VERTEX®

August 5, 2019

United States Environmental Protection Agency – Region 1
National Pollutant Discharge Elimination System (NPDES)
5 Post Office Square
Boston, MA 02109

Subject: Massachusetts Notice of Intent (NOI) – Remediation General Permit (RGP)
Construction Site Dewatering Discharge Permit Application
Parcel E/F
Cambridge Crossing Development
Cambridge & Boston, Massachusetts

To Whom it May Concern,

The Vertex Companies, Inc., is submitting this National Pollutant Discharge Elimination System (NPDES) Remediation General Permit (RGP) Notice of Intent (NOI) on behalf of Parcel E/F owner DW Propco EF, LLC for construction Site dewatering associated with the Parcel E/F redevelopment at the Cambridge Crossing (CX) project, located in Cambridge and Boston, Massachusetts.

The table below lists the Parcel E/F Operator and Owner as well as The Vertex Companies, Inc. as the consultant for the Owner. Please copy the parties listed below on correspondence regarding this NPDES RGP.

Operator	Owner	Consultant
John Moriarty and Associates, Inc. (JMa) Mr. Kyle Weber 3 Church Street Winchester, MA 01890 kweber@jm-a.com (781) 729-3900	DW Propco EF, LLC c/o DW NP Property, LLC Mr. Mark Johnson, Director of Development 200 State Street, 12th Floor Boston, MA, 02109 MJohnson@divcowest.com (617) 914-8640	The Vertex Companies, Inc. Mr. Jesse M. Freeman, PE 100 North Washington Street, Suite 302 Boston, MA 02114 jfreeman@vertexeng.com (617) 275-5407

The following provide additional supporting information related to the specific sections of the attached NOI and/or the NPDES RGP regulatory requirements.

- **Section D.1 of the NOI.** Utilities located within the Cambridge Crossing property are owned by DW NP Property, LLC. A portion of the discharge will travel through the on-site utilities

and afterward will flow through a stormwater utility managed and permitted by the City of Cambridge department of Public Works.

- **Section F.2 and F.3 of the NOI.** Material Safety Data Sheets (MSDS)/Safety Data Sheets (SDS) for the proposed potential chemical additives are attached. If the chemical additives are needed, a Notice of Change will be submitted prior to the use of these additives, which will include the information requested under 2.5.2.g.iii.

Please do not hesitate to contact us should you have any questions or require additional information.

Sincerely,

The Vertex Companies, Inc.

Jesse M. Freeman, PE
Senior Project Manager

Jessica L. Fox, PE
Executive Vice President

Attachments:

NPDES RGP NOI
NOI Supplemental Text
Figures – Site Locus Map
Parcel E/F NPDES Sampling Location Map
Dewatering On-Site Discharge Location
Outfall Location
Groundwater Analytical Data
Laboratory Analytical Reports
Other Supporting Documentation

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:
Cambridge Crossing Development Site
Parcel E/F</td><td colspan="3">Site address: 250 Water Street
Street:</td></tr>
<tr><td>City: Somerville</td><td>State: MA</td><td>Zip: 02141</td></tr>
<tr><td rowspan="4">2. Site owner
DW Propco EF, LLC

Owner is (check one): ☐ Federal ☐ State/Tribal ■ Private
☐ Other; if so, specify:</td><td colspan="3">Contact Person: Mark Johnson, Director of Development</td></tr>
<tr><td colspan="2">Telephone: 617 914-8600</td><td>Email: mjohnson@divcowest.com</td></tr>
<tr><td colspan="3">Mailing address: 200 State Street, 12th Floor
Street:</td></tr>
<tr><td>City: Boston</td><td>State: MA</td><td>Zip: 02109</td></tr>
<tr><td rowspan="4">3. Site operator, if different than owner
John Moriarty & Associates, Inc. (JMa)
Generator Contractor</td><td colspan="3">Contact Person: Kyle Weber</td></tr>
<tr><td colspan="2">Telephone: 781-729-3900</td><td>Email: kweber@jm-a.com</td></tr>
<tr><td colspan="3">Mailing address:
Street: 3 Church Street</td></tr>
<tr><td>City: Winchester</td><td>State: MA</td><td>Zip: 01890</td></tr>
<tr><td>4. NPDES permit number assigned by EPA:
NA

NPDES permit is (check all that apply: ■ RGP ☐ DGP ☐ CGP
☐ MSGP ☐ Individual NPDES permit ☐ Other; if so, specify:</td><td colspan="3">5. Other regulatory program(s) that apply to the site (check all that apply):
■ MA Chapter 21e; list RTN(s):
3-11533
☐ 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):
Lechmere Canal	MA72-36	Class B Surface Water

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

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

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

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

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.	NA
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: May 12, 2017. Correspondence attached.

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: PAHs, Ammonia, Chloride, Arsenic, Lead, Copper, Iron, VOCs	
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): Outfall D3C to the Lechmere Canal	Outfall location(s): (Latitude, Longitude) 42.369377° N, -71.075744° E
Discharges enter the receiving water(s) via (check any that apply): ☐ Direct discharge to the receiving water ■ Indirect discharge, if so, specify: Discharge will enter on-site drainage system leading to on-site infiltration structure with an overflow that will discharge to the Lechmere Canal. ☐ 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: 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): August 2019 to December 2020 Indicate if the discharge is expected to occur over a duration of: ☐ less than 12 months ■ 12 months or more ☐ is an emergency discharge	
Has the operator attached a site plan in accordance with the instructions in D, above? (check one): ■ Yes ☐ No	

<table>
<tr><td>2. Activity Category: (check all that apply)</td><td colspan="2">3. Contamination Type Category: (check all that apply)</td></tr>
<tr><td rowspan="5">☐ I – Petroleum-Related Site Remediation
☐ II – Non-Petroleum-Related Site Remediation
■ III – Contaminated Site Dewatering
☐ IV – Dewatering of Pipelines and Tanks
☐ V – Aquifer Pump Testing
☐ VI – Well Development/Rehabilitation
☐ VII – Collection Structure Dewatering/Remediation
☐ VIII – Dredge-Related Dewatering</td><td colspan="2">a. If Activity Category I or II: (check all that apply)

☐ A. Inorganics
☐ B. Non-Halogenated Volatile Organic Compounds
☐ C. Halogenated Volatile Organic Compounds
☐ D. Non-Halogenated Semi-Volatile Organic Compounds
☐ E. Halogenated Semi-Volatile Organic Compounds
☐ F. Fuels Parameters</td></tr>
<tr><td colspan="2">b. If Activity Category III, IV, V, VI, VII or VIII: (check either G or H)</td></tr>
<tr><td>■ G. Sites with Known Contamination</td><td>☐ H. Sites with Unknown Contamination</td></tr>
<tr><td>c. If Category III-G, IV-G, V-G, VI-G, VII-G or VIII-G: (check all that apply)

■ A. Inorganics
■ B. Non-Halogenated Volatile Organic Compounds
☐ C. Halogenated Volatile Organic Compounds
■ D. Non-Halogenated Semi-Volatile Organic Compounds
☐ E. Halogenated Semi-Volatile Organic Compounds
☐ F. Fuels Parameters</td><td>d. If Category III-H, IV-H, V-H, VI-H, VII-H or VIII-H Contamination Type Categories A through F apply</td></tr>
</table>

4. Influent and Effluent Characteristics

Parameter	Known or believed absent	Known or believed present	# of samples	Test method (#)	Detection limit (µg/l)	Influent		Effluent Limitations	
						Daily maximum (µg/l)	Daily average (µg/l)	TBEL	WQBEL
A. Inorganics									
Ammonia		✓	1	4500NH3	750	28,400	28,400	Report mg/L	---
Chloride		✓	1	300.0	25,000	1,600,000	1,600,000	Report µg/l	---
Total Residual Chlorine	✓		1	4500CL-D	20	<20	<20	0.2 mg/L	0.011 mg/L
Total Suspended Solids		✓	1	2540D	10,000	39,000	39,000	30 mg/L	---
Antimony	✓		1	200.7	4.00	<4.00	<4.00	206 µg/L	---
Arsenic		✓	1	200.7	1.00	2.25	2.25	104 µg/L	---
Cadmium	✓		1	200.7	0.20	<0.20	<0.20	10.2 µg/L	---
Chromium III	✓		1	200.7	50	<50	<50	323 µg/L	---
Chromium VI	✓		1	200.7	50	<50	<50	323 µg/L	---
Copper		✓	1	200.7	1.00	2.85	2.85	242 µg/L	---
Iron		✓	1	200.7	50	18,900	18,900	5,000 µg/L	1,000 ug/L
Lead		✓	1	200.8	1.00	7.64	7.64	160 µg/L	---
Mercury	✓		1	245.1	0.20	<0.20	<0.20	0.739 µg/L	---
Nickel	✓		1	200.7	2.00	<2.00	<2.00	1,450 µg/L	---
Selenium	✓		1	200.7	5.00	<5.00	<5.00	235.8 µg/L	---
Silver	✓		1	200.7	0.40	<0.40	<0.40	35.1 µg/L	---
Zinc	✓		1	200.7	10.00	<10.00	<10.00	420 µg/L	---
Cyanide	✓		1	4500CN-C	5	<5	<5	178 mg/L	---
B. Non-Halogenated VOCs									
Total BTEX	✓		1	624	3.75	<3.75	<3.75	100 µg/L	---
Benzene	✓		1	624	0.50	<0.50	<0.50	5.0 µg/L	---
1,4 Dioxane	✓		1	624.1-SIM	3.0	<3.0	<3.0	200 µg/L	---
Acetone	✓		1	624	5.0	<5.0	<5.0	7.97 mg/L	---
Phenol		✓	1	625	5.0	10	10	1,080 µg/L	---

Parameter	Known or believed absent	Known or believed present	# of samples	Test method (#)	Detection limit (µg/l)	Influent		Effluent Limitations	
						Daily maximum (µg/l)	Daily average (µg/l)	TBEL	WQBEL
C. Halogenated VOCs									
Carbon Tetrachloride	✓		1	624	0.50	<0.50	<0.50	4.4 µg/L	---
1,2 Dichlorobenzene	✓		1	624	2.5	<2.5	<2.5	600 µg/L	---
1,3 Dichlorobenzene	✓		1	624	2.5	<2.5	<2.5	320 µg/L	---
1,4 Dichlorobenzene	✓		1	624	2.5	<2.5	<2.5	5.0 µg/L	---
Total dichlorobenzene			-	-	-	-	-	763 µg/L in NH	---
1,1 Dichloroethane	✓		1	624	0.75	<0.75	<0.75	70 µg/L	---
1,2 Dichloroethane	✓		1	624	0.50	<0.50	<0.50	5.0 µg/L	---
1,1 Dichloroethylene	✓		1	624	0.50	<0.50	<0.50	3.2 µg/L	---
Ethylene Dibromide	✓		1	504.1	0.010	<0.010	<0.010	0.05 µg/L	---
Methylene Chloride	✓		1	624	3.0	<3.0	<3.0	4.6 µg/L	---
1,1,1 Trichloroethane	✓		1	624	0.50	<0.50	<0.50	200 µg/L	---
1,1,2 Trichloroethane	✓		1	624	0.75	<0.75	<0.75	5.0 µg/L	---
Trichloroethylene	✓		1	624	0.50	<0.50	<0.50	5.0 µg/L	---
Tetrachloroethylene	✓		1	624	0.50	<0.50	<0.50	5.0 µg/L	---
cis-1,2 Dichloroethylene	✓		1	624	0.50	<0.50	<0.50	70 µg/L	---
Vinyl Chloride	✓		1	624	1.0	<1.0	<1.0	2.0 µg/L	---
D. Non-Halogenated SVOCs									
Total Phthalates			1	625	5	<5	<5	190 µg/L	---
Diethylhexyl phthalate			1	625	-	-	-	101 µg/L	---
Total Group I PAHs		✓	1	625.1-SIM	0.7	2.92	2.92	1.0 µg/L	---
Benzo(a)anthracene		✓	1	625.1-SIM	0.10	0.64	0.64	As Total PAHs	0.0038
Benzo(a)pyrene		✓	1	625.1-SIM	0.10	0.51	0.51		0.0038
Benzo(b)fluoranthene		✓	1	625.1-SIM	0.10	0.61	0.61		0.0038
Benzo(k)fluoranthene		✓	1	625.1-SIM	0.10	0.20	0.20		0.0038
Chrysene		✓	1	625.1-SIM	0.10	0.59	0.59		0.0038
Dibenzo(a,h)anthracene	✓		1	625.1-SIM	0.10	<0.10	<0.10		---
Indeno(1,2,3-cd)pyrene		✓	1	625.1-SIM	0.10	0.37	0.37		0.0038

Parameter	Known or believed absent	Known or believed present	# of samples	Test method (#)	Detection limit (µg/l)	Influent		Effluent Limitations	
						Daily maximum (µg/l)	Daily average (µg/l)	TBEL	WQBEL
Total Group II PAHs		✓	1	625	1.0	83.82	83.82	100 µg/L	---
Naphthalene		✓	1	625	0.20	40	40	20 µg/L	---
E. Halogenated SVOCs									
Total PCBs	✓		1	608	0.250	<0.250	<0.250	0.000064 µg/L	---
Pentachlorophenol	✓		1	625.1-SIM	0.80	<0.80	<0.80	1.0 µg/L	---
F. Fuels Parameters									
Total Petroleum Hydrocarbons	✓		1	1664A	4,000	<4,000	<4,000	5.0 mg/L	---
Ethanol	✓		1	1671A	2,000	<2,000	<2,000	Report mg/L	---
Methyl-tert-Butyl Ether	✓		1	8260C	1.0	<1.0	<1.0	70 µg/L	---
tert-Butyl Alcohol	✓		1	8260C	10	<10	<10	120 µg/L in MA 40 µg/L in NH	---
tert-Amyl Methyl Ether	✓		1	8260C	2.0	<2.0	<2.0	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			1	field	-	7.09	7.09		
Total Phenolics		✓	1	4,420.1	30	45	45		

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:

Note that a Notice of Change will be submitted prior to use of flocculation or GAC, if needed.

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

The treatment system will consist of a construction dewatering pump that will pump water to a settling tank. Aeration may be provided within the settling tank if needed. The water will then be pumped through at least one set of three in-line canister bag filters. Due to the presence of localized petroleum releases at the Cambridge Crossing project, where encountered and if needed, water will be pumped through an oil/water separator. Additionally, depending on the presence of liquid phase petroleum and the potential for metals to be present over the discharge limits, water may be treated through granular activates carbon vessels, ion-exchange, pH adjustment, coagulation, or flocculation as needed.

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: In-line settling tank. If needed, aeration and additional holding tanks. Granular activated carbon, ion exchange, pH adjustment, flocculation, as needed (Notice of Change will be submitted before use of these additives).

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: Bag Filters Is use of a flow meter feasible? (check one): ■ Yes ☐ No, if so, provide justification:	200
Provide the proposed maximum effluent flow in gpm.	200
Provide the average effluent flow in gpm.	30
If Activity Category IV applies, indicate the estimated total volume of water that will be discharged:	NA

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

F. Chemical and additive information

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

☐ Algaecides/biocides ☐ Antifoams ■ Coagulants ☐ Corrosion/scale inhibitors ☐ Disinfectants ■ Flocculants ☐ Neutralizing agents ☐ Oxidants ☐ Oxygen ☐ scavengers ☐ pH conditioners ☐ Bioremedial agents, including microbes ☐ Chlorine or chemicals containing chlorine ☐ Other; if so, specify:
MSDS/SDS are included for proposed additives and flocculation agents. A Notice of Change will be submitted prior to implementation.

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

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

G. Endangered Species Act eligibility determination

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

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

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

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

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

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

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

H. National Historic Preservation Act eligibility determination

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

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

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

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

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

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

I. Supplemental information

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

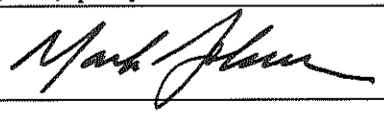
Please refer to cover letter which includes: Site schematic, treatment system diagram, data table summarizing influent concentrations with supporting laboratory reports, and correspondence with the Massachusetts Department of Environmental Protection (MassDEP) and United States Wildlife Service.

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

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

J. Certification requirement

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

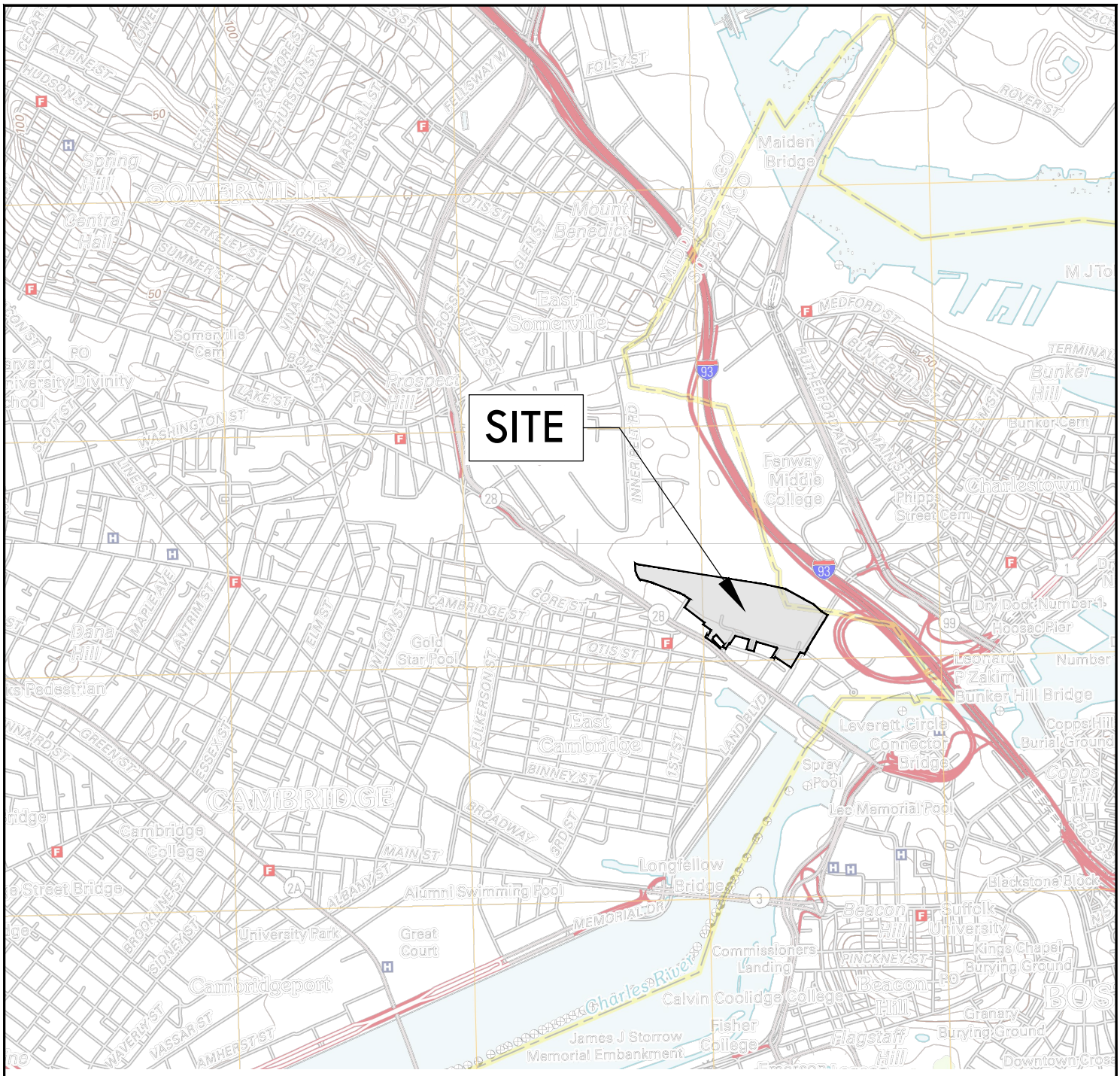
BMPP certification statement:	A BMPP meeting the requirements of this Remediation General Permit will be developed, maintained at the site, implemented upon initiation of discharge and modified as needed to meet discharge limits.
Notification provided to the appropriate State, including a copy of this 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: 8/5/2019
Print Name and Title: Mark Johnson Director of Development on behalf of LLC	

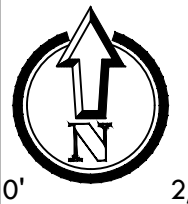
B. Receiving water Information (cont.)

3. Indicate if the receiving water(s) is listed in the State's Integrated List of Waters (i.e., CWA Section 303(d)). Include which designated uses are impaired, and any pollutants indicated. Also, indicate if a final TMDL is available for any of the indicated pollutants. For more information, contact the appropriate State as noted in Part 4.6 of the RGP.
The Lechmere Canal is a small inlet on the Charles River, so it is considered to be part of Charles Segment MA72-36. The Charles River is listed as a category 5 water. Impairment causes are chlorophyll-a (TMDL 33826), combined biota/habitat bioassessments, DDT, dissolved oxygen saturation, escherichia coli, excess algal growth (TMDL 33826), nutrient/eutrophication biological indicators (TMDL 33826), oil and grease, dissolved oxygen, PCB in fish tissue, phosphorous (total) (TMDL 33826), salinity, secchi disk transparency (TMDL 33826), sediment screening value (exceedence), taste and odor (TMDL 33826), and water temperature.
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:
May 12, 2017. Correspondence attached.

THE VERTEX COMPANIES, INC.
100 NORTH WASHINGTON STREET
SUITE 302
BOSTON, MA 02114

617.275.5407 | VERTEXENG.COM





0' 2,000' 4,000' 6,000'

SCALE: 1" = 2,000'

SOURCE:
U.S.G.S. BOSTON SOUTH QUADRANGLE, 7.5 MINUTE (2012)
U.S.G.S. BOSTON NORTH QUADRANGLE, 7.5 MINUTE (2012)

SITE LOCUS MAP

CAMBRIDGE CROSSING
Cambridge, Somerville, and Boston, Massachusetts

File No.:	35663
Date:	OCTOBER 2018
Drawn:	LPV
Checked:	JMF
Job No.:	35663

FIGURE 1

VERTEX®
100 NORTH WASHINGTON STREET
BOSTON, MA 02114
(T): 617.275.5407
VERTEXENG.COM

CAMBRIDGE CROSSING BOUNDARY (FORMERLY THE NORTHPOINT DEVELOPMENT SITE)

FORMER PROPERTY BOUNDARY

CAMBRIDGE-SOMERVILLE BOUNDARY

CAMBRIDGE-BOSTON BOUNDARY

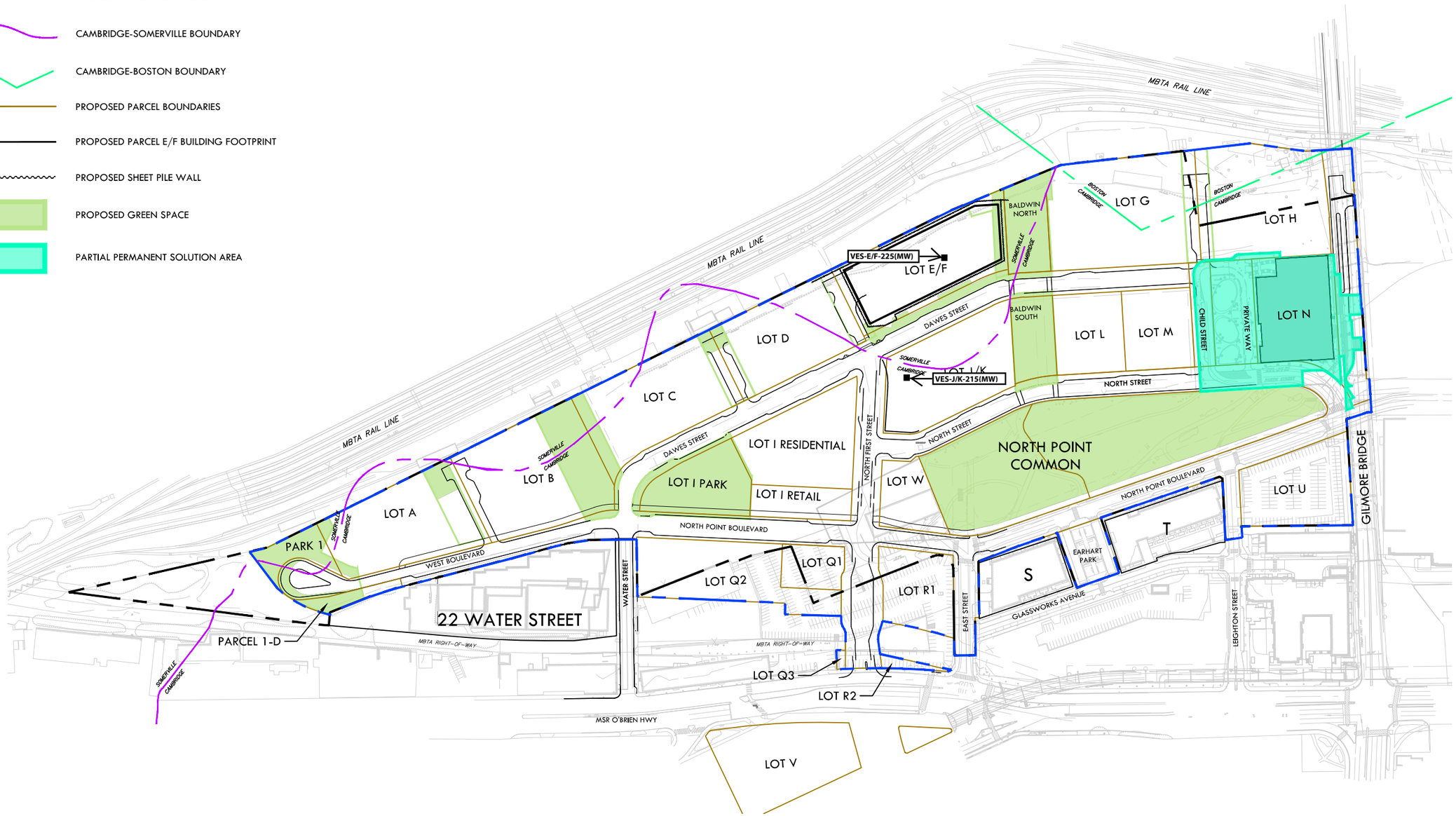
PROPOSED PARCEL BOUNDARIES

PROPOSED PARCEL E/F BUILDING FOOTPRINT

PROPOSED SHEET PILE WALL

PROPOSED GREEN SPACE

PARTIAL PERMANENT SOLUTION AREA



0' 250' 500' 750'

SCALE: 1" = 250'

NOTE:
FIGURE BASED UPON 2084B001U AND 208402D037G SHEETING, DATED OCTOBER 26, 2018 FROM BEALS & THOMAS, INC.

VERTEX®
100 NORTH WASHINGTON STREET
BOSTON, MA 02114
(T): 781.952.6000
VERTEXENG.COM

REVISIONS

Figure 2

File No.:	35663
Date:	NOVEMBER 2018
Drawn:	JWP
Checked:	JMF
Job No.:	35663

Parcel E/F NPDES Sampling Location Map

CAMBRIDGE CROSSING
COMBRIDGE, SOMERVILLE, & BOSTON, MASSACHUSETTS

Figure 3. Potential On-Site Discharge Locations

POTENTIAL POINTS OF DISCHARGE
TO ON-SITE STORM WATER SYSTEM

N

LOT EF

LOT G

LOT H

LOT I-1

BOSTON
SOMERVILLE

SOMERVILLE
CAMBRIDGE

BOSTON
CAMBRIDGE

DAWES STREET

CHILD STREET

AUSTIN ST

CHARLESTOWN AVENUE

NORTH STREET

NORTH POINT BOULEVARD

NORTH EAST STREET

LEIGHTON STREET

EARHART STREET

GLASSWORKS AVENUE

To the Lechmere Canal

METERS 0 5 10 25
FEET 0 20 40 80 120

DEWATERING LOCATIONS

DRAWN BY:	FDW	DATE:	11/26/2018
CHECKED BY:	PAT	FILE NO.:	208402D040G
JOB NO.:	2084.02	SCALE:	1" = 40'

NORTH POINT PROPERTY BOUNDARY

CAMBRIDGE-SOMERVILLE BOUNDARY

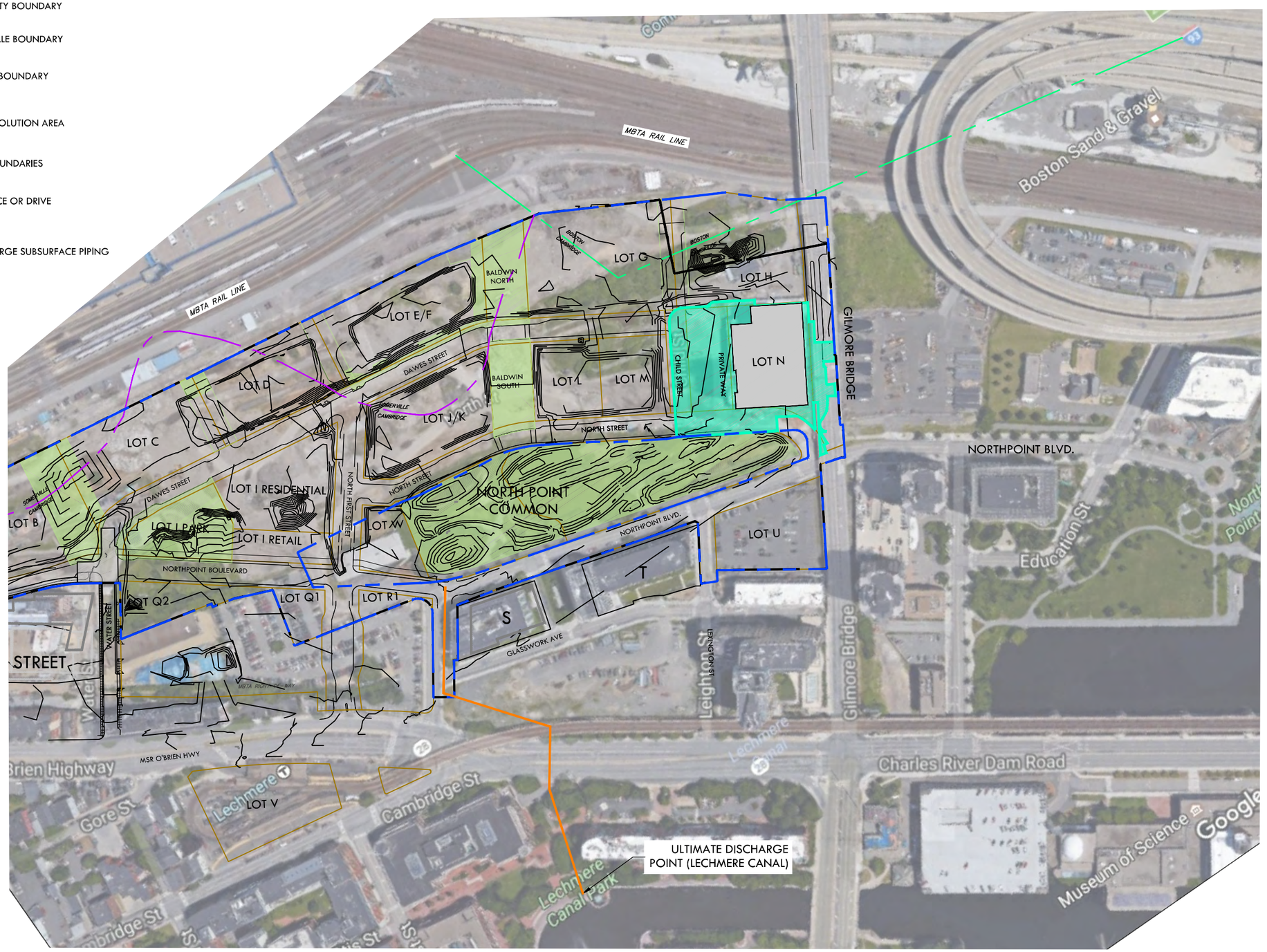
CAMBRIDGE-BOSTON BOUNDARY

PARTIAL PERMANENT SOLUTION AREA

PROPOSED PARCEL BOUNDARIES

PROPOSED OPEN SPACE OR DRIVE

STORMWATER DISCHARGE SUBSURFACE PIPING



NOTES:

- FIGURE BASED UPON 2084B001A, DATED JANUARY 11, 2011 FROM BEALS & THOMAS, INC.
- LOT LINES BASED UPON THE BEALS & THOMAS, INC. MARCH 30, 2016 75% DESIGN DEVELOPMENT INDEX PLAN
- STORMWATER DRAINAGE PIPING BASED UPON GLX, NOVEMBER 26, 2014.
- DEWATERING CONNECTION POINTS BASED UPON 208402P335A-001, DATED APRIL 21, 2017 FROM BEALS & THOMAS, INC.

0' 250' 500' 750'

SCALE: 1" = 250'

VERTEX®
ONE CONGRESS STREET
BOSTON, MA 02114
(T): 781.952.6000
VERTEXENG.COM

REVISIONS

STORMWATER DISCHARGE SYSTEM & OUTFALL LOCATION
NORTHPOINT DEVELOPMENT SITE
CAMBRIDGE, SOMERVILLE & BOSTON
MASSACHUSETTS

File No.:	35663
Date:	JAN 2017
Drawn:	AS
Checked:	JMF
Job No.:	35663

Figure 4

Enter number values in green boxes below

Enter values in the units specified

↓

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

Enter a dilution factor, if other than zero

↓

0

Enter values in the units specified

↓

1310	C_d = Enter influent hardness in **mg/L** $CaCO_3$
86.2	C_s = Enter receiving water hardness in **mg/L** $CaCO_3$

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

↓

8.24	pH in **Standard Units**
13.6	Temperature in **°C**
0.136	Ammonia in **mg/L**
86.2	Hardness in **mg/L** $CaCO_3$
0	Salinity in **ppt**
0	Antimony in **µg/L**
0	Arsenic in **µg/L**
0	Cadmium in **µg/L**
0	Chromium III in **µg/L**
0	Chromium VI in **µg/L**
0	Copper in **µg/L**
0	Iron in **µg/L**
0	Lead in **µg/L**
0	Mercury in **µg/L**
0	Nickel in **µg/L**
0	Selenium in **µg/L**
0	Silver in **µg/L**
0	Zinc in **µg/L**

Notes:

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

Saltwater (estuarine and marine): enter Q_R if approved by the State; enter 0 if no entry

Discharge flow is equal to the design flow or 1 MGD, whichever is less

Only if approved by State as the entry for Q_R; leave 0 if no entry

Saltwater (estuarine and marine): only if approved by the State

Leave 0 if no entry

Freshwater only

pH, temperature, and ammonia required for all discharges

Hardness required for freshwater

Salinity required for saltwater (estuarine and marine)

Metals required for all discharges if present and if dilution factor is > 1

Enter 0 if non-detect or testing not required

Enter **influent** concentrations in the units specified

if >1 sample, enter maximum

if >10 samples, may enter 95th percentile

Enter 0 if non-detect or testing not required

↓

0	TRC in **µg/L**
28.40	Ammonia in **mg/L**
0	Antimony in **µg/L**
2.25	Arsenic in **µg/L**
0	Cadmium in **µg/L**
0	Chromium III in **µg/L**
0	Chromium VI in **µg/L**
2.85	Copper in **µg/L**
18,900	Iron in **µg/L**
7.64	Lead in **µg/L**
0	Mercury in **µg/L**
0	Nickel in **µg/L**
0	Selenium in **µg/L**
0	Silver in **µg/L**
0	Zinc in **µg/L**
0	Cyanide in **µg/L**
10	Phenol in **µg/L**
0	Carbon Tetrachloride in **µg/L**
0	Tetrachloroethylene in **µg/L**
0	Total Phthalates in **µg/L**
0	Diethylhexylphthalate in **µg/L**
0.64	Benzo(a)anthracene in **µg/L**
0.51	Benzo(a)pyrene in **µg/L**
0.61	Benzo(b)fluoranthene in **µg/L**
0.2	Benzo(k)fluoranthene in **µg/L**
0.59	Chrysene in **µg/L**
0	Dibenzo(a,h)anthracene in **µg/L**
0.37	Indeno(1,2,3-cd)pyrene in **µg/L**
0	Methyl-tert butyl ether in **µg/L**

I. Dilution Factor Calculation Method

A. 7Q10

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

B. Dilution Factor

Calculated as follows:

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

Q_R = 7Q10 in MGD

Q_P = Discharge flow, in MGD

II. Effluent Limitation Calculation Method

A. Calculate Water Quality Criterion:

Step 1. Downstream hardness, calculated as follows:

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

C_r = Downstream hardness in mg/L

Q_d = Discharge flow in MGD

C_d = Discharge hardness in mg/L

Q_s = Upstream flow (7Q10) in MGD

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

Q_r = Downstream receiving water flow in MGD

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

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

m_c = Pollutant-specific coefficient (m_a for silver)

b_c = Pollutant-specific coefficient (b_a for silver)

ln = Natural logarithm

h = Hardness calculated in Step 1

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

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

B. Calculate WQBEL:

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

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

C_r = Water quality criterion in µg/L

Q_d = Discharge flow in MGD

C_d = WQBEL in µg/L

Q_s = Upstream flow (7Q10) in MGD

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

Q_r = Downstream receiving water flow in MGD

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

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

C_r = Water quality criterion in µg/L

Q_d = Discharge flow in MGD

Q_r = Downstream receiving water flow in MGD

C. Determine if a WQBEL applies:

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

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

C_r = Downstream concentration in µg/L

Q_d = Discharge flow in MGD

C_d = Influent concentration in µg/L

Q_s = Upstream flow (7Q10) in MGD

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

Q_r = Downstream receiving water flow in MGD

The WQBEL applies if:

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

AND

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

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

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

AND

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

Part 2.1.1 of the RGP for that parameter applies.

Dilution Factor	1.0					
A. Inorganics	TBEL applies if bolded		WQBEL applies if bolded		Compliance Level applies if shown	
Ammonia	**Report**	mg/L	---			
Chloride	**Report**	µg/L	---			
Total Residual Chlorine	0.2	mg/L	**11**	µg/L	50	µg/L
Total Suspended Solids	**30**	mg/L	---			
Antimony	**206**	µg/L	640	µg/L		
Arsenic	**104**	µg/L	10	µg/L		
Cadmium	**10.2**	µg/L	1.8203	µg/L		
Chromium III	**323**	µg/L	708.7	µg/L		
Chromium VI	**323**	µg/L	11.4	µg/L		
Copper	**242**	µg/L	84.1	µg/L		
Iron	5000	µg/L	**1000**	µg/L		
Lead	**160**	µg/L	84.13	µg/L		
Mercury	**0.739**	µg/L	0.91	µg/L		
Nickel	**1450**	µg/L	459.8	µg/L		
Selenium	**235.8**	µg/L	5.0	µg/L		
Silver	**35.1**	µg/L	316.0	µg/L		
Zinc	**420**	µg/L	1059.7	µg/L		
Cyanide	**178**	mg/L	5.2	µg/L	---	µg/L
B. Non-Halogenated VOCs						
Total BTEX	**100**	µg/L	---			
Benzene	**5.0**	µg/L	---			
1,4 Dioxane	**200**	µg/L	---			
Acetone	**7970**	µg/L	---			
Phenol	**1,080**	µg/L	300	µg/L		
C. Halogenated VOCs						
Carbon Tetrachloride	**4.4**	µg/L	1.6	µg/L		
1,2 Dichlorobenzene	**600**	µg/L	---			
1,3 Dichlorobenzene	**320**	µg/L	---			
1,4 Dichlorobenzene	**5.0**	µg/L	---			
Total dichlorobenzene	**---**	µg/L	---			
1,1 Dichloroethane	**70**	µg/L	---			
1,2 Dichloroethane	**5.0**	µg/L	---			
1,1 Dichloroethylene	**3.2**	µg/L	---			
Ethylene Dibromide	**0.05**	µg/L	---			
Methylene Chloride	**4.6**	µg/L	---			
1,1,1 Trichloroethane	**200**	µg/L	---			
1,1,2 Trichloroethane	**5.0**	µg/L	---			
Trichloroethylene	**5.0**	µg/L	---			
Tetrachloroethylene	**5.0**	µg/L	3.3	µg/L		
cis-1,2 Dichloroethylene	**70**	µg/L	---			
Vinyl Chloride	**2.0**	µg/L	---			
D. Non-Halogenated SVOCs						
Total Phthalates	**190**	µg/L	---	µg/L		
Diethylhexyl phthalate	**101**	µg/L	2.2	µg/L		
Total Group I Polycyclic Aromatic Hydrocarbons	**1.0**	µg/L	---			
Benzo(a)anthracene	1.0	µg/L	**0.0038**	µg/L	0.1	µg/L
Benzo(a)pyrene	1.0	µg/L	**0.0038**	µg/L	0.1	µg/L
Benzo(b)fluoranthene	1.0	µg/L	**0.0038**	µg/L	0.1	µg/L
Benzo(k)fluoranthene	1.0	µg/L	**0.0038**	µg/L	0.1	µg/L
Chrysene	1.0	µg/L	**0.0038**	µg/L	0.1	µg/L
Dibenzo(a,h)anthracene	**1.0**	µg/L	0.0038	µg/L	---	µg/L
Indeno(1,2,3-cd)pyrene	1.0	µg/L	**0.0038**	µg/L	0.1	µg/L
Total Group II Polycyclic Aromatic Hydrocarbons	**100**	µg/L	---			
Naphthalene	**20**	µg/L	---			
E. Halogenated SVOCs						
Total Polychlorinated Biphenyls	**0.000064**	µg/L	---		0.5	µg/L
Pentachlorophenol	**1.0**	µg/L	---			
F. Fuels Parameters						
Total Petroleum Hydrocarbons	**5.0**	mg/L	---			
Ethanol	**Report**	mg/L	---			
Methyl-tert-Butyl Ether	**70**	µg/L	20	µg/L		
tert-Butyl Alcohol	**120**	µg/L	---			
tert-Amyl Methyl Ether	**90**	µg/L	---			

Table 1
Summary of Parcel E/F NPDES Groundwater Results
Cambridge Crossing
Cambridge Somerville, Massachusetts
VERTEX Project No. 35663
Release Tracking Number (RTN) 3-11533

LOCATION			VES-E/F-225(MW)	Lechmere Canal
SAMPLING DATE			2/28/2018	-
LABORATORY SAMPLE ID			L1806947-01	-
ANALYTE	CAS No.	Units		
Total Petroleum Hydrocarbons (TPH)				
TPH	NONE	µg/L	ND(4000)	-
Volatile Organic Compounds (VOCs)				
1,1,1,2-Tetrachloroethane	630-20-6	µg/L	-	-
1,1,1-Trichloroethane	71-55-6	µg/L	ND(0.5)	-
1,1,2,2-Tetrachloroethane	79-34-5	µg/L	-	-
1,1,2-Trichloroethane	79-00-5	µg/L	ND(0.75)	-
1,1-Dichloroethane	75-34-3	µg/L	ND(0.75)	-
1,1-Dichloroethene	75-35-4	µg/L	ND(0.5)	-
1,1-Dichloropropene	563-58-6	µg/L	-	-
1,2,3-Trichlorobenzene	87-61-6	µg/L	-	-
1,2,3-Trichloropropane	96-18-4	µg/L	-	-
1,2-Dibromoethane	106-93-4	µg/L	ND(0.01)	-
1,2-Dichlorobenzene	95-50-1	µg/L	ND(2.5)	-
1,2-Dichloroethane	107-06-2	µg/L	ND(0.5)	-
1,3-Dichlorobenzene	541-73-1	µg/L	ND(2.5)	-
1,4-Dichlorobenzene	106-46-7	µg/L	ND(2.5)	-
1,4-Dioxane	123-91-1	µg/L	ND(3)	-
Acetone	67-64-1	µg/L	ND(5)	-
Benzene	71-43-2	µg/L	ND(0.5)	-
Carbon tetrachloride	56-23-5	µg/L	ND(0.5)	-
cis-1,2-Dichloroethene	156-59-2	µg/L	ND(0.5)	-
Ethylbenzene	100-41-4	µg/L	ND(0.5)	-
Methyl tert butyl ether	1634-04-4	µg/L	ND(1)	-
Methylene chloride	75-09-2	µg/L	ND(3)	-
o-Xylene	95-47-6	µg/L	ND(1)	-
p/m-Xylene	179601-23-1	µg/L	ND(1)	-
Tert-Butyl Alcohol	75-65-0	µg/L	ND(10)	-
Tertiary-Amyl Methyl Ether	994-05-8	µg/L	ND(2)	-
Tetrachloroethene	127-18-4	µg/L	ND(0.5)	-
Toluene	108-88-3	µg/L	ND(0.75)	-
Trichloroethene	79-01-6	µg/L	ND(0.5)	-
Vinyl chloride	75-01-4	µg/L	ND(1)	-
Ethanol	64-17-5	µg/L	ND(2000)	
Total Xylenes	1330-20-7	µg/L	ND(1)	-
Total VOCs	Multiple	µg/L	-	-
Semivolatile Organic Compounds (SVOCs)				
Bis(2-ethylhexyl)phthalate	117-81-7	µg/L	-	-
Butyl benzyl phthalate	85-68-7	µg/L	ND(5)	-
Di-n-butylphthalate	84-74-2	µg/L	ND(5)	-
Di-n-octylphthalate	117-84-0	µg/L	ND(5)	-
Diethyl phthalate	84-66-2	µg/L	ND(5)	-
Dimethyl phthalate	131-11-3	µg/L	ND(5)	-
Phenol	108-95-2	µg/L	10	-
Acenaphthene	83-32-9	µg/L	13	-
Acenaphthylene	208-96-8	µg/L	0.31	-
Anthracene	120-12-7	µg/L	3.2	-
Benzo(a)anthracene	56-55-3	µg/L	0.64	-
Benzo(a)pyrene	50-32-8	µg/L	0.51	-
Benzo(b)fluoranthene	205-99-2	µg/L	0.61	-
Benzo(ghi)perylene	191-24-2	µg/L	0.31	-
Benzo(k)fluoranthene	207-08-9	µg/L	0.2	-
Chrysene	218-01-9	µg/L	0.59	-
Dibenzo(a,h)anthracene	53-70-3	µg/L	ND(0.1)	-
Fluoranthene	206-44-0	µg/L	4	-
Fluorene	86-73-7	µg/L	8.2	-
Indeno(1,2,3-cd)Pyrene	193-39-5	µg/L	0.37	-
Naphthalene	91-20-3	µg/L	40	-
Pentachlorophenol	87-86-5	µg/L	ND(0.8)	-
Phenanthrene	85-01-8	µg/L	12	-
Pyrene	129-00-0	µg/L	2.8	-
Total SVOCs	Multiple	µg/L	96.74	
Total Metals				
Antimony, Total	7440-36-0	µg/L	ND(4)	-

Table 1
Summary of Parcel E/F NPDES Groundwater Results
Cambridge Crossing
Cambridge Somerville, Massachusetts
VERTEX Project No. 35663
Release Tracking Number (RTN) 3-11533

LOCATION			VES-E/F-225(MW)	Lechmere Canal
SAMPLING DATE			2/28/2018	-
LABORATORY SAMPLE ID			L1806947-01	-
ANALYTE	CAS No.	Units		
Arsenic, Total	7440-38-2	µg/L	2.25	-
Cadmium, Total	7440-43-9	µg/L	ND(0.2)	-
Chromium, Total	7440-47-3	µg/L	ND(1)	-
Copper, Total	7440-50-8	µg/L	2.85	-
Iron, Total	7439-89-6	µg/L	18900	-
Lead, Total	7439-92-1	µg/L	7.64	-
Mercury, Total	7439-97-6	µg/L	ND(0.2)	-
Nickel, Total	7440-02-0	µg/L	ND(2)	-
Selenium, Total	7782-49-2	µg/L	ND(5)	-
Silver, Total	7440-22-4	µg/L	ND(0.4)	-
Zinc, Total	7440-66-6	µg/L	ND(10)	-
Chromium, Trivalent	16065-83-1	µg/L	ND(50)	
Chromium, Hexavalent	18540-29-9	µg/L	ND(50)	-
Polychlorinated Biphenyls (PCBs)				
Aroclor 1016	12674-11-2	µg/L	ND(0.25)	-
Aroclor 1221	11104-28-2	µg/L	ND(0.25)	-
Aroclor 1232	11141-16-5	µg/L	ND(0.25)	-
Aroclor 1242	53469-21-9	µg/L	ND(0.25)	-
Aroclor 1248	12672-29-6	µg/L	ND(0.25)	-
Aroclor 1254	11097-69-1	µg/L	ND(0.25)	-
Aroclor 1260	11096-82-5	µg/L	ND(0.2)	-
Cyanide				
Cyanide, Total	57-12-5	µg/L	ND(5)	-
General Chemistry				
Chlorine, Total Residual	NONE	µg/L	ND(20)	-
Nitrogen, Ammonia	7664-41-7	µg/L	28400	136
pH	12408-02-5	SU	7.09†	8.24†
Phenolics, Total	NONE	µg/L	45	-
Solids, Total Suspended	NONE	µg/L	39000	-
Temperature	NONE	°C	14.6†	13.6†
Anions by Ion Chromatography				
Chloride	16887-00-6	µg/L	1,600,000	-
Hardness				
Hardness	NONE	µg/L	1,310,000**	86,200

Notes

1. CAS No. = Chemical Abstract Service Number.
2. - = Sample was not analyzed for specific analyte.
3. ND = Not Detected above the laboratory reporting limit shown in parenthesis.
4. µg/L = micrograms per liter.
5 mg CaCO3/L = milligrams of calcium carbonate per liter.
6. SU = Standard Units.
7. µmhos/cm = micromhos per centimeter.
8. † = Field Measured.
9. TBEL = Technology-Based Effluent Limitation
10. WQBEL - Water Quality-based Effluent Limitation
11. * = Calculated WQBEL value
12. ** = Influent Hardness value from well VES-J/K-215 (MW)

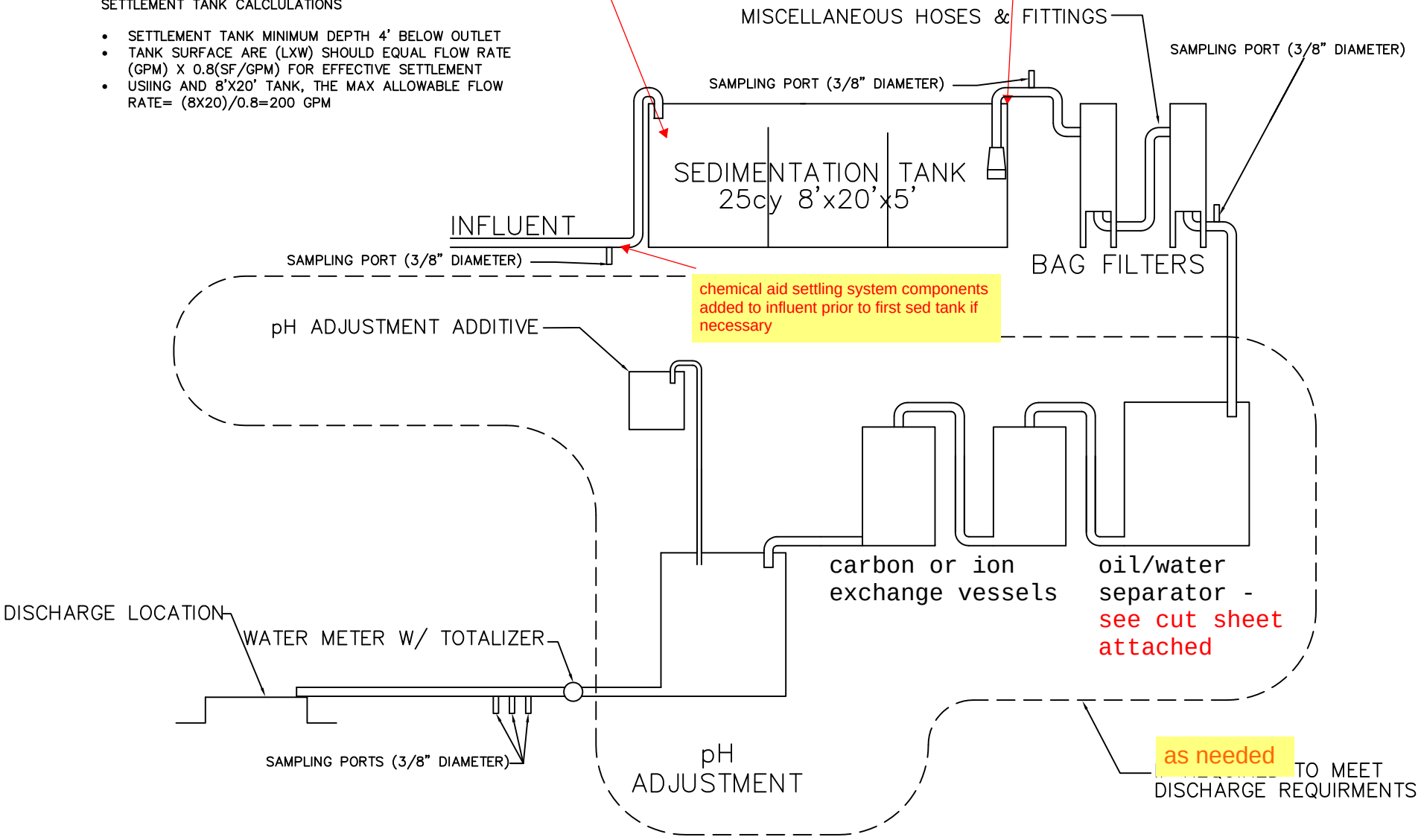
add blower for aeration as needed to first compartment of sed tank for TSS control

312319.1.4.2.a,e

Additional settlement tanks may be added to increase storage capacity as directed if site logistics allow. The flow from one weir tank to the other will be by gravity with the outlet from the first tank at a higher invert elevation than the inlet to the second tank

SETTLEMENT TANK CALCLULATIONS

- SETTLEMENT TANK MINIMUM DEPTH 4' BELOW OUTLET
- TANK SURFACE ARE (LXW) SHOULD EQUAL FLOW RATE (GPM) X 0.8(SF/GPM) FOR EFFECTIVE SETTLEMENT
- USIING AND 8'X20' TANK, THE MAX ALLOWABLE FLOW RATE= (8X20)/0.8=200 GPM



NORTH POINT PARCEL EF DEWATERING TREATMENT SYSTEM	A.A. WILL CORPORATION 145 ISLAND STREET STOUGHTON, MA	DATE: 5/30/19 DRAWN: SRB SCALE: NTS	SKETCH 1

United States Department of the Interior

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

In Reply Refer To:
Consultation Code: 05E1NE00-2019-SLI-0293
Event Code: 05E1NE00-2019-E-00652
Project Name: Cambridge Crossing

November 08, 2018

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

To Whom It May Concern:

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

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

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

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

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

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

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

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

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

Attachment(s):

- Official Species List

Official Species List

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

This species list is provided by:

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

Project Summary

Consultation Code: 05E1NE00-2019-SLI-0293

Event Code: 05E1NE00-2019-E-00652

Project Name: Cambridge Crossing

Project Type: DEVELOPMENT

Project Description: Development

Project Location:

Approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/place/42.3728393098731N71.07446861411378W

Counties: Middlesex, MA | Suffolk, MA

Endangered Species Act Species

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

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

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA 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.

Critical habitats

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

Massachusetts Cultural Resource Information System

MACRIS

MACRIS Search Results

Search Criteria: Town(s): Cambridge; Place: East Cambridge; Resource Type(s): Building, Area, Burial Ground, Object, Structure;

Inv. No.	Property Name	Street	Town	Year
CAM.B	Lockhart, William L. and Company Coffin Factory		Cambridge	
CAM.C	Blake and Knowles Steam Pump Company		Cambridge	
CAM.E	East Cambridge Historic District		Cambridge	
CAM.F	Winter Street Historic District		Cambridge	
CAM.G	Cambridge Multiple Resource Area		Cambridge	
CAM.H	Lechmere Point Corporation Houses		Cambridge	
CAM.I	Sacred Heart Church, Rectory, School and Convent		Cambridge	
CAM.AJ	Charles River Basin Historic District		Cambridge	
CAM.AO	East Cambridge		Cambridge	
CAM.AV	Blake and Knowles Steam Pump Company		Cambridge	
CAM.352	Blake and Knowles Main Foundry	180 Bent St	Cambridge	c 1895
CAM.357	Blake and Knowles Machine Shop #2	195 Binney St	Cambridge	1917
CAM.358	Blake and Knowles Machine Shop #3	199 Binney St	Cambridge	1918
CAM.356	Blake and Knowles Erecting and Assembling Building	201 Binney St	Cambridge	1903
CAM.906	Cambridge Parkway Bridge over Broad Canal	Cambridge Pkwy	Cambridge	1957
CAM.931	Cambridge Parkway	Cambridge Pkwy	Cambridge	1900
CAM.379	Middlesex County Registry of Deeds Building	Cambridge St	Cambridge	1896
CAM.380	Middlesex County Clerk of Courts Building	Cambridge St	Cambridge	1889
CAM.912	Longfellow Bridge - West Boston Bridge	Cambridge St	Cambridge	c 1907
CAM.914	Lechmere Square Streetcar Station	Cambridge St	Cambridge	1922
CAM.372		82-84 Cambridge St	Cambridge	1937
CAM.373	Davenport, A. H. - Irving and Casson Company	88-134 Cambridge St	Cambridge	1866
CAM.378		160 Cambridge St	Cambridge	1965
CAM.93	East Cambridge Savings Bank	292 Cambridge St	Cambridge	1931
CAM.94	Union Railway Car Barn	613-621 Cambridge St	Cambridge	1869

Inv. No.	Property Name	Street	Town	Year
CAM.99	Boston and Maine Railroad Signal Tower A	Charles River	Cambridge	1931
CAM.911	Charles River Railroad Draw Bridge #1	Charles River	Cambridge	1931
CAM.920	Charles River Dam	Charles River	Cambridge	r 1905
CAM.928	Lechmere Canal	Charles River	Cambridge	1909
CAM.929	Broad Canal	Charles River	Cambridge	1805
CAM.932	Charles River Basin Granite Seawall and Iron Fence	Charles River	Cambridge	
CAM.908	Commercial Avenue Bridge over Lechmere Canal	Commercial Ave	Cambridge	1907
CAM.1318	Metropolitan District Commission Stables	Commercial Ave	Cambridge	
CAM.123		42 Edward J. Lopez Ave	Cambridge	c 1830
CAM.430	Cambridge Public Library - O'Connell Branch	Fifth St	Cambridge	1938
CAM.441		69-71 Fifth St	Cambridge	
CAM.452	Hall, Jesse House	75 Fifth St	Cambridge	1837
CAM.428		82 Fifth St	Cambridge	
CAM.429		83 Fifth St	Cambridge	
CAM.907	First Street Bridge over Broad Canal	First St	Cambridge	1924
CAM.147	Athenaeum Press Building	215 First St	Cambridge	1895
CAM.502	Lechmere Point Corporation Row House	47 Gore St	Cambridge	c 1821
CAM.503	Lechmere Point Corporation Row House	49 Gore St	Cambridge	c 1821
CAM.504	Lechmere Point Corporation Row House	51 Gore St	Cambridge	c 1821
CAM.1317	Metropolitan District Commission Boat House	Lechmere Canal	Cambridge	1910
CAM.913	East Cambridge Viaduct - Lechmere Viaduct	O'Brien Hwy	Cambridge	1910
CAM.9020	Boston and Lowell Railroad Retaining Wall	O'Brien Hwy	Cambridge	c 1857
CAM.349	Lockhart, William L. Coffin Factory Warehouse	195-199 O'Brien Hwy	Cambridge	1873
CAM.271	Barnes, James B. House	200 O'Brien Hwy	Cambridge	1824
CAM.348	Lockhart, William L. Coffin Factory Main Building	201 O'Brien Hwy	Cambridge	r 1870
CAM.272	Lockart, William L. Company Building	209 O'Brien Hwy	Cambridge	c 1859
CAM.1400	Morrell, John and Company Branch House	221 O'Brien Hwy	Cambridge	1929
CAM.1399	Whitehead Metal Products Company	225 O'Brien Hwy	Cambridge	1929
CAM.461	Putnam School	Otis St	Cambridge	1889
CAM.465	Saint Hedwig's Parish Church	Otis St	Cambridge	1939
CAM.468	Otis Hospital	Otis St	Cambridge	
CAM.371	Woodbury, James A. - Geldowsky, Ferdinand Building	2-28 Otis St	Cambridge	1869
CAM.374		31 Otis St	Cambridge	1900
CAM.473	Hall, Lewis and William A. Rowhouse	55 Otis St	Cambridge	1851
CAM.474	Hall, Lewis and William A. Rowhouse	57 Otis St	Cambridge	1851
CAM.475	Hall, Lewis and William A. Rowhouse	59 Otis St	Cambridge	1851

Inv. No.	Property Name	Street	Town	Year
CAM.485	Hazard, Samuel L. House	60 Otis St	Cambridge	1871
CAM.476	Hall, Lewis and William A. Rowhouse	61 Otis St	Cambridge	1851
CAM.484		62 Otis St	Cambridge	
CAM.472	Sortwell, Daniel R. Double House	63-65 Otis St	Cambridge	1871
CAM.483		64 Otis St	Cambridge	
CAM.471		65 1/2 Otis St	Cambridge	
CAM.482	Jones, Andrew - Hall, William A. Double House	66-68 Otis St	Cambridge	1846
CAM.470	Goss, Abiel Double House	67-69 Otis St	Cambridge	1839
CAM.481		70 Otis St	Cambridge	
CAM.469		73-75 Otis St	Cambridge	
CAM.480		74 Otis St	Cambridge	
CAM.479		78 Otis St	Cambridge	
CAM.477	Clark, Josias - Cummings, Daniel P. Rowhouse	80 Otis St	Cambridge	1861
CAM.478	Clark, Josias - Cummings, Daniel P. Rowhouse	82 Otis St	Cambridge	1861
CAM.467	Deshon, Royal P. House	93 Otis St	Cambridge	1842
CAM.460		94 Otis St	Cambridge	
CAM.466		95-97 Otis St	Cambridge	
CAM.459		96 Otis St	Cambridge	
CAM.458		98 Otis St	Cambridge	
CAM.457	Taylor, Oliver House	100 Otis St	Cambridge	1848
CAM.455	Adams, Jabez F. - Atwood, Samuel S. Rowhouse	102 Otis St	Cambridge	1848
CAM.464	Bridgeman, John L. Double House	103-105 Otis St	Cambridge	1843
CAM.456	Adams, Jabez F. - Atwood, Samuel S. Rowhouse	104 Otis St	Cambridge	1848
CAM.454		106-108 Otis St	Cambridge	
CAM.463		107-109 Otis St	Cambridge	
CAM.453		110 Otis St	Cambridge	
CAM.462		113 Otis St	Cambridge	
CAM.439		117 1/2 Otis St	Cambridge	
CAM.440		117-119 Otis St	Cambridge	
CAM.451		118 Otis St	Cambridge	
CAM.450		120 Otis St	Cambridge	
CAM.448	Dennison, James Double House	122-124 Otis St	Cambridge	1870
CAM.449		122 1/2-124 1/2 Otis St	Cambridge	
CAM.438		123 Otis St	Cambridge	
CAM.437		125-127 Otis St	Cambridge	
CAM.447		126-128 Otis St	Cambridge	
CAM.436		129-131 Otis St	Cambridge	
CAM.446		130 Otis St	Cambridge	

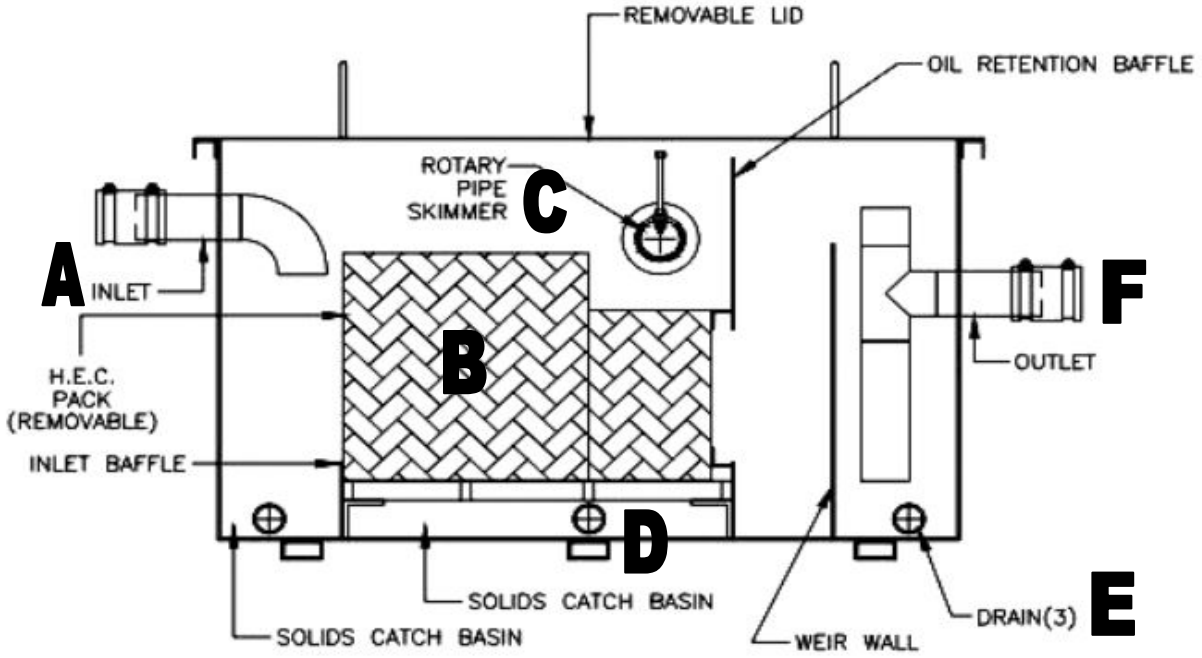
Inv. No.	Property Name	Street	Town	Year
CAM.445		132 Otis St	Cambridge	
CAM.435		133-135 Otis St	Cambridge	
CAM.275	Hoyt, Benjamin House	134 Otis St	Cambridge	1868
CAM.443		136-138 Otis St	Cambridge	
CAM.434	Warren, Moses - Smith, Benjamin G. Rowhouse	137 Otis St	Cambridge	1852
CAM.1339	Warren, Moses - Smith, Benjamin G. Rowhouse	139 Otis St	Cambridge	1852
CAM.442		140 Otis St	Cambridge	1895
CAM.1340	Warren, Moses - Smith, Benjamin G. Rowhouse	141 Otis St	Cambridge	1852
CAM.1341	Warren, Moses - Smith, Benjamin G. Rowhouse	143 Otis St	Cambridge	1852
CAM.1342	Warren, Moses - Smith, Benjamin G. Rowhouse	145 Otis St	Cambridge	1852
CAM.433	Fraser, John B. Double House	147-149 Otis St	Cambridge	1846
CAM.432		151 Otis St	Cambridge	
CAM.415	Hastings, Deborah House	72 Sciarappa St	Cambridge	1823
CAM.416		74 Sciarappa St	Cambridge	
CAM.401	Pendexter, Charles House	80-82 Sciarappa St	Cambridge	1847
CAM.1321	Boston Museum of Science	Science Park	Cambridge	1951
CAM.1322	Hayden Planetarium	Science Park	Cambridge	1958
CAM.375	Roby, Ebenezer Rowhouse	30 Second St	Cambridge	1836
CAM.376	Roby, Ebenezer Rowhouse	32 Second St	Cambridge	1836
CAM.377	Roby, Ebenezer Rowhouse	34 Second St	Cambridge	1836
CAM.364	Hall, Jesse Rowhouse	36 Second St	Cambridge	1842
CAM.365	Hall, Jesse Rowhouse	38 Second St	Cambridge	1842
CAM.366	Hall, Jesse Rowhouse	40 Second St	Cambridge	1842
CAM.367	Hall, Jesse Rowhouse	42 Second St	Cambridge	1842
CAM.368	Hall, Jesse Rowhouse	44 Second St	Cambridge	1842
CAM.369	Hall, Jesse Rowhouse	46 Second St	Cambridge	1842
CAM.370		50 Second St	Cambridge	
CAM.308	American Net and Twine Company Factory	155R Second St	Cambridge	1875
CAM.506	Sacred Heart Roman Catholic Church	39 Sixth St	Cambridge	1874
CAM.431		40 Sixth St	Cambridge	
CAM.508	Sacred Heart Roman Catholic Church Rectory	49 Sixth St	Cambridge	1885
CAM.325	Harugari Hall	154 Spring St	Cambridge	1873
CAM.353	Blake and Knowles Core Shop #1	Third St	Cambridge	c 1889
CAM.354	Blake and Knowles Core Shop #2	Third St	Cambridge	c 1890
CAM.505	Lechmere Point Corporation Row House	25 Third St	Cambridge	c 1821
CAM.381	Rollins, John W. Rowhouse	83 Third St	Cambridge	1860
CAM.382	Rollins, John W. Rowhouse	85 Third St	Cambridge	1860
CAM.383	Rollins, John W. Rowhouse	87 Third St	Cambridge	1860

Inv. No.	Property Name	Street	Town	Year
CAM.384	Rollins, John W. Rowhouse	89 Third St	Cambridge	1860
CAM.331	Old Middlesex County Superior Courthouse	90 Third St	Cambridge	1814
CAM.385	Rollins, John W. Rowhouse	91 Third St	Cambridge	1860
CAM.386	Rollins, John W. Rowhouse	93 Third St	Cambridge	1860
CAM.387	Rollins, John W. Rowhouse	95 Third St	Cambridge	1860
CAM.314	Holy Cross Polish National Catholic Church	99 Third St	Cambridge	1827
CAM.315	Bottle House Block	204-214 Third St	Cambridge	1826
CAM.350	Blake and Knowles Machine Shop #1	265 Third St	Cambridge	1889
CAM.351	Blake and Knowles Office Headhouse	265 Third St	Cambridge	1892
CAM.355	Blake and Knowles Smith Shop and Brass Foundry	275 Third St	Cambridge	c 1890
CAM.326	Cambridge Gas Light Company Purifying Plant	354 Third St	Cambridge	1908
CAM.388	Stevens, Atherton H. Rowhouse	59 Thorndike St	Cambridge	1827
CAM.395	Smallidge, Samuel House	66 Thorndike St	Cambridge	1827
CAM.389	Bates, Moses Jr. House	69 Thorndike St	Cambridge	1844
CAM.396	Buck, Silas B. House	70 Thorndike St	Cambridge	1845
CAM.390	Tufts, Sophia Kimball Double House	71-73 Thorndike St	Cambridge	1857
CAM.397	Wellington, Peter House	74 Thorndike St	Cambridge	1843
CAM.391		75 Thorndike St	Cambridge	
CAM.398		76 Thorndike St	Cambridge	
CAM.392		77 Thorndike St	Cambridge	
CAM.399		78 Thorndike St	Cambridge	
CAM.393		79-81 Thorndike St	Cambridge	
CAM.400		80 Thorndike St	Cambridge	
CAM.394		83 Thorndike St	Cambridge	
CAM.402	Stickney, Francis H. - Davies, Benjamin Rowhouse	84 Thorndike St	Cambridge	1867
CAM.417	Clark, Cornelius - Kneeland, W. W. House	85 Thorndike St	Cambridge	1822
CAM.403	Stickney, Francis H. - Davies, Benjamin Rowhouse	86 Thorndike St	Cambridge	1867
CAM.404	Stickney, Francis H. - Davies, Benjamin Rowhouse	88 Thorndike St	Cambridge	1867
CAM.418		89-91 Thorndike St	Cambridge	
CAM.405	Stickney, Francis H. - Davies, Benjamin Rowhouse	90 Thorndike St	Cambridge	1867
CAM.406	Stickney, Francis H. - Davies, Benjamin Rowhouse	92 Thorndike St	Cambridge	1867
CAM.419	Whitacre, Celeste I. Rowhouse	93 Thorndike St	Cambridge	1885
CAM.407	Stickney, Francis H. - Davies, Benjamin Rowhouse	94 Thorndike St	Cambridge	1867

Inv. No.	Property Name	Street	Town	Year
CAM.420	Whitacre, Celeste I. Rowhouse	95 Thorndike St	Cambridge	1885
CAM.408	Train, Isaac House	96 Thorndike St	Cambridge	1826
CAM.421	Whitacre, Celeste I. Rowhouse	97 Thorndike St	Cambridge	1885
CAM.422	Davies, Daniel House	97 1/2 Thorndike St	Cambridge	1843
CAM.409		98 Thorndike St	Cambridge	
CAM.423		99 Thorndike St	Cambridge	
CAM.424	Daniels, Granville W. House	101 Thorndike St	Cambridge	1868
CAM.410		102 Thorndike St	Cambridge	
CAM.411	Spare, Elijah Jr. Double House	104-106 Thorndike St	Cambridge	1846
CAM.425	Eaton, Charles House	109 Thorndike St	Cambridge	1857
CAM.412	Quimby, Amos House	110 Thorndike St	Cambridge	1857
CAM.426		111-113 Thorndike St	Cambridge	
CAM.413	Stickney, Francis H. Double House	112-114 Thorndike St	Cambridge	1863
CAM.427		113 1/2 Thorndike St	Cambridge	
CAM.414	Bacon, Henry A. House	116 Thorndike St	Cambridge	1865
CAM.507	Sacred Heart Roman Catholic School and Convent	163 Thorndike St	Cambridge	1902
CAM.500		19 Winter St	Cambridge	r 1855
CAM.492		21 Winter St	Cambridge	c 1854
CAM.486	Leighton, Thomas H. House	22 Winter St	Cambridge	1833
CAM.491		24 Winter St	Cambridge	c 1854
CAM.493		25 Winter St	Cambridge	c 1854
CAM.494		27 Winter St	Cambridge	c 1854
CAM.496		28-30 Winter St	Cambridge	c 1854
CAM.495		29 Winter St	Cambridge	c 1854
CAM.497		31-33 Winter St	Cambridge	c 1854
CAM.501		34-42 Winter St	Cambridge	r 1875
CAM.498		61 Winter St	Cambridge	c 1854
CAM.499		65 Winter St	Cambridge	c 1854
CAM.489	Stevens, Atherton Haugh House	67 Winter St	Cambridge	1843
CAM.490	Stevens, Atherton Haugh House	71 Winter St	Cambridge	1843
CAM.487	Stevens, Atherton Haugh House	74 Winter St	Cambridge	1838
CAM.1344		75 Winter St	Cambridge	
CAM.1345	Stevens, Atherton Haugh House	77 Winter St	Cambridge	1838
CAM.488	Stevens, Atherton Haugh House	79 Winter St	Cambridge	1838

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

Environmental
Oil Water Separator



Specifications:

- Rated for 50 gpm
- Manual drain line for NAPL
- Coalescing Media

A: Inlet
B: Separation Chamber with Coalescing Media
C: Drain Line for Oil/NAPL
D: Clarifier with Sludge Drain Line
E: Clean Water Chamber

pH Adjustment System Components
pH Adjustment Reagent MSDS Sheets
(Hydrochloric Acid, Caustic Soda, Carbon Dioxide)

BL 7916 • BL 7917

pH & ORP Measuring & Dosing System

Black Stone

- Accurate and affordable
- Controller and dosing pump in one compact unit
- Proportional dosing
- Corrosion resistant housing
- Easy to install

This series of instruments will mount easily in your plant using a minimal amount of wall space. The controls and pumphead are located in the front to allow easy access. They offer accurate measurements with unbeatable performance in one compact, affordable unit.

ISO 9001 Certified

1 Stop Shopping for All Your Water Treatment Needs

HANNA® instruments
Water Analysis & Control Division

High Performance pH & ORP Controller & Dosing Pump to Maximize Efficiency

2 Advanced Instruments in 1

MEADOS pumps combine the powerful BlackStone dosing pumps with the state-of-the-art controllers that Hanna is famous for. These unique products were developed by HANNA for measuring and controlling pH or ORP and regulated dosing of various chemicals. This latest innovation eliminates the need for multiple instruments by combining two instruments into one. No more complicated installations, wiring, or compatibility problems. This compact unit features accurate regulation, proportional dosing, alarm and recorder signals and much more all in one meter.

Easy Installation

Designed with mounting holes in the rugged base, BlackStone pump/controllers are simple to install. There is no need for any additional hardware. All the controls and pump assemblies are conveniently located on the front of the unit. If the operator must access the pump head or control panel for any reason, there is no need to uninstall the unit.

Rugged Construction

BlackStone pump/controllers are housed in rugged, fiber-reinforced, polypropylene casings. They are IP55 rated, preventing the intrusion of liquids. The material used for the housing resists corrosion caused by most chemicals, protecting the unit from hazardous spills and splashes.

Superior Materials

BlackStone pumps use PVDF, FPM/FKMand PTFE materials for all components in contact with the chemicals being dosed. These materials have properties which enable them to resist even the most corrosive chemicals in the industry. BlackStone's choice of material makes the pump more versatile, allowing it to handle a wider variety of chemicals.

Simple Pump Action

A positive displacement solenoid with few moving parts make BlackStone pumps more reliable than motor driven pumps. With no rotating parts, gears or cams, part wear and oiling associated with motor driven pumps is eliminated, drastically reducing any chance of mechanical failure.

BL 7916
pH Controller & Pump

- pH controller and dosing pump in one compact unit.
- ±0.01 pH accuracy with unbeatable performance.
- Isolated 4 to 20 mA recorder output.
- Proportional dosing slows the pump down when the measured pH level approaches the setpoint which ensures precise dosage and avoids costly waste of chemicals due to overdosage.
- Alarm contact is activated whenever the pH value varies by more than 2 pH units from the setpoint.
- Auxiliary contacts allow the user to attach a mixer or priming pump that is activated only when the pump is dosing.
- PVDF, FPM/FKM & PTFE materials are used for all parts that come into contact with liquid.

Specifications	BL 7916U
Range	0.00 to 14.00 pH
Resolution	0.01 pH
Accuracy (20°C/68°F)	±0.01 pH
Typical EMC Deviation	±0.1 pH
Flow Rate	See table on next page
Input	High impedance 10^{12} Ohm
Calibration	Offset: ±1 pH by offset printer; Slope: 85 to 115% by slope trimmer
Dosage	Proportional: acid or base. User-selectable
Recorder Output	4 to 20 mA, isolated
Dosing Contact	Isolated, 2 A, Max. 240V, resistive load, 1,000,000 strokes
Alarm Relay	Isolated, 2 A, Max. 240V, resistive load, 1,000,000 strokes
Power Supply	115V ±15% (40W)
Environment	0 to 50°C (32 to 122°F); RH 85% non-condensing
Dimensions	7.1 x 8.7 x 5.6" (181 x 221 x 142 mm)
Weight	11 lb. (5 Kg)

Accessories and Replacement Parts for BL 7916

HI 1001 ..... Plastic in-line pH electrode
HI 721101 ..... Pumphead, O-ring & 6 screws
HI 721102 ..... Discharge valve assembly
HI 721103 ..... Suction valve assembly
HI 721004 ..... Injection valve assembly
HI 721005 ..... Foot valve assembly
HI 721008 ..... 4 x ceramic weight
HI 7020L ..... ORP testing solution, 16.9 oz. (500 mL)
HI 7091L ..... Reducing solution, 16.9 oz. (500 mL)
HI 7092L ..... Oxidizing solution, 16.9 oz. (500 mL)
HI 7004L ..... pH 4.01 buffer solution, 16.9 oz. (500 mL)
HI 7007L ..... pH 7.01 buffer solution, 16.9 oz. (500 mL)
HI 7010L ..... pH 10.01 buffer solution, 16.9 oz. (500 mL)
HI 767/P ..... Power plug (5 pcs)
HI 7671/P ..... Outlet plug (5 pcs)
HI 8427 ..... pH & ORP electrode simulator
HI 931001 ..... pH & ORP electrode simulator

BL 7917
ORP Controller & Pump

- ORP controller and dosing pump in one compact unit.
- ±5 mV accuracy with unbeatable performance.
- Isolated 4 to 20 mA recorder output.
- Proportional dosing slows the pump down when the measured ORP level approaches the set value which avoids overdosage of oxidizing or reducing agents.
- Alarm contact is activated whenever the ORP value varies by more than 200 mV from the set point.
- Auxiliary contacts allow the user to attach a mixer or priming pump that is activated only when the pump is dosing.
- PVDF, FPM/FKM & PTFE materials are used for all parts that come into contact with liquid.

Specifications	BL 7917U
Range	±999 mV
Resolution	1 mV
Accuracy (20°C/68°F)	±5 mV
Typical EMC Deviation	±6 mV
Flow Rate	See table below
Input	High impedance 10^{12} Ohm
Calibration	Offset: ±2 pH by offset printer; Slope: 85 to 115% by slope trimmer
Dosage	Proportional: oxidizing or reducing. User-selectable
Recorder Output	4 to 20 mA, isolated
Dosing Contact	Isolated, 2 A, Max. 240V, resistive load, 1,000,000 strokes
Alarm Relay	Isolated, 2 A, Max. 240V, resistive load, 1,000,000 strokes
Power Supply	115V ±15% (40W)
Environment	32 to 122°F (0 to 50°C); RH 85% non-condensing
Dimensions	7.1 x 8.7 x 5.6" (181 x 221 x 142 mm)
Weight	11 lb. (5 Kg)

Accessories and Replacement Parts for BL 7917

HI 2001 .....Plastic in-line ORP electrode
HI 721101 .....Pumphead, O-ring & 6 screws
HI 721102 .....Discharge valve assembly
HI 721103 .....Suction valve assembly
HI 721004 .....Injection valve assembly
HI 721005 .....Foot valve assembly
HI 721008 .....4 x ceramic weights
HI 7020L .....ORP testing solution, 16.9 oz. (500 mL)
HI 7091L .....Reducing solution, 16.9 oz. (500 mL)
HI 7092L .....Oxidizing solution, 16.9 oz. (500 mL)

BL 7916 & BL 7917 FLOW/PRESSURE	
PSI	GPH
7.4	3.5
14.7	3.0
29.4	2.6
44.1	2.3
58.8	2.0

Proportional Dosing

The BlackStone controller/pump strokes at full capacity when the measured value deviates by more than 1.5 pH or 150 mV from the set value. A proportional control slows down the stroke rate as the measured value approaches the user-selectable value, avoiding overdosage of chemicals. This feature makes the pump's dosing more accurate, saves chemicals and eliminates unnecessary and costly corrections of your processes, especially with slow reacting chemicals.

Isolated Recorder Output

To enhance troubleshooting and provide the user with the ability to record data while monitoring, BlackStone's controller/pumps provide a recorder output. By simply attaching a recorder to the instrument's 4 to 20 mA output contacts conveniently located on the front panel, you can obtain a hard copy of the results on demand.

Alarm Output

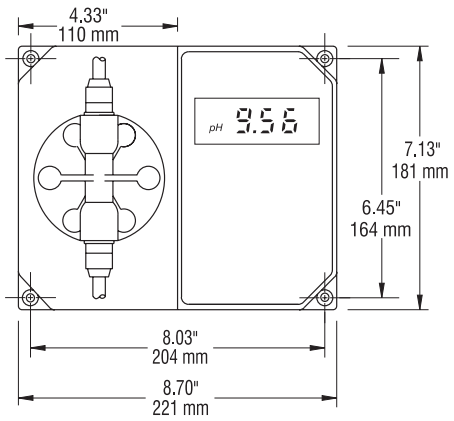
When monitoring and controlling pH and ORP levels in a process, it is very important that any potential problem does not go unattended. The Hanna MEADOS units incorporate an alarm system that will alert the user if the reaction is not within certain guidelines. The alarm of the BL 7916 will be activated if the measured pH value is 2 pH units lower than the setpoint (If dosing acid, this indicates overdosage, a common symptom of siphoning). The alarm will also activate if the value is 2 pH higher than the setpoint (If dosing acid, this is an indication of insufficient dosage, a common symptom of the lack of chemicals). The BL 7917's alarm will activate if the mV value is 200 mV lower than the setpoint (if dosing reducing chemicals, this indicates overdosage). The alarm will also activate if the value is 200 mV higher than the setpoint (if dosing reducing chemicals, this is an indication of lack of chemicals).

Auxiliary Dosing Contacts

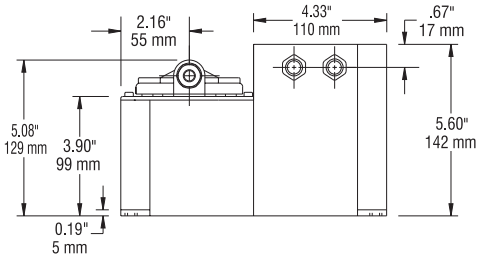
The auxiliary dosing contacts of the MEADOS units are closed whenever the pump is dosing. This solution offers considerable advantages, especially for small plants where these pumps need to be the only equipment left running. This will spare other equipment such as mixers, priming pumps etc. With this feature activated, a mixer can be automatically started when the pump is dosing.

Mechanical Dimensions for the Meados pH & ORP measuring & dosing systems

Front View



Bottom View



Accessories

HI 721101
This kit contains the PVDF pumphead, PTFE coated O-ring, 6 screws and washers.

HI 721102
This kit contains all the necessary replacement parts for your discharge valve assembly. Complete with a FPM/FKM O-ring, glass valve ball, valve spacer and seat, head nipple and tube nut to secure the assembled parts.

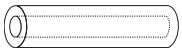
HI 721103
HI 721103 is the suction valve assembly. Complete with a FPM/FKM O-ring, glass valve ball, valve spacer and seat, head nipple, and tube nut to secure the assembled parts.

HI 721004
The HI 721004 comes complete with an injection nipple, PTFE coated spring, glass valve ball, and a valve assembly.

HI 721005
This kit contains a filter with a filter holder and a valve assembly.

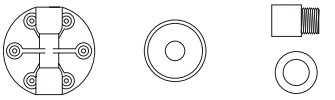
HI 721008
This kit contains 4 ceramic weights.

HI 721008



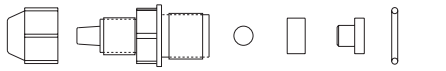
CERAMIC WEIGHT

HI 721101



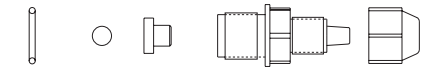
PUMPHEAD | TEFLON® COATED O-RING | 6 SCREWS & WASHERS

HI 721102



TUBE NUT | HEAD NIPPLE | CHECK BALL | SPACER | VALVE SEAT | VITON® O-RING

HI 721103

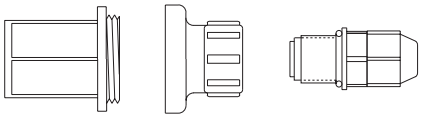


VITON® O-RING | CHECK BALL | VALVE SEAT | HEAD NIPPLE | TUBE NUT

HI 721004

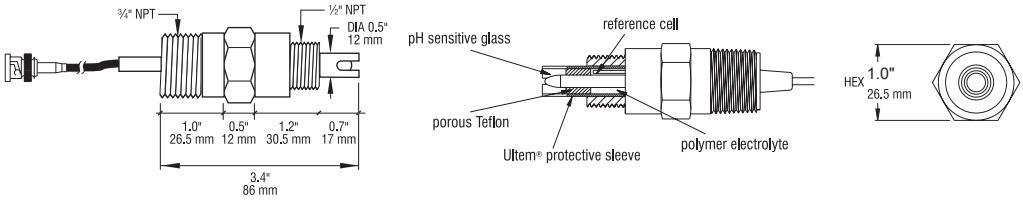
INJECTION NIPPLE | KYNAR® SPRING | CHECK BALL | VALVE ASSEMBLY

HI 721005



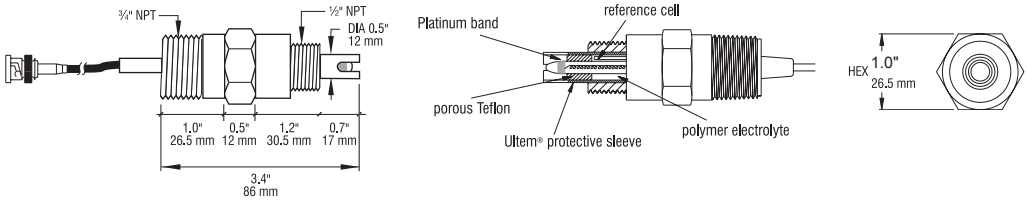
FILTER | FILTER HOLDER | VALVE ASSEMBLY

HI 1001
Combination pH Electrode



Specifications	HI 1001
Reference System	
Junction	Double
Type	PTFE
Electrolyte	Polymer
Temperature	23 to 176°F (-5 to 80°C)
Max Pressure	87 psi (6 bar)
Lead	
Connector	BNC
Cable	10' (3 m)

HI 2001
Combination ORP Platinum Electrode



Specifications	HI 2001
Reference System	
Junction	Double
Type	PTFE
Electrolyte	Polymer
Temperature	23 to 176°F (-5 to 80°C)
Max Pressure	87 psi (6 bar)
Lead	
Connector	BNC
Cable	10' (3 m)

Authorized Distributor:

HANNA® instruments
Water Analysis & Control Division

ISO 9001 Certified

P/L WACDBL7916BL 7917 07/03 PRINTED IN USA

Material Safety Data Sheet

Carbon Dioxide

Section 1. Chemical product and company identification

Product Name : Carbon Dioxide

Supplier : AIRGAS INC., on behalf of its subsidiaries
259 North Radnor-Chester Road
Suite 100
Radnor, PA 19087-5283
1-610-687-5253

Product use : Synthetic/Analytical chemistry.

MSDS# : 001013

Date of Preparation/Revision : **4/11/2005.**

In case of emergency : 1-800-949-7937

Section 2. Composition, Information on Ingredients

Name	CAS number	% Volume	Exposure limits
Carbon Dioxide	124-38-9	100	**ACGIH TLV (United States, 9/2004).** STEL: 54000 mg/m^3 15 minute(s). Form: All forms STEL: 30000 ppm 15 minute(s). Form: All forms TWA: 9000 mg/m^3 8 hour(s). Form: All forms TWA: 5000 ppm 8 hour(s). Form: All forms **NIOSH REL (United States, 6/2001).** STEL: 54000 mg/m^3 15 minute(s). Form: All forms STEL: 30000 ppm 15 minute(s). Form: All forms TWA: 9000 mg/m^3 10 hour(s). Form: All forms TWA: 5000 ppm 10 hour(s). Form: All forms **OSHA PEL (United States, 6/1993).** TWA: 9000 mg/m^3 8 hour(s). Form: All forms TWA: 5000 ppm 8 hour(s). Form: All forms

Section 3. Hazards identification

Physical state : Gas.

Emergency overview : Warning!

CONTENTS UNDER PRESSURE.
CAUSES DAMAGE TO THE FOLLOWING ORGANS: LUNGS, CARDIOVASCULAR SYSTEM, SKIN, EYES, CENTRAL NERVOUS SYSTEM, EYE, LENS OR CORNEA.
MAY CAUSE RESPIRATORY TRACT, EYE AND SKIN IRRITATION.

Avoid contact with skin and clothing. Avoid breathing gas. Do not puncture or incinerate container. Keep container closed. Use only with adequate ventilation. Wash thoroughly after handling.

Contact with rapidly expanding gas, liquid, or solid can cause frostbite.

Routes of entry : Inhalation,Dermal,Eyes

Potential acute health effects

Eyes : Moderately irritating to the eyes.

Skin : Moderately irritating to the skin.

Inhalation : Moderately irritating to the respiratory system.

Ingestion : Ingestion is not a normal route of exposure for gases

Carbon Dioxide

Potential chronic health effects : **CARCINOGENIC EFFECTS** Not available.
MUTAGENIC EFFECTS Not available.
TERATOGENIC EFFECTS: Not available.

Medical conditions aggravated by overexposure : Acute or chronic respiratory conditions may be aggravated by overexposure to this gas.

See toxicological Information (section 11)

Section 4. First aid measures

No action shall be taken involving any personal risk or without suitable training.If fumes are still suspected to be present, the rescuer should wear an appropriate mask or a self-contained breathing apparatus.It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation.

Eye contact : In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention immediately.

Skin contact : In case of contact, immediately flush skin with plenty of water. Remove contaminated clothing and shoes. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention.

Frostbite : Try to warm up the frozen tissues and seek medical attention.

Inhalation : If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

Ingestion : Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Get medical attention if symptoms appear.

Section 5. Fire fighting measures

Flammability of the product : Non-flammable.

Fire fighting media and instructions : Use an extinguishing agent suitable for surrounding fires.

If involved in fire, shut off flow immediately if it can be done without risk. Apply water from a safe distance to cool container and protect surrounding area.

No specific hazard.

Special protective equipment for fire-fighters : Fire fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full facepiece operated in positive pressure mode.

Section 6. Accidental release measures

Personal precautions : Immediately contact emergency personnel. Keep unnecessary personnel away. Use suitable protective equipment (Section 8). Shut off gas supply if this can be done safely. Isolate area until gas has dispersed.

Environmental precautions : Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

Section 7. Handling and storage

Handling : Avoid contact with eyes, skin and clothing. Keep container closed. Use only with adequate ventilation. Do not puncture or incinerate container. Wash thoroughly after handling. High pressure gas. Use equipment rated for cylinder pressure. Close valve after each use and when empty. Protect cylinders from physical damage; do not drag, roll, slide, or drop. Use a suitable hand truck for cylinder movement.
Never allow any unprotected part of the body to touch uninsulated pipes or vessels that contain cryogenic liquids. Prevent entrapment of liquid in closed systems or piping without pressure relief devices. Some materials may become brittle at low temperatures and will easily fracture.

Storage : Keep container tightly closed. Keep container in a cool, well-ventilated area. Cylinders should be stored upright, with valve protection cap in place, and firmly secured to prevent falling or being knocked over. Cylinder temperatures should not exceed 52 °C (125 °F).

Section 8. Exposure Controls, Personal Protection

Engineering controls : Use only with adequate ventilation. Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits.

Personal protection

Eyes : Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists or dusts.

When working with cryogenic liquids, wear a full face shield.

Skin : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Respiratory : Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary.Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.

The applicable standards are (US) 29 CFR 1910.134 and (Canada) Z94.4-93

Hands : Chemical-resistant, impervious gloves or gauntlets complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary.

Insulated gloves suitable for low temperatures

Personal protection in case of a large spill : A self-contained breathing apparatus should be used to avoid inhalation of the product.

Consult local authorities for acceptable exposure limits.

Section 9. Physical and chemical properties

Molecular weight : 44.01 g/mole

Molecular formula : CO_2

Boiling/condensation point : -78.55°C (-109.4°F)

Melting/freezing point : Sublimation temperature: -78.5°C (-109.3°F)

Critical temperature : 30.9°C (87.6°F)

Vapor pressure : 830 psig

Vapor density : 1.53 (Air = 1)

Specific Volume (ft^3/lb) : 8.77193

Gas Density (lb/ft^3) : 0.114

Physical chemical comments : Not available.

Section 10. Stability and reactivity

Stability and reactivity : The product is stable.

Section 11. Toxicological information

Toxicity data

IDLH : 40000 ppm

Chronic effects on humans : Causes damage to the following organs: lungs, cardiovascular system, skin, eyes, central nervous system (CNS), eye, lens or cornea.

Other toxic effects on humans : No specific information is available in our database regarding the other toxic effects of this material for humans.

Specific effects

Carcinogenic effects : No known significant effects or critical hazards.

Mutagenic effects : No known significant effects or critical hazards.

Reproduction toxicity : No known significant effects or critical hazards.

Section 12. Ecological information

Products of degradation : These products are carbon oxides (CO, CO_2).

Toxicity of the products of biodegradation : The product itself and its products of degradation are not toxic.

Environmental fate : Not available.

Environmental hazards : No known significant effects or critical hazards.

Toxicity to the environment : Not available.

Section 13. Disposal considerations

Product removed from the cylinder must be disposed of in accordance with appropriate Federal, State, local regulation.Return cylinders with residual product to Airgas, Inc.Do not dispose of locally.

Section 14. Transport information

Regulatory information	UN number	Proper shipping name	Class	Packing group	Label	Additional information
DOT Classification	UN1013 UN2187	CARBON DIOXIDE Carbon dioxide, refrigerated liquid	2.2	Not applicable (gas).		**Limited quantity** Yes. **Packaging instruction** **Passenger Aircraft** Quantity limitation: 75 kg **Cargo Aircraft** Quantity limitation: 150 kg
TDG Classification	UN1013 UN2187	CARBON DIOXIDE Carbon dioxide, refrigerated liquid	2.2	Not applicable (gas).		**Explosive Limit and Limited Quantity Index** 0.125 **Passenger Carrying Road or Rail Index** 75
Mexico Classification	UN1013 UN2187	CARBON DIOXIDE Carbon dioxide, refrigerated liquid	2.2	Not applicable (gas).		-

Section 15. Regulatory information

United States

U.S. Federal regulations : TSCA 8(b) inventory: Carbon Dioxide

SARA 302/304/311/312 extremely hazardous substances: No products were found.
SARA 302/304 emergency planning and notification: No products were found.
SARA 302/304/311/312 hazardous chemicals: Carbon Dioxide
SARA 311/312 MSDS distribution - chemical inventory - hazard identification: Carbon Dioxide: Sudden Release of Pressure, Immediate (Acute) Health Hazard, Delayed (Chronic) Health Hazard

Clean Water Act (CWA) 307: No products were found.

Clean Water Act (CWA) 311: No products were found.

Clean air act (CAA) 112 accidental release prevention: No products were found.

Clean air act (CAA) 112 regulated flammable substances: No products were found.

Clean air act (CAA) 112 regulated toxic substances: No products were found.

State regulations : Pennsylvania RTK: Carbon Dioxide: (generic environmental hazard)
Massachusetts RTK: Carbon Dioxide
New Jersey: Carbon Dioxide

Canada

WHMIS (Canada) : Class A: Compressed gas.

CEPA DSL: Carbon Dioxide

Section 16. Other information

United States

Label Requirements : CONTENTS UNDER PRESSURE.
CAUSES DAMAGE TO THE FOLLOWING ORGANS: LUNGS, CARDIOVASCULAR SYSTEM, SKIN, EYES, CENTRAL NERVOUS SYSTEM, EYE, LENS OR CORNEA.
MAY CAUSE RESPIRATORY TRACT, EYE AND SKIN IRRITATION.

Canada

Label Requirements : Class A: Compressed gas.

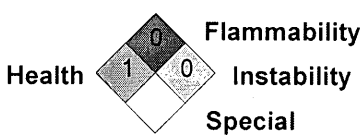
Hazardous Material Information System (U.S.A.) :

Health *	1
Fire hazard	0
Reactivity	0
Personal protection	C

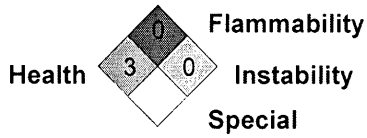
liquid:

Health	3
Fire hazard	0
Reactivity	0
Personal protection	

National Fire Protection Association (U.S.A.) :



liquid:



Notice to reader

To the best of our knowledge, the information contained herein is accurate. However, neither the above named supplier nor any of its subsidiaries assumes any liability whatsoever for the accuracy or completeness of the information contained herein.
Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.

Material Safety Data Sheet (MSDS): HYDROCHLORIC ACID

Company Headquarters
Cooper Natural Resources Chemical Division, Inc.
2407 E. Skelly Drive
Tulsa, OK 74105

24 Hour Emergency Telephone: 505-390-7115

1. Product Identification

Synonyms: Muriatic acid; hydrogen chloride, aqueous
CAS No.: 7647-01-0
Molecular Weight (Hydrogen Chloride): 36.46
Chemical Formula: HCl

2. Composition/Information on Ingredients

Ingredient	CAS No.	Percent	Hazardous
Hydrogen Chloride	7647-01-0	31.5 -35.2%	Yes
Water	7732-18-5	64.8-68.5%	No

3. Hazards Identification

Emergency Overview

Poison! Danger! Corrosive! Liquid and mist cause severe burns to all body tissue. May be fatal if swallowed or inhaled. Inhalation may cause lung damage.

Potential Health Effects

Eye:
Corrosive! Vapor or mist may cause irritation and severe burns and permanent eye damage. May cause painful sensitization to light. May cause conjunctivitis.

Skin:
Corrosive! May be absorbed through the skin in harmful amounts. Contact with liquid is corrosive and causes severe burns and ulceration. May cause photosensitization in certain individuals.

Ingestion:
Corrosive! May cause circulatory system failure. Causes severe digestive tract burns with abdominal pain, vomiting, and possible death. May cause permanent tissue destruction of the esophagus and digestive tract.

Inhalation:
Corrosive! Causes severe irritation of upper respiratory tract with coughing, burns, breathing difficulty, and possible coma. May cause pulmonary edema and severe respiratory disturbances.

Chronic:
Prolonged or repeated skin contact may cause dermatitis. Repeated exposure may cause erosion of teeth. May cause conjunctivitis and photosensitization.

4. First Aid Measures

Eyes:
Flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower lids. Get medical aid immediately. Do NOT allow victim to rub or keep eyes closed.

Skin:
Get medical attention immediately. Rinse area with large amounts of water for at least 15 minutes. Remove contaminated clothing and shoes.

Ingestion:
DO NOT INDUCE VOMITING. If victim is conscious and alert, give 2-4 cupfuls of milk or water. Get medical attention immediately.

Inhalation:
Remove to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

5. Fire Fighting Measures

General Information:
In the event of a fire, wear full protective clothing and NIOSH (approved or equivalent), and full protective gear. Not flammable, but reacts with most metals to form flammable hydrogen gas. Cool tanks with water spray until well after fire is out.

Fire and Explosion Hazards: May release toxic gases

Extinguishing Media: Use extinguishing agents appropriate for surrounding fires.

Fire Fighting: Keep unnecessary people away, isolate hazard area and deny entry. Wear NIOSH approved positive-pressure self-contained breathing apparatus. Move container from fire area if it can be done without risk. Avoid inhalation of material or combustion by-products, Stay upwind and keep out of low areas. Cool containers with water.

Hazardous Combustion Products:

Thermal decomposition products or combustion: hydrogen chloride

6. Accidental Release Measures

Ventilate area of leak or spill. Wear appropriate personal protective equipment as specified in section 8. Isolate hazard area. Contain and recover liquid when possible. Neutralize with alkaline material (soda ash, lime), then absorb with an inert material (e.g., vermiculite, dry sand, earth), and place in a chemical waste container. Do not use combustible materials, such as saw dust. Do not flush to sewer. US regulations (CERCLA) require reporting spills and releases to soil, water and air in excess of reportable quantities.
If release occurs in the U.S. and is reportable under CERCLA Section 103, notify the National Response Center at (800)424-8802 (USA) or (202)426-2675 (USA)

7. Handling and Storage

Handling:
Wash thoroughly after handling. Remove contaminated clothing and wash before reuse. Use with adequate ventilation. Do not get on skin or in eyes. Do not ingest or inhale.

Storage:
Keep away from heat and flame. Keep out of direct sunlight. Store in a cool, dry, well-ventilated area away from incompatible substances.

8. Exposure Controls/Personal Protection

Airborne Exposure Limits:
OSHA Permissible Exposure Limit (PEL): 5 ppm Ceiling
ACGIH Threshold Limit Value (TLV): 5 ppm Ceiling

Ventilation System:
Use closed systems when possible. Provide local exhaust ventilation where vapor or mist may be generated. Ensure compliance with applicable exposure limits.

Personal Protective Equipment

Skin Protection:
Wear impervious protective clothing, including boots, gloves, suitable chemical splash protection (i.e., rubber overalls and jacket buttoned to the collar), as appropriate to prevent skin contact.

Eye Protection:
Use chemical safety goggles and full face shield where splashing is possible. Maintain eye wash fountain and quick drench facilities (safety shower) in immediate work area.

Personal Respirators: (NIOSH Approved):
For emergencies or instances where the exposure levels are not known, use a full-face piece positive-pressure, air supplied respirator. **WARNING: Air purifying respirators do not protect workers in oxygen-deficient atmospheres.**

9. Physical and Chemical Properties (Hydrochloric Acid)

Physical State: liquid
Appearance: clear
Color: colorless
Odor: pungent odor
Molecular Weight: 36.46
Molecular Formula: HCl
Boiling Point: 140-221 F (60.0-105 C)
Freezing Point: -29 to 5 F (-34 to -15 C)
Vapor Pressure: 14.6-80 mmHg @ 20 C
Vapor Density: (air=1): 1.3 @ 20 C
Specific Gravity (water=1): 1.05-1.18
Bulk Density: 8.75-9.83 lbs/gal
Water Solubility: 100%
PH: 2 (.02% solution)
Volatility: 9-36% by volume
Odor Threshold: 0.3 ppm (causes of factory fatigue)
Evaporation Rate: <1.00 (butyl acetate=1)
Coefficient of water/oil distribution: Not available

10. Stability and Reactivity

Chemical Stability:
Stable under normal temperatures and pressures. Containers may burst when heated.

Hazardous Decomposition Products:
When heated to decomposition emits toxic hydrogen chloride fumes and will react with water or steam to produce heat and toxic and corrosive fumes. Thermal oxidative decomposition produces toxic chlorine fumes and explosive hydrogen gas.

Hazardous Polymerization:
Will not occur.

Incompatibilities:
A strong mineral acid, concentrated hydrochloric acid is incompatible with many substances and highly reactive with strong bases, metals, metal oxides, hydroxides, amines, carbonates and other alkaline materials. Incompatible with materials such as cyanides, sulfides, sulfites and formaldehyde.

Conditions to Avoid:
Avoid heat, flames, sparks and other sources of ignition. Contact with water may produce a strong exothermic reaction with spattering. Contact with metals may evolve flammable hydrogen gas. Hydrogen chloride may react with cyanide, forming lethal concentrations of hydrocyanic acid.

11. Toxicological Information

Inhalation rat LC50: 3124 ppm/1H; oral rabbit LD50: 900mg/kg (Hydrochloric acid concentrated); investigated as a tumorigen, mutagen, reproductive effector.

Cancer Lists

Ingredient	Known	-NTP Carcinogen- Anticipated	IARC	Category
Hydrogen Chloride (7647-01-0	No	No		3
Water	No	No		None

12. Ecological Information

Environmental Fate:
When released into the soil, this material is not expected to be biodegrade. When released into the soil, this material may leak into groundwater.

Environmental Toxicity:
This material is expected to be toxic to aquatic life.

13. Disposal Considerations

Whatever cannot be saved for recovery or recycling should be handled as hazardous waste and sent to a RCRA approved waste facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Reuse or reprocess if possible. Dispose in accordance with all applicable regulations. Subject to disposal regulations: U.S. EPA 40 CFR 262. Hazardous Waste Number(s): D002

14. Transport Information

Domestic (Land, D.O.T.)

Proper Shipping Name: Hydrochloric Acid
UN/NA: UN1789
Hazard Class: 8
Packing Group: II
Information reported for product/size: 475LB

International (Water, I.M.O.)

Proper Shipping name: Hydrochloric Acid
UN/NA: UN1789
Hazard Class: 8
Packing Group: II
Information reported for product/size: 475LB

15. Regulatory Information

U.S. Regulations:

CERCLA sections 102a/103 hazardous substances (40 CFR 302.4):
Hydrogen Chloride (Hydrochloric Acid): 5000 LBS RQ (liquid)
Chlorine: 10 LBS RQ
Sara Title III Section 302 extremely hazardous substances (40 CFR 355.30):
Hydrogen Chloride (Hydrochloric Acid): 500LBS TPQ (gas)

Sara Title III section 311/312 hazardous categories (40 CFR 370.21):
Acute: Yes
Chronic: No
Fire: No
Reactive: No
Sudden Release: No

Sara Title III section 313 (40 CFR 372.65):
Hydrogen Chloride (Hydrochloric Acid): aerosol form only

This product contains a toxic chemical subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR 372. Refer to Section 3.

OSHA Process safety (29CFR1910.1190:
Hydrogen Chloride (Hydrochloric Acid): 5000 LBS TQ (gas)
Chlorine: 1500 LBS TQ

FDA: This material has Generally Recognized as Safe (GRAS) status under specific FDA regulations. Additional information is available from the Code of Federal Register (CFR) which is accessible on the FDA's website.

State Regulations:
California Proposition 65: This product may contain contaminants known to the State of California to cause cancer or reproductive toxicity as listed under Proposition 65 State Drinking Water and Toxic Enforcement Act. For additional information, contact Customer Service.

16. Other Information

NFPA Ratings:
Health: 3 Flammability: 0 Reactivity: 0

Label Hazard Warning:

POISON! DANGER! CORROSIVE LIQUID AND MIST CAUSE SEVERE BURNS TO ALL BODY TISSUE. MAY BE FATAL IF SWALLOWED OR INHALED, INHALATION MAY CAUSE LUNG DAMAGE.

Label Precautions:

Do not get in eyes, on skin, or on clothing.
Do not breathe vapor or mist.
Use only with adequate ventilation.
Wash thoroughly after handling.
Store in a tightly closed container.
Remove and wash contaminated clothing promptly.

Label First Aid:

In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. If swallowed, **DO NOT INDUCE VOMITING** Give large quantities of water. Never give anything by mouth to an unconscious person. If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. In all cases get medical attention immediately.

Product Use:

Chemical intermediate; oil & gas well acidizing; pH control; water treatment; steel pickling and metal cleaning; ore reduction; food processing.

Disclaimer:

****

Cooper Natural Resources Chemical Division, Inc. ("CNR") provides the information contained herein in good faith but makes no representation as to its comprehensiveness or accuracy. This document is intended only as a guide to the appropriate precautionary handling of the material by a properly trained person using this product. Individuals receiving the information must exercise their independent judgment in determining its appropriateness for a particular purpose.

CNR makes no representations or warranties, either expressed or implied, including without limitation any warranties of merchantability, fitness for a particular purpose with respect to the information set forth herein or the product to which the information refers. Accordingly, CNR will not be responsible for damages resulting from use of or reliance upon this information.

****

SAFETY DATA SHEET

OxyChem®

Responsible Care® Good Chemistry at Work

CAUSTIC SODA LIQUID (ALL GRADES)

MSDS No.: M32415 **Rev. Date:** 05/29/2009 **Rev. Num.:** 08

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Company Identification:	Occidental Chemical Corporation 5005 LBJ Freeway P.O. Box 809050 Dallas, Tx 75380-9050
24 Hour Emergency Telephone Number:	1-800-733-3665 or 1-972-404-3228 (U.S.); 32.3.575.55.55 (Europe); 1800-033-111 (Australia)
To Request an MSDS: **Customer Service:**	MSDS@oxy.com or 1-972-404-3245 1-800-752-5151 or 1-972-404-3700
Trade Name:	Caustic Soda Diaphragm Grade 10%, 15%, 18%, 20%, 25%, 30%, 35%, 40%, 50%, Caustic Soda Rayon Grade 18%, 20%, 25%, 30%, 50%, 50% Caustic Soda Rayon Grade OS, Caustic Soda Membrane 6%, 18%, 20%, 25%, 30%, 48%, 50%, 50% Caustic Soda Membrane OS, 50% Caustic Soda Diaphragm OS, Caustic Soda Low Salt 50%, 25% Caustic Soda Purified, 50% Caustic Soda Purified, 50% Caustic Soda Purified OS, Caustic Soda Liquid 70/30, Membrane Blended, 50% Caustic Soda Membrane (Northeast), 50% Caustic Soda Diaphragm (West Coast), 50% Blended Rayon Grade Blended, Membrane Cell Liquor
Synonyms:	Sodium hydroxide solution, Liquid Caustic, Lye Solution, Caustic, Lye, Soda Lye
Product Use:	Metal finishing, Cleaner, Process chemical, Petroleum industry

2. HAZARDS IDENTIFICATION

****

EMERGENCY OVERVIEW:

Color:	Colorless to slightly colored
Physical State:	Liquid
Odor:	Odorless
Signal Word:	Danger

MAJOR HEALTH HAZARDS: CORROSIVE. CAUSES BURNS TO THE RESPIRATORY TRACT, SKIN, EYES AND GASTROINTESTINAL TRACT. CAUSES PERMANENT EYE DAMAGE.
PHYSICAL HAZARDS: CORROSIVE. Mixing with water, acid or incompatible materials may cause splattering and release of heat.
ECOLOGICAL HAZARDS: Keep out of water supplies and sewers. This material is alkaline and may raise the pH of surface waters. This material has exhibited moderate toxicity to aquatic organisms.
PRECAUTIONARY STATEMENTS: Avoid breathing vapors or mist. Avoid contact with skin, eyes and clothing. Keep container tightly closed. Wash thoroughly after handling. Use only with adequate ventilation.
****

POTENTIAL HEALTH EFFECTS:

Inhalation: May cause irritation (possibly severe), chemical burns, and pulmonary edema.

Skin contact: May cause irritation (possibly severe) and chemical burns.

Eye contact: May cause irritation (possibly severe), chemical burns, eye damage, and blindness.

Ingestion: May cause irritation (possibly severe), chemical burns, nausea, and vomiting.

Target Organs Effected: Respiratory System, Skin, Eye

Medical Conditions Aggravated by Exposure: Asthma, Respiratory disorders

See Section 11: TOXICOLOGICAL INFORMATION

3. COMPOSITION/INFORMATION ON INGREDIENTS

Hazardous Component	Concentration (by weight %)	CAS - No.
Water	48.5 - 94.5	7732-18-5
Sodium hydroxide	5.5 - 51.5	1310-73-2
Sodium chloride (NaCl)	1 - 5	7647-14-5

4. FIRST AID MEASURES

Inhalation: If adverse effects occur, remove to uncontaminated area. Give artificial respiration if not breathing. If breathing is difficult, oxygen should be administered by qualified personnel. If respiration or pulse has stopped, have a trained person administer basic life support (Cardio-Pulmonary Resuscitation/Automatic External Defibrillator) and CALL FOR EMERGENCY SERVICES IMMEDIATELY.

Skin Contact: Immediately flush contaminated areas with water. Remove contaminated clothing, jewelry, and shoes immediately. Wash contaminated areas with soap and water. Thoroughly clean and dry contaminated clothing before reuse. Discard contaminated leather goods. GET MEDICAL ATTENTION IMMEDIATELY.

4. FIRST AID MEASURES

Eye Contact: Immediately flush eyes with a directed stream of water for at least 15 minutes, forcibly holding eyelids apart to ensure complete irrigation of all eye and lid tissues. Washing eyes within several seconds is essential to achieve maximum effectiveness. GET MEDICAL ATTENTION IMMEDIATELY.

Ingestion: Never give anything by mouth to an unconscious or convulsive person. If swallowed, do not induce vomiting. Give large amounts of water. If vomiting occurs spontaneously, keep airway clear. Give more water when vomiting stops. GET MEDICAL ATTENTION IMMEDIATELY.

Notes to Physician: The absence of visible signs or symptoms of burns does NOT reliably exclude the presence of actual tissue damage. Probable mucosal damage may contraindicate the use of gastric lavage.

5. FIRE-FIGHTING MEASURES

Fire Hazard: Negligible fire hazard.

Extinguishing Media: Use media appropriate for surrounding fire

Fire Fighting: Move container from fire area if it can be done without risk. Cool containers with water. Avoid contact with skin.

Sensitivity to Mechanical Impact: Not sensitive.

Sensitivity to Static Discharge: Not sensitive.

Flash point: Not flammable

6. ACCIDENTAL RELEASE MEASURES

Occupational Release:
Wear appropriate personal protective equipment recommended in Section 8 of the MSDS. Completely contain spilled material with dikes, sandbags, etc. Shovel dry material into suitable container. Liquid material may be removed with a vacuum truck. Remaining material may be diluted with water and neutralized with dilute acid, then absorbed and collected. Flush spill area with water, if appropriate. Keep product and flush water out of water supplies and sewers. This material is alkaline and may raise the pH of surface waters with low buffering capacity. Releases should be reported, if required, to appropriate agencies.

7. HANDLING AND STORAGE

Storage Conditions: Store and handle in accordance with all current regulations and standards. Keep container tightly closed and properly labeled. Do not store in aluminum container or use aluminum fittings or transfer lines, as flammable hydrogen gas may be generated. Keep separated from incompatible substances.

7. HANDLING AND STORAGE

Handling Procedures: Avoid breathing vapor or mist. Do not get in eyes, on skin, or on clothing. Wash thoroughly after handling. When mixing, slowly add to water to minimize heat generation and spattering.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

OSHA Regulatory Exposure limit(s):

Hazardous Component	CAS - No.	OSHA Final PEL TWA	OSHA Final PEL STEL	OSHA Final PEL Ceiling
Sodium hydroxide	1310-73-2	2 mg/m^3	-----	-----

Non-Regulatory Exposure Limit(s):
The Non-Regulatory OSHA limits shown in the table are the Vacated 1989 PEL's (vacated by 58 FR 35338, June 30, 1993).

Hazardous Component	CAS - No.	ACGIH TWA	ACGIH STEL	ACGIH Ceiling	OSHA TWA (Vacated)	OSHA STEL (Vacated)	OSHA Ceiling (Vacated)
Sodium hydroxide	1310-73-2	-----	-----	2 mg/m^3	-----	-----	2 mg/m^3

ENGINEERING CONTROLS: Provide local exhaust ventilation where dust or mist may be generated. Ensure compliance with applicable exposure limits.

PERSONAL PROTECTIVE EQUIPMENT:

Eye Protection: Wear chemical safety goggles with a faceshield to protect against eye and skin contact when appropriate. Provide an emergency eye wash fountain and quick drench shower in the immediate work area.

Skin and Body Protection: Wear chemical resistant clothing and rubber boots when potential for contact with the material exists. Contaminated clothing should be removed, then discarded or laundered.

Hand Protection: Wear appropriate chemical resistant gloves

Protective Material Types: Natural rubber, Neoprene, Nitrile

Hazardous Component	Immediately Dangerous to Life/ Health (IDLH)
Sodium hydroxide	10 mg/m^3 IDLH

Respiratory Protection: A NIOSH approved respirator with N95 (dust, fume, mist) cartridges may be permissible under certain circumstances where airborne concentrations are expected to exceed exposure limits, or when symptoms have been observed that are indicative of overexposure. If eye irritation occurs, a full face style mask should be used. A respiratory protection program that meets 29 CFR 1910.134 must be followed whenever workplace conditions warrant use of a respirator.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State:	Liquid
Appearance:	Clear to opaque
Color:	Colorless to slightly colored
Odor:	Odorless
Boiling Point/Range:	230 – 291 F (110 – 144 C)

9. PHYSICAL AND CHEMICAL PROPERTIES

Freezing Point/Range:	-26 to 59 F (-32 to 15 C)
Vapor Pressure:	13 - 135 mmHg @ 60 C
Vapor Density (air=1):	No data available
Specific Gravity (water=1):	1.11 – 1.53 @ 15.6 C
Water Solubility:	100%
pH:	14.0 (7.5% solution)
Volatility:	No data available
Evaporation Rate (ether=1):	No data available
Partition Coefficient (n-octanol/water):	No data available

10. STABILITY AND REACTIVITY

Reactivity/ Stability: Stable at normal temperatures and pressures.

Conditions to Avoid: Mixing with water, acid or incompatible materials may cause splattering and release of large amounts of heat. Will react with some metals forming flammable hydrogen gas. Carbon monoxide gas may form upon contact with reducing sugars, food and beverage products in enclosed spaces.

Incompatibilities/ Materials to Avoid: Acids, Halogenated compounds, Prolonged contact with aluminum, brass, bronze, copper, lead, tin, zinc or other alkali sensitive metals or alloys

Hazardous Decomposition Products: Toxic fumes of sodium oxide

Hazardous Polymerization: Will not occur

11. TOXICOLOGICAL INFORMATION

TOXICITY DATA:

Hazardous Component	LD50 Oral	LC50 Inhalation	LD50 Dermal
Sodium hydroxide	Not listed	Not listed	1350 mg/kg (Rabbit)
Sodium chloride (NaCl)	3 g/kg (Rat)	42 g/m^3 (1 hr-Rat)	10 g/kg (Rabbit)

TOXICITY:
The severity of the tissue damage is a function of its concentration, the length of tissue contact time, and local tissue conditions. After exposure there may be a time delay before irritation and other effects occur. This material is a strong irritant and is corrosive to the skin, eyes, and mucous membranes. This material may cause severe burns and permanent damage to any tissue with which it comes into contact. Inhalation will cause severe irritation, possible burns with pulmonary edema, which may lead to pneumonitis. Skin contact with this material may cause severe irritation and corrosion of tissue. Repeated exposure may cause dermatitis. Eye contact can cause severe irritation, corrosion with possible corneal damage and blindness. Ingestion may cause irritation, corrosion/ulceration, nausea, and vomiting.

CARCINOGENICITY: This product is not classified as a carcinogen by NTP, IARC or OSHA.

12. ECOLOGICAL INFORMATION

AQUATIC TOXICITY: This material has exhibited moderate toxicity to aquatic organisms. Data provided are for sodium hydroxide.

Freshwater Fish Data:
LC50 brook trout: 25 ppm/24 hr
LC50 king salmon: 48 ppm
Invertebrate Toxicity Data:
EC50 daphnia magna: 100 ppm
EC50 shrimp: 33 – 100 ppm/48 hr
EC50 cockle: 330 – 1000 ppm/48 hr

BIODEGRADATION: This material is inorganic and not subject to biodegradation.

PERSISTENCE: This material is alkaline and may raise the pH of surface waters with low buffering capacity. This material is believed to exist in the disassociated state in the environment.

BIOCONCENTRATION: This material is not expected to bioconcentrate in organisms.

ADDITIONAL ECOLOGICAL INFORMATION: This material has exhibited slight toxicity to terrestrial organisms.

13. DISPOSAL CONSIDERATIONS

Reuse or reprocess, if possible. Dispose in accordance with all applicable regulations. May be subject to disposal regulations: U.S. EPA 40 CFR 261. Hazardous Waste Number(s): D002

14. TRANSPORT INFORMATION

U.S.DOT 49 CFR 172.101:

PROPER SHIPPING NAME:	Sodium Hydroxide Solution
DOT UN NUMBER:	UN1824
HAZARD CLASS/ DIVISION:	8
PACKING GROUP:	II
LABELING REQUIREMENTS:	8
DOT RQ (lbs):	RQ 1000 lbs. (Sodium Hydroxide)

CANADIAN TRANSPORTATION OF DANGEROUS GOODS:

SHIPPING NAME:	Sodium hydroxide solution
UN NUMBER:	UN1824
CLASS:	8
PACKING/RISK GROUP:	II

Water Meter w/Totalizer
Manufacturer's Information

312319.1.4.A.2.f

Recordall® Cold Water Top Load Bronze Disc Meter	Size 2" (DN 50mm)	Technical Brief

DESCRIPTION

Badger Meter offers the Recordall Disc meter in Cast Bronze and a Low Lead Alloy. The Low Lead Alloy (Trade Designation: M170 LL) version complies with NSF/ANSI Standard 61 and carries the NSF-61 Mark on the housing. All components of the Low Lead Alloy meter, i.e., disc, chamber, housing, seals, etc., comprise the certified system.

APPLICATIONS: For use in measurement of potable cold water in residential, commercial and industrial services where flow is in one direction only.

OPERATION: Water flows through the meter's strainer and into the measuring chamber where it causes the disc to nutate. The disc, which moves freely, nutates on its own ball, guided by a thrust roller. A drive magnet transmits the motion of the disc to a follower magnet located within the permanently-sealed register. The follower magnet is connected to the register gear train. The gear train reduces the disc nutations into volume totalization units displayed on the register dial face.

OPERATING PERFORMANCE: The Badger Recordall Disc meters meet or exceed registration accuracy for the low flow rates (95%), normal operating flow rates (100 ± 1.5%), and maximum continuous operation flow rates as specifically stated by AWWA Standard C700.

CONSTRUCTION: Badger Recordall Disc meter construction, which complies with ANSI/AWWA standard C700, consists of three basic components: bronze meter housing, measuring chamber, and permanently, sealed register. A corrosion-resistant thermoplastic material is used for the measuring chamber.

To simplify maintenance, the register, measuring chamber, and strainer can be replaced without removing the meter housing from the installation. No change gears are required for accuracy calibration. Interchangeability of parts among like-sized meters also minimizes spare parts inventory investment. The built-in strainer has an effective straining area of twice the inlet size.

MAGNETIC DRIVE: Direct magnetic drive, through the use of high-strength magnets, provides positive, reliable and dependable register coupling for straight-reading, remote or automatic meter reading options.

SEALED REGISTER: The standard register consists of a straight-reading, odometer-type totalization display, 360° test circle with center sweep hand and flow finder to detect leaks. Register gearing consists of self-lubricating thermoplastic gears to minimize friction and provides long life. Permanently sealed; dirt, moisture, tampering and lens fogging problems are eliminated. Multi-position register simplifies meter installation and reading. Generator-type remote reading and automatic meter reading systems are available for all Recordall Disc meters. All reading options are removable from the meter without disrupting water service.

TAMPER-PROOF FEATURES: Customer removal of the register to obtain free water can be prevented when the optional tamper detection seal wire screw/or Torx® tamper seal resistant screw is added to the meter. Both can be installed at the meter site or at the factory.

MAINTENANCE: Badger Recordall Disc meters are designed and manufactured to provide long-term service with minimal maintenance. When maintenance is required, it can be performed easily either at the meter installation or at any other convenient location. As an alternative to repair by the utility, Badger offers various maintenance and meter component exchange programs to fit the needs of the utility.

CONNECTIONS: Tailpieces/Flanges for installations of meters on various pipe types and sizes, including misaligned pipes, are available as an option.

Model 170 shown with optional 1" Test Plug

SPECIFICATIONS

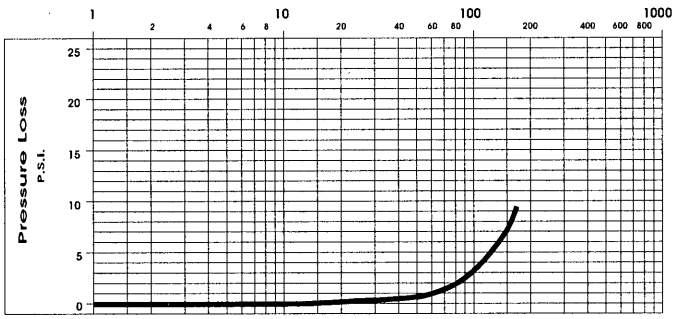
Typical Operating Range (100% ± 1.5%)	2 1/2 -170 GPM (.57 to 39 m^3/hr)
Low Flow (Min. 95%)	1 1/2 GPM (.34 m^3/hr)
Maximum Continuous Operation	100 GPM (23 m^3/hr)
Pressure Loss at Maximum Continuous Operation	3.3 PSI at 100 GPM (.23 bar at 23 m^3/hr)
Maximum Operating Temperature	80°F (26°C)
Maximum Operating Pressure	150 PSI (10 bar)
Measuring Element	Nutating disc, positive displacement
Register Type	Straight reading, permanently sealed magnetic drive standard. Remote reading or Automatic Meter Reading units optional.
Registration	100 Gallons, 10 Cubic Feet, 1 m^3
Register Capacity	100,000,000 Gallons, 10,000,000 Cubic Feet, 1,000,000 m^3. 6 odometer wheels.
Meter Connections	2" AWWA two bolt elliptical flange, drilled, or 2" - 11 1/2 NPT internal pipe threads.
Optional Test Plug	1" NPT test plug (TP) available on elliptical long and short versions.

MATERIALS

Meter Housing	Cast Bronze, Low Lead Alloy
Housing Top Plates	Bronze, Low Lead Alloy
Measuring Chamber	Thermoplastic
Disc	Thermoplastic
Trim	Stainless Steel/Bronze
Strainer	Thermoplastic
Disc Spindle	Stainless Steel
Magnet	Ceramic
Magnet Spindle	Stainless Steel
Register Lid and Box	Thermoplastic or Bronze
Generator Housing	Thermoplastic

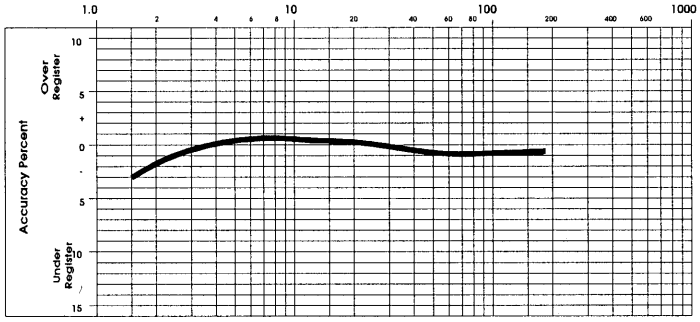
PRESSURE LOSS CHART

Rate of Flow, in Gallons per Minute



ACCURACY CHART

Rate of Flow, in Gallons per Minute

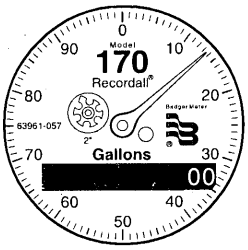


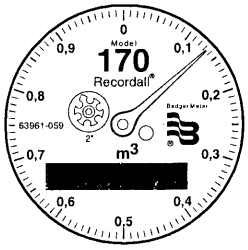
METER SIZE	METER MODEL	A LAYING LENGTH	B HEIGHT REG./RTR	C HEIGHT GEN.	D CENTERLINE BASE	WIDTH	APPROX. SHIPPING WEIGHT
2" (50mm)	170 EL, Hex. 170 EL, TP	15 1/4" (387mm)	8" (203mm)	9 3/8" (238mm)	2 7/8" (73mm)	9 1/2" (241mm)	30 lb. (13.6kg)
2" (50mm)	170 ELL, 170 ELL, TP	17" (432mm)	8" (203mm)	9 3/8" (238mm)	2 7/8" (73mm)	9 1/2" (241mm)	30 lb. (13.6kg)

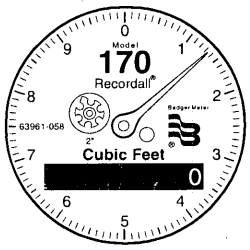
EL = Elliptical ELL = Elliptical Long Hex = Hexagon, 2" - 11 1/2 NPT Thread TP=Test Plug 1"

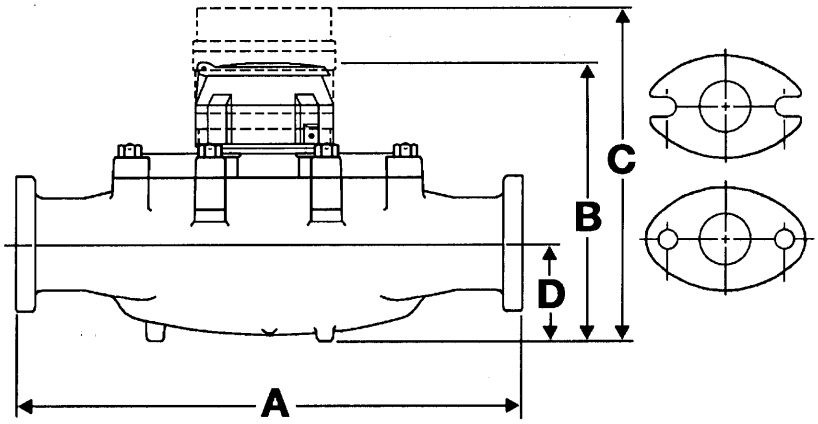
Sweep Hand Registration

MODEL	GALLON	CU.FT.	CU. METER
M170	100	10	1









RTR® and Recordall® are registered trademarks of Badger Meter, Inc.
TORX® is a registered trademark of Camcar, Division of Textron, Inc.

TÜV MANAGEMENT SERVICE ISO 9001

Please see our website at
www.badgermeter.com
for specific contacts.

Due to continuous research, product improvements and enhancements, Badger Meter reserves the right to change product or system specifications without notice, except to the extent an outstanding contractual obligation exists.

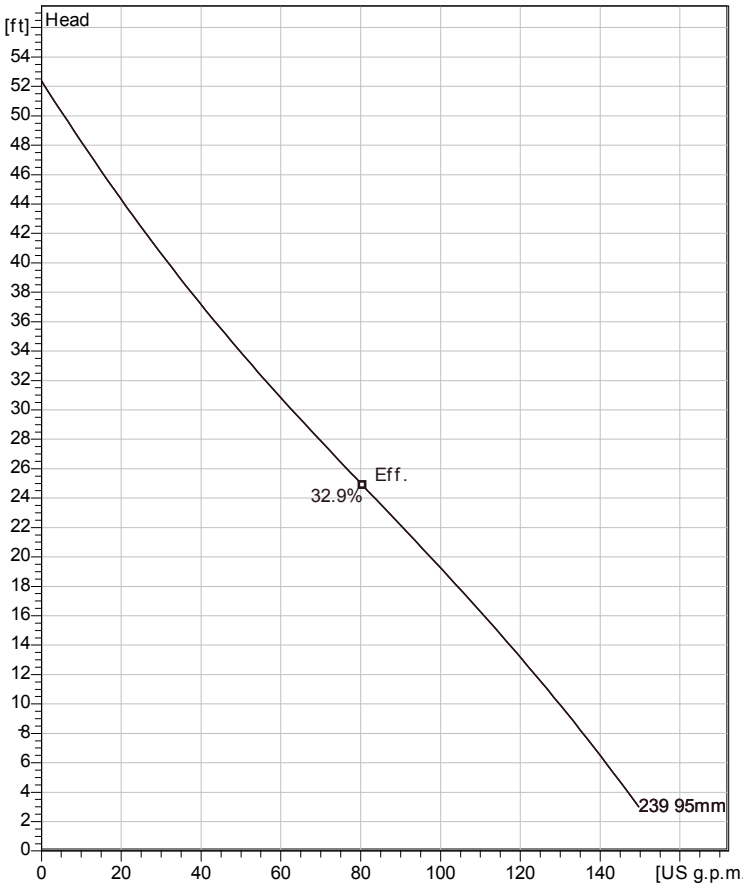
BadgerMeter, Inc.
P.O. Box 245036, Milwaukee, WI 53224-9536
(800) 876-3837 / Fax: (888) 371-5982
www.badgermeter.com

Dewatering Pumps
Manufacturer's Information

312319.1.4.A.2.a

KS 2610 MT 1~ 239

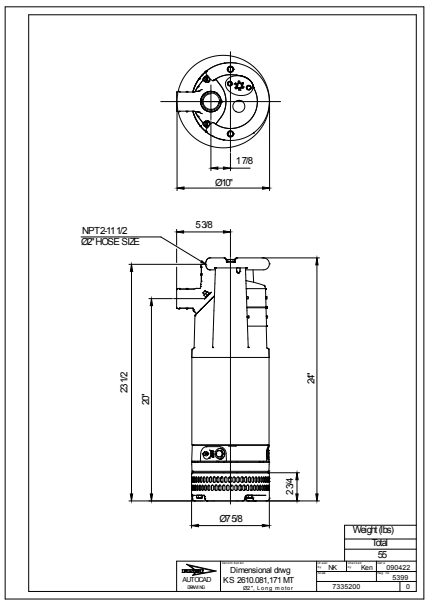
Technical specification



Curve according to: ISO 9906 grade 2 annex 1 or 2

Note: Picture might not correspond to the current configuration.

Installation: S - Portable Semi permanent, Wet



General

Portable pumps ideal for applications in which the water or liquid contains concentrations of abrasives when clogging problems can occur

Impeller

Impeller material	Hard-Iron ™
Outlet width	1 15/16 inch
Inlet diameter	72 mm
Impeller diameter	95 mm
Number of blades	2
	0 inch

Motor

Motor #	K2610.171 13-10-2BB-W 1.8hp
Stator variant	7
Frequency	60 Hz
Rated voltage	220 V
Number of poles	2
Phases	1~
Rated power	1.8 hp
Rated current	7.5 A
Starting current	35 A
Rated speed	3465 rpm
Power factor	
1/1 Load	0.98
3/4 Load	0.98
1/2 Load	0.98
Efficiency	
1/1 Load	82.0 %
3/4 Load	80.5 %
1/2 Load	75.5 %

Configuration

Project	Project ID	Created by	Created on	Last update
			2013-04-24	

KS 2610 MT 1~ 239

Performance curve

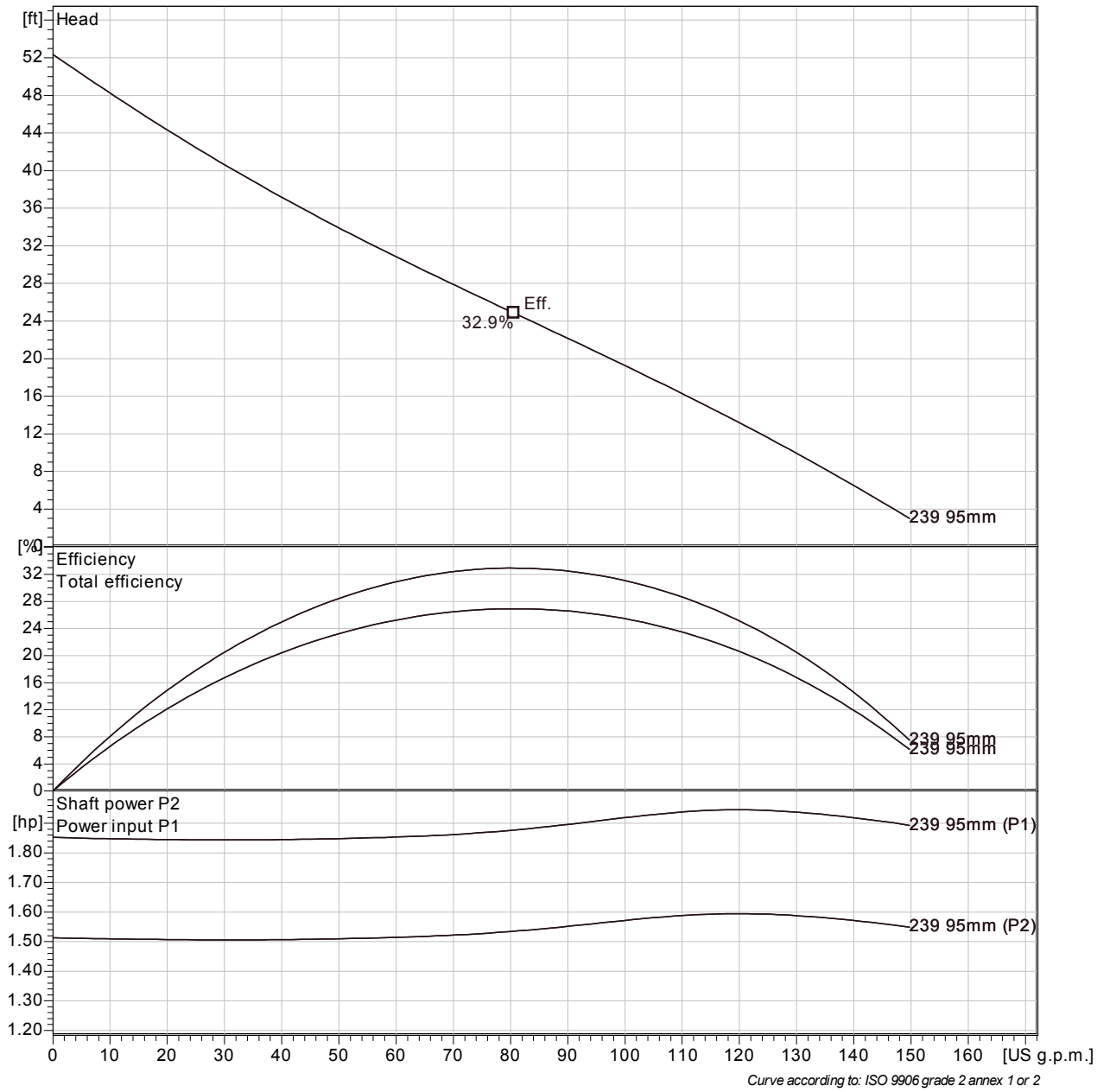
Pump

Outlet width	1 15/16 inch
Inlet diameter	72 mm
Impeller diameter	3 3/4"
Number of blades	2
	0 inch

Motor

Motor #	K2610.171 13-10-2BB-W 1.8hp
Stator variant	7
Frequency	60 Hz
Rated voltage	220 V
Number of poles	2
Phases	1~
Rated power	1.8 hp
Rated current	7.5 A
Starting current	35 A
Rated speed	3465 rpm

Power factor	
1/1 Load	0.98
3/4 Load	0.98
1/2 Load	0.98
Efficiency	
1/1 Load	82.0 %
3/4 Load	80.5 %
1/2 Load	75.5 %

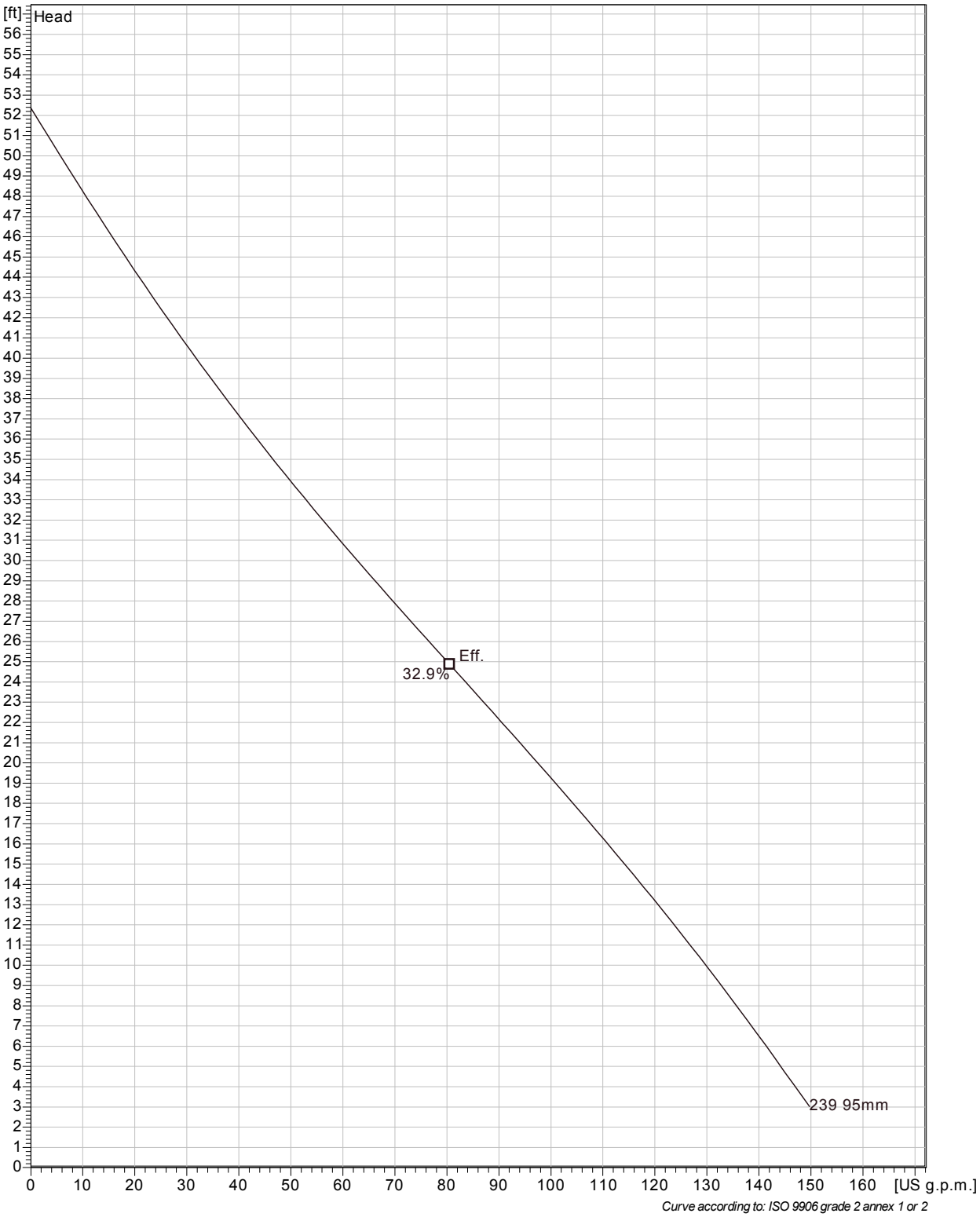


Curve according to: ISO 9906 grade 2 annex 1 or 2

Project	Project ID	Created by	Created on	Last update
			2013-04-24	

KS 2610 MT 1~ 239

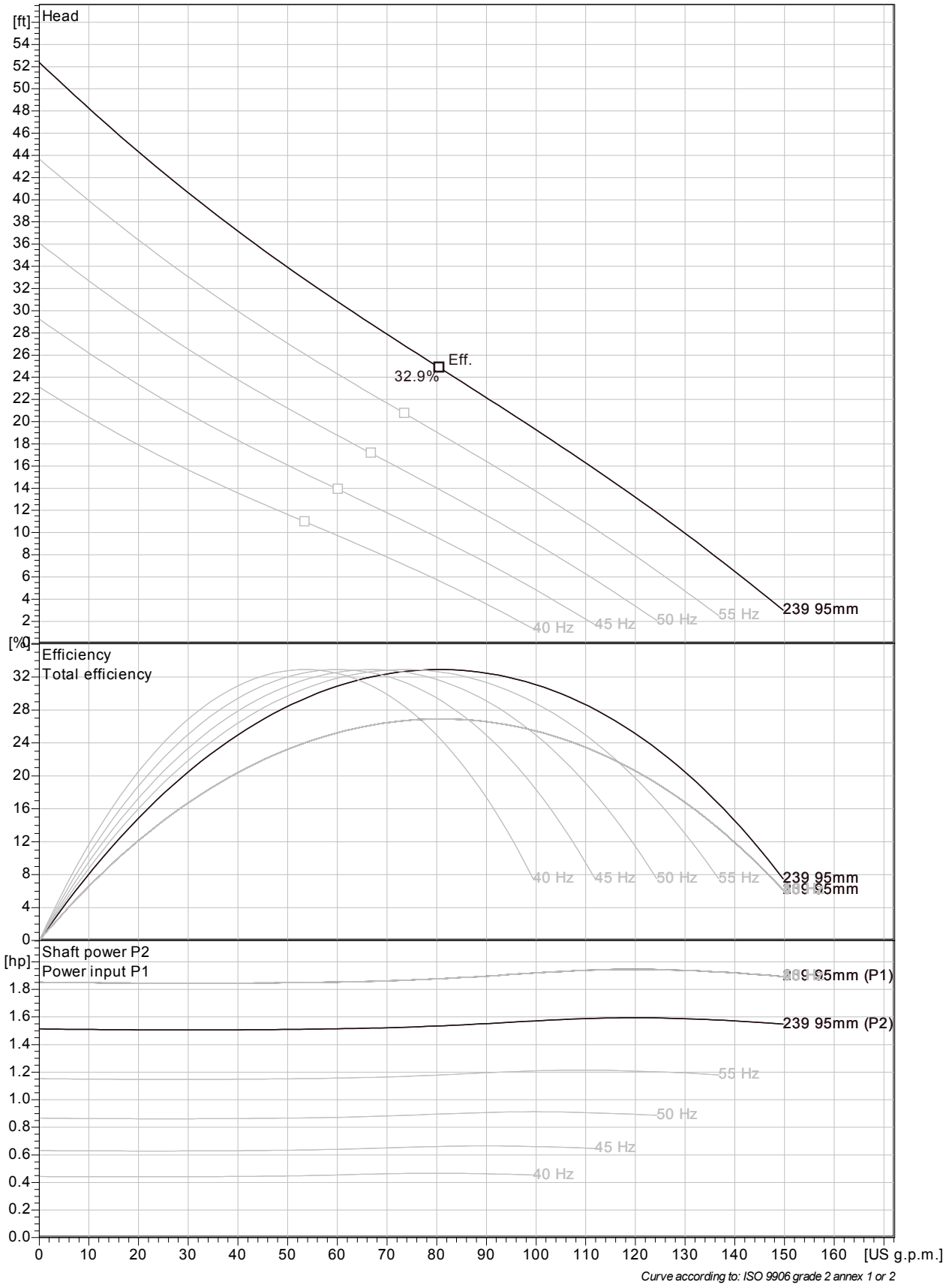
Duty Analysis



Project	Project ID	Created by	Created on	Last update
			2013-04-24	

KS 2610 MT 1~ 239

VFD Curve

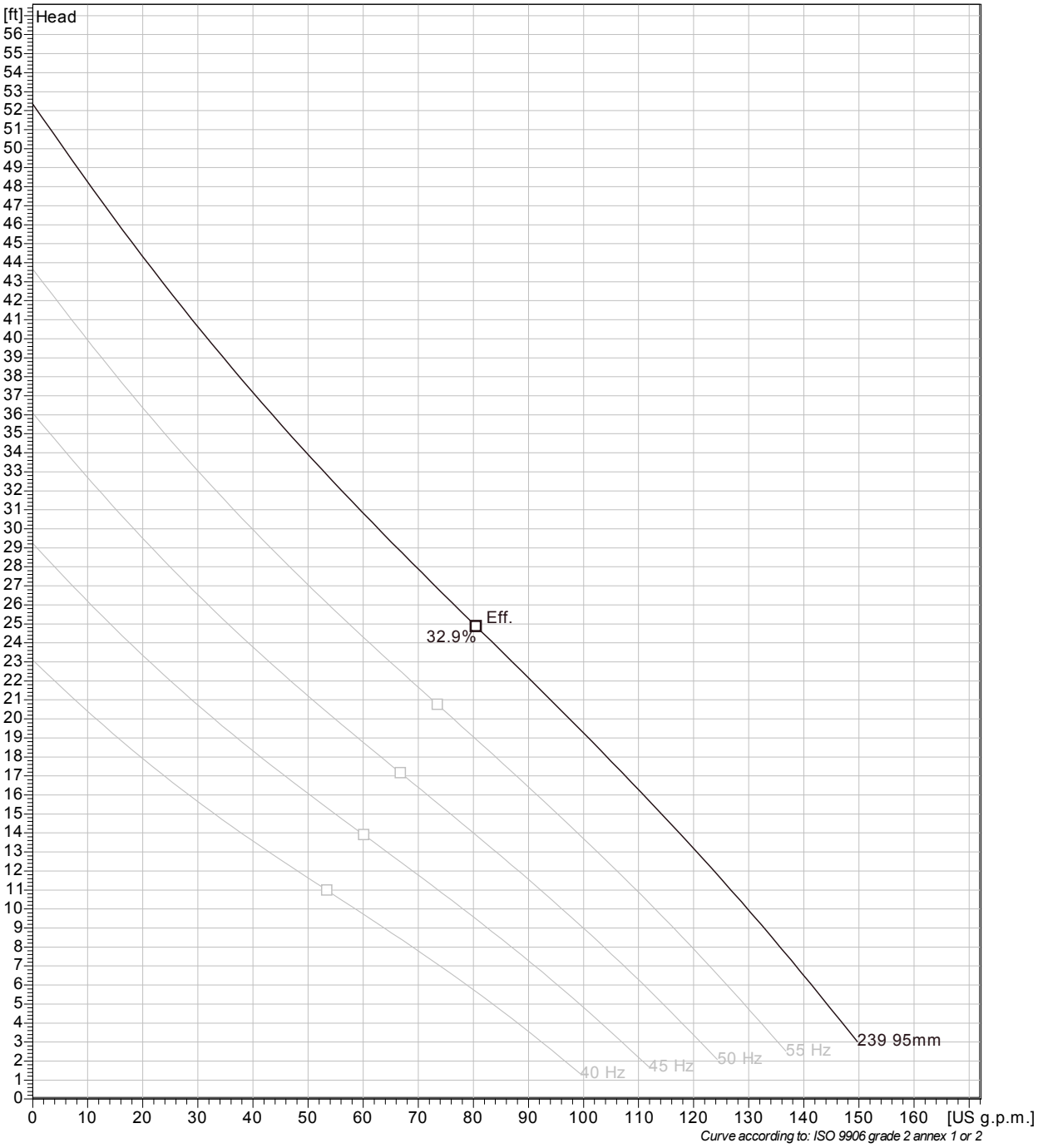


Curve according to: ISO 9906 grade 2 annex 1 or 2

Project	Project ID	Created by	Created on	Last update
			2013-04-24	

KS 2610 MT 1~ 239

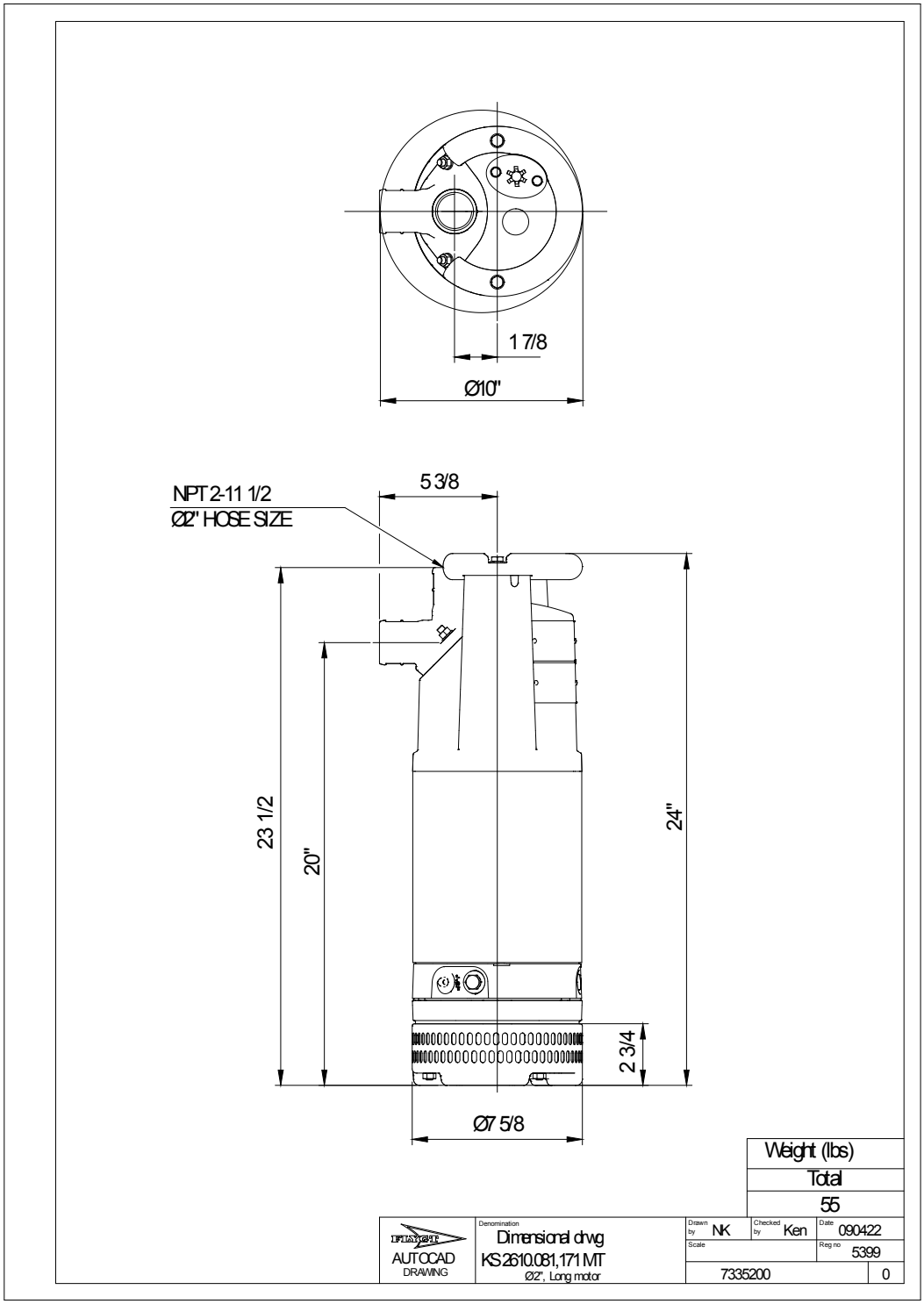
VFD Analysis



Project	Project ID	Created by	Created on	Last update
			2013-04-24	

KS 2610 MT 1~ 239

Dimensional drawing



Project	Project ID	Created by	Created on	Last update
			2013-04-24	

TSURUMI PUMP

LB-800/LBT-800
SEMI-VORTEX - DEWATERING PUMP

SPECIFICATIONS

FEATURES

1. Semi-vortex, urethane rubber impeller, urethane front & rear ware plates and ethylene propylene rubber casing increases wear resistance when pumpage contains abrasive particles.

2. Double inside mechanical seals with silicon carbide faces, (both top and bottom) running in an oil filled chamber and further protected by a lip seal running against a replaceable, 304 stainless steel shaft sleeve, provides for the most durable seal design available.

3. Highly efficient, continuous duty air filled, copper wound motor with class B, insulation minimizes the cost of operation.

4. Built in thermal protector prevents motor failure due to- overloading or accidental run -dry conditions.

5. Double shielded, permanently lubricated, high temperature C3 ball bearings, extend operational life.

6. Top discharge, flow-thru design enables operation at low water levels for extended periods.

APPLICATIONS

1. Residential, commercial, industrial wastewater and construction site drainage.

2. Effluent transfer.

3. Decorative waterfalls and fountains.

4. Raw water supply from rivers or lakes..

EQUIPPED

SPECIFICATIONS

Discharge Size	2" Npt (50 mm)
Horsepower Range	1 Hp. (.75 Kw)
Performance Range Capacity	10 ~ 82 Gpm. (.037 ~ .31 m^3/min)
Head	7 ~ 59 Ft. (2.1 ~ 17.9 m)
Maximum water temperature	104° F. (40° C.)
Materials of Construction	
Casing	Ethylene Propylene Rubber
Impeller	Urethane Rubber
Shaft	403 Stainless Steel
Motor Frame	Aluminum alloy
Fasteners	304 Stainless Steel
Mechanical Seal	Silicon Carbide/Silicon Carbide
Elastomers	NBR (Nitril Buna Rubber)
Impeller Type	Semi-vortex, solids handling.
Solids Handling Capability	Screen opening
Bearings	Pre-lubricated, Double Shielded C3
Motor Nomenclature	
Type, Speed, Hz.	Air Filled, 3600 Rpm, 60 Hz.
Voltage, Phase	115/230 V., 1 Phase
	230/460/575 V. 3 Phase (LBT-800)
Insulation	Class E
Accessories	Submersible Power Cable 50' (9.75 m)
Operational Mode	Manual

STANDARD

OPTIONS

Length as Required, (97' Max)

*See Technical Data section for details.

TSURUMI PUMP

LB SERIES
SEMI-VORTEX - DEWATERING PUMP

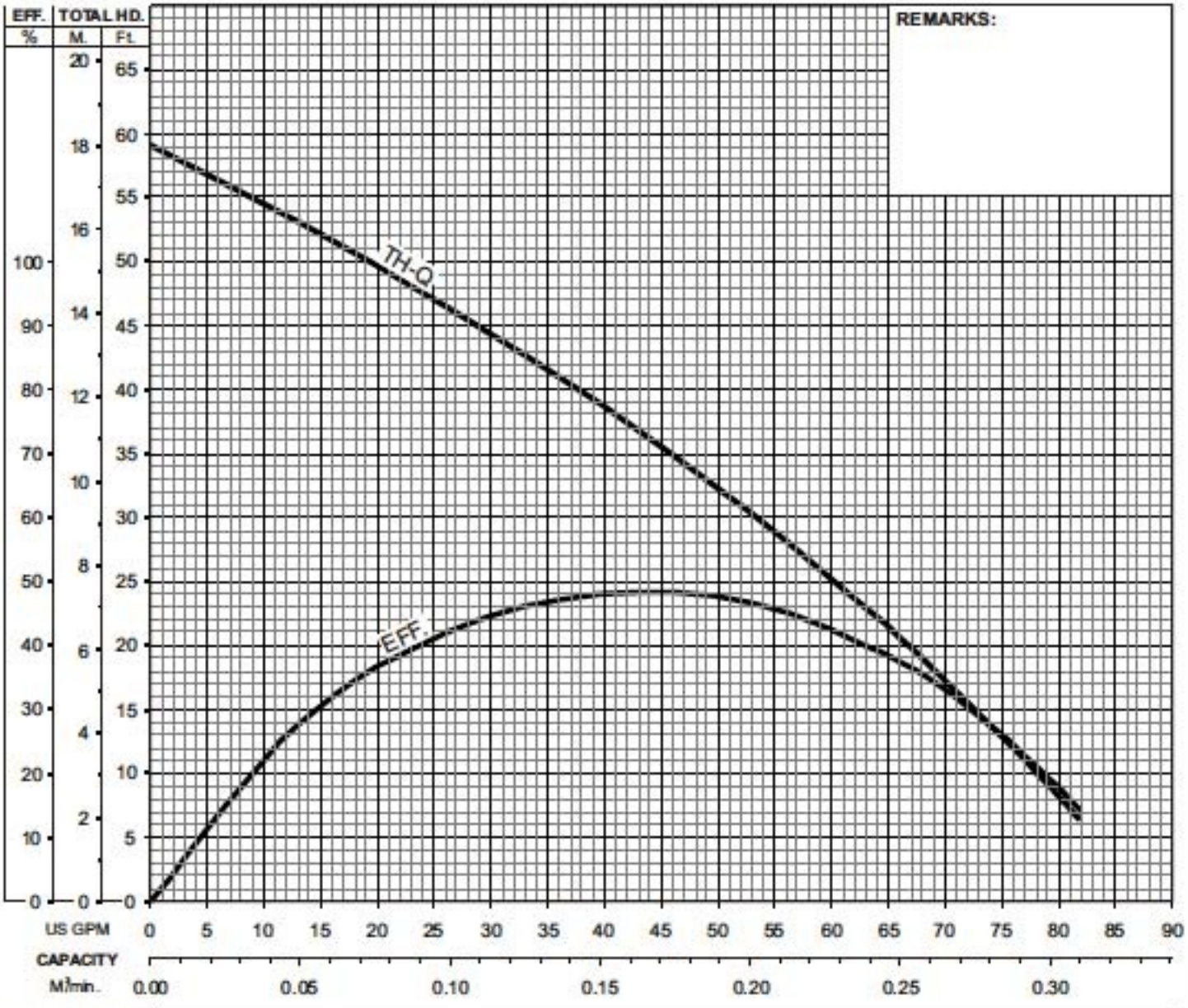
PERFORMANCE CURVE

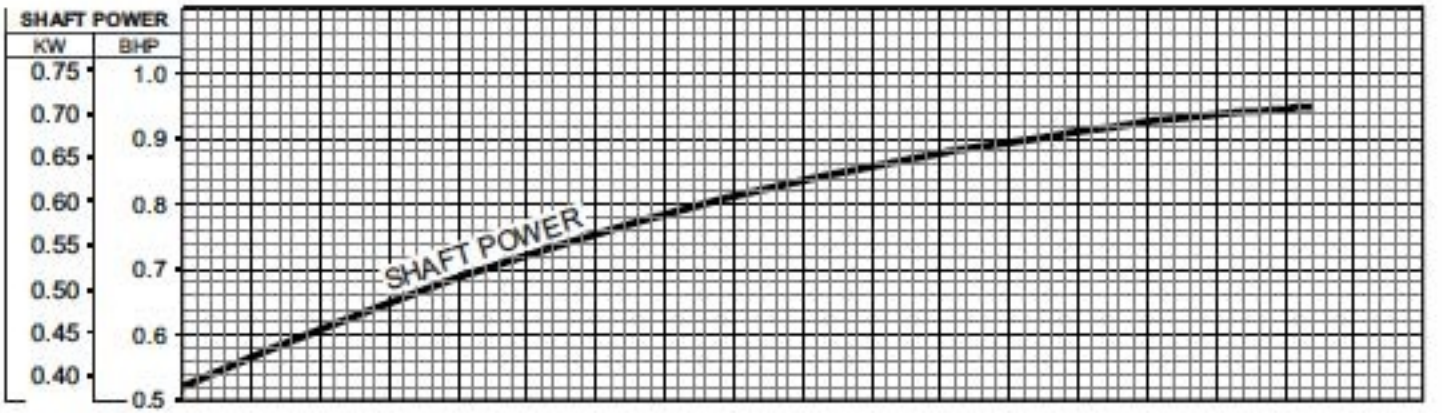
MODEL	BORE	HP	KW	RPM	SOLIDS DIA	LIQUID	SG.	VISCOSITY	TEMP.
LB-800-60	2"/50mm	1	0.75	3330	0.236"/6mm	Water	1.0	1.81 CST	60F

PUMP TYPE	PHASE	VOLTAGE	AMPERAGE	HZ	STARTING METHOD	INS. CLASS
Semi-Vortex - Dewatering Pump	Single	110/115/220/230	10.8/10.3 / 5.7/5.5	60	Capacitor Start	E

CURVE No.	DATE	PHASE	VOLTAGE	AMPERAGE	HZ	STARTING METHOD	INS. CLASS
-	-	-	-	-	-	-	-

REMARKS:





May 1, 2019

START OF ADDITIONAL INFO FOR TREATMENT EQUIPMENT DUE TO HIGH IRON LEVELS

Mr. Steve Barth
A.A. Will Corporation
145 Island Street
Stoughton, MA 02072

Reference: Proposal – Water Treatment Services
North Point – Parcels G/E/F
Cambridge, Massachusetts
LRT Reference # 3373

Dear Steve:

Thank you for your inquiry regarding water treatment services provided by Lockwood Remediation Technologies, LLC (LRT) on behalf of A.A. Will Corporation (A.A. Will) for the excavation work at the above-referenced jobsite (site). The following proposal is based on the analytical data and available information provided by A.A. Will.

Baseline Assumptions

1. Dewatering will be completed by localized sumping.
2. The influent flow rate for has been estimated at 30 gallons per minute (gpm); however, this is only an estimate and actual site conditions may vary.
3. Primary contaminants of concern in the waste stream include total suspended solids (TSS), petroleum compounds, volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs) and metals. If additional analytes are encountered in the groundwater, modification to the treatment system may be necessary which could affect the system budget.
4. LRT will provide and install a chemical aided settling system to the base water treatment system.

Work Scope

Aerator

1. One (1) blower with aeration installed in the first chamber of the existing weir tank provided by A.A. Will. Power requirements will be 3-Phase, 480V.

Additional Settling Tank

1. One (1) 10,000-gallon weir tank for additional sediment settling capacity. Please note that LRT expects gravity flow from the first settling tank (AA Will provided) to the second settling tank.

Therefore, the first tank will need to be raised; the first tank elevation will be determined based on a review of an AA Will tank cutsheet.

Chemical Aided Settling System

1. One (1) chemical aided settling system for the application of LRT E-50 coagulant and LRT nonionic dry polymer. The system includes two chemical feed pumps, mixers and a control panel. A flocculant "make-down" system that prepares a batch of dry polymer for use is included. The appropriate chemical dosing necessary for efficient solid separation will need to be determined onsite via a "jar test". Once this is completed an accurate estimate of chemical usage can be established. Please note that chemical usage can vary throughout a project with changes in influent water characteristics such as pH, TSS concentration, etc. LRT recommends that periodic jar testing occur throughout the project especially when changes to influent water conditions are expected. The chemical aided settling system will require 1-phase 110V power.

Pricing

Mobilization and Installation: Chemical Aided Settling System, Aerator & Settling Tank w/ installed fabric weirs – Includes two (2) LRT technicians for setup and training on equipment.
Monthly Rental: Chemical Aided Settling System, Aerator & Modified Weir Tank
Demobilization: Chemical Aided Settling System, Aerator & Settling Tank *Does not include tank cleaning or waste disposal
Consumables: LRT E50 Coagulant – 55 Gallon Drum LRT Anionic Polymer – 55 Pound Bag

Exclusions:

1. Unloading and loading of equipment at the jobsite. LRT will transport all equipment to and from the site on flat trailers. Client will need to use a machine for unloading and loading.
2. Level ground
3. Electrical power
4. Union or prevailing wage labor (unless otherwise specified in this proposal)
5. Winterization (unless otherwise specified in this proposal)

6. Operation or maintenance of proposed equipment (unless otherwise specified in this proposal)
7. Water for media reactivation or flocculant make-down
8. Permits or discharge fees
9. Cleaning of equipment or disposal of material left in equipment (unless otherwise specified in this proposal)
10. Taxes

Our standard limited warranty, disclaimer and limitation of liability and remedy statement is attached and considered part of this proposal. The pricing contained in this proposal is valid for 30 days. Our payment terms are net 30 on delivery. Based on our current availability, the proposed rental equipment can be delivered in less than 2 weeks from your signature of this proposal.

Please feel free to contact us at 774-450-7177 if you have any questions or if you require additional information. We look forward to working with you on this project.
Sincerely,

Lockwood Remediation Technologies, LLC

Kim Gravelle

Kim Gravelle, P.G.
Project Manager

Paul Lockwood

Paul Lockwood
President

Acceptance of Terms for Services:

_____
Print Name/Job Title

_____
Company Name

_____
Signature

_____
Date

Lockwood Remediation Technologies, LLC (LRT)

Limited Warranty Disclaimer and Limitation of Liability and Remedy

1. **Equipment Manufactured by LRT** – LRT warrants its products against defects in workmanship or materials under normal use for a period of twelve months from the date of installation by LRT personnel. The warranty includes all cost borne by LRT associated with the repair or replacement (at LRT's discretion) of the part or equipment. LRT will make a good faith effort to complete a prompt correction or other adjustment with respect to any product, which proves to be defective within the warranty period. This warranty does not include damages occurring from improper installation, improper operation, improper maintenance, or work by 3rd parties not under LRT's control.

2. **Products or Components Manufactured by Others** – LRT will honor the manufacturer's specific warranty for products and/or components manufactured by others, however all cost incurred by LRT to remedy the warranty claim will be incurred by the Client, unless the repair is the result of equipment improperly installed by LRT personnel. The repair(s) will be invoiced in accordance with our Schedule of Fees.

3. **Chemical Compatibility** – Our warranty does not extend to damage caused by chemical incompatibility unless specifically stated in our proposal. The compatibility statement must include and would be limited to the specific chemicals and concentrations listed.

4. **Treatment Plants** – LRT's treatment plants are warranted to treat chemicals to the concentrations listed in LRT's proposal. All other chemicals, concentrations or constituents other than specifically listed may not be treated or may hinder the treatment process. Any modifications required to either treat or remove additional said chemicals is not included.

5. **Manuals** – LRT's treatment system manual is intended to provide a qualified operator with a compilation of manufacturer's manuals for equipment provided. Only qualified personnel shall perform the specified operation, optimization and maintenance of specified equipment. LRT's manuals are not intended to be used by unqualified personnel and are not to be used as a training tool. Any operation, optimization or maintenance completed by unqualified personnel may result in property damage, serious injury or death, under such circumstances, client shall hold LRT harmless.

6. **Limitation of Liability** – The warranty expressed herein is in lieu of any other warranties expressed or implied including, but not limited to, any implied warranty or merchantability or fitness for a particular purpose and is in lieu of an and all other obligations or liability on LRT's part. Under no circumstance will LRT be liable for any incidental, special, or consequential damages, or for any other loss, damage or expense of any kind, including loss of profits, or claims for labor, arising from any cause whatsoever. LRT's maximum liability shall not exceed at LRT's discretion, either the (i) repair or replacement of the defective part of product, at LRT's option; or (ii) return of the product and refund the purchased price. Either remedy shall constitute the Client's entire and exclusive remedy whether in contract, tort under warranty or otherwise.

START OF ADDITIONAL INFO FOR TREATMENT EQUIPMENT DUE TO HIGH IRON LEVELS

STANDARD SPECIFICATIONS for AL275

CAPACITY - 10,000 GAL. 238 Bbl
LENGTH - 22'-11" Tank Length / 26'-5 ½" Overall Length
WIDTH - 97" Tank Inside / 102" Overall Width
HEIGHT - 87" Tank Height / 105 ½" Overall Height

PLATFORM - Outside Rail Construction (36" Inside Rails)
(2) - 6" x 2" x 1/4" Tubing Long Sills / HD Nose Cones / 1" Thick Open Hook
(2) - 6"x13# Outer Channel Floor Rails
1/4" Plate A36 Floor (Slope Floor Configuration)
3" x 4.1# Structural Channel Floor Crossmembers (16" on Center)
3" x 4.1# Structural Channel Rub Rail (each side of tank)
8" Sch40 x 8" long Rear Platform Rollers
4" O.D. x 6" long Front Nose Rollers

SIDES - 1/4" Plate A36 / 6" x 2 3/4" x 1/4" Formed Side Stakes
(1) - 22" Manway Curb Side

FRONT - 1/4" Plate A36 / (2) - 1/4" Formed Horizontal Supports
(2) - Outlet Port - 4" Slip-on Flange 150# w/ Butterfly Valve
- 4" Threaded Nipple
(1) - Inlet Port - 3" Removable Fill Line
(1) - 22" Manway

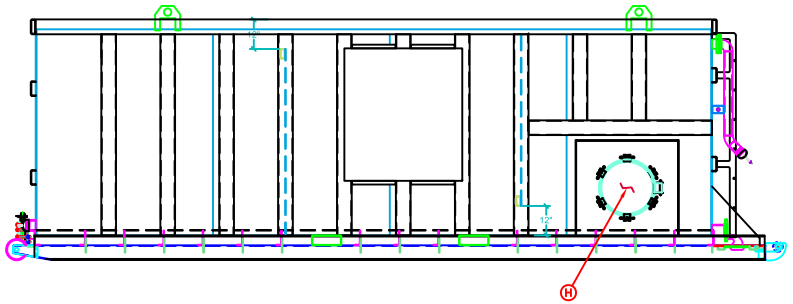
REAR - 1/4" Plate A36 / (2) - 1/4" Formed Horizontal Supports
(1) - Outlet Port - 4" Slip-on Flange 150# w/ Butterfly Valve
- 4" Threaded Nipple
(1) - 22" Manway

BLAST -
INTERIOR SURFACE PREPARATION - SSPC-SP-10 Near-White Metal Blast
EXTERIOR SURFACE PREPARATION - SSPC-SP-6 Commercial Blast Cleaning

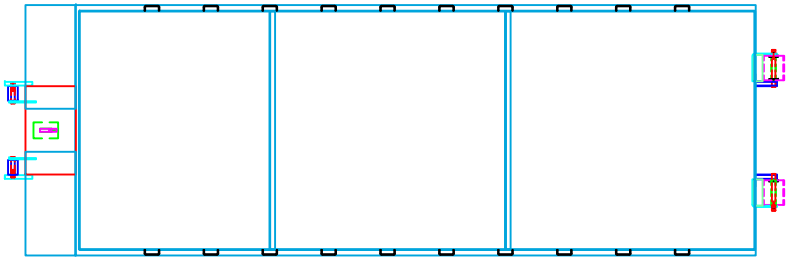
PAINT -
(INTERIOR) EPOXYPHENOLIC 100% SOLID 20.0 MILS D.F.T
(EXTERIOR) Finish Coat Polurethane 4.0 - 5.0 Mils D.F.T

PLACARD - (2) 10 ga. Placard - Drivers & Passenger Side
(Customer Specifications)

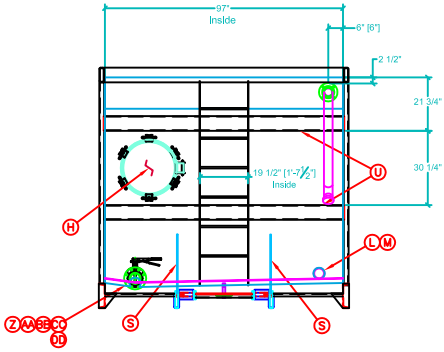
HYDRO-TESTED



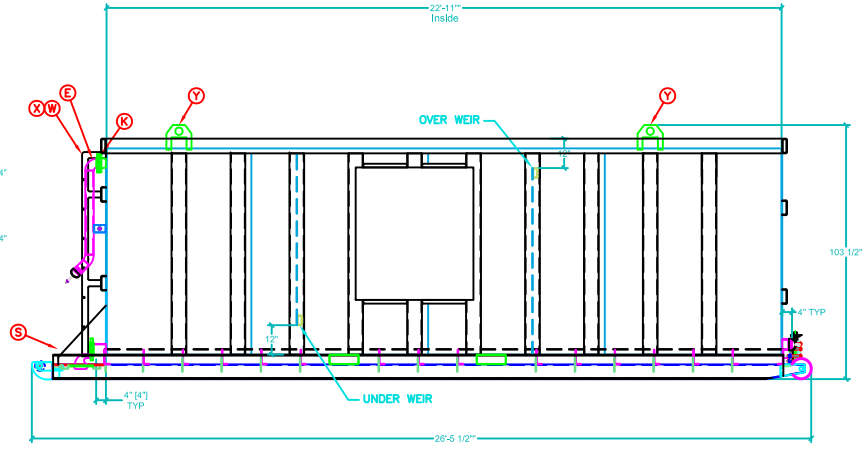
Curb View



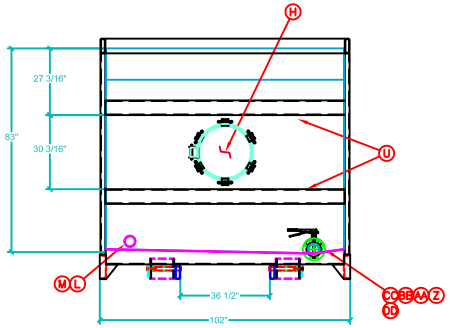
Top View



Front View



Street View



Rear View

NO.	DESCRIPTION	PART NO.	QTY.	WT.
E	3" FILL LINE (SEE DETAIL DWG.)		1	
H	Ø22" MANWAY		3	
K	3" WELD-NECK FLANGE 150#		1	
L	4" THREADED NIPPLE x 4" LG.		2	
M	4" PIPE CAP		2	
S	PL 3/8" FRONT GUSSET BURNOUT		2	
U	6" x 2" x 1/4" x 97 1/2" LG. FORMED CHANNEL		4	
W	LADDER SIDES PL 1/4" BURNOUT		2	
X	R.B. Ø3/4" x 20" LG.		6	
Y	PL 3/4" LIFTING LUG BURNOUT		4	
Z	PIPE 4" SCH40 x 4" LG.		2	
AA	4" SLIP-ON FLANGE 150#		2	
BB	4" BUTTERFLY VALVE		2	
CC	BOLTS GRADE 5 Ø5/8" x 5" LG. w/ NYLOCK NUT		16	
DD	4" THREADED FLANGE 150# w/ PLUG		2	

10,000 Gal. Weir Tank

Lockwood Remediation Technologies, LLC

89 Crawford Street
Leominster, Massachusetts 01453
O: 774-450-7177
F: 888-835-0617

The Pulsatron Series HV designed for high viscosity applications for precise and accurate metering control. The Series HV offers manual control over stroke length and stroke rate as standard with the option to choose between 4-20mA and external pace inputs for automatic control.

Five distinct models are available, having pressure capabilities to 150 PSIG (10 BAR) @ 12 GPD (1.9 lph), and flow capacities to 240 GPD (37.9 lph) @ 80 PSIG (5.6 BAR), with a turndown ratio of 100:1. Metering performance is reproducible to within ± 2% of maximum capacity.

Features

- Automatic Control, available with 4-20mADC direct or external pacing, with stop function.
- Manual Control by on-line adjustable stroke rate and stroke length.
- Auto-Off-Manual switch.
- Highly Reliable timing circuit.
- Circuit Protection against voltage and current upsets.
- Panel Mounted Fuse.
- Solenoid Protection by thermal overload with auto-reset.
- Water Resistant, for outdoor and indoor applications.
- Indicator Lights, panel mounted.
- Guided Ball Check Valve Systems, to reduce back flow and enhance outstanding priming characteristics.
- Viscosities to 20,000 CPS.

Controls

Manual Stroke Rate

- Turn-Down Ratio 10:1

Manual Stroke Length

- Turn-Down Ratio 10:1

4-20mA or 20-4mA Input

- Automatic Control

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 HV

Specifications and Model Selection

MODEL		LVB3	LVF4	LVG4	LVG5	LVH7
Capacity	GPH	0.50	1.00	2.00	4.00	10.00
nominal	GPD	12	24	48	96	240
(max.)	LPH	1.9	3.8	7.6	15.1	37.9
Pressure	PSIG	150	150	110	110	80
(max.)	BAR	10	10	7	7	5.6
Connections:	Tubing	(S) .50" I.D. X .75" O.D. .38" I.D. X .50" OD (LVB3 & F4 only) (S & D) .50" I.D. X .75" O.D. (LVG4,G5 & H7 only)				

Engineering Data

Pump Head Materials Available: GFPPL, PVC, PVDF, 316 SS

Diaphragm: PTFE-faced CSPE-backed

Check Valves Materials Available:

Seats/O-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: +/- 2% at maximum capacity

Viscosity Max CPS: 20,000 CPS

Stroke Frequency Max SPM: 125

Stroke Frequency Turn-Down Ratio: 10:1

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: 1.0 Amps

@ 230 VAC; Amps: 0.5 Amps @ 230 VAC

Peak Input Power: 300 Watts

Average Input Power @ Max SPM: 130 Watts

Custom Engineered Designs – Pre-Engineered Systems

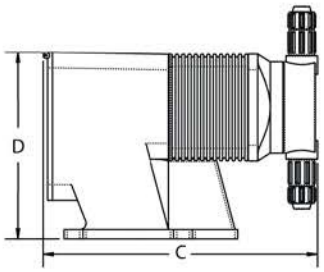
Pre-Engineered Systems

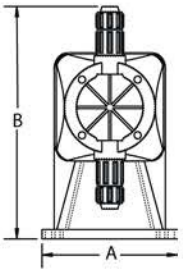
Pulsafeeder's Pre-Engineered Systems are designed to provide complete chemical feed solutions for all electronic metering applications. From stand alone simplex pH control applications to full-featured, redundant sodium hypochlorite disinfection metering, these rugged fabricated assemblies offer turn-key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

Dimensions

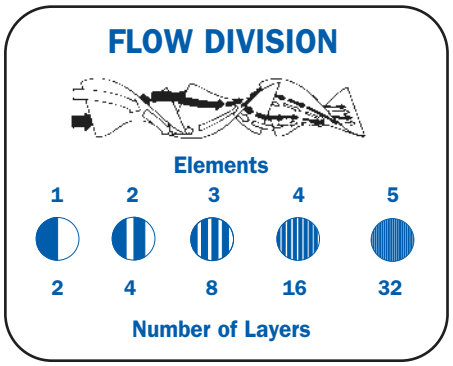
Series HV Dimensions (inches)					
Model No.	A	B	C	D	Shipping Weight
LVB3	5.4	9.3	9.5	7.5	13
LVF4	5.4	10.8	10.8	7.5	18
LVG4	5.4	9.5	10.6	7.5	18
LVG5	5.4	10.8	10.8	7.5	18
LVH7	6.1	11.5	11	8.2	25

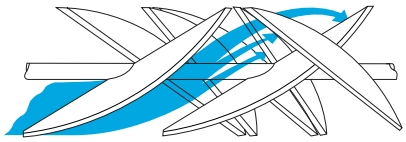
NOTE: Inches X 2.54 = cm

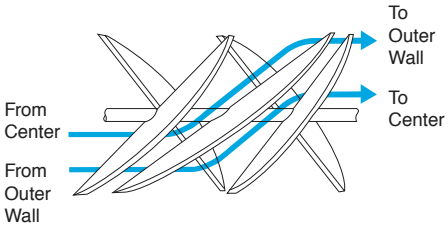


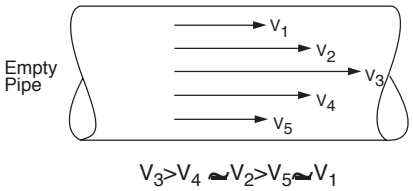


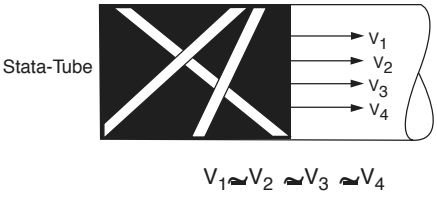
Principles of Operation









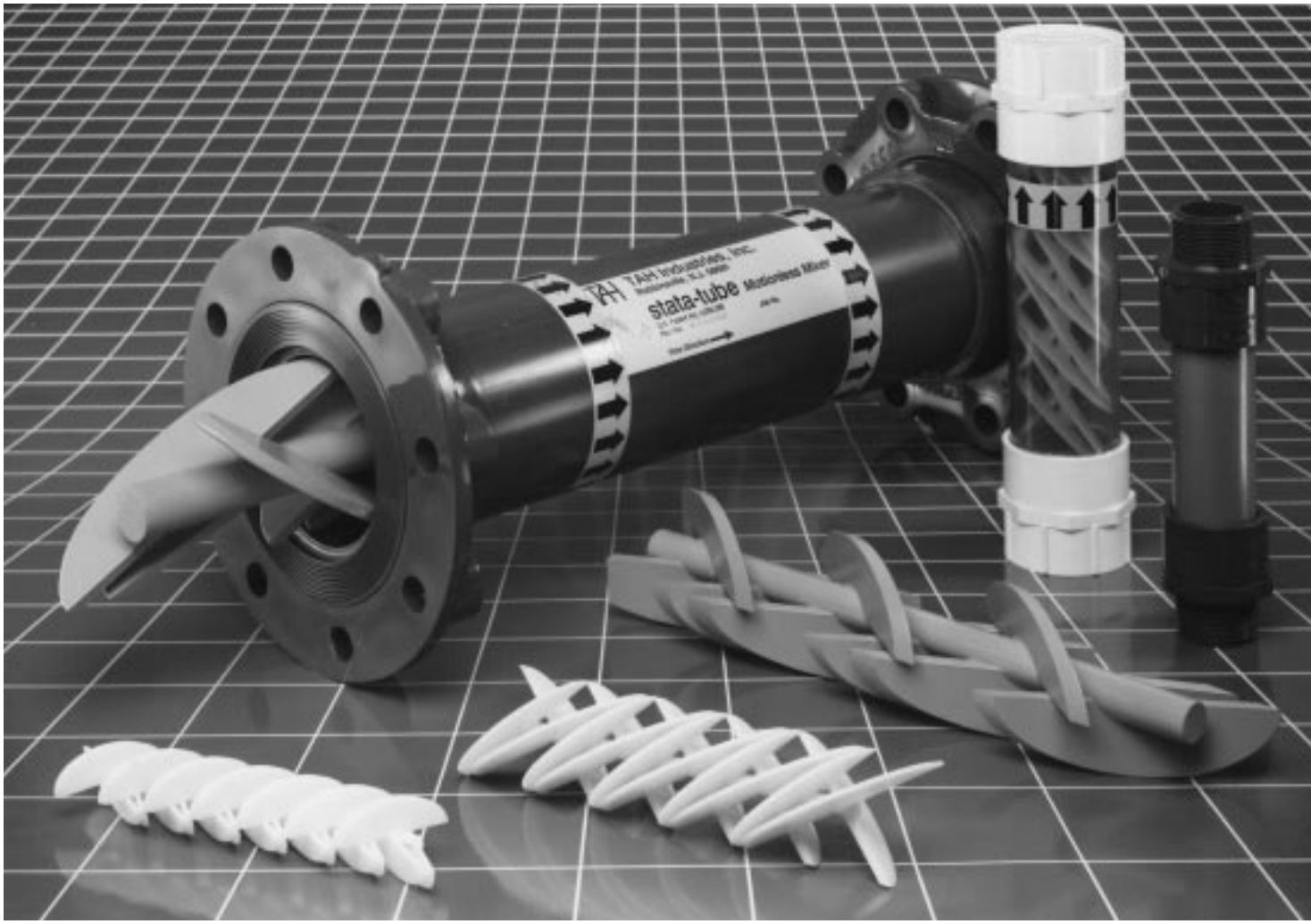


$$Blending = f\left\{\text{Re}, \mu, \frac{\mu_1}{\mu_2}, \frac{p_1}{p_2}, \frac{V_1}{V_2}, v, n, \frac{L}{D}, Inj\right\}$$

Where Re = Reynolds Number
μ = Absolute viscosity
μ_1/μ_2 = Viscosity ration of unmixed streams
p_1/p_2 = Density ratio of unmixed streams
V_1/v_2 = Volumetric ratio of unmixed streams
v = Shear rate
n = Number of elements
L/D = Element length to diameter ratio
Inj = Injection method of additive stream

Reynolds No	Spiral Mixer No Elements	Flow Characteristics
<10	18	Laminar (creeping flow)
10 to 100	12	Laminar through Transitional
100 to 1000	6	Transitional
1000 to 5000	4	Turbulent
>5000	2	Turbulent

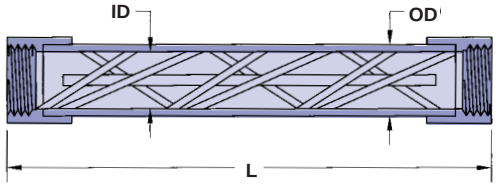
50 SERIES
Stata-tube™ PVC Mixer



The Series 50 Stata-tube™ is an effective answer to your mixing requirements. Operating in-line, with ***no moving parts****, this mixer blends and disperses treatment chemicals into waste water streams. Compared to competitive mixers, its unique baffling design ensures complete mixing in a shorter length and lower pressure drop.*

The Series 50 are easily installed in new or existing process lines. They are available in pipe sizes from 3/8" to 18" diameter. Construction materials include PVC, CPVC and Polypropylene.

PIPE MIXERS 3/8" through 2"



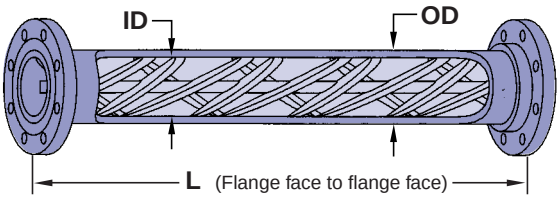
Elements: **Polypropylene, Non Removable**

Housing: PVC Type 1 (white or gray)

Clear PVC Housing **is available, contact factory.**
CPVC also Available.

PART NUMBER	NUMBER OF STAGES	ID INCH	OD INCH	END FNPT INCH	L INCH	PRESSURE LIMITATION psi @ 75°F	PIPE SCHEDULE
050-031F	7	0.43	0.675	3/8	5.7	850	80
050-032F	14	0.43	0.675	3/8	7.0	850	
050-061	7	0.69	1.050	3/4	7.0	690	80
050-062	14	0.69	1.050	3/4	10.5	690	
050-081	7	0.91	1.315	1	8.2	630	80
050-082	14	0.91	1.315	1	12.6	630	
050-121	7	1.38	1.660	1 1/4	10.3	370	40
050-122	14	1.38	1.660	1 1/4	17.5	370	
050-161	5	2.05	2.375	2	11.3	280	40
050-162	10	2.05	2.375	2	19.3	280	

PROCESS MIXERS 3" through 12"



Elements: PVC or CPVC Type 1, **Removable**

Housing: PVC, Type 1

Flanges: FFSO, Van Stone ASA #150 Drilling

Side Ports: Available upon request

Consult factory for Process Mixers greater than 12"

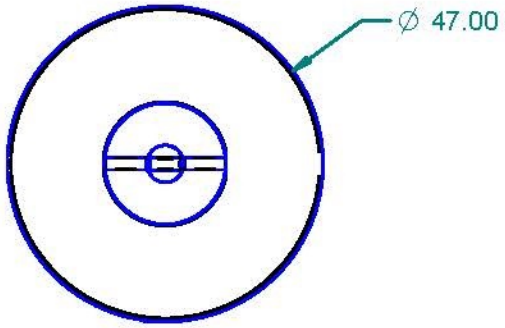
PART NUMBER	STATIC MIXER		HOUSING				
	Number of Stages	Material	Pipe	ID Inch	L Inch	Weight lbs.	Material
T-3-G57-H31	3	CPVC	3" Sch 80	2.90	17	9	PVC
T-3-G57-H61	6	CPVC	3" Sch 80	2.90	30	16	PVC
T-3-H57-H31	3	CPVC	3" Sch 80	2.90	17	9	CPVC
T-3-H57-H61	6	CPVC	3" Sch 80	2.90	30	16	CPVC
T-4-G57-H31	3	CPVC	4" Sch 80	3.83	20	16	PVC
T-4-G57-H61	6	CPVC	4" Sch 80	3.83	35	22	PVC
T-4-H57-H31	3	CPVC	4" Sch 80	3.83	20	16	CPVC
T-4-H57-H61	6	CPVC	4" Sch 80	3.83	35	22	CPVC
T-6-G57-H31	3	CPVC	6" Sch 80	5.76	28	33	PVC
T-6-G57-H61	6	CPVC	6" Sch 80	5.76	51	50	PVC
T-6-H57-H31	3	CPVC	6" Sch 80	5.76	28	33	CPVC
T-6-H57-H61	6	CPVC	6" Sch 80	5.76	51	50	CPVC
T-8-G57-G31	3	PVC	8" Sch 80	7.63	33	55	PVC
T-8-G57-G61	6	PVC	8" Sch 80	7.63	59	90	PVC
T-10-G57-G31	3	PVC	10" Sch 80	9.56	40	88	PVC
T-10-G57-G61	6	PVC	10" Sch 80	9.56	72	130	PVC
T-12-G57-G31	3	PVC	12" Sch 80	11.38	50	140	PVC
T-12-G57-G61	6	PVC	12" Sch 80	11.38	88.5	200	PVC

TAH Industries, Inc.
8 Applegate Drive
Robbinsville, NJ 08691
USA
Toll Free: 800-257-5238
Tel: 609-259-9222
Fax: 609-259-0957
Website: www.tah.com

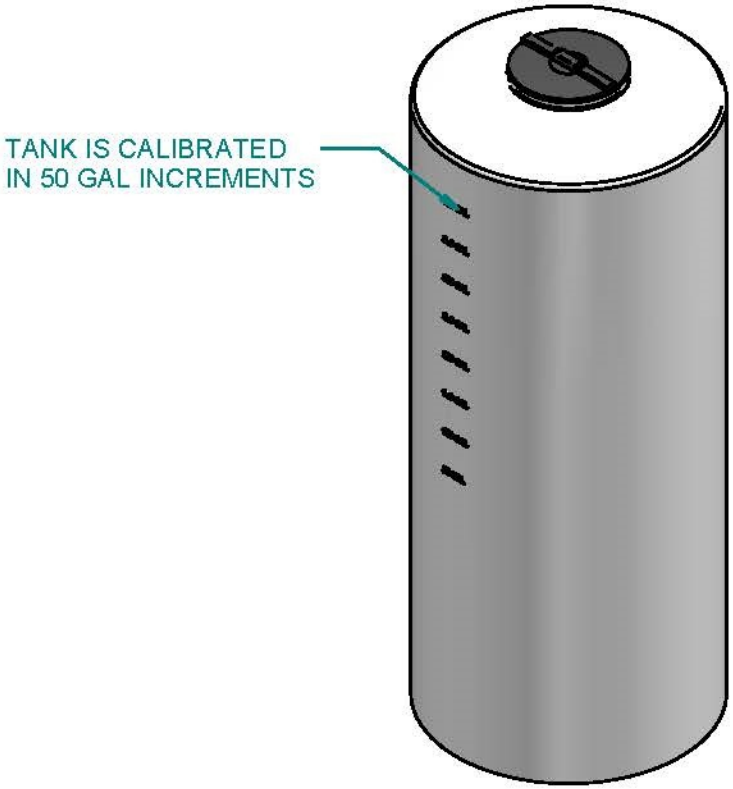
TAH Europe, Inc.
2 Francis Court
Wellingborough Road
Rushden, Northamptonshire NN10 6AY
Great Britain
Tel: 44 (0) 1933 413233
Fax: 44 (0) 1933 413194
Website: www.tah.com

Distributed By:

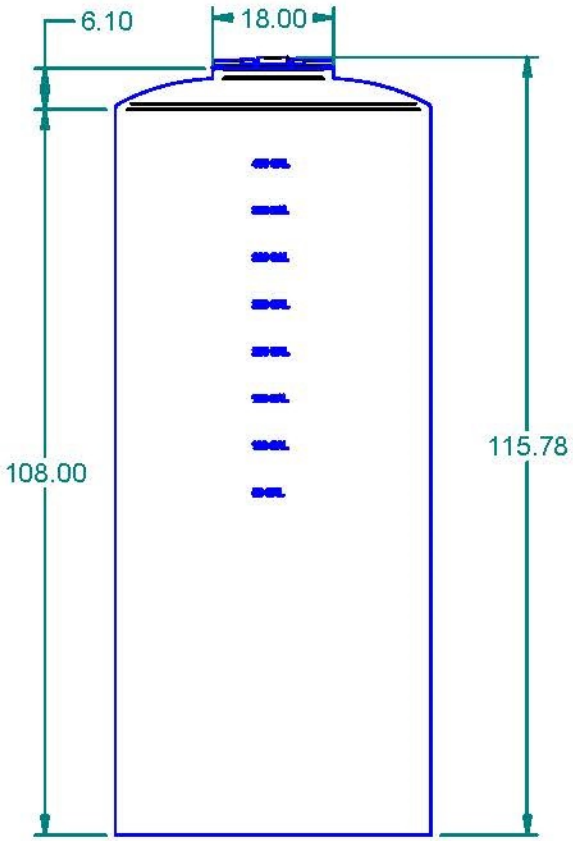
REVISION HISTORY			
REV	DESCRIPTION	DATE	APPROVED



Top View



ISO View



Side View

wall thickness: 0.350"

	NAME	DATE
DRAWN		
CHECKED		
ENG APPR		
MGR APPR		

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
ANGLES ±0.5°
2 PL ±0.125" 3 PL ±0.060"

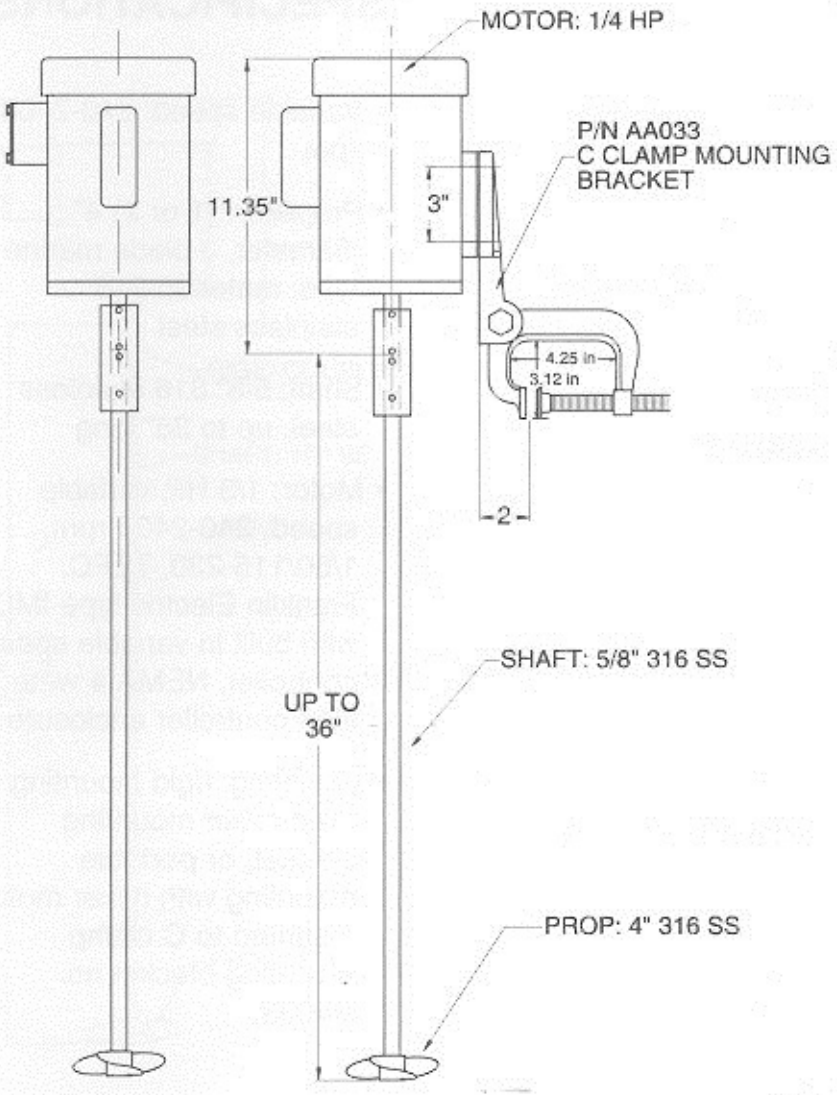
TITLE V-800 Gallon Tank

SIZE	MATERIAL: Error: No reference	REV
A		

FILE NAME: V-800 Vertical.dft

PART#: 900800	WEIGHT: Error: No reference	SHEET 1 OF 1

MIXER MODEL NO. AA102A



AA102A

SPECIFICATIONS

- Speed: 1,725 rpm
- Propeller: (1 or 2) 4" diameter, 3 blade marine type, material: 316 stainless steel
- Shaft: 5/8" 316 stainless steel, up to 36" long
- Motor: 1/4 HP, 1,725 rpm, 1/60/115-230, capacitor start, or 3/60/230-460, TEFC
- Mounting: rigid mounting to fixed mixer mounting bracket, or portable mounting with mixer motor mounted to C clamp mounting bracket no. AA033.

SAFETY DATA SHEET

Revision date 2018-06-11 **Revision number** 2

1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND OF THE COMPANY/UNDERTAKING

Product identifier

Product name Redux E50

Other means of identification

Product code
Synonyms Water And Wastewater Treatment Coagulant/Flocculant

Recommended use of the chemical and restrictions on use

Recommended use [RU] No information available
Uses advised against No information available

Details of the supplier of the safety data sheet

Supplier

Lockwood Remediation Technologies, LLC
89 Crawford Street
Leominster, Massachusetts 01453
Tel: (774) 450-7177
Hours: Monday-Friday 9:00-5:00 EST

Emergency telephone number

24 Hour Emergency Phone Number CHEMTREC: (800) 424-9300
Outside USA - +1 (703) 527-3887 collect calls accepted

Contact Point info@reduxtech.com

2. HAZARDS IDENTIFICATION

Classification

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

Skin corrosion/irritation	Category 2
Serious eye damage/eye irritation	Category 2
Corrosive to metals	Category 1

GHS Label elements, including precautionary statements

EMERGENCY OVERVIEW

Physical state	Color	Appearance	Odor
liquid	colorless to yellow	clear	no appreciable odor

WARNING

Hazard statements
Causes skin irritation
Causes serious eye irritation
May be corrosive to metals

Precautionary Statements - Prevention
Wash face, hands and any exposed skin thoroughly after handling
Wear protective gloves/protective clothing/eye protection/face protection
Keep only in original container

Precautionary Statements - Response
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
If eye irritation persists: Get medical advice/attention
IF ON SKIN: Wash with plenty of soap and water
If skin irritation occurs: Get medical advice/attention
Take off contaminated clothing and wash before reuse
Absorb spillage to prevent material damage

Precautionary Statements - Storage
Store in corrosive resistant container with a resistant inner liner

Other information
• May be harmful in contact with skin

3. COMPOSITION/INFORMATION ON INGREDIENTS

Component	CAS-No	weight-%	TRADE SECRET
Trade Secret Ingredient	PROPRIETARY	45 - 55%	*

*The exact percentage (concentration) of composition has been withheld as a trade secret

4. FIRST AID MEASURES

First Aid Measures

Eye contact
Immediately flush with plenty of water for at least 20 minutes, holding eyelids apart to ensure flushing of the entire surface. Washing within one minute is essential to achieve maximum effectiveness. Seek immediate medical attention.

Skin contact
Immediately wash thoroughly with soap and water, remove contaminated clothing and footwear. Wash clothing before reuse. Get medical attention if irritation should develop.

Ingestion
Seek medical attention immediately. Give large amounts of water to drink. If vomiting should occur spontaneously, keep airway clear. Never give anything by mouth to an unconscious person.

Inhalation
Remove to fresh air.

Most important symptoms and effects, both acute and delayed

Acute effects
Possible eye, skin and respiratory tract irritation.

Chronic effects
May aggravate existing skin, eye, and lung conditions. Persons with kidney disorders have an increased risk from exposure based on general information found on aluminum salts.

Indication of any immediate medical attention and special treatment needed

Note to physicians
Aluminum soluble salts may cause gastroenteritis if ingested. Treatment includes the use of demulcents. Note: Consideration should be given to the possibility that overexposure to materials other than this product may have occurred.

5. FIRE-FIGHTING MEASURES

Extinguishing media

Suitable extinguishing media
Water Spray, Carbon Dioxide, Foam, Dry Chemical.

Extinguishing media which must not be used for safety reasons
No information available

Special hazards arising from the substance or mixture

Special Hazard
May produce hazardous fumes or hazardous decomposition products.

Advice for firefighters

Firefighting measures
Product is a water solution and nonflammable. In a fire, this product may build up pressure and rupture a sealed container; cool exposed containers with water spray. Use self-contained breathing apparatus in confined areas; avoid breathing mist or spray.

Special protective equipment for firefighters
Not determined

Explosion data

Sensitivity to Mechanical Impact
None.

Sensitivity to Static Discharge
None.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures

Personal precautions
Wear suitable protective clothing and gloves.

Environmental precautions

Environmental precautions
Do not permit run-off to get into sewers or surface waterways.

Methods and material for containment and cleaning up

Methods for containment
Prevent further leakage or spillage if safe to do so. Dike to collect large liquid spills.

Methods for cleaning up
Clear spills immediately. Contain large spill and remove using a vacuum truck. Soak up small spills with inert absorbent material and place in a labeled waste container for disposal. Ventilate area of leak or spill. Spills of solution are extremely slippery so all residue must be removed promptly.

7. HANDLING AND STORAGE

Precautions for safe handling

Advice on safe handling
Keep container closed when not in use
Keep away from heat and open flame.
Avoid contact with eyes, skin and clothing
Wash thoroughly after handling
Wear chemical splash goggles, gloves, and protective clothing when handling.
Avoid breathing vapor or mist
Use with adequate ventilation and employ respiratory protection where mist or spray may be generated.
FOR INDUSTRIAL USE ONLY.

Conditions for safe storage, including any incompatibilities

Technical measures and storage conditions
Do not store in unlined metal containers.
Product may slowly corrode iron, brass, copper, aluminum, mild steel, and stainless steel.
Store in a cool, dry place away from direct heat.
Keep in tightly closed container.

Incompatible products
Oxidizing agents.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Control parameters

Exposure Guidelines
This product, as supplied, does not contain any hazardous materials with occupational exposure limits established by the region specific regulatory bodies

Appropriate engineering controls

Engineering controls
Local exhaust ventilation as necessary to maintain exposures to within applicable limits. Please refer to the ACGIH document, "Industrial Ventilation, A Manual of Recommended Practices", most recent edition, for details. If there are no applicable or established exposure limit requirements or guidelines, general ventilation should be sufficient.

Individual protection measures, such as personal protective equipment

Eye/face Protection
Wear chemical splash goggles and face shield (when eye and face contact is possible due to splashing or spraying of material).

Hand Protection
Appropriate chemical resistant gloves should be worn.

Skin and body protection
Standard work clothing and work shoes.

Respiratory protection
If exposures exceed the PEL or TLV, use NIOSH/MSHA approved respirator in accordance with OSHA Respiratory Protection Requirements under 29 CFR 1910.134.

Other personal protection data
Eyewash fountains and safety showers must be easily accessible.

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

9. PHYSICAL AND CHEMICAL PROPERTIES

Information on basic physical and chemical properties

Physical state	liquid
Color	colorless to yellow
Appearance	clear
Odor	no appreciable odor
Odor threshold	No information available

Property	Values	Remarks / Method
pH	3.5	as is
Melting / freezing point	-7 °C / 19 °F	No information available
Boiling point / boiling range	No information available	No information available
Flash point	Not applicable	No information available
Evaporation rate	No information available	No information available

Flammability (solid, gas)	Not applicable	No information available
Flammability Limit in Air		
Upper flammability limit	Not applicable	No information available
Lower flammability limit	Not applicable	No information available
Vapor pressure	No information available	No information available
Vapor density	No information available	No information available
Specific gravity	1.33 - 1.35	No information available
Solubility (water)	Soluble	No information available
Solubility in other solvents	No information available	No information available
Partition coefficient: n-octanol/water	No information available	No information available
Autoignition temperature	Not applicable	No information available
Decomposition temperature	No information available	No information available
Kinematic viscosity	No information available	No information available
Dynamic viscosity	< 100 cps @ 20 °C	No information available

Other information

Density	11.0 - 11.3 lb/gal
Bulk Density	No information available
Explosive properties	No information available.
Oxidizing properties	No information available
Softening point	No information available
Molecular weight	No information available
Volatile organic compounds (VOCs) content	No information available
Percent Volatile, wt.%	40 - 50%

10. STABILITY AND REACTIVITY

Reactivity

Reactivity
No data available.

Chemical stability

Chemical stability
Stable.

Possibility of hazardous reactions

Possibility of hazardous reactions
None under normal processing.

Hazardous polymerization
No.

Conditions to avoid

Conditions to avoid
None

Incompatible materials

Materials to avoid
Oxidizing agents.

Hazardous decomposition products

Hazardous decomposition products
Thermal decomposition may release toxic and/or hazardous gases such as Cl_2 and HCl.

11. TOXICOLOGICAL INFORMATION

Information on likely routes of exposure

Eye contact
May cause moderate eye irritation that can become severe with prolonged contact. Prolonged exposure to Aluminum salts may cause conjunctivitis.

Skin contact
May be harmful in contact with skin. Prolonged and/or repeated contact may cause skin irritation.

Ingestion
May cause irritation of the mouth, throat and stomach. Ingestion may cause gastrointestinal irritation, nausea, vomiting and diarrhea.

Inhalation
Inhalation of mist or vapor may cause respiratory tract irritation.

Acute toxicity - Product Information

Oral LD50 No information available

Dermal LD50 No information available

Inhalation LC50 No information available

Acute toxicity - Component Information

Component	weight-%	Oral LD50	Dermal LD50	Inhalation LC50
Trade Secret Ingredient	45 - 55%	= 9187 mg/kg (Rat)	> 2000 mg/kg (Rat)	--

Information on toxicological effects

Symptoms
No information available.

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

Skin corrosion/irritation
Irritating to skin

Serious eye damage/eye irritation
Causes serious eye irritation

Sensitization
No information available

Germ cell mutagenicity
No information available

Carcinogenicity
This product does not contain any components in concentrations greater than or equal to 0.1% that are listed as known or suspected carcinogens by NTP, IARC, ACGIH, or OSHA.

Reproductive toxicity
No information available

Specific target organ toxicity - Single exposure
No information available.

Specific target organ toxicity - Repeated exposure
No information available

Aspiration hazard
No information available.

Numerical measures of toxicity - Product Information

The following values are calculated based on chapter 3.1 of the GHS document

ATEmix (oral)	18374 mg/kg
ATEmix (dermal)	4004 mg/kg

Other information
Conclusions are drawn from sources other than direct testing.

12. ECOLOGICAL INFORMATION

Ecotoxicity

Aquatic toxicity - Product Information

Fish	LC 50 (96 hour, static) 776.4 mg/L *Pimephales promelas* (Fathead Minnow) [1] EC 50 (96 hour, static) 265.5 mg/L *Pimephales promelas* (Fathead Minnow) [1]
Crustacea	LC 50 (48 hour, static) 803.8 mg/L *Ceriodaphnia dubia* (Water Flea) [1] NOEC (7 day chronic, static) 200 mg/L *Ceriodaphnia dubia* (Water Flea) [1]
Algae/aquatic plants	No information available

Acute aquatic toxicity - Component Information

Component	weight-%	Algae/aquatic plants	Fish	Toxicity to daphnia and other aquatic invertebrates
Trade Secret Ingredient	45 - 55%	--	LC50 (96 h static) 100 - 500 mg/L (Brachydanio rerio)	--

Persistence and degradability

Persistence and degradability
No information available

Bioaccumulative potential

Bioaccumulative potential
No information available.

Mobility

Mobility
No information available

Results of PBT and vPvB assessment

PBT and vPvB assessment
No information available

Other adverse effects

Other information
[1] Generated from tests conducted by ECT-Superior Laboratories May 2010

13. DISPOSAL CONSIDERATIONS

Waste treatment methods

Disposal of wastes
Do NOT mix with other chemical wastes. Do not put solutions containing this product into sewer systems. Dispose of product in an approved chemical waste landfill or incinerate in accordance with applicable Federal, state and local regulations. Do not re-use empty containers.

Contaminated packaging
Since empty containers retain product residue, follow label warnings even after container is emptied.

14. TRANSPORT INFORMATION

DOT

NOT REGULATED FOR TRANSPORTATION
This product is excepted from DOT regulations under 49 CFR 173.154(d) when shipped by road or railway. The product exception is referenced in 49 CFR 172.101 Table. Packaging material must not be aluminum, steel or be degraded by this product

ICAO/IATA

Regulated

UN number	UN3264
Proper shipping name	Corrosive Liquid, Acidic, Inorganic, N.O.S. (Polyaluminum Chloride Solution)
Hazard class	8
Packing group	III
ERG Code	8L

IMDG

Regulated

UN number	UN3264
Proper shipping name	Corrosive Liquid, Acidic, Inorganic, N.O.S. (Polyaluminum Chloride Solution)
Hazard class	8
Packing group	III
EmS	F-A, S-B

Harmonized Tariff Number 2827.32

15. REGULATORY INFORMATION

International Inventories

TSCA (United States)
All ingredients are on the inventory or exempt from listing

Australia (AICS)
All ingredients are on the inventory or exempt from listing

Canada (DSL)
All ingredients are on the inventory or exempt from listing

Canada (NDSL)
None of the ingredients are on the inventory.

China (IECSC)
All ingredients are on the inventory or exempt from listing

EINECS (European Inventory of Existing Chemical Substances)
All ingredients are on the inventory or exempt from listing

ELINCS (European List of Notified Chemical Substances)
None of the ingredients are on the inventory.

ENCS (Japan)
All ingredients are on the inventory or exempt from listing

South Korea (KECL)
All ingredients are on the inventory or exempt from listing

Philippines (PICCS)
All ingredients are on the inventory or exempt from listing

Legend

TSCA - United States Toxic Substances Control Act Section 8(b) Inventory
AICS - Australian Inventory of Chemical Substances
DSL/NDSL - Canadian Domestic Substances List/Non-Domestic Substances List
IECSC - China Inventory of Existing Chemical Substances
EINECS/ELINCS - European Inventory of Existing Commercial Chemical Substances/EU List of Notified Chemical Substances
ENCS - Japan Existing and New Chemical Substances
KECL - Korean Existing and Evaluated Chemical Substances
PICCS - Philippines Inventory of Chemicals and Chemical Substances

U.S. Federal Regulations

CERCLA
This material, as supplied, does not contain any substances regulated as hazardous substances under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302) or the Superfund Amendments and Reauthorization Act (SARA) (40 CFR 355). There may be specific reporting requirements at the local, regional, or state level pertaining to releases of this material.

CWA (Clean Water Act)
This product does not contain any substances regulated as pollutants pursuant to the Clean Water Act (40 CFR 122.21 and 40 CFR 122.42).

SARA 311/312 Hazard Categories

Acute health hazard	Yes
Chronic health hazard	No
Fire hazard	No
Sudden release of pressure hazard	No
Reactive hazard	No

SARA 313

Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). This product does not contain any chemicals which are subject to the reporting requirements of the Act and Title 40 of the Code of Federal Regulations, Part 372.

U.S. State Regulations

California Proposition 65

This product does not contain any Proposition 65 chemicals.

U.S. State Right-to-Know Regulations

This product does not contain any substances regulated under applicable state right-to-know regulations

16. OTHER INFORMATION

NFPA Rating	Health - 1	Flammability - 0	Instability - 0	Special Hazard -
HMIS Rating	Health - 1	Flammability - 0	Physical hazard - 0	Personal protection - B

Product code

Revision date 2015-03-12

Revision number 1

Disclaimer

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

End of Safety Data Sheet

SAFETY DATA SHEET

I. Chemical Product and Company Identification

Product Name: Nonionic / Anionic Polymer
Product #s: LRT- 800 Series Polymers

Distributor: Lockwood Remediation Technologies, LLC
89 Crawford Street
Leominster, Massachusetts 01453
Tel: 774-450-7177
Fax: 885-835-0617
Email: plockwood@lrt-llc.net

For Chemical Emergency - Spill, Leak, Fire, Exposure or Accident
Call **CHEMTEL** - Day or Night – 1800-255-3924

II. Composition and Ingredient Information

Components:	CAS #:
Anionic Polyacrylamide	25085-02-3
Permissible Exposure Limit (PEL):	No information available.
Threshold Limit Value (TLV):	Information not available.

III. Hazard Identification

Primary Routes of Exposure: Skin Contact - Eye Contact - Inhalation

Skin Contact: May cause irritation, especially after prolonged or repeated contact.

Eye Contact: Dust contact and solution may cause irritation.

Ingestion: May cause discomfort or gastrointestinal disturbance. Low oral toxicity.

Inhalation: Dust contact and solution may cause irritation.

Unusual Chronic Toxicity: None Known.

IV. First Aid Measures

Skin Contact: Flush with plenty of soap and water for at least 15 minutes. If irritation persists, get medical attention.

Eyes Contact: Immediately flush with water, continuing for 15 minutes. Immediately contact a physician for additional treatment.

Ingestion: If conscious, immediately give 2 to 4 glasses of water, and induce vomiting by touching finger to back of throat or giving syrup of Ipecac.

CAUTION: If unconscious, having breathing or in convulsions, do not induce vomiting or give water.

Inhalation: Remove to fresh air.

V. Fire-Fighting Measures

Flammability Classification: NFPA - Minimal - Will not burn under normal conditions.

Flash Point: Not flammable.

Flammable and Explosive Limits: UEL: ND LEL: ND

Hazardous Combustion Byproducts:

Thermal decomposition expected to produce carbon monoxide, carbon dioxide, and various nitrous oxides and some HCl vapors.

Extinguishing Media: Foam - Carbon Dioxide - Dry Chemical

AVOID USING WATER - MAY CAUSE EXTREMELY SLIPPERY CONDITIONS.

Special Fire-Fighting Procedures: Wear self-contained breathing apparatus.
Solutions of product are extremely slippery.

Unusual Fire and Explosion Hazards: Material and its solutions are extremely slippery.

VI. Accidental Release Measures

Procedures: Sweep up or shovel into metal or plastic container. Do not use water to clean area; product is very slippery when wet.

Waste Disposal: Incineration and/or disposal in a chemical landfill. Disposer must comply with Federal, State, and Local disposal or discharge laws.

VII. Handling and Storage Avoid contact with skin, eyes, or clothing.
Do not inhale mist if formed.
Use normal personal hygiene and housekeeping.
Store in a cool dry place.

VIII. Exposure Controls and Personal Protection

Eye Protection: Safety glasses for normal handling conditions.
Splash-proof goggles when handling solutions.
Do not wear contact lens.

Hand Protection: Rubber gloves.

Ventilation: Local exhaust - if dusting occurs. Natural ventilation adequate in absence of dust.

Respiratory Protection: If dusty conditions are encountered, wear NIOSH approved respirator.

Other Protection: Eye wash recommended, full work clothing, add protective rubber clothing if splashing or repeated contact with solution is likely.

IX. Physical and Chemical Properties

Appearance	White granular
State	Solid
Specific Gravity (Water = 1)	0.8 - 1.0
Solubility in Water	Complete

X. Stability and Reactivity

Stability: Product is stable as supplied.

Incompatibility: Oxidizing Agents may cause exothermic reaction.

Hazardous Decomposition or Byproducts:

Thermal decomposition expected to produce carbon oxides, and various nitrous oxides.

Hazardous Polymerization: Will not occur.

XI. Toxicological Information Not listed as a carcinogen by IARC, NTP, OSHA or ACGIH.

XII. Ecological Information

XIII. Disposal Considerations

Incineration and/or disposal in chemical landfill. Disposer must comply with federal, state, and local disposal or discharge laws.

RCRA Status of Unused Material if Discarded: Not a hazardous waste.

Hazardous Waste Number: N/A

XIV. Transport Information

Not DOT regulated. Not a RCRA hazardous waste.

Label Instructions: Signal Word: **"Caution! Products are extremely slippery! "**

XV. Regulatory Information

Reportable Quantity (EPA 40 CFR 302): N/A

Threshold Planning Quantity (EPA 40 CFR 355): N/A

Toxic Chemical Release Reporting (EPA 40 CFR 372): N/A

SARA TITLE 3: Section 311 Hazard Categorizations (40CFR 370): N/A

SARA TITLE 3: Section 313 Information (40CFR 372): N/A

Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) Information (40CFR 302.4) N/A

US TSCA: Product is manufactured in compliance with all provisions of the Toxic Substances Control Act, 15 U.S.C.

XVI. Other Information

		Scale
Health	0	4 = Severe
Flammability	1	3 = Serious
Reactivity	0	2 = Moderate
Personal Protection	**F**	1 = Slight
		0 = Insignificant

Personal Protective Equipment Guide

A = Safety Glasses

B = Safety Glasses, Gloves

C = Safety Glasses, Gloves, Apron

D = Gloves, Apron, Face shield

E = Safety Glasses, Gloves, and Dust Respirator

F = Safety Glasses, Gloves, Apron and Dust Respirator

G = Safety Glasses, Gloves, and Vapor Respirator

H = Splash Goggles, Gloves, Apron, Vapor Respirator

I = Safety Glasses, Gloves, and Dust & Vapor Respirator

J = Splash Goggles, Gloves, Apron, and Dust & Vapor Respirator

K = Air Line Hood/Mask, Gloves, Full Suit, Boots

X = Ask supervisor for special handling instructions

ABBREVIATIONS:

ACGIH - American Conference of Governmental Industrial Hygienists
OSHA - Occupational Safety and Health Administration
TLV - Threshold Limit Value
PEL - Permissible Exposure Limit
TWA - Time Weighted Average
STEL - Short-Term Exposure Limit
ANSI - American National Standard Institute
MSHA - Mine Safety and Health Administration
NIOSH - National Institute for Occupational Safety & Health
NA - Not Applicable
NE - Not Established
NR - Not Required
PPE - Personal Protective Equipment
LEL - Lower Exposure Level
UEL - Upper Exposure Level

ANALYTICAL REPORT

Lab Number:	L1632408
Client:	Vertex Environmental Services, Inc. One Congress Street 10th Floor Boston, MA 02114
ATTN:	Jesse Freeman
Phone:	(781) 952-6000
Project Name:	NORTHPOINT
Project Number:	35663
Report Date:	10/19/16

Certifications & Approvals: MA (M-MA086), NY (11148), CT (PH-0574), NH (2003), NJ NELAP (MA935), RI (LAO00065), ME (MA00086), PA (68-03671), VA (460195), MD (348), IL (200077), NC (666), TX (T104704476), DOD (L2217), USDA (Permit #P-330-11-00240).

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

Project Name: NORTHPOINT
Project Number: 35663

Lab Number: L1632408
Report Date: 10/19/16

Alpha Sample ID	Client ID	Matrix	Sample Location	Collection Date/Time	Receive Date
L1632408-01	VES-J/K-215 (MW)	WATER	CAMBRIDGE, MA	10/11/16 14:10	10/11/16
L1632408-02	TRIP BLANK	WATER	CAMBRIDGE, MA	10/07/16 00:00	10/11/16

Project Name: NORTHPOINT
Project Number: 35663

Lab Number: L1632408
Report Date: 10/19/16

Case Narrative

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

Results contained within this report relate only to the samples submitted under this Alpha Lab Number and meet NELAP requirements for all NELAP accredited parameters unless otherwise noted in the following narrative. The data presented in this report is organized by parameter (i.e. VOC, SVOC, etc.). Sample specific Quality Control data (i.e. Surrogate Spike Recovery) is reported at the end of the target analyte list for each individual sample, followed by the Laboratory Batch Quality Control at the end of each parameter. Tentatively Identified Compounds (TICs), if requested, are reported for compounds identified to be present and are not part of the method/program Target Compound List, even if only a subset of the TCL are being reported. If a sample was re-analyzed or re-extracted due to a required quality control corrective action and if both sets of data are reported, the Laboratory ID of the re-analysis or re-extraction is designated with an "R" or "RE", respectively. When multiple Batch Quality Control elements are reported (e.g. more than one LCS), the associated samples for each element are noted in the grey shaded header line of each data table. Any Laboratory Batch, Sample Specific % recovery or RPD value that is outside the listed Acceptance Criteria is bolded in the report. All specific QC information is also incorporated in the Data Usability format of our Data Merger tool where it can be reviewed along with any associated usability implications. Soil/sediments, solids and tissues are reported on a dry weight basis unless otherwise noted. Definitions of all data qualifiers and acronyms used in this report are provided in the Glossary located at the back of the report.

In reference to questions H (CAM) or 4 (RCP) when "NO" is checked, the performance criteria for CAM and RCP methods allow for some quality control failures to occur and still be within method compliance. In these instances the specific failure is not narrated but noted in the associated QC table. The information is also incorporated in the Data Usability format of our Data Merger tool where it can be reviewed along with any associated usability implications.

Please see the associated ADEx data file for a comparison of laboratory reporting limits that were achieved with the regulatory Numerical Standards requested on the Chain of Custody.

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

Please contact Client Services at 800-624-9220 with any questions.

Project Name: NORTHPOINT **Lab Number:** L1632408
Project Number: 35663 **Report Date:** 10/19/16

Case Narrative (continued)

Sample Receipt

A Trip Blank was received in the laboratory, but not listed on the Chain of Custody, and was not analyzed.

Microextractables

An LCS/LCSD was performed in lieu of a Matrix Spike due to insufficient sample volume available for analysis.

Semivolatile Organics

The WG941429-2 LCS recovery, associated with L1632408-01, is below the acceptance criteria for benzidine (6%); however, it has been identified as a "difficult" analyte. The results of the associated samples are reported.

Semivolatile Organics by SIM

The surrogate recoveries for the WG941420-3 LCSD, associated with L1632408-01, are outside the acceptance criteria for nitrobenzene-d5 (143%) and 2-fluorobiphenyl (130%). The LCSD spike compounds are within overall method allowances; therefore, no further action was taken.

Pesticides

The WG942194-3 MS recovery, performed on L1632408-01, is below the acceptance criteria for methoxychlor (0%) due to the concentration of this compound falling below the reported detection limit.

Cyanide, Total

WG941664: A Laboratory Duplicate was prepared with the sample batch, however, the native sample was not available for reporting; therefore, the laboratory duplicate results could not be reported.

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

Authorized Signature:  Lura L Troy

Title: Technical Director/Representative Date: 10/19/16

ORGANICS

VOLATILES

Project Name: NORTHPOINT
Lab Number: L1632408
Project Number: 35663
Report Date: 10/19/16

SAMPLE RESULTS

Lab ID: L1632408-01
Client ID: VES-J/K-215 (MW)
Sample Location: CAMBRIDGE, MA
Matrix: Water
Analytical Method: 14,504.1
Analytical Date: 10/17/16 17:40
Analyst: NS

Date Collected: 10/11/16 14:10
Date Received: 10/11/16
Field Prep: Not Specified
Extraction Method: EPA 8011
Extraction Date: 10/17/16 14:03

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

Project Name: NORTHPOINT
Project Number: 35663
Lab Number: L1632408
Report Date: 10/19/16

SAMPLE RESULTS

Lab ID: L1632408-01
Client ID: VES-J/K-215 (MW)
Sample Location: CAMBRIDGE, MA
Matrix: Water
Analytical Method: 5,624
Analytical Date: 10/12/16 14:10
Analyst: GT

Date Collected: 10/11/16 14:10
Date Received: 10/11/16
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by GC/MS - Westborough Lab						
2-Chloroethylvinyl ether	ND		ug/l	10	--	1
Acrolein[1]	ND		ug/l	8.0	--	1
Acrylonitrile[1]	ND		ug/l	10	--	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Pentafluorobenzene	103		80-120
Fluorobenzene	110		80-120
4-Bromofluorobenzene	92		80-120

Project Name: NORTHPOINT
Project Number: 35663

Lab Number: L1632408
Report Date: 10/19/16

Method Blank Analysis
Batch Quality Control

Analytical Method: 5,624
Analytical Date: 10/12/16 11:50
Analyst: GT

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by GC/MS - Westborough Lab for sample(s): 01 Batch: WG940591-18					
2-Chloroethylvinyl ether	ND		ug/l	10	--
Acrolein[1]	ND		ug/l	8.0	--
Acrylonitrile[1]	ND		ug/l	10	--

Surrogate	%Recovery	Qualifier	Acceptance Criteria
Pentafluorobenzene	103		80-120
Fluorobenzene	108		80-120
4-Bromofluorobenzene	89		80-120

Project Name: NORTHPOINT
Project Number: 35663

Lab Number: L1632408
Report Date: 10/19/16

Method Blank Analysis
Batch Quality Control

Analytical Method: 14,504.1
Analytical Date: 10/17/16 16:49
Analyst: NS

Extraction Method: EPA 8011
Extraction Date: 10/17/16 14:03

Parameter	Result	Qualifier	Units	RL	MDL	
Microextractables by GC - Westborough Lab for sample(s): 01 Batch: WG942842-1						
1,2-Dibromoethane	ND		ug/l	0.010	--	A

Lab Control Sample Analysis
Batch Quality Control

Project Name: NORTHPOINT
Project Number: 35663

Lab Number: L1632408
Report Date: 10/19/16

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by GC/MS - Westborough Lab Associated sample(s): 01 Batch: WG940591-17								
Methylene chloride	110		-		70-111	-		30
1,1-Dichloroethane	**120**	Q	-		78-116	-		30
Chloroform	**115**	Q	-		86-111	-		30
Carbon tetrachloride	100		-		60-112	-		30
1,2-Dichloropropane	**120**	Q	-		83-113	-		30
Dibromochloromethane	90		-		58-129	-		30
1,1,2-Trichloroethane	95		-		80-118	-		30
2-Chloroethylvinyl ether	90		-		69-124	-		30
Tetrachloroethene	95		-		80-126	-		30
Chlorobenzene	90		-		80-126	-		30
Trichlorofluoromethane	100		-		83-128	-		30
1,2-Dichloroethane	**115**	Q	-		82-110	-		30
1,1,1-Trichloroethane	**110**	Q	-		72-109	-		30
Bromodichloromethane	95		-		71-120	-		30
trans-1,3-Dichloropropene	95		-		73-106	-		30
cis-1,3-Dichloropropene	95		-		78-111	-		30
Bromoform	75		-		45-131	-		30
1,1,2,2-Tetrachloroethane	85		-		81-122	-		30
Benzene	115		-		84-116	-		30
Toluene	100		-		83-121	-		30
Ethylbenzene	90		-		84-123	-		30

Lab Control Sample Analysis
Batch Quality Control

Project Name: NORTHPOINT
Project Number: 35663

Lab Number: L1632408
Report Date: 10/19/16

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by GC/MS - Westborough Lab Associated sample(s): 01 Batch: WG940591-17								
Chloromethane	105		-		70-144	-		30
Bromomethane	90		-		63-141	-		30
Vinyl chloride	95		-		56-118	-		30
Chloroethane	110		-		74-130	-		30
1,1-Dichloroethene	105		-		77-116	-		30
trans-1,2-Dichloroethene	110		-		81-121	-		30
cis-1,2-Dichloroethene[1]	**115**	Q	-		85-110	-		30
Trichloroethene	110		-		84-118	-		30
1,2-Dichlorobenzene	80		-		78-128	-		30
1,3-Dichlorobenzene	80		-		77-125	-		30
1,4-Dichlorobenzene	80		-		77-125	-		30
p/m-Xylene[1]	92		-		81-121	-		30
o-Xylene[1]	95		-		81-124	-		30
Styrene[1]	90		-		84-133	-		30
Acetone[1]	124		-		40-160	-		30
Carbon disulfide[1]	110		-		54-134	-		30
2-Butanone[1]	**128**	Q	-		57-116	-		30
Vinyl acetate[1]	120		-		40-160	-		30
4-Methyl-2-pentanone[1]	104		-		79-125	-		30
2-Hexanone[1]	110		-		78-120	-		30
Acrolein[1]	115		-		40-160	-		30

Lab Control Sample Analysis

Batch Quality Control

Project Name: NORTHPOINT

Project Number: 35663

Lab Number: L1632408

Report Date: 10/19/16

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by GC/MS - Westborough Lab Associated sample(s): 01 Batch: WG940591-17								
Acrylonitrile[1]	122		-		66-123	-		30
Methyl tert butyl ether[1]	105		-		57-126	-		30
Dibromomethane[1]	115		-		65-126	-		30
tert-Butyl Alcohol[1]	**120**	Q	-		52-114	-		30
Tertiary-Amyl Methyl Ether[1]	110		-		66-111	-		30

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
Pentafluorobenzene	106				80-120
Fluorobenzene	111				80-120
4-Bromofluorobenzene	93				80-120

Lab Control Sample Analysis

Batch Quality Control

Project Name: NORTHPOINT

Project Number: 35663

Lab Number: L1632408

Report Date: 10/19/16

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits	Column
Microextractables by GC - Westborough Lab Associated sample(s): 01 Batch: WG942842-2 WG942842-3									
1,2-Dibromoethane	105		109		70-130	4		20	A
1,2-Dibromo-3-chloropropane	106		108		70-130	2		20	A

Matrix Spike Analysis
Batch Quality Control

Project Name: NORTHPOINT
Project Number: 35663

Lab Number: L1632408
Report Date: 10/19/16

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by GC/MS - Westborough Lab Associated sample(s): 01 QC Batch ID: WG940591-6 QC Sample: L1631582-01 Client ID: MS Sample												
Methylene chloride	ND	200	240	**120**	Q	-	-		70-111	-		30
1,1-Dichloroethane	ND	200	260	**130**	Q	-	-		78-116	-		30
Chloroform	ND	200	260	**130**	Q	-	-		86-111	-		30
Carbon tetrachloride	ND	200	240	**120**	Q	-	-		60-112	-		30
1,2-Dichloropropane	ND	200	260	**130**	Q	-	-		83-113	-		30
Dibromochloromethane	ND	200	180	90		-	-		58-129	-		30
1,1,2-Trichloroethane	ND	200	190	95		-	-		80-118	-		30
2-Chloroethylvinyl ether	ND	200	160	80		-	-		69-124	-		30
Tetrachloroethene	ND	200	220	110		-	-		80-126	-		30
Chlorobenzene	ND	200	220	110		-	-		80-126	-		30
Trichlorofluoromethane	ND	200	240	120		-	-		83-128	-		30
1,2-Dichloroethane	ND	200	240	**120**	Q	-	-		82-110	-		30
1,1,1-Trichloroethane	ND	200	240	**120**	Q	-	-		72-109	-		30
Bromodichloromethane	ND	200	200	100		-	-		71-120	-		30
trans-1,3-Dichloropropene	ND	200	190	95		-	-		73-106	-		30
cis-1,3-Dichloropropene	ND	200	200	100		-	-		78-111	-		30
Bromoform	ND	200	150	75		-	-		45-131	-		30
1,1,2,2-Tetrachloroethane	ND	200	170	85		-	-		81-122	-		30
Benzene	ND	200	260	**130**	Q	-	-		84-116	-		30
Toluene	ND	200	220	110		-	-		83-121	-		30
Ethylbenzene	ND	200	230	115		-	-		84-123	-		30

Matrix Spike Analysis
Batch Quality Control

Project Name: NORTHPOINT
Project Number: 35663

Lab Number: L1632408
Report Date: 10/19/16

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by GC/MS - Westborough Lab Associated sample(s): 01 QC Batch ID: WG940591-6 QC Sample: L1631582-01 Client ID: MS Sample												
Chloromethane	ND	200	240	120		-	-		70-144	-		30
Bromomethane	ND	200	190	95		-	-		63-141	-		30
Vinyl chloride	ND	200	240	**120**	Q	-	-		56-118	-		30
Chloroethane	ND	200	250	125		-	-		74-130	-		30
1,1-Dichloroethene	ND	200	240	**120**	Q	-	-		77-116	-		30
trans-1,2-Dichloroethene	ND	200	250	**125**	Q	-	-		81-121	-		30
cis-1,2-Dichloroethene[1]	ND	200	250	**125**	Q	-	-		85-110	-		30
Trichloroethene	ND	200	250	**125**	Q	-	-		84-118	-		30
1,2-Dichlorobenzene	ND	200	180	90		-	-		78-128	-		30
1,3-Dichlorobenzene	ND	200	200	100		-	-		77-125	-		30
1,4-Dichlorobenzene	ND	200	190	95		-	-		77-125	-		30
p/m-Xylene[1]	ND	400	450	113		-	-		81-121	-		30
o-Xylene[1]	ND	200	220	110		-	-		81-124	-		30
Styrene[1]	ND	200	220	110		-	-		84-133	-		30
Acetone[1]	220	500	740	104		-	-		40-160	-		30
Carbon disulfide[1]	ND	200	240	120		-	-		54-134	-		30
2-Butanone[1]	ND	500	550	110		-	-		57-116	-		30
Vinyl acetate[1]	ND	400	450	113		-	-		40-160	-		30
4-Methyl-2-pentanone[1]	ND	500	460	92		-	-		79-125	-		30
2-Hexanone[1]	ND	500	500	100		-	-		78-120	-		30
Acrolein[1]	ND	400	340	85		-	-		40-160	-		30

Matrix Spike Analysis
Batch Quality Control

Project Name: NORTHPOINT
Project Number: 35663

Lab Number: L1632408
Report Date: 10/19/16

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by GC/MS - Westborough Lab Associated sample(s): 01 QC Batch ID: WG940591-6 QC Sample: L1631582-01 Client ID: MS Sample												
Acrylonitrile[1]	ND	400	410	103		-	-		66-123	-		30
Dibromomethane[1]	ND	200	220	110		-	-		65-126	-		30

Surrogate	MS % Recovery	MS Qualifier	MSD % Recovery	MSD Qualifier	Acceptance Criteria
4-Bromofluorobenzene	103				80-120
Fluorobenzene	113				80-120
Pentafluorobenzene	106				80-120

Lab Duplicate Analysis
Batch Quality Control

Project Name: NORTHPOINT
Project Number: 35663

Lab Number: L1632408
Report Date: 10/19/16

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
Volatile Organics by GC/MS - Westborough Lab Associated sample(s): 01 QC Batch ID: WG940591-5 QC Sample: L1631582-01 Client ID: DUP Sample						
Methylene chloride	ND	ND	ug/l	NC		30
1,1-Dichloroethane	ND	ND	ug/l	NC		30
Chloroform	ND	ND	ug/l	NC		30
Carbon tetrachloride	ND	ND	ug/l	NC		30
1,2-Dichloropropane	ND	ND	ug/l	NC		30
Dibromochloromethane	ND	ND	ug/l	NC		30
1,1,2-Trichloroethane	ND	ND	ug/l	NC		30
2-Chloroethylvinyl ether	ND	ND	ug/l	NC		30
Tetrachloroethene	ND	ND	ug/l	NC		30
Chlorobenzene	ND	ND	ug/l	NC		30
Trichlorofluoromethane	ND	ND	ug/l	NC		30
1,2-Dichloroethane	ND	ND	ug/l	NC		30
1,1,1-Trichloroethane	ND	ND	ug/l	NC		30
Bromodichloromethane	ND	ND	ug/l	NC		30
trans-1,3-Dichloropropene	ND	ND	ug/l	NC		30
cis-1,3-Dichloropropene	ND	ND	ug/l	NC		30
Bromoform	ND	ND	ug/l	NC		30
1,1,2,2-Tetrachloroethane	ND	ND	ug/l	NC		30
Benzene	ND	ND	ug/l	NC		30

Lab Duplicate Analysis
Batch Quality Control

Project Name: NORTHPOINT
Project Number: 35663

Lab Number: L1632408
Report Date: 10/19/16

Parameter	Native Sample	Duplicate Sample	Units	RPD	RPD Limits
Volatile Organics by GC/MS - Westborough Lab Associated sample(s): 01 QC Batch ID: WG940591-5 QC Sample: L1631582-01 Client ID: DUP Sample					
Toluene	ND	ND	ug/l	NC	30
Ethylbenzene	ND	ND	ug/l	NC	30
Chloromethane	ND	ND	ug/l	NC	30
Bromomethane	ND	ND	ug/l	NC	30
Vinyl chloride	ND	ND	ug/l	NC	30
Chloroethane	ND	ND	ug/l	NC	30
1,1-Dichloroethene	ND	ND	ug/l	NC	30
trans-1,2-Dichloroethene	ND	ND	ug/l	NC	30
cis-1,2-Dichloroethene[1]	ND	ND	ug/l	NC	30
Trichloroethene	ND	ND	ug/l	NC	30
1,2-Dichlorobenzene	ND	ND	ug/l	NC	30
1,3-Dichlorobenzene	ND	ND	ug/l	NC	30
1,4-Dichlorobenzene	ND	ND	ug/l	NC	30
p/m-Xylene[1]	ND	ND	ug/l	NC	30
o-Xylene[1]	ND	ND	ug/l	NC	30
Xylene (Total)[1]	ND	ND	ug/l	NC	30
Styrene[1]	ND	ND	ug/l	NC	30
Acetone[1]	220	240	ug/l	9	30
Carbon disulfide[1]	ND	ND	ug/l	NC	30

Lab Duplicate Analysis
Batch Quality Control

Project Name: NORTHPOINT
Project Number: 35663

Lab Number: L1632408
Report Date: 10/19/16

Parameter	Native Sample	Duplicate Sample	Units	RPD	RPD Limits
Volatile Organics by GC/MS - Westborough Lab Associated sample(s): 01 QC Batch ID: WG940591-5 QC Sample: L1631582-01 Client ID: DUP Sample					
2-Butanone[1]	ND	ND	ug/l	NC	30
Vinyl acetate[1]	ND	ND	ug/l	NC	30
4-Methyl-2-pentanone[1]	ND	ND	ug/l	NC	30
2-Hexanone[1]	ND	ND	ug/l	NC	30
Acrolein[1]	ND	ND	ug/l	NC	30
Acrylonitrile[1]	ND	ND	ug/l	NC	30
Dibromomethane[1]	ND	ND	ug/l	NC	30

Surrogate	%Recovery	Qualifier	%Recovery	Qualifier	Acceptance Criteria
Pentafluorobenzene	103		104		80-120
Fluorobenzene	111		112		80-120
4-Bromofluorobenzene	104		104		80-120

SEMIVOLATILES

Project Name: NORTHPOINT **Lab Number:** L1632408

Project Number: 35663 **Report Date:** 10/19/16

SAMPLE RESULTS

Lab ID: L1632408-01
Client ID: VES-J/K-215 (MW)
Sample Location: CAMBRIDGE, MA
Matrix: Water
Analytical Method: 1,8270D
Analytical Date: 10/18/16 14:13
Analyst: HL

Date Collected: 10/11/16 14:10
Date Received: 10/11/16
Field Prep: Not Specified
Extraction Method: EPA 3510C
Extraction Date: 10/12/16 16:35

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Benzidine	ND		ug/l	20	--	1
1,2,4-Trichlorobenzene	ND		ug/l	5.0	--	1
Bis(2-chloroethyl)ether	ND		ug/l	2.0	--	1
1,2-Dichlorobenzene	ND		ug/l	2.0	--	1
1,3-Dichlorobenzene	ND		ug/l	2.0	--	1
1,4-Dichlorobenzene	ND		ug/l	2.0	--	1
3,3'-Dichlorobenzidine	ND		ug/l	5.0	--	1
2,4-Dinitrotoluene	ND		ug/l	5.0	--	1
2,6-Dinitrotoluene	ND		ug/l	5.0	--	1
Azobenzene	ND		ug/l	2.0	--	1
4-Chlorophenyl phenyl ether	ND		ug/l	2.0	--	1
4-Bromophenyl phenyl ether	ND		ug/l	2.0	--	1
Bis(2-chloroisopropyl)ether	ND		ug/l	2.0	--	1
Bis(2-chloroethoxy)methane	ND		ug/l	5.0	--	1
Hexachlorocyclopentadiene	ND		ug/l	20	--	1
Isophorone	ND		ug/l	5.0	--	1
Nitrobenzene	ND		ug/l	2.0	--	1
NDPA/DPA	ND		ug/l	2.0	--	1
n-Nitrosodi-n-propylamine	ND		ug/l	5.0	--	1
Bis(2-ethylhexyl)phthalate	ND		ug/l	3.0	--	1
Butyl benzyl phthalate	ND		ug/l	5.0	--	1
Di-n-butylphthalate	ND		ug/l	5.0	--	1
Di-n-octylphthalate	ND		ug/l	5.0	--	1
Diethyl phthalate	ND		ug/l	5.0	--	1
Dimethyl phthalate	ND		ug/l	5.0	--	1
Biphenyl	ND		ug/l	2.0	--	1
Aniline	ND		ug/l	2.0	--	1
4-Chloroaniline	ND		ug/l	5.0	--	1
2-Nitroaniline	ND		ug/l	5.0	--	1
3-Nitroaniline	ND		ug/l	5.0	--	1

Project Name: NORTHPOINT **Lab Number:** L1632408

Project Number: 35663 **Report Date:** 10/19/16

SAMPLE RESULTS

Lab ID: L1632408-01 Date Collected: 10/11/16 14:10

Client ID: VES-J/K-215 (MW) Date Received: 10/11/16

Sample Location: CAMBRIDGE, MA Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
4-Nitroaniline	ND		ug/l	5.0	--	1
Dibenzofuran	ND		ug/l	2.0	--	1
n-Nitrosodimethylamine	ND		ug/l	2.0	--	1
2,4,6-Trichlorophenol	ND		ug/l	5.0	--	1
p-Chloro-m-cresol	ND		ug/l	2.0	--	1
2-Chlorophenol	ND		ug/l	2.0	--	1
2,4-Dichlorophenol	ND		ug/l	5.0	--	1
2,4-Dimethylphenol	ND		ug/l	5.0	--	1
2-Nitrophenol	ND		ug/l	10	--	1
4-Nitrophenol	ND		ug/l	10	--	1
2,4-Dinitrophenol	ND		ug/l	20	--	1
4,6-Dinitro-o-cresol	ND		ug/l	10	--	1
Phenol	ND		ug/l	5.0	--	1
2-Methylphenol	ND		ug/l	5.0	--	1
3-Methylphenol/4-Methylphenol	ND		ug/l	5.0	--	1
2,4,5-Trichlorophenol	ND		ug/l	5.0	--	1
Benzoic Acid	ND		ug/l	50	--	1
Benzyl Alcohol	ND		ug/l	2.0	--	1
Carbazole	ND		ug/l	2.0	--	1
Pyridine	ND		ug/l	5.0	--	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Fluorophenol	27		21-120
Phenol-d6	16		10-120
Nitrobenzene-d5	58		23-120
2-Fluorobiphenyl	49		15-120
2,4,6-Tribromophenol	56		10-120
4-Terphenyl-d14	51		41-149

Project Name: NORTHPOINT
Project Number: 35663
Lab Number: L1632408
Report Date: 10/19/16

SAMPLE RESULTS

Lab ID: L1632408-01
Client ID: VES-J/K-215 (MW)
Sample Location: CAMBRIDGE, MA
Matrix: Water
Analytical Method: 1,8270D-SIM
Analytical Date: 10/14/16 23:13
Analyst: KV

Date Collected: 10/11/16 14:10
Date Received: 10/11/16
Field Prep: Not Specified
Extraction Method: EPA 3510C
Extraction Date: 10/12/16 16:28

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS-SIM - Westborough Lab						
Acenaphthene	ND		ug/l	0.10	--	1
2-Chloronaphthalene	ND		ug/l	0.20	--	1
Fluoranthene	ND		ug/l	0.20	--	1
Hexachlorobutadiene	ND		ug/l	0.50	--	1
Naphthalene	ND		ug/l	0.20	--	1
Benzo(a)anthracene	ND		ug/l	0.20	--	1
Benzo(a)pyrene	ND		ug/l	0.20	--	1
Benzo(b)fluoranthene	ND		ug/l	0.20	--	1
Benzo(k)fluoranthene	ND		ug/l	0.20	--	1
Chrysene	ND		ug/l	0.20	--	1
Acenaphthylene	ND		ug/l	0.20	--	1
Anthracene	ND		ug/l	0.20	--	1
Benzo(ghi)perylene	ND		ug/l	0.20	--	1
Fluorene	ND		ug/l	0.20	--	1
Phenanthrene	ND		ug/l	0.20	--	1
Dibenzo(a,h)anthracene	ND		ug/l	0.20	--	1
Indeno(1,2,3-cd)pyrene	ND		ug/l	0.20	--	1
Pyrene	ND		ug/l	0.20	--	1
1-Methylnaphthalene	ND		ug/l	0.20	--	1
2-Methylnaphthalene	ND		ug/l	0.20	--	1
Pentachlorophenol	ND		ug/l	0.80	--	1
Hexachlorobenzene	ND		ug/l	0.80	--	1
Hexachloroethane	ND		ug/l	0.80	--	1

Project Name: NORTHPOINT **Lab Number:** L1632408

Project Number: 35663 **Report Date:** 10/19/16

SAMPLE RESULTS

Lab ID: L1632408-01 Date Collected: 10/11/16 14:10

Client ID: VES-J/K-215 (MW) Date Received: 10/11/16

Sample Location: CAMBRIDGE, MA Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor

Semivolatile Organics by GC/MS-SIM - Westborough Lab

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Fluorophenol	32		21-120
Phenol-d6	21		10-120
Nitrobenzene-d5	63		23-120
2-Fluorobiphenyl	64		15-120
2,4,6-Tribromophenol	66		10-120
4-Terphenyl-d14	66		41-149

Project Name: NORTHPOINT
Project Number: 35663

Lab Number: L1632408
Report Date: 10/19/16

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8270D-SIM
Analytical Date: 10/14/16 17:27
Analyst: YW

Extraction Method: EPA 3510C
Extraction Date: 10/12/16 15:52

Parameter	Result	Qualifier	Units	RL	MDL
Semivolatile Organics by GC/MS-SIM - Westborough Lab for sample(s): 01 Batch: WG941420-1					
Acenaphthene	ND		ug/l	0.10	--
2-Chloronaphthalene	ND		ug/l	0.20	--
Fluoranthene	ND		ug/l	0.20	--
Hexachlorobutadiene	ND		ug/l	0.50	--
Naphthalene	ND		ug/l	0.20	--
Benzo(a)anthracene	ND		ug/l	0.20	--
Benzo(a)pyrene	ND		ug/l	0.20	--
Benzo(b)fluoranthene	ND		ug/l	0.20	--
Benzo(k)fluoranthene	ND		ug/l	0.20	--
Chrysene	ND		ug/l	0.20	--
Acenaphthylene	ND		ug/l	0.20	--
Anthracene	ND		ug/l	0.20	--
Benzo(ghi)perylene	ND		ug/l	0.20	--
Fluorene	ND		ug/l	0.20	--
Phenanthrene	ND		ug/l	0.20	--
Dibenzo(a,h)anthracene	ND		ug/l	0.20	--
Indeno(1,2,3-cd)pyrene	ND		ug/l	0.20	--
Pyrene	ND		ug/l	0.20	--
1-Methylnaphthalene	ND		ug/l	0.20	--
2-Methylnaphthalene	ND		ug/l	0.20	--
Pentachlorophenol	ND		ug/l	0.80	--
Hexachlorobenzene	ND		ug/l	0.80	--
Hexachloroethane	ND		ug/l	0.80	--

Project Name: NORTHPOINT
Project Number: 35663

Lab Number: L1632408
Report Date: 10/19/16

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8270D-SIM
Analytical Date: 10/14/16 17:27
Analyst: YW

Extraction Method: EPA 3510C
Extraction Date: 10/12/16 15:52

Parameter	Result	Qualifier	Units	RL	MDL
Semivolatile Organics by GC/MS-SIM - Westborough Lab for sample(s): 01 Batch: WG941420-1					

Surrogate	%Recovery	Qualifier	Acceptance Criteria
2-Fluorophenol	46		21-120
Phenol-d6	30		10-120
Nitrobenzene-d5	89		23-120
2-Fluorobiphenyl	79		15-120
2,4,6-Tribromophenol	83		10-120
4-Terphenyl-d14	87		41-149

Project Name: NORTHPOINT
Project Number: 35663

Lab Number: L1632408
Report Date: 10/19/16

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8270D
Analytical Date: 10/13/16 23:21
Analyst: PS

Extraction Method: EPA 3510C
Extraction Date: 10/12/16 16:35

Parameter	Result	Qualifier	Units	RL	MDL
Semivolatile Organics by GC/MS - Westborough Lab for sample(s): 01 Batch: WG941429-1					
Acenaphthene	ND		ug/l	2.0	--
Benzidine	ND		ug/l	20	--
1,2,4-Trichlorobenzene	ND		ug/l	5.0	--
Hexachlorobenzene	ND		ug/l	2.0	--
Bis(2-chloroethyl)ether	ND		ug/l	2.0	--
2-Chloronaphthalene	ND		ug/l	2.0	--
1,2-Dichlorobenzene	ND		ug/l	2.0	--
1,3-Dichlorobenzene	ND		ug/l	2.0	--
1,4-Dichlorobenzene	ND		ug/l	2.0	--
3,3'-Dichlorobenzidine	ND		ug/l	5.0	--
2,4-Dinitrotoluene	ND		ug/l	5.0	--
2,6-Dinitrotoluene	ND		ug/l	5.0	--
Azobenzene	ND		ug/l	2.0	--
Fluoranthene	ND		ug/l	2.0	--
4-Chlorophenyl phenyl ether	ND		ug/l	2.0	--
4-Bromophenyl phenyl ether	ND		ug/l	2.0	--
Bis(2-chloroisopropyl)ether	ND		ug/l	2.0	--
Bis(2-chloroethoxy)methane	ND		ug/l	5.0	--
Hexachlorobutadiene	ND		ug/l	2.0	--
Hexachlorocyclopentadiene	ND		ug/l	20	--
Hexachloroethane	ND		ug/l	2.0	--
Isophorone	ND		ug/l	5.0	--
Naphthalene	ND		ug/l	2.0	--
Nitrobenzene	ND		ug/l	2.0	--
NDPA/DPA	ND		ug/l	2.0	--
n-Nitrosodi-n-propylamine	ND		ug/l	5.0	--
Bis(2-ethylhexyl)phthalate	ND		ug/l	3.0	--
Butyl benzyl phthalate	ND		ug/l	5.0	--
Di-n-butylphthalate	ND		ug/l	5.0	--

Project Name: NORTHPOINT
Project Number: 35663

Lab Number: L1632408
Report Date: 10/19/16

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8270D
Analytical Date: 10/13/16 23:21
Analyst: PS

Extraction Method: EPA 3510C
Extraction Date: 10/12/16 16:35

Parameter	Result	Qualifier	Units	RL	MDL
Semivolatile Organics by GC/MS - Westborough Lab for sample(s): 01 Batch: WG941429-1					
Di-n-octylphthalate	ND		ug/l	5.0	--
Diethyl phthalate	ND		ug/l	5.0	--
Dimethyl phthalate	ND		ug/l	5.0	--
Benzo(a)anthracene	ND		ug/l	2.0	--
Benzo(a)pyrene	ND		ug/l	2.0	--
Benzo(b)fluoranthene	ND		ug/l	2.0	--
Benzo(k)fluoranthene	ND		ug/l	2.0	--
Chrysene	ND		ug/l	2.0	--
Acenaphthylene	ND		ug/l	2.0	--
Anthracene	ND		ug/l	2.0	--
Benzo(ghi)perylene	ND		ug/l	2.0	--
Fluorene	ND		ug/l	2.0	--
Phenanthrene	ND		ug/l	2.0	--
Dibenzo(a,h)anthracene	ND		ug/l	2.0	--
Indeno(1,2,3-cd)pyrene	ND		ug/l	2.0	--
Pyrene	ND		ug/l	2.0	--
Biphenyl	ND		ug/l	2.0	--
Aniline	ND		ug/l	2.0	--
4-Chloroaniline	ND		ug/l	5.0	--
1-Methylnaphthalene	ND		ug/l	2.0	--
2-Nitroaniline	ND		ug/l	5.0	--
3-Nitroaniline	ND		ug/l	5.0	--
4-Nitroaniline	ND		ug/l	5.0	--
Dibenzofuran	ND		ug/l	2.0	--
2-Methylnaphthalene	ND		ug/l	2.0	--
n-Nitrosodimethylamine	ND		ug/l	2.0	--
2,4,6-Trichlorophenol	ND		ug/l	5.0	--
p-Chloro-m-cresol	ND		ug/l	2.0	--
2-Chlorophenol	ND		ug/l	2.0	--

Project Name: NORTHPOINT
Project Number: 35663

Lab Number: L1632408
Report Date: 10/19/16

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8270D
Analytical Date: 10/13/16 23:21
Analyst: PS

Extraction Method: EPA 3510C
Extraction Date: 10/12/16 16:35

Parameter	Result	Qualifier	Units	RL	MDL
Semivolatile Organics by GC/MS - Westborough Lab for sample(s): 01 Batch: WG941429-1					
2,4-Dichlorophenol	ND		ug/l	5.0	--
2,4-Dimethylphenol	ND		ug/l	5.0	--
2-Nitrophenol	ND		ug/l	10	--
4-Nitrophenol	ND		ug/l	10	--
2,4-Dinitrophenol	ND		ug/l	20	--
4,6-Dinitro-o-cresol	ND		ug/l	10	--
Pentachlorophenol	ND		ug/l	10	--
Phenol	ND		ug/l	5.0	--
2-Methylphenol	ND		ug/l	5.0	--
3-Methylphenol/4-Methylphenol	ND		ug/l	5.0	--
2,4,5-Trichlorophenol	ND		ug/l	5.0	--
Benzoic Acid	ND		ug/l	50	--
Benzyl Alcohol	ND		ug/l	2.0	--
Carbazole	ND		ug/l	2.0	--
Pyridine	ND		ug/l	5.0	--

Surrogate	%Recovery	Qualifier	Acceptance Criteria
2-Fluorophenol	37		21-120
Phenol-d6	23		10-120
Nitrobenzene-d5	74		23-120
2-Fluorobiphenyl	64		15-120
2,4,6-Tribromophenol	76		10-120
4-Terphenyl-d14	66		41-149

Lab Control Sample Analysis
Batch Quality Control

Project Name: NORTHPOINT
Project Number: 35663

Lab Number: L1632408
Report Date: 10/19/16

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Semivolatile Organics by GC/MS-SIM - Westborough Lab Associated sample(s): 01 Batch: WG941420-2 WG941420-3								
Acenaphthene	89		80		37-111	20		40
2-Chloronaphthalene	87		74		40-140	29		40
Fluoranthene	94		81		40-140	25		40
Naphthalene	88		70		40-140	26		40
Benzo(a)anthracene	97		82		40-140	26		40
Benzo(a)pyrene	86		72		40-140	24		40
Benzo(b)fluoranthene	84		71		40-140	24		40
Benzo(k)fluoranthene	88		72		40-140	27		40
Chrysene	86		72		40-140	27		40
Acenaphthylene	92		79		40-140	31		40
Anthracene	96		80		40-140	28		40
Benzo(ghi)perylene	96		84		40-140	18		40
Fluorene	92		79		40-140	25		40
Phenanthrene	93		83		40-140	19		40
Dibenzo(a,h)anthracene	89		77		40-140	21		40
Indeno(1,2,3-cd)pyrene	90		79		40-140	18		40
Pyrene	86		74		26-127	25		40
1-Methylnaphthalene	88		74		40-140	27		40
2-Methylnaphthalene	94		76		40-140	26		40

Lab Control Sample Analysis

Batch Quality Control

Project Name: NORTHPOINT

Project Number: 35663

Lab Number: L1632408

Report Date: 10/19/16

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Semivolatile Organics by GC/MS-SIM - Westborough Lab Associated sample(s): 01 Batch: WG941420-2 WG941420-3								

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
Nitrobenzene-d5	86		**143**	Q	23-120
2-Fluorobiphenyl	78		**130**	Q	15-120
4-Terphenyl-d14	85		145		41-149

Lab Control Sample Analysis
Batch Quality Control

Project Name: NORTHPOINT
Project Number: 35663

Lab Number: L1632408
Report Date: 10/19/16

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Semivolatile Organics by GC/MS - Westborough Lab Associated sample(s): 01 Batch: WG941429-2 WG941429-3								
Acenaphthene	68		70		37-111	3		30
Benzidine	**6**	Q	15		10-75	**86**	Q	30
1,2,4-Trichlorobenzene	62		64		39-98	3		30
Hexachlorobenzene	71		73		40-140	3		30
Bis(2-chloroethyl)ether	64		65		40-140	2		30
2-Chloronaphthalene	67		70		40-140	4		30
1,2-Dichlorobenzene	59		60		40-140	2		30
1,3-Dichlorobenzene	57		61		40-140	7		30
1,4-Dichlorobenzene	58		60		36-97	3		30
3,3'-Dichlorobenzidine	63		69		40-140	9		30
2,4-Dinitrotoluene	78		83		24-96	6		30
2,6-Dinitrotoluene	78		84		40-140	7		30
Azobenzene	70		74		40-140	6		30
Fluoranthene	70		75		40-140	7		30
4-Chlorophenyl phenyl ether	68		70		40-140	3		30
4-Bromophenyl phenyl ether	69		72		40-140	4		30
Bis(2-chloroisopropyl)ether	75		75		40-140	0		30
Bis(2-chloroethoxy)methane	71		74		40-140	4		30
Hexachlorobutadiene	59		61		40-140	3		30
Hexachlorocyclopentadiene	72		75		40-140	4		30
Hexachloroethane	59		62		40-140	5		30

Lab Control Sample Analysis
Batch Quality Control

Project Name: NORTHPOINT
Project Number: 35663

Lab Number: L1632408
Report Date: 10/19/16

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Semivolatile Organics by GC/MS - Westborough Lab Associated sample(s): 01 Batch: WG941429-2 WG941429-3								
Isophorone	70		74		40-140	6		30
Naphthalene	63		64		40-140	2		30
Nitrobenzene	73		74		40-140	1		30
NDPA/DPA	71		74		40-140	4		30
n-Nitrosodi-n-propylamine	73		76		29-132	4		30
Bis(2-ethylhexyl)phthalate	78		82		40-140	5		30
Butyl benzyl phthalate	78		82		40-140	5		30
Di-n-butylphthalate	75		80		40-140	6		30
Di-n-octylphthalate	79		82		40-140	4		30
Diethyl phthalate	72		76		40-140	5		30
Dimethyl phthalate	72		76		40-140	5		30
Benzo(a)anthracene	68		72		40-140	6		30
Benzo(a)pyrene	72		75		40-140	4		30
Benzo(b)fluoranthene	70		73		40-140	4		30
Benzo(k)fluoranthene	72		74		40-140	3		30
Chrysene	69		72		40-140	4		30
Acenaphthylene	70		74		45-123	6		30
Anthracene	70		74		40-140	6		30
Benzo(ghi)perylene	70		73		40-140	4		30
Fluorene	69		72		40-140	4		30
Phenanthrene	68		72		40-140	6		30

Lab Control Sample Analysis
Batch Quality Control

Project Name: NORTHPOINT
Project Number: 35663

Lab Number: L1632408
Report Date: 10/19/16

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Semivolatile Organics by GC/MS - Westborough Lab Associated sample(s): 01 Batch: WG941429-2 WG941429-3								
Dibenzo(a,h)anthracene	70		73		40-140	4		30
Indeno(1,2,3-cd)pyrene	71		73		40-140	3		30
Pyrene	69		74		26-127	7		30
Biphenyl	73		77		40-140	5		30
Aniline	**31**	Q	**35**	Q	40-140	12		30
4-Chloroaniline	54		55		40-140	2		30
1-Methylnaphthalene	65		68		41-103	5		30
2-Nitroaniline	86		91		52-143	6		30
3-Nitroaniline	63		70		25-145	11		30
4-Nitroaniline	73		76		51-143	4		30
Dibenzofuran	67		70		40-140	4		30
2-Methylnaphthalene	66		69		40-140	4		30
1,2,4,5-Tetrachlorobenzene	70		73		2-134	4		30
Acetophenone	72		74		39-129	3		30
n-Nitrosodimethylamine	34		33		22-74	3		30
2,4,6-Trichlorophenol	75		79		30-130	5		30
p-Chloro-m-cresol	72		76		23-97	5		30
2-Chlorophenol	62		63		27-123	2		30
2,4-Dichlorophenol	73		76		30-130	4		30
2,4-Dimethylphenol	68		68		30-130	0		30
2-Nitrophenol	88		89		30-130	1		30

Lab Control Sample Analysis
Batch Quality Control

Project Name: NORTHPOINT
Project Number: 35663

Lab Number: L1632408
Report Date: 10/19/16

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Semivolatile Organics by GC/MS - Westborough Lab Associated sample(s): 01 Batch: WG941429-2 WG941429-3								
4-Nitrophenol	42		42		10-80	0		30
2,4-Dinitrophenol	93		99		20-130	6		30
4,6-Dinitro-o-cresol	97		102		20-164	5		30
Pentachlorophenol	70		73		9-103	4		30
Phenol	22		24		12-110	9		30
2-Methylphenol	55		57		30-130	4		30
3-Methylphenol/4-Methylphenol	50		53		30-130	6		30
2,4,5-Trichlorophenol	77		82		30-130	6		30
Benzoic Acid	31		27		10-164	14		30
Benzyl Alcohol	53		54		26-116	2		30
Carbazole	70		75		55-144	7		30
Pyridine	18		22		10-66	20		30
Parathion, ethyl	129		136		40-140	5		30
Atrazine	93		97		40-140	4		30
Benzaldehyde	52		51		40-140	2		30
Caprolactam	20		22		10-130	10		30
2,3,4,6-Tetrachlorophenol	78		81		40-140	4		30

Lab Control Sample Analysis

Batch Quality Control

Project Name: NORTHPOINT

Project Number: 35663

Lab Number: L1632408

Report Date: 10/19/16

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Semivolatile Organics by GC/MS - Westborough Lab Associated sample(s): 01 Batch: WG941429-2 WG941429-3								

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
2-Fluorophenol	36		37		21-120
Phenol-d6	24		26		10-120
Nitrobenzene-d5	75		80		23-120
2-Fluorobiphenyl	66		70		15-120
2,4,6-Tribromophenol	82		87		10-120
4-Terphenyl-d14	68		74		41-149

PESTICIDES

Project Name: NORTHPOINT
Project Number: 35663
Lab Number: L1632408
Report Date: 10/19/16

SAMPLE RESULTS

Lab ID: L1632408-01
Client ID: VES-J/K-215 (MW)
Sample Location: CAMBRIDGE, MA
Matrix: Water
Analytical Method: 5,608
Analytical Date: 10/18/16 12:01
Analyst: AM

Date Collected: 10/11/16 14:10
Date Received: 10/11/16
Field Prep: Not Specified
Extraction Method: EPA 608
Extraction Date: 10/14/16 12:33
Cleanup Method: EPA 3620B
Cleanup Date: 10/14/16

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
Organochlorine Pesticides by GC - Westborough Lab							
Delta-BHC	ND		ug/l	0.020	--	1	A
Lindane	ND		ug/l	0.020	--	1	A
Alpha-BHC	ND		ug/l	0.020	--	1	A
Beta-BHC	ND		ug/l	0.020	--	1	A
Heptachlor	ND		ug/l	0.020	--	1	A
Aldrin	ND		ug/l	0.020	--	1	A
Heptachlor epoxide	ND		ug/l	0.020	--	1	A
Endrin	ND		ug/l	0.040	--	1	A
Endrin aldehyde	ND		ug/l	0.040	--	1	A
Endrin ketone[1]	ND		ug/l	0.040	--	1	A
Dieldrin	ND		ug/l	0.040	--	1	A
4,4'-DDE	ND		ug/l	0.040	--	1	A
4,4'-DDD	ND		ug/l	0.040	--	1	A
4,4'-DDT	ND		ug/l	0.040	--	1	A
Endosulfan I	ND		ug/l	0.020	--	1	A
Endosulfan II	ND		ug/l	0.040	--	1	B
Endosulfan sulfate	ND		ug/l	0.040	--	1	A
Methoxychlor[1]	ND		ug/l	0.100	--	1	A
Toxaphene	ND		ug/l	0.400	--	1	A
Chlordane	ND		ug/l	0.200	--	1	A
cis-Chlordane[1]	ND		ug/l	0.020	--	1	A
trans-Chlordane[1]	ND		ug/l	0.020	--	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	65		30-150	A
Decachlorobiphenyl	84		30-150	A

Project Name: NORTHPOINT
Project Number: 35663

Lab Number: L1632408
Report Date: 10/19/16

Method Blank Analysis
Batch Quality Control

Analytical Method: 5,608
Analytical Date: 10/18/16 12:27
Analyst: AM

Extraction Method: EPA 608
Extraction Date: 10/14/16 12:33
Cleanup Method: EPA 3620B
Cleanup Date: 10/14/16

Parameter	Result	Qualifier	Units	RL	MDL	Column
Organochlorine Pesticides by GC - Westborough Lab for sample(s): 01 Batch: WG942194-1						
Delta-BHC	ND		ug/l	0.020	--	A
Lindane	ND		ug/l	0.020	--	A
Alpha-BHC	ND		ug/l	0.020	--	A
Beta-BHC	ND		ug/l	0.020	--	A
Heptachlor	ND		ug/l	0.020	--	A
Aldrin	ND		ug/l	0.020	--	A
Heptachlor epoxide	ND		ug/l	0.020	--	A
Endrin	ND		ug/l	0.040	--	A
Endrin aldehyde	ND		ug/l	0.040	--	A
Endrin ketone[1]	ND		ug/l	0.040	--	A
Dieldrin	ND		ug/l	0.040	--	A
4,4'-DDE	ND		ug/l	0.040	--	A
4,4'-DDD	ND		ug/l	0.040	--	A
4,4'-DDT	ND		ug/l	0.040	--	A
Endosulfan I	ND		ug/l	0.020	--	A
Endosulfan sulfate	ND		ug/l	0.040	--	A
Methoxychlor[1]	ND		ug/l	0.100	--	A
Toxaphene	ND		ug/l	0.400	--	A
Chlordane	ND		ug/l	0.200	--	A
cis-Chlordane[1]	ND		ug/l	0.020	--	A
trans-Chlordane[1]	ND		ug/l	0.020	--	A
Endosulfan II	ND		ug/l	0.040	--	B

Surrogate	%Recovery	Qualifier	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	67		30-150	A
Decachlorobiphenyl	84		30-150	A

Lab Control Sample Analysis
Batch Quality Control

Project Name: NORTHPOINT
Project Number: 35663

Lab Number: L1632408
Report Date: 10/19/16

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits	Column
Organochlorine Pesticides by GC - Westborough Lab Associated sample(s): 01 Batch: WG942194-2									
Delta-BHC	87		-		30-150	-		30	A
Lindane	79		-		30-150	-		30	A
Alpha-BHC	83		-		30-150	-		30	A
Beta-BHC	81		-		30-150	-		30	A
Heptachlor	76		-		30-150	-		30	A
Aldrin	76		-		30-150	-		30	A
Heptachlor epoxide	64		-		30-150	-		30	A
Endrin	86		-		30-150	-		30	A
Endrin aldehyde	64		-		30-150	-		30	A
Endrin ketone[1]	94		-		30-150	-		30	A
Dieldrin	87		-		30-150	-		30	A
4,4'-DDE	76		-		30-150	-		30	A
4,4'-DDD	85		-		30-150	-		30	A
4,4'-DDT	89		-		30-150	-		30	A
Endosulfan I	79		-		30-150	-		30	A
Endosulfan sulfate	77		-		30-150	-		30	A
Methoxychlor[1]	91		-		30-150	-		30	A
cis-Chlordane[1]	74		-		30-150	-		30	A
trans-Chlordane[1]	76		-		30-150	-		30	A

Lab Control Sample Analysis

Batch Quality Control

Project Name: NORTHPOINT

Project Number: 35663

Lab Number: L1632408

Report Date: 10/19/16

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Organochlorine Pesticides by GC - Westborough Lab Associated sample(s): 01 Batch: WG942194-2								

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	70				30-150	A
Decachlorobiphenyl	80				30-150	A

Lab Control Sample Analysis

Batch Quality Control

Project Name: NORTHPOINT

Project Number: 35663

Lab Number: L1632408

Report Date: 10/19/16

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits	Column
Organochlorine Pesticides by GC - Westborough Lab Associated sample(s): 01 Batch: WG942194-2									
Endosulfan II	102		-		30-150	-		30	B

			Column
2,4,5,6-Tetrachloro-m-xylene	70	30-150	A
Decachlorobiphenyl	80	30-150	A

Matrix Spike Analysis
Batch Quality Control

Project Name: NORTHPOINT
Project Number: 35663

Lab Number: L1632408
Report Date: 10/19/16

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits	Column
Organochlorine Pesticides by GC - Westborough Lab (MW)	Associated sample(s): 01		QC Batch ID: WG942194-3			QC Sample: L1632408-01			Client ID: VES-J/K-215				
Delta-BHC	ND	0.156	0.129	83		-	-		19-140	-		30	A
Lindane	ND	0.156	0.123	79		-	-		56-123	-		30	A
Alpha-BHC	ND	0.156	0.125	80		-	-		37-134	-		30	A
Beta-BHC	ND	0.156	0.138	88		-	-		17-147	-		30	A
Heptachlor	ND	0.156	0.118	76		-	-		40-111	-		30	A
Aldrin	ND	0.156	0.120	77		-	-		40-120	-		30	A
Heptachlor epoxide	ND	0.156	0.129	83		-	-		37-142	-		30	A
Endrin	ND	0.156	0.121	77		-	-		56-121	-		30	A
Endrin aldehyde	ND	0.156	0.100	64		-	-		42-122	-		30	A
Endrin ketone[1]	ND	0.156	0.132	84		-	-		30-150	-		30	A
Dieldrin	ND	0.156	0.126	81		-	-		52-126	-		30	A
4,4'-DDE	ND	0.156	0.114	73		-	-		30-145	-		30	A
4,4'-DDD	ND	0.156	0.122	78		-	-		31-141	-		30	A
4,4'-DDT	ND	0.156	0.128	82		-	-		38-127	-		30	A
Endosulfan I	ND	0.156	0.114	73		-	-		45-153	-		30	A
Endosulfan II	ND	0.156	0.156	100		-	-		.1-202	-		30	B
Endosulfan sulfate	ND	0.156	0.104	67		-	-		26-144	-		30	A
Methoxychlor[1]	ND	0.156	ND	**0**	Q	-	-		30-150	-		30	A
cis-Chlordane[1]	ND	0.156	0.112	72		-	-		30-150	-		30	A
trans-Chlordane[1]	ND	0.156	0.102	65		-	-		30-150	-		30	A

Matrix Spike Analysis
Batch Quality Control

Project Name: NORTHPOINT
Project Number: 35663

Lab Number: L1632408
Report Date: 10/19/16

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
Organochlorine Pesticides by GC - Westborough Lab (MW)	Associated sample(s): 01	QC Batch ID: WG942194-3	QC Sample: L1632408-01	Client ID: VES-J/K-215								

Surrogate	MS % Recovery	MS Qualifier	MSD % Recovery	MSD Qualifier	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	74				30-150	A
Decachlorobiphenyl	89				30-150	A

Lab Duplicate Analysis
Batch Quality Control

Project Name: NORTHPOINT
Project Number: 35663

Lab Number: L1632408
Report Date: 10/19/16

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits	
Organochlorine Pesticides by GC - Westborough Lab Associated sample(s): 01 QC Batch ID: WG942194-4 QC Sample: L1632259-01 Client ID: DUP Sample							
Delta-BHC	ND	ND	ug/l	NC		30	A
Lindane	ND	ND	ug/l	NC		30	A
Alpha-BHC	ND	ND	ug/l	NC		30	A
Beta-BHC	ND	ND	ug/l	NC		30	A
Heptachlor	ND	ND	ug/l	NC		30	A
Aldrin	ND	ND	ug/l	NC		30	A
Heptachlor epoxide	ND	ND	ug/l	NC		30	A
Endrin	ND	ND	ug/l	NC		30	A
Endrin aldehyde	ND	ND	ug/l	NC		30	A
Endrin ketone[1]	ND	ND	ug/l	NC		30	A
Dieldrin	ND	ND	ug/l	NC		30	A
4,4'-DDE	ND	ND	ug/l	NC		30	A
4,4'-DDD	ND	ND	ug/l	NC		30	A
4,4'-DDT	ND	ND	ug/l	NC		30	A
Endosulfan I	ND	ND	ug/l	NC		30	A
Endosulfan II	ND	ND	ug/l	NC		30	B
Endosulfan sulfate	ND	ND	ug/l	NC		30	A
Methoxychlor[1]	ND	ND	ug/l	NC		30	A
Toxaphene	ND	ND	ug/l	NC		30	A

Lab Duplicate Analysis
Batch Quality Control

Project Name: NORTHPOINT
Project Number: 35663

Lab Number: L1632408
Report Date: 10/19/16

Parameter	Native Sample	Duplicate Sample	Units	RPD	RPD Limits	
Organochlorine Pesticides by GC - Westborough Lab Sample	Associated sample(s): 01	QC Batch ID: WG942194-4	QC Sample: L1632259-01	Client ID: DUP		
Chlordane	ND	ND	ug/l	NC	30	A
cis-Chlordane[1]	ND	ND	ug/l	NC	30	A
trans-Chlordane[1]	ND	ND	ug/l	NC	30	A

Surrogate	%Recovery	Qualifier	%Recovery	Qualifier	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	71		72		30-150	A
Decachlorobiphenyl	83		97		30-150	A

METALS

Project Name: NORTHPOINT
Lab Number: L1632408
Project Number: 35663
Report Date: 10/19/16

SAMPLE RESULTS

Lab ID: L1632408-01
Client ID: VES-J/K-215 (MW)
Sample Location: CAMBRIDGE, MA
Matrix: Water
Date Collected: 10/11/16 14:10
Date Received: 10/11/16
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	0.0025		mg/l	0.0005	--	1	10/13/16 13:40	10/14/16 09:06	EPA 3005A	1,6020A	AM
Beryllium, Total	ND		mg/l	0.0005	--	1	10/13/16 13:40	10/14/16 09:06	EPA 3005A	1,6020A	AM
Boron, Total	0.422		mg/l	0.030	--	1	10/13/16 13:40	10/18/16 11:58	EPA 3005A	19,200.7	AB
Cadmium, Total	ND		mg/l	0.0002	--	1	10/13/16 13:40	10/14/16 09:06	EPA 3005A	1,6020A	AM
Calcium, Total	230		mg/l	2.00	--	20	10/13/16 13:40	10/14/16 09:18	EPA 3005A	1,6020A	AM
Chromium, Total	ND		mg/l	0.0010	--	1	10/13/16 13:40	10/14/16 09:06	EPA 3005A	1,6020A	AM
Copper, Total	ND		mg/l	0.0010	--	1	10/13/16 13:40	10/14/16 09:06	EPA 3005A	1,6020A	AM
Iron, Total	0.166		mg/l	0.050	--	1	10/13/16 13:40	10/18/16 11:58	EPA 3005A	19,200.7	AB
Lead, Total	ND		mg/l	0.0005	--	1	10/13/16 13:40	10/14/16 09:06	EPA 3005A	1,6020A	AM
Magnesium, Total	243		mg/l	1.40	--	20	10/13/16 13:40	10/14/16 09:18	EPA 3005A	1,6020A	AM
Manganese, Total	0.3876		mg/l	0.0010	--	1	10/13/16 13:40	10/14/16 09:06	EPA 3005A	1,6020A	AM
Mercury, Total	ND		mg/l	0.00020	--	1	10/13/16 09:51	10/13/16 21:31	EPA 245.1	3,245.1	EA
Potassium, Total	70.0		mg/l	0.100	--	1	10/13/16 13:40	10/14/16 09:06	EPA 3005A	1,6020A	AM
Selenium, Total	ND		mg/l	0.005	--	1	10/13/16 13:40	10/14/16 09:06	EPA 3005A	1,6020A	AM
Sodium, Total	1860		mg/l	20.0	--	200	10/13/16 13:40	10/14/16 10:24	EPA 3005A	1,6020A	AM
Zinc, Total	ND		mg/l	0.0100	--	1	10/13/16 13:40	10/14/16 09:06	EPA 3005A	1,6020A	AM
Total Hardness by SM 2340B - Mansfield Lab											
Hardness	1310		mg/l	0.660	NA	1	10/13/16 13:40	10/18/16 11:58	EPA 3005A	19,200.7	AB

Project Name: NORTHPOINT **Lab Number:** L1632408

Project Number: 35663 **Report Date:** 10/19/16

Method Blank Analysis
Batch Quality Control

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Metals - Mansfield Lab for sample(s): 01 Batch: WG941681-1										
Mercury, Total	ND		mg/l	0.00020	--	1	10/13/16 09:51	10/13/16 21:15	3,245.1	EA

Prep Information

Digestion Method: EPA 245.1

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Metals - Mansfield Lab for sample(s): 01 Batch: WG941790-1										
Arsenic, Total	ND		mg/l	0.0005	--	1	10/13/16 13:40	10/14/16 08:41	1,6020A	AM
Beryllium, Total	ND		mg/l	0.0005	--	1	10/13/16 13:40	10/14/16 08:41	1,6020A	AM
Cadmium, Total	ND		mg/l	0.0002	--	1	10/13/16 13:40	10/14/16 08:41	1,6020A	AM
Calcium, Total	ND		mg/l	0.100	--	1	10/13/16 13:40	10/14/16 08:41	1,6020A	AM
Chromium, Total	ND		mg/l	0.0010	--	1	10/13/16 13:40	10/14/16 08:41	1,6020A	AM
Copper, Total	ND		mg/l	0.0010	--	1	10/13/16 13:40	10/14/16 08:41	1,6020A	AM
Lead, Total	ND		mg/l	0.0010	--	1	10/13/16 13:40	10/14/16 08:41	1,6020A	AM
Magnesium, Total	ND		mg/l	0.070	--	1	10/13/16 13:40	10/14/16 08:41	1,6020A	AM
Manganese, Total	ND		mg/l	0.0010	--	1	10/13/16 13:40	10/14/16 08:41	1,6020A	AM
Potassium, Total	ND		mg/l	0.100	--	1	10/13/16 13:40	10/14/16 08:41	1,6020A	AM
Selenium, Total	ND		mg/l	0.005	--	1	10/13/16 13:40	10/14/16 08:41	1,6020A	AM
Sodium, Total	ND		mg/l	0.100	--	1	10/13/16 13:40	10/14/16 08:41	1,6020A	AM
Zinc, Total	ND		mg/l	0.0100	--	1	10/13/16 13:40	10/14/16 08:41	1,6020A	AM

Prep Information

Digestion Method: EPA 3005A

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Metals - Mansfield Lab for sample(s): 01 Batch: WG942646-1										
Boron, Total	ND		mg/l	0.030	--	1	10/13/16 13:40	10/18/16 10:34	19,200.7	JH
Iron, Total	ND		mg/l	0.050	--	1	10/13/16 13:40	10/18/16 10:34	19,200.7	JH

Project Name: NORTHPOINT
Project Number: 35663
Lab Number: L1632408
Report Date: 10/19/16

Method Blank Analysis
Batch Quality Control

Prep Information

Digestion Method: EPA 3005A

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Hardness by SM 2340B - Mansfield Lab for sample(s): 01 Batch: WG942646-1										
Hardness	ND		mg/l	0.660	NA	1	10/13/16 13:40	10/18/16 10:34	19,200.7	JH

Prep Information

Digestion Method: EPA 3005A

Lab Control Sample Analysis

Batch Quality Control

Project Name: NORTHPOINT

Project Number: 35663

Lab Number: L1632408

Report Date: 10/19/16

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 01 Batch: WG941681-2								
Mercury, Total	95		-		85-115	-		
Total Metals - Mansfield Lab Associated sample(s): 01 Batch: WG941790-2								
Arsenic, Total	107		-		80-120	-		
Beryllium, Total	101		-		80-120	-		
Cadmium, Total	120		-		80-120	-		
Calcium, Total	105		-		80-120	-		
Chromium, Total	107		-		80-120	-		
Copper, Total	108		-		80-120	-		
Lead, Total	106		-		80-120	-		
Magnesium, Total	108		-		80-120	-		
Manganese, Total	103		-		80-120	-		
Potassium, Total	104		-		80-120	-		
Selenium, Total	110		-		80-120	-		
Sodium, Total	103		-		80-120	-		
Zinc, Total	106		-		80-120	-		
Total Metals - Mansfield Lab Associated sample(s): 01 Batch: WG942646-2								
Boron, Total	105		-		85-115	-		
Iron, Total	92		-		85-115	-		

Lab Control Sample Analysis

Batch Quality Control

Project Name: NORTHPOINT

Project Number: 35663

Lab Number: L1632408

Report Date: 10/19/16

Parameter	LCS %Recovery	LCSD %Recovery	%Recovery Limits	RPD	RPD Limits
Total Hardness by SM 2340B - Mansfield Lab Associated sample(s): 01 Batch: WG942646-2					
Hardness	98	-	85-115	-	

Matrix Spike Analysis
Batch Quality Control

Project Name: NORTHPOINT
Project Number: 35663

Lab Number: L1632408
Report Date: 10/19/16

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 01 QC Batch ID: WG941681-4 QC Sample: L1631988-01 Client ID: MS Sample												
Mercury, Total	ND	0.005	0.00485	97		-	-		70-130	-		20
Total Metals - Mansfield Lab Associated sample(s): 01 QC Batch ID: WG941790-4 QC Sample: L1632495-01 Client ID: MS Sample												
Arsenic, Total	0.0262	0.12	0.1424	97		-	-		75-125	-		20
Beryllium, Total	ND	0.05	0.0508	102		-	-		75-125	-		20
Cadmium, Total	0.0016	0.051	0.0562	107		-	-		75-125	-		20
Calcium, Total	93.8	10	94.0	**2**	Q	-	-		75-125	-		20
Chromium, Total	0.0018	0.2	0.1904	94		-	-		75-125	-		20
Copper, Total	0.0135	0.25	0.2787	106		-	-		75-125	-		20
Lead, Total	0.0152	0.51	0.4978	95		-	-		75-125	-		20
Magnesium, Total	7.00	10	16.8	98		-	-		75-125	-		20
Manganese, Total	0.8284	0.5	1.276	90		-	-		75-125	-		20
Potassium, Total	16.8	10	25.4	86		-	-		75-125	-		20
Selenium, Total	ND	0.12	0.137	114		-	-		75-125	-		20
Sodium, Total	12.1	10	21.4	93		-	-		75-125	-		20
Zinc, Total	0.0764	0.5	0.5930	103		-	-		75-125	-		20
Total Metals - Mansfield Lab Associated sample(s): 01 QC Batch ID: WG942646-4 QC Sample: L1600010-60 Client ID: MS Sample												
Boron, Total	0.066	1	1.16	109		-	-		75-125	-		20
Iron, Total	4.80	1	5.60	80		-	-		75-125	-		20
Total Hardness by SM 2340B - Mansfield Lab Associated sample(s): 01 QC Batch ID: WG942646-4 QC Sample: L1600010-60 Client ID: MS Sample												
Hardness	217	66.2	281	97		-	-		75-125	-		20

Lab Duplicate Analysis
Batch Quality Control

Project Name: NORTHPOINT
Project Number: 35663

Lab Number: L1632408
Report Date: 10/19/16

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 01 QC Batch ID: WG941681-3 QC Sample: L1631988-01 Client ID: DUP Sample						
Mercury, Total	ND	ND	mg/l	NC		20
Total Metals - Mansfield Lab Associated sample(s): 01 QC Batch ID: WG941790-3 QC Sample: L1632495-01 Client ID: DUP Sample						
Arsenic, Total	0.0262	0.0246	mg/l	6		20
Beryllium, Total	ND	ND	mg/l	NC		20
Cadmium, Total	0.0016	0.0014	mg/l	15		20
Chromium, Total	0.0018	ND	mg/l	NC		20
Copper, Total	0.0135	0.0127	mg/l	6		20
Lead, Total	0.0152	0.0145	mg/l	5		20
Selenium, Total	ND	ND	mg/l	NC		20
Zinc, Total	0.0764	0.0695	mg/l	9		20
Total Metals - Mansfield Lab Associated sample(s): 01 QC Batch ID: WG942646-3 QC Sample: L1600010-60 Client ID: DUP Sample						
Boron, Total	0.066	0.066	mg/l	0		20
Total Hardness by SM 2340B - Mansfield Lab Associated sample(s): 01 QC Batch ID: WG942646-3 QC Sample: L1600010-60 Client ID: DUP Sample						
Hardness	217	216	mg/l	0		20

INORGANICS
&
MISCELLANEOUS

Project Name: NORTHPOINT
Project Number: 35663

Lab Number: L1632408
Report Date: 10/19/16

SAMPLE RESULTS

Lab ID: L1632408-01
Client ID: VES-J/K-215 (MW)
Sample Location: CAMBRIDGE, MA
Matrix: Water

Date Collected: 10/11/16 14:10
Date Received: 10/11/16
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Alkalinity, Total	235.		mg CaCO3/L	2.00	NA	1	-	10/12/16 13:55	121,2320B	SG
Alkalinity, Carbonate	ND		mg CaCO3/L	2.00	NA	1	-	10/12/16 13:55	121,2320B	SG
Alkalinity, Bicarbonate	234.		mg CaCO3/L	2.00	NA	1	-	10/12/16 13:55	121,2320B	SG
Alkalinity, Hydroxide	ND		mg CaCO3/L	2.00	NA	1	-	10/12/16 13:55	121,2320B	SG
Specific Conductance @ 25 C	11000		umhos/cm	10	--	1	-	10/11/16 20:35	121,2510B	MR
Solids, Total Dissolved	6100		mg/l	10	--	1	-	10/12/16 12:25	121,2540C	DW
Solids, Total Suspended	ND		mg/l	5.0	NA	1	-	10/13/16 12:45	121,2540D	DW
Cyanide, Total	ND		mg/l	0.005	--	1	10/13/16 11:00	10/13/16 15:30	121,4500CN-CE	JO
Chlorine, Total Residual	ND		mg/l	0.02	--	1	-	10/11/16 21:30	121,4500CL-D	MR
pH (H)	8.0		SU	-	NA	1	-	10/11/16 20:40	121,4500H+-B	MR
Nitrogen, Nitrite	ND		mg/l	0.050	--	1	-	10/11/16 22:22	44,353.2	MR
Phosphorus, Total	0.194		mg/l	0.010	--	1	10/13/16 09:45	10/14/16 12:47	121,4500P-E	SD
Phosphorus, Soluble	0.178		mg/l	0.020	--	2	10/17/16 10:00	10/17/16 13:06	121,4500P-E	SD
TPH, SGT-HEM	ND		mg/l	4.00	--	1	10/14/16 18:00	10/14/16 22:50	74,1664A	ML
Phenolics, Total	ND		mg/l	0.030	--	1	10/13/16 09:03	10/13/16 18:15	4,420.1	AW
Chromium, Hexavalent	ND		mg/l	0.010	--	1	10/12/16 00:04	10/12/16 00:27	121,3500CR-B	KA
Anions by Ion Chromatography - Westborough Lab										
Chloride	3820		mg/l	50.0	--	100	-	10/12/16 03:17	44,300.0	AU
Nitrogen, Nitrate	ND		mg/l	0.050	--	1	-	10/11/16 23:17	44,300.0	AU
Sulfate	89.7		mg/l	1.00	--	1	-	10/11/16 23:17	44,300.0	AU

Project Name: NORTHPOINT
Project Number: 35663
Lab Number: L1632408
Report Date: 10/19/16

Method Blank Analysis
Batch Quality Control

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab for sample(s): 01 Batch: WG941035-1										
Nitrogen, Nitrite	ND		mg/l	0.050	--	1	-	10/11/16 21:15	44,353.2	MR
General Chemistry - Westborough Lab for sample(s): 01 Batch: WG941059-1										
Chlorine, Total Residual	ND		mg/l	0.02	--	1	-	10/11/16 21:30	121,4500CL-D	MR
General Chemistry - Westborough Lab for sample(s): 01 Batch: WG941084-1										
Chromium, Hexavalent	ND		mg/l	0.010	--	1	10/12/16 00:04	10/12/16 00:26	121,3500CR-B	KA
General Chemistry - Westborough Lab for sample(s): 01 Batch: WG941142-1										
Solids, Total Dissolved	ND		mg/l	10	--	1	-	10/12/16 12:25	121,2540C	DW
General Chemistry - Westborough Lab for sample(s): 01 Batch: WG941252-1										
Alkalinity, Carbonate	ND		mg CaCO3/L	2.00	NA	1	-	10/12/16 13:55	121,2320B	SG
General Chemistry - Westborough Lab for sample(s): 01 Batch: WG941254-1										
Alkalinity, Bicarbonate	ND		mg CaCO3/L	2.00	NA	1	-	10/12/16 13:55	121,2320B	SG
General Chemistry - Westborough Lab for sample(s): 01 Batch: WG941256-1										
Alkalinity, Hydroxide	ND		mg CaCO3/L	2.00	NA	1	-	10/12/16 13:55	121,2320B	SG
General Chemistry - Westborough Lab for sample(s): 01 Batch: WG941257-1										
Alkalinity, Total	ND		mg CaCO3/L	2.00	NA	1	-	10/12/16 13:55	121,2320B	SG
Anions by Ion Chromatography - Westborough Lab for sample(s): 01 Batch: WG941476-1										
Chloride	ND		mg/l	0.500	--	1	-	10/11/16 17:41	44,300.0	AU
Sulfate	ND		mg/l	1.00	--	1	-	10/11/16 17:41	44,300.0	AU
Anions by Ion Chromatography - Westborough Lab for sample(s): 01 Batch: WG941476-1										
Nitrogen, Nitrate	ND		mg/l	0.050	--	1	-	10/11/16 17:41	44,300.0	AU
General Chemistry - Westborough Lab for sample(s): 01 Batch: WG941637-1										
Phosphorus, Total	ND		mg/l	0.010	--	1	10/13/16 09:45	10/14/16 12:16	121,4500P-E	SD
General Chemistry - Westborough Lab for sample(s): 01 Batch: WG941646-1										
Solids, Total Suspended	ND		mg/l	5.0	NA	1	-	10/13/16 12:45	121,2540D	DW
General Chemistry - Westborough Lab for sample(s): 01 Batch: WG941664-1										
Cyanide, Total	ND		mg/l	0.005	--	1	10/13/16 11:00	10/13/16 15:11	121,4500CN-CE	JO
General Chemistry - Westborough Lab for sample(s): 01 Batch: WG941679-1										
Phenolics, Total	ND		mg/l	0.030	--	1	10/13/16 09:03	10/13/16 19:01	4,420.1	AW

Project Name: NORTHPOINT
Project Number: 35663
Lab Number: L1632408
Report Date: 10/19/16

Method Blank Analysis
Batch Quality Control

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab for sample(s): 01 Batch: WG942306-1										
TPH, SGT-HEM	ND		mg/l	4.00	--	1	10/14/16 18:00	10/14/16 22:50	74,1664A	ML
General Chemistry - Westborough Lab for sample(s): 01 Batch: WG942777-1										
Phosphorus, Soluble	ND		mg/l	0.010	--	1	10/17/16 10:00	10/17/16 13:06	121,4500P-E	SD

Lab Control Sample Analysis

Batch Quality Control

Project Name: NORTHPOINT

Project Number: 35663

Lab Number: L1632408

Report Date: 10/19/16

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 01 Batch: WG941035-2								
Nitrogen, Nitrite	106		-		90-110	-		20
General Chemistry - Westborough Lab Associated sample(s): 01 Batch: WG941052-1								
Specific Conductance	101		-		99-101	-		
General Chemistry - Westborough Lab Associated sample(s): 01 Batch: WG941055-1								
pH	100		-		99-101	-		5
General Chemistry - Westborough Lab Associated sample(s): 01 Batch: WG941059-2								
Chlorine, Total Residual	97		-		90-110	-		
General Chemistry - Westborough Lab Associated sample(s): 01 Batch: WG941084-2								
Chromium, Hexavalent	104		-		85-115	-		20
General Chemistry - Westborough Lab Associated sample(s): 01 Batch: WG941142-2								
Solids, Total Dissolved	92		-		80-120	-		
General Chemistry - Westborough Lab Associated sample(s): 01 Batch: WG941257-3								
Alkalinity, Total	104		-		90-110	-		10

Lab Control Sample Analysis

Batch Quality Control

Project Name: NORTHPOINT
Project Number: 35663

Lab Number: L1632408
Report Date: 10/19/16

Parameter	LCS %Recovery	LCSD %Recovery	%Recovery Limits	RPD	RPD Limits
Anions by Ion Chromatography - Westborough Lab Associated sample(s): 01 Batch: WG941476-2					
Chloride	98	-	90-110	-	
Nitrogen, Nitrate	96	-	90-110	-	
Sulfate	107	-	90-110	-	
General Chemistry - Westborough Lab Associated sample(s): 01 Batch: WG941637-2					
Phosphorus, Total	115	-	80-120	-	
General Chemistry - Westborough Lab Associated sample(s): 01 Batch: WG941664-2					
Cyanide, Total	97	-	90-110	-	
General Chemistry - Westborough Lab Associated sample(s): 01 Batch: WG941679-2					
Phenolics, Total	86	-	70-130	-	
General Chemistry - Westborough Lab Associated sample(s): 01 Batch: WG942306-2					
TPH	90	-	64-132	-	34
General Chemistry - Westborough Lab Associated sample(s): 01 Batch: WG942777-2					
Phosphorus, Soluble	102	-	80-120	-	

Matrix Spike Analysis
Batch Quality Control

Project Name: NORTHPOINT
Project Number: 35663

Lab Number: L1632408
Report Date: 10/19/16

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 01 QC Batch ID: WG941035-4 QC Sample: L1632355-01 Client ID: MS Sample												
Nitrogen, Nitrite	ND	4	4.2	105		-	-		80-120	-		20
General Chemistry - Westborough Lab Associated sample(s): 01 QC Batch ID: WG941084-4 QC Sample: L1632408-01 Client ID: VES-J/K-215 (MW)												
Chromium, Hexavalent	ND	0.1	0.108	108		-	-		85-115	-		20
General Chemistry - Westborough Lab Associated sample(s): 01 QC Batch ID: WG941257-4 QC Sample: L1632408-01 Client ID: VES-J/K-215 (MW)												
Alkalinity, Total	235	100	333	98		-	-		86-116	-		10
Anions by Ion Chromatography - Westborough Lab Associated sample(s): 01 QC Batch ID: WG941476-3 QC Sample: L1632451-02 Client ID: MS Sample												
Chloride	ND	4	4.50	113		-	-		40-151	-		18
Nitrogen, Nitrate	ND	0.4	0.388	97		-	-		80-122	-		15
Sulfate	ND	8	9.15	114		-	-		60-140	-		20
General Chemistry - Westborough Lab Associated sample(s): 01 QC Batch ID: WG941637-3 QC Sample: L1631797-01 Client ID: MS Sample												
Phosphorus, Total	49.9	0.5	48.6	**0**	Q	-	-		75-125	-		20
General Chemistry - Westborough Lab Associated sample(s): 01 QC Batch ID: WG941664-4 QC Sample: L1632260-02 Client ID: MS Sample												
Cyanide, Total	ND	0.2	0.191	96		-	-		90-110	-		30
General Chemistry - Westborough Lab Associated sample(s): 01 QC Batch ID: WG941679-4 QC Sample: L1600010-50 Client ID: MS Sample												
Phenolics, Total	0.033	0.4	0.39	89		-	-		70-130	-		20
General Chemistry - Westborough Lab Associated sample(s): 01 QC Batch ID: WG942306-4 QC Sample: L1632356-01 Client ID: MS Sample												
TPH	ND	20.4	17.1	84		-	-		64-132	-		34

Matrix Spike Analysis
Batch Quality Control

Project Name: NORTHPOINT
Project Number: 35663

Lab Number: L1632408
Report Date: 10/19/16

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	MSD Found	MSD %Recovery	Recovery Limits	RPD	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 01 QC Batch ID: WG942777-3 QC Sample: L1632345-10 Client ID: MS Sample									
Phosphorus, Soluble	0.025	0.5	0.561	107	-	-	75-125	-	20

Lab Duplicate Analysis
Batch Quality Control

Project Name: NORTHPOINT
Project Number: 35663

Lab Number: L1632408
Report Date: 10/19/16

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 01 QC Batch ID: WG941035-3 QC Sample: L1632355-01 Client ID: DUP Sample						
Nitrogen, Nitrite	ND	ND	mg/l	NC		20
General Chemistry - Westborough Lab Associated sample(s): 01 QC Batch ID: WG941052-2 QC Sample: L1632408-01 Client ID: VES-J/K-215 (MW)						
Specific Conductance @ 25 C	11000	11000	umhos/cm	0		20
General Chemistry - Westborough Lab Associated sample(s): 01 QC Batch ID: WG941055-2 QC Sample: L1632408-01 Client ID: VES-J/K-215 (MW)						
pH (H)	8.0	8.0	SU	0		5
General Chemistry - Westborough Lab Associated sample(s): 01 QC Batch ID: WG941059-3 QC Sample: L1632408-01 Client ID: VES-J/K-215 (MW)						
Chlorine, Total Residual	ND	ND	mg/l	NC		20
General Chemistry - Westborough Lab Associated sample(s): 01 QC Batch ID: WG941084-3 QC Sample: L1632408-01 Client ID: VES-J/K-215 (MW)						
Chromium, Hexavalent	ND	ND	mg/l	NC		20
General Chemistry - Westborough Lab Associated sample(s): 01 QC Batch ID: WG941142-3 QC Sample: L1632185-01 Client ID: DUP Sample						
Solids, Total Dissolved	9800	10000	mg/l	2		17
General Chemistry - Westborough Lab Associated sample(s): 01 QC Batch ID: WG941252-2 QC Sample: L1632408-01 Client ID: VES-J/K-215 (MW)						
Alkalinity, Carbonate	ND	ND	mg CaCO3/L	NC		
General Chemistry - Westborough Lab Associated sample(s): 01 QC Batch ID: WG941254-2 QC Sample: L1632408-01 Client ID: VES-J/K-215 (MW)						
Alkalinity, Bicarbonate	234	234	mg CaCO3/L	0		
General Chemistry - Westborough Lab Associated sample(s): 01 QC Batch ID: WG941256-2 QC Sample: L1632408-01 Client ID: VES-J/K-215 (MW)						
Alkalinity, Hydroxide	ND	ND	mg CaCO3/L	NC		

Lab Duplicate Analysis
Batch Quality Control

Project Name: NORTHPOINT
Project Number: 35663

Lab Number: L1632408
Report Date: 10/19/16

Parameter	Native Sample	Duplicate Sample	Units	RPD	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 01 QC Batch ID: WG941257-2 QC Sample: L1632408-01 Client ID: VES-J/K-215 (MW)					
Alkalinity, Total	235	234	mg CaCO3/L	0	10
Anions by Ion Chromatography - Westborough Lab Associated sample(s): 01 QC Batch ID: WG941476-4 QC Sample: L1632451-02 Client ID: DUP Sample					
Chloride	ND	ND	mg/l	NC	18
Nitrogen, Nitrate	ND	ND	mg/l	NC	15
Sulfate	ND	1.00	mg/l	NC	20
General Chemistry - Westborough Lab Associated sample(s): 01 QC Batch ID: WG941637-4 QC Sample: L1631797-01 Client ID: DUP Sample					
Phosphorus, Total	49.9	44.9	mg/l	11	20
General Chemistry - Westborough Lab Associated sample(s): 01 QC Batch ID: WG941646-2 QC Sample: L1632412-01 Client ID: DUP Sample					
Solids, Total Suspended	32	38	mg/l	17	29
General Chemistry - Westborough Lab Associated sample(s): 01 QC Batch ID: WG941679-3 QC Sample: L1600010-50 Client ID: DUP Sample					
Phenolics, Total	0.033	0.034	mg/l	3	20
General Chemistry - Westborough Lab Associated sample(s): 01 QC Batch ID: WG942306-3 QC Sample: L1632356-01 Client ID: DUP Sample					
TPH	ND	ND	mg/l	NC	34
General Chemistry - Westborough Lab Associated sample(s): 01 QC Batch ID: WG942777-4 QC Sample: L1632345-06 Client ID: DUP Sample					
Phosphorus, Soluble	0.017	0.014	mg/l	19	20

Project Name: NORTHPOINT
Project Number: 35663

Lab Number: L1632408
Report Date: 10/19/16

Sample Receipt and Container Information

Were project specific reporting limits specified? YES

Cooler Information Custody Seal

Cooler	
A	Absent

Container Information

Container ID	Container Type	Cooler	pH	Temp deg C	Pres	Seal	Analysis(*)
L1632408-01A	Vial Na2S2O3 preserved	A	N/A	2.9	Y	Absent	624(3)
L1632408-01B	Vial Na2S2O3 preserved	A	N/A	2.9	Y	Absent	624(3)
L1632408-01C	Vial Na2S2O3 preserved	A	N/A	2.9	Y	Absent	624(3)
L1632408-01D	Vial Na2S2O3 preserved	A	N/A	2.9	Y	Absent	504(14)
L1632408-01E	Vial Na2S2O3 preserved	A	N/A	2.9	Y	Absent	504(14)
L1632408-01F	Plastic 250ml HNO3 preserved	A	<2	2.9	Y	Absent	SE-6020T(180),CA-6020T(180),CR-6020T(180),K-6020T(180),CU-6020T(180),NA-6020T(180),ZN-6020T(180),FE-UI(180),HARDU(180),PB-6020T(180),BE-6020T(180),HG-U(28),MN-6020T(180),AS-6020T(180),B-UI(180),CD-6020T(180),MG-6020T(180)
L1632408-01G	Plastic 250ml NaOH preserved	A	<2	2.9	Y	Absent	TCN-4500(14)
L1632408-01H	Plastic 250ml H2SO4 preserved	A	<2	2.9	Y	Absent	TPHOS-4500(28)
L1632408-01I	Amber 1000ml unpreserved	A	8	2.9	Y	Absent	8270TCL(7),8270TCL-SIM(7)
L1632408-01J	Amber 1000ml unpreserved	A	8	2.9	Y	Absent	8270TCL(7),8270TCL-SIM(7)
L1632408-01K	Amber 1000ml HCl preserved	A	N/A	2.9	Y	Absent	TPH-1664(28)
L1632408-01L	Amber 1000ml HCl preserved	A	N/A	2.9	Y	Absent	TPH-1664(28)
L1632408-01M	Amber 1000ml Na2S2O3	A	8	2.9	Y	Absent	PESTICIDE-608(7)
L1632408-01N	Amber 1000ml Na2S2O3	A	8	2.9	Y	Absent	PESTICIDE-608(7)
L1632408-01O	Amber 950ml H2SO4 preserved	A	<2	2.9	Y	Absent	TPHENOL-420(28)
L1632408-01P	Plastic 950ml unpreserved	A	8	2.9	Y	Absent	SO4-300(28),CL-300(28),HEXCR-3500(1),NO2-353(2),NO3-300(2),TRC-4500(1),COND-2510(1),PH-4500(.01),TDS-2540(7)
L1632408-01Q	Amber 1000ml unpreserved	A	8	2.9	Y	Absent	SO4-300(28),CL-300(28),HEXCR-3500(1),NO2-353(2),NO3-300(2),TRC-4500(1),COND-2510(1),PH-4500(.01),TDS-2540(7)
L1632408-01R	Plastic 950ml unpreserved	A	8	2.9	Y	Absent	TSS-2540(7)
L1632408-01S	Plastic 250ml unpreserved w/No H	A	N/A	2.9	Y	Absent	ALK-T-2320(14),ALK-HCO3-2320(14),ALK-OH-2320(14),ALK-CO3-2320(14)

*Values in parentheses indicate holding time in days

Project Name: NORTHPOINT
Project Number: 35663

Lab Number: L1632408
Report Date: 10/19/16

Container Information

Container ID	Container Type	Cooler	pH	Temp deg C	Pres	Seal	Analysis(*)
L1632408-01T	Plastic 250ml unpreserved w/No H	A	N/A	2.9	Y	Absent	ALK-T-2320(14),ALK-HCO3-2320(14),ALK-OH-2320(14),ALK-CO3-2320(14)
L1632408-01U	Plastic 250ml unpreserved	A	8	2.9	Y	Absent	SPHOS-4500(28)
L1632408-01U9	Plastic 250ml H2SO4 preserved Fi	A	N/A	2.9	Y	Absent	SPHOS-4500(28)
L1632408-01V	Plastic 250ml unpreserved	A	8	2.9	Y	Absent	ARCHIVE()
L1632408-01W	Plastic 250ml unpreserved	A	8	2.9	Y	Absent	ARCHIVE()
L1632408-01X	Plastic 250ml unpreserved	A	8	2.9	Y	Absent	ARCHIVE()
L1632408-02A	Vial Na2S2O3 preserved	A	N/A	2.9	Y	Absent	HOLD-624(3)
L1632408-02B	Vial Na2S2O3 preserved	A	N/A	2.9	Y	Absent	HOLD-624(3)
L1632408-02C	Vial Na2S2O3 preserved	A	N/A	2.9	Y	Absent	HOLD-504/8011(14)
L1632408-02D	Vial Na2S2O3 preserved	A	N/A	2.9	Y	Absent	HOLD-504/8011(14)

*Values in parentheses indicate holding time in days

Project Name:	NORTHPOINT	**Lab Number:**	L1632408
Project Number:	35663	**Report Date:**	10/19/16

GLOSSARY

Acronyms

EDL	- Estimated Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The EDL includes any adjustments from dilutions, concentrations or moisture content, where applicable. The use of EDLs is specific to the analysis of PAHs using Solid-Phase Microextraction (SPME).
EPA	- Environmental Protection Agency.
LCS	- Laboratory Control Sample: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
LCSD	- Laboratory Control Sample Duplicate: Refer to LCS.
LFB	- Laboratory Fortified Blank: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
MDL	- Method Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The MDL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
MS	- Matrix Spike Sample: A sample prepared by adding a known mass of target analyte to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available.
MSD	- Matrix Spike Sample Duplicate: Refer to MS.
NA	- Not Applicable.
NC	- Not Calculated: Term is utilized when one or more of the results utilized in the calculation are non-detect at the parameter's reporting unit.
NDPA/DPA	- N-Nitrosodiphenylamine/Diphenylamine.
NI	- Not Ignitable.
NP	- Non-Plastic: Term is utilized for the analysis of Atterberg Limits in soil.
RL	- Reporting Limit: The value at which an instrument can accurately measure an analyte at a specific concentration. The RL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
RPD	- Relative Percent Difference: The results from matrix and/or matrix spike duplicates are primarily designed to assess the precision of analytical results in a given matrix and are expressed as relative percent difference (RPD). Values which are less than five times the reporting limit for any individual parameter are evaluated by utilizing the absolute difference between the values; although the RPD value will be provided in the report.
SRM	- Standard Reference Material: A reference sample of a known or certified value that is of the same or similar matrix as the associated field samples.
STLP	- Semi-dynamic Tank Leaching Procedure per EPA Method 1315.
TIC	- Tentatively Identified Compound: A compound that has been identified to be present and is not part of the target compound list (TCL) for the method and/or program. All TICs are qualitatively identified and reported as estimated concentrations.

Footnotes

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

Terms

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

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

Data Qualifiers

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

Report Format: Data Usability Report

Project Name:	NORTHPOINT	**Lab Number:**	L1632408
Project Number:	35663	**Report Date:**	10/19/16

Data Qualifiers

reporting limit for common lab contaminants (Phthalates, Acetone, Methylene Chloride, 2-Butanone).

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

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

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

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

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

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

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

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

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

Q - The quality control sample exceeds the associated acceptance criteria. For DOD-related projects, LCS and/or Continuing Calibration Standard exceedences are also qualified on all associated sample results. Note: This flag is not applicable for matrix spike recoveries when the sample concentration is greater than 4x the spike added or for batch duplicate RPD when the sample concentrations are less than 5x the RL. (Metals only.)

R - Analytical results are from sample re-analysis.

RE - Analytical results are from sample re-extraction.

S - Analytical results are from modified screening analysis.

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

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

Report Format: Data Usability Report

Project Name:	NORTHPOINT	**Lab Number:**	L1632408
Project Number:	35663	**Report Date:**	10/19/16

REFERENCES

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

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

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

5 Methods for the Organic Chemical Analysis of Municipal and Industrial Wastewater. Appendix A, Part 136, 40 CFR (Code of Federal Regulations).

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

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

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

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

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

LIMITATION OF LIABILITIES

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

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

Certification Information

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

Westborough Facility
EPA 624: m/p-xylene, o-xylene
EPA 8260C: NPW: 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene, Azobenzene; SCM: Iodomethane (methyl iodide), Methyl methacrylate, 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene.
EPA 8270D: NPW: Dimethylnaphthalene,1,4-Diphenylhydrazine; SCM: Dimethylnaphthalene,1,4-Diphenylhydrazine.
EPA 300: DW: Bromide
EPA 6860: NPW and SCM: Perchlorate
EPA 9010: NPW and SCM: Amenable Cyanide Distillation
EPA 9012B: NPW: Total Cyanide
EPA 9050A: NPW: Specific Conductance
SM3500: NPW: Ferrous Iron
SM4500: NPW: Amenable Cyanide, Dissolved Oxygen; SCM: Total Phosphorus, TKN, NO2, NO3.
SM5310C: DW: Dissolved Organic Carbon

Mansfield Facility
SM 2540D: TSS
EPA 3005A NPW
EPA 8082A: NPW: PCB: 1, 5, 31, 87,101, 110, 141, 151, 153, 180, 183, 187.
EPA TO-15: Halothane, 2,4,4-Trimethyl-2-pentene, 2,4,4-Trimethyl-1-pentene, Thiophene, 2-Methylthiophene, 3-Methylthiophene, 2-Ethylthiophene, 1,2,3-Trimethylbenzene, Indan, Indene, 1,2,4,5-Tetramethylbenzene, Benzothiophene, 1-Methylnaphthalene.
Biological Tissue Matrix: ***EPA 3050B***

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

Westborough Facility:

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

Non-Potable Water
SM4500H,B, EPA 120.1, SM2510B, SM2540C, SM2320B, SM4500CL-E, SM4500F-BC, SM4500NH3-BH, **EPA 350.1**: Ammonia-N, **LACHAT 10-107-06-1-B**: Ammonia-N, **SM4500NO3-F, EPA 353.2**: Nitrate-N**, EPA 351.1, SM4500P-E, SM4500P-B, E, SM4500SO4-E, SM5220D, EPA 410.4, SM5210B, SM5310C, SM4500CL-D, EPA 1664, EPA 420.1, SM4500-CN-CE, SM2540D.**
EPA 624: Volatile Halocarbons & Aromatics,
EPA 608: Chlordane, Toxaphene, Aldrin, alpha-BHC, beta-BHC, gamma-BHC, delta-BHC, Dieldrin, DDD, DDE, DDT, Endosulfan I, Endosulfan II, Endosulfan sulfate, Endrin, Endrin Aldehyde, Heptachlor, Heptachlor Epoxide, PCBs
EPA 625: SVOC (Acid/Base/Neutral Extractables), **EPA 600/4-81-045**: PCB-Oil.
Microbiology: **SM9223B-Colilert-QT; Enterolert-QT, SM9222D-MF**.

Mansfield Facility:

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

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

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

CHAIN OF CUSTODY

PAGE 1 OF 3

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

Date Rec'd in Lab: 10/11/16

ALPHA Job #: L1632408

Client Information

Client: The Vertex Companies
Address: 1 Congress St., 10th Fl, Boston, MA
Phone: 617-
Email: jfreeman@vertexeng.com; kmelling@vertexeng.com

Project Information

Project Name: Northpoint
Project Location: Cambridge, MA
Project #: 35663
Project Manager: Jesse Freeman
ALPHA Quote #: 2013

Turn-Around Time

[X] Standard [ ] RUSH (only confirmed if pre-approved!)
Date Due: 5-day TAT

Report Information - Data Deliverables

[X] ADEx [X] EMAIL

Billing Information

[X] Same as Client info PO #:

Regulatory Requirements & Project Information Requirements

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

Additional Project Information:

* only run 624 2-Chloroethyl vinyl ether, acrolein screen, + acrylonitrile screen from the 624 1st

ANALYSIS

- VOC: [ ] 8260 [X] 624 [ ] 524.2 *see note
- SVOC: [ ] ABN [ ] PAH 8270 SIM
- METALS: [ ] MCP 13 [ ] MCP 14 [ ] RCP 15
- METALS: [ ] RCRA5 [ ] RCRA8 [ ] PP13
- EPH: [ ] Ranges & Targets [ ] Ranges Only
- VPH: [ ] Ranges & Targets [ ] Ranges Only
- [ ] PCB [X] PEST
- TPH: [X] Quant Only [ ] Fingerprint 1664
- EDB SIM
- TCN
- Total metals: As, B, Be, Cd, Ca, Cr, Cu, Fe, Pb, Mg, Mn, Hg, K, Na, Se, Zn, + hex Cr
- Hardness
- Phenols

SAMPLE INFO
Filtration: [ ] Field [ ] Lab to do
Preservation: [ ] Lab to do

ALPHA Lab ID (Lab Use Only)	Sample ID	Collection Date	Collection Time	Sample Matrix	Sampler Initials	VOC	SVOC	METALS	METALS	EPH	VPH	PCB	TPH	EDB SIM	TCN	Total metals	Hardness	Phenols	Sample Comments	TOTAL # BOTTLES
32408-01	VES-J/K-215 (MW)					X	X					X	X	X	X	X	X	X		

Container Type	
Container Type	
Preservative	D

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

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

Relinquished By:	Date/Time	Received By:	Date/Time
Stephanie Lynch	10/11/16 14:50	[signature] AAL	10/11/16 14:50
[signature] AAL	10/11/16 17:20	[signature]	10/11/16 17:20

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

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

CHAIN OF CUSTODY

PAGE 2 OF 3

Date Rec'd in Lab: 10/11/16

ALPHA Job #: L1632408

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

Project Information
Project Name: Northpoint
Project Location: Cambridge, MA
Project #: 350603
Project Manager: Jesse Freeman
ALPHA Quote #:

Report Information - Data Deliverables
X ADEx X EMAIL

Billing Information
X Same as Client info PO #:

Client Information
Client: The Vertex Companies
Address: 1 Congress St., 10th Fl. Boston, MA
Phone:
Email: jfreeman@vertexeng.com rsnelling@vertexeng.com

Turn-Around Time
☐ Standard ☐ RUSH (only confirmed if pre-approved!)
Date Due:

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

Additional Project Information:

ANALYSIS
VOC: ☐ 8260 ☐ 624 ☐ 524.2
SVOC: ☐ ABN ☐ PAH
METALS: ☐ MCP 13 ☐ MCP 14 ☐ RCP 15
METALS: ☐ RCRA5 ☐ RCRA8 ☐ PP13
EPH: ☐ Ranges & Targets ☐ Ranges Only
VPH: ☐ Ranges & Targets ☐ Ranges Only
☐ PCB ☐ PEST
TPH: ☐ Quant Only ☐ Fingerprint
TDS, chloride, sulfate, nitrate, nitrite, conductivity, pH, TRC, TSS, alkalinity (all kinds), carbonate + bicarbonate

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

ALPHA Lab ID (Lab Use Only)	Sample ID	Collection Date	Collection Time	Sample Matrix	Sampler Initials	Sample Comments	TOTAL # BOTTLES
32408-01	VES-J/K-215(MW)						

Container Type										A	A	A	B	P	P		
Preservative										A	A	A	A	A	A		

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

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

Relinquished By:	Date/Time	Received By:	Date/Time
Stephanie Lynn	10/11/16 14:50	AAL	10/11/16 14:50
AAL	10/11/16 17:20		10/11/16 17:20

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

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

CHAIN OF CUSTODY

PAGE 3 OF 3

Date Rec'd in Lab:

ALPHA Job #: L1632408

ALPHA ANALYTICAL

8 Walkup Drive, Westboro, MA 01581, Tel: 508-898-9220

320 Forbes Blvd, Mansfield, MA 02048, Tel: 508-822-9300

Project Information

Project Name: Northpoint

Project Location: Cambridge, MA

Project #: 356603

Project Manager: Jesse Freeman

ALPHA Quote #:

Report Information - Data Deliverables

☒ ADEx ☒ EMAIL

Billing Information

☒ Same as Client info PO #:

Client Information

Client: The Vertex Companies

Address: 1 Congress St., 10th Fl Boston, MA

Phone:

Email: jfreeman@vertexeng.com, rsnulling@vertexeng.com

Additional Project Information:

Regulatory Requirements & Project Information Requirements

☐ Yes ☒ No MA MCP Analytical Methods ☐ Yes ☒ No CT RCP Analytical Methods

☐ Yes ☒ No Matrix Spike Required on this SDG? (Required for MCP Inorganics)

☐ Yes ☒ No GW1 Standards (Info Required for Metals & EPH with Targets)

☒ Yes ☐ No NPDES RGP

☐ Other State /Fed Program ____ Criteria ____

Turn-Around Time

☐ Standard ☐ RUSH *(only confirmed if pre-approved!)*

Date Due:

ANALYSIS: VOC: ☐ 8260 ☐ 624 ☐ 524.2; SVOC: ☐ ABN ☐ PAH; METALS: ☐ MCP 13 ☐ MCP 14 ☐ RCP 15; METALS: ☐ RCRA5 ☐ RCRA8 ☐ PP13; EPH: ☐ Ranges & Targets ☐ Ranges Only; VPH: ☐ Ranges & Targets ☐ Ranges Only; ☐ PCB ☐ PEST; TPH: ☐ Quant Only ☐ Fingerprint; soluble phosphorus; total phosphorus

SAMPLE INFO: Filtration ☒ Field (sol. P) ☒ Lab to do (Sol. P); Preservation ☒ Lab to do (tot. P)

ALPHA Lab ID (Lab Use Only)	Sample ID	Collection Date	Collection Time	Sample Matrix	Sampler Initials	soluble phosphorus	total phosphorus	Sample Comments	TOTAL # BOTTLES
32408-9	VES-J/K-215(MW)					X	X		

	soluble phosphorus	total phosphorus
Container Type	P	P
Preservative	A	A

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

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

Relinquished By:	Date/Time	Received By:	Date/Time
Stephanie [signature]	10/11/16 14:50	[signature] AAL	10/11/16 14:50
[signature] AAL	10/11/16 17:20	[signature]	10/11/16 17:20

ANALYTICAL REPORT

Lab Number:	L1806947
Client:	Vertex Environmental Services, Inc. 100 North Washington Street Suite 302 Boston, MA 02114
ATTN:	Jesse Freeman
Phone:	(781) 952-6000
Project Name:	CAMBRIDGE CROSSING-E/F
Project Number:	35663
Report Date:	11/27/18

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

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

Project Name: CAMBRIDGE CROSSING-E/F
Project Number: 35663

Lab Number: L1806947
Report Date: 11/27/18

Alpha Sample ID	Client ID	Matrix	Sample Location	Collection Date/Time	Receive Date
L1806947-01	VES-E/F-225(MW)	WATER	CAMBRIDGE, MA	02/28/18 13:55	02/28/18

Project Name:	CAMBRIDGE CROSSING-E/F	**Lab Number:**	L1806947
Project Number:	35663	**Report Date:**	11/27/18

Case Narrative

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

Results contained within this report relate only to the samples submitted under this Alpha Lab Number and meet NELAP requirements for all NELAP accredited parameters unless otherwise noted in the following narrative. The data presented in this report is organized by parameter (i.e. VOC, SVOC, etc.). Sample specific Quality Control data (i.e. Surrogate Spike Recovery) is reported at the end of the target analyte list for each individual sample, followed by the Laboratory Batch Quality Control at the end of each parameter. Tentatively Identified Compounds (TICs), if requested, are reported for compounds identified to be present and are not part of the method/program Target Compound List, even if only a subset of the TCL are being reported. If a sample was re-analyzed or re-extracted due to a required quality control corrective action and if both sets of data are reported, the Laboratory ID of the re-analysis or re-extraction is designated with an "R" or "RE", respectively. When multiple Batch Quality Control elements are reported (e.g. more than one LCS), the associated samples for each element are noted in the grey shaded header line of each data table. Any Laboratory Batch, Sample Specific % recovery or RPD value that is outside the listed Acceptance Criteria is bolded in the report. All specific QC information is also incorporated in the Data Usability format of our Data Merger tool where it can be reviewed along with any associated usability implications. Soil/sediments, solids and tissues are reported on a dry weight basis unless otherwise noted. Definitions of all data qualifiers and acronyms used in this report are provided in the Glossary located at the back of the report.

In reference to questions H (CAM) or 4 (RCP) when "NO" is checked, the performance criteria for CAM and RCP methods allow for some quality control failures to occur and still be within method compliance. In these instances the specific failure is not narrated but noted in the associated QC table. The information is also incorporated in the Data Usability format of our Data Merger tool where it can be reviewed along with any associated usability implications.

Please see the associated ADEx data file for a comparison of laboratory reporting limits that were achieved with the regulatory Numerical Standards requested on the Chain of Custody.

HOLD POLICY

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

Please contact Client Services at 800-624-9220 with any questions.

Project Name:	CAMBRIDGE CROSSING-E/F	**Lab Number:**	L1806947
Project Number:	35663	**Report Date:**	11/27/18

Case Narrative (continued)

Report Revision

November 27, 2018: The Semivolatile Organics reporting list has been amended.

Hexavalent Chromium

L1806947-01: The sample has an elevated detection limit due to the dilution required by the sample matrix. The WG1093332-4 MS recovery, performed on L1806947-01, is outside the acceptance criteria for (0%); however, the associated LCS recovery is within criteria. No further action was taken.

Report Submission

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

Hexavalent Chromium

L1806947-01: The sample has an elevated detection limit due to the dilution required by the sample matrix. The WG1093332-4 MS recovery (0%), performed on L1806947-01, is outside the acceptance criteria; however, the associated LCS recovery is within criteria. No further action was taken.

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

Authorized Signature: Cristin Walker

Title: Technical Director/Representative Date: 11/27/18

ORGANICS

VOLATILES

Project Name: CAMBRIDGE CROSSING-E/F **Lab Number:** L1806947

Project Number: 35663 **Report Date:** 11/27/18

SAMPLE RESULTS

Lab ID: L1806947-01 Date Collected: 02/28/18 13:55
Client ID: VES-E/F-225(MW) Date Received: 02/28/18
Sample Location: CAMBRIDGE, MA Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 1,8260C
Analytical Date: 03/06/18 10:04
Analyst: MM

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by GC/MS - Westborough Lab						
Methylene chloride	ND		ug/l	3.0	--	1
1,1-Dichloroethane	ND		ug/l	0.75	--	1
Carbon tetrachloride	ND		ug/l	0.50	--	1
1,1,2-Trichloroethane	ND		ug/l	0.75	--	1
Tetrachloroethene	ND		ug/l	0.50	--	1
1,2-Dichloroethane	ND		ug/l	0.50	--	1
1,1,1-Trichloroethane	ND		ug/l	0.50	--	1
Benzene	ND		ug/l	0.50	--	1
Toluene	ND		ug/l	0.75	--	1
Ethylbenzene	ND		ug/l	0.50	--	1
Vinyl chloride	ND		ug/l	1.0	--	1
1,1-Dichloroethene	ND		ug/l	0.50	--	1
Trichloroethene	ND		ug/l	0.50	--	1
1,2-Dichlorobenzene	ND		ug/l	2.5	--	1
1,3-Dichlorobenzene	ND		ug/l	2.5	--	1
1,4-Dichlorobenzene	ND		ug/l	2.5	--	1
Methyl tert butyl ether	ND		ug/l	1.0	--	1
p/m-Xylene	ND		ug/l	1.0	--	1
o-Xylene	ND		ug/l	1.0	--	1
Xylenes, Total	ND		ug/l	1.0	--	1
cis-1,2-Dichloroethene	ND		ug/l	0.50	--	1
Acetone	ND		ug/l	5.0	--	1
Tert-Butyl Alcohol	ND		ug/l	10	--	1
Tertiary-Amyl Methyl Ether	ND		ug/l	2.0	--	1

Project Name: CAMBRIDGE CROSSING-E/F **Lab Number:** L1806947

Project Number: 35663 **Report Date:** 11/27/18

SAMPLE RESULTS

Lab ID: L1806947-01 Date Collected: 02/28/18 13:55

Client ID: VES-E/F-225(MW) Date Received: 02/28/18

Sample Location: CAMBRIDGE, MA Field Prep: Not Specified

Sample Depth:

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

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	107		70-130
Toluene-d8	98		70-130
4-Bromofluorobenzene	101		70-130
Dibromofluoromethane	102		70-130

Project Name: CAMBRIDGE CROSSING-E/F
Lab Number: L1806947
Project Number: 35663
Report Date: 11/27/18

SAMPLE RESULTS

Lab ID: L1806947-01
Client ID: VES-E/F-225(MW)
Sample Location: CAMBRIDGE, MA

Date Collected: 02/28/18 13:55
Date Received: 02/28/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 1,8260C-SIM(M)
Analytical Date: 03/06/18 10:04
Analyst: MM

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by GC/MS-SIM - Westborough Lab						
1,4-Dioxane	ND		ug/l	3.0	--	1

Project Name: CAMBRIDGE CROSSING-E/F
Lab Number: L1806947
Project Number: 35663
Report Date: 11/27/18

SAMPLE RESULTS

Lab ID: L1806947-01
Client ID: VES-E/F-225(MW)
Sample Location: CAMBRIDGE, MA

Date Collected: 02/28/18 13:55
Date Received: 02/28/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 14,504.1
Analytical Date: 03/05/18 12:38
Analyst: NS

Extraction Method: EPA 504.1
Extraction Date: 03/05/18 10:19

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

Project Name: CAMBRIDGE CROSSING-E/F
Project Number: 35663
Lab Number: L1806947
Report Date: 11/27/18

Method Blank Analysis
Batch Quality Control

Analytical Method: 14,504.1
Analytical Date: 03/05/18 11:50
Analyst: NS

Extraction Method: EPA 504.1
Extraction Date: 03/05/18 10:19

Parameter	Result	Qualifier	Units	RL	MDL	
Microextractables by GC - Westborough Lab for sample(s): 01 Batch: WG1094492-1						
1,2-Dibromoethane	ND		ug/l	0.010	--	A

Project Name: CAMBRIDGE CROSSING-E/F
Project Number: 35663
Lab Number: L1806947
Report Date: 11/27/18

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8260C-SIM(M)
Analytical Date: 03/06/18 06:17
Analyst: MM

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by GC/MS-SIM - Westborough Lab for sample(s): 01 Batch: WG1094887-5					
1,4-Dioxane	ND		ug/l	3.0	--

Project Name: CAMBRIDGE CROSSING-E/F **Lab Number:** L1806947

Project Number: 35663 **Report Date:** 11/27/18

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8260C
Analytical Date: 03/06/18 06:17
Analyst: MM

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by GC/MS - Westborough Lab for sample(s): 01 Batch: WG1094892-5					
Methylene chloride	ND		ug/l	3.0	--
1,1-Dichloroethane	ND		ug/l	0.75	--
Carbon tetrachloride	ND		ug/l	0.50	--
1,1,2-Trichloroethane	ND		ug/l	0.75	--
Tetrachloroethene	ND		ug/l	0.50	--
1,2-Dichloroethane	ND		ug/l	0.50	--
1,1,1-Trichloroethane	ND		ug/l	0.50	--
Benzene	ND		ug/l	0.50	--
Toluene	ND		ug/l	0.75	--
Ethylbenzene	ND		ug/l	0.50	--
Vinyl chloride	ND		ug/l	1.0	--
1,1-Dichloroethene	ND		ug/l	0.50	--
Trichloroethene	ND		ug/l	0.50	--
1,2-Dichlorobenzene	ND		ug/l	2.5	--
1,3-Dichlorobenzene	ND		ug/l	2.5	--
1,4-Dichlorobenzene	ND		ug/l	2.5	--
Methyl tert butyl ether	ND		ug/l	1.0	--
p/m-Xylene	ND		ug/l	1.0	--
o-Xylene	ND		ug/l	1.0	--
Xylenes, Total	ND		ug/l	1.0	--
cis-1,2-Dichloroethene	ND		ug/l	0.50	--
Acetone	ND		ug/l	5.0	--
Tert-Butyl Alcohol	ND		ug/l	10	--
Tertiary-Amyl Methyl Ether	ND		ug/l	2.0	--

Project Name: CAMBRIDGE CROSSING-E/F **Lab Number:** L1806947

Project Number: 35663 **Report Date:** 11/27/18

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8260C
Analytical Date: 03/06/18 06:17
Analyst: MM

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by GC/MS - Westborough Lab for sample(s): 01 Batch: WG1094892-5					

Surrogate	%Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	101		70-130
Toluene-d8	100		70-130
4-Bromofluorobenzene	103		70-130
Dibromofluoromethane	103		70-130

Lab Control Sample Analysis

Batch Quality Control

Project Name: CAMBRIDGE CROSSING-E/F

Project Number: 35663

Lab Number: L1806947

Report Date: 11/27/18

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits	Column
Microextractables by GC - Westborough Lab	Associated sample(s): 01		Batch: WG1094492-2						
1,2-Dibromoethane	90		-		80-120	-			A

Lab Control Sample Analysis

Batch Quality Control

Project Name: CAMBRIDGE CROSSING-E/F

Project Number: 35663

Lab Number: L1806947

Report Date: 11/27/18

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by GC/MS-SIM - Westborough Lab Associated sample(s): 01 Batch: WG1094887-3 WG1094887-4								
1,4-Dioxane	100		110		70-130	10		25

Lab Control Sample Analysis

Batch Quality Control

Project Name: CAMBRIDGE CROSSING-E/F

Project Number: 35663

Lab Number: L1806947

Report Date: 11/27/18

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by GC/MS - Westborough Lab Associated sample(s): 01 Batch: WG1094892-3 WG1094892-4								
Methylene chloride	110		110		70-130	0		20
1,1-Dichloroethane	100		100		70-130	0		20
Carbon tetrachloride	100		110		63-132	10		20
1,1,2-Trichloroethane	100		110		70-130	10		20
Tetrachloroethene	91		99		70-130	8		20
1,2-Dichloroethane	100		100		70-130	0		20
1,1,1-Trichloroethane	100		100		67-130	0		20
Benzene	100		100		70-130	0		25
Toluene	93		99		70-130	6		25
Ethylbenzene	92		96		70-130	4		20
Vinyl chloride	100		110		55-140	10		20
1,1-Dichloroethene	100		110		61-145	10		25
Trichloroethene	100		110		70-130	10		25
1,2-Dichlorobenzene	93		96		70-130	3		20
1,3-Dichlorobenzene	98		98		70-130	0		20
1,4-Dichlorobenzene	94		92		70-130	2		20
Methyl tert butyl ether	100		110		63-130	10		20
p/m-Xylene	95		100		70-130	5		20
o-Xylene	90		95		70-130	5		20
cis-1,2-Dichloroethene	98		100		70-130	2		20
Acetone	130		130		58-148	0		20
Tert-Butyl Alcohol	108		108		70-130	0		20
Tertiary-Amyl Methyl Ether	100		100		66-130	0		20

Lab Control Sample Analysis
Batch Quality Control

Project Name: CAMBRIDGE CROSSING-E/F
Project Number: 35663
Lab Number: L1806947
Report Date: 11/27/18

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by GC/MS - Westborough Lab Associated sample(s): 01 Batch: WG1094892-3 WG1094892-4								

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
1,2-Dichloroethane-d4	102		104		70-130
Toluene-d8	99		101		70-130
4-Bromofluorobenzene	101		101		70-130
Dibromofluoromethane	104		99		70-130

Matrix Spike Analysis

Batch Quality Control

Project Name: CAMBRIDGE CROSSING-E/F

Project Number: 35663

Lab Number: L1806947

Report Date: 11/27/18

Parameter	*Native Sample*	*MS Added*	*MS Found*	*MS %Recovery*	*Qual*	*MSD Found*	*MSD %Recovery*	*Qual*	*Recovery Limits*	*RPD*	*Qual*	*RPD Limits*	*Column*
Microextractables by GC - Westborough Lab Associated sample(s): 01 QC Batch ID: WG1094492-3 QC Sample: L1806948-01 Client ID: MS Sample													
1,2-Dibromoethane	ND	0.254	0.270	106		-	-		80-120	-		20	A
1,2-Dibromo-3-chloropropane	ND	0.254	0.277	109		-	-		80-120	-		20	A

SEMIVOLATILES

Project Name: CAMBRIDGE CROSSING-E/F
Lab Number: L1806947
Project Number: 35663
Report Date: 11/27/18

SAMPLE RESULTS

Lab ID: L1806947-01
Client ID: VES-E/F-225(MW)
Sample Location: CAMBRIDGE, MA

Date Collected: 02/28/18 13:55
Date Received: 02/28/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 1,8270D
Analytical Date: 03/06/18 05:12
Analyst: TT

Extraction Method: EPA 3510C
Extraction Date: 03/01/18 01:42

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Bis(2-ethylhexyl)phthalate	ND		ug/l	3.0	--	1
Butyl benzyl phthalate	ND		ug/l	5.0	--	1
Di-n-butylphthalate	ND		ug/l	5.0	--	1
Di-n-octylphthalate	ND		ug/l	5.0	--	1
Diethyl phthalate	ND		ug/l	5.0	--	1
Dimethyl phthalate	ND		ug/l	5.0	--	1
Phenol	10.		ug/l	5.0	--	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Fluorophenol	76		21-120
Phenol-d6	58		10-120
Nitrobenzene-d5	**134**	Q	23-120
2-Fluorobiphenyl	107		15-120
2,4,6-Tribromophenol	109		10-120
4-Terphenyl-d14	93		41-149

Project Name: CAMBRIDGE CROSSING-E/F
Lab Number: L1806947
Project Number: 35663
Report Date: 11/27/18

SAMPLE RESULTS

Lab ID: L1806947-01
Client ID: VES-E/F-225(MW)
Sample Location: CAMBRIDGE, MA

Date Collected: 02/28/18 13:55
Date Received: 02/28/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 1,8270D-SIM
Analytical Date: 03/03/18 19:07
Analyst: KL

Extraction Method: EPA 3510C
Extraction Date: 03/01/18 01:46

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS-SIM - Westborough Lab						
Acenaphthene	13		ug/l	0.10	--	1
Fluoranthene	4.0		ug/l	0.10	--	1
Naphthalene	34	E	ug/l	0.10	--	1
Benzo(a)anthracene	0.64		ug/l	0.10	--	1
Benzo(a)pyrene	0.51		ug/l	0.10	--	1
Benzo(b)fluoranthene	0.61		ug/l	0.10	--	1
Benzo(k)fluoranthene	0.20		ug/l	0.10	--	1
Chrysene	0.59		ug/l	0.10	--	1
Acenaphthylene	0.31		ug/l	0.10	--	1
Anthracene	3.2		ug/l	0.10	--	1
Benzo(ghi)perylene	0.31		ug/l	0.10	--	1
Fluorene	8.2		ug/l	0.10	--	1
Phenanthrene	12		ug/l	0.10	--	1
Dibenzo(a,h)anthracene	ND		ug/l	0.10	--	1
Indeno(1,2,3-cd)pyrene	0.37		ug/l	0.10	--	1
Pyrene	2.8		ug/l	0.10	--	1
Pentachlorophenol	ND		ug/l	0.80	--	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Fluorophenol	65		21-120
Phenol-d6	50		10-120
Nitrobenzene-d5	104		23-120
2-Fluorobiphenyl	101		15-120
2,4,6-Tribromophenol	**142**	Q	10-120
4-Terphenyl-d14	118		41-149

Project Name: CAMBRIDGE CROSSING-E/F
Lab Number: L1806947
Project Number: 35663
Report Date: 11/27/18

SAMPLE RESULTS

Lab ID: L1806947-01 D
Client ID: VES-E/F-225(MW)
Sample Location: CAMBRIDGE, MA

Date Collected: 02/28/18 13:55
Date Received: 02/28/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 1,8270D-SIM
Analytical Date: 03/03/18 19:36
Analyst: KL

Extraction Method: EPA 3510C
Extraction Date: 03/01/18 01:46

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS-SIM - Westborough Lab						
Naphthalene	40		ug/l	0.20	--	2

Project Name: CAMBRIDGE CROSSING-E/F
Project Number: 35663
Lab Number: L1806947
Report Date: 11/27/18

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8270D
Analytical Date: 03/04/18 18:15
Analyst: PS

Extraction Method: EPA 3510C
Extraction Date: 02/28/18 16:16

Parameter	Result	Qualifier	Units	RL	MDL
Semivolatile Organics by GC/MS - Westborough Lab for sample(s): 01 Batch: WG1093149-1					
Bis(2-ethylhexyl)phthalate	ND		ug/l	3.0	--
Butyl benzyl phthalate	ND		ug/l	5.0	--
Di-n-butylphthalate	ND		ug/l	5.0	--
Di-n-octylphthalate	ND		ug/l	5.0	--
Diethyl phthalate	ND		ug/l	5.0	--
Dimethyl phthalate	ND		ug/l	5.0	--
Phenol	ND		ug/l	5.0	--

Surrogate	%Recovery	Qualifier	Acceptance Criteria
2-Fluorophenol	48		21-120
Phenol-d6	37		10-120
Nitrobenzene-d5	91		23-120
2-Fluorobiphenyl	85		15-120
2,4,6-Tribromophenol	82		10-120
4-Terphenyl-d14	98		41-149

Project Name: CAMBRIDGE CROSSING-E/F
Project Number: 35663
Lab Number: L1806947
Report Date: 11/27/18

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8270D-SIM
Analytical Date: 03/04/18 11:55
Analyst: KL

Extraction Method: EPA 3510C
Extraction Date: 02/28/18 16:16

Parameter	Result	Qualifier	Units	RL	MDL
Semivolatile Organics by GC/MS-SIM - Westborough Lab for sample(s): 01 Batch: WG1093150-1					
Acenaphthene	ND		ug/l	0.10	--
Fluoranthene	ND		ug/l	0.10	--
Naphthalene	ND		ug/l	0.10	--
Benzo(a)anthracene	ND		ug/l	0.10	--
Benzo(a)pyrene	ND		ug/l	0.10	--
Benzo(b)fluoranthene	ND		ug/l	0.10	--
Benzo(k)fluoranthene	ND		ug/l	0.10	--
Chrysene	ND		ug/l	0.10	--
Acenaphthylene	ND		ug/l	0.10	--
Anthracene	ND		ug/l	0.10	--
Benzo(ghi)perylene	ND		ug/l	0.10	--
Fluorene	ND		ug/l	0.10	--
Phenanthrene	ND		ug/l	0.10	--
Dibenzo(a,h)anthracene	ND		ug/l	0.10	--
Indeno(1,2,3-cd)pyrene	ND		ug/l	0.10	--
Pyrene	ND		ug/l	0.10	--
Pentachlorophenol	ND		ug/l	0.80	--

Surrogate	%Recovery	Qualifier	Acceptance Criteria
2-Fluorophenol	42		21-120
Phenol-d6	33		10-120
Nitrobenzene-d5	70		23-120
2-Fluorobiphenyl	69		15-120
2,4,6-Tribromophenol	83		10-120
4-Terphenyl-d14	83		41-149

Lab Control Sample Analysis

Batch Quality Control

Project Name: CAMBRIDGE CROSSING-E/F

Project Number: 35663

Lab Number: L1806947

Report Date: 11/27/18

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Semivolatile Organics by GC/MS - Westborough Lab Associated sample(s): 01 Batch: WG1093149-2 WG1093149-3								
Bis(2-ethylhexyl)phthalate	96		96		40-140	0		30
Butyl benzyl phthalate	96		92		40-140	4		30
Di-n-butylphthalate	92		87		40-140	6		30
Di-n-octylphthalate	100		100		40-140	0		30
Diethyl phthalate	88		86		40-140	2		30
Dimethyl phthalate	100		95		40-140	5		30
Phenol	40		38		12-110	5		30

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
2-Fluorophenol	51		47		21-120
Phenol-d6	40		38		10-120
Nitrobenzene-d5	92		89		23-120
2-Fluorobiphenyl	86		85		15-120
2,4,6-Tribromophenol	84		83		10-120
4-Terphenyl-d14	81		78		41-149

Lab Control Sample Analysis
Batch Quality Control

Project Name: CAMBRIDGE CROSSING-E/F
Project Number: 35663
Lab Number: L1806947
Report Date: 11/27/18

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Semivolatile Organics by GC/MS-SIM - Westborough Lab Associated sample(s): 01 Batch: WG1093150-2 WG1093150-3								
Acenaphthene	71		68		40-140	4		40
Fluoranthene	75		72		40-140	4		40
Naphthalene	64		63		40-140	2		40
Benzo(a)anthracene	73		71		40-140	3		40
Benzo(a)pyrene	80		78		40-140	3		40
Benzo(b)fluoranthene	79		78		40-140	1		40
Benzo(k)fluoranthene	83		82		40-140	1		40
Chrysene	76		74		40-140	3		40
Acenaphthylene	74		72		40-140	3		40
Anthracene	76		73		40-140	4		40
Benzo(ghi)perylene	78		77		40-140	1		40
Fluorene	77		74		40-140	4		40
Phenanthrene	72		70		40-140	3		40
Dibenzo(a,h)anthracene	84		82		40-140	2		40
Indeno(1,2,3-cd)pyrene	81		80		40-140	1		40
Pyrene	74		72		40-140	3		40
Pentachlorophenol	79		75		40-140	5		40

Lab Control Sample Analysis
Batch Quality Control

Project Name: CAMBRIDGE CROSSING-E/F
Project Number: 35663
Lab Number: L1806947
Report Date: 11/27/18

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits

Semivolatile Organics by GC/MS-SIM - Westborough Lab Associated sample(s): 01 Batch: WG1093150-2 WG1093150-3

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
2-Fluorophenol	45		46		21-120
Phenol-d6	33		33		10-120
Nitrobenzene-d5	71		71		23-120
2-Fluorobiphenyl	69		68		15-120
2,4,6-Tribromophenol	85		81		10-120
4-Terphenyl-d14	74		72		41-149

PCBS

Project Name: CAMBRIDGE CROSSING-E/F
Lab Number: L1806947
Project Number: 35663
Report Date: 11/27/18

SAMPLE RESULTS

Lab ID: L1806947-01
Client ID: VES-E/F-225(MW)
Sample Location: CAMBRIDGE, MA

Date Collected: 02/28/18 13:55
Date Received: 02/28/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 5,608
Analytical Date: 03/02/18 09:54
Analyst: JW

Extraction Method: EPA 608
Extraction Date: 03/01/18 01:56
Cleanup Method: EPA 3665A
Cleanup Date: 03/01/18
Cleanup Method: EPA 3660B
Cleanup Date: 03/02/18

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

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	94		30-150	A
Decachlorobiphenyl	57		30-150	A

Project Name: CAMBRIDGE CROSSING-E/F
Project Number: 35663
Lab Number: L1806947
Report Date: 11/27/18

Method Blank Analysis
Batch Quality Control

Analytical Method: 5,608
Analytical Date: 03/01/18 05:56
Analyst: HT

Extraction Method: EPA 608
Extraction Date: 02/28/18 04:27
Cleanup Method: EPA 3665A
Cleanup Date: 02/28/18
Cleanup Method: EPA 3660B
Cleanup Date: 02/28/18

Parameter	Result	Qualifier	Units	RL	MDL	Column
Polychlorinated Biphenyls by GC - Westborough Lab for sample(s): 01 Batch: WG1092967-1						
Aroclor 1016	ND		ug/l	0.250	--	A
Aroclor 1221	ND		ug/l	0.250	--	A
Aroclor 1232	ND		ug/l	0.250	--	A
Aroclor 1242	ND		ug/l	0.250	--	A
Aroclor 1248	ND		ug/l	0.250	--	A
Aroclor 1254	ND		ug/l	0.250	--	A
Aroclor 1260	ND		ug/l	0.200	--	A

Surrogate	%Recovery	Qualifier	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	99		30-150	A
Decachlorobiphenyl	99		30-150	A

Lab Control Sample Analysis

Batch Quality Control

Project Name: CAMBRIDGE CROSSING-E/F

Project Number: 35663

Lab Number: L1806947

Report Date: 11/27/18

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits	Column
Polychlorinated Biphenyls by GC - Westborough Lab Associated sample(s): 01 Batch: WG1092967-2									
Aroclor 1016	93		-		30-150	-		30	A
Aroclor 1260	95		-		30-150	-		30	A

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	102				30-150	A
Decachlorobiphenyl	93				30-150	A

Matrix Spike Analysis

Batch Quality Control

Project Name: CAMBRIDGE CROSSING-E/F

Project Number: 35663

Lab Number: L1806947

Report Date: 11/27/18

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits	Column
Polychlorinated Biphenyls by GC - Westborough Lab Associated sample(s): 01 QC Batch ID: WG1092967-3 QC Sample: L1800002-01 Client ID: MS Sample													
Aroclor 1016	ND	3.12	3.00	96		-	-		40-126	-		30	A
Aroclor 1260	ND	3.12	2.83	91		-	-		40-127	-		30	A

Surrogate	MS % Recovery	MS Qualifier	MSD % Recovery	MSD Qualifier	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	104				30-150	A
Decachlorobiphenyl	74				30-150	A

Lab Duplicate Analysis
Batch Quality Control

Project Name: CAMBRIDGE CROSSING-E/F
Project Number: 35663

Lab Number: L1806947
Report Date: 11/27/18

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits	
Polychlorinated Biphenyls by GC - Westborough Lab Associated sample(s): 01 QC Batch ID: WG1092967-4 QC Sample: L1800002-01 Client ID: DUP Sample							
Aroclor 1016	ND	ND	ug/l	NC		30	A
Aroclor 1221	ND	ND	ug/l	NC		30	A
Aroclor 1232	ND	ND	ug/l	NC		30	A
Aroclor 1242	ND	ND	ug/l	NC		30	A
Aroclor 1248	ND	ND	ug/l	NC		30	A
Aroclor 1254	ND	ND	ug/l	NC		30	A
Aroclor 1260	ND	ND	ug/l	NC		30	A

Surrogate	%Recovery	Qualifier	%Recovery	Qualifier	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	95		107		30-150	A
Decachlorobiphenyl	83		88		30-150	A

METALS

Project Name: CAMBRIDGE CROSSING-E/F **Lab Number:** L1806947

Project Number: 35663 **Report Date:** 11/27/18

SAMPLE RESULTS

Lab ID: L1806947-01 Date Collected: 02/28/18 13:55

Client ID: VES-E/F-225(MW) Date Received: 02/28/18

Sample Location: CAMBRIDGE, MA Field Prep: Not Specified

Sample Depth:

Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Antimony, Total	ND		mg/l	0.00400	--	1	03/01/18 15:40	03/02/18 12:56	EPA 3005A	3,200.8	AM
Arsenic, Total	0.00225		mg/l	0.00100	--	1	03/01/18 15:40	03/02/18 12:56	EPA 3005A	3,200.8	AM
Cadmium, Total	ND		mg/l	0.00020	--	1	03/01/18 15:40	03/02/18 12:56	EPA 3005A	3,200.8	AM
Chromium, Total	ND		mg/l	0.00100	--	1	03/01/18 15:40	03/02/18 12:56	EPA 3005A	3,200.8	AM
Copper, Total	0.00285		mg/l	0.00100	--	1	03/01/18 15:40	03/02/18 12:56	EPA 3005A	3,200.8	AM
Iron, Total	18.9		mg/l	0.050	--	1	03/01/18 15:40	03/06/18 15:16	EPA 3005A	19,200.7	LC
Lead, Total	0.00764		mg/l	0.00100	--	1	03/01/18 15:40	03/02/18 12:56	EPA 3005A	3,200.8	AM
Mercury, Total	ND		mg/l	0.00020	--	1	03/01/18 10:43	03/01/18 19:13	EPA 245.1	3,245.1	EA
Nickel, Total	ND		mg/l	0.00200	--	1	03/01/18 15:40	03/02/18 12:56	EPA 3005A	3,200.8	AM
Selenium, Total	ND		mg/l	0.00500	--	1	03/01/18 15:40	03/02/18 12:56	EPA 3005A	3,200.8	AM
Silver, Total	ND		mg/l	0.00040	--	1	03/01/18 15:40	03/02/18 12:56	EPA 3005A	3,200.8	AM
Zinc, Total	ND		mg/l	0.01000	--	1	03/01/18 15:40	03/02/18 12:56	EPA 3005A	3,200.8	AM
General Chemistry - Mansfield Lab											
Chromium, Trivalent	ND		mg/l	0.050	--	1		03/02/18 12:56	NA	107,-	

Project Name: CAMBRIDGE CROSSING-E/F **Lab Number:** L1806947

Project Number: 35663 **Report Date:** 11/27/18

Method Blank Analysis
Batch Quality Control

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Metals - Mansfield Lab for sample(s): 01 Batch: WG1093482-1										
Mercury, Total	ND		mg/l	0.00020	--	1	03/01/18 10:43	03/01/18 18:36	3,245.1	EA

Prep Information

Digestion Method: EPA 245.1

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Metals - Mansfield Lab for sample(s): 01 Batch: WG1093586-1										
Iron, Total	ND		mg/l	0.050	--	1	03/01/18 15:40	03/06/18 13:22	19,200.7	LC

Prep Information

Digestion Method: EPA 3005A

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Metals - Mansfield Lab for sample(s): 01 Batch: WG1093588-1										
Antimony, Total	ND		mg/l	0.00400	--	1	03/01/18 15:40	03/02/18 12:00	3,200.8	AM
Arsenic, Total	ND		mg/l	0.00100	--	1	03/01/18 15:40	03/02/18 12:00	3,200.8	AM
Cadmium, Total	ND		mg/l	0.00020	--	1	03/01/18 15:40	03/02/18 12:00	3,200.8	AM
Chromium, Total	ND		mg/l	0.00100	--	1	03/01/18 15:40	03/02/18 12:00	3,200.8	AM
Copper, Total	ND		mg/l	0.00100	--	1	03/01/18 15:40	03/02/18 12:00	3,200.8	AM
Lead, Total	ND		mg/l	0.00050	--	1	03/01/18 15:40	03/02/18 12:00	3,200.8	AM
Nickel, Total	ND		mg/l	0.00200	--	1	03/01/18 15:40	03/02/18 12:00	3,200.8	AM
Selenium, Total	ND		mg/l	0.00500	--	1	03/01/18 15:40	03/02/18 12:00	3,200.8	AM
Silver, Total	ND		mg/l	0.00040	--	1	03/01/18 15:40	03/02/18 12:00	3,200.8	AM
Zinc, Total	ND		mg/l	0.01000	--	1	03/01/18 15:40	03/02/18 12:00	3,200.8	AM

Prep Information

Digestion Method: EPA 3005A

Lab Control Sample Analysis

Batch Quality Control

Project Name: CAMBRIDGE CROSSING-E/F

Project Number: 35663

Lab Number: L1806947

Report Date: 11/27/18

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 01 Batch: WG1093482-2								
Mercury, Total	102		-		85-115	-		
Total Metals - Mansfield Lab Associated sample(s): 01 Batch: WG1093586-2								
Iron, Total	103		-		85-115	-		
Total Metals - Mansfield Lab Associated sample(s): 01 Batch: WG1093588-2								
Antimony, Total	102		-		85-115	-		
Arsenic, Total	105		-		85-115	-		
Cadmium, Total	107		-		85-115	-		
Chromium, Total	100		-		85-115	-		
Copper, Total	102		-		85-115	-		
Lead, Total	99		-		85-115	-		
Nickel, Total	101		-		85-115	-		
Selenium, Total	111		-		85-115	-		
Silver, Total	100		-		85-115	-		
Zinc, Total	108		-		85-115	-		

Matrix Spike Analysis
Batch Quality Control

Project Name: CAMBRIDGE CROSSING-E/F
Project Number: 35663
Lab Number: L1806947
Report Date: 11/27/18

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 01 QC Batch ID: WG1093482-3 QC Sample: L1806885-01 Client ID: MS Sample												
Mercury, Total	ND	0.005	0.00506	101		-	-		70-130	-		20
Total Metals - Mansfield Lab Associated sample(s): 01 QC Batch ID: WG1093482-5 QC Sample: L1806885-02 Client ID: MS Sample												
Mercury, Total	ND	0.005	0.00494	99		-	-		70-130	-		20
Total Metals - Mansfield Lab Associated sample(s): 01 QC Batch ID: WG1093586-3 QC Sample: L1806885-01 Client ID: MS Sample												
Iron, Total	0.918	1	2.04	112		-	-		75-125	-		20
Total Metals - Mansfield Lab Associated sample(s): 01 QC Batch ID: WG1093588-3 QC Sample: L1806885-01 Client ID: MS Sample												
Antimony, Total	0.00577	0.5	0.5537	110		-	-		70-130	-		20
Arsenic, Total	0.00406	0.12	0.1372	111		-	-		70-130	-		20
Cadmium, Total	ND	0.051	0.05827	114		-	-		70-130	-		20
Chromium, Total	0.00161	0.2	0.2141	106		-	-		70-130	-		20
Copper, Total	0.00407	0.25	0.2776	109		-	-		70-130	-		20
Lead, Total	0.00359	0.51	0.5508	107		-	-		70-130	-		20
Nickel, Total	ND	0.5	0.5397	108		-	-		70-130	-		20
Selenium, Total	ND	0.12	0.1382	115		-	-		70-130	-		20
Silver, Total	ND	0.05	0.05410	108		-	-		70-130	-		20
Zinc, Total	0.03678	0.5	0.6062	114		-	-		70-130	-		20

Lab Duplicate Analysis

Batch Quality Control

Project Name: CAMBRIDGE CROSSING-E/F

Project Number: 35663

Lab Number: L1806947

Report Date: 11/27/18

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 01 QC Batch ID: WG1093482-4 QC Sample: L1806885-01 Client ID: DUP Sample						
Mercury, Total	ND	ND	mg/l	NC		20
Total Metals - Mansfield Lab Associated sample(s): 01 QC Batch ID: WG1093482-6 QC Sample: L1806885-02 Client ID: DUP Sample						
Mercury, Total	ND	ND	mg/l	NC		20
Total Metals - Mansfield Lab Associated sample(s): 01 QC Batch ID: WG1093586-4 QC Sample: L1806885-01 Client ID: DUP Sample						
Iron, Total	0.918	0.918	mg/l	0		20
Total Metals - Mansfield Lab Associated sample(s): 01 QC Batch ID: WG1093588-4 QC Sample: L1806885-01 Client ID: DUP Sample						
Antimony, Total	0.00577	0.00593	mg/l	3		20
Arsenic, Total	0.00406	0.00410	mg/l	1		20
Cadmium, Total	ND	ND	mg/l	NC		20
Chromium, Total	0.00161	0.00166	mg/l	3		20
Copper, Total	0.00407	0.00404	mg/l	1		20
Lead, Total	0.00359	0.00360	mg/l	0		20
Nickel, Total	ND	ND	mg/l	NC		20
Selenium, Total	ND	ND	mg/l	NC		20
Silver, Total	ND	ND	mg/l	NC		20
Zinc, Total	0.03678	0.03753	mg/l	2		20

INORGANICS
&
MISCELLANEOUS

Project Name: CAMBRIDGE CROSSING-E/F
Project Number: 35663
Lab Number: L1806947
Report Date: 11/27/18

SAMPLE RESULTS

Lab ID: L1806947-01
Client ID: VES-E/F-225(MW)
Sample Location: CAMBRIDGE, MA
Sample Depth:
Matrix: Water
Date Collected: 02/28/18 13:55
Date Received: 02/28/18
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total Suspended	39.		mg/l	10	NA	2	-	03/02/18 11:30	121,2540D	JT
Cyanide, Total	ND		mg/l	0.005	--	1	02/28/18 22:52	03/01/18 10:05	121,4500CN-CE	LH
Chlorine, Total Residual	ND		mg/l	0.02	--	1	-	02/28/18 23:30	121,4500CL-D	AS
Nitrogen, Ammonia	28.4		mg/l	0.750	--	10	03/01/18 02:00	03/01/18 22:06	121,4500NH3-BH	AT
TPH, SGT-HEM	ND		mg/l	4.00	--	1	03/01/18 17:00	03/01/18 21:45	74,1664A	ML
Phenolics, Total	0.045		mg/l	0.030	--	1	03/02/18 13:29	03/02/18 19:41	4,420.1	BR
Chromium, Hexavalent	ND		mg/l	0.050	--	5	03/01/18 01:13	03/01/18 02:09	1,7196A	UN
Anions by Ion Chromatography - Westborough Lab										
Chloride	1600		mg/l	25.0	--	50	-	03/02/18 18:33	44,300.0	JR

Project Name: CAMBRIDGE CROSSING-E/F **Lab Number:** L1806947

Project Number: 35663 **Report Date:** 11/27/18

Method Blank Analysis
Batch Quality Control

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab for sample(s): 01 Batch: WG1093295-1										
Chlorine, Total Residual	ND		mg/l	0.02	--	1	-	02/28/18 23:30	121,4500CL-D	AS
General Chemistry - Westborough Lab for sample(s): 01 Batch: WG1093298-1										
Cyanide, Total	ND		mg/l	0.005	--	1	02/28/18 22:52	03/01/18 09:47	121,4500CN-CE	LH
General Chemistry - Westborough Lab for sample(s): 01 Batch: WG1093332-1										
Chromium, Hexavalent	ND		mg/l	0.010	--	1	03/01/18 01:13	03/01/18 01:50	1,7196A	UN
General Chemistry - Westborough Lab for sample(s): 01 Batch: WG1093343-1										
Nitrogen, Ammonia	ND		mg/l	0.075	--	1	03/01/18 02:00	03/01/18 22:03	121,4500NH3-BH	AT
General Chemistry - Westborough Lab for sample(s): 01 Batch: WG1093620-1										
TPH, SGT-HEM	ND		mg/l	4.00	--	1	03/01/18 17:00	03/01/18 21:45	74,1664A	ML
General Chemistry - Westborough Lab for sample(s): 01 Batch: WG1093770-1										
Solids, Total Suspended	ND		mg/l	5.0	NA	1	-	03/02/18 11:30	121,2540D	JT
General Chemistry - Westborough Lab for sample(s): 01 Batch: WG1094008-1										
Phenolics, Total	ND		mg/l	0.030	--	1	03/02/18 14:45	03/02/18 19:33	4,420.1	BR
Anions by Ion Chromatography - Westborough Lab for sample(s): 01 Batch: WG1094375-1										
Chloride	ND		mg/l	0.500	--	1	-	03/02/18 18:09	44,300.0	JR

Lab Control Sample Analysis

Batch Quality Control

Project Name: CAMBRIDGE CROSSING-E/F

Project Number: 35663

Lab Number: L1806947

Report Date: 11/27/18

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 01 Batch: WG1093295-2								
Chlorine, Total Residual	101		-		90-110	-		
General Chemistry - Westborough Lab Associated sample(s): 01 Batch: WG1093298-2								
Cyanide, Total	98		-		90-110	-		
General Chemistry - Westborough Lab Associated sample(s): 01 Batch: WG1093332-2								
Chromium, Hexavalent	97		-		85-115	-		20
General Chemistry - Westborough Lab Associated sample(s): 01 Batch: WG1093343-2								
Nitrogen, Ammonia	101		-		80-120	-		20
General Chemistry - Westborough Lab Associated sample(s): 01 Batch: WG1093620-2								
TPH	92		-		64-132	-		34
General Chemistry - Westborough Lab Associated sample(s): 01 Batch: WG1094008-2								
Phenolics, Total	92		-		70-130	-		
Anions by Ion Chromatography - Westborough Lab Associated sample(s): 01 Batch: WG1094375-2								
Chloride	103		-		90-110	-		

Matrix Spike Analysis
Batch Quality Control

Project Name: CAMBRIDGE CROSSING-E/F
Project Number: 35663
Lab Number: L1806947
Report Date: 11/27/18

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 01 QC Batch ID: WG1093295-4 QC Sample: L1806948-01 Client ID: MS Sample												
Chlorine, Total Residual	ND	0.248	0.22	89		-	-		80-120	-		20
General Chemistry - Westborough Lab Associated sample(s): 01 QC Batch ID: WG1093298-4 QC Sample: L1806885-01 Client ID: MS Sample												
Cyanide, Total	ND	0.2	0.210	105		-	-		90-110	-		30
General Chemistry - Westborough Lab Associated sample(s): 01 QC Batch ID: WG1093332-4 QC Sample: L1806947-01 Client ID: VES-E/F-225(MW)												
Chromium, Hexavalent	ND	0.1	ND	**0**	Q	-	-		85-115	-		20
General Chemistry - Westborough Lab Associated sample(s): 01 QC Batch ID: WG1093343-4 QC Sample: L1806947-01 Client ID: VES-E/F-225(MW)												
Nitrogen, Ammonia	28.4	4	33.2	120		-	-		80-120	-		20
General Chemistry - Westborough Lab Associated sample(s): 01 QC Batch ID: WG1093620-4 QC Sample: L1806725-01 Client ID: MS Sample												
TPH	9.80	20.4	26.1	80		-	-		64-132	-		34
General Chemistry - Westborough Lab Associated sample(s): 01 QC Batch ID: WG1094008-4 QC Sample: L1806875-02 Client ID: MS Sample												
Phenolics, Total	ND	0.4	0.38	96		-	-		70-130	-		20
Anions by Ion Chromatography - Westborough Lab Associated sample(s): 01 QC Batch ID: WG1094375-3 QC Sample: L1807170-02 Client ID: MS Sample												
Chloride	221	100	323	102		-	-		90-110	-		18

Lab Duplicate Analysis

Batch Quality Control

Project Name: CAMBRIDGE CROSSING-E/F

Project Number: 35663

Lab Number: L1806947

Report Date: 11/27/18

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 01 QC Batch ID: WG1093295-3 QC Sample: L1806947-01 Client ID: VES-E/F-225(MW)						
Chlorine, Total Residual	ND	ND	mg/l	NC		20
General Chemistry - Westborough Lab Associated sample(s): 01 QC Batch ID: WG1093298-3 QC Sample: L1806885-01 Client ID: DUP Sample						
Cyanide, Total	ND	0.007	mg/l	NC		30
General Chemistry - Westborough Lab Associated sample(s): 01 QC Batch ID: WG1093332-3 QC Sample: L1806947-01 Client ID: VES-E/F-225(MW)						
Chromium, Hexavalent	ND	ND	mg/l	NC		20
General Chemistry - Westborough Lab Associated sample(s): 01 QC Batch ID: WG1093343-3 QC Sample: L1806947-01 Client ID: VES-E/F-225(MW)						
Nitrogen, Ammonia	28.4	28.4	mg/l	0		20
General Chemistry - Westborough Lab Associated sample(s): 01 QC Batch ID: WG1093620-3 QC Sample: L1806725-01 Client ID: DUP Sample						
TPH	9.80	8.50	mg/l	14		34
General Chemistry - Westborough Lab Associated sample(s): 01 QC Batch ID: WG1093770-2 QC Sample: L1807125-01 Client ID: DUP Sample						
Solids, Total Suspended	86	86	mg/l	0		29
General Chemistry - Westborough Lab Associated sample(s): 01 QC Batch ID: WG1094008-3 QC Sample: L1806875-02 Client ID: DUP Sample						
Phenolics, Total	ND	ND	mg/l	NC		20
Anions by Ion Chromatography - Westborough Lab Associated sample(s): 01 QC Batch ID: WG1094375-4 QC Sample: L1807170-02 Client ID: DUP Sample						
Chloride	221	221	mg/l	0		18

Project Name: CAMBRIDGE CROSSING-E/F
Project Number: 35663

Lab Number: L1806947
Report Date: 11/27/18

Sample Receipt and Container Information

Were project specific reporting limits specified? YES

Cooler Information

Cooler	Custody Seal
B	Absent

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L1806947-01A	Vial HCl preserved	B	NA		2.2	Y	Absent		8260-SIM(14),8260(14)
L1806947-01B	Vial HCl preserved	B	NA		2.2	Y	Absent		8260-SIM(14),8260(14)
L1806947-01C	Vial HCl preserved	B	NA		2.2	Y	Absent		8260-SIM(14),8260(14)
L1806947-01D	Vial Na2S2O3 preserved	B	NA		2.2	Y	Absent		504(14)
L1806947-01E	Vial Na2S2O3 preserved	B	NA		2.2	Y	Absent		504(14)
L1806947-01F	Vial HCl preserved	B	NA		2.2	Y	Absent		SUB-ETHANOL(14)
L1806947-01G	Vial HCl preserved	B	NA		2.2	Y	Absent		SUB-ETHANOL(14)
L1806947-01H	Vial HCl preserved	B	NA		2.2	Y	Absent		SUB-ETHANOL(14)
L1806947-01I	Plastic 250ml NaOH preserved	B	>12	>12	2.2	Y	Absent		TCN-4500(14)
L1806947-01J	Plastic 250ml HNO3 preserved	B	<2	<2	2.2	Y	Absent		CD-2008T(180),NI-2008T(180),ZN-2008T(180),CU-2008T(180),FE-UI(180),AG-2008T(180),AS-2008T(180),HG-U(28),SE-2008T(180),CR-2008T(180),PB-2008T(180),SB-2008T(180)
L1806947-01K	Plastic 500ml H2SO4 preserved	B	<2	<2	2.2	Y	Absent		NH3-4500(28)
L1806947-01L	Plastic 950ml unpreserved	B	7	7	2.2	Y	Absent		CL-300(28),HEXCR-7196(1),TRC-4500(1)
L1806947-01M	Plastic 950ml unpreserved	B	7	7	2.2	Y	Absent		TSS-2540(7)
L1806947-01N	Amber 1000ml HCl preserved	B	NA		2.2	Y	Absent		TPH-1664(28)
L1806947-01O	Amber 1000ml HCl preserved	B	NA		2.2	Y	Absent		TPH-1664(28)
L1806947-01P	Amber 950ml H2SO4 preserved	B	<2	<2	2.2	Y	Absent		TPHENOL-420(28)
L1806947-01Q	Amber 1000ml Na2S2O3	B	7	7	2.2	Y	Absent		PCB-608(7)
L1806947-01R	Amber 1000ml Na2S2O3	B	7	7	2.2	Y	Absent		PCB-608(7)
L1806947-01S	Amber 1000ml unpreserved	B	7	7	2.2	Y	Absent		8270TCL(7),8270TCL-SIM(7)
L1806947-01T	Amber 1000ml unpreserved	B	7	7	2.2	Y	Absent		8270TCL(7),8270TCL-SIM(7)

*Values in parentheses indicate holding time in days

Project Name:	CAMBRIDGE CROSSING-E/F	**Lab Number:**	L1806947
Project Number:	35663	**Report Date:**	11/27/18

GLOSSARY

Acronyms

EDL	- Estimated Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The EDL includes any adjustments from dilutions, concentrations or moisture content, where applicable. The use of EDLs is specific to the analysis of PAHs using Solid-Phase Microextraction (SPME).
EMPC	- Estimated Maximum Possible Concentration: The concentration that results from the signal present at the retention time of an analyte when the ions meet all of the identification criteria except the ion abundance ratio criteria. An EMPC is a worst-case estimate of the concentration.
EPA	- Environmental Protection Agency.
LCS	- Laboratory Control Sample: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
LCSD	- Laboratory Control Sample Duplicate: Refer to LCS.
LFB	- Laboratory Fortified Blank: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
MDL	- Method Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The MDL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
MS	- Matrix Spike Sample: A sample prepared by adding a known mass of target analyte to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available.
MSD	- Matrix Spike Sample Duplicate: Refer to MS.
NA	- Not Applicable.
NC	- Not Calculated: Term is utilized when one or more of the results utilized in the calculation are non-detect at the parameter's reporting unit.
NDPA/DPA	- N-Nitrosodiphenylamine/Diphenylamine.
NI	- Not Ignitable.
NP	- Non-Plastic: Term is utilized for the analysis of Atterberg Limits in soil.
RL	- Reporting Limit: The value at which an instrument can accurately measure an analyte at a specific concentration. The RL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
RPD	- Relative Percent Difference: The results from matrix and/or matrix spike duplicates are primarily designed to assess the precision of analytical results in a given matrix and are expressed as relative percent difference (RPD). Values which are less than five times the reporting limit for any individual parameter are evaluated by utilizing the absolute difference between the values; although the RPD value will be provided in the report.
SRM	- Standard Reference Material: A reference sample of a known or certified value that is of the same or similar matrix as the associated field samples.
STLP	- Semi-dynamic Tank Leaching Procedure per EPA Method 1315.
TEF	- Toxic Equivalency Factors: The values assigned to each dioxin and furan to evaluate their toxicity relative to 2,3,7,8-TCDD.
TEQ	- Toxic Equivalent: The measure of a sample¿s toxicity derived by multiplying each dioxin and furan by its corresponding TEF and then summing the resulting values.
TIC	- Tentatively Identified Compound: A compound that has been identified to be present and is not part of the target compound list (TCL) for the method and/or program. All TICs are qualitatively identified and reported as estimated concentrations.

Footnotes

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

Terms

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

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

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

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

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

Report Format: Data Usability Report

Project Name:	CAMBRIDGE CROSSING-E/F	**Lab Number:**	L1806947
Project Number:	35663	**Report Date:**	11/27/18

Data Qualifiers

A - Spectra identified as "Aldol Condensation Product".

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

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

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

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

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

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

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

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

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

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

Q - The quality control sample exceeds the associated acceptance criteria. For DOD-related projects, LCS and/or Continuing Calibration Standard exceedences are also qualified on all associated sample results. Note: This flag is not applicable for matrix spike recoveries when the sample concentration is greater than 4x the spike added or for batch duplicate RPD when the sample concentrations are less than 5x the RL. (Metals only.)

R - Analytical results are from sample re-analysis.

RE - Analytical results are from sample re-extraction.

S - Analytical results are from modified screening analysis.

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

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

Report Format: Data Usability Report

Project Name:	CAMBRIDGE CROSSING-E/F	**Lab Number:**	L1806947
Project Number:	35663	**Report Date:**	11/27/18

REFERENCES

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

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

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

5 Methods for the Organic Chemical Analysis of Municipal and Industrial Wastewater. Appendix A, Part 136, 40 CFR (Code of Federal Regulations).

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

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

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

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

107 Alpha Analytical - In-house calculation method.

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

LIMITATION OF LIABILITIES

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

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

Certification Information

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

Westborough Facility
EPA 624/624.1: m/p-xylene, o-xylene
EPA 8260C: NPW: 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene, Azobenzene; SCM: Iodomethane (methyl iodide), Methyl methacrylate, 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene.
EPA 8270D: NPW: Dimethylnaphthalene,1,4-Diphenylhydrazine; SCM: Dimethylnaphthalene,1,4-Diphenylhydrazine.

EPA 6860: SCM: Perchlorate

SM4500: NPW: Amenable Cyanide; SCM: Total Phosphorus, TKN, NO2, NO3.

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

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

Westborough Facility:

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

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

Mansfield Facility:

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

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

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

CHAIN OF CUSTODY

PAGE 1 OF 1

Date Rec'd in Lab: 2/28/18

ALPHA Job #: L1806947

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

Client Information

Client: The Vertex Companies
Address: 1 Congress St., 10th Fl, Boston, MA
Phone: 617-274-5407
Email: jfreeman@vertexeng.com

Additional Project Information:
rsnelling@"", ewalker@""

Project Information

Project Name: Cambridge Crossing-E/F
Project Location: Cambridge, MA
Project #: 38616 3
Project Manager: Jesse Freeman
ALPHA Quote #:

Turn-Around Time

☒ Standard ☐ RUSH (only confirmed if pre-approved!)
Date Due: 5-Day

Report Information - Data Deliverables

☒ ADEx ☒ EMAIL

Billing Information

☒ Same as Client info PO #:

Regulatory Requirements & Project Information Requirements

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

ALPHA Lab ID (Lab Use Only)	Sample ID	Collection Date	Collection Time	Sample Matrix	Sampler Initials	ANALYSIS: VOC: ☐ 8260 ☐ 624 ☐ 524.2	SVOC: ☐ ABN ☐ PAH	METALS: ☐ MCP 13	METALS: ☐ MCP 14 ☐ RCP 15	EPH: ☐ Ranges & Targets ☐ RCRA8 ☐ PP13	VPH: ☐ Ranges & Targets ☐ Ranges Only	☐ PCB ☐ PEST	TPH: ☐ Quant Only ☐ Fingerprint	NPDES RGP	SAMPLE INFO: Filtration ☐ Field ☐ Lab to do; Preservation ☐ Lab to do	Sample Comments	TOTAL # BOTTLES
06947-01	VES-E/F-225(MW)	2/28/18	13:55	W	EMW									X			

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

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

Container Type																	
Preservative																	

Relinquished By:	Date/Time	Received By:	Date/Time
Stephanie Lunon	2/28/18 13:19		2/28/18 1519
	AAL 2/28/18 1812		2/28/18 1812

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

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

ALPHA ANALYTICAL
World Class Chemistry

Subcontract Chain of Custody

Test America (Nashville)
2960 Foster Creighton Drive
Nashville, TN 37204

Alpha Job Number
L1806947

Client Information

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

Phone: 603.319.5010
Email: mgulli@alphalab.com

Project Information

Project Location: MA
Project Manager: Melissa Gulli

Turnaround & Deliverables Information

Due Date: 03/07/18 (RUSH)
Deliverables:

Regulatory Requirements/Report Limits

State/Federal Program:
Regulatory Criteria: GW-2-14;S1/G2-14

Project Specific Requirements and/or Report Requirements

Reference following Alpha Job Number on final report/deliverables: L1806947

Report to include Method Blank, LCS/LCSD:

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

Lab ID	Client ID	Collection Date/Time	Sample Matrix	Analysis	Batch QC
	VES-E/F-225(MW)	02-28-18 13:55	WATER	Ethanol by EPA 1671 Revision A	

Relinquished By:	Date/Time:	Received By:	Date/Time:
AAL	3/1/18		

Form No: AL_subcoc

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica Nashville
2960 Foster Creighton Drive
Nashville, TN 37204
Tel: (615)726-0177

TestAmerica Job ID: 490-147312-1
Client Project/Site: L1806947

For:
Alpha Analytical Inc
145 Flanders Road
Westborough, Massachusetts 01581-1019

Attn: Melissa Gulli

Authorized for release by:
3/7/2018 1:56:21 PM

Ken Hayes, Project Manager II
(615)301-5035
ken.hayes@testamericainc.com

Table of Contents

Sample Summary

Client: Alpha Analytical Inc
Project/Site: L1806947

TestAmerica Job ID: 490-147312-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
490-147312-1	VES-E/F-225(MW)	Water	02/28/18 13:55	03/02/18 09:00

Case Narrative

Client: Alpha Analytical Inc
Project/Site: L1806947

TestAmerica Job ID: 490-147312-1

Job ID: 490-147312-1

Laboratory: TestAmerica Nashville

Narrative

Job Narrative
490-147312-1

Comments
No additional comments.

Receipt
The sample was received on 3/2/2018 9:00 AM; the sample arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 2.7º C.

GC Semi VOA
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Definitions/Glossary

Client: Alpha Analytical Inc
Project/Site: L1806947

TestAmerica Job ID: 490-147312-1

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Client Sample Results

Client: Alpha Analytical Inc
Project/Site: L1806947

TestAmerica Job ID: 490-147312-1

Client Sample ID: VES-E/F-225(MW)
Date Collected: 02/28/18 13:55
Date Received: 03/02/18 09:00

Lab Sample ID: 490-147312-1
Matrix: Water

Method: 1671A - Ethanol (GC/FID)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ethanol	ND		2000	500	ug/L			03/03/18 16:02	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Isopropyl acetate (Surr)	*71*		*70 - 130*		*03/03/18 16:02*	*1*

QC Sample Results

Client: Alpha Analytical Inc
Project/Site: L1806947

TestAmerica Job ID: 490-147312-1

Method: 1671A - Ethanol (GC/FID)

Lab Sample ID: MB 490-499157/22
Matrix: Water
Analysis Batch: 499157

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ethanol	ND		2000	500	ug/L			03/03/18 15:43	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Isopropyl acetate (Surr)	*73*		*70 - 130*		*03/03/18 15:43*	*1*

Lab Sample ID: LCS 490-499157/23
Matrix: Water
Analysis Batch: 499157

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Ethanol			50200	53230		ug/L		106	70 - 130		

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
Isopropyl acetate (Surr)	*78*		*70 - 130*

Lab Sample ID: 490-147323-D-6 MS
Matrix: Water
Analysis Batch: 499157

Client Sample ID: Matrix Spike
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits		
Ethanol	ND		50200	52880		ug/L		105	70 - 130		

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
Isopropyl acetate (Surr)	*80*		*70 - 130*

Lab Sample ID: 490-147323-D-6 MSD
Matrix: Water
Analysis Batch: 499157

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Ethanol	ND		50200	47250		ug/L		94	70 - 130	11	20

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
Isopropyl acetate (Surr)	*79*		*70 - 130*

QC Association Summary

Client: Alpha Analytical Inc
Project/Site: L1806947

TestAmerica Job ID: 490-147312-1

GC VOA

Analysis Batch: 499157

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
490-147312-1	VES-E/F-225(MW)	Total/NA	Water	1671A	
MB 490-499157/22	Method Blank	Total/NA	Water	1671A	
LCS 490-499157/23	Lab Control Sample	Total/NA	Water	1671A	
490-147323-D-6 MS	Matrix Spike	Total/NA	Water	1671A	
490-147323-D-6 MSD	Matrix Spike Duplicate	Total/NA	Water	1671A	

Lab Chronicle

Client: Alpha Analytical Inc
Project/Site: L1806947

TestAmerica Job ID: 490-147312-1

Client Sample ID: VES-E/F-225(MW)
Date Collected: 02/28/18 13:55
Date Received: 03/02/18 09:00

Lab Sample ID: 490-147312-1
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	1671A		1			499157	03/03/18 16:02	MH	TAL NSH

Laboratory References:

TAL NSH = TestAmerica Nashville, 2960 Foster Creighton Drive, Nashville, TN 37204, TEL (615)726-0177

Method Summary

Client: Alpha Analytical Inc
Project/Site: L1806947

TestAmerica Job ID: 490-147312-1

Method	Method Description	Protocol	Laboratory
1671A	Ethanol (GC/FID)	EPA	TAL NSH

Protocol References:

EPA = US Environmental Protection Agency

Laboratory References:

TAL NSH = TestAmerica Nashville, 2960 Foster Creighton Drive, Nashville, TN 37204, TEL (615)726-0177

Accreditation/Certification Summary

Client: Alpha Analytical Inc
Project/Site: L1806947

TestAmerica Job ID: 490-147312-1

Laboratory: TestAmerica Nashville

Unless otherwise noted, all analytes for this laboratory were covered under each accreditation/certification below.

Authority	Program	EPA Region	Identification Number	Expiration Date
California	State Program	9	2938	10-31-18

The following analytes are included in this report, but accreditation/certification is not offered by the governing authority:

Analysis Method	Prep Method	Matrix	Analyte
1671A		Water	Ethanol

Maine	State Program	1	TN00032	11-03-19

The following analytes are included in this report, but accreditation/certification is not offered by the governing authority:

Analysis Method	Prep Method	Matrix	Analyte
1671A		Water	Ethanol

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING
Nashville, TN

COOLER RECEIPT FORM

490-147312 Chain of Custody

Cooler Received/Opened On 03-02-2018 @ 0900

Time Samples Removed From Cooler 1305 Time Samples Placed In Storage 1314 (2 Hour Window)

1. Tracking # 1ZE306546197 (last 4 digits, FedEx) Courier: UPS next day air

IR Gun ID 31470366 pH Strip Lot NA Chlorine Strip Lot NA

2. Temperature of rep. sample or temp blank when opened: 2.7 *Degrees Celsius*

3. If Item #2 temperature is 0°C or less, was the representative sample or temp blank frozen? YES NO...NA

4. Were custody seals on outside of cooler? YES...NO...NA

If yes, how many and where: 0

5. Were the seals intact, signed, and dated correctly? YES...NO...NA

6. Were custody papers inside cooler? YES...NO...NA

I certify that I opened the cooler and answered questions 1-6 (intial) _____

7. Were custody seals on containers: YES NO and Intact YES...NO...NA

Were these signed and dated correctly? YES...NO...NA

8. Packing mat'l used? Bubblewrap Plastic bag Peanuts Vermiculite Foam Insert Paper Other None

9. Cooling process: Ice Ice-pack Ice (direct contact) Dry ice Other None

10. Did all containers arrive in good condition (unbroken)? YES...NO...NA

11. Were all container labels complete (#, date, signed, pres., etc)? YES...NO...NA

12. Did all container labels and tags agree with custody papers? YES...NO...NA

13a. Were VOA vials received? YES...NO...NA

b. Was there any observable headspace present in any VOA vial? YES...NO...NA

● ⬅ Larger than this.

14. Was there a Trip Blank in this cooler? YES...NO...NA If multiple coolers, sequence # _____

I certify that I unloaded the cooler and answered questions 7-14 (intial) _____

15a. On pres'd bottles, did pH test strips suggest preservation reached the correct pH level? YES...NO...NA

b. Did the bottle labels indicate that the correct preservatives were used YES...NO...NA

16. Was residual chlorine present? YES...NO...NA

I certify that I checked for chlorine and pH as per SOP and answered questions 15-16 (intial) _____

17. Were custody papers properly filled out (ink, signed, etc)? YES...NO...NA

18. Did you sign the custody papers in the appropriate place? YES...NO...NA

19. Were correct containers used for the analysis requested? YES...NO...NA

20. Was sufficient amount of sample sent in each container? YES...NO...NA

I certify that I entered this project into LIMS and answered questions 17-20 (intial) _____

I certify that I attached a label with the unique LIMS number to each container (intial) _____

21. Were there Non-Conformance issues at login? YES...NO Was a NCM generated? YES...NO...# _____

BIS = Broken in shipment
Cooler Receipt Form.doc

LF-1
End of Form

Revised 8/23/17

ALPHA ANALYTICAL
World Class Chemistry

Subcontract Chain of Custody

Test America (Nashville)
2960 Foster Creighton Drive
Nashville, TN 37204

Alpha Job Number
L1806947

Client Information	Project Information	Regulatory Requirements/Report Limits
Client: Alpha Analytical Labs Address: Eight Walkup Drive Westborough, MA 01581-1019 Phone: 603.319.5010 Email: mgulli@alphalab.com	Project Location: MA Project Manager: Melissa Gulli **Turnaround & Deliverables Information** Due Date: 03/07/18 (RUSH) Deliverables:	State/Federal Program: Regulatory Criteria: GW-2-14;S1/G2-14

Project Specific Requirements and/or Report Requirements

Reference following Alpha Job Number on final report/deliverables: L1806947

Report to include Method Blank, LCS/LCSD:

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

Lab ID	Client ID	Collection Date/Time	Sample Matrix	Analysis	Batch QC
	VES-E/F-225(MW)	02-28-18 13:55	WATER	Ethanol by EPA 1671 Revision A	

Loc: 490
147312

Relinquished By:	Date/Time:	Received By:	Date/Time:
AAL	3/1/18		
		[illegible] - A-NAS	3-2-18 0900

Form No: AL_subcoc