B1	Vial Na2S2O3 preserved	A	NA		2.5	Y	Absent		624.1-SIM-RGP(7),624.1-RGP(7)
L2037651-01C	Vial Na2S2O3 preserved	A	NA		2.5	Y	Absent		624.1-SIM-RGP(7),624.1-RGP(7)
L2037651-01D	Vial Na2S2O3 preserved	A	NA		2.5	Y	Absent		624.1-SIM-RGP(7),624.1-RGP(7)
L2037651-01E	Vial Na2S2O3 preserved	A	NA		2.5	Y	Absent		504(14)
L2037651-01F	Vial Na2S2O3 preserved	A	NA		2.5	Y	Absent		504(14)
L2037651-01G	Vial unpreserved	A	NA		2.5	Y	Absent		SUB-ETHANOL(14)
L2037651-01G1	Vial unpreserved	A	NA		2.5	Y	Absent		SUB-ETHANOL(14)
L2037651-01H	Vial unpreserved	A	NA		2.5	Y	Absent		SUB-ETHANOL(14)
L2037651-01I	Plastic 250ml unpreserved	A	7	7	2.5	Y	Absent		CL-300(28),HEXCR-7196(1),TRC-4500(1),PH-4500(.01)
L2037651-01J	Plastic 250ml NaOH preserved	A	>12	>12	2.5	Y	Absent		PACN(14)
L2037651-01K	Plastic 250ml NaOH preserved	A	>12	>12	2.5	Y	Absent		TCN-4500(14),FCN-9016(14)
L2037651-01L	Plastic 250ml HNO3 preserved	A	<2	<2	2.5	Y	Absent		HOLD-METAL-DISSOLVED(180)
L2037651-01M	Plastic 250ml HNO3 preserved	A	<2	<2	2.5	Y	Absent		CD-2008T(180),NI-2008T(180),ZN-2008T(180),HARDU(180),CU-2008T(180),FE-UI(180),AS-2008T(180),HG-U(28),AG-2008T(180),SE-2008T(180),SB-2008T(180),CR-2008T(180),PB-2008T(180)
L2037651-01N	Plastic 500ml H2SO4 preserved	A	<2	<2	2.5	Y	Absent		NH3-4500(28)
L2037651-01O	Plastic 950ml unpreserved	A	7	7	2.5	Y	Absent		CL-300(28),HEXCR-7196(1),TRC-4500(1),PH-4500(.01)
L2037651-01P	Plastic 950ml unpreserved	A	7	7	2.5	Y	Absent		TSS-2540(7)
L2037651-01Q	Amber 950ml H2SO4 preserved	A	<2	<2	2.5	Y	Absent		TPHENOL-420(28)

*Values in parentheses indicate holding time in days

Project Name: MIT-SCC
Project Number: 134283-002

Lab Number: L2037651
Report Date: 09/15/20

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L2037651-01R	Amber 1000ml HCl preserved	A	NA		2.5	Y	Absent		TPH-1664(28)
L2037651-01S	Amber 1000ml HCl preserved	A	NA		2.5	Y	Absent		TPH-1664(28)
L2037651-01T	Amber 1000ml Na2S2O3	A	7	7	2.5	Y	Absent		PCB-608.3(365)
L2037651-01U	Amber 1000ml Na2S2O3	A	7	7	2.5	Y	Absent		PCB-608.3(365)
L2037651-01V	Amber 1000ml Na2S2O3	A	7	7	2.5	Y	Absent		PCB-608.3(365)
L2037651-01W	Amber 1000ml Na2S2O3	A	7	7	2.5	Y	Absent		625.1-RGP(7),625.1-SIM-RGP(7)
L2037651-01X	Amber 1000ml Na2S2O3	A	7	7	2.5	Y	Absent		625.1-RGP(7),625.1-SIM-RGP(7)
L2037651-01Y	Amber 1000ml Na2S2O3	A	7	7	2.5	Y	Absent		625.1-RGP(7),625.1-SIM-RGP(7)
L2037651-02A	Plastic 250ml unpreserved	A	7	7	2.5	Y	Absent		HEXCR-7196(1),PH-4500(.01)
L2037651-02B	Plastic 250ml HNO3 preserved	A	<2	<2	2.5	Y	Absent		CD-2008T(180),NI-2008T(180),ZN-2008T(180),FE-UI(180),CU-2008T(180),HARDU(180),AG-2008T(180),SE-2008T(180),AS-2008T(180),HG-U(28),SB-2008T(180),CR-2008T(180),PB-2008T(180)
L2037651-02C	Plastic 500ml H2SO4 preserved	A	<2	<2	2.5	Y	Absent		NH3-4500(28)
L2037651-03A	Vial Na2S2O3 preserved	A	NA		2.5	Y	Absent		ARCHIVE()
L2037651-03B	Vial Na2S2O3 preserved	A	NA		2.5	Y	Absent		ARCHIVE()

*Values in parentheses indicate holding time in days

Project Name:	MIT-SCC	**Lab Number:**	L2037651
Project Number:	134283-002	**Report Date:**	09/15/20

GLOSSARY

Acronyms

DL - Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the limit of quantitation (LOQ). The DL includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)

EDL - Estimated Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The EDL includes any adjustments from dilutions, concentrations or moisture content, where applicable. The use of EDLs is specific to the analysis of PAHs using Solid-Phase Microextraction (SPME).

EMPC - Estimated Maximum Possible Concentration: The concentration that results from the signal present at the retention time of an analyte when the ions meet all of the identification criteria except the ion abundance ratio criteria. An EMPC is a worst-case estimate of the concentration.

EPA - Environmental Protection Agency.

LCS - Laboratory Control Sample: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.

LCSD - Laboratory Control Sample Duplicate: Refer to LCS.

LFB - Laboratory Fortified Blank: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.

LOD - Limit of Detection: This value represents the level to which a target analyte can reliably be detected for a specific analyte in a specific matrix by a specific method. The LOD includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)

LOQ - Limit of Quantitation: The value at which an instrument can accurately measure an analyte at a specific concentration. The LOQ includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)

Limit of Quantitation: The value at which an instrument can accurately measure an analyte at a specific concentration. The LOQ includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)

MDL - Method Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The MDL includes any adjustments from dilutions, concentrations or moisture content, where applicable.

MS - Matrix Spike Sample: A sample prepared by adding a known mass of target analyte to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available. For Method 332.0, the spike recovery is calculated using the native concentration, including estimated values.

MSD - Matrix Spike Sample Duplicate: Refer to MS.

NA - Not Applicable.

NC - Not Calculated: Term is utilized when one or more of the results utilized in the calculation are non-detect at the parameter's reporting unit.

NDPA/DPA - N-Nitrosodiphenylamine/Diphenylamine.

NI - Not Ignitable.

NP - Non-Plastic: Term is utilized for the analysis of Atterberg Limits in soil.

RL - Reporting Limit: The value at which an instrument can accurately measure an analyte at a specific concentration. The RL includes any adjustments from dilutions, concentrations or moisture content, where applicable.

RPD - Relative Percent Difference: The results from matrix and/or matrix spike duplicates are primarily designed to assess the precision of analytical results in a given matrix and are expressed as relative percent difference (RPD). Values which are less than five times the reporting limit for any individual parameter are evaluated by utilizing the absolute difference between the values; although the RPD value will be provided in the report.

SRM - Standard Reference Material: A reference sample of a known or certified value that is of the same or similar matrix as the associated field samples.

STLP - Semi-dynamic Tank Leaching Procedure per EPA Method 1315.

TEF - Toxic Equivalency Factors: The values assigned to each dioxin and furan to evaluate their toxicity relative to 2,3,7,8-TCDD.

TEQ - Toxic Equivalent: The measure of a sample's toxicity derived by multiplying each dioxin and furan by its corresponding TEF and then summing the resulting values.

TIC - Tentatively Identified Compound: A compound that has been identified to be present and is not part of the target compound list (TCL) for the method and/or program. All TICs are qualitatively identified and reported as estimated concentrations.

Footnotes

Report Format: Data Usability Report

Project Name:	MIT-SCC	**Lab Number:**	L2037651
Project Number:	134283-002	**Report Date:**	09/15/20

1 - The reference for this analyte should be considered modified since this analyte is absent from the target analyte list of the original method.

Terms

Analytical Method: Both the document from which the method originates and the analytical reference method. (Example: EPA 8260B is shown as 1,8260B.) The codes for the reference method documents are provided in the References section of the Addendum.

Difference: With respect to Total Oxidizable Precursor (TOP) Assay analysis, the difference is defined as the Post-Treatment value minus the Pre-Treatment value.

Final pH: As it pertains to Sample Receipt & Container Information section of the report, Final pH reflects pH of container determined after adjustment at the laboratory, if applicable. If no adjustment required, value reflects Initial pH.

Frozen Date/Time: With respect to Volatile Organics in soil, Frozen Date/Time reflects the date/time at which associated Reagent Water-preserved vials were initially frozen. Note: If frozen date/time is beyond 48 hours from sample collection, value will be reflected in 'bold'.

Initial pH: As it pertains to Sample Receipt & Container Information section of the report, Initial pH reflects pH of container determined upon receipt, if applicable.

PAH Total: With respect to Alkylated PAH analyses, the 'PAHs, Total' result is defined as the summation of results for all or a subset of the following compounds: Naphthalene, C1-C4 Naphthalenes, 2-Methylnaphthalene, 1-Methylnaphthalene, Biphenyl, Acenaphthylene, Acenaphthene, Fluorene, C1-C3 Fluorenes, Phenanthrene, C1-C4 Phenanthrenes/Anthracenes, Anthracene, Fluoranthene, Pyrene, C1-C4 Fluoranthenes/Pyrenes, Benz(a)anthracene, Chrysene, C1-C4 Chrysenes, Benzo(b)fluoranthene, Benzo(j)+(k)fluoranthene, Benzo(e)pyrene, Benzo(a)pyrene, Perylene, Indeno(1,2,3-cd)pyrene, Dibenz(ah)+(ac)anthracene, Benzo(g,h,i)perylene. If a 'Total' result is requested, the results of its individual components will also be reported.

PFAS Total: With respect to PFAS analyses, the 'PFAS, Total (5)' result is defined as the summation of results for: PFHpA, PFHxS, PFOA, PFNA and PFOS. If a 'Total' result is requested, the results of its individual components will also be reported.

The target compound Chlordane (CAS No. 57-74-9) is reported for GC ECD analyses. Per EPA,this compound "refers to a mixture of chlordane isomers, other chlorinated hydrocarbons and numerous other components." (Reference: USEPA Toxicological Review of Chlordane, In Support of Summary Information on the Integrated Risk Information System (IRIS), December 1997.)

Total: With respect to Organic analyses, a 'Total' result is defined as the summation of results for individual isomers or Aroclors. If a 'Total' result is requested, the results of its individual components will also be reported. This is applicable to 'Total' results for methods 8260, 8081 and 8082.

Data Qualifiers

A - Spectra identified as "Aldol Condensates" are byproducts of the extraction/concentration procedures when acetone is introduced in the process.

B - The analyte was detected above the reporting limit in the associated method blank. Flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For MCP-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For DOD-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank AND the analyte was detected above one-half the reporting limit (or above the reporting limit for common lab contaminants) in the associated method blank. For NJ-Air-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte above the reporting limit. For NJ-related projects (excluding Air), flag only applies to associated field samples that have detectable concentrations of the analyte, which was detected above the reporting limit in the associated method blank or above five times the reporting limit for common lab contaminants (Phthalates, Acetone, Methylene Chloride, 2-Butanone).

C - Co-elution: The target analyte co-elutes with a known lab standard (i.e. surrogate, internal standards, etc.) for co-extracted analyses.

D - Concentration of analyte was quantified from diluted analysis. Flag only applies to field samples that have detectable concentrations of the analyte.

E - Concentration of analyte exceeds the range of the calibration curve and/or linear range of the instrument.

F - The ratio of quantifier ion response to qualifier ion response falls outside of the laboratory criteria. Results are considered to be an estimated maximum concentration.

G - The concentration may be biased high due to matrix interferences (i.e, co-elution) with non-target compound(s). The result should be considered estimated.

H - The analysis of pH was performed beyond the regulatory-required holding time of 15 minutes from the time of sample collection.

I - The lower value for the two columns has been reported due to obvious interference.

J - Estimated value. This represents an estimated concentration for Tentatively Identified Compounds (TICs).

M - Reporting Limit (RL) exceeds the MCP CAM Reporting Limit for this analyte.

ND - Not detected at the reporting limit (RL) for the sample.

NJ - Presumptive evidence of compound. This represents an estimated concentration for Tentatively Identified Compounds (TICs), where the identification is based on a mass spectral library search.

P - The RPD between the results for the two columns exceeds the method-specified criteria.

Q - The quality control sample exceeds the associated acceptance criteria. For DOD-related projects, LCS and/or Continuing Calibration

Report Format: Data Usability Report

Project Name:	MIT-SCC	**Lab Number:**	L2037651
Project Number:	134283-002	**Report Date:**	09/15/20

Data Qualifiers

Standard exceedences are also qualified on all associated sample results. Note: This flag is not applicable for matrix spike recoveries when the sample concentration is greater than 4x the spike added or for batch duplicate RPD when the sample concentrations are less than 5x the RL. (Metals only.)

R - Analytical results are from sample re-analysis.

RE - Analytical results are from sample re-extraction.

S - Analytical results are from modified screening analysis.

Report Format: Data Usability Report

Project Name:	MIT-SCC	**Lab Number:**	L2037651
Project Number:	134283-002	**Report Date:**	09/15/20

REFERENCES

1 Test Methods for Evaluating Solid Waste: Physical/Chemical Methods. EPA SW-846. Third Edition. Updates I - VI, 2018.

3 Methods for the Determination of Metals in Environmental Samples, Supplement I. EPA/600/R-94/111. May 1994.

4 Methods for Chemical Analysis of Water and Wastes. EPA 600/4-79-020. Revised March 1983.

14 Methods for the Determination of Organic Compounds in Finished Drinking Water and Raw Source Water. EPA/600/4-88/039, Revised July 1991.

19 Inductively Coupled Plasma Atomic Emission Spectrometric Method for Trace Element Analysis of Water and Wastes. Appendix C, Part 136, 40 CFR (Code of Federal Regulations). July 1, 1999 edition.

44 Methods for the Determination of Inorganic Substances in Environmental Samples, EPA/600/R-93/100, August 1993.

64 Quality Assurance and Quality Control Requirements and Performance Standards for SW-846 Methods. MADEP BWSC. WSC-CAM-IIA (Revision 4), WSC-CAM-V C (Revision 2), WSC-CAM-IIIA (Revision 5). August 2004.

74 Method 1664,Revision A: N-Hexane Extractable Material (HEM; Oil & Grease) and Silica Gel Treated N-Hexane Extractable Material (SGT-HEM; Non-polar Material) by Extraction and Gravimetry, EPA-821-R-98-002, February 1999.

107 Alpha Analytical - In-house calculation method.

109 Test Methods for Evaluating Solid Waste: Physical/Chemical Methods. EPA SW-846. Revision 0, June 2010.

121 Standard Methods for the Examination of Water and Wastewater. APHA-AWWA-WEF. Standard Methods Online.

127 Method 608.3: Organochlorine Pesticides and PCBs by GC/HSD, EPA 821-R-16-009, December 2016.

128 Method 624.1: Purgeables by GC/MS, EPA 821-R-16-008, December 2016.

129 Method 625.1: Base/Neutrals and Acids by GC/MS, EPA 821-R-16-007, December 2016.

LIMITATION OF LIABILITIES

Alpha Analytical performs services with reasonable care and diligence normal to the analytical testing laboratory industry. In the event of an error, the sole and exclusive responsibility of Alpha Analytical shall be to re-perform the work at it's own expense. In no event shall Alpha Analytical be held liable for any incidental, consequential or special damages, including but not limited to, damages in any way connected with the use of, interpretation of, information or analysis provided by Alpha Analytical.

We strongly urge our clients to comply with EPA protocol regarding sample volume, preservation, cooling, containers, sampling procedures, holding time and splitting of samples in the field.

Certification Information

The following analytes are not included in our Primary NELAP Scope of Accreditation:

Westborough Facility
EPA 624/624.1: m/p-xylene, o-xylene, Naphthalene
EPA 8260C: NPW: 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene, Azobenzene; SCM: Iodomethane (methyl iodide), 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene.
EPA 8270D: NPW: Dimethylnaphthalene,1,4-Diphenylhydrazine; SCM: Dimethylnaphthalene,1,4-Diphenylhydrazine.
SM4500: NPW: Amenable Cyanide; SCM: Total Phosphorus, TKN, NO2, NO3.

Mansfield Facility
SM 2540D: TSS
EPA 8082A: NPW: PCB: 1, 5, 31, 87,101, 110, 141, 151, 153, 180, 183, 187.
EPA TO-15: Halothane, 2,4,4-Trimethyl-2-pentene, 2,4,4-Trimethyl-1-pentene, Thiophene, 2-Methylthiophene, 3-Methylthiophene, 2-Ethylthiophene, 1,2,3-Trimethylbenzene, Indan, Indene, 1,2,4,5-Tetramethylbenzene, Benzothiophene, 1-Methylnaphthalene.
EPA TO-12 Non-methane organics
EPA 3C Fixed gases
Biological Tissue Matrix: EPA 3050B

The following analytes are included in our Massachusetts DEP Scope of Accreditation

Westborough Facility:

Drinking Water
EPA 300.0: Chloride, Nitrate-N, Fluoride, Sulfate; **EPA 353.2**: Nitrate-N, Nitrite-N; **SM4500NO3-F**: Nitrate-N, Nitrite-N; **SM4500F-C, SM4500CN-CE, EPA 180.1, SM2130B, SM4500Cl-D, SM2320B, SM2540C, SM4500H-B, SM4500NO2-B**
EPA 332: Perchlorate; **EPA 524.2:** THMs and VOCs; **EPA 504.1:** EDB, DBCP.
Microbiology: **SM9215B; SM9223-P/A, SM9223B-Colilert-QT,SM9222D**.

Non-Potable Water
SM4500H,B, EPA 120.1, SM2510B, SM2540C, SM2320B, SM4500CL-E, SM4500F-BC, SM4500NH3-BH: Ammonia-N and Kjeldahl-N, **EPA 350.1**: Ammonia-N, **LACHAT 10-107-06-1-B**: Ammonia-N, **EPA 351.1, SM4500NO3-F, EPA 353.2**: Nitrate-N**, SM4500P-E, SM4500P-B, E, SM4500SO4-E, SM5220D, EPA 410.4, SM5210B, SM5310C, SM4500CL-D, EPA 1664, EPA 420.1, SM4500-CN-CE, SM2540D, EPA 300: Chloride, Sulfate, Nitrate.**
EPA 624.1: Volatile Halocarbons & Aromatics,
EPA 608.3: Chlordane, Toxaphene, Aldrin, alpha-BHC, beta-BHC, gamma-BHC, delta-BHC, Dieldrin, DDD, DDE, DDT, Endosulfan I, Endosulfan II, Endosulfan sulfate, Endrin, Endrin Aldehyde, Heptachlor, Heptachlor Epoxide, PCBs
EPA 625.1: SVOC (Acid/Base/Neutral Extractables), **EPA 600/4-81-045**: PCB-Oil.
Microbiology: **SM9223B-Colilert-QT; Enterolert-QT, SM9221E, EPA 1600, EPA 1603.**

Mansfield Facility:

Drinking Water
EPA 200.7: Al, Ba, Cd, Cr, Cu, Fe, Mn, Ni, Na, Ag, Ca, Zn. **EPA 200.8:** Al, Sb, As, Ba, Be, Cd, Cr, Cu, Pb, Mn, Ni, Se, Ag, TL, Zn. **EPA 245.1** Hg.
EPA 522.

Non-Potable Water
EPA 200.7: Al, Sb, As, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Mo, Ni, K, Se, Ag, Na, Sr, TL, Ti, V, Zn.
EPA 200.8: Al, Sb**,** As, Be, Cd, Cr, Cu, Fe, Pb, Mn, Ni, K, Se, Ag, Na, TL, Zn.
EPA 245.1 Hg.
SM2340B

For a complete listing of analytes and methods, please contact your Alpha Project Manager.

CHAIN OF CUSTODY

ALPHA ANALYTICAL

Westborough, MA 01581 — 8 Walkup Dr. — TEL: 508-898-9220 — FAX: 508-898-9193

Mansfield, MA 02048 — 320 Forbes Blvd — TEL: 508-822-9300 — FAX: 508-822-3288

Service Centers
Brewer, ME 04412 Portsmouth, NH 03801 Mahwah, NJ 07430 Albany, NY 12205
Tonawanda, NY 14150 Holmes, PA 19043

Page 1 of 1

Date Rec'd in Lab: 9/10/20

ALPHA Job #: L2037651

H&A Information
- H&A Client: MIT
- H&A Address: 465 Medford St, #220
- Boston, MA 02129
- H&A Phone: 6178867400
- H&A Fax:
- H&A Email: kscalise@haleyaldrich.com

Project Information
- Project Name: MIT - SCC
- Project Location: Vassar Street, Cambridge, MA
- Project #: 134283-002
- (Use Project name as Project #)
- Project Manager: T. Butler
- ALPHAQuote #: 12002

Turn-Around Time
- Standard — Due Date:
- Rush (only if pre approved) — # of Days: 2

Deliverables
- Email — Fax
- EQuIS (1 File) — EQuIS (4 File)
- Other:

Billing Information
Same as Client Info
PO #

Regulatory Requirements (Program/Criteria)
MA MCP RCS-1

Note: Select State from menu & identify criteria.

Disposal Site Information
Please identify below location of applicable disposal facilities.

Disposal Facility:
NJ NY
Other:

These samples have been previously analyzed by Alpha

Other project specific requirements/comments:

Please refer to Alpha Quote # 12002
Total NPDES Metals = Sb, As, Cd, Cr, Cu, Fe, Pb, Hg, Ni, Se, Ag, Zn

Please specify Metals or TAL.

Sample Filtration
Done
Lab to do
Preservation
Lab to do
(Please Specify below)

ALPHA Lab ID (Lab Use Only)	Sample ID	Collection Date	Collection Time	Sample Matrix	Sampler Initials	Depth	NPDES RGP Parameters + CL-300	Ethanol by 1671	Ammonia Nitrogen - SM 4500	Dissolved NPDES Metals See Note #1	Total Hardness	Total NPDES Metals, + Hex Cr + Tri Cr	pH	Free Cyanide + Phys. Available Cyanide	Sample Specific Comments	Total Bottles
37651-01	HA20-E3	9/10/2020	1200	aq	MJD	--	x	x	x	x	x		x	x	1. HOLD, field filtered	27
-02	Outfall	"	1320	aq	MJD	--			x		x	x	x		Temp:	3
															2 Trip Blanks @1100	2
															31 TOTAL	

Preservative Code:
A = None
B = HCl
C = HNO_3
D = H_2SO_4
E = NaOH
F = MeOH
G = $NaHSO_4$
H = $Na_2S_2O_3$
K/E = Zn Ac/NaOH
O = Other

Container Code
P = Plastic
A = Amber Glass
V = Vial
G = Glass
B = Bacteria Cup
C = Cube
O = Other
E = Encore
D = BOD Bottle

Westboro: Certification No: MA935
Mansfield: Certification No: MA015

Container Type									
Preservative									

Relinquished By:	Date/Time	Received By:	Date/Time
[illegible]	9/10/2020 1620	[illegible] DICK DOS	9/10/20 1620
[illegible] DICK DOS	9/10/20 1715	[illegible]	9/10/20 1715

Please print clearly, legibly and completely. Samples can not be logged in and turnaround time clock will not start until any ambiguities are resolved. Alpha Analytical's services under this Chain of Custody shall be performed in accordance with terms and conditions within Blanket Service Agreement# 2019-22-Alpha Analytical by and between Haley & Aldrich, Inc., its subsidiaries and affiliates and Alpha Analytical.

Document ID: 20455 Rev 3 (1/7/2019)

September 15, 2020

Melissa Gulli
Alpha Analytical
145 Flanders Road
Westborough, MA 01581
TEL: (603) 319-5010
FAX:

RE: L2037651 **WorkOrder:** 20090770

Dear Melissa Gulli:

TEKLAB, INC received 1 sample on 9/14/2020 8:40:00 AM for the analysis presented in the following report.

Samples are analyzed on an as received basis unless otherwise requested and documented. The sample results contained in this report relate only to the requested analytes of interest as directed on the chain of custody. NELAP accredited fields of testing are indicated by the letters NELAP under the Certification column. Unless otherwise documented within this report, Teklab Inc. analyzes samples utilizing the most current methods in compliance with 40CFR. All tests are performed in the Collinsville, IL laboratory unless otherwise noted in the Case Narrative.

All quality control criteria applicable to the test methods employed for this project have been satisfactorily met and are in accordance with NELAP except where noted. The following report shall not be reproduced, except in full, without the written approval of Teklab, Inc.

If you have any questions regarding these tests results, please feel free to call.

Sincerely,

Marvin L. Darling II

Marvin L. Darling
Project Manager
(618)344-1004 ex 41
mdarling@teklabinc.com

Teklab, Inc.
Environmental Laboratory

Report Contents

http://www.teklabinc.com/

Client: Alpha Analytical
Work Order: 20090770
Client Project: L2037651
Report Date: 15-Sep-2020

This reporting package includes the following:

Teklab, Inc.
Environmental Laboratory

Definitions

http://www.teklabinc.com/

Client: Alpha Analytical **Work Order:** 20090770

Client Project: L2037651 **Report Date:** 15-Sep-2020

Abbr Definition

*	Analytes on report marked with an asterisk are not NELAP accredited
CCV	Continuing calibration verification is a check of a standard to determine the state of calibration of an instrument between recalibration.
CRQL	A Client Requested Quantitation Limit is a reporting limit that varies according to customer request. The CRQL may not be less than the MDL.
DF	Dilution factor is the dilution performed during analysis only and does not take into account any dilutions made during sample preparation. The reported result is final and includes all dilution factors.
DNI	Did not ignite
DUP	Laboratory duplicate is a replicate aliquot prepared under the same laboratory conditions and independently analyzed to obtain a measure of precision.
ICV	Initial calibration verification is a check of a standard to determine the state of calibration of an instrument before sample analysis is initiated.
IDPH	IL Dept. of Public Health
LCS	Laboratory control sample is a sample matrix, free from the analytes of interest,spiked with verified known amounts of analytes and analyzed exactly like a sample to establish intra-laboratory or analyst specific precision and bias or to assess the performance of all or a portion of the measurement system.
LCSD	Laboratory control sample duplicate is a replicate laboratory control sample that is prepared and analyzed in order to determine the precision of the approved test method. The acceptable recovery range is listed in the QC Package (provided upon request).
MBLK	Method blank is a sample of a matrix similar to the batch of associated sample (when available) that is free from the analytes of interest and is processed simultaneously with and under the same conditions as samples through all steps of the analytical procedures, and in which no target analytes or interferences should present at concentrations that impact the analytical results for sample analyses.
MDL	"The method detection limit is defined as the minimum measured concentration of a substance that can be reported with 99% confidence that the measured concentration is distinguishable from method blank results."
MS	Matrix spike is an aliquot of matrix fortified (spiked) with known quantities of specific analytes that is subjected to the entire analytical procedures in order to determine the effect of the matrix on an approved test method's recovery system. The acceptable recovery range is listed in the QC Package (provided upon request).
MSD	Matrix spike duplicate means a replicate matrix spike that is prepared and analyzed in order to determine the precision of the approved test method. The acceptable recovery range is listed in the QC Package (provided upon request).
MW	Molecular weight
ND	Not Detected at the Reporting Limit
NELAP	NELAP Accredited
PQL	Practical quantitation limit means the lowest level that can be reliably achieved within specified limits of precision and accuracy during routine laboratory operation conditions.
RL	The reporting limit the lowest level that the data is displayed in the final report. The reporting limit may vary according to customer request or sample dilution. The reporting limit may not be less than the MDL.
RPD	Relative percent difference is a calculated difference between two recoveries (ie. MS/MSD). The acceptable recovery limit is listed in the QC Package (provided upon request).
SPK	The spike is a known mass of target analyte added to a blank sample or sub-sample; used to determine recovery deficiency or for other quality control purposes.
Surr	Surrogates are compounds which are similar to the analytes of interest in chemical composition and behavior in the analytical process, but which are not normally found in environmental samples.
TIC	Tentatively identified compound: Analytes tentatively identified in the sample by using a library search. Only results not in the calibration standard will be reported as tentatively identified compounds. Results for tentatively identified compounds that are not present in the calibration standard, but are assigned a specific chemical name based upon the library search, are calculated using total peak areas from reconstructed ion chromatograms and a response factor of one. The nearest Internal Standard is used for the calculation. The results of any TICs must be considered estimated, and are flagged with a "T". If the estimated result is above the calibration range it is flagged "ET"
TNTC	Too numerous to count (> 200 CFU)

Qualifiers

# -	Unknown hydrocarbon	B -	Analyte detected in associated Method Blank
C -	RL shown is a Client Requested Quantitation Limit	E -	Value above quantitation range
H -	Holding times exceeded	I -	Associated internal standard was outside method criteria
J -	Analyte detected below quantitation limits	M -	Manual Integration used to determine area response
ND -	Not Detected at the Reporting Limit	R -	RPD outside accepted recovery limits
S -	Spike Recovery outside recovery limits	T -	TIC(Tentatively identified compound)
X -	Value exceeds Maximum Contaminant Level		

Teklab, Inc.
Environmental Laboratory

Case Narrative

http://www.teklabinc.com/

Client: Alpha Analytical
Client Project: L2037651

Work Order: 20090770
Report Date: 15-Sep-2020

Cooler Receipt Temp: 9.0 °C

Locations

Collinsville

Address 5445 Horseshoe Lake Road
Collinsville, IL 62234-7425
Phone (618) 344-1004
Fax (618) 344-1005
Email jhriley@teklabinc.com

Springfield

Address 3920 Pintail Dr
Springfield, IL 62711-9415
Phone (217) 698-1004
Fax (217) 698-1005
Email KKlostermann@teklabinc.com

Kansas City

Address 8421 Nieman Road
Lenexa, KS 66214
Phone (913) 541-1998
Fax (913) 541-1998
Email jhriley@teklabinc.com

Collinsville Air

Address 5445 Horseshoe Lake Road
Collinsville, IL 62234-7425
Phone (618) 344-1004
Fax (618) 344-1005
Email EHurley@teklabinc.com

Chicago

Address 1319 Butterfield Rd.
Downers Grove, IL 60515
Phone (630) 324-6855
Fax
Email arenner@teklabinc.com

Teklab, Inc. Environmental Laboratory

Accreditations

http://www.teklabinc.com/

Client: Alpha Analytical

Work Order: 20090770

Client Project: L2037651

Report Date: 15-Sep-2020

State	Dept	Cert #	NELAP	Exp Date	Lab
Illinois	IEPA	100226	NELAP	1/31/2021	Collinsville
Kansas	KDHE	E-10374	NELAP	4/30/2021	Collinsville
Louisiana	LDEQ	05002	NELAP	6/30/2021	Collinsville
Louisiana	LDEQ	05003	NELAP	6/30/2021	Collinsville
Oklahoma	ODEQ	9978	NELAP	8/31/2021	Collinsville
Arkansas	ADEQ	88-0966		3/14/2021	Collinsville
Illinois	IDPH	17584		5/31/2021	Collinsville
Kentucky	UST	0073		1/31/2021	Collinsville
Missouri	MDNR	00930		5/31/2021	Collinsville
Missouri	MDNR	930		1/31/2022	Collinsville

Teklab, Inc.
Environmental Laboratory

Laboratory Results

http://www.teklabinc.com/

Client: Alpha Analytical
Work Order: 20090770
Client Project: L2037651
Report Date: 15-Sep-2020
Lab ID: 20090770-001
Client Sample ID: HA20-E3
Matrix: AQUEOUS
Collection Date: 09/10/2020 12:00

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
EPA 600 1671A, PHARMACEUTICAL MANUFACTURING INDUSTRY NON-PURGEABLE VOLATILE ORGANICS								
Ethanol	*	20		**ND**	mg/L	1	09/14/2020 19:17	R281509

Teklab, Inc. Environmental Laboratory

Quality Control Results

http://www.teklabinc.com/

Client: Alpha Analytical
Client Project: L2037651

Work Order: 20090770
Report Date: 15-Sep-2020

EPA 600 1671A, PHARMACEUTICAL MANUFACTURING INDUSTRY NON-PURGEABLE VOLATILE ORG

Batch R281509 **SampType:** MBLK Units **mg/L**
SampID: MBLK-091420

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Ethanol	*	20		**ND**						09/14/2020

Batch R281509 **SampType:** LCS Units **mg/L**
SampID: LCS-091420

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Ethanol	*	20		**110**	100.0	0	105.2	70	132	09/14/2020

Batch R281509 **SampType:** MS Units **mg/L**
SampID: 20090368-003AMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Ethanol	*	20		**120**	100.0	0	119.1	70	132	09/14/2020

Batch R281509 **SampType:** MSD Units **mg/L** RPD Limit **30**
SampID: 20090368-003AMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Ethanol	*	20	R	**85**	100.0	0	85.4	119.1	33.01	09/14/2020

Teklab, Inc. Environmental Laboratory

Receiving Check List

http://www.teklabinc.com/

Client: Alpha Analytical

Client Project: L2037651

Work Order: 20090770

Report Date: 15-Sep-2020

Carrier: UPS

Received By: AMD

Completed by: Amber M. Dilallo
On: 14-Sep-2020

Reviewed by: Elizabeth A. Hurley
On: 14-Sep-2020

Pages to follow: Chain of custody 1 Extra pages included 0

Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐	Temp °C	9.0	
Type of thermal preservation?	None ☐	Ice ☑	Blue Ice ☐	Dry Ice	☐	
Chain of custody present?	Yes ☑	No ☐				
Chain of custody signed when relinquished and received?	Yes ☑	No ☐				
Chain of custody agrees with sample labels?	Yes ☑	No ☐				
Samples in proper container/bottle?	Yes ☑	No ☐				
Sample containers intact?	Yes ☑	No ☐				
Sufficient sample volume for indicated test?	Yes ☑	No ☐				
All samples received within holding time?	Yes ☑	No ☐				
Reported field parameters measured:	Field ☐	Lab ☐	NA ☑			
Container/Temp Blank temperature in compliance?	Yes ☐	No ☑				

When thermal preservation is required, samples are compliant with a temperature between 0.1°C - 6.0°C, or when samples are received on ice the same day as collected.

Water – at least one vial per sample has zero headspace?	Yes ☑	No ☐	No VOA vials ☐
Water - TOX containers have zero headspace?	Yes ☐	No ☐	No TOX containers ☑
Water - pH acceptable upon receipt?	Yes ☑	No ☐	NA ☐
NPDES/CWA TCN interferences checked/treated in the field?	Yes ☐	No ☐	NA ☑

Any No responses must be detailed below or on the COC.

The sample was out of temperature compliance upon receipt. Per Melissa Gulli, proceed with analysis. - adilallo - 9/14/2020 8:50:02 AM

20090770

Subcontract Chain of Custody

Tek Lab, Inc.
5445 Horsehoe Lake Road
Collinsville, IL 62234-7425

Alpha Job Number
L2037651

Client Information

Client: Alpha Analytical Labs
Address: Eight Walkup Drive
Westborough, MA 01581-1019

Phone: 603.319.5010
Email: mgulli@alphalab.com

Project Information

Project Location: MA
Project Manager: Melissa Gulli

Turnaround & Deliverables Information

Due Date: 09/15/20 (RUSH)
Deliverables:

Regulatory Requirements/Report Limits

State/Federal Program:
Regulatory Criteria: RCS-1-14;S1/G1-14

Project Specific Requirements and/or Report Requirements

Reference following Alpha Job Number on final report/deliverables: L2037651

Report to include Method Blank, LCS/LCSD:

Additional Comments: Send all results/reports to subreports@alphalab.com

Lab ID	Client ID	Collection Date/Time	Sample Matrix	Analysis	Batch QC
20090770-001	HA20-E3	09-10-20 12:00	WATER	Ethanol by EPA 1671 Revision A	

ONE DAY TAT

OK H [illegible] 9/11/20 melted 9.0° ice 1023

Relinquished By:	Date/Time:	Received By:	Date/Time:
[illegible signature]	9/11/20	[illegible signature]	9/11/20 840

Form No: AL_subcoc

9/11/20