Prepared for:
Saint Gobain Abrasives
1 New Bond Street
Worcester, Massachusetts 01615

Prepared By:
Ramboll Environ US Corporation
Westford, Massachusetts

Date:
July 2021

Project Number:
1690022480

NOTICE OF INTENT FOR MASSACHUSETTS REMEDIATION GENERAL PERMIT

SAINT GOBAIN ABRAISIVES

1 NEW BOND STREET

WORCESTER, MASSACHUSETTS

RAMBOLL ENVIRON

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1. INTRODUCTION

Ramboll prepared a Notice of Intent (NOI) for a National Pollutant Discharge Elimination System (NPDES) General Permit for Remediation Activity Discharges, Massachusetts General Permit (RGP) for dewatering activities associated with a construction project at the Saint Gobain Abrasives Plant located at 167 West Boylston Drive, Worcester, Massachusetts on behalf of the site owner, Saint Gobain Abrasives (St. Gobain). This NOI is being submitted to the Massachusetts Department of Environmental Protection (MassDEP) and United States Environmental Protection Agency (USEPA) in accordance with the requirements of the Massachusetts General Permit No. MAG910000.

This NOI for an RGP is being submitted to account for site construction activities being conducted at the facility. A portion of these activities include the dewatering of groundwater to allow for the construction of a powerplant on the St. Gobain property. Based on recent groundwater sampling total residual chlorine, antimony, arsenic, chromium VI, Phenol, Benzo(a)anthracene, Chrysene, Naphthalene, 1,4 Dichlorobenzene, and PCBs were detected in groundwater within the anticipated dewatering area at concentrations exceeding the RGP Water Quality Based Effluent Standards. For the purpose of this NOI, the "facility" is defined as the area located within the property boundaries of 167 Boylston Drive, Worcester, Massachusetts. A Site Locus Map is presented as **Figure 1**. A Site layout plan is presented as **Figure 2**. A copy of the NOI is included as **Attachment A**.

2. GENERAL FACILITY INFORMATION

General disposal site information for which this Phase I applies includes the following:

Property Owner/Facility Operator:	Jason Myers, Environmental Compliance Mgr. St. Gobain Abrasives LLC 1 New Bond Street Worcester, MA, 01615 Tel: (781) 278-0444
Owner/Facility Operator Contact:	Jason Myers, Environmental Compliance Mgr. jason.myers@saintgobain.com Tel: (508) 795-2441
USGS Quadrangle:	Worcester, Massachusetts
Longitude, Latitude: (approximate)	71° 48' 10.7" W, 42° 18' 6.41" N
Site Zoning:	MG-1.0 Manufacturing General
County:	Worcester
Release Tracking Number (RTN):	RTN 2-0021593

2.1 Facility Description

The facility is located at 167 West Boylston Drive, Worcester, MA and is in a mixed industrial, commercial and residential land use area. **Figure 1 – Site Location Map,** depicts the location of the Property. An aerial photograph of the Property, which is approximately 28 acres in size, is shown in the on **Figure 2 – Site Layout.** Land use surrounding the Property is characterized by a combination of industrial, commercial, and residential use. Adjacent properties include the following:

- North: Industrial land use
- East: A mixed use industrial, commercial and residential land use area
- South: A mixed use industrial and commercial land use area
- West: Shore Drive, Frontage Road and Interstate 190 beyond which is Indian Lake

2.2 Sensitive Environmental Receptors

According to a MassDEP Bureau of Waste Site Cleanup (BWSC) Phase 1 Site Assessment Map (**Figure 3**), the Property is not located within a drinking water source protection area (Zone A, Zone II, or Interim Water Protection Area (IWPA)). The Site is not located within 500 feet of a Protected Open Space. The Site is located within a Medium or High Yield Non-Potential Drinking Water Source Area. Areas of Priority Habitats of Rare Species, Habitats of Rare Wildlife, or Certified Vernal Pools are not located within 500 feet of the disposal site. No wetlands are located at the Property or adjacent properties.

No potable supply wells are known to be present at the Site and no private supply wells are known to exist within 500 feet of the Site. Based on the MassDEP Geographic Information System (MassGIS), the nearest municipal water supplies are located greater than 1.5 miles from the Site.

The closest surface water body is Indian Lake, approximately 1,000 feet to the west of the Site. Indian Lake is classified as an impaired water body and Total Maximum Daily Load (TMDL) is required but not yet established. Water resource mapping in relation to the facility is presented on **Figure 3**.

2.3 RGP Status

An RGP permit has not been previously applied for or granted for this discharge, and thus St. Gobain is considered a new discharger under the RGP.

3. DISCHARGE INFORMATION

This NOI for a RGP is being applied for groundwater discharge necessary during site construction activities. The proposed scope of work will include excavation and construction of a new power plant at the St. Gobain facility in Worcester, MA. Dewatering of the excavation will be required for installation of concrete piers associated with the foundation of the new building. The building to be constructed will have a footprint of approximately 70 X 130 feet.

Averaged depth to water at the two temporary monitoring wells was measured at 6.01 feet below ground surface, as documented during groundwater sampling on June 29, 2021. The proposed discharge location for treated groundwater is an outfall (Outfall A) to Salisbury Pond, as depicted on **Figure 4**. The approximate latitude and longitude of the discharge (outfall) point is:

- Latitude: 42° 16’ 41.04”

- Longitude: 71° 48’ 28.88”

Water from the wellpoint dewatering system will be pumped to one (1) 18,000-gallon weir tank at the head of the water treatment system. From the weir tank, water will be pumped via a centrifugal or submersible pump through a bag filter skid consisting of three (3) single bag filters plumbed in parallel. From the bag filters, water will be discharged to two (2) carbon vessels plumbed in series. Each carbon vessel will contain 3,000 pounds of reactivated liquid phase carbon. Following the carbon vessels, water will be pumped to a cartridge filter skid with two (2) cartridge filter housings plumbed in parallel. From the cartridge filter skid, water will be pumped through a non-resettable flow meter/totalizer prior to discharge to an existing storm sewer catch basin on the 167 West Boylston Drive property. Please note that a contingency lead treatment system and/or pH buffering will be utilized if concentrations of either exceed the permit criteria. The contingency lead treatment system will consist of one (1) ion exchange vessel containing 60 cubic feet of cation exchange resin. The contingency pH adjustment will include addition of sulphuric acid to lower the pH. This system is designed to meet the required effluent limits for this permit. A schematic of the treatment system is provided on **Figure 6**. Product information related to the water treatment is included in **Attachment F**.

One discharge point, described above as Outfall A, will be necessary for dewatering activities. Based on the depth to water, the extent of the construction activities, and the system design, the estimated maximum daily flowrate is 432,000 gallons per day (GPD) with an average discharge of 216,000 GPD. Discharge will be continuous (24-hours per day) over the project duration. The pH of onsite groundwater was measured at an average of 8.69 (s.u.) and site activities are not anticipated to alter this pH. Discharge activities will only occur during site construction activities, which are expected to occur between July and December 2021. The discharge point for these dewatering activities is not within an Area of Critical Environmental Concern (ACEC). **Figure 3** provides a MassDEP BWSC Receptor Map identifying potential environmental receptors within a 500 foot and ½ mile radius from the disposal site. **Appendix D** includes ACEC mapping for the State of Massachusetts.

If conditions change modifications to the system will be made. Modifications to the system will be submitted for approval via a Notice of Change (NOC).

3.1 Receiving Water Information

The receiving water for the indirect discharge of groundwater from the facility is Salisbury Pond, part of the Blackstone River Basin. The StreamStats data from this portion of the unnamed stream flowing into Salisbury Pond was unavailable. Receiving water data provided in **Attachment B**.

Per the Waterbody Assessment and TMDL Status Map BWSC Phase 1 Site Assessment Map (**Figure 3**), Salisbury Pond is listed on the Massachusetts 303d list for Nuisance Aquatic Plants and Turbidity due to high phosphorus loading. The pond is dominated by algae rather than macrophytes and that the pond volume is decreasing due to sediment inputs.

3.2 Receiving Water Classification

Salisbury Pond is listed as an impaired water body (Class B (CSO)). Additionally, Salisbury Pond is not listed as an Outstanding Resource.

4. CONTAMINANT INFORMATION

On June 29, 2021, groundwater samples were collected from temporary monitoring wells TW-TP-01 and TW-TP-02. Groundwater samples collected were submitted to ESS Laboratory, Cranston, Rhode Island (ESS) for analysis of volatile organic compounds (VOCS) including benzene, toluene, ethylbenzene, and xylene (BTEX) by EPA method 524.2; semi-volatile organic compounds (SVOs) by EPA method 625.1; polycyclic aromatic hydrocarbons (PAHs) by EPA method 8270; total petroleum hydrocarbons (TPH) by method 8100/1664; Chloride by EPA method 300; Ammonia by EPA method 350.1; total suspended solids (TSS) by method SIM 2540; total and dissolved metals (antimony, cadmium, chromium, copper, iron, lead, nickel, silver and zinc) by EPA method 200.7; total and dissolved arsenic and selenium by EPA method 3113; total mercury by EPA method 245.1; hexavalent chromium by EPA method 3500Cr B-2009; Phenols by EPA method 420.1; total cyanide and total residual chlorine by EPA method 4500; Polychlorinated Biphenyls (PCBs) by EPA method 608.3; by EPA method 4500 1,4- Dioxane by EPA method 8270 Semi-Volatile Organic Compounds w/ Isotope Dilution. The analytes were selected were required under the RGP.

Based on recent groundwater sampling Total Residual Chlorine, Antimony, Arsenic, Chromium VI, Phenol, Benzo(a)anthracene, Chrysene, Naphthalene, 1,4 Dichlorobenzene, and PCBs were detected in groundwater within the anticipated dewatering area at concentrations exceeding the RGP Water Quality Based Effluent Standards (WQBEL). **Table 1** includes a summary of data from the two temporary monitoring wells sampled. **Figure 5** shows the location of the temporary groundwater wells. Complete groundwater laboratory analytical reports are provided in **Attachment C**.

5. DILUTION FACTOR

A dilution factor is not being applied to effluent calculations.

6. DETERMINATION OF ENDANGERED SPECIES ACT ELIGIBILITY (ESA)

The United States Department of the Interior Fish and Wildlife Service – New England Ecological Services Field Office was contacted regarding the determination of endangered species act eligibility (ESA). There is one endangered or candidate species (Northern Long Eared Bat) and no critical habitats within the project area for this NOI. As detailed by the US Fish and Wildlife Service determination letter dated July 12, 2021 "Based upon your IPaC submission, any take of the northern long-eared bat that may occur as a result of the Action is not prohibited under the ESA Section 4(d) rule adopted for this species at 50 CFR §17.40(o). Unless the Service advises you within 30 days of the date of this letter that your IPaC-assisted determination was incorrect, this letter verifies that the Action is not likely to result in unauthorized take of the northern long-eared bat"; therefore this ESA determination is FWS Criterion C. Mapping (IPaC) and the letter of determination regarding the Fish and Wildlife species is located in **Attachment D**.

7. DOCUMENTATION OF NATIONAL HISTORIC PRESERVATION ACT (NHPA) REQUIREMENTS

Listings of historic places within the City of Worcester were obtained from the Massachusetts Cultural Resources Information System (MARCIS) online database and the National Register of Historic Places (HRHP) mapping:

- MACRIS Results (mhc-macris.net)
- National Register of Historic Places (nps.gov)

Copies of the National Historic Landmarks (NHL) inventory map and the MARCIS report are provided in **Attachment E**. No historic places are located on site.

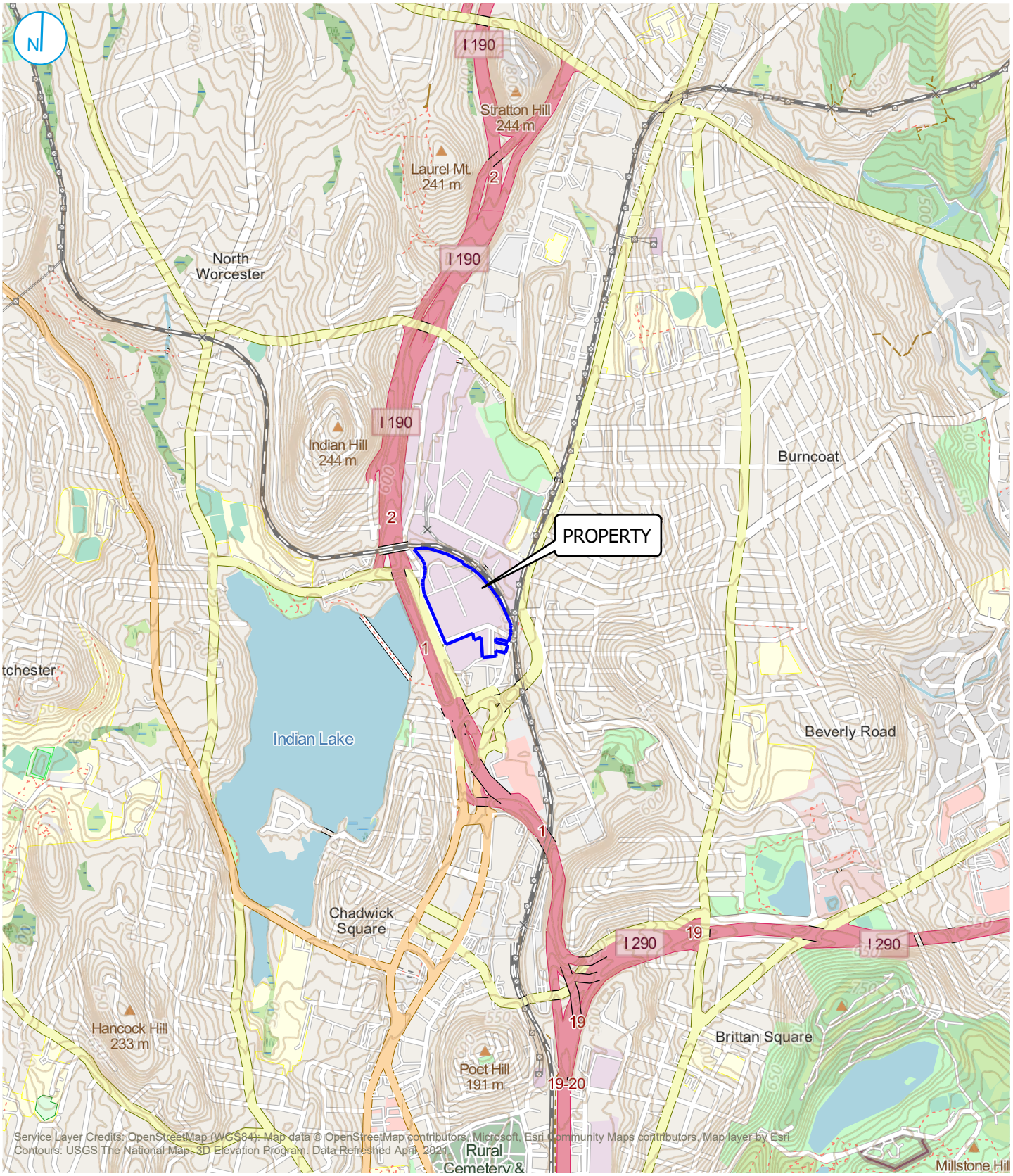
8. SUPPLEMENTAL INFORMATION

Currently no additional supplemental information is necessary to meet the requirements of the NOI for the RGP.

9. REMEDIATION CONSTRUCTION SCHEDULE

Remediation activities requiring dewatering are anticipated to begin in July 2021 and are anticipated to be complete by December 2021.

FIGURES



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PROJECT: 1690022480 | DATED: 7/11/2021 | DESIGNER: GMILES

Map Scale: 1:24,000 | Map Center: 71°48'7"W 42°18'15"N

PROPERTY LOCATION MAP

FIGURE 1

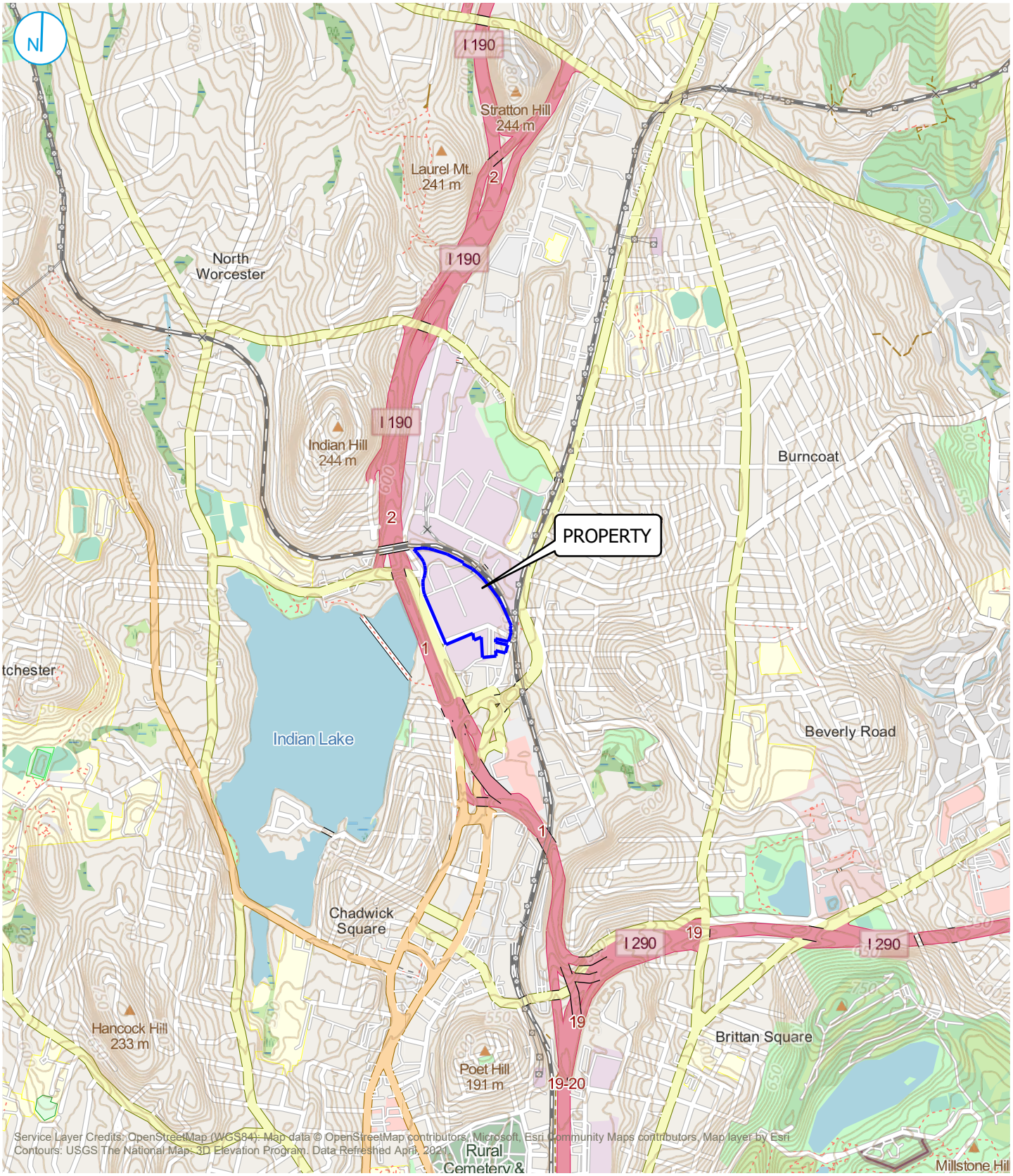
KEY MAP (not to scale)

0 1,000 2,000 Feet

167 WEST BOYLSTON DRIVE
WORCESTER, MASSACHUSETTS

RAMBOLL US CONSULTING, INC.
A RAMBOLL COMPANY

RAMBOLL



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KEY MAP (not to scale)

0 1,000 2,000 Feet

167 WEST BOYLSTON DRIVE
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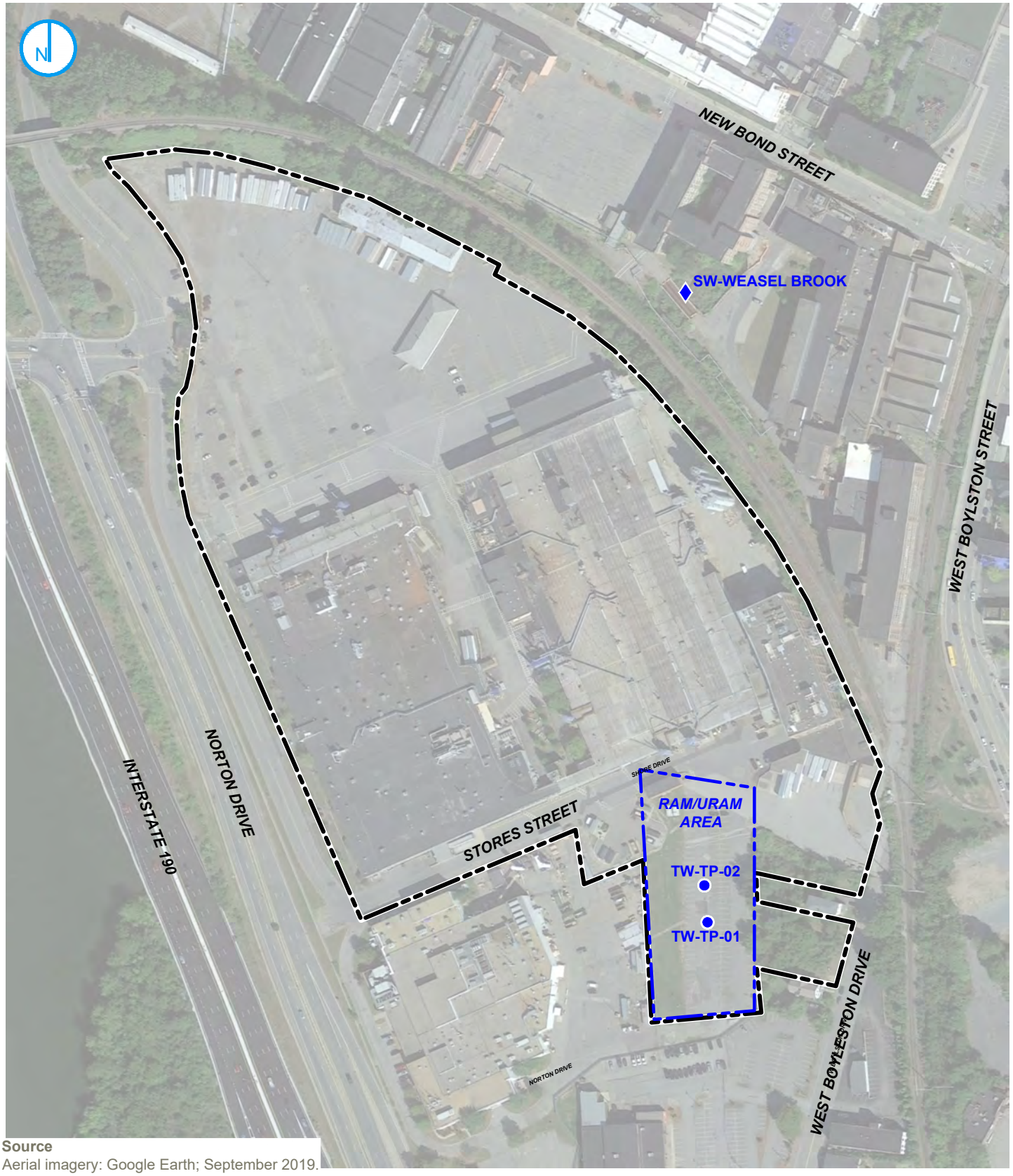

Source
Aerial imagery: Google Earth; September 2019.

PROJECT: WORCESTER_MA DESIGNER: GMILES
UPDATED: 7/11/2021
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PROPERTY BOUNDARY (APPROXIMATE)
TEMPORARY WELL LOCATION
SURFACE WATER SAMPLING LOCATION

0 250 Feet

PROPERTY LAYOUT

167 WEST BOYLSTON DRIVE
WORCESTER, MASSACHUSETTS

FIGURE 2

RAMBOLL US CONSULTING, INC.
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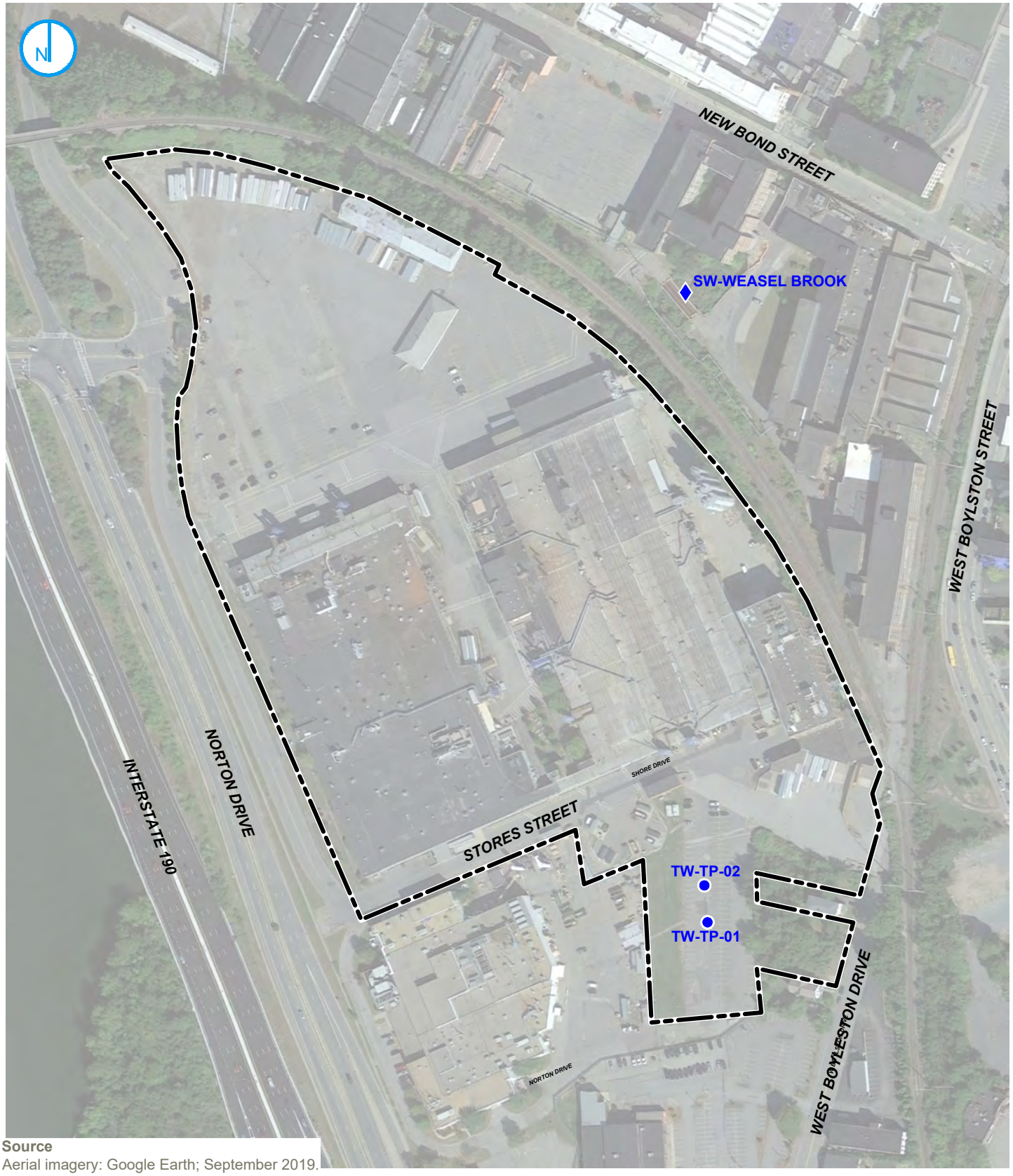

Source
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PROJECT: WORCESTER_MA DATED: 7/11/2021 DESIGNER: GMILES

PROPERTY BOUNDARY (APPROXIMATE)
TEMPORARY WELL LOCATION
SURFACE WATER SAMPLING LOCATION

0 250 Feet

PROPERTY LAYOUT

167 WEST BOYLSTON DRIVE
WORCESTER, MASSACHUSETTS

FIGURE 2

RAMBOLL US CONSULTING, INC.
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RAMBOLL

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PROJECT: WORCESTER_MADATED: 7/12/2021 DESIGNER: GMILES

MassDEP - Bureau of Waste Site Cleanup

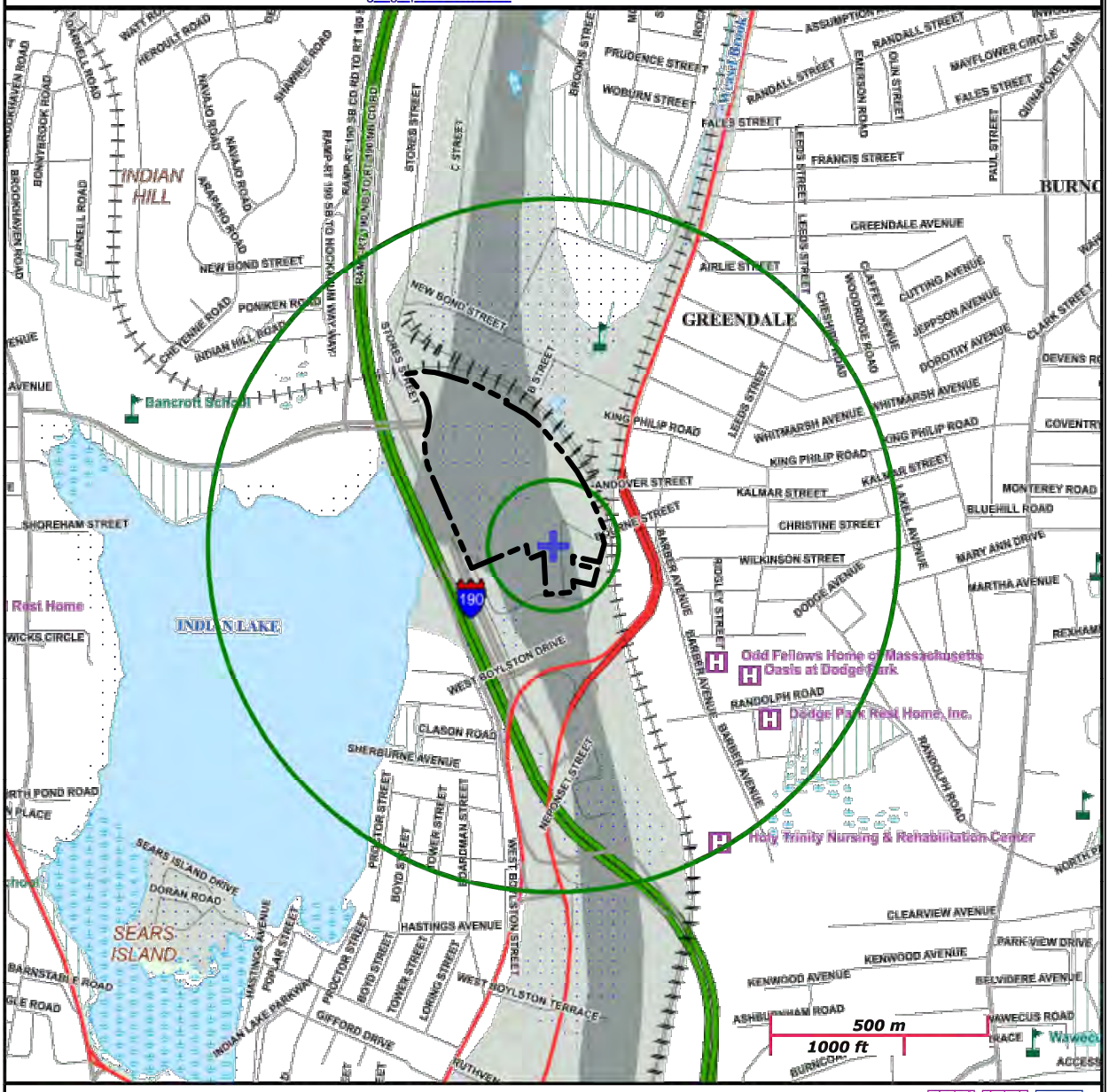
Phase 1 Site Assessment Map: 500 feet & 0.5 Mile Radii

Site Information:
SAINT GOBAIN - WORCESTER
1 NEW BOND STREET WORCESTER, MA

NAD83 UTM Meters:
4687109mN , 268954mE (Zone: 19)
May 26, 2021

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

MassDEP
Commonwealth of Massachusetts
Department of Environmental Protection



Roads: Limited Access, Divided, Other Hwy, Major Road, Minor Road, Track, Trail
Boundaries: Town, County, DEP Region; Train; Powerline; Pipeline; Aqueduct
Basins: Major, PWS; Streams: Perennial, Intermittent, Man Made Shore, Dam
Aquifers: Medium Yield, High Yield, EPA Sole Source
Non Potential Drinking Water Source Area: Medium, High (Yield)
PWS Protection Areas: Zone II, IWPA, Zone A
Hydrography: Open Water, PWS Reservoir, Tidal Flat
Wetlands: Freshwater, Saltwater, Cranberry Bog
FEMA 100yr Floodplain; Protected Open Space; ACEC
Est. Rare Wetland Wildlife Hab; Vernal Pool: Cert., Potential
Solid Waste Landfill; PWS: Com.GW,SW, Emerg., Non-Com.

MASSDEP BWSC PHASE I SITE ASSESSMENT MAP

FIGURE 3

PROPERTY BOUNDARY (APPROXIMATE)

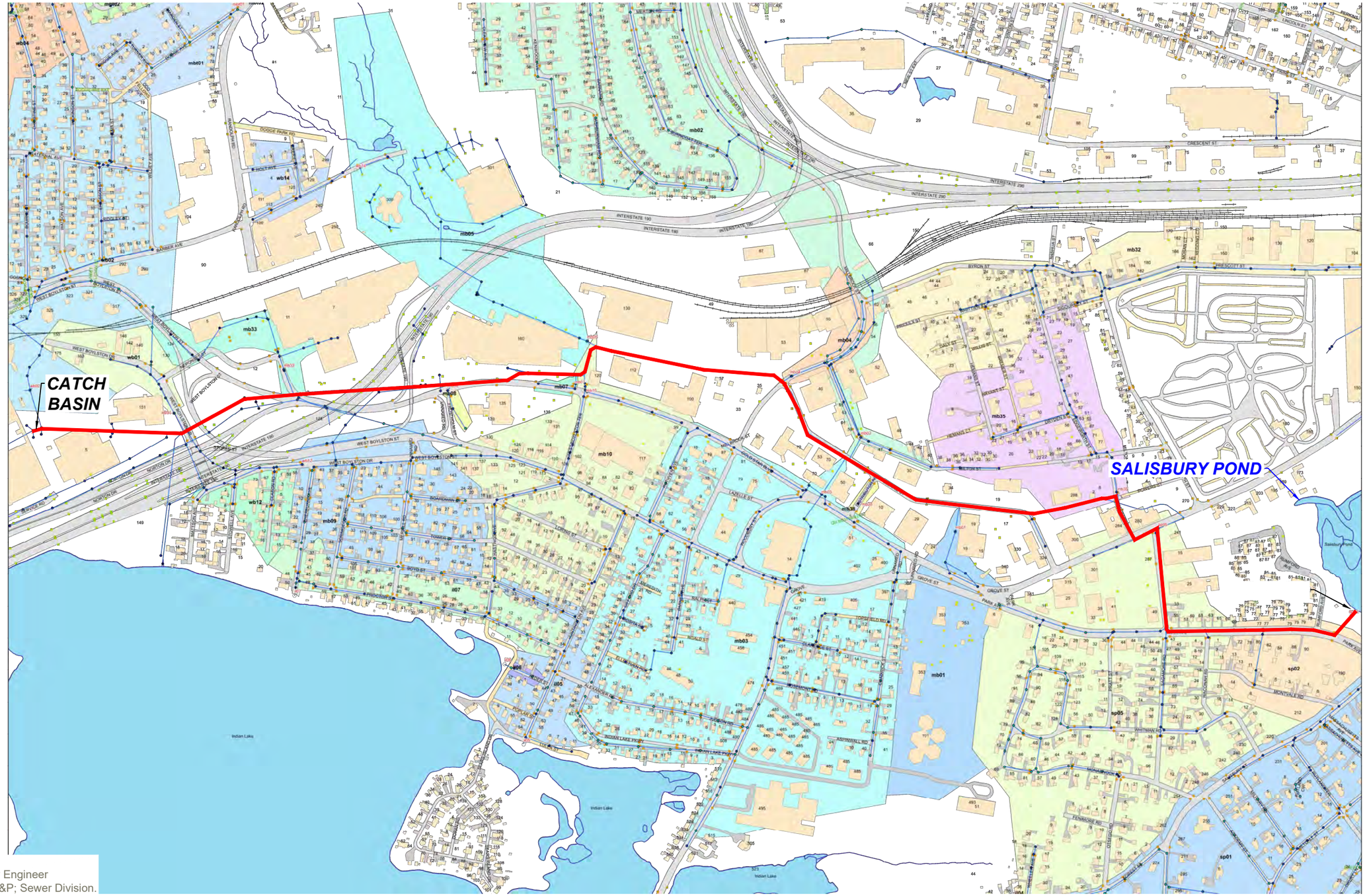
SOURCE: maps.massgis.state.ma.us/images/dep/mcp/mcp.htm

167 WEST BOYLSTON DRIVE
WORCESTER, MASSACHUSETTS

RAMBOLL US CONSULTING, INC.
A RAMBOLL COMPANY

RAMBOLL

F:\Graemel\1690022480\STORMWATER_CONVEYANCE_SYSTEM.dwg



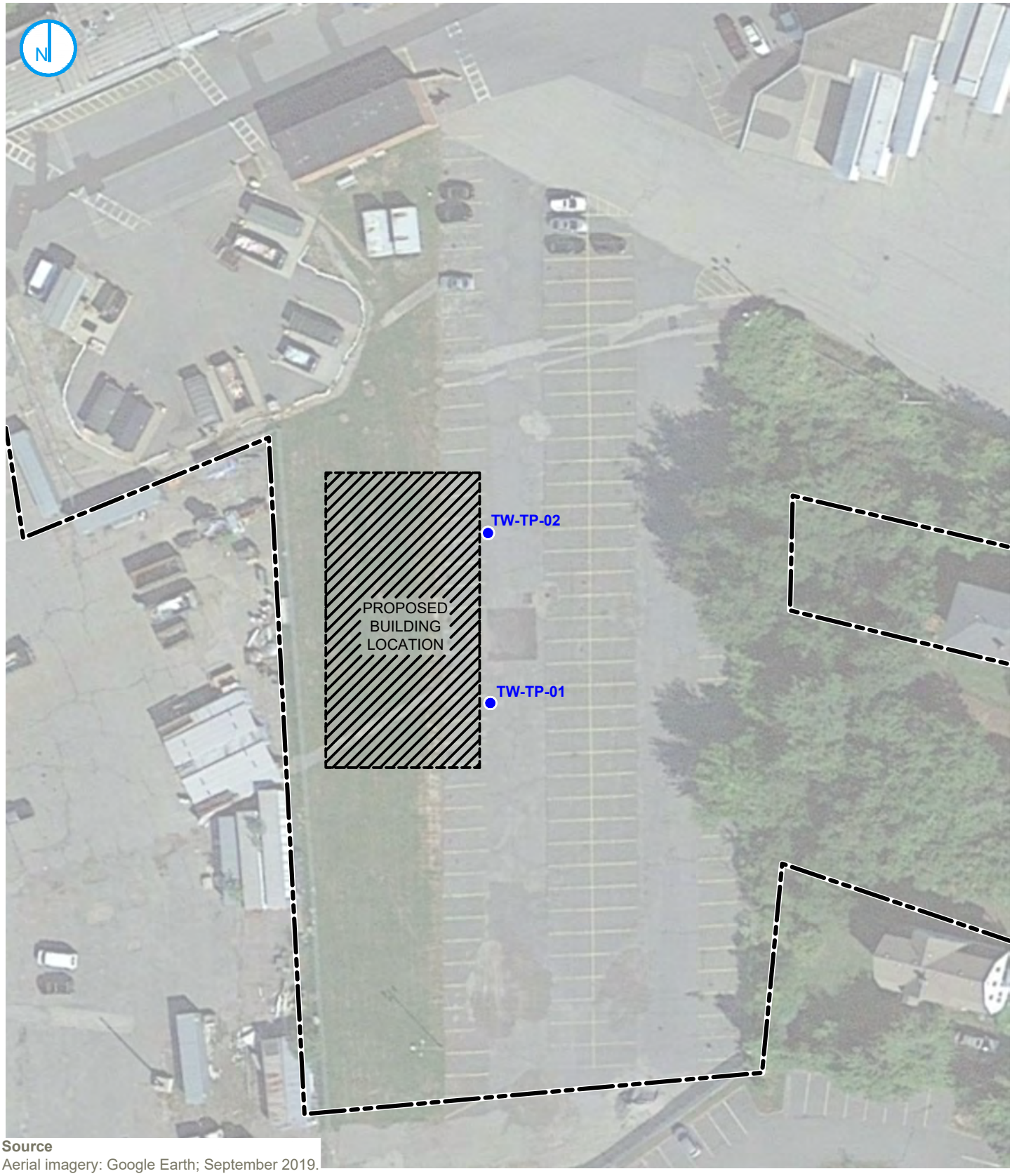
Source Provided By:
Ian Weyburne, Sanitary Engineer
City of Worcester DPW&P; Sewer Division.

PROJECT: 1690022480 DATED: 7/12/2021 DESIGNER: GMILES

STORMWATER CONVEYANCE SYSTEM

167 WEST BOYLSTON DRIVE
WORCESTER, MASSACHUSETTS

RAMBOLL



Source
Aerial imagery: Google Earth; September 2019.

PROJECT: WORCESTER_MA DATED: 7/11/2021 DESIGNER: GMILES
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PROPERTY BOUNDARY (APPROXIMATE)
TEMPORARY WELL LOCATION

GROUNDWATER SAMPLING LOCATIONS

FIGURE 5

0 60 Feet

167 WEST BOYLSTON DRIVE
WORCESTER, MASSACHUSETTS

RAMBOLL US CONSULTING, INC.
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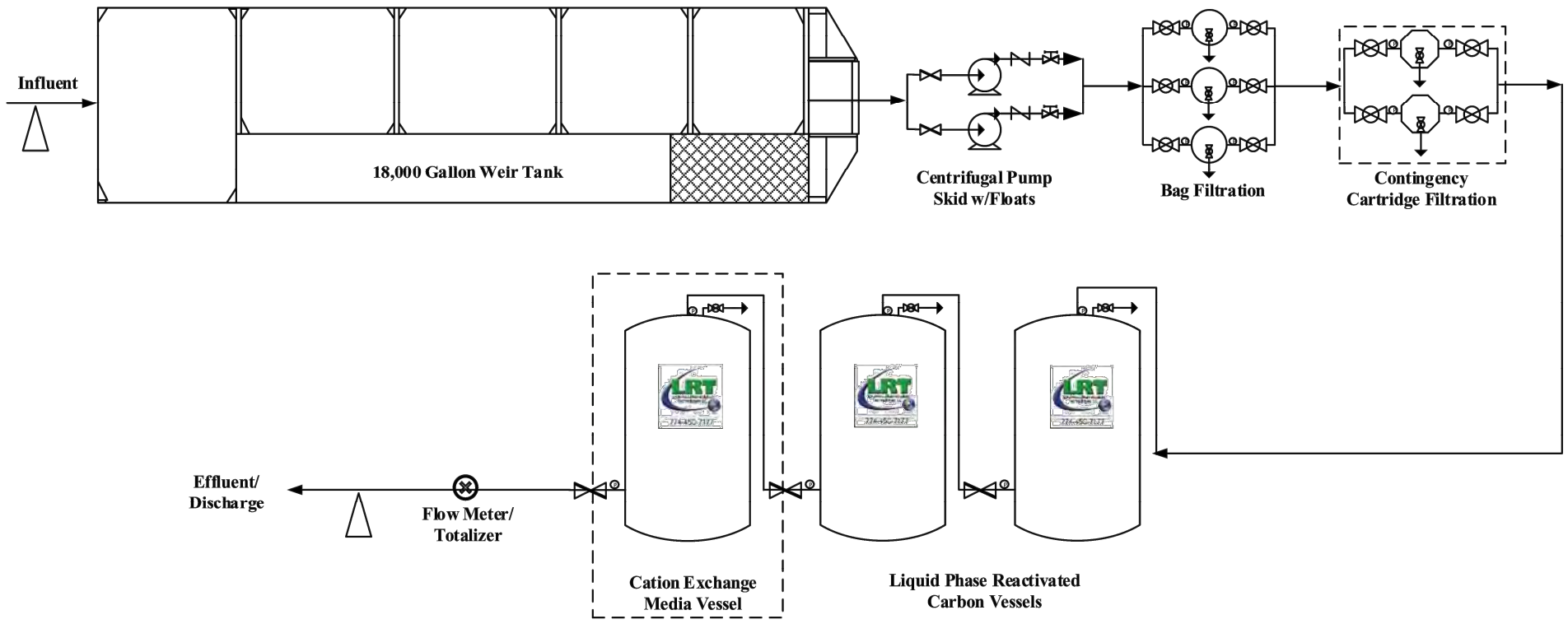


Notes:

1.) Figure is not to scale
2.) System rated for 150 GPM

Source
Lockwood Remediation Technologies, LLC: Figure 1; Water Treatment Schematic.

TREATMENT SYSTEM SCHEMATIC

FIGURE 6

RAMBOLL US CONSULTING, INC.
A RAMBOLL COMPANY

167 WEST BOYLSTON DRIVE
WORCESTER, MASSACHUSETTS

0 1.01 Feet

TABLES

Table 1. Saint Gobain NPDES RGP NOI

Parameter	Units	TW-TP-01	TW-TP-02	Weasel Brook	Technology Based Effluent Limitations	Water Quality Based Effluent Limitations	Complaince Level	Daily Maximum	Daily Average
A. Inorganics					(applies if bold)	(applies if bold)	(applies if shown)		
Ammonia	mg/L	2.76	10.7	0.2	**report mg/L**	---		10.7	6.73
Chloride	ug/L	1290000	3360000		**report ug/L**	---		3360000	2325000
Total Residual Chlorine	mg/L	<0.02	<0.02		0.2 mg/L	**11ug/L**	**50 ug/L**	<0.02	<0.02
Total Suspended Solids	mg/L	23	148		**30 mg/L**	---		148	85.5
Antimony	ug/L	<15	<15	<25	**206 ug/L**	640.00		<15	<15
Arsenic	ug/L	35.7	96.8	3.8	104 ug/L	**10 ug/L**		96.8	66.25
Cadmium	ug/L	<3	<3	1.1	**10.2 ug/L**	1.1671		<3	<3
Chromium III	ug/L	<10	<10		**323 ug/L**	433.60		<10	<10
Chromium VI	ug/L	12	<10	15	323 ug/L	**11.4 ug/L**		12	12
Copper	ug/L	<6	10.8	<10	**242 ug/L**	50.30		10.8	10.8
Iron	ug/L	246	177	482	**5000 ug/L**	1000.00		246	211.5
Lead	ug/L	<6	8	<2.5	**160 ug/L**	39.20		8	8
Mercury	ug/L	<0.2	<0.2	<0.2	**0.739 ug/L**	0.91		<.2	<.2
Nickel	ug/L	<15	24.5	<2.5	**1450 ug/L**	276.80		24.5	24.5
Selenium	ug/L	<3	<5	<5	**235.8 ug/L**	5.00		<5	<5
Silver	ug/L	<3	<3	<2.5	**35.1 ug/L**	112.60		<3	<3
Zinc	ug/L	<15	26	25.2	**420 ug/L**	637.40		26	26
Cyanide	mg/L	<0.005	<0.005		**178 mg/L**	5.20		<0.005	<0.005
B. Non-Halogenated VOCs									
Total BTEX	ug/L	<0.5	1.4		**100 ug/L**	---		1.4	1.4
Benzene	ug/L	<0.5	<0.5		**5.0 ug/L**	---		<0.5	<0.5
1,4 Dioxane	ug/L	<0.25	<0.25		**200 ug/L**	---		<0.25	<0.25
Acetone	mg/L	<0.005	0.0151		**7.97 mg/L**	---		0.0151	0.0151
Phenol	ug/L	434	<50		1080 ug/L	**300 ug/L**		434	434
C. Halogenated VOCs									
Carbon Tetrachloride	ug/L	<0.3	<0.3		**4.4 ug/L**	1.60		<0.3	<0.3
1,2 Dichlorobenzene	ug/L	<0.5	<0.5		**600 ug/L**	---		<0.5	<0.5
1,3 Dichlorobenzene	ug/L	<0.5	<0.5		**320 ug/L**	---		<0.5	<0.5
1,4 Dichlorobenzene	ug/L	39.2	1.9		**5.0 ug/L**	---		39.2	20.55
Total dichlorobenzene	ug/L	39.2	1.9		**763 ug/L in NH**	---		39.2	20.55
1,1 Dichloroethane	ug/L	<0.5	<0.5		**70 ug/L**	---		<0.5	<0.5
1,2 Dichloroethane	ug/L	<0.5	<0.5		**5.0 ug/L**	---		<0.5	<0.5
1,1 Dichloroethylene	ug/L	<0.5	<0.5		**3.2 ug/L**	---		<0.5	<0.5
Ethylene Dibromide	ug/L	<0.015	<0.015		**0.05 ug/L**	---		<0.015	<0.015
Methylene Chloride	ug/L	<0.5	<0.5		**4.6 ug/L**	---		<0.5	<0.5
1,1,1 Trichloroethane	ug/L	<0.5	<0.5		**200 ug/L**	---		<0.5	<0.5
1,1,2 Trichloroethane	ug/L	<0.5	<0.5		**5.0 ug/L**	---		<0.5	<0.5
Trichloroethylene	ug/L	<0.5	<0.5		**5.0 ug/L**	---		<0.5	<0.5
Tetrachloroethylene	ug/L	<0.5	<0.5		**5.0 ug/L**	3.30		<0.5	<0.5
cis-1,2 Dichloroethylene	ug/L	<0.5	<0.5		**70 ug/L**	---		<0.5	<0.5
Vinyl Chloride	ug/L	<0.2	<0.2		**2.0 ug/L**	---		<0.2	<0.2
D. Non-Halogenated SVOCs									
Total Phthalates	ug/L	<2.36	<2.34		**190 ug/L**	---		<2.36	<2.36
Diethylhexyl phthalate	ug/L	<2.36	<2.34		**101 ug/L**	2.20		<2.36	<2.36
Total Group I PAHs	ug/L	0.12	<0.05		**1.0 ug/L**	---		0.12	0.12
Benzo(a)anthracene	ug/L	0.06	<0.05			**0.0038 ug/L**	**0.1 ug/L**	0.06	0.06
Benzo(a)pyrene	ug/L	<0.05	<0.05			0.0038		<0.05	<0.05
Benzo(b)fluoranthene	ug/L	<0.05	<0.05			0.0038		<0.05	<0.05
Benzo(k)fluoranthene	ug/L	<0.05	<0.05		As Total PAHs	0.0038		<0.05	<0.05
Chrysene	ug/L	0.06	<0.05			**0.0038 ug/L**	**0.1 ug/L**	0.06	0.06
Dibenzo(a,h)anthracene	ug/L	<0.05	<0.05			0.0038		<0.05	<0.05
Indeno(1,2,3-cd)pyrene	ug/L	<0.05	<0.05			0.0038		<0.05	<0.05
Total Group II PAHs	ug/L	20.93	41.3		**100 ug/L**	---		41.3	31.115
Naphthalene	ug/L	24.2/9.65	26.8/10.2		**20 ug/L**	---		26.8	25.5
E. Halogenated SVOCs									
Total PCBs	ug/L	0.12	<0.09		**0.000064 ug/L**	---		0.12	0.12
Pentachlorophenol	ug/L	<0.85	<0.84		**1.0 ug/L**	---		<0.84	<0.84
F. Fuels Parameters									
Total Petroleum Hydrocar	mg/L	<5	<5		**5.0 mg/L**	---		<5	<5
Ethanol	mg/L	<10	<10		**report mg/L**	---		<10	<10
Methyl-tert-Butyl Ether	ug/L	<0.5	<0.5		**70 ug/L**	---		<0.5	<0.5
tert-Butyl Alcohol	ug/L	<25	<25		**120 ug/L in MA**	---		<25	<25
tert-Amyl Methyl Ether	ug/L	<1	<1		**90 ug/L in MA**	---		<1	<1
Other									
pH	S.U.	7.57	9.81	6.8		---		9.81	8.69
pH sample temp	*C	20.5	21.6	14		---		21.6	21.05
Hardness	ug/L	578000	719000	114000		---		719000	648500
Salinity	ppt			0.6		---			

ATTACHMENT A
NOTICE OF INTENT

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

A. General site information:

<table>
<tr><td rowspan="2">1. Name of site:
Saint Gobain Abrasives</td><td colspan="3">Site address: 167 West Boylston Drive
Street:</td></tr>
<tr><td>City: Worcester</td><td>State: MA</td><td>Zip: 01615</td></tr>
<tr><td rowspan="4">2. Site owner
St. Gobain Abrasives LLC

Owner is (check one): ☐ Federal ☐ State/Tribal ■ Private
☐ Other; if so, specify:</td><td colspan="3">Contact Person: Jason Myers, Environmental Compliance Manager</td></tr>
<tr><td colspan="2">Telephone: 781-795-2441</td><td>Email: jason.myers@saintgobain.com</td></tr>
<tr><td colspan="3">Mailing address: 1 New Bond Street
Street:</td></tr>
<tr><td>City: Worcester</td><td>State: MA</td><td>Zip: 01615</td></tr>
<tr><td rowspan="4">3. Site operator, if different than owner</td><td colspan="3">Contact Person:</td></tr>
<tr><td colspan="2">Telephone:</td><td>Email:</td></tr>
<tr><td colspan="3">Mailing address:
Street:</td></tr>
<tr><td>City:</td><td>State:</td><td>Zip:</td></tr>
<tr><td>4. NPDES permit number assigned by EPA:

NPDES permit is (check all that apply: ■ RGP ☐ DGP ☐ CGP
☐ MSGP ☐ Individual NPDES permit ☐ Other; if so, specify:
Dewatering General Permit is no longer valid (5/8/20) therefore this application is for an NOI under the RGP</td><td colspan="3">5. Other regulatory program(s) that apply to the site (check all that apply):
■ MA Chapter 21e; list RTN(s):
RTN 2-0021593
☐ 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):
Salisbury Pond	MA 51142	Impaired

Receiving water is (check any that apply): ☐ Outstanding Resource Water ☐ Ocean Sanctuary ☐ territorial sea ☐ Wild and Scenic River

2. Has the operator attached a location map in accordance with the instructions in B, above? (check one): ■ Yes ☐ No

Are sensitive receptors present near the site? (check one): ☐ Yes ■ No
If yes, specify:

3. Indicate if the receiving water(s) is listed in the State's Integrated List of Waters (i.e., CWA Section 303(d)). Include which designated uses are impaired, and any pollutants indicated. Also, indicate if a final TMDL is available for any of the indicated pollutants. For more information, contact the appropriate State as noted in Part 4.6 of the RGP. Noxious Aquatic Plants, Turbidity ,odor, color and taste

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.	45 cfs
5. Indicate the requested dilution factor for the calculation of water quality-based effluent limitations (WQBELs) determined in accordance with the instructions in Appendix V for sites in Massachusetts and Appendix VI for sites in New Hampshire.	NA

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:

7. Has the operator attached a summary of receiving water sampling results as required in Part 4.2 of the RGP in accordance with the instruction in Appendix VIII? (check one): ■ Yes ☐ No

C. Source water information:

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

■ Contaminated groundwater Has the operator attached a summary of influent sampling results as required in Part 4.2 of the RGP in accordance with the instruction in Appendix VIII? (check one): ■ Yes ☐ No	☐ Contaminated surface water Has the operator attached a summary of influent sampling results as required in Part 4.2 of the RGP in accordance with the instruction in Appendix VIII? (check one): ■ Yes ☐ No	☐ The receiving water ☐ 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: Inorganics, VOCs, SVOCs, PCBs	
a. For source waters that are contaminated groundwater or contaminated surface water, indicate are any contaminants present that are not included in the RGP? (check one): ☐ Yes ☐ No If yes, indicate the contaminant(s) and the maximum concentration present in accordance with the instructions in Appendix VIII.	b. For a source water that is a surface water other than the receiving water, potable water or other, indicate any contaminants present at the maximum concentration in accordance with the instructions in Appendix VIII? (check one): ☐ Yes ☐ No
3. Has the source water been previously chlorinated or otherwise contains residual chlorine? (check one): ☐ Yes ■ No	

D. Discharge information

1.The discharge(s) is a(n) (check any that apply): ☐ Existing discharge ■ New discharge ☐ New source	
Outfall(s): Stormwater outfall discharges to Salisbury Pond south of the site (eventually)	Outfall location(s): (Latitude, Longitude) 42° 16’ 41.04” 71° 48’ 28.88”
Discharges enter the receiving water(s) via (check any that apply): ☐ Direct discharge to the receiving water ■ Indirect discharge, if so, specify: Indirect via stormwater conveyance system ☐ A private storm sewer system ■ A municipal storm sewer system If the discharge enters the receiving water via a private or municipal storm sewer system: Has notification been provided to the owner of this system? (check one): ■ Yes ☐ No Has the operator has received permission from the owner to use such system for discharges? (check one): ☐ Yes ■ No, if so, explain, with an estimated timeframe for obtaining permission: Written notice has been posted to the City of Worcester - no response as of submission 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): July 2021 - December 2021 Indicate if the discharge is expected to occur over a duration of: ■ less than 12 months ☐ 12 months or more ☐ is an emergency discharge	
Has the operator attached a site plan in accordance with the instructions in D, above? (check one): ■ Yes ☐ No	

<table>
<tr><td>2. Activity Category: (check all that apply)</td><td colspan="2">3. Contamination Type Category: (check all that apply)</td></tr>
<tr><td rowspan="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		✔	2	350.1	1.0	10.7	6.73	Report mg/L	---
Chloride		✔	2	300	100	3360000	2325000	Report µg/l	---
Total Residual Chlorine		✔	2	4500Cl	0.02	<0.02	<0.02	0.2 mg/L	11ug/L
Total Suspended Solids		✔	2	2540D	5	148	85.5	30 mg/L	---
Antimony		✔	2	200.7	15	<15	<15	206 µg/L	640 ug/L
Arsenic		✔	2	3113B	25	96.8	66.25	104 µg/L	10 ug/L
Cadmium		✔	2	200.7	3	<3	<3	10.2 µg/L	1.167 ug/L
Chromium III		✔	2	200.7	10	<10	<10	323 µg/L	433.6 ug/L
Chromium VI		✔	2	3500Cr	10	12	12	323 µg/L	11.4 ug/L
Copper		✔	2	200.7	6	10.8	10.8	242 µg/L	50.3 ug/L
Iron		✔	2	200.7	30	246	211.5	5,000 µg/L	1000 ug/L
Lead		✔	2	200.7	6	8	8	160 µg/L	39.2 ug/L
Mercury		✔	2	245.1	0.2	<.2	<.2	0.739 µg/L	0.91 ug/L
Nickel		✔	2	200.7	15	24.5	24.5	1,450 µg/L	276.8 ug/L
Selenium		✔	2	3113B	5	<5	<5	235.8 µg/L	5 ug/L
Silver		✔	2	200.7	3	<3	<3	35.1 µg/L	112.6 ug/L
Zinc		✔	2	200.7	15	26	26	420 µg/L	637.4 ug?l
Cyanide		✔	2	4500	0.005	<0.005	<0.005	178 mg/L	5.2 ug/L
B. Non-Halogenated VOCs									
Total BTEX		✔	2	524.2		1.4	1.4	100 µg/L	---
Benzene		✔	2	524.2	0.5	<0.5	<0.5	5.0 µg/L	---
1,4 Dioxane		✔	2	8270D	0.250	<0.25	<0.25	200 µg/L	---
Acetone		✔	2	524.2	0.005	0.0151	0.0151	7.97 mg/L	---
Phenol		✔	2	524.2	50	434	434	1,080 µg/L	300 ug/L

Parameter	Known or believed absent	Known or believed present	# of samples	Test method (#)	Detection limit (µg/l)	Influent		Effluent Limitations	
						Daily maximum (µg/l)	Daily average (µg/l)	TBEL	WQBEL
C. Halogenated VOCs									
Carbon Tetrachloride		✔	2	524.2	0.3	<0.3	<0.3	4.4 µg/L	1.60 ug/L
1,2 Dichlorobenzene		✔	2	524.2	0.5	<0.5	<0.5	600 µg/L	---
1,3 Dichlorobenzene		✔	2	524.2	0.5	<0.5	<0.5	320 µg/L	---
1,4 Dichlorobenzene		✔	2	524.2	0.5	39.2	39.2	5.0 µg/L	---
Total dichlorobenzene		✔	2	524.2	0.5	39.2	39.2	763 µg/L in NH	---
1,1 Dichloroethane		✔	2	524.2	0.5	<0.5	<0.5	70 µg/L	---
1,2 Dichloroethane		✔	2	524.2	0.5	<0.5	<0.5	5.0 µg/L	---
1,1 Dichloroethylene		✔	2	524.2	0.5	<0.5	<0.5	3.2 µg/L	---
Ethylene Dibromide		✔	2	524.2	0.015	<0.015	<0.015	0.05 µg/L	---
Methylene Chloride		✔	2	524.2	0.5	<0.5	<0.5	4.6 µg/L	---
1,1,1 Trichloroethane		✔	2	524.2	0.5	<0.5	<0.5	200 µg/L	---
1,1,2 Trichloroethane		✔	2	524.2	0.5	<0.5	<0.5	5.0 µg/L	---
Trichloroethylene		✔	2	524.2	0.5	<0.5	<0.5	5.0 µg/L	---
Tetrachloroethylene		✔	2	524.2	0.5	<0.5	<0.5	5.0 µg/L	3.30 ug/L
cis-1,2 Dichloroethylene		✔	2	524.2	0.5	<0.5	<0.5	70 µg/L	---
Vinyl Chloride		✔	2	524.2	0.2	<0.2	<0.2	2.0 µg/L	---
D. Non-Halogenated SVOCs									
Total Phthalates		✔	2	625.1	2.36	<2.36	<2.36	190 µg/L	
Diethylhexyl phthalate		✔	2	625.1	2.36	<2.36	<2.36	101 µg/L	2.20 ug/L
Total Group I PAHs		✔	2	625.1		0.12	0.12	1.0 µg/L	---
Benzo(a)anthracene		✔	2	625.1	0.05	0.06	0.06	As Total PAHs	0.0038 ug/L
Benzo(a)pyrene		✔	2	625.1	0.5	<0.05	<0.05		0.0038 ug/L
Benzo(b)fluoranthene		✔	2	625.1	0.05	<0.05	<0.05		0.0038 ug/L
Benzo(k)fluoranthene		✔	2	625.1	0.05	<0.05	<0.05		0.0038 ug/L
Chrysene		✔	2	625.1	0.05	0.06	0.06		0.0038 ug/L
Dibenzo(a,h)anthracene		✔	2	625.1	0.05	<0.05	<0.05		0.0038 ug/L
Indeno(1,2,3-cd)pyrene		✔	2	625.1	0.05	<0.05	<0.05		0.0038 ug/L

Parameter	Known or believed absent	Known or believed present	# of samples	Test method (#)	Detection limit (µg/l)	Influent		Effluent Limitations	
						Daily maximum (µg/l)	Daily average (µg/l)	TBEL	WQBEL
Total Group II PAHs		✔	2	625.1		41.3	41.3	100 µg/L	---
Naphthalene		✔	2	625.1	0.19	26.8	26.8	20 µg/L	---
E. Halogenated SVOCs									
Total PCBs		✔	2	608.3	0.09	0.12	0.12	0.000064 µg/L	---
Pentachlorophenol			2	625.1	0.84	<0.84	<0.84	1.0 µg/L	---
F. Fuels Parameters									
Total Petroleum Hydrocarbons		✔	2	1664A	5	<5	<5	5.0 mg/L	---
Ethanol		✔	2	D3695	10	<10	<10	Report mg/L	---
Methyl-tert-Butyl Ether		✔	2	624.1	0.5	<0.5	<0.5	70 µg/L	
tert-Butyl Alcohol		✔	2	524.2	25	<25	<25	120 µg/L in MA 40 µg/L in NH	---
tert-Amyl Methyl Ether		✔	2	524.2	1	<1	<1	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			2			9.81	8.69		
pH Sample Temp			2			21.6	21.05		
Hardness			2			719000	648500		
Salinity			2						

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:

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

Water from the wellpoint dewatering system will be pumped to one (1) 18,000-gallon weir tank at the head of the water treatment system. From the weir tank, water will be pumped via a centrifugal or submersible pump through a bag filter skid consisting of three (3) single bag filters plumbed in parallel. From the bag filters, water will be discharged to two (2) carbon vessels plumbed in series. Each carbon vessel will contain 3,000 pounds of reactivated liquid phase carbon. Following the carbon vessels, water will be pumped to a cartridge filter skid with two (2) cartridge filter housings plumbed in parallel. From the cartridge filter skid, water will be pumped through a non-resettable flow meter/totalizer prior to discharge to an

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:

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: Media Vessels Is use of a flow meter feasible? (check one): ■ Yes ☐ No, if so, provide justification:	150 gpm
Provide the proposed maximum effluent flow in gpm.	150 gpm
Provide the average effluent flow in gpm.	75 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

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:

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

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

G. Endangered Species Act eligibility determination

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

☐ **FWS Criterion A**: No endangered or threatened species or critical habitat are in proximity to the discharges or related activities or come in contact with the "action area".

☐ **FWS Criterion B**: Formal or informal consultation with the FWS under section 7 of the ESA resulted in either a no jeopardy opinion (formal consultation) or a written concurrence by FWS on a finding that the discharges and related activities are "not likely to adversely affect" listed species or critical habitat (informal consultation). Has the operator completed consultation with FWS? (check one): ☐ Yes ☐ No; if no, is consultation underway? (check one): ☐ Yes ☐ No

■ **FWS Criterion C**: Using the best scientific and commercial data available, the effect of the discharges and related activities on listed species and critical habitat have been evaluated. Based on those evaluations, a determination is made by EPA, or by the operator and affirmed by EPA, that the discharges and related activities will have "no effect" on any federally threatened or endangered listed species or designated critical habitat under the jurisdiction of the FWS. This determination was made by: (check one) ☐ the operator ☐ EPA ■ Other; if so, specify: Consultant - Ramboll

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

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

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

H. National Historic Preservation Act eligibility determination

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

■ **Criterion A**: No historic properties are present. The discharges and discharge-related activities (e.g., BMPs) do not have the potential to cause effects on historic properties.

☐ **Criterion B**: Historic properties are present. Discharges and discharge related activities do not have the potential to cause effects on historic properties.

☐ **Criterion C**: Historic properties are present. The discharges and discharge-related activities have the potential to have an effect or will have an adverse effect on historic properties.

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

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

I. Supplemental information

Describe any supplemental information being provided with the NOI. Include attachments if required or otherwise necessary.
Full analytical results for groundwater samples collected from the work area are included as an attachment.

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 has been or 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 ☐
Permission obtained from the owner of a private or municipal storm sewer system, if such system is used for site discharges. If yes, attach additional conditions. If no, attach explanation and timeframe for obtaining permission.	Check one: Yes ■ No ☐ NA ☐
Notification provided to the owner/operator of the area associated with activities covered by an additional discharge permit(s). Additional discharge permit is (check one): ☐ RGP ☐ DGP ☐ CGP ☐ MSGP ☐ Individual NPDES permit ☐ Other; if so, specify:	Check one: Yes ☐ No ☐ NA ■
Signature:	Date: 7/20/21
Print Name and Title: Jason Myers, Manager Environmental Compliance	

ATTACHMENT B
RECEIVING WATER (SALISBURY POND)
WATER QUALITY INFORMATION

Total Maximum Daily Loads of Phosphorus for Salisbury Pond

COMMONWEALTH OF MASSACHUSETTS
EXECUTIVE OFFICE OF ENVIRONMENTAL AFFAIRS
BOB DURAND, SECRETARY
MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION
LAUREN A. LISS, COMMISSIONER
BUREAU OF RESOURCE PROTECTION
CYNTHIA GILES, ASSISTANT COMMISSIONER
DIVISION OF WATERSHED MANAGEMENT
GLENN HAAS, DIRECTOR

NOTICE OF AVAILABILITY

Limited copies of this report are available at no cost by written request to:

Massachusetts Department of Environmental Protection
Division of Watershed Management
627 Main Street, 2nd Floor
Worcester, MA 01608

This report is also available from DEP's home page on the World Wide Web at:

http://www.magnet.state.ma.us/dep/brp/wm/wmpubs.htm

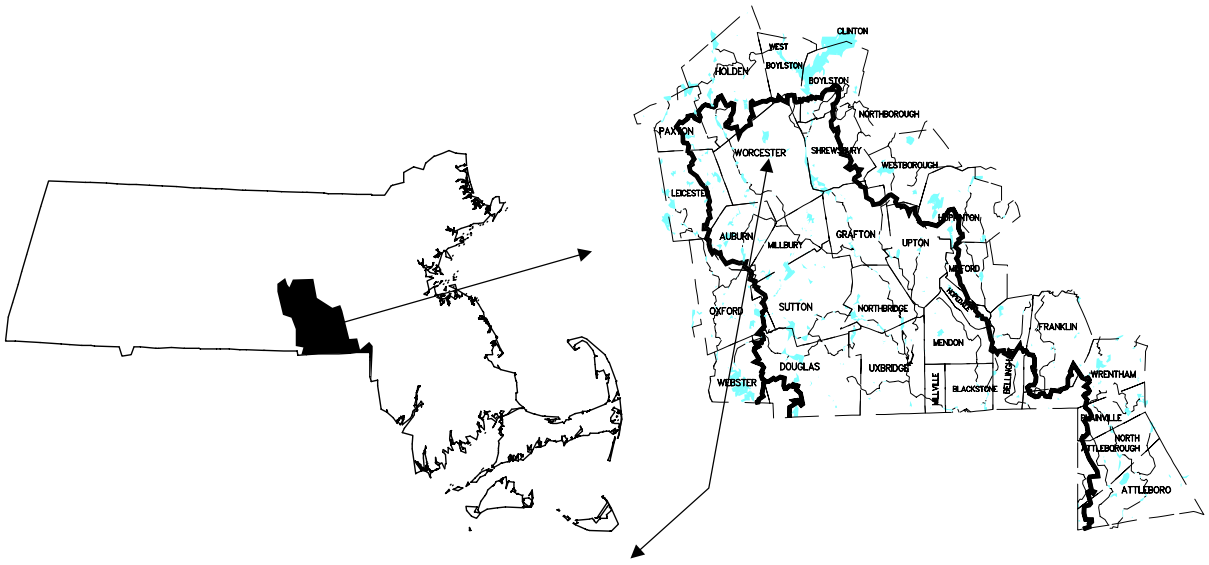
A complete list of reports published since 1963 is updated annually and printed in July. This report, entitled, "Publications of the Massachusetts Division of Watershed Management – Watershed Planning Program, 1963-(current year)", is also available by writing to the DWM in Worcester and on the DEP web site identified above.

DISCLAIMER

References to trade names, commercial products, manufacturers, or distributors in this report constituted neither endorsement nor recommendations by the Division of Watershed Management for use.

Front Cover
Photograph of Salisbury Pond in Worcester.

Total Maximum Daily Load of Phosphorus for
Salisbury Pond, Worcester, MA. (MA51142)
DEP, DWM TMDL Report MA51142-2002-010 CN 114 May 14, 2002



Location of Blackstone Basin, and Salisbury Pond in Massachusetts.

Key Feature:	Phosphorus TMDL assessment of a lake with nuisance aquatic plants and high turbidity, illicit sewage connections, bacteria, urban and highway runoff and sedimentation.
Location:	Worcester, MA - EPA Region 1
Scope/ Size:	Watershed 1820 Ha, Surface area 6.1 Ha (15.1 ac)
Land Uses:	Residential 59%, Urban 19%, Forest 17%
303d Listing:	Noxious Aquatic Plants (Code 2200); Turbidity (Code 2500)
Data Sources:	D/F Study Camp Dresser & McKee, 1987; unpublished data.
Monitoring Plan:	Massachusetts Watershed Initiative Five-year cycle; volunteer monitoring
Control Measures:	Sewage separation and system improvements, watershed, highway stormwater management, installation of structural BMPs and detention basins on inlets to pond, optional limited dredging.

Executive Summary

The Massachusetts Department of Environmental Protection (DEP) is responsible for monitoring the waters of the Commonwealth, identifying those waters that are impaired, and developing a plan to bring them back into compliance with the Massachusetts Water Quality Standards. The list of impaired waters, better known as the "303d list" identifies river, lake, and coastal waters and the reason for impairment.

Once a water body is identified as impaired, DEP is required by the Federal Clean Water Act to essentially develop a "pollution budget" designed to restore the health of the impaired body of water. The process of developing this budget, generally referred to as a Total Maximum Daily Load (TMDL), includes identifying the source(s) of the pollutant from direct discharges (point sources) and indirect discharges (non-point sources), determining the maximum amount of the pollutant that can be discharged to a specific water body to meet water quality standards, and developing a plan to meet that goal.

This report represents a TMDL for Salisbury Pond in the Blackstone River Watershed. Salisbury Pond is located in the headwaters of the Blackstone River Watershed, in the center of the Mill Brook sub-watershed in Worcester, MA. This area is highly developed, with a large percentage of impervious surfaces; as a result, Salisbury Pond exhibits continual water quality violations typical of urban waterways. The goal for the pond is to achieve Class B water [314 CMR 4.05(3)b]. Salisbury Pond is listed on the Massachusetts 303d list for Nuisance Aquatic Plants and Turbidity associated with high phosphorus loadings. These pollutants and stressors are indicators of nutrient enriched system, better known as the process of eutrophication. In freshwater systems the primary nutrient known to accelerate eutrophication is phosphorus. Therefore, in order to prevent further degradation in water quality and to ensure that the pond meets state water quality standards, the TMDL establishes a phosphorus limit for the pond and outlines corrective actions to achieve that goal.

The proposed Total Maximum Daily Load (TMDL) of 1082 kg/yr total phosphorus is based on a Diagnostic/Feasibility (D/F) Study conducted by Camp Dresser and McKee (CDM, 1987) and funded under the Massachusetts Clean Lakes Program. (Parts of the D/F are reproduced in Appendix 1). The Summary of the D/F study (see Appendix I) concludes that the pond is dominated by algae rather than macrophytes and that the pond volume is decreasing due to sediment inputs. The predominant source of phosphorus is from the twin culverts that constitute the major inlet of the pond. Phosphorus sources include runoff from MassHighways I-190, stormwater from surrounding urban areas, and sewage contamination.

Recent data also indicate that impairment of Salisbury Pond is also due to rapid sedimentation and excessive bacterial loads (associated with the ongoing sewage inputs). Data collected in 1999 have identified two areas of the pond that are in advanced stages of sedimentation; if material continues to fill the pond at the existing rate, these areas may be at or above the surface with the next 2 to 3 years. Rapid filling along the entire southern shore has resulted in dense stands of cattails and other macrophytes. Flagellated algae, typically associated with waters downstream of wastewater treatment plants dominated late summer algal assemblages.

The study recommended removing the sewage contamination from illicit connections, which was assumed to be a major problem and is being corrected. Sediment infilling of the pond from erosion and highway runoff is another major concern. A combination of continued separation of domestic and stormwater sewers, MassHighways BMPs, public education and erosion control is expected to bring the total phosphorus loading down to about 1082 kg/yr. The D/F study indicated that a phosphorus load of 500 kg/yr may be achieved through the installation of a stormwater diversion of the northern inlet, which would direct the Mill Brook flow to the Salisbury Pond outlet, thus bypassing the pond. However, this alternative is not recommended due to the anticipated degradation in the water quality of the Blackstone River. It is recommended to implement the TMDL in stages as the final diversion is expensive and may not be required due to the high flushing rate of the pond. The D/F study recommends watershed management to control nutrients and sediments and also recommends water level manipulation and plant harvesting (Appendix I). The proposed control effort is predicted to reduce total phosphorus concentrations from 70 ug/l to 45.5 ug/l.

Sediment control is also required in order for the pond to achieve surface water quality standards. Significant improvements in highway maintenance practices and Best Management Practices (BMPs); paving dirt roads;

implementing erosion control measures; and educating the public are expected to control sediment loading to the pond. Removal of sediment is also required to prevent infilling of the pond and sediment traps on the tributaries may be required. The sediment traps on the twin culverts and two other inlets are already being developed under a DEP Section 319 grant to the City of Worcester. An aggressive pond monitoring and maintenance program will ensure the continued viability of this urban pond.

The DEP recommends implementing a water quality improvement program in stages, with the initial focus placed on eliminating sources of phosphorus, bacteria and sediments before implementing expensive capital projects such as dredging and stormwater diversion structures. Long-term monitoring of the pond is essential to ensuring that source controls continue to be implemented. This TMDL can be achieved through the cooperation and effort of state and municipal agencies, commercial entities in the watershed, and volunteers.

In most cases, authority to regulate nonpoint source pollution and thus successful implementation of this TMDL is limited to local government entities and will require cooperative support from local volunteers, lake and watershed associations, and local officials in municipal government. Those activities can take the form of expanded education, obtaining and/or providing funding, and possibly local enforcement. Funding support to aid in implementation of this TMDL is available on a competitive basis under various state programs including the Section 319 Grant Program, the State Revolving Fund Program (SRF), and the Department of Environmental Management's Lakes and Pond Small Grants Program.

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Introduction

Section 303(d) of the Federal Clean Water Act requires each state to (1) identify waters for which effluent limitations normally required are not stringent enough to attain water quality standards and (2) to establish Total Maximum Daily Loads (TMDLs) for such waters for the pollutant of concern. TMDLs may also be applied to waters threatened by excessive pollutant loadings. The TMDL establishes the allowable pollutant loading from all contributing sources at a level necessary to achieve the applicable water quality standards. The TMDLs must account for seasonal variability and include a margin of safety (MOS) to account for uncertainty of how pollutant loadings may impact the receiving water's quality. This report and attached documents are submitted to the USEPA as a TMDL under Section 303d of the Federal Clean Water Act, 40 CFR 130.7. After public comment and final approval by the EPA, the TMDL will be incorporated into the watershed action plan to be developed by the Executive Office of Environmental Affairs Basin Team (see below) and serve as a guide for future implementation activities. In some cases, TMDLs will be used by DEP to set appropriate limits in permits for wastewater and other discharges. No individual point source discharges are permitted in the Salisbury Pond Watershed with the exception of the Worcester Phase I Stormwater Permit and a non-contact cooling water permit to the Norton Company. All of these are not considered as itemized phosphorus sources in this report, although the Norton Company General stormwater permit has expired and the company should reapply for a stormwater permit this year. All stormwater discharges are considered to be part of the Waste Load Allocation in this TMDL.

The Massachusetts Watershed Initiative is a new structure in state government that focuses all branches of government within each watershed to manage environmental issues. The Executive Office of Environmental Affairs (EOEA) has set up Watershed Teams with a Team Leader within each watershed in Massachusetts. The Teams represent state and federal agencies and local community partners. Within each watershed will be created a Watershed Community Council that may consist of watershed associations, business councils, regional planning agencies and other groups. Stream Teams may be created to assess environmental quality, identify local problems and recommend solutions. Stream Teams may include watershed associations, municipal government and business representatives. Additional information and contact information on the Watershed Teams is available on the web at http://www.state.ma.us/envir/watershd.htm.

The proposed Total Maximum Daily Load (TMDL) for Salisbury Pond is based on a Diagnostic/Feasibility (D/F) Study conducted by Camp Dresser and McKee (CDM, 1987) and funded under the Massachusetts Clean Lakes Program. (Parts of the D/F are reproduced in Appendix 1). Salisbury Pond is listed on the Massachusetts 303d list for Nuisance Aquatic Plants and Turbidity due to high phosphorus loadings. The Summary of the D/F study (see Appendix I) concludes that the pond is dominated by algae rather than macrophytes and that the pond volume is decreasing due to sediment inputs. The predominant source of phosphorus is from the twin culverts that constitute the major inlet of the pond and that sewage contamination was observed in the twin culverts.

The study recommended removing the sewage contamination that was assumed to be the major problem. A combination of public education and erosion control is expected to bring the loading down to about 1082 kg/yr. A final stage of stormwater diversion of the twin culverts, if needed, would reduce loading to the target of 500 kg/yr.

General Background and Rationale

Nutrient Enrichment: Nutrients are a requirement of life, but in excess can create problems. Lakes are ephemeral features of the landscape and over geological time most tend to fill with sediments and associated nutrients as they make a transition from lake to marsh to dry land. However, this natural successional ("aging") process can be and often is accelerated through the activities of humans—especially through development in the watershed. For highly productive lakes with developed watersheds, it is not easy to separate natural succession from "culturally induced " effects. Nonetheless, all feasible steps should be taken to reduce the impacts from cultural activities. The following discussion summarizes the current understanding of how nutrients influence the growth of algae and macrophytes, the time scale used in the studies, the type of models applied and the data collection methods used to create a

nutrient budget. A brief description of the rationale for choosing a target load (the TMDL) as well as a brief discussion of implementation and management options is presented.

A detailed description of the current understanding of limnology (the study of lakes and freshwaters) and management of lakes and reservoirs can be found in Wetzel (1983) and Cooke et al., (1993). To prevent cultural enrichment it is important to examine the nutrients required for growth of phytoplankton (algae) and macrophytes. The limiting nutrient is typically the one in shortest supply relative to the nutrient requirements of the plants. The ratio of nitrogen (N) to phosphorus (P) in both algae and macrophyte biomass is typically about 7 by weight or 16 by atomic ratio (Vallentyne, 1974). Examination of relatively high N/P ratios in water suggests P is most often limiting and careful reviews of numerous experimental studies have concluded that phosphorus is a limiting nutrient in most freshwater lakes (Likens, 1972; Schindler and Fee, 1974). Most diagnostic/feasibility studies of Massachusetts lakes also indicate phosphorus as the limiting nutrient. Even in cases where nitrogen may be limiting, previous experience has shown that it is easier, more cost-effective and more ecologically sound to control phosphorus than nitrogen. The reasons include the fact that phosphorus is related to terrestrial sources and does not have a significant atmospheric source as does nitrogen (e.g., nitrates in precipitation). Thus, non-point sources of phosphorus can be managed more effectively by best management practices (BMPs). In addition, phosphorus is relatively easy to control in point source discharges. Finally, phosphorus does not have a gaseous phase, while the atmosphere is a nearly limitless source of nitrogen gas which can be fixed by some types of phytoplankton (the blue-greens, or cyanobacteria) even in the absence of other sources of nitrogen. For all of the reasons noted above, phosphorus is chosen as the critical element to control freshwater eutrophication, particularly for algal dominated lakes or in lakes threatened with excessive nutrient loading.

There is a direct link between phosphorus loading and algal biomass (expressed as chlorophyll a) in algae dominated lakes (Vollenweider, 1976). The situation is more complex in macrophyte dominated lakes where the rooted aquatic macrophytes may obtain most of the required nutrients from the sediments. In organic, nutrient rich sediments, the plants may be limited more by light or physical constraints such as water movement than by nutrients. In such cases, it is difficult to separate the effects of sediment deposition, which reduce depth and extend the littoral zone, from the effects of increased nutrients, especially phosphorus, associated with the sediments. In Massachusetts, high densities of aquatic macrophytes are typically limited to depths less than ten feet and to lakes where organic rich sediments are found (Mattson et al., 1998). Thus, the response of rooted macrophytes to reductions in nutrients in the overlying water will be much weaker and much slower than the response of algae or non-rooted macrophytes, which rely on the water for their nutrients. In algal or non-rooted macrophyte dominated systems nutrient reduction in the water column can be expected to control growth with a lag time related to the hydraulic flushing rate of the system. In lakes dominated by rooted macrophytes, additional, direct control measures such as harvesting, herbicides or drawdowns will be required to realize reductions in plant biomass on a reasonably short time scale. In both cases, however, nutrient control is essential since any reduction in one component (either rooted macrophytes or phytoplankton) may result in a proportionate increase in the other due to the relaxation of competition for light and nutrients. In addition, it is critical to establish a Total Maximum Daily Load so that future development around the lake will not impair water quality. It is far easier to prevent nutrients from causing eutrophication than to attempt to restore a eutrophic lake. The first step in nutrient control is to calculate the current nutrient loading rate or nutrient budget for the lake.

Nutrient budgets: Nutrient budgets and loading rates in lakes are determined on a yearly basis because lakes tend to accumulate nutrients as well as algal and macrophyte biomass over long time periods compared to rivers, which constantly flush components downstream. Nutrients in lakes can be released from the sediments into the bottom waters during the winter and summer and circulated to the surface during mixing events (typically fall and spring in deep lakes and also during the summer in shallow lakes). Nutrients stored in shallow lake sediments can also be directly used by rooted macrophytes during the growing season. In Massachusetts lakes, peak algal production, or blooms may begin in the spring and continue during the summer and fall while macrophyte biomass peaks in late summer. The impairment of uses is usually not severe until summer when macrophyte biomass reaches the surface of the water interfering with boating and swimming. Also, at this time of year the high daytime primary production and high nighttime respiration can cause large changes in dissolved oxygen. In addition, oxygen is less soluble in warm water of summer as compared to other times of the year. The combination of these factors can drive oxygen to low levels during the summer and may cause fish kills. For these reasons the critical period for use impairment is during the summer, yet the modeling is done on a yearly basis.

There are three basic approaches to estimating current nutrient loading rates: the measured mass balance approach and the landuse export approach and modeling the observed in-lake concentration. The measured mass balance

approach requires frequent measurements of all fluvial inputs to the lake in terms of flow rates and phosphorus concentrations. The yearly loading is the product of flow (liters per year) times concentration (mg/l), summed over all sources (i.e., all streams and other inputs) and expressed as kg/year. The landuse export approach assumes phosphorus is exported from various land areas at a rate dependent on the type of landuse. The yearly loading is the sum of the product of landuse area (Ha) times the export coefficient (in kg/Ha/yr). Using a model of in-lake phosphorus concentrations is a indirect method of estimating loading and does not provide information on the sources of input but can be used in conjunction with other methods to validate results. The mass balance method is generally considered to be more accurate, but also more time consuming and more costly due to the field sampling and analysis. For this reason, the mass balance results are used whenever possible. If a previous diagnostic/ feasibility study or mass balance budget is not available, then a landuse export model, such as Reckhow et al., (1980) or the NPSLAKE model (Mattson and Isaac, 1999) can be used to estimate nutrient loading.

Target Load: Once the current nutrient loading rate is established, a new, lower rate of nutrient loading must be established which will restore water quality. This target load or TMDL, can be set in a variety of ways. Usually a target concentration in the lake is established and the new load must be reduced to achieve the lower concentration. This target nutrient concentration may be established by a water quality model that relates phosphorus concentrations to water quality required to maintain designated uses or specific water quality standards, such as the four-foot transparency criterion at Massachusetts swimming beaches. Alternatively, the target concentration may be set based on concentrations observed in background reference lakes for similar lake types or from concentration ranges found in lakes within the same ecological region (ecoregions). Various models (equations) have been used for predicting productivity or lake total phosphorus concentrations in lakes from analysis of phosphorus loads. These models typically take into consideration the waterbody's hydraulic loading rate and some factor to account for settling and storage of phosphorus in the lake sediments. Among the more well known metrics are those of Vollenweider (1975), Dillon-Rigler (1974) and Reckhow (1979). The TMDL must account for the uncertainty in the estimates of the phosphorus loads from the sources identified above by including a margin of safety. This margin of safety can be specifically included, and/or included in the selection of a conservative target, and/or included as part of conservative assumptions used to develop the TMDL.

After the target TMDL has been established, the allowed loading of nutrients is apportioned to various sources which may include point sources as well as private septic systems and various land uses within the watershed. In Massachusetts, few, if any, lakes receive direct point source discharges of nutrients. River impoundments often have upstream point sources, but these will be addressed as part of the appropriate river system. The nutrient source analysis generally will be related to landuse that reflects the extent of development in the watershed. This effort can be facilitated by the use of geographic information systems (GIS) digital maps of the area that can summarize landuse categories within the watershed. The targeted reductions must be reasonable given the reductions possible with the best available technology and Best Management Practices. The first scenario for allocating loads will be based on what is practicable and feasible for each activity and/or landuse to make the effort as equitable as possible.

Although the landuse approach gives an estimate of the magnitude of typical phosphorus export from various landuses, it is important to recognize that nonpoint phosphorus pollution comes from many discrete sources within the watershed. Perhaps the most common sources in rural areas are leaching from failed or inadequate septic systems and phosphorus associated with soil erosion. Soils tend to erode most rapidly following soil disturbances such as construction, gravel pit operations, tilling of agricultural lands, overgrazing, and trampling by animals or vehicles. A common problem with erosion in rural areas is erosion from unpaved roads. Soils may also erode rapidly where runoff water concentrates into channels and erodes the channel bottom. This may occur where impervious surfaces such as parking lots direct large volumes of water into ditches which begin to erode and may also result from excessive water drainage from roadways with poorly designed ditches and culverts. Any unvegetated drainage way is a likely source of soil erosion.

Discrete sources of nonpoint phosphorus in urban, commercial and industrial areas include a variety of sources that are lumped together as 'urban runoff' or 'stormwater'. As many of these urban sources are difficult to identify the most common methods to control such sources include reduction of impervious surfaces, street sweeping and other best management practices as well as treatment of stormwater runoff in detention ponds or other structural controls.

Other sources of phosphorus include phosphorus based lawn fertilizers used in residential areas, parks, cemeteries and golf courses and fertilizers used by agriculture. Manure from animals, especially dairies and other confined animal feeding areas is high in phosphorus. In some cases the manure is inappropriately spread or piled on frozen ground during winter months and the phosphorus can leach into nearby surface waters. Over a period of repeated

applications of manure to local agricultural fields, the phosphorus in the manure can saturate the ability of the soil to bind phosphorus, resulting in phosphorus export to surface waters. In some cases, cows and other animals including wildlife such as flocks of ducks and geese may have access to surface waters and cause both erosion and direct deposition of feces to streams and lakes. Perhaps the most difficult source of phosphorus to account for is the phosphorus recycled within the lake from the lake sediments. Phosphorus release from shallow lake sediments may be a significant input for several reasons. These reasons include higher microbial activity in shallow warmer waters that can lead to sediment anoxia and the resultant release of iron and associated phosphorus. Phosphorus release may also occur during temporary mixing events such as wind or powerboat caused turbulence or bottom feeding fish, which can resuspend phosphorus rich sediments. Phosphorus can also be released from nutrient 'pumping' by rooted aquatic macrophytes as they extract phosphorus from the sediments and excrete phosphorus to the water during seasonal growth and senescence (Cooke et al., 1993; Horne and Goldman, 1994). Shallow lakes also have less water to dilute the phosphorus released from sediment sources and thus the impact on lake water concentrations is higher than in deeper lakes.

Implementation: The implementation plan or watershed management plan to achieve the TMDL will vary from lake to lake depending on the type and degree of development. While the impacts from development can not be completely eliminated, they can be minimized by prudent "good housekeeping" practices, known more formally as best management practices (BMPs). Among these BMPs are control of runoff and erosion, well-maintained subsurface wastewater disposal systems and reductions in the use of fertilizers. Activities close to the waterbody and its tributaries merit special attention for following good land management practices. In addition, there are some statewide efforts that provide part of an overall framework. These include the legislation that curbed the phosphorus content of many cleaning agents, revisions to regulations that encourage better maintenance of subsurface disposal systems (Title 5 Septic systems), and the Rivers Act that provides for greater protection of land bordering waterbodies. In addition, there is the public's concern about the environment that is being harnessed to implement remediation and protection plans through efforts associated with the Massachusetts Watershed Initiative and the Basin Teams. In some cases, structural controls, such as detention ponds, may be used to reduce pollution loads to surface waters.

The most important factor controlling macrophyte growth appears to be light (Cooke et al., 1994). Due to the typically large mass of nutrients stored in lake sediments, reductions in nutrient loadings by themselves are not expected to reduce macrophyte growth in many macrophyte-dominated lakes, at least not in the short-term. In such cases additional in-lake control methods are generally recommended to directly reduce macrophyte biomass. Lake management techniques for both nutrient control and macrophyte control have been reviewed by a Draft Generic Environmental Impact Report (Mattson et al., 1998). The Massachusetts Department of Environmental Protection will endorse in-lake remediation efforts that meet all environmental concerns, however, instituting such measures will rest with communities and the Clean Lakes Program now administered by EPA and, in Massachusetts, the Department of Environmental Management.

Financial support for implementation is potentially available on a competitive basis through both the non-point source (319) grants and the state revolving fund (SRF) loan program. The 319 grants require a 40 percent non-federal match of the total project cost although the local match can be through in-kind services such as volunteer efforts. Other sources of funding include the 604b Water Quality Management Planning Grant Program, the Community Septic Management Loan Program and the DEM Lake and Pond Grant Program. Information on these programs are available in a pamphlet "Grant and Loan Programs – Opportunities for Watershed Protection, Planning and Implementation" through the Massachusetts Department of Environmental Protection, Bureau of Resource Protection and the Massachusetts Department of Environmental Management (for the Lake and Pond Grant Program).

Since the lake restoration and improvements can take a long period of time to be realized, follow-up monitoring will be essential. This can be accomplished through a variety of mechanisms including volunteer efforts. Recommended monitoring will include Secchi disk readings, lake total phosphorus, macrophyte mapping of species distribution and density, visual inspection of any structural BMPs, coordination with Conservation Commission and Board of Health activities and continued education efforts for citizens in the watershed.

Waterbody Description and Problem Assessment

Description: Salisbury Pond, (MA51142) is a 15 acre, municipally-owned pond located in Institute Park, adjacent to Worcester Polytechnic Institute in Worcester Massachusetts at approximately 42°16'38" N, 71°48'22" W. The

pond was created by damming the Mill Brook in 1834 and used as a power source for a wire producing mill. The pond was reported dredged in 1956 and the National Guard did some additional sediment removal in the 1970s but the CDM (1987) study estimates the pond is filling in at a rate of 50,000 cubic feet per year between 1973 and 1987. The pond has a mean depth of only 0.96 m (3.1 feet) as of the 1987 CDM report (see map in Appendix I.) Recent depth data from a 1999 DEP survey show the pond is even more shallow now with many areas nearly filled in with sediment (see map in Appendix II).

The watershed is a mixture of residential and urban land uses. Several stormwater drains feed into the lake however the major source of water is a twin inlet culvert at the north end of the lake which is the former Mill Brook, now diverted underground. This twin culvert drains both the Mill Brook watershed to the north (generally east of and including Interstate I-190) as well as water from the outlet of Indian Lake including areas west of I-190. A separate Total Maximum Daily Load report for Indian Lake is under development in conjunction with this report and a detailed study of Indian Lake is also available (Lycott, 1989).

The park is used for concerts and picnics but numerous complaints about weed growth, odors and aesthetics indicate the pond is in poor condition and not meeting its designated uses. No boating is allowed but there are reports of people using the pond for fishing. The lake was treated with Diquat in 1986, however according to DEP records on herbicide permit applications there have been no herbicide treatments of the lake at least since 1993.

Due to the high phosphorus loading from the watershed the lake is experiencing nuisance algae blooms with associated high turbidity. Data from the CDM (1987) study showed dense macrophyte growth around the edges of the lake (see Fig. 1-8 in the Appendix). The report also states algal densities were in the range of 1000 to 1500 units/ml which indicates water quality problems with algal blooms, although no Secchi disk transparency was noted in the report. An earlier study by DWPC in 1983 reported the Secchi disk transparency of 0.7 meters and a total phosphorus concentration of 0.11 mg/l. The CDM (1987) report also states total phosphorus ranged between 0.013 - 0.17 mg/l in 1986 and that bacteria counts for fecal coliform bacteria exceed the state standard for Class B waters of a log mean of 200/100ml or 10% of samples exceeding 400/100ml. Further dry weather comparative testing of the outlet of the upstream Indian Lake to the twin culvert inlet of Salisbury Pond and observation of toilet paper and human feces near the twin culvert outlet strongly suggests there is a sewage contamination problem in the culvert between the two lakes. Raw sewage has historically impacted Salisbury Pond, and continues at this time. Sewage enters the stormwater system at many points in the Mill Brook watershed, as a result of both structural misconnections (where the sewer line from a home or business has been directed to the storm drainage system) and sewerage line failures (old pipes have rotted/broken). Recent citizen monitoring data indicates fecal coliform levels ranging from 100 to 16,600 colonies/100ml (Mass WaterWatch, 1999 unpublished data). As stated previously, there are many known and suspected sources of raw sewage to the pond. Many miles of wooden pipes are still in use in the City of Worcester, as well as many clay pipes. Observations of the condition of some of these lines compare them to “Swiss cheese” due to the degree of rot and breakage. In addition, many sewer lines from residences and businesses were misconnected to the storm system at the time of construction, and have been releasing raw sewage to Mill Brook for 70+ years. At this time, the City of Worcester has instituted an aggressive program to correct these problems, which will be discussed later in this TMDL

A recent site visit by DEP on September 9, 1998 reported a Secchi disk transparency of 0.9 and 0.5 meters at two different sites along the shore and an algae bloom in the water and duckweed on the surface. The macrophyte distribution appeared to be somewhat less extensive and restricted to very shallow water compared to the CDM (1987) map (Fig. 1-8 in the Appendix). The apparent reduction in macrophyte distribution may be a result of decreased transparency but lack of Secchi disk data from 1987 prevents any conclusions. An odor of fuel oil was evident at the lake outlet spillway and reported to DEP staff who were able to trace the spill to a storm-drain on the Norton Company property. As this site is completely fenced, the spill was assumed to be a result of discharges by Norton personnel. The Norton Company agreed to implement increased staff training and pollution awareness at the site.

Pollutant Sources and Natural Background

The CDM (1987) D/F study concluded that phosphorus concentrations were excessive and nearly always exceeding 0.02 mg/l and ranged between 0.013 and 0.17 mg/l. The average surface total phosphorus concentration was 70 ppb (CDM, 1987). It should be noted that light may also limit macrophyte growth, particularly when turbidity is high. Direct measurement of concentrations and estimates of inflow from the culverts and storm-drains into the pond were

used to estimate phosphorus loading to the pond. Separate calculations were made for stormflow and baseflow. The total annual phosphorus loading estimates of 4,646 kg/yr were much higher than those predicted by land use export coefficients (1,353 kg/yr) and the difference was attributed to sewage contamination (see below). Further study on loadings would help in the implementation of BMPs, but implementation of the BMPs recommended here should not be further delayed.

A study of the stormwater nutrient loads was included in the Diagnostic/Feasibility Study of CDM (1987). The report concludes that the excessive algae growth and aquatic macrophyte growth can be attributed to the high phosphorus loading from the twin inlet culvert to the pond and that most of this is likely due to sewer contamination of the system somewhere between Indian Lake and Salisbury Pond.

Sedimentation is another source of impairment of Salisbury Pond. The upstream watershed contains steep hills, and has a very high proportion of impervious surface, which exacerbates sedimentation and erosion conditions. Field observation and visual inspections have identified some sediment sources. These sources are: drainage from Interstate 190; unpaved private roads that drain to paved streets where runoff enters the Worcester storm drainage system (mainly via the southwestern inlet); winter sanding from private residential and commercial properties; unstabilized surfaces on brownfields industrial properties; and construction activities. A review of many highway runoff studies conducted by the Federal Highway Administration (FHWA) reported the Event Mean Concentration for suspended solids was 143 mg/l and that the EMC for PO_4-P was 0.435 mg/l(Driscoll et al., 1990). It is generally recommended that phosphorus inputs to lakes be less than 0.050 mg/l. There are 19.4 lane miles of Interstate 190 that drain directly to the Mill Brook and Salisbury Pond via the eastern of the twin inlet culverts. The Massachusetts Highway Department (MassHighway), which is responsible for maintenance of the interstate, applies sand liberally during snow and ice storms to provide traction. Visual inspection by the Mill Brook Task Force of surface drains exiting the highway corridor indicates periodic episodes of high flow and insufficient BMPs. Much of this sediment appears to be coming from Interstate Route I-190, where the currently installed stormwater BMPs are apparently overwhelmed and filled with sediments in many locations (see Figures 1 and 2). The sediments have also filled in some small detention ponds along the east side of I-190.

Figure 1. Example of poorly maintained stormpipe from Interstate I-190 overpass.
Note pipe is completely clogged with sediment and debris.

Figure 2. A mound of sand covering a stormwater discharge pipe from Interstate I-190. The mound is covered with grass and weeds. Note size of shovel for scale.

Large commercial parking lots, e.g. Sam's Club and the Greendale Mall, use sand as well. The level of catch basin maintenance at these locations is either undocumented or unknown. The City of Worcester generally uses salt rather than sand on city streets, so city street sanding is thought to be only a minor contributor of sediment.

In addition to the sediment sources described above, there are several unique sites in the watershed that may also serve as significant sources of sediment. There are a number of unpaved streets with steep gradients from Rockdale St. to Mount Ave. The stream channel along the downgradient railroad has insufficient hydraulic capacity to carry runoff during large storms, and a partially collapsed culvert near Brooks Street also restricts flow. During high flows the stream exceeds bankfull capacity, and flows westward across industrial properties to Rockdale Street. At Rockdale Street, the water flows south where it returns to the stream channel. Runoff from the unpaved streets during such events flows directly to the stream overland rather than through catch basins and the MS4.

Another potentially significant source of sediment is the Wrightline Building at 160 Gold Star Boulevard, which is located within the Mill Brook flood plain. When the Wrightline Building was expanded, the City of Worcester required provision of flood storage in the form of a vault beneath the building. The vault was designed to fill when surface runoff in the area exceeds the capacity of the Worcester storm drainage system. Surface runoff from the property flows through direct inlets to the flood storage vault. When carrying capacity in the storm drainage system is available, the water is pumped from the vault into the municipal system. However, this vault has not been inspected for at least 5 years. Although the pumps have been maintained, it is unknown whether sediment has accumulated in the vault, which would reduce the available flood storage volume, as well as serve as a sediment source to the downstream watershed Additional work is needed to quantify these sediment sources in order to develop an effective sediment remediation and control plan.

Because the direct measurement of loading from runoff includes natural background it is difficult to separate this source from anthropogenic sources. In this case, not separating natural background is reasonable because the approach used to estimate loadings by subwatershed and the limited and general nature of the information available. Natural background can be estimated based on the forest export coefficient of 0.13 kg/ha/yr multiplied by the hectares of the watershed assuming the watershed to be entirely forested. Without site specific information regarding soil phosphorus and natural erosion rates the accuracy of this estimate would be uncertain and would add little value to the analysis.

Water Quality Standards Violations

There are two water quality violations listed on the 303d list; Nuisance Aquatic Plants and Turbidity. In consideration that the waters listed are a Class B water, the data listed above were judged sufficiently well documented to place the lake on the Massachusetts 303d list for 1998 (DEP, 1998) related to impairment of primary and secondary contact recreation and aesthetics. These Water Quality Standards are described in the Code of Massachusetts Regulations under sections:

> 314CMR 4.04 subsection 5:
>
> (5) Control of Eutrophication. From and after the date 314 CMR 4.00 become effective there shall be no new or increased point source discharge of nutrients, primarily phosphorus and nitrogen, directly to lakes and ponds. There shall be no new or increased point source discharge to tributaries of lakes or ponds that would encourage cultural eutrophication or the growth of weeds or algae in these lakes or ponds. Any existing point source discharge containing nutrients in concentrations which encourage eutrophication or growth of weeds or algae shall be provided with the highest and best practical treatment to remove such nutrients. Activities which result in the nonpoint source discharge of nutrients to lakes and ponds shall be provided with all reasonable best management practices for nonpoint source control.
>
> 314CMR 4.05 (3) b: "These waters are designated as a habitat for aquatic life, and wildlife, and for primary and secondary contact recreation...These waters shall have consistently good aesthetic value."
>
> 5. "Solids – These waters shall be free form floating, suspended and settleable solids in concentrations and combinations that would impair any use assigned to this Class, that would cause aesthetically objectionable conditions, or that would impair the benthic biota or degrade the chemical composition of the bottom."
>
> 6. "Color and Turbidity - These waters shall be free from color and turbidity in concentrations that are aesthetically objectionable or would impair any use assigned to this Class."
>
> 314CMR 4.05 (5) (a): All surface waters shall be free from pollutants .....or produce undesirable or nuisance species of aquatic life".
>
> (b):Bottom Pollutants or Alterations – All surface waters shall be free from pollutants in concentrations and combinations or from alterations that adversely affect the physical or chemical nature of the bottom, interfere with the propagation of fish or shellfish, or adversely affect populations of non-mobile or sessile benthic organisms.

The Water Quality Standards for turbidity are based on the Minimum Standards for Bathing Beaches established by the Massachusetts Department of Public Health which state that swimming and bathing are not permitted at public beaches when:

> 105CMR 445.10 (2b) A black disk, six inches in diameter, on a white field placed at a depth of at least 4 feet of water is not readily visible from the surface of the water; or when, under normal usage, such disk is not readily visible from the surface of the water when placed on the bottom where the water depth is less than four feet….

As noted above, there are also violations of water quality standards for bacteria and sediments that are not listed on the current 303d list, but which will be addressed in the BMPs proposed here. Bacteria levels are expected to meet

standards as the sewer system is upgraded. Sediment inputs are expected to decline as additional BMPs are added to the highways and as BMPs or pavement are applied to the remaining local dirt roads.

TMDL Analysis

Identification of Target: There is no loading capacity *per se* for nuisance aquatic plants. The plants simply grow in response to favorable conditions and nutrient availability. As the term implies, TMDLs are often expressed as maximum daily loads. However, as specified in 40 CFR 130.2(I), TMDLs may be expressed in other terms when appropriate. For this case, the TMDL is expressed in terms of allowable annual loadings of phosphorus because the growth of phytoplankton and macrophytes responds to changes in annual rather than daily loadings of nutrients. The target in-lake total phosphorus concentration chosen is based on consideration of the typical concentrations expected in lakes in the region. The phosphorus ecoregion map of Griffith et al. (1994) indicates the lake is in an ecoregion with concentrations of 15-19 ppb, based on spring/fall concentrations, while the phosphorus ecoregion map of Rohm et al., (1995) suggests that typical lakes in this ecoregion would have concentrations between 30 and 50 ppb, based on summer concentrations. Based on the above ecoregion analysis and the very fast flushing rate (413 times per year) of the pond, DEP has set the target TP concentration at 45.5 ppb. Because of the flow-through nature of the pond, the fast flushing rate of the pond (0.9 times per day) would tend to flush algae and duckweed out of the pond as fast as they grow and thus water transparency meeting the 4 foot swimming criteria may be met at a higher phosphorus level than in other, slower flushing lakes in the same ecoregion. Thus, a relatively high phosphorus target is justified in this lake. The 45.5 ppb target represents a 35 percent reduction from the average surface total phosphorus concentration of 70 ppb reported in CDM (1987). Apparently CDM (1987) did not report Secchi disk transparency, however a recent unpublished DEP survey in September, 1998 reported Secchi disk transparencies of 0.9 and 0.5 meters, which is below the swimming criteria of 1.2 meters (4 foot). Although swimming is not a current use, the goal is to meet water quality standards of swimable conditions.

Loading Capacity

There is no loading capacity per se for nuisance aquatic plants. As the term implies, TMDLs are often expressed as maximum daily loads. However, as specified in 40 CFR 130.2(I), TMDLs may be expressed in other terms when appropriate. For this case, the TMDL is expressed in terms of allowable annual loadings of phosphorus because the growth of phytoplankton and macrophytes responds to changes in annual rather than daily loadings of nutrients. Because of the rapid flushing rate (0.9 per day), a simple mass balance approach was used to predict phosphorus concentrations based on mass of phosphorus input divided by volume of water loading per year. The CDM (1987) report established several target conditions based on phases of implementation. The final CDM (1987) target was based on the assumption that the sewage contamination could be eliminated and the loading reduced to that expected from the land use analysis (1,353 kg/yr). The remaining non-point source pollution could be reduced 10-20 percent by a combination of public education and erosion control.

The prudent approach, however, is to implement the target in phases, beginning first with elimination of sewage contamination and implementing a 20% reduction in watershed loading, or 1082 kg/yr as described in the CDM (1987) report, combined with an aggressive stormwater control program for both the City of Worcester and MassHighway. With current water loading rates of $2.38 \times 10^7 m^3$ per year, this would result in a predicted in lake phosphorus concentration of:

Average P in pond = P loading/ water loading = $1082kg / 2.38 \times 10^7 m^3 = 0.0455$ mg/l

Although is still rather high, the fast flushing rate of the pond (0.9 times per day) would tend to flush algae and duckweed out of the pond as fast as they grow. However, during the summer low flow period the flushing rate would be greatly reduced and the possibility exists for continued algal growth.

Wasteload Allocations, Load Allocations and Margin of Safety:

Although there is some uncertainty with the predictions, the first two stages of implementation (sewage elimination and NPS reduction) may be able to achieve the water quality standards, controlling both eutrophication and meeting water transparency criteria. If so, this pond could meet water quality standards without the need for the final stage: the proposed diversion with a cost estimated at $328,000 in 1987.

The CDM (1987) study recommended the major effort be placed on controlling phosphorus export particularly that associated with stormwater from the major twin culvert inlet. To some extent, the proliferation of aquatic macrophytes in the pond is a natural condition resulting from the availability of shallow, nutrient rich sediments being flooded when the lake was enhanced by a dam. The shallow pond offers an ideal habitat for natural growth of aquatic macrophytes and complete elimination of macrophytes is neither possible nor desired. Thus reducing the supply of external phosphorus may not meet the goals of the TMDL without additional management in the lake as discussed below.

DEP chose an additional margin of safety of 5 percent of the total TMDL. In this case, the margin of safety is 1082 kg/yr*.05 or 54 kg/yr. The watershed is largely urbanized and thus the culverts drains and runoff listed in Table 1 may be considered a combination of point and nonpoint runoff that is listed under waste load allocation. The waste load allocation is 1028 kg/yr, with a load allocation of zero for the target allocations as indicated in the right side of Table 1. By far the largest reduction is targeted for the twin culverts, most of which is expected to be accomplished by removal of the sewage contamination and by implementation of stormwater BMPs at the inlets and at MassHighways sites, which is expected to reduce overall loading of the twin culverts to 888 kg/yr. Similarly, a 20 percent reduction in loading is targeted for drain #4. No reduction is targeted for other runoff.

Table 1. TMDL Load Allocations.

Source	***Current TP Loading (kg/yr)***	***Target TP Load Allocation (kg/yr)***
Load Allocation:	0	0
Waste Load Allocation:		
Twin Culvert Inlet *	4480	888
Drain #4 Stormflow	149	123
Other drains & runoff	17	17
Total Inputs	4646	1028

*Note that the Twin Culvert Inlet includes illicit stormwater connections, as well as runoff from MassHighways I-190 and city streets. These sources were not separately estimated in the report.

The TMDL is the sum of the wasteload allocations (WLA) from point sources (e.g., sewage treatment plants) plus load allocations (LA) from nonpoint sources (e.g., landuse sources) plus a margin of safety (MOS). In this case the TMDL is:

TMDL = WLA + LA + MOS = 1028 kg/yr + 0 kg/yr + 54 kg/yr = 1082 kg/yr.

Modeling Assumptions, Key Input, Calibration and Validation:

No models currently exist to predict a reduction of nuisance aquatic macrophytes as a result of phosphorus controls, therefore, no macrophyte models were used. Control of nuisance aquatic macrophytes is based on established literature and best professional judgment. In-lake nutrient concentrations were modeled by simple, conservative flow through equations, based on the rapid flushing rate. Control of nuisance algae was based on control of in lake phosphorus concentrations, which were assumed to be predictable from total phosphorus loading divided by total water loading. The essential input is the loading rate. In this case, the loading rate was estimated from measured total phosphorus concentrations and estimated flows based on nearby gaged watersheds. Flows in the watershed may be even higher due to the large percentage of impervious surfaces in the watershed. As noted above, the total phosphorus in the pond was so variable that it cannot be used for reliable modeling verification. While there is a wide range of error possible in the final model prediction, our best professional judgment is that the proposed reduction of nearly 78 percent of inputs would result in noticeable improvements in water quality.

Seasonality: As the term implies, TMDLs are often expressed as maximum daily loads. However, as specified in 40 CFR 130.2(I), TMDLs may be expressed in other terms when appropriate. For this case, the TMDL is expressed in terms of allowable annual loadings of phosphorus. Although Salisbury Pond is likely to respond to daily loadings

due to the very fast flushing rate not enough data is available to construct daily loading estimates. Furthermore, the sediment infilling of the pond occurs over a longer time scale and therefore an annual basis for loading is preferred. Because critical conditions occur during the summer season when weed growth is more likely to interfere with uses and this TMDL is intended to meet water quality standards during the summer this TMDL will also meet water quality standards during other times of the year. Therefore, seasonal variation is taken into account with the estimation of annual loads. In addition, evaluating the effectiveness of nonpoint source controls can be more easily accomplished on an annual basis rather than a daily basis.

For most lakes, it is appropriate and justifiable to express a nutrient TMDL in terms of allowable annual loadings. The annual load should inherently account for seasonal variations by being protective of the most sensitive time of year. The most sensitive time of year in most lakes occurs during summer, when the frequency and occurrence of nuisance algal blooms and macrophyte growth are usually greatest. Therefore, because the Salisbury Pond phosphorus TMDL was established to be protective of the most environmentally sensitive period (i.e., the summer season), it will also be protective of water quality during all other seasons. Additionally, the targeted reduction in annual phosphorus load to Salisbury Pond will result in the application of phosphorus controls that also address seasonal variation. For example, certain control practices such as diverting runoff and stabilizing eroding drainage ways will be in place throughout the year while others will be in effect during the times the sources are active (e.g., application of lawn fertilizer).

Implementation

The CDM (1987) study recommended replacing the sewage pumping station near Indian Lake. This has already been done and no further sewage overflows from this site have been reported since that time. In addition, according to Joseph Buckley (pers. comm. 1999) the Sewer Operation Division located and corrected some illicit connections in the pipes leading to Salisbury Pond, but many more are known or suspected to exist. Although the twin invert modifications to the sewer system in the Salisbury Pond area is not completed, the work is ongoing. In 1998, the City was issued a NPDES permit MAS010002 for stormwater discharges. Mr. Buckley notes the stormwater controls and BMPs required by the City of Worcester as part of the NPDES Stormwater permit application are being implemented.

The City has committed to and begun implementation of an aggressive program designed to identify and correct sources of sewage to the storm drain system. This program has had major successes in the Mill Brook watershed in the past year alone. Under the stormwater permit, the city must look at each of its major watersheds on a five-year cycle; Mill Brook is scheduled for (calendar year) 2000. On 2 January 2000, staff members of the DPW had already identified one significant source: an office building of 50 staff members. This building, which has housed numerous commercial enterprises, was misconnected to the stormwater system in 1928, and has been discharging raw sewage to the Mill Brook less than one mile upstream of Salisbury Pond since that time. The Worcester Health Department has instructed the owners to correct this situation immediately.

However, other significant sources of sewage are not addressed in such a timely manner. Projects necessitating replacement of sections of sewer pipes require large capital outlays, and are not within the scope of the annual budget of the Worcester DPW. Such projects may not receive the requisite funding for several years, during which time raw sewage will continue to impact Salisbury Pond.

Details of the stormwater controls can be found in the permit applications (DPW, 1992 and DPW, 1993). This permit requires the following:

Street Sweeping Program- Residential streets twice a year; downtown streets weekly or more often.

Catch Basins Cleaning—about 7,000 basins (more than 50 percent of total) will be cleaned and inspected annually. On average, each basin will be cleaned every other year.

Illicit connections—A program to detect and remove illicit connections to the sewer will be carried out.

Dual manhole modification program—Nearly 30 percent of manholes within Worcester are dual manholes; a common structure that provides access to separate sanitary and storm sewer lines. To alleviate cross

contamination during high stormwater flows aluminum plates were and are currently being bolted over the sanitary invert. The sewer system discharges are treated and discharged to the Blackstone River and does not impact Salisbury Pond.

The City of Worcester Department of Public Works, (DPW), was the first city in New England to receive a NPDES permit for its Municipal Separate Storm Sewer System or MS4. The Permit is issued by the United States Environmental Protection Agency, and covers any City owned drainage outfalls that discharge to lakes, streams, rivers, and ponds within the City of Worcester, including Salisbury Pond. Under the auspices of the Stormwater Management Program, the City performs many Best Management Practices, or BMPs. Some of these BMPs include education, public outreach, street sweeping, catch basin cleaning, source control and structural modifications. These BMPs when combined with the sampling and monitoring program within Stormwater Management Program continue to locate and eliminate pollution sources throughout the life of the permit term. As part of the NPDES stormwater permit the City of Worcester is required to implement both wet and dry weather monitoring to estimate annual, mean and seasonal discharge loadings from all major outfalls and to identify illicit connections and improper discharges. An annual report summarizing the stormwater discharge program must be submitted to both DEP and EPA beginning April 1, 2000. According to a letter (Feb. 1999) provided by J. Buckley of the City of Worcester Department of Public Works, the City has been implementing BMPs since 1994.

The DPW cleans all City owned catch basins on a two-year cycle. The DPW estimates they are currently responsible for some (14,000- 15,000) catch basins. The catch basin location data is currently available through the Cities Geographic Information Systems (GIS) database. As the Stormwater Management Program is a component of the NPDES permitting structure, which is a five year cycle, DPW is hoping to track problem basins over the next five years, and recording that information in a digital format. The City estimates that it produces an annual 5,000 cubic yards of catch basin cleanings. The DPW Street Sweeping Program covers 950 curb-miles of streets; some 560 miles of streets are residential streets. The streets are swept in the fall for leaf collection producing about 50,000 cubic yards of material. All streets are also swept in the spring to collect de-icing material, and there is a year round main line and arterial sweeping. Street sweeping produces approximately 7,000 cubic yards of material annually. The Mill Brook watershed is covered in the second year of the EPA approved Sampling and Monitoring Program section of DPW's Stormwater Management Program. Dry weather screening of outfalls which effect Salisbury Pond began in January of 2,000. An update of progress on the BMPs related to the NPDES stormwater permit can be found in the Labovites (1998) report to the EPA.

MassHighway which maintains the Interstate Highways including I-190 as well as state roads such as Route 122 and Route 12 will also be required to apply for the EPA Phase II General Stormwater NPDES Permit by March 10 of 2003. MassHighways does have a draft Stormwater Handbook (MassHighways 2000) which details BMP installation and maintenance on new construction. Apparently these types of BMPs and general maintenance of the stormwater system are not being followed diligently in the case of I-190.

To reduce loadings of sediments and associated nutrients to the target level this TMDL will require the following additional minimal, performance standards for roadways within the watershed area of the TMDL (see map in Appendix I). :

1)Visually inspect the roads monthly and sweep as needed. Any solids or "visible roadway accumulation" (debris, sand, dust, etc.) on paved roads must be removed. At a minimum, roads must be swept a least twice a year as soon after snowmelt as possible or by April 1st of each year and again in the fall. It is recommended that future purchases of sweepers should be of the high efficiency design.
2)Inspect catch basins at least twice a year and any other settling or detention basins once a year to measure depth of solids. If solids are one half or more of design volume for solids, then completely remove all solids.
3)Inspect and maintain all structural components of stormwater system on a yearly basis.

The Salisbury Pond Watershed is also included in the DEP DWM and USEPA (1997) TMDL interim report on the Blackstone watershed. The DEP has one staff person assigned to education and outreach for industrial and construction site stormwater controls within the City of Worcester.

In addition, the Mill Brook Task Force was established as a grass roots organization in 1998. The Task Force consists of dedicated state and municipal agencies, environmental groups, local businessmen, students, and citizens focused on improving water quality within the Mill Brook watershed. A major accomplishment of the group has been the establishment of a citizen monitoring program, coupled with a municipal and state response mechanism. This program has met with continued successes in identifying pollutants and other conditions at the inlets to the pond. When problems have been noted, the appropriate municipal and/or state agents were notified, and the problem addressed. Numerous releases of sewage and oil, as well as trash, have been identified and ceased or remediated as a direct result of the citizen monitoring program. The City of Worcester has cooperated with the Mill Brook Task force to apply for, and be awarded a large Section 319 grant from DEP. This grant will fund the construction of a large settling basin at the Twin Culverts and will also fund the installation of two smaller sediment traps on additional inlets. Inlet number 4 apparently has a forbay in the pond that has filled in and needs to be cleaned out. A public education and water quality monitoring components are also included in the project.

Considering the lack of information on discrete sources of phosphorus to the lake the implementation plan will of necessity include an organizational phase, an information gathering phase, and the actual remedial action phase. Phosphorus sources can not be reduced or eliminated until the sources of phosphorus are identified. Because many of the nutrient sources are not under regulatory control of the state, engagement and cooperation with local citizens groups, landowners, local officials and government organizations will be needed to implement this TMDL. The Massachusetts Department of Environmental Protection will use the Watershed Basin Team as the primary means for obtaining public comment and support for this TMDL. The proposed tasks and responsibilities for implementing the TMDL are shown in Table 2. The local citizens within the watershed will be encouraged to participate in the education and outreach program. This program may include a citizen questionnaire mailed to homeowners within the watershed to obtain information on use of the lake, identify problem areas in the lake and to survey phosphorus use and Best Management Practices in the watershed. An important part of the process is to conduct a NPS watershed field survey to locate and describe sources of erosion and phosphorus within the watershed following methods described in "Massachusetts Volunteers Guide for Surveying a Lake Watershed and Preparing an Action Plan" (DEP, 2001).

For this survey volunteers are organized and assigned to subwatersheds to specifically identify, describe and locate potential sources of erosion and other phosphorus sources by driving the roads and walking the streams. Once the survey is completed, the Basin Team will be asked to review and compile the data and make recommendations for implementation. Responsibility for remediation of each identified source will vary depending on land ownership, local jurisdiction and expertise as indicated in Table 3. Town public works departments will generally be responsible for reduction of erosion from town roadways and urban runoff. The conservation commission will generally be responsible for ensuring the BMPs are being followed to minimize erosion from construction within the city. A description of funding sources for these efforts is provided in the Program Background section, above.

Additional nutrient and erosion control will focus on enforcement of the wetlands protection act by the local Conservation Commission and various Best Management practices supported by the National Resource Conservation Service (NRCS formerly SCS. BMPs for general nonpoint source pollution control are described in a manual by Boutiette and Duerring (1994), BMPs for erosion and sediment control are presented in DEP (1997). The Commonwealth has provided a strong framework to encourage watershed management through the recent modifications to on-site septic system regulations under Title 5 and by legislation requiring low phosphorus detergents. All of these actions will be emphasized during the outreach efforts of the Watershed Team.

The Department is recommending that the lake be monitored on a regular basis and if the lake does not meet the water quality standards additional implementation measures may be implemented. For example, if phosphorus concentrations remain high after watershed controls are in place, then in-lake control of sediment phosphorus recycling may be considered.

The current TMDL proposes only a 20 percent reduction in phosphorus loading from landuse and this is assumed to be feasible. As new housing development expands within the watershed, additional measures are needed to control the associated additional inputs of phosphorus. Examples of town bylaws for zoning and construction, as well as descriptions of BMPs are presented in the Nonpoint Source Management Manual by Boutiette and Duerring (1994) that was distributed to all municipalities in Massachusetts. Other voluntary measures may include encouraging the establishment of a vegetative buffer around the lake and along its tributaries, encouraging the use of non-phosphorus lawn fertilizers and controlling runoff. Such actions can be initiated in stages and at low cost. They provide enhancements that residents should find attractive and, therefore, should facilitate voluntary implementation. The

National Resource Conservation Service is an ideal agency for such an effort and the residents will be encouraged to pursue NRCS' aid.

Reducing the supply of nutrients will not in itself result in achievement of the goals of the TMDL and continued macrophyte management is an essential part of the implementation plan. The approach is to continue with close monitoring and to conduct spot harvesting as required and seek opportunities to get selected areas dredged at reduced cost.

Table 2. Proposed Tasks and Responsibilities

Tasks	Responsible Group
TMDL development	DEP
Public comments on TMDL, Public meeting	DEP and Watershed Team
Response to public comments	DEP
Organization, contacts with Volunteer Groups	Watershed Team and Mill Brook Task Force
Develop guidance for NPS watershed field survey.	DEP
Initiate intensive roadway sweeping, catch basin cleaning and BMP inspection program (see text)	MassHighway and City of Worcester
Develop methodology to calculate loadings from highways	MassHighway
Conduct pilot project to assess loadings and test BMPs on highways	MassHighway
Organize and implement NPS watershed field survey	Watershed Team and Mill Brook Task Force
Compile and prioritize results of NPS watershed surveys	Watershed Team and Mill Brook Task Force
Organize implementation; work with stakeholders and local officials to identify remedial measures and potential funding sources.	Watershed Team, Mill Brook Task Force and local Conservation Commission.
Write grant and loan funding proposals	Mill Brook Task Force, Mill Brook Watershed Associations, Towns, Central MA Regional Planning Comm., NRCS Holden Field Office
Organize and implement education, outreach programs	Mill Brook Task Force, City of Worcester, MassHighway, Massachusetts Audubon Society
Implement remedial measures for discrete NPS pollution	See Table 3 below.
Include proposed remedial actions in the Watershed Management Plan	Watershed Team
Provide periodic status reports on implementation of remedial actions to DEP	Watershed Team
Monitoring of lake conditions	DEP (year 2 of cycle) and Mill Brook Task Force (annually), City of Worcester DPW.

Table 3. Guide to Urban Nonpoint Source Control of Phosphorus and Erosion.

Type of NPS Pollution	Whom to Contact	Types of Remedial Actions
Industrial		
Phosphorus Cleaning Agents	Industry Manager	Reuse and reduce or eliminate phosphorus containing cleaning agents.
Floor drains connected to storm sewers	Industry Manager and Regional DEP	Redirect floor drains to sewer system.
Stormdrains	Industry Manager and Regional DEP	Label stormdrains and forbid dumping or washing of chemicals into stormdrains. Add detention/ filtration basins to all stormdrains.
Stormwater runoff	Industry Manager, EPA	Use nonstructural BMPs for reducing stormwater pollution including fertilizer use, street and parking lot sweeping and Pollution Prevention Plans, Multi-sector NPDES permits.
Construction		
Erosion, pollution from development and new construction.	Conservation commission, Town officials, planning boards	Enact bylaws requiring BMPs and slope restrictions for new construction, zoning regulations, strict septic regulations. Enforce Wetlands Protection Act
Erosion at construction sites	Contractors, Conservation commission	Various techniques including seeding, diversion dikes, sediment fences, detention ponds etc.
Stormwater Runoff		
Turf Management	Golf Courses, Parks & Recreation Departments	Use non-phosphorus containing fertilizers. Apply fertilizers only after soil tests.
Urban Runoff from public roads	MassHighway, Town or city Dept. Public Works,	Reduce impervious surfaces, institute more frequent street sweeping and catch basin cleaning, install detention basins, dredge and maintain stormwater detention basins, etc.
Unpaved Road runoff	Town or city Dept. Public Works	Pave heavily used roads, divert runoff to vegetated areas, install riprap or vegetate eroded ditches.
Residential areas		
Septic Systems	Homeowner, Lake associations, Town Board of Health, Town officials	Establish a septic system inspection program to identify and replace systems in non-compliance with Title 5. Establish a regular septic system inspection program. Discourage garbage disposals in septic systems.
Lawn and Garden fertilizers	Homeowner, Lake associations	Establish an outreach and education program to encourage homeowners to eliminate the use of phosphorus fertilizers on lawns, encourage perennial plantings over lawns.
Runoff from Housing lots	Homeowner, Lake associations	Divert runoff to vegetated areas, plant buffer strips between house and lake
Other stream or lakeside erosion	Landowner, Conservation Commission	Determine cause of problem; install riprap, plant vegetation.

Reasonable Assurances

Reasonable assurances that the TMDL will be implemented include both enforcement of current regulations, availability of financial incentives, and the various local, state and federal program for pollution control. Specific programs have already been described above. Enforcement of regulations includes enforcement of the permit conditions for point sources and in some cases stormwater under the National Pollutant Discharge Elimination System (NPDES). Enforcement of regulations controlling nonpoint discharges include local enforcement of the states Wetlands Protection Act and Rivers Protection Act; the Title 5 regulations for septic systems and various local regulations including zoning regulations. Financial incentives include Federal monies available under the 319 NPS program and the 604 and 104b programs, which are provided as part of the Performance Partnership Agreement between DEP and the USEPA. Lake management grants are also provided by the State Department of Environmental Management Lakes and Ponds Program.

Water Quality Standards Attainment Statement

The proposed TMDL, if fully implemented, will result in the attainment of all applicable water quality standards, including designated uses and numeric criteria, for each pollutant named in the Water Quality Standards Violations noted above.

Monitoring

A synoptic survey of the lake from vantage points on the shoreline was conducted by DEP in August of 1998 and as noted above most of the lake surface (approximately 90 percent) was apparently clear of nuisance aquatic vegetation although the Secchi disk transparency averaged only 0.7 meters. Monitoring by DEP staff will be continued on a regular basis according to the five-year watershed cycle. Baseline surveys on the lake should include Secchi disk transparency, nutrient analyses, temperature and oxygen profiles and aquatic vegetation maps of distribution and density. At that time the effectiveness reducing total phosphorus concentrations can be re-evaluated and the TMDL modified, if necessary. Additional monitoring by volunteer groups will be encouraged.

Public Participation

A preliminary public meeting was held on Nov. 10, 1999 with state and local government representatives and local environmental groups including the Millbrook Task Force at the DEP office in Worcester to discuss an earlier draft of the TMDL A preliminary public meeting was held on Nov. 10, 1999 with state and local government representatives and local environmental groups including the Indian Lake Watershed Association. at the DEP office in Worcester to discuss an earlier draft of the TMDL. A public meeting to discuss the draft TMDLs for both Indian lake and Salisbury Pond was announced in the Environmental Monitor and in various letters sent to public officials, regional planning agencies and local environmental organizations. The public meeting was held October 18, 2001 at the Bancroft School in Worcester near Indian Lake. An attendance list for the meeting is available in Appendix III.

Public Comment and Reply

The following comments were taken at the public meeting or are written comments that were received within the 30 day comment period following the meeting. Note that some comments were generic and are included in both Indian Lake and Salisbury Pond TMDLs.

Comment: What is the enforcement status of the Indian Hill Development Project? Erosion and sedimentation has had a significant effect to Indian Lake since 1980's (about 10' of sediment over the course of the last 10 years?).
Response: DEP's Central Regional Office, Bureau of Resource Protection executed an Administrative Consent Order with Penalty (ACOP) with Indian Hill Partnership in Worcester for $10,000.00. The fine was issued for erosion and siltation to off-site wetland resource areas. The ACOP required immediate improvements to erosion and drainage controls and restoration or compensation for an off-site pond that was silted.

Comment: It was suggested there should be a statewide discussion (including DEP, Army Corp f Engineers (ACOE) and other state / federal agencies) to formulate a "workable" dredging policy. Specific guidance and or fact sheets on what dredging materials and thresholds are considered "hazardous waste"? And what materials thresholds could potentially be used for daily cover at landfills etc? This guidance and or fact sheets would be

extremely helpful to community officials, lake and watershed associations and advocacy groups who are evaluating dredging as an In-Lake Management option.
Response: The new Generic Environmental Impact Report (GEIR) on lake management should be available within a year and should have this information.

Comment: Lynne Welsh EOEA Blackstone River Team Leader requested a copy of the Walden Pond Porous Pavement Demonstration Project funded under the Nonpoint Source Section 319 grants program.
Response: Mike DiBara has located a copy of the February, 1986 Research Project titled: Installation and Evaluation of Permeable Pavement at Walden Pond State Reservation, by Irvine Wei, Department of Civil Engineering at Northeastern University. Several copies of this report are being made and one will be forwarded to Lynne.

Comment: What can be done about inputs of sediments and nutrients from MassHighways?
Response: It was noted at the meeting that MassHighways will be required to comply with a new Phase II Stormwater discharge permit. In addition, the Regional DEP office in Worcester submitted a written request to the Regional office of MassHighways (which received a positive response) to give the roads in the Millbrook drainage area (including parts of Indian Lake Watershed) priority for increased Best Management Practices such as sweeping and catch basin cleaning. This TMDL will include specific BMPs that MassHighways should be conducting and may be included in future Phase II Stormwater Permits.

Comment: These reports set forth an assumption that highways are significant contributors of nutrients to receiving waters. To our (MassHighways) knowledge, the majority of the contaminants contained in highway runoff (especially in particulate form) are associated with the sand used during winter maintenance operations, which is assumed to contain only minor amounts of nutrients. However, conditions may be different along Interstates 290 and 190. It is for these reasons that we need a valid method of calculating nutrient (and other contaminant) loadings from highways.

As I have mentioned in the past, MassHighway is working toward developing a research study that would collect data and develop a contaminant loading model for highway runoff. Sometime in the next couple of weeks I would like to provide you with a general scope of work for this study -- for your review and comment.

Response: While sand may be considered low in nutrients, high concentrations of nutrients are known to be associated with highway runoff in both dissolved form and associated with fine sediments that run off the roadway. A review of many highway runoff studies conducted by the Federal Highway Administration (FHWA) reported the Event Mean Concentration for suspended solids was 143 mg/l and that the EMC for PO_4-P was 0.435 mg/l (Driscoll et al., 1990). These levels that are not considered "minor amounts" as EPA generally recommends that phosphorus inputs to lakes be less than 0.050 mg/l. A USGS review of dozens of other reports also indicated substantial biological impacts from highway runoff (Buckler and Granato, 1999). There are 19.4 lane miles of Interstate 190 that drain directly to the Mill Brook and Salisbury Pond via the eastern of the twin inlet culverts. In addition, nutrients are not the sole focus of pollutant runoff from MassHighways. Highway sand and other solids discharged from roadways are a pollution source that also contributes to infilling of wetlands and lakes, as is the case in the Salisbury Pond.

We are pleased that you have developed scope of work for further research on highway runoff. Unfortunately, the study as written does not currently address the parameters of concern associated with this and other TMDLs (total phosphorus, suspended solids, bedload sediments and bacteria). As previously discussed, DEP would be happy to work with you on a revised scope to address these issues from a statewide prospective. However, DEP cannot delay the development of the TMDLs any further. The Federal Clean Water Act, Federal regulations and EPA policy require us to complete the TMDLs based on best available evidence and that is basis for this TMDL. In order to implement the TMDL in the absence of loading information for specific highways and city streets, DEP has established a set of performance standards for maintenance of all roadways within the affected watershed. We have discussed specific recommendations with the MassHighways District office and have received assurance that efforts will be made to reduce non-point source pollutants from State controlled roadways within the sub-watershed.

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Appendix I Reprint of Camp Desser McKee (1987).

The following pages are selectively reproduced from CDM (1987). Final Report. Diagnostic/Feasibility Study of Salisbury Pond. Worcester, Massachusetts.

FINAL REPORT

DIAGNOSTIC/FEASIBILITY STUDY

SALISBURY POND

City of Worcester, Massachusetts

Department of Parks and Recreation

October, 1987

SUMMARY

DIAGNOSTIC STUDY

- The residence time of Salisbury Pond is on the order of one day, and the flushing rate is very high. At many times of the year, the residence time of water in the pond may not be long enough to permit chemical or biological processes that would remove nutrients and heavy metals.

- The plant community of Salisbury Pond is dominated by algae rather than aquatic weeds.

- Sediment depths are greatest in the western basin of Salisbury Pond, reaching a maximum of 2.5 meters or 7.5 feet. The volume of the pond has decreased by 460,000 cubic feet (13,000 cubic meters) since 1973.

- At Salisbury Pond, the predominant phosphorus source is storm runoff through the twin culverts that constitute the major inlet stream.

- The phosphorus budget indicates an annual loading of approximately ~~2560~~ 448 kilograms of phosphorus through this drain, more than 90% of the total loading of phosphorus to the pond.

- Observations made at the "twin culvert" inlet indicate severely polluted conditions.

- Bacterial levels and phosphorus concentrations were relatively high even for an urban pond. Bacteria are at levels that indicate sewage pollution of some form, even during dry weather.

- The two main areas where sewage pollution is suspected are the inlet culvert between Indian Lake and Salisbury Pond, the Indian Lake pump stations during storms, and a partially clogged sewer at the intersection of Massachusetts Avenue and Salisbury Street.

- It is likely that these point sources are contributing a large portion of the phosphorus loading, and the nutrient status of the pond will be substantially improved when they are corrected.

- These point sources of pollution are probably also contributing to the high turbidity of the pond and its rapid filling-in, as well as aesthetic problems such as scum and odors. Marked improvement expected in the aesthetics and water quality of the pond can be expected upon removal of these sources.

FEASIBILITY STUDY

- Problems that will remain after the correction of the bacterial sources will include shallow depth, high nutrients, and gradual filling-in of the pond. A total of 16 alternative technologies were evaluated to address these problems. This was followed by a detailed evaluation of alternative projects.

- The selected project has components of Limited Diversion of Stormflows, In-pond Aeration, and a Public Education/Erosion Control Program. The components are as follows:

  1. Implementation of a Public Education/Erosion Control Program to reduce sediment and nutrient loading to the pond. The program is divided into two parts, with the first to include the development of comprehensive mailing lists; meetings with municipal and other agencies; development, printing, and distribution of informational materials; and special assistance to certain groups such as the Conservation Commission to implement the program. The second part

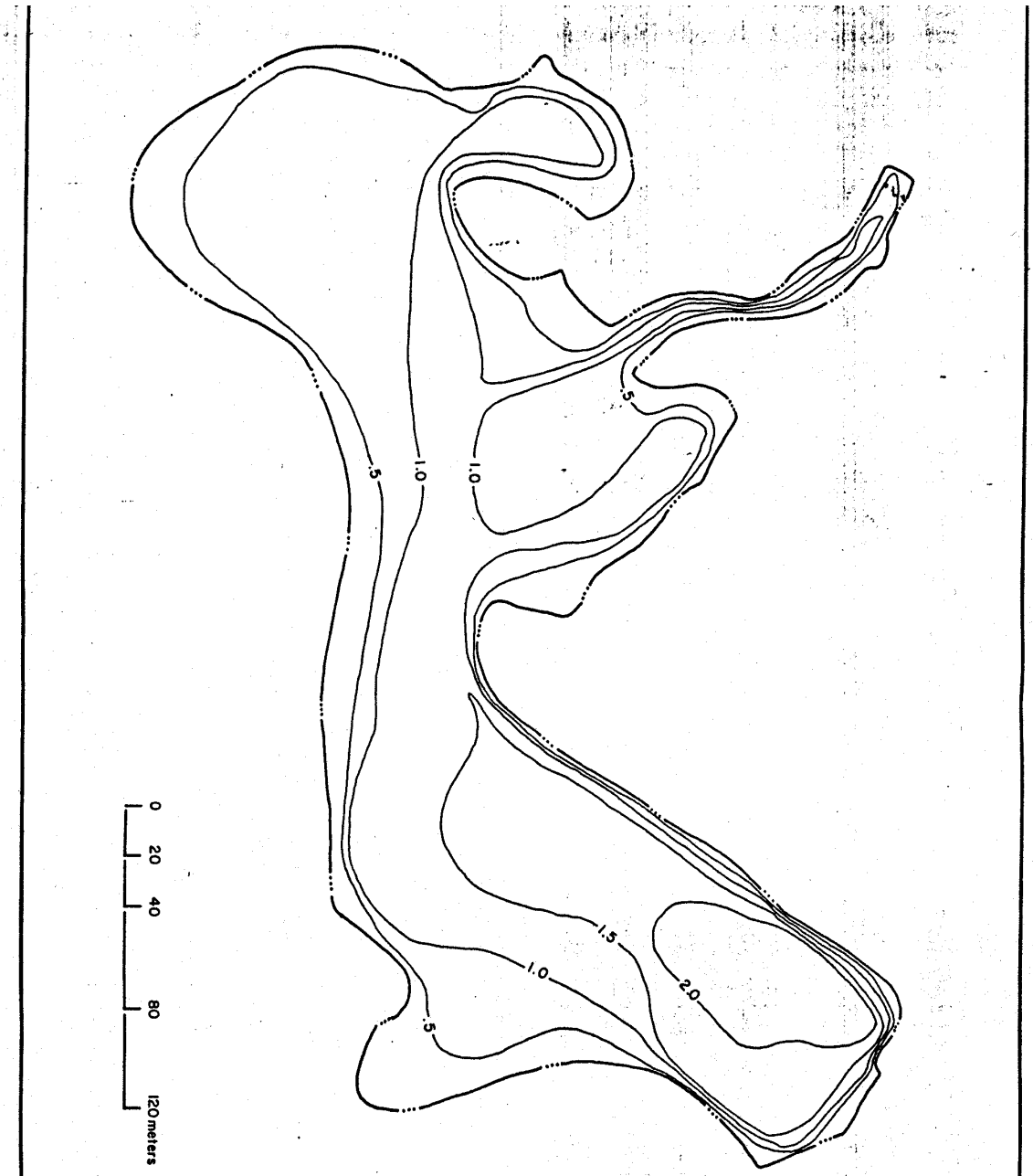
of the program is geared towards enforcement and will include meetings with municipal agencies, the development of a systematic approach to deal with pollution sources, and the implementation of the program.

2. Construction of a limited diversion of "first flush" stormwater from the main inlet via a pipe to the outlet spillway. This stormwater currently contributes about 90% of the total phosphorus load to the pond.

3. Construction of an aerator "fountain" in the pond to eliminate odor problems caused by sediment gases released during low flow conditions.

- The project is expected to dramatically improve conditions in the pond with minimal environmental impact downstream because the overall conditions downstream will also be substantially improved on a long-term basis.

- In comparison with the "no action" alternative (in which the pond will fill in rapidly over the next 10 years), the project will significantly improve the pond as an aesthetic and recreational resource and preserve the pond indefinitely. The aerator fountain has a project life of about 20 years, the limited diversion has a project life of about 50 years, and the public education/erosion control portion of the project will provide permanent improvements.



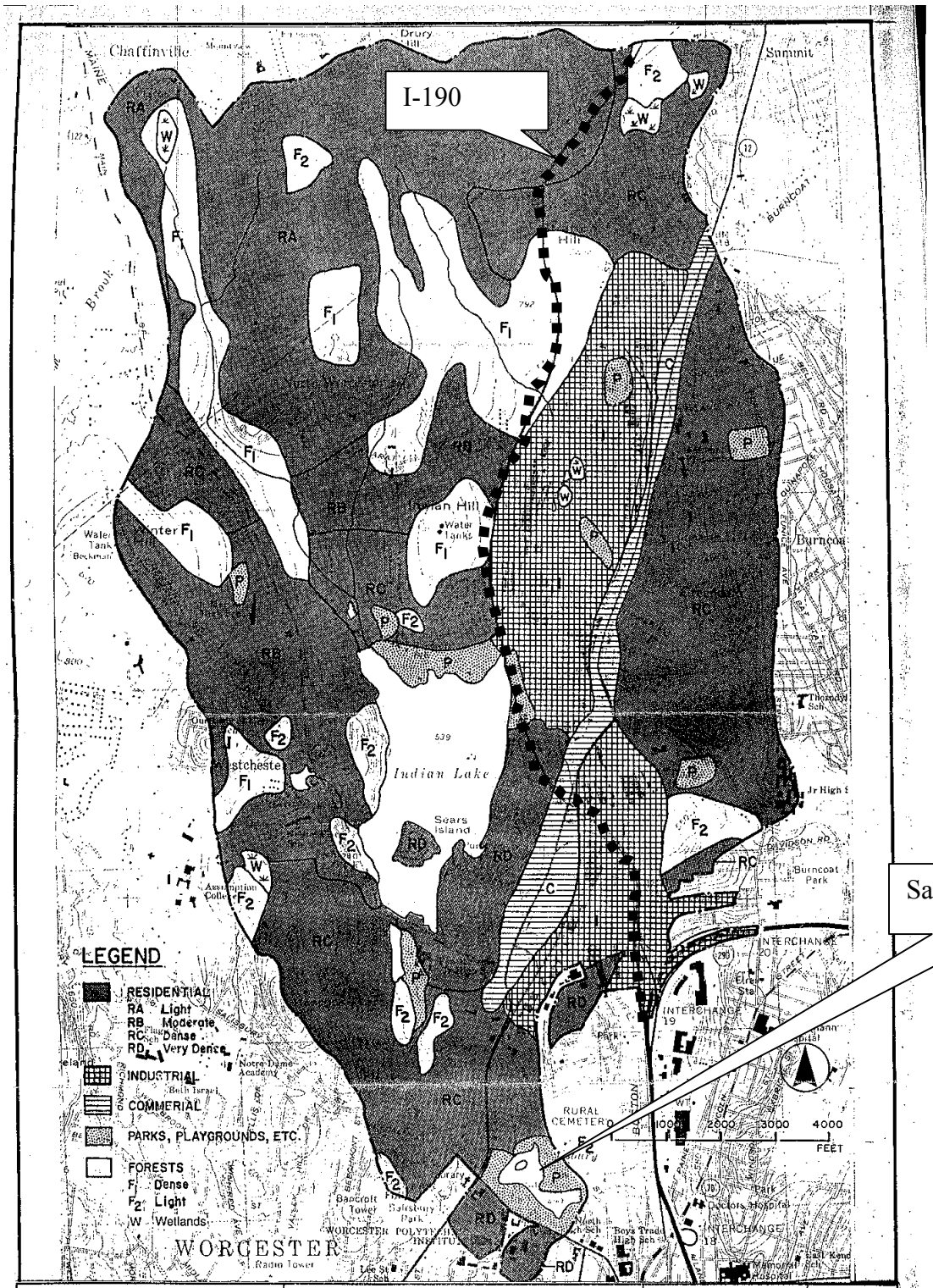
SALISBURY POND

DIAGNOSTIC AND FEASIBILITY STUDY

FIGURE 1-5:
WATER DEPTH

SCALE:
1" = 40m
DEPTH IN METERS

CAMP DRESSER & McKEE INC. in association with IEP, INC.



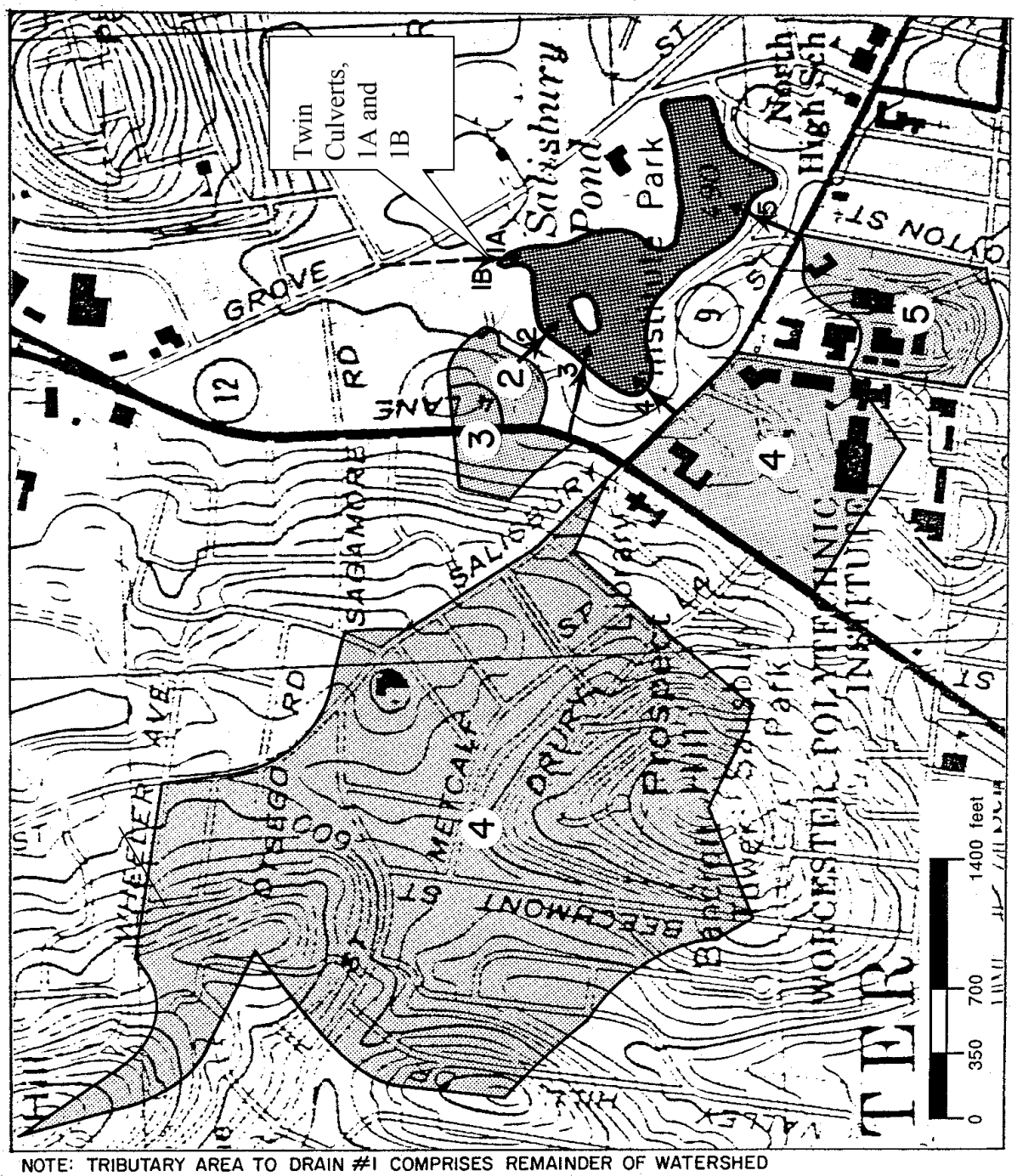
SALISBURY POND

DIAGNOSTIC AND FEASIBILITY STUDY

FIGURE 1-4:

LAND USE

CAMP DRESSER & McKEE INC. In association with IEP, INC.

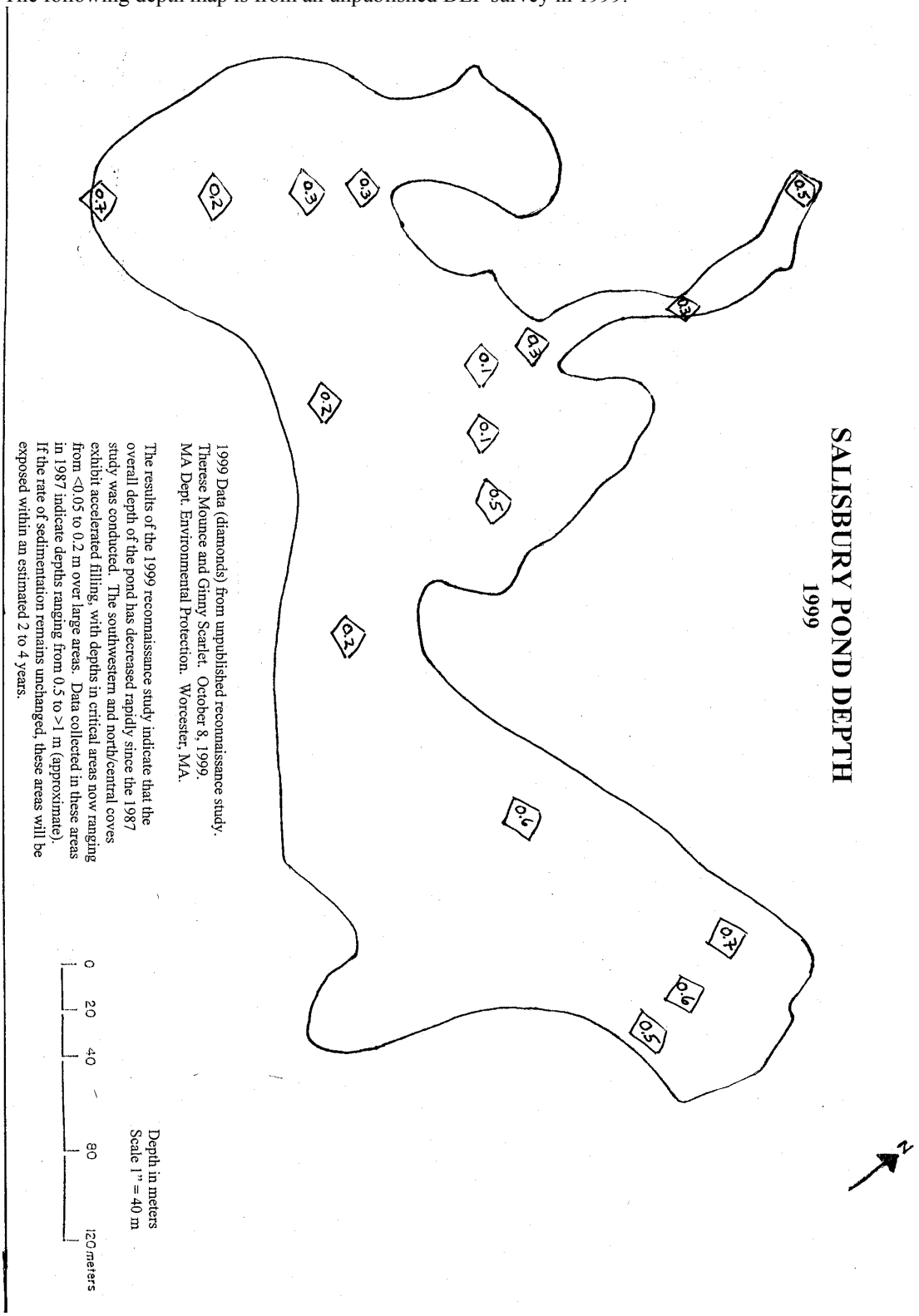


NOTE: TRIBUTARY AREA TO DRAIN #1 COMPRISES REMAINDER OF WATERSHED

SALISBURY POND DIAGNOSTIC AND FEASIBILITY STUDY	FIGURE 1-9: **STORM DRAIN TRIBUTARY AREAS**	SCALE: 1" = 700'	
	CAMP DRESSER & McKEE INC. in association with IEP, INC.		DATE:

Appendix II Salisbury Pond Water Depths, 1990.

The following depth map is from an unpublished DEP survey in 1999.



Appendix III. Public Meeting Attendance List.

Meeting presented by Mark Mattson and Mike DiBara of DEP.

COMMONWEALTH OF MASSACHUSETTS
EXECUTIVE OFFICE OF ENVIRONMENTAL AFFAIRS
DEPARTMENT OF ENVIRONMENTAL PROTECTION
Division of Watershed Management, 627 Main Street, Worcester, MA 01608

ARGEO PAUL CELLUCCI
Governor

JANE SWIFT
Lieutenant Governor

BOB DURAND
Secretary

LAUREN A. LISS
Commissioner

MEETING ATTENDEES LIST

Meeting: Indian Lake + Salisbury Pond TMDL
Date: Oct. 18 2001 Place: Bancroft Worcester MA

	Name	Affiliation	phone	email
1	ROBERT E GATES	INDIAN LAKE WATERSHED	508 852 6525	ROBERT.GATES@NATICK.ARMY.MIL
2	Lynne Welsh	EOEA Blackstone RV	508 792-7423 X503	
3	ED BRANK	INDIAN LAKE WATERSHED	508-852-5987	
4	TERRY BEAUDOIN	MA DEP	(508) 767-2742	Therese.Beaudoin@state.ma.us
5	Richard Chase	MADEP/DWM		Richard.Chase@masscoil.state.ma.us
6	MATT HABOVITES	WDPW	508. 799. 1480	
7	Kerrie Carnes	Sen. Harriette Chandler	617-722-1544	kcarnes@senate.state.ma.us
8	ALAN F. SMITH	NORTH WORCESTER RESOURCE PRESERVATION SOCIETY	508 853 5245	
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ATTACHMENT C
LABORATORY ANALYTICAL REPORTS

CERTIFICATE OF ANALYSIS

Emily Mushlitz
Ramboll US Consulting Inc
3 Carlisle Road - Suite 210
Westford, MA 01886

RE: St Gobain Worcester MA RGP (1690022025)
ESS Laboratory Work Order Number: 21F1128

This signed Certificate of Analysis is our approved release of your analytical results. These results are only representative of sample aliquots received at the laboratory. ESS Laboratory expects its clients to follow all regulatory sampling guidelines. Beginning with this page, the entire report has been paginated. This report should not be copied except in full without the approval of the laboratory. Samples will be disposed of thirty days after the final report has been delivered. If you have any questions or concerns, please feel free to call our Customer Service Department.

Laurel Stoddard
Laboratory Director

REVIEWED
By ESS Laboratory at 5:19 pm, Jul 02, 2021

Analytical Summary
The project as described above has been analyzed in accordance with the ESS Quality Assurance Plan. This plan utilizes the following methodologies: US EPA SW-846, US EPA Methods for Chemical Analysis of Water and Wastes per 40 CFR Part 136, APHA Standard Methods for the Examination of Water and Wastewater, American Society for Testing and Materials (ASTM), and other recognized methodologies. The analyses with these noted observations are in conformance to the Quality Assurance Plan. In chromatographic analysis, manual integration is frequently used instead of automated integration because it produces more accurate results.

The test results present in this report are in compliance with TNI and relative state standards, and/or client Quality Assurance Project Plans (QAPP). The laboratory has reviewed the following: Sample Preservations, Hold Times, Initial Calibrations, Continuing Calibrations, Method Blanks, Blank Spikes, Blank Spike Duplicates, Duplicates, Matrix Spikes, Matrix Spike Duplicates, Surrogates and Internal Standards. Any results which were found to be outside of the recommended ranges stated in our SOPs will be noted in the Project Narrative.

CERTIFICATE OF ANALYSIS

Client Name: Ramboll US Consulting Inc
Client Project ID: St Gobain Worcester MA RGP

ESS Laboratory Work Order: 21F1128

SAMPLE RECEIPT

The following samples were received on June 29, 2021 for the analyses specified on the enclosed Chain of Custody Record.

The samples and analyses listed below were analyzed in accordance with the 2017 Remediation General Permit under the National Pollutant Discharge Elimination System (NPDES).

ESS Laboratory is unable to achieve the required detection limit of 0.4 mg/L for Ethanol for the RGP permit. We have also been unable to procure a subcontract laboatory that is able to achieve this limit. The data for Ethanol has been reported using our current method reporting limit.

The cooler temperature was not within the acceptance limit of <6°C, however, samples were delivered on ice and therefore meet regulatory criteria.

Lab Number	Sample Name	Matrix	Analysis
21F1128-01	TW-TP-01-210629	Ground Water	1664A, 200.7, 245.1, 2540D, 300.0, 3113B, 350.1, 3500Cr B-2009, 420.1, 4500 CN CE, 4500 H+ B, 4500Cl D, 504.1, 524.2, 608.3, 625.1 SIM, 8270D SIM, ASTM D3695, CALC

CERTIFICATE OF ANALYSIS

Client Name: Ramboll US Consulting Inc
Client Project ID: St Gobain Worcester MA RGP

ESS Laboratory Work Order: 21F1128

PROJECT NARRATIVE

625.1(SIM) Semi-Volatile Organic Compounds

D1F0585-CCV1 **Calibration required quadratic regression (Q).**
2,4,6-Tribromophenol (101% @ 80-120%), Pentachlorophenol (104% @ 80-120%)

D1F0585-CCV1 **Continuing Calibration %Diff/Drift is above control limit (CD+).**
bis(2-Ethylhexyl)phthalate (25% @ 20%), Butylbenzylphthalate (27% @ 20%), Dibenzo(a,h)Anthracene (27% @ 20%), Di-n-octylphthalate (33% @ 20%), Indeno(1,2,3-cd)Pyrene (23% @ 20%)

D1F0642-CCV1 **Calibration required quadratic regression (Q).**
2,4,6-Tribromophenol (98% @ 80-120%), Pentachlorophenol (86% @ 80-120%)

D1F0642-CCV1 **Continuing Calibration %Diff/Drift is above control limit (CD+).**
Di-n-octylphthalate (27% @ 20%)

DF12907-BSD1 **Relative percent difference for duplicate is outside of criteria (D+).**
Benzo(k)fluoranthene (22% @ 20%), Di-n-octylphthalate (22% @ 20%)

Classical Chemistry

21F1128-01 **The maximum holding time listed in 40 CFR Part 136 Table II for pH, Dissolved Oxygen, Sulfite and Residual Chlorine is fifteen minutes.**

Dissolved Metals

21F1128-01 **Elevated Method Reporting Limits due to sample matrix (EL).**
Antimony , Cadmium , Chromium , Copper , Lead , Nickel , Silver , Zinc

Total Metals

21F1128-01 **Elevated Method Reporting Limits due to sample matrix (EL).**
Antimony , Cadmium , Chromium , Copper , Lead , Nickel , Silver , Zinc

No other observations noted.

End of Project Narrative.

DATA USABILITY LINKS

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Definitions of Quality Control Parameters

Semivolatile Organics Internal Standard Information

Semivolatile Organics Surrogate Information

Volatile Organics Internal Standard Information

Volatile Organics Surrogate Information

EPH and VPH Alkane Lists

CERTIFICATE OF ANALYSIS

Client Name: Ramboll US Consulting Inc
Client Project ID: St Gobain Worcester MA RGP

ESS Laboratory Work Order: 21F1128

CURRENT SW-846 METHODOLOGY VERSIONS

Analytical Methods

1010A - Flashpoint
6010C - ICP
6020A - ICP MS
7010 - Graphite Furnace
7196A - Hexavalent Chromium
7470A - Aqueous Mercury
7471B - Solid Mercury
8011 - EDB/DBCP/TCP
8015C - GRO/DRO
8081B - Pesticides
8082A - PCB
8100M - TPH
8151A - Herbicides
8260B - VOA
8270D - SVOA
8270D SIM - SVOA Low Level
9014 - Cyanide
9038 - Sulfate
9040C - Aqueous pH
9045D - Solid pH (Corrosivity)
9050A - Specific Conductance
9056A - Anions (IC)
9060A - TOC
9095B - Paint Filter
MADEP 04-1.1 - EPH
MADEP 18-2.1 - VPH

Prep Methods

3005A - Aqueous ICP Digestion
3020A - Aqueous Graphite Furnace / ICP MS Digestion
3050B - Solid ICP / Graphite Furnace / ICP MS Digestion
3060A - Solid Hexavalent Chromium Digestion
3510C - Separatory Funnel Extraction
3520C - Liquid / Liquid Extraction
3540C - Manual Soxhlet Extraction
3541 - Automated Soxhlet Extraction
3546 - Microwave Extraction
3580A - Waste Dilution
5030B - Aqueous Purge and Trap
5030C - Aqueous Purge and Trap
5035A - Solid Purge and Trap

SW846 Reactivity Methods 7.3.3.2 (Reactive Cyanide) and 7.3.4.1 (Reactive Sulfide) have been withdrawn by EPA. These methods are reported per client request and are not NELAP accredited.

CERTIFICATE OF ANALYSIS

Client Name: Ramboll US Consulting Inc
Client Project ID: St Gobain Worcester MA RGP
Client Sample ID: TW-TP-01-210629
Date Sampled: 06/29/21 15:25
Percent Solids: N/A

ESS Laboratory Work Order: 21F1128
ESS Laboratory Sample ID: 21F1128-01
Sample Matrix: Ground Water
Units: ug/L

Extraction Method: 3005A/200.7

Dissolved Metals

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyst	Analyzed	I/V	F/V	Batch
Antimony	**EL** ND (15.0)		200.7		3	KJK	06/30/21 19:27	100	10	DF13013
Arsenic	**34.5** (7.5)		3113B		15	KJK	06/30/21 21:05	100	10	DF13013
Cadmium	**EL** ND (3.0)		200.7		3	KJK	06/30/21 19:27	100	10	DF13013
Chromium	**EL** ND (6.0)		200.7		3	KJK	06/30/21 19:27	100	10	DF13013
Copper	**EL** ND (6.0)		200.7		3	KJK	06/30/21 19:27	100	10	DF13013
Iron	**252** (30.0)		200.7		3	KJK	06/30/21 19:27	100	10	DF13013
Lead	**EL** ND (6.0)		200.7		3	KJK	06/30/21 19:27	100	10	DF13013
Mercury	ND (0.20)		245.1		1	JRB	07/02/21 10:18	20	40	DG10139
Nickel	**EL** ND (15.0)		200.7		3	KJK	06/30/21 19:27	100	10	DF13013
Selenium	ND (3.0)		3113B		3	KJK	06/30/21 18:05	100	10	DF13013
Silver	**EL** ND (3.0)		200.7		3	KJK	06/30/21 19:27	100	10	DF13013
Zinc	**EL** ND (15.0)		200.7		3	KJK	06/30/21 19:27	100	10	DF13013

CERTIFICATE OF ANALYSIS

Client Name: Ramboll US Consulting Inc
Client Project ID: St Gobain Worcester MA RGP
Client Sample ID: TW-TP-01-210629
Date Sampled: 06/29/21 15:25
Percent Solids: N/A

ESS Laboratory Work Order: 21F1128
ESS Laboratory Sample ID: 21F1128-01
Sample Matrix: Ground Water
Units: ug/L

Extraction Method: 3005A/200.7

Total Metals

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyst	Analyzed	I/V	F/V	Batch
Antimony	**EL** ND (15.0)		200.7		3	KJK	06/30/21 19:24	100	10	DF13013
Arsenic	**35.7** (7.5)		3113B		15	KJK	06/30/21 20:54	100	10	DF13013
Cadmium	**EL** ND (3.0)		200.7		3	KJK	06/30/21 19:24	100	10	DF13013
Chromium	**EL** ND (6.0)		200.7		3	KJK	06/30/21 19:24	100	10	DF13013
Chromium III	ND (10.0)		200.7		3	EAM	06/30/21 19:24	1	1	[CALC]
Copper	**EL** ND (6.0)		200.7		3	KJK	06/30/21 19:24	100	10	DF13013
Iron	**246** (30.0)		200.7		3	KJK	06/30/21 19:24	100	10	DF13013
Lead	**EL** ND (6.0)		200.7		3	KJK	06/30/21 19:24	100	10	DF13013
Mercury	ND (0.2)		245.1		1	JRB	07/02/21 10:16	20	40	DG10139
Nickel	**EL** ND (15.0)		200.7		3	KJK	06/30/21 19:24	100	10	DF13013
Selenium	ND (3.0)		3113B		3	KJK	06/30/21 17:59	100	10	DF13013
Silver	**EL** ND (3.0)		200.7		3	KJK	06/30/21 19:24	100	10	DF13013
Total Hardness	**578000** (1250)		CALC		25	KJK	06/30/21 23:19	1	1	[CALC]
Zinc	**EL** ND (15.0)		200.7		3	KJK	06/30/21 19:24	100	10	DF13013

CERTIFICATE OF ANALYSIS

Client Name: Ramboll US Consulting Inc
Client Project ID: St Gobain Worcester MA RGP
Client Sample ID: TW-TP-01-210629
Date Sampled: 06/29/21 15:25
Percent Solids: N/A
Initial Volume: 25
Final Volume: 25
Extraction Method: 524.2

ESS Laboratory Work Order: 21F1128
ESS Laboratory Sample ID: 21F1128-01
Sample Matrix: Ground Water
Units: ug/L
Analyst: MD

524.2 Volatile Organic Compounds

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyzed	Sequence	Batch
1,1,1-Trichloroethane	ND (0.5)		524.2		1	07/01/21 12:34	D1G0020	DG10143
1,1,2-Trichloroethane	ND (0.5)		524.2		1	07/01/21 12:34	D1G0020	DG10143
1,1-Dichloroethane	ND (0.5)		524.2		1	07/01/21 12:34	D1G0020	DG10143
1,1-Dichloroethene	ND (0.5)		524.2		1	07/01/21 12:34	D1G0020	DG10143
1,2-Dichlorobenzene	ND (0.5)		524.2		1	07/01/21 12:34	D1G0020	DG10143
1,2-Dichloroethane	ND (0.5)		524.2		1	07/01/21 12:34	D1G0020	DG10143
1,3-Dichlorobenzene	ND (0.5)		524.2		1	07/01/21 12:34	D1G0020	DG10143
1,4-Dichlorobenzene	**39.2** (5.0)		524.2		10	07/01/21 14:34	D1G0020	DG10143
Acetone	ND (5.0)		524.2		1	07/01/21 12:34	D1G0020	DG10143
Benzene	ND (0.5)		524.2		1	07/01/21 12:34	D1G0020	DG10143
Carbon Tetrachloride	ND (0.3)		524.2		1	07/01/21 12:34	D1G0020	DG10143
cis-1,2-Dichloroethene	ND (0.5)		524.2		1	07/01/21 12:34	D1G0020	DG10143
Ethylbenzene	ND (0.5)		524.2		1	07/01/21 12:34	D1G0020	DG10143
Methyl tert-Butyl Ether	ND (0.5)		524.2		1	07/01/21 12:34	D1G0020	DG10143
Methylene Chloride	ND (0.5)		524.2		1	07/01/21 12:34	D1G0020	DG10143
Naphthalene	**24.2** (0.5)		524.2		1	07/01/21 12:34	D1G0020	DG10143
Tertiary-amyl methyl ether	ND (1.0)		524.2		1	07/01/21 12:34	D1G0020	DG10143
Tertiary-butyl Alcohol	ND (25.0)		524.2		1	07/01/21 12:34	D1G0020	DG10143
Tetrachloroethene	ND (0.5)		524.2		1	07/01/21 12:34	D1G0020	DG10143
Toluene	ND (0.5)		524.2		1	07/01/21 12:34	D1G0020	DG10143
Trichloroethene	ND (0.5)		524.2		1	07/01/21 12:34	D1G0020	DG10143
Vinyl Chloride	ND (0.2)		524.2		1	07/01/21 12:34	D1G0020	DG10143
Xylene O	ND (0.5)		524.2		1	07/01/21 12:34	D1G0020	DG10143
Xylene P,M	ND (0.5)		524.2		1	07/01/21 12:34	D1G0020	DG10143

	%Recovery	Qualifier	Limits
Surrogate: 1,2-Dichlorobenzene-d4	*102 %*		*80-120*
Surrogate: 4-Bromofluorobenzene	*90 %*		*80-120*

CERTIFICATE OF ANALYSIS

Client Name: Ramboll US Consulting Inc
Client Project ID: St Gobain Worcester MA RGP
Client Sample ID: TW-TP-01-210629
Date Sampled: 06/29/21 15:25
Percent Solids: N/A
Initial Volume: 1060
Final Volume: 1
Extraction Method: 3510C

ESS Laboratory Work Order: 21F1128
ESS Laboratory Sample ID: 21F1128-01
Sample Matrix: Ground Water
Units: ug/L
Analyst: MJV
Prepared: 6/30/21 10:43

608.3 Polychlorinated Biphenyls (PCB)

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyzed	Sequence	Batch
Aroclor 1016	ND (0.09)		608.3		1	06/30/21 12:45		DF13009
Aroclor 1221	ND (0.09)		608.3		1	06/30/21 12:45		DF13009
Aroclor 1232	ND (0.09)		608.3		1	06/30/21 12:45		DF13009
Aroclor 1242 [2C]	**0.12** (0.09)		608.3		1	06/30/21 12:45		DF13009
Aroclor 1248	ND (0.09)		608.3		1	06/30/21 12:45		DF13009
Aroclor 1254	ND (0.09)		608.3		1	06/30/21 12:45		DF13009
Aroclor 1260	ND (0.09)		608.3		1	06/30/21 12:45		DF13009
Aroclor 1262	ND (0.09)		608.3		1	06/30/21 12:45		DF13009
Aroclor 1268	ND (0.09)		608.3		1	06/30/21 12:45		DF13009

	%Recovery	Qualifier	Limits
Surrogate: Decachlorobiphenyl	*57 %*		*30-150*
Surrogate: Decachlorobiphenyl [2C]	*66 %*		*30-150*
Surrogate: Tetrachloro-m-xylene	*80 %*		*30-150*
Surrogate: Tetrachloro-m-xylene [2C]	*91 %*		*30-150*

CERTIFICATE OF ANALYSIS

Client Name: Ramboll US Consulting Inc
Client Project ID: St Gobain Worcester MA RGP
Client Sample ID: TW-TP-01-210629
Date Sampled: 06/29/21 15:25
Percent Solids: N/A
Initial Volume: 1060
Final Volume: 0.25
Extraction Method: 3510C

ESS Laboratory Work Order: 21F1128
ESS Laboratory Sample ID: 21F1128-01
Sample Matrix: Ground Water
Units: ug/L
Analyst: TAJ
Prepared: 6/30/21 10:12

625.1(SIM) Semi-Volatile Organic Compounds

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyzed	Sequence	Batch
Acenaphthene	**4.61** (0.19)		625.1 SIM		1	07/01/21 11:01	D1F0642	DF12907
Acenaphthylene	**0.27** (0.19)		625.1 SIM		1	07/01/21 11:01	D1F0642	DF12907
Anthracene	**0.21** (0.19)		625.1 SIM		1	07/01/21 11:01	D1F0642	DF12907
Benzo(a)anthracene	**0.06** (0.05)		625.1 SIM		1	07/01/21 11:01	D1F0642	DF12907
Benzo(a)pyrene	ND (0.05)		625.1 SIM		1	07/01/21 11:01	D1F0642	DF12907
Benzo(b)fluoranthene	ND (0.05)		625.1 SIM		1	07/01/21 11:01	D1F0642	DF12907
Benzo(g,h,i)perylene	ND (0.19)		625.1 SIM		1	07/01/21 11:01	D1F0642	DF12907
Benzo(k)fluoranthene	ND (0.05)		625.1 SIM		1	07/01/21 11:01	D1F0642	DF12907
bis(2-Ethylhexyl)phthalate	ND (2.36)		625.1 SIM		1	07/01/21 11:01	D1F0642	DF12907
Butylbenzylphthalate	ND (2.36)		625.1 SIM		1	07/01/21 11:01	D1F0642	DF12907
Chrysene	**0.06** (0.05)		625.1 SIM		1	07/01/21 11:01	D1F0642	DF12907
Dibenzo(a,h)Anthracene	ND (0.05)		625.1 SIM		1	07/01/21 11:01	D1F0642	DF12907
Diethylphthalate	ND (2.36)		625.1 SIM		1	07/01/21 11:01	D1F0642	DF12907
Dimethylphthalate	ND (2.36)		625.1 SIM		1	07/01/21 11:01	D1F0642	DF12907
Di-n-butylphthalate	ND (2.36)		625.1 SIM		1	07/01/21 11:01	D1F0642	DF12907
Di-n-octylphthalate	ND (2.36)		625.1 SIM		1	07/01/21 11:01	D1F0642	DF12907
Fluoranthene	**0.51** (0.19)		625.1 SIM		1	07/01/21 11:01	D1F0642	DF12907
Fluorene	**3.03** (0.19)		625.1 SIM		1	07/01/21 11:01	D1F0642	DF12907
Indeno(1,2,3-cd)Pyrene	ND (0.05)		625.1 SIM		1	07/01/21 11:01	D1F0642	DF12907
Naphthalene	**9.65** (0.19)		625.1 SIM		1	07/01/21 11:01	D1F0642	DF12907
Pentachlorophenol	ND (0.85)		625.1 SIM		1	07/01/21 11:01	D1F0642	DF12907
Phenanthrene	**2.37** (0.19)		625.1 SIM		1	07/01/21 11:01	D1F0642	DF12907
Pyrene	**0.28** (0.19)		625.1 SIM		1	07/01/21 11:01	D1F0642	DF12907

	%Recovery	Qualifier	Limits
Surrogate: 1,2-Dichlorobenzene-d4	*49 %*		*30-130*
Surrogate: 2,4,6-Tribromophenol	*72 %*		*15-110*
Surrogate: 2-Fluorobiphenyl	*62 %*		*30-130*
Surrogate: Nitrobenzene-d5	*64 %*		*30-130*
Surrogate: p-Terphenyl-d14	*68 %*		*30-130*

CERTIFICATE OF ANALYSIS

Client Name: Ramboll US Consulting Inc
Client Project ID: St Gobain Worcester MA RGP
Client Sample ID: TW-TP-01-210629
Date Sampled: 06/29/21 15:25
Percent Solids: N/A
Initial Volume: 500
Final Volume: 0.5
Extraction Method: 3535A

ESS Laboratory Work Order: 21F1128
ESS Laboratory Sample ID: 21F1128-01
Sample Matrix: Ground Water
Units: ug/L
Analyst: TAJ
Prepared: 7/1/21 16:00

8270D(SIM) Semi-Volatile Organic Compounds w/ Isotope Dilution

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyzed	Sequence	Batch
1,4-Dioxane	ND (0.250)		8270D SIM		1	07/02/21 4:36	D1G0035	DG10154

	%Recovery	Qualifier	Limits
Surrogate: 1,4-Dioxane-d8	*58 %*		*15-115*

CERTIFICATE OF ANALYSIS

Client Name: Ramboll US Consulting Inc
Client Project ID: St Gobain Worcester MA RGP
Client Sample ID: TW-TP-01-210629
Date Sampled: 06/29/21 15:25
Percent Solids: N/A

ESS Laboratory Work Order: 21F1128
ESS Laboratory Sample ID: 21F1128-01
Sample Matrix: Ground Water

Classical Chemistry

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyst	Analyzed	Units	Batch
Ammonia as N	**2.76** (0.10)		350.1		1	JLK	07/01/21 16:38	mg/L	DG10109
Chloride	**1290** (100)		300.0		200	EEM	07/01/21 1:25	mg/L	DF13024
Hexavalent Chromium	**12.0** (10.0)		3500Cr B-2009		1	EAM	06/29/21 21:51	ug/L	DF12965
pH	**7.57** (N/A)		4500 H+ B		1	EAM	07/01/21 21:28	S.U.	DG10171
pH Sample Temp	**Aqueous pH measured in water at 20.5 ºC.** (N/A)								
Phenols	**434** (50)		420.1		1	JLK	06/30/21 16:00	ug/L	DF12952
Total Cyanide	ND (5.00)		4500 CN CE		1	EEM	06/30/21 11:55	ug/L	DF13023
Total Petroleum Hydrocarbon	ND (5)		1664A		1	LAB	06/30/21 14:00	mg/L	DF13030
Total Residual Chlorine	ND (20.0)		4500Cl D		1	CCP	06/29/21 20:34	ug/L	DF12959
Total Suspended Solids	**23** (5)		2540D		1	CCP	06/30/21 8:04	mg/L	DF13001

CERTIFICATE OF ANALYSIS

Client Name: Ramboll US Consulting Inc
Client Project ID: St Gobain Worcester MA RGP
Client Sample ID: TW-TP-01-210629
Date Sampled: 06/29/21 15:25
Percent Solids: N/A
Initial Volume: 35
Final Volume: 2
Extraction Method: 504/8011

ESS Laboratory Work Order: 21F1128
ESS Laboratory Sample ID: 21F1128-01
Sample Matrix: Ground Water
Units: ug/L
Analyst: DMC
Prepared: 7/1/21 11:20

504.1 1,2-Dibromoethane / 1,2-Dibromo-3-chloropropane

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyzed	Sequence	Batch
1,2-Dibromo-3-Chloropropane	ND (0.015)		504.1		1	07/01/21 14:02		DG10119
1,2-Dibromoethane	ND (0.015)		504.1		1	07/01/21 14:02		DG10119

	%Recovery	Qualifier	Limits
Surrogate: Pentachloroethane	*124 %*		*30-150*
Surrogate: Pentachloroethane [2C]	*138 %*		*30-150*

CERTIFICATE OF ANALYSIS

Client Name: Ramboll US Consulting Inc
Client Project ID: St Gobain Worcester MA RGP
Client Sample ID: TW-TP-01-210629
Date Sampled: 06/29/21 15:25
Percent Solids: N/A
Initial Volume: 1
Final Volume: 1
Extraction Method: No Prep

ESS Laboratory Work Order: 21F1128
ESS Laboratory Sample ID: 21F1128-01
Sample Matrix: Ground Water
Units: mg/L
Analyst: MJV
Prepared: 7/1/21 8:00

Alcohol Scan by GC/FID

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyst	Analyzed	Sequence	Batch
Ethanol	ND (10)		ASTM D3695		1	MJV	07/01/21 11:04		DG10104

CERTIFICATE OF ANALYSIS

Client Name: Ramboll US Consulting Inc
Client Project ID: St Gobain Worcester MA RGP

ESS Laboratory Work Order: 21F1128

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Dissolved Metals										
Batch DF13013 - 3005A/200.7										
Blank										
Antimony	ND	5.0	ug/L							
Cadmium	ND	1.0	ug/L							
Chromium	ND	2.0	ug/L							
Copper	ND	2.0	ug/L							
Iron	ND	10.0	ug/L							
Lead	ND	2.0	ug/L							
Nickel	ND	5.0	ug/L							
Silver	ND	1.0	ug/L							
Zinc	ND	5.0	ug/L							
Blank										
Arsenic	ND	0.5	ug/L							
Selenium	ND	1.0	ug/L							
LCS										
Antimony	51.8	5.0	ug/L	50.00		104	85-115			
Cadmium	25.1	1.0	ug/L	25.00		100	85-115			
Chromium	49.9	2.0	ug/L	50.00		100	85-115			
Copper	51.1	2.0	ug/L	50.00		102	85-115			
Iron	244	10.0	ug/L	250.0		98	85-115			
Lead	52.0	2.0	ug/L	50.00		104	80-120			
Nickel	51.3	5.0	ug/L	50.00		103	85-115			
Silver	25.7	1.0	ug/L	25.00		103	85-115			
Zinc	51.6	5.0	ug/L	50.00		103	85-115			
LCS										
Arsenic	47.1	12.5	ug/L	50.00		94	85-115			
Selenium	85.3	25.0	ug/L	100.0		85	85-115			
Batch DG10139 - 245.1/7470A										
Blank										
Mercury	ND	0.20	ug/L							
LCS										
Mercury	6.51	0.20	ug/L	6.042		108	85-115			
Total Metals										
Batch DF13013 - 3005A/200.7										
Blank										
Antimony	ND	5.0	ug/L							
Cadmium	ND	1.0	ug/L							
Chromium	ND	2.0	ug/L							
Copper	ND	2.0	ug/L							
Iron	ND	10.0	ug/L							
Lead	ND	2.0	ug/L							
Magnesium	ND	0.020	mg/L							
Nickel	ND	5.0	ug/L							

CERTIFICATE OF ANALYSIS

Client Name: Ramboll US Consulting Inc
Client Project ID: St Gobain Worcester MA RGP

ESS Laboratory Work Order: 21F1128

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Total Metals										
Batch DF13013 - 3005A/200.7										
Silver	ND	1.0	ug/L							
Zinc	ND	5.0	ug/L							
Blank										
Arsenic	ND	0.5	ug/L							
Selenium	ND	1.0	ug/L							
LCS										
Antimony	51.8	5.0	ug/L	50.00		104	85-115			
Cadmium	25.1	1.0	ug/L	25.00		100	85-115			
Chromium	49.9	2.0	ug/L	50.00		100	85-115			
Copper	51.1	2.0	ug/L	50.00		102	85-115			
Iron	244	10.0	ug/L	250.0		98	85-115			
Lead	52.0	2.0	ug/L	50.00		104	85-115			
Magnesium	0.500	0.020	mg/L	0.5000		100	85-115			
Nickel	51.3	5.0	ug/L	50.00		103	85-115			
Silver	25.7	1.0	ug/L	25.00		103	85-115			
Zinc	51.6	5.0	ug/L	50.00		103	85-115			
LCS										
Arsenic	47.1	12.5	ug/L	50.00		94	85-115			
Selenium	85.3	25.0	ug/L	100.0		85	85-115			
Batch DG10139 - 245.1/7470A										
Blank										
Mercury	ND	0.2	ug/L							
LCS										
Mercury	6.5	0.2	ug/L	6.042		108	85-115			
524.2 Volatile Organic Compounds										
Batch DG10143 - 524.2										
Blank										
1,1,1-Trichloroethane	ND	0.5	ug/L							
1,1,2-Trichloroethane	ND	0.5	ug/L							
1,1-Dichloroethane	ND	0.5	ug/L							
1,1-Dichloroethene	ND	0.5	ug/L							
1,2-Dichlorobenzene	ND	0.5	ug/L							
1,2-Dichloroethane	ND	0.5	ug/L							
1,3-Dichlorobenzene	ND	0.5	ug/L							
1,4-Dichlorobenzene	ND	0.5	ug/L							
Acetone	ND	5.0	ug/L							
Benzene	ND	0.5	ug/L							
Carbon Tetrachloride	ND	0.3	ug/L							
cis-1,2-Dichloroethene	ND	0.5	ug/L							
Ethylbenzene	ND	0.5	ug/L							
Methyl tert-Butyl Ether	ND	0.5	ug/L							
Methylene Chloride	ND	0.5	ug/L							

CERTIFICATE OF ANALYSIS

Client Name: Ramboll US Consulting Inc
Client Project ID: St Gobain Worcester MA RGP

ESS Laboratory Work Order: 21F1128

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
524.2 Volatile Organic Compounds										
Batch DG10143 - 524.2										
Naphthalene	ND	0.5	ug/L							
Tertiary-amyl methyl ether	ND	1.0	ug/L							
Tertiary-butyl Alcohol	ND	25.0	ug/L							
Tetrachloroethene	ND	0.5	ug/L							
Toluene	ND	0.5	ug/L							
Trichloroethene	ND	0.5	ug/L							
Vinyl Chloride	ND	0.2	ug/L							
Xylene O	ND	0.5	ug/L							
Xylene P,M	ND	0.5	ug/L							
Surrogate: 1,2-Dichlorobenzene-d4	*4.38*		ug/L	*5.000*		*88*	*80-120*			
Surrogate: 4-Bromofluorobenzene	*4.24*		ug/L	*5.000*		*85*	*80-120*			
LCS										
1,1,1-Trichloroethane	10.2	0.5	ug/L	10.00		102	70-130			
1,1,2-Trichloroethane	10.1	0.5	ug/L	10.00		101	70-130			
1,1-Dichloroethane	10.0	0.5	ug/L	10.00		100	70-130			
1,1-Dichloroethene	11.0	0.5	ug/L	10.00		110	70-130			
1,2-Dichlorobenzene	10.9	0.5	ug/L	10.00		109	70-130			
1,2-Dichloroethane	9.4	0.5	ug/L	10.00		94	70-130			
1,3-Dichlorobenzene	11.3	0.5	ug/L	10.00		113	70-130			
1,4-Dichlorobenzene	11.2	0.5	ug/L	10.00		112	70-130			
Acetone	53.2	5.0	ug/L	50.00		106	70-130			
Benzene	10.6	0.5	ug/L	10.00		106	70-130			
Carbon Tetrachloride	10.9	0.3	ug/L	10.00		109	70-130			
cis-1,2-Dichloroethene	10.8	0.5	ug/L	10.00		108	70-130			
Ethylbenzene	11.2	0.5	ug/L	10.00		112	70-130			
Methyl tert-Butyl Ether	9.7	0.5	ug/L	10.00		97	70-130			
Methylene Chloride	10.8	0.5	ug/L	10.00		108	70-130			
Naphthalene	8.8	0.5	ug/L	10.00		88	70-130			
Tertiary-amyl methyl ether	8.6	1.0	ug/L	10.00		86	70-130			
Tertiary-butyl Alcohol	50.3	25.0	ug/L	50.00		101	70-130			
Tetrachloroethene	11.9	0.5	ug/L	10.00		119	70-130			
Toluene	10.9	0.5	ug/L	10.00		109	70-130			
Trichloroethene	10.7	0.5	ug/L	10.00		107	70-130			
Vinyl Chloride	10.5	0.2	ug/L	10.00		105	70-130			
Xylene O	11.7	0.5	ug/L	10.00		117	70-130			
Xylene P,M	23.7	0.5	ug/L	20.00		118	70-130			
Surrogate: 1,2-Dichlorobenzene-d4	*5.25*		ug/L	*5.000*		*105*	*80-120*			
Surrogate: 4-Bromofluorobenzene	*5.08*		ug/L	*5.000*		*102*	*80-120*			
LCS Dup										
1,1,1-Trichloroethane	9.8	0.5	ug/L	10.00		98	70-130	5	20	
1,1,2-Trichloroethane	9.9	0.5	ug/L	10.00		99	70-130	1	20	
1,1-Dichloroethane	9.6	0.5	ug/L	10.00		96	70-130	5	20	
1,1-Dichloroethene	10.8	0.5	ug/L	10.00		108	70-130	2	20	
1,2-Dichlorobenzene	10.7	0.5	ug/L	10.00		107	70-130	2	20	
1,2-Dichloroethane	9.2	0.5	ug/L	10.00		92	70-130	2	20	

CERTIFICATE OF ANALYSIS

Client Name: Ramboll US Consulting Inc
Client Project ID: St Gobain Worcester MA RGP

ESS Laboratory Work Order: 21F1128

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
524.2 Volatile Organic Compounds										
Batch DG10143 - 524.2										
1,3-Dichlorobenzene	11.1	0.5	ug/L	10.00		111	70-130	2	20	
1,4-Dichlorobenzene	11.3	0.5	ug/L	10.00		113	70-130	0.9	20	
Acetone	53.0	5.0	ug/L	50.00		106	70-130	0.3	20	
Benzene	10.2	0.5	ug/L	10.00		102	70-130	4	20	
Carbon Tetrachloride	10.5	0.3	ug/L	10.00		105	70-130	4	20	
cis-1,2-Dichloroethene	10.4	0.5	ug/L	10.00		104	70-130	3	20	
Ethylbenzene	10.7	0.5	ug/L	10.00		107	70-130	5	20	
Methyl tert-Butyl Ether	9.9	0.5	ug/L	10.00		99	70-130	2	20	
Methylene Chloride	10.7	0.5	ug/L	10.00		107	70-130	1	20	
Naphthalene	9.6	0.5	ug/L	10.00		96	70-130	8	20	
Tertiary-amyl methyl ether	9.2	1.0	ug/L	10.00		92	70-130	7	20	
Tertiary-butyl Alcohol	51.4	25.0	ug/L	50.00		103	70-130	2	25	
Tetrachloroethene	11.6	0.5	ug/L	10.00		116	70-130	3	20	
Toluene	10.7	0.5	ug/L	10.00		107	70-130	2	20	
Trichloroethene	10.1	0.5	ug/L	10.00		101	70-130	6	20	
Vinyl Chloride	9.8	0.2	ug/L	10.00		98	70-130	6	20	
Xylene O	11.3	0.5	ug/L	10.00		113	70-130	4	20	
Xylene P,M	23.0	0.5	ug/L	20.00		115	70-130	3	20	
Surrogate: 1,2-Dichlorobenzene-d4	*5.22*		ug/L	*5.000*		*104*	*80-120*			
Surrogate: 4-Bromofluorobenzene	*5.09*		ug/L	*5.000*		*102*	*80-120*			
608.3 Polychlorinated Biphenyls (PCB)										
Batch DF13009 - 3510C										
Blank										
Aroclor 1016	ND	0.10	ug/L							
Aroclor 1016 [2C]	ND	0.10	ug/L							
Aroclor 1221	ND	0.10	ug/L							
Aroclor 1221 [2C]	ND	0.10	ug/L							
Aroclor 1232	ND	0.10	ug/L							
Aroclor 1232 [2C]	ND	0.10	ug/L							
Aroclor 1242	ND	0.10	ug/L							
Aroclor 1242 [2C]	ND	0.10	ug/L							
Aroclor 1248	ND	0.10	ug/L							
Aroclor 1248 [2C]	ND	0.10	ug/L							
Aroclor 1254	ND	0.10	ug/L							
Aroclor 1254 [2C]	ND	0.10	ug/L							
Aroclor 1260	ND	0.10	ug/L							
Aroclor 1260 [2C]	ND	0.10	ug/L							
Aroclor 1262	ND	0.10	ug/L							
Aroclor 1262 [2C]	ND	0.10	ug/L							
Aroclor 1268	ND	0.10	ug/L							
Aroclor 1268 [2C]	ND	0.10	ug/L							
Surrogate: Decachlorobiphenyl	*0.0368*		ug/L	*0.05000*		*74*	*30-150*			
Surrogate: Decachlorobiphenyl [2C]	*0.0380*		ug/L	*0.05000*		*76*	*30-150*			

CERTIFICATE OF ANALYSIS

Client Name: Ramboll US Consulting Inc
Client Project ID: St Gobain Worcester MA RGP

ESS Laboratory Work Order: 21F1128

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
608.3 Polychlorinated Biphenyls (PCB)										
Batch DF13009 - 3510C										
Surrogate: Tetrachloro-m-xylene	*0.0386*		ug/L	*0.05000*		*77*	*30-150*			
Surrogate: Tetrachloro-m-xylene [2C]	*0.0412*		ug/L	*0.05000*		*82*	*30-150*			
LCS										
Aroclor 1016	0.80	0.10	ug/L	1.000		80	50-140			
Aroclor 1016 [2C]	0.82	0.10	ug/L	1.000		82	50-140			
Aroclor 1260	0.84	0.10	ug/L	1.000		84	1-164			
Aroclor 1260 [2C]	0.87	0.10	ug/L	1.000		87	1-164			
Surrogate: Decachlorobiphenyl	*0.0399*		ug/L	*0.05000*		*80*	*30-150*			
Surrogate: Decachlorobiphenyl [2C]	*0.0407*		ug/L	*0.05000*		*81*	*30-150*			
Surrogate: Tetrachloro-m-xylene	*0.0411*		ug/L	*0.05000*		*82*	*30-150*			
Surrogate: Tetrachloro-m-xylene [2C]	*0.0415*		ug/L	*0.05000*		*83*	*30-150*			
LCS Dup										
Aroclor 1016	0.83	0.10	ug/L	1.000		83	50-140	5	36	
Aroclor 1016 [2C]	0.86	0.10	ug/L	1.000		86	50-140	4	36	
Aroclor 1260	0.90	0.10	ug/L	1.000		90	1-164	6	38	
Aroclor 1260 [2C]	0.93	0.10	ug/L	1.000		93	1-164	7	38	
Surrogate: Decachlorobiphenyl	*0.0412*		ug/L	*0.05000*		*82*	*30-150*			
Surrogate: Decachlorobiphenyl [2C]	*0.0430*		ug/L	*0.05000*		*86*	*30-150*			
Surrogate: Tetrachloro-m-xylene	*0.0411*		ug/L	*0.05000*		*82*	*30-150*			
Surrogate: Tetrachloro-m-xylene [2C]	*0.0413*		ug/L	*0.05000*		*83*	*30-150*			
625.1(SIM) Semi-Volatile Organic Compounds										
Batch DF12907 - 3510C										
Blank										
Acenaphthene	ND	0.20	ug/L							
Acenaphthylene	ND	0.20	ug/L							
Anthracene	ND	0.20	ug/L							
Benzo(a)anthracene	ND	0.05	ug/L							
Benzo(a)pyrene	ND	0.05	ug/L							
Benzo(b)fluoranthene	ND	0.05	ug/L							
Benzo(g,h,i)perylene	ND	0.20	ug/L							
Benzo(k)fluoranthene	ND	0.05	ug/L							
bis(2-Ethylhexyl)phthalate	ND	2.50	ug/L							
Butylbenzylphthalate	ND	2.50	ug/L							
Chrysene	ND	0.05	ug/L							
Dibenzo(a,h)Anthracene	ND	0.05	ug/L							
Diethylphthalate	ND	2.50	ug/L							
Dimethylphthalate	ND	2.50	ug/L							
Di-n-butylphthalate	ND	2.50	ug/L							
Di-n-octylphthalate	ND	2.50	ug/L							
Fluoranthene	ND	0.20	ug/L							
Fluorene	ND	0.20	ug/L							

CERTIFICATE OF ANALYSIS

Client Name: Ramboll US Consulting Inc
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Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
625.1(SIM) Semi-Volatile Organic Compounds										
Batch DF12907 - 3510C										
Indeno(1,2,3-cd)Pyrene	ND	0.05	ug/L							
Naphthalene	ND	0.20	ug/L							
Pentachlorophenol	ND	0.90	ug/L							
Phenanthrene	ND	0.20	ug/L							
Pyrene	ND	0.20	ug/L							
Surrogate: 1,2-Dichlorobenzene-d4	*1.75*		ug/L	*2.500*		*70*	*30-130*			
Surrogate: 2,4,6-Tribromophenol	*2.95*		ug/L	*3.750*		*79*	*15-110*			
Surrogate: 2-Fluorobiphenyl	*1.89*		ug/L	*2.500*		*76*	*30-130*			
Surrogate: Nitrobenzene-d5	*2.21*		ug/L	*2.500*		*89*	*30-130*			
Surrogate: p-Terphenyl-d14	*2.37*		ug/L	*2.500*		*95*	*30-130*			
LCS										
Acenaphthene	2.85	0.20	ug/L	4.000		71	40-140			
Acenaphthylene	2.62	0.20	ug/L	4.000		66	40-140			
Anthracene	2.96	0.20	ug/L	4.000		74	40-140			
Benzo(a)anthracene	3.15	0.05	ug/L	4.000		79	40-140			
Benzo(a)pyrene	3.21	0.05	ug/L	4.000		80	40-140			
Benzo(b)fluoranthene	3.41	0.05	ug/L	4.000		85	40-140			
Benzo(g,h,i)perylene	3.11	0.20	ug/L	4.000		78	40-140			
Benzo(k)fluoranthene	3.06	0.05	ug/L	4.000		76	40-140			
bis(2-Ethylhexyl)phthalate	3.83	2.50	ug/L	4.000		96	40-140			
Butylbenzylphthalate	3.68	2.50	ug/L	4.000		92	40-140			
Chrysene	3.08	0.05	ug/L	4.000		77	40-140			
Dibenzo(a,h)Anthracene	3.53	0.05	ug/L	4.000		88	40-140			
Diethylphthalate	3.45	2.50	ug/L	4.000		86	40-140			
Dimethylphthalate	3.36	2.50	ug/L	4.000		84	40-140			
Di-n-butylphthalate	3.44	2.50	ug/L	4.000		86	40-140			
Di-n-octylphthalate	3.79	2.50	ug/L	4.000		95	40-140			
Fluoranthene	3.13	0.20	ug/L	4.000		78	40-140			
Fluorene	3.07	0.20	ug/L	4.000		77	40-140			
Indeno(1,2,3-cd)Pyrene	3.67	0.05	ug/L	4.000		92	40-140			
Naphthalene	2.43	0.20	ug/L	4.000		61	40-140			
Pentachlorophenol	3.06	0.90	ug/L	4.000		77	30-130			
Phenanthrene	3.03	0.20	ug/L	4.000		76	40-140			
Pyrene	3.21	0.20	ug/L	4.000		80	40-140			
Surrogate: 1,2-Dichlorobenzene-d4	*1.62*		ug/L	*2.500*		*65*	*30-130*			
Surrogate: 2,4,6-Tribromophenol	*3.15*		ug/L	*3.750*		*84*	*15-110*			
Surrogate: 2-Fluorobiphenyl	*1.88*		ug/L	*2.500*		*75*	*30-130*			
Surrogate: Nitrobenzene-d5	*2.03*		ug/L	*2.500*		*81*	*30-130*			
Surrogate: p-Terphenyl-d14	*2.32*		ug/L	*2.500*		*93*	*30-130*			
LCS Dup										
Acenaphthene	3.08	0.20	ug/L	4.000		77	40-140	8	20	
Acenaphthylene	2.86	0.20	ug/L	4.000		72	40-140	9	20	
Anthracene	3.25	0.20	ug/L	4.000		81	40-140	9	20	
Benzo(a)anthracene	3.51	0.05	ug/L	4.000		88	40-140	11	20	
Benzo(a)pyrene	3.65	0.05	ug/L	4.000		91	40-140	13	20	

CERTIFICATE OF ANALYSIS

Client Name: Ramboll US Consulting Inc
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ESS Laboratory Work Order: 21F1128

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
625.1(SIM) Semi-Volatile Organic Compounds										
Batch DF12907 - 3510C										
Benzo(b)fluoranthene	3.79	0.05	ug/L	4.000		95	40-140	10	20	
Benzo(g,h,i)perylene	3.40	0.20	ug/L	4.000		85	40-140	9	20	
Benzo(k)fluoranthene	3.81	0.05	ug/L	4.000		95	40-140	22	20	D+
bis(2-Ethylhexyl)phthalate	4.22	2.50	ug/L	4.000		105	40-140	10	20	
Butylbenzylphthalate	4.13	2.50	ug/L	4.000		103	40-140	11	20	
Chrysene	3.42	0.05	ug/L	4.000		85	40-140	10	20	
Dibenzo(a,h)Anthracene	3.88	0.05	ug/L	4.000		97	40-140	10	20	
Diethylphthalate	3.72	2.50	ug/L	4.000		93	40-140	8	20	
Dimethylphthalate	3.62	2.50	ug/L	4.000		91	40-140	8	20	
Di-n-butylphthalate	3.88	2.50	ug/L	4.000		97	40-140	12	20	
Di-n-octylphthalate	4.75	2.50	ug/L	4.000		119	40-140	22	20	D+
Fluoranthene	3.44	0.20	ug/L	4.000		86	40-140	9	20	
Fluorene	3.35	0.20	ug/L	4.000		84	40-140	9	20	
Indeno(1,2,3-cd)Pyrene	4.06	0.05	ug/L	4.000		102	40-140	10	20	
Naphthalene	2.73	0.20	ug/L	4.000		68	40-140	12	20	
Pentachlorophenol	3.40	0.90	ug/L	4.000		85	30-130	10	20	
Phenanthrene	3.26	0.20	ug/L	4.000		81	40-140	7	20	
Pyrene	3.61	0.20	ug/L	4.000		90	40-140	12	20	
Surrogate: 1,2-Dichlorobenzene-d4	*1.71*		ug/L	*2.500*		*68*	*30-130*			
Surrogate: 2,4,6-Tribromophenol	*3.37*		ug/L	*3.750*		*90*	*15-110*			
Surrogate: 2-Fluorobiphenyl	*1.97*		ug/L	*2.500*		*79*	*30-130*			
Surrogate: Nitrobenzene-d5	*2.18*		ug/L	*2.500*		*87*	*30-130*			
Surrogate: p-Terphenyl-d14	*2.48*		ug/L	*2.500*		*99*	*30-130*			
8270D(SIM) Semi-Volatile Organic Compounds w/ Isotope Dilution										
Batch DG10154 - 3535A										
Blank										
1,4-Dioxane	ND	0.250	ug/L							
Surrogate: 1,4-Dioxane-d8	*3.79*		ug/L	*5.000*		*76*	*15-115*			
LCS										
1,4-Dioxane	8.32	0.250	ug/L	10.00		83	40-140			
Surrogate: 1,4-Dioxane-d8	*4.00*		ug/L	*5.000*		*80*	*15-115*			
LCS Dup										
1,4-Dioxane	9.00	0.250	ug/L	10.00		90	40-140	8	20	
Surrogate: 1,4-Dioxane-d8	*4.15*		ug/L	*5.000*		*83*	*15-115*			
Classical Chemistry										
Batch DF12952 - General Preparation										
Blank										
Phenols	ND	50	ug/L							
LCS										
Phenols	1070	50	ug/L	1000		107	80-120			
Batch DF12959 - General Preparation										

CERTIFICATE OF ANALYSIS

Client Name: Ramboll US Consulting Inc
Client Project ID: St Gobain Worcester MA RGP

ESS Laboratory Work Order: 21F1128

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Classical Chemistry										
Batch DF12959 - General Preparation										
Blank										
Total Residual Chlorine	ND	20.0	ug/L							
LCS										
Total Residual Chlorine	2.26		mg/L	2.260		100	85-115			
Batch DF12965 - General Preparation										
Blank										
Hexavalent Chromium	ND	10.0	ug/L							
LCS										
Hexavalent Chromium	497	10.0	ug/L	499.8		99	90-110			
LCS Dup										
Hexavalent Chromium	499	10.0	ug/L	499.8		100	90-110	0.4	20	
Batch DF13001 - General Preparation										
Blank										
Total Suspended Solids	ND	5	mg/L							
LCS										
Total Suspended Solids	90		mg/L	88.60		102	80-120			
Batch DF13023 - TCN Prep										
Blank										
Total Cyanide	ND	5.00	ug/L							
LCS										
Total Cyanide	20.3	5.00	ug/L	20.06		101	90-110			
LCS										
Total Cyanide	150	5.00	ug/L	150.4		100	90-110			
LCS Dup										
Total Cyanide	149	5.00	ug/L	150.4		99	90-110	0.3	20	
Batch DF13024 - General Preparation										
Blank										
Chloride	ND	0.5	mg/L							
LCS										
Chloride	9.7		mg/L	10.00		97	90-110			
Batch DF13030 - General Preparation										
Blank										
Total Petroleum Hydrocarbon	ND	5	mg/L							
LCS										
Total Petroleum Hydrocarbon	14	5	mg/L	19.38		74	66-114			
Batch DG10109 - NH4 Prep										
Blank										
Ammonia as N	ND	0.10	mg/L							
LCS										
Ammonia as N	0.94	0.10	mg/L	0.9994		94	80-120			

CERTIFICATE OF ANALYSIS

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Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
504.1 1,2-Dibromoethane / 1,2-Dibromo-3-chloropropane										
Batch DG10119 - 504/8011										
Blank										
1,2-Dibromo-3-Chloropropane	ND	0.015	ug/L							
1,2-Dibromo-3-Chloropropane [2C]	ND	0.015	ug/L							
1,2-Dibromoethane	ND	0.015	ug/L							
1,2-Dibromoethane [2C]	ND	0.015	ug/L							
Surrogate: Pentachloroethane	*0.0801*		ug/L	*0.08000*		*100*	*30-150*			
Surrogate: Pentachloroethane [2C]	*0.0771*		ug/L	*0.08000*		*96*	*30-150*			
LCS										
1,2-Dibromo-3-Chloropropane	0.045	0.015	ug/L	0.04000		111	70-130			
1,2-Dibromo-3-Chloropropane [2C]	0.041	0.015	ug/L	0.04000		103	70-130			
1,2-Dibromoethane	0.041	0.015	ug/L	0.04000		103	70-130			
1,2-Dibromoethane [2C]	0.043	0.015	ug/L	0.04000		109	70-130			
Surrogate: Pentachloroethane	*0.0802*		ug/L	*0.08000*		*100*	*30-150*			
Surrogate: Pentachloroethane [2C]	*0.0769*		ug/L	*0.08000*		*96*	*30-150*			
LCS										
1,2-Dibromo-3-Chloropropane	0.090	0.015	ug/L	0.08000		113	70-130			
1,2-Dibromo-3-Chloropropane [2C]	0.083	0.015	ug/L	0.08000		104	70-130			
1,2-Dibromoethane	0.086	0.015	ug/L	0.08000		107	70-130			
1,2-Dibromoethane [2C]	0.091	0.015	ug/L	0.08000		114	70-130			
Surrogate: Pentachloroethane	*0.0823*		ug/L	*0.08000*		*103*	*30-150*			
Surrogate: Pentachloroethane [2C]	*0.0763*		ug/L	*0.08000*		*95*	*30-150*			
Alcohol Scan by GC/FID										
Batch DG10104 - No Prep										
Blank										
Ethanol	ND	10	mg/L							
LCS										
Ethanol	1320	10	mg/L	1000		132	60-140			
LCS Dup										
Ethanol	1180	10	mg/L	1000		118	60-140	11	30	

CERTIFICATE OF ANALYSIS

Client Name: Ramboll US Consulting Inc
Client Project ID: St Gobain Worcester MA RGP ESS Laboratory Work Order: 21F1128

Notes and Definitions

Z16	Aqueous pH measured in water at 20.5 ºC.
U	Analyte included in the analysis, but not detected
Q	Calibration required quadratic regression (Q).
HT	The maximum holding time listed in 40 CFR Part 136 Table II for pH, Dissolved Oxygen, Sulfite and Residual Chlorine is fifteen minutes.
EL	Elevated Method Reporting Limits due to sample matrix (EL).
D+	Relative percent difference for duplicate is outside of criteria (D+).
D	Diluted.
CD+	Continuing Calibration %Diff/Drift is above control limit (CD+).
ND	Analyte NOT DETECTED at or above the MRL (LOQ), LOD for DoD Reports, MDL for J-Flagged Analytes
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference
MDL	Method Detection Limit
MRL	Method Reporting Limit
LOD	Limit of Detection
LOQ	Limit of Quantitation
DL	Detection Limit
I/V	Initial Volume
F/V	Final Volume
§	Subcontracted analysis; see attached report
1	Range result excludes concentrations of surrogates and/or internal standards eluting in that range.
2	Range result excludes concentrations of target analytes eluting in that range.
3	Range result excludes the concentration of the C9-C10 aromatic range.
Avg	Results reported as a mathematical average.
NR	No Recovery
[CALC]	Calculated Analyte
SUB	Subcontracted analysis; see attached report
RL	Reporting Limit
EDL	Estimated Detection Limit
MF	Membrane Filtration
MPN	Most Probably Number
TNTC	Too numerous to Count
CFU	Colony Forming Units

CERTIFICATE OF ANALYSIS

Client Name: Ramboll US Consulting Inc
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ESS Laboratory Work Order: 21F1128

ESS LABORATORY CERTIFICATIONS AND ACCREDITATIONS

ENVIRONMENTAL

Rhode Island Potable and Non Potable Water: LAI00179
http://www.health.ri.gov/find/labs/analytical/ESS.pdf

Connecticut Potable and Non Potable Water, Solid and Hazardous Waste: PH-0750
http://www.ct.gov/dph/lib/dph/environmental_health/environmental_laboratories/pdf/OutofStateCommercialLaboratories.pdf

Maine Potable and Non Potable Water, and Solid and Hazardous Waste: RI00002
http://www.maine.gov/dhhs/mecdc/environmental-health/dwp/partners/labCert.shtml

Massachusetts Potable and Non Potable Water: M-RI002
http://public.dep.state.ma.us/Labcert/Labcert.aspx

New Hampshire (NELAP accredited) Potable and Non Potable Water, Solid and Hazardous Waste: 2424
http://des.nh.gov/organization/divisions/water/dwgb/nhelap/index.htm

New York (NELAP accredited) Non Potable Water, Solid and Hazardous Waste: 11313
http://www.wadsworth.org/labcert/elap/comm.html

New Jersey (NELAP accredited) Non Potable Water, Solid and Hazardous Waste: RI006
http://datamine2.state.nj.us/DEP_OPRA/OpraMain/pi_main?mode=pi_by_site&sort_order=PI_NAMEA&Select+a+Site:=58715

United States Department of Agriculture Soil Permit: P330-12-00139

Pennsylvania: 68-01752
http://www.dep.pa.gov/Business/OtherPrograms/Labs/Pages/Laboratory-Accreditation-Program.aspx

ESS Laboratory Sample and Cooler Receipt Checklist

Client: Ramboll Environ - ML

Shipped/Delivered Via: Client

ESS Project ID: 21F1128
Date Received: 6/29/2021
Project Due Date: 7/1/2021
Days for Project: 2 Day

1. Air bill manifest present? No
   Air No.: NA
2. Were custody seals present? No
3. Is radiation count <100 CPM? Yes
4. Is a Cooler Present? Yes
   Temp: 7.7 Iced with: Ice
5. Was COC signed and dated by client? Yes
6. Does COC match bottles? Yes
7. Is COC complete and correct? Yes
8. Were samples received intact? Yes
9. **Were labs informed about short holds & rushes?** (Yes) / No / NA
10. Were any analyses received outside of hold time? Yes / (No)

11. Any Subcontracting needed? Yes / (No)
    ESS Sample IDs:
    Analysis:
    TAT:
12. Were VOAs received? (Yes) / No
    a. Air bubbles in aqueous VOAs? Yes (No)
    b. Does methanol cover soil completely? Yes / No / NA

13. Are the samples properly preserved? (Yes) / No
    a. If metals preserved upon receipt: Date: Time: By:
    b. Low Level VOA vials frozen: Date: Time: By:

Sample Receiving Notes:

14. Was there a need to contact Project Manager? Yes / (No)
    a. Was there a need to contact the client? Yes / (No)
    Who was contacted? Date: Time: By:

Sample Number	Container ID	Proper Container	Air Bubbles Present	Sufficient Volume	Container Type	Preservative	Record pH (Cyanide and 608 Pesticides)
1	182421	Yes	N/A	Yes	1L Amber	NP pH=7	
1	182422	Yes	N/A	Yes	1L Amber	NP	
1	182423	Yes	N/A	Yes	1L Amber	NP	
1	182424	Yes	N/A	Yes	1L Amber	NP pH=7	
1	182425	Yes	N/A	Yes	1L Amber	NP	
1	182426	Yes	N/A	Yes	1L Amber	NP	
1	182427	Yes	N/A	Yes	1L Amber	H2SO4	
1	182428	Yes	N/A	Yes	1L Amber	H2SO4	
1	182429	Yes	N/A	Yes	500 mL Poly	HNO3	
1	182430	Yes	N/A	Yes	500 mL Poly	HNO3	
1	182431	Yes	N/A	Yes	500 mL Poly	H2SO4	
1	182432	Yes	N/A	Yes	250 mL Poly	NP	
1	182433	Yes	N/A	Yes	250 mL Poly	NaOH pH 12	
1	182434	Yes	N/A	Yes	250 mL Poly	HNO3	
1	182435	Yes	No	Yes	VOA Vial	HCl	
1	182436	Yes	No	Yes	VOA Vial	HCl	

ESS Laboratory Sample and Cooler Receipt Checklist

Client: Ramboll Environ - ML

ESS Project ID: 21F1128
Date Received: 6/29/2021

1	182437	Yes	No	Yes	VOA Vial	HCl
1	182438	Yes	No	Yes	VOA Vial	HCl
1	182439	Yes	No	Yes	VOA Vial	HCl
1	182440	Yes	No	Yes	VOA Vial	HCl
1	182463	Yes	N/A	Yes	1L Poly	NP
1	182464	Yes	No	Yes	VOA Vial	NP

2nd Review

Were all containers scanned into storage/lab? Initials TD
Are barcode labels on correct containers? Yes / No
Are all Flashpoint stickers attached/container ID # circled? Yes / No / NA
Are all Hex Chrome stickers attached? Yes / No / NA
Are all QC stickers attached? Yes / No / NA
Are VOA stickers attached if bubbles noted? Yes / No / NA

Completed By: Taylor Davis Date & Time: 6/29/21 2037
Reviewed By: [signature] Date & Time: 6/29/21 2052

21F1128

CHAIN OF CUSTODY

ESS LABORATORY
185 Frances Avenue
Cranston, RI 02921
Phone: 401-461-7181
Fax: 401-461-4486
www.esslaboratory.com

ESS Lab # ~~21F1129~~

Turn Time ☐ >5 ☐ 5 ☐ 4 ☐ 3 ☒ 2 ☐ 1 ☐ Same Day

Regulatory State: Criteria:

Is this project for any of the following?: ☐ CT RCP ☐ MA MCP ☒ RGP ☐ Permit ☐ 401 WQ

ELECTRONIC DELIVERABLES (Final Reports are PDF)

☐ Limit Checker ☐ State Forms ☒ EQuIS
☒ Excel ☐ Hard Copy ☐ Enviro Data
☐ CLP-Like Package ☐ Other (Specify) →

CLIENT INFORMATION

Client: Ramboll
Address: 3 Carlisle Rd
Westford, MA
Phone:
Email Distribution List: emwhite@ramboll.com
millabrose@ramboll.com

PROJECT INFORMATION

Project Name: St. Gobain
Project Location: Worcester, MA
Project Number: 1690022025
Project Manager:
Bill to:
PO#:
Quote#:

Client acknowledges that sampling is compliant with all EPA / State regulatory programs

REQUESTED ANALYSES

ESS Lab ID	Collection Date	Collection Time	Sample Type	Sample Matrix	Sample ID	RGP Metals total	RGP metals dissolved	Hardness calculation	ethanol astm D3695	Chloride 300	Total cyanide 4500	TPH 1664	TSS 2540D	TRC 4500	Ammonia 350	Tri Cr (calc) mt T	Hex Cr 3500	Phenol 420	RGP VOC Long list 524	1,4-Dioxane	EDB 504	RGP SVOC long list	PCB 608	Total Number of Bottles
1	6/29/21	1525	GW	GW	TW-TP-01-210629	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	22
Container Type						P	P	P	V	P	P	AG	P	P	P	-	P	AG	V	AG	V	GA	AG	
Container Volume																								
Preservation Code						4	4	4	1	1	5	3	1	1	3	-	1	3	2	1	2	1	1	

Container Type: AC-Air Cassette AG-Amber Glass B-BOD Bottle C-Cubitainer J-Jar O-Other P-Poly S-Sterile V-Vial

Container Volume: 1-100 mL 2-2.5 gal 3-250 mL 4-300 mL 5-500 mL 6-1L 7-VOA 8-2 oz 9-4 oz 10-8 oz 11-Other*

Preservation Code: 1-Non Preserved 2-HCl 3-H2SO4 4-HNO3 5-NaOH 6-Methanol 7-Na2S2O3 8-ZnAce, NaOH 9-NH4Cl 10-DI H2O 11-Other*

Sampled by :

Chain needs to be filled out neatly and completely for on time delivery.

Laboratory Use Only

Cooler Temperature (°C): 7.7 Ice

Comments: * Please specify "Other" preservative and containers types in this space
dissolved metals field filtered

All samples submitted are subject to ESS Laboratory's payment terms and conditions.

Dissolved Filtration
☐ Lab Filter

Relinquished by (Signature)	Date	Time	Received by (Signature)	Relinquished by (Signature)	Date	Time	Received by (Signature)
[signature]	6/29/21	1900	[signature]				
Relinquished by (Signature)	**Date**	**Time**	**Received by (Signature)**	**Relinquished by (Signature)**	**Date**	**Time**	**Received by (Signature)**

CERTIFICATE OF ANALYSIS

Emily Mushlitz
Ramboll US Consulting Inc
3 Carlisle Road - Suite 210
Westford, MA 01886

RE: St Gobain Worcester MA (1690022025)
ESS Laboratory Work Order Number: 21F1129

This signed Certificate of Analysis is our approved release of your analytical results. These results are only representative of sample aliquots received at the laboratory. ESS Laboratory expects its clients to follow all regulatory sampling guidelines. Beginning with this page, the entire report has been paginated. This report should not be copied except in full without the approval of the laboratory. Samples will be disposed of thirty days after the final report has been delivered. If you have any questions or concerns, please feel free to call our Customer Service Department.

Laurel Stoddard
Laboratory Director

REVIEWED
By ESS Laboratory at 6:01 pm, Jul 02, 2021

Analytical Summary
The project as described above has been analyzed in accordance with the ESS Quality Assurance Plan. This plan utilizes the following methodologies: US EPA SW-846, US EPA Methods for Chemical Analysis of Water and Wastes per 40 CFR Part 136, APHA Standard Methods for the Examination of Water and Wastewater, American Society for Testing and Materials (ASTM), and other recognized methodologies. The analyses with these noted observations are in conformance to the Quality Assurance Plan. In chromatographic analysis, manual integration is frequently used instead of automated integration because it produces more accurate results.

The test results present in this report are in compliance with TNI and relative state standards, and/or client Quality Assurance Project Plans (QAPP). The laboratory has reviewed the following: Sample Preservations, Hold Times, Initial Calibrations, Continuing Calibrations, Method Blanks, Blank Spikes, Blank Spike Duplicates, Duplicates, Matrix Spikes, Matrix Spike Duplicates, Surrogates and Internal Standards. Any results which were found to be outside of the recommended ranges stated in our SOPs will be noted in the Project Narrative.

CERTIFICATE OF ANALYSIS

Client Name: Ramboll US Consulting Inc
Client Project ID: St Gobain Worcester MA

ESS Laboratory Work Order: 21F1129

SAMPLE RECEIPT

The following samples were received on June 29, 2021 for the analyses specified on the enclosed Chain of Custody Record.

The samples and analyses listed below were analyzed in accordance with the Guidelines Establishing Test Procedures for the Analysis of Pollutants, 40 CFR Part 136, as amended.

Lab Number	Sample Name	Matrix	Analysis
21F1129-01	SW-Weasel Brook-210629	Surface Water	200.7, 200.8, 245.1, 2520B, 3113B, 350.1, 3500Cr B-2009, 4500 H+ B, CALC

CERTIFICATE OF ANALYSIS

Client Name: Ramboll US Consulting Inc
Client Project ID: St Gobain Worcester MA

ESS Laboratory Work Order: 21F1129

PROJECT NARRATIVE

Classical Chemistry
21F1129-01 **The maximum holding time listed in 40 CFR Part 136 Table II for pH, Dissolved Oxygen, Sulfite and Residual Chlorine is fifteen minutes.**

No other observations noted.

End of Project Narrative.

DATA USABILITY LINKS

To ensure you are viewing the most current version of the documents below, please clear your internet cookies for www.ESSLaboratory.com. Consult your IT Support personnel for information on how to clear your internet cookies.

Definitions of Quality Control Parameters

Semivolatile Organics Internal Standard Information

Semivolatile Organics Surrogate Information

Volatile Organics Internal Standard Information

Volatile Organics Surrogate Information

EPH and VPH Alkane Lists

CERTIFICATE OF ANALYSIS

Client Name: Ramboll US Consulting Inc
Client Project ID: St Gobain Worcester MA

ESS Laboratory Work Order: 21F1129

CURRENT SW-846 METHODOLOGY VERSIONS

Analytical Methods

1010A - Flashpoint
6010C - ICP
6020A - ICP MS
7010 - Graphite Furnace
7196A - Hexavalent Chromium
7470A - Aqueous Mercury
7471B - Solid Mercury
8011 - EDB/DBCP/TCP
8015C - GRO/DRO
8081B - Pesticides
8082A - PCB
8100M - TPH
8151A - Herbicides
8260B - VOA
8270D - SVOA
8270D SIM - SVOA Low Level
9014 - Cyanide
9038 - Sulfate
9040C - Aqueous pH
9045D - Solid pH (Corrosivity)
9050A - Specific Conductance
9056A - Anions (IC)
9060A - TOC
9095B - Paint Filter
MADEP 04-1.1 - EPH
MADEP 18-2.1 - VPH

Prep Methods

3005A - Aqueous ICP Digestion
3020A - Aqueous Graphite Furnace / ICP MS Digestion
3050B - Solid ICP / Graphite Furnace / ICP MS Digestion
3060A - Solid Hexavalent Chromium Digestion
3510C - Separatory Funnel Extraction
3520C - Liquid / Liquid Extraction
3540C - Manual Soxhlet Extraction
3541 - Automated Soxhlet Extraction
3546 - Microwave Extraction
3580A - Waste Dilution
5030B - Aqueous Purge and Trap
5030C - Aqueous Purge and Trap
5035A - Solid Purge and Trap

SW846 Reactivity Methods 7.3.3.2 (Reactive Cyanide) and 7.3.4.1 (Reactive Sulfide) have been withdrawn by EPA. These methods are reported per client request and are not NELAP accredited.

CERTIFICATE OF ANALYSIS

Client Name: Ramboll US Consulting Inc
Client Project ID: St Gobain Worcester MA
Client Sample ID: SW-Weasel Brook-210629
Date Sampled: 06/29/21 14:00
Percent Solids: N/A

ESS Laboratory Work Order: 21F1129
ESS Laboratory Sample ID: 21F1129-01
Sample Matrix: Surface Water
Units: ug/L

Extraction Method: 3005A/200.7
All methods used are in accordance with 40 CFR 136.

Total Metals

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyst	Analyzed	I/V	F/V	Batch
Antimony	ND (25.0)		200.7		1	KJK	06/30/21 23:08	50	25	DF12958
Arsenic	**3.8** (2.5)		3113B		1	KJK	07/01/21 16:19	50	25	DF12958
Cadmium	**1.1** (1.0)		200.8		5	KJK	07/02/21 11:02	50	25	DF12958
Chromium	ND (10.0)		200.7		1	KJK	06/30/21 23:08	50	25	DF12958
Copper	ND (10.0)		200.7		1	KJK	06/30/21 23:08	50	25	DF12958
Iron	**482** (50.0)		200.7		1	KJK	06/30/21 23:08	50	25	DF12958
Lead	ND (2.5)		200.8		5	KJK	07/02/21 11:02	50	25	DF12958
Mercury	ND (0.2)		245.1		1	JRB	07/02/21 11:35	20	40	DG10146
Nickel	ND (2.5)		200.8		5	KJK	07/02/21 11:02	50	25	DF12958
Selenium	ND (5.0)		3113B		1	KJK	07/01/21 21:05	50	25	DF12958
Silver	ND (2.5)		200.8		5	KJK	07/02/21 11:02	50	25	DF12958
Total Hardness	**114** (0.412)		CALC		1	KJK	06/30/21 23:08	1	1	[CALC]
Zinc	**25.2** (25.0)		200.7		1	KJK	06/30/21 23:08	50	25	DF12958

CERTIFICATE OF ANALYSIS

Client Name: Ramboll US Consulting Inc
Client Project ID: St Gobain Worcester MA
Client Sample ID: SW-Weasel Brook-210629
Date Sampled: 06/29/21 14:00
Percent Solids: N/A

ESS Laboratory Work Order: 21F1129
ESS Laboratory Sample ID: 21F1129-01
Sample Matrix: Surface Water

All methods used are in accordance with 40 CFR 136.

Classical Chemistry

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyst	Analyzed	Units	Batch
Ammonia as N	**0.20** (0.10)		350.1		1	JLK	07/01/21 16:39	mg/L	DG10109
Hexavalent Chromium	**0.015** (0.010)		3500Cr B-2009		1	EAM	06/29/21 21:51	mg/L	DF12965
pH	**6.80** (N/A)		4500 H+ B		1	EAM	06/29/21 20:46	S.U.	DF12969
pH Sample Temp	**Aqueous pH measured in water at 14.0 ºC.** (N/A)								
Salinity	**0.6** (0.1)		2520B		1	EAM	06/30/21 16:39	ppt	DF13048

CERTIFICATE OF ANALYSIS

Client Name: Ramboll US Consulting Inc
Client Project ID: St Gobain Worcester MA

ESS Laboratory Work Order: 21F1129

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Total Metals										
Batch DF12958 - 3005A/200.7										
Blank										
Antimony	ND	25.0	ug/L							
Chromium	ND	10.0	ug/L							
Copper	ND	10.0	ug/L							
Iron	ND	50.0	ug/L							
Zinc	ND	25.0	ug/L							
Blank										
Cadmium	ND	1.0	ug/L							
Lead	ND	2.5	ug/L							
Nickel	ND	2.5	ug/L							
Silver	ND	2.5	ug/L							
Blank										
Arsenic	ND	2.5	ug/L							
Selenium	ND	5.0	ug/L							
LCS										
Antimony	277	25.0	ug/L	250.0		111	85-115			
Chromium	265	10.0	ug/L	250.0		106	85-115			
Copper	261	10.0	ug/L	250.0		104	85-115			
Iron	1340	50.0	ug/L	1250		108	85-115			
Zinc	265	25.0	ug/L	250.0		106	85-115			
LCS										
Cadmium	121	5.0	ug/L	125.0		97	85-115			
Lead	258	12.5	ug/L	250.0		103	85-115			
Nickel	220	12.5	ug/L	250.0		88	85-115			
Silver	117	12.5	ug/L	125.0		94	85-115			
LCS										
Arsenic	225	62.5	ug/L	250.0		90	85-115			
Selenium	504	125	ug/L	500.0		101	85-115			
Batch DG10146 - 245.1/7470A										
Blank										
Mercury	ND	0.2	ug/L							
LCS										
Mercury	6.4	0.2	ug/L	6.042		107	85-115			
LCS Dup										
Mercury	5.8	0.2	ug/L	6.042		96	85-115	11	20	
Classical Chemistry										
Batch DF12965 - General Preparation										
Blank										
Hexavalent Chromium	ND	0.010	mg/L							
LCS										
Hexavalent Chromium	0.497	0.010	mg/L	0.4998		99	90-110			

CERTIFICATE OF ANALYSIS

Client Name: Ramboll US Consulting Inc
Client Project ID: St Gobain Worcester MA

ESS Laboratory Work Order: 21F1129

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Classical Chemistry										
Batch DF12965 - General Preparation										
LCS Dup										
Hexavalent Chromium	0.499	0.010	mg/L	0.4998		100	90-110	0.4	20	
Batch DF13048 - General Preparation										
LCS										
Salinity	1.0		ppt	1.000		101	85-115			
Batch DG10109 - NH4 Prep										
Blank										
Ammonia as N	ND	0.10	mg/L							
LCS										
Ammonia as N	0.94	0.10	mg/L	0.9994		94	80-120			

CERTIFICATE OF ANALYSIS

Client Name: Ramboll US Consulting Inc
Client Project ID: St Gobain Worcester MA

ESS Laboratory Work Order: 21F1129

Notes and Definitions

Z16	Aqueous pH measured in water at 14.0 ºC.
U	Analyte included in the analysis, but not detected
HT	The maximum holding time listed in 40 CFR Part 136 Table II for pH, Dissolved Oxygen, Sulfite and Residual Chlorine is fifteen minutes.
D	Diluted.
ND	Analyte NOT DETECTED at or above the MRL (LOQ), LOD for DoD Reports, MDL for J-Flagged Analytes
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference
MDL	Method Detection Limit
MRL	Method Reporting Limit
LOD	Limit of Detection
LOQ	Limit of Quantitation
DL	Detection Limit
I/V	Initial Volume
F/V	Final Volume
§	Subcontracted analysis; see attached report
1	Range result excludes concentrations of surrogates and/or internal standards eluting in that range.
2	Range result excludes concentrations of target analytes eluting in that range.
3	Range result excludes the concentration of the C9-C10 aromatic range.
Avg	Results reported as a mathematical average.
NR	No Recovery
[CALC]	Calculated Analyte
SUB	Subcontracted analysis; see attached report
RL	Reporting Limit
EDL	Estimated Detection Limit
MF	Membrane Filtration
MPN	Most Probably Number
TNTC	Too numerous to Count
CFU	Colony Forming Units

CERTIFICATE OF ANALYSIS

Client Name: Ramboll US Consulting Inc
Client Project ID: St Gobain Worcester MA

ESS Laboratory Work Order: 21F1129

ESS LABORATORY CERTIFICATIONS AND ACCREDITATIONS

ENVIRONMENTAL

Rhode Island Potable and Non Potable Water: LAI00179
http://www.health.ri.gov/find/labs/analytical/ESS.pdf

Connecticut Potable and Non Potable Water, Solid and Hazardous Waste: PH-0750
http://www.ct.gov/dph/lib/dph/environmental_health/environmental_laboratories/pdf/OutofStateCommercialLaboratories.pdf

Maine Potable and Non Potable Water, and Solid and Hazardous Waste: RI00002
http://www.maine.gov/dhhs/mecdc/environmental-health/dwp/partners/labCert.shtml

Massachusetts Potable and Non Potable Water: M-RI002
http://public.dep.state.ma.us/Labcert/Labcert.aspx

New Hampshire (NELAP accredited) Potable and Non Potable Water, Solid and Hazardous Waste: 2424
http://des.nh.gov/organization/divisions/water/dwgb/nhelap/index.htm

New York (NELAP accredited) Non Potable Water, Solid and Hazardous Waste: 11313
http://www.wadsworth.org/labcert/elap/comm.html

New Jersey (NELAP accredited) Non Potable Water, Solid and Hazardous Waste: RI006
http://datamine2.state.nj.us/DEP_OPRA/OpraMain/pi_main?mode=pi_by_site&sort_order=PI_NAMEA&Select+a+Site:=58715

United States Department of Agriculture Soil Permit: P330-12-00139

Pennsylvania: 68-01752
http://www.dep.pa.gov/Business/OtherPrograms/Labs/Pages/Laboratory-Accreditation-Program.aspx

ESS Laboratory Sample and Cooler Receipt Checklist

Client: Ramboll Environ - ML

Shipped/Delivered Via: Client

ESS Project ID: 21F1129
Date Received: 6/29/2021
Project Due Date: 7/1/2021
Days for Project: 2 Day

1. Air bill manifest present? No
   Air No.: NA
2. Were custody seals present? No
3. Is radiation count <100 CPM? Yes
4. Is a Cooler Present? Yes
   Temp: 2.6 Iced with: Ice
5. Was COC signed and dated by client? Yes
6. Does COC match bottles? Yes
7. Is COC complete and correct? Yes
8. Were samples received intact? Yes
9. **Were labs informed about short holds & rushes?** Yes / No / NA
10. Were any analyses received outside of hold time? Yes / No

11. Any Subcontracting needed? Yes / No
    ESS Sample IDs:
    Analysis:
    TAT:
12. Were VOAs received? Yes / No
    a. Air bubbles in aqueous VOAs? Yes / No
    b. Does methanol cover soil completely? Yes / No / NA
13. Are the samples properly preserved? Yes / No
    a. If metals preserved upon receipt: Date: Time: By:
    b. Low Level VOA vials frozen: Date: Time: By:

Sample Receiving Notes:

14. Was there a need to contact Project Manager? Yes / No
    a. Was there a need to contact the client? Yes / No
    Who was contacted? Date: Time: By:

Sample Number	Container ID	Proper Container	Air Bubbles Present	Sufficient Volume	Container Type	Preservative	Record pH (Cyanide and 608 Pesticides)
1	182441	Yes	N/A	Yes	500 mL Poly	H2SO4	
1	182442	Yes	N/A	Yes	250 mL Poly	HNO3	
1	182443	Yes	N/A	Yes	250 mL Poly	HNO3	
1	182444	Yes	N/A	Yes	250 mL Poly	NP	
1	182445	Yes	N/A	Yes	250 mL Poly	NP	
1	182446	Yes	N/A	Yes	250 mL Poly	NP	

2nd Review
Were all containers scanned into storage/lab? Initials TO
Are barcode labels on correct containers? Yes / No
Are all Flashpoint stickers attached/container ID # circled? Yes / No / NA
Are all Hex Chrome stickers attached? Yes / No / NA
Are all QC stickers attached? Yes / No / NA
Are VOA stickers attached if bubbles noted? Yes / No / NA

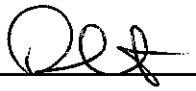
Completed By: Clayton Dewitt Date & Time: 6/29/21 2000

ESS Laboratory Sample and Cooler Receipt Checklist

Client: Ramboll Environ - ML

ESS Project ID: 21F1129

Date Received: 6/29/2021

Reviewed By: 

Date & Time: 6/29/21 2057

ZIF1129

CHAIN OF CUSTODY

ESS Lab # ZIF1128 | Page 1 of 1

185 Frances Avenue
Cranston, RI 02921
Phone: 401-461-7181
Fax: 401-461-4486
www.esslaboratory.com

Turn Time: ☐ >5 ☐ 5 ☐ 4 ☐ 3 ☒ 2 ☐ 1 ☐ Same Day

Regulatory State: Criteria:

Is this project for any of the following?:

☐ CT RCP ☐ MA MCP ☐ RGP ☐ Permit ☐ 401 WQ

ELECTRONIC DELIVERABLES (Final Reports are PDF)

☐ Limit Checker ☐ State Forms ☒ EQuIS
☒ Excel ☐ Hard Copy ☐ Enviro Data
☐ CLP-Like Package ☐ Other (Specify) →

CLIENT INFORMATION

Client: Rambol
Address: 3 Carlisle Rd
Westford, MA
Phone:
Email Distribution List: emunnutz@ramboll.com
jwilkinson@ramboll.com

PROJECT INFORMATION

Project Name: St. Gobain
Project Location: Worcester, MA
Project Number: 1690022025
Project Manager:
Bill to:
PO#:
Quote#:

Client acknowledges that sampling is compliant with all EPA / State regulatory programs

REQUESTED ANALYSES

ESS Lab ID	Collection Date	Collection Time	Sample Type	Sample Matrix	Sample ID	Metals	Hex Cr	Hardness	pH	Salinity	Ammonia	Total Number of Bottles
1	6/29/21	1400	SW	SW	SW-weasel brook-210629	Y	Y	Y	Y	Y	Y	5

Container Type: AC-Air Cassette AG-Amber Glass B-BOD Bottle C-Cubitainer J-Jar O-Other P-Poly S-Sterile V-Vial — P P P P P P

Container Volume: 1-100 mL 2-2.5 gal 3-250 mL 4-300 mL 5-500 mL 6-1L 7-VOA 8-2 oz 9-4 oz 10-8 oz 11-Other*

Preservation Code: 1-Non Preserved 2-HCl 3-H2SO4 4-HNO3 5-NaOH 6-Methanol 7-Na2S2O3 8-ZnAce, NaOH 9-NH4Cl 10-DI H2O 11-Other* — 4 1 4 1 1 3

Chain needs to be filled out neatly and completely for on time delivery.

Sampled by :

Laboratory Use Only

Cooler Temperature (°C): 2.6 / 1a

Comments: * Please specify "Other" preservative and containers types in this space

All samples submitted are subject to ESS Laboratory's payment terms and conditions.

Dissolved Filtration: ☐ Lab Filter

Relinquished by (Signature)	Date	Time	Received by (Signature)	Relinquished by (Signature)	Date	Time	Received by (Signature)
	6/29/21	1900					

CERTIFICATE OF ANALYSIS

Jason Wilkinson
Ramboll US Consulting Inc
3 Carlisle Road - Suite 210
Westford, MA 01886

RE: St Gobain Worcester MA RGP (1690022025)
ESS Laboratory Work Order Number: 21F1141

This signed Certificate of Analysis is our approved release of your analytical results. These results are only representative of sample aliquots received at the laboratory. ESS Laboratory expects its clients to follow all regulatory sampling guidelines. Beginning with this page, the entire report has been paginated. This report should not be copied except in full without the approval of the laboratory. Samples will be disposed of thirty days after the final report has been delivered. If you have any questions or concerns, please feel free to call our Customer Service Department.

Laurel Stoddard
Laboratory Director

REVIEWED
By ESS Laboratory at 5:26 pm, Jul 02, 2021

Analytical Summary
The project as described above has been analyzed in accordance with the ESS Quality Assurance Plan. This plan utilizes the following methodologies: US EPA SW-846, US EPA Methods for Chemical Analysis of Water and Wastes per 40 CFR Part 136, APHA Standard Methods for the Examination of Water and Wastewater, American Society for Testing and Materials (ASTM), and other recognized methodologies. The analyses with these noted observations are in conformance to the Quality Assurance Plan. In chromatographic analysis, manual integration is frequently used instead of automated integration because it produces more accurate results.

The test results present in this report are in compliance with TNI and relative state standards, and/or client Quality Assurance Project Plans (QAPP). The laboratory has reviewed the following: Sample Preservations, Hold Times, Initial Calibrations, Continuing Calibrations, Method Blanks, Blank Spikes, Blank Spike Duplicates, Duplicates, Matrix Spikes, Matrix Spike Duplicates, Surrogates and Internal Standards. Any results which were found to be outside of the recommended ranges stated in our SOPs will be noted in the Project Narrative.

CERTIFICATE OF ANALYSIS

Client Name: Ramboll US Consulting Inc
Client Project ID: St Gobain Worcester MA RGP

ESS Laboratory Work Order: 21F1141

SAMPLE RECEIPT

The following samples were received on June 30, 2021 for the analyses specified on the enclosed Chain of Custody Record.

The samples and analyses listed below were analyzed in accordance with the 2017 Remediation General Permit under the National Pollutant Discharge Elimination System (NPDES).

ESS Laboratory is unable to achieve the required detection limit of 0.4 mg/L for Ethanol for the RGP permit. We have also been unable to procure a subcontract laboatory that is able to achieve this limit. The data for Ethanol has been reported using our current method reporting limit.

The cooler temperature was not within the acceptance limit of <6°C, however, samples were delivered on ice and therefore meet regulatory criteria.

Lab Number	Sample Name	Matrix	Analysis
21F1141-01	TW-TP-02-210630	Ground Water	1664A, 200.7, 245.1, 2540D, 300.0, 3113B, 350.1, 3500Cr B-2009, 420.1, 4500 CN CE, 4500 H+ B, 4500Cl D, 504.1, 524.2, 608.3, 625.1 SIM, 8270D SIM, ASTM D3695, CALC

CERTIFICATE OF ANALYSIS

Client Name: Ramboll US Consulting Inc
Client Project ID: St Gobain Worcester MA RGP

ESS Laboratory Work Order: 21F1141

PROJECT NARRATIVE

625.1(SIM) Semi-Volatile Organic Compounds

D1F0642-CCV1 **Calibration required quadratic regression (Q).**
2,4,6-Tribromophenol (98% @ 80-120%), Pentachlorophenol (86% @ 80-120%)

D1F0642-CCV1 **Continuing Calibration %Diff/Drift is above control limit (CD+).**
Di-n-octylphthalate (27% @ 20%)

DG10117-BSD1 **Relative percent difference for duplicate is outside of criteria (D+).**
Fluoranthene (23% @ 20%), Pentachlorophenol (40% @ 20%)

Classical Chemistry

21F1141-01 **The maximum holding time listed in 40 CFR Part 136 Table II for pH, Dissolved Oxygen, Sulfite and Residual Chlorine is fifteen minutes.**

Dissolved Metals

21F1141-01 **Elevated Method Reporting Limits due to sample matrix (EL).**
Antimony , Cadmium , Chromium , Copper , Lead , Silver , Zinc

Total Metals

21F1141-01 **Elevated Method Reporting Limits due to sample matrix (EL).**
Antimony , Cadmium , Chromium , Silver

No other observations noted.

End of Project Narrative.

DATA USABILITY LINKS

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Definitions of Quality Control Parameters

Semivolatile Organics Internal Standard Information

Semivolatile Organics Surrogate Information

Volatile Organics Internal Standard Information

Volatile Organics Surrogate Information

EPH and VPH Alkane Lists

CERTIFICATE OF ANALYSIS

Client Name: Ramboll US Consulting Inc
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ESS Laboratory Work Order: 21F1141

CURRENT SW-846 METHODOLOGY VERSIONS

Analytical Methods

1010A - Flashpoint
6010C - ICP
6020A - ICP MS
7010 - Graphite Furnace
7196A - Hexavalent Chromium
7470A - Aqueous Mercury
7471B - Solid Mercury
8011 - EDB/DBCP/TCP
8015C - GRO/DRO
8081B - Pesticides
8082A - PCB
8100M - TPH
8151A - Herbicides
8260B - VOA
8270D - SVOA
8270D SIM - SVOA Low Level
9014 - Cyanide
9038 - Sulfate
9040C - Aqueous pH
9045D - Solid pH (Corrosivity)
9050A - Specific Conductance
9056A - Anions (IC)
9060A - TOC
9095B - Paint Filter
MADEP 04-1.1 - EPH
MADEP 18-2.1 - VPH

Prep Methods

3005A - Aqueous ICP Digestion
3020A - Aqueous Graphite Furnace / ICP MS Digestion
3050B - Solid ICP / Graphite Furnace / ICP MS Digestion
3060A - Solid Hexavalent Chromium Digestion
3510C - Separatory Funnel Extraction
3520C - Liquid / Liquid Extraction
3540C - Manual Soxhlet Extraction
3541 - Automated Soxhlet Extraction
3546 - Microwave Extraction
3580A - Waste Dilution
5030B - Aqueous Purge and Trap
5030C - Aqueous Purge and Trap
5035A - Solid Purge and Trap

SW846 Reactivity Methods 7.3.3.2 (Reactive Cyanide) and 7.3.4.1 (Reactive Sulfide) have been withdrawn by EPA. These methods are reported per client request and are not NELAP accredited.

CERTIFICATE OF ANALYSIS

Client Name: Ramboll US Consulting Inc
Client Project ID: St Gobain Worcester MA RGP
Client Sample ID: TW-TP-02-210630
Date Sampled: 06/30/21 12:10
Percent Solids: N/A

ESS Laboratory Work Order: 21F1141
ESS Laboratory Sample ID: 21F1141-01
Sample Matrix: Ground Water
Units: ug/L

Extraction Method: 3005A/200.7

Dissolved Metals

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyst	Analyzed	I/V	F/V	Batch
Antimony	**EL** ND (15.0)		200.7		3	KJK	07/01/21 18:09	100	10	DG10106
Arsenic	**77.6** (12.5)		3113B		25	KJK	07/01/21 19:08	100	10	DG10106
Cadmium	**EL** ND (3.0)		200.7		3	KJK	07/01/21 18:09	100	10	DG10106
Chromium	**EL** ND (6.0)		200.7		3	KJK	07/01/21 18:09	100	10	DG10106
Copper	**EL** ND (6.0)		200.7		3	KJK	07/01/21 18:09	100	10	DG10106
Iron	**87.6** (30.0)		200.7		3	KJK	07/01/21 18:09	100	10	DG10106
Lead	**EL** ND (6.0)		200.7		3	KJK	07/01/21 18:09	100	10	DG10106
Mercury	ND (0.20)		245.1		1	JRB	07/02/21 10:43	20	40	DG10139
Nickel	**15.6** (15.0)		200.7		3	KJK	07/01/21 18:09	100	10	DG10106
Selenium	ND (5.0)		3113B		5	KJK	07/01/21 23:49	100	10	DG10106
Silver	**EL** ND (3.0)		200.7		3	KJK	07/01/21 18:09	100	10	DG10106
Zinc	**EL** ND (15.0)		200.7		3	KJK	07/01/21 18:09	100	10	DG10106

CERTIFICATE OF ANALYSIS

Client Name: Ramboll US Consulting Inc
Client Project ID: St Gobain Worcester MA RGP
Client Sample ID: TW-TP-02-210630
Date Sampled: 06/30/21 12:10
Percent Solids: N/A

ESS Laboratory Work Order: 21F1141
ESS Laboratory Sample ID: 21F1141-01
Sample Matrix: Ground Water
Units: ug/L

Extraction Method: 3005A/200.7

Total Metals

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyst	Analyzed	I/V	F/V	Batch
Antimony	**EL** ND (15.0)		200.7		3	KJK	07/01/21 17:50	100	10	DG10106
Arsenic	**96.8** (25.0)		3113B		50	KJK	07/01/21 19:13	100	10	DG10106
Cadmium	**EL** ND (3.0)		200.7		3	KJK	07/01/21 17:50	100	10	DG10106
Chromium	**EL** ND (6.0)		200.7		3	KJK	07/01/21 17:50	100	10	DG10106
Chromium III	ND (10.0)		200.7		3	EAM	07/01/21 17:50	1	1	[CALC]
Copper	**10.8** (6.0)		200.7		3	KJK	07/01/21 17:50	100	10	DG10106
Iron	**177** (30.0)		200.7		3	KJK	07/01/21 17:50	100	10	DG10106
Lead	**8.0** (6.0)		200.7		3	KJK	07/01/21 17:50	100	10	DG10106
Mercury	ND (0.2)		245.1		1	JRB	07/02/21 10:33	20	40	DG10139
Nickel	**24.5** (15.0)		200.7		3	KJK	07/01/21 17:50	100	10	DG10106
Selenium	ND (5.0)		3113B		5	KJK	07/01/21 22:41	100	10	DG10106
Silver	**EL** ND (3.0)		200.7		3	KJK	07/01/21 17:50	100	10	DG10106
Total Hardness	**719000** (1250)		CALC		25	KJK	07/01/21 18:11	1	1	[CALC]
Zinc	**26.0** (15.0)		200.7		3	KJK	07/01/21 17:50	100	10	DG10106

CERTIFICATE OF ANALYSIS

Client Name: Ramboll US Consulting Inc
Client Project ID: St Gobain Worcester MA RGP
Client Sample ID: TW-TP-02-210630
Date Sampled: 06/30/21 12:10
Percent Solids: N/A
Initial Volume: 25
Final Volume: 25
Extraction Method: 524.2

ESS Laboratory Work Order: 21F1141
ESS Laboratory Sample ID: 21F1141-01
Sample Matrix: Ground Water
Units: ug/L
Analyst: MD

524.2 Volatile Organic Compounds

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyzed	Sequence	Batch
1,1,1-Trichloroethane	ND (0.5)		524.2		1	07/01/21 13:04	D1G0020	DG10143
1,1,2-Trichloroethane	ND (0.5)		524.2		1	07/01/21 13:04	D1G0020	DG10143
1,1-Dichloroethane	ND (0.5)		524.2		1	07/01/21 13:04	D1G0020	DG10143
1,1-Dichloroethene	ND (0.5)		524.2		1	07/01/21 13:04	D1G0020	DG10143
1,2-Dichlorobenzene	ND (0.5)		524.2		1	07/01/21 13:04	D1G0020	DG10143
1,2-Dichloroethane	ND (0.5)		524.2		1	07/01/21 13:04	D1G0020	DG10143
1,3-Dichlorobenzene	ND (0.5)		524.2		1	07/01/21 13:04	D1G0020	DG10143
1,4-Dichlorobenzene	**1.9** (0.5)		524.2		1	07/01/21 13:04	D1G0020	DG10143
Acetone	**15.1** (5.0)		524.2		1	07/01/21 13:04	D1G0020	DG10143
Benzene	ND (0.5)		524.2		1	07/01/21 13:04	D1G0020	DG10143
Carbon Tetrachloride	ND (0.3)		524.2		1	07/01/21 13:04	D1G0020	DG10143
cis-1,2-Dichloroethene	ND (0.5)		524.2		1	07/01/21 13:04	D1G0020	DG10143
Ethylbenzene	ND (0.5)		524.2		1	07/01/21 13:04	D1G0020	DG10143
Methyl tert-Butyl Ether	ND (0.5)		524.2		1	07/01/21 13:04	D1G0020	DG10143
Methylene Chloride	ND (0.5)		524.2		1	07/01/21 13:04	D1G0020	DG10143
Naphthalene	**26.8** (0.5)		524.2		1	07/01/21 13:04	D1G0020	DG10143
Tertiary-amyl methyl ether	ND (1.0)		524.2		1	07/01/21 13:04	D1G0020	DG10143
Tertiary-butyl Alcohol	ND (25.0)		524.2		1	07/01/21 13:04	D1G0020	DG10143
Tetrachloroethene	ND (0.5)		524.2		1	07/01/21 13:04	D1G0020	DG10143
Toluene	**1.4** (0.5)		524.2		1	07/01/21 13:04	D1G0020	DG10143
Trichloroethene	ND (0.5)		524.2		1	07/01/21 13:04	D1G0020	DG10143
Vinyl Chloride	ND (0.2)		524.2		1	07/01/21 13:04	D1G0020	DG10143
Xylene O	ND (0.5)		524.2		1	07/01/21 13:04	D1G0020	DG10143
Xylene P,M	ND (0.5)		524.2		1	07/01/21 13:04	D1G0020	DG10143

	%Recovery	Qualifier	Limits
Surrogate: 1,2-Dichlorobenzene-d4	*103 %*		*80-120*
Surrogate: 4-Bromofluorobenzene	*91 %*		*80-120*

CERTIFICATE OF ANALYSIS

Client Name: Ramboll US Consulting Inc
Client Project ID: St Gobain Worcester MA RGP
Client Sample ID: TW-TP-02-210630
Date Sampled: 06/30/21 12:10
Percent Solids: N/A
Initial Volume: 1070
Final Volume: 1
Extraction Method: 3510C

ESS Laboratory Work Order: 21F1141
ESS Laboratory Sample ID: 21F1141-01
Sample Matrix: Ground Water
Units: ug/L
Analyst: MJV
Prepared: 6/30/21 19:30

608.3 Polychlorinated Biphenyls (PCB)

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyzed	Sequence	Batch
Aroclor 1016	ND (0.09)		608.3		1	07/01/21 9:43		DF13009
Aroclor 1221	ND (0.09)		608.3		1	07/01/21 9:43		DF13009
Aroclor 1232	ND (0.09)		608.3		1	07/01/21 9:43		DF13009
Aroclor 1242	ND (0.09)		608.3		1	07/01/21 9:43		DF13009
Aroclor 1248	ND (0.09)		608.3		1	07/01/21 9:43		DF13009
Aroclor 1254	ND (0.09)		608.3		1	07/01/21 9:43		DF13009
Aroclor 1260	ND (0.09)		608.3		1	07/01/21 9:43		DF13009
Aroclor 1262	ND (0.09)		608.3		1	07/01/21 9:43		DF13009
Aroclor 1268	ND (0.09)		608.3		1	07/01/21 9:43		DF13009

	%Recovery	*Qualifier*	*Limits*
Surrogate: Decachlorobiphenyl	*66 %*		*30-150*
Surrogate: Decachlorobiphenyl [2C]	*70 %*		*30-150*
Surrogate: Tetrachloro-m-xylene	*65 %*		*30-150*
Surrogate: Tetrachloro-m-xylene [2C]	*68 %*		*30-150*

CERTIFICATE OF ANALYSIS

Client Name: Ramboll US Consulting Inc
Client Project ID: St Gobain Worcester MA RGP
Client Sample ID: TW-TP-02-210630
Date Sampled: 06/30/21 12:10
Percent Solids: N/A
Initial Volume: 1070
Final Volume: 0.25
Extraction Method: 3510C

ESS Laboratory Work Order: 21F1141
ESS Laboratory Sample ID: 21F1141-01
Sample Matrix: Ground Water
Units: ug/L
Analyst: TAJ
Prepared: 7/1/21 12:25

625.1(SIM) Semi-Volatile Organic Compounds

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyzed	Sequence	Batch
Acenaphthene	**16.2** (1.87)		625.1 SIM		10	07/01/21 19:46	D1F0642	DG10117
Acenaphthylene	**0.22** (0.19)		625.1 SIM		1	07/01/21 16:35	D1F0642	DG10117
Anthracene	**0.68** (0.19)		625.1 SIM		1	07/01/21 16:35	D1F0642	DG10117
Benzo(a)anthracene	ND (0.05)		625.1 SIM		1	07/01/21 16:35	D1F0642	DG10117
Benzo(a)pyrene	ND (0.05)		625.1 SIM		1	07/01/21 16:35	D1F0642	DG10117
Benzo(b)fluoranthene	ND (0.05)		625.1 SIM		1	07/01/21 16:35	D1F0642	DG10117
Benzo(g,h,i)perylene	ND (0.19)		625.1 SIM		1	07/01/21 16:35	D1F0642	DG10117
Benzo(k)fluoranthene	ND (0.05)		625.1 SIM		1	07/01/21 16:35	D1F0642	DG10117
bis(2-Ethylhexyl)phthalate	ND (2.34)		625.1 SIM		1	07/01/21 16:35	D1F0642	DG10117
Butylbenzylphthalate	ND (2.34)		625.1 SIM		1	07/01/21 16:35	D1F0642	DG10117
Chrysene	ND (0.05)		625.1 SIM		1	07/01/21 16:35	D1F0642	DG10117
Dibenzo(a,h)Anthracene	ND (0.05)		625.1 SIM		1	07/01/21 16:35	D1F0642	DG10117
Diethylphthalate	ND (2.34)		625.1 SIM		1	07/01/21 16:35	D1F0642	DG10117
Dimethylphthalate	ND (2.34)		625.1 SIM		1	07/01/21 16:35	D1F0642	DG10117
Di-n-butylphthalate	ND (2.34)		625.1 SIM		1	07/01/21 16:35	D1F0642	DG10117
Di-n-octylphthalate	ND (2.34)		625.1 SIM		1	07/01/21 16:35	D1F0642	DG10117
Fluoranthene	**1.03** (0.19)		625.1 SIM		1	07/01/21 16:35	D1F0642	DG10117
Fluorene	**6.01** (0.19)		625.1 SIM		1	07/01/21 16:35	D1F0642	DG10117
Indeno(1,2,3-cd)Pyrene	ND (0.05)		625.1 SIM		1	07/01/21 16:35	D1F0642	DG10117
Naphthalene	**10.2** (0.19)		625.1 SIM		1	07/01/21 16:35	D1F0642	DG10117
Pentachlorophenol	ND (0.84)		625.1 SIM		1	07/01/21 16:35	D1F0642	DG10117
Phenanthrene	**6.38** (0.19)		625.1 SIM		1	07/01/21 16:35	D1F0642	DG10117
Pyrene	**0.58** (0.19)		625.1 SIM		1	07/01/21 16:35	D1F0642	DG10117

	%Recovery	Qualifier	Limits
Surrogate: 1,2-Dichlorobenzene-d4	*37 %*		*30-130*
Surrogate: 2,4,6-Tribromophenol	*89 %*		*15-110*
Surrogate: 2-Fluorobiphenyl	*55 %*		*30-130*
Surrogate: Nitrobenzene-d5	*77 %*		*30-130*
Surrogate: p-Terphenyl-d14	*97 %*		*30-130*

CERTIFICATE OF ANALYSIS

Client Name: Ramboll US Consulting Inc
Client Project ID: St Gobain Worcester MA RGP
Client Sample ID: TW-TP-02-210630
Date Sampled: 06/30/21 12:10
Percent Solids: N/A
Initial Volume: 500
Final Volume: 0.5
Extraction Method: 3535A

ESS Laboratory Work Order: 21F1141
ESS Laboratory Sample ID: 21F1141-01
Sample Matrix: Ground Water
Units: ug/L
Analyst: TAJ
Prepared: 7/1/21 16:00

8270D(SIM) Semi-Volatile Organic Compounds w/ Isotope Dilution

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyzed	Sequence	Batch
1,4-Dioxane	ND (0.250)		8270D SIM		1	07/02/21 5:09	D1G0035	DG10154

	%Recovery	Qualifier	Limits
Surrogate: 1,4-Dioxane-d8	58 %		15-115

CERTIFICATE OF ANALYSIS

Client Name: Ramboll US Consulting Inc
Client Project ID: St Gobain Worcester MA RGP
Client Sample ID: TW-TP-02-210630
Date Sampled: 06/30/21 12:10
Percent Solids: N/A

ESS Laboratory Work Order: 21F1141
ESS Laboratory Sample ID: 21F1141-01
Sample Matrix: Ground Water

Classical Chemistry

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyst	Analyzed	Units	Batch
Ammonia as N	**10.7** (1.00)		350.1		10	JLK	07/01/21 16:57	mg/L	DG10109
Chloride	**3360** (100)		300.0		200	EEM	07/01/21 3:56	mg/L	DF13024
Hexavalent Chromium	ND (10.0)		3500Cr B-2009		1	EAM	06/30/21 19:50	ug/L	DF13054
pH	**9.81** (N/A)		4500 H+ B		1	EAM	06/30/21 20:21	S.U.	DF13059
pH Sample Temp	**Aqueous pH measured in water at 21.6 ºC.** (N/A)								
Phenols	ND (50)		420.1		1	JLK	07/01/21 17:34	ug/L	DG10159
Total Cyanide	ND (5.00)		4500 CN CE		1	EEM	07/01/21 14:45	ug/L	DG10130
Total Petroleum Hydrocarbon	ND (5)		1664A		1	LAB	07/01/21 13:47	mg/L	DG10111
Total Residual Chlorine	ND (20.0)		4500Cl D		1	CCP	06/30/21 17:36	ug/L	DF13052
Total Suspended Solids	**148** (5)		2540D		1	CCP	06/30/21 19:30	mg/L	DF13001

CERTIFICATE OF ANALYSIS

Client Name: Ramboll US Consulting Inc
Client Project ID: St Gobain Worcester MA RGP
Client Sample ID: TW-TP-02-210630
Date Sampled: 06/30/21 12:10
Percent Solids: N/A
Initial Volume: 35
Final Volume: 2
Extraction Method: 504/8011

ESS Laboratory Work Order: 21F1141
ESS Laboratory Sample ID: 21F1141-01
Sample Matrix: Ground Water
Units: ug/L
Analyst: DMC
Prepared: 7/1/21 11:20

504.1 1,2-Dibromoethane / 1,2-Dibromo-3-chloropropane

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyzed	Sequence	Batch
1,2-Dibromo-3-Chloropropane	ND (0.015)		504.1		1	07/01/21 14:33		DG10119
1,2-Dibromoethane	ND (0.015)		504.1		1	07/01/21 14:33		DG10119

	%Recovery	Qualifier	Limits
Surrogate: Pentachloroethane	*122 %*		*30-150*
Surrogate: Pentachloroethane [2C]	*128 %*		*30-150*

CERTIFICATE OF ANALYSIS

Client Name: Ramboll US Consulting Inc
Client Project ID: St Gobain Worcester MA RGP
Client Sample ID: TW-TP-02-210630
Date Sampled: 06/30/21 12:10
Percent Solids: N/A
Initial Volume: 1
Final Volume: 1
Extraction Method: No Prep

ESS Laboratory Work Order: 21F1141
ESS Laboratory Sample ID: 21F1141-01
Sample Matrix: Ground Water
Units: mg/L
Analyst: MJV
Prepared: 7/1/21 8:00

Alcohol Scan by GC/FID

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyst	Analyzed	Sequence	Batch
Ethanol	ND (10)		ASTM D3695		1	MJV	07/01/21 11:24		DG10104

CERTIFICATE OF ANALYSIS

Client Name: Ramboll US Consulting Inc
Client Project ID: St Gobain Worcester MA RGP

ESS Laboratory Work Order: 21F1141

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Dissolved Metals										
Batch DG10106 - 3005A/200.7										
Blank										
Antimony	ND	5.0	ug/L							
Cadmium	ND	1.0	ug/L							
Chromium	ND	2.0	ug/L							
Copper	ND	2.0	ug/L							
Iron	ND	10.0	ug/L							
Lead	ND	2.0	ug/L							
Nickel	ND	5.0	ug/L							
Silver	ND	1.0	ug/L							
Zinc	ND	5.0	ug/L							
Blank										
Arsenic	ND	0.5	ug/L							
Selenium	ND	1.0	ug/L							
LCS										
Antimony	54.8	5.0	ug/L	50.00		110	85-115			
Cadmium	25.7	1.0	ug/L	25.00		103	85-115			
Chromium	52.3	2.0	ug/L	50.00		105	85-115			
Copper	50.5	2.0	ug/L	50.00		101	85-115			
Iron	260	10.0	ug/L	250.0		104	85-115			
Lead	54.2	2.0	ug/L	50.00		108	80-120			
Nickel	53.6	5.0	ug/L	50.00		107	85-115			
Silver	25.6	1.0	ug/L	25.00		102	85-115			
Zinc	52.8	5.0	ug/L	50.00		106	85-115			
LCS										
Arsenic	43.1	12.5	ug/L	50.00		86	85-115			
Selenium	93.8	25.0	ug/L	100.0		94	85-115			
Batch DG10139 - 245.1/7470A										
Blank										
Mercury	ND	0.20	ug/L							
LCS										
Mercury	6.51	0.20	ug/L	6.042		108	85-115			
Total Metals										
Batch DG10106 - 3005A/200.7										
Blank										
Antimony	ND	5.0	ug/L							
Cadmium	ND	1.0	ug/L							
Calcium	ND	0.020	mg/L							
Chromium	ND	2.0	ug/L							
Copper	ND	2.0	ug/L							
Iron	ND	10.0	ug/L							
Lead	ND	2.0	ug/L							
Magnesium	ND	0.020	mg/L							

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Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Total Metals										
Batch DG10106 - 3005A/200.7										
Nickel	ND	5.0	ug/L							
Silver	ND	1.0	ug/L							
Zinc	ND	5.0	ug/L							
Blank										
Arsenic	ND	0.5	ug/L							
Selenium	ND	1.0	ug/L							
LCS										
Antimony	54.8	5.0	ug/L	50.00		110	85-115			
Cadmium	25.7	1.0	ug/L	25.00		103	85-115			
Calcium	0.530	0.020	mg/L	0.5000		106	85-115			
Chromium	52.3	2.0	ug/L	50.00		105	85-115			
Copper	50.5	2.0	ug/L	50.00		101	85-115			
Iron	260	10.0	ug/L	250.0		104	85-115			
Lead	54.2	2.0	ug/L	50.00		108	85-115			
Magnesium	0.522	0.020	mg/L	0.5000		104	85-115			
Nickel	53.6	5.0	ug/L	50.00		107	85-115			
Silver	25.6	1.0	ug/L	25.00		102	85-115			
Zinc	52.8	5.0	ug/L	50.00		106	85-115			
LCS										
Arsenic	43.1	12.5	ug/L	50.00		86	85-115			
Selenium	93.8	25.0	ug/L	100.0		94	85-115			
Batch DG10139 - 245.1/7470A										
Blank										
Mercury	ND	0.2	ug/L							
LCS										
Mercury	6.5	0.2	ug/L	6.042		108	85-115			
524.2 Volatile Organic Compounds										
Batch DG10143 - 524.2										
Blank										
1,1,1-Trichloroethane	ND	0.5	ug/L							
1,1,2-Trichloroethane	ND	0.5	ug/L							
1,1-Dichloroethane	ND	0.5	ug/L							
1,1-Dichloroethene	ND	0.5	ug/L							
1,2-Dichlorobenzene	ND	0.5	ug/L							
1,2-Dichloroethane	ND	0.5	ug/L							
1,3-Dichlorobenzene	ND	0.5	ug/L							
1,4-Dichlorobenzene	ND	0.5	ug/L							
Acetone	ND	5.0	ug/L							
Benzene	ND	0.5	ug/L							
Carbon Tetrachloride	ND	0.3	ug/L							
cis-1,2-Dichloroethene	ND	0.5	ug/L							
Ethylbenzene	ND	0.5	ug/L							

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Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
524.2 Volatile Organic Compounds										
Batch DG10143 - 524.2										
Methyl tert-Butyl Ether	ND	0.5	ug/L							
Methylene Chloride	ND	0.5	ug/L							
Naphthalene	ND	0.5	ug/L							
Tertiary-amyl methyl ether	ND	1.0	ug/L							
Tertiary-butyl Alcohol	ND	25.0	ug/L							
Tetrachloroethene	ND	0.5	ug/L							
Toluene	ND	0.5	ug/L							
Trichloroethene	ND	0.5	ug/L							
Vinyl Chloride	ND	0.2	ug/L							
Xylene O	ND	0.5	ug/L							
Xylene P,M	ND	0.5	ug/L							
Surrogate: 1,2-Dichlorobenzene-d4	*4.38*		ug/L	*5.000*		*88*	*80-120*			
Surrogate: 4-Bromofluorobenzene	*4.24*		ug/L	*5.000*		*85*	*80-120*			
LCS										
1,1,1-Trichloroethane	10.2	0.5	ug/L	10.00		102	70-130			
1,1,2-Trichloroethane	10.1	0.5	ug/L	10.00		101	70-130			
1,1-Dichloroethane	10.0	0.5	ug/L	10.00		100	70-130			
1,1-Dichloroethene	11.0	0.5	ug/L	10.00		110	70-130			
1,2-Dichlorobenzene	10.9	0.5	ug/L	10.00		109	70-130			
1,2-Dichloroethane	9.4	0.5	ug/L	10.00		94	70-130			
1,3-Dichlorobenzene	11.3	0.5	ug/L	10.00		113	70-130			
1,4-Dichlorobenzene	11.2	0.5	ug/L	10.00		112	70-130			
Acetone	53.2	5.0	ug/L	50.00		106	70-130			
Benzene	10.6	0.5	ug/L	10.00		106	70-130			
Carbon Tetrachloride	10.9	0.3	ug/L	10.00		109	70-130			
cis-1,2-Dichloroethene	10.8	0.5	ug/L	10.00		108	70-130			
Ethylbenzene	11.2	0.5	ug/L	10.00		112	70-130			
Methyl tert-Butyl Ether	9.7	0.5	ug/L	10.00		97	70-130			
Methylene Chloride	10.8	0.5	ug/L	10.00		108	70-130			
Naphthalene	8.8	0.5	ug/L	10.00		88	70-130			
Tertiary-amyl methyl ether	8.6	1.0	ug/L	10.00		86	70-130			
Tertiary-butyl Alcohol	50.3	25.0	ug/L	50.00		101	70-130			
Tetrachloroethene	11.9	0.5	ug/L	10.00		119	70-130			
Toluene	10.9	0.5	ug/L	10.00		109	70-130			
Trichloroethene	10.7	0.5	ug/L	10.00		107	70-130			
Vinyl Chloride	10.5	0.2	ug/L	10.00		105	70-130			
Xylene O	11.7	0.5	ug/L	10.00		117	70-130			
Xylene P,M	23.7	0.5	ug/L	20.00		118	70-130			
Surrogate: 1,2-Dichlorobenzene-d4	*5.25*		ug/L	*5.000*		*105*	*80-120*			
Surrogate: 4-Bromofluorobenzene	*5.08*		ug/L	*5.000*		*102*	*80-120*			
LCS Dup										
1,1,1-Trichloroethane	9.8	0.5	ug/L	10.00		98	70-130	5	20	
1,1,2-Trichloroethane	9.9	0.5	ug/L	10.00		99	70-130	1	20	
1,1-Dichloroethane	9.6	0.5	ug/L	10.00		96	70-130	5	20	
1,1-Dichloroethene	10.8	0.5	ug/L	10.00		108	70-130	2	20	

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Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
524.2 Volatile Organic Compounds										
Batch DG10143 - 524.2										
1,2-Dichlorobenzene	10.7	0.5	ug/L	10.00		107	70-130	2	20	
1,2-Dichloroethane	9.2	0.5	ug/L	10.00		92	70-130	2	20	
1,3-Dichlorobenzene	11.1	0.5	ug/L	10.00		111	70-130	2	20	
1,4-Dichlorobenzene	11.3	0.5	ug/L	10.00		113	70-130	0.9	20	
Acetone	53.0	5.0	ug/L	50.00		106	70-130	0.3	20	
Benzene	10.2	0.5	ug/L	10.00		102	70-130	4	20	
Carbon Tetrachloride	10.5	0.3	ug/L	10.00		105	70-130	4	20	
cis-1,2-Dichloroethene	10.4	0.5	ug/L	10.00		104	70-130	3	20	
Ethylbenzene	10.7	0.5	ug/L	10.00		107	70-130	5	20	
Methyl tert-Butyl Ether	9.9	0.5	ug/L	10.00		99	70-130	2	20	
Methylene Chloride	10.7	0.5	ug/L	10.00		107	70-130	1	20	
Naphthalene	9.6	0.5	ug/L	10.00		96	70-130	8	20	
Tertiary-amyl methyl ether	9.2	1.0	ug/L	10.00		92	70-130	7	20	
Tertiary-butyl Alcohol	51.4	25.0	ug/L	50.00		103	70-130	2	25	
Tetrachloroethene	11.6	0.5	ug/L	10.00		116	70-130	3	20	
Toluene	10.7	0.5	ug/L	10.00		107	70-130	2	20	
Trichloroethene	10.1	0.5	ug/L	10.00		101	70-130	6	20	
Vinyl Chloride	9.8	0.2	ug/L	10.00		98	70-130	6	20	
Xylene O	11.3	0.5	ug/L	10.00		113	70-130	4	20	
Xylene P,M	23.0	0.5	ug/L	20.00		115	70-130	3	20	
Surrogate: 1,2-Dichlorobenzene-d4	*5.22*		ug/L	*5.000*		*104*	*80-120*			
Surrogate: 4-Bromofluorobenzene	*5.09*		ug/L	*5.000*		*102*	*80-120*			
608.3 Polychlorinated Biphenyls (PCB)										
Batch DF13009 - 3510C										
Blank										
Aroclor 1016	ND	0.10	ug/L							
Aroclor 1016 [2C]	ND	0.10	ug/L							
Aroclor 1221	ND	0.10	ug/L							
Aroclor 1221 [2C]	ND	0.10	ug/L							
Aroclor 1232	ND	0.10	ug/L							
Aroclor 1232 [2C]	ND	0.10	ug/L							
Aroclor 1242	ND	0.10	ug/L							
Aroclor 1242 [2C]	ND	0.10	ug/L							
Aroclor 1248	ND	0.10	ug/L							
Aroclor 1248 [2C]	ND	0.10	ug/L							
Aroclor 1254	ND	0.10	ug/L							
Aroclor 1254 [2C]	ND	0.10	ug/L							
Aroclor 1260	ND	0.10	ug/L							
Aroclor 1260 [2C]	ND	0.10	ug/L							
Aroclor 1262	ND	0.10	ug/L							
Aroclor 1262 [2C]	ND	0.10	ug/L							
Aroclor 1268	ND	0.10	ug/L							
Aroclor 1268 [2C]	ND	0.10	ug/L							

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608.3 Polychlorinated Biphenyls (PCB)										
Batch DF13009 - 3510C										
Surrogate: Decachlorobiphenyl	*0.0368*		ug/L	*0.05000*		*74*	*30-150*			
Surrogate: Decachlorobiphenyl [2C]	*0.0380*		ug/L	*0.05000*		*76*	*30-150*			
Surrogate: Tetrachloro-m-xylene	*0.0386*		ug/L	*0.05000*		*77*	*30-150*			
Surrogate: Tetrachloro-m-xylene [2C]	*0.0412*		ug/L	*0.05000*		*82*	*30-150*			
LCS										
Aroclor 1016	0.80	0.10	ug/L	1.000		80	50-140			
Aroclor 1016 [2C]	0.82	0.10	ug/L	1.000		82	50-140			
Aroclor 1260	0.84	0.10	ug/L	1.000		84	1-164			
Aroclor 1260 [2C]	0.87	0.10	ug/L	1.000		87	1-164			
Surrogate: Decachlorobiphenyl	*0.0399*		ug/L	*0.05000*		*80*	*30-150*			
Surrogate: Decachlorobiphenyl [2C]	*0.0407*		ug/L	*0.05000*		*81*	*30-150*			
Surrogate: Tetrachloro-m-xylene	*0.0411*		ug/L	*0.05000*		*82*	*30-150*			
Surrogate: Tetrachloro-m-xylene [2C]	*0.0415*		ug/L	*0.05000*		*83*	*30-150*			
LCS Dup										
Aroclor 1016	0.83	0.10	ug/L	1.000		83	50-140	5	36	
Aroclor 1016 [2C]	0.86	0.10	ug/L	1.000		86	50-140	4	36	
Aroclor 1260	0.90	0.10	ug/L	1.000		90	1-164	6	38	
Aroclor 1260 [2C]	0.93	0.10	ug/L	1.000		93	1-164	7	38	
Surrogate: Decachlorobiphenyl	*0.0412*		ug/L	*0.05000*		*82*	*30-150*			
Surrogate: Decachlorobiphenyl [2C]	*0.0430*		ug/L	*0.05000*		*86*	*30-150*			
Surrogate: Tetrachloro-m-xylene	*0.0411*		ug/L	*0.05000*		*82*	*30-150*			
Surrogate: Tetrachloro-m-xylene [2C]	*0.0413*		ug/L	*0.05000*		*83*	*30-150*			
625.1(SIM) Semi-Volatile Organic Compounds										
Batch DG10117 - 3510C										
Blank										
Acenaphthene	ND	0.20	ug/L							
Acenaphthylene	ND	0.20	ug/L							
Anthracene	ND	0.20	ug/L							
Benzo(a)anthracene	ND	0.05	ug/L							
Benzo(a)pyrene	ND	0.05	ug/L							
Benzo(b)fluoranthene	ND	0.05	ug/L							
Benzo(g,h,i)perylene	ND	0.20	ug/L							
Benzo(k)fluoranthene	ND	0.05	ug/L							
bis(2-Ethylhexyl)phthalate	ND	2.50	ug/L							
Butylbenzylphthalate	ND	2.50	ug/L							
Chrysene	ND	0.05	ug/L							
Dibenzo(a,h)Anthracene	ND	0.05	ug/L							
Diethylphthalate	ND	2.50	ug/L							
Dimethylphthalate	ND	2.50	ug/L							
Di-n-butylphthalate	ND	2.50	ug/L							
Di-n-octylphthalate	ND	2.50	ug/L							

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625.1(SIM) Semi-Volatile Organic Compounds										
Batch DG10117 - 3510C										
Fluoranthene	ND	0.20	ug/L							
Fluorene	ND	0.20	ug/L							
Indeno(1,2,3-cd)Pyrene	ND	0.05	ug/L							
Naphthalene	ND	0.20	ug/L							
Pentachlorophenol	ND	0.90	ug/L							
Phenanthrene	ND	0.20	ug/L							
Pyrene	ND	0.20	ug/L							
Surrogate: 1,2-Dichlorobenzene-d4	*1.20*		ug/L	*2.500*		*48*	*30-130*			
Surrogate: 2,4,6-Tribromophenol	*2.46*		ug/L	*3.750*		*66*	*15-110*			
Surrogate: 2-Fluorobiphenyl	*1.47*		ug/L	*2.500*		*59*	*30-130*			
Surrogate: Nitrobenzene-d5	*1.93*		ug/L	*2.500*		*77*	*30-130*			
Surrogate: p-Terphenyl-d14	*2.11*		ug/L	*2.500*		*84*	*30-130*			
LCS										
Acenaphthene	2.64	0.20	ug/L	4.000		66	40-140			
Acenaphthylene	2.51	0.20	ug/L	4.000		63	40-140			
Anthracene	2.79	0.20	ug/L	4.000		70	40-140			
Benzo(a)anthracene	2.72	0.05	ug/L	4.000		68	40-140			
Benzo(a)pyrene	2.91	0.05	ug/L	4.000		73	40-140			
Benzo(b)fluoranthene	3.37	0.05	ug/L	4.000		84	40-140			
Benzo(g,h,i)perylene	3.24	0.20	ug/L	4.000		81	40-140			
Benzo(k)fluoranthene	3.25	0.05	ug/L	4.000		81	40-140			
bis(2-Ethylhexyl)phthalate	3.55	2.50	ug/L	4.000		89	40-140			
Butylbenzylphthalate	3.64	2.50	ug/L	4.000		91	40-140			
Chrysene	2.70	0.05	ug/L	4.000		68	40-140			
Dibenzo(a,h)Anthracene	3.42	0.05	ug/L	4.000		85	40-140			
Diethylphthalate	3.24	2.50	ug/L	4.000		81	40-140			
Dimethylphthalate	3.19	2.50	ug/L	4.000		80	40-140			
Di-n-butylphthalate	3.23	2.50	ug/L	4.000		81	40-140			
Di-n-octylphthalate	3.98	2.50	ug/L	4.000		100	40-140			
Fluoranthene	2.72	0.20	ug/L	4.000		68	40-140			
Fluorene	2.87	0.20	ug/L	4.000		72	40-140			
Indeno(1,2,3-cd)Pyrene	3.57	0.05	ug/L	4.000		89	40-140			
Naphthalene	2.20	0.20	ug/L	4.000		55	40-140			
Pentachlorophenol	1.54	0.90	ug/L	4.000		39	30-130			
Phenanthrene	2.75	0.20	ug/L	4.000		69	40-140			
Pyrene	3.32	0.20	ug/L	4.000		83	40-140			
Surrogate: 1,2-Dichlorobenzene-d4	*1.39*		ug/L	*2.500*		*56*	*30-130*			
Surrogate: 2,4,6-Tribromophenol	*2.72*		ug/L	*3.750*		*73*	*15-110*			
Surrogate: 2-Fluorobiphenyl	*1.82*		ug/L	*2.500*		*73*	*30-130*			
Surrogate: Nitrobenzene-d5	*2.00*		ug/L	*2.500*		*80*	*30-130*			
Surrogate: p-Terphenyl-d14	*2.44*		ug/L	*2.500*		*97*	*30-130*			
LCS Dup										
Acenaphthene	2.70	0.20	ug/L	4.000		67	40-140	2	20	
Acenaphthylene	2.50	0.20	ug/L	4.000		63	40-140	0.1	20	
Anthracene	3.02	0.20	ug/L	4.000		75	40-140	8	20	

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625.1(SIM) Semi-Volatile Organic Compounds										
Batch DG10117 - 3510C										
Benzo(a)anthracene	3.26	0.05	ug/L	4.000		81	40-140	18	20	
Benzo(a)pyrene	3.25	0.05	ug/L	4.000		81	40-140	11	20	
Benzo(b)fluoranthene	3.39	0.05	ug/L	4.000		85	40-140	0.6	20	
Benzo(g,h,i)perylene	3.15	0.20	ug/L	4.000		79	40-140	3	20	
Benzo(k)fluoranthene	3.10	0.05	ug/L	4.000		77	40-140	5	20	
bis(2-Ethylhexyl)phthalate	3.92	2.50	ug/L	4.000		98	40-140	10	20	
Butylbenzylphthalate	4.00	2.50	ug/L	4.000		100	40-140	9	20	
Chrysene	3.04	0.05	ug/L	4.000		76	40-140	12	20	
Dibenzo(a,h)Anthracene	3.57	0.05	ug/L	4.000		89	40-140	5	20	
Diethylphthalate	3.50	2.50	ug/L	4.000		87	40-140	8	20	
Dimethylphthalate	3.29	2.50	ug/L	4.000		82	40-140	3	20	
Di-n-butylphthalate	3.71	2.50	ug/L	4.000		93	40-140	14	20	
Di-n-octylphthalate	3.98	2.50	ug/L	4.000		100	40-140	0.08	20	
Fluoranthene	3.44	0.20	ug/L	4.000		86	40-140	23	20	D+
Fluorene	3.02	0.20	ug/L	4.000		76	40-140	5	20	
Indeno(1,2,3-cd)Pyrene	3.91	0.05	ug/L	4.000		98	40-140	9	20	
Naphthalene	2.26	0.20	ug/L	4.000		56	40-140	2	20	
Pentachlorophenol	2.32	0.90	ug/L	4.000		58	30-130	40	20	D+
Phenanthrene	3.00	0.20	ug/L	4.000		75	40-140	9	20	
Pyrene	3.19	0.20	ug/L	4.000		80	40-140	4	20	
Surrogate: 1,2-Dichlorobenzene-d4	*1.38*		ug/L	*2.500*		*55*	*30-130*			
Surrogate: 2,4,6-Tribromophenol	*2.95*		ug/L	*3.750*		*79*	*15-110*			
Surrogate: 2-Fluorobiphenyl	*1.70*		ug/L	*2.500*		*68*	*30-130*			
Surrogate: Nitrobenzene-d5	*1.95*		ug/L	*2.500*		*78*	*30-130*			
Surrogate: p-Terphenyl-d14	*2.26*		ug/L	*2.500*		*91*	*30-130*			
8270D(SIM) Semi-Volatile Organic Compounds w/ Isotope Dilution										
Batch DG10154 - 3535A										
Blank										
1,4-Dioxane	ND	0.250	ug/L							
Surrogate: 1,4-Dioxane-d8	*3.79*		ug/L	*5.000*		*76*	*15-115*			
LCS										
1,4-Dioxane	8.32	0.250	ug/L	10.00		83	40-140			
Surrogate: 1,4-Dioxane-d8	*4.00*		ug/L	*5.000*		*80*	*15-115*			
LCS Dup										
1,4-Dioxane	9.00	0.250	ug/L	10.00		90	40-140	8	20	
Surrogate: 1,4-Dioxane-d8	*4.15*		ug/L	*5.000*		*83*	*15-115*			
Classical Chemistry										
Batch DF13001 - General Preparation										
Blank										
Total Suspended Solids	ND	5	mg/L							
LCS										
Total Suspended Solids	90		mg/L	88.60		102	80-120			

CERTIFICATE OF ANALYSIS

Client Name: Ramboll US Consulting Inc
Client Project ID: St Gobain Worcester MA RGP

ESS Laboratory Work Order: 21F1141

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Classical Chemistry										
Batch DF13024 - General Preparation										
Blank										
Chloride	ND	0.5	mg/L							
LCS										
Chloride	9.7		mg/L	10.00		97	90-110			
Batch DF13052 - General Preparation										
Blank										
Total Residual Chlorine	ND	20.0	ug/L							
LCS										
Total Residual Chlorine	2.26		mg/L	2.260		100	85-115			
Batch DF13054 - General Preparation										
Blank										
Hexavalent Chromium	ND	10.0	ug/L							
LCS										
Hexavalent Chromium	490	10.0	ug/L	499.8		98	90-110			
LCS Dup										
Hexavalent Chromium	493	10.0	ug/L	499.8		99	90-110	0.5	20	
Batch DG10109 - NH4 Prep										
Blank										
Ammonia as N	ND	0.10	mg/L							
LCS										
Ammonia as N	0.94	0.10	mg/L	0.9994		94	80-120			
Batch DG10111 - General Preparation										
Blank										
Total Petroleum Hydrocarbon	ND	5	mg/L							
LCS										
Total Petroleum Hydrocarbon	15	5	mg/L	19.38		75	66-114			
Batch DG10130 - TCN Prep										
Blank										
Total Cyanide	ND	5.00	ug/L							
LCS										
Total Cyanide	20.3	5.00	ug/L	20.06		101	90-110			
LCS										
Total Cyanide	149	5.00	ug/L	150.4		99	90-110			
LCS Dup										
Total Cyanide	148	5.00	ug/L	150.4		99	90-110	0.6	20	
Batch DG10159 - General Preparation										
Blank										
Phenols	ND	50	ug/L							
LCS										
Phenols	1010	50	ug/L	1000		101	80-120			

CERTIFICATE OF ANALYSIS

Client Name: Ramboll US Consulting Inc
Client Project ID: St Gobain Worcester MA RGP

ESS Laboratory Work Order: 21F1141

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
504.1 1,2-Dibromoethane / 1,2-Dibromo-3-chloropropane										
Batch DG10119 - 504/8011										
Blank										
1,2-Dibromo-3-Chloropropane	ND	0.015	ug/L							
1,2-Dibromo-3-Chloropropane [2C]	ND	0.015	ug/L							
1,2-Dibromoethane	ND	0.015	ug/L							
1,2-Dibromoethane [2C]	ND	0.015	ug/L							
Surrogate: Pentachloroethane	*0.0801*		ug/L	*0.08000*		*100*	*30-150*			
Surrogate: Pentachloroethane [2C]	*0.0771*		ug/L	*0.08000*		*96*	*30-150*			
LCS										
1,2-Dibromo-3-Chloropropane	0.045	0.015	ug/L	0.04000		111	70-130			
1,2-Dibromo-3-Chloropropane [2C]	0.041	0.015	ug/L	0.04000		103	70-130			
1,2-Dibromoethane	0.041	0.015	ug/L	0.04000		103	70-130			
1,2-Dibromoethane [2C]	0.043	0.015	ug/L	0.04000		109	70-130			
Surrogate: Pentachloroethane	*0.0802*		ug/L	*0.08000*		*100*	*30-150*			
Surrogate: Pentachloroethane [2C]	*0.0769*		ug/L	*0.08000*		*96*	*30-150*			
LCS										
1,2-Dibromo-3-Chloropropane	0.090	0.015	ug/L	0.08000		113	70-130			
1,2-Dibromo-3-Chloropropane [2C]	0.083	0.015	ug/L	0.08000		104	70-130			
1,2-Dibromoethane	0.086	0.015	ug/L	0.08000		107	70-130			
1,2-Dibromoethane [2C]	0.091	0.015	ug/L	0.08000		114	70-130			
Surrogate: Pentachloroethane	*0.0823*		ug/L	*0.08000*		*103*	*30-150*			
Surrogate: Pentachloroethane [2C]	*0.0763*		ug/L	*0.08000*		*95*	*30-150*			
Alcohol Scan by GC/FID										
Batch DG10104 - No Prep										
Blank										
Ethanol	ND	10	mg/L							
LCS										
Ethanol	1320	10	mg/L	1000		132	60-140			
LCS Dup										
Ethanol	1180	10	mg/L	1000		118	60-140	11	30	

CERTIFICATE OF ANALYSIS

Client Name: Ramboll US Consulting Inc
Client Project ID: St Gobain Worcester MA RGP

ESS Laboratory Work Order: 21F1141

Notes and Definitions

Z16	Aqueous pH measured in water at 21.6 ºC.
U	Analyte included in the analysis, but not detected
Q	Calibration required quadratic regression (Q).
HT	The maximum holding time listed in 40 CFR Part 136 Table II for pH, Dissolved Oxygen, Sulfite and Residual Chlorine is fifteen minutes.
EL	Elevated Method Reporting Limits due to sample matrix (EL).
D+	Relative percent difference for duplicate is outside of criteria (D+).
D	Diluted.
CD+	Continuing Calibration %Diff/Drift is above control limit (CD+).
ND	Analyte NOT DETECTED at or above the MRL (LOQ), LOD for DoD Reports, MDL for J-Flagged Analytes
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference
MDL	Method Detection Limit
MRL	Method Reporting Limit
LOD	Limit of Detection
LOQ	Limit of Quantitation
DL	Detection Limit
I/V	Initial Volume
F/V	Final Volume
§	Subcontracted analysis; see attached report
1	Range result excludes concentrations of surrogates and/or internal standards eluting in that range.
2	Range result excludes concentrations of target analytes eluting in that range.
3	Range result excludes the concentration of the C9-C10 aromatic range.
Avg	Results reported as a mathematical average.
NR	No Recovery
[CALC]	Calculated Analyte
SUB	Subcontracted analysis; see attached report
RL	Reporting Limit
EDL	Estimated Detection Limit
MF	Membrane Filtration
MPN	Most Probably Number
TNTC	Too numerous to Count
CFU	Colony Forming Units

CERTIFICATE OF ANALYSIS

Client Name: Ramboll US Consulting Inc
Client Project ID: St Gobain Worcester MA RGP

ESS Laboratory Work Order: 21F1141

ESS LABORATORY CERTIFICATIONS AND ACCREDITATIONS

ENVIRONMENTAL

Rhode Island Potable and Non Potable Water: LAI00179
http://www.health.ri.gov/find/labs/analytical/ESS.pdf

Connecticut Potable and Non Potable Water, Solid and Hazardous Waste: PH-0750
http://www.ct.gov/dph/lib/dph/environmental_health/environmental_laboratories/pdf/OutofStateCommercialLaboratories.pdf

Maine Potable and Non Potable Water, and Solid and Hazardous Waste: RI00002
http://www.maine.gov/dhhs/mecdc/environmental-health/dwp/partners/labCert.shtml

Massachusetts Potable and Non Potable Water: M-RI002
http://public.dep.state.ma.us/Labcert/Labcert.aspx

New Hampshire (NELAP accredited) Potable and Non Potable Water, Solid and Hazardous Waste: 2424
http://des.nh.gov/organization/divisions/water/dwgb/nhelap/index.htm

New York (NELAP accredited) Non Potable Water, Solid and Hazardous Waste: 11313
http://www.wadsworth.org/labcert/elap/comm.html

New Jersey (NELAP accredited) Non Potable Water, Solid and Hazardous Waste: RI006
http://datamine2.state.nj.us/DEP_OPRA/OpraMain/pi_main?mode=pi_by_site&sort_order=PI_NAMEA&Select+a+Site:=58715

United States Department of Agriculture Soil Permit: P330-12-00139

Pennsylvania: 68-01752
http://www.dep.pa.gov/Business/OtherPrograms/Labs/Pages/Laboratory-Accreditation-Program.aspx

ESS Laboratory Sample and Cooler Receipt Checklist

Client: Ramboll Environ - ML

Shipped/Delivered Via: Client

ESS Project ID: 21F1141
Date Received: 6/30/2021
Project Due Date: 7/2/2021
Days for Project: 2 Day

1. Air bill manifest present? No
   Air No.: NA
2. Were custody seals present? No
3. Is radiation count <100 CPM? Yes
4. Is a Cooler Present? Yes
   Temp: 6.4 Iced with: Ice
5. Was COC signed and dated by client? Yes
6. Does COC match bottles? Yes
7. Is COC complete and correct? Yes
8. Were samples received intact? Yes
9. **Were labs informed about short holds & rushes?** Yes / No / NA
10. Were any analyses received outside of hold time? Yes / No

11. Any Subcontracting needed? Yes / No
    ESS Sample IDs:
    Analysis:
    TAT:
12. Were VOAs received? Yes / No
    a. Air bubbles in aqueous VOAs? Yes / No
    b. Does methanol cover soil completely? Yes / No / NA
13. Are the samples properly preserved? Yes / No
    a. If metals preserved upon receipt: Date: Time: By:
    b. Low Level VOA vials frozen: Date: Time: By:

Sample Receiving Notes:

14. Was there a need to contact Project Manager? Yes / No
    a. Was there a need to contact the client? Yes / No
    Who was contacted? Date: Time: By:

Sample Number	Container ID	Proper Container	Air Bubbles Present	Sufficient Volume	Container Type	Preservative	Record pH (Cyanide and 608 Pesticides)
1	182886	Yes	N/A	Yes	500 mL Poly	HNO3	
1	182887	Yes	N/A	Yes	500 mL Poly	HNO3	
1	182888	Yes	N/A	Yes	250 mL Poly	HNO3	
1	182889	Yes	N/A	Yes	1L Amber	NP	
1	182890	Yes	N/A	Yes	1L Amber	NP	
1	182891	Yes	N/A	Yes	1L Amber	NP	pH=7
1	182892	Yes	N/A	Yes	1L Amber	NP	
1	182893	Yes	N/A	Yes	1L Amber	NP	pH=7
1	182894	Yes	N/A	Yes	1L Amber	NP	
1	182895	Yes	No	Yes	VOA Vial	~~HCl~~ NP TDW13D	
1	182896	Yes	No	Yes	VOA Vial	HCl	
1	182897	Yes	No	Yes	VOA Vial	HCl	
1	182898	Yes	No	Yes	VOA Vial	HCl	
1	182899	Yes	No	Yes	VOA Vial	HCl	
1	182900	Yes	No	Yes	VOA Vial	HCl	
1	182901	Yes	N/A	Yes	500 mL Poly	H2SO4	

ESS Laboratory Sample and Cooler Receipt Checklist

Client: Ramboll Environ - ML

ESS Project ID: 21F1141

Date Received: 6/30/2021

1	182902	Yes	N/A	Yes	250 mL Poly	NaOH pH 12
1	182903	Yes	N/A	Yes	1L Amber	H2SO4
1	182904	Yes	N/A	Yes	1L Amber	H2SO4
1	182905	Yes	N/A	Yes	1L Poly	NP
1	182906	Yes	N/A	Yes	250 mL Poly	NP
1	182907	Yes	No	Yes	VOA Vial	HCl

2nd Review

Were all containers scanned into storage/lab? Initials

Are barcode labels on correct containers? Yes / No

Are all Flashpoint stickers attached/container ID # circled? Yes / No / NA

Are all Hex Chrome stickers attached? Yes / No / NA

Are all QC stickers attached? Yes / No / NA

Are VOA stickers attached if bubbles noted? Yes / No / NA

Completed By: Taylor Diaz Date & Time: 6/30/21 1709

Reviewed By: Taylor Diaz Date & Time: 6/30/21 1814

ESS Laboratory

Division of Thielsch Engineering, Inc.
185 Frances Avenue, Cranston, RI 02910-2211
Tel. (401) 461-7181 Fax (401) 461-4486
www.esslaboratory.com

CHAIN OF CUSTODY

ESS LAB PROJECT ID: 21F1141

Turn Time _____Standard Rush___X___ Approved By: _____

Reporting Limits -

State where samples were collected: **MA** NH

Discharge into: **Fresh Water** ☐ **Salt Water** ☐

Is this project for: **RGP**

Electonic Deliverable Yes__X__ No____
Format: Excel_X__ Access___ PDF_X__ Other____

Project Manager: JASON WILKINSON
Company: Ramboll
Address: 3 Carlisle Road, Suite 210
Westford, MA
jwilkinson@ramboll.com
emushlitz@ramboll.com

Project #

Project Name: St Gobain
Worcester, MA

PO # 1690022480

ESS Lab Sample ID	Date	Collection Time	Grab -G Composite-C	Matrix	Sample Identification	# of Containers	RGP Metals Total	RGP Metals Dissolved	Hardness (Calculation)	Ethanol ASTM D3695	Chloride 300.0*	Total Cyanide 4500 LL	TPH 1664	TSS 2540D*	TRC 4500-CL D* / pH	Ammonia 350.1	Tri Cr (Calc. MUST run T. Cr)	Hex Cr 3500	Phenol 420.1	RGP VOC Long List 524	1,4-Dioxane 8270-SIM	EDB 504.1	RGP SVOC Log List 625-SIM	PCB 608	Comment #
1	6/30/21	12:10	Grab -G	GW	TW-TP-02-210630	22	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	1,2
Preservation Code: 1-NP, 2-HCl, 3-H2SO4, 4-HNO3, 5-NaOH, 6-MeOH, 7-Asorbic Acid, 8-ZnAct, 9-_____							4	4	4	1	1	5	3	1	1	3	-	1	3	2	1	2	1	1	
Container Type: P-Poly G-Glass AG-Amber Glass S-Sterile V-VOA							P	P	P	V	P	P	AG	P	P	P	-	P	AG	V	AG	V	AG	AG	

Matrix: S-Soil SD-Solid D-Sludge WW-Wastewater GW-Groundwater SW-Surface Water DW-Drinking Water O-Oil W-Wipes F-Filter

Cooler Present ___Yes ___No

Seals Intact ___Yes ___No NA:___

Cooler Temperature: 6.4 ICE

Sampled by : Z Demitrack

Comments: 1) RGP Metals include Sb, As, Cd, Cu, Fe, Pb, Ni, Se, Ag and Zn by 200.7/3113B and Hg by 245.1
2) Parameters in **BOLD** have Short hold-time **PERMIT ATTACHED**
*** TSS, TRC and Cl taken from the same container**

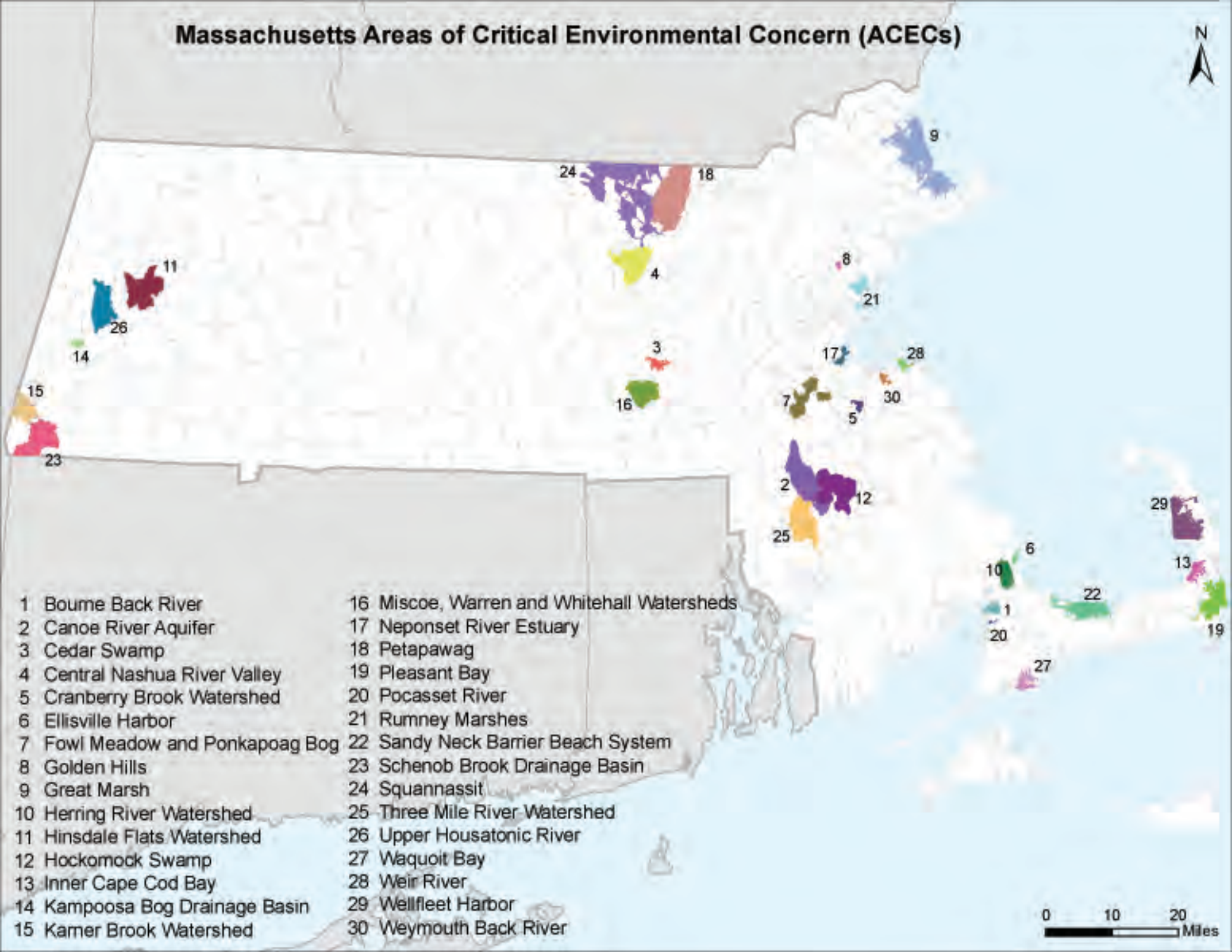
Relinquished by: (Signature)	Date/Time	Received by: (Signature)	Relinquished by: (Signature)	Date/Time	Received by: (Signature)
	21/06/30 16:21	6/30/21			
Relinquished by: (Signature)	Date/Time	Received by: (Signature)	Relinquished by: (Signature)	Date/Time	Received by: (Signature)

Please E-mail all changes to Chain of Custody in writi

Page ____ of ____

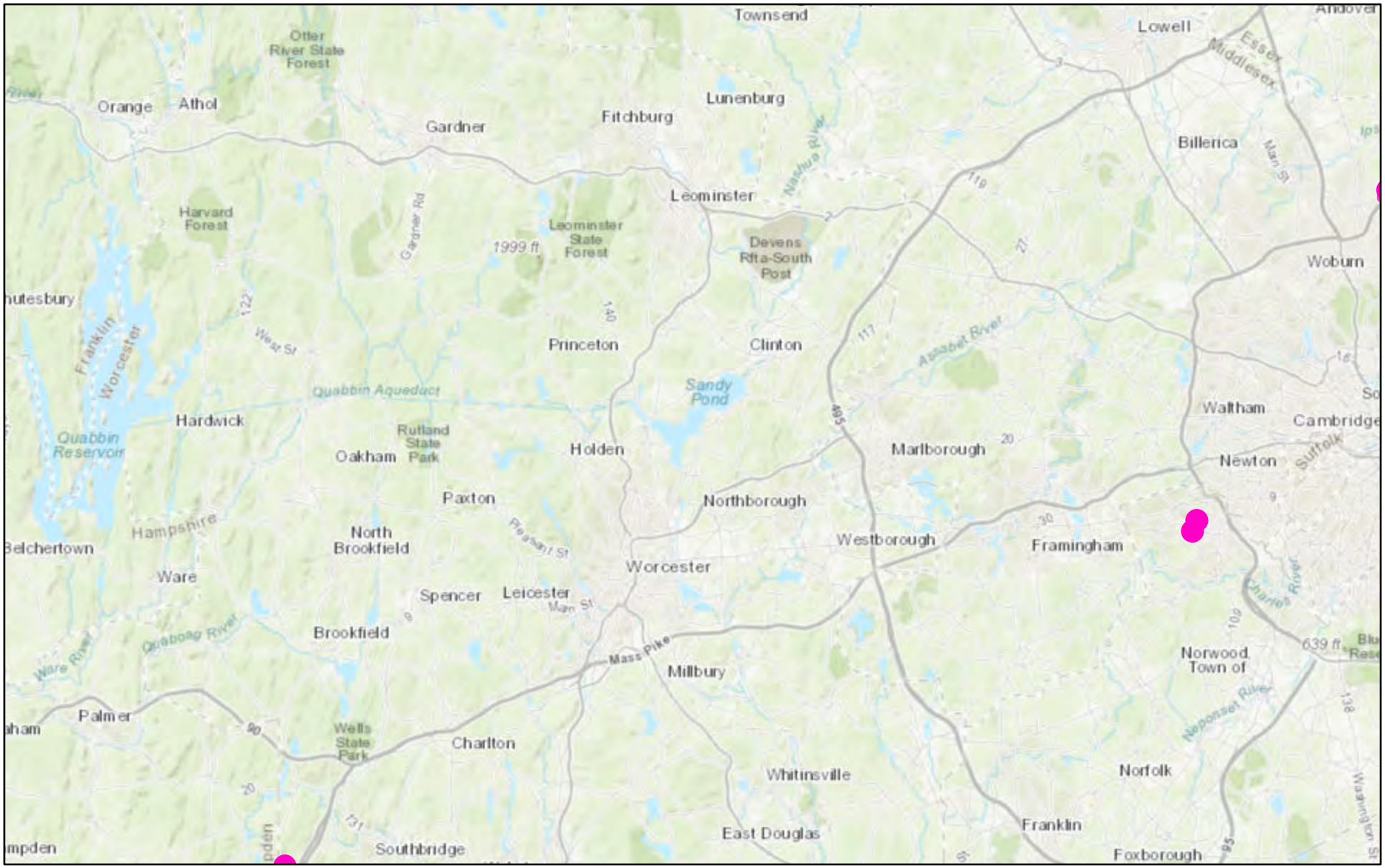
ATTACHMENT D
CRITIACAL HABITAT, ENDAGERED SPECIES AND IPAC MAPPING

Massachusetts Areas of Critical Environmental Concern (ACECs)



1 Bourne Back River
2 Canoe River Aquifer
3 Cedar Swamp
4 Central Nashua River Valley
5 Cranberry Brook Watershed
6 Ellisville Harbor
7 Fowl Meadow and Ponkapoag Bog
8 Golden Hills
9 Great Marsh
10 Herring River Watershed
11 Hinsdale Flats Watershed
12 Hockomock Swamp
13 Inner Cape Cod Bay
14 Kampoosa Bog Drainage Basin
15 Karner Brook Watershed
16 Miscoe, Warren and Whitehall Watersheds
17 Neponset River Estuary
18 Petapawag
19 Pleasant Bay
20 Pocasset River
21 Rumney Marshes
22 Sandy Neck Barrier Beach System
23 Schenob Brook Drainage Basin
24 Squannassit
25 Three Mile River Watershed
26 Upper Housatonic River
27 Waquoit Bay
28 Weir River
29 Wellfleet Harbor
30 Weymouth Back River

NHESP No. Long-eared Bat Locations



July 13, 2021

Statewide_NLEB_Symbology

Hibernaculum

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

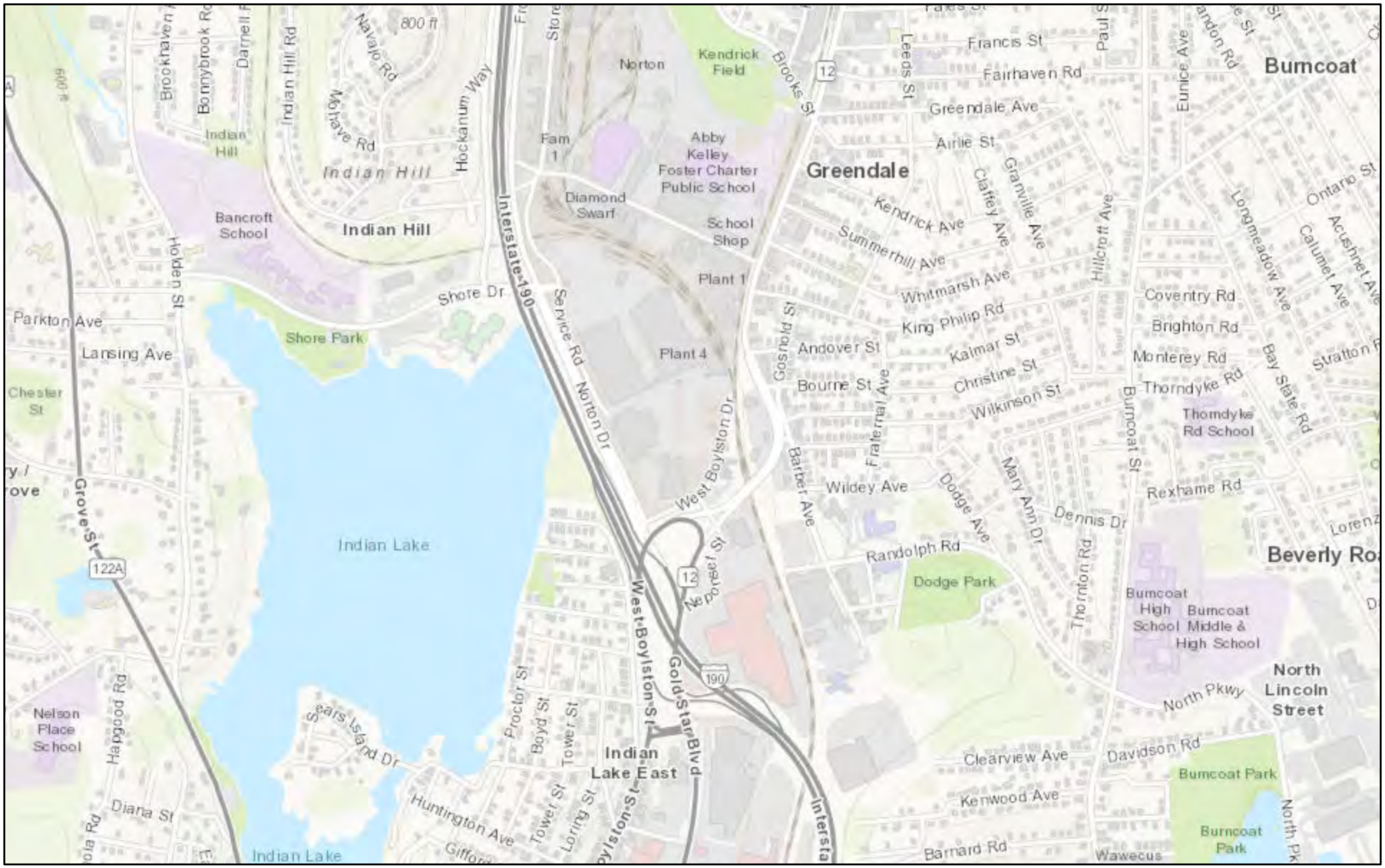
1:577,791

0 3.5 7 14 mi

0 5 10 20 km

Esri Canada, Esri, HERE, Garmin, USGS, NGA, EPA, USDA, NPS

Critical Habitat for Threatened & Endangered Species [USFWS]



6/28/2021

1:18,056

0 0.1 0.2 0.4 mi

0 0.17 0.35 0.7 km

City of Worcester, MassGIS, Esri Canada, Esri, HERE, Garmin,

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

IPaC Record Locator: 329-103761315 July 12, 2021

Subject: Consistency letter for the 'St Gobain Dewatering' project indicating that any take of the northern long-eared bat that may occur as a result of the Action is not prohibited under the ESA Section 4(d) rule adopted for this species at 50 CFR §17.40(o).

Dear Jason Currier:

The U.S. Fish and Wildlife Service (Service) received on July 12, 2021 your effects determination for the 'St Gobain Dewatering' (the Action) using the northern long-eared bat (*Myotis septentrionalis*) key within the Information for Planning and Consultation (IPaC) system. You indicated that no Federal agencies are involved in funding or authorizing this Action. This IPaC key assists users in determining whether a non-Federal action may cause "take"[1] of the northern long-eared bat that is prohibited under the Endangered Species Act of 1973 (ESA) (87 Stat.884, as amended; 16 U.S.C. 1531 et seq.).

Based upon your IPaC submission, any take of the northern long-eared bat that may occur as a result of the Action is not prohibited under the ESA Section 4(d) rule adopted for this species at 50 CFR §17.40(o). Unless the Service advises you within 30 days of the date of this letter that your IPaC-assisted determination was incorrect, this letter verifies that the Action is not likely to result in unauthorized take of the northern long-eared bat.

Please report to our office any changes to the information about the Action that you entered into IPaC, the results of any bat surveys conducted in the Action area, and any dead, injured, or sick northern long-eared bats that are found during Action implementation.

If your Action proceeds as described and no additional information about the Action's effects on species protected under the ESA becomes available, no further coordination with the Service is required with respect to the northern long-eared bat.

---

[1]Take means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct [ESA Section 3(19)].

Action Description
You provided to IPaC the following name and description for the subject Action.

1. Name

St Gobain Dewatering

2. Description

The following description was provided for the project 'St Gobain Dewatering':

> excavation and dewatering for building foundation

Approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@42.301484,-71.80273152843353,14z

Determination Key Result

This non-Federal Action may affect the northern long-eared bat; however, any take of this species that may occur incidental to this Action is not prohibited under the final 4(d) rule at 50 CFR §17.40(o).

Determination Key Description: Northern Long-eared Bat 4(d) Rule
This key was last updated in IPaC on **May 15, 2017**. Keys are subject to periodic revision.

This key is intended for actions that may affect the threatened northern long-eared bat.

The purpose of the key for non-Federal actions is to assist determinations as to whether proposed actions are excepted from take prohibitions under the northern long-eared bat 4(d) rule.

If a non-Federal action may cause prohibited take of northern long-eared bats or other ESA-listed animal species, we recommend that you coordinate with the Service.

Determination Key Result

Based upon your IPaC submission, any take of the northern long-eared bat that may occur as a result of the Action is not prohibited under the ESA Section 4(d) rule adopted for this species at 50 CFR §17.40(o).

Qualification Interview

1. Is the action authorized, funded, or being carried out by a Federal agency?

   No

2. Will your activity purposefully **Take** northern long-eared bats?

   No

3. [Semantic] Is the project action area located wholly outside the White-nose Syndrome Zone?

   Automatically answered
   No

4. Have you contacted the appropriate agency to determine if your project is near a known hibernaculum or maternity roost tree?

   Location information for northern long-eared bat hibernacula is generally kept in state Natural Heritage Inventory databases – the availability of this data varies state-by-state. Many states provide online access to their data, either directly by providing maps or by providing the opportunity to make a data request. In some cases, to protect those resources, access to the information may be limited. A web page with links to state Natural Heritage Inventory databases and other sources of information on the locations of northern long-eared bat roost trees and hibernacula is available at www.fws.gov/midwest/endangered/mammals/nleb/nhisites.html.

   Yes

5. Will the action affect a cave or mine where northern long-eared bats are known to hibernate (i.e., hibernaculum) or could it alter the entrance or the environment (physical or other alteration) of a hibernaculum?

   No

6. Will the action involve Tree Removal?

   No

Project Questionnaire

If the project includes forest conversion, report the appropriate acreages below. Otherwise, type '0' in questions 1-3.

1. Estimated total acres of forest conversion:

0

2. If known, estimated acres of forest conversion from April 1 to October 31

0

3. If known, estimated acres of forest conversion from June 1 to July 31

0

If the project includes timber harvest, report the appropriate acreages below. Otherwise, type '0' in questions 4-6.

4. Estimated total acres of timber harvest

0

5. If known, estimated acres of timber harvest from April 1 to October 31

0

6. If known, estimated acres of timber harvest from June 1 to July 31

0

If the project includes prescribed fire, report the appropriate acreages below. Otherwise, type '0' in questions 7-9.

7. Estimated total acres of prescribed fire

0

8. If known, estimated acres of prescribed fire from April 1 to October 31

0

9. If known, estimated acres of prescribed fire from June 1 to July 31

0

If the project includes new wind turbines, report the megawatts of wind capacity below. Otherwise, type '0' in question 10.

10. What is the estimated wind capacity (in megawatts) of the new turbine(s)?

0

United States Department of the Interior

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

In Reply Refer To: June 29, 2021
Consultation Code: 05E1NE00-2021-SLI-3959
Event Code: 05E1NE00-2021-E-11981
Project Name: St Gobain Dewatering

Subject: List of threatened and endangered species that may occur in your proposed project location 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: 05E1NE00-2021-SLI-3959
Event Code: 05E1NE00-2021-E-11981
Project Name: St Gobain Dewatering
Project Type: DREDGE / EXCAVATION
Project Description: Dewatering construction excavation July-October 2021
Project Location:

Approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@42.3016427,-71.80299530075843,14z

Counties: Worcester County, Massachusetts

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.

---

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*	Threatened

No critical habitat has been designated for this species.
Species profile: https://ecos.fws.gov/ecp/species/9045

Critical habitats

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

ATTACHMENT E
MARCIS REPORT AND SITE VICINITY MAP

Massachusetts Cultural Resource Information System

MACRIS

MACRIS Search Results

Search Criteria: Town(s): Worcester; Place: Indian Lake; Resource Type(s): Structure, Object, Burial Ground, Building, Area;

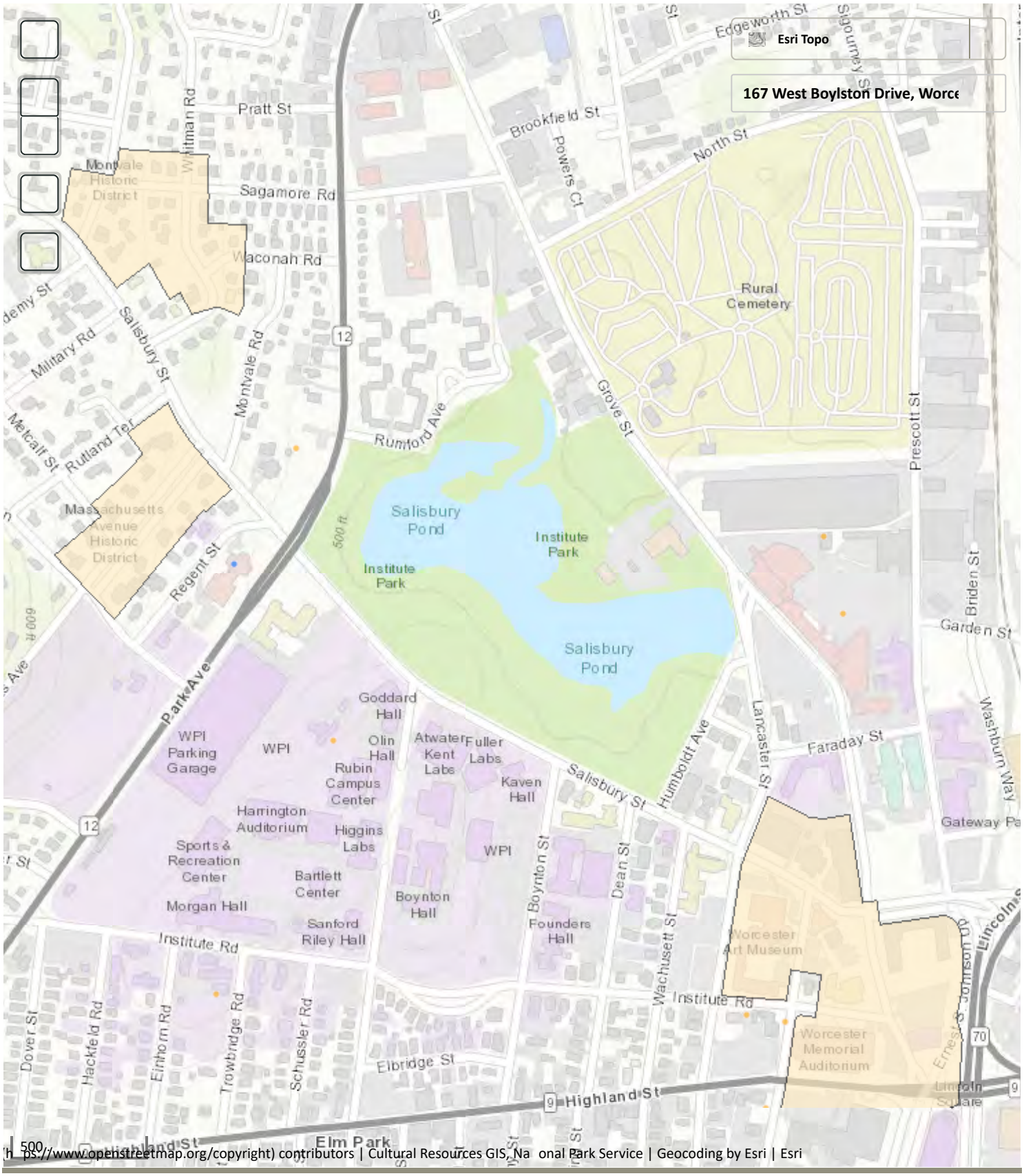
Inv. No.	Property Name	Street	Town	Year
WOR.M	Institutional District		Worcester	
WOR.X	Washburn and Moen North Works		Worcester	
WOR.BZ	Prescott Street Manufacturing District		Worcester	
WOR.DU	Gasoline Row		Worcester	
WOR.405	Worcester and Nashua Rail Company Freight Depot	Concord St	Worcester	r 1865
WOR.189	Washburn and Moen Manufacturing Company	Grove St	Worcester	1868
WOR.227	Washburn and Moen North Works - Long Mill	Grove St	Worcester	1869
WOR.228	Washburn and Moen North Work - Annealing House #10	Grove St	Worcester	1869
WOR.229	Washburn and Moen North Works - Machine Shop	Grove St	Worcester	c 1869
WOR.230	Washburn and Moen North Works - Main Building	Grove St	Worcester	1870
WOR.233	Washburn and Moen North Works - 1916 Addition	Grove St	Worcester	1916
WOR.1794	Washburn and Moen North Works - Gate Way	Grove St	Worcester	c 1870
WOR.9021	Grove Street World War II Memorial	Grove St	Worcester	c 1946
WOR.9030	Davis, Eliza Medallion Portrait	Grove St	Worcester	1876
WOR.368	Worcester Industrial Technical Institute	2 Grove St	Worcester	1909
WOR.366	Logan, Swift and Brigham Envelope Company Building	75 Grove St	Worcester	r 1889
WOR.226	Washburn and Moen North Works - Cotton Mill	90 Grove St	Worcester	1863
WOR.9015	Worcester Firefighters' Memorial	141 Grove St	Worcester	1964
WOR.9038	Winslow Street Fire Station Bell	141 Grove St	Worcester	1882
WOR.238	McGrath, Lawrence Cottage	207 Grove St	Worcester	r 1855
WOR.2212	Grove Street Jenney Station	410 Grove St	Worcester	r 1927
WOR.2213	Grove Street Gulf Station	419 Grove St	Worcester	1933
WOR.2211	Grove Street Standard Oil Station	425 Grove St	Worcester	r 1927

Inv. No.	Property Name	Street	Town	Year
WOR.2044	Independent Order of Good Templars Clubhouse	62-68 Island Dr	Worcester	1929
WOR.373	Worcester Boys' Club	Lincoln Sq	Worcester	r 1929
WOR.908	Worcester War Memorial	Lincoln Sq	Worcester	1935
WOR.9034	Worcester Police Memorial	Lincoln Sq	Worcester	1954
WOR.404	Worcester Girls' Club	67 Lincoln St	Worcester	1852
WOR.401	Morgan Spring Company	21 Old Lincoln St	Worcester	1884
WOR.402	Bliss, William H. Building	26 Old Lincoln St	Worcester	1888
WOR.403	Bliss, Harrison Tenement House	34 Old Lincoln St	Worcester	c 1880
WOR.231	Washburn and Moen North Work - Annealing House #14	Prescott St	Worcester	c 1870
WOR.232	Washburn and Moen North Works - Quartermaster	Prescott St	Worcester	c 1870
WOR.1795	Washburn and Moen North Works - Machine Shop #23	Prescott St	Worcester	r 1880
WOR.1796	Washburn and Moen North Works - Wire Mill #4	Prescott St	Worcester	c 1890
WOR.1797	Washburn and Moen North Works - Rolling Mill #17	Prescott St	Worcester	c 1870
WOR.1798	Washburn and Moen North Works Building	Prescott St	Worcester	r 1880
WOR.2138	Blue Belle Diner	47 Prescott St	Worcester	1948
WOR.234	United States Envelope Company Factory	68 Prescott St	Worcester	1912
WOR.235	Warren Thread Company	72 Prescott St	Worcester	1870
WOR.2217	Barnard, George A. Roofing Company	72R Prescott St	Worcester	1880
WOR.236	Richardson Manufacturing Company	84 Prescott St	Worcester	1870
WOR.237	Ames Plow Company	90 Prescott St	Worcester	1874
WOR.2137	Chadwick Square Diner	95R Prescott St	Worcester	1930
WOR.376	North High School	Salisbury St	Worcester	1889
WOR.367	Worcester National Guard Armory	44 Salisbury St	Worcester	c 1889
WOR.2153	Clough, Benjamin H. and Estella House	4 Stowell Ave	Worcester	c 1900
WOR.2152	Hoyle, Bill Texaco Station	73 West Boylston Dr	Worcester	c 1930
WOR.9020	Greendale Eagle	West Boylston St	Worcester	1947
WOR.2210	Dow, Herbert L. Garage	4 West Boylston St	Worcester	1923
WOR.2072	Thoreen, Carl F. Filling Station	39-41 West Boylston St	Worcester	c 1936
WOR.2073	Lakin, Thomas Block	64-68 West Boylston St	Worcester	c 1920
WOR.2066	Stuart's Super Diner	317 West Boylston St	Worcester	1948
WOR.2067	West Boylston Street Socony Station	321 West Boylston St	Worcester	c 1938
WOR.9001	1898 - Worcester Spanish-American War Memorial	Wheaton Sq	Worcester	c 1917

Na onal Register of Histori…

Na onal Park Service
U.S. Department of the Interior

Public, non-restricted data depic ng Na onal Register spa al data proce…



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h ps://www.openstreetmap.org/copyright) contributors | Cultural Resources GIS, Na onal Park Service | Geocoding by Esri | Esri

Na onal Register of Histori…

Na onal Park Service
U.S. Department of the Interior

Public, non-restricted data depic ng Na onal Register spa al data proce…

ATTACHMENT F
WATER TREATMENT PRODUCT INFORMATION

Basic Pedestal

Standard Centrifugal Pump

Model VG2C3-B

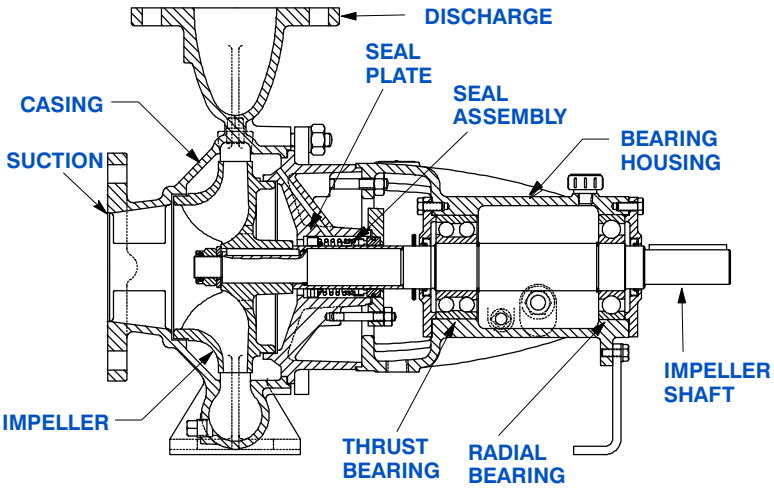
Size 2 1/2” x 2”

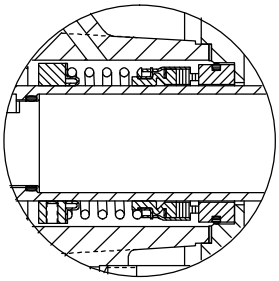
PUMP SPECIFICATIONS

Size: 2 1/2” x 2” (64 mm x 51 mm) Flanged.
Casing: Gray Iron 40.
Maximum Operating Pressure 173 psi (1193 kPa).*
Enclosed Type, Six Vane Impeller: Gray Iron 40.
Handles 7/16” (11,1 mm) Diameter Spherical Solids.
Impeller Shaft: Steel 1045.
Shaft Sleeve: Stainless Steel 420.
Seal Plate: Gray Iron 40.
Bearing Housing: Gray Iron 40.
Radial Bearing: Open Single Row Ball.
Thrust Bearing: Open Double Row Ball.
Bearing Lubrication: SAE 30 Non-Detergent Oil.
Gaskets: Nitrile Rubber.
O-Ring: Fluorocarbon (DuPont Viton® or Equivalent).
Hardware: Standard Plated Steel.
Oil Level Sight Gauge.

Optional Equipment: NPT Suction and Discharge Flanges. Strainer. Stainless Steel Impeller. Mechanical Seal with Fluorocarbon Elastomers (DuPont Viton® or Equivalent).

**Consult Factory for Applications Exceeding Maximum Pressure and/or Temperature Indicated.*





SEAL DETAIL

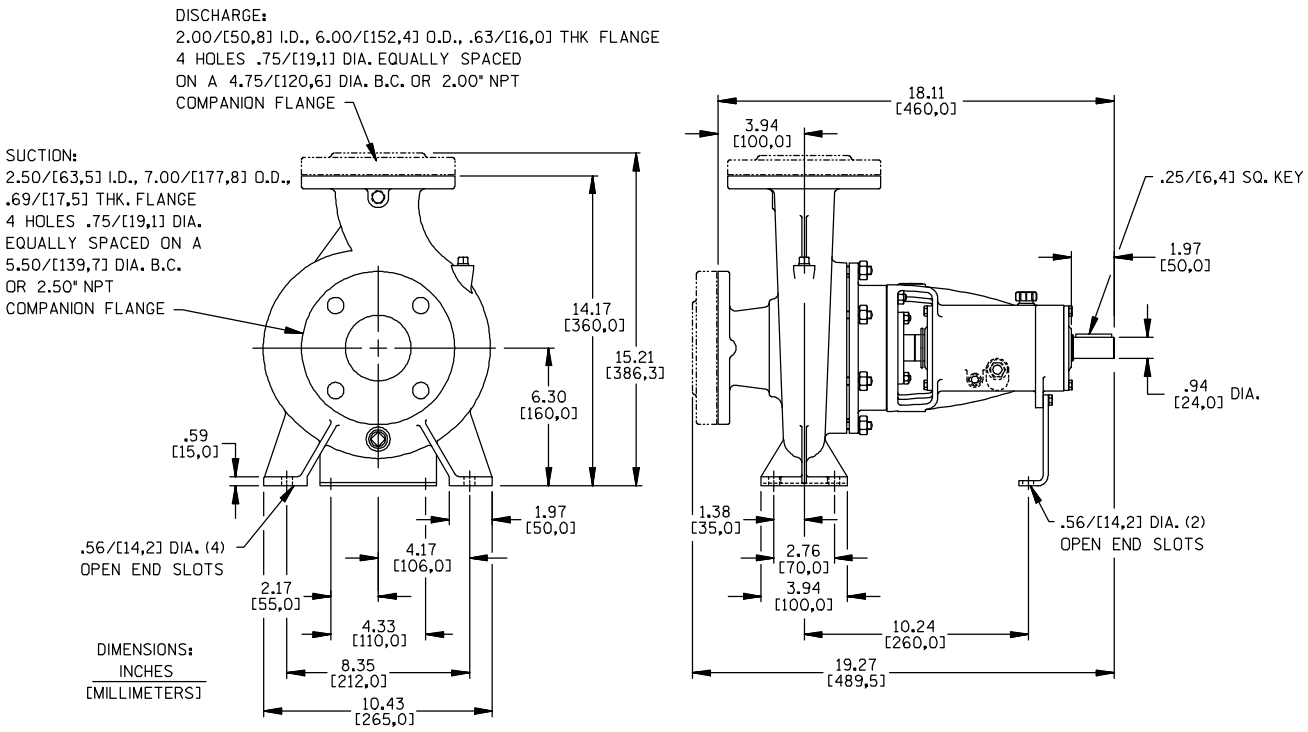
Type 1, Mechanical, Self-Lubricated. Carbon Rotating Face. Ceramic Stationary Seat. Buna-N Elastomers. Stainless Steel and/or Brass Cage and Spring. Maximum Temperature of Liquid Pumped, 160°F (71°C).*

Specification Data

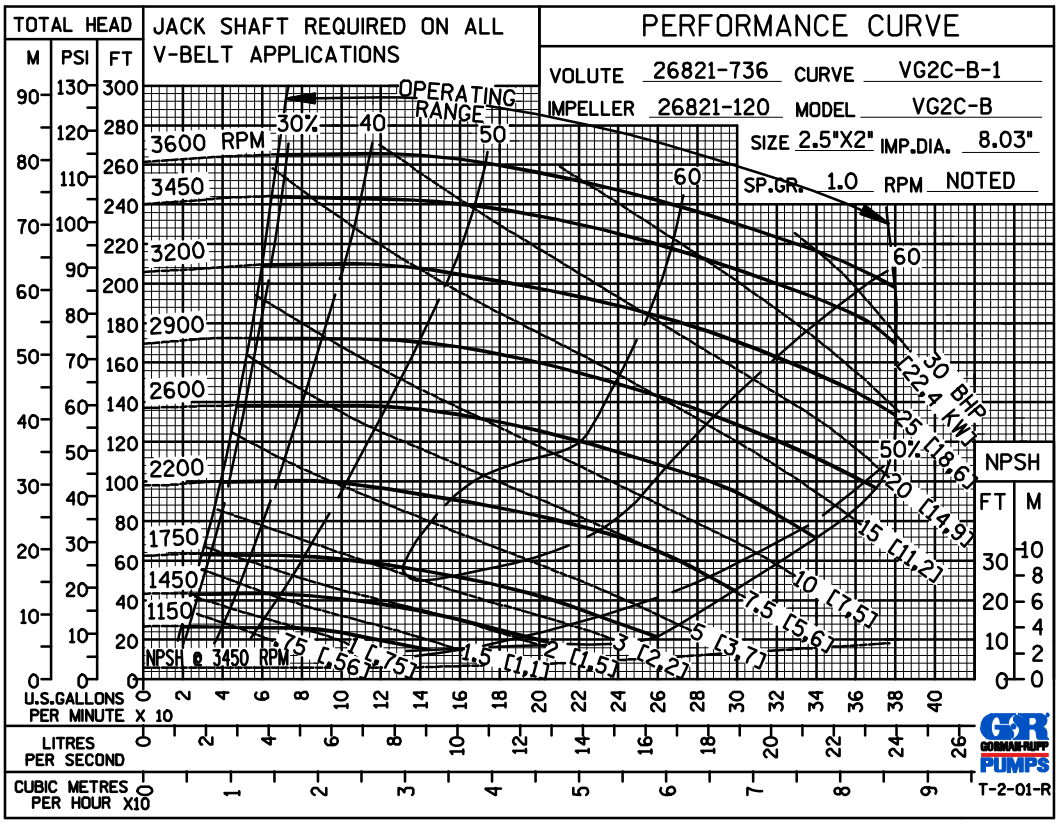
SECTION 70, PAGE 255

APPROXIMATE
DIMENSIONS and WEIGHTS

NET WEIGHT: 82 LBS. (37,2 KG.)
SHIPPING WEIGHT: 94 LBS. (42,6 KG.)
EXPORT CRATE SIZE: 3.8 CU. FT. (0,11 CU. M.)



PERFORMANCE BASED ON WATER



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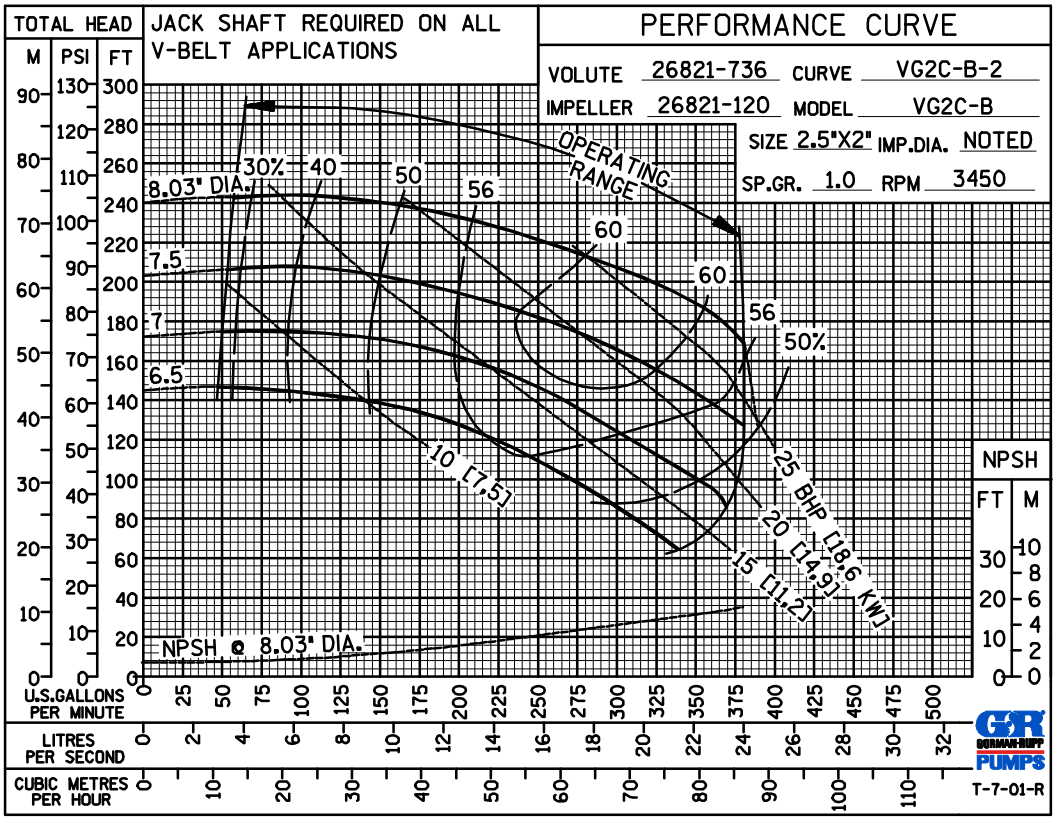

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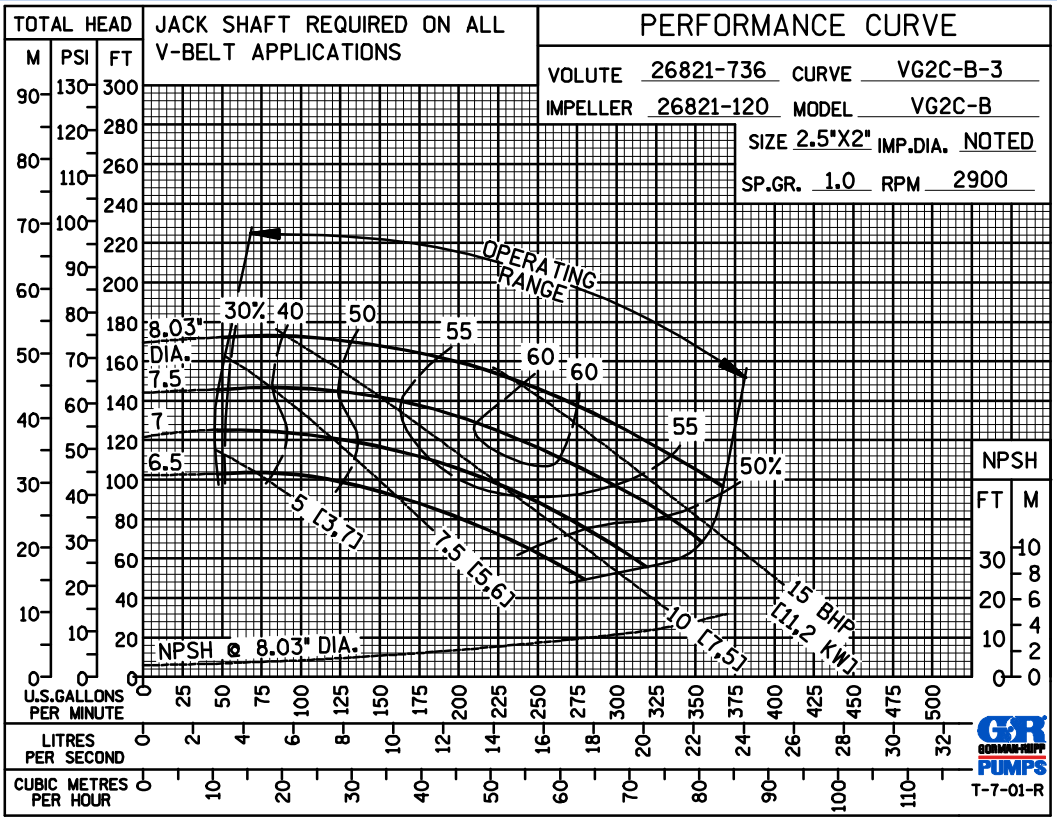

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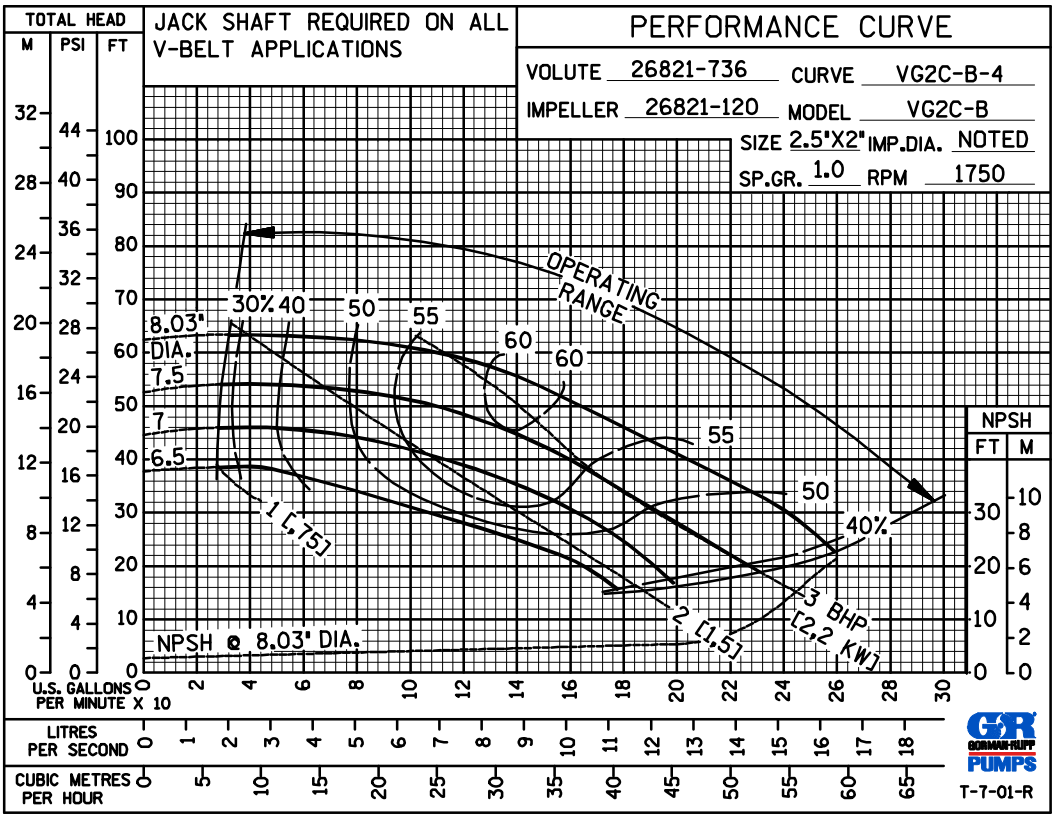

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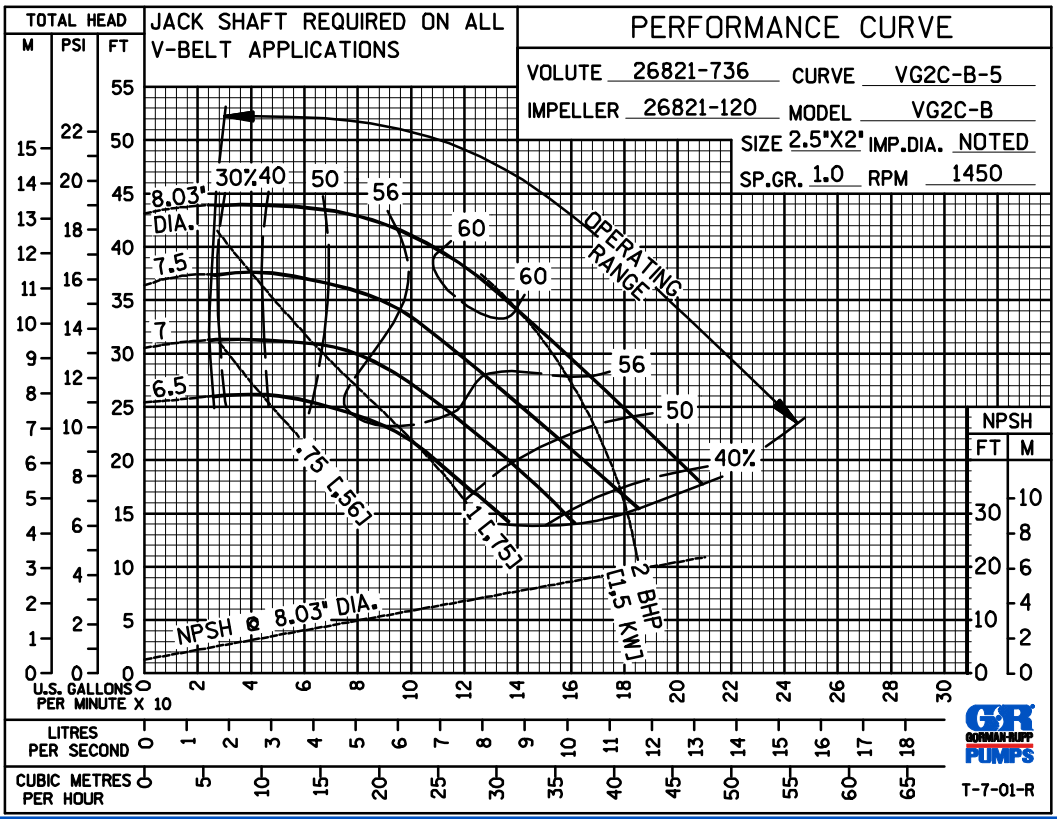
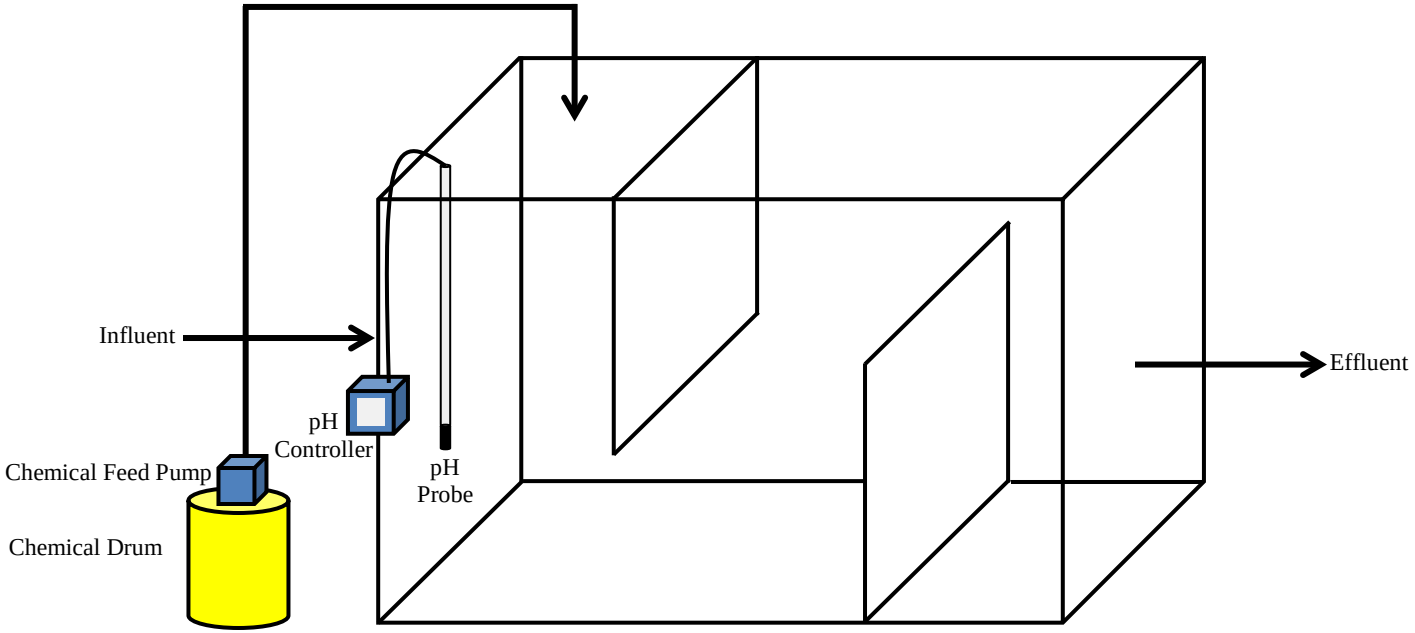




Notes:

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

One Controller for the Broadest Range of Sensors.

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

Maximum Versatility

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

Ease of Use and Confidence in Results

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

Wide Variety of Communication Options

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

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

Controller Comparison

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

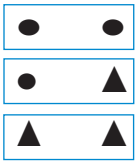
Choose from Hach's Broad Range of Digital and Analog Sensors

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

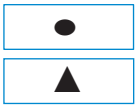
● = Digital ▲ = Analog

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

2 Channel Configurations



1 Channel Configurations



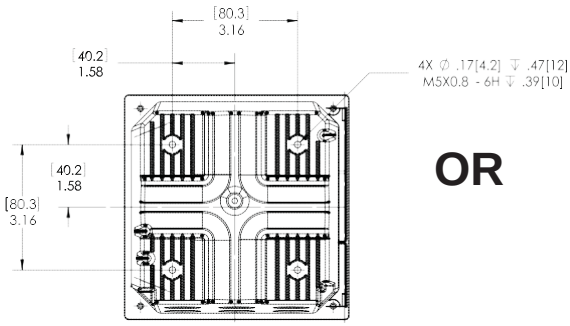
Specifications*

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

**Subject to change without notice.*

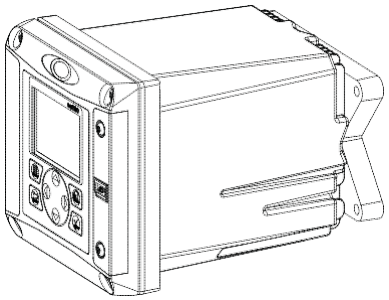
Dimensions

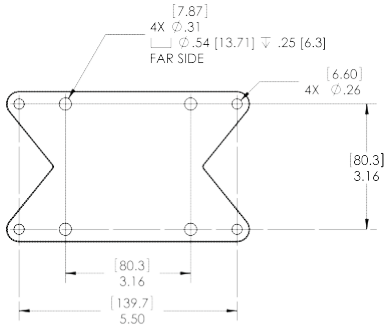
Surface Mounting Dimensions



Mounting Dimensions
(Rear View)

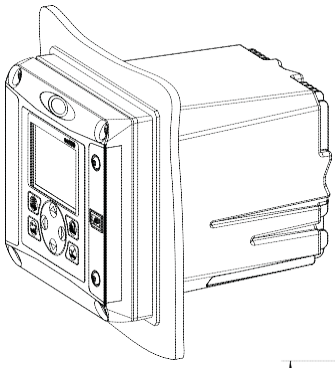
OR

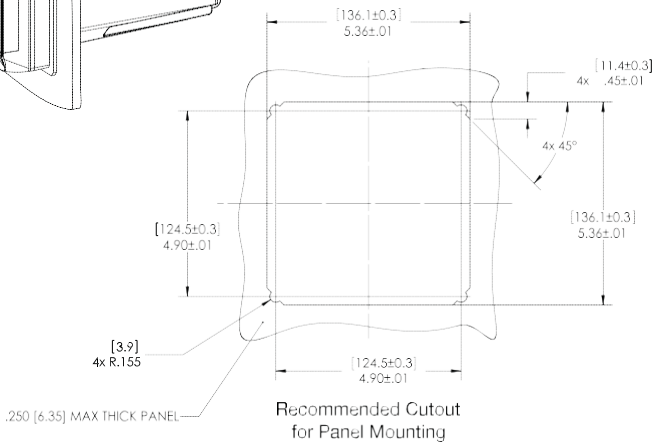




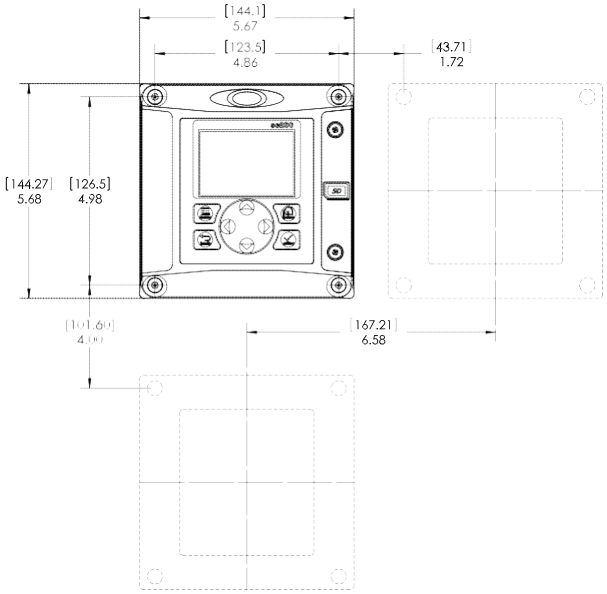
Bracket (supplied) for Surface Mounting
(Not compatible with Weather and Sun Shield
p/n 9220600 when surface mounting.)

Panel Mounting Dimensions



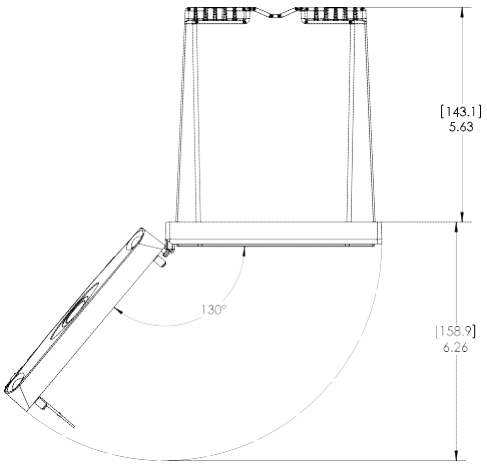


Recommended Cutout
for Panel Mounting

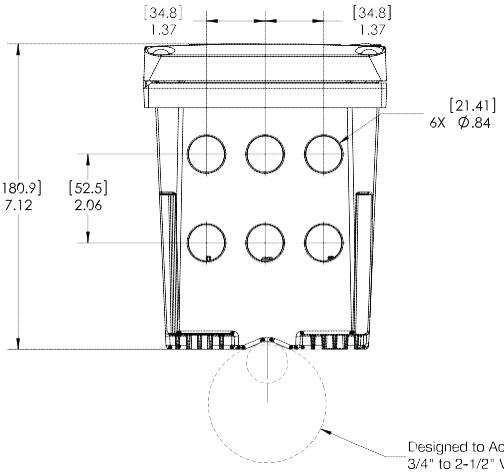


Minimum Spacing Dimensions
for Group Mounting

Top and Bottom Views



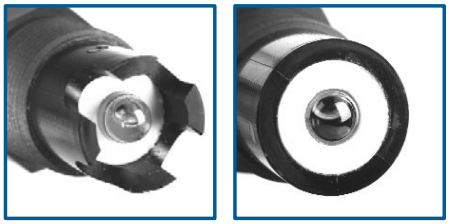
Door Opening Details



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

3/4-inch Combination pH and ORP Sensor Kits

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



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

Features and Benefits

Low Price—High Performance

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

Special Electrode Configurations

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

Temperature Compensation Element Option

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

Versatile Mounting Styles

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

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

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

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

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

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

Specifications*

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

Combination pH Sensors

Measuring Range
0 to 14 pH

Accuracy
Less than 0.1 pH under reference conditions

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

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

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

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

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

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

Wetted Materials

Convertible style: Ryton® body (glass filled)

Insertion style: PVDF body (Kynar®)

Sanitary style: 316 stainless steel sleeved PVDF body

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

Warranty
90 days

Combination ORP Sensors

Measuring Range
-2000 to +2000 millivolts

Accuracy
Limited to calibration solution accuracy (± 20 mV)

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

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

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

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

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

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

Wetted Materials

Convertible style: Ryton® body (glass filled)

Insertion style: PVDF body (Kynar®)

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

Warranty
90 days

**Specifications subject to change without notice.*

Engineering Specifications

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

Dimensions

Convertible Style Sensor

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

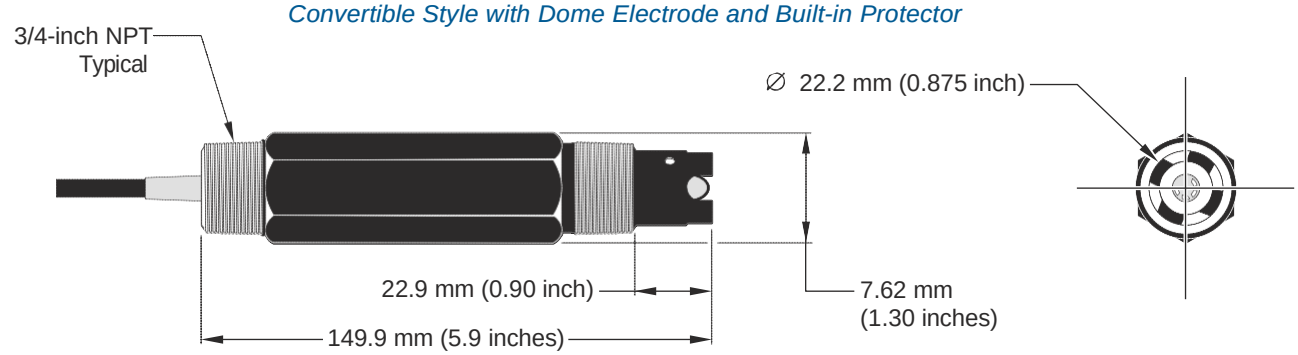
Insertion Style Sensor

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

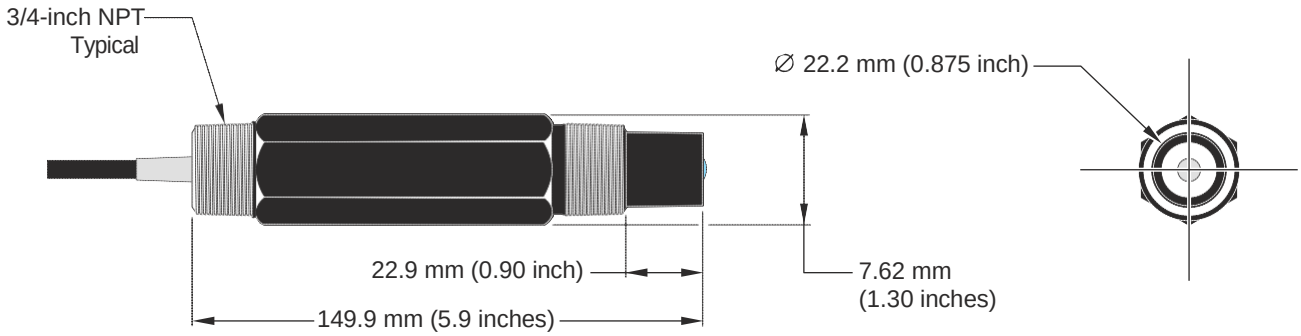
Sanitary Style Sensor

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

Convertible Style with Dome Electrode and Built-in Protector



Convertible Style with Flat Electrode



Lockwood Remediation Technologies, LLC

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

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

Features

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

Controls

Manual Stroke Rate

Manual Stroke Length

External Pacing - Optional

External Pace With Stop - Optional (125 SPM only)

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

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

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

Operating Benefits

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

Aftermarket

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

Series A Plus
Electronic Metering Pumps

Lockwood Remediation Technologies, LLC

Series A Plus

Specifications and Model Selection

MODEL			LBC2	LB02	LBC3	LB03	LB04	LB64	LBC4	LBS2	LBS3	LBS4
Capacity nominal (max.)		GPH	0.25	0.25	0.42	0.50	1.00	1.25	2.00	0.50	1.38	2.42
		GPO	6	6	10	12	24	30	48	12	33	58
		LPH	0.9	0.9	1.6	1.9	3.8	4.7	7.6	1.9	5.2	9.14
Pressure[3] (max.)	GFPP, PVDF, 316SS or PVC <;N code) wITFE Seats)	PSIG (Bar)	250 (17)	150 (10)	250 (17)	150 (10)	100 (7)	100 (7)	50 (3.3)	250 (17)	150 (10)	100 (7)
	PVC (V code) Viton or CSPE Seats IDegas Liquid End		150 (10)							150 (10)		
Connections:		Tubina	1.14" ID X 3.8" OD						3.8" D X 1.2" OD	1.14" D X 3.8" OD		
		Pioina	1.14" 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 capacty
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

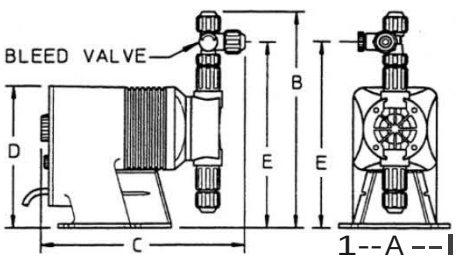
Pre-Engineered Systems

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



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SECTION 1. IDENTIFICATION

Product identifier used on the label

: **Sulfuric Acid 71-100%**

Product Code(s) : Not available.

Recommended use of the chemical and restrictions on use

: Reagent ;Chemical intermediate.
Use pattern: Professional Use Only
Recommended restrictions: None known.

Chemical family : Inorganic acid

Name, address, and telephone number of the supplier:

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63 Water St.
PO Box 2573
Fall River, MA, USA
02722

Supplier's Telephone # : 508-675-0096

Name, address, and telephone number of the manufacturer:

Refer to supplier

24 Hr. Emergency Tel # : Chemtrec: 1-800-424-9300 (Within Continental U.S.); 703-527-3887.

SECTION 2. HAZARDS IDENTIFICATION

Classification of the chemical

Clear to cloudy liquid. Odorless.

This material is classified as hazardous under U.S. OSHA regulations (29CFR 1910.1200) (Hazcom 2012) and Canadian WHMIS regulations (Hazardous Products Regulations) (WHMIS 2015).

Hazard classification :

Corrosive to metals: Category 1
Acute toxicity, inhalation - Category 2 (mist)
Eye damage/irritation: Category 1
Skin corrosion/irritation: Category 1
Specific Target Organ Toxicity, Single Exposure -Category 3 (respiratory)

Label elements

Hazard pictogram(s)

Signal Word

DANGER!

Hazard statement(s)

May be corrosive to metals.
Fatal if inhaled.
Causes severe skin burns and eye damage.
May cause respiratory irritation.

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Precautionary statement(s)

Keep only in original container.
Wash thoroughly after handling.
Do not breathe mists.
Use only outdoors or in a well-ventilated area.
Wear protective gloves/clothing and eye/face protection.
[In case of inadequate ventilation] wear respiratory protection.

If swallowed: Rinse mouth. Do NOT induce vomiting.
IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.
Wash contaminated clothing before reuse.
If inhaled: Remove person to fresh air and keep comfortable for breathing.
Immediately call a POISON CENTER or doctor/physician.
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do.
Continue rinsing.
Immediately call a POISON CENTER or doctor/physician.
Absorb spillage to prevent material damage.

Store in corrosive resistant container with a resistant inner liner.
Store locked up.
Store in a well-ventilated place. Keep container tightly closed.

Dispose of contents/container in accordance with local/regional/national/international regulations.

Other hazards

Other hazards which do not result in classification:

Ingestion may cause severe irritation to the mouth, throat and stomach.Contact with metals may release small amounts of flammable hydrogen gas.Prolonged skin contact may cause dermatitis (rash), characterized by red, dry, itching skin.Prolonged or repeated inhalation of fumes or vapours, may cause chronic lung effects, such as bronchitis, and tooth enamel erosion. Chronic skin contact with low concentrations may cause dermatitis.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Pure substance

Chemical name	Common name and synonyms	CAS #	Concentration
Sulfuric acid	Battery acid; Hydrogen sulfate; Oil of vitriol	7664-93-9	**71.0 - 100.0**
Water	H2O	7732-18-5	**Balance**

SECTION 4. FIRST-AID MEASURES

Description of first aid measures

Ingestion : Do NOT induce vomiting. Have victim rinse mouth with water, then give one to two glasses of water to drink. Seek immediate medical attention/advice. Never give anything by mouth if victim is unconscious.

Inhalation : Immediately remove person to fresh air. If breathing has stopped, give artificial respiration. If breathing is difficult, give oxygen by qualified medical personnel only. Seek immediate medical attention/advice.

Skin contact : Take off all contaminated clothing immediately. Immediately flush skin with gently flowing, running water for at least 20 minutes. Do not rub area of contact. Cover wound with sterile dressing. Seek immediate medical attention/advice. Wash contaminated clothing before reuse. Leather and shoes that have been contaminated with the solution may need to be destroyed.

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Eye contact : Immediately flush eyes with running water for at least 20 minutes. Protect unharmed eye. Seek immediate medical attention/advice.

Most important symptoms and effects, both acute and delayed

: May cause serious eye irritation or damage. Symptoms may include redness, pain, tearing and conjunctivitis. Direct skin contact may cause corrosive skin burns, deep ulcerations and possibly permanent scarring. May cause severe irritation and corrosive damage in the mouth, throat and stomach. Symptoms may include abdominal pain, vomiting, burns, perforations, bleeding and eventually death. May cause severe irritation to the nose, throat and respiratory tract. Symptoms may include coughing, choking and wheezing. Could result in pulmonary edema (fluid accumulation). Symptoms of pulmonary edema (chest pain, shortness of breath) may be delayed. Prolonged or repeated inhalation of fumes or vapours, may cause chronic lung effects, such as bronchitis, and tooth enamel erosion.

Indication of any immediate medical attention and special treatment needed

: Immediate medical attention is required. Causes burns. Treat symptomatically.

SECTION 5. FIRE-FIGHTING MEASURES

Extinguishing media

Suitable extinguishing media

: Use extinguishing measures that are appropriate to local circumstances and the surrounding environment. Use water with caution. Contact with water will generate considerable heat.

Unsuitable extinguishing media

: Do not use a solid water stream as it may scatter and spread fire.

Special hazards arising from the substance or mixture / Conditions of flammability

: Not considered flammable. Burning produces obnoxious and toxic fumes. Contact with metals may release small amounts of flammable hydrogen gas. Reacts violently with a wide variety of organic and inorganic chemicals including alcohol, carbides, chlorates, picrates, nitrates and metals. Contact with water will generate considerable heat.

Flammability classification (OSHA 29 CFR 1910.106)

: Non-flammable.

Hazardous combustion products

: Sulphur oxides. Carbon dioxide and carbon monoxide. Oxygen.

Special protective equipment and precautions for firefighters

Protective equipment for fire-fighters

: Firefighters must use standard protective equipment including flame retardant coat, helmet with face shield, gloves, rubber boots, and in enclosed spaces, SCBA.

Special fire-fighting procedures

: Firefighters should wear proper protective equipment and self-contained breathing apparatus with full face piece operated in positive pressure mode. A full-body chemical resistant suit should be worn. Move containers from fire area if safe to do so. Water spray may be useful in cooling equipment exposed to heat and flame. Dike for water control. Do not allow run-off from fire fighting to enter drains or water courses.

SECTION 6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures

: All persons dealing with clean-up should wear the appropriate protective equipment including self-contained breathing apparatus. Keep all other personnel upwind and away from the spill/release. Restrict access to area until completion of clean-up. Refer to Section 8, EXPOSURE CONTROLS AND PERSONAL PROTECTION, for additional information on acceptable personal protective equipment.

Environmental precautions : Do not allow material to contaminate ground water system. For large spills, dike the area to prevent spreading.

Methods and material for containment and cleaning up

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: Remove all sources of ignition. Ventilate area of release. Stop spill or leak at source if safely possible. Dike for water control. Neutralize with sodium bicarbonate or a mixture of soda ash/slaked lime. Contain and absorb spilled liquid with non-combustible, inert absorbent material (e.g. sand), then place absorbent material into a container for later disposal (see Section 13). Contact the proper local authorities.

Special spill response procedures

: If a spill/release in excess of the EPA reportable quantity is made into the environment, immediately notify the national response center in the United States (phone: 1-800-424-8802).
US CERCLA Reportable quantity (RQ): Sulfuric acid (1000 lbs / 454 kg)

SECTION 7. HANDLING AND STORAGE

Precautions for safe handling

: Use in a well-ventilated area. Wear protective gloves/clothing and eye/face protection. See Section 8 for additional personal protection advice when handling this product. Do not ingest. Avoid breathing vapour or mist. Avoid contact with skin, eyes and clothing. Keep away from extreme heat and flame. Keep away from bases, metals and other incompatibles. Keep container tightly closed when not in use. Keep only in original container. Wash thoroughly after handling. During preparation or dilution, always add liquid slowly to water and with constant stirring.

Conditions for safe storage : Store in a cool, dry, well-ventilated area. Store locked up. Store away from incompatibles and out of direct sunlight. Storage area should be clearly identified, clear of obstruction and accessible only to trained and authorized personnel. Inspect periodically for damage or leaks. Store in corrosion-resistant containers. Keep only in original container.

Incompatible materials : Strong oxidizing agents;Metals (e.g. Aluminum, brass, copper); Alkalies; Aldehydes ; Reducing agents; Water; Organic materials; Acids Chlorate . .

SECTION 8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Exposure Limits:

Chemical Name	ACGIH TLV		OSHA PEL	
	TWA	STEL	PEL	STEL
Sulfuric acid	0.2 mg/m³ (thoracic fraction)	N/Av	1 mg/m³	N/Av
Water	N/Av	N/Av	N/Av	N/Av

Exposure controls

Ventilation and engineering measures

: Use general or local exhaust ventilation to maintain air concentrations below recommended exposure limits.

Respiratory protection : If the TLV is exceeded, a NIOSH/MSHA-approved respirator is advised. Confirmation of which type of respirator is most suitable for the intended application should be obtained from respiratory protection suppliers. Respirators should be selected based on the form and concentration of contaminants in air, and in accordance with OSHA (29 CFR 1910.134) or CSA Z94.4-02.

Skin protection : Wear chemically protective gloves (impervious), boots, aprons, and gauntlets to prevent prolonged or repeated skin contact. Wear impervious gloves, such as butyl rubber. Unsuitable material: polyvinyl alcohol. Advice should be sought from glove suppliers.

Eye / face protection : Chemical splash goggles must be worn when handling this material. A full face shield may also be necessary.

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Other protective equipment	:	Other equipment may be required depending on workplace standards. An eyewash station and safety shower should be made available in the immediate working area.
General hygiene considerations	:	Do not breathe mist or vapor. Avoid contact with skin, eyes and clothing. Do not eat, drink, smoke or use cosmetics while working with this product. Upon completion of work, wash hands before eating, drinking, smoking or use of toilet facilities. Remove and wash contaminated clothing before re-use. Do not take contaminated clothing home.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	:	Clear, oily, colourless liquid
Odour	:	Odorless.
Odour threshold	:	N/Av
pH	:	<1.0
Melting/Freezing point	:	-40°C (-40°F)
Initial boiling point and boiling range	:	102°C (215.6°F)
Flash point	:	Not applicable.
Flashpoint (Method)	:	Not applicable.
Evaporation rate (BuAe = 1)	:	Slower than ether.
Flammability (solid, gas)	:	Not applicable.
Lower flammable limit (% by vol.)	:	Not applicable.
Upper flammable limit (% by vol.)	:	Not applicable.
Oxidizing properties	:	None known.
Explosive properties	:	Not explosive
Vapour pressure	:	<0.3 mmHg @75°F
Vapour density	:	3.4
Relative density / Specific gravity	:	1.84
Solubility in water	:	Soluble
Other solubility(ies)	:	None known.
Partition coefficient: n-octanol/water or Coefficient of water/oil distribution	:	N/Av
Auto-ignition temperature	:	N/Ap
Decomposition temperature	:	Not available.
Viscosity	:	N/Av
Volatiles (% by weight)	:	Not available.
Volatile organic Compounds (VOC's)	:	Not available.
Absolute pressure of container	:	N/Ap
Flame projection length	:	N/Ap
Other physical/chemical comments	:	None.

SECTION 10. STABILITY AND REACTIVITY

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Reactivity	:	Contact with metals may release small amounts of flammable hydrogen gas. Corrosive in contact with metals Avoid contact with incompatible materials. Contact with water will generate considerable heat. Reacts vigorously, violently or explosively with many organic and inorganic chemicals, such as strong acids, acid chlorides, acid anhydrides, ketones, glycols, and organic peroxides.
Chemical stability	:	Stable under the recommended storage and handling conditions prescribed.
Possibility of hazardous reactions	:	Hazardous polymerization does not occur. Contact with metals may release small amounts of flammable hydrogen gas.
Conditions to avoid	:	Avoid heat and open flame. Ensure adequate ventilation, especially in confined areas. Avoid contact with incompatible materials.
Incompatible materials	:	Strong oxidizing agents;Metals (e.g. Aluminum, brass, copper); Alkalies; Aldehydes ; Reducing agents; Water; Organic materials; Acids Chlorate . .
Hazardous decomposition products	:	Decomposes at 340 deg C into sulfur trioxide and water.

SECTION 11. TOXICOLOGICAL INFORMATION

Information on likely routes of exposure:

Routes of entry inhalation	:	YES
Routes of entry skin & eye	:	YES
Routes of entry Ingestion	:	YES
Routes of exposure skin absorption	:	NO

Potential Health Effects:

Signs and symptoms of short-term (acute) exposure

Sign and symptoms Inhalation	:	Fatal if inhaled. Inhalation of high concentrations of fumes or mists may cause severe irritation and corrosive damage to the nose, throat and upper respiratory tract. Symptoms may include coughing, choking and wheezing. Could result in pulmonary edema (fluid accumulation). Symptoms of pulmonary edema (chest pain, shortness of breath) may be delayed.
Sign and symptoms ingestion	:	May be harmful if swallowed. May cause severe irritation and corrosive damage in the mouth, throat and stomach. Symptoms may include abdominal pain, vomiting, burns, perforations, bleeding and eventually death.
Sign and symptoms skin	:	This material is classified as hazardous under OSHA regulations (29CFR 1910.1200) (Hazcom 2012). Classification: Skin corrosion/irritation: Category 1 Causes severe skin burns and eye damage. Direct skin contact may cause corrosive skin burns, deep ulcerations and possibly permanent scarring.
Sign and symptoms eyes	:	This material is classified as hazardous under OSHA regulations (29CFR 1910.1200) (Hazcom 2012). Classification: Eye damage/irritation: Category 1 Causes serious eye damage. Symptoms may include severe pain, tearing, redness, swelling and blurred vision. Contact may lead to permanent injury and blindness.
Potential Chronic Health Effects	:	Chronic skin contact with low concentrations may cause dermatitis. Prolonged or repeated inhalation of fumes or vapours, may cause chronic lung effects, such as bronchitis, and tooth enamel erosion.
Mutagenicity	:	Not expected to be mutagenic in humans.

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Carcinogenicity : This material is not classified as hazardous under U.S. OSHA regulations (29CFR 1910.1200) (Hazcom 2012) and Canadian WHMIS regulations (Hazardous Products Regulations) (WHMIS 2015). Strong inorganic acid mist containing sulfuric acid is classified as a Group 1 Human Carcinogen by the IARC. However, this classification does not apply to liquid forms of sulfuric acid.

Reproductive effects & Teratogenicity

: Not expected to cause reproductive effects.

Sensitization to material : Not expected to be a skin or respiratory sensitizer.

Specific target organ effects : Target Organs:: Eyes, skin, respiratory system and digestive system.

This material is classified as hazardous under OSHA regulations (29CFR 1910.1200) (Hazcom 2012). Classification:
Specific target organ toxicity, single exposure -Category 3
May cause respiratory irritation.

The substance or mixture is not classified as specific target organ toxicant, repeated exposure.

Medical conditions aggravated by overexposure

: Pre-existing skin, eye and respiratory disorders.

Synergistic materials : Not available.

Toxicological data : See below for toxicological data on the substance.
The calculated ATE values for this mixture are:
ATE inhalation (mists) = 0.5 mg/L (75%)

Chemical name	LC_{50}(4hr) inh, rat	LD_{50} (Oral, rat)	LD_{50} (Rabbit, dermal)
Sulfuric acid	0.375mg/L	2140 mg/kg	N/Av
Water	N/Av	>90 mL/kg	N/Av

Other important toxicological hazards

: None known or reported by the manufacturer.

SECTION 12. ECOLOGICAL INFORMATION

Ecotoxicity : Because of the low pH of this product, it would be expected to produce significant ecotoxicity upon exposure to aquatic organisms and aquatic systems. The product should not be allowed to enter drains or water courses, or be deposited where it can affect ground or surface waters.

Ecotoxicity data:

Ingredients	CAS No	Toxicity to Fish		
		LC50 / 96h	NOEC / 21 day	M Factor
Sulfuric acid	7664-93-9	N/Av	N/Av	None.
Water	7732-18-5	No information available.	No information available.	Not applicable.

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Ingredients	CAS No	Toxicity to Daphnia		
		EC50 / 48h	NOEC / 21 day	M Factor
Sulfuric acid	7664-93-9	N/Av	N/Av	None.
Water	7732-18-5	No information available.	No information available.	Not applicable.

Ingredients	CAS No	Toxicity to Algae		
		EC50 / 96h or 72h	NOEC / 96h or 72h	M Factor
Sulfuric acid	7664-93-9	>100mg/L(Green algae)	N/Av	None.
Water	7732-18-5	No information available.	No information available.	Not applicable.

Persistence and degradability

: Biodegradation is not applicable to inorganic materials.

Bioaccumulation potential : No data is available on the product itself.

Components	Partition coefficent n-octanol/ater (log Kow)	Bioconcentration factor (BCF)
Sulfuric acid (CAS 7664-93-9)	N/Ap	no bioaccumulation
Water (CAS 7732-18-5)	N/Ap	N/Ap

Mobility in soil : No data is available on the product itself.

Other Adverse Environmental effects

: No additional information.

SECTION 13. DISPOSAL CONSIDERATIONS

Handling for Disposal : Handle waste according to recommendations in Section 7. Empty containers retain residue (liquid and/or vapour) and can be dangerous.

Methods of Disposal : Dispose in accordance with all applicable federal, state, provincial and local regulations.

RCRA : If this product, as supplied, becomes a waste in the United States, it may meet the criteria of a hazardous waste as defined under RCRA, Title 40 CFR 261. It is the responsibility of the waste generator to determine the proper waste identification and disposal method. For disposal of unused or waste material, check with local, state and federal environmental agencies.

SECTION 14. TRANSPORTATION INFORMATION

Regulatory Information	UN Number	UN proper shipping name	Transport hazard class(es)	Packing Group	Label
49CFR/DOT	UN1830	SULFURIC ACID ; or SULPHURIC ACID	8	II	
49CFR/DOT Additional information	May be shipped as a limited quantity in receptacles not exceeding 1.0 Liters, according to 49 CFR 173.154.				
TDG	UN1830	SULPHURIC ACID	8	II	

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TDG Additional information	May be shipped as LIMITED QUANTITY when transported in containers no larger than 1.0 Litre, in packages not exceeding 30 kg gross mass.				
ICAO/IATA	UN1830	Sulphuric acid	8	II	
ICAO/IATA Additional information	Refer to ICAO/IATA Packing Instruction				
IMDG	UN1830	SULFURIC ACID or SULPHURIC ACID	8	II	
IMDG Additional information	May be shipped as a limited quantity. Consult the IMDG regulations for more information.				

Special precautions for user : None known.

Environmental hazards : See ECOLOGICAL INFORMATION, Section 12.

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

: Not applicable.

SECTION 15 - REGULATORY INFORMATION

US Federal Information:

Components listed below are present on the following U.S. Federal chemical lists:

Ingredients	CAS #	TSCA Inventory	CERCLA Reportable Quantity(RQ) (40 CFR 117.302):	SARA TITLE III: Sec. 302, Extremely Hazardous Substance, 40 CFR 355:	SARA TITLE III: Sec. 313, 40 CFR 372, Specific Toxic Chemical	
					Toxic Chemical	de minimus Concentration
Sulfuric acid	7664-93-9	Yes	1000 lb/ 454 kg	1000 lb TPQ	Yes	1%
Water	7732-18-5	Yes	N/Ap	N/Av	No	N/Ap

SARA TITLE III: Sec. 311 and 312, SDS Requirements, 40 CFR 370 Hazard Classes: Acute Health Hazard. Chronic Health Hazard

Under SARA Sections 311 and 312, the EPA has established threshold quantities for the reporting of hazardous chemicals. The current thresholds are 500 pounds for the threshold planning quantity (TPQ), whichever is lower, for extremely hazardous substances and 10,000 pounds for all other hazardous chemicals.

US State Right to Know Laws:

The following chemicals are specifically listed by individual States:

Ingredients	CAS #	California Proposition 65		State "Right to Know" Lists					
		Listed	Type of Toxicity	CA	MA	MN	NJ	PA	RI
Sulfuric acid	7664-93-9	No	N/Ap	Yes	Yes	Yes	Yes	Yes	Yes
Water	7732-18-5	No	N/Ap	No	No	No	No	No	No

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Canadian Information:

Canadian Environmental Protection Act (CEPA) information: All ingredients listed appear on the Domestic Substances List (DSL).

WHMIS information: Refer to Section 2 for a WHMIS Classification for this product.

International Information:

Components listed below are present on the following International Inventory list:

Ingredients	CAS #	European EINECs	Australia AICS	Philippines PICCS	Japan ENCS	Korea KECI/KECL	China IECSC	NewZealand IOC
Sulfuric acid	7664-93-9	231-639-5	Present	Present	(1)-724; (1)-430	KE-32570	Present	HSR001572, HSR001573, HSR001588 (dilution)
Water	7732-18-5	231-791-2	Present	Listed	Listed	KE-35400	Present	Listed

SECTION 16. OTHER INFORMATION

Legend : ACGIH: American Conference of Governmental Industrial Hygienists
CA: California
CAS: Chemical Abstract Services
CERCLA: Comprehensive Environmental Response, Compensation, and Liability Act of 1980
CFR: Code of Federal Regulations
DOT: Department of Transportation
EPA: Environmental Protection Agency
HMIS: Hazardous Materials Identification System
HSDB: Hazardous Substances Data Bank
IARC: International Agency for Research on Cancer
Inh: Inhalation
IUCLID: International Uniform ChemicaL Information Database
MA: Massachusetts
MN: Minnesota
MSHA: Mine Safety and Health Administration
N/Ap: Not Applicable
N/Av: Not Available
NFPA: National Fire Protection Association
NIOSH: National Institute of Occupational Safety and Health
NJ: New Jersey
NTP: National Toxicology Program
OSHA: Occupational Safety and Health Administration
PA: Pennsylvania
PEL: Permissible exposure limit
RCRA: Resource Conservation and Recovery Act
RI: Rhode Island
RTECS: Registry of Toxic Effects of Chemical Substances
SARA: Superfund Amendments and Reauthorization Act
STEL: Short Term Exposure Limit
TDG: Canadian Transportation of Dangerous Goods Act & Regulations
TLV: Threshold Limit Values
TWA: Time Weighted Average
WHMIS: Workplace Hazardous Materials Identification System

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References : Canadian Centre for Occupational Health and Safety, CCInfoWeb Databases, 2015 (Chempendium, RTECs, HSDB, INCHEM).
European Chemicals Agency, Classification Legislation, 2015
Material Safety Data Sheet from manufacturer
OECD - The Global Portal to Information on Chemical Substances - eChemPortal, 2015

Preparation Date (mm/dd/yyyy)

: 10/13/2015

Other special considerations for handling

: Provide adequate information, instruction and training for operators.

HMIS Rating : *- Chronic hazard 0 - Minimal 1 - Slight 2 - Moderate 3 - Serious 4 - Severe

Health: 3 *Flammability:* 0 *Reactivity:* 2

NFPA Rating

0 - Minimal 1 - Slight 2 - Moderate 3 - Serious 4 - Severe

: *Health:* 3 *Flammability:* 0 *Instability:* 2 *Special Hazards:* None.

Prepared for: Borden & Remington Corp 63 Water St. Fall River, MA 02722 Telephone: 508-675-0096	
Prepared by: ICC The Compliance Center Inc. Telephone: (888) 442-9628 (U.S.): (888) 977-4834 (Canada) http://www.thecompliancecenter.com	

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