SITE DEVELOPMENT · ENVIRONMENTAL REMEDIATION · SOIL MANAGEMENT

U.S. Environmental Protection Agency
Office of Ecosystem Protection
EPA/OEP RGP Applications Coordinator
5 Post Office Square, Suite 100 (OEP06-01)
Boston, MA 02109-3912

February 25, 2020
File No. 4325.04

Re: Notice of Intent for the Remediation General Permit
Temporary Construction Dewatering for Site Redevelopment
Madison Commons
Madison Street, Worcester, MA

Dear Sir/Madam:

On behalf of The Worcester Redevelopment Authority, W. L. French Excavating Corporation (WLF) has submitted this Notice of Intent (NOI) to the U.S. Environmental Protection Agency (U.S. EPA) for coverage under the National Pollutant Discharge Elimination System (NPDES) Remediation General Permit (RGP) MAG910000 for the Madison Commons (the Site) property. This letter and supporting documentation were prepared in accordance with the U.S. EPA guidance for construction dewatering under the RGP program. WLF is the earthwork contractor for the project and will have direct responsibility of the subcontractors performing the dewatering activities at the Site. Subcontractors working for WLF on the project will be required to meet the requirements of this NOI and the RGP. The location of the Site and the discharge location via a culvert are shown on Figure 1, and the extent of the Site area is shown on Figure 2.

The Site is located in the vicinity of Madison Street, Washington Street, and Lamartine Street in Worcester, Massachusetts as shown on Figure 1. Redevelopment activities at the Site include construction of a mixed-use development. Two primary Massachusetts Contingency Plan (310 CMR 40.0000) (MCP) sites are present on the Site, with Release Tracking Numbers (RTNs) 2-10256 and 2-10760. Four other RTNs were subsequently linked to the primary RTNs. Activity and Use Limitations (AULs) have been filed with partial Class A-3 Response Action Outcome (RAO) Statements for these releases. Two other MCP sites within the Site boundary, RTNs 2-14918 and 2-14921, have achieved regulatory closure with the filing of Class A-1 RAO Statements (i.e., Permanent Solutions without Conditions). Documented impacts to the Site include petroleum hydrocarbons, metals, volatile organic compounds (VOCs), and semi-volatile organic compounds (SVOCs) in soil and groundwater.

The Site is located between approximately Madison Street, Washington Street, and Lamartine Street in Worcester, Massachusetts. The Site is currently an active construction site. An existing building slab occupies the southern corner of the Site, which is intended to be repurposed as a parking area. Historically, the Site has been used for a variety of commercial, industrial, and residential purposes since its development dating to at least the early 1890s. The Site was formerly occupied by Stanley Tools, Inc.

(Stanley) for manufacturing hand tools, followed more recently by the Kelley Square Flea Market. The remainder of the Site was formerly operated by Wyman Gordon for the manufacture of ferrous and non-ferrous metal forgings for use in the aircraft and aerospace industries. Much of the manufacturing operations at the Site were ceased in the late 1990s and early 2000s, during which time the former buildings on the main Wyman Gordon Property were decommissioned and demolished.

Groundwater is anticipated to be encountered between approximately Elevation (El.) 438 feet to El. 442 feet. Elevations referenced herein are given in feet and refer to the North American Vertical Datum of 1988. It is anticipated that excavations below the groundwater table may be required to facilitate the removal of existing building foundation elements and construction of new buildings on the Site. Groundwater that flows into the excavations during construction activities will be treated prior to discharge to an existing storm drain such that the discharged effluent meets the effluent limitations established by NPDES Part 2.1 and Appendix V of the RGP Application. Figure 3 includes a schematic of the proposed dewatering treatment system. The completed NOI for the Remediation General Permit form is included as Appendix A.

The receiving surface water body for the treatment system will be Mill Brook, an underground culvert that daylights at its confluence with the Middle River. At the confluence, the combined water body becomes the Blackstone River. The Middle River was sampled as the receiving surface water body. Information regarding the receiving water was collected from the Massachusetts Year 2014 Integrated List of Waters which is included in Appendix B. Dilution calculation information including correspondence with DEP is included in Appendix C. Analytical laboratory data for on-Site and surface water sampling is summarized in Tables 1 and 2, respectively, and analytical data reports are included in Appendix D. Municipal correspondence in the form of a memorandum is provided in Appendix E, indicating a notification of discharge into the Middle River via a municipal storm sewer system has been provided to the Owner of the discharge system. City of Worcester maps and the 2014 Massachusetts Integrated List of Waters map showing the subsurface infrastructure that will be used to convey the discharge are included in Appendix E.

According to the Information for Planning and Conservation (IPaC), the excavation activities will not impact Areas of Critical Environmental Concern (ACEC) or Habitats of Rare Wetland

Wildlife. A review of the information on the U.S. Fish and Wildlife Service website led to the conclusion that the project will not impact federally-listed threatened or endangered species. A letter from that agency is included in Appendix F. An email requesting information regarding Oceanic Fisheries was sent to the National Oceanic and Atmospheric Administration (NOAA), and their response, included in Appendix F, states that no listed species are known to occur in the vicinity of Worcester, MA in the area of discharge. Additional supplemental information required by the RGP is included in Appendix G, and are referenced within the completed NOI (Appendix A).

Thank you for your consideration of this NOI/Permit. Please feel free to contact us if you wish to discuss the information contained in this application, or if any additional information is needed.

Very truly yours,

W.L. French Excavating Corp., Operator of Permit

James Ganiatsos
Project Manager
W.L. French Excavating Corp.

Encl. Table 1 – Summary of Groundwater Quality
Table 2 – Summary of Surface Water Quality
Figure 1 – Locus Plan
Figure 2 – Location of Proposed Excavation and Dewatering
Figure 3 – Proposed Groundwater Treatment Schematic
Appendix A – Notice of Intent Form
Appendix B – Massachusetts Category 5 Waters "Waters requiring a TDML"
Appendix C – Middle River Dilution Calculations
Appendix D – Analytical Data Reports
Appendix E – Municipal Correspondence
Appendix F – Federal Correspondence
Appendix G – National Register of Historic Places, Worcester, Massachusetts

cc: City of Worcester
DEP Bureau of Water Resources
Mr. Greg Ormsby ~ City of Worcester
Mr. Paul Moosey ~ City of Worcester
Mr. Russ Adams ~ City of Worcester

TABLES

Table 1
Summary of Groundwater Quality
Madison Commons
Worcester, MA

LOCATION	RCGW-2	NPDES TBEL	Units	MC-41 (OW)	GZ-813/GP70	MW-1	Maximum Detection	Average Detection
SAMPLING DATE				8/8/2019	8/8/2019	8/8/2019		
SAMPLE TYPE				WATER	WATER	WATER		
Anions by Ion Chromatography								
Chloride	NS	NS	ug/l	**4,760**	**2,440**	**154,000**	154,000	53,733
Dissolved Metals								
Arsenic, Dissolved	900	104	ug/l	**1.8**	**33**	**6.5**	33	13.8
Cadmium, Dissolved	4	10.2	ug/l	<0.2	<0.2	<0.2	BDL	BDL
Chromium, Dissolved	300	323	ug/l	<1	**17.7**	<1	17.7	6.2
Copper, Dissolved	100,000	242	ug/l	**22.9**	**2.7**	**2.5**	22.9	9.4
Iron, Dissolved	NS	5,000	ug/l	**611**	<50	**128**	611	255
Lead, Dissolved	10	160	ug/l	**1.4**	<1	<1	1.4	0.8
Mercury, Dissolved	20	0.739	ug/l	<0.2	<0.2	<0.2	BDL	BDL
Nickel, Dissolved	200	1,450	ug/l	**4.1**	**32.1**	**39.7**	39.7	25.3
Selenium, Dissolved	100	235.8	ug/l	<5	<5	<5	BDL	BDL
Silver, Dissolved	7	35.1	ug/l	<0.4	<0.4	<0.4	BDL	BDL
Zinc, Dissolved	900	420	ug/l	**38.7**	<10	<10	38.7	16.2
General Chemistry								
Chromium, Trivalent	600	323	ug/l	<10	**219**	<10	219	76
Solids, Total Suspended	NS	30	mg/l	**320**	**10**	**130**	320	153
Cyanide, Total	0.03	178	mg/l	***0.361***	**0.006**	<0.005	*0.361*	0.123
Chlorine, Total Residual	NS	0.2	mg/l	<0.02	<0.02	<0.02	BDL	BDL
pH (H)	NS	NS	SU	**7.0**	**6.8**	**7.2**	7.2	7.0
Nitrogen, Ammonia	NS	NS	mg/l	**0.079**	**0.106**	**0.213**	0.213	0.133
Sulfate	NS	NS	ug/l	**17,000**	<10,000	**12,000**	17,000	11,333
TPH, SGT-HEM	5	5	mg/l	<4	***38.3***	<5.2	*38.3*	*14*
Phenolics, Total	NS	NS	ug/l	<30	<30	<30	BDL	BDL
Chromium, Hexavalent	300	323	ug/l	<10	<10	<10	BDL	BDL
Microextractables by GC								
1,2-Dibromoethane	2	0.05	ug/l	<0.01	<0.01	<0.01	BDL	BDL
Polychlorinated Biphenyls by GC								
Aroclor 1016	5	NS	ug/l	<0.25	<0.25	<0.25	BDL	BDL
Aroclor 1221	5	NS	ug/l	<0.25	<0.25	<0.25	BDL	BDL
Aroclor 1232	5	NS	ug/l	<0.25	<0.25	<0.25	BDL	BDL
Aroclor 1242	5	NS	ug/l	<0.25	<0.25	<0.25	BDL	BDL
Aroclor 1248	5	NS	ug/l	<0.25	<0.25	<0.25	BDL	BDL
Aroclor 1254	5	NS	ug/l	<0.25	<0.25	<0.25	BDL	BDL
Aroclor 1260	5	NS	ug/l	<0.2	<0.2	<0.2	BDL	BDL
Semivolatile Organics by GC/MS								
Bis(2-ethylhexyl)phthalate	50,000	101	ug/l	<2.2	**11**	**2.7**	11	4.9
Butyl benzyl phthalate	10,000	NS	ug/l	<5	<5	<5	BDL	BDL
Di-n-butylphthalate	5,000	NS	ug/l	<5	<5	<5	BDL	BDL
Di-n-octylphthalate	100,000	NS	ug/l	<5	<5	<5	BDL	BDL
Diethyl phthalate	9,000	NS	ug/l	<5	<5	<5	BDL	BDL
Dimethyl phthalate	50,000	NS	ug/l	<5	<5	<5	BDL	BDL
Total Phthalates	NS	190	ug/l	<27.2	**11**	**2.7**	11	9.1
Semivolatile Organics by GC/MS-SIM								
Pentachlorophenol	200	1	ug/l	<1	<1	<1	BDL	BDL
Group I Polycyclic Aromatic Hydrocarbons								
Benzo(a)anthracene	1,000	NS	ug/l	**0.22**	**1.0**	**0.19**	1.0	0.47
Benzo(a)pyrene	500	NS	ug/l	**0.17**	**1.2**	**0.20**	1.2	0.52
Benzo(b)fluoranthene	400	NS	ug/l	**0.22**	**2.2**	**0.30**	2.2	0.91
Benzo(k)fluoranthene	100	NS	ug/l	<0.1	**0.72**	<0.1	0.72	0.27
Chrysene	70	NS	ug/l	**0.15**	**1.4**	**0.19**	1.4	0.58
Dibenzo(a,h)anthracene	40	NS	ug/l	<0.1	**0.26**	<0.1	0.26	0.12
Indeno(1,2,3-cd)pyrene	100	NS	ug/l	**0.14**	**1.3**	**0.16**	1.3	0.53
Total Group I PAHs	NS	1	ug/l	**0.9**	**8.08**	**1.04**	8.08	3.34
Group II Polycyclic Aromatic Hydrocarbons								
Acenaphthene	10,000	NS	ug/l	<0.1	<0.1	<0.1	BDL	BDL
Acenaphthylene	40	NS	ug/l	<0.1	**0.19**	<0.1	0.19	0.10
Anthracene	30	NS	ug/l	<0.1	**0.21**	<0.1	0.21	0.10
Benzo(ghi)perylene	20	NS	ug/l	**0.13**	**1.3**	**0.16**	1.3	0.53
Fluoranthene	200	NS	ug/l	**0.27**	**3.9**	**0.41**	3.9	1.53
Fluorene	40	NS	ug/l	<0.1	**0.10**	<0.1	0.1	0.07
Naphthalene	700	20	ug/l	**0.11**	<0.1	**0.15**	0.15	0.10
Phenanthrene	10,000	NS	ug/l	**0.11**	**0.66**	**0.16**	0.66	0.31
Pyrene	20	NS	ug/l	**0.24**	**2.4**	**0.36**	2.4	1.00
Total Group II PAHs	NS	100	ug/l	**0.86**	**8.76**	**1.24**	8.76	3.62
Total Hardness by SM 2340B								
Hardness	NS	NS	ug/l	**122,000**	**204,000**	**124,000**	204,000	150,000
Total Metals								
Arsenic, Total	900	104	ug/l	**7.23**	**48.79**	**9.14**	48.79	21.72
Cadmium, Total	4	10.2	ug/l	**0.59**	**0.55**	**0.27**	0.59	0.47
Chromium, Total	300	323	ug/l	**2.06**	**219**	**2.14**	219	74.4
Copper, Total	100,000	242	ug/l	**35.60**	**10.4**	**8.47**	35.6	18.2
Iron, Total	NS	5,000	ug/l	**5,340**	**4,230**	**1,080**	5,340	3,550
Lead, Total	10	160	ug/l	**16.56**	**6.46**	**6.41**	*16.56*	9.81
Mercury, Total	20	0.739	ug/l	<0.2	<0.2	<0.2	BDL	BDL
Nickel, Total	200	1,450	ug/l	**5.83**	**15.37**	**47.17**	47.17	22.79
Selenium, Total	100	235.8	ug/l	<5	<5	<5	BDL	BDL
Silver, Total	7	35.1	ug/l	<0.4	<0.4	<0.4	BDL	BDL
Zinc, Total	900	420	ug/l	**108.9**	**46.63**	**25.03**	108.9	60.19

Table 1
Summary of Groundwater Quality
Madison Commons
Worcester, MA

LOCATION	RCGW-2	NPDES TBEL	Units	MC-41 (OW)	GZ-813/GP70	MW-1	Maximum Detection	Average Detection
SAMPLING DATE				8/8/2019	8/8/2019	8/8/2019		
SAMPLE TYPE				WATER	WATER	WATER		
Volatile Organics by GC/MS								
Methylene chloride	2,000	4.6	ug/l	<1	<1	<1	BDL	BDL
1,1-Dichloroethane	2,000	70	ug/l	<1.5	<1.5	<1.5	BDL	BDL
Carbon tetrachloride	2	4.4	ug/l	<1	<1	<1	BDL	BDL
1,1,2-Trichloroethane	900	5	ug/l	<1.5	<1.5	<1.5	BDL	BDL
Tetrachloroethene	50	5	ug/l	<1	**3.1**	<1	3.1	1.4
1,2-Dichloroethane	5	5	ug/l	<1.5	<1.5	<1.5	BDL	BDL
1,1,1-Trichloroethane	4,000	200	ug/l	<2	<2	<2	BDL	BDL
Benzene	1,000	5	ug/l	<1	<1	<1	BDL	BDL
Toluene	40,000	NS	ug/l	<1	<1	<1	BDL	BDL
Ethylbenzene	5,000	NS	ug/l	<1	<1	<1	BDL	BDL
Vinyl chloride	2	2	ug/l	<1	***23***	<1	*23*	*8*
1,1-Dichloroethene	80	3.2	ug/l	<1	<1	<1	BDL	BDL
cis-1,2-Dichloroethene	20	70	ug/l	<1	***170***	<1	*170*	57
Trichloroethene	5	5	ug/l	**1.0**	***22***	<1	*22*	*8*
1,2-Dichlorobenzene	2,000	600	ug/l	<5	<5	<5	BDL	BDL
1,3-Dichlorobenzene	6,000	320	ug/l	<5	<5	<5	BDL	BDL
1,4-Dichlorobenzene	60	5	ug/l	<5	<5	<5	BDL	BDL
p/m-Xylene	3,000	NS	ug/l	<2	<2	<2	BDL	BDL
o-xylene	3,000	NS	ug/l	<1	<1	<1	BDL	BDL
Xylenes, Total	3,000	NS	ug/l	<1	<1	<1	BDL	BDL
Acetone	50	7.97	mg/l	<0.010	<0.010	<0.010	BDL	BDL
Methyl tert butyl ether	5,000	70	ug/l	<10	<10	<10	BDL	BDL
Tert-Butyl Alcohol	NS	120	ug/l	<100	<100	<100	BDL	BDL
Tertiary-Amyl Methyl Ether	NS	90	ug/l	<20	<20	<20	BDL	BDL
Volatile Organics by GC/MS-SIM								
1,4-Dioxane	6,000	200	ug/l	<50	<50	<50	BDL	BDL

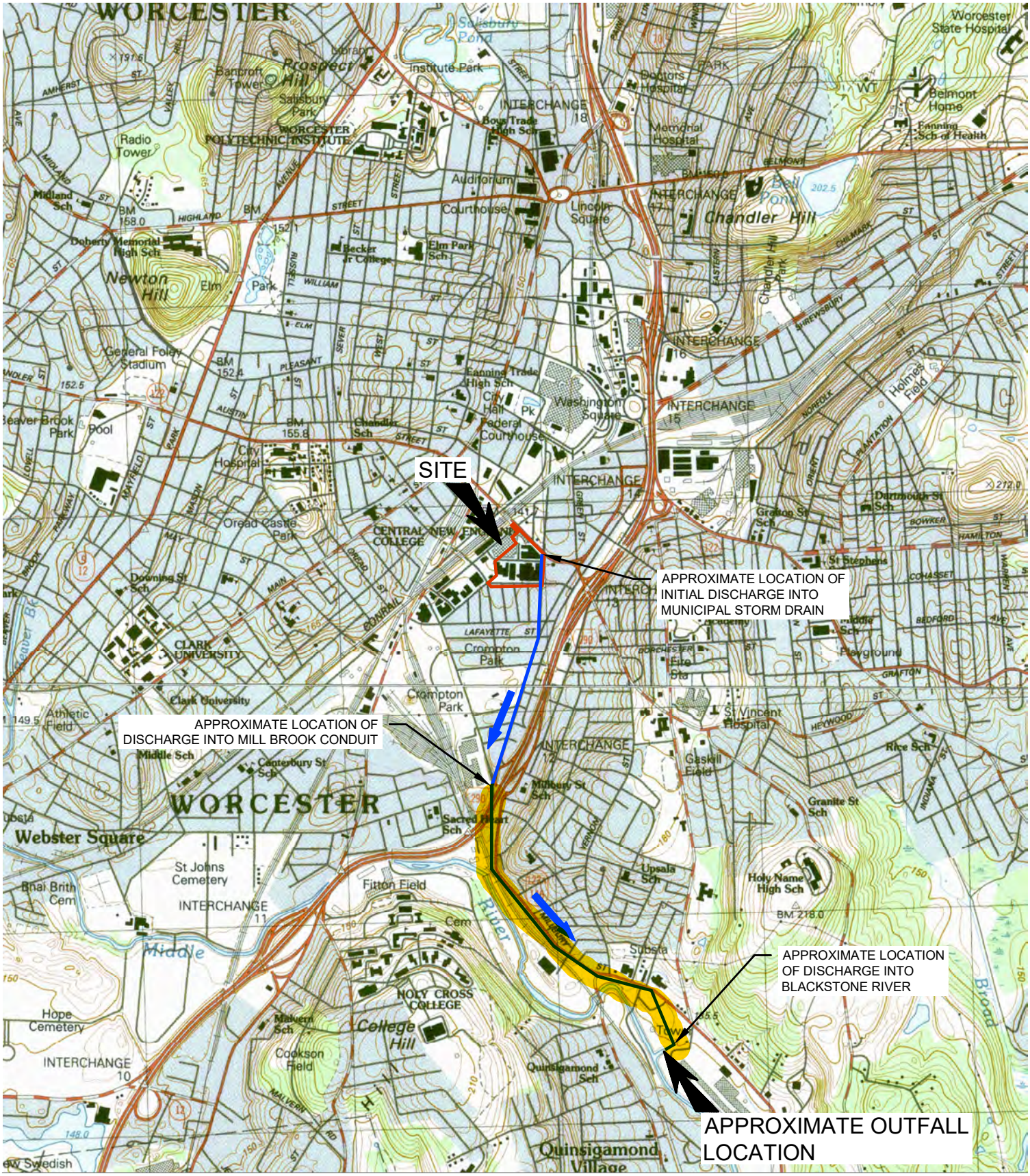
Notes:
1. The samples were collected by Sanborn, Head & Associates, Inc. (Sanborn Head) on the dates indicated and analyzed by Alpha Analytical Laboratories, Inc. of Westborough, Massachusetts.
2. Average concentrations for each analyte were calculated as an average of detected concentrations. Where analytes were not detected, half of the detection limit was used in the average calcuation.
3. Bolded values indicate detections of that analyte above laboratory reporting limits.
4. Italicized values indicate detections of that analyte above the applicable Massachusetts Contingency Plan (MCP) Reportable Concentrations for Groundwater (RCGW-2).
5. Highlighted values indicate detections of that analyte above the National Pollution Discharge Elimination System (NPDES) Technology-Based Effluent Limitation (TBEL) criteria.
6. Total metals are provided for informational purposes only and are not compared to RCGW-2 or NPDES TBEL criteria.
7. Abbreviations:
"<" indicates the analyte was not detected above the laboratory reporting limit shown
BDL = below detection limit
NS = no standard
NT = not tested
ug/l = micrograms per liter
mg/l = milligrams per liter

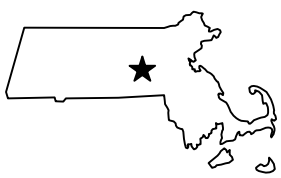
Table 2
Summary of Surface Water Quality
Madison Commons
Worcester, MA

LOCATION	Units	MIDDLE RIVER
SAMPLING DATE		**7/26/2019**
SAMPLE TYPE		**WATER**
General Chemistry		
pH (H)	SU	**7.5**
Nitrogen, Ammonia	mg/l	**0.125**
Total Hardness by SM 2340B		
Hardness	ug/l	**56,600**
Total Metals		
Antimony, Total	ug/l	<4
Arsenic, Total	ug/l	**17.16**
Cadmium, Total	ug/l	**0.66**
Chromium, Total	ug/l	**5.63**
Copper, Total	ug/l	**17.31**
Iron, Total	ug/l	**4,970**
Lead, Total	ug/l	**25.32**
Mercury, Total	ug/l	<0.2
Nickel, Total	ug/l	**4.38**
Selenium, Total	ug/l	<5
Silver, Total	ug/l	<0.4
Zinc, Total	ug/l	**57.55**

Notes:
1. The samples were collected by Sanborn, Head & Associates, Inc. on the dates indicated and analyzed by Alpha Analytical Laboratories, Inc. of Westborough, Massachusetts.
2. Bolded values indicate detections of that analyte above laboratory reporting limits.
3. Abbreviations:
"<" indicates the analyte was not detected above the laboratory reporting limit shown
NS = no standard
ug/l = micrograms per liter
mg/l = milligrams per liter

FIGURES





NOTES:
Base map was taken from the "Office of Geographic and Environmental Information (MassGIS), Commonwealth of Massachusetts Information Technology Division"
7.5 minute USGS Quadrangle Maps: Worcester, Massachusetts, REV: 1983

Drawn By: C.Dias
Designed By: C.Disenhof
Reviewed By: P.Pinto
Project No: 4325.04
Date: FEBRUARY 2020

SCALE: 1:25,000

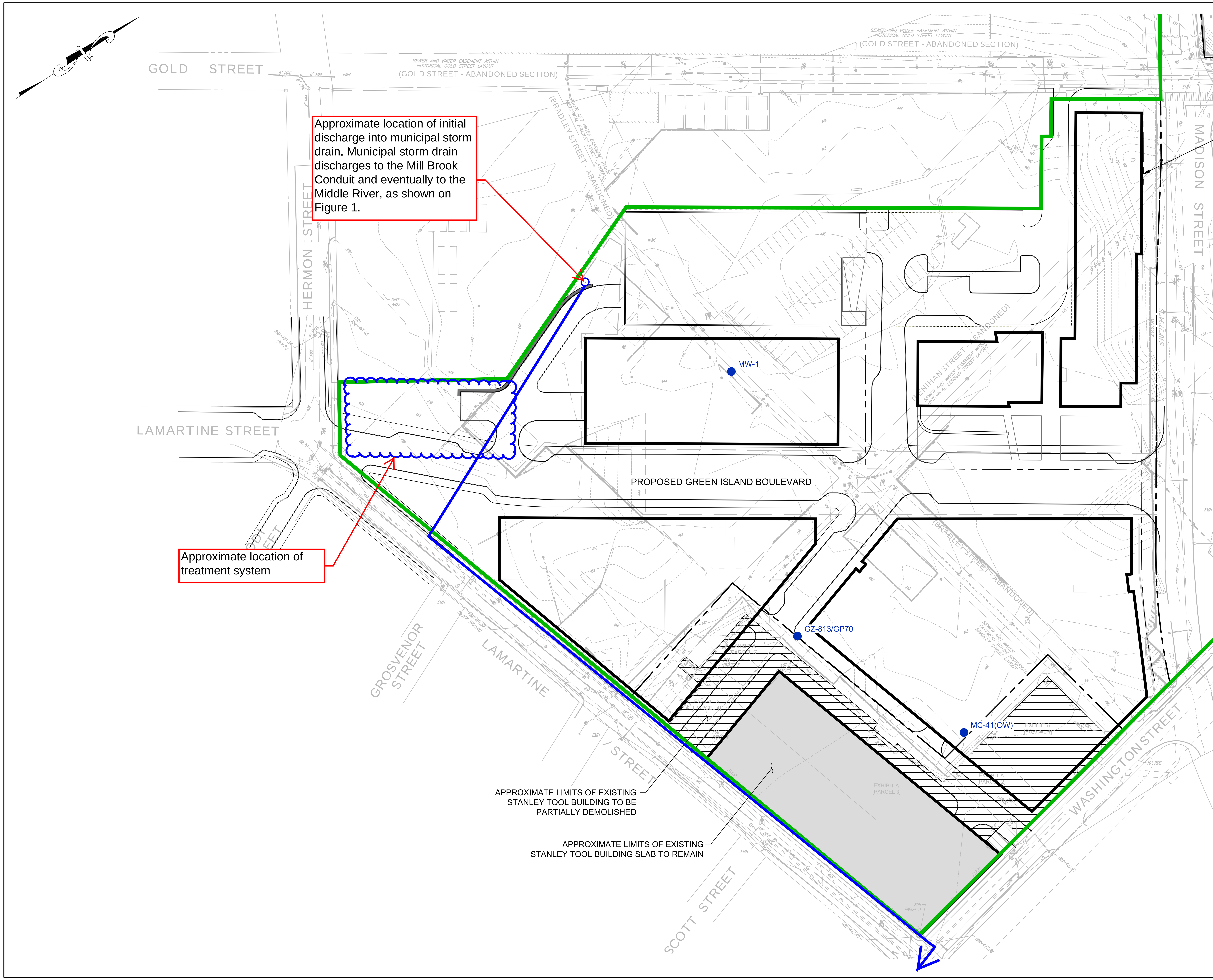
SANBORN HEAD

Figure 1

Locus Plan

Notice of Intent for Remediation General Permit

Madison Commons
Worcester, Massachusetts



NOTES:

1. THE BASE MAP WAS DRAWN FROM A PLAN ENTITLED, "WORCESTER SOMA SITE PLAN (2019.06.04)", PREPARED BY BOHLER ENGINEERING (BOHLER) OF SOUTHBOROUGH, MA, DATED JUNE 4, 2019 WITH AN ORIGINAL SCALE OF 1" = 100'.
2. THE LOCATIONS OF HISTORICAL EXPLORATIONS WERE INTERPOLATED FROM SITE PLANS BY OTHERS AND SHOULD BE CONSIDERED APPROXIMATE.

LEGEND:

- APPROXIMATE BOUNDARY AND LIMITS OF PROPOSED EXCAVATION AND DEWATERING ACTIVITIES
- GZ-103 ● APPROXIMATE LOCATION AND DESIGNATIONS OF MONITORING WELL BY OTHERS

SANBORN HEAD

GRAPHICAL SCALE: 50' 25' 0' 50' 100'

NO.	DATE	DESCRIPTION	BY

DRAWN BY: C.DIAS
DESIGNED BY: C.DISENHOF
REVIEWED BY: P.PINTO
PROJECT MGR: K.WALKER
PIC: P.PINTO
DATE: FEBRUARY 2020

NOTICE OF INTENT FOR REMEDIATION GENERAL PERMIT
MADISON COMMONS
WORCESTER, MASSACHUSETTS

SITE PLAN

PROJECT NUMBER: 4325.04

FIGURE NUMBER: 2

Influent from Excavation

Oil Water Separator

Effluent to Treatment System

Product Storage Drum

Excavation Area

Influent

Contingency pH Adjustment System

18,000 Gallon Weir Tank

18,000 Gallon Weir Tank

18,000 Gallon Weir Tank

Centrifugal Pump Skid

Bag Filtration

Effluent/ Discharge

Flow Meter/ Totalizer

Anion Resin Media Vessel

Cation Resin Media Vessel

Granular Activated Carbon Vessel

Granular Activated Carbon Vessel

Notes:

1.) Figure is not to scale
2.) System rated for 500 GPM

Key:

Piping/Hose	——→
Sample Port	▷
Ball Valve	⊗
Butterfly Valve	⋈
Pressure Gauge	⓪
Contingency	— —

Lockwood Remediation Technologies, LLC
89 Crawford Street
Leominster, MA 01453
Office: 774-450-7177

DESIGNED BY: LRT DRAWN BY: JHJ

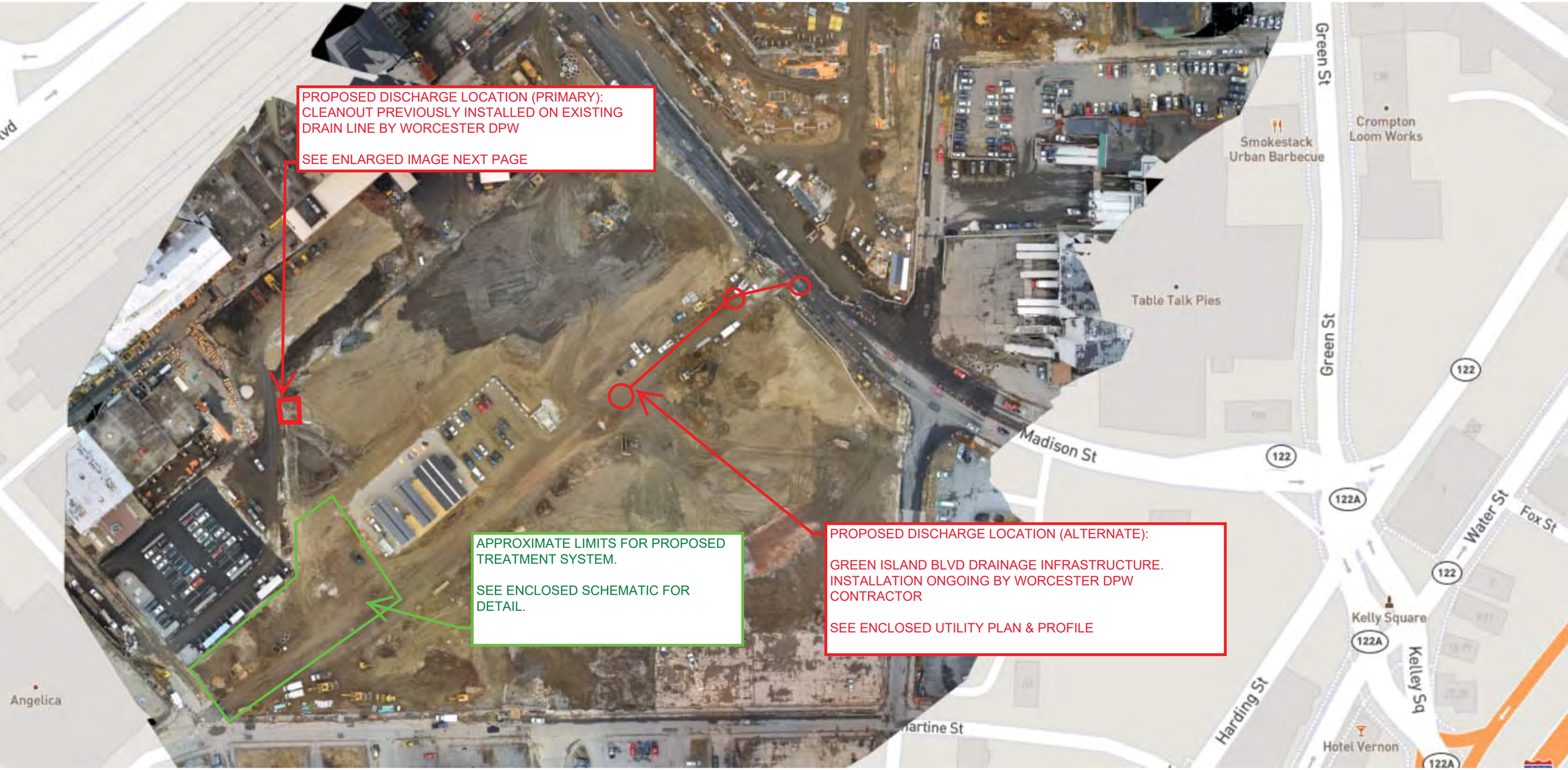
CHECKED BY: DATE:

Water Treatment System Schematic

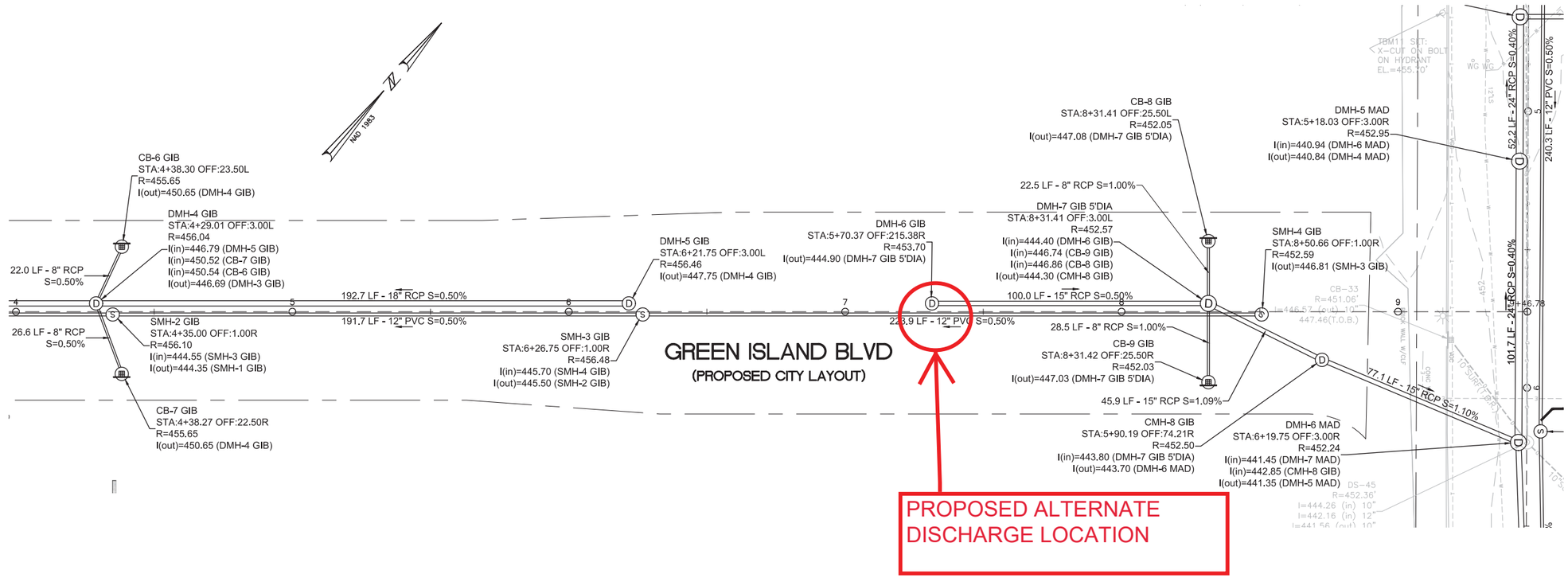
Polar Park
Worcester, MA

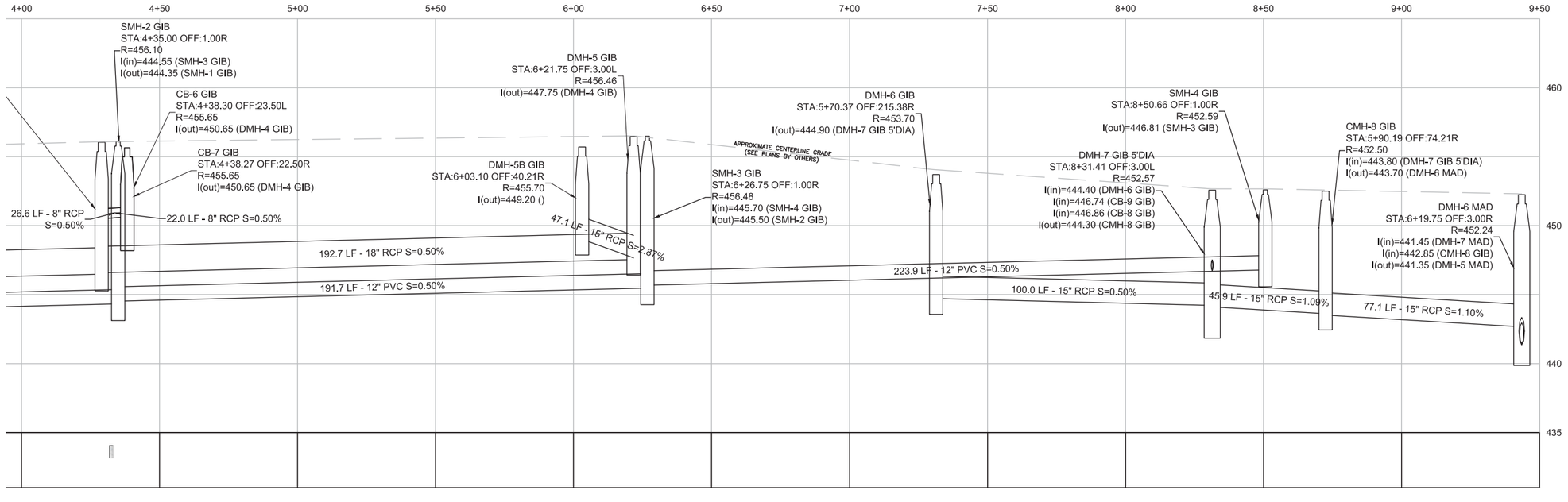
PROJECT No. 2-2009

FIGURE No. 3


PROPOSED DISCHARGE LOCATION (PRIMARY):
CLEANOUT PREVIOUSLY INSTALLED ON EXISTING DRAIN LINE BY WORCESTER DPW
SEE ENLARGED IMAGE NEXT PAGE
APPROXIMATE LIMITS FOR PROPOSED TREATMENT SYSTEM.
SEE ENCLOSED SCHEMATIC FOR DETAIL.
PROPOSED DISCHARGE LOCATION (ALTERNATE):
GREEN ISLAND BLVD DRAINAGE INFRASTRUCTURE. INSTALLATION ONGOING BY WORCESTER DPW CONTRACTOR
SEE ENCLOSED UTILITY PLAN & PROFILE
Green St
Smokestack Urban Barbecue
Crompton Loom Works
Table Talk Pies
Madison St
122
122A
Water St
Fox St
Kelly Square
Kelley Sq
Harding St
Hotel Vernon
Angelica


PROPOSED DISCHARGE LOCATION (PRIMARY):
CLEANOUT INSTALLED BY WORCESTER DPW ON EXISTING DRAIN LINE





HOR. SCALE IN FEET
20 0 20 40
VER. SCALE IN FEET
4 0 4 8

NO.	DATE	DESCRIPTION	BY
8	11/25/2019	REVISED TO ADD GREEN ISLAND BLVD	CPM
7	10/04/2019	REVISIONS TO LAMARTINE STREET	CPM
6	08/30/2019	NO CHANGES THIS SHEET	CPM
5	07/15/2019	NO CHANGES THIS SHEET	CPM
4	06/28/2019	NO CHANGES THIS SHEET	CPM
3	04/29/2019	NO CHANGES THIS SHEET	CPM

DEPARTMENT OF PUBLIC WORKS AND PARKS
Engineering Division
20 East Worcester St, Worcester MA 01604

CONTRACT S19-1
CONSTRUCTION & RECONSTRUCTION OF SANITARY & SURFACE SEWERS & WATER WORK
WORCESTER, MA

TITLE:
GREEN ISLAND BLVD PLAN & PROFILE
(STA. 4+00 to 9+50)

DRAWN BY:	CPM
CHECKED BY:	MAE
SCALE: (H)	1"=20'
SCALE: (V)	1"=4'
CAD I.D.:	CONTRACT S19-1_08.DWG
DATE:	DECEMBER 13, 2018

SHEET 12 OF 12

APPENDIX A

NOTICE OF INTENT FORM

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

A. General site information:

<table>
<tr><td rowspan="4">1. Name of site:
Madison Commons</td><td colspan="3">Site address: Madison Street
Street:</td></tr>
<tr><td colspan="2">City: Worcester</td><td>State: MA</td><td>Zip: 01610</td></tr>
<tr><td rowspan="4">2. Site owner
Worcester Redevelopment Authority

Owner is (check one): ☐ Federal ☐ State/Tribal ☐ Private
■ Other; if so, specify: Local Municipality</td><td colspan="3">Contact Person: Greg Ormsby</td></tr>
<tr><td colspan="2">Telephone: (508) 799-1400</td><td colspan="2">Email: OrmsbyG@worcesterma.gov</td></tr>
<tr><td colspan="3">Mailing address:
Street: City Hall 4th Floor
455 Main Street</td></tr>
<tr><td colspan="2">City: Worcester</td><td>State: MA</td><td>Zip: 01608</td></tr>
<tr><td rowspan="4">3. Site operator, if different than owner
W.L. French Excavating Corporation</td><td colspan="3">Contact Person: James Ganiatsos</td></tr>
<tr><td colspan="2">Telephone: 978-600-2134</td><td colspan="2">Email: jganiatsos@wlfrench.com</td></tr>
<tr><td colspan="3">Mailing address:
Street: 14 Sterling Road</td></tr>
<tr><td colspan="2">City: N. Billerica</td><td>State: MA</td><td>Zip: 01862</td></tr>
<tr><td>4. NPDES permit number assigned by EPA:
NA

NPDES permit is (check all that apply: ☐ RGP ☐ DGP ☐ CGP
☐ MSGP ☐ Individual NPDES permit ☐ Other; if so, specify:</td><td colspan="4">5. Other regulatory program(s) that apply to the site (check all that apply):
■ MA Chapter 21e; list RTN(s):
2-10256, 2-10760, 2-14918, 2-14921, 2-13510,
☐ 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):
Blackstone River	MA51-03	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 See Figure 1

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. See Appendix B

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.	1.90 MGD See Appendix C
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.	3.6

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: February 21, 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 See Table 1 and Appendix D

C. Source water information:

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

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

2. Source water contaminants: Chloride, Arsenic, Cadmium, Chromium, Copper, Iron, Lead, Mercury, Nickel, Selenium, Silver, Zinc, TSS, Ammonia, Sulfate, Benzo(a)anthracene, Benzo(a) pyrene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Chrysene, Indeno(1,2,3-cd)pyrene, Benzo(ghi)perylene, Fluoranthene, Naphthalene, Phenanthrene, Pyrene	
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 J.G.	
Outfall(s): Via drain to an underground culvert, Unnamed Tributary "Mill Brook" (MA51-08), which discharges to Blackstone River	Outfall location(s): (Latitude, Longitude) 42.23402, -71.79342
Discharges enter the receiving water(s) via (check any that apply): ☐ Direct discharge to the receiving water ■ Indirect discharge, if so, specify: Effluent will enter an existing storm water drainage system that discharges into Mill Brook, an existing below-grade conduit. Mill Brook discharges into the Blackstone River at the approximate Lat/Long specified. ☐ 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 See Appendix E 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: Prior to discharge, a copy of the NOI approval will be provided to the City of Worcester as requested 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): February/2020 through August/2020 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="4">☐ 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		✔	3	4500NH3-	0.075	0.213	0.133	Report mg/L	---
Chloride		✔	3	300.0	0.5	154,000	53,733	Report µg/l	---
Total Residual Chlorine	✔		3	4500CL-D	0.02	ND		0.2 mg/L	40
Total Suspended Solids		✔	3	2540D	16	320	153	30 mg/L	---
Antimony	✔		3	200.8	40	ND		206 µg/L	
Arsenic		✔	3	200.8	1	48.79	21.72	104 µg/L	10
Cadmium		✔	3	200.8	0.2	0.59	0.47	10.2 µg/L	0.2648
Chromium III		✔	3	200.8	1	219	74.4	323 µg/L	
Chromium VI	✔		3	200.8	10	ND		323 µg/L	
Copper		✔	3	200.8	1	35.6	18.2	242 µg/L	9.1
Iron		✔	3	200.7	50	5,340	3,550	5,000 µg/L	1000
Lead		✔	3	200.8	1	16.56	9.81	160 µg/L	3.06
Mercury	✔		3	245.1	0.2	ND		0.739 µg/L	
Nickel		✔	3	200.8	2	47.17	22.79	1,450 µg/L	
Selenium	✔		3	200.8	5	ND		235.8 µg/L	
Silver	✔		3	200.8	0.4	ND		35.1 µg/L	
Zinc		✔	3	200.8	10	108.9	60.19	420 µg/L	
Cyanide		✔	3	4500CN-C	0.005	0.361	0.123	178 mg/L	
B. Non-Halogenated VOCs									
Total BTEX	✔		3	624.1	1	ND		100 µg/L	---
Benzene	✔		3	624.1	1	ND		5.0 µg/L	---
1,4 Dioxane	✔		3	624.1-SIM	50	ND		200 µg/L	---
Acetone	✔		3	624.1	0.010	ND		7.97 mg/L	---
Phenol	✔		3	420.1	30	ND		1,080 µg/L	

Parameter	Known or believed absent	Known or believed present	# of samples	Test method (#)	Detection limit (µg/l)	Influent		Effluent Limitations	
						Daily maximum (µg/l)	Daily average (µg/l)	TBEL	WQBEL
C. Halogenated VOCs									
Carbon Tetrachloride	✔		3	624.1	1	ND		4.4 µg/L	
1,2 Dichlorobenzene	✔		3	624.1	5	ND		600 µg/L	---
1,3 Dichlorobenzene	✔		3	624.1	5	ND		320 µg/L	---
1,4 Dichlorobenzene	✔		3	624.1	5	ND		5.0 µg/L	---
Total dichlorobenzene	✔		3	624.1	5	ND		763 µg/L in NH	---
1,1 Dichloroethane	✔		3	624.1	1.5	ND		70 µg/L	---
1,2 Dichloroethane	✔		3	624.1	1.5	ND		5.0 µg/L	---
1,1 Dichloroethylene	✔		3	624.1	1	ND		3.2 µg/L	---
Ethylene Dibromide								0.05 µg/L	---
Methylene Chloride	✔		3	624.1	1	ND		4.6 µg/L	---
1,1,1 Trichloroethane	✔		3	624.1	2	ND		200 µg/L	---
1,1,2 Trichloroethane	✔		3	624.1	1.5	ND		5.0 µg/L	---
Trichloroethylene		✔	3	624.1	1	22	8	5.0 µg/L	---
Tetrachloroethylene		✔	3	624.1	1	3.1	1.4	5.0 µg/L	
cis-1,2 Dichloroethylene		✔	3	624.1	1	170	57	70 µg/L	---
Vinyl Chloride		✔	3	624.1	1	23	8	2.0 µg/L	---
D. Non-Halogenated SVOCs									
Total Phthalates		✔	3	625.1	5	11	9.1	190 µg/L	
Diethylhexyl phthalate		✔	3	625.1	2.2	11	4.9	101 µg/L	8
Total Group I PAHs		✔	3	625.1-SIM	0.1	8.08	3.34	1.0 µg/L	---
Benzo(a)anthracene		✔	3	625.1-SIM	0.1	1.0	0.47	As Total PAHs	0.0138
Benzo(a)pyrene		✔	3	625.1-SIM	0.1	1.2	0.52		0.0138
Benzo(b)fluoranthene		✔	3	625.1-SIM	0.1	2.2	0.91		0.0138
Benzo(k)fluoranthene		✔	3	625.1-SIM	0.1	0.72	0.27		0.0138
Chrysene		✔	3	625.1-SIM	0.1	1.4	0.58		0.0138
Dibenzo(a,h)anthracene		✔	3	625.1-SIM	0.1	0.26	0.12		0.0138
Indeno(1,2,3-cd)pyrene		✔	3	625.1-SIM	0.1	1.3	0.53		0.0138

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		✔	3	625.1-SIM	0.1	8.76	3.62	100 µg/L	---
Naphthalene		✔	3	625.1-SIM	0.1	0.15	0.1	20 µg/L	---
E. Halogenated SVOCs									
Total PCBs	✔		3	608.3	0.25	ND		0.000064 µg/L	---
Pentachlorophenol	✔		3	625.1-SIM	1	ND		1.0 µg/L	---
F. Fuels Parameters									
Total Petroleum Hydrocarbons		✔	3	1664A	4	38.3	14	5.0 mg/L	---
Ethanol								Report mg/L	---
Methyl-tert-Butyl Ether	✔		3	624.1	10	ND		70 µg/L	
tert-Butyl Alcohol	✔		3	624.1	100	ND		120 µg/L in MA 40 µg/L in NH	---
tert-Amyl Methyl Ether	✔		3	624.1	20	ND		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:									
pH		✔	3	4500H+-B	NA	7.2	7		
Hardness		✔	3	200.7	660	204,000	150,000		
Sulfate		✔	3	4500SO4-	10,000	17,000	11,333		

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:

pH adjustment (if needed)

2. Provide a written description of all treatment system(s) or processes that will be applied to the effluent prior to discharge.

The first element of the treatment system will be a fractionalization tank where solids will settle out. The effluent will then pass through the following as necessary: a bag filter, a granular activated carbon vessel, and a cation resin vessel. The effluent will be discharged to an existing catch basin on-site with discharges to the existing storm drain 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: Cation resin vessel and/or carbon vessels (if needed)

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: Fractionalization tank Is use of a flow meter feasible? (check one): ■ Yes ☐ No, if so, provide justification:	500 GPM
Provide the proposed maximum effluent flow in gpm.	500 GPM
Provide the average effluent flow in gpm.	350 GPM
If Activity Category IV applies, indicate the estimated total volume of water that will be discharged:	

4. Has the operator attached a schematic of flow in accordance with the instructions in E, above? (check one): ■ Yes ☐ No See Figure 3

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:

2. Provide the following information for each chemical/additive, using attachments, if necessary:
Sulfuric Acid (See Appendix F)
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 See Appendix G

☐ **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. See Appendix G

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

See Appendix H

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.

Appendix B includes the Massachusetts Category 5 Waters "Waters requiring a TMDL" and lists pollutants for the Middle River
Appendix C includes calculations for the dilution factor
Appendix D includes the analytical data collected by Sanborn, Head & Associates, Inc.
Appendix E includes municipal correspondence
Appendix F includes the proposed pH conditioner material safety data sheet
Appendix G includes correspondence from the National Oceanic and Atmospheric Administration and the US Fish and Wildlife Service
Appendix H includes a list of Historic Places in Worcester, Massachusetts

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 developed and implemented upon initiation of discharge.	
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 ☐ See Appendix E
Permission obtained from the owner of a private or municipal storm sewer system, if such system is used for site discharges. If yes, attach additional conditions. If no, attach explanation and timeframe for obtaining permission.	Check one: Yes ■ No ☐ NA ☐
Notification provided to the owner/operator of the area associated with activities covered by an additional discharge permit(s). Additional discharge permit is (check one): ☐ RGP ☐ DGP ☐ CGP ☐ MSGP ☐ Individual NPDES permit ☐ Other; if so, specify:	Check one: Yes ☐ No ☐ NA ■
Signature:	Date: 2/25/20
Print Name and Title: James Ganiatsos, Project Manager	

APPENDIX B

MASSACHUSETTS CATEGORY 5 WATERS
"WATERS REQUIRING A TMDL"

Massachusetts Category 5 Waters
"Waters requiring a TMDL"

NAME	SEGMENT ID	DESCRIPTION	SIZE	UNITS	IMPAIRMENT CAUSE	EPA TMDL NO.
Blackstone						
Aldrich Pond	MA51002	Sutton	2	ACRES	(Non-Native Aquatic Plants*)	
					Aquatic Plants (Macrophytes)	
Arcade Pond	MA51003	Northbridge	20	ACRES	(Non-Native Aquatic Plants*)	
					Excess Algal Growth	
Arnolds Brook	MA51-32	Perennial portion only, from outlet of unnamed pond at Whitehall Way, Bellingham to confluence with Peters River, Bellingham.	1.7	MILES	Escherichia coli	
Beaver Brook	MA51-07	Outlet of small unnamed impoundment north of Beth Israel School and Flag Street School, Worcester to confluence with Middle River, Worcester. (Includes underground portion)	2.9	MILES	(Debris/Floatables/Trash*)	
					(Fish Kills*)	
					(Physical substrate habitat alterations*)	
					Bottom Deposits	
					Escherichia coli	
					Taste and Odor	
Blackstone River	MA51-03	Confluence of Middle River and Mill Brook (downstream of the railroad spur bridge west of Tobias Boland Boulevard), Worcester to Fisherville Dam, Grafton. (through a portion of Fisherville Pond formerly segment MA51048)	10.4	MILES	(Debris/Floatables/Trash*)	
					(Other flow regime alterations*)	
					(Physical substrate habitat alterations*)	
					Ambient Bioassays -- Chronic Aquatic Toxicity	
					Aquatic Macroinvertebrate Bioassessments	
					Escherichia coli	
					Excess Algal Growth	
					Fishes Bioassessments	
					Foam/Flocs/Scum/Oil Slicks	
					Lead	
					Nutrient/Eutrophication Biological Indicators	
					Other	
					Oxygen, Dissolved	
					Phosphorus (Total)	
					Sedimentation/Siltation	
					Taste and Odor	
					Turbidity	

Massachusetts Category 5 Waters
"Waters requiring a TMDL"

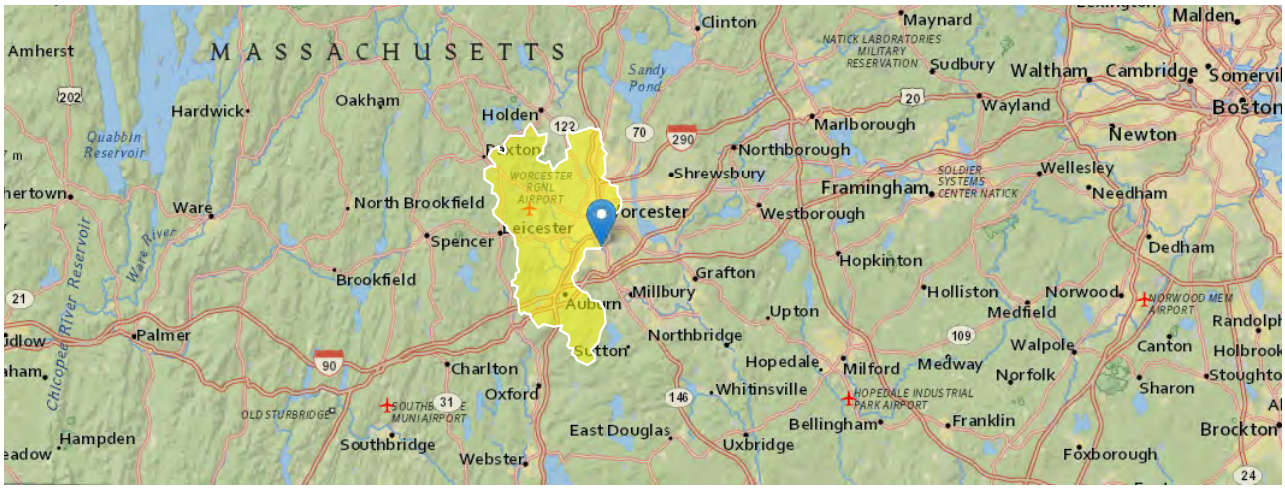
NAME	SEGMENT ID	DESCRIPTION	SIZE	UNITS	IMPAIRMENT CAUSE	EPA TMDL NO.
Poor Farm Brook	MA51-17	Headwaters, West Boylston to the inlet of Shirley Street Pond, Shrewsbury (through City Farm Pond formerly segment MA51020).	3.6	MILES	(Low flow alterations*)	
					Aquatic Plants (Macrophytes)	
					Sedimentation/Siltation	
Riley Pond	MA51134	Northbridge	7	ACRES	Turbidity	
Singletary Brook	MA51-31	Headwaters, outlet Singletary Pond, Millbury to confluence with the Blackstone River, Millbury (excluding the approximately 0.4 miles through Brierly Pond segment MA51010).	1.5	MILES	(Non-Native Aquatic Plants*)	
					Aquatic Plants (Macrophytes)	
Sutton Falls	MA51163	Sutton	10	ACRES	Turbidity	
Tatnuck Brook	MA51-15	Outlet Holden Reservoir #2, Holden to inlet of Coes Reservoir, Worcester (through Cook Pond formerly segment MA51027 and Patch Reservoir formerly segment MA51118).	3.3	MILES	(Debris/Floatables/Trash*)	
					(Non-Native Aquatic Plants*)	
					(Other flow regime alterations*)	
					Aquatic Macroinvertebrate Bioassessments	
					Sedimentation/Siltation	
					Turbidity	
Unnamed Tributary	MA51-08	(Also known as "Mill Brook") Outlet Indian Lake, Worcester to confluence with Middle River (downstream of the railroad spur bridge west of Tobias Boland Boulevard), Worcester (through Salisbury Pond formerly segment MA51142).	5.6	MILES	(Debris/Floatables/Trash*)	
					(Physical substrate habitat alterations*)	
					Ammonia (Un-ionized)	
					Aquatic Plants (Macrophytes)	2319
					Fecal Coliform	
					Foam/Flocs/Scum/Oil Slicks	
					Nutrient/Eutrophication Biological Indicators	
					Other	
					Sedimentation/Siltation	
					Taste and Odor	
					Turbidity	2319
Unnamed Tributary	MA51-20	From the outlet of Leesville Pond, Worcester to the confluence with the Middle River, Worcester (through Curtis ponds formerly reported as segments MA51033 and MA51032).	1.4	MILES	(Debris/Floatables/Trash*)	
					(Low flow alterations*)	
					(Non-Native Aquatic Plants*)	
					Aquatic Plants (Macrophytes)	360
					Aquatic Plants (Macrophytes)	361
					Fecal Coliform	
					Nutrient/Eutrophication Biological Indicators	
					Sedimentation/Siltation	

APPENDIX C

MIDDLE RIVER DILUTION CALCULATIONS

StreamStats Report

Region ID:	MA
Workspace ID:	MA20190806202847788000
Clicked Point (Latitude, Longitude):	42.23465, -71.79388
Time:	2019-08-06 16:29:03 -0400



Basin Characteristics

Parameter Code	Parameter Description	Value	Unit
DRNAREA	Area that drains to a point on a stream	63	square miles
BSLDEM250	Mean basin slope computed from 1:250K DEM	4.39	percent
DRFTPERSTR	Area of stratified drift per unit of stream length	0.0828	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	63	square miles	1.61	149
BSLDEM250	Mean Basin Slope from 250K DEM	4.39	percent	0.32	24.6
DRFTPERSTR	Stratified Drift per Stream Length	0.0828	square mile per mile	0	1.29
MAREGION	Massachusetts Region	0	dimensionless	0	1

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

PII: Prediction Interval-Lower, Plu: Prediction Interval-Upper, SEp: Standard Error of Prediction, SE: Standard Error (other -- see report)

Statistic	Value	Unit	PII	Plu	SE	SEp
7 Day 2 Year Low Flow	6.5	ft^3/s	1.87	21.8	49.5	49.5
7 Day 10 Year Low Flow	2.94	ft^3/s	0.693	11.6	70.8	70.8

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/)

PURPOSE:
To calculate the dilution factor (DF) for metal concentrations in a potential discharge from on-site construction dewatering activities.

METHOD:

$$DF = (Qd + Qs)/Qd$$

Where: DF = Dilution Factor
Qd = Design flow rate of the discharge in million gallons per day (MGD)
Qs = Receiving water 7Q10 flow (MGD) where 7Q10 is the minimum flow for 7 consecutive days with a recurrence interval of 10 years

GIVEN:
1.0 gpm = 0.00144 MGD
1.0 cfs = 0.64632 MGD
Qd = 500 gpm = 0.72 MGD
Qs = 2.94 cfs = 1.90 MGD of flow into the Middle River [Reference 1]

CALCULATION:

$$DF = (0.72 \text{ MGD} + 1.90 \text{ MGD}) / 0.72 \text{ MGD}$$

DF = 3.64

RESULTS:
The resulting dilution factor to be used when discharging to the Middle River is 3.64.

REFERENCES:

[1] StreamStats Report. Accessed online: http://streamstatsags.cr.usgs.gov/streamstats/ (Refer to Attachment A)

Americo Santamaria

From: Vakalopoulos, Catherine (DEP) <catherine.vakalopoulos@state.ma.us>
Sent: Friday, February 21, 2020 3:59 PM
To: Americo Santamaria
Cc: Kent Walker
Subject: RE: Madison St, Worcester, MA RGP

Hi Americo,
It looks like the lat/long that you listed for the delineation point is on the Middle River, upstream of where Mill Brook comes in. However, the 7Q10, 2.94 cfs, is correct for location where the culverted Mill Brook daylights and Middle River turns into the Blackstone River.

Your dilution factor calculation of 3.6 for this 500 gpm proposed discharge to the culverted Mill Brook which discharges to the Blackstone River is correct. Though Mill Brook is a Water of the Commonwealth, it is entirely underground and can't be sampled, therefore, as you mentioned, we are calculating the DF at where the brook daylights at the Blackstone River.

To assist you with filling out the NOI for coverage under the RGP, this segment of the Blackstone River is identified as MA51-03, is classified as Class B, is not listed as an Outstanding Resource Water, and there are no approved TMDLs. To see the causes of impairments, go to: https://www.mass.gov/doc/final-massachusetts-year-2016-integrated-list-of-waters/download and search for "MA51-03".

Also, if this is not a *current* MCP site then you will also have to apply to MassDEP by following the instructions at: https://www.mass.gov/how-to/wm-15-npdes-general-permit-notice-of-intent. There is also a $500 fee unless the applicant is fee-exempt (e.g. a municipality). Please send me a copy of the transmittal form (it's not in the online instructions because that form is used by many programs).

Please let me know if you have any questions and have a nice weekend!

Cathy

Cathy Vakalopoulos, Massachusetts Department of Environmental Protection
1 Winter St., Boston, MA 02108, 617-348-4026

From: Americo Santamaria [mailto:asantamaria@sanbornhead.com]
Sent: Thursday, February 20, 2020 3:53 PM
To: Vakalopoulos, Catherine (DEP)
Cc: Kent Walker
Subject: Madison St, Worcester, MA RGP

Good afternoon Cathy,

I would like to confirm the following 7Q10 value for a RGP project located in Worcester, MA. This project is expected to discharge to the Mill Brook underground culvert, which discharges to the Blackstone River. Similar to a previous project in this vicinity, because Mill Brook is entirely underground and cannot be sampled, our sampling point is the Middle River, immediately upstream of the location at which Mill Brook daylights and the waterway subsequently becomes the Blackstone River.

Site Address: Madison Street, Worcester, MA
Type of Discharge: Via drain to the underground Mill Brook, discharging to the Blackstone River at the approximate latitude/longitude indicated below.
Approximate Discharge Lat/Long:
Lat: 42.23402 Long: -71.79342
Approximate Basin Delineation Point Selected:
Lat: 42.23465 Long: -71.79388
Upstream StreamStats generated 7Q10: 2.94 cfs = 1.90 MGD
Design Flow Rate: 500 gpm = 0.72 MGD
Dilution Factor: DF = 3.6

Please let me know if there is any other information that you need, and please either confirm these assumptions or provide guidance if there are revisions required.

Thank you.
-Rico

Americo J. Santamaria
Senior Project Engineer

SANBORN | HEAD & ASSOCIATES, INC.
D 978.577.1040 | M 603.520.5106 | 1 Technology Park Drive, Westford, MA 01886

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Enter number values in green boxes below

Enter values in the units specified

↓		
1.9	Q_R = Enter upstream flow in **MGD**	Freshwater: critical low flow equal to the 7Q10; enter alternate low flow if approved by the State
0.72	Q_P = Enter discharge flow in **MGD**	Saltwater (estuarine and marine): enter critical low flow if approved by the State; enter 0 if no entry
0	Downstream 7Q10	Discharge flow is equal to the design flow or 1 MGD, whichever is less
		Optional entry for Q_r; leave 0 if no entry

Enter a dilution factor, if other than zero

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

Enter values in the units specified

↓	
204	C_d = Enter influent hardness in **mg/L** $CaCO_3$
56.6	C_s = Enter receiving water hardness in **mg/L** $CaCO_3$

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

↓		
7.5	pH in **Standard Units**	pH, temperature, and ammonia required for all discharges
25	Temperature in **°C**	Hardness required for freshwater
0.125	Ammonia in **mg/L**	Salinity required for saltwater (estuarine and marine)
56.6	Hardness in **mg/L** $CaCO_3$	Metals required for all discharges if present and if dilution factor is > 1
0	Salinity in **ppt**	Enter 0 if non-detect or testing not required
0	Antimony in **µg/L**	
17.16	Arsenic in **µg/L**	
0.66	Cadmium in **µg/L**	
5.63	Chromium III in **µg/L**	
0	Chromium VI in **µg/L**	
17.31	Copper in **µg/L**	
4970	Iron in **µg/L**	
25.32	Lead in **µg/L**	
0	Mercury in **µg/L**	
4.38	Nickel in **µg/L**	
0	Selenium in **µg/L**	
0	Silver in **µg/L**	
57.55	Zinc in **µg/L**	

Enter **influent** concentrations in the units specified

↓		
0	TRC in **µg/L**	if >1 sample, enter maximum
0.213	Ammonia in **mg/L**	if >10 samples, may enter 95th percentile
0	Antimony in **µg/L**	Enter 0 if non-detect or testing not required
48.79	Arsenic in **µg/L**	
0.59	Cadmium in **µg/L**	
219	Chromium III in **µg/L**	
0	Chromium VI in **µg/L**	
35.6	Copper in **µg/L**	
5340	Iron in **µg/L**	
16.56	Lead in **µg/L**	
0	Mercury in **µg/L**	
47.17	Nickel in **µg/L**	
0	Selenium in **µg/L**	
0	Silver in **µg/L**	
108.9	Zinc in **µg/L**	
361	Cyanide in **µg/L**	
0	Phenol in **µg/L**	
0	Carbon Tetrachloride in **µg/L**	
3.1	Tetrachloroethylene in **µg/L**	
11	Total Phthalates in **µg/L**	
11	Diethylhexylphthalate in **µg/L**	
1	Benzo(a)anthracene in **µg/L**	
1.2	Benzo(a)pyrene in **µg/L**	
2.2	Benzo(b)fluoranthene in **µg/L**	
0.72	Benzo(k)fluoranthene in **µg/L**	
1.4	Chrysene in **µg/L**	
0.26	Dibenzo(a,h)anthracene in **µg/L**	
1.3	Indeno(1,2,3-cd)pyrene in **µg/L**	
0	Methyl-tert butyl ether in **µg/L**	

I. Dilution Factor Calculation Method

A. 7Q10

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

B. Dilution Factor

Calculated as follows:

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

Q_R = 7Q10 in MGD

Q_P = Discharge flow, in MGD

II. Effluent Limitation Calculation Method

A. Calculate Water Quality Criterion:

Step 1. Downstream hardness, calculated as follows:

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

C_r = Downstream hardness in mg/L

Q_d = Discharge flow in MGD

C_d = Discharge hardness in mg/L

Q_s = Upstream flow (7Q10) in MGD

C_s = Upstream (receiving water) hardness in mg/L

Q_r = Downstream receiving water flow in MGD

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

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

m_c = Pollutant-specific coefficient (m_a for silver)

b_c = Pollutant-specific coefficient (b_a for silver)

ln = Natural logarithm

h = Hardness calculated in Step 1

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

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

B. Calculate WQBEL:

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

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

C_r = Water quality criterion in µg/L

Q_d = Discharge flow in MGD

C_d = WQBEL in µg/L

Q_s = Upstream flow (7Q10) in MGD

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

Q_r = Downstream receiving water flow in MGD

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

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

C_r = Water quality criterion in µg/L
Q_d = Discharge flow in MGD
Q_r = Downstream receiving water flow in MGD

C. Determine if a WQBEL applies:

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

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

C_r = Downstream concentration in µg/L
Q_d = Discharge flow in MGD
C_d = Influent concentration in µg/L
Q_s = Upstream flow (7Q10) in MGD
C_s = Upstream (receiving water) concentration in µg/L
Q_r = Downstream receiving water flow in MGD

The WQBEL applies if:

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

AND

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

of the RGP for that parameter applies.

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

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

AND

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

Part 2.1.1 of the RGP for that parameter applies.

Dilution Factor	3.6					
A. Inorganics	TBEL applies if bolded		WQBEL applies if bolded		Compliance Level applies if shown	
Ammonia	**Report**	mg/L	---			
Chloride	**Report**	µg/L	---			
Total Residual Chlorine	0.2	mg/L	**40**	µg/L	50	µg/L
Total Suspended Solids	**30**	mg/L	---			
Antimony	**206**	µg/L	2329	µg/L		
Arsenic	104	µg/L	**10**	µg/L		
Cadmium	10.2	µg/L	**0.2648**	µg/L		
Chromium III	**323**	µg/L	291.3	µg/L		
Chromium VI	**323**	µg/L	41.6	µg/L		
Copper	242	µg/L	**9.1**	µg/L		
Iron	5000	µg/L	**1000**	µg/L		
Lead	160	µg/L	**3.06**	µg/L		
Mercury	**0.739**	µg/L	3.30	µg/L		
Nickel	**1450**	µg/L	173.6	µg/L		
Selenium	**235.8**	µg/L	18.2	µg/L		
Silver	**35.1**	µg/L	13.1	µg/L		
Zinc	**420**	µg/L	273.4	µg/L		
Cyanide	178	mg/L	18.9	µg/L	5	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	1092	µg/L		
C. Halogenated VOCs						
Carbon Tetrachloride	**4.4**	µg/L	5.8	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	12.0	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	**8.0**	µg/L		
Total Group I Polycyclic Aromatic Hydrocarbons	**1.0**	µg/L	---			
Benzo(a)anthracene	1.0	µg/L	**0.0138**	µg/L	0.1	µg/L
Benzo(a)pyrene	1.0	µg/L	**0.0138**	µg/L	0.1	µg/L
Benzo(b)fluoranthene	1.0	µg/L	**0.0138**	µg/L	0.1	µg/L
Benzo(k)fluoranthene	1.0	µg/L	**0.0138**	µg/L	0.1	µg/L
Chrysene	1.0	µg/L	**0.0138**	µg/L	0.1	µg/L
Dibenzo(a,h)anthracene	1.0	µg/L	**0.0138**	µg/L	0.1	µg/L
Indeno(1,2,3-cd)pyrene	1.0	µg/L	**0.0138**	µg/L	0.1	µg/L
Total Group II Polycyclic Aromatic Hydrocarbons	**100**	µg/L	---			
Naphthalene	**20**	µg/L	---			
E. Halogenated SVOCs						
Total Polychlorinated Biphenyls	**0.000064**	µg/L	---		0.5	µg/L
Pentachlorophenol	**1.0**	µg/L	---			
F. Fuels Parameters						
Total Petroleum Hydrocarbons	**5.0**	mg/L	---			
Ethanol	**Report**	mg/L	---			
Methyl-tert-Butyl Ether	**70**	µg/L	73	µg/L		
tert-Butyl Alcohol	**120**	µg/L	---			
tert-Amyl Methyl Ether	**90**	µg/L	---			

APPENDIX D

ANALYTICAL DATA REPORTS

ANALYTICAL REPORT

Lab Number:	L1933226
Client:	Sanborn, Head & Associates, Inc. 1 Technology Park Drive Westford, MA 01886
ATTN:	Kent Walker
Phone:	(978) 577-1003
Project Name:	POLAR PARK
Project Number:	4325.03
Report Date:	08/06/19

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: POLAR PARK
Project Number: 4325.03

Analytical laboratory report amended to remove those samples not included in this Remediation General Permit (RGP) Notice of Intent (NOI).

Lab Number: L1933226
Report Date: 08/06/19

Alpha Sample ID	Client ID	Matrix	Sample Location	Collection Date/Time	Receive Date
~~L1933226-01~~	~~HA19-2(OW)~~	~~WATER~~	~~WORCESTER, MA~~	~~07/26/19 10:00~~	~~07/26/19~~
L1933226-02	MIDDLE RIVER	WATER	WORCESTER, MA	07/26/19 11:20	07/26/19

Project Name:	POLAR PARK	**Lab Number:**	L1933226
Project Number:	4325.03	**Report Date:**	08/06/19

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:	POLAR PARK	**Lab Number:**	L1933226
Project Number:	4325.03	**Report Date:**	08/06/19

Case Narrative (continued)

Report Submission

August 06, 2019: This final report includes the results of all requested analyses.

August 02, 2019: This is a preliminary report.

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: Cristin Walker

Title: Technical Director/Representative Date: 08/06/19

ORGANICS

VOLATILES

Project Name: POLAR PARK
Project Number: 4325.03
Lab Number: L1933226
Report Date: 08/06/19

SAMPLE RESULTS

Lab ID: L1933226-01
Client ID: HA19-2(OW)
Sample Location: WORCESTER, MA
Date Collected: 07/26/19 10:00
Date Received: 07/26/19
Field Prep: Refer to COC

Sample Depth:
Matrix: Water
Analytical Method: 128,624.1
Analytical Date: 07/29/19 20:24
Analyst: NLK

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: POLAR PARK
Lab Number: L1933226
Project Number: 4325.03
Report Date: 08/06/19

SAMPLE RESULTS

Lab ID: L1933226-01
Client ID: HA19-2(OW)
Sample Location: WORCESTER, MA
Date Collected: 07/26/19 10:00
Date Received: 07/26/19
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	96		60-140
Fluorobenzene	94		60-140
4-Bromofluorobenzene	100		60-140

Project Name: POLAR PARK
Project Number: 4325.03
Lab Number: L1933226
Report Date: 08/06/19

SAMPLE RESULTS

Lab ID: L1933226-01
Client ID: HA19-2(OW)
Sample Location: WORCESTER, MA
Date Collected: 07/26/19 10:00
Date Received: 07/26/19
Field Prep: Refer to COC

Sample Depth:
Matrix: Water
Analytical Method: 128,624.1-SIM
Analytical Date: 07/29/19 20:24
Analyst: NLK

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	98		60-140
4-Bromofluorobenzene	95		60-140

Project Name: POLAR PARK
Project Number: 4325.03
Lab Number: L1933226
Report Date: 08/06/19

SAMPLE RESULTS

Lab ID: L1933226-01
Client ID: HA19-2(OW)
Sample Location: WORCESTER, MA

Date Collected: 07/26/19 10:00
Date Received: 07/26/19
Field Prep: Refer to COC

Sample Depth:
Matrix: Water
Analytical Method: 14,504.1
Analytical Date: 08/05/19 23:03
Analyst: AWS

Extraction Method: EPA 504.1
Extraction Date: 08/05/19 11:50

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

Project Name: POLAR PARK
Project Number: 4325.03
Lab Number: L1933226
Report Date: 08/06/19

Method Blank Analysis
Batch Quality Control

Analytical Method: 128,624.1
Analytical Date: 07/29/19 17:29
Analyst: AD

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by GC/MS - Westborough Lab for sample(s): 01 Batch: WG1266317-4					
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: POLAR PARK
Project Number: 4325.03
Lab Number: L1933226
Report Date: 08/06/19

Method Blank Analysis
Batch Quality Control

Analytical Method: 128,624.1
Analytical Date: 07/29/19 17:29
Analyst: AD

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by GC/MS - Westborough Lab for sample(s): 01 Batch: WG1266317-4					

Surrogate	%Recovery	Qualifier	Acceptance Criteria
Pentafluorobenzene	87		60-140
Fluorobenzene	91		60-140
4-Bromofluorobenzene	99		60-140

Project Name: POLAR PARK
Project Number: 4325.03
Lab Number: L1933226
Report Date: 08/06/19

Method Blank Analysis
Batch Quality Control

Analytical Method: 128,624.1-SIM
Analytical Date: 07/29/19 17:29
Analyst: AD

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by GC/MS-SIM - Westborough Lab for sample(s): 01 Batch: WG1266333-4					
1,4-Dioxane	ND		ug/l	50	--

Surrogate	%Recovery	Qualifier	Acceptance Criteria
Fluorobenzene	95		60-140
4-Bromofluorobenzene	96		60-140

Project Name: POLAR PARK
Project Number: 4325.03

Lab Number: L1933226
Report Date: 08/06/19

Method Blank Analysis
Batch Quality Control

Analytical Method: 14,504.1
Analytical Date: 08/05/19 22:47
Analyst: AWS

Extraction Method: EPA 504.1
Extraction Date: 08/05/19 11:50

Parameter	Result	Qualifier	Units	RL	MDL	
Microextractables by GC - Westborough Lab for sample(s): 01 Batch: WG1268692-1						
1,2-Dibromoethane	ND		ug/l	0.010	--	A

Lab Control Sample Analysis
Batch Quality Control

Project Name: POLAR PARK
Project Number: 4325.03

Lab Number: L1933226
Report Date: 08/06/19

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: WG1266317-3								
Methylene chloride	100		-		60-140	-		28
1,1-Dichloroethane	85		-		50-150	-		49
Carbon tetrachloride	85		-		70-130	-		41
1,1,2-Trichloroethane	95		-		70-130	-		45
Tetrachloroethene	95		-		70-130	-		39
1,2-Dichloroethane	80		-		70-130	-		49
1,1,1-Trichloroethane	105		-		70-130	-		36
Benzene	80		-		65-135	-		61
Toluene	105		-		70-130	-		41
Ethylbenzene	105		-		60-140	-		63
Vinyl chloride	90		-		5-195	-		66
1,1-Dichloroethene	105		-		50-150	-		32
cis-1,2-Dichloroethene	100		-		60-140	-		30
Trichloroethene	85		-		65-135	-		48
1,2-Dichlorobenzene	105		-		65-135	-		57
1,3-Dichlorobenzene	100		-		70-130	-		43
1,4-Dichlorobenzene	100		-		65-135	-		57
p/m-Xylene	102		-		60-140	-		30
o-xylene	95		-		60-140	-		30
Acetone	92		-		40-160	-		30
Methyl tert butyl ether	95		-		60-140	-		30
Tert-Butyl Alcohol	100		-		60-140	-		30
Tertiary-Amyl Methyl Ether	65		-		60-140	-		30

Lab Control Sample Analysis
Batch Quality Control

Project Name: POLAR PARK
Project Number: 4325.03

Lab Number: L1933226
Report Date: 08/06/19

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: WG1266317-3								

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
Pentafluorobenzene	98				60-140
Fluorobenzene	84				60-140
4-Bromofluorobenzene	99				60-140

Lab Control Sample Analysis

Batch Quality Control

Project Name: POLAR PARK
Project Number: 4325.03

Lab Number: L1933226
Report Date: 08/06/19

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: WG1266333-3								
1,4-Dioxane	110		-		60-140	-		20

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
Fluorobenzene	87				60-140
4-Bromofluorobenzene	93				60-140

Lab Control Sample Analysis

Batch Quality Control

Project Name: POLAR PARK

Project Number: 4325.03

Lab Number: L1933226

Report Date: 08/06/19

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits	Column
Microextractables by GC - Westborough Lab	Associated sample(s): 01		Batch: WG1268692-2						
1,2-Dibromoethane	114		-		80-120	-			A

Matrix Spike Analysis

Batch Quality Control

Project Name: POLAR PARK

Project Number: 4325.03

Lab Number: L1933226

Report Date: 08/06/19

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: WG1268692-3 QC Sample: L1932588-02 Client ID: MS Sample													
1,2-Dibromoethane	ND	0.252	0.202	80		-	-		80-120	-		20	A
1,2-Dibromo-3-chloropropane	ND	0.252	0.288	114		-	-		80-120	-		20	A
1,2,3-Trichloropropane	ND	0.252	0.250	99		-	-		80-120	-		20	A

SEMIVOLATILES

Project Name: POLAR PARK
Project Number: 4325.03
Lab Number: L1933226
Report Date: 08/06/19

SAMPLE RESULTS

Lab ID: L1933226-01
Client ID: HA19-2(OW)
Sample Location: WORCESTER, MA

Date Collected: 07/26/19 10:00
Date Received: 07/26/19
Field Prep: Refer to COC

Sample Depth:
Matrix: Water
Analytical Method: 129,625.1
Analytical Date: 08/02/19 13:04
Analyst: ALS

Extraction Method: EPA 625.1
Extraction Date: 08/01/19 07:41

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Bis(2-ethylhexyl)phthalate	ND		ug/l	2.2	--	1
Butyl benzyl phthalate	ND		ug/l	4.9	--	1
Di-n-butylphthalate	ND		ug/l	4.9	--	1
Di-n-octylphthalate	ND		ug/l	4.9	--	1
Diethyl phthalate	ND		ug/l	4.9	--	1
Dimethyl phthalate	ND		ug/l	4.9	--	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	92		42-122
2-Fluorobiphenyl	75		46-121
4-Terphenyl-d14	96		47-138

Project Name: POLAR PARK
Project Number: 4325.03
Lab Number: L1933226
Report Date: 08/06/19

SAMPLE RESULTS

Lab ID: L1933226-01
Client ID: HA19-2(OW)
Sample Location: WORCESTER, MA

Date Collected: 07/26/19 10:00
Date Received: 07/26/19
Field Prep: Refer to COC

Sample Depth:
Matrix: Water
Analytical Method: 129,625.1-SIM
Analytical Date: 08/01/19 23:47
Analyst: DV

Extraction Method: EPA 625.1
Extraction Date: 08/01/19 07:43

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS-SIM - Westborough Lab						
Acenaphthene	ND		ug/l	0.10	--	1
Fluoranthene	ND		ug/l	0.10	--	1
Naphthalene	ND		ug/l	0.10	--	1
Benzo(a)anthracene	ND		ug/l	0.10	--	1
Benzo(a)pyrene	ND		ug/l	0.10	--	1
Benzo(b)fluoranthene	ND		ug/l	0.10	--	1
Benzo(k)fluoranthene	ND		ug/l	0.10	--	1
Chrysene	ND		ug/l	0.10	--	1
Acenaphthylene	ND		ug/l	0.10	--	1
Anthracene	ND		ug/l	0.10	--	1
Benzo(ghi)perylene	ND		ug/l	0.10	--	1
Fluorene	ND		ug/l	0.10	--	1
Phenanthrene	ND		ug/l	0.10	--	1
Dibenzo(a,h)anthracene	ND		ug/l	0.10	--	1
Indeno(1,2,3-cd)pyrene	ND		ug/l	0.10	--	1
Pyrene	ND		ug/l	0.10	--	1
Pentachlorophenol	ND		ug/l	0.98	--	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Fluorophenol	47		25-87
Phenol-d6	32		16-65
Nitrobenzene-d5	90		42-122
2-Fluorobiphenyl	87		46-121
2,4,6-Tribromophenol	83		45-128
4-Terphenyl-d14	84		47-138

Project Name: POLAR PARK
Project Number: 4325.03

Lab Number: L1933226
Report Date: 08/06/19

Method Blank Analysis
Batch Quality Control

Analytical Method: 129,625.1
Analytical Date: 08/02/19 12:14
Analyst: CB

Extraction Method: EPA 625.1
Extraction Date: 07/31/19 15:40

Parameter	Result	Qualifier	Units	RL	MDL
Semivolatile Organics by GC/MS - Westborough Lab for sample(s): 01 Batch: WG1266979-1					
Bis(2-ethylhexyl)phthalate	ND		ug/l	2.2	--
Butyl benzyl phthalate	ND		ug/l	5.0	--
Di-n-butylphthalate	ND		ug/l	5.0	--
Di-n-octylphthalate	ND		ug/l	5.0	--
Diethyl phthalate	ND		ug/l	5.0	--
Dimethyl phthalate	ND		ug/l	5.0	--

Surrogate	%Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	97		42-122
2-Fluorobiphenyl	81		46-121
4-Terphenyl-d14	97		47-138

Project Name: POLAR PARK
Project Number: 4325.03

Lab Number: L1933226
Report Date: 08/06/19

Method Blank Analysis
Batch Quality Control

Analytical Method: 129,625.1-SIM
Analytical Date: 08/01/19 22:24
Analyst: DV

Extraction Method: EPA 625.1
Extraction Date: 08/01/19 05:33

Parameter	Result	Qualifier	Units	RL	MDL
Semivolatile Organics by GC/MS-SIM - Westborough Lab for sample(s): 01 Batch: WG1267211-1					
Acenaphthene	ND		ug/l	0.10	--
Fluoranthene	ND		ug/l	0.10	--
Naphthalene	ND		ug/l	0.10	--
Benzo(a)anthracene	ND		ug/l	0.10	--
Benzo(a)pyrene	ND		ug/l	0.10	--
Benzo(b)fluoranthene	ND		ug/l	0.10	--
Benzo(k)fluoranthene	ND		ug/l	0.10	--
Chrysene	ND		ug/l	0.10	--
Acenaphthylene	ND		ug/l	0.10	--
Anthracene	ND		ug/l	0.10	--
Benzo(ghi)perylene	ND		ug/l	0.10	--
Fluorene	ND		ug/l	0.10	--
Phenanthrene	ND		ug/l	0.10	--
Dibenzo(a,h)anthracene	ND		ug/l	0.10	--
Indeno(1,2,3-cd)pyrene	ND		ug/l	0.10	--
Pyrene	ND		ug/l	0.10	--
Pentachlorophenol	ND		ug/l	1.0	--

Surrogate	%Recovery	Qualifier	Acceptance Criteria
2-Fluorophenol	59		25-87
Phenol-d6	45		16-65
Nitrobenzene-d5	89		42-122
2-Fluorobiphenyl	82		46-121
2,4,6-Tribromophenol	78		45-128
4-Terphenyl-d14	89		47-138

Lab Control Sample Analysis

Batch Quality Control

Project Name: POLAR PARK
Project Number: 4325.03

Lab Number: L1933226
Report Date: 08/06/19

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: WG1266979-3								
Bis(2-ethylhexyl)phthalate	106		-		29-137	-		82
Butyl benzyl phthalate	96		-		1-140	-		60
Di-n-butylphthalate	99		-		8-120	-		47
Di-n-octylphthalate	104		-		19-132	-		69
Diethyl phthalate	90		-		1-120	-		100
Dimethyl phthalate	81		-		1-120	-		183

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
Nitrobenzene-d5	92				42-122
2-Fluorobiphenyl	76				46-121
4-Terphenyl-d14	92				47-138

Lab Control Sample Analysis
Batch Quality Control

Project Name: POLAR PARK
Project Number: 4325.03

Lab Number: L1933226
Report Date: 08/06/19

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: WG1267211-2								
Acenaphthene	81		-		60-132	-		30
Fluoranthene	94		-		43-121	-		30
Naphthalene	82		-		36-120	-		30
Benzo(a)anthracene	98		-		42-133	-		30
Benzo(a)pyrene	94		-		32-148	-		30
Benzo(b)fluoranthene	89		-		42-140	-		30
Benzo(k)fluoranthene	88		-		25-146	-		30
Chrysene	90		-		44-140	-		30
Acenaphthylene	86		-		54-126	-		30
Anthracene	99		-		43-120	-		30
Benzo(ghi)perylene	94		-		1-195	-		30
Fluorene	84		-		70-120	-		30
Phenanthrene	92		-		65-120	-		30
Dibenzo(a,h)anthracene	96		-		1-200	-		30
Indeno(1,2,3-cd)pyrene	93		-		1-151	-		30
Pyrene	93		-		70-120	-		30
Pentachlorophenol	75		-		38-152	-		30

Lab Control Sample Analysis
Batch Quality Control

Project Name: POLAR PARK
Project Number: 4325.03

Lab Number: L1933226
Report Date: 08/06/19

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: WG1267211-2

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
2-Fluorophenol	63				25-87
Phenol-d6	50				16-65
Nitrobenzene-d5	95				42-122
2-Fluorobiphenyl	86				46-121
2,4,6-Tribromophenol	82				45-128
4-Terphenyl-d14	86				47-138

PCBS

Project Name: POLAR PARK
Project Number: 4325.03
Lab Number: L1933226
Report Date: 08/06/19

SAMPLE RESULTS

Lab ID: L1933226-01
Client ID: HA19-2(OW)
Sample Location: WORCESTER, MA

Date Collected: 07/26/19 10:00
Date Received: 07/26/19
Field Prep: Refer to COC

Sample Depth:
Matrix: Water
Analytical Method: 127,608.3
Analytical Date: 08/04/19 15:57
Analyst: WR

Extraction Method: EPA 608.3
Extraction Date: 08/01/19 08:07
Cleanup Method: EPA 3665A
Cleanup Date: 08/01/19
Cleanup Method: EPA 3660B
Cleanup Date: 08/01/19

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	42		37-123	B
Decachlorobiphenyl	41		38-114	B
2,4,5,6-Tetrachloro-m-xylene	43		37-123	A
Decachlorobiphenyl	40		38-114	A

Project Name: POLAR PARK
Project Number: 4325.03

Lab Number: L1933226
Report Date: 08/06/19

Method Blank Analysis
Batch Quality Control

Analytical Method: 127,608.3
Analytical Date: 08/04/19 14:55
Analyst: WR

Extraction Method: EPA 608.3
Extraction Date: 08/01/19 02:56
Cleanup Method: EPA 3665A
Cleanup Date: 08/01/19
Cleanup Method: EPA 3660B
Cleanup Date: 08/01/19

Parameter	Result	Qualifier	Units	RL	MDL	Column
Polychlorinated Biphenyls by GC - Westborough Lab for sample(s): 01 Batch: WG1267157-1						
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	61		37-123	B
Decachlorobiphenyl	83		38-114	B
2,4,5,6-Tetrachloro-m-xylene	63		37-123	A
Decachlorobiphenyl	75		38-114	A

Lab Control Sample Analysis

Batch Quality Control

Project Name: POLAR PARK
Project Number: 4325.03

Lab Number: L1933226
Report Date: 08/06/19

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: WG1267157-2									
Aroclor 1016	78		-		50-140	-		36	A
Aroclor 1260	83		-		8-140	-		38	A

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	75				37-123	B
Decachlorobiphenyl	89				38-114	B
2,4,5,6-Tetrachloro-m-xylene	77				37-123	A
Decachlorobiphenyl	84				38-114	A

METALS

Project Name: POLAR PARK
Lab Number: L1933226
Project Number: 4325.03
Report Date: 08/06/19

SAMPLE RESULTS

Lab ID: L1933226-02
Client ID: MIDDLE RIVER
Sample Location: WORCESTER, MA
Date Collected: 07/26/19 11:20
Date Received: 07/26/19
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	0.00400	--	1	07/29/19 20:55	07/30/19 20:51	EPA 3005A	3,200.8	AM
Arsenic, Total	0.01716		mg/l	0.00100	--	1	07/29/19 20:55	07/30/19 20:51	EPA 3005A	3,200.8	AM
Cadmium, Total	0.00066		mg/l	0.00020	--	1	07/29/19 20:55	07/30/19 20:51	EPA 3005A	3,200.8	AM
Chromium, Total	0.00563		mg/l	0.00100	--	1	07/29/19 20:55	07/30/19 20:51	EPA 3005A	3,200.8	AM
Copper, Total	0.01731		mg/l	0.00100	--	1	07/29/19 20:55	07/30/19 20:51	EPA 3005A	3,200.8	AM
Iron, Total	4.97		mg/l	0.050	--	1	07/29/19 20:55	07/30/19 13:20	EPA 3005A	19,200.7	AB
Lead, Total	0.02532		mg/l	0.00100	--	1	07/29/19 20:55	07/30/19 20:51	EPA 3005A	3,200.8	AM
Mercury, Total	ND		mg/l	0.00020	--	1	07/30/19 15:22	07/30/19 20:05	EPA 245.1	3,245.1	EA
Nickel, Total	0.00438		mg/l	0.00200	--	1	07/29/19 20:55	07/30/19 20:51	EPA 3005A	3,200.8	AM
Selenium, Total	ND		mg/l	0.00500	--	1	07/29/19 20:55	07/30/19 20:51	EPA 3005A	3,200.8	AM
Silver, Total	ND		mg/l	0.00040	--	1	07/29/19 20:55	07/30/19 20:51	EPA 3005A	3,200.8	AM
Zinc, Total	0.05755		mg/l	0.01000	--	1	07/29/19 20:55	07/30/19 20:51	EPA 3005A	3,200.8	AM
Total Hardness by SM 2340B - Mansfield Lab											
Hardness	56.6		mg/l	0.660	NA	1	07/29/19 20:55	07/30/19 13:20	EPA 3005A	19,200.7	AB

Project Name: POLAR PARK **Lab Number:** L1933226

Project Number: 4325.03 **Report Date:** 08/06/19

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: WG1265972-1										
Iron, Total	ND		mg/l	0.050	--	1	07/29/19 20:55	07/30/19 10:58	19,200.7	AB

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: WG1265972-1										
Hardness	ND		mg/l	0.660	NA	1	07/29/19 20:55	07/30/19 10:58	19,200.7	AB

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: WG1265975-1										
Antimony, Total	ND		mg/l	0.00400	--	1	07/29/19 20:55	07/30/19 19:03	3,200.8	AM
Arsenic, Total	ND		mg/l	0.00100	--	1	07/29/19 20:55	07/30/19 19:03	3,200.8	AM
Cadmium, Total	ND		mg/l	0.00020	--	1	07/29/19 20:55	07/30/19 19:03	3,200.8	AM
Chromium, Total	ND		mg/l	0.00100	--	1	07/29/19 20:55	07/30/19 19:03	3,200.8	AM
Copper, Total	ND		mg/l	0.00100	--	1	07/29/19 20:55	07/30/19 19:03	3,200.8	AM
Lead, Total	ND		mg/l	0.00100	--	1	07/29/19 20:55	07/30/19 19:03	3,200.8	AM
Nickel, Total	ND		mg/l	0.00200	--	1	07/29/19 20:55	07/30/19 19:03	3,200.8	AM
Selenium, Total	ND		mg/l	0.00500	--	1	07/29/19 20:55	07/30/19 19:03	3,200.8	AM
Silver, Total	ND		mg/l	0.00040	--	1	07/29/19 20:55	07/30/19 19:03	3,200.8	AM
Zinc, Total	ND		mg/l	0.01000	--	1	07/29/19 20:55	07/30/19 19:03	3,200.8	AM

Prep Information

Digestion Method: EPA 3005A

Project Name: POLAR PARK
Project Number: 4325.03
Lab Number: L1933226
Report Date: 08/06/19

Method Blank Analysis
Batch Quality Control

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Dissolved Metals - Mansfield Lab for sample(s): 01 Batch: WG1266359-1										
Iron, Dissolved	ND		mg/l	0.050	--	1	07/30/19 15:30	07/30/19 20:49	19,200.7	AB

Prep Information

Digestion Method: EPA 3005A

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Dissolved Metals - Mansfield Lab for sample(s): 01 Batch: WG1266361-1										
Antimony, Dissolved	ND		mg/l	0.0040	--	1	07/30/19 15:30	07/31/19 02:13	3,200.8	AM
Arsenic, Dissolved	ND		mg/l	0.0010	--	1	07/30/19 15:30	07/31/19 02:13	3,200.8	AM
Cadmium, Dissolved	ND		mg/l	0.0002	--	1	07/30/19 15:30	07/31/19 02:13	3,200.8	AM
Chromium, Dissolved	ND		mg/l	0.0010	--	1	07/30/19 15:30	07/31/19 02:13	3,200.8	AM
Copper, Dissolved	ND		mg/l	0.0010	--	1	07/30/19 15:30	07/31/19 02:13	3,200.8	AM
Lead, Dissolved	ND		mg/l	0.0010	--	1	07/30/19 15:30	07/31/19 02:13	3,200.8	AM
Nickel, Dissolved	ND		mg/l	0.0020	--	1	07/30/19 15:30	07/31/19 02:13	3,200.8	AM
Selenium, Dissolved	ND		mg/l	0.0050	--	1	07/30/19 15:30	07/31/19 02:13	3,200.8	AM
Silver, Dissolved	ND		mg/l	0.0004	--	1	07/30/19 15:30	07/31/19 02:13	3,200.8	AM
Zinc, Dissolved	ND		mg/l	0.0100	--	1	07/30/19 15:30	07/31/19 02:13	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: WG1266382-1										
Mercury, Total	ND		mg/l	0.00020	--	1	07/30/19 15:22	07/30/19 19:30	3,245.1	EA

Prep Information

Digestion Method: EPA 245.1

Project Name: POLAR PARK
Project Number: 4325.03
Lab Number: L1933226
Report Date: 08/06/19

Method Blank Analysis
Batch Quality Control

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Dissolved Metals - Mansfield Lab for sample(s): 01 Batch: WG1266803-1										
Mercury, Dissolved	ND		mg/l	0.00020	--	1	07/31/19 11:07	07/31/19 19:38	3,245.1	EA

Prep Information

Digestion Method: EPA 245.1

Lab Control Sample Analysis

Batch Quality Control

Project Name: POLAR PARK

Project Number: 4325.03

Lab Number: L1933226

Report Date: 08/06/19

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 01-02 Batch: WG1265972-2								
Iron, Total	104		-		85-115	-		
Total Hardness by SM 2340B - Mansfield Lab Associated sample(s): 01-02 Batch: WG1265972-2								
Hardness	100		-		85-115	-		
Total Metals - Mansfield Lab Associated sample(s): 01-02 Batch: WG1265975-2								
Antimony, Total	92		-		85-115	-		
Arsenic, Total	102		-		85-115	-		
Cadmium, Total	106		-		85-115	-		
Chromium, Total	99		-		85-115	-		
Copper, Total	96		-		85-115	-		
Lead, Total	103		-		85-115	-		
Nickel, Total	103		-		85-115	-		
Selenium, Total	103		-		85-115	-		
Silver, Total	102		-		85-115	-		
Zinc, Total	101		-		85-115	-		
Dissolved Metals - Mansfield Lab Associated sample(s): 01 Batch: WG1266359-2								
Iron, Dissolved	105		-		85-115	-		

Lab Control Sample Analysis

Batch Quality Control

Project Name: POLAR PARK

Project Number: 4325.03

Lab Number: L1933226

Report Date: 08/06/19

Parameter	LCS %Recovery	LCSD %Recovery	%Recovery Limits	RPD	RPD Limits
Dissolved Metals - Mansfield Lab Associated sample(s): 01 Batch: WG1266361-2					
Antimony, Dissolved	91	-	85-115	-	
Arsenic, Dissolved	98	-	85-115	-	
Cadmium, Dissolved	101	-	85-115	-	
Chromium, Dissolved	99	-	85-115	-	
Copper, Dissolved	95	-	85-115	-	
Lead, Dissolved	102	-	85-115	-	
Nickel, Dissolved	103	-	85-115	-	
Selenium, Dissolved	107	-	85-115	-	
Silver, Dissolved	98	-	85-115	-	
Zinc, Dissolved	102	-	85-115	-	
Total Metals - Mansfield Lab Associated sample(s): 01-02 Batch: WG1266382-2					
Mercury, Total	99	-	85-115	-	
Dissolved Metals - Mansfield Lab Associated sample(s): 01 Batch: WG1266803-2					
Mercury, Dissolved	112	-	85-115	-	

Matrix Spike Analysis
Batch Quality Control

Project Name: POLAR PARK
Project Number: 4325.03

Lab Number: L1933226
Report Date: 08/06/19

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: WG1265972-3 QC Sample: L1933079-01 Client ID: MS Sample												
Iron, Total	1.59	1	2.48	89		-	-		75-125	-		20
Total Hardness by SM 2340B - Mansfield Lab Associated sample(s): 01-02 QC Batch ID: WG1265972-3 QC Sample: L1933079-01 Client ID: MS Sample												
Hardness	271	66.2	318	**71**	Q	-	-		75-125	-		20
Total Metals - Mansfield Lab Associated sample(s): 01-02 QC Batch ID: WG1265972-7 QC Sample: L1932366-01 Client ID: MS Sample												
Iron, Total	41.8	1	39.1	**0**	Q	-	-		75-125	-		20
Total Hardness by SM 2340B - Mansfield Lab Associated sample(s): 01-02 QC Batch ID: WG1265972-7 QC Sample: L1932366-01 Client ID: MS Sample												
Hardness	198	66.2	254	85		-	-		75-125	-		20
Total Metals - Mansfield Lab Associated sample(s): 01-02 QC Batch ID: WG1265975-3 QC Sample: L1933079-01 Client ID: MS Sample												
Antimony, Total	ND	0.5	0.4657	93		-	-		70-130	-		20
Arsenic, Total	0.01481	0.12	0.1272	94		-	-		70-130	-		20
Cadmium, Total	ND	0.051	0.05102	100		-	-		70-130	-		20
Chromium, Total	ND	0.2	0.1915	96		-	-		70-130	-		20
Copper, Total	0.3476	0.25	0.5670	88		-	-		70-130	-		20
Lead, Total	0.02179	0.51	0.5344	100		-	-		70-130	-		20
Nickel, Total	ND	0.5	0.4697	94		-	-		70-130	-		20
Selenium, Total	ND	0.12	0.1118	93		-	-		70-130	-		20
Silver, Total	ND	0.05	0.04714	94		-	-		70-130	-		20
Zinc, Total	0.6190	0.5	1.093	95		-	-		70-130	-		20

Matrix Spike Analysis
Batch Quality Control

Project Name: POLAR PARK
Project Number: 4325.03

Lab Number: L1933226
Report Date: 08/06/19

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	MSD Found	MSD %Recovery	Recovery Limits	RPD	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 01-02 QC Batch ID: WG1265975-5 QC Sample: L1932366-01 Client ID: MS Sample									
Antimony, Total	ND	0.5	0.3547	71	-	-	70-130	-	20
Arsenic, Total	0.01943	0.12	0.1217	85	-	-	70-130	-	20
Cadmium, Total	0.00036	0.051	0.05106	99	-	-	70-130	-	20
Chromium, Total	0.03955	0.2	0.2198	90	-	-	70-130	-	20
Copper, Total	0.03196	0.25	0.2541	89	-	-	70-130	-	20
Lead, Total	0.04701	0.51	0.5381	96	-	-	70-130	-	20
Nickel, Total	0.0348	0.5	0.5006	93	-	-	70-130	-	20
Selenium, Total	ND	0.12	0.09829	82	-	-	70-130	-	20
Silver, Total	ND	0.05	0.04687	94	-	-	70-130	-	20
Zinc, Total	0.1324	0.5	0.5916	92	-	-	70-130	-	20
Dissolved Metals - Mansfield Lab Associated sample(s): 01 QC Batch ID: WG1266359-3 QC Sample: L1932366-01 Client ID: MS Sample									
Iron, Dissolved	1.25	1	2.40	115	-	-	75-125	-	20

Matrix Spike Analysis
Batch Quality Control

Project Name: POLAR PARK
Project Number: 4325.03

Lab Number: L1933226
Report Date: 08/06/19

Parameter	Native Sample	MS Added	MS Found	MS %Recovery		MSD Found	MSD %Recovery	Recovery Limits	RPD	RPD Limits
Dissolved Metals - Mansfield Lab Associated sample(s): 01 QC Batch ID: WG1266361-3 QC Sample: L1932366-01 Client ID: MS Sample										
Antimony, Dissolved	ND	0.5	0.6026	120		-	-	70-130	-	20
Arsenic, Dissolved	0.0033	0.12	0.1351	110		-	-	70-130	-	20
Cadmium, Dissolved	ND	0.051	0.0564	110		-	-	70-130	-	20
Chromium, Dissolved	ND	0.2	0.2132	107		-	-	70-130	-	20
Copper, Dissolved	ND	0.25	0.2603	104		-	-	70-130	-	20
Lead, Dissolved	ND	0.51	0.5630	110		-	-	70-130	-	20
Nickel, Dissolved	0.0033	0.5	0.5399	107		-	-	70-130	-	20
Selenium, Dissolved	ND	0.12	0.1413	118		-	-	70-130	-	20
Silver, Dissolved	ND	0.05	0.0519	104		-	-	70-130	-	20
Zinc, Dissolved	ND	0.5	0.5618	112		-	-	70-130	-	20
Total Metals - Mansfield Lab Associated sample(s): 01-02 QC Batch ID: WG1266382-3 QC Sample: L1933582-01 Client ID: MS Sample										
Mercury, Total	ND	0.005	0.00457	91		-	-	70-130	-	20
Total Metals - Mansfield Lab Associated sample(s): 01-02 QC Batch ID: WG1266382-5 QC Sample: L1933582-02 Client ID: MS Sample										
Mercury, Total	ND	0.005	0.00472	94		-	-	70-130	-	20
Dissolved Metals - Mansfield Lab Associated sample(s): 01 QC Batch ID: WG1266803-3 QC Sample: L1932366-02 Client ID: MS Sample										
Mercury, Dissolved	ND	0.005	0.00344	**69**	Q	-	-	75-125	-	20

Lab Duplicate Analysis
Batch Quality Control

Project Name: POLAR PARK
Project Number: 4325.03

Lab Number: L1933226
Report Date: 08/06/19

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 01-02 QC Batch ID: WG1265972-4 QC Sample: L1933079-01 Client ID: DUP Sample						
Iron, Total	1.59	1.55	mg/l	3		20
Total Metals - Mansfield Lab Associated sample(s): 01-02 QC Batch ID: WG1265972-8 QC Sample: L1932366-01 Client ID: DUP Sample						
Iron, Total	41.8	39.1	mg/l	7		20
Total Hardness by SM 2340B - Mansfield Lab Associated sample(s): 01-02 QC Batch ID: WG1265972-8 QC Sample: L1932366-01 Client ID: DUP Sample						
Hardness	198	194	mg/l	2		20
Total Metals - Mansfield Lab Associated sample(s): 01-02 QC Batch ID: WG1265975-4 QC Sample: L1933079-01 Client ID: DUP Sample						
Antimony, Total	ND	ND	mg/l	NC		20
Arsenic, Total	0.01481	0.01555	mg/l	5		20
Cadmium, Total	ND	ND	mg/l	NC		20
Chromium, Total	ND	ND	mg/l	NC		20
Copper, Total	0.3476	0.3461	mg/l	0		20
Lead, Total	0.02179	0.02179	mg/l	0		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	0.6190	0.6297	mg/l	2		20

Lab Duplicate Analysis
Batch Quality Control

Project Name: POLAR PARK
Project Number: 4325.03

Lab Number: L1933226
Report Date: 08/06/19

Parameter	Native Sample	Duplicate Sample	Units	RPD		RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 01-02 QC Batch ID: WG1265975-6 QC Sample: L1932366-01 Client ID: DUP Sample						
Arsenic, Total	0.01943	0.01782	mg/l	9		20
Cadmium, Total	0.00036	0.00028	mg/l	**26**	Q	20
Chromium, Total	0.03955	0.03498	mg/l	12		20
Copper, Total	0.03196	0.02986	mg/l	7		20
Lead, Total	0.04701	0.04452	mg/l	5		20
Selenium, Total	ND	ND	mg/l	NC		20
Silver, Total	ND	ND	mg/l	NC		20
Zinc, Total	0.1324	0.1225	mg/l	8		20
Dissolved Metals - Mansfield Lab Associated sample(s): 01 QC Batch ID: WG1266359-4 QC Sample: L1932366-01 Client ID: DUP Sample						
Iron, Dissolved	1.25	1.27	mg/l	2		20
Dissolved Metals - Mansfield Lab Associated sample(s): 01 QC Batch ID: WG1266361-4 QC Sample: L1932366-01 Client ID: DUP Sample						
Arsenic, Dissolved	0.0033	0.0029	mg/l	11		20
Cadmium, Dissolved	ND	ND	mg/l	NC		20
Chromium, Dissolved	ND	ND	mg/l	NC		20
Copper, Dissolved	ND	ND	mg/l	NC		20
Lead, Dissolved	ND	ND	mg/l	NC		20
Selenium, Dissolved	ND	ND	mg/l	NC		20
Silver, Dissolved	ND	ND	mg/l	NC		20
Zinc, Dissolved	ND	ND	mg/l	NC		20

Lab Duplicate Analysis

Batch Quality Control

Project Name: POLAR PARK
Project Number: 4325.03

Lab Number: L1933226
Report Date: 08/06/19

Parameter	Native Sample	Duplicate Sample	Units	RPD	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 01-02 QC Batch ID: WG1266382-4 QC Sample: L1933582-01 Client ID: DUP Sample					
Mercury, Total	ND	ND	mg/l	NC	20
Total Metals - Mansfield Lab Associated sample(s): 01-02 QC Batch ID: WG1266382-6 QC Sample: L1933582-02 Client ID: DUP Sample					
Mercury, Total	ND	0.00020	mg/l	NC	20
Dissolved Metals - Mansfield Lab Associated sample(s): 01 QC Batch ID: WG1266803-4 QC Sample: L1932366-02 Client ID: DUP Sample					
Mercury, Dissolved	ND	ND	mg/l	NC	20

INORGANICS
&
MISCELLANEOUS

Project Name: POLAR PARK
Project Number: 4325.03

Lab Number: L1933226
Report Date: 08/06/19

SAMPLE RESULTS

Lab ID: L1933226-01
Client ID: HA19-2(OW)
Sample Location: WORCESTER, MA

Date Collected: 07/26/19 10:00
Date Received: 07/26/19
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	140		mg/l	10	NA	2	-	07/29/19 13:50	121,2540D	DR
Cyanide, Total	ND		mg/l	0.005	--	1	07/29/19 16:45	07/30/19 11:43	121,4500CN-CE	LH
Chlorine, Total Residual	ND		mg/l	0.02	--	1	-	07/26/19 23:38	121,4500CL-D	AS
pH (H)	7.5		SU	-	NA	1	-	07/26/19 22:58	121,4500H+-B	AS
Nitrogen, Ammonia	0.089		mg/l	0.075	--	1	07/27/19 14:42	07/29/19 20:30	121,4500NH3-BH	ML
Sulfate	100		mg/l	50	--	5	07/29/19 12:01	07/29/19 12:01	121,4500SO4-E	BR
TPH, SGT-HEM	ND		mg/l	4.00	--	1	07/30/19 16:00	07/30/19 21:25	74,1664A	ML
Phenolics, Total	ND		mg/l	0.030	--	1	07/30/19 05:52	07/30/19 10:45	4,420.1	BR
Chromium, Hexavalent	ND		mg/l	0.010	--	1	07/27/19 05:00	07/27/19 05:54	1,7196A	JW
Anions by Ion Chromatography - Westborough Lab										
Chloride	191.		mg/l	5.00	--	10	-	07/30/19 05:23	44,300.0	AT

Project Name: POLAR PARK
Project Number: 4325.03

Lab Number: L1933226
Report Date: 08/06/19

SAMPLE RESULTS

Lab ID: L1933226-02
Client ID: MIDDLE RIVER
Sample Location: WORCESTER, MA

Date Collected: 07/26/19 11:20
Date Received: 07/26/19
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										
pH (H)	7.5		SU	-	NA	1	-	07/26/19 22:58	121,4500H+-B	AS
Nitrogen, Ammonia	0.125		mg/l	0.075	--	1	07/27/19 14:42	07/29/19 20:31	121,4500NH3-BH	ML

Project Name: POLAR PARK
Project Number: 4325.03
Lab Number: L1933226
Report Date: 08/06/19

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 Batch: WG1265241-1										
Chlorine, Total Residual	ND		mg/l	0.02	--	1	-	07/26/19 23:38	121,4500CL-D	AS
General Chemistry - Westborough Lab for sample(s): 01 Batch: WG1265285-1										
Chromium, Hexavalent	ND		mg/l	0.010	--	1	07/27/19 05:00	07/27/19 05:49	1,7196A	JW
General Chemistry - Westborough Lab for sample(s): 01-02 Batch: WG1265399-1										
Nitrogen, Ammonia	ND		mg/l	0.075	--	1	07/27/19 14:42	07/29/19 19:56	121,4500NH3-BH	ML
General Chemistry - Westborough Lab for sample(s): 01 Batch: WG1265722-1										
Sulfate	ND		mg/l	10	--	1	07/29/19 12:01	07/29/19 12:01	121,4500SO4-E	BR
General Chemistry - Westborough Lab for sample(s): 01 Batch: WG1265749-1										
Solids, Total Suspended	ND		mg/l	5.0	NA	1	-	07/29/19 13:50	121,2540D	DR
General Chemistry - Westborough Lab for sample(s): 01 Batch: WG1265787-1										
Cyanide, Total	ND		mg/l	0.005	--	1	07/29/19 16:45	07/30/19 11:18	121,4500CN-CE	LH
Anions by Ion Chromatography - Westborough Lab for sample(s): 01 Batch: WG1266101-1										
Chloride	ND		mg/l	0.500	--	1	-	07/30/19 02:46	44,300.0	AT
General Chemistry - Westborough Lab for sample(s): 01 Batch: WG1266135-1										
Phenolics, Total	ND		mg/l	0.030	--	1	07/30/19 05:52	07/30/19 10:42	4,420.1	BR
General Chemistry - Westborough Lab for sample(s): 01 Batch: WG1266423-1										
TPH, SGT-HEM	ND		mg/l	4.00	--	1	07/30/19 16:00	07/30/19 21:25	74,1664A	ML

Lab Control Sample Analysis

Batch Quality Control

Project Name: POLAR PARK
Project Number: 4325.03

Lab Number: L1933226
Report Date: 08/06/19

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 01-02 Batch: WG1265236-1								
pH	100		-		99-101	-		5
General Chemistry - Westborough Lab Associated sample(s): 01 Batch: WG1265241-2								
Chlorine, Total Residual	92		-		90-110	-		
General Chemistry - Westborough Lab Associated sample(s): 01 Batch: WG1265285-2								
Chromium, Hexavalent	102		-		85-115	-		20
General Chemistry - Westborough Lab Associated sample(s): 01-02 Batch: WG1265399-2								
Nitrogen, Ammonia	92		-		80-120	-		20
General Chemistry - Westborough Lab Associated sample(s): 01 Batch: WG1265722-2								
Sulfate	90		-		90-110	-		
General Chemistry - Westborough Lab Associated sample(s): 01 Batch: WG1265787-2								
Cyanide, Total	98		-		90-110	-		
Anions by Ion Chromatography - Westborough Lab Associated sample(s): 01 Batch: WG1266101-2								
Chloride	104		-		90-110	-		

Lab Control Sample Analysis

Batch Quality Control

Project Name: POLAR PARK
Project Number: 4325.03

Lab Number: L1933226
Report Date: 08/06/19

Parameter	LCS %Recovery	LCSD %Recovery	%Recovery Limits	RPD	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 01 Batch: WG1266135-2					
Phenolics, Total	86	-	70-130	-	
General Chemistry - Westborough Lab Associated sample(s): 01 Batch: WG1266423-2					
TPH	93	-	64-132	-	34

Matrix Spike Analysis
Batch Quality Control

Project Name: POLAR PARK
Project Number: 4325.03

Lab Number: L1933226
Report Date: 08/06/19

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 QC Batch ID: WG1265241-4 QC Sample: L1933226-01 Client ID: HA19-2(OW)												
Chlorine, Total Residual	ND	0.25	0.26	104		-	-		80-120	-		20
General Chemistry - Westborough Lab Associated sample(s): 01 QC Batch ID: WG1265285-4 QC Sample: L1933226-01 Client ID: HA19-2(OW)												
Chromium, Hexavalent	ND	0.1	0.099	99		-	-		85-115	-		20
General Chemistry - Westborough Lab Associated sample(s): 01-02 QC Batch ID: WG1265399-4 QC Sample: L1932925-02 Client ID: MS Sample												
Nitrogen, Ammonia	ND	4	3.56	89		-	-		80-120	-		20
General Chemistry - Westborough Lab Associated sample(s): 01 QC Batch ID: WG1265722-4 QC Sample: L1932442-01 Client ID: MS Sample												
Sulfate	32	50	81	98		-	-		55-147	-		14
General Chemistry - Westborough Lab Associated sample(s): 01 QC Batch ID: WG1265787-4 QC Sample: L1932955-04 Client ID: MS Sample												
Cyanide, Total	ND	0.2	0.179	90		-	-		90-110	-		30
Anions by Ion Chromatography - Westborough Lab Associated sample(s): 01 QC Batch ID: WG1266101-3 QC Sample: L1933582-01 Client ID: MS Sample												
Chloride	1060	200	1210	**74**	Q	-	-		90-110	-		18
General Chemistry - Westborough Lab Associated sample(s): 01 QC Batch ID: WG1266135-4 QC Sample: L1933226-01 Client ID: HA19-2(OW)												
Phenolics, Total	ND	0.4	0.34	84		-	-		70-130	-		20
General Chemistry - Westborough Lab Associated sample(s): 01 QC Batch ID: WG1266423-4 QC Sample: L1932796-06 Client ID: MS Sample												
TPH	ND	20	15.6	78		-	-		64-132	-		34

Lab Duplicate Analysis
Batch Quality Control

Project Name: POLAR PARK
Project Number: 4325.03

Lab Number: L1933226
Report Date: 08/06/19

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 01-02 QC Batch ID: WG1265236-2 QC Sample: L1931592-03 Client ID: DUP Sample						
pH	2.9	3.0	SU	3		5
General Chemistry - Westborough Lab Associated sample(s): 01 QC Batch ID: WG1265241-3 QC Sample: L1933226-01 Client ID: HA19-2(OW)						
Chlorine, Total Residual	ND	ND	mg/l	NC		20
General Chemistry - Westborough Lab Associated sample(s): 01 QC Batch ID: WG1265285-3 QC Sample: L1933226-01 Client ID: HA19-2(OW)						
Chromium, Hexavalent	ND	ND	mg/l	NC		20
General Chemistry - Westborough Lab Associated sample(s): 01-02 QC Batch ID: WG1265399-3 QC Sample: L1932925-02 Client ID: DUP Sample						
Nitrogen, Ammonia	ND	ND	mg/l	NC		20
General Chemistry - Westborough Lab Associated sample(s): 01 QC Batch ID: WG1265722-3 QC Sample: L1932442-01 Client ID: DUP Sample						
Sulfate	32	31	mg/l	3		14
General Chemistry - Westborough Lab Associated sample(s): 01 QC Batch ID: WG1265749-2 QC Sample: L1933201-01 Client ID: DUP Sample						
Solids, Total Suspended	56	55	mg/l	2		29
General Chemistry - Westborough Lab Associated sample(s): 01 QC Batch ID: WG1265787-3 QC Sample: L1932955-02 Client ID: DUP Sample						
Cyanide, Total	ND	ND	mg/l	NC		30
Anions by Ion Chromatography - Westborough Lab Associated sample(s): 01 QC Batch ID: WG1266101-4 QC Sample: L1933582-01 Client ID: DUP Sample						
Chloride	1060	1070	mg/l	1		18
General Chemistry - Westborough Lab Associated sample(s): 01 QC Batch ID: WG1266135-3 QC Sample: L1933226-01 Client ID: HA19-2(OW)						
Phenolics, Total	ND	ND	mg/l	NC		20

Lab Duplicate Analysis

Batch Quality Control

Project Name: POLAR PARK
Project Number: 4325.03

Lab Number: L1933226
Report Date: 08/06/19

Parameter	Native Sample	Duplicate Sample	Units	RPD	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 01 QC Batch ID: WG1266423-3 QC Sample: L1933582-02 Client ID: DUP Sample					
TPH	ND	ND	mg/l	NC	34

Project Name: POLAR PARK
Project Number: 4325.03

Lab Number: L1933226
Report Date: 08/06/19

Sample Receipt and Container Information

Were project specific reporting limits specified? YES

Cooler Information

Cooler	Custody Seal
A	Absent
B	Absent

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L1933226-01A	Vial Na2S2O3 preserved	A	NA		2.6	Y	Absent		504(14)
L1933226-01B	Vial Na2S2O3 preserved	A	NA		2.6	Y	Absent		504(14)
L1933226-01C	Vial Na2S2O3 preserved	A	NA		2.6	Y	Absent		504(14)
L1933226-01D	Vial Na2S2O3 preserved	A	NA		2.6	Y	Absent		504(14)
L1933226-01E	Vial Na2S2O3 preserved	A	NA		2.6	Y	Absent		624.1-RGP(7),624.1-SIM-RGP(7)
L1933226-01F	Vial Na2S2O3 preserved	A	NA		2.6	Y	Absent		624.1-RGP(7),624.1-SIM-RGP(7)
L1933226-01G	Vial Na2S2O3 preserved	A	NA		2.6	Y	Absent		624.1-RGP(7),624.1-SIM-RGP(7)
L1933226-01H	Vial Na2S2O3 preserved	A	NA		2.6	Y	Absent		624.1-RGP(7),624.1-SIM-RGP(7)
L1933226-01I	Vial HCl preserved	A	NA		2.6	Y	Absent		HOLD-SUB()
L1933226-01J	Vial HCl preserved	A	NA		2.6	Y	Absent		HOLD-SUB()
L1933226-01K	Vial HCl preserved	A	NA		2.6	Y	Absent		HOLD-SUB()
L1933226-01L	Plastic 250ml NaOH preserved	B	>12	>12	2.9	Y	Absent		TCN-4500(14)
L1933226-01M	Plastic 250ml HNO3 preserved	B	<2	<2	2.9	Y	Absent		AG-2008S(180),CR-2008S(180),FE-RI(180),AS-2008S(180),PB-2008S(180),ZN-2008S(180),NI-2008S(180),SE-2008S(180),CD-2008S(180),CU-2008S(180),SB-2008S(180),HG-R(28)
L1933226-01N	Plastic 250ml HNO3 preserved	B	<2	<2	2.9	Y	Absent		CD-2008T(180),NI-2008T(180),ZN-2008T(180),CU-2008T(180),FE-UI(180),HARDU(180),AG-2008T(180),AS-2008T(180),HG-U(28),SE-2008T(180),CR-2008T(180),PB-2008T(180),SB-2008T(180)
L1933226-01O	Plastic 500ml H2SO4 preserved	B	<2	<2	2.9	Y	Absent		NH3-4500(28)
L1933226-01P	Plastic 950ml unpreserved	B	7	7	2.9	Y	Absent		SO4-4500(28),CL-300(28),HEXCR-7196(1),TRC-4500(1),PH-4500(.01)
L1933226-01Q	Plastic 950ml unpreserved	B	7	7	2.9	Y	Absent		TSS-2540(7)
L1933226-01R	Amber 950ml H2SO4 preserved	B	<2	<2	2.9	Y	Absent		TPHENOL-420(28)

*Values in parentheses indicate holding time in days

Project Name: POLAR PARK
Project Number: 4325.03

Lab Number: L1933226
Report Date: 08/06/19

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L1933226-01S	Amber 1000ml HCl preserved	A	NA		2.6	Y	Absent		TPH-1664(28)
L1933226-01T	Amber 1000ml HCl preserved	A	NA		2.6	Y	Absent		TPH-1664(28)
L1933226-01U	Amber 1000ml Na2S2O3	A	7	7	2.6	Y	Absent		625.1-RGP(7),625.1-SIM-RGP(7)
L1933226-01V	Amber 1000ml Na2S2O3	A	7	7	2.6	Y	Absent		625.1-RGP(7),625.1-SIM-RGP(7)
L1933226-01W	Amber 1000ml Na2S2O3	A	7	7	2.6	Y	Absent		625.1-RGP(7),625.1-SIM-RGP(7)
L1933226-01X	Amber 1000ml Na2S2O3	A	7	7	2.6	Y	Absent		PCB-608.3(7)
L1933226-01Y	Amber 1000ml Na2S2O3	A	7	7	2.6	Y	Absent		PCB-608.3(7)
L1933226-01Z	Amber 1000ml Na2S2O3	A	7	7	2.6	Y	Absent		PCB-608.3(7)
L1933226-02A	Plastic 250ml HNO3 preserved	A	<2	<2	2.6	Y	Absent		CD-2008T(180),NI-2008T(180),ZN-2008T(180),CU-2008T(180),FE-UI(180),HARDU(180),AG-2008T(180),AS-2008T(180),HG-U(28),SE-2008T(180),CR-2008T(180),PB-2008T(180),SB-2008T(180)
L1933226-02A1	Plastic 250ml HNO3 preserved	A	<2	<2	2.6	Y	Absent		CD-2008T(180),NI-2008T(180),ZN-2008T(180),CU-2008T(180),FE-UI(180),HARDU(180),AG-2008T(180),AS-2008T(180),HG-U(28),SE-2008T(180),CR-2008T(180),PB-2008T(180),SB-2008T(180)
L1933226-02B	Plastic 500ml H2SO4 preserved	A	<2	<2	2.6	Y	Absent		NH3-4500(28)
L1933226-02B1	Plastic 500ml H2SO4 preserved	A	<2	<2	2.6	Y	Absent		NH3-4500(28)
L1933226-02C	Plastic 60ml unpreserved	A	7	7	2.6	Y	Absent		PH-4500(.01)
L1933226-02C1	Plastic 60ml unpreserved	A	7	7	2.6	Y	Absent		PH-4500(.01)

*Values in parentheses indicate holding time in days

Project Name:	POLAR PARK	**Lab Number:**	L1933226
Project Number:	4325.03	**Report Date:**	08/06/19

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:	POLAR PARK	**Lab Number:**	L1933226
Project Number:	4325.03	**Report Date:**	08/06/19

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.

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.

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 Condensation Product".

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.

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 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:	POLAR PARK	**Lab Number:**	L1933226
Project Number:	4325.03	**Report Date:**	08/06/19

REFERENCES

1 Test Methods for Evaluating Solid Waste: Physical/Chemical Methods. EPA SW-846. Third Edition. Updates I - IV, 2007.

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.

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.

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
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.
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

PAGE 1 OF 1

Date Rec'd in Lab: 7/26/19

ALPHA Job #: L1933226

ALPHA Analytical
8 Walkup Drive, Westboro, MA 01581, Tel: 508-898-9220
320 Forbes Blvd, Mansfield, MA 02048, Tel: 508-822-9300

Client Information

Client: Sanborn Head
Address: 1 Technology Park Dr
Westford, MA 01886
Phone: 978-577-1003
Email: Kwalker@Sanbornhead.com

Project Information

Project Name: Polar Park
Project Location: Worcester, MA
Project #: 4325.03
Project Manager: Kent Walker
ALPHA Quote #:

Turn-Around Time

☒ Standard ☐ RUSH (only confirmed if pre-approved)
Date Due:

Report Information - Data Deliverables

☒ ADEx ☒ EMAIL

Billing Information

☒ Same as Client info PO #:

Regulatory Requirements & Project Information Requirements

☐ Yes ☒ No MA MCP Analytical Methods ☐ Yes ☒ No CT RCP Analytical Methods
☐ Yes ☒ No Matrix Spike Required on this SDG? (Required for MCP Inorganics)
☐ Yes ☒ No GW1 Standards (Info Required for Metals & EPH with Targets)
☒ Yes ☐ No NPDES RGP
☐ Other State /Fed Program _____ Criteria _____

Additional Project Information:
*RGP metals include As, As, Cd, Cr, Cu, Ni, Pb, Sb, Se, Zn, Fe, Hg
HexCr, TriCr
*NPDES RGP minimum levels must be met

ALPHA Lab ID (Lab Use Only)	Sample ID	Collection Date	Collection Time	Sample Matrix	Sampler Initials	VOC: ☐ 8260 ☐ 624 ☐ 524.2	SVOC: ☐ ABN ☐ PAH	METALS: ☐ MCP 13 ☐ MCP 14 ☐ RCP 15	METALS: ☐ RCRA5 ☐ RCRA8 ☐ PP13	EPH: ☐ Ranges & Targets ☐ Ranges Only	VPH: ☐ Ranges & Targets ☐ Ranges Only	☐ PCB ☐ PEST	TPH: ☐ Quant Only ☐ Fingerprint	NPDES RGP Package	Total + Dissolved Metals *	pH, Sulfate, Hardness	Ammonia, pH, Hardness	Total Metals *	Ethanol	Sample Comments	TOTAL # BOTTLES
33226-01	HA19-2(OW)	7/26/19	10:00	GW	CWM									X	X	X			(H)		
-02	Middle River	7/26/19	11:20	SW	↓												X	X			

SAMPLE INFO
Filtration
☒ Field
☐ Lab to do
Preservation
☐ Lab to do

Container Type														F/A	P	P	P	P			
Preservative														O	O	O	O	O			

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

Preservative
A= None
B= HCl
C= HNO_3
D= H_2SO_4
E= NaOH
F= MeOH
G= $NaHSO_4$
H = $Na_2S_2O_3$
I= Ascorbic Acid
J = NH_4Cl
K= Zn Acetate
O= Other

Relinquished By:	Date/Time	Received By:	Date/Time
	7/26/19 12:13		7/26/19 1213

All samples submitted are subject to Alpha's Terms and Conditions. See reverse side.

FORM NO: 01-01 (rev. 12-Mar-2012)

ANALYTICAL REPORT

Lab Number:	L1935658
Client:	Sanborn, Head & Associates, Inc. 1 Technology Park Drive Westford, MA 01886
ATTN:	Kent Walker
Phone:	(978) 577-1003
Project Name:	MADISON COMMONS
Project Number:	4325.02
Report Date:	08/16/19

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: MADISON COMMONS
Project Number: 4325.02

Lab Number: L1935658
Report Date: 08/16/19

Alpha Sample ID	Client ID	Matrix	Sample Location	Collection Date/Time	Receive Date
L1935658-01	MC-41 (OW)	WATER	WORCESTER, MA	08/08/19 08:30	08/08/19
L1935658-02	GZ-813/GP70	WATER	WORCESTER, MA	08/08/19 10:15	08/08/19
L1935658-03	MW-1	WATER	WORCESTER, MA	08/08/19 12:30	08/08/19

Project Name:	MADISON COMMONS	**Lab Number:**	L1935658
Project Number:	4325.02	**Report Date:**	08/16/19

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:	MADISON COMMONS	**Lab Number:**	L1935658
Project Number:	4325.02	**Report Date:**	08/16/19

Case Narrative (continued)

Sample Receipt

The analyses performed were specified by the client.

Volatile Organics by Method 624

The WG1271705-3 LCS recovery, associated with L1935658-01 through -03, is above the acceptance criteria for tert-butyl alcohol (160%); however, the associated samples are non-detect to the RL for this target analyte. The results of the original analysis are reported.

Total Metals

The WG1270614-2 LCS recovery, associated with L1935658-01 through -03, is above the acceptance criteria for selenium (126%); however, the associated samples are non-detect to the RL for this target analyte. The results of the original analysis are reported.

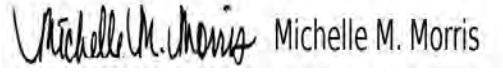
Dissolved Metals

The WG1270623-2 LCS recovery, associated with L1935658-01 through -03, is above the acceptance criteria for selenium (124%); however, the associated samples are non-detect to the RL for this target analyte. The results of the original analysis are reported.

Chlorine, Total Residual

The WG1270412-4 MS recovery (64%), performed on L1935658-03, is outside the acceptance criteria; however, the associated LCS recovery is within criteria. No further action was taken.

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:  Michelle M. Morris

Title: Technical Director/Representative Date: 08/16/19

ORGANICS

VOLATILES

Project Name: MADISON COMMONS
Project Number: 4325.02
Lab Number: L1935658
Report Date: 08/16/19

SAMPLE RESULTS

Lab ID: L1935658-01
Client ID: MC-41 (OW)
Sample Location: WORCESTER, MA

Date Collected: 08/08/19 08:30
Date Received: 08/08/19
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 128,624.1
Analytical Date: 08/12/19 13:52
Analyst: GT

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	1.0		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: MADISON COMMONS **Lab Number:** L1935658

Project Number: 4325.02 **Report Date:** 08/16/19

SAMPLE RESULTS

Lab ID: L1935658-01 Date Collected: 08/08/19 08:30

Client ID: MC-41 (OW) Date Received: 08/08/19

Sample Location: WORCESTER, MA Field Prep: Not Specified

Sample Depth:

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

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Pentafluorobenzene	110		60-140
Fluorobenzene	116		60-140
4-Bromofluorobenzene	101		60-140

Project Name: MADISON COMMONS
Project Number: 4325.02
Lab Number: L1935658
Report Date: 08/16/19

SAMPLE RESULTS

Lab ID: L1935658-01
Client ID: MC-41 (OW)
Sample Location: WORCESTER, MA

Date Collected: 08/08/19 08:30
Date Received: 08/08/19
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 128,624.1-SIM
Analytical Date: 08/12/19 13:52
Analyst: GT

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	113		60-140
4-Bromofluorobenzene	119		60-140

Project Name: MADISON COMMONS
Project Number: 4325.02
Lab Number: L1935658
Report Date: 08/16/19

SAMPLE RESULTS

Lab ID: L1935658-01
Client ID: MC-41 (OW)
Sample Location: WORCESTER, MA

Date Collected: 08/08/19 08:30
Date Received: 08/08/19
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 14,504.1
Analytical Date: 08/15/19 15:39
Analyst: AWS

Extraction Method: EPA 504.1
Extraction Date: 08/15/19 11:00

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

Project Name: MADISON COMMONS
Project Number: 4325.02
Lab Number: L1935658
Report Date: 08/16/19

SAMPLE RESULTS

Lab ID: L1935658-02
Client ID: GZ-813/GP70
Sample Location: WORCESTER, MA
Date Collected: 08/08/19 10:15
Date Received: 08/08/19
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 128,624.1
Analytical Date: 08/12/19 14:27
Analyst: GT

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	3.1		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	23		ug/l	1.0	--	1
1,1-Dichloroethene	ND		ug/l	1.0	--	1
cis-1,2-Dichloroethene	170		ug/l	1.0	--	1
Trichloroethene	22		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: MADISON COMMONS **Lab Number:** L1935658

Project Number: 4325.02 **Report Date:** 08/16/19

SAMPLE RESULTS

Lab ID: L1935658-02 Date Collected: 08/08/19 10:15

Client ID: GZ-813/GP70 Date Received: 08/08/19

Sample Location: WORCESTER, MA Field Prep: Not Specified

Sample Depth:

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

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Pentafluorobenzene	109		60-140
Fluorobenzene	115		60-140
4-Bromofluorobenzene	103		60-140

Project Name: MADISON COMMONS
Project Number: 4325.02
Lab Number: L1935658
Report Date: 08/16/19

SAMPLE RESULTS

Lab ID: L1935658-02
Client ID: GZ-813/GP70
Sample Location: WORCESTER, MA
Date Collected: 08/08/19 10:15
Date Received: 08/08/19
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 128,624.1-SIM
Analytical Date: 08/12/19 14:27
Analyst: GT

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	111		60-140
4-Bromofluorobenzene	117		60-140

Project Name: MADISON COMMONS
Project Number: 4325.02
Lab Number: L1935658
Report Date: 08/16/19

SAMPLE RESULTS

Lab ID: L1935658-02
Client ID: GZ-813/GP70
Sample Location: WORCESTER, MA

Date Collected: 08/08/19 10:15
Date Received: 08/08/19
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 14,504.1
Analytical Date: 08/15/19 16:11
Analyst: AWS

Extraction Method: EPA 504.1
Extraction Date: 08/15/19 11:00

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

Project Name: MADISON COMMONS
Project Number: 4325.02
Lab Number: L1935658
Report Date: 08/16/19

SAMPLE RESULTS

Lab ID: L1935658-03
Client ID: MW-1
Sample Location: WORCESTER, MA

Date Collected: 08/08/19 12:30
Date Received: 08/08/19
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 128,624.1
Analytical Date: 08/12/19 15:01
Analyst: GT

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: MADISON COMMONS **Lab Number:** L1935658

Project Number: 4325.02 **Report Date:** 08/16/19

SAMPLE RESULTS

Lab ID: L1935658-03 Date Collected: 08/08/19 12:30

Client ID: MW-1 Date Received: 08/08/19

Sample Location: WORCESTER, MA Field Prep: Not Specified

Sample Depth:

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

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Pentafluorobenzene	110		60-140
Fluorobenzene	116		60-140
4-Bromofluorobenzene	104		60-140

Project Name: MADISON COMMONS
Project Number: 4325.02
Lab Number: L1935658
Report Date: 08/16/19

SAMPLE RESULTS

Lab ID: L1935658-03
Client ID: MW-1
Sample Location: WORCESTER, MA

Date Collected: 08/08/19 12:30
Date Received: 08/08/19
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 128,624.1-SIM
Analytical Date: 08/12/19 15:01
Analyst: GT

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	112		60-140
4-Bromofluorobenzene	118		60-140

Project Name: MADISON COMMONS
Project Number: 4325.02
Lab Number: L1935658
Report Date: 08/16/19

SAMPLE RESULTS

Lab ID: L1935658-03
Client ID: MW-1
Sample Location: WORCESTER, MA

Date Collected: 08/08/19 12:30
Date Received: 08/08/19
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 14,504.1
Analytical Date: 08/15/19 16:28
Analyst: AWS

Extraction Method: EPA 504.1
Extraction Date: 08/15/19 11:00

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

Project Name: MADISON COMMONS
Project Number: 4325.02
Lab Number: L1935658
Report Date: 08/16/19

Method Blank Analysis
Batch Quality Control

Analytical Method: 128,624.1
Analytical Date: 08/12/19 11:07
Analyst: GT

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by GC/MS - Westborough Lab for sample(s): 01-03 Batch: WG1271705-4					
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: MADISON COMMONS
Project Number: 4325.02
Lab Number: L1935658
Report Date: 08/16/19

Method Blank Analysis
Batch Quality Control

Analytical Method: 128,624.1
Analytical Date: 08/12/19 11:07
Analyst: GT

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by GC/MS - Westborough Lab for sample(s): 01-03 Batch: WG1271705-4					

Surrogate	%Recovery	Qualifier	Acceptance Criteria
Pentafluorobenzene	113		60-140
Fluorobenzene	114		60-140
4-Bromofluorobenzene	101		60-140

Project Name: MADISON COMMONS
Project Number: 4325.02
Lab Number: L1935658
Report Date: 08/16/19

Method Blank Analysis
Batch Quality Control

Analytical Method: 128,624.1-SIM
Analytical Date: 08/12/19 11:07
Analyst: GT

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by GC/MS-SIM - Westborough Lab for sample(s): 01-03 Batch: WG1271730-4					
1,4-Dioxane	ND		ug/l	50	--

Surrogate	%Recovery	Qualifier	Acceptance Criteria
Fluorobenzene	111		60-140
4-Bromofluorobenzene	117		60-140

Project Name: MADISON COMMONS
Project Number: 4325.02
Lab Number: L1935658
Report Date: 08/16/19

Method Blank Analysis
Batch Quality Control

Analytical Method: 14,504.1
Analytical Date: 08/15/19 14:33
Analyst: AWS

Extraction Method: EPA 504.1
Extraction Date: 08/15/19 11:00

Parameter	Result	Qualifier	Units	RL	MDL	
Microextractables by GC - Westborough Lab for sample(s): 01-03 Batch: WG1272861-1						
1,2-Dibromoethane	ND		ug/l	0.010	--	A

Lab Control Sample Analysis

Batch Quality Control

Project Name: MADISON COMMONS

Project Number: 4325.02

Lab Number: L1935658

Report Date: 08/16/19

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by GC/MS - Westborough Lab Associated sample(s): 01-03 Batch: WG1271705-3								
Methylene chloride	100		-		60-140	-		28
1,1-Dichloroethane	90		-		50-150	-		49
Carbon tetrachloride	90		-		70-130	-		41
1,1,2-Trichloroethane	100		-		70-130	-		45
Tetrachloroethene	105		-		70-130	-		39
1,2-Dichloroethane	115		-		70-130	-		49
1,1,1-Trichloroethane	125		-		70-130	-		36
Benzene	120		-		65-135	-		61
Toluene	105		-		70-130	-		41
Ethylbenzene	105		-		60-140	-		63
Vinyl chloride	95		-		5-195	-		66
1,1-Dichloroethene	120		-		50-150	-		32
cis-1,2-Dichloroethene	120		-		60-140	-		30
Trichloroethene	120		-		65-135	-		48
1,2-Dichlorobenzene	105		-		65-135	-		57
1,3-Dichlorobenzene	100		-		70-130	-		43
1,4-Dichlorobenzene	100		-		65-135	-		57
p/m-Xylene	102		-		60-140	-		30
o-xylene	100		-		60-140	-		30
Acetone	114		-		40-160	-		30
Methyl tert butyl ether	125		-		60-140	-		30
Tert-Butyl Alcohol	**160**	Q	-		60-140	-		30
Tertiary-Amyl Methyl Ether	120		-		60-140	-		30

Lab Control Sample Analysis
Batch Quality Control

Project Name: MADISON COMMONS
Project Number: 4325.02

Lab Number: L1935658
Report Date: 08/16/19

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by GC/MS - Westborough Lab Associated sample(s): 01-03 Batch: WG1271705-3								

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
Pentafluorobenzene	114				60-140
Fluorobenzene	114				60-140
4-Bromofluorobenzene	99				60-140

Lab Control Sample Analysis
Batch Quality Control

Project Name: MADISON COMMONS
Project Number: 4325.02

Lab Number: L1935658
Report Date: 08/16/19

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by GC/MS-SIM - Westborough Lab Associated sample(s): 01-03 Batch: WG1271730-3								
1,4-Dioxane	100		-		60-140	-		20

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
Fluorobenzene	111				60-140
4-Bromofluorobenzene	102				60-140

Lab Control Sample Analysis

Batch Quality Control

Project Name: MADISON COMMONS

Project Number: 4325.02

Lab Number: L1935658

Report Date: 08/16/19

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits	Column
Microextractables by GC - Westborough Lab	Associated sample(s): 01-03 Batch: WG1272861-2								
1,2-Dibromoethane	104		-		80-120	-			A

Matrix Spike Analysis

Batch Quality Control

Project Name: MADISON COMMONS

Project Number: 4325.02

Lab Number: L1935658

Report Date: 08/16/19

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): 01-03	QC Batch ID: WG1272861-3	QC Sample: L1935658-01	Client ID: MC-41 (OW)									
1,2-Dibromoethane	ND	0.249	0.266	107		-	-		80-120	-		20	A

SEMIVOLATILES

Project Name: MADISON COMMONS
Project Number: 4325.02
Lab Number: L1935658
Report Date: 08/16/19

SAMPLE RESULTS

Lab ID: L1935658-01
Client ID: MC-41 (OW)
Sample Location: WORCESTER, MA

Date Collected: 08/08/19 08:30
Date Received: 08/08/19
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 129,625.1
Analytical Date: 08/14/19 14:47
Analyst: EK

Extraction Method: EPA 625.1
Extraction Date: 08/11/19 07:54

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Bis(2-ethylhexyl)phthalate	ND		ug/l	2.2	--	1
Butyl benzyl phthalate	ND		ug/l	5.0	--	1
Di-n-butylphthalate	ND		ug/l	5.0	--	1
Di-n-octylphthalate	ND		ug/l	5.0	--	1
Diethyl phthalate	ND		ug/l	5.0	--	1
Dimethyl phthalate	ND		ug/l	5.0	--	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	74		42-122
2-Fluorobiphenyl	64		46-121
4-Terphenyl-d14	81		47-138

Project Name: MADISON COMMONS
Project Number: 4325.02
Lab Number: L1935658
Report Date: 08/16/19

SAMPLE RESULTS

Lab ID: L1935658-01
Client ID: MC-41 (OW)
Sample Location: WORCESTER, MA

Date Collected: 08/08/19 08:30
Date Received: 08/08/19
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 129,625.1-SIM
Analytical Date: 08/12/19 11:07
Analyst: DV

Extraction Method: EPA 625.1
Extraction Date: 08/11/19 07:55

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS-SIM - Westborough Lab						
Acenaphthene	ND		ug/l	0.10	--	1
Fluoranthene	0.27		ug/l	0.10	--	1
Naphthalene	0.11		ug/l	0.10	--	1
Benzo(a)anthracene	0.22		ug/l	0.10	--	1
Benzo(a)pyrene	0.17		ug/l	0.10	--	1
Benzo(b)fluoranthene	0.22		ug/l	0.10	--	1
Benzo(k)fluoranthene	ND		ug/l	0.10	--	1
Chrysene	0.15		ug/l	0.10	--	1
Acenaphthylene	ND		ug/l	0.10	--	1
Anthracene	ND		ug/l	0.10	--	1
Benzo(ghi)perylene	0.13		ug/l	0.10	--	1
Fluorene	ND		ug/l	0.10	--	1
Phenanthrene	0.11		ug/l	0.10	--	1
Dibenzo(a,h)anthracene	ND		ug/l	0.10	--	1
Indeno(1,2,3-cd)pyrene	0.14		ug/l	0.10	--	1
Pyrene	0.24		ug/l	0.10	--	1
Pentachlorophenol	ND		ug/l	1.0	--	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Fluorophenol	39		25-87
Phenol-d6	29		16-65
Nitrobenzene-d5	76		42-122
2-Fluorobiphenyl	75		46-121
2,4,6-Tribromophenol	69		45-128
4-Terphenyl-d14	70		47-138

Project Name: MADISON COMMONS
Project Number: 4325.02
Lab Number: L1935658
Report Date: 08/16/19

SAMPLE RESULTS

Lab ID: L1935658-02
Client ID: GZ-813/GP70
Sample Location: WORCESTER, MA

Date Collected: 08/08/19 10:15
Date Received: 08/08/19
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 129,625.1
Analytical Date: 08/14/19 15:13
Analyst: SZ

Extraction Method: EPA 625.1
Extraction Date: 08/11/19 07:54

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Bis(2-ethylhexyl)phthalate	11		ug/l	2.2	--	1
Butyl benzyl phthalate	ND		ug/l	5.0	--	1
Di-n-butylphthalate	ND		ug/l	5.0	--	1
Di-n-octylphthalate	ND		ug/l	5.0	--	1
Diethyl phthalate	ND		ug/l	5.0	--	1
Dimethyl phthalate	ND		ug/l	5.0	--	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	87		42-122
2-Fluorobiphenyl	76		46-121
4-Terphenyl-d14	94		47-138

Project Name: MADISON COMMONS
Project Number: 4325.02
Lab Number: L1935658
Report Date: 08/16/19

SAMPLE RESULTS

Lab ID: L1935658-02
Client ID: GZ-813/GP70
Sample Location: WORCESTER, MA

Date Collected: 08/08/19 10:15
Date Received: 08/08/19
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 129,625.1-SIM
Analytical Date: 08/12/19 11:24
Analyst: DV

Extraction Method: EPA 625.1
Extraction Date: 08/11/19 07:55

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS-SIM - Westborough Lab						
Acenaphthene	ND		ug/l	0.10	--	1
Fluoranthene	3.9		ug/l	0.10	--	1
Naphthalene	ND		ug/l	0.10	--	1
Benzo(a)anthracene	1.0		ug/l	0.10	--	1
Benzo(a)pyrene	1.2		ug/l	0.10	--	1
Benzo(b)fluoranthene	2.2		ug/l	0.10	--	1
Benzo(k)fluoranthene	0.72		ug/l	0.10	--	1
Chrysene	1.4		ug/l	0.10	--	1
Acenaphthylene	0.19		ug/l	0.10	--	1
Anthracene	0.21		ug/l	0.10	--	1
Benzo(ghi)perylene	1.3		ug/l	0.10	--	1
Fluorene	0.10		ug/l	0.10	--	1
Phenanthrene	0.66		ug/l	0.10	--	1
Dibenzo(a,h)anthracene	0.26		ug/l	0.10	--	1
Indeno(1,2,3-cd)pyrene	1.3		ug/l	0.10	--	1
Pyrene	2.4		ug/l	0.10	--	1
Pentachlorophenol	ND		ug/l	1.0	--	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Fluorophenol	47		25-87
Phenol-d6	34		16-65
Nitrobenzene-d5	94		42-122
2-Fluorobiphenyl	88		46-121
2,4,6-Tribromophenol	84		45-128
4-Terphenyl-d14	82		47-138

Project Name: MADISON COMMONS
Project Number: 4325.02
Lab Number: L1935658
Report Date: 08/16/19

SAMPLE RESULTS

Lab ID: L1935658-03
Client ID: MW-1
Sample Location: WORCESTER, MA

Date Collected: 08/08/19 12:30
Date Received: 08/08/19
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 129,625.1
Analytical Date: 08/14/19 16:03
Analyst: SZ

Extraction Method: EPA 625.1
Extraction Date: 08/11/19 07:54

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Bis(2-ethylhexyl)phthalate	2.7		ug/l	2.2	--	1
Butyl benzyl phthalate	ND		ug/l	5.0	--	1
Di-n-butylphthalate	ND		ug/l	5.0	--	1
Di-n-octylphthalate	ND		ug/l	5.0	--	1
Diethyl phthalate	ND		ug/l	5.0	--	1
Dimethyl phthalate	ND		ug/l	5.0	--	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	92		42-122
2-Fluorobiphenyl	81		46-121
4-Terphenyl-d14	104		47-138

Project Name: MADISON COMMONS
Project Number: 4325.02
Lab Number: L1935658
Report Date: 08/16/19

SAMPLE RESULTS

Lab ID: L1935658-03
Client ID: MW-1
Sample Location: WORCESTER, MA

Date Collected: 08/08/19 12:30
Date Received: 08/08/19
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 129,625.1-SIM
Analytical Date: 08/12/19 11:41
Analyst: DV

Extraction Method: EPA 625.1
Extraction Date: 08/11/19 07:55

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS-SIM - Westborough Lab						
Acenaphthene	ND		ug/l	0.10	--	1
Fluoranthene	0.41		ug/l	0.10	--	1
Naphthalene	0.15		ug/l	0.10	--	1
Benzo(a)anthracene	0.19		ug/l	0.10	--	1
Benzo(a)pyrene	0.20		ug/l	0.10	--	1
Benzo(b)fluoranthene	0.30		ug/l	0.10	--	1
Benzo(k)fluoranthene	ND		ug/l	0.10	--	1
Chrysene	0.19		ug/l	0.10	--	1
Acenaphthylene	ND		ug/l	0.10	--	1
Anthracene	ND		ug/l	0.10	--	1
Benzo(ghi)perylene	0.16		ug/l	0.10	--	1
Fluorene	ND		ug/l	0.10	--	1
Phenanthrene	0.16		ug/l	0.10	--	1
Dibenzo(a,h)anthracene	ND		ug/l	0.10	--	1
Indeno(1,2,3-cd)pyrene	0.16		ug/l	0.10	--	1
Pyrene	0.36		ug/l	0.10	--	1
Pentachlorophenol	ND		ug/l	1.0	--	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Fluorophenol	49		25-87
Phenol-d6	36		16-65
Nitrobenzene-d5	89		42-122
2-Fluorobiphenyl	80		46-121
2,4,6-Tribromophenol	80		45-128
4-Terphenyl-d14	85		47-138

Project Name: MADISON COMMONS
Project Number: 4325.02
Lab Number: L1935658
Report Date: 08/16/19

Method Blank Analysis
Batch Quality Control

Analytical Method: 129,625.1-SIM
Analytical Date: 08/11/19 11:14
Analyst: DV

Extraction Method: EPA 625.1
Extraction Date: 08/10/19 13:30

Parameter	Result	Qualifier	Units	RL	MDL
Semivolatile Organics by GC/MS-SIM - Westborough Lab for sample(s): 01-03 Batch: WG1270981-1					
Acenaphthene	ND		ug/l	0.10	--
Fluoranthene	ND		ug/l	0.10	--
Naphthalene	ND		ug/l	0.10	--
Benzo(a)anthracene	ND		ug/l	0.10	--
Benzo(a)pyrene	ND		ug/l	0.10	--
Benzo(b)fluoranthene	ND		ug/l	0.10	--
Benzo(k)fluoranthene	ND		ug/l	0.10	--
Chrysene	ND		ug/l	0.10	--
Acenaphthylene	ND		ug/l	0.10	--
Anthracene	ND		ug/l	0.10	--
Benzo(ghi)perylene	ND		ug/l	0.10	--
Fluorene	ND		ug/l	0.10	--
Phenanthrene	ND		ug/l	0.10	--
Dibenzo(a,h)anthracene	ND		ug/l	0.10	--
Indeno(1,2,3-cd)pyrene	ND		ug/l	0.10	--
Pyrene	ND		ug/l	0.10	--
Pentachlorophenol	ND		ug/l	1.0	--

Surrogate	%Recovery	Qualifier	Acceptance Criteria
2-Fluorophenol	41		25-87
Phenol-d6	28		16-65
Nitrobenzene-d5	69		42-122
2-Fluorobiphenyl	67		46-121
2,4,6-Tribromophenol	58		45-128
4-Terphenyl-d14	65		47-138

Project Name: MADISON COMMONS
Project Number: 4325.02
Lab Number: L1935658
Report Date: 08/16/19

Method Blank Analysis
Batch Quality Control

Analytical Method: 129,625.1
Analytical Date: 08/11/19 18:12
Analyst: SZ

Extraction Method: EPA 625.1
Extraction Date: 08/10/19 13:30

Parameter	Result	Qualifier	Units	RL	MDL
Semivolatile Organics by GC/MS - Westborough Lab for sample(s): 01-03 Batch: WG1271005-1					
Bis(2-ethylhexyl)phthalate	ND		ug/l	2.2	--
Butyl benzyl phthalate	ND		ug/l	5.0	--
Di-n-butylphthalate	ND		ug/l	5.0	--
Di-n-octylphthalate	ND		ug/l	5.0	--
Diethyl phthalate	ND		ug/l	5.0	--
Dimethyl phthalate	ND		ug/l	5.0	--

Surrogate	%Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	60		42-122
2-Fluorobiphenyl	49		46-121
4-Terphenyl-d14	60		47-138

Lab Control Sample Analysis
Batch Quality Control

Project Name: MADISON COMMONS
Project Number: 4325.02

Lab Number: L1935658
Report Date: 08/16/19

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Semivolatile Organics by GC/MS-SIM - Westborough Lab Associated sample(s): 01-03 Batch: WG1270981-2								
Acenaphthene	68		-		60-132	-		30
Fluoranthene	82		-		43-121	-		30
Naphthalene	68		-		36-120	-		30
Benzo(a)anthracene	88		-		42-133	-		30
Benzo(a)pyrene	75		-		32-148	-		30
Benzo(b)fluoranthene	78		-		42-140	-		30
Benzo(k)fluoranthene	75		-		25-146	-		30
Chrysene	75		-		44-140	-		30
Acenaphthylene	75		-		54-126	-		30
Anthracene	84		-		43-120	-		30
Benzo(ghi)perylene	79		-		1-195	-		30
Fluorene	72		-		70-120	-		30
Phenanthrene	79		-		65-120	-		30
Dibenzo(a,h)anthracene	79		-		1-200	-		30
Indeno(1,2,3-cd)pyrene	86		-		1-151	-		30
Pyrene	81		-		70-120	-		30
Pentachlorophenol	69		-		38-152	-		30

Lab Control Sample Analysis
Batch Quality Control

Project Name: MADISON COMMONS
Project Number: 4325.02

Lab Number: L1935658
Report Date: 08/16/19

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Semivolatile Organics by GC/MS-SIM - Westborough Lab Associated sample(s): 01-03 Batch: WG1270981-2								

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
2-Fluorophenol	47				25-87
Phenol-d6	34				16-65
Nitrobenzene-d5	82				42-122
2-Fluorobiphenyl	73				46-121
2,4,6-Tribromophenol	75				45-128
4-Terphenyl-d14	79				47-138

Lab Control Sample Analysis
Batch Quality Control

Project Name: MADISON COMMONS
Project Number: 4325.02

Lab Number: L1935658
Report Date: 08/16/19

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Semivolatile Organics by GC/MS - Westborough Lab Associated sample(s): 01-03 Batch: WG1271005-2								
Bis(2-ethylhexyl)phthalate	122		-		29-137	-		82
Butyl benzyl phthalate	108		-		1-140	-		60
Di-n-butylphthalate	109		-		8-120	-		47
Di-n-octylphthalate	118		-		19-132	-		69
Diethyl phthalate	96		-		1-120	-		100
Dimethyl phthalate	80		-		1-120	-		183

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
Nitrobenzene-d5	82				42-122
2-Fluorobiphenyl	68				46-121
4-Terphenyl-d14	90				47-138

PCBS

Project Name: MADISON COMMONS
Project Number: 4325.02
Lab Number: L1935658
Report Date: 08/16/19

SAMPLE RESULTS

Lab ID: L1935658-01
Client ID: MC-41 (OW)
Sample Location: WORCESTER, MA

Date Collected: 08/08/19 08:30
Date Received: 08/08/19
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 127,608.3
Analytical Date: 08/16/19 00:24
Analyst: AWS

Extraction Method: EPA 608.3
Extraction Date: 08/13/19 05:04
Cleanup Method: EPA 3665A
Cleanup Date: 08/14/19
Cleanup Method: EPA 3660B
Cleanup Date: 08/15/19

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	78		37-123	B
Decachlorobiphenyl	60		38-114	B
2,4,5,6-Tetrachloro-m-xylene	77		37-123	A
Decachlorobiphenyl	68		38-114	A

Project Name: MADISON COMMONS
Project Number: 4325.02
Lab Number: L1935658
Report Date: 08/16/19

SAMPLE RESULTS

Lab ID: L1935658-02
Client ID: GZ-813/GP70
Sample Location: WORCESTER, MA

Date Collected: 08/08/19 10:15
Date Received: 08/08/19
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 127,608.3
Analytical Date: 08/16/19 03:06
Analyst: AWS

Extraction Method: EPA 608.3
Extraction Date: 08/13/19 05:04
Cleanup Method: EPA 3665A
Cleanup Date: 08/14/19
Cleanup Method: EPA 3660B
Cleanup Date: 08/15/19

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	64		37-123	B
Decachlorobiphenyl	53		38-114	B
2,4,5,6-Tetrachloro-m-xylene	64		37-123	A
Decachlorobiphenyl	49		38-114	A

Project Name: MADISON COMMONS
Project Number: 4325.02
Lab Number: L1935658
Report Date: 08/16/19

SAMPLE RESULTS

Lab ID: L1935658-03
Client ID: MW-1
Sample Location: WORCESTER, MA

Date Collected: 08/08/19 12:30
Date Received: 08/08/19
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 127,608.3
Analytical Date: 08/16/19 03:18
Analyst: AWS

Extraction Method: EPA 608.3
Extraction Date: 08/13/19 05:04
Cleanup Method: EPA 3665A
Cleanup Date: 08/14/19
Cleanup Method: EPA 3660B
Cleanup Date: 08/15/19

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	65		38-114	B
2,4,5,6-Tetrachloro-m-xylene	62		37-123	A
Decachlorobiphenyl	59		38-114	A

Project Name: MADISON COMMONS
Project Number: 4325.02
Lab Number: L1935658
Report Date: 08/16/19

Method Blank Analysis
Batch Quality Control

Analytical Method: 127,608.3
Analytical Date: 08/16/19 01:12
Analyst: AWS

Extraction Method: EPA 608.3
Extraction Date: 08/12/19 17:03
Cleanup Method: EPA 3665A
Cleanup Date: 08/14/19
Cleanup Method: EPA 3660B
Cleanup Date: 08/15/19

Parameter	Result	Qualifier	Units	RL	MDL	Column
Polychlorinated Biphenyls by GC - Westborough Lab for sample(s): 01-03 Batch: WG1271458-1						
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	82		37-123	B
Decachlorobiphenyl	85		38-114	B
2,4,5,6-Tetrachloro-m-xylene	79		37-123	A
Decachlorobiphenyl	92		38-114	A

Lab Control Sample Analysis
Batch Quality Control

Project Name: MADISON COMMONS
Project Number: 4325.02

Lab Number: L1935658
Report Date: 08/16/19

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits	Column
Polychlorinated Biphenyls by GC - Westborough Lab Associated sample(s): 01-03 Batch: WG1271458-2									
Aroclor 1016	82		-		50-140	-		36	A
Aroclor 1260	74		-		8-140	-		38	A

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	76				37-123	B
Decachlorobiphenyl	84				38-114	B
2,4,5,6-Tetrachloro-m-xylene	79				37-123	A
Decachlorobiphenyl	95				38-114	A

METALS

Project Name: MADISON COMMONS
Project Number: 4325.02
Lab Number: L1935658
Report Date: 08/16/19

SAMPLE RESULTS

Lab ID: L1935658-01
Client ID: MC-41 (OW)
Sample Location: WORCESTER, MA
Sample Depth:
Matrix: Water

Date Collected: 08/08/19 08:30
Date Received: 08/08/19
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	0.00723		mg/l	0.00100	--	1	08/09/19 13:20	08/12/19 18:11	EPA 3005A	3,200.8	AM
Cadmium, Total	0.00059		mg/l	0.00020	--	1	08/09/19 13:20	08/12/19 18:11	EPA 3005A	3,200.8	AM
Chromium, Total	0.00206		mg/l	0.00100	--	1	08/09/19 13:20	08/12/19 18:11	EPA 3005A	3,200.8	AM
Copper, Total	0.03560		mg/l	0.00100	--	1	08/09/19 13:20	08/12/19 18:11	EPA 3005A	3,200.8	AM
Iron, Total	5.34		mg/l	0.050	--	1	08/09/19 13:20	08/13/19 16:13	EPA 3005A	19,200.7	LC
Lead, Total	0.01656		mg/l	0.00100	--	1	08/09/19 13:20	08/12/19 18:11	EPA 3005A	3,200.8	AM
Mercury, Total	ND		mg/l	0.00020	--	1	08/12/19 16:36	08/13/19 12:23	EPA 245.1	3,245.1	GD
Nickel, Total	0.00583		mg/l	0.00200	--	1	08/09/19 13:20	08/12/19 18:11	EPA 3005A	3,200.8	AM
Selenium, Total	ND		mg/l	0.00500	--	1	08/09/19 13:20	08/12/19 18:11	EPA 3005A	3,200.8	AM
Silver, Total	ND		mg/l	0.00040	--	1	08/09/19 13:20	08/12/19 18:11	EPA 3005A	3,200.8	AM
Zinc, Total	0.1089		mg/l	0.01000	--	1	08/09/19 13:20	08/12/19 18:11	EPA 3005A	3,200.8	AM
Total Hardness by SM 2340B - Mansfield Lab											
Hardness	122		mg/l	0.660	NA	1	08/09/19 13:20	08/13/19 16:13	EPA 3005A	19,200.7	LC
General Chemistry - Mansfield Lab											
Chromium, Trivalent	ND		mg/l	0.010	--	1		08/12/19 18:11	NA	107,-	
Dissolved Metals - Mansfield Lab											
Arsenic, Dissolved	0.0018		mg/l	0.0010	--	1	08/09/19 12:16	08/12/19 18:19	EPA 3005A	3,200.8	AM
Cadmium, Dissolved	ND		mg/l	0.0002	--	1	08/09/19 12:16	08/12/19 18:19	EPA 3005A	3,200.8	AM
Chromium, Dissolved	ND		mg/l	0.0010	--	1	08/09/19 12:16	08/12/19 18:19	EPA 3005A	3,200.8	AM
Copper, Dissolved	0.0229		mg/l	0.0010	--	1	08/09/19 12:16	08/12/19 18:19	EPA 3005A	3,200.8	AM
Iron, Dissolved	0.611		mg/l	0.050	--	1	08/09/19 12:16	08/13/19 15:36	EPA 3005A	19,200.7	LC
Lead, Dissolved	0.0014		mg/l	0.0010	--	1	08/09/19 12:16	08/12/19 18:19	EPA 3005A	3,200.8	AM
Mercury, Dissolved	ND		mg/l	0.00020	--	1	08/13/19 15:50	08/13/19 21:37	EPA 245.1	3,245.1	MG
Nickel, Dissolved	0.0041		mg/l	0.0020	--	1	08/09/19 12:16	08/12/19 18:19	EPA 3005A	3,200.8	AM
Selenium, Dissolved	ND		mg/l	0.0050	--	1	08/09/19 12:16	08/12/19 18:19	EPA 3005A	3,200.8	AM

Project Name: MADISON COMMONS
Lab Number: L1935658
Project Number: 4325.02
Report Date: 08/16/19

SAMPLE RESULTS

Lab ID: L1935658-01
Client ID: MC-41 (OW)
Sample Location: WORCESTER, MA
Date Collected: 08/08/19 08:30
Date Received: 08/08/19
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
Silver, Dissolved	ND		mg/l	0.0004	--	1	08/09/19 12:16	08/12/19 18:19	EPA 3005A	3,200.8	AM
Zinc, Dissolved	0.0387		mg/l	0.0100	--	1	08/09/19 12:16	08/12/19 18:19	EPA 3005A	3,200.8	AM

Project Name: MADISON COMMONS
Project Number: 4325.02
Lab Number: L1935658
Report Date: 08/16/19

SAMPLE RESULTS

Lab ID: L1935658-02
Client ID: GZ-813/GP70
Sample Location: WORCESTER, MA
Sample Depth:
Matrix: Water

Date Collected: 08/08/19 10:15
Date Received: 08/08/19
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	0.04879		mg/l	0.00100	--	1	08/09/19 13:20	08/12/19 18:15	EPA 3005A	3,200.8	AM
Cadmium, Total	0.00055		mg/l	0.00020	--	1	08/09/19 13:20	08/12/19 18:15	EPA 3005A	3,200.8	AM
Chromium, Total	0.2190		mg/l	0.00100	--	1	08/09/19 13:20	08/12/19 18:15	EPA 3005A	3,200.8	AM
Copper, Total	0.01040		mg/l	0.00100	--	1	08/09/19 13:20	08/12/19 18:15	EPA 3005A	3,200.8	AM
Iron, Total	4.23		mg/l	0.050	--	1	08/09/19 13:20	08/13/19 17:51	EPA 3005A	19,200.7	AB
Lead, Total	0.00646		mg/l	0.00100	--	1	08/09/19 13:20	08/12/19 18:15	EPA 3005A	3,200.8	AM
Mercury, Total	ND		mg/l	0.00020	--	1	08/12/19 16:36	08/13/19 12:25	EPA 245.1	3,245.1	GD
Nickel, Total	0.01537		mg/l	0.00200	--	1	08/09/19 13:20	08/12/19 18:15	EPA 3005A	3,200.8	AM
Selenium, Total	ND		mg/l	0.00500	--	1	08/09/19 13:20	08/12/19 18:15	EPA 3005A	3,200.8	AM
Silver, Total	ND		mg/l	0.00040	--	1	08/09/19 13:20	08/12/19 18:15	EPA 3005A	3,200.8	AM
Zinc, Total	0.04663		mg/l	0.01000	--	1	08/09/19 13:20	08/12/19 18:15	EPA 3005A	3,200.8	AM
Total Hardness by SM 2340B - Mansfield Lab											
Hardness	204		mg/l	0.660	NA	1	08/09/19 13:20	08/13/19 17:51	EPA 3005A	19,200.7	AB
General Chemistry - Mansfield Lab											
Chromium, Trivalent	0.219		mg/l	0.010	--	1		08/12/19 18:15	NA	107,-	
Dissolved Metals - Mansfield Lab											
Arsenic, Dissolved	0.0330		mg/l	0.0010	--	1	08/09/19 12:16	08/12/19 18:24	EPA 3005A	3,200.8	AM
Cadmium, Dissolved	ND		mg/l	0.0002	--	1	08/09/19 12:16	08/12/19 18:24	EPA 3005A	3,200.8	AM
Chromium, Dissolved	0.0177		mg/l	0.0010	--	1	08/09/19 12:16	08/12/19 18:24	EPA 3005A	3,200.8	AM
Copper, Dissolved	0.0027		mg/l	0.0010	--	1	08/09/19 12:16	08/12/19 18:24	EPA 3005A	3,200.8	AM
Iron, Dissolved	ND		mg/l	0.050	--	1	08/09/19 12:16	08/13/19 15:40	EPA 3005A	19,200.7	AB
Lead, Dissolved	ND		mg/l	0.0010	--	1	08/09/19 12:16	08/12/19 18:24	EPA 3005A	3,200.8	AM
Mercury, Dissolved	ND		mg/l	0.00020	--	1	08/13/19 15:50	08/13/19 21:38	EPA 245.1	3,245.1	MG
Nickel, Dissolved	0.0321		mg/l	0.0020	--	1	08/09/19 12:16	08/12/19 18:24	EPA 3005A	3,200.8	AM
Selenium, Dissolved	ND		mg/l	0.0050	--	1	08/09/19 12:16	08/12/19 18:24	EPA 3005A	3,200.8	AM

Project Name: MADISON COMMONS
Lab Number: L1935658
Project Number: 4325.02
Report Date: 08/16/19

SAMPLE RESULTS

Lab ID: L1935658-02
Client ID: GZ-813/GP70
Sample Location: WORCESTER, MA
Date Collected: 08/08/19 10:15
Date Received: 08/08/19
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
Silver, Dissolved	ND		mg/l	0.0004	--	1	08/09/19 12:16	08/12/19 18:24	EPA 3005A	3,200.8	AM
Zinc, Dissolved	ND		mg/l	0.0100	--	1	08/09/19 12:16	08/12/19 18:24	EPA 3005A	3,200.8	AM

Project Name: MADISON COMMONS
Project Number: 4325.02
Lab Number: L1935658
Report Date: 08/16/19

SAMPLE RESULTS

Lab ID: L1935658-03
Client ID: MW-1
Sample Location: WORCESTER, MA
Sample Depth:
Matrix: Water

Date Collected: 08/08/19 12:30
Date Received: 08/08/19
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	0.00914		mg/l	0.00100	--	1	08/09/19 13:20	08/12/19 20:02	EPA 3005A	3,200.8	AM
Cadmium, Total	0.00027		mg/l	0.00020	--	1	08/09/19 13:20	08/12/19 20:02	EPA 3005A	3,200.8	AM
Chromium, Total	0.00214		mg/l	0.00100	--	1	08/09/19 13:20	08/12/19 20:02	EPA 3005A	3,200.8	AM
Copper, Total	0.00847		mg/l	0.00100	--	1	08/09/19 13:20	08/12/19 20:02	EPA 3005A	3,200.8	AM
Iron, Total	1.08		mg/l	0.050	--	1	08/09/19 13:20	08/13/19 17:55	EPA 3005A	19,200.7	AB
Lead, Total	0.00641		mg/l	0.00100	--	1	08/09/19 13:20	08/12/19 20:02	EPA 3005A	3,200.8	AM
Mercury, Total	ND		mg/l	0.00020	--	1	08/12/19 16:36	08/13/19 12:27	EPA 245.1	3,245.1	GD
Nickel, Total	0.04717		mg/l	0.00200	--	1	08/09/19 13:20	08/12/19 20:02	EPA 3005A	3,200.8	AM
Selenium, Total	ND		mg/l	0.00500	--	1	08/09/19 13:20	08/12/19 20:02	EPA 3005A	3,200.8	AM
Silver, Total	ND		mg/l	0.00040	--	1	08/09/19 13:20	08/12/19 20:02	EPA 3005A	3,200.8	AM
Zinc, Total	0.02503		mg/l	0.01000	--	1	08/09/19 13:20	08/12/19 20:02	EPA 3005A	3,200.8	AM
Total Hardness by SM 2340B - Mansfield Lab											
Hardness	124		mg/l	0.660	NA	1	08/09/19 13:20	08/13/19 17:55	EPA 3005A	19,200.7	AB
General Chemistry - Mansfield Lab											
Chromium, Trivalent	ND		mg/l	0.010	--	1		08/12/19 20:02	NA	107,-	
Dissolved Metals - Mansfield Lab											
Arsenic, Dissolved	0.0065		mg/l	0.0010	--	1	08/09/19 12:16	08/12/19 18:28	EPA 3005A	3,200.8	AM
Cadmium, Dissolved	ND		mg/l	0.0002	--	1	08/09/19 12:16	08/12/19 18:28	EPA 3005A	3,200.8	AM
Chromium, Dissolved	ND		mg/l	0.0010	--	1	08/09/19 12:16	08/12/19 18:28	EPA 3005A	3,200.8	AM
Copper, Dissolved	0.0025		mg/l	0.0010	--	1	08/09/19 12:16	08/12/19 18:28	EPA 3005A	3,200.8	AM
Iron, Dissolved	0.128		mg/l	0.050	--	1	08/09/19 12:16	08/13/19 15:45	EPA 3005A	19,200.7	AB
Lead, Dissolved	ND		mg/l	0.0010	--	1	08/09/19 12:16	08/12/19 18:28	EPA 3005A	3,200.8	AM
Mercury, Dissolved	ND		mg/l	0.00020	--	1	08/13/19 15:50	08/13/19 21:40	EPA 245.1	3,245.1	MG
Nickel, Dissolved	0.0397		mg/l	0.0020	--	1	08/09/19 12:16	08/12/19 18:28	EPA 3005A	3,200.8	AM
Selenium, Dissolved	ND		mg/l	0.0050	--	1	08/09/19 12:16	08/12/19 18:28	EPA 3005A	3,200.8	AM

Project Name: MADISON COMMONS
Lab Number: L1935658
Project Number: 4325.02
Report Date: 08/16/19

SAMPLE RESULTS

Lab ID: L1935658-03
Client ID: MW-1
Sample Location: WORCESTER, MA
Date Collected: 08/08/19 12:30
Date Received: 08/08/19
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
Silver, Dissolved	ND		mg/l	0.0004	--	1	08/09/19 12:16	08/12/19 18:28	EPA 3005A	3,200.8	AM
Zinc, Dissolved	ND		mg/l	0.0100	--	1	08/09/19 12:16	08/12/19 18:28	EPA 3005A	3,200.8	AM

Project Name: MADISON COMMONS **Lab Number:** L1935658

Project Number: 4325.02 **Report Date:** 08/16/19

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): 01-03 Batch: WG1270609-1										
Iron, Total	ND		mg/l	0.050	--	1	08/09/19 13:20	08/13/19 15:46	19,200.7	LC

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): 01-03 Batch: WG1270609-1										
Hardness	ND		mg/l	0.660	NA	1	08/09/19 13:20	08/13/19 15:46	19,200.7	LC

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): 01-03 Batch: WG1270614-1										
Arsenic, Total	ND		mg/l	0.00100	--	1	08/09/19 13:20	08/12/19 17:49	3,200.8	AM
Cadmium, Total	ND		mg/l	0.00020	--	1	08/09/19 13:20	08/12/19 17:49	3,200.8	AM
Chromium, Total	ND		mg/l	0.00100	--	1	08/09/19 13:20	08/12/19 17:49	3,200.8	AM
Copper, Total	ND		mg/l	0.00100	--	1	08/09/19 13:20	08/12/19 17:49	3,200.8	AM
Lead, Total	ND		mg/l	0.00100	--	1	08/09/19 13:20	08/12/19 17:49	3,200.8	AM
Nickel, Total	ND		mg/l	0.00200	--	1	08/09/19 13:20	08/12/19 17:49	3,200.8	AM
Selenium, Total	ND		mg/l	0.00500	--	1	08/09/19 13:20	08/12/19 17:49	3,200.8	AM
Silver, Total	ND		mg/l	0.00040	--	1	08/09/19 13:20	08/12/19 17:49	3,200.8	AM
Zinc, Total	ND		mg/l	0.01000	--	1	08/09/19 13:20	08/12/19 17:49	3,200.8	AM

Prep Information

Digestion Method: EPA 3005A

Project Name: MADISON COMMONS **Lab Number:** L1935658

Project Number: 4325.02 **Report Date:** 08/16/19

Method Blank Analysis
Batch Quality Control

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Dissolved Metals - Mansfield Lab for sample(s): 01-03 Batch: WG1270616-1										
Iron, Dissolved	ND		mg/l	0.050	--	1	08/09/19 12:16	08/13/19 15:08	19,200.7	LC

Prep Information

Digestion Method: EPA 3005A

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Dissolved Metals - Mansfield Lab for sample(s): 01-03 Batch: WG1270623-1										
Arsenic, Dissolved	ND		mg/l	0.0010	--	1	08/09/19 12:16	08/12/19 16:23	3,200.8	AM
Cadmium, Dissolved	ND		mg/l	0.0002	--	1	08/09/19 12:16	08/12/19 16:23	3,200.8	AM
Chromium, Dissolved	ND		mg/l	0.0010	--	1	08/09/19 12:16	08/12/19 16:23	3,200.8	AM
Copper, Dissolved	ND		mg/l	0.0010	--	1	08/09/19 12:16	08/12/19 16:23	3,200.8	AM
Lead, Dissolved	ND		mg/l	0.0010	--	1	08/09/19 12:16	08/12/19 16:23	3,200.8	AM
Nickel, Dissolved	ND		mg/l	0.0020	--	1	08/09/19 12:16	08/12/19 16:23	3,200.8	AM
Selenium, Dissolved	ND		mg/l	0.0050	--	1	08/09/19 12:16	08/12/19 16:23	3,200.8	AM
Silver, Dissolved	ND		mg/l	0.0004	--	1	08/09/19 12:16	08/12/19 16:23	3,200.8	AM
Zinc, Dissolved	ND		mg/l	0.0100	--	1	08/09/19 12:16	08/12/19 16:23	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): 01-03 Batch: WG1271441-1										
Mercury, Total	ND		mg/l	0.00020	--	1	08/12/19 16:36	08/13/19 11:44	3,245.1	GD

Prep Information

Digestion Method: EPA 245.1

Project Name: MADISON COMMONS
Project Number: 4325.02
Lab Number: L1935658
Report Date: 08/16/19

Method Blank Analysis
Batch Quality Control

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Dissolved Metals - Mansfield Lab for sample(s): 01-03 Batch: WG1271862-1										
Mercury, Dissolved	ND		mg/l	0.00020	--	1	08/13/19 15:50	08/13/19 21:25	3,245.1	MG

Prep Information

Digestion Method: EPA 245.1

Lab Control Sample Analysis

Batch Quality Control

Project Name: MADISON COMMONS

Project Number: 4325.02

Lab Number: L1935658

Report Date: 08/16/19

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 01-03 Batch: WG1270609-2								
Iron, Total	106		-		85-115	-		
Total Hardness by SM 2340B - Mansfield Lab Associated sample(s): 01-03 Batch: WG1270609-2								
Hardness	100		-		85-115	-		
Total Metals - Mansfield Lab Associated sample(s): 01-03 Batch: WG1270614-2								
Arsenic, Total	108		-		85-115	-		
Cadmium, Total	112		-		85-115	-		
Chromium, Total	107		-		85-115	-		
Copper, Total	98		-		85-115	-		
Lead, Total	114		-		85-115	-		
Nickel, Total	102		-		85-115	-		
Selenium, Total	**126**	Q	-		85-115	-		
Silver, Total	108		-		85-115	-		
Zinc, Total	110		-		85-115	-		
Dissolved Metals - Mansfield Lab Associated sample(s): 01-03 Batch: WG1270616-2								
Iron, Dissolved	110		-		85-115	-		

Lab Control Sample Analysis

Batch Quality Control

Project Name: MADISON COMMONS

Project Number: 4325.02

Lab Number: L1935658

Report Date: 08/16/19

Parameter	LCS %Recovery		LCSD %Recovery	%Recovery Limits	RPD	RPD Limits
Dissolved Metals - Mansfield Lab Associated sample(s): 01-03 Batch: WG1270623-2						
Arsenic, Dissolved	109		-	85-115	-	
Cadmium, Dissolved	105		-	85-115	-	
Chromium, Dissolved	107		-	85-115	-	
Copper, Dissolved	106		-	85-115	-	
Lead, Dissolved	103		-	85-115	-	
Nickel, Dissolved	104		-	85-115	-	
Selenium, Dissolved	**124**	Q	-	85-115	-	
Silver, Dissolved	110		-	85-115	-	
Zinc, Dissolved	112		-	85-115	-	
Total Metals - Mansfield Lab Associated sample(s): 01-03 Batch: WG1271441-2						
Mercury, Total	100		-	85-115	-	
Dissolved Metals - Mansfield Lab Associated sample(s): 01-03 Batch: WG1271862-2						
Mercury, Dissolved	94		-	85-115	-	

Matrix Spike Analysis
Batch Quality Control

Project Name: MADISON COMMONS
Project Number: 4325.02

Lab Number: L1935658
Report Date: 08/16/19

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): 01-03 QC Batch ID: WG1270609-3 QC Sample: L1935074-02 Client ID: MS Sample												
Iron, Total	ND	1	1.07	107		-	-		75-125	-		20
Total Hardness by SM 2340B - Mansfield Lab Associated sample(s): 01-03 QC Batch ID: WG1270609-3 QC Sample: L1935074-02 Client ID: MS Sample												
Hardness	131	66.2	200	104		-	-		75-125	-		20
Total Metals - Mansfield Lab Associated sample(s): 01-03 QC Batch ID: WG1270609-7 QC Sample: L1935658-01 Client ID: MC-41 (OW)												
Iron, Total	5.34	1	6.28	94		-	-		75-125	-		20
Total Hardness by SM 2340B - Mansfield Lab Associated sample(s): 01-03 QC Batch ID: WG1270609-7 QC Sample: L1935658-01 Client ID: MC-41 (OW)												
Hardness	122	66.2	186	97		-	-		75-125	-		20
Total Metals - Mansfield Lab Associated sample(s): 01-03 QC Batch ID: WG1270614-3 QC Sample: L1935658-01 Client ID: MC-41 (OW)												
Arsenic, Total	0.00723	0.12	0.1398	110		-	-		70-130	-		20
Cadmium, Total	0.00059	0.051	0.06111	119		-	-		70-130	-		20
Chromium, Total	0.00206	0.2	0.2298	114		-	-		70-130	-		20
Copper, Total	0.03560	0.25	0.2903	102		-	-		70-130	-		20
Lead, Total	0.01656	0.51	0.6321	121		-	-		70-130	-		20
Nickel, Total	0.00583	0.5	0.5421	107		-	-		70-130	-		20
Selenium, Total	ND	0.12	0.1564	130		-	-		70-130	-		20
Silver, Total	ND	0.05	0.05606	112		-	-		70-130	-		20
Zinc, Total	0.1089	0.5	0.6877	116		-	-		70-130	-		20
Dissolved Metals - Mansfield Lab Associated sample(s): 01-03 QC Batch ID: WG1270616-3 QC Sample: L1935655-01 Client ID: MS Sample												
Iron, Dissolved	0.599	1	1.67	107		-	-		75-125	-		20

Matrix Spike Analysis
Batch Quality Control

Project Name: MADISON COMMONS
Project Number: 4325.02

Lab Number: L1935658
Report Date: 08/16/19

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	MSD Found	MSD %Recovery	Recovery Limits	RPD	RPD Limits
Dissolved Metals - Mansfield Lab Associated sample(s): 01-03 QC Batch ID: WG1270623-3 QC Sample: L1935655-01 Client ID: MS Sample									
Arsenic, Dissolved	0.0022	0.12	0.1396	114	-	-	70-130	-	20
Cadmium, Dissolved	ND	0.051	0.0587	115	-	-	70-130	-	20
Chromium, Dissolved	0.0014	0.2	0.2078	103	-	-	70-130	-	20
Copper, Dissolved	0.0018	0.25	0.2449	97	-	-	70-130	-	20
Lead, Dissolved	0.0013	0.51	0.6027	118	-	-	70-130	-	20
Nickel, Dissolved	0.0056	0.5	0.4989	99	-	-	70-130	-	20
Selenium, Dissolved	ND	0.12	0.1412	118	-	-	70-130	-	20
Silver, Dissolved	ND	0.05	0.0546	109	-	-	70-130	-	20
Zinc, Dissolved	ND	0.5	0.5424	108	-	-	70-130	-	20
Total Metals - Mansfield Lab Associated sample(s): 01-03 QC Batch ID: WG1271441-3 QC Sample: L1935359-01 Client ID: MS Sample									
Mercury, Total	ND	0.005	0.00430	86	-	-	70-130	-	20
Total Metals - Mansfield Lab Associated sample(s): 01-03 QC Batch ID: WG1271441-5 QC Sample: L1935359-02 Client ID: MS Sample									
Mercury, Total	ND	0.005	0.00406	81	-	-	70-130	-	20
Dissolved Metals - Mansfield Lab Associated sample(s): 01-03 QC Batch ID: WG1271862-3 QC Sample: L1935655-01 Client ID: MS Sample									
Mercury, Dissolved	ND	0.005	0.00426	85	-	-	75-125	-	20

Lab Duplicate Analysis
Batch Quality Control

Project Name: MADISON COMMONS
Project Number: 4325.02

Lab Number: L1935658
Report Date: 08/16/19

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 01-03 QC Batch ID: WG1270609-4 QC Sample: L1935074-02 Client ID: DUP Sample						
Iron, Total	ND	ND	mg/l	NC		20
Total Metals - Mansfield Lab Associated sample(s): 01-03 QC Batch ID: WG1270609-8 QC Sample: L1935658-01 Client ID: MC-41 (OW)						
Iron, Total	5.34	5.44	mg/l	2		20
Total Hardness by SM 2340B - Mansfield Lab Associated sample(s): 01-03 QC Batch ID: WG1270609-8 QC Sample: L1935658-01 Client ID: MC-41 (OW)						
Hardness	122	123	mg/l	1		20
Total Metals - Mansfield Lab Associated sample(s): 01-03 QC Batch ID: WG1270614-4 QC Sample: L1935658-01 Client ID: MC-41 (OW)						
Arsenic, Total	0.00723	0.00742	mg/l	3		20
Cadmium, Total	0.00059	0.00062	mg/l	5		20
Chromium, Total	0.00206	0.00187	mg/l	10		20
Copper, Total	0.03560	0.03374	mg/l	5		20
Lead, Total	0.01656	0.01596	mg/l	4		20
Nickel, Total	0.00583	0.00542	mg/l	7		20
Selenium, Total	ND	ND	mg/l	NC		20
Silver, Total	ND	ND	mg/l	NC		20
Zinc, Total	0.1089	0.1033	mg/l	5		20
Dissolved Metals - Mansfield Lab Associated sample(s): 01-03 QC Batch ID: WG1270616-4 QC Sample: L1935655-01 Client ID: DUP Sample						
Iron, Dissolved	0.599	1.06	mg/l	**56**	Q	20

Lab Duplicate Analysis
Batch Quality Control

Project Name: MADISON COMMONS
Project Number: 4325.02

Lab Number: L1935658
Report Date: 08/16/19

Parameter	Native Sample	Duplicate Sample	Units	RPD		RPD Limits
Dissolved Metals - Mansfield Lab Associated sample(s): 01-03 QC Batch ID: WG1270623-4 QC Sample: L1935655-01 Client ID: DUP Sample						
Arsenic, Dissolved	0.0022	0.0026	mg/l	19		20
Cadmium, Dissolved	ND	ND	mg/l	NC		20
Chromium, Dissolved	0.0014	0.0023	mg/l	**51**	Q	20
Copper, Dissolved	0.0018	0.0022	mg/l	**21**	Q	20
Lead, Dissolved	0.0013	0.0014	mg/l	12		20
Nickel, Dissolved	0.0056	0.0057	mg/l	2		20
Selenium, Dissolved	ND	ND	mg/l	NC		20
Silver, Dissolved	ND	ND	mg/l	NC		20
Zinc, Dissolved	ND	ND	mg/l	NC		20
Total Metals - Mansfield Lab Associated sample(s): 01-03 QC Batch ID: WG1271441-4 QC Sample: L1935359-01 Client ID: DUP Sample						
Mercury, Total	ND	ND	mg/l	NC		20
Total Metals - Mansfield Lab Associated sample(s): 01-03 QC Batch ID: WG1271441-6 QC Sample: L1935359-02 Client ID: DUP Sample						
Mercury, Total	ND	ND	mg/l	NC		20
Dissolved Metals - Mansfield Lab Associated sample(s): 01-03 QC Batch ID: WG1271862-4 QC Sample: L1935655-01 Client ID: DUP Sample						
Mercury, Dissolved	ND	ND	mg/l	NC		20

INORGANICS
&
MISCELLANEOUS

Project Name: MADISON COMMONS
Project Number: 4325.02
Lab Number: L1935658
Report Date: 08/16/19

SAMPLE RESULTS

Lab ID: L1935658-01
Client ID: MC-41 (OW)
Sample Location: WORCESTER, MA
Sample Depth:
Matrix: Water

Date Collected: 08/08/19 08:30
Date Received: 08/08/19
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total Suspended	320		mg/l	16	NA	3.3	-	08/09/19 11:20	121,2540D	DR
Cyanide, Total	0.361		mg/l	0.005	--	1	08/09/19 11:10	08/09/19 14:38	121,4500CN-CE	LH
Chlorine, Total Residual	ND		mg/l	0.02	--	1	-	08/09/19 04:40	121,4500CL-D	MA
pH (H)	7.0		SU	-	NA	1	-	08/09/19 02:16	121,4500H+-B	DS
Nitrogen, Ammonia	0.079		mg/l	0.075	--	1	08/09/19 13:04	08/09/19 20:03	121,4500NH3-BH	ML
Sulfate	17.		mg/l	10	--	1	08/09/19 16:07	08/09/19 16:07	121,4500SO4-E	BR
TPH, SGT-HEM	ND		mg/l	4.00	--	1	08/12/19 16:30	08/12/19 21:30	74,1664A	ML
Phenolics, Total	ND		mg/l	0.030	--	1	08/12/19 01:14	08/12/19 05:52	4,420.1	BR
Chromium, Hexavalent	ND		mg/l	0.010	--	1	08/09/19 06:30	08/09/19 06:59	1,7196A	MA
Anions by Ion Chromatography - Westborough Lab										
Chloride	4.76		mg/l	0.500	--	1	-	08/13/19 01:15	44,300.0	AT

Project Name: MADISON COMMONS
Project Number: 4325.02
Lab Number: L1935658
Report Date: 08/16/19

SAMPLE RESULTS

Lab ID: L1935658-02
Client ID: GZ-813/GP70
Sample Location: WORCESTER, MA
Sample Depth:
Matrix: Water

Date Collected: 08/08/19 10:15
Date Received: 08/08/19
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total Suspended	10.		mg/l	5.0	NA	1	-	08/09/19 11:20	121,2540D	DR
Cyanide, Total	0.006		mg/l	0.005	--	1	08/09/19 11:10	08/09/19 14:41	121,4500CN-CE	LH
Chlorine, Total Residual	ND		mg/l	0.02	--	1	-	08/09/19 04:40	121,4500CL-D	MA
pH (H)	6.8		SU	-	NA	1	-	08/09/19 02:16	121,4500H+-B	DS
Nitrogen, Ammonia	0.106		mg/l	0.075	--	1	08/09/19 13:04	08/09/19 20:04	121,4500NH3-BH	ML
Sulfate	ND		mg/l	10	--	1	08/09/19 16:07	08/09/19 16:07	121,4500SO4-E	BR
TPH, SGT-HEM	38.3		mg/l	4.00	--	1	08/12/19 16:30	08/12/19 21:30	74,1664A	ML
Phenolics, Total	ND		mg/l	0.030	--	1	08/12/19 01:14	08/12/19 05:53	4,420.1	BR
Chromium, Hexavalent	ND		mg/l	0.010	--	1	08/09/19 06:30	08/09/19 07:01	1,7196A	MA
Anions by Ion Chromatography - Westborough Lab										
Chloride	2.44		mg/l	0.500	--	1	-	08/13/19 01:24	44,300.0	AT

Project Name: MADISON COMMONS
Project Number: 4325.02
Lab Number: L1935658
Report Date: 08/16/19

SAMPLE RESULTS

Lab ID: L1935658-03
Client ID: MW-1
Sample Location: WORCESTER, MA
Sample Depth:
Matrix: Water

Date Collected: 08/08/19 12:30
Date Received: 08/08/19
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total Suspended	130		mg/l	5.0	NA	1	-	08/09/19 11:20	121,2540D	DR
Cyanide, Total	ND		mg/l	0.005	--	1	08/09/19 11:10	08/09/19 15:00	121,4500CN-CE	LH
Chlorine, Total Residual	ND		mg/l	0.02	--	1	-	08/09/19 04:40	121,4500CL-D	MA
pH (H)	7.2		SU	-	NA	1	-	08/09/19 02:16	121,4500H+-B	DS
Nitrogen, Ammonia	0.213		mg/l	0.075	--	1	08/09/19 13:04	08/09/19 20:05	121,4500NH3-BH	ML
Sulfate	12.		mg/l	10	--	1	08/09/19 16:07	08/09/19 16:07	121,4500SO4-E	BR
TPH, SGT-HEM	ND		mg/l	5.20	--	1.3	08/12/19 16:30	08/12/19 21:30	74,1664A	ML
Phenolics, Total	ND		mg/l	0.030	--	1	08/12/19 01:14	08/12/19 05:54	4,420.1	BR
Chromium, Hexavalent	ND		mg/l	0.010	--	1	08/09/19 06:30	08/09/19 07:01	1,7196A	MA
Anions by Ion Chromatography - Westborough Lab										
Chloride	154.		mg/l	12.5	--	25	-	08/12/19 19:11	44,300.0	AT

Project Name: MADISON COMMONS
Project Number: 4325.02
Lab Number: L1935658
Report Date: 08/16/19

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): 01-03 Batch: WG1270412-1										
Chlorine, Total Residual	ND		mg/l	0.02	--	1	-	08/09/19 04:40	121,4500CL-D	MA
General Chemistry - Westborough Lab for sample(s): 01-03 Batch: WG1270458-1										
Chromium, Hexavalent	ND		mg/l	0.010	--	1	08/09/19 06:30	08/09/19 06:57	1,7196A	MA
General Chemistry - Westborough Lab for sample(s): 01-03 Batch: WG1270508-1										
Solids, Total Suspended	ND		mg/l	5.0	NA	1	-	08/09/19 11:20	121,2540D	DR
General Chemistry - Westborough Lab for sample(s): 01-03 Batch: WG1270576-1										
Nitrogen, Ammonia	ND		mg/l	0.075	--	1	08/09/19 13:04	08/09/19 20:00	121,4500NH3-BH	ML
General Chemistry - Westborough Lab for sample(s): 01-03 Batch: WG1270580-1										
Cyanide, Total	ND		mg/l	0.005	--	1	08/09/19 11:10	08/09/19 14:27	121,4500CN-CE	LH
General Chemistry - Westborough Lab for sample(s): 01-03 Batch: WG1270587-1										
Sulfate	ND		mg/l	10	--	1	08/09/19 16:07	08/09/19 16:07	121,4500SO4-E	BR
General Chemistry - Westborough Lab for sample(s): 01-03 Batch: WG1271199-1										
Phenolics, Total	ND		mg/l	0.030	--	1	08/12/19 01:14	08/12/19 05:39	4,420.1	BR
General Chemistry - Westborough Lab for sample(s): 01-03 Batch: WG1271447-1										
TPH, SGT-HEM	ND		mg/l	4.00	--	1	08/12/19 16:30	08/12/19 21:30	74,1664A	ML
Anions by Ion Chromatography - Westborough Lab for sample(s): 01-03 Batch: WG1271890-1										
Chloride	ND		mg/l	0.500	--	1	-	08/12/19 18:15	44,300.0	AT

Lab Control Sample Analysis

Batch Quality Control

Project Name: MADISON COMMONS

Project Number: 4325.02

Lab Number: L1935658

Report Date: 08/16/19

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 01-03 Batch: WG1270386-1								
pH	100		-		99-101	-		5
General Chemistry - Westborough Lab Associated sample(s): 01-03 Batch: WG1270412-2								
Chlorine, Total Residual	92		-		90-110	-		
General Chemistry - Westborough Lab Associated sample(s): 01-03 Batch: WG1270458-2								
Chromium, Hexavalent	99		-		85-115	-		20
General Chemistry - Westborough Lab Associated sample(s): 01-03 Batch: WG1270576-2								
Nitrogen, Ammonia	94		-		80-120	-		20
General Chemistry - Westborough Lab Associated sample(s): 01-03 Batch: WG1270580-2								
Cyanide, Total	100		-		90-110	-		
General Chemistry - Westborough Lab Associated sample(s): 01-03 Batch: WG1270587-2								
Sulfate	95		-		90-110	-		
General Chemistry - Westborough Lab Associated sample(s): 01-03 Batch: WG1271199-2								
Phenolics, Total	90		-		70-130	-		

Lab Control Sample Analysis

Batch Quality Control

Project Name: MADISON COMMONS

Project Number: 4325.02

Lab Number: L1935658

Report Date: 08/16/19

Parameter	LCS %Recovery	LCSD %Recovery	%Recovery Limits	RPD	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 01-03 Batch: WG1271447-2					
TPH	88	-	64-132	-	34
Anions by Ion Chromatography - Westborough Lab Associated sample(s): 01-03 Batch: WG1271890-2					
Chloride	95	-	90-110	-	

Matrix Spike Analysis
Batch Quality Control

Project Name: MADISON COMMONS
Project Number: 4325.02

Lab Number: L1935658
Report Date: 08/16/19

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): 01-03 QC Batch ID: WG1270412-4 QC Sample: L1935658-03 Client ID: MW-1												
Chlorine, Total Residual	ND	0.25	0.16	**64**	Q	-	-		80-120	-		20
General Chemistry - Westborough Lab Associated sample(s): 01-03 QC Batch ID: WG1270458-4 QC Sample: L1935658-01 Client ID: MC-41 (OW)												
Chromium, Hexavalent	ND	0.1	0.092	92		-	-		85-115	-		20
General Chemistry - Westborough Lab Associated sample(s): 01-03 QC Batch ID: WG1270576-4 QC Sample: L1935713-01 Client ID: MS Sample												
Nitrogen, Ammonia	0.241	4	3.91	92		-	-		80-120	-		20
General Chemistry - Westborough Lab Associated sample(s): 01-03 QC Batch ID: WG1270580-4 QC Sample: L1935658-02 Client ID: GZ-813/GP70												
Cyanide, Total	0.006	0.2	0.205	99		-	-		90-110	-		30
General Chemistry - Westborough Lab Associated sample(s): 01-03 QC Batch ID: WG1270587-4 QC Sample: L1929441-132 Client ID: MS Sample												
Sulfate	ND	20	24	120		-	-		55-147	-		14
General Chemistry - Westborough Lab Associated sample(s): 01-03 QC Batch ID: WG1271199-4 QC Sample: L1935412-01 Client ID: MS Sample												
Phenolics, Total	ND	0.4	0.32	80		-	-		70-130	-		20
General Chemistry - Westborough Lab Associated sample(s): 01-03 QC Batch ID: WG1271447-4 QC Sample: L1934660-02 Client ID: MS Sample												
TPH	ND	20	18.2	91		-	-		64-132	-		34
Anions by Ion Chromatography - Westborough Lab Associated sample(s): 01-03 QC Batch ID: WG1271890-3 QC Sample: L1934319-16 Client ID: MS Sample												
Chloride	4.29	4	8.02	93		-	-		90-110	-		18

Lab Duplicate Analysis
Batch Quality Control

Project Name: MADISON COMMONS
Project Number: 4325.02

Lab Number: L1935658
Report Date: 08/16/19

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 01-03 QC Batch ID: WG1270386-2 QC Sample: L1935658-01 Client ID: MC-41 (OW)						
pH (H)	7.0	7.0	SU	0		5
General Chemistry - Westborough Lab Associated sample(s): 01-03 QC Batch ID: WG1270412-3 QC Sample: L1935658-02 Client ID: GZ-813/GP70						
Chlorine, Total Residual	ND	ND	mg/l	NC		20
General Chemistry - Westborough Lab Associated sample(s): 01-03 QC Batch ID: WG1270458-3 QC Sample: L1935658-01 Client ID: MC-41 (OW)						
Chromium, Hexavalent	ND	ND	mg/l	NC		20
General Chemistry - Westborough Lab Associated sample(s): 01-03 QC Batch ID: WG1270508-2 QC Sample: L1935708-01 Client ID: DUP Sample						
Solids, Total Suspended	72	72	mg/l	0		29
General Chemistry - Westborough Lab Associated sample(s): 01-03 QC Batch ID: WG1270576-3 QC Sample: L1935713-01 Client ID: DUP Sample						
Nitrogen, Ammonia	0.241	0.217	mg/l	10		20
General Chemistry - Westborough Lab Associated sample(s): 01-03 QC Batch ID: WG1270580-3 QC Sample: L1935658-01 Client ID: MC-41 (OW)						
Cyanide, Total	0.361	0.366	mg/l	1		30
General Chemistry - Westborough Lab Associated sample(s): 01-03 QC Batch ID: WG1270587-3 QC Sample: L1929441-132 Client ID: DUP Sample						
Sulfate	ND	ND	mg/l	NC		14
General Chemistry - Westborough Lab Associated sample(s): 01-03 QC Batch ID: WG1271199-3 QC Sample: L1935412-01 Client ID: DUP Sample						
Phenolics, Total	ND	ND	mg/l	NC		20
General Chemistry - Westborough Lab Associated sample(s): 01-03 QC Batch ID: WG1271447-3 QC Sample: L1934660-01 Client ID: DUP Sample						
TPH	ND	ND	mg/l	NC		34

Lab Duplicate Analysis

Batch Quality Control

Project Name: MADISON COMMONS

Project Number: 4325.02

Lab Number: L1935658

Report Date: 08/16/19

Parameter	Native Sample	Duplicate Sample	Units	RPD	RPD Limits
Anions by Ion Chromatography - Westborough Lab Associated sample(s): 01-03 QC Batch ID: WG1271890-4 QC Sample: L1934319-16 Client ID: DUP Sample					
Chloride	4.29	4.29	mg/l	0	18

Project Name: MADISON COMMONS
Project Number: 4325.02

Lab Number: L1935658
Report Date: 08/16/19

Sample Receipt and Container Information

Were project specific reporting limits specified? YES

Cooler Information

Cooler	Custody Seal
A	Absent
B	Absent
C	Absent

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L1935658-01A	Vial HCl preserved	A	NA		3.2	Y	Absent		HOLD-SUB()
L1935658-01A1	Vial HCl preserved	A	NA		3.2	Y	Absent		HOLD-SUB()
L1935658-01A2	Vial HCl preserved	A	NA		3.2	Y	Absent		HOLD-SUB()
L1935658-01B	Vial Na2S2O3 preserved	A	NA		3.2	Y	Absent		624.1-RGP(7),624.1-SIM-RGP(7)
L1935658-01B1	Vial Na2S2O3 preserved	A	NA		3.2	Y	Absent		624.1-RGP(7),624.1-SIM-RGP(7)
L1935658-01C	Vial Na2S2O3 preserved	A	NA		3.2	Y	Absent		624.1-RGP(7),624.1-SIM-RGP(7)
L1935658-01C1	Vial Na2S2O3 preserved	A	NA		3.2	Y	Absent		624.1-RGP(7),624.1-SIM-RGP(7)
L1935658-01D	Vial Na2S2O3 preserved	A	NA		3.2	Y	Absent		624.1-RGP(7),624.1-SIM-RGP(7)
L1935658-01D1	Vial Na2S2O3 preserved	A	NA		3.2	Y	Absent		624.1-RGP(7),624.1-SIM-RGP(7)
L1935658-01E	Vial Na2S2O3 preserved	A	NA		3.2	Y	Absent		504(14)
L1935658-01E1	Vial Na2S2O3 preserved	A	NA		3.2	Y	Absent		504(14)
L1935658-01G	Plastic 250ml HNO3 preserved	A	<2	<2	3.2	Y	Absent		AG-2008S(180),CR-2008S(180),FE-RI(180),AS-2008S(180),PB-2008S(180),ZN-2008S(180),NI-2008S(180),SE-2008S(180),CD-2008S(180),CU-2008S(180),HG-R(28)
L1935658-01H	Plastic 250ml HNO3 preserved	A	<2	<2	3.2	Y	Absent		CD-2008T(180),NI-2008T(180),ZN-2008T(180),CU-2008T(180),FE-UI(180),HARDU(180),AG-2008T(180),AS-2008T(180),HG-U(28),SE-2008T(180),CR-2008T(180),PB-2008T(180)
L1935658-01J	Plastic 250ml NaOH preserved	A	>12	>12	3.2	Y	Absent		TCN-4500(14)
L1935658-01K	Plastic 950ml unpreserved	A	7	7	3.2	Y	Absent		SO4-4500(28),CL-300(28),HEXCR-7196(1),TRC-4500(1),PH-4500(.01)
L1935658-01L	Plastic 950ml unpreserved	A	7	7	3.2	Y	Absent		TSS-2540(7)
L1935658-01M	Plastic 500ml H2SO4 preserved	A	<2	<2	3.2	Y	Absent		NH3-4500(28)

*Values in parentheses indicate holding time in days

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L1935658-01N	Amber 1000ml HCl preserved	A	NA		3.2	Y	Absent		TPH-1664(28)
L1935658-01P	Amber 1000ml HCl preserved	A	NA		3.2	Y	Absent		TPH-1664(28)
L1935658-01Q	Amber 950ml H2SO4 preserved	A	<2	<2	3.2	Y	Absent		TPHENOL-420(28)
L1935658-01R	Amber 1000ml Na2S2O3	A	7	7	3.2	Y	Absent		PCB-608.3(7)
L1935658-01S	Amber 1000ml Na2S2O3	A	7	7	3.2	Y	Absent		PCB-608.3(7)
L1935658-01T	Amber 1000ml Na2S2O3	A	7	7	3.2	Y	Absent		PCB-608.3(7)
L1935658-01U	Amber 1000ml Na2S2O3	A	7	7	3.2	Y	Absent		625.1-RGP(7),625.1-SIM-RGP(7)
L1935658-01V	Amber 1000ml Na2S2O3	A	7	7	3.2	Y	Absent		625.1-RGP(7),625.1-SIM-RGP(7)
L1935658-01W	Amber 1000ml Na2S2O3	A	7	7	3.2	Y	Absent		625.1-RGP(7),625.1-SIM-RGP(7)
L1935658-02A	Vial HCl preserved	B	NA		3.7	Y	Absent		HOLD-SUB()
L1935658-02A1	Vial HCl preserved	B	NA		3.7	Y	Absent		HOLD-SUB()
L1935658-02A2	Vial HCl preserved	B	NA		3.7	Y	Absent		HOLD-SUB()
L1935658-02B	Vial Na2S2O3 preserved	B	NA		3.7	Y	Absent		624.1-RGP(7),624.1-SIM-RGP(7)
L1935658-02B1	Vial Na2S2O3 preserved	B	NA		3.7	Y	Absent		624.1-RGP(7),624.1-SIM-RGP(7)
L1935658-02C	Vial Na2S2O3 preserved	B	NA		3.7	Y	Absent		624.1-RGP(7),624.1-SIM-RGP(7)
L1935658-02C1	Vial Na2S2O3 preserved	B	NA		3.7	Y	Absent		624.1-RGP(7),624.1-SIM-RGP(7)
L1935658-02D	Vial Na2S2O3 preserved	B	NA		3.7	Y	Absent		624.1-RGP(7),624.1-SIM-RGP(7)
L1935658-02D1	Vial Na2S2O3 preserved	B	NA		3.7	Y	Absent		624.1-RGP(7),624.1-SIM-RGP(7)
L1935658-02E	Vial Na2S2O3 preserved	B	NA		3.7	Y	Absent		504(14)
L1935658-02E1	Vial Na2S2O3 preserved	B	NA		3.7	Y	Absent		504(14)
L1935658-02G	Plastic 250ml HNO3 preserved	B	<2	<2	3.7	Y	Absent		AG-2008S(180),CR-2008S(180),FE-RI(180),AS-2008S(180),PB-2008S(180),ZN-2008S(180),NI-2008S(180),SE-2008S(180),CD-2008S(180),CU-2008S(180),HG-R(28)
L1935658-02H	Plastic 250ml HNO3 preserved	B	<2	<2	3.7	Y	Absent		CD-2008T(180),NI-2008T(180),ZN-2008T(180),CU-2008T(180),FE-UI(180),HARDU(180),AG-2008T(180),AS-2008T(180),HG-U(28),SE-2008T(180),CR-2008T(180),PB-2008T(180)
L1935658-02J	Plastic 250ml NaOH preserved	B	>12	>12	3.7	Y	Absent		TCN-4500(14)
L1935658-02K	Plastic 950ml unpreserved	B	7	7	3.7	Y	Absent		SO4-4500(28),CL-300(28),HEXCR-7196(1),TRC-4500(1),PH-4500(.01)
L1935658-02L	Plastic 950ml unpreserved	B	7	7	3.7	Y	Absent		TSS-2540(7)

*Values in parentheses indicate holding time in days

Project Name: MADISON COMMONS
Project Number: 4325.02

Lab Number: L1935658
Report Date: 08/16/19

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L1935658-02M	Plastic 500ml H2SO4 preserved	B	<2	<2	3.7	Y	Absent		NH3-4500(28)
L1935658-02N	Amber 1000ml HCl preserved	B	NA		3.7	Y	Absent		TPH-1664(28)
L1935658-02P	Amber 1000ml HCl preserved	B	NA		3.7	Y	Absent		TPH-1664(28)
L1935658-02Q	Amber 950ml H2SO4 preserved	B	<2	<2	3.7	Y	Absent		TPHENOL-420(28)
L1935658-02R	Amber 1000ml Na2S2O3	B	7	7	3.7	Y	Absent		PCB-608.3(7)
L1935658-02S	Amber 1000ml Na2S2O3	B	7	7	3.7	Y	Absent		PCB-608.3(7)
L1935658-02T	Amber 1000ml Na2S2O3	B	7	7	3.7	Y	Absent		PCB-608.3(7)
L1935658-02U	Amber 1000ml Na2S2O3	B	7	7	3.7	Y	Absent		625.1-RGP(7),625.1-SIM-RGP(7)
L1935658-02V	Amber 1000ml Na2S2O3	B	7	7	3.7	Y	Absent		625.1-RGP(7),625.1-SIM-RGP(7)
L1935658-02W	Amber 1000ml Na2S2O3	B	7	7	3.7	Y	Absent		625.1-RGP(7),625.1-SIM-RGP(7)
L1935658-03A	Vial HCl preserved	C	NA		4.2	Y	Absent		HOLD-SUB()
L1935658-03A1	Vial HCl preserved	C	NA		4.2	Y	Absent		HOLD-SUB()
L1935658-03A2	Vial HCl preserved	C	NA		4.2	Y	Absent		HOLD-SUB()
L1935658-03B	Vial Na2S2O3 preserved	C	NA		4.2	Y	Absent		624.1-RGP(7),624.1-SIM-RGP(7)
L1935658-03B1	Vial Na2S2O3 preserved	C	NA		4.2	Y	Absent		624.1-RGP(7),624.1-SIM-RGP(7)
L1935658-03C	Vial Na2S2O3 preserved	C	NA		4.2	Y	Absent		624.1-RGP(7),624.1-SIM-RGP(7)
L1935658-03C1	Vial Na2S2O3 preserved	C	NA		4.2	Y	Absent		624.1-RGP(7),624.1-SIM-RGP(7)
L1935658-03D	Vial Na2S2O3 preserved	C	NA		4.2	Y	Absent		624.1-RGP(7),624.1-SIM-RGP(7)
L1935658-03D1	Vial Na2S2O3 preserved	C	NA		4.2	Y	Absent		624.1-RGP(7),624.1-SIM-RGP(7)
L1935658-03E	Vial Na2S2O3 preserved	C	NA		4.2	Y	Absent		504(14)
L1935658-03E1	Vial Na2S2O3 preserved	C	NA		4.2	Y	Absent		504(14)
L1935658-03G	Plastic 250ml HNO3 preserved	C	<2	<2	4.2	Y	Absent		AG-2008S(180),CR-2008S(180),FE-RI(180),AS-2008S(180),PB-2008S(180),ZN-2008S(180),NI-2008S(180),SE-2008S(180),CD-2008S(180),CU-2008S(180),HG-R(28)
L1935658-03H	Plastic 250ml HNO3 preserved	C	<2	<2	4.2	Y	Absent		CD-2008T(180),NI-2008T(180),ZN-2008T(180),CU-2008T(180),FE-UI(180),HARDU(180),AG-2008T(180),AS-2008T(180),HG-U(28),SE-2008T(180),CR-2008T(180),PB-2008T(180)
L1935658-03J	Plastic 250ml NaOH preserved	C	>12	>12	4.2	Y	Absent		TCN-4500(14)
L1935658-03K	Plastic 950ml unpreserved	C	7	7	4.2	Y	Absent		SO4-4500(28),CL-300(28),HEXCR-7196(1),TRC-4500(1),PH-4500(.01)

*Values in parentheses indicate holding time in days

Project Name: MADISON COMMONS
Project Number: 4325.02

Lab Number: L1935658
Report Date: 08/16/19

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L1935658-03L	Plastic 950ml unpreserved	C	7	7	4.2	Y	Absent		TSS-2540(7)
L1935658-03M	Plastic 500ml H2SO4 preserved	C	<2	<2	4.2	Y	Absent		NH3-4500(28)
L1935658-03N	Amber 1000ml HCl preserved	C	NA		4.2	Y	Absent		TPH-1664(28)
L1935658-03P	Amber 1000ml HCl preserved	C	NA		4.2	Y	Absent		TPH-1664(28)
L1935658-03Q	Amber 950ml H2SO4 preserved	C	<2	<2	4.2	Y	Absent		TPHENOL-420(28)
L1935658-03R	Amber 1000ml Na2S2O3	C	7	7	4.2	Y	Absent		PCB-608.3(7)
L1935658-03S	Amber 1000ml Na2S2O3	C	7	7	4.2	Y	Absent		PCB-608.3(7)
L1935658-03T	Amber 1000ml Na2S2O3	C	7	7	4.2	Y	Absent		PCB-608.3(7)
L1935658-03U	Amber 1000ml Na2S2O3	C	7	7	4.2	Y	Absent		625.1-RGP(7),625.1-SIM-RGP(7)
L1935658-03V	Amber 1000ml Na2S2O3	C	7	7	4.2	Y	Absent		625.1-RGP(7),625.1-SIM-RGP(7)
L1935658-03W	Amber 1000ml Na2S2O3	C	7	7	4.2	Y	Absent		625.1-RGP(7),625.1-SIM-RGP(7)

*Values in parentheses indicate holding time in days

Project Name:	MADISON COMMONS	**Lab Number:**	L1935658
Project Number:	4325.02	**Report Date:**	08/16/19

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:	MADISON COMMONS	**Lab Number:**	L1935658
Project Number:	4325.02	**Report Date:**	08/16/19

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.

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.

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 Condensation Product".

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.

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 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:	MADISON COMMONS	**Lab Number:**	L1935658
Project Number:	4325.02	**Report Date:**	08/16/19

REFERENCES

1 Test Methods for Evaluating Solid Waste: Physical/Chemical Methods. EPA SW-846. Third Edition. Updates I - IV, 2007.

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.

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.

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
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.
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

PAGE 1 OF 1

Date Rec'd in Lab: 8/8/19

ALPHA Job #: L1935658

ALPHA Analytical
8 Walkup Drive, Westboro, MA 01581, Tel: 508-898-9220
320 Forbes Blvd, Mansfield, MA 02048, Tel: 508-822-9300

Client Information

Client: Sanborn Head
Address: 1 Technology Park Dr, Westford, MA
Phone: 978-392-0900
Email: kwalker@sanbornhead.com

Project Information

Project Name: Madison Commons
Project Location: 48 Worcester, MA
Project #: 4325.02
Project Manager: K. Walker
ALPHA Quote #:

Report Information - Data Deliverables

☑ ADEx ☑ EMAIL

Billing Information

☑ Same as Client info PO #:

Regulatory Requirements & Project Information Requirements

☐ Yes ☑ No MA MCP Analytical Methods ☐ Yes ☑ No CT RCP Analytical Methods
☐ Yes ☑ No Matrix Spike Required on this SDG? (Required for MCP Inorganics)
☐ Yes ☑ No GW1 Standards (Info Required for Metals & EPH with Targets)
☑ Yes ☐ No NPDES RGP
☐ Other State /Fed Program _____ Criteria _____

Turn-Around Time

☑ Standard ☐ RUSH (only confirmed if pre-approved)
Date Due:

Additional Project Information:

* RGP metals include Ag, As, cd, Cr, Cu, Ni, Pb, Sb, Se, Zn, Fe, Hg, HexCr and Tri Cr.
* NPDES RGP minimum levels must be met

ALPHA Lab ID (Lab Use Only)	Sample ID	Collection Date	Collection Time	Sample Matrix	Sampler Initials	VOC: ☐ 8260 ☐ 624 ☐ 524.2	SVOC: ☐ ABN ☐ PAH	METALS: ☐ MCP 13 ☐ MCP 14 ☐ RCP 15	METALS: ☐ RCRA5 ☐ RCRA8 ☐ PP13	EPH: ☐ Ranges & Targets ☐ Ranges Only	VPH: ☐ Ranges & Targets ☐ Ranges Only	☐ PCB ☐ PEST	TPH: ☐ Quant Only ☐ Fingerprint	NPDES RGP Package	total + Dissolved Metals*	pH, sulfate, hardness	Ethanol	Sample Comments	TOTAL # BOTTLES
35658-01	MC-41 (OW)	8/8/19	8:30	GW	SPS									X	X	X	(H)		
02	GZ-813/GP70	8/8/19	10:15	GW	SPS									↓	↓	↓	(H)		
03	MW-1	8/8/19	12:30	GW	SPS												(H)		

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

Preservative
A= None
B= HCl
C= HNO_3
D= H_2SO_4
E= NaOH
F= MeOH
G= $NaHSO_4$
H = $Na_2S_2O_3$
I= Ascorbic Acid
J = NH_4Cl
K= Zn Acetate
O= Other

Container Type																			
Preservative																			

Relinquished By:	Date/Time	Received By:	Date/Time
Samuel Sienn	8/8/19 16:05		8/8/19 1600

All samples submitted are subject to Alpha's Terms and Conditions. See reverse side.

FORM NO: 01-01 (rev. 12-Mar-2012)

APPENDIX E

MUNICIPAL CORRESPONDENCE

SANBORN HEAD

Building Trust. Engineering Success.

MEMORANDUM

From: C. Disenhof & D. DeWolfe

File: 4325.04

Date: August 27, 2019

Re: Communication with the City of Worcester

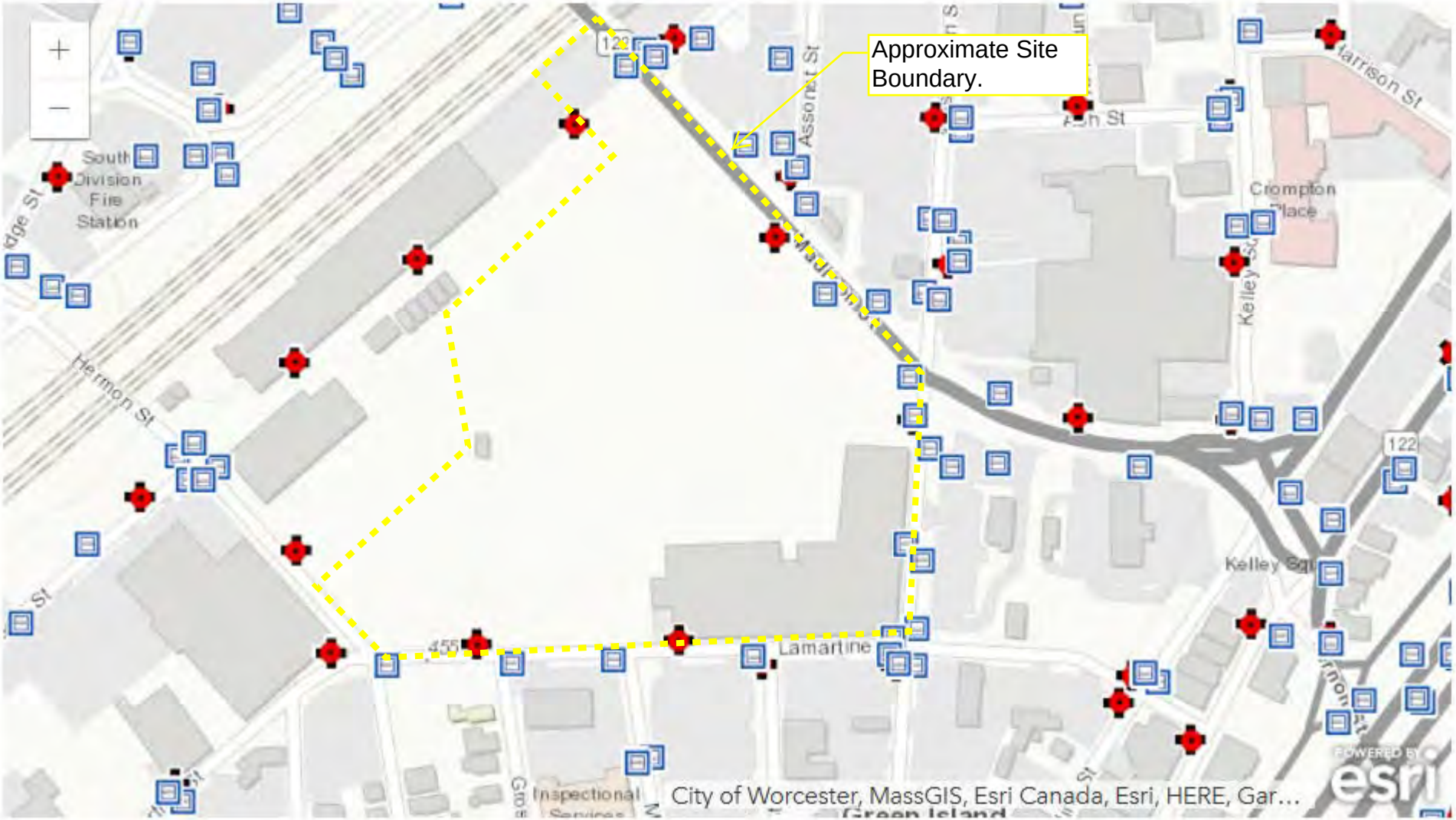
At approximately 10:00AM on August 27, 2019, I spoke to Deb Davis with the City of Worcester Department of Public Works & Parks (DPW) regarding requirements for notification to the City or permitting of construction dewatering projects that discharge to a stormwater system. This phone call and memorandum serve as our notification to the owner of the stormwater system to which treated groundwater from the Site may be discharged to under the National Pollution Discharge Elimination System (NPDES) Remediation General Permit (RGP).

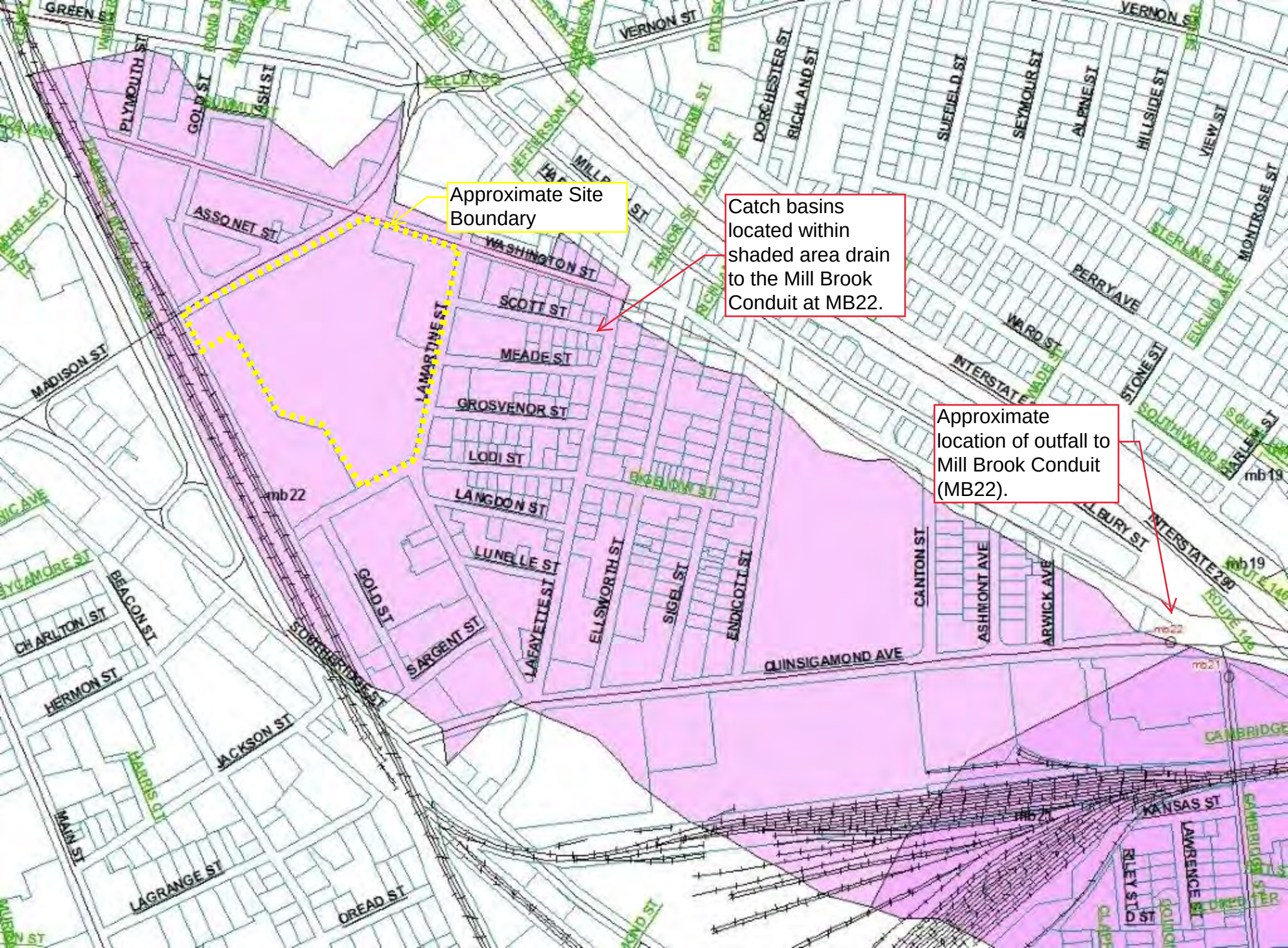
Deb requested a copy of the NPDES permit approval once completed, including the flow rate, treatment system and duration of the project. A copy of the RGP approval letter will be provided to the City upon US Environmental Protection Agency (EPA) approval.

CRD: dmd

\\wesserv2\shdata\4300s\4325.04\Source Files\RGP\App E - Municipal Correspondence\20190827 Memo - Municipal Stormwater Communication.docx

Locate Hydrants and **Catch Basins** in your neighborhood:




Approximate Site Boundary
Catch basins located within shaded area drain to the Mill Brook Conduit at MB22.
Approximate location of outfall to Mill Brook Conduit (MB22).
mb22
mb21
mb19
ASSONET ST
WASHINGTON ST
SCOTT ST
MEADE ST
GROSVENOR ST
LODI ST
LANGDON ST
LUNELLE ST
LAMARTINE ST
GOLD ST
SARGENT ST
LAFAYETTE ST
ELLSWORTH ST
SIGEL ST
ENDICOTT ST
CANTON ST
ASHMONT AVE
ARWICK AVE
QUINSIGAMOND AVE
SOUTHBRIDGE ST
MADISON ST
PLYMOUTH ST
VERNON ST
DORCHESTER ST
RICHLAND ST
SUFFIELD ST
SEYMOUR ST
ALPINE ST
HILLSIDE ST
VIEW ST
MONTROSE ST
PERRY AVE
WARD ST
STONE ST
HARLEM ST
INTERSTATE 290
ROUTE 146
CAMBRIDGE ST
KANSAS ST
LAWRENCE ST
RILEY ST
D ST
CHARLTON ST
BEACON ST
HERMON ST
JACKSON ST
MAIN ST
LAGRANGE ST
OREAD ST
SYCAMORE ST
HARRIS CT

MassDEP Online Map Viewer

2014 Integrated List of Waters Map

Helpful Links:
- The Clean Water Act
- MassDEP Total Maximum Daily Loads

Mass.gov

Map Tools

Overview Map Layers Legend Map Help Contact Query Results

Approximate location where MB22 drains to Mill Brook Conduit.

MassDEP Online Map Viewer

Unnamed Tributary

2014 Assessment Unit ID: MA51-08
Water Name: Unnamed Tributary
Watershed: Blackstone **Water Type:** RIVER **Water Code:** 5131005
Size: 5.6 MILES **Class:** B **Qualifier:** WWF, CSO **Category:** 5 **TMDL Count:** 1
Description: (Also known as "Mill Brook") Outlet Indian Lake, Worcester to confluence with Middle River (downstream of the railroad spur bridge west of Tobias Boland Boulevard), Worcester (through Salisbury Pond formerly segment MA51142).

Use	Attainment	Cause	Poltnt_Flg	Source	TMDL DWM Id
Aesthetic	Not Supporting	Aquatic Plants (Macrophytes)	Y	Source Unknown	CN 114.0
Aesthetic	Not Supporting	Taste and Odor	Y	Illicit Connections/Hook-ups to Storm Sewers	
Aesthetic	Not Supporting	Aquatic Plants (Macrophytes)	Y	Unspecified Urban Stormwater	CN 114.0
Aesthetic	Not Supporting	Aquatic Plants (Macrophytes)	Y	Illicit Connections/Hook-ups to Storm Sewers	CN 114.0
Aesthetic	Not Supporting	Taste and Odor	Y	Unspecified Urban Stormwater	
Aesthetic	Not Supporting	Turbidity	Y	Unspecified Urban Stormwater	CN 114.0

Overview | Map Layers | Legend | Map Help | Contact | Query Results

Approximate location where Mill Brook Conduit daylights and discharges to the Blackstone River. Upgradient of the outfall, the surface water body is identified as the Middle River.

500 m
1000 ft
42°13'49.7"N, 71°47'55.3"W
(42.2305, -71.7987)

APPENDIX F

PH CONDITIONER MATERIAL SAFETY DATA SHEET

Americo Santamaria

From: Kim Gravelle <kgravelle@lrt-llc.net>
Sent: Wednesday, February 19, 2020 4:10 PM
To: Paul Lockwood
Cc: Brian Caccavale
Subject: Polar Park Chemical additive language for RGP
Attachments: LRT pH Adjustment System - Rev1.pdf; SULFURIC ACID 70-100 SDS 5-15-15 Fisher Scientific.pdf

Paul,

Please see language below. Thanks

A pH adjustment system that is capable of lowering pH will be implemented if required to meet the permit requirements. The pH system is designed to lower the pH with sulfuric acid and includes an automatic metered acid feed system with a mix tank, acid feed pumps and setpoint controls that maintain the pH approved by the permit, usually set between 6.5 and 8.3. The pH is continuously monitored and the sulfuric acid will only be added if the setpoints are exceeded. The sulfuric acid will be stored in 55-gallon drums with secondary containment systems in place (overpack drum). Please note that the realistic average use of sulfuric acid/day will be 0.5 gallons or less. The maximum application concentration for sulfuric acid would be 67 mg/L based on the calculations provided below.

Our calculations are as follows to obtain the max concentration of sulfuric acid.

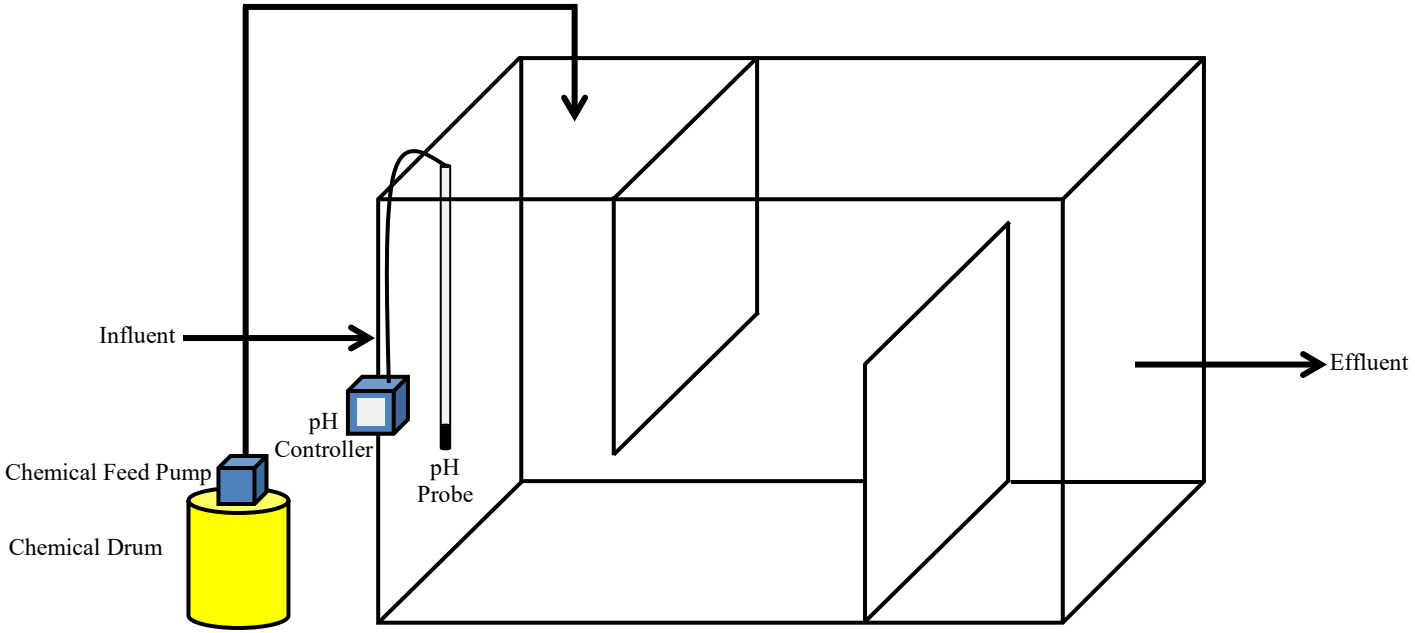
Worst case scenario… pumping at 500 gpm and using 48 gallons of sulfuric acid/day (based on a 2 gal/hr metering rate)
500 gpm = 720,000 gal/day
Sulfuric acid use (one day) = 48 gal/day
48 gal / 720,000 gal = 6.7×10^{-5} gal
6.7×10^{-5} gal * 100% = 0.006%
1% = 10,000 ppm, therefore;
0.006% * 10,000 ppm = 67 ppm

The EC50 for fish is 500 mg/l (ppm) listed on the attached SDS. Even at a worst case scenario, the addition of sulfuric acid is less than the EC50.

Part F of the RGP NOI requires that chemical additives be identified if applied to the effluent prior to discharge. To satisfy the confirmation requirements of RGP Part 2.5.3.d.ii:

1. The addition of a pH conditioner will not add any pollutants in concentrations which exceed permit effluent limitations;
2. The addition of a pH conditioner will not result in the exceedance of any applicable water quality standard; and
3. The addition of a pH conditioner will not add any pollutants that would justify the application of permit conditions that are different from or absent in the permit."

The addition of sulfuric acid to control and adjust pH is a standard treatment technique for temporary construction dewatering; it is not expected to exceed applicable permit limitations and water quality standards or alter conditions in the receiving water. No additional testing is considered necessary for use of this product or to demonstrate that use of this product will not adversely affect the receiving water.



Notes:

1.) Figure is not to scale.
2.) System layout can vary with site conditions.

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

Configuration of pH Adjustment System

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

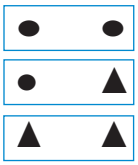
Choose from Hach's Broad Range of Digital and Analog Sensors

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	▲

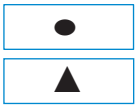
● = Digital ▲ = Analog

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



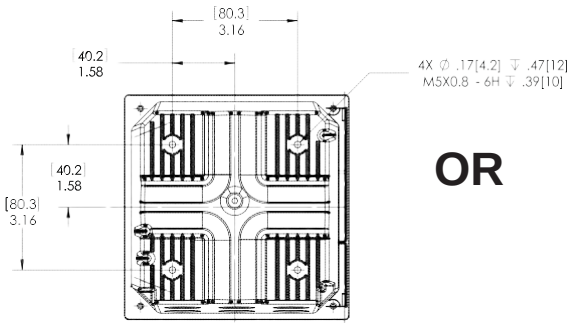
Specifications*

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.*

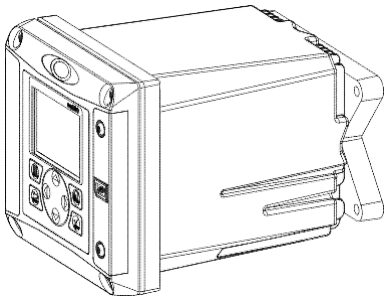
Dimensions

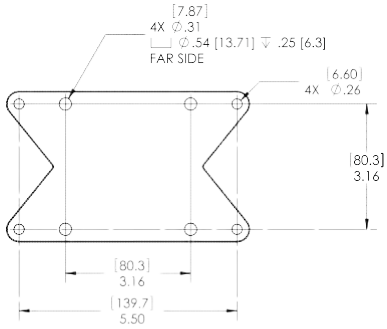
Surface Mounting Dimensions



Mounting Dimensions
(Rear View)

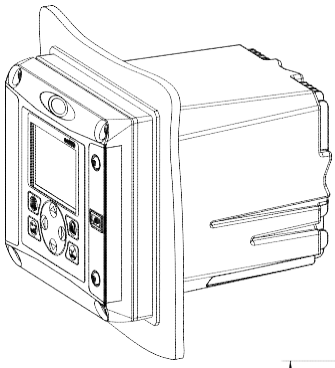
OR

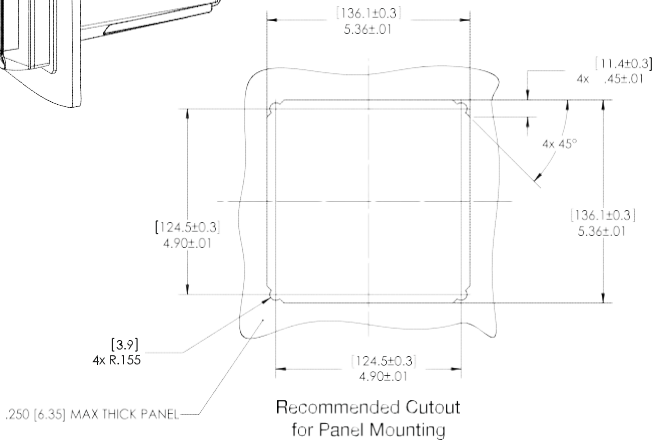




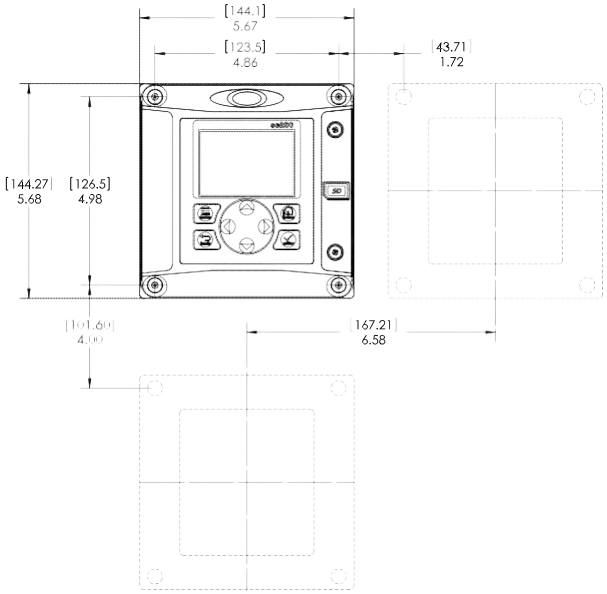
Bracket (supplied) for Surface Mounting
(Not compatible with Weather and Sun Shield
p/n 9220600 when surface mounting.)

Panel Mounting Dimensions



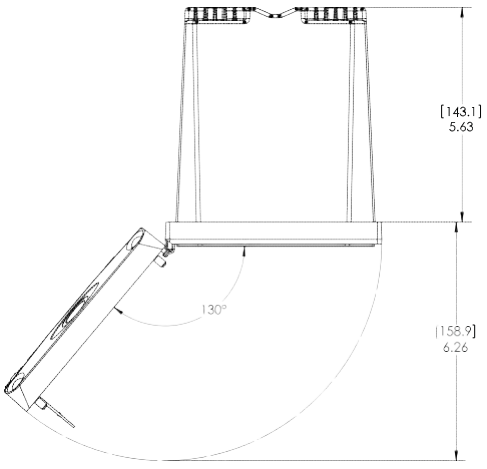


Recommended Cutout
for Panel Mounting

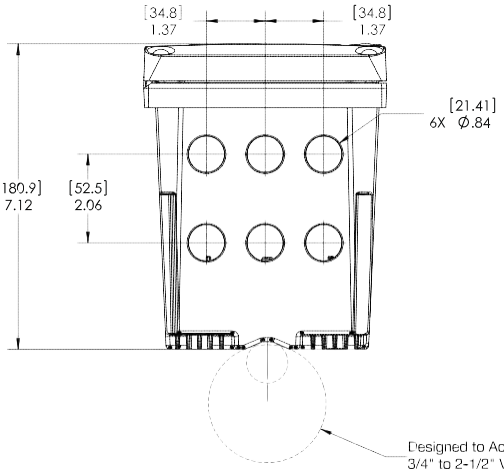


Minimum Spacing Dimensions
for Group Mounting

Top and Bottom Views

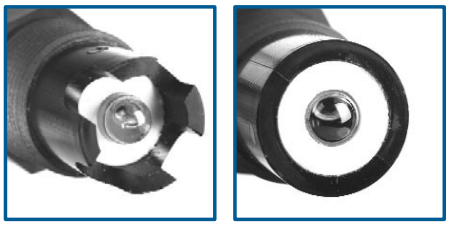


Door Opening Details



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.

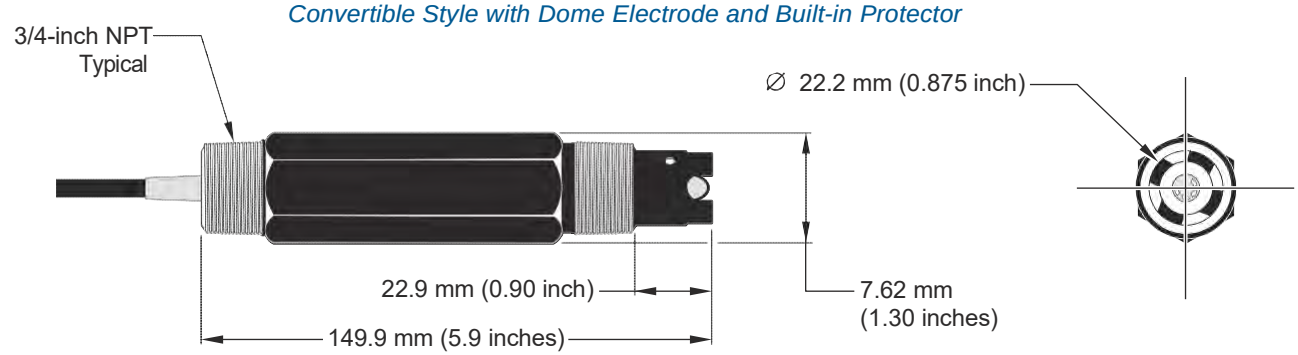
Insertion Style Sensor

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.

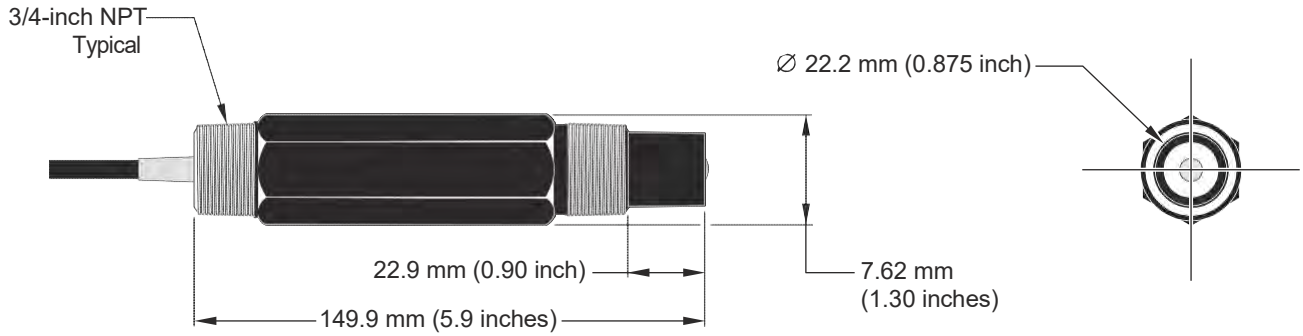
Sanitary Style Sensor

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

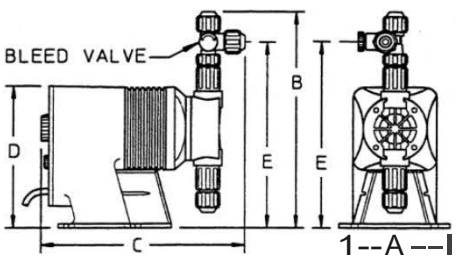
Pre-Engineered Systems

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
LB0B4	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



95-Gallon OverPack - 32" dia x 41.5", 1 each/package

Stock a SpillTech® OverPack with sorbents for emergency spill response, or use it as a salvage drum to ship damaged containers or hazardous waste.

- DOT-Approved for Salvage: All SpillTech® OverPacks are DOT-approved and X-rated for use as salvage drums. Helps companies conform to federal regulations when shipping damaged or leaking containers of hazardous materials, or absorbents contaminated with hazardous substances.
- Perfect for Spill Kits: Stores sorbent products (not included) for easy access as needed for spill control. Saves time when quick response is necessary.
- Sturdy Construction: 100% polyethylene OverPack resists chemicals, rust and corrosion for years of use. Integrated handles make them easy to lift, move or carry with standard material handling equipment. Twist-on, double-wall lid with closed-cell gasket provides sealed, secure closure to prevent leaks and protect contents from moisture, dirt and damage. Durable to withstand rough handling.
- Customized for You: We can customize a Spill Kit to your exact specifications, including the container, its contents and accessories, with no upcharge! Contact your local Distributor for details.

A95OVER Specifications

Dimensions:	ext. dia. 32" x 41.5" H
Shipping Dimensions:	31.75" W x 41.5" L x 31.75" H
Sold as:	1 per package
Color:	Yellow
Composition:	Polyethylene
# per Pallet:	3
Incinerable:	No
Ship Class:	250

Metric Equivalent Specifications

Dimensions:	ext. dia. 81.3cm x 105.4cm H
Shipping Dimensions:	80.6cm W x 105.4cm L x 80.6cm H

A95OVER Technical Information

Warnings & Restrictions:
There are no known warnings and restrictions for this product.

Regulations and Compliance:
49 CFR 173.3(c)(1) - If a container of hazardous waste is damaged or leaking, it can be placed in a compatible salvage drum that meets UN criteria for shipping

49 CFR 173.12(b)(2)(iv) - When labpacking, "Inner packagings…must be surrounded by a chemically compatible absorbent material in sufficient quantity to absorb the total liquid contents."

49 CFR 173.12(b) - A container used for labpacking must be "a UN 1A2 or UN 1B2 metal drum, a UN 1D plywood drum, a UN 1G fiber drum or a UN 1H2 plastic drum tested and marked at least for the Packing Group III performance level for liquids or solids."

Kim Gravelle, P.G.
Senior Project Manager

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kgravelle@lrt-llc.net

SAFETY DATA SHEET

Creation Date 12-Nov-2010 **Revision Date** 24-May-2017 **Revision Number** 5

1. Identification

Product Name **Sulfuric Acid (Certified ACS Plus)**

Cat No. : **A300-212; A300-225LB; A300-500; A300-612GAL; A300-700LB; A300C212; A300C212EA; A300P500; A300S212; A300S212EA; A300S500; A300SI212**

Synonyms Hydrogen sulfate; Vitriol brown oil; Oil of vitriol

Recommended Use Laboratory chemicals.
Uses advised against Not for food, drug, pesticide or biocidal product use

Details of the supplier of the safety data sheet

Company
Fisher Scientific
One Reagent Lane
Fair Lawn, NJ 07410
Tel: (201) 796-7100

Emergency Telephone Number
CHEMTREC®, Inside the USA: 800-424-9300
CHEMTREC®, Outside the USA: 001-703-527-3887

2. Hazard(s) identification

Classification
This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

Skin Corrosion/irritation	Category 1 A
Serious Eye Damage/Eye Irritation	Category 1
Specific target organ toxicity (single exposure)	Category 3
Target Organs - Respiratory system.	

Label Elements

Signal Word
Danger

Hazard Statements
Causes severe skin burns and eye damage
May cause respiratory irritation

Precautionary Statements
Prevention
Do not breathe dust/fume/gas/mist/vapors/spray
Wear protective gloves/protective clothing/eye protection/face protection
Wash face, hands and any exposed skin thoroughly after handling
Use only outdoors or in a well-ventilated area
Response
Immediately call a POISON CENTER or doctor/physician
Inhalation
IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing
Skin
IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower
Wash contaminated clothing before reuse
Eyes
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
Ingestion
IF SWALLOWED: Rinse mouth. DO NOT induce vomiting
Storage
Store locked up
Store in a well-ventilated place. Keep container tightly closed
Disposal
Dispose of contents/container to an approved waste disposal plant
Hazards not otherwise classified (HNOC)

WARNING! This product contains a chemical known in the State of California to cause cancer.
Unknown Acute Toxicity

3. Composition / information on ingredients

Component	CAS-No	Weight %
Sulfuric acid	7664-93-9	90 - 98
Water	7732-18-5	2 - 10

4. First-aid measures

General Advice Show this safety data sheet to the doctor in attendance. Immediate medical attention is required.

Eye Contact Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Immediate medical attention is required.

Skin Contact Wash off immediately with plenty of water for at least 15 minutes. Remove and wash contaminated clothing before re-use. Call a physician immediately.

Inhalation If not breathing, give artificial respiration. Remove from exposure, lie down. Do not use mouth-to-mouth method if victim ingested or inhaled the substance; give artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device. Call a physician immediately.

Ingestion Do not induce vomiting. Clean mouth with water. Never give anything by mouth to an unconscious person. Call a physician immediately.

Most important symptoms/effects Causes burns by all exposure routes. Product is a corrosive material. Use of gastric lavage or emesis is contraindicated. Possible perforation of stomach or esophagus should be investigated: Ingestion causes severe swelling, severe damage to the delicate tissue and danger of perforation

Notes to Physician Treat symptomatically

5. Fire-fighting measures

Suitable Extinguishing Media CO_2, dry chemical, dry sand, alcohol-resistant foam.

Unsuitable Extinguishing Media DO NOT USE WATER

Flash Point Not applicable
Method - No information available

Autoignition Temperature No information available
Explosion Limits
Upper No data available
Lower No data available
Sensitivity to Mechanical Impact No information available
Sensitivity to Static Discharge No information available

Specific Hazards Arising from the Chemical
Thermal decomposition can lead to release of irritating gases and vapors. The product causes burns of eyes, skin and mucous membranes.

Hazardous Combustion Products
Sulfur oxides Hydrogen
Protective Equipment and Precautions for Firefighters
As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear. Thermal decomposition can lead to release of irritating gases and vapors.

NFPA

Health	Flammability	Instability	Physical hazards
3	0	2	W

6. Accidental release measures

Personal Precautions Ensure adequate ventilation. Use personal protective equipment. Evacuate personnel to safe areas. Keep people away from and upwind of spill/leak.

Environmental Precautions Should not be released into the environment.

Methods for Containment and Clean Up Soak up with inert absorbent material. Keep in suitable, closed containers for disposal.

7. Handling and storage

Handling Wear personal protective equipment. Do not get in eyes, on skin, or on clothing. Use only under a chemical fume hood. Do not breathe vapors or spray mist. Do not ingest.

Storage Keep containers tightly closed in a dry, cool and well-ventilated place. Keep away from water. Corrosives area.

8. Exposure controls / personal protection

Exposure Guidelines

Component	ACGIH TLV	OSHA PEL	NIOSH IDLH	Mexico OEL (TWA)
Sulfuric acid	TWA: 0.2 mg/m³	(Vacated) TWA: 1 mg/m³ TWA: 1 mg/m³	IDLH: 15 mg/m³ TWA: 1 mg/m³	TWA: 1 mg/m³

Legend

ACGIH - American Conference of Governmental Industrial Hygienists
OSHA - Occupational Safety and Health Administration
NIOSH IDLH: The National Institute for Occupational Safety and Health Immediately Dangerous to Life or Health

Engineering Measures Use only under a chemical fume hood. Ensure adequate ventilation, especially in confined areas. Ensure that eyewash stations and safety showers are close to the workstation location.

Personal Protective Equipment

Eye/face Protection Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.

Skin and body protection Long sleeved clothing.

Respiratory Protection Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

Hygiene Measures Handle in accordance with good industrial hygiene and safety practice.

9. Physical and chemical properties

Physical State	Liquid
Appearance	Clear, Colorless to brown
Odor	Odorless
Odor Threshold	No information available
pH	0.3 (1N)
Melting Point/Range	10 °C / 50 °F
Boiling Point/Range	290 - 338 °C / 554 - 640.4 °F
Flash Point	Not applicable
Evaporation Rate	Slower than ether
Flammability (solid,gas)	Not applicable
Flammability or explosive limits	
Upper	No data available
Lower	No data available
Vapor Pressure	< 0.001 mmHg @ 20 °C
Vapor Density	3.38 (Air = 1.0)
Specific Gravity	1.84
Solubility	Soluble in water
Partition coefficient; n-octanol/water	No data available
Autoignition Temperature	No information available
Decomposition Temperature	340°C
Viscosity	No information available
Molecular Formula	H2SO4
Molecular Weight	98.08

10. Stability and reactivity

Reactive Hazard Yes

Stability Reacts violently with water. Hygroscopic.

Conditions to Avoid Incompatible products. Excess heat. Exposure to moist air or water.

Incompatible Materials Water, Organic materials, Strong acids, Strong bases, Metals, Alcohols, Cyanides, Sulfides

Hazardous Decomposition Products Sulfur oxides, Hydrogen

Hazardous Polymerization Hazardous polymerization does not occur.

Hazardous Reactions None under normal processing.

11. Toxicological information

Acute Toxicity

Product Information

Oral LD50 Based on ATE data, the classification criteria are not met. ATE > 2000 mg/kg.

Dermal LD50 Based on ATE data, the classification criteria are not met. ATE > 2000 mg/kg.

Vapor LC50 Based on ATE data, the classification criteria are not met. ATE > 20 mg/l.

Component Information

Component	LD50 Oral	LD50 Dermal	LC50 Inhalation
Sulfuric acid	2140 mg/kg (Rat)	Not listed	LC50 = 510 mg/m³ (Rat) 2 h
Water	-	Not listed	Not listed

Toxicologically Synergistic Products No information available

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Irritation Causes severe burns by all exposure routes

Sensitization No information available

Carcinogenicity The table below indicates whether each agency has listed any ingredient as a carcinogen. Exposure to strong inorganic mists containing sulfuric acid may cause cancer by inhalation.

Component	CAS-No	IARC	NTP	ACGIH	OSHA	Mexico
Sulfuric acid	7664-93-9	Group 1	Known	A2	X	A2
Water	7732-18-5	Not listed	Not listed	Not listed	Not listed	Not listed

IARC: (International Agency for Research on Cancer)

NTP: (National Toxicity Program)

ACGIH: (American Conference of Governmental Industrial Hygienists)

Mexico - Occupational Exposure Limits - Carcinogens

IARC: (International Agency for Research on Cancer)
Group 1 - Carcinogenic to Humans
Group 2A - Probably Carcinogenic to Humans
Group 2B - Possibly Carcinogenic to Humans
NTP: (National Toxicity Program)
Known - Known Carcinogen
Reasonably Anticipated - Reasonably Anticipated to be a Human Carcinogen
A1 - Known Human Carcinogen
A2 - Suspected Human Carcinogen
A3 - Animal Carcinogen
ACGIH: (American Conference of Governmental Industrial Hygienists)
Mexico - Occupational Exposure Limits - Carcinogens
A1 - Confirmed Human Carcinogen
A2 - Suspected Human Carcinogen
A3 - Confirmed Animal Carcinogen
A4 - Not Classifiable as a Human Carcinogen
A5 - Not Suspected as a Human Carcinogen

Mutagenic Effects No information available

Reproductive Effects No information available.

Developmental Effects No information available.

Teratogenicity No information available.

STOT - single exposure Respiratory system

STOT - repeated exposure None known

Aspiration hazard No information available

Symptoms / effects,both acute and delayed Product is a corrosive material. Use of gastric lavage or emesis is contraindicated. Possible perforation of stomach or esophagus should be investigated: Ingestion causes severe swelling, severe damage to the delicate tissue and danger of perforation

Endocrine Disruptor Information No information available

Other Adverse Effects The toxicological properties have not been fully investigated.

12. Ecological information

Ecotoxicity

This product contains the following substance(s) which are hazardous for the environment. .

Component	Freshwater Algae	Freshwater Fish	Microtox	Water Flea
Sulfuric acid	-	LC50: > 500 mg/L, 96h static (Brachydanio rerio)	-	EC50: 29 mg/L/24h

Persistence and Degradability No information available

Bioaccumulation/ Accumulation No information available.

Mobility No information available.

13. Disposal considerations

Waste Disposal Methods Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. Chemical waste generators must also consult local, regional, and national hazardous waste regulations to ensure complete and accurate classification.

14. Transport information

DOT

UN-No UN1830
Proper Shipping Name Sulfuric acid
Hazard Class 8
Packing Group II

TDG

UN-No UN1830
Proper Shipping Name SULFURIC ACID
Hazard Class 8
Packing Group II

IATA

UN-No UN1830
Proper Shipping Name SULFURIC ACID
Hazard Class 8
Packing Group II

IMDG/IMO

UN-No UN1830
Proper Shipping Name SULFURIC ACID
Hazard Class 8
Packing Group II

15. Regulatory information

All of the components in the product are on the following Inventory lists: X = listed

International Inventories

Component	TSCA	DSL	NDSL	EINECS	ELINCS	NLP	PICCS	ENCS	AICS	IECSC	KECL
Sulfuric acid	X	X	-	231-639-5	-		X	X	X	X	X
Water	X	X	-	231-791-2	-		X	-	X	X	X

Legend:
X - Listed
E - Indicates a substance that is the subject of a Section 5(e) Consent order under TSCA.
F - Indicates a substance that is the subject of a Section 5(f) Rule under TSCA.

N - Indicates a polymeric substance containing no free-radical initiator in its inventory name but is considered to cover the designated polymer made with any free-radical initiator regardless of the amount used.
P - Indicates a commenced PMN substance
R - Indicates a substance that is the subject of a Section 6 risk management rule under TSCA.
S - Indicates a substance that is identified in a proposed or final Significant New Use Rule
T - Indicates a substance that is the subject of a Section 4 test rule under TSCA.
XU - Indicates a substance exempt from reporting under the Inventory Update Rule, i.e. Partial Updating of the TSCA Inventory Data Base Production and Site Reports (40 CFR 710(B).
Y1 - Indicates an exempt polymer that has a number-average molecular weight of 1,000 or greater.
Y2 - Indicates an exempt polymer that is a polyester and is made only from reactants included in a specified list of low concern reactants that comprises one of the eligibility criteria for the exemption rule.

U.S. Federal Regulations

TSCA 12(b) Not applicable

SARA 313

Component	CAS-No	Weight %	SARA 313 - Threshold Values %
Sulfuric acid	7664-93-9	90 - 98	1.0

SARA 311/312 Hazard Categories

Acute Health Hazard	Yes
Chronic Health Hazard	Yes
Fire Hazard	No
Sudden Release of Pressure Hazard	No
Reactive Hazard	Yes

CWA (Clean Water Act)

Component	CWA - Hazardous Substances	CWA - Reportable Quantities	CWA - Toxic Pollutants	CWA - Priority Pollutants
Sulfuric acid	X	1000 lb	-	-

Clean Air Act Not applicable

OSHA Occupational Safety and Health Administration
Not applicable

CERCLA
This material, as supplied, contains one or more substances regulated as a hazardous substance under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302)

Component	Hazardous Substances RQs	CERCLA EHS RQs
Sulfuric acid	1000 lb	1000 lb

California Proposition 65 This product contains the following proposition 65 chemicals

Component	CAS-No	California Prop. 65	Prop 65 NSRL	Category
Sulfuric acid	7664-93-9	Carcinogen	-	Carcinogen

U.S. State Right-to-Know Regulations

Component	Massachusetts	New Jersey	Pennsylvania	Illinois	Rhode Island
Sulfuric acid	X	X	X	X	X
Water	-	-	X	-	-

U.S. Department of Transportation

Reportable Quantity (RQ):	Y
DOT Marine Pollutant	N
DOT Severe Marine Pollutant	N

U.S. Department of Homeland Security

This product does not contain any DHS chemicals.

Other International Regulations

Mexico - Grade No information available

16. Other information

Prepared By
Regulatory Affairs
Thermo Fisher Scientific
Email: EMSDS.RA@thermofisher.com

Creation Date 12-Nov-2010
Revision Date 24-May-2017
Print Date 24-May-2017
Revision Summary SDS sections updated. 2.

Disclaimer
The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text

End of SDS

Updated November 4, 2015

Applied Polymer Systems, Inc.

Safety Data Sheet

1. IDENTIFICATION OF THE PRODUCT AND THE COMPANY

Product Name: APS 703d #3 Floc Log®

Supplied:
Applied Polymer Systems, Inc.
519 Industrial Drive
Woodstock, GA 30189
Tel. 678-494-5998
Fax. 678-494-5298
www.siltstop.com

2. HAZARD IDENTIFICATION

Placement of these materials on wet walking surface will create extreme slipping hazard.

3. COMPOSITION/INFORMAION ON INGREDIENTS

Identification of the preparation: Anionic water-soluble Co-polymer gel

4. FIRST AID MEASURES

Inhalation: None

Skin contact: Contact with wet skin could cause dryness and chapping. Wash with water and soap. Use of gloves recommended.

Eye contact: Rinse thoroughly with plenty of water, also under the eyelids, seek medical attention in case of persistent irritation.

Ingestion: Consult a physician

5. FIRE-FIGHTING MEASURES

Suitable extinguishing media: Water, water spray, foam, carbon dioxide, dry powder.

Special fire-fighting precautions: Floc Logs that become wet render surfaces extremely slippery.

Protective equipment for firefighters: No special equipment required.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions: No special precautions required.

Methods for cleaning up: Dry wipe as well as possible, Keep in suitable and closed containers for disposal. After cleaning, flush away traces with water.

7. HANDLING AND STORAGE

Handling: Avoid contact with skin and eyes. Wash hands after handling.

Storage: Keep in a cool, dry place.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Engineering controls: **Use dry handling areas only.**

Personal protection equipment

Respiratory Protection: **None**
Hand protection: **Dry cloth, leather or rubber gloves.**
Eye Protection: **Safety glasses with side shields. Do not wear contact lenses.**
Skin protection: **No special protective clothing required.**
Hygiene measures: **Wash hands before breaks and at end of work day.**

9. PHYSICAL AND CHEMICAL PROPERTIES

Form: **Granular semi-solid gel**
Color: **Blue**
Odor: **None**
pH: **7.73**
Melting point: **N/A**
Flash point: **N/A**
Vapor density: **N/A**

10. STABILITY AND REACTIVITY

Stability: **Product is stable, no hazardous polymerization will occur.**

Materials to avoid: **Oxidizing agents may cause exothermic reactions.**

Hazardous decomposition products: **Thermal decomposition may produce nitrogen oxides (NOx), carbon oxides.**

11. TOXICOLOGICAL INFORMATION

Acute toxicity (EPA-821-R-02-012)

LC 50 (Survival) / *Ceriodaphnia dubia* / 48h / 673 ppm
NOAEC (Survival) / *Ceriodaphnia dubia* / 48h / 420 ppm
LC 50 / *Oncorhynchus mykiss* / 96h / 2928 ppm

12. ECOLOGICAL INFORMATION

Chronic toxicity (EPA-821-R-02-013)

IC 25 (Survival) / *P. promelas* / 7 day / 77.8 ppm
NOEC (Survival) / *P. promelas* / 7 day / 52.5 ppm

IC 25 (Survival) / *C. dubia* / 7 day / 78.7 ppm
NOEC (Survival) / *C. dubia* / 7 day / 52.7 ppm

IC 25 (Growth) / *P. promelas* / 7 day / 50.1 ppm
NOEC (Growth) / *P. promelas* / 7 day / 52.5 ppm

IC 25 (Reproduction) / *C. dubia* / 7 day / 66.8 ppm
NOEC (Reproduction) / *C. dubia* / 7 day / 52.5 ppm

Bioaccumulation: **The product is not expected to bioaccumulate.**
Persistence / degradability: **Not readily biodegradable: (~85% after 180 days).**

13. DISPOSAL CONSIDERATIONS

Waste from residues/unused products.
Any disposal practice must be in compliance with local, state and federal laws and regulations (contact local or state environmental agency for specific rules).

14. TRANSPORT INFORMATION

Not regulated by DOT, **RCRA status-Not a hazardous waste**

15. REGULATORY INFORMATION

TSCA Chemical Substances Inventory: **All components of this product are either listed on the inventory or are exempt from listing.**

SARA Section 311 / 312 Hazard Class: **Not concerned**
RCRA Status: **Not RCRA hazardous**

16. OTHER INFORMATION

NFPA and HMIS ratings:

NFPA	**Health:**	**1**	**Flammability:**	**0**	**Reactivity:**	**0**
HMIS	**Health**	**1**	**Flammability**	**0**	**Reactivity**	**0**

DATE EDITED: Nov 4th 2015

APPENDIX G

FEDERAL CORRESPONDENCE

SANBORN HEAD

Building Trust. Engineering Success.

MEMORANDUM

From: C. Disenhof

File: 4325.04

Date: August 12, 2019

Re: Northern Long-Eared Bat Endangered Species Determination

We determine that the Madison Commons dewatering project in the vicinity of Madison Street in Worcester, Massachusetts will have No Effect on the Northern Long-Eared Bat (NLEB) because:

- The Site has no suitable habitat for the NLEB, and therefore the NLEB is not present
- There are no maternity roost trees or hibernacula within ¼-mile of the Site (see attached Natural Heritage & Endangered Species Program (NHESP) map)
- Very few trees (<0.2 acres) will be removed from the Site, and no trees are known maternity roost trees, within 150 of a known maternity roost tree, or within 0.25 miles of a known hibernaculum

CRD: crd

Enclosures: NHESP No. Long-Eared Bat Locations

\\wesserv2\shdata\4300s\4325.04\Source Files\RGP\App F - Federal Correspondence\20190812 Memo - NLEB Determination.docx

SANBORN HEAD

Building Trust. Engineering Success.

PHONE MEMORANDUM

From: C. Disenhof

File: 4325.04

Date: August 12, 2019

Re: Phone Call Regarding Endangered Species Determination

At approximately 8:25 AM on August 12, 2019, I received a call from Maria Tur with the United States Fish and Wildlife Service (US FWS), following up on my inquiry about endangered species determinations for a Notice of Intent (NOI) for a Remediation General Permit (RGP). I explained that we had used the Information for Planning and Consultation (IPaC) tool at the FWS website to determine potential effects on the Northern Long-Eared Bat, which had come to a "may affect" determination. I asked about the next step for reaching a "no affect" or "not likely to adversely affect" determination for the Polar Park project, as the project is composed of parking lots and several buildings.

Ms. Tur stated that the EPA has left this determination to the contractor, and that if there is no suitable habitat on the Site and no trees are being removed, no communication with FWS is needed. A statement of "no affect" because of "no suitable habitat" should be documented in the NOI, and no further information needs to be sent to or received from the FWS.

CRD: crd

\\wesserv2\shdata\4300s\4325.04\Source Files\RGP\App F - Federal Correspondence\20190812 Phone Memo - Conversation with USFWS.docx

United States Department of the Interior

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

In Reply Refer To:
Consultation Code: 05E1NE00-2019-SLI-2552
Event Code: 05E1NE00-2019-E-06598
Project Name: Madison Commons

August 12, 2019

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

To Whom It May Concern:

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

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

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 *et seq.*), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

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

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

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

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

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

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

Attachment(s):

- Official Species List

Official Species List

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

This species list is provided by:

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

Project Summary

Consultation Code: 05E1NE00-2019-SLI-2552

Event Code: 05E1NE00-2019-E-06598

Project Name: Madison Commons

Project Type: Water Withdrawal / Depletion

Project Description: Construction dewatering in the vicinity of Madison Street and Washington Street, Worcester, MA

Project Location:

Approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/place/42.25565547975933N71.80128081731468W

Counties: Worcester, MA

Endangered Species Act Species

There is a total of 1 threatened, endangered, or candidate species on this species list.

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

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries[1], as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

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

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

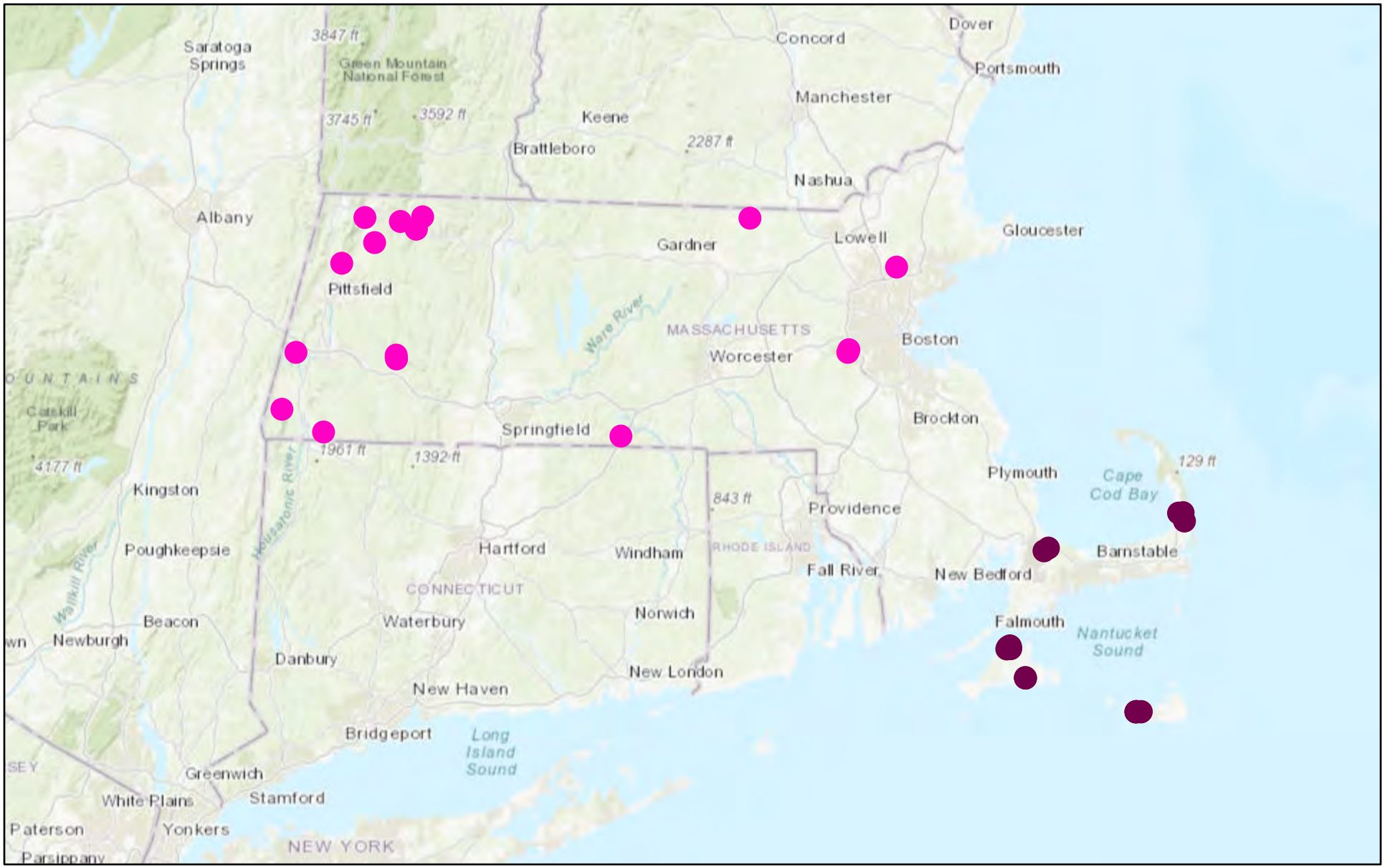
Mammals

NAME	STATUS
Northern Long-eared Bat *Myotis septentrionalis* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/9045	Threatened

Critical habitats

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

NHESP No. Long-eared Bat Locations



August 12, 2019

Statewide_NLEB_Symbology

- Maternity Roost Tree
- Hibernaculum

MA_Northern_Long_eared_Bat_Maternity_Roost_Trees

MA Northern Long-eared Bat Winter Hibernacula (with ¼ mile buffer)

1:2,311,162

0 15 30 60 mi

0 20 40 80 km

From: Zachary Jylkka - NOAA Federal
To: Corinne Disenhof
Subject: Re: Worcester, MA RGP
Date: Thursday, August 8, 2019 5:00:43 PM

Hi Corinne,

Thanks for the inquiry.

Please consult our ESA Section 7 Mapper to learn more about where we expect to find ESA-listed species or critical habitat under our office's jurisdiction:
https://noaa.maps.arcgis.com/apps/webappviewer/index.html?id=1bc332edc5204e03b250ac11f9914a27

We do not have any listed species or critical habitat in the immediate vicinity of Worcester.

Thanks,
Zach

On Thu, Aug 8, 2019 at 4:57 PM NMFS.GAR ESA.Section7 - NOAA Service Account <nmfs.gar.esa.section7@noaa.gov> wrote:

> ---------- Forwarded message ---------
> From: **Corinne Disenhof** <cdisenhof@sanbornhead.com>
> Date: Thu, Aug 8, 2019 at 3:57 PM
> Subject: Worcester, MA RGP
> To: Nmfs.gar.esa.section7@noaa.gov <Nmfs.gar.esa.section7@noaa.gov>
>
> Good afternoon,
>
> I am requesting information to be included as part of a Notice of Intent (NOI) for a Remediation General Permit (RGP). The NOI is for construction dewatering during excavation activities in the vicinity of 37-40 Gold Street in Worcester, Massachusetts. Effluent will be discharged to the Middle River via a drainage to an underground culvert ("Mill Brook") which confluences with the Middle River.
>
> As part of the application to the USEPA for the RGP, we need to investigate whether this proposed temporary discharge has the potential to adversely affect any federally listed species in the reach of the Middle River located downstream of the discharge point.
>
> The approximate discharge location is:
>
> Latitude: 42.23402 Longitude: -71.79342

Thank you in advance for your assistance, and please let me know if you require further information.

Corinne Disenhof

--
Corinne Disenhof
Geotechnical Project Engineer

SANBORN | HEAD & ASSOCIATES, INC.

1 Technology Park Drive, Westford, MA 01886
T 978.392.0900 D 978.577.1037 C 603.498.2075
www.sanbornhead.com

--
Zach Jylkka
Fisheries Biologist
Protected Resources Division
Greater Atlantic Regional Fisheries Office
NOAA Fisheries
Gloucester, MA 01930
zachary.jylkka@noaa.gov
office: (978) 282-8467
Pronouns: (he/him/his)

For additional ESA Section 7 information and Critical Habitat guidance, please see:
www.greateratlantic.fisheries.noaa.gov/protected/section7

APPENDIX H

NATIONAL REGISTER OF HISTORICAL PLACES, WORCESTER, MASSACHUSETTS

Appendix H
National Register of Historic Places
Research Documentation
Worcester, Massachusetts

Ref#	Property Name	Name of Multiple Property Listing	Listed Date	Street & Number	City	County	State
80000595	Abbott Street School	Worcester MRA	3/5/1980	36 Abbott St.	Worcester	Worcester	MASSACHUSETTS
80000584	Adams, Elwood, Store	Worcester MRA	3/5/1980	156 Main St.	Worcester	Worcester	MASSACHUSETTS
80000483	Adriatic Mills	Worcester MRA	3/5/1980	3-35 Armory St.	Worcester	Worcester	MASSACHUSETTS
89002392	Ahern, Catherine, Three-Decker	Worcester Three-Deckers TR	2/9/1990	215 Cambridge St.	Worcester	Worcester	MASSACHUSETTS
80000544	Alexander, Arad, House	Worcester MRA	3/5/1980	53 Waverly St.	Worcester	Worcester	MASSACHUSETTS
80000579	Allen, Charles, House	Worcester MRA	3/5/1980	65 Elm St.	Worcester	Worcester	MASSACHUSETTS
68000018	American Antiquarian Society		11/24/1968	185 Salisbury St.	Worcester	Worcester	MASSACHUSETTS
89002355	Anderson, Ludwig, Three-Decker	Worcester Three-Deckers TR	2/9/1990	4 Fairbanks St.	Worcester	Worcester	MASSACHUSETTS
80000598	Armsby Block	Worcester MRA	3/5/1980	144-148 Main St.	Worcester	Worcester	MASSACHUSETTS
80000542	Ash Street School	Worcester MRA	3/5/1980	Ash St.	Worcester	Worcester	MASSACHUSETTS
80000489	Ashworth and Jones Factory	Worcester MRA	3/5/1980	1511 Main St.	Worcester	Worcester	MASSACHUSETTS
88000429	Aurora Hotel	Worcester MRA	4/28/1988	652--660 Main St.	Worcester	Worcester	MASSACHUSETTS
80000611	Babcock Block	Worcester MRA	3/5/1980	600 Main St.	Worcester	Worcester	MASSACHUSETTS
89002445	Baker, Peter, Three-Decker	Worcester Three-Deckers TR	2/9/1990	90 Vernon St.	Worcester	Worcester	MASSACHUSETTS
80000614	Bancroft Hotel	Worcester MRA	3/5/1980	50 Franklin St.	Worcester	Worcester	MASSACHUSETTS
80000524	Bancroft Tower	Worcester MRA	3/5/1980	Bancroft Tower Rd.	Worcester	Worcester	MASSACHUSETTS
80000569	Bannister, Emory, House	Worcester MRA	3/5/1980	3 Harvard St.	Worcester	Worcester	MASSACHUSETTS
80000592	Barker, Richard, Octagon House	Worcester MRA	3/5/1980	312 Plantation St.	Worcester	Worcester	MASSACHUSETTS
89002429	Battelle, Marion, Three-Decker	Worcester Three-Deckers TR	2/9/1990	13 Preston St.	Worcester	Worcester	MASSACHUSETTS
80000538	Beacon Street Firehouse	Worcester MRA	3/5/1980	108 Beacon St.	Worcester	Worcester	MASSACHUSETTS
89002377	Beaver Street Historic District	Worcester Three-Deckers TR	2/9/1990	31--39 Beaver St.	Worcester	Worcester	MASSACHUSETTS
80000560	Bentley, George, House	Worcester MRA	3/5/1980	9 Earle St.	Worcester	Worcester	MASSACHUSETTS
80000497	Bliss Building	Worcester MRA	3/5/1980	26 Old Lincoln St.	Worcester	Worcester	MASSACHUSETTS
89002417	Blodgett, Lydia, Three-Decker	Worcester Three-Deckers TR	2/9/1990	167 Eastern Ave.	Worcester	Worcester	MASSACHUSETTS
80000593	Bloomingdale Firehouse	Worcester MRA	3/5/1980	676 Franklin St.	Worcester	Worcester	MASSACHUSETTS
80000562	Bloomingdale School	Worcester MRA	3/5/1980	327 Plantation St.	Worcester	Worcester	MASSACHUSETTS
80000590	Borden-Pond House	Worcester MRA	3/5/1980	40 Laurel St.	Worcester	Worcester	MASSACHUSETTS
89002414	Bostrom, Eric, Three-Decker	Worcester Three-Deckers TR	2/9/1990	152 Eastern Ave.	Worcester	Worcester	MASSACHUSETTS
00001394	Boulevard Diner	Diners of Massachusetts MPS	11/22/2000	155 Shrewsbury St.	Worcester	Worcester	MASSACHUSETTS
89002360	Bousquet, Henry, Three-Decker	Worcester Three-Deckers TR	2/9/1990	8/10 Fairmont Ave.	Worcester	Worcester	MASSACHUSETTS
80000540	Boynton and Windsor	Worcester MRA	3/5/1980	718 and 720 Main St.	Worcester	Worcester	MASSACHUSETTS
80000635	Brightside Apartments	Worcester MRA	3/5/1980	2 King St.	Worcester	Worcester	MASSACHUSETTS
80000516	Brooks, John, House	Worcester MRA	3/5/1980	12 Nelson Pl.	Worcester	Worcester	MASSACHUSETTS
80000487	Cambridge Street Firehouse	Worcester MRA	3/5/1980	534 Cambridge St.	Worcester	Worcester	MASSACHUSETTS
80000484	Cambridge Street School	Worcester MRA	3/5/1980	510 Cambridge St.	Worcester	Worcester	MASSACHUSETTS
89002415	Carlson, Eric, Three-Decker	Worcester Three-Deckers TR	2/9/1990	154 Eastern Ave.	Worcester	Worcester	MASSACHUSETTS
80000625	Castle Street Row	Worcester MRA	3/5/1980	4-18 Castle St.	Worcester	Worcester	MASSACHUSETTS
01000120	Castle Street Row--Boundary Increase	Worcester MRA	2/16/2001	20-24 Castle St.	Worcester	Worcester	MASSACHUSETTS
80000604	Cathedral of St. Paul	Worcester MRA	3/5/1980	38 Chatham St.	Worcester	Worcester	MASSACHUSETTS
03001206	Chadwick Square Diner	Diners of Massachusetts MPS	11/26/2003	95 rear Prescott St.	Worcester	Worcester	MASSACHUSETTS
80000518	Chadwick-Brittan House	Worcester MRA	3/5/1980	309 Lincoln St.	Worcester	Worcester	MASSACHUSETTS
80000596	Chamberlain, Charles, House	Worcester MRA	3/5/1980	373 Pleasant St.	Worcester	Worcester	MASSACHUSETTS
80000519	Chamberlain-Flagg House	Worcester MRA	3/5/1980	2 Brookshire Dr.	Worcester	Worcester	MASSACHUSETTS
80000547	Clark University	Worcester MRA	3/5/1980	Clark University Campus	Worcester	Worcester	MASSACHUSETTS
80000571	Cobb, George, House	Worcester MRA	3/5/1980	24 William St.	Worcester	Worcester	MASSACHUSETTS
80000610	Colton's Block	Worcester MRA	3/5/1980	588 Main St.	Worcester	Worcester	MASSACHUSETTS
80000563	Copeland, Samuel, House	Worcester MRA	3/5/1980	31 Harvard St.	Worcester	Worcester	MASSACHUSETTS
00001286	Corner Lunch	Diners of Massachusetts MPS	11/15/2000	133 Lamartine St.	Worcester	Worcester	MASSACHUSETTS

Appendix H
National Register of Historic Places
Research Documentation
Worcester, Massachusetts

Ref#	Property Name	Name of Multiple Property Listing	Listed Date	Street & Number	City	County	State
89002383	Crabtree, Thomas, Three-Decker	Worcester Three-Deckers TR	2/9/1990	22 Haynes St.	Worcester	Worcester	MASSACHUSETTS
80000552	Crawford, Elias, House	Worcester MRA	3/5/1980	3 Norwood St.	Worcester	Worcester	MASSACHUSETTS
80000541	Crompton Loom Works	Worcester MRA	3/5/1980	132-142 Green St.	Worcester	Worcester	MASSACHUSETTS
89002379	Crystal Street Historic District	Worcester Three-Deckers TR	2/9/1990	30--34 Crystal St.	Worcester	Worcester	MASSACHUSETTS
80000526	Daniels, Frederick, House	Worcester MRA	3/5/1980	148 Lincoln St.	Worcester	Worcester	MASSACHUSETTS
80000546	Dartmouth Street School	Worcester MRA	3/5/1980	13 Dartmouth St.	Worcester	Worcester	MASSACHUSETTS
80000578	Davis, Isaac, House	Worcester MRA	3/5/1980	1 Oak St.	Worcester	Worcester	MASSACHUSETTS
80000574	Davis, Joseph, House	Worcester MRA	3/5/1980	41 Elm St.	Worcester	Worcester	MASSACHUSETTS
89002398	Davis, Rodney, Three-Decker	Worcester Three-Deckers TR	2/9/1990	62 Catharine St.	Worcester	Worcester	MASSACHUSETTS
89002386	Davis, Wesley, Three-Decker	Worcester Three-Deckers TR	2/9/1990	7 Albert St.	Worcester	Worcester	MASSACHUSETTS
09000618	Day Building		9/13/1978	300-310 Main St.	Worcester	Worcester	MASSACHUSETTS
02001471	Dean, Frank L. and Mabel H., House		12/5/2002	10 Cedar St.	Worcester	Worcester	MASSACHUSETTS
89002390	Dean, Mary, Three-Decker	Worcester Three-Deckers TR	2/9/1990	130 Belmont St.	Worcester	Worcester	MASSACHUSETTS
89002396	Delsignore, Louis, Three-Decker	Worcester Three-Deckers TR	2/9/1990	12 Imperial Rd.	Worcester	Worcester	MASSACHUSETTS
80000580	Dewey Francis, House	Worcester MRA	3/5/1980	71 Elm St.	Worcester	Worcester	MASSACHUSETTS
02000155	Dodge Block and Sawyer Building, Bancroft Trust Building	Worcester MRA	3/15/2002	60 Franklin St.	Worcester	Worcester	MASSACHUSETTS
89002427	Dodge, Helen, Three-Decker	Worcester Three-Deckers TR	2/9/1990	570 Pleasant St.	Worcester	Worcester	MASSACHUSETTS
89002406	Doran, Thomas F., Three-Decker	Worcester Three-Deckers TR	2/9/1990	27 John St.	Worcester	Worcester	MASSACHUSETTS
80000627	Dowley-Taylor House	Worcester MRA	3/5/1980	770 Main St.	Worcester	Worcester	MASSACHUSETTS
80000621	Downing Street School	Worcester MRA	3/5/1980	92 Downing St.	Worcester	Worcester	MASSACHUSETTS
89002384	Drew, Elvira, Three-Decker	Worcester Three-Deckers TR	2/9/1990	42 Abbott St.	Worcester	Worcester	MASSACHUSETTS
89002425	Duke, Philip, Three-Decker	Worcester Three-Deckers TR	2/9/1990	7 Maxwell St.	Worcester	Worcester	MASSACHUSETTS
89002430	Dworman, David, Three-Decker	Worcester Three-Deckers TR	2/9/1990	159 Providence St.	Worcester	Worcester	MASSACHUSETTS
80000618	East Worcester School-Norcross Factory	Worcester MRA	3/5/1980	10 E. Worcester St.	Worcester	Worcester	MASSACHUSETTS
80000589	Elizabeth Street School	Worcester MRA	3/5/1980	31 Elizabeth St.	Worcester	Worcester	MASSACHUSETTS
70000096	Elm Park	Worcester MRA	7/1/1970	Elm Park	Worcester	Worcester	MASSACHUSETTS
89002374	Elm Street Historic District	Worcester Three-Deckers TR	2/9/1990	132--148 Elm St.	Worcester	Worcester	MASSACHUSETTS
80000536	Emmanuel Baptist	Worcester MRA	3/5/1980	717 Main St.	Worcester	Worcester	MASSACHUSETTS
80000601	English High School	Worcester MRA	3/5/1980	20 Irving St.	Worcester	Worcester	MASSACHUSETTS
80000608	Enterprise Building	Worcester MRA	3/5/1980	540 Main St.	Worcester	Worcester	MASSACHUSETTS
89002438	Erikson, Knut, Three-Decker	Worcester Three-Deckers TR	2/9/1990	19 Stanton St.	Worcester	Worcester	MASSACHUSETTS
89002357	Euclid Avenue--Montrose Street Historic District	Worcester Three-Deckers TR	2/9/1990	Along Euclid Ave. and Montrose St., between Vernon St. and Perry Ave.	Worcester	Worcester	MASSACHUSETTS
80000594	Fairlawn	Worcester MRA	3/5/1980	189 May St.	Worcester	Worcester	MASSACHUSETTS
89002372	Fay Street Historic District	Worcester Three-Deckers TR	2/9/1990	4--6 Fay St.	Worcester	Worcester	MASSACHUSETTS
80000631	Fitch, C.H., House	Worcester MRA	3/5/1980	15 Oread St.	Worcester	Worcester	MASSACHUSETTS
80000515	Flagg, Amos, House	Worcester MRA	3/5/1980	246 Burncoat St.	Worcester	Worcester	MASSACHUSETTS
80000620	Flagg, Benjamin, House	Worcester MRA	3/5/1980	136 Plantation St.	Worcester	Worcester	MASSACHUSETTS
89002362	Flagg, Levi, Three-Decker	Worcester Three-Deckers TR	2/9/1990	79 Florence St.	Worcester	Worcester	MASSACHUSETTS
89002447	Fontaine, George, Three-Decker	Worcester Three-Deckers TR	2/9/1990	141 Vernon St.	Worcester	Worcester	MASSACHUSETTS
80000636	Forbes, William Trowbridge, House	Worcester MRA	3/5/1980	23 Trowbridge Rd.	Worcester	Worcester	MASSACHUSETTS
80000529	Forest Hill Cottage	Worcester MRA	3/5/1980	22 Windsor St.	Worcester	Worcester	MASSACHUSETTS
80000482	Freeland Street School	Worcester MRA	3/5/1980	12 Freeland St.	Worcester	Worcester	MASSACHUSETTS
89002387	Friberg, Andrew, Three-Decker	Worcester Three-Deckers TR	2/9/1990	26 Ames St.	Worcester	Worcester	MASSACHUSETTS
75000303	G.A.R. Hall		3/13/1975	55 Pearl St.	Worcester	Worcester	MASSACHUSETTS
80000523	Gabriel, George, House	Worcester MRA	3/5/1980	31 Lenox St.	Worcester	Worcester	MASSACHUSETTS
80000561	Gale, George, House	Worcester MRA	3/5/1980	15 Elizabeth St.	Worcester	Worcester	MASSACHUSETTS
89002356	Giguere, Thomas, Three-Decker	Worcester Three-Deckers TR	2/9/1990	18 Fairhaven Rd.	Worcester	Worcester	MASSACHUSETTS

Ref#	Property Name	Name of Multiple Property Listing	Listed Date	Street & Number	City	County	State
00001342	Gilman Block		11/20/2000	207-219 Main St.	Worcester	Worcester	MASSACHUSETTS
80000555	Goddard House	Worcester MRA	3/5/1980	12 Catherine St.	Worcester	Worcester	MASSACHUSETTS
80000525	Goddard, Harry, House	Worcester MRA	3/5/1980	190 Salisbury St.	Worcester	Worcester	MASSACHUSETTS
07001202	Goldberg Building	Worcester MRA	11/19/2007	97-103 Water St.	Worcester	Worcester	MASSACHUSETTS
80000564	Goulding, Henry, House	Worcester MRA	3/5/1980	26 Harvard St.	Worcester	Worcester	MASSACHUSETTS
80000566	Goulding, W.H., House	Worcester MRA	3/5/1980	4 Dix St.	Worcester	Worcester	MASSACHUSETTS
80000545	Grafton Street School	Worcester MRA	3/5/1980	311 Grafton St.	Worcester	Worcester	MASSACHUSETTS
80000522	Green Hill Park Shelter	Worcester MRA	3/5/1980	Green Hill Parkway	Worcester	Worcester	MASSACHUSETTS
80000511	Greendale Branch Library	Worcester MRA	3/5/1980	470 W. Boylston St.	Worcester	Worcester	MASSACHUSETTS
76000949	Greendale Village Improvement Society Building	Worcester MRA	11/7/1976	480 W. Boylston St.	Worcester	Worcester	MASSACHUSETTS
89002388	Gullberg, Evert, Three-Decker	Worcester Three-Deckers TR	2/9/1990	18 Ashton St.	Worcester	Worcester	MASSACHUSETTS
11000068	Hadley Furniture Company Building		3/1/2011	651-659 Main St	Worcester	Worcester	MASSACHUSETTS
89002433	Hadley, Gilbert, Three-Decker	Worcester Three-Deckers TR	2/9/1990	31 Russell St.	Worcester	Worcester	MASSACHUSETTS
89002423	Hall, Charles A., Three-Decker	Worcester Three-Deckers TR	2/9/1990	68 Mason St.	Worcester	Worcester	MASSACHUSETTS
80000531	Hammond Heights	Worcester MRA	3/5/1980	Properties along Germain, Haviland, Highland, and Westland Sts. and Institute Rd.	Worcester	Worcester	MASSACHUSETTS
80000632	Hammond Organ Factory	Worcester MRA	3/5/1980	9 May St.	Worcester	Worcester	MASSACHUSETTS
80000543	Harding-Winter Street Manufacturing District	Worcester MRA	3/5/1980	28-88 Winter St.	Worcester	Worcester	MASSACHUSETTS
80000602	Harris-Merrick House	Worcester MRA	3/5/1980	41 Fruit St.	Worcester	Worcester	MASSACHUSETTS
80000572	Hastins, John, Cottage	Worcester MRA	3/5/1980	31 William St.	Worcester	Worcester	MASSACHUSETTS
80000514	Higgins Armory Museum	Worcester MRA	3/5/1980	100 Barber Ave.	Worcester	Worcester	MASSACHUSETTS
80000496	Higgins, Aldus Chapin, House	Worcester MRA	3/5/1980	1 John Wing Rd.	Worcester	Worcester	MASSACHUSETTS
89002420	Hirst, Samuel, Three-Decker	Worcester Three-Deckers TR	2/9/1990	90 Lovell St.	Worcester	Worcester	MASSACHUSETTS
80000582	Hobbs, Marcus, House	Worcester MRA	3/5/1980	16 William St.	Worcester	Worcester	MASSACHUSETTS
80000576	Hogg, William, House	Worcester MRA	3/5/1980	54 Elm St.	Worcester	Worcester	MASSACHUSETTS
80000491	Holy Cross College	Worcester MRA	3/5/1980	Holy Cross College Campus	Worcester	Worcester	MASSACHUSETTS
88000721	Holy Name of Jesus Complex	Worcester MRA	6/9/1988	Illinois St.	Worcester	Worcester	MASSACHUSETTS
97001560	Hope Cemetery		12/22/1997	119 Webster St.	Worcester	Worcester	MASSACHUSETTS
89002371	Houghton Street Historic District	Worcester Three-Deckers TR	2/9/1990	Houghton St. between Palm and Dorchester Sts.	Worcester	Worcester	MASSACHUSETTS
89002451	Hunt, Daniel, Three-Decker	Worcester Three-Deckers TR	2/9/1990	9 Wyman St.	Worcester	Worcester	MASSACHUSETTS
89002412	Hunt, David, Three-Decker	Worcester Three-Deckers TR	2/9/1990	26 Louise St.	Worcester	Worcester	MASSACHUSETTS
80000535	I00F Building	Worcester MRA	3/5/1980	674 Main St.	Worcester	Worcester	MASSACHUSETTS
80000510	Indian Hill-North Village	Worcester MRA	3/5/1980	properties along Ararat St. and Delaval, Heroult, Marconi, Watt, and Westinghouse Rds.	Worcester	Worcester	MASSACHUSETTS
89002369	Ingleside Avenue Historic District	Worcester Three-Deckers TR	2/9/1990	218--220 and 226--228 Ingleside Ave.	Worcester	Worcester	MASSACHUSETTS
89002363	Ingraham, Harry B., Three-Decker	Worcester Three-Deckers TR	2/9/1990	19 Freeland St.	Worcester	Worcester	MASSACHUSETTS
80000554	Institutional District	Worcester MRA	3/5/1980	Properties on Lincoln and Wheaton Squares and on Salisbury and Tuckerman Sts.	Worcester	Worcester	MASSACHUSETTS
89002389	Johnson, Edwin, Three-Decker	Worcester Three-Deckers TR	2/9/1990	183 Austin St.	Worcester	Worcester	MASSACHUSETTS
89002416	Johnson, John and Edward, Three-Decker	Worcester Three-Deckers TR	2/9/1990	31 Louise St.	Worcester	Worcester	MASSACHUSETTS
89002408	Johnson, John, Three-Decker	Worcester Three-Deckers TR	2/9/1990	140 Eastern Ave.	Worcester	Worcester	MASSACHUSETTS
89002437	Johnson, Paul, Three-Decker	Worcester Three-Deckers TR	2/9/1990	7 Stanton St.	Worcester	Worcester	MASSACHUSETTS
80000533	Junction Shop and Herman Street District	Worcester MRA	3/5/1980	Properties on Jackson, Herman, and Beacon Sts.	Worcester	Worcester	MASSACHUSETTS
89002411	Kaller, Erick, Three-Decker	Worcester Three-Deckers TR	2/9/1990	146 Eastern Ave.	Worcester	Worcester	MASSACHUSETTS
89002413	Kaller, Erick, Three-Decker	Worcester Three-Deckers TR	2/9/1990	148 Eastern Ave.	Worcester	Worcester	MASSACHUSETTS
80000575	Katz and Leavitt Apartment House	Worcester MRA	3/5/1980	53 Elm St.	Worcester	Worcester	MASSACHUSETTS
80000520	Knollwood	Worcester MRA	3/5/1980	425 Salisbury St.	Worcester	Worcester	MASSACHUSETTS
80000628	Knowles, Lucius, House	Worcester MRA	3/5/1980	838 Main St.	Worcester	Worcester	MASSACHUSETTS
80000492	Larchmont	Worcester MRA	3/5/1980	36 Butler St.	Worcester	Worcester	MASSACHUSETTS
89002443	Larson, Swan, Three-Decker	Worcester Three-Deckers TR	2/9/1990	12 Summerhill Ave.	Worcester	Worcester	MASSACHUSETTS

Ref#	Property Name	Name of Multiple Property Listing	Listed Date	Street & Number	City	County	State
80000623	Legg, John, House	Worcester MRA	3/5/1980	5 Claremont St.	Worcester	Worcester	MASSACHUSETTS
89002446	Levenson, Morris, Three-Decker	Worcester Three-Deckers TR	2/9/1990	38 Plantation St.	Worcester	Worcester	MASSACHUSETTS
74002046	Liberty Farm	Worcester MRA	9/13/1974	116 Mower St.	Worcester	Worcester	MASSACHUSETTS
80000570	Lincoln Estate-Elm Park Historic District	Worcester MRA	3/5/1980	Properties along Cedar, Fruit, Oak, Sever, West, and William Sts.	Worcester	Worcester	MASSACHUSETTS
80000573	Lincoln, Gov. Levi, House	Worcester MRA	3/5/1980	4 Avalon Pl.	Worcester	Worcester	MASSACHUSETTS
80000613	Lower Pleasant Street District	Worcester MRA	3/5/1980	418-426 Main St. and 9-49 Pleasant St.	Worcester	Worcester	MASSACHUSETTS
89002403	Lumb, Thomas, Three-Decker	Worcester Three-Deckers TR	2/9/1990	80 Dewey St.	Worcester	Worcester	MASSACHUSETTS
89002448	Lumb, Thomas, Three-Decker	Worcester Three-Deckers TR	2/9/1990	44 Winfield St.	Worcester	Worcester	MASSACHUSETTS
89002399	Lundberg, Charles, Three-Decker	Worcester Three-Deckers TR	2/9/1990	67 Catharine St.	Worcester	Worcester	MASSACHUSETTS
89002434	Magnuson, Charles, Three-Decker	Worcester Three-Deckers TR	2/9/1990	56/58 Olga Ave.	Worcester	Worcester	MASSACHUSETTS
84000096	Malvern Road School	Worcester MRA	10/4/1984	Malvern Rd. and Southbridge St.	Worcester	Worcester	MASSACHUSETTS
80000567	Marble, Jerome, House	Worcester MRA	3/5/1980	23 Harvard St.	Worcester	Worcester	MASSACHUSETTS
89002435	Mark, John, Three-Decker	Worcester Three-Deckers TR	2/9/1990	24 Sigel St.	Worcester	Worcester	MASSACHUSETTS
80000583	Marsh, Alexander, House	Worcester MRA	3/5/1980	57 Elm St.	Worcester	Worcester	MASSACHUSETTS
80000537	Masonic Temple	Worcester MRA	3/5/1980	Ionic Ave.	Worcester	Worcester	MASSACHUSETTS
71000356	Massachusetts Avenue Historic District	Worcester MRA	12/16/1971	Between Salisbury St. and Drury Lane	Worcester	Worcester	MASSACHUSETTS
89002380	Massad, Anthony, Three-Decker	Worcester Three-Deckers TR	2/9/1990	14 Harlow St.	Worcester	Worcester	MASSACHUSETTS
80000622	May Street Historic District	Worcester MRA	3/5/1980	Properties from 29 to 46 May St.	Worcester	Worcester	MASSACHUSETTS
89002395	McCafferty, Elizabeth, Three-Decker	Worcester Three-Deckers TR	2/9/1990	45 Canterbury St.	Worcester	Worcester	MASSACHUSETTS
89002442	McCarron, Andrew, Three-Decker	Worcester Three-Deckers TR	2/9/1990	3 Pitt St.	Worcester	Worcester	MASSACHUSETTS
89002366	McDermott, John B., Three-Decker	Worcester Three-Deckers TR	2/9/1990	21 Freeland St.	Worcester	Worcester	MASSACHUSETTS
80000517	McFarland, William, House	Worcester MRA	3/5/1980	525 Salisbury St.	Worcester	Worcester	MASSACHUSETTS
89002407	McGrath, Patrick, Three-Decker	Worcester Three-Deckers TR	2/9/1990	50 Dorchester St.	Worcester	Worcester	MASSACHUSETTS
89002439	McGuinness, Patrick, Three-Decker	Worcester Three-Deckers TR	2/9/1990	25 Suffield St.	Worcester	Worcester	MASSACHUSETTS
89002436	McPartland, Frank, Three-Decker	Worcester Three-Deckers TR	2/9/1990	61 Paine St.	Worcester	Worcester	MASSACHUSETTS
89002428	McPartland, James, Three-Decker	Worcester Three-Deckers TR	2/9/1990	17 Pond St.	Worcester	Worcester	MASSACHUSETTS
72000152	Mechanics Hall		11/9/1972	321 Main St.	Worcester	Worcester	MASSACHUSETTS
80000577	Mechanics' Hall District	Worcester MRA	3/5/1980	Properties between 282 and 343 Main St.	Worcester	Worcester	MASSACHUSETTS
80000581	Merrill Double House	Worcester MRA	3/5/1980	18-20 West St.	Worcester	Worcester	MASSACHUSETTS
80000527	Miles, Charles, House	Worcester MRA	3/5/1980	131 Lincoln St.	Worcester	Worcester	MASSACHUSETTS
03001178	Miss Worcester Diner	Diners of Massachusetts MPS	11/21/2003	302 Southbridge St.	Worcester	Worcester	MASSACHUSETTS
80000616	Mission Chapel	Worcester MRA	3/5/1980	205 Summer St.	Worcester	Worcester	MASSACHUSETTS
80000521	Montvale	Worcester MRA	3/5/1980	Properties along Monadnock, Sagamore, Waconah, and Whitman Rds., and Salisbury St.	Worcester	Worcester	MASSACHUSETTS
80000557	Moore, Jesse, House	Worcester MRA	3/5/1980	25 Catherine St.	Worcester	Worcester	MASSACHUSETTS
89002432	Munroe, Sarah, Three-Decker	Worcester Three-Deckers TR	2/9/1990	11 Rodney St.	Worcester	Worcester	MASSACHUSETTS
89002404	Murphy, Patrick, Three-Decker		2/9/1990	31 Jefferson St.	Worcester	Worcester	MASSACHUSETTS
89002391	Nelson, Christina, Three-Decker	Worcester Three-Deckers TR	2/9/1990	45 Butler St.	Worcester	Worcester	MASSACHUSETTS
80000508	Newton, Charles, House	Worcester MRA	3/5/1980	24 Brattle St.	Worcester	Worcester	MASSACHUSETTS
09000142	Newton, S.D., House	Worcester MRA	3/5/1980	8 Sycamore St.	Worcester	Worcester	MASSACHUSETTS
80000624	Norcross Brothers Houses	Worcester MRA	3/5/1980	16, 18 Claremont St.	Worcester	Worcester	MASSACHUSETTS
80000512	North Worcester Aid Society	Worcester MRA	3/5/1980	58 Holden St.	Worcester	Worcester	MASSACHUSETTS
89002441	O'Brien, Richard, Three-Decker	Worcester Three-Deckers TR	2/9/1990	43 Suffolk St.	Worcester	Worcester	MASSACHUSETTS
89002419	O'Connor, James, Three-Decker	Worcester Three-Deckers TR	2/9/1990	23 Endicott St.	Worcester	Worcester	MASSACHUSETTS
89002393	O'Connor, James--John Trybowski Three-Decker	Worcester Three-Deckers TR	2/9/1990	21 Canton St.	Worcester	Worcester	MASSACHUSETTS
80000513	Odd Fellows' Home	Worcester MRA	3/5/1980	40 Randolph Rd.	Worcester	Worcester	MASSACHUSETTS
80000585	Old State Mutual Building	Worcester MRA	3/5/1980	240 Main St.	Worcester	Worcester	MASSACHUSETTS
100002161	Osgood Bradley Building		3/5/2018	18 Grafton St.	Worcester	Worcester	MASSACHUSETTS

Appendix H
National Register of Historic Places
Research Documentation
Worcester, Massachusetts

Ref#	Property Name	Name of Multiple Property Listing	Listed Date	Street & Number	City	County	State
80000605	Oxford-Crown Extension District	Worcester MRA	3/5/1980	Properties along Ashland, Austin, Chatham, Congress, Crown, and Pleasant Sts.	Worcester	Worcester	MASSACHUSETTS
76000954	Oxford-Crown Historic District	Worcester MRA	5/6/1976	Roughly bounded by Chatham, Congress, Crown, Pleasant, Oxford Sts. and Oxford Pl.	Worcester	Worcester	MASSACHUSETTS
76000948	Paine, Timothy, House	Worcester MRA	4/30/1976	140 Lincoln St.	Worcester	Worcester	MASSACHUSETTS
80000607	Park Building	Worcester MRA	3/5/1980	507 Main St.	Worcester	Worcester	MASSACHUSETTS
89002367	Perry Avenue Historic District	Worcester Three-Deckers TR	2/9/1990	49--55 Perry Ave.	Worcester	Worcester	MASSACHUSETTS
89002358	Petterson, Lars--Adolph Carlson Three-Decker	Worcester Three-Deckers TR	2/9/1990	76 Fairhaven Rd.	Worcester	Worcester	MASSACHUSETTS
89002368	Petterson, Lars--Fred Gurney Three-Decker	Worcester Three-Deckers TR	2/9/1990	2 Harlow St.	Worcester	Worcester	MASSACHUSETTS
89002359	Petterson, Lars--Silas Archer Three-Decker	Worcester Three-Deckers TR	2/9/1990	80 Fairhaven Rd.	Worcester	Worcester	MASSACHUSETTS
89002376	Petterson,Lars--James Reidy Three-Decker	Worcester Three-Deckers TR	2/9/1990	4 Harlow St.	Worcester	Worcester	MASSACHUSETTS
80000551	Pilgrim Congregational Church	Worcester MRA	3/5/1980	909 Main St.	Worcester	Worcester	MASSACHUSETTS
80000597	Pleasant Street Firehouse	Worcester MRA	3/5/1980	408 Pleasant St.	Worcester	Worcester	MASSACHUSETTS
10001122	Poli's Palace Theater		1/10/2011	2 Southbridge St	Worcester	Worcester	MASSACHUSETTS
80000558	Prentiss, Addison, House	Worcester MRA	3/5/1980	3 Channing Way	Worcester	Worcester	MASSACHUSETTS
80000553	Providence Street Firehouse	Worcester MRA	3/5/1980	98 Providence St.	Worcester	Worcester	MASSACHUSETTS
89002381	Providence Street Historic District	Worcester Three-Deckers TR	2/9/1990	127--145 Providence St.	Worcester	Worcester	MASSACHUSETTS
89002444	Provost, Arthur, Three-Decker	Worcester Three-Deckers TR	2/9/1990	30 Thorne St.	Worcester	Worcester	MASSACHUSETTS
80000565	Putnam, Otis, House	Worcester MRA	3/5/1980	25 Harvard St.	Worcester	Worcester	MASSACHUSETTS
80000494	Quinsigamond Branch Library	Worcester MRA	3/5/1980	812 Millbury St.	Worcester	Worcester	MASSACHUSETTS
80000495	Quinsigamond Firehouse	Worcester MRA	3/5/1980	837 Millbury St.	Worcester	Worcester	MASSACHUSETTS
80000568	Raymond, Tilley, House	Worcester MRA	3/5/1980	12 George St.	Worcester	Worcester	MASSACHUSETTS
89002422	Reed, Frank, Three-Decker	Worcester Three-Deckers TR	2/9/1990	913/915 Main St.	Worcester	Worcester	MASSACHUSETTS
80000507	Rice, Ezra, House	Worcester MRA	3/5/1980	1133 W. Boylston St.	Worcester	Worcester	MASSACHUSETTS
85002783	Richmond, Willard, Apartment Block	Worcester MRA	11/7/1985	43 Austin St.	Worcester	Worcester	MASSACHUSETTS
89002431	Ridyard, Albert, Three-Decker	Worcester Three-Deckers TR	2/9/1990	5 Mount Pleasant St.	Worcester	Worcester	MASSACHUSETTS
89002402	Ridyard, B. E., Three-Decker	Worcester Three-Deckers TR	2/9/1990	29 Dewey St.	Worcester	Worcester	MASSACHUSETTS
89002405	Riordan, John, Three-Decker	Worcester Three-Deckers TR	2/9/1990	8 Dix St.	Worcester	Worcester	MASSACHUSETTS
89002397	Roynane, Catharine, Three-Decker	Worcester Three-Deckers TR	2/9/1990	18 Ingalls St.	Worcester	Worcester	MASSACHUSETTS
80000556	Ruggles, Draper, House	Worcester MRA	3/5/1980	21 Catherine St.	Worcester	Worcester	MASSACHUSETTS
85002782	Russell, The	Worcester MRA	11/7/1985	49 Austin St.	Worcester	Worcester	MASSACHUSETTS
80000587	Salisbury Factory Building	Worcester MRA	3/5/1980	25 Union St.	Worcester	Worcester	MASSACHUSETTS
80000588	Salisbury Factory Building	Worcester MRA	3/5/1980	49-51 Union St.	Worcester	Worcester	MASSACHUSETTS
75000837	Salisbury House	Worcester MRA	6/10/1975	61 Harvard St.	Worcester	Worcester	MASSACHUSETTS
75000838	Salisbury Mansion and Store	Worcester MRA	5/30/1975	30, 40 Highland St.	Worcester	Worcester	MASSACHUSETTS
80000634	Schofield, James, House	Worcester MRA	3/5/1980	3 Mt. Pleasant St.	Worcester	Worcester	MASSACHUSETTS
90000729	Shaarai Torah Synagogue	Worcester MRA	5/7/1990	32 Providence St.	Worcester	Worcester	MASSACHUSETTS
80000626	Shattuck, Moody, House	Worcester MRA	3/5/1980	768 Main St.	Worcester	Worcester	MASSACHUSETTS
89002400	Shea, Bridget, Three-Decker	Worcester Three-Deckers TR	2/9/1990	21 Jefferson St.	Worcester	Worcester	MASSACHUSETTS
89002440	Simpson, Clara, Three-Decker	Worcester Three-Deckers TR	2/9/1990	69 Piedmont St.	Worcester	Worcester	MASSACHUSETTS
80000609	Slater Building	Worcester MRA	3/5/1980	390 Main St.	Worcester	Worcester	MASSACHUSETTS
89002409	Smith, Ellen M., Three-Decker	Worcester Three-Deckers TR	2/9/1990	22 Kilby St.	Worcester	Worcester	MASSACHUSETTS
80000629	Smith, Elliot, House	Worcester MRA	3/5/1980	839 Main St.	Worcester	Worcester	MASSACHUSETTS
80000509	Smith-Thaxter-Merrifield House	Worcester MRA	3/5/1980	158 Holden St.	Worcester	Worcester	MASSACHUSETTS
80000528	Soho Cottage	Worcester MRA	3/5/1980	21 Windsor St.	Worcester	Worcester	MASSACHUSETTS
80000550	South Unitarian	Worcester MRA	3/5/1980	888 Main St.	Worcester	Worcester	MASSACHUSETTS
80000486	South Worcester Branch Library	Worcester MRA	3/5/1980	705 Southbridge St.	Worcester	Worcester	MASSACHUSETTS
80000534	Southbridge-Sargent Manufacturing District	Worcester MRA	3/5/1980	Southbridge, Sargent, and Gold Sts.	Worcester	Worcester	MASSACHUSETTS
80000619	St. John`s Catholic Church	Worcester MRA	3/5/1980	40 Temple St.	Worcester	Worcester	MASSACHUSETTS
80000481	St. Marks	Worcester MRA	3/5/1980	Freeland St.	Worcester	Worcester	MASSACHUSETTS

Appendix H
National Register of Historic Places
Research Documentation
Worcester, Massachusetts

Ref#	Property Name	Name of Multiple Property Listing	Listed Date	Street & Number	City	County	State
80000485	St. Matthews	Worcester MRA	3/5/1980	693 Southbridge St.	Worcester	Worcester	MASSACHUSETTS
80000548	St. Peters Catholic Church	Worcester MRA	3/5/1980	935 Main St.	Worcester	Worcester	MASSACHUSETTS
80000633	Stark, Edward, House	Worcester MRA	3/5/1980	21 Oread St.	Worcester	Worcester	MASSACHUSETTS
80000479	Stearns Tavern	Worcester MRA	3/5/1980	651 Park Ave.	Worcester	Worcester	MASSACHUSETTS
80000615	Stevens' Building	Worcester MRA	3/5/1980	24-44 Southbridge St.	Worcester	Worcester	MASSACHUSETTS
80000532	Stevens, Daniel, House	Worcester MRA	3/5/1980	7 Sycamore St.	Worcester	Worcester	MASSACHUSETTS
89002449	Stoliker, Edna, Three-Decker	Worcester Three-Deckers TR	2/9/1990	41 Plantation St.	Worcester	Worcester	MASSACHUSETTS
89002450	Stone, Edward, Three-Decker	Worcester Three-Deckers TR	2/9/1990	8 Wyman St.	Worcester	Worcester	MASSACHUSETTS
80000591	Sturtevant, Leonard, House	Worcester MRA	3/5/1980	84 Mulberry St.	Worcester	Worcester	MASSACHUSETTS
80000559	Swift, D. Wheeler, House	Worcester MRA	3/5/1980	22 Oak Ave.	Worcester	Worcester	MASSACHUSETTS
11000019	Thule--Plummer Buildings		2/18/2011	180 and 184 Main St	Worcester	Worcester	MASSACHUSETTS
80000600	Tower, Horatio, House	Worcester MRA	3/5/1980	71 Pleasant St.	Worcester	Worcester	MASSACHUSETTS
89002394	Troupes, John, Three-Decker	Worcester Three-Deckers TR	2/9/1990	25 Canton St.	Worcester	Worcester	MASSACHUSETTS
11000161	U.S. Post Office and Courthouse		4/8/2011	595 Main St	Worcester	Worcester	MASSACHUSETTS
80000599	Union Congregational Church	Worcester MRA	3/5/1980	5 Chestnut St.	Worcester	Worcester	MASSACHUSETTS
80000617	Union Station	Worcester MRA	3/5/1980	Washington Sq.	Worcester	Worcester	MASSACHUSETTS
80000493	Upsala Street School	Worcester MRA	3/5/1980	36 Upsala St.	Worcester	Worcester	MASSACHUSETTS
89002331	Vendome, The, and the St. Ives	Worcester MRA	2/9/1990	17--19 and 21--23 Chandler St.	Worcester	Worcester	MASSACHUSETTS
89002361	View Street Historic District	Worcester Three-Deckers TR	2/9/1990	7--17 and 8--16 View Street	Worcester	Worcester	MASSACHUSETTS
80000586	Waldo Street Police Station	Worcester MRA	3/5/1980	Waldo St.	Worcester	Worcester	MASSACHUSETTS
80000488	Ward Street School-Millbury Street	Worcester MRA	3/5/1980	389 Millbury St.	Worcester	Worcester	MASSACHUSETTS
80000439	Washburn and Moen North Works District	Worcester MRA	3/5/1980	Properties on Grove St.	Worcester	Worcester	MASSACHUSETTS
80000606	WCIS Bank	Worcester MRA	3/5/1980	365 Main St.	Worcester	Worcester	MASSACHUSETTS
80000480	Webster Street Firehouse	Worcester MRA	3/5/1980	40 Webster St.	Worcester	Worcester	MASSACHUSETTS
80000539	Wellington Street Apartment House District	Worcester MRA	3/5/1980	Properties along Jacques Ave., and Wellington and Irving Sts.	Worcester	Worcester	MASSACHUSETTS
89002426	Wescott, John, Three-Decker	Worcester Three-Deckers TR	2/9/1990	454 Pleasant St.	Worcester	Worcester	MASSACHUSETTS
80000603	Wesson, Franklin, House	Worcester MRA	3/5/1980	8 Claremont St.	Worcester	Worcester	MASSACHUSETTS
77000653	Whitcomb House		11/9/1977	51 Harvard St.	Worcester	Worcester	MASSACHUSETTS
80000499	Whitcomb Mansion	Worcester MRA	3/5/1980	51 Harvard St.	Worcester	Worcester	MASSACHUSETTS
80000490	Whittall Mills	Worcester MRA	3/5/1980	properties off Brussels St.	Worcester	Worcester	MASSACHUSETTS
89002365	Woodford Street Historic District		2/9/1990	35--39 and 38--40 Woodford St.	Worcester	Worcester	MASSACHUSETTS
80000630	Woodland Street Firehouse	Worcester MRA	3/5/1980	36 Woodland St.	Worcester	Worcester	MASSACHUSETTS
80000549	Woodland Street Historic District	Worcester MRA	3/5/1980	Properties along Hawthorne, Loudon, Norwood, and Woodland Sts.	Worcester	Worcester	MASSACHUSETTS
80000478	Worcester Academy	Worcester MRA	3/5/1980	Worcester Academy Campus	Worcester	Worcester	MASSACHUSETTS
80000530	Worcester Asylum and related buildings	Worcester MRA	3/5/1980	305 Belmont St.	Worcester	Worcester	MASSACHUSETTS
00001343	Worcester Bleach and Dye Works		11/8/2000	60 Fremont St.	Worcester	Worcester	MASSACHUSETTS
78001405	Worcester City Hall and Common	Worcester MRA	3/29/1978	455 Main St.	Worcester	Worcester	MASSACHUSETTS
84000097	Worcester Corset Company Factory	Worcester MRA	10/4/1984	30 Wyman St.	Worcester	Worcester	MASSACHUSETTS
78000472	Worcester Five Cents Savings Bank		9/13/1978	316 Main St.	Worcester	Worcester	MASSACHUSETTS
80000612	Worcester Market Building	Worcester MRA	3/5/1980	831 Main St.	Worcester	Worcester	MASSACHUSETTS
100001262	Worcester State Hospital Farmhouse		7/3/2017	361 Plantation St.	Worcester	Worcester	MASSACHUSETTS
89002401	Zemaitis, Anthony, Three-Decker	Worcester Three-Deckers TR	2/9/1990	35 Dartmouth St.	Worcester	Worcester	MASSACHUSETTS

Notes:
Sanborn, Head & Associates, Inc. (Sanborn Head) conducted a review of the National Register of Historic Places within Worcester, Massachusetts. The search returned 279 results within Worcester. The Site is not listed on the National Register of Historic Places.