HALEY & ALDRICH, INC.
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Boston, MA 02129
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7 October 2021
File No. 132111-002

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

Attention: Shauna Little, EPA/OEP RGP Applications Coordinator

Subject: Notice of Intent (NOI)
Temporary Construction Dewatering
10 World Trade Center
10 World Trade Center Avenue
Boston, Massachusetts

Dear Ms. Little:

On behalf of our client, 10 World Trade LHI LLC, and in accordance with the National Pollutant Discharge Elimination System (NPDES) Remediation General Permit (RGP) in Massachusetts, MAG910000, this letter submits a Notice of Intent (NOI) and the applicable documentation as required by the US Environmental Protection Agency (EPA) for temporary construction site dewatering under the RGP. Haley & Aldrich, Inc. (Haley & Aldrich) has prepared this submission to facilitate off-site discharge of temporary dewatering during construction activities at the 10 World Trade Center project (the "site"), located at 10 World Trade Center Avenue in Boston, Massachusetts (see Figure 1, Project Locus). A copy of the NPDES RGP NOI is included in Appendix A.

As this site is not a listed Massachusetts of Department of Environmental Protection (MassDEP) Massachusetts Contingency Plan (MCP) Disposal Site, a WM15 Transmittal Form and $500 fee have been submitted to MassDEP concurrently with this application; a copy of the WM15 Transmittal Form is included in Appendix B.

SITE LOCATION AND HISTORICAL SITE USAGE

The subject site consists of two parcels of land, Parcel A2 and the Triangle Parcel, totaling approximately 1.6 acres. The two parcels are bisected by interstate access ramps. The Massachusetts Bay Transportation Authority (MBTA) Silver Line Tunnel runs underground through the site. Parcel A2 is developed with an asphalt paved parking area and limited associated landscaped areas. Parcel A2 is bound to the north by Congress Street, to the south and west by the Exit 25, Interstate 90 (I-90) off-ramp, and to the east by the World Trade Center MBTA station. Existing ground surface is generally flat and ranges from elevation (El.) 17.5 to 19.5, except for an access ramp in the southeast corner which slopes up to approximately El. 25. Elevations are in feet (ft) and refer to the Boston City Base datum (BCB).

The Triangle Parcel is primarily a gravel and dirt lot that is currently being used for construction staging and to store materials for other construction projects. The Triangle Parcel is bound to the north and south by Congress Street and the Exit 25, I-90 off-ramp, to the east by Parcel A2, and to the west by an on-ramp for Interstate 93 North and South. Existing ground surface is generally flat with grades ranging from El. 19.5 to 20.

The subject site was originally part of the South Boston tidal flats and was filled in the 1870s. The area was filled with material dredged from Boston Harbor and covered with several feet of sand and gravel at the surface. From 1878 to the late 1970s/early 1980s, the land was developed and used as railroad tracks and a terminal ground. In the late 1970s/early 1980s, the railroad terminal was decommissioned, and support buildings removed. An auto repair facility and filling station were observed on the western portion of the Triangle Parcel and straddling the parcels boundary from at least 1950 through approximately 1970.

In the 1990's the adjacent central artery tunnel (I-90 tunnel) and ramps and World Trade Center Avenue were constructed followed by the MBTA Silver Line Transitway which extends beneath the subject site. Following construction of the MBTA Silver Line Transitway, Parcel A2 has been used as a parking lot, and the Triangle Parcel as an undeveloped area.

PROPOSED CONSTRUCTION

The proposed construction will consist of a new mixed-use building with retail, community, lab, and office space. The proposed building includes 17 above-grade floors with below-grade storage space to be supported by load-bearing elements. Construction of the foundations, below grade basement space, and utility installations is anticipated to require excavations extending from current ground surface down to approximately El. 9 to El. 0, or 5 to 20 ft below current site grades. The excavations are expected to extend through Fill, Organic Soils, Marine (sand) Deposits, and terminate within the natural Marine (clay) Deposits. The building footprint is approximately 41,000 square feet (sq ft).

REGULATORY STATUS

Based on review of the MassDEP on-line database, no documented release of oil and/or hazardous materials has occurred at the subject site and there are no recorded Release Tracking Numbers (RTNs) for the subject site.

Releases to soil have been identified at properties adjacent to the north of the subject site (RTN 3-13624) and attributed to historic site usage. Concentrations of metals, polycyclic aromatic hydrocarbons (PAHs) and petroleum hydrocarbons have been identified at adjacent properties which have required reporting to MassDEP and management of impacted material during redevelopment and construction activities under the MCP.

Precharacterization programs were conducted at the project site in May/June 2019 and May/June 2021 to develop geotechnical information and environmental soil and groundwater quality data. These data were not judged to constitute a reporting condition under the MCP.

GROUNDWATER QUALITY DATA

On 10 and 11 June 2021, a groundwater sample was collected from the observation well GW-2(OW). The location of the well is shown on Figure 2. The groundwater sample was submitted to Alpha Analytical Laboratory (Alpha) of Westborough, Massachusetts, for chemical analysis of 2017 NPDES RGP parameters. The sample was unfiltered in accordance with RGP requirements. Additionally, a "receiving water" sample was collected from the Boston Inner Harbor as required by the NPDES RGP application requirements.

Refer to Table I for a summary of groundwater analytical data. The laboratory data reports are provided in Appendix C. The recent groundwater analyses did not detect concentrations of chemical constituents above applicable MCP RCGW-2 reportable concentrations.

RECEIVING WATER QUALITY INFORMATION AND DILUTION FACTOR

On 10 June 2021, Haley & Aldrich collected a receiving water sample from the Boston Inner Harbor using a disposable polyethylene bailer. The receiving water sample was collected from the Seaport World Trade Center Pier near the proposed stormwater outfalls (SDO202 and SDO3), as approximately located on Figure 3, and was submitted to Alpha for chemical analysis of pH, ammonia, and salinity. Field parameters, including pH and temperature, were collected from surface water sample at the time of sampling. The results of water quality testing are summarized in Table I.

The pH and temperature readings collected in the field and lab were used to calculate the site Water Quality Based Effluent Limitations (WQBELs). It is our understanding that since the receiving water is a saltwater body, hardness does not need to be analyzed on either the effluent water or receiving water. We have additionally confirmed with MassDEP that the dilution factor for the receiving waters is 1.

EFFLUENT CRITERIA DETERMINATION

The EPA suggested WQBEL Calculation spreadsheet was used to calculate the effluent criteria for the site. Groundwater and Receiving Water data were entered and the resulting criteria was tabulated in the attached Table I. As requested by EPA, the Microsoft Excel spreadsheet for the WQBEL calculation will be submitted to the EPA via email, for their review upon submission of this NOI. Copies of the "EnterData" and "SaltwaterResults" tabs from the Excel file provided as an additional resource by EPA are included in Appendix D and will be transmitted electronically with the NOI.

DEWATERING SYSTEM AND OFF-SITE DISCHARGE

During the remedial activities, it will be necessary to perform temporary dewatering to control surface water runoff from precipitation, groundwater seepage and construction-generated water to enable remedial excavations in-the-dry. Dewatering activities are anticipated to start in November 2021 and are anticipated to be required for up to 20 months. On average, we estimate effluent discharge rates of about 50 gallons per minute (gpm), with occasional peak flows of approximately 100 gpm during

significant precipitation events. Temporary dewatering will be conducted from sumps located in excavations or from dewatering wells installed at the site.

Construction dewatering includes piping and discharging to storm drains located on or near the site that discharge to the Boston Inner Harbor, as shown on Figure 3. An effluent treatment system will be designed by the Contractor to meet the 2017 NPDES RGP Discharge Effluent Criteria. Prior to discharge, collected water is routed through a sedimentation tank and a bag filter and other necessary treatment components, to remove suspended solids and undissolved chemical constituents, as shown on Figure 4.

DOCUMENTATION OF NATIONAL HISTORIC PRESERVATION ACT ELIGIBILITY REQUIREMENTS

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

DETERMINATION OF ENDANGERED SPECIES ACT ELIGIBILITY

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

NATIONAL MARINE FISHERIES SERVICE ELIGIBILITY

Based on our review of the National Marine Fisheries Service (NMFS) criterion, it is the opinion of Haley & Aldrich that related activities under the NPDES RGP are not likely to adversely affect federally threatened or endangered listed species or critical habitat under the jurisdiction of NMFS and should not result in a take of listed species.

According to Appendix I: Endangered Species Act (ESA) Guidance and Eligibility Criteria in the NPDES RGP, and reference footnoted below[1], the Atlantic Sturgeon and the Shortnose Sturgeon are the only ESA-listed species under the NMFS jurisdiction that may have a critical habitat in Massachusetts Bay. The Shortnose Sturgeon mainly occupy deep channel sections of large coastal rivers and nearshore marine waters.

The outfall to be used for the site discharge is not situated adjacent to large coastal rivers and is not expected to affect the Shortnose Sturgeon population. The closest river to the outfall is the Charles River, which is approximately 1.5 miles from the site. Similarly, the Atlantic Sturgeon is more commonly found in large rivers and brackish waters; adults who live in coastal waters are typically found in shallow

[1] https://www3.epa.gov/region1/npdes/remediation/RGPNMFSletter.pdf

areas with sand and gravel substrates. The outfall proposed for discharge is not located in an area where Atlantic Sturgeon may be found, and the discharge is similarly not expected to affect its population. Furthermore, according the CRWA and NRWA references below[2], resident populations of Sturgeon no longer exist in the Charles River.

TREATMENT CHEMICALS AND ADDITIVES INFORMATION

A pH adjustment system will likely be added to the weir tank (estimated to be 18,000-gallon capacity) at the head of the treatment system. It is anticipated that sulfuric acid (70 to 100 percent) will be used to lower the pH as necessary to maintain pH within discharge requirements of 6.5 to 8.5, and dosing will be automatically controlled using a meter pump, pH controller, and probe. The sulfuric acid will be stored in a 55-gallon drum within secondary containment. The rest of the water treatment system will remain unchanged.

In accordance with Part 2.5.3.d.i of the RGP, the typical product information, including chemical formula, SDS, CAS registry number, manufacturer, and associated hazards, toxicological and ecological information, and manufacturer information, including dosing and metering, are provided in Appendix G. A summary of control measures for proper handling and spill prevention are incorporated in the Best Management Practices Plan and include: regular maintenance for proper operation; daily monitoring for the condition of the treatment system; storage in appropriate containers in accordance with local, state, and federal regulations; and appropriate training for employees who have direct or indirect responsibility for compliance with the RGP.

The estimated maximum magnitude of application ("worst case/ceiling value") would be 48 gallons of sulfuric acid per day at a flow rate of 0.144 million gallons per day, which equates to a concentration of 333 parts per million (ppm). The lethal concentration to kill 50 percent of the fish population (LC50) in a receiving water is 500 ppm per the SDS. So even at ceiling values, the sulfuric acid would not exceed LC50. Actual daily application of sulfuric acid is anticipated to be 0.5 gallons/day or less.

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

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

[2] https://www.crwa.org/uploads/1/2/6/7/126781580/charkes_river_fish_field_guide.pdf
https://www.neponset.org/archived-pages/migratory-fish/

OWNER AND OPERATOR INFORMATION

Owner:
10 World Trade LHI LLC
c/o Boston Global Investors
55 Seaport Boulevard
Boston, MA 02109
Contact: Scott Summers
Senior Vice President

Operator:
Suffolk Construction Co., Inc.
65 Allerton Street
Boston, MA 02119
Contact: Geoff Witheford
Vice President, Operations

APPENDICES

The completed "Suggested Notice of Intent" form as provided in the RGP is enclosed in Appendix A. The site owner is 10 World Trade LHI LLC. 10 World Trade LHI LLC has hired Suffolk Construction Co., Inc. as the general contractor conducting the site work, including dewatering activities. The excavation subcontractor will operate the dewatering system. Haley & Aldrich is monitoring the Contractor's dewatering activities on behalf of 10 World Trade LHI LLC in accordance with the requirements for this NOI submission.

A copy of the WM15 Transmittal to MassDEP is included in Appendix B. Copies of the groundwater testing laboratory data reports are provided in Appendix C and the EPA WQBEL spreadsheet are provided in Appendix D. Appendices E and F include the National Register of Historic Places and Endangered Species Act Documentation, respectively. Appendix G provides the Site Contractor's dewatering submittal, which includes details of the dewatering system. Appendix H provides a copy of the Boston Water and Sewer Commission (BWSC) Dewatering Permit provided by the BWSC as part of the previous RGP submission. A Best Management Practices Plan (BMPP), which outlines the proposed discharge operations covered under the RGP, will be available at the site and is not being submitted with this NOI as requested by EPA.

CLOSING

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

Sincerely yours,
HALEY & ALDRICH, INC

Kate A. Lamberti, E.I.T.
Engineer

Lindsey R. Howard, P.E. (NH)
Assistant Project Manager

Cole E. Worthy III, LSP
Senior Associate

Attachments:

Table I – Summary of Water Quality Data
Figure 1 – Project Locus
Figure 2 – Site and Subsurface Exploration Location Plan
Figure 3 – Proposed Discharge Route
Figure 4 – Proposed Treatment System Schematic
Appendix A – NOI for RGP
Appendix B – WM 15 Transmittal
Appendix C – Laboratory Data Reports
Appendix D – EPA WQBEL Calculation Spreadsheet
Appendix E – National Register of Historic Places and Massachusetts Historical Commission Documentation
Appendix F – Endangered Species Act Documentation
Appendix G – Typical Contractor Dewatering Submittal
Appendix H – BWSC Permit Application

c: Boston Global Investors; Attn: John Hynes IV

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TABLE

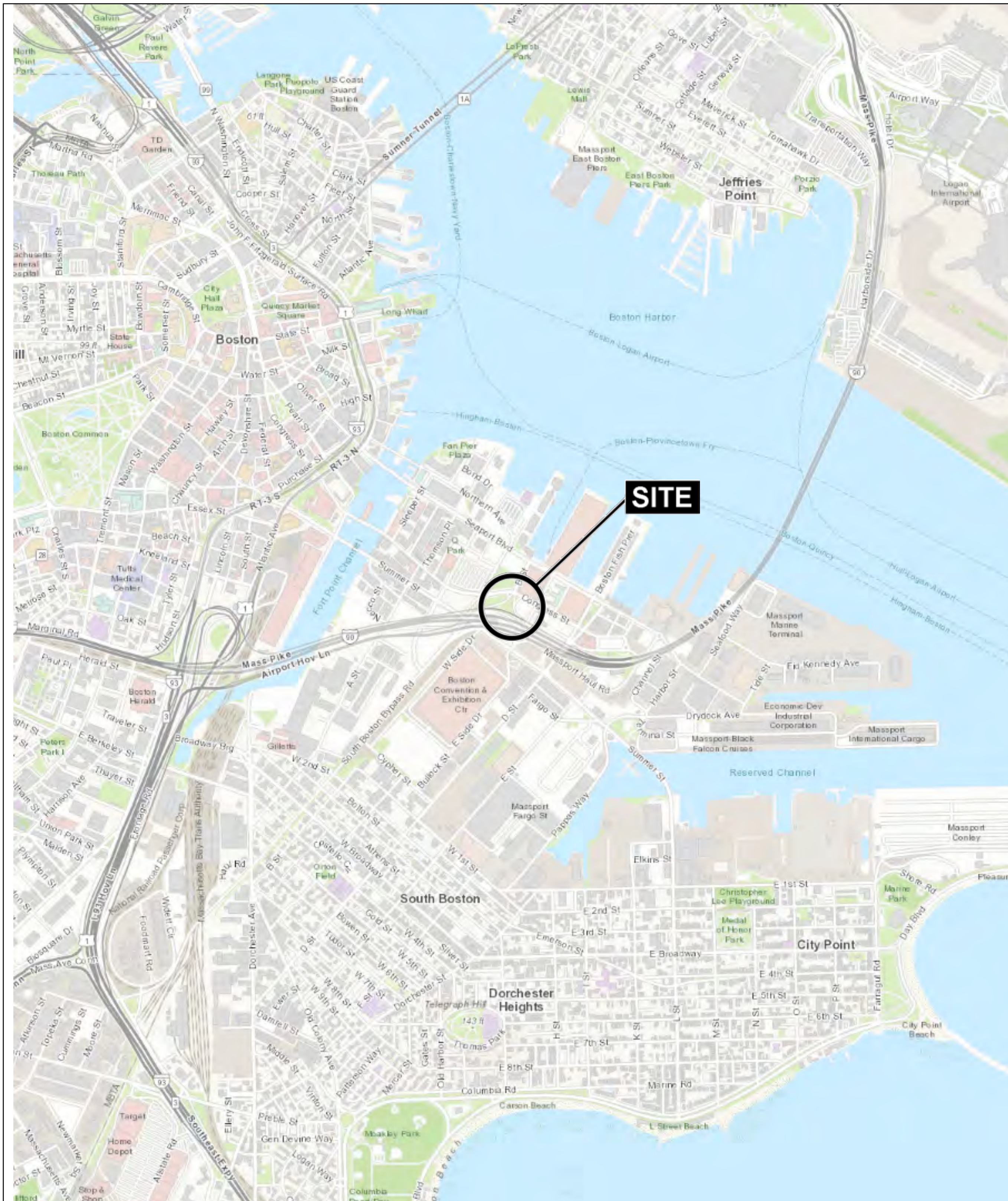
TABLE I
SUMMARY OF WATER QUALITY DATA
10 WORLD TRADE CENTER
BOSTON, MA
FILE NO. 132111

	Action Level			
Location Name			GW-2	HA21-BOSTON HARBOR
Sample Name	Massachusetts RGP Saltwater WQBEL 2017	MCP Reportable Concentration RCGW-2 2014	GW-2_20210610 & GW-2_20210611	HA21-BOSTON HARBOR-20210610
Sample Date			06/10/2021 & 06/11/2021	06/10/2021
Lab Sample ID			L2131409-01, L2133990-01 & L2131783-01	L2131433-01
Volatile Organic Compounds (ug/L)				
1,1,1-Trichloroethane	200	4000	ND (2)	-
1,1,2-Trichloroethane	5	900	ND (1.5)	-
1,1-Dichloroethane	70	2000	ND (1.5)	-
1,1-Dichloroethene	3.2	80	ND (1)	-
1,2-Dibromoethane (Ethylene Dibromide)	0.05	2	ND (0.01)	-
1,2-Dichlorobenzene	600	2000	ND (5)	-
1,2-Dichloroethane	5	5	ND (1.5)	-
1,3-Dichlorobenzene	320	6000	ND (5)	-
1,4-Dichlorobenzene	5	60	ND (5)	-
1,4-Dioxane	200	6000	ND (5)	-
Acetone	7970	50000	ND (10)	-
Benzene	5	1000	ND (1)	-
Carbon tetrachloride	1.6	2	ND (1)	-
cis-1,2-Dichloroethene	70	20	ND (1)	-
Ethylbenzene	100	5000	ND (1)	-
m,p-Xylenes	100	NA	ND (2)	-
Methyl Tert Butyl Ether	20	5000	ND (10)	-
Methylene chloride	4.6	2000	ND (1)	-
o-Xylene	100	NA	ND (1)	-
Tert-Amyl Methyl Ether (TAME)	90	NA	ND (20)	-
Tert-Butyl Alcohol (tert-Butanol)	120	NA	ND (100)	-
Tetrachloroethene	3.3	50	ND (1)	-
Toluene	100	40000	ND (1)	-
Trichloroethene	5	5	ND (1)	-
Vinyl chloride	2	2	ND (1)	-
Xylene (total)	100	3000	ND (1)	-
Semi-Volatile Organic Compounds (ug/L)				
bis(2-Ethylhexyl)phthalate	2.2	50000	ND (2.2)	-
Butyl benzylphthalate	NA	10000	ND (5)	-
Diethyl phthalate	NA	9000	ND (5)	-
Dimethyl phthalate	NA	50000	ND (5)	-
Di-n-butylphthalate	NA	5000	ND (5)	-
Di-n-octyl phthalate	NA	100000	ND (5)	-
Acenaphthene	100	6000	ND (0.1)	-
Acenaphthylene	100	40	ND (0.1)	-
Anthracene	100	30	ND (0.1)	-
Benzo(a)anthracene	0.0038	1000	**0.178**	-
Benzo(a)pyrene	0.0038	500	**0.156**	-
Benzo(b)fluoranthene	0.0038	400	**0.173**	-
Benzo(g,h,i)perylene	100	20	ND (0.1)	-
Benzo(k)fluoranthene	0.0038	100	**ND (0.1)**	-
Chrysene	0.0038	70	**0.135**	-
Dibenz(a,h)anthracene	0.0038	40	**ND (0.1)**	-
Fluoranthene	100	200	0.286	-
Fluorene	100	40	ND (0.1)	-
Indeno(1,2,3-cd)pyrene	0.0038	100	**0.104**	-
Naphthalene	20	700	0.971	-
Pentachlorophenol	1	200	ND (1)	-
Phenanthrene	100	10000	0.207	-
Pyrene	100	20	0.32	-
Total Petroleum Hydrocarbons (mg/L)				
Petroleum hydrocarbons	5	5	ND (4)	-
Inorganic Compounds (mg/L)				
Antimony, Total	0.64	8	ND (0.004)	-
Arsenic, Total	0.036	0.9	0.0107	-
Cadmium, Total	0.0088	0.004	0.00074	-
Chromium, Total	NA	0.3	0.1732	-
Chromium VI (Hexavalent), Dissolved	0.05	0.3	ND (0.01)	-
Copper, Total	0.0031	100	**0.159**	-
Iron, Total	NA	NA	103	-
Lead, Total	0.0081	NA	**0.3866**	-
Lead, Dissolved	NA	0.01	ND (0.001)	
Mercury, Total	0.00094	0.02	0.00026	-
Nickel, Total	0.0082	0.2	**0.1058**	-
Selenium, Total	0.071	0.1	ND (0.025)	-
Silver, Total	0.0019	0.007	0.00046	-
Zinc, Total	0.081	0.9	**0.3531**	-
Pesticides and PCBs (ug/L)				
Aroclor-1016 (PCB-1016)	6.40E-05	5	**ND (0.25)**	-
Aroclor-1221 (PCB-1221)	6.40E-05	5	**ND (0.25)**	-
Aroclor-1232 (PCB-1232)	6.40E-05	5	**ND (0.25)**	-
Aroclor-1242 (PCB-1242)	6.40E-05	5	**ND (0.25)**	-
Aroclor-1248 (PCB-1248)	6.40E-05	5	**ND (0.25)**	-
Aroclor-1254 (PCB-1254)	6.40E-05	5	**ND (0.25)**	-
Aroclor-1260 (PCB-1260)	6.40E-05	5	**ND (0.2)**	-
Other				
Ammonia, Total (mg/L)	NA	NA	1.77	0.077
Chloride, Total (mg/L)	NA	NA	3520	-
Cyanide, Total (mg/L)	0.001	0.03	**ND (0.005)**	-
Hardness, Total	NA	NA	657	-
Total Phenols (mg/L)	0.3	NA	ND (0.03)	-
Total Suspended Solids (TSS) (mg/L)	30	NA	**53**	-
pH (field), Total (pH units)	NA	NA	7.5	-
pH (lab), Total (pH units)	NA	NA	-	7.9
Salinity, Total (SU)	NA	NA	-	26

ABBREVIATIONS AND NOTES:
-: Not Analyzed
µg/L: micrograms per liter
MCP: 310 CMR 40.0000 Massachusetts Contingency Plan effective 25 April 2014; revisions 23 May 2014.
mg/L: milligram per liter
NA: Not Applicable
ND (2.5): Not detected, number in parentheses is the laboratory reporting limit
RC: MCP Reportable Concentration
SU: Standard Units

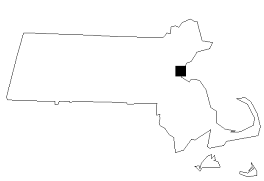
- Bold values indicate an exceedance of the **WQBEL** or **RCGW-2** criteria.
- Groundwater samples analyzed for dissolved metals were filtered in the field with a 0.45 micrometer filter.

FIGURES



MAP SOURCE: ESRI

SITE COORDINATES: 42°20'56"N, 71°2'37"W



HALEY ALDRICH

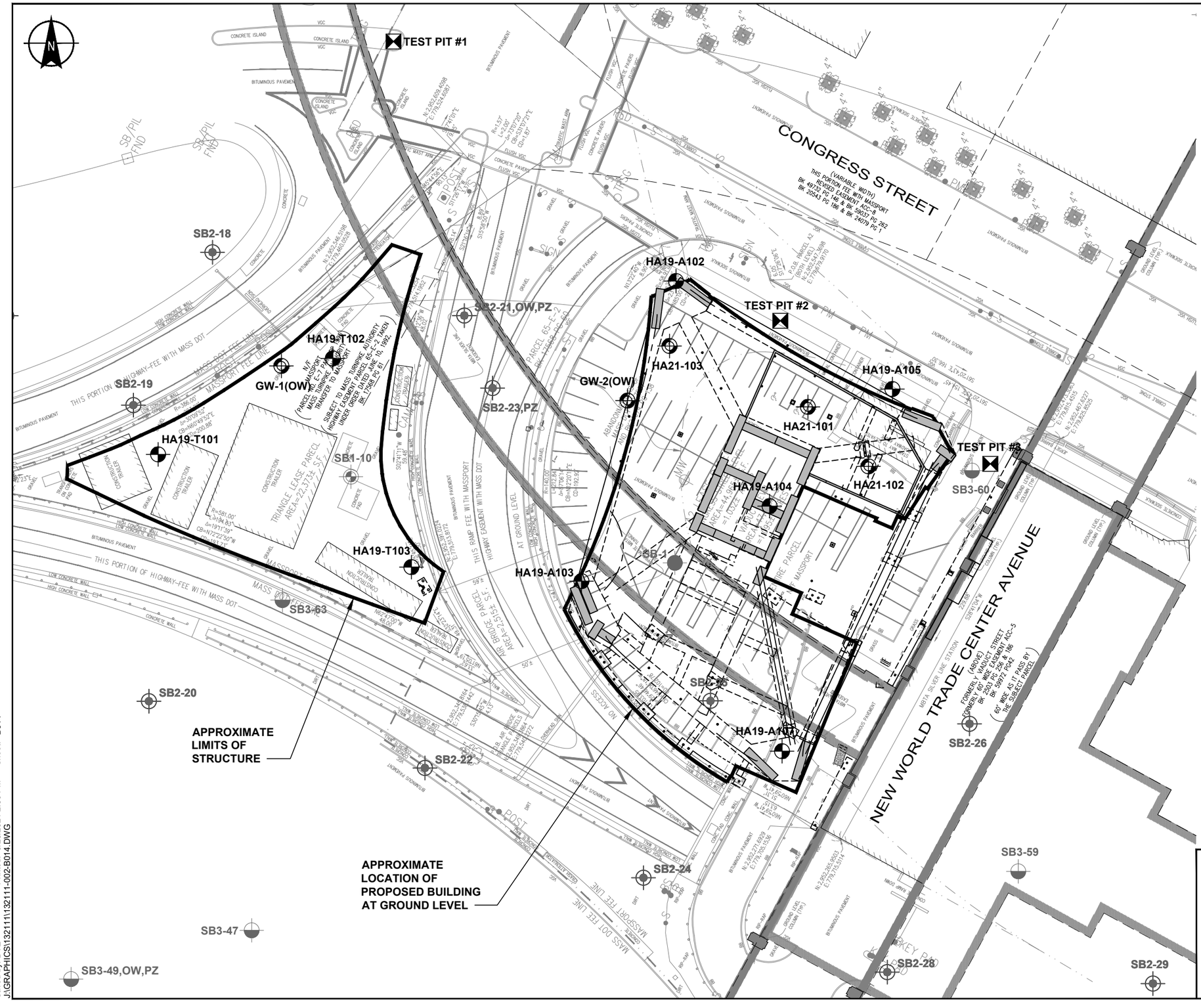
10 WORLD TRADE CENTER
BOSTON, MASSACHUSETTS

PROJECT LOCUS

APPROXIMATE SCALE: 1 IN = 2000 FT
OCTOBER 2021

FIGURE 1

132111-003_1_LOCUS.PDF



LEGEND

HA21-101	DESIGNATION AND APPROXIMATE LOCATION OF TEST BORINGS PERFORMED BY GEOLOGIC-EARTH EXPLORATIONS, INC. BETWEEN 25 MAY AND 1 JUNE 2021.
TEST PIT #1 ☒	DESIGNATION AND APPROXIMATE LOCATION OF TEST PITS EXCAVATED BY J DERENZO CO. IN JUNE 2021.
HA19-T101	DESIGNATION AND APPROXIMATE LOCATION OF TEST BORINGS PERFORMED BY GEOLOGIC-EARTH EXPLORATIONS, INC. BETWEEN 15 MAY AND 14 JUNE 2019.
SB3-60	DESIGNATION AND APPROXIMATE LOCATION OF TEST BORINGS PERFORMED BY GUILD DRILLING CO., INC. FOR THE CENTRAL ARTERY (I-93)/TUNNEL (I-90) PROJECT, FROM MAY 1991 TO SEPTEMBER 1991.
SB2-20	DESIGNATION AND APPROXIMATE LOCATION OF TEST BORINGS PERFORMED BY GZA DRILLING, INC. FOR THE CENTRAL ARTERY (I-93)/TUNNEL (I-90) PROJECT, FROM DECEMBER 1989 TO MARCH 1990.
SB1-10	DESIGNATION AND APPROXIMATE LOCATION OF TEST BORINGS PERFORMED BY GUILD DRILLING CO., INC. FOR THE CENTRAL ARTERY (I-93)/TUNNEL (I-90) PROJECT, FROM DECEMBER 1988 TO FEBRUARY 1989.
SB-1 ●	DESIGNATION AND APPROXIMATE LOCATION OF TEST BORING PERFORMED BY GUILD DRILLING CO., INC. FOR THE CENTRAL ARTERY (I-93)/TUNNEL (I-90) PROJECT, FROM 28 APRIL TO 4 MAY 1983.
(OW)	INDICATES OBSERVATION WELL INSTALLED IN COMPLETED BOREHOLE

NOTES

1. BASE PLAN TAKEN FROM ELECTRONIC FILE TITLED "12796.1_ALTA1_2019.04.10" RECEIVED 4 JUNE 2019, PREPARED BY NITSCH ENGINEERING.
2. APPROXIMATE LIMITS OF PROPOSED STRUCTURES AND TEST PITS TAKEN FROM PLAN PROVIDED BY BGI ON 19 MARCH 2021.
3. FOUNDATION ELEMENTS TAKEN FROM AN ELECTRONIC FILE TITLED "S1-101.dwg" RECEIVED ON 24 JUNE 2021 PROVIDED BY THORNTON TOMASETTI.

0 50 100

SCALE IN FEET

HALEY ALDRICH

10 WORLD TRADE CENTER
BOSTON, MASSACHUSETTS

SITE AND SUBSURFACE EXPLORATION LOCATION PLAN

SCALE: AS SHOWN
OCTOBER 2021

FIGURE 2

Printed: 6/28/2021 2:30 PM Sheet: B014
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J:\GRAPHICS\132111\132111-002-B014.DWG

PROPOSED DISCHARGE ROUTE

BOSTON HARBOR

BOSTON INNER HARBOR

COMMONWEALTH PIER 5

SITE

PROJECT LOCUS

APPROXIMATE SCALE: 1 IN = 2000 FT
SEPTEMBER 2019

FIGURE 3

WATERSIDE AV
LIBERTY DR
FAN PIER BLVD
BOND DR
MARINA PARK DR
NORTHERN AV
AUTUMN LN
HARBOR SHORE DR
PIER 4 BLVD
SEAPORT BLVD
B ST
EAST SERVICE RD
SILVER LINE TUNNEL
VIADUCT ST
SEAPORT LN
D ST
CONGRESS ST
PUMPHOUSE RD
PARK LN
HARBOR VIEW LN
STARBOARD LN
NORTHERN AV
MASSPORT HAUL RD
CHANNEL ST
HARBOR ST
SUMMER ST
FARGO ST
INMAN ST
MASSACHUSETTS TNPK
MASSACHUSETTS TURNPIKE RAMP
TRILLING WAY PUMPING STATION
SOUTH BOSTON WATERFRONT TRANSPORTATION CENTER
BOSTON FISH PIER
World Trade Center
Convention Center
Westin Hotel
Fargo Building
VENT BLDG #5
Ramp Up
BCEC Ramp Down
CONRAIL
BURIED MH252
Summer St Pump Station PS5
BWSC PUMP STATION
6" FMAIN
METERED
E Street Interceptor
SS3 AIR RELEASE
SS4 AIR RELEASE
INLINE CHECK VALVE
SDO15
SDO195 (1.83)
SDO202 MDOT (1.00)
SDO206
SDO208 8.46
SDO210 12.00
SDO211 11.90
SDO212 15.00
SDO213 10.70
SDO214 10.17
SDO3
SDO016
SDO215
SDO241 3.96
SDO216
SDO243 5.80
PA1
PA2 13.33
PA3 9.06 9.06
PA4 25.62
PA5
PA9
PA10 8.23
PA11
PA12
PA14 8.83 8.59
PA15 6.59 6.62
PA16 11.61 11.61
CZ1
CZ502 10.60 10.60
CZ503 13.40 13.40
TF7 UN 2.54
TF8 2.84 3.00 2.90
TWIN 24" SD
High Inlet Line
PARCEL A AND TRIANGLE PARCEL BOSTON, MASSACHUSETTS

N W E S

0 65 130 260 390 520

1 inch = 100 feet

HALEY ALDRICH

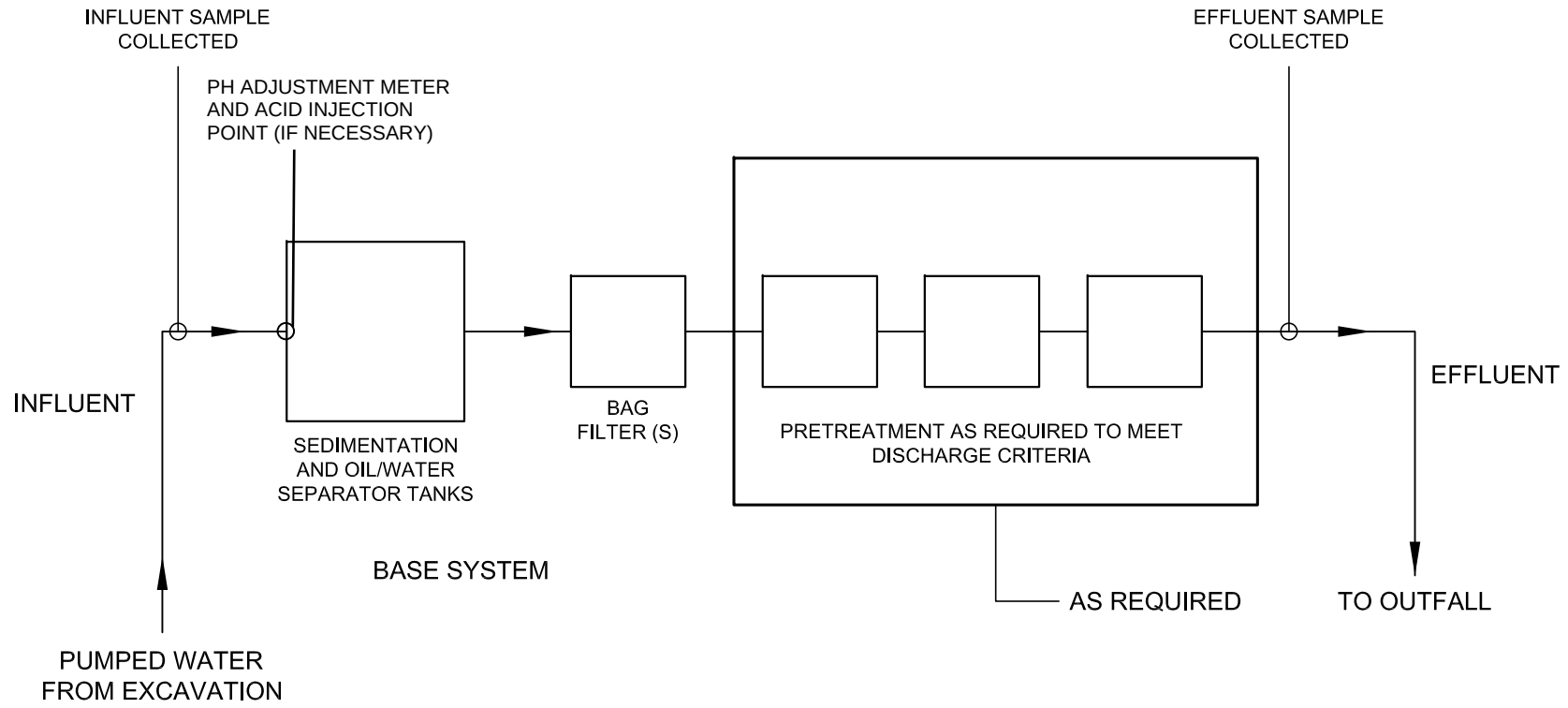
10 WORLD TRADE CENTER
BOSTON, MASSACHUSETTS

PROPOSED DISCHARGE ROUTE

SCALE: AS SHOWN
OCTOBER 2021

FIGURE 3

G:\38625\NPDES\FIGURES\COPY-A142.DWG



LEGEND:

→ DIRECTION OF FLOW

NOTE:

1. DETAILS OF TREATMENT SYSTEM MAY VARY FROM SYSTEM INDICATED ABOVE. SPECIFIC MEANS AND METHODS OF TREATMENT TO BE SELECTED BY CONTRACTOR. WATER WILL BE TREATED TO MEET REQUIRED EFFLUENT STANDARDS.
2. PH ADJUSTMENT ACID STORAGE TO BE ADJACENT TO TREATMENT NEAR INJECTION POINT. REFER TO EQUIPMENT CUT SHEETS AND CHEMICAL SAFETY DATA SHEETS IN APPENDIX F.

HALEY ALDRICH

10 WORLD TRADE CENTER
BOSTON, MASSACHUSETTS

PROPOSED TREATMENT SYSTEM SCHEMATIC

SCALE: NONE
OCTOBER 2021

FIGURE 4

APPENDIX A

NOI for RGP

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

A. General site information:

<table>
<tr><td rowspan="2">1. Name of site:
10 World Trade Center
(MassPort Parcel A2 and Triangle Parcel)</td><td colspan="3">Site address: 10 World Trade Center Avenue
Street: World Trade Center Avenue</td></tr>
<tr><td>City: Boston</td><td>State: MA</td><td>Zip: 02210</td></tr>
<tr><td rowspan="4">2. Site owner
10 World Trade LHI LLC

Owner is (check one): ☐ Federal ☐ State/Tribal ■ Private
☐ Other; if so, specify:</td><td colspan="3">Contact Person: Scott Summers</td></tr>
<tr><td colspan="2">Telephone: 617-717-7976</td><td>Email: ssummers@bginvestors.com</td></tr>
<tr><td colspan="3">Mailing address: c/o Boston Global Investors, 55 Summer Street
Street: Summer Street</td></tr>
<tr><td>City: Boston</td><td>State: MA</td><td>Zip: 02210</td></tr>
<tr><td rowspan="4">3. Site operator, if different than owner
Suffolk Construction Co., Inc.</td><td colspan="3">Contact Person: Geoff Witheford</td></tr>
<tr><td colspan="2">Telephone: 617-517-4212</td><td>Email: gwitheford@suffolk.com</td></tr>
<tr><td colspan="3">Mailing address:
Street: 65 Allerton Street</td></tr>
<tr><td>City: Boston</td><td>State: MA</td><td>Zip: 02119</td></tr>
<tr><td>4. NPDES permit number assigned by EPA:

NPDES permit is (check all that apply: ■ RGP ☐ DGP ☐ CGP
☐ MSGP ☐ Individual NPDES permit ☐ Other; if so, specify:</td><td colspan="3">5. Other regulatory program(s) that apply to the site (check all that apply):
☐ MA Chapter 21e; list RTN(s):
☐ 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):
Boston Inner Harbor	MA70-02	SB

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

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

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

3. Indicate if the receiving water(s) is listed in the State's Integrated List of Waters (i.e., CWA Section 303(d)). Include which designated uses are impaired, and any pollutants indicated. Also, indicate if a final TMDL is available for any of the indicated pollutants. For more information, contact the appropriate State as noted in Part 4.6 of the RGP. The Boston Inner Harbor is a Category 5 water on the MA Integrated List. Pollutants indicated include dissolved oxygen & PCBs (no TMDL available)

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 - Receiving water is an ocean
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.	1 - Receiving water is an ocean

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

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

C. Source water information:

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

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

Although "Contaminated Groundwater" is listed, see table for compounds actually detected and concentrations

2. Source water contaminants: PAHs, copper, lead, nickel, zinc	
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): SDO202 SDO3	Outfall location(s): (Latitude, Longitude) 42.350726, -71.042657 42.349455, -71.039925
Discharges enter the receiving water(s) via (check any that apply): ☐ Direct discharge to the receiving water ■ Indirect discharge, if so, specify: Discharges through Boston Water and Sewer drain on Congress Street to outfalls listed above. ☐ 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: BWSC permit submitted concurrently with this NOI. Has the operator attached a summary of any additional requirements the owner of this system has specified? (check one): ■ Yes ☐ No	
Provide the expected start and end dates of discharge(s) (month/year): November 2021 Indicate if the discharge is expected to occur over a duration of: ☐ less than 12 months ■ 12 months or more ☐ is an emergency discharge	
Has the operator attached a site plan in accordance with the instructions in D, above? (check one): ■ Yes ☐ No	

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

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

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

4. Influent and Effluent Characteristics

Parameter	Known or believed absent	Known or believed present	# of samples	Test method (#)	Detection limit (µg/l)	Influent		Effluent Limitations	
						Daily maximum (µg/l)	Daily average (µg/l)	TBEL	WQBEL
A. Inorganics									
Ammonia		✓	1	4500NH	0.075	1.77	1.77	Report mg/L	---
Chloride		✓	1	300.0	125000	3520000	3520000	Report µg/l	---
Total Residual Chlorine	✓		0	-	-	-	-	0.2 mg/L	7.5
Total Suspended Solids		✓	1	2540D	5	53	53	30 mg/L	---
Antimony Total		✓ *	1	3005A	4	ND	ND	206 µg/L	640
Arsenic Total		✓	1	3005A	1	10.7	10.7	104 µg/L	36
Cadmium Total		✓	1	3005A	2	0.74	0.74	10.2 µg/L	8.9
Chromium III		✓	1	3005A	1	173.2	173.2	323 µg/L	100.0
Chromium VI	✓		1	7196A	10	ND	ND	323 µg/L	50
Copper Total		✓	1	3005A	1	159	159	242 µg/L	3.7
Iron Total		✓	1	200.7	50	103000	103000	5,000 µg/L	---
Lead Total		✓	1	3005A	1	386.6	386.6	160 µg/L	8.5
Mercury Total		✓	1	245.1	2	0.26	0.26	0.739 µg/L	1.11
Nickel Total		✓	1	3005A	2	105.8	105.8	1,450 µg/L	8.3
Selenium Total	✓		1	3005A	25	ND	ND	235.8 µg/L	71
Silver Total		✓	1	3005A	2	0.46	0.46	35.1 µg/L	2.2
Zinc Total		✓	1	3005A	50	353.1	353.1	420 µg/L	86
Cyanide Total	✓		1	4500-CN	5	ND	ND	178 mg/L	1.0
B. Non-Halogenated VOCs									
Total BTEX		✓ *	1	624.1	-	ND	ND	100 µg/L	---
Benzene		✓ *	1	624.1	1	ND	ND	5.0 µg/L	---
1,4 Dioxane	✓		1	624.1-SIM	5	ND	ND	200 µg/L	---
Acetone		✓ *	1	624.1	0.010	ND	ND	7.97 mg/L	---
Phenol	✓		1	420.1	30	ND	ND	1,080 µg/L	300

X* - detected in soil only

Parameter	Known or believed absent	Known or believed present	# of samples	Test method (#)	Detection limit (µg/l)	Influent		Effluent Limitations	
						Daily maximum (µg/l)	Daily average (µg/l)	TBEL	WQBEL
C. Halogenated VOCs									
Carbon Tetrachloride	✓		1	624.1	1	ND	ND	4.4 µg/L	1.6
1,2 Dichlorobenzene	✓		1	624.1	5	ND	ND	600 µg/L	---
1,3 Dichlorobenzene	✓		1	624.1	5	ND	ND	320 µg/L	---
1,4 Dichlorobenzene	✓		1	624.1	5	ND	ND	5.0 µg/L	---
Total dichlorobenzene	✓		1	624.1	5	ND	ND	763 µg/L in NH	---
1,1 Dichloroethane	✓		1	624.1	1.5	ND	ND	70 µg/L	---
1,2 Dichloroethane	✓		1	624.1	1.5	ND	ND	5.0 µg/L	---
1,1 Dichloroethylene	✓		1	624.1	1	ND	ND	3.2 µg/L	---
Ethylene Dibromide	✓		1	624.1	0.01	ND	ND	0.05 µg/L	---
Methylene Chloride	✓		1	624.1	1	ND	ND	4.6 µg/L	---
1,1,1 Trichloroethane	✓		1	624.1	2	ND	ND	200 µg/L	---
1,1,2 Trichloroethane	✓		1	624.1	1.5	ND	ND	5.0 µg/L	---
Trichloroethylene	✓		1	624.1	1	ND	ND	5.0 µg/L	---
Tetrachloroethylene	✓		1	624.1	1	ND	ND	5.0 µg/L	3.3
cis-1,2 Dichloroethylene	✓		1	624.1	1	ND	ND	70 µg/L	---
Vinyl Chloride	✓		1	624.1	1	ND	ND	2.0 µg/L	---
D. Non-Halogenated SVOCs									
Total Phthalates	✓		1	625.1	-	ND	ND	190 µg/L	---
Diethylhexyl phthalate	✓		1	625.1	2.2	ND	ND	101 µg/L	2.2
Total Group I PAHs		✓	1	625.1	-	0.746	0.746	1.0 µg/L	---
Benzo(a)anthracene		✓	1	625.1-SIM	0.1	0.178	0.178	As Total PAHs	0.0038
Benzo(a)pyrene		✓	1	625.1-SIM	0.1	0.156	0.156		0.0038
Benzo(b)fluoranthene		✓	1	625.1-SIM	0.1	0.173	0.173		0.0038
Benzo(k)fluoranthene		✓ *	1	625.1-SIM	0.1	ND	ND		0.0038
Chrysene		✓	1	625.1-SIM	0.1	0.135	0.135		0.0038
Dibenzo(a,h)anthracene		✓ *	1	625.1-SIM	0.1	ND	ND		0.0038
Indeno(1,2,3-cd)pyrene		✓	1	625.1-SIM	0.1	0.104	0.104		0.0038

X* - detected in soil only

Parameter	Known or believed absent	Known or believed present	# of samples	Test method (#)	Detection limit (µg/l)	Influent		Effluent Limitations	
						Daily maximum (µg/l)	Daily average (µg/l)	TBEL	WQBEL
Total Group II PAHs		✔	1	625.1-SIM	-	1.784	1.784	100 µg/L	---
Naphthalene		✔	1	625.1-SIM	0.1	0.971	0.971	20 µg/L	---
E. Halogenated SVOCs									
Total PCBs	✔		1	608.3	0.25	ND	ND	0.000064 µg/L	---
Pentachlorophenol	✔		1	624.1	1	ND	ND	1.0 µg/L	---
F. Fuels Parameters									
Total Petroleum Hydrocarbons		✔ *	1	1664A	4	ND	ND	5.0 mg/L	---
Ethanol	✔		1	1671	20	ND	ND	Report mg/L	---
Methyl-tert-Butyl Ether	✔		1	624.1	10	ND	ND	70 µg/L	20
tert-Butyl Alcohol	✔		1	624.1	100	ND	ND	120 µg/L in MA 40 µg/L in NH	---
tert-Amyl Methyl Ether	✔		1	624.1	20	ND	ND	90 µg/L in MA 140 µg/L in NH	---
Other (i.e., pH, temperature, hardness, salinity, LC_{50}, additional pollutants present); if so, specify:									
pH		✔	1			7.5	7.5		
Hardness		✔	1	200.7	0.66	657	657		
See attached Table I									

X* - detected in soil only

Additional compounds detected in soil only:

SVOCs
2-Methylnaphthalene
Acenaphthene
Acenaphthylene
Anthracene
Benzo(g,h,i)perylene
Benzo(k)fluoranthene
bis(2-Ethylhexyl)phthalate
Dibenz(a,h)anthracene
Dibenzofuran
Fluoranthene
Fluorene
Phenanthrene
Pyrene

VOCs
Acetone
Benzene
Carbon disulfide
Naphthalene
Tetrahydrofuran
Toluene
Xylene

Metals
Antimony
Barium
Beryllium
Vanadium

Other
Conductivity
Petroleum hydrocarbons

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:
AS NECESSARY to meet permit requirements

2. Provide a written description of all treatment system(s) or processes that will be applied to the effluent prior to discharge.
Prior to discharge, collected water will be routed through a sedimentation tank and a bag filter and other necessary treatment components (potentially: Ion exchange, GAC, oil/water separator), to remove suspended solids and undissolved chemical constituents, as shown on Figure 4 of the NPDES permit application. If required, pH conditioners (sulfuric acid) will be added near the influent pipe in the sedimentation tank.

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: AS NECESSARY to meet permit requirements

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: Flow meter Is use of a flow meter feasible? (check one): ■ Yes ☐ No, if so, provide justification:	100
Provide the proposed maximum effluent flow in gpm.	100
Provide the average effluent flow in gpm.	50
If Activity Category IV applies, indicate the estimated total volume of water that will be discharged:	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:
As required to meet permit criteria

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

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

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

G. Endangered Species Act eligibility determination

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

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

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

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

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

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

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

H. National Historic Preservation Act eligibility determination

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

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

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

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

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

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

I. Supplemental information

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

Refer to attached Haley & Aldrich, Inc. letter

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

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

J. Certification requirement

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

BMPP certification statement: A BMPP meeting the requirements of this general permit will be implemented upon initiation of discharge.	
Notification provided to the appropriate State, including a copy of this NOI, if required.	Check one: Yes ■ No ☐
Notification provided to the municipality in which the discharge is located, including a copy of this NOI, if requested.	Check one: Yes ■ No ☐
Notification provided to the owner of a private or municipal storm sewer system, if such system is used for site discharges, including a copy of this NOI, if requested.	Check one: Yes ■ No ☐ NA ☐
Permission obtained from the owner of a private or municipal storm sewer system, if such system is used for site discharges. If yes, attach additional conditions. If no, attach explanation and timeframe for obtaining permission.	BWSC Permit being submitted concurrently with this NOI 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: [signature]	Date: 10/5/21
Print Name and Title: Geoffrey M Witherell Vice President of Operations Suffolk Construction Co, Inc	

APPENDIX B

WM 15 Transmittal

Enter your transmittal number → X288275 (Transmittal Number)

Your unique Transmittal Number can be accessed online:
https://www.mass.gov/service-details/transmittal-form-number-for-massdep-permit-application-payment

Massachusetts Department of Environmental Protection

Transmittal Form for Permit Application and Payment

1. Please type or print. A separate Transmittal Form must be completed for each permit application.

2. Make your check payable to the Commonwealth of Massachusetts and mail it with a copy of this form to: MassDEP, P.O. Box 4062, Boston, MA 02211.

3. Three copies of this form will be needed.

Copy 1 - the original must accompany your permit application. **Copy 2** must accompany your fee payment. **Copy 3** should be retained for your records

4. Both fee-paying and exempt applicants must mail a copy of this transmittal form to:

MassDEP
P.O. Box 4062
Boston, MA 02211

*** Note:**
For BWSC Permits, enter the LSP.

A. Permit Information

1. Permit Code: 4-to-7-character code from permit instructions	2. Name of Permit Category
WM15	NPDES RGP

3. Type of Project or Activity: Construction dewatering associated with property development

B. Applicant Information – Firm or Individual

1. Name of Firm - Or, if party needing this approval is an individual enter name below: 10 World Trade LHI LLC

2. **Last Name** of Individual	3. **First Name** of Individual	4. MI
NA	NA	NA

5. Street Address: c/o Boston Global Investors, 55 Seaport Boulevard

6. City/Town	7. State	8. Zip Code	9. Telephone #	10. Ext. #
Boston	MA	02109	617-717-7976	

11. Contact Person	12. e-mail address
Scott Summers	ssummers@bginvestors.com

C. Facility, Site or Individual Requiring Approval

1. Name of Facility, Site or Individual: 10 World Trade Center

2. Street Address: 10 World Trade Center Avenue

3. City/Town	4. State	5. Zip Code	6. Telephone #	7. Ext. #
Boston	MA	02210	617-717-7976	NA

8. DEP Facility Number (if Known)	9. Federal I.D. Number (if Known)	10. BWSC Tracking # (if Known)
NA	NA	NA

D. Application Prepared by (if different from Section B)*

1. Name of Firm or Individual: Haley & Aldrich, Inc

2. Address: 465 Medford Street, Suite 2200

3. City/Town	4. State	5. Zip Code	6. Telephone #	7. Ext. #
Boston	MA	02129	617-886-7400	NA

8. Contact Person	9. LSP Number (BWSC Permits only)
Cole E. Worthy III, LSP	6812

E. Permit - Project Coordination

1. Is this project subject to MEPA review? ☐ yes ☒ no
   If yes, enter the project's EOEA file number - assigned when an Environmental Notification Form is submitted to the MEPA unit: NA (EOEA File Number)

F. Amount Due

DEP Use Only

Permit No:

Rec'd Date:

Reviewer:

Special Provisions:

1. ☐ **Fee** Exempt: city, town, county, or district of the Commonwealth; federally recognized Indian tribe housing authority; municipal housing authority; the MBTA; or state agency if fee is $100 or less. *There are no fee exemptions for BWSC permits, regardless of applicant status.*
2. ☐ Hardship Request - payment extensions according to 310 CMR 4.04(3)(c).
3. ☐ Alternative Schedule Project (according to 310 CMR 4.05 and 4.10).
4. ☐ Homeowner (according to 310 CMR 4.02).

Check Number	Dollar Amount	Date

APPENDIX C

Laboratory Data Reports

ANALYTICAL REPORT

Lab Number:	L2131409
Client:	Haley & Aldrich, Inc. 465 Medford Street, Suite 2200 Charlestown, MA 02129-1400
ATTN:	Heather Scranton
Phone:	(617) 886-7400
Project Name:	10 WORLD TRADE CENTER
Project Number:	132111-002-000 T00
Report Date:	06/22/21

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: 10 WORLD TRADE CENTER
Project Number: 132111-002-000 T00

Lab Number: L2131409
Report Date: 06/22/21

Alpha Sample ID	Client ID	Matrix	Sample Location	Collection Date/Time	Receive Date
L2131409-01	GW-2_20210610	WATER	SEAPORT, BOSTON, MA	06/10/21 05:20	06/10/21

Project Name:	10 WORLD TRADE CENTER	**Lab Number:**	L2131409
Project Number:	132111-002-000 T00	**Report Date:**	06/22/21

Case Narrative

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

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

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

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

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

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

Project Name:	10 WORLD TRADE CENTER	**Lab Number:**	L2131409
Project Number:	132111-002-000 T00	**Report Date:**	06/22/21

Case Narrative (continued)

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.

Sample Receipt

L2131409-01: A sample container for TRC was listed on the Chain of Custody, but not received. This was verified by the client.

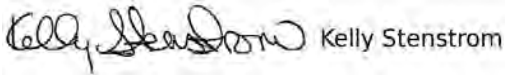
Volatile Organics by Method 624

The WG1512318-9 LCS recovery, associated with L2131409-01, is above the acceptance criteria for tert-butyl alcohol (160%); however, the associated sample is non-detect to the RL for this target analyte. The results of the original analysis are reported.

Total Metals

L2131409-01: The sample has an elevated detection limit for selenium due to the dilution required by the sample matrix.

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:  Kelly Stenstrom

Title: Technical Director/Representative Date: 06/22/21

ORGANICS

VOLATILES

Project Name: 10 WORLD TRADE CENTER
Lab Number: L2131409
Project Number: 132111-002-000 T00
Report Date: 06/22/21

SAMPLE RESULTS

Lab ID: L2131409-01
Client ID: GW-2_20210610
Sample Location: SEAPORT, BOSTON, MA

Date Collected: 06/10/21 05:20
Date Received: 06/10/21
Field Prep: Refer to COC

Sample Depth:
Matrix: Water
Analytical Method: 128,624.1
Analytical Date: 06/15/21 12:31
Analyst: GT

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

Project Name: 10 WORLD TRADE CENTER
Lab Number: L2131409
Project Number: 132111-002-000 T00
Report Date: 06/22/21

SAMPLE RESULTS

Lab ID: L2131409-01
Client ID: GW-2_20210610
Sample Location: SEAPORT, BOSTON, MA
Date Collected: 06/10/21 05:20
Date Received: 06/10/21
Field Prep: Refer to COC

Sample Depth:

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

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Pentafluorobenzene	95		60-140
Fluorobenzene	86		60-140
4-Bromofluorobenzene	102		60-140

Project Name: 10 WORLD TRADE CENTER
Lab Number: L2131409
Project Number: 132111-002-000 T00
Report Date: 06/22/21

SAMPLE RESULTS

Lab ID: L2131409-01
Client ID: GW-2_20210610
Sample Location: SEAPORT, BOSTON, MA

Date Collected: 06/10/21 05:20
Date Received: 06/10/21
Field Prep: Refer to COC

Sample Depth:
Matrix: Water
Analytical Method: 128,624.1-SIM
Analytical Date: 06/15/21 12:31
Analyst: GT

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by GC/MS-SIM - Westborough Lab						
1,4-Dioxane	ND		ug/l	5.0	--	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Fluorobenzene	88		60-140
4-Bromofluorobenzene	102		60-140

Project Name: 10 WORLD TRADE CENTER
Lab Number: L2131409
Project Number: 132111-002-000 T00
Report Date: 06/22/21

SAMPLE RESULTS

Lab ID: L2131409-01
Client ID: GW-2_20210610
Sample Location: SEAPORT, BOSTON, MA

Date Collected: 06/10/21 05:20
Date Received: 06/10/21
Field Prep: Refer to COC

Sample Depth:
Matrix: Water
Analytical Method: 14,504.1
Analytical Date: 06/14/21 15:20
Analyst: AMM

Extraction Method: EPA 504.1
Extraction Date: 06/14/21 13:13

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: 10 WORLD TRADE CENTER
Project Number: 132111-002-000 T00

Lab Number: L2131409
Report Date: 06/22/21

Method Blank Analysis
Batch Quality Control

Analytical Method: 14,504.1
Analytical Date: 06/14/21 13:58
Analyst: AMM

Extraction Method: EPA 504.1
Extraction Date: 06/14/21 13:13

Parameter	Result	Qualifier	Units	RL	MDL	
Microextractables by GC - Westborough Lab for sample(s): 01 Batch: WG1511681-1						
1,2-Dibromoethane	ND		ug/l	0.010	--	A

Project Name: 10 WORLD TRADE CENTER
Project Number: 132111-002-000 T00
Lab Number: L2131409
Report Date: 06/22/21

Method Blank Analysis
Batch Quality Control

Analytical Method: 128,624.1
Analytical Date: 06/15/21 10:29
Analyst: GT

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by GC/MS - Westborough Lab for sample(s): 01 Batch: WG1512318-10					
Methylene chloride	ND		ug/l	1.0	--
1,1-Dichloroethane	ND		ug/l	1.5	--
Carbon tetrachloride	ND		ug/l	1.0	--
1,1,2-Trichloroethane	ND		ug/l	1.5	--
Tetrachloroethene	ND		ug/l	1.0	--
1,2-Dichloroethane	ND		ug/l	1.5	--
1,1,1-Trichloroethane	ND		ug/l	2.0	--
Benzene	ND		ug/l	1.0	--
Toluene	ND		ug/l	1.0	--
Ethylbenzene	ND		ug/l	1.0	--
Vinyl chloride	ND		ug/l	1.0	--
1,1-Dichloroethene	ND		ug/l	1.0	--
cis-1,2-Dichloroethene	ND		ug/l	1.0	--
Trichloroethene	ND		ug/l	1.0	--
1,2-Dichlorobenzene	ND		ug/l	5.0	--
1,3-Dichlorobenzene	ND		ug/l	5.0	--
1,4-Dichlorobenzene	ND		ug/l	5.0	--
p/m-Xylene	ND		ug/l	2.0	--
o-xylene	ND		ug/l	1.0	--
Xylenes, Total	ND		ug/l	1.0	--
Acetone	ND		ug/l	10	--
Methyl tert butyl ether	ND		ug/l	10	--
Tert-Butyl Alcohol	ND		ug/l	100	--
Tertiary-Amyl Methyl Ether	ND		ug/l	20	--

Project Name: 10 WORLD TRADE CENTER
Project Number: 132111-002-000 T00
Lab Number: L2131409
Report Date: 06/22/21

Method Blank Analysis
Batch Quality Control

Analytical Method: 128,624.1
Analytical Date: 06/15/21 10:29
Analyst: GT

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by GC/MS - Westborough Lab for sample(s): 01 Batch: WG1512318-10					

Surrogate	%Recovery	Qualifier	Acceptance Criteria
Pentafluorobenzene	95		60-140
Fluorobenzene	89		60-140
4-Bromofluorobenzene	101		60-140

Project Name: 10 WORLD TRADE CENTER
Project Number: 132111-002-000 T00
Lab Number: L2131409
Report Date: 06/22/21

Method Blank Analysis
Batch Quality Control

Analytical Method: 128,624.1-SIM
Analytical Date: 06/15/21 10:29
Analyst: GT

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by GC/MS-SIM - Westborough Lab for sample(s): 01 Batch: WG1512844-4					
1,4-Dioxane	ND		ug/l	5.0	--

Surrogate	%Recovery	Qualifier	Acceptance Criteria
Fluorobenzene	91		60-140
4-Bromofluorobenzene	104		60-140

Lab Control Sample Analysis

Batch Quality Control

Project Name: 10 WORLD TRADE CENTER

Project Number: 132111-002-000 T00

Lab Number: L2131409

Report Date: 06/22/21

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits	Column
Microextractables by GC - Westborough Lab	Associated sample(s): 01		Batch: WG1511681-2						
1,2-Dibromoethane	110		-		80-120	-			A

Lab Control Sample Analysis
Batch Quality Control

Project Name: 10 WORLD TRADE CENTER
Project Number: 132111-002-000 T00

Lab Number: L2131409
Report Date: 06/22/21

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: WG1512318-9								
Methylene chloride	90		-		60-140	-		28
1,1-Dichloroethane	90		-		50-150	-		49
Carbon tetrachloride	120		-		70-130	-		41
1,1,2-Trichloroethane	100		-		70-130	-		45
Tetrachloroethene	105		-		70-130	-		39
1,2-Dichloroethane	115		-		70-130	-		49
1,1,1-Trichloroethane	115		-		70-130	-		36
Benzene	95		-		65-135	-		61
Toluene	100		-		70-130	-		41
Ethylbenzene	100		-		60-140	-		63
Vinyl chloride	70		-		5-195	-		66
1,1-Dichloroethene	90		-		50-150	-		32
cis-1,2-Dichloroethene	95		-		60-140	-		30
Trichloroethene	95		-		65-135	-		48
1,2-Dichlorobenzene	95		-		65-135	-		57
1,3-Dichlorobenzene	90		-		70-130	-		43
1,4-Dichlorobenzene	90		-		65-135	-		57
p/m-Xylene	100		-		60-140	-		30
o-xylene	95		-		60-140	-		30
Acetone	126		-		40-160	-		30
Methyl tert butyl ether	95		-		60-140	-		30
Tert-Butyl Alcohol	**160**	Q	-		60-140	-		30
Tertiary-Amyl Methyl Ether	85		-		60-140	-		30

Lab Control Sample Analysis
Batch Quality Control

Project Name: 10 WORLD TRADE CENTER
Project Number: 132111-002-000 T00

Lab Number: L2131409
Report Date: 06/22/21

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: WG1512318-9								

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
Pentafluorobenzene	109				60-140
Fluorobenzene	104				60-140
4-Bromofluorobenzene	95				60-140

Lab Control Sample Analysis

Batch Quality Control

Project Name: 10 WORLD TRADE CENTER
Project Number: 132111-002-000 T00

Lab Number: L2131409
Report Date: 06/22/21

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: WG1512844-3								
1,4-Dioxane	106		-		60-140	-		20

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
Fluorobenzene	92				60-140
4-Bromofluorobenzene	101				60-140

Matrix Spike Analysis

Batch Quality Control

Project Name: 10 WORLD TRADE CENTER

Project Number: 132111-002-000 T00

Lab Number: L2131409

Report Date: 06/22/21

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: WG1511681-3 QC Sample: L2129424-01 Client ID: MS Sample													
1,2-Dibromoethane	ND	0.25	0.248	99		-	-		80-120	-		20	A
1,2-Dibromo-3-chloropropane	ND	0.25	0.246	98		-	-		80-120	-		20	A
1,2,3-Trichloropropane	ND	0.25	0.284	113		-	-		80-120	-		20	A

SEMIVOLATILES

Project Name: 10 WORLD TRADE CENTER
Project Number: 132111-002-000 T00

Lab Number: L2131409
Report Date: 06/22/21

SAMPLE RESULTS

Lab ID: L2131409-01
Client ID: GW-2_20210610
Sample Location: SEAPORT, BOSTON, MA

Date Collected: 06/10/21 05:20
Date Received: 06/10/21
Field Prep: Refer to COC

Sample Depth:
Matrix: Water
Analytical Method: 129,625.1
Analytical Date: 06/16/21 06:22
Analyst: SZ

Extraction Method: EPA 625.1
Extraction Date: 06/15/21 08:05

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

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	90		42-122
2-Fluorobiphenyl	93		46-121
4-Terphenyl-d14	119		47-138

Project Name: 10 WORLD TRADE CENTER
Project Number: 132111-002-000 T00
Lab Number: L2131409
Report Date: 06/22/21

SAMPLE RESULTS

Lab ID: L2131409-01
Client ID: GW-2_20210610
Sample Location: SEAPORT, BOSTON, MA

Date Collected: 06/10/21 05:20
Date Received: 06/10/21
Field Prep: Refer to COC

Sample Depth:
Matrix: Water
Analytical Method: 129,625.1-SIM
Analytical Date: 06/16/21 11:00
Analyst: JJW

Extraction Method: EPA 625.1
Extraction Date: 06/15/21 08:03

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS-SIM - Westborough Lab						
Acenaphthene	ND		ug/l	0.100	--	1
Fluoranthene	0.286		ug/l	0.100	--	1
Naphthalene	0.971		ug/l	0.100	--	1
Benzo(a)anthracene	0.178		ug/l	0.100	--	1
Benzo(a)pyrene	0.156		ug/l	0.100	--	1
Benzo(b)fluoranthene	0.173		ug/l	0.100	--	1
Benzo(k)fluoranthene	ND		ug/l	0.100	--	1
Chrysene	0.135		ug/l	0.100	--	1
Acenaphthylene	ND		ug/l	0.100	--	1
Anthracene	ND		ug/l	0.100	--	1
Benzo(ghi)perylene	ND		ug/l	0.100	--	1
Fluorene	ND		ug/l	0.100	--	1
Phenanthrene	0.207		ug/l	0.100	--	1
Dibenzo(a,h)anthracene	ND		ug/l	0.100	--	1
Indeno(1,2,3-cd)pyrene	0.104		ug/l	0.100	--	1
Pyrene	0.320		ug/l	0.100	--	1
Pentachlorophenol	ND		ug/l	1.00	--	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Fluorophenol	61		25-87
Phenol-d6	44		16-65
Nitrobenzene-d5	101		42-122
2-Fluorobiphenyl	94		46-121
2,4,6-Tribromophenol	123		45-128
4-Terphenyl-d14	97		47-138

Project Name: 10 WORLD TRADE CENTER
Project Number: 132111-002-000 T00
Lab Number: L2131409
Report Date: 06/22/21

Method Blank Analysis
Batch Quality Control

Analytical Method: 129,625.1-SIM
Analytical Date: 06/15/21 10:18
Analyst: RP

Extraction Method: EPA 625.1
Extraction Date: 06/14/21 20:54

Parameter	Result	Qualifier	Units	RL	MDL
Semivolatile Organics by GC/MS-SIM - Westborough Lab for sample(s): 01 Batch: WG1511992-1					
Acenaphthene	ND		ug/l	0.100	--
Fluoranthene	ND		ug/l	0.100	--
Naphthalene	ND		ug/l	0.100	--
Benzo(a)anthracene	ND		ug/l	0.100	--
Benzo(a)pyrene	ND		ug/l	0.100	--
Benzo(b)fluoranthene	ND		ug/l	0.100	--
Benzo(k)fluoranthene	ND		ug/l	0.100	--
Chrysene	ND		ug/l	0.100	--
Acenaphthylene	ND		ug/l	0.100	--
Anthracene	ND		ug/l	0.100	--
Benzo(ghi)perylene	ND		ug/l	0.100	--
Fluorene	ND		ug/l	0.100	--
Phenanthrene	ND		ug/l	0.100	--
Dibenzo(a,h)anthracene	ND		ug/l	0.100	--
Indeno(1,2,3-cd)pyrene	ND		ug/l	0.100	--
Pyrene	ND		ug/l	0.100	--
Pentachlorophenol	ND		ug/l	1.00	--

Surrogate	%Recovery	Qualifier	Acceptance Criteria
2-Fluorophenol	65		25-87
Phenol-d6	48		16-65
Nitrobenzene-d5	118		42-122
2-Fluorobiphenyl	69		46-121
2,4,6-Tribromophenol	78		45-128
4-Terphenyl-d14	85		47-138

Project Name: 10 WORLD TRADE CENTER
Project Number: 132111-002-000 T00
Lab Number: L2131409
Report Date: 06/22/21

Method Blank Analysis
Batch Quality Control

Analytical Method: 129,625.1
Analytical Date: 06/16/21 01:52
Analyst: SZ

Extraction Method: EPA 625.1
Extraction Date: 06/14/21 20:49

Parameter	Result	Qualifier	Units	RL	MDL
Semivolatile Organics by GC/MS - Westborough Lab for sample(s): 01 Batch: WG1512531-1					
Bis(2-ethylhexyl)phthalate	ND		ug/l	2.20	--
Butyl benzyl phthalate	ND		ug/l	5.00	--
Di-n-butylphthalate	ND		ug/l	5.00	--
Di-n-octylphthalate	ND		ug/l	5.00	--
Diethyl phthalate	ND		ug/l	5.00	--
Dimethyl phthalate	ND		ug/l	5.00	--

Surrogate	%Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	74		42-122
2-Fluorobiphenyl	82		46-121
4-Terphenyl-d14	94		47-138

Lab Control Sample Analysis
Batch Quality Control

Project Name: 10 WORLD TRADE CENTER
Project Number: 132111-002-000 T00

Lab Number: L2131409
Report Date: 06/22/21

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: WG1511992-3								
Acenaphthene	86		-		60-132	-		30
Fluoranthene	96		-		43-121	-		30
Naphthalene	82		-		36-120	-		30
Benzo(a)anthracene	93		-		42-133	-		30
Benzo(a)pyrene	97		-		32-148	-		30
Benzo(b)fluoranthene	95		-		42-140	-		30
Benzo(k)fluoranthene	86		-		25-146	-		30
Chrysene	80		-		44-140	-		30
Acenaphthylene	80		-		54-126	-		30
Anthracene	100		-		43-120	-		30
Benzo(ghi)perylene	97		-		1-195	-		30
Fluorene	90		-		70-120	-		30
Phenanthrene	92		-		65-120	-		30
Dibenzo(a,h)anthracene	101		-		1-200	-		30
Indeno(1,2,3-cd)pyrene	107		-		1-151	-		30
Pyrene	94		-		70-120	-		30
Pentachlorophenol	100		-		38-152	-		30

Lab Control Sample Analysis

Batch Quality Control

Project Name: 10 WORLD TRADE CENTER

Project Number: 132111-002-000 T00

Lab Number: L2131409

Report Date: 06/22/21

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: WG1511992-3								

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
2-Fluorophenol	63				25-87
Phenol-d6	47				16-65
Nitrobenzene-d5	118				42-122
2-Fluorobiphenyl	65				46-121
2,4,6-Tribromophenol	78				45-128
4-Terphenyl-d14	81				47-138

Lab Control Sample Analysis
Batch Quality Control

Project Name: 10 WORLD TRADE CENTER
Project Number: 132111-002-000 T00

Lab Number: L2131409
Report Date: 06/22/21

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: WG1512531-2								
Bis(2-ethylhexyl)phthalate	85		-		29-137	-		82
Butyl benzyl phthalate	95		-		1-140	-		60
Di-n-butylphthalate	87		-		8-120	-		47
Di-n-octylphthalate	90		-		19-132	-		69
Diethyl phthalate	88		-		1-120	-		100
Dimethyl phthalate	92		-		1-120	-		183

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
Nitrobenzene-d5	79				42-122
2-Fluorobiphenyl	83				46-121
4-Terphenyl-d14	92				47-138

PCBS

Project Name: 10 WORLD TRADE CENTER
Project Number: 132111-002-000 T00
Lab Number: L2131409
Report Date: 06/22/21

SAMPLE RESULTS

Lab ID: L2131409-01
Client ID: GW-2_20210610
Sample Location: SEAPORT, BOSTON, MA

Date Collected: 06/10/21 05:20
Date Received: 06/10/21
Field Prep: Refer to COC

Sample Depth:
Matrix: Water
Analytical Method: 127,608.3
Analytical Date: 06/20/21 20:05
Analyst: JAW

Extraction Method: EPA 608.3
Extraction Date: 06/19/21 10:05
Cleanup Method: EPA 3665A
Cleanup Date: 06/19/21
Cleanup Method: EPA 3660B
Cleanup Date: 06/20/21

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	65		37-123	B
Decachlorobiphenyl	52		38-114	B
2,4,5,6-Tetrachloro-m-xylene	61		37-123	A
Decachlorobiphenyl	54		38-114	A

Project Name: 10 WORLD TRADE CENTER
Project Number: 132111-002-000 T00
Lab Number: L2131409
Report Date: 06/22/21

Method Blank Analysis
Batch Quality Control

Analytical Method: 127,608.3
Analytical Date: 06/20/21 17:54
Analyst: JAW

Extraction Method: EPA 608.3
Extraction Date: 06/19/21 08:33
Cleanup Method: EPA 3665A
Cleanup Date: 06/19/21
Cleanup Method: EPA 3660B
Cleanup Date: 06/20/21

Parameter	Result	Qualifier	Units	RL	MDL	Column
Polychlorinated Biphenyls by GC - Westborough Lab for sample(s): 01 Batch: WG1514285-1						
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	65		37-123	B
Decachlorobiphenyl	63		38-114	B
2,4,5,6-Tetrachloro-m-xylene	66		37-123	A
Decachlorobiphenyl	68		38-114	A

Lab Control Sample Analysis

Batch Quality Control

Project Name: 10 WORLD TRADE CENTER

Project Number: 132111-002-000 T00

Lab Number: L2131409

Report Date: 06/22/21

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: WG1514285-2									
Aroclor 1016	77		-		50-140	-		36	A
Aroclor 1260	69		-		8-140	-		38	A

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	75				37-123	B
Decachlorobiphenyl	63				38-114	B
2,4,5,6-Tetrachloro-m-xylene	77				37-123	A
Decachlorobiphenyl	63				38-114	A

METALS

Project Name: 10 WORLD TRADE CENTER
Lab Number: L2131409
Project Number: 132111-002-000 T00
Report Date: 06/22/21

SAMPLE RESULTS

Lab ID: L2131409-01
Client ID: GW-2_20210610
Sample Location: SEAPORT, BOSTON, MA
Date Collected: 06/10/21 05:20
Date Received: 06/10/21
Field Prep: Refer to COC

Sample Depth:
Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Antimony, Total	ND		mg/l	0.00400	--	1	06/15/21 16:39	06/18/21 13:59	EPA 3005A	3,200.8	CD
Arsenic, Total	0.01070		mg/l	0.00100	--	1	06/15/21 16:39	06/18/21 13:59	EPA 3005A	3,200.8	CD
Cadmium, Total	0.00074		mg/l	0.00020	--	1	06/15/21 16:39	06/18/21 13:59	EPA 3005A	3,200.8	CD
Chromium, Total	0.1732		mg/l	0.00100	--	1	06/15/21 16:39	06/18/21 13:59	EPA 3005A	3,200.8	CD
Copper, Total	0.1590		mg/l	0.00100	--	1	06/15/21 16:39	06/18/21 13:59	EPA 3005A	3,200.8	CD
Iron, Total	103		mg/l	0.050	--	1	06/15/21 16:39	06/17/21 19:57	EPA 3005A	19,200.7	BV
Lead, Total	0.3866		mg/l	0.00100	--	1	06/15/21 16:39	06/18/21 13:59	EPA 3005A	3,200.8	CD
Mercury, Total	0.00026		mg/l	0.00020	--	1	06/15/21 16:44	06/16/21 16:52	EPA 245.1	3,245.1	OU
Nickel, Total	0.1058		mg/l	0.00200	--	1	06/15/21 16:39	06/18/21 13:59	EPA 3005A	3,200.8	CD
Selenium, Total	ND		mg/l	0.02500	--	5	06/15/21 16:39	06/21/21 19:48	EPA 3005A	3,200.8	BM
Silver, Total	0.00046		mg/l	0.00040	--	1	06/15/21 16:39	06/18/21 13:59	EPA 3005A	3,200.8	CD
Zinc, Total	0.3531		mg/l	0.01000	--	1	06/15/21 16:39	06/18/21 13:59	EPA 3005A	3,200.8	CD
Total Hardness by SM 2340B - Mansfield Lab											
Hardness	657		mg/l	0.660	NA	1	06/15/21 16:39	06/17/21 19:57	EPA 3005A	19,200.7	BV

Project Name: 10 WORLD TRADE CENTER
Project Number: 132111-002-000 T00
Lab Number: L2131409
Report Date: 06/22/21

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: WG1512292-1										
Iron, Total	ND		mg/l	0.050	--	1	06/15/21 16:39	06/17/21 13:41	19,200.7	GD

Prep Information

Digestion Method: EPA 3005A

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Hardness by SM 2340B - Mansfield Lab for sample(s): 01 Batch: WG1512292-1										
Hardness	ND		mg/l	0.660	NA	1	06/15/21 16:39	06/17/21 13:41	19,200.7	GD

Prep Information

Digestion Method: EPA 3005A

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Metals - Mansfield Lab for sample(s): 01 Batch: WG1512294-1										
Antimony, Total	ND		mg/l	0.00400	--	1	06/15/21 16:39	06/17/21 11:06	3,200.8	CD
Arsenic, Total	ND		mg/l	0.00100	--	1	06/15/21 16:39	06/17/21 11:06	3,200.8	CD
Cadmium, Total	ND		mg/l	0.00020	--	1	06/15/21 16:39	06/17/21 11:06	3,200.8	CD
Chromium, Total	ND		mg/l	0.00100	--	1	06/15/21 16:39	06/17/21 11:06	3,200.8	CD
Copper, Total	ND		mg/l	0.00100	--	1	06/15/21 16:39	06/17/21 11:06	3,200.8	CD
Lead, Total	ND		mg/l	0.00100	--	1	06/15/21 16:39	06/17/21 11:06	3,200.8	CD
Nickel, Total	ND		mg/l	0.00200	--	1	06/15/21 16:39	06/17/21 11:06	3,200.8	CD
Selenium, Total	ND		mg/l	0.00500	--	1	06/15/21 16:39	06/17/21 11:06	3,200.8	CD
Silver, Total	ND		mg/l	0.00040	--	1	06/15/21 16:39	06/17/21 11:06	3,200.8	CD
Zinc, Total	ND		mg/l	0.01000	--	1	06/15/21 16:39	06/17/21 11:06	3,200.8	CD

Prep Information

Digestion Method: EPA 3005A

Project Name: 10 WORLD TRADE CENTER
Project Number: 132111-002-000 T00
Lab Number: L2131409
Report Date: 06/22/21

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: WG1512297-1										
Mercury, Total	ND		mg/l	0.00020	--	1	06/15/21 16:44	06/16/21 15:32	3,245.1	OU

Prep Information

Digestion Method: EPA 245.1

Lab Control Sample Analysis

Batch Quality Control

Project Name: 10 WORLD TRADE CENTER

Project Number: 132111-002-000 T00

Lab Number: L2131409

Report Date: 06/22/21

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 01 Batch: WG1512292-2								
Iron, Total	103		-		85-115	-		
Total Hardness by SM 2340B - Mansfield Lab Associated sample(s): 01 Batch: WG1512292-2								
Hardness	106		-		85-115	-		
Total Metals - Mansfield Lab Associated sample(s): 01 Batch: WG1512294-2								
Antimony, Total	87		-		85-115	-		
Arsenic, Total	108		-		85-115	-		
Cadmium, Total	111		-		85-115	-		
Chromium, Total	110		-		85-115	-		
Copper, Total	106		-		85-115	-		
Lead, Total	108		-		85-115	-		
Nickel, Total	99		-		85-115	-		
Selenium, Total	114		-		85-115	-		
Silver, Total	107		-		85-115	-		
Zinc, Total	108		-		85-115	-		
Total Metals - Mansfield Lab Associated sample(s): 01 Batch: WG1512297-2								
Mercury, Total	96		-		85-115	-		

Matrix Spike Analysis
Batch Quality Control

Project Name: 10 WORLD TRADE CENTER
Project Number: 132111-002-000 T00

Lab Number: L2131409
Report Date: 06/22/21

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: WG1512292-3 QC Sample: L2131070-01 Client ID: MS Sample												
Iron, Total	0.819	1	1.83	101		-	-		75-125	-		20
Total Hardness by SM 2340B - Mansfield Lab Associated sample(s): 01 QC Batch ID: WG1512292-3 QC Sample: L2131070-01 Client ID: MS Sample												
Hardness	240	66.2	303	95		-	-		75-125	-		20
Total Metals - Mansfield Lab Associated sample(s): 01 QC Batch ID: WG1512292-7 QC Sample: L2131070-02 Client ID: MS Sample												
Iron, Total	0.354	1	1.46	111		-	-		75-125	-		20
Total Hardness by SM 2340B - Mansfield Lab Associated sample(s): 01 QC Batch ID: WG1512292-7 QC Sample: L2131070-02 Client ID: MS Sample												
Hardness	254	66.2	335	122		-	-		75-125	-		20
Total Metals - Mansfield Lab Associated sample(s): 01 QC Batch ID: WG1512294-3 QC Sample: L2131070-01 Client ID: MS Sample												
Antimony, Total	ND	0.5	0.5136	103		-	-		70-130	-		20
Arsenic, Total	ND	0.12	0.1304	109		-	-		70-130	-		20
Cadmium, Total	ND	0.051	0.05388	106		-	-		70-130	-		20
Chromium, Total	ND	0.2	0.2250	112		-	-		70-130	-		20
Copper, Total	0.01740	0.25	0.2727	102		-	-		70-130	-		20
Lead, Total	ND	0.51	0.5406	106		-	-		70-130	-		20
Nickel, Total	ND	0.5	0.4884	98		-	-		70-130	-		20
Selenium, Total	ND	0.12	0.1295	108		-	-		70-130	-		20
Silver, Total	ND	0.05	0.05222	104		-	-		70-130	-		20
Zinc, Total	ND	0.5	0.5539	111		-	-		70-130	-		20

Matrix Spike Analysis
Batch Quality Control

Project Name: 10 WORLD TRADE CENTER
Project Number: 132111-002-000 T00

Lab Number: L2131409
Report Date: 06/22/21

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	MSD Found	MSD %Recovery	Recovery Limits	RPD	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 01 QC Batch ID: WG1512294-5 QC Sample: L2131070-02 Client ID: MS Sample									
Antimony, Total	ND	0.5	0.3750	75	-	-	70-130	-	20
Arsenic, Total	ND	0.12	0.1216	101	-	-	70-130	-	20
Cadmium, Total	ND	0.051	0.05770	113	-	-	70-130	-	20
Chromium, Total	ND	0.2	0.2240	112	-	-	70-130	-	20
Copper, Total	ND	0.25	0.2932	117	-	-	70-130	-	20
Lead, Total	ND	0.51	0.5681	111	-	-	70-130	-	20
Nickel, Total	ND	0.5	0.5328	106	-	-	70-130	-	20
Selenium, Total	ND	0.12	0.1150	96	-	-	70-130	-	20
Silver, Total	ND	0.05	0.05207	104	-	-	70-130	-	20
Zinc, Total	ND	0.5	0.6087	122	-	-	70-130	-	20
Total Metals - Mansfield Lab Associated sample(s): 01 QC Batch ID: WG1512297-3 QC Sample: L2127285-01 Client ID: MS Sample									
Mercury, Total	ND	0.005	0.00487	97	-	-	70-130	-	20

Lab Duplicate Analysis

Batch Quality Control

Project Name: 10 WORLD TRADE CENTER
Project Number: 132111-002-000 T00

Lab Number: L2131409
Report Date: 06/22/21

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 01 QC Batch ID: WG1512292-4 QC Sample: L2131070-01 Client ID: DUP Sample						
Iron, Total	0.819	0.851	mg/l	4		20
Total Metals - Mansfield Lab Associated sample(s): 01 QC Batch ID: WG1512292-8 QC Sample: L2131070-02 Client ID: DUP Sample						
Iron, Total	0.354	0.366	mg/l	3		20
Total Metals - Mansfield Lab Associated sample(s): 01 QC Batch ID: WG1512294-4 QC Sample: L2131070-01 Client ID: DUP Sample						
Antimony, Total	ND	ND	mg/l	NC		20
Arsenic, Total	ND	ND	mg/l	NC		20
Cadmium, Total	ND	ND	mg/l	NC		20
Chromium, Total	ND	ND	mg/l	NC		20
Copper, Total	0.01740	0.01994	mg/l	14		20
Lead, Total	ND	ND	mg/l	NC		20
Nickel, Total	ND	ND	mg/l	NC		20
Selenium, Total	ND	ND	mg/l	NC		20
Silver, Total	ND	ND	mg/l	NC		20
Zinc, Total	ND	ND	mg/l	NC		20

Lab Duplicate Analysis
Batch Quality Control

Project Name: 10 WORLD TRADE CENTER
Project Number: 132111-002-000 T00

Lab Number: L2131409
Report Date: 06/22/21

Parameter	Native Sample	Duplicate Sample	Units	RPD	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 01 QC Batch ID: WG1512294-6 QC Sample: L2131070-02 Client ID: DUP Sample					
Antimony, Total	ND	ND	mg/l	NC	20
Arsenic, Total	ND	ND	mg/l	NC	20
Cadmium, Total	ND	ND	mg/l	NC	20
Chromium, Total	ND	ND	mg/l	NC	20
Copper, Total	ND	ND	mg/l	NC	20
Lead, Total	ND	ND	mg/l	NC	20
Nickel, Total	ND	ND	mg/l	NC	20
Selenium, Total	ND	ND	mg/l	NC	20
Silver, Total	ND	ND	mg/l	NC	20
Zinc, Total	ND	ND	mg/l	NC	20
Total Metals - Mansfield Lab Associated sample(s): 01 QC Batch ID: WG1512297-4 QC Sample: L2127285-01 Client ID: DUP Sample					
Mercury, Total	ND	ND	mg/l	NC	20

INORGANICS
&
MISCELLANEOUS

Project Name: 10 WORLD TRADE CENTER
Project Number: 132111-002-000 T00

Lab Number: L2131409
Report Date: 06/22/21

SAMPLE RESULTS

Lab ID: L2131409-01
Client ID: GW-2_20210610
Sample Location: SEAPORT, BOSTON, MA

Date Collected: 06/10/21 05:20
Date Received: 06/10/21
Field Prep: Refer to COC

Sample Depth:
Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Cyanide, Total	ND		mg/l	0.005	--	1	06/15/21 10:30	06/15/21 13:05	121,4500CN-CE	CR
Nitrogen, Ammonia	1.70		mg/l	0.150	--	2	06/14/21 17:30	06/15/21 20:14	121,4500NH3-BH	AT
TPH, SGT-HEM	ND		mg/l	4.00	--	1	06/15/21 18:00	06/15/21 18:45	74,1664A	TL
Phenolics, Total	ND		mg/l	0.030	--	1	06/14/21 07:47	06/14/21 12:19	4,420.1	KP

Project Name: 10 WORLD TRADE CENTER
Project Number: 132111-002-000 T00
Lab Number: L2131409
Report Date: 06/22/21

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: WG1510210-1										
Phenolics, Total	ND		mg/l	0.030	--	1	06/14/21 07:47	06/14/21 11:31	4,420.1	KP
General Chemistry - Westborough Lab for sample(s): 01 Batch: WG1511942-1										
Nitrogen, Ammonia	ND		mg/l	0.075	--	1	06/14/21 17:30	06/15/21 20:02	121,4500NH3-BH	AT
General Chemistry - Westborough Lab for sample(s): 01 Batch: WG1512192-1										
Cyanide, Total	ND		mg/l	0.005	--	1	06/15/21 10:30	06/15/21 12:59	121,4500CN-CE	CR
General Chemistry - Westborough Lab for sample(s): 01 Batch: WG1512389-1										
TPH, SGT-HEM	ND		mg/l	4.00	--	1	06/15/21 18:00	06/15/21 18:45	74,1664A	TL

Lab Control Sample Analysis

Batch Quality Control

Project Name: 10 WORLD TRADE CENTER

Project Number: 132111-002-000 T00

Lab Number: L2131409

Report Date: 06/22/21

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 01 Batch: WG1510210-2								
Phenolics, Total	110		-		70-130	-		
General Chemistry - Westborough Lab Associated sample(s): 01 Batch: WG1511942-2								
Nitrogen, Ammonia	104		-		80-120	-		20
General Chemistry - Westborough Lab Associated sample(s): 01 Batch: WG1512192-2								
Cyanide, Total	107		-		90-110	-		
General Chemistry - Westborough Lab Associated sample(s): 01 Batch: WG1512389-2								
TPH	75		-		64-132	-		34

Matrix Spike Analysis
Batch Quality Control

Project Name: 10 WORLD TRADE CENTER
Project Number: 132111-002-000 T00

Lab Number: L2131409
Report Date: 06/22/21

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: WG1510210-4 QC Sample: L2130573-01 Client ID: MS Sample												
Phenolics, Total	ND	0.4	0.42	104		-	-		70-130	-		20
General Chemistry - Westborough Lab Associated sample(s): 01 QC Batch ID: WG1511942-4 QC Sample: L2131070-02 Client ID: MS Sample												
Nitrogen, Ammonia	0.435	4	4.36	98		-	-		80-120	-		20
General Chemistry - Westborough Lab Associated sample(s): 01 QC Batch ID: WG1512192-4 QC Sample: L2131778-02 Client ID: MS Sample												
Cyanide, Total	ND	0.2	0.208	104		-	-		90-110	-		30
General Chemistry - Westborough Lab Associated sample(s): 01 QC Batch ID: WG1512389-4 QC Sample: L2131070-02 Client ID: MS Sample												
TPH	ND	18.9	7.08	**37**	Q	-	-		64-132	-		34

Lab Duplicate Analysis

Batch Quality Control

Project Name: 10 WORLD TRADE CENTER

Project Number: 132111-002-000 T00

Lab Number: L2131409

Report Date: 06/22/21

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 01 QC Batch ID: WG1510210-3 QC Sample: L2130573-01 Client ID: DUP Sample						
Phenolics, Total	ND	ND	mg/l	NC		20
General Chemistry - Westborough Lab Associated sample(s): 01 QC Batch ID: WG1511942-3 QC Sample: L2131070-02 Client ID: DUP Sample						
Nitrogen, Ammonia	0.435	0.616	mg/l	**34**	Q	20
General Chemistry - Westborough Lab Associated sample(s): 01 QC Batch ID: WG1512192-3 QC Sample: L2131778-01 Client ID: DUP Sample						
Cyanide, Total	0.078	0.081	mg/l	3		30
General Chemistry - Westborough Lab Associated sample(s): 01 QC Batch ID: WG1512389-3 QC Sample: L2131070-01 Client ID: DUP Sample						
TPH	ND	ND	mg/l	NC		34

Project Name: 10 WORLD TRADE CENTER
Project Number: 132111-002-000 T00

Lab Number: L2131409
Report Date: 06/22/21

Sample Receipt and Container Information

Were project specific reporting limits specified? YES

Cooler Information

Cooler	Custody Seal
D	Absent

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L2131409-01A	Vial Na2S2O3 preserved	D	NA		3.3	Y	Absent		624.1-RGP(7),624.1-SIM-RGP(7)
L2131409-01B	Vial Na2S2O3 preserved	D	NA		3.3	Y	Absent		624.1-RGP(7),624.1-SIM-RGP(7)
L2131409-01C	Vial Na2S2O3 preserved	D	NA		3.3	Y	Absent		624.1-RGP(7),624.1-SIM-RGP(7)
L2131409-01D	Vial Na2S2O3 preserved	D	NA		3.3	Y	Absent		624.1-RGP(7),624.1-SIM-RGP(7)
L2131409-01E	Vial Na2S2O3 preserved	D	NA		3.3	Y	Absent		624.1-RGP(7),624.1-SIM-RGP(7)
L2131409-01F	Vial Na2S2O3 preserved	D	NA		3.3	Y	Absent		624.1-RGP(7),624.1-SIM-RGP(7)
L2131409-01G	Vial Na2S2O3 preserved	D	NA		3.3	Y	Absent		504(14)
L2131409-01H	Vial Na2S2O3 preserved	D	NA		3.3	Y	Absent		504(14)
L2131409-01I	Vial unpreserved	D	NA		3.3	Y	Absent		SUB-ETHANOL(14)
L2131409-01J	Vial unpreserved	D	NA		3.3	Y	Absent		SUB-ETHANOL(14)
L2131409-01K	Vial unpreserved	D	NA		3.3	Y	Absent		SUB-ETHANOL(14)
L2131409-01L	Plastic 250ml HNO3 preserved	D	<2	<2	3.3	Y	Absent		CD-2008T(180),NI-2008T(180),ZN-2008T(180),HARDU(180),CU-2008T(180),FE-UI(180),AS-2008T(180),HG-U(28),SE-2008T(180),AG-2008T(180),CR-2008T(180),SB-2008T(180),PB-2008T(180)
L2131409-01M	Plastic 250ml NaOH preserved	D	>12	>12	3.3	Y	Absent		TCN-4500(14)
L2131409-01O	Amber 1000ml H2SO4 preserved	D	<2	<2	3.3	Y	Absent		TPHENOL-420(28),NH3-4500(28)
L2131409-01P	Amber 1000ml Na2S2O3	D	7	7	3.3	Y	Absent		625.1-RGP(7),625.1-SIM-RGP(7)
L2131409-01Q	Amber 1000ml Na2S2O3	D	7	7	3.3	Y	Absent		625.1-RGP(7),625.1-SIM-RGP(7)
L2131409-01R	Amber 1000ml Na2S2O3	D	7	7	3.3	Y	Absent		PCB-608.3(365)
L2131409-01S	Amber 1000ml Na2S2O3	D	7	7	3.3	Y	Absent		PCB-608.3(365)
L2131409-01T	Amber 1000ml Na2S2O3	D	7	7	3.3	Y	Absent		PCB-608.3(365)
L2131409-01U	Amber 1000ml Na2S2O3	D	7	7	3.3	Y	Absent		PCB-608.3(365)
L2131409-01V	Amber 1000ml HCl preserved	D	NA		3.3	Y	Absent		TPH-1664(28)

*Values in parentheses indicate holding time in days

Project Name: 10 WORLD TRADE CENTER
Project Number: 132111-002-000 T00

Lab Number: L2131409
Report Date: 06/22/21

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L2131409-01W	Amber 1000ml HCl preserved	D	NA		3.3	Y	Absent		TPH-1664(28)

*Values in parentheses indicate holding time in days

Project Name:	10 WORLD TRADE CENTER	**Lab Number:**	L2131409
Project Number:	132111-002-000 T00	**Report Date:**	06/22/21

GLOSSARY

Acronyms

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

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

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

EPA - Environmental Protection Agency.

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

LCSD - Laboratory Control Sample Duplicate: Refer to LCS.

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

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

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

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

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

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

MSD - Matrix Spike Sample Duplicate: Refer to MS.

NA - Not Applicable.

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

NDPA/DPA - N-Nitrosodiphenylamine/Diphenylamine.

NI - Not Ignitable.

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

NR - No Results: Term is utilized when 'No Target Compounds Requested' is reported for the analysis of Volatile or Semivolatile Organic TIC only requests.

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.

Report Format: Data Usability Report

Project Name:	10 WORLD TRADE CENTER	**Lab Number:**	L2131409
Project Number:	132111-002-000 T00	**Report Date:**	06/22/21

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.

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

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

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

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

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

PFAS Total: With respect to PFAS analyses, the 'PFAS, Total (5)' result is defined as the summation of results for: PFHpA, PFHxS, PFOA, PFNA and PFOS. In addition, the 'PFAS, Total (6)' result is defined as the summation of results for: PFHpA, PFHxS, PFOA, PFNA, PFDA and PFOS. For MassDEP DW compliance analysis only, the 'PFAS, Total (6)' result is defined as the summation of results at or above the RL. Note: If a 'Total' result is requested, the results of its individual components will also be reported.

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

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

Data Qualifiers

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

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

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

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

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

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

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

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

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

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

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

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

NJ - Presumptive evidence of compound. This represents an estimated concentration for Tentatively Identified Compounds (TICs), where

Report Format: Data Usability Report

Project Name:	10 WORLD TRADE CENTER	**Lab Number:**	L2131409
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Data Qualifiers

the identification is based on a mass spectral library search.

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

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

R - Analytical results are from sample re-analysis.

RE - Analytical results are from sample re-extraction.

S - Analytical results are from modified screening analysis.

Report Format: Data Usability Report

Project Name:	10 WORLD TRADE CENTER	**Lab Number:**	L2131409
Project Number:	132111-002-000 T00	**Report Date:**	06/22/21

REFERENCES

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

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

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

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

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.

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

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

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

LIMITATION OF LIABILITIES

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

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

Certification Information

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

Westborough Facility
EPA 624/624.1: m/p-xylene, o-xylene, Naphthalene
EPA 625/625.1: alpha-Terpineol
EPA 8260C/8260D: NPW: 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene, Azobenzene; SCM: Iodomethane (methyl iodide), 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene.
EPA 8270D/8270E: NPW: Dimethylnaphthalene,1,4-Diphenylhydrazine, alpha-Terpineol; SCM: Dimethylnaphthalene,1,4-Diphenylhydrazine.
SM4500: NPW: Amenable Cyanide; SCM: Total Phosphorus, TKN, NO2, NO3.

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

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

Westborough Facility:

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

Non-Potable Water
SM4500H,B, EPA 120.1, SM2510B, SM2540C, SM2320B, SM4500CL-E, SM4500F-BC, SM4500NH3-BH: Ammonia-N and Kjeldahl-N, **EPA 350.1**: Ammonia-N, **LACHAT 10-107-06-1-B**: Ammonia-N, **EPA 351.1, SM4500NO3-F, EPA 353.2**: Nitrate-N, **SM4500P-E, SM4500P-B, E, SM4500SO4-E, SM5220D, EPA 410.4, SM5210B, SM5310C, SM4500CL-D, EPA 1664, EPA 420.1, SM4500-CN-CE, SM2540D, EPA 300: Chloride, Sulfate, Nitrate.**
EPA 624.1: Volatile Halocarbons & Aromatics,
EPA 608.3: Chlordane, Toxaphene, Aldrin, alpha-BHC, beta-BHC, gamma-BHC, delta-BHC, Dieldrin, DDD, DDE, DDT, Endosulfan I, Endosulfan II, Endosulfan sulfate, Endrin, Endrin Aldehyde, Heptachlor, Heptachlor Epoxide, PCBs
EPA 625.1: SVOC (Acid/Base/Neutral Extractables), **EPA 600/4-81-045**: PCB-Oil.
Microbiology: **SM9223B-Colilert-QT; Enterolert-QT, SM9221E, EPA 1600, EPA 1603, SM9222D.**

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, EPA 537.1.

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.

ALPHA CHAIN OF CUSTODY

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

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

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

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Date Rec'd in Lab: 6/10/21

ALPHA Job #: L2131409

H&A Information

H&A Client:	401 Congress, LLC
H&A Address:	465 Medford St, Suite 2200
	Boston, MA 02129
H&A Phone:	617-886-7400
H&A Fax:	
H&A Email:	LHoward, CWorthy, KLamberti

Project Information

Project Name:	10 World Trade Center
Project Location:	Seaport, Boston, MA
Project #	132111-002-000 Task 00
(Use Project name as Project #)	☐
Project Manager:	H. Scranton
ALPHAQuote #:	

Turn-Around Time

Standard ☒ Due Date:
(only if pre approved) ☐ # of Days:

Deliverables

☒ Email ☐ Fax
☒ EQuIS (1 File) ☐ EQuIS (4 File)
☐ Other:

Billing Information

☒ Same as Client info
PO #

Regulatory Requirements (Program/Criteria)

Note: Select State from menu & identify criteria.

Disposal Site Information

Please identify below location of applicable disposal facilities.

Disposal Facility:
☐ NJ ☐ NY
☐ Other:

These samples have been previously analyzed by Alpha ☐

Other project specific requirements/comments:

3. HOLD PACN & ACN 11. Dissolved Metals ON HOLD (Field Filtered)
Please sample per EPA Approved 2017 RGP Permit methods

Please specify Metals or TAL.

ANALYSIS

ALPHA Lab ID (Lab Use Only)	Sample ID	Collection Date	Collection Time	Sample Matrix	Sampler's Initials	[redacted]	2. TRC-4500	3. TCN-4500 HOLD PACN & ACN	4. 504	5. 8260 & 8260 SIM for Dioxane	[redacted]	7. TPHENOL-420	8. 8270TCL (including Diethylhexylphthalate)	9. 8270TCL-SIM	[redacted]	11. Total Metals - Ag, As, Cd, Cr, Cu, Ni, Pb, Sb, Se, Zn, Fe, Hg	12. Ammonia	13 Total Hardness	14. Ethanol	15. TPH-1664	16. PCB-608	Sample Specific Comments	Total Bottles
31409-01	GW-2_20210610	6/10/21	5:20	AQ	CAS	[redacted]	X	X	X	X	[redacted]	X	X	X	[redacted]	X	X	X	X	X	X		22
Container Type						[redacted]	P	P	V	V	[redacted]	A	A	A	[redacted]	P	P	P	V	A	A		
Preservative						[redacted]	A	E	H	H	[redacted]	D	H	H	[redacted]	C	D	A	A	B	H		

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

Preservative Code:	Container Code
A = None	P = Plastic
B = HCl	A = Amber Glass
C = HNO_3	V = Vial
D = H_2SO_4	G = Glass
E = NaOH	B = Bacteria Cup
F = MeOH	C = Cube
G = $NaHSO_4$	O = Other
H = $Na_2S_2O_3$	E = Encore
K/E = Zn Ac/NaOH	D = BOD Bottle
O = Other	

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

Relinquished By:	Date/Time	Received By:	Date/Time
[signature]	6/10/2021 1445	[signature]	6/10/21 1635
[signature]	6/10/21 1635	W. Damaso [signature]	6-10-21 16:35
W. Damaso [signature]	6-10-21 18:16	[signature]	6/10/21 18:16

Please print clearly, legibly and completely. Samples can not be logged in and turnaround time clock will not start until any ambiguities are resolved. Alpha Analytical's services under this Chain of Custody shall be performed in accordance with terms and conditions within Blanket Service Agreement# 2015-18-Alpha Analytical by and between Haley & Aldrich, Inc., its subsidiaries and affiliates and Alpha Analytical.

Document ID: 20455 Rev 1 (1/28/2016)

ALPHA ANALYTICAL
World Class Chemistry

Subcontract Chain of Custody

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

Alpha Job Number
L2131409

Client Information

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

Phone: 508.439.5186
Email: kraymond@alphalab.com

Project Information

Project Location: MA
Project Manager: Karyn Raymond

Turnaround & Deliverables Information

Due Date:
Deliverables:

Regulatory Requirements/Report Limits

State/Federal Program:
Regulatory Criteria:

Project Specific Requirements and/or Report Requirements

Reference following Alpha Job Number on final report/deliverables: L2131409

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
	GW-2_20210610	06-10-21 05:20	WATER	Ethanol by EPA 1671 Revision A	

	Relinquished By:	Date/Time:	Received By:	Date/Time:
		6/14/21		
Form No: AL_subcoc				

Teklab, Inc.
Environmental Laboratory
http://www.teklabinc.com/

June 21, 2021

Karyn Raymond
Alpha Analytical
145 Flanders Road
Westborough, MA 01581
TEL: (508) 439-5186
FAX:

Illinois	100226
Kansas	E-10374
Louisiana	05002
Louisiana	05003
Oklahoma	9978

RE: L2131409 **WorkOrder:** 21060942

Dear Karyn Raymond:

TEKLAB, INC received 1 sample on 6/15/2021 10:00:00 AM for the analysis presented in the following report.

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

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

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

Sincerely,

Marvin L. Darling II

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

Teklab, Inc.
Environmental Laboratory

Report Contents

http://www.teklabinc.com/

Client: Alpha Analytical
Client Project: L2131409

Work Order: 21060942
Report Date: 21-Jun-21

This reporting package includes the following:

Teklab, Inc.
Environmental Laboratory

Definitions

http://www.teklabinc.com/

Client: Alpha Analytical **Work Order:** 21060942

Client Project: L2131409 **Report Date:** 21-Jun-21

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

Teklab, Inc.
Environmental Laboratory

Definitions

http://www.teklabinc.com/

Client: Alpha Analytical
Work Order: 21060942
Client Project: L2131409
Report Date: 21-Jun-21

Qualifiers

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

Teklab, Inc.
Environmental Laboratory

Case Narrative

http://www.teklabinc.com/

Client: Alpha Analytical
Client Project: L2131409

Work Order: 21060942
Report Date: 21-Jun-21

Cooler Receipt Temp: 3.2 °C

Locations

Collinsville

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

Springfield

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

Kansas City

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

Collinsville Air

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

Chicago

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

Teklab, Inc. Environmental Laboratory

Accreditations

http://www.teklabinc.com/

Client: Alpha Analytical

Client Project: L2131409

Work Order: 21060942

Report Date: 21-Jun-21

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

Teklab, Inc.
Environmental Laboratory

Laboratory Results

http://www.teklabinc.com/

Client: Alpha Analytical
Work Order: 21060942
Client Project: L2131409
Report Date: 21-Jun-21
Lab ID: 21060942-001
Client Sample ID: GW-2_20210610
Matrix: AQUEOUS
Collection Date: 06/10/2021 5:20

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
EPA 600 1671A, PHARMACEUTICAL MANUFACTURING INDUSTRY NON-PURGEABLE VOLATILE ORGANICS								
Ethanol	*	20		**ND**	mg/L	1	06/18/2021 13:10	R293427

Teklab, Inc. Environmental Laboratory

Quality Control Results

http://www.teklabinc.com/

Client: Alpha Analytical
Work Order: 21060942
Client Project: L2131409
Report Date: 21-Jun-21

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

Batch R293427 **SampType:** MBLK Units **mg/L**
SampID: MBLK-061821

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Ethanol	*	20		**ND**						06/18/2021

Batch R293427 **SampType:** LCS Units **mg/L**
SampID: LCS-061821

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Ethanol	*	20		**250**	250.0	0	101.9	70	132	06/18/2021

Batch R293427 **SampType:** MS Units **mg/L**
SampID: 21060942-001AMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Ethanol	*	20		**230**	250.0	0	92.6	70	132	06/18/2021

Batch R293427 **SampType:** MSD Units **mg/L** RPD Limit **30**
SampID: 21060942-001AMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Ethanol	*	20		**250**	250.0	0	99.1	231.6	6.72	06/18/2021

Teklab, Inc.
Environmental Laboratory

Receiving Check List

http://www.teklabinc.com/

Client: Alpha Analytical
Client Project: L2131409

Work Order: 21060942
Report Date: 21-Jun-21

Carrier: UPS

Received By: MEK

Completed by: Ellie Hopkins
On: 15-Jun-21

Reviewed by: Elizabeth A. Hurley
On: 15-Jun-21

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

Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐	Temp °C 3.2
Type of thermal preservation?	None ☐	Ice ☑	Blue Ice ☐	Dry Ice ☐
Chain of custody present?	Yes ☑	No ☐		
Chain of custody signed when relinquished and received?	Yes ☑	No ☐		
Chain of custody agrees with sample labels?	Yes ☑	No ☐		
Samples in proper container/bottle?	Yes ☑	No ☐		
Sample containers intact?	Yes ☑	No ☐		
Sufficient sample volume for indicated test?	Yes ☑	No ☐		
All samples received within holding time?	Yes ☑	No ☐		
Reported field parameters measured:	Field ☐	Lab ☐	NA ☑	
Container/Temp Blank temperature in compliance?	Yes ☑	No ☐		

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

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

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

2100942

Subcontract Chain of Custody

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

Alpha Job Number
L2131409

Client Information

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

Phone: 508.439.5186
Email: kraymond@alphalab.com

Project Information

Project Location: MA
Project Manager: Karyn Raymond

Turnaround & Deliverables Information

Due Date:
Deliverables:

Regulatory Requirements/Report Limits

State/Federal Program:
Regulatory Criteria:

Project Specific Requirements and/or Report Requirements

Reference following Alpha Job Number on final report/deliverables: L2131409

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
21000942-001	GW-2_20210610	06-10-21 05:20	WATER	Ethanol by EPA 1671 Revision A	

Relinquished By:	Date/Time:	Received By:	Date/Time:
	6/14/21	Mary Kemp (UPS)	6/15/21 1000

Form No: AL_subcoc

Temp: 3.2°C LTG: 5
HS EH 10/15/21

EH 10/15/21

ANALYTICAL REPORT

Lab Number:	L2131433
Client:	Haley & Aldrich, Inc. 465 Medford Street, Suite 2200 Charlestown, MA 02129-1400
ATTN:	Heather Scranton
Phone:	(617) 886-7400
Project Name:	10 WORLD TRADE CENTER
Project Number:	132111-002-000 T00
Report Date:	06/17/21

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: 10 WORLD TRADE CENTER
Project Number: 132111-002-000 T00

Lab Number: L2131433
Report Date: 06/17/21

Alpha Sample ID	Client ID	Matrix	Sample Location	Collection Date/Time	Receive Date
L2131433-01	HA21-BOSTON HARBOR	WATER	SEAPORT, BOSTON, MA	06/10/21 06:10	06/10/21

Project Name:	10 WORLD TRADE CENTER	**Lab Number:**	L2131433
Project Number:	132111-002-000 T00	**Report Date:**	06/17/21

Case Narrative

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

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

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

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

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

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

Project Name:	10 WORLD TRADE CENTER	**Lab Number:**	L2131433
Project Number:	132111-002-000 T00	**Report Date:**	06/17/21

Case Narrative (continued)

Sample Receipt

L2131433-01: Sample containers for VOC 8260, Total Metals and additional Wetchem analyses were received for the "HA21-BOSTON HARBOR" sample, but were not listed on the chain of custody. At the client's request, the analyses were not performed.

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: Caitlin Walukevich

Caitlin Walukevich

Title: Technical Director/Representative

Date: 06/17/21

INORGANICS
&
MISCELLANEOUS

Project Name: 10 WORLD TRADE CENTER
Project Number: 132111-002-000 T00

Lab Number: L2131433
Report Date: 06/17/21

SAMPLE RESULTS

Lab ID: L2131433-01
Client ID: HA21-BOSTON HARBOR
Sample Location: SEAPORT, BOSTON, MA

Date Collected: 06/10/21 06:10
Date Received: 06/10/21
Field Prep: Not Specified

Sample Depth:
Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
SALINITY	26		SU	2.0	--	1	-	06/15/21 18:30	121,2520B	AS
pH (H)	7.9		SU	-	NA	1	-	06/12/21 03:14	121,4500H+-B	KA
Nitrogen, Ammonia	0.077		mg/l	0.075	--	1	06/16/21 11:00	06/16/21 19:12	44,350.1	AT

Project Name: 10 WORLD TRADE CENTER
Project Number: 132111-002-000 T00
Lab Number: L2131433
Report Date: 06/17/21

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: WG1512687-1										
Nitrogen, Ammonia	ND		mg/l	0.075	--	1	06/16/21 11:00	06/16/21 19:04	44,350.1	AT

Lab Control Sample Analysis

Batch Quality Control

Project Name: 10 WORLD TRADE CENTER

Project Number: 132111-002-000 T00

Lab Number: L2131433

Report Date: 06/17/21

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 01 Batch: WG1511199-1								
pH	101		-		99-101	-		5
General Chemistry - Westborough Lab Associated sample(s): 01 Batch: WG1512485-1								
SALINITY	100		-			-		
General Chemistry - Westborough Lab Associated sample(s): 01 Batch: WG1512687-2								
Nitrogen, Ammonia	109		-		90-110	-		20

Matrix Spike Analysis
Batch Quality Control

Project Name: 10 WORLD TRADE CENTER
Project Number: 132111-002-000 T00

Lab Number: L2131433
Report Date: 06/17/21

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: WG1512687-4 QC Sample: L2128898-109 Client ID: MS Sample												
Nitrogen, Ammonia	2.00	4	5.56	**89**	Q	-	-		90-110	-		20

Lab Duplicate Analysis

Batch Quality Control

Project Name: 10 WORLD TRADE CENTER

Project Number: 132111-002-000 T00

Lab Number: L2131433

Report Date: 06/17/21

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 01 QC Batch ID: WG1511199-2 QC Sample: L2131599-01 Client ID: DUP Sample						
pH	7.4	7.2	SU	3		5
General Chemistry - Westborough Lab Associated sample(s): 01 QC Batch ID: WG1512485-2 QC Sample: L2131927-02 Client ID: DUP Sample						
SALINITY	ND	ND	SU	NC		
General Chemistry - Westborough Lab Associated sample(s): 01 QC Batch ID: WG1512687-3 QC Sample: L2128898-109 Client ID: DUP Sample						
Nitrogen, Ammonia	2.00	2.16	mg/l	8		20

Project Name: 10 WORLD TRADE CENTER
Project Number: 132111-002-000 T00

Lab Number: L2131433
Report Date: 06/17/21

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(*)
L2131433-01A	Vial Na2S2O3 preserved	B	NA		5.1	Y	Absent		HOLD-8260(14)
L2131433-01B	Vial Na2S2O3 preserved	B	NA		5.1	Y	Absent		HOLD-8260(14)
L2131433-01C	Vial Na2S2O3 preserved	B	NA		5.1	Y	Absent		HOLD-8260(14)
L2131433-01D	Vial Na2S2O3 preserved	B	NA		5.1	Y	Absent		HOLD-8260(14)
L2131433-01E	Vial Na2S2O3 preserved	B	NA		5.1	Y	Absent		HOLD-8260(14)
L2131433-01F	Vial Na2S2O3 preserved	B	NA		5.1	Y	Absent		HOLD-8260(14)
L2131433-01G	Vial Na2S2O3 preserved	B	NA		5.1	Y	Absent		HOLD-8260(14)
L2131433-01H	Vial Na2S2O3 preserved	B	NA		5.1	Y	Absent		HOLD-8260(14)
L2131433-01I	Vial unpreserved	B	NA		5.1	Y	Absent		HOLD-8260(14)
L2131433-01J	Vial unpreserved	B	NA		5.1	Y	Absent		HOLD-8260(14)
L2131433-01K	Vial unpreserved	B	NA		5.1	Y	Absent		HOLD-8260(14)
L2131433-01L	Plastic 250ml HNO3 preserved	B	<2	<2	5.1	Y	Absent		HOLD-METAL-TOTAL(180)
L2131433-01M	Plastic 250ml NaOH preserved	B	>12	>12	5.1	Y	Absent		HOLD-WETCHEM()
L2131433-01N	Plastic 500ml H2SO4 preserved	B	<2	<2	5.1	Y	Absent		NH3-350(28)
L2131433-01O	Plastic 950ml unpreserved	B	7	7	5.1	Y	Absent		SALINITY(28),HOLD-WETCHEM(),PH-4500(.01)
L2131433-01P	Plastic 950ml unpreserved	B	7	7	5.1	Y	Absent		HOLD-WETCHEM()
L2131433-01Q	Amber 1000ml H2SO4 preserved	B	<2	<2	5.1	Y	Absent		HOLD-WETCHEM()
L2131433-01R	Amber 1000ml Na2S2O3	B	7	7	5.1	Y	Absent		HOLD-WETCHEM()
L2131433-01S	Amber 1000ml Na2S2O3	B	7	7	5.1	Y	Absent		HOLD-WETCHEM()
L2131433-01T	Amber 1000ml Na2S2O3	B	7	7	5.1	Y	Absent		HOLD-WETCHEM()
L2131433-01U	Amber 1000ml Na2S2O3	B	7	7	5.1	Y	Absent		HOLD-WETCHEM()
L2131433-01V	Amber 1000ml Na2S2O3	B	7	7	5.1	Y	Absent		HOLD-WETCHEM()
L2131433-01W	Amber 1000ml Na2S2O3	B	7	7	5.1	Y	Absent		HOLD-WETCHEM()

*Values in parentheses indicate holding time in days

Project Name: 10 WORLD TRADE CENTER
Project Number: 132111-002-000 T00

Lab Number: L2131433
Report Date: 06/17/21

Container Information

Container ID	*Container Type*	*Cooler*	*Initial pH*	*Final pH*	*Temp deg C*	*Pres*	*Seal*	*Frozen Date/Time*	*Analysis(*)*
L2131433-01X	Amber 1000ml HCl preserved	B	N/A	N/A	5.1	Y	Absent		HOLD-WETCHEM()
L2131433-01Y	Amber 1000ml HCl preserved	B	N/A	N/A	5.1	Y	Absent		HOLD-WETCHEM()

*Values in parentheses indicate holding time in days

Project Name:	10 WORLD TRADE CENTER	**Lab Number:**	L2131433
Project Number:	132111-002-000 T00	**Report Date:**	06/17/21

GLOSSARY

Acronyms

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

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

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

EPA - Environmental Protection Agency.

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

LCSD - Laboratory Control Sample Duplicate: Refer to LCS.

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

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

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

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

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

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

MSD - Matrix Spike Sample Duplicate: Refer to MS.

NA - Not Applicable.

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

NDPA/DPA - N-Nitrosodiphenylamine/Diphenylamine.

NI - Not Ignitable.

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

NR - No Results: Term is utilized when 'No Target Compounds Requested' is reported for the analysis of Volatile or Semivolatile Organic TIC only requests.

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.

Report Format: Data Usability Report

Project Name:	10 WORLD TRADE CENTER	**Lab Number:**	L2131433
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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.

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

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

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

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

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

PFAS Total: With respect to PFAS analyses, the 'PFAS, Total (5)' result is defined as the summation of results for: PFHpA, PFHxS, PFOA, PFNA and PFOS. In addition, the 'PFAS, Total (6)' result is defined as the summation of results at or above the RL for: PFHpA, PFHxS, PFOA, PFNA, PFDA and PFOS. (Note: 'PFAS, Total (6)' is applicable to MassDEP DW compliance analysis only.). If a 'Total' result is requested, the results of its individual components will also be reported.

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

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

Data Qualifiers

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

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

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

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

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

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

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

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

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

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

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

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

NJ - Presumptive evidence of compound. This represents an estimated concentration for Tentatively Identified Compounds (TICs), where

Report Format: Data Usability Report

Project Name:	10 WORLD TRADE CENTER	**Lab Number:**	L2131433
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Data Qualifiers

the identification is based on a mass spectral library search.

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

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

R - Analytical results are from sample re-analysis.

RE - Analytical results are from sample re-extraction.

S - Analytical results are from modified screening analysis.

Report Format: Data Usability Report

REFERENCES

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

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, Naphthalene
EPA 625/625.1: alpha-Terpineol
EPA 8260C/8260D: NPW: 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene, Azobenzene; SCM: Iodomethane (methyl iodide), 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene.
EPA 8270D/8270E: NPW: Dimethylnaphthalene,1,4-Diphenylhydrazine, alpha-Terpineol; SCM: Dimethylnaphthalene,1,4-Diphenylhydrazine.
SM4500: NPW: Amenable Cyanide; SCM: Total Phosphorus, TKN, NO2, NO3.

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

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

Westborough Facility:

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

Non-Potable Water
SM4500H,B, EPA 120.1, SM2510B, SM2540C, SM2320B, SM4500CL-E, SM4500F-BC, SM4500NH3-BH: Ammonia-N and Kjeldahl-N, **EPA 350.1**: Ammonia-N, **LACHAT 10-107-06-1-B**: Ammonia-N, **EPA 351.1, SM4500NO3-F, EPA 353.2**: Nitrate-N, **SM4500P-E, SM4500P-B, E, SM4500SO4-E, SM5220D, EPA 410.4, SM5210B, SM5310C, SM4500CL-D, EPA 1664, EPA 420.1, SM4500-CN-CE, SM2540D, EPA 300: Chloride, Sulfate, Nitrate.**
EPA 624.1: Volatile Halocarbons & Aromatics,
EPA 608.3: Chlordane, Toxaphene, Aldrin, alpha-BHC, beta-BHC, gamma-BHC, delta-BHC, Dieldrin, DDD, DDE, DDT, Endosulfan I, Endosulfan II, Endosulfan sulfate, Endrin, Endrin Aldehyde, Heptachlor, Heptachlor Epoxide, PCBs
EPA 625.1: SVOC (Acid/Base/Neutral Extractables), **EPA 600/4-81-045**: PCB-Oil.
Microbiology: **SM9223B-Colilert-QT; Enterolert-QT, SM9221E, EPA 1600, EPA 1603, SM9222D.**

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, EPA 537.1.

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

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

CHAIN OF CUSTODY

ALPHA ANALYTICAL

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

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

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

Page of

Date Rec'd in Lab: 6/10/21

ALPHA Job #: L2131433

H&A Information

H&A Client: 401 Congress, LLC
H&A Address: 465 Medford St, Suite 2200
Boston, MA 02129
H&A Phone: 617-886-7400
H&A Fax:
H&A Email: Lhoward, Cworthy, KLamberti

Project Information

Project Name: 10 World Trade Center
Project Location: Seaport, Boston, MA
Project #: 132111-002-000 Task 00
(Use Project name as Project #) ☐
Project Manager: H Scranton
ALPHAQuote #:

Turn-Around Time

Standard ☑ Due Date:
Rush (only if pre approved) ☐ # of Days:

Deliverables

☑ Email ☐ Fax
☐ EQuIS (1 File) ☐ EQuIS (4 File)
☐ Other:

Regulatory Requirements (Program/Criteria)

EPA NPDES

Note: Select State from menu & identify criteria.

Billing Information

☑ Same as Client Info
PO #

Disposal Site Information

Please identify below location of applicable disposal facilities.

Disposal Facility:
☐ NJ ☐ NY
☐ Other:

These samples have been previously analyzed by Alpha ☐

Other project specific requirements/comments:

Use 2017 NPDES RGP Approved methods

Please specify Metals or TAL.

ANALYSIS

1. pH
2. Salinity
3. Ammonia

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

ALPHA Lab ID (Lab Use Only)	Sample ID	Collection Date	Collection Time	Sample Matrix	Sampler's Initials	1. pH	2. Salinity	3. Ammonia	Sample Specific Comments	Total # Bottles
31433-01	HA21-Boston Harbor	6/10/2021	6:10	AQ	CAS	X	X	X		25

Container Type
Preservative

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

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

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

Relinquished By:	Date/Time	Received By:	Date/Time
	6/10/2021 1640		6/10/21 1635
	6/10/21 1635		6/10/21 1635
	6/10/21 18:15		6/10/21 18:15

Please print clearly, legibly and completely. Samples can not be logged in and turnaround time clock will not start until any ambiguities are resolved. Alpha Analytical's services under this Chain of Custody shall be performed in accordance with terms and conditions within Blanket Service Agreement# 2015-18-Alpha Analytical by and between Haley & Aldrich, Inc., its subsidiaries and affiliates and Alpha Analytical.

Document ID: 20455 Rev 1 (1/26/2016)

ANALYTICAL REPORT

Lab Number:	L2131783
Client:	Haley & Aldrich, Inc. 465 Medford Street, Suite 2200 Charlestown, MA 02129-1400
ATTN:	Heather Scranton
Phone:	(617) 886-7400
Project Name:	10 WORLD TRADE CENTER
Project Number:	132111-002-000 T00
Report Date:	06/21/21

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: 10 WORLD TRADE CENTER
Project Number: 132111-002-000 T00

Lab Number: L2131783
Report Date: 06/21/21

Alpha Sample ID	Client ID	Matrix	Sample Location	Collection Date/Time	Receive Date
L2131783-01	GW-2_20210611	WATER	SEAPORT, BOSTON, MA	06/11/21 05:00	06/11/21

Project Name:	10 WORLD TRADE CENTER	**Lab Number:**	L2131783
Project Number:	132111-002-000 T00	**Report Date:**	06/21/21

Case Narrative

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

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

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

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

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

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

Project Name:	10 WORLD TRADE CENTER	**Lab Number:**	L2131783
Project Number:	132111-002-000 T00	**Report Date:**	06/21/21

Case Narrative (continued)

Sample Receipt

The analyses performed were specified by the client.

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: Caitlin Walukevich

Title: Technical Director/Representative Date: 06/21/21

INORGANICS
&
MISCELLANEOUS

Project Name: 10 WORLD TRADE CENTER
Project Number: 132111-002-000 T00

Lab Number: L2131783
Report Date: 06/21/21

SAMPLE RESULTS

Lab ID: L2131783-01
Client ID: GW-2_20210611
Sample Location: SEAPORT, BOSTON, MA

Date Collected: 06/11/21 05:00
Date Received: 06/11/21
Field Prep: None

Sample Depth:
Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total Suspended	53.		mg/l	5.0	NA	1	-	06/17/21 13:40	121,2540D	AC
Nitrogen, Ammonia	1.77		mg/l	0.075	--	1	06/16/21 18:00	06/17/21 20:04	121,4500NH3-BH	AT
Chromium, Hexavalent	ND		mg/l	0.010	--	1	06/11/21 23:25	06/11/21 23:49	1,7196A	KA
Anions by Ion Chromatography - Westborough Lab										
Chloride	3520		mg/l	125	--	250	-	06/17/21 22:50	44,300.0	AT

Project Name: 10 WORLD TRADE CENTER
Project Number: 132111-002-000 T00
Lab Number: L2131783
Report Date: 06/21/21

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: WG1511168-1										
Chromium, Hexavalent	ND		mg/l	0.010	--	1	06/11/21 23:25	06/11/21 23:44	1,7196A	KA
General Chemistry - Westborough Lab for sample(s): 01 Batch: WG1513039-1										
Nitrogen, Ammonia	ND		mg/l	0.075	--	1	06/16/21 18:00	06/17/21 20:01	121,4500NH3-BH	AT
General Chemistry - Westborough Lab for sample(s): 01 Batch: WG1513449-1										
Solids, Total Suspended	ND		mg/l	5.0	NA	1	-	06/17/21 13:40	121,2540D	AC
Anions by Ion Chromatography - Westborough Lab for sample(s): 01 Batch: WG1513705-1										
Chloride	ND		mg/l	0.500	--	1	-	06/17/21 17:55	44,300.0	AT

Lab Control Sample Analysis

Batch Quality Control

Project Name: 10 WORLD TRADE CENTER

Project Number: 132111-002-000 T00

Lab Number: L2131783

Report Date: 06/21/21

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 01 Batch: WG1511168-2								
Chromium, Hexavalent	104		-		85-115	-		20
General Chemistry - Westborough Lab Associated sample(s): 01 Batch: WG1513039-2								
Nitrogen, Ammonia	101		-		80-120	-		20
General Chemistry - Westborough Lab Associated sample(s): 01 Batch: WG1513449-2								
Solids, Total Suspended	91		-		80-120	-		
Anions by Ion Chromatography - Westborough Lab Associated sample(s): 01 Batch: WG1513705-2								
Chloride	100		-		90-110	-		

Matrix Spike Analysis
Batch Quality Control

Project Name: 10 WORLD TRADE CENTER
Project Number: 132111-002-000 T00

Lab Number: L2131783
Report Date: 06/21/21

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: WG1511168-4 QC Sample: L2131783-01 Client ID: GW-2_20210611												
Chromium, Hexavalent	ND	0.1	0.105	105		-	-		85-115	-		20
General Chemistry - Westborough Lab Associated sample(s): 01 QC Batch ID: WG1513039-4 QC Sample: L2131599-02 Client ID: MS Sample												
Nitrogen, Ammonia	0.405	4	4.17	94		-	-		80-120	-		20
Anions by Ion Chromatography - Westborough Lab Associated sample(s): 01 QC Batch ID: WG1513705-3 QC Sample: L2129422-04 Client ID: MS Sample												
Chloride	2.47	4	6.40	98		-	-		90-110	-		18

Lab Duplicate Analysis

Batch Quality Control

Project Name: 10 WORLD TRADE CENTER

Project Number: 132111-002-000 T00

Lab Number: L2131783

Report Date: 06/21/21

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 01 QC Batch ID: WG1511168-3 QC Sample: L2131783-01 Client ID: GW-2_20210611						
Chromium, Hexavalent	ND	ND	mg/l	NC		20
General Chemistry - Westborough Lab Associated sample(s): 01 QC Batch ID: WG1513039-3 QC Sample: L2131599-02 Client ID: DUP Sample						
Nitrogen, Ammonia	0.405	0.392	mg/l	3		20
General Chemistry - Westborough Lab Associated sample(s): 01 QC Batch ID: WG1513449-3 QC Sample: L2131976-02 Client ID: DUP Sample						
Solids, Total Suspended	65	72	mg/l	10		29
Anions by Ion Chromatography - Westborough Lab Associated sample(s): 01 QC Batch ID: WG1513705-4 QC Sample: L2129422-04 Client ID: DUP Sample						
Chloride	2.47	2.50	mg/l	1		18

Project Name: 10 WORLD TRADE CENTER
Project Number: 132111-002-000 T00

Lab Number: L2131783
Report Date: 06/21/21

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(*)*
L2131783-01A	Plastic 500ml H2SO4 preserved	B	<2	<2	4.9	Y	Absent		NH3-4500(28)
L2131783-01B	Plastic 950ml unpreserved	B	7	7	4.9	Y	Absent		CL-300(28),HEXCR-7196(1)
L2131783-01C	Plastic 950ml unpreserved	B	7	7	4.9	Y	Absent		TSS-2540(7)

*Values in parentheses indicate holding time in days

Project Name:	10 WORLD TRADE CENTER	**Lab Number:**	L2131783
Project Number:	132111-002-000 T00	**Report Date:**	06/21/21

GLOSSARY

Acronyms

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

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

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

EPA - Environmental Protection Agency.

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

LCSD - Laboratory Control Sample Duplicate: Refer to LCS.

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

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

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

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

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

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

MSD - Matrix Spike Sample Duplicate: Refer to MS.

NA - Not Applicable.

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

NDPA/DPA - N-Nitrosodiphenylamine/Diphenylamine.

NI - Not Ignitable.

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

NR - No Results: Term is utilized when 'No Target Compounds Requested' is reported for the analysis of Volatile or Semivolatile Organic TIC only requests.

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.

Report Format: Data Usability Report

Project Name:	10 WORLD TRADE CENTER	**Lab Number:**	L2131783
Project Number:	132111-002-000 T00	**Report Date:**	06/21/21

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.

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

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

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

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

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

PFAS Total: With respect to PFAS analyses, the 'PFAS, Total (5)' result is defined as the summation of results for: PFHpA, PFHxS, PFOA, PFNA and PFOS. In addition, the 'PFAS, Total (6)' result is defined as the summation of results for: PFHpA, PFHxS, PFOA, PFNA, PFDA and PFOS. For MassDEP DW compliance analysis only, the 'PFAS, Total (6)' result is defined as the summation of results at or above the RL. Note: If a 'Total' result is requested, the results of its individual components will also be reported.

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

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

Data Qualifiers

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

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

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

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

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

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

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

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

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

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

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

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

NJ - Presumptive evidence of compound. This represents an estimated concentration for Tentatively Identified Compounds (TICs), where

Report Format: Data Usability Report

Project Name:	10 WORLD TRADE CENTER	**Lab Number:**	L2131783
Project Number:	132111-002-000 T00	**Report Date:**	06/21/21

Data Qualifiers

the identification is based on a mass spectral library search.

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

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

R - Analytical results are from sample re-analysis.

RE - Analytical results are from sample re-extraction.

S - Analytical results are from modified screening analysis.

Report Format: Data Usability Report

Project Name:	10 WORLD TRADE CENTER	**Lab Number:**	L2131783
Project Number:	132111-002-000 T00	**Report Date:**	06/21/21

REFERENCES

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

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

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, Naphthalene
EPA 625/625.1: alpha-Terpineol
EPA 8260C/8260D: NPW: 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene, Azobenzene; SCM: Iodomethane (methyl iodide), 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene.
EPA 8270D/8270E: NPW: Dimethylnaphthalene,1,4-Diphenylhydrazine, alpha-Terpineol; SCM: Dimethylnaphthalene,1,4-Diphenylhydrazine.
SM4500: NPW: Amenable Cyanide; SCM: Total Phosphorus, TKN, NO2, NO3.

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

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

Westborough Facility:

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

Non-Potable Water
SM4500H,B, EPA 120.1, SM2510B, SM2540C, SM2320B, SM4500CL-E, SM4500F-BC, SM4500NH3-BH: Ammonia-N and Kjeldahl-N, **EPA 350.1**: Ammonia-N, **LACHAT 10-107-06-1-B**: Ammonia-N, **EPA 351.1, SM4500NO3-F, EPA 353.2**: Nitrate-N, **SM4500P-E, SM4500P-B, E, SM4500SO4-E, SM5220D, EPA 410.4, SM5210B, SM5310C, SM4500CL-D, EPA 1664, EPA 420.1, SM4500-CN-CE, SM2540D, EPA 300: Chloride, Sulfate, Nitrate.**
EPA 624.1: Volatile Halocarbons & Aromatics,
EPA 608.3: Chlordane, Toxaphene, Aldrin, alpha-BHC, beta-BHC, gamma-BHC, delta-BHC, Dieldrin, DDD, DDE, DDT, Endosulfan I, Endosulfan II, Endosulfan sulfate, Endrin, Endrin Aldehyde, Heptachlor, Heptachlor Epoxide, PCBs
EPA 625.1: SVOC (Acid/Base/Neutral Extractables), **EPA 600/4-81-045**: PCB-Oil.
Microbiology: **SM9223B-Colilert-QT; Enterolert-QT, SM9221E, EPA 1600, EPA 1603, SM9222D.**

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, EPA 537.1.

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.

ALPHA

CHAIN OF CUSTODY

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

Westborough, MA 01581 4 Walkup Dr. TEL: 508-898-9220 FAX: 508-898-9193

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

Page ___ of ___

Date Rec'd in Lab: 6/11/21

ALPHA Job #: L2131783

Project Information	
Project Name:	10 World Trade Center
Project Location:	Seaport, Boston, MA
Project #	132111-002-000 Task 00
(Use Project name as Project #)	☐
Project Manager:	H. Scranton
ALPHAQuote #:	

H&A Information	
H&A Client:	401 Congress, LLC
H&A Address:	465 Medford St, Suite 2200, Boston, MA 02129
H&A Phone:	617-886-7400
H&A Fax:	
H&A Email:	Lhoward, Cworthy, KLamberti

Turn-Around Time
Standard ☒ Due Date:
(only if pre approved) ☐ # of Days:

Deliverables
☐ Email ☐ Fax
☒ EQuIS (1 File) ☐ EQuIS (4 File)
☐ Other

Regulatory Requirements (Program/Criteria)
Note: Select State from menu & identify criteria.

Billing Information
☒ Same as Client Info
PO #

Disposal Site Information
Please identify below location of applicable disposal facilities.
Disposal Facility:
☐ NJ ☐ NY
Other:

These samples have been previously analyzed by Alpha ☐

Other project specific requirements/comments:
3. HOLD PACN & ACN 11. Dissolved Metals ON HOLD (Field Filtered)
Please sample per EPA Approved 2017 RGP Permit methods

Please specify Metals or TAL.

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

ALPHA Lab ID (Lab Use Only)	Sample ID	Collection Date	Collection Time	Sample Matrix	Sampler's Initials	1. TSS - 2540	[illegible]	[illegible]	[illegible]	[illegible]	[illegible] Chromium	[illegible]	[illegible]	[illegible]	10. CL-300	[illegible]	12. Ammonia	[illegible]	[illegible]	[illegible]	16. PCB-608 / 16. Hex Cr-3500, & trivalent Cr	Sample Specific Comments
31783-01	GW-2_20210611	6/11/21	5:00	AQ	CAS	X									X		X			X	X	

Container Type	P									P		P				P
Preservative	A									A		D				A

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

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

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

Relinquished By:	Date/Time	Received By:	Date/Time
[signature]	6/11/21 5:45	[signature] AAL	6/11/21 1640
[signature]	6/11/21 1821	Melissa Wood	6/11/21 1821

Please print clearly, legibly and completely. Samples can not be logged in and turnaround time clock will not start until any ambiguities are resolved. Alpha Analytical's services under this Chain of Custody shall be performed in accordance with terms and conditions within Blanket Service Agreement# 2015-18-Alpha Analytical by and between Haley & Aldrich, Inc., its subsidiaries and affiliates and Alpha Analytical.

Document ID: 20455 Rev 1 (1/28/2016)

ANALYTICAL REPORT

Lab Number:	L2133990
Client:	Haley & Aldrich, Inc. 465 Medford Street, Suite 2200 Charlestown, MA 02129-1400
ATTN:	Heather Scranton
Phone:	(617) 886-7400
Project Name:	10 WORLD TRADE CENTER
Project Number:	132111-002-000 T00
Report Date:	06/28/21

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: 10 WORLD TRADE CENTER
Project Number: 132111-002-000 T00

Lab Number: L2133990
Report Date: 06/28/21

Alpha Sample ID	Client ID	Matrix	Sample Location	Collection Date/Time	Receive Date
L2133990-01	GW-2_20210611	WATER	SEAPORT, BOSTON, MA	06/11/21 05:00	06/11/21

Project Name:	10 WORLD TRADE CENTER	**Lab Number:**	L2133990
Project Number:	132111-002-000 T00	**Report Date:**	06/28/21

Case Narrative

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

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

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

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

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

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

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:  Sebastian Corbin

Title: Technical Director/Representative Date: 06/28/21

METALS

Project Name: 10 WORLD TRADE CENTER
Lab Number: L2133990
Project Number: 132111-002-000 T00
Report Date: 06/28/21

SAMPLE RESULTS

Lab ID: L2133990-01
Client ID: GW-2_20210611
Sample Location: SEAPORT, BOSTON, MA
Date Collected: 06/11/21 05:00
Date Received: 06/11/21
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
Dissolved Metals - Mansfield Lab											
Lead, Dissolved	ND		mg/l	0.0010	--	1	06/28/21 12:17	06/28/21 13:44	EPA 3005A	3,200.8	CD

Project Name: 10 WORLD TRADE CENTER
Project Number: 132111-002-000 T00
Lab Number: L2133990
Report Date: 06/28/21

Method Blank Analysis
Batch Quality Control

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Dissolved Metals - Mansfield Lab for sample(s): 01 Batch: WG1516558-1										
Lead, Dissolved	ND		mg/l	0.0010	--	1	06/28/21 12:17	06/28/21 13:10	3,200.8	CD

Prep Information

Digestion Method: EPA 3005A

Lab Control Sample Analysis

Batch Quality Control

Project Name: 10 WORLD TRADE CENTER

Project Number: 132111-002-000 T00

Lab Number: L2133990

Report Date: 06/28/21

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Dissolved Metals - Mansfield Lab Associated sample(s): 01 Batch: WG1516558-2								
Lead, Dissolved	94		-		85-115	-		

Matrix Spike Analysis
Batch Quality Control

Project Name: 10 WORLD TRADE CENTER
Project Number: 132111-002-000 T00

Lab Number: L2133990
Report Date: 06/28/21

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
Dissolved Metals - Mansfield Lab Associated sample(s): 01 QC Batch ID: WG1516558-3 QC Sample: L2134081-01 Client ID: MS Sample												
Lead, Dissolved	0.0168	0.51	0.5084	96		-	-		70-130	-		20

Lab Duplicate Analysis

Batch Quality Control

Project Name: 10 WORLD TRADE CENTER

Project Number: 132111-002-000 T00

Lab Number: L2133990

Report Date: 06/28/21

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
Dissolved Metals - Mansfield Lab Associated sample(s): 01 QC Batch ID: WG1516558-4 QC Sample: L2134081-01 Client ID: DUP Sample						
Lead, Dissolved	0.0168	0.0115	mg/l	**37**	Q	20

Project Name: 10 WORLD TRADE CENTER
Project Number: 132111-002-000 T00

Lab Number: L2133990
Report Date: 06/28/21

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(*)
L2133990-01A	Plastic 120ml unpreserved split	B	7	7	4.9	Y	Absent		-
L2133990-01X	Plastic 120ml HNO3 preserved Filtrates	B	N/A	N/A	4.9	Y	Absent		PB-2008S(180)

*Values in parentheses indicate holding time in days

Project Name:	10 WORLD TRADE CENTER	**Lab Number:**	L2133990
Project Number:	132111-002-000 T00	**Report Date:**	06/28/21

GLOSSARY

Acronyms

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

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

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

EPA - Environmental Protection Agency.

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

LCSD - Laboratory Control Sample Duplicate: Refer to LCS.

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

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

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

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

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

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

MSD - Matrix Spike Sample Duplicate: Refer to MS.

NA - Not Applicable.

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

NDPA/DPA - N-Nitrosodiphenylamine/Diphenylamine.

NI - Not Ignitable.

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

NR - No Results: Term is utilized when 'No Target Compounds Requested' is reported for the analysis of Volatile or Semivolatile Organic TIC only requests.

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.

Report Format: Data Usability Report

Project Name:	10 WORLD TRADE CENTER	**Lab Number:**	L2133990
Project Number:	132111-002-000 T00	**Report Date:**	06/28/21

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.

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

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

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

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

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

PFAS Total: With respect to PFAS analyses, the 'PFAS, Total (5)' result is defined as the summation of results for: PFHpA, PFHxS, PFOA, PFNA and PFOS. In addition, the 'PFAS, Total (6)' result is defined as the summation of results for: PFHpA, PFHxS, PFOA, PFNA, PFDA and PFOS. For MassDEP DW compliance analysis only, the 'PFAS, Total (6)' result is defined as the summation of results at or above the RL. Note: If a 'Total' result is requested, the results of its individual components will also be reported.

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

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

Data Qualifiers

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

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

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

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

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

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

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

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

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

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

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

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

NJ - Presumptive evidence of compound. This represents an estimated concentration for Tentatively Identified Compounds (TICs), where

Report Format: Data Usability Report

Project Name:	10 WORLD TRADE CENTER	**Lab Number:**	L2133990
Project Number:	132111-002-000 T00	**Report Date:**	06/28/21

Data Qualifiers

the identification is based on a mass spectral library search.

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

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

R - Analytical results are from sample re-analysis.

RE - Analytical results are from sample re-extraction.

S - Analytical results are from modified screening analysis.

Report Format: Data Usability Report

REFERENCES

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

LIMITATION OF LIABILITIES

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

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

Certification Information

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

Westborough Facility
EPA 624/624.1: m/p-xylene, o-xylene, Naphthalene
EPA 625/625.1: alpha-Terpineol
EPA 8260C/8260D: NPW: 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene, Azobenzene; SCM: Iodomethane (methyl iodide), 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene.
EPA 8270D/8270E: NPW: Dimethylnaphthalene,1,4-Diphenylhydrazine, alpha-Terpineol; SCM: Dimethylnaphthalene,1,4-Diphenylhydrazine.
SM4500: NPW: Amenable Cyanide; SCM: Total Phosphorus, TKN, NO2, NO3.

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

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

Westborough Facility:

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

Non-Potable Water
SM4500H,B, EPA 120.1, SM2510B, SM2540C, SM2320B, SM4500CL-E, SM4500F-BC, SM4500NH3-BH: Ammonia-N and Kjeldahl-N, **EPA 350.1**: Ammonia-N, **LACHAT 10-107-06-1-B**: Ammonia-N, **EPA 351.1, SM4500NO3-F, EPA 353.2**: Nitrate-N, **SM4500P-E, SM4500P-B, E, SM4500SO4-E, SM5220D, EPA 410.4, SM5210B, SM5310C, SM4500CL-D, EPA 1664, EPA 420.1, SM4500-CN-CE, SM2540D, EPA 300: Chloride, Sulfate, Nitrate.**
EPA 624.1: Volatile Halocarbons & Aromatics,
EPA 608.3: Chlordane, Toxaphene, Aldrin, alpha-BHC, beta-BHC, gamma-BHC, delta-BHC, Dieldrin, DDD, DDE, DDT, Endosulfan I, Endosulfan II, Endosulfan sulfate, Endrin, Endrin Aldehyde, Heptachlor, Heptachlor Epoxide, PCBs
EPA 625.1: SVOC (Acid/Base/Neutral Extractables), **EPA 600/4-81-045**: PCB-Oil.
Microbiology: **SM9223B-Colilert-QT; Enterolert-QT, SM9221E, EPA 1600, EPA 1603, SM9222D.**

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, EPA 537.1.

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.

L2133990

CHAIN OF CUSTODY

ALPHA
Westborough, MA 01581, 8 Walkup Dr., TEL: 508-898-9220, FAX: 508-898-9193
Mansfield, MA 02048, 320 Forbes Blvd, TEL: 508-822-9300, FAX: 508-822-3288
Service Centers: Brewer, ME 04412 · Portsmouth, NH 03801 · Mahwah, NJ 07430 · Albany, NY 12205 · Tonawanda, NY 14150 · Holmes, PA 19043

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6/11/21

ALPHA Job # ~~L2131783~~ L2133990 EO 6/23/21

Project Information	
Project Name:	10 World Trade Center
Project Location:	Seaport, Boston, MA
Project #	132111-002-000 Task 00
(Use Project name as Project #)	☐
Project Manager:	H. Scranton
ALPHAQuote #:	

H&A Information	
H&A Client:	401 Congress, LLC
H&A Address:	465 Medford St, Suite 2200, Boston, MA 02129
H&A Phone:	617-886-7400
H&A Fax:	
H&A Email:	LHoward, CWorthy, KLamberti

Turn-Around Time
Standard ☒ Due Date:
(only if pre approved) ☐ # of Days:

Deliverables: ☑ Email ☐ Fax ☐ EQuIS (1 File) ☐ EQuIS (4 File) ☐ Other

Regulatory Requirements (Program/Criteria)
Note: Select State from menu & identify criteria.

Billing Information
☐ Same as Client Info
PO #

Disposal Site Information
Please identify below location of applicable disposal facilities.
Disposal Facility: ☐ NJ ☐ NY ☐ Other:

These samples have been previously analyzed by Alpha ☐

Other project specific requirements/comments:
3. HOLD PACN & ACN 11. Dissolved Metals ON HOLD (Field Filtered)
Please sample per EPA Approved 2017 RGP Permit methods

Please specify Metals or TAL.

ANALYSIS: 1. TSS - 2540 (struck); [illegible] (struck); [illegible] (struck); [illegible] (struck); [illegible] (struck); [illegible] (struck); [illegible] (struck); Chromium; [illegible] (struck); [illegible] (struck); [illegible] (struck); 10. Cl- (struck) – Dissolved Pb; [illegible] (struck); 12. Ammonia; [illegible] (struck); [illegible] (struck); [illegible] (struck); 16. Hex Cr 3500, Trivalent Cr

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

ALPHA Lab ID (Lab Use Only)	Sample ID	Collection Date	Collection Time	Sample Matrix	Sampler's Initials	Analysis	Sample Specific Comments
~~31783-01~~ 33990-01	GW-2_20210611	6/11/21	5:00	AQ	CAS	X (1. TSS); X (Dissolved Pb); X (12. Ammonia); X (16. Hex Cr / Trivalent Cr)	

	1. TSS	Dissolved Pb	12. Ammonia	16. Hex Cr
Container Type	P	P	P	P
Preservative	A	A	D	A

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

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

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

Relinquished By:	Date/Time	Received By:	Date/Time
[signature]	6/11/21 5:45	[signature] Alpha AAL	6/11/21 1640
[signature]	6/11/21 1821	Melissa Wood	6/11/21 1821

Please print clearly, legibly and completely. Samples can not be logged in and turnaround time clock will not start until any ambiguities are resolved. Alpha Analytical's services under this Chain of Custody shall be performed in accordance with terms and conditions within Blanket Service Agreement# 2015-18-Alpha Analytical by and between Haley & Aldrich, Inc., its subsidiaries and affiliates and Alpha Analytical.

Document ID: 20455 Rev 1 (1/28/2016)

APPENDIX D

EPA WQBEL Calculation Spreadsheet

Enter number values in green boxes below

Enter values in the units specified

0	Q_R = Enter upstream flow in **MGD**
0.144	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

657	C_d = Enter influent hardness in **mg/L** $CaCO_3$
0	C_s = Enter receiving water hardness in **mg/L** $CaCO_3$

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

7.9	pH in **Standard Units**
16.1	Temperature in **°C**
0.077	Ammonia in **mg/L**
0	Hardness in **mg/L** $CaCO_3$
26	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**

Enter **influent** concentrations in the units specified

0	TRC in **µg/L**
1.77	Ammonia in **mg/L**
0	Antimony in **µg/L**
10.7	Arsenic in **µg/L**
0.74	Cadmium in **µg/L**
173.2	Chromium III in **µg/L**
0	Chromium VI in **µg/L**
159	Copper in **µg/L**
103000	Iron in **µg/L**
386.6	Lead in **µg/L**
0.26	Mercury in **µg/L**
105.8	Nickel in **µg/L**
0	Selenium in **µg/L**
0.46	Silver in **µg/L**
353.1	Zinc in **µg/L**
0	Cyanide in **µg/L**
0	Phenol in **µg/L**
0	Carbon Tetrachloride in **µg/L**
0	Tetrachloroethylene in **µg/L**
0	Total Phthalates in **µg/L**
0	Diethylhexylphthalate in **µg/L**
0.178	Benzo(a)anthracene in **µg/L**
0.156	Benzo(a)pyrene in **µg/L**
0.173	Benzo(b)fluoranthene in **µg/L**
0	Benzo(k)fluoranthene in **µg/L**
0.135	Chrysene in **µg/L**
0	Dibenzo(a,h)anthracene in **µg/L**
0.104	Indeno(1,2,3-cd)pyrene in **µg/L**
0	Methyl-tert butyl ether in **µg/L**

Notes:

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

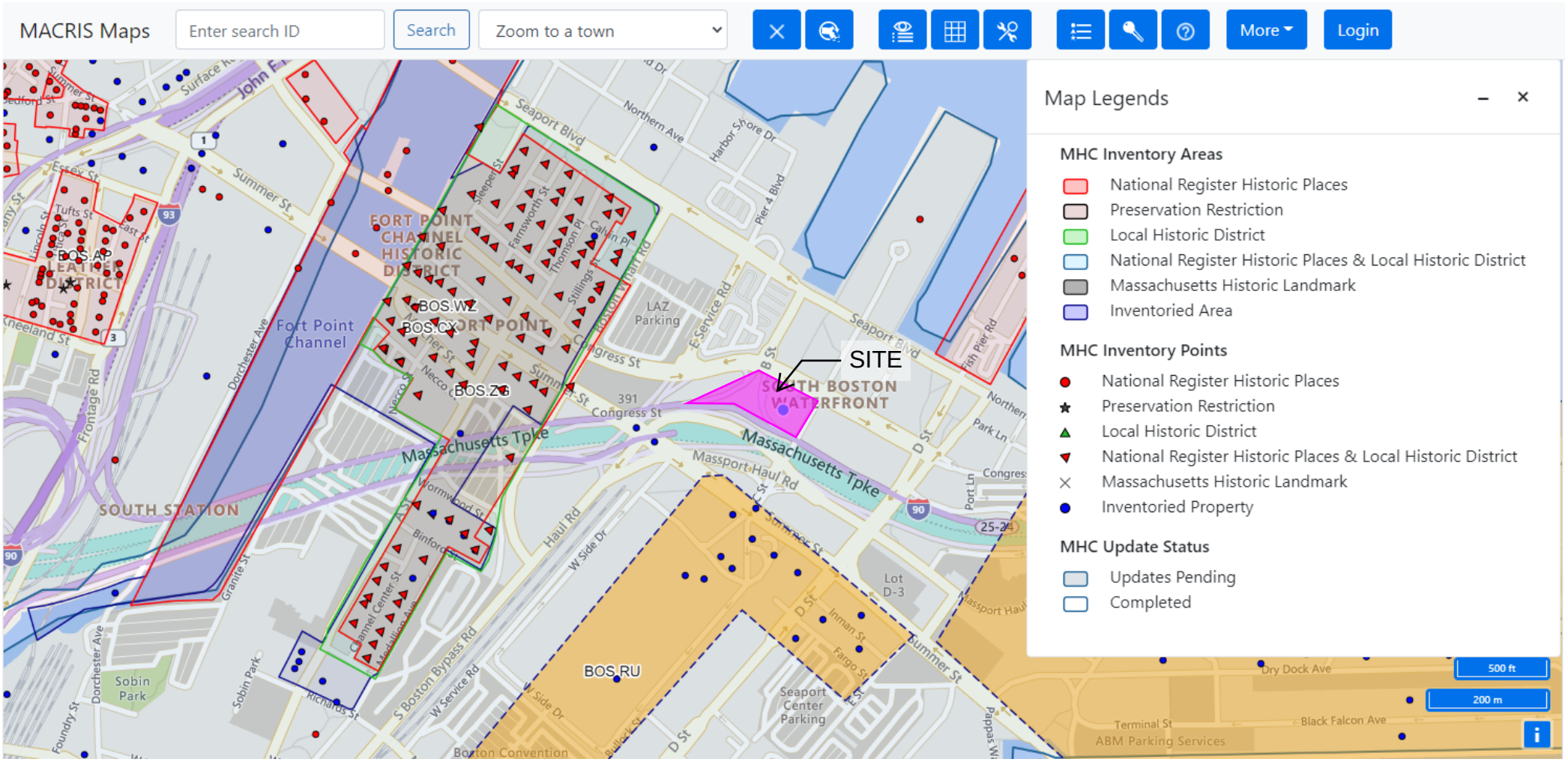
if >1 sample, enter maximum
if >10 samples, may enter 95th percentile
Enter 0 if non-detect or testing not required

Dilution Factor	0.0					
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	**7.5**	µg/L	50	µg/L
Total Suspended Solids	**30**	mg/L	---			
Antimony	**206**	µg/L	640	µg/L		
Arsenic	**104**	µg/L	36	µg/L		
Cadmium	**10.2**	µg/L	8.9	µg/L		
Chromium III	323	µg/L	**100.0**	µg/L		
Chromium VI	**323**	µg/L	50	µg/L		
Copper	242	µg/L	**3.7**	µg/L		
Iron	**5000**	µg/L	---	µg/L		
Lead	160	µg/L	**8.5**	µg/L		
Mercury	**0.739**	µg/L	1.11	µg/L		
Nickel	1450	µg/L	**8.3**	µg/L		
Selenium	**235.8**	µg/L	71	µg/L		
Silver	**35.1**	µg/L	2.2	µg/L		
Zinc	420	µg/L	**86**	µg/L		
Cyanide	**178**	mg/L	1.0	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	**7.97**	mg/L	---			
Phenol	**1,080**	µg/L	300	µg/L		
C. Halogenated VOCs						
Carbon Tetrachloride	**4.4**		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	---	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	---			

APPENDIX E

National Register of Historic Places and Massachusetts Historical Commission Documentation


MACRIS Maps
Enter search ID
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Zoom to a town
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Map Legends
MHC Inventory Areas
National Register Historic Places
Preservation Restriction
Local Historic District
National Register Historic Places & Local Historic District
Massachusetts Historic Landmark
Inventoried Area
MHC Inventory Points
National Register Historic Places
Preservation Restriction
Local Historic District
National Register Historic Places & Local Historic District
Massachusetts Historic Landmark
Inventoried Property
MHC Update Status
Updates Pending
Completed
SITE
BOS.AP
BOS.WZ
BOS.CX
BOS.ZG
BOS.RU
FORT POINT CHANNEL HISTORIC DISTRICT
Fort Point Channel
SOUTH STATION
SOUTH BOSTON WATERFRONT
LAZ Parking
Seaport Center Parking
Lot D-3
Sobin Park
Boston Convention
ABM Parking Services
Seaport Blvd
Summer St
Congress St
Massachusetts Tpke
Haul Rd
W Side Dr
D St
Dry Dock Ave
Terminal St
Black Falcon Ave
500 ft
200 m

Na onal Register of Historic Places

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

Public, non-restricted data depic ng Na onal Register spa al data processed by the Cultural Resources GIS facility. …

Ref#	Property Name	City	Street & Number	Listed Date	Category of Property	External Link
87000885	Abbotsford	Boston	300 Walnut Ave.	9/16/1987	BUILDING	LINK
82004456	Adams-Nervine Asylum	Boston	990-1020 Centre St.	6/1/1982	BUILDING	LINK
71000087	African Meetinghouse	Boston	8 Smith St.	10/7/1971	BUILDING	LINK
80000678	All Saints' Church	Boston	211 Ashmont St.	6/16/1980	BUILDING	LINK
97001377	Allston Congregational Church	Boston	31-41 Quint Ave.	11/7/1997	BUILDING	LINK
14000698	Almont Apartments	Boston	Address Restricted	9/22/2014	BUILDING	LINK
74000382	Ames Building	Boston	1 Court St.	4/26/1974	BUILDING	LINK
77001541	Appleton, Nathan, Residence	Boston	39-40 Beacon St.	12/22/1977	BUILDING	LINK
73000313	Arlington Street Church	Boston	Arlington and Boylston Sts.	5/4/1973	BUILDING	LINK
73000314	Armory of the First Corps of Cadets	Boston	97-105 Arlington St. and 130 Columbus Ave.	5/22/1973	BUILDING	LINK
66000127	Arnold Arboretum	Boston	22 Divinity Ave.	10/15/1966	SITE	LINK
100004783	Ascension-Caproni Historic District	Boston	Roughly bounded by Washington St., Newcon	12/23/2019	district	LINK
87001478	Austin, Francis B., House	Boston	58 High St.	10/21/1988	BUILDING	LINK
05000459	Ayer, Frederick, Mansion	Boston	395 Commonwealth Avenue	4/5/2005	BUILDING	LINK
73001948	Back Bay Historic District	Boston	Roughly bounded by the Charles River, Arlingt	8/14/1973	DISTRICT	LINK
98001381	Baker Congregational Church	Boston	760 Saratoga St.	11/19/1998	BUILDING	LINK
83004285	Baker, Sarah J., School	Boston	33 Perrin St.	7/7/1983	BUILDING	LINK
80000462	Beach-Knapp District	Boston	Roughly bounded by Harrison Ave., Washingt	12/9/1980	DISTRICT	LINK
66000130	Beacon Hill Historic District	Boston	Bounded by Beacon St., the Charles River Emb	10/15/1966	DISTRICT	LINK
79000368	Bedford Building	Boston	89-103 Bedford St.	8/21/1979	BUILDING	LINK
89002251	Bellevue Standpipe	Boston	On Bellevue Hill at Washington St. and Roxbu	1/18/1990	STRUCTURE	LINK
04000023	Benedict Fenwick School	Boston	150 Magnolia St.	2/11/2004	BUILDING	LINK
100002790	Benjamin Silverman Apartments	Boston	50-52 Lorne & 4 Wilson Sts.	8/24/2018	building	LINK
02000548	Bennington Street Burying Ground	Boston	Bennington St., bet. Swift and harmony Sts.	5/22/2002	SITE	LINK
80000677	Berger Factory	Boston	37 Williams St.	4/9/1980	BUILDING	LINK
85000316	Bigelow School	Boston	350 W. 4th St.	2/21/1985	BUILDING	LINK
73000315	Blackstone Block Historic District	Boston	Area bound by Union, Hanover, Blackstone, a	5/26/1973	DISTRICT	LINK
14000272	Blake and Amory Building	Boston	59 Temple Pl.	6/2/2014	BUILDING	LINK
74002350	Blake, James, House	Boston	735 Columbia Rd.	5/1/1974	BUILDING	LINK
80004396	Boston African American National Historic Site	Boston	Museum of Afro American History, Dudley Sta	10/10/1980	DISTRICT	LINK
66000132	Boston Athenaeum	Boston	10 1/2 Beacon St.	10/15/1966	BUILDING	LINK
87000760	Boston Common	Boston	Beacon, Park, Tremont, Boylston, and Charles	2/27/1987	DISTRICT	LINK
72000144	Boston Common and Public Garden	Boston	Beacon, Park, Tremont, Boylston, and Arlingto	7/12/1972	DISTRICT	LINK
01001557	Boston Consumptives Hospital	Boston	249 River St.	2/7/2002	DISTRICT	LINK
80000453	Boston Edison Electric Illuminating Company	Boston	25-39 Boylston St.	12/9/1980	BUILDING	LINK
100001314	Boston Fish Pier Historic District	Boston	212-234 Northern Ave.	7/13/2017	district	LINK
85003323	Boston Harbor Islands Archeological District	Boston	Address Restricted	12/21/1985	DISTRICT	LINK
66000133	Boston Light	Boston	Little Brewster Island, Boston Harbor	10/15/1966	STRUCTURE	LINK
15000195	Boston National Historical Park	Boston	Charlestown Navy Yard	5/5/2015	DISTRICT	LINK
74002222	Boston National Historical Park	Boston	Inner harbor at mouth of Charles River	10/26/1974	DISTRICT	LINK
66000134	Boston Naval Shipyard	Boston	E of Chelsea St., Charlestown	11/15/1966	DISTRICT	LINK
15000048	Boston Police Station Number One-Traffic Tunne	Boston	128, 150 North & 130 -140 Richmond St.	3/3/2015	BUILDING	LINK
87000761	Boston Public Garden	Boston	Beacon, Charles, Boylston, and Arlington Sts.	2/27/1987	DISTRICT	LINK
73000317	Boston Public Library	Boston	Copley Sq.	5/6/1973	BUILDING	LINK
07000861	Boston Transit Commission Building	Boston	15 Beacon St.	8/31/2007	BUILDING	LINK
98001082	Boston Young Men's Christian Association	Boston	312-320 Huntington Ave.	8/20/1998	BUILDING	LINK
80000451	Boston Young Men's Christian Union	Boston	48 Boylston St.	12/9/1980	BUILDING	LINK
90001145	Bowditch School	Boston	80--82 Greene St.	8/3/1990	BUILDING	LINK
80000450	Boylston Building	Boston	2-22 Boylston St.	12/9/1980	BUILDING	LINK
01000088	Brighton Center Historic District	Boston	Academy Hill R., Chestnut Hill Ave., Dighton, E	2/20/2001	DISTRICT	LINK
97000920	Brighton Evangelical Congregational Church	Boston	404-410 Washington St.	8/21/1997	BUILDING	LINK
66000141	Brook Farm	Boston	670 Baker St.	10/15/1966	SITE	LINK
85002015	Building at 138--142 Portland Street	Boston	138--142 Portland St.	9/5/1985	BUILDING	LINK
14000561	Buildings at 825-829 Blue Hill Avenue	Boston	825-829 Blue Hill Ave.	9/10/2014	BUILDING	LINK
86000274	Bulfinch Triangle Historic District	Boston	Roughly bounded by Canal, Market, Merrimac	2/27/1986	DISTRICT	LINK
66000138	Bunker Hill Monument	Boston	Breed's Hill	10/15/1966	STRUCTURE	LINK
87001771	Bunker Hill School	Boston	65 Baldwin St.	10/15/1987	BUILDING	LINK
90001095	Calf Pasture Pumping Station Complex	Boston	435 Mount Vernon St.	8/2/1990	BUILDING	LINK
100005763	Cartoof & Sherman Apartments	Boston	31-35 Wales St.	11/12/2020	building	LINK
98001361	Cathedral of St. George Historic District	Boston	517-523-525 E. Broadway	11/25/1998	DISTRICT	LINK
12001012	Central Congregational Church	Boston	67 Newbury St.	10/16/2012	BUILDING	LINK
80000676	Charles Playhouse	Boston	74-78 Warenton St.	6/16/1980	BUILDING	LINK
10000506	Charles River Reservation (Speedway)-Upper Bas	Boston	1420-1440 Soldiers Field Rd	7/19/2010	BUILDING	LINK
83000601	Charles Street African Methodist Episcopal Chur	Boston	551 Warren St.	9/1/1983	BUILDING	LINK
97000969	Charlestown Heights	Boston	Roughly bounded by St. Martin, Bunker Hill, M	1/8/1998	SITE	LINK
89002271	Chestnut Hill Reservoir Historic District	Boston	Beacon St. and Commonwealth Ave.	1/18/1990	DISTRICT	LINK
86000140	Christ Church	Boston	1220 River Rd.	1/30/1986	BUILDING	LINK
99001614	Church Green Buildings Historic District	Boston	101-113 Summer St.	12/30/1999	DISTRICT	LINK
74000911	Clapp Houses	Boston	199 and 195 Boston St.	5/2/1974	BUILDING	LINK
83004097	Codman Building	Boston	55 Kilby St.	10/19/1983	BUILDING	LINK
83000602	Codman Square District	Boston	Norfolk, Talbot, Epping, Lithgow, Centre, and	6/23/1983	DISTRICT	LINK
05000559	Collins Building	Boston	213-217 Washington St.	6/8/2005	BUILDING	LINK
100001582	Columbia Road-Bellevue Street Historic District	Boston	400-500 blk. of Columbia Rd., portions of Bell	9/8/2017	district	LINK
100001315	Columbia Road-Devon Street Historic District	Boston	193-231 (odd) & 200-204 (even) Columbia Rd.	7/17/2017	district	LINK

100002734	Columbia Road-Strathcona Road Historic District	Boston	90-94,102-108, 105-111, 129-135, 137, 143-1	8/3/2018	district	LINK
12001162	Commonwealth Pier Five	Boston	165 Northern Ave.	10/10/1979	BUILDING	LINK
08001284	Compton Building	Boston	159, 161-175 Devonshire St., 18-20 Arch St.	12/31/2008	BUILDING	LINK
99001304	Congregation Adath Jeshurun	Boston	397 Blue Hill Ave.	11/12/1999	BUILDING	LINK
87001396	Congress Street Fire Station	Boston	344 Congress St.	9/3/1987	BUILDING	LINK
74000385	Copp's Hill Burial Ground	Boston	Charter, Snowhill, and Hull Sts.	4/18/1974	SITE	LINK
90000631	Copp's Hill Terrace	Boston	Between Commercial and Charter Sts. W of Ja	4/19/1990	SITE	LINK
100005798	Crawford Street Historic District	Boston	5-38 Crawford St., 42 Elm Hill Ave., 621 Warre	11/18/2020	district	LINK
72000145	Crowninshield House	Boston	164 Marlborough St.	2/23/1972	BUILDING	LINK
73000321	Custom House District	Boston	Between J.F.K. Expwy. and Kirby St. and S. Ma	5/11/1973	DISTRICT	LINK
73000318	Cyclorama Building	Boston	543-547 Tremont St.	4/13/1973	BUILDING	LINK
13000928	Davidson, Sarah, Apartment Block	Boston	3 Gaylord St.	12/18/2013	BUILDING	LINK
00000871	Dearborn School	Boston	25 Ambrose St.	8/2/2000	BUILDING	LINK
80000448	Dill Building	Boston	11-25 Stuart St.	12/9/1980	BUILDING	LINK
80001683	Dillaway School	Boston	16-20 Kenilworth St.	4/9/1980	BUILDING	LINK
85000317	Dimock Community Health Center Complex	Boston	41 and 55 Dimock St.	2/21/1985	BUILDING	LINK
87002549	District 13 Police Station	Boston	28 Seaverns Ave.	2/10/1988	BUILDING	LINK
66000050	Dorchester Heights National Historic Site	Boston	South Boston	10/15/1966	STRUCTURE	LINK
74000915	Dorchester North Burying Ground	Boston	Stroughton St. and Columbia Rd.	4/18/1974	DISTRICT	LINK
08000089	Dorchester Park	Boston	Bounded by Dorchester Ave., Richmond, Adar	2/20/2008	SITE	LINK
85000318	Dorchester Pottery Works	Boston	101-105 Victory Rd.	2/21/1985	BUILDING	LINK
14000365	Dorchester South Burying Ground	Boston	2095 Dorchester Ave.	6/27/2014	SITE	LINK
97001239	Dorchester Temple Baptist Church	Boston	670 Washington St.	1/16/1998	BUILDING	LINK
80000675	Dorchester-Milton Lower Mills Industrial District	Boston	Both sides of Neponset River	4/2/1980	DISTRICT	LINK
01000304	Dorchester-Milton Lower Mills Industrial District	Boston	Roughly: Adams, River, Medway Sts., Millers L	4/6/2001	DISTRICT	LINK
96001063	Douglass, Frederick, Square Historic District	Boston	Roughly bounded by Hammond St., Cobat St.,	10/3/1996	DISTRICT	LINK
85003074	Dudley Station Historic District	Boston	Washington, Warren, and Dudley Sts.	12/5/1985	DISTRICT	LINK
98000149	Eagle Hill Historic District	Boston	Roughly bounded by Border, Lexington, Trent	2/26/1998	DISTRICT	LINK
06000127	East Boston High School, Old	Boston	127 Marion St.	3/15/2006	BUILDING	LINK
10000039	EDNA G. shipwreck (Eastern Rig dragger)	Boston	Address Restricted	11/22/2010	SITE	LINK
10001066	Egleston Substation	Boston	3025 Washington St	12/27/2010	BUILDING	LINK
74000388	Eliot Burying Ground	Boston	Eustis and Washington Sts.	6/25/1974	SITE	LINK
93001587	Eliot Congregational Church	Boston	56 Dale St., corner 118--120 Walnut St.	2/9/1994	BUILDING	LINK
88000959	Eliot Hall	Boston	7A Eliot St.	7/15/1988	BUILDING	LINK
100006078	Elm Hill Park Historic District	Boston	2-38 Elm Hill Park, 538-570 Warren St.	2/1/2021	district	LINK
85003375	Engine House No. 34	Boston	444 Western Ave.	10/24/1985	BUILDING	LINK
100003070	Esmond Street Historic District	Boston	Bicknell, Bradshaw, Esmond, & Harvard Sts.	11/5/2018	district	LINK
66000366	Ether Dome, Massachusetts General Hospital	Boston	Fruit St.	10/15/1966	BUILDING	LINK
09000612	Evergreen Cemetery	Boston	2060 Commonwealth Ave.	8/14/2009	SITE	LINK
100005597	Fairview Cemetery (Additional Documentation)	Boston	45 Fairview Ave.	9/16/2009	SITE	LINK
66000368	Faneuil Hall	Boston	Dock Sq.	10/15/1966	BUILDING	LINK
94001492	Faneuil, Peter, School	Boston	60 Joy St.	12/16/1994	BUILDING	LINK
12000069	Fenway Park	Boston	24, & 2-4 Yawkey Wy., 64-76 Brookline Ave., 8	3/7/2012	BUILDING	LINK
78000473	Fenway Studios	Boston	30 Ipswich St.	9/13/1978	BUILDING	LINK
84002875	Fenway-Boylston Street District	Boston	Fenway, Boylston, Westland, and Hemenway	9/4/1984	DISTRICT	LINK
81000620	Fields Corner Municipal Building	Boston	1 Arcadia St., 195 Adams St.	11/12/1981	BUILDING	LINK
86001909	Filene's Department Store	Boston	426 Washington St.	7/24/1986	BUILDING	LINK
72000146	First Baptist Church	Boston	Commonwealth Ave. and Clarendon St.	2/23/1972	BUILDING	LINK
88000955	First Church of Jamaica Plain	Boston	6 Eliot St.	7/15/1988	BUILDING	LINK
99001308	First Congregational Church of Hyde Park	Boston	6 Webster St.	11/12/1999	BUILDING	LINK
04001219	Forest Hills Cemetery	Boston	95 Forest Hills Ave.	11/17/2004	SITE	LINK
70000921	Fort Independence	Boston	Castle Island	10/15/1970	SITE	LINK
04000959	Fort Point Channel Historic District	Boston	Necco Court, Thomson Place, A, Binford, Cong	9/10/2004	DISTRICT	LINK
70000540	Fort Warren	Boston	Georges Island, Boston Harbor	8/29/1970	DISTRICT	LINK
100005089	Fowler-Clark-Epstein Farmstead	Boston	487 Norfolk St.	3/26/2020	building	LINK
15000942	Fox, I.J., Building	Boston	407 Washington St.	12/29/2015	BUILDING	LINK
02000081	Frances and Isabella Apartments	Boston	430-432 and 434-436 Dudley St.	2/22/2002	BUILDING	LINK
16000409	Francis Street-Fenwood Road Historic District	Boston	Roughly bounded by Huntington Ave., Francis	6/23/2016	DISTRICT	LINK
73000319	Fulton-Commercial Streets District	Boston	Fulton, Commercial, Mercantile, Lewis, and Ri	3/21/1973	DISTRICT	LINK
00000160	Fulton-Commercial Streets Historic District (Bour	Boston	81-95 Richmond St.	3/3/2000	DISTRICT	LINK
83000603	Gardner, Isabella Stewart, Museum	Boston	280 The Fenway	1/27/1983	BUILDING	LINK
66000653	Garrison, William Lloyd, House	Boston	125 Highland St.	10/15/1966	BUILDING	LINK
80000674	Garrison, William Lloyd, School	Boston	20 Hutchings St.	4/16/1980	BUILDING	LINK
01001048	Gibson House	Boston	137 Beacon St.	8/7/2001	BUILDING	LINK
07000510	Goldsmith Block	Boston	41 Ruggles St., 746-750 Shawmut Ave.	6/5/2007	BUILDING	LINK
88000908	Goodwin, Ozias, House	Boston	7 Jackson Ave.	6/23/1988	BUILDING	LINK
16000454	Governor Shirley Square Historic District	Boston	Dudley, Hampden, Dunmore & Magazine Sts.,	7/18/2016	district	LINK
88000957	Greek Orthodox Cathedral of New England	Boston	520 Parker St.	6/30/1988	BUILDING	LINK
100006134	Greenville Street Historic District	Boston	2, 6-25 Greenville St.	2/11/2021	district	LINK
02000154	Greenwood Memorial United Methodist Church	Boston	378A-380 Washington St.	3/8/2002	BUILDING	LINK
14000974	Gridley Street Historic District	Boston	Bounded by Congress, High, Pearl & Purchase	12/3/2014	DISTRICT	LINK
82004453	Haffenreffer Brewery	Boston	Germania St.	5/2/1982	BUILDING	LINK
73000325	Hale, Edward Everett, House	Boston	12 Morley St.	3/21/1979	BUILDING	LINK
66000764	Harding, Chester, House	Boston	16 Beacon St.	10/15/1966	BUILDING	LINK
02001190	Harrison Square Historic District	Boston	Bounded by MBTA Braintree line embankmen	10/22/2002	DISTRICT	LINK
86000375	Harriswood Crescent	Boston	60--88 Harold St.	3/13/1986	BUILDING	LINK

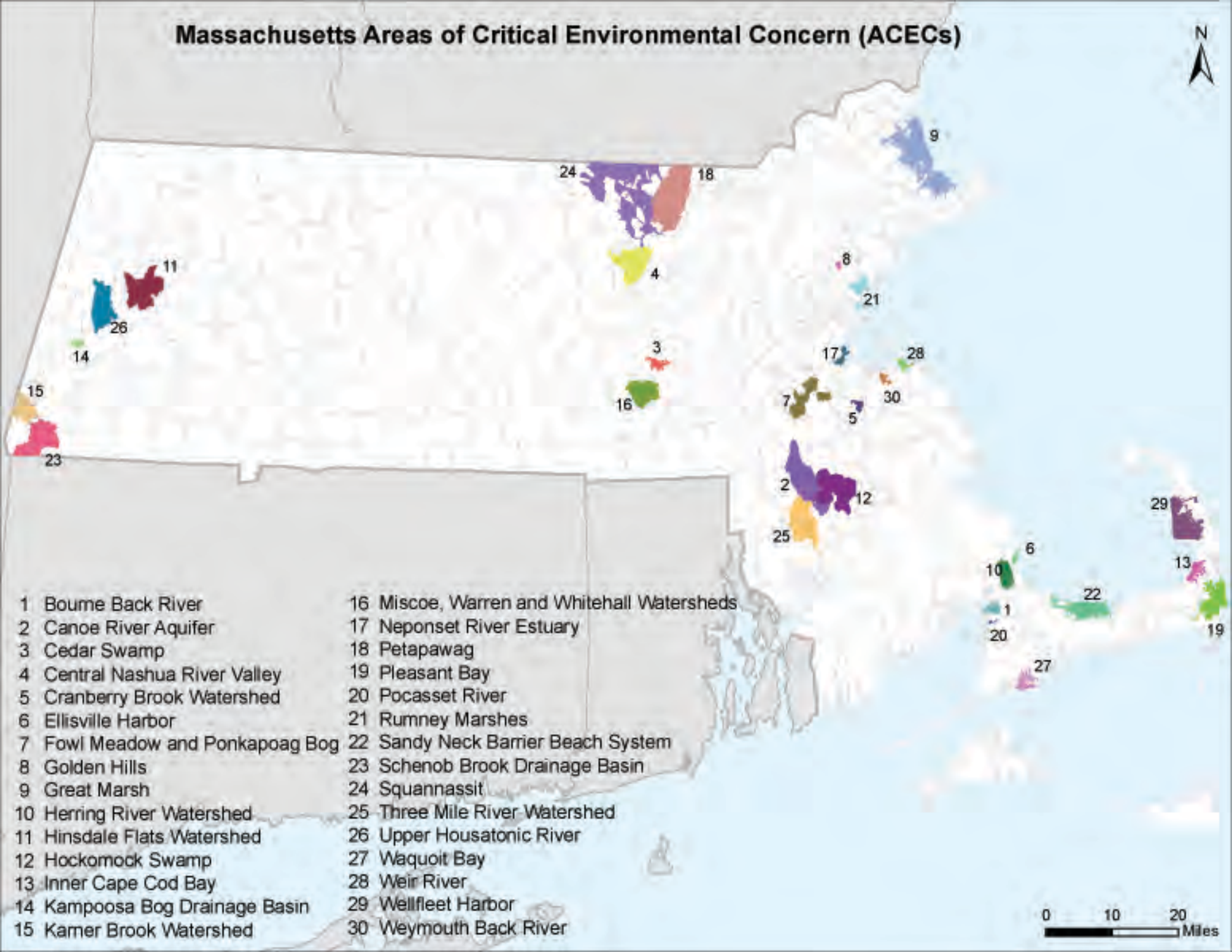
83000605	Harvard Avenue Fire Station	Boston	16 Harvard Ave.	3/31/1983	BUILDING	LINK
00000415	Harvard Avenue Historic District	Boston	Roughly bounded by Linden St., Commonwea	4/28/2000	DISTRICT	LINK
87000757	Harvard Stadium	Boston	60 N. Harvard St.	2/27/1987	STRUCTURE	LINK
04000085	Haskell, Edward H., Home for Nurses	Boston	220 Fisther Ave., 63 Parker Hill Ave.	2/26/2004	BUILDING	LINK
80000446	Hayden Building	Boston	681-683 Washington St.	12/9/1980	BUILDING	LINK
66000765	Headquarters House	Boston	55 Beacon St.	10/15/1966	BUILDING	LINK
04000534	Hibernian Hall	Boston	182-186 Dudley St.	6/2/2004	BUILDING	LINK
10000300	Highland Spring Brewery Bottling and Storage Bu	Boston	154-166 Terrace St	5/28/2010	BUILDING	LINK
05000879	Home for Aged Couples	Boston	409, 419 Walnut Ave. and 2055 Columbus Ave	8/11/2005	BUILDING	LINK
14000840	Home for Destitute Jewish Children	Boston	Address Restricted	10/8/2014	BUILDING	LINK
93001573	House at 1 Bay Street	Boston	1 Bay St.	2/9/1994	BUILDING	LINK
87001398	House at 17 Cranston Street	Boston	17 Cranston St.	11/20/1987	BUILDING	LINK
74002044	Howe, Samuel Gridley and Julia Ward, House	Boston	13 Chestnut St.	9/13/1974	BUILDING	LINK
87001399	Hoxie, Timothy, House	Boston	135 Hillside St.	11/20/1987	BUILDING	LINK
79000369	International Trust Company Building	Boston	39-47 Milk St.	9/10/1979	BUILDING	LINK
100005783	Intervale Street-Blue Hill Avenue Historic District	Boston	Blue Hill Ave. and Intervale St.	11/13/2020	district	LINK
100003470	Intervale Street-Columbia Road Historic District	Boston	117-121, 123-127, 129-135, 137-143, 145-159	2/28/2019	district	LINK
74000391	John Adams Courthouse	Boston	Pemberton Sq.	5/8/1974	BUILDING	LINK
73000854	John Eliot Square District	Boston	John Eliot Sq.	4/23/1973	DISTRICT	LINK
08000793	Joshua Bates School	Boston	731 Harrison Ave.	8/22/2008	BUILDING	LINK
74002045	King's Chapel	Boston	Tremont and School Sts.	5/2/1974	BUILDING	LINK
73000855	Kittredge, Alvah, House	Boston	12 Linwood St.	5/8/1973	BUILDING	LINK
100006127	Lawrence Avenue Historic District	Boston	Blue Hill Ave., Lawrence Ave., Coleus Park, Ma	2/11/2021	district	LINK
83000606	Lawrence Model Lodging Houses	Boston	79, 89, 99 and 109 E. Canton St.	9/22/1983	BUILDING	LINK
83004098	Leather District	Boston	Roughly bounded by Atlantic Ave., Kneeland,	12/21/1983	DISTRICT	LINK
80000460	Liberty Tree District	Boston	Roughly bounded by Harrison Ave., Washingt	12/9/1980	DISTRICT	LINK
86001911	Locke--Ober Restaurant	Boston	3--4 Winter Pl.	7/24/1986	BUILDING	LINK
87001481	Long Island Head Light	Boston	Long Island	6/15/1987	STRUCTURE	LINK
66000768	Long Wharf and Customhouse Block	Boston	Foot of State St.	11/13/1966	STRUCTURE	LINK
83000604	Loring, Harrison, House	Boston	789 E. Broadway St.	9/1/1983	BUILDING	LINK
72000544	Loring-Greenough House	Boston	12 South St.	4/26/1972	BUILDING	LINK
94001494	Lower Roxbury Historic District	Boston	Roughly, area surrounding Coventry, Cunard,	12/9/1994	DISTRICT	LINK
83004099	LUNA (tugboat)	Boston	NDC Pier, Charles River	10/6/1983	STRUCTURE	LINK
14000975	Lyman, Theodore, School	Boston	30 Gove St.	12/2/2014	BUILDING	LINK
100006263	Malcolm X-Ella Little Collins House	Boston	72 Dale St.	2/12/2021	building	LINK
99001302	Mariner's House	Boston	11 North Square	11/12/1999	BUILDING	LINK
70000682	Massachusetts General Hospital	Boston	Fruit Street	12/30/1970	BUILDING	LINK
66000770	Massachusetts Historical Society Building	Boston	1154 Boylston St.	10/15/1966	BUILDING	LINK
93001489	Massachusetts Mental Health Center	Boston	74 Fenwood Rd.	1/21/1994	DISTRICT	LINK
89000974	Massachusetts School of Art	Boston	364 Brookline Ave.	8/3/1989	BUILDING	LINK
66000771	Massachusetts Statehouse	Boston	Beacon Hill	10/15/1966	BUILDING	LINK
82004450	McKay, Donald, House	Boston	78-80 White St.	6/2/1982	BUILDING	LINK
80000445	Metropolitan Theatre	Boston	252-272 Tremont St.	12/9/1980	BUILDING	LINK
89001747	Mission Hill Triangle Historic District	Boston	Roughly bounded by Smith St., Worthington S	11/6/1989	DISTRICT	LINK
87001128	Monument Square Historic District	Boston	Monument Sq.	6/2/1987	DISTRICT	LINK
90001536	Monument Square Historic District	Boston	Roughly bounded by Jamaicaway, Pond, Centı	10/11/1990	DISTRICT	LINK
84002890	Moreland Street Historic District	Boston	Roughly bounded by Kearsarge, Blue Hill Aves	3/29/1984	DISTRICT	LINK
04001572	Morton Street, Metropolitan Park System of Gre	Boston	Morton St.	1/24/2005	DISTRICT	LINK
100003547	Mount Hope Cemetery	Boston	355 Walk Hill St.	9/24/2009	site	LINK
89000004	Mount Pleasant Historic District	Boston	Roughly bounded by Forest St. and Mount Ple	2/9/1989	DISTRICT	LINK
100004784	Nathan Warnick Apartments	Boston	57 Bicknell St.	12/23/2019	building	LINK
04000426	Nazing Court Apartments	Boston	224-236 Seaver St. and 1-8 Nazing Court	5/12/2004	BUILDING	LINK
76001979	Nell, William C., House	Boston	3 Smith Ct.	5/11/1976	BUILDING	LINK
04001573	Neponset Valley Parkway, Metorpolitan Park Sys	Boston	Neponset Valley Parkway	1/24/2005	DISTRICT	LINK
80000672	New England Conservatory of Music	Boston	290 Huntington Ave.	5/14/1980	BUILDING	LINK
87001394	New Riding Club	Boston	52 Hemenway St.	8/20/1987	BUILDING	LINK
83000607	Newspaper Row	Boston	322-328 Washington St., 5-23 Milk St., and 11	7/7/1983	BUILDING	LINK
04000189	Nix's Mate Daybeacon	Boston	Nubble Channel, The Narrows, Boston Harbor	3/18/2004	STRUCTURE	LINK
97000971	North Terminal Garage	Boston	600 Commercial St.	9/11/1997	BUILDING	LINK
80000465	Oak Square School	Boston	35 Nonantum St.	11/10/1980	BUILDING	LINK
08000795	Ohabei Shalom Cemetery	Boston	147 Wordsworth St.	8/19/2008	SITE	LINK
70000687	Old City Hall	Boston	School and Providence Sts.	12/30/1970	BUILDING	LINK
73000322	Old Corner Bookstore	Boston	NW corner of Washington and School Sts.	4/11/1973	BUILDING	LINK
08000693	Old Harbor Reservation Parkways, Metropolitan	Boston	William J. Day Blvd., Columbia Rd. between Fa	7/24/2008	DISTRICT	LINK
66000776	Old North Church	Boston	193 Salem St.	10/15/1966	BUILDING	LINK
70000690	Old South Church in Boston	Boston	645 Boylston St.	12/30/1970	BUILDING	LINK
66000778	Old South Meetinghouse	Boston	Milk and Washington Sts.	10/15/1966	BUILDING	LINK
66000779	Old State House	Boston	Washington and State Sts.	10/15/1966	BUILDING	LINK
70000691	Old West Church	Boston	131 Cambridge St.	12/30/1970	BUILDING	LINK
70000539	Otis, (First) Harrison Gray, House	Boston	141 Cambridge St.	12/30/1970	BUILDING	LINK
73001955	Otis, (Second) Harrison Gray, House	Boston	85 Mt. Vernon St.	7/27/1973	BUILDING	LINK
02001039	Paine Furniture Building	Boston	75-81 Arlington St.	9/12/2002	BUILDING	LINK
74000390	Park Street District	Boston	Tremont, Park, and Beacon Sts.	5/1/1974	DISTRICT	LINK
66000782	Parkman, Francis, House	Boston	50 Chestnut St.	10/15/1966	BUILDING	LINK
01000872	Peabody, The	Boston	195-197 Ashmont St.	8/8/2001	BUILDING	LINK
74000907	Phipps Street Burying Ground	Boston	Phipps St.	5/14/1974	SITE	LINK

80000458	Piano Row District	Boston	Boston Common, Park Sq., Boylston Pl. and Tr	12/9/1980	DISTRICT	LINK
74000917	Pierce House	Boston	24 Oakton Ave.	4/26/1974	BUILDING	LINK
68000042	Pierce-Hichborn House	Boston	29 North Sq.	11/24/1968	BUILDING	LINK
13000929	Pilgrim Congregational Church	Boston	540-544 Columbia Rd.	12/18/2013	BUILDING	LINK
03000781	Publicity Building	Boston	40-44 Bromfield St.	8/20/2003	BUILDING	LINK
100001458	Quincy Grammar School	Boston	88-90 Tyler St.	8/1/2017	building	LINK
66000784	Quincy Market	Boston	S. Market St.	11/13/1966	BUILDING	LINK
66000785	Revere, Paul, House	Boston	19 North Sq.	10/15/1966	BUILDING	LINK
86001504	Richardson Block	Boston	113--151 Pearl and 109--119 High Sts.	8/9/1986	BUILDING	LINK
95001450	Riviera, The	Boston	270 Huntington Ave.	12/7/1995	BUILDING	LINK
97001278	ROSEWAY (schooner)	Boston	Boston Harbor	9/25/1997	SITE	LINK
98001330	Roslindale Baptist Church	Boston	52 Cummins Hwy.	11/5/1998	BUILDING	LINK
13000621	Roslindale Substation	Boston	4228 Washington St.	8/27/2013	BUILDING	LINK
82004448	Roughan Hall	Boston	15-18 City Sq.	4/15/1982	BUILDING	LINK
73000856	Roxbury High Fort	Boston	Beech Glen St. at Fort Ave.	4/23/1973	SITE	LINK
89000147	Roxbury Highlands Historic District	Boston	Roughly bounded by Dudley St., Washington S	2/22/1989	DISTRICT	LINK
89002125	Roxbury Presbyterian Church	Boston	328 Warren St.	3/15/1991	BUILDING	LINK
80000463	Russia Wharf Buildings	Boston	518-540 Atlantic Ave., 270 Congress St. and 2	12/2/1980	BUILDING	LINK
87001495	Saint Augustine Chapel and Cemetery	Boston	Dorchester St. between W. Sixth and Tudor St	9/18/1987	DISTRICT	LINK
12000783	Saint Mark's Episcopal Church	Boston	73 Columbia Rd.	7/3/2014	BUILDING	LINK
100003471	Samuel Edelman Apartments	Boston	97-103 Norfolk St.	3/5/2019	building	LINK
03000385	Savin Hill Historic District	Boston	Roughly bounded by Savin Hill Ave., Morrissey	5/9/2003	DISTRICT	LINK
86001486	Sears' Crescent and Sears' Block	Boston	38--68 and 70--72 Cornhill	8/9/1986	BUILDING	LINK
90001992	Sears Roebuck and Company Mail Order Store	Boston	309 Park Dr. and 201 Brookline Ave.	1/15/1991	BUILDING	LINK
70000731	Sears, David, House	Boston	42 Beacon St.	12/30/1970	BUILDING	LINK
86001913	Second Brazer Building	Boston	25--29 State St.	7/24/1986	BUILDING	LINK
10000391	Second Church in Boston	Boston	874, 876, 880 Beacon St	6/24/2010	BUILDING	LINK
12000978	Sherman Apartments Historic District	Boston	544-546 Washington, 4-6, 12-14, 18 Lyndhurs	11/28/2012	DISTRICT	LINK
80000444	Shubert, Sam S., Theatre	Boston	263-265 Tremont St.	12/9/1980	BUILDING	LINK
05000936	South Boston Boat Clubs Historic District	Boston	1793-1849 William J. Day Blvd.	9/1/2005	DISTRICT	LINK
73000324	South End District	Boston	South Bay area between Huntington and Harr	5/8/1973	DISTRICT	LINK
14001095	South End District (Boundary Increase)	Boston	200-224 Northampton St.	12/29/2014	DISTRICT	LINK
75000299	South Station Headhouse	Boston	Atlantic Ave. and Summer St.	2/13/1975	BUILDING	LINK
89002169	St. Joseph's Roman Catholic Church Complex	Boston	Bounded by Circuit, Regent, Hulbert, and Fen	12/28/1989	DISTRICT	LINK
97001472	St. Luke's and St. Margaret's Church	Boston	5-7 St. Luke's Rd.	11/12/1997	DISTRICT	LINK
98001292	St. Mary's Episcopal Church	Boston	14-16 Cushing Ave.	10/30/1998	BUILDING	LINK
70000730	St. Paul's Church	Boston	136 Tremont St.	12/30/1970	BUILDING	LINK
75000300	St. Stephen's Church	Boston	Hanover St. between Clark and Harris Sts.	4/14/1975	BUILDING	LINK
80000671	Stearns, R. H., House	Boston	140 Tremont St.	6/16/1980	BUILDING	LINK
05001509	Stony Brook Reservation Parkways, Metropolitar	Boston	Dedham, Enneking, Turtle Pond Parkways, Sm	1/3/2006	DISTRICT	LINK
97000970	Students House	Boston	96 The Fenway	9/11/1997	BUILDING	LINK
80000670	Suffolk County Jail	Boston	215 Charles St.	4/23/1980	BUILDING	LINK
87001889	Sumner Hill Historic District	Boston	Roughly bounded by Seaverns Ave., Everett St	10/22/1987	DISTRICT	LINK
73001953	Sumner, Charles, House	Boston	20 Hancock St.	11/7/1973	BUILDING	LINK
75000301	Symphony and Horticultural Halls	Boston	Massachusetts and Huntington Aves.	5/30/1975	BUILDING	LINK
99000633	Symphony Hall	Boston	301 Massachusetts Avenue	1/20/1999	BUILDING	LINK
88000427	Temple Place Historic District	Boston	11--55, 26--58 Temple Pl.	7/26/1988	DISTRICT	LINK
12000099	Terminal Storage Warehouse District	Boston	267-281 Medford St., 40 & 50 Terminal St.	3/12/2012	DISTRICT	LINK
90001757	Textile District	Boston	Roughly, Essex St. from Phillips Sq. to Columb	11/29/1990	DISTRICT	LINK
100005782	Thane Street Historic District	Boston	70-78 Harvard St, 22-24, 26-28, 30-32 Thane S	11/13/2020	district	LINK
100005313	Theodore Parker Unitarian Universalist Church	Boston	1859 Centre St.	6/29/2020	building	LINK
73000850	Town Hill District	Boston	Bounded roughly by Rutherford Ave. and Mai	5/11/1973	DISTRICT	LINK
66000788	Tremont Street Subway	Boston	Beneath Tremont, Boylston, and Washington	10/15/1966	STRUCTURE	LINK
70000733	Trinity Church	Boston	Copley Sq.	7/1/1970	BUILDING	LINK
92000356	Trinity Neighborhood House	Boston	406 Meridian St.	4/14/1992	BUILDING	LINK
72000150	Trinity Rectory	Boston	Clarendon and Newbury Sts.	2/23/1972	BUILDING	LINK
04001430	Truman Parkway-Metropolitan Park System of G	Boston	Truman Parkway	1/5/2005	DISTRICT	LINK
66000789	U.S.S. CONSTITUTION	Boston	Boston Naval Shipyard	10/15/1966	STRUCTURE	LINK
03000645	Union Oyster House	Boston	41-43 Union Street	5/27/2003	BUILDING	LINK
80000669	Union Wharf	Boston	295-353 Commercial St.	6/22/1980	BUILDING	LINK
80000668	United Shoe Machinery Corporation Building	Boston	138-164 Federal St.	8/19/1980	BUILDING	LINK
11000160	United State Post Office, Courthouse, and Federa	Boston	5 Post Office Square	4/8/2011	BUILDING	LINK
90001537	Upham's Corner Market	Boston	600 Columbia Rd.	10/11/1990	BUILDING	LINK
86000084	USS CASSIN YOUNG (destroyer)	Boston	Charlestown Navy Yard	1/14/1986	STRUCTURE	LINK
84000421	Vermont Building	Boston	6-12 Thacher St.	11/13/1984	BUILDING	LINK
04001432	VFW Parkway, Metropolitan Park System of Grea	Boston	VFW Parkway, bet. Spring And Centre Sts.	1/5/2005	DISTRICT	LINK
13000930	Walton and Roslin Halls	Boston	702-708 & 710-726 Washington St., 3-5 Waltc	12/18/2013	BUILDING	LINK
79000370	Washington Street Theatre District	Boston	511-559 Washington St.	3/19/1979	DISTRICT	LINK
80000455	West Street District	Boston	West St.	12/9/1980	DISTRICT	LINK
82000486	Wigglesworth Building	Boston	89-83 Franklin St.	10/21/1982	BUILDING	LINK
80000443	Wilbur Theatre	Boston	244-250 Tremont St.	12/9/1980	BUILDING	LINK
74000392	Winthrop Building	Boston	7 Water St.	4/18/1974	BUILDING	LINK
80000442	Wirth, Jacob, Buildings	Boston	31-39 Stuart St.	12/9/1980	BUILDING	LINK
99000593	Woodbourne Historic District	Boston	Roughly bounded by Walk Hill, Goodway, and	6/4/1999	DISTRICT	LINK
74000393	Youth's Companion Building	Boston	209 Columbus Ave.	5/2/1974	BUILDING	LINK
04000119	YWCA Boston	Boston	140 Clarendon St.	3/3/2004	BUILDING	LINK

APPENDIX F

Endangered Species Act Documentation

Massachusetts Areas of Critical Environmental Concern (ACECs)



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

MASSACHUSETTS AREAS OF CRITICAL ENVIRONMENTAL CONCERN
November 2010

Total Approximate Acreage: 268,000 acres
Approximate acreage and designation date follow ACEC names below.

Bourne Back River
(1,850 acres, 1989) Bourne

Canoe River Aquifer and Associated Areas (17,200 acres, 1991) Easton, Foxborough, Mansfield, Norton, Sharon, and Taunton

Cedar Swamp
(1,650 acres, 1975) Hopkinton and Westborough

Central Nashua River Valley
(12,900 acres, 1996) Bolton, Harvard, Lancaster, and Leominster

Cranberry Brook Watershed
(1,050 acres, 1983) Braintree and Holbrook

Ellisville Harbor
(600 acres, 1980) Plymouth

Fowl Meadow and Ponkapoag Bog
(8,350 acres, 1992) Boston, Canton, Dedham, Milton, Norwood, Randolph, Sharon, and Westwood

Golden Hills
(500 acres, 1987) Melrose, Saugus, and Wakefield

Great Marsh (originally designated as Parker River/Essex Bay)
(25,500 acres, 1979) Essex, Gloucester, Ipswich, Newbury, and Rowley

Herring River Watershed
(4,450 acres, 1991) Bourne and Plymouth

Hinsdale Flats Watershed
(14,500 acres, 1992) Dalton, Hinsdale, Peru, and Washington

Hockomock Swamp
(16,950 acres, 1990) Bridgewater, Easton, Norton, Raynham, Taunton, and West Bridgewater

Inner Cape Cod Bay
(2,600 acres, 1985) Brewster, Eastham, and Orleans

Kampoosa Bog Drainage Basin
(1,350 acres, 1995) Lee and Stockbridge

Karner Brook Watershed
(7,000 acres, 1992) Egremont and Mount Washington

Miscoe, Warren, and Whitehall Watersheds
(8,700 acres, 2000) Grafton, Hopkinton, and Upton

Neponset River Estuary
(1,300 acres, 1995) Boston, Milton, and Quincy

Petapawag
(25,680 acres, 2002) Ayer, Dunstable, Groton, Pepperell, and Tyngsborough

Pleasant Bay
(9,240 acres, 1987) Brewster, Chatham, Harwich, and Orleans

Pocasset River
(160 acres, 1980) Bourne

Rumney Marshes
(2,800 acres, 1988) Boston, Lynn, Revere, Saugus, and Winthrop

Sandy Neck Barrier Beach System
(9,130 acres, 1978) Barnstable and Sandwich

Schenob Brook Drainage Basin
(13,750 acres, 1990) Mount Washington and Sheffield

Squannassit
(37,420 acres, 2002) Ashby, Ayer, Groton, Harvard, Lancaster, Lunenburg, Pepperell, Shirley, and Townsend

Three Mile River Watershed
(14,280 acres, 2008) Dighton, Norton, Taunton

Upper Housatonic River
(12,280 acres, 2009) Lee, Lenox, Pittsfield, Washington

Waquoit Bay
(2,580 acres, 1979) Falmouth and Mashpee

Weir River
(950 acres, 1986) Cohasset, Hingham, and Hull

Wellfleet Harbor
(12,480 acres, 1989) Eastham, Truro, and Wellfleet

Weymouth Back River
(800 acres, 1982) Hingham and Weymouth

ACEC acreages above are based on MassGIS calculations and may differ from numbers originally presented in designation documents and other ACEC publications due to improvements in accuracy of GIS data and boundary clarifications. Listed acreages have been rounded to the nearest 50 or 10 depending on whether boundary clarification has occurred. For more information please see, http://www.mass.gov/dcr/stewardship/acec/aboutMaps.htm.

Towns with ACECs within their Boundaries — November 2010

TOWN	ACEC
Ashby	Squannassit
Ayer	Petapawag
	Squannassit
Barnstable	Sandy Neck Barrier Beach System
Bolton	Central Nashua River Valley
Boston	Rumney Marshes
	Fowl Meadow and Ponkapoag Bog
	Neponset River Estuary
Bourne	Pocasset River
	Bourne Back River
	Herring River Watershed
Braintree	Cranberry Brook Watershed
Brewster	Pleasant Bay
	Inner Cape Cod Bay
Bridgewater	Hockomock Swamp
Canton	Fowl Meadow and Ponkapoag Bog
Chatham	Pleasant Bay
Cohasset	Weir River
Dalton	Hinsdale Flats Watershed
Dedham	Fowl Meadow and Ponkapoag Bog
Dighton	Three Mile River Watershed
Dunstable	Petapawag
Eastham	Inner Cape Cod Bay
	Wellfleet Harbor
Easton	Canoe River Aquifer
	Hockomock Swamp
Egremont	Karner Brook Watershed
Essex	Great Marsh
Falmouth	Waquoit Bay
Foxborough	Canoe River Aquifer
Gloucester	Great Marsh
Grafton	Miscoe-Warren-Whitehall Watersheds
Groton	Petapawag
	Squannassit
Harvard	Central Nashua River Valley
	Squannassit
Harwich	Pleasant Bay
Hingham	Weir River
	Weymouth Back River
Hinsdale	Hinsdale Flats Watershed
Holbrook	Cranberry Brook Watershed
Hopkinton	Miscoe-Warren-Whitehall Watersheds
	Cedar Swamp
Hull	Weir River
Ipswich	Great Marsh
Lancaster	Central Nashua River Valley
	Squannassit
Lee	Kampoosa Bog Drainage Basin
	Upper Housatonic River
Lenox	Upper Housatonic River
Leominster	Central Nashua River Valley
Lunenburg	Squannassit
Lynn	Rumney Marshes
Mansfield	Canoe River Aquifer
Mashpee	Waquoit Bay
Melrose	Golden Hills
Milton	Fowl Meadow and Ponkapoag Bog
	Neponset River Estuary
Mt. Washington	Karner Brook Watershed
	Schenob Brook
Newbury	Great Marsh
Norton	Hockomock Swamp
	Canoe River Aquifer
	Three Mile River Watershed
Norwood	Fowl Meadow and Ponkapoag Bog
Orleans	Inner Cape Cod Bay
	Pleasant Bay
Pepperell	Petapawag
	Squannassit
Peru	Hinsdale Flats Watershed
Pittsfield	Upper Housatonic River
Plymouth	Herring River Watershed
	Ellisville Harbor
Quincy	Neponset River Estuary
Randolph	Fowl Meadow and Ponkapoag Bog
Raynham	Hockomock Swamp
Revere	Rumney Marshes
Rowley	Great Marsh
Sandwich	Sandy Neck Barrier Beach System
Saugus	Rumney Marshes
	Golden Hills
Sharon	Canoe River Aquifer
	Fowl Meadow and Ponkapoag Bog
Sheffield	Schenob Brook
Shirley	Squannassit
Stockbridge	Kampoosa Bog Drainage Basin
Taunton	Hockomock Swamp
	Canoe River Aquifer
	Three Mile River Watershed
Truro	Wellfleet Harbor
Townsend	Squannassit
Tyngsborough	Petapawag
Upton	Miscoe-Warren-Whitehall Watersheds
Wakefield	Golden Hills
Washington	Hinsdale Flats Watershed
	Upper Housatonic River
Wellfleet	Wellfleet Harbor
W Bridgewater	Hockomock Swamp
Westborough	Cedar Swamp
Westwood	Fowl Meadow and Ponkapoag Bog
Weymouth	Weymouth Back River
Winthrop	Rumney Marshes

.

Town	Taxonomic Group	Scientific Name	Common Name	MESA Status	Most Recent Observation	County
BOSTON	Butterfly/Moth	Abagrotis nefascia	Coastal Heathland Cutworm	SC	2001	SUFFOLK
BOSTON	Vascular Plant	Ageratina aromatica	Lesser Snakeroot	E	1896	SUFFOLK
BOSTON	Amphibian	Ambystoma laterale	Blue-spotted Salamander	SC	2015	SUFFOLK
BOSTON	Bird	Ammodramus savannarum	Grasshopper Sparrow	T	1993	SUFFOLK
BOSTON	Butterfly/Moth	Apodrepanulatrix liberaria	New Jersey Tea Inchworm	E	Historic	SUFFOLK
BOSTON	Vascular Plant	Aristida purpurascens	Purple Needlegrass	T	1800s	SUFFOLK
BOSTON	Vascular Plant	Aristida tuberculosa	Seabeach Needlegrass	T	1877	SUFFOLK
BOSTON	Vascular Plant	Asclepias verticillata	Linear-leaved Milkweed	T	1878	SUFFOLK
BOSTON	Bird	Bartramia longicauda	Upland Sandpiper	E	2015	SUFFOLK
BOSTON	Vascular Plant	Boechera missouriensis	Green Rock-cress	T	1930	SUFFOLK
BOSTON	Vascular Plant	Carex striata	Walter's Sedge	E	Historic	SUFFOLK
BOSTON	Bird	Charadrius melodus	Piping Plover	T	2018	SUFFOLK
BOSTON	Beetle	Cicindela duodecimguttata	Twelve-spotted Tiger Beetle	SC	1910	SUFFOLK
BOSTON	Beetle	Cicindela purpurea	Cow Path Tiger Beetle	SC	1928	SUFFOLK
BOSTON	Beetle	Cicindela rufiventris hentzii	Eastern Red-bellied Tiger Beetle	T	1927	SUFFOLK
BOSTON	Vascular Plant	Desmodium cuspidatum	Large-bracted Tick-trefoil	T	1896	SUFFOLK
BOSTON	Vascular Plant	Eriophorum gracile	Slender Cottongrass	T	1885	SUFFOLK
BOSTON	Bird	Falco peregrinus	Peregrine Falcon	T	2018	SUFFOLK
BOSTON	Fish	Gasterosteus aculeatus	Threespine Stickleback	T	2016	SUFFOLK
BOSTON	Bird	Gavia immer	Common Loon	SC	1824	SUFFOLK
BOSTON	Vascular Plant	Houstonia longifolia	Long-leaved Bluet	E	1918	SUFFOLK
BOSTON	Vascular Plant	Liatris scariosa var. novae-angliae	New England Blazing Star	SC	1933	SUFFOLK
BOSTON	Mussel	Ligumia nasuta	Eastern Pondmussel	SC	1841	SUFFOLK
BOSTON	Vascular Plant	Linum medium var. texanum	Rigid Flax	T	1909	SUFFOLK
BOSTON	Vascular Plant	Lycopus rubellus	Gypsywort	E	1896	SUFFOLK
BOSTON	Vascular Plant	Malaxis unifolia	Green Adder's Mouth	T	1883	SUFFOLK
BOSTON	Butterfly/Moth	Metarranthis apiciaria	Barrens Metarranthis	E	1934	SUFFOLK
BOSTON	Vascular Plant	Myriophyllum alterniflorum	Alternate-flowered Water-milfoil	E	Historic	SUFFOLK
BOSTON	Vascular Plant	Ophioglossum pusillum	Adder's-tongue Fern	T	1884	SUFFOLK
BOSTON	Vascular Plant	Platanthera flava var. herbiola	Pale Green Orchis	T	1908	SUFFOLK
BOSTON	Bird	Pooecetes gramineus	Vesper Sparrow	T	1985	SUFFOLK
BOSTON	Butterfly/Moth	Pyrrhia aurantiago	Orange Sallow Moth	SC	1988	SUFFOLK
BOSTON	Vascular Plant	Ranunculus micranthus	Tiny-flowered Buttercup	E	1891	SUFFOLK
BOSTON	Vascular Plant	Rumex pallidus	Seabeach Dock	T	1984	SUFFOLK
BOSTON	Vascular Plant	Sanicula odorata	Long-styled Sanicle	T	Historic	SUFFOLK
BOSTON	Amphibian	Scaphiopus holbrookii	Eastern Spadefoot	T	1932	SUFFOLK
BOSTON	Vascular Plant	Scirpus longii	Long's Bulrush	T	1907	SUFFOLK
BOSTON	Vascular Plant	Setaria parviflora	Bristly Foxtail	SC	2001	SUFFOLK
BOSTON	Dragonfly/Damselfly	Somatochlora linearis	Mocha Emerald	SC	2009	SUFFOLK
BOSTON	Bird	Sterna hirundo	Common Tern	SC	2015	SUFFOLK
BOSTON	Bird	Sternula antillarum	Least Tern	SC	2015	SUFFOLK
BOSTON	Vascular Plant	Suaeda calceoliformis	American Sea-blite	SC	1909	SUFFOLK
BOSTON	Reptile	Terrapene carolina	Eastern Box Turtle	SC	1939	SUFFOLK
BOSTON	Bird	Tyto alba	Barn Owl	SC	1989	SUFFOLK
BOSTON	Bird	Vermivora chrysoptera	Golden-winged Warbler	E	Historic	SUFFOLK
BOSTON	Vascular Plant	Viola brittoniana	Britton's Violet	T	1909	SUFFOLK

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: August 25, 2021
Consultation Code: 05E1NE00-2021-SLI-4503
Event Code: 05E1NE00-2021-E-13788
Project Name: MassPort Parcel A2 and Triangle Parcel

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

To Whom It May Concern:

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

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

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

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

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

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

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

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

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

Attachment(s):

- Official Species List

Official Species List

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

This species list is provided by:

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

Project Summary

Consultation Code: 05E1NE00-2021-SLI-4503
Event Code: 05E1NE00-2021-E-13788
Project Name: MassPort Parcel A2 and Triangle Parcel
Project Type: DEVELOPMENT
Project Description: The project is located in the Seaport neighborhood of Boston. It consists of two parcels, Parcel A2 and the adjacent Triangle Parcel, totaling approximately 1.6 acres. The proposed building is planned to be used for retail, community, lab, and office space. Construction is expected to begin in late 2021 or early 2022.

Project Location:

Approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@42.3487402,-71.0435933358629,14z

Counties: Suffolk County, Massachusetts

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.

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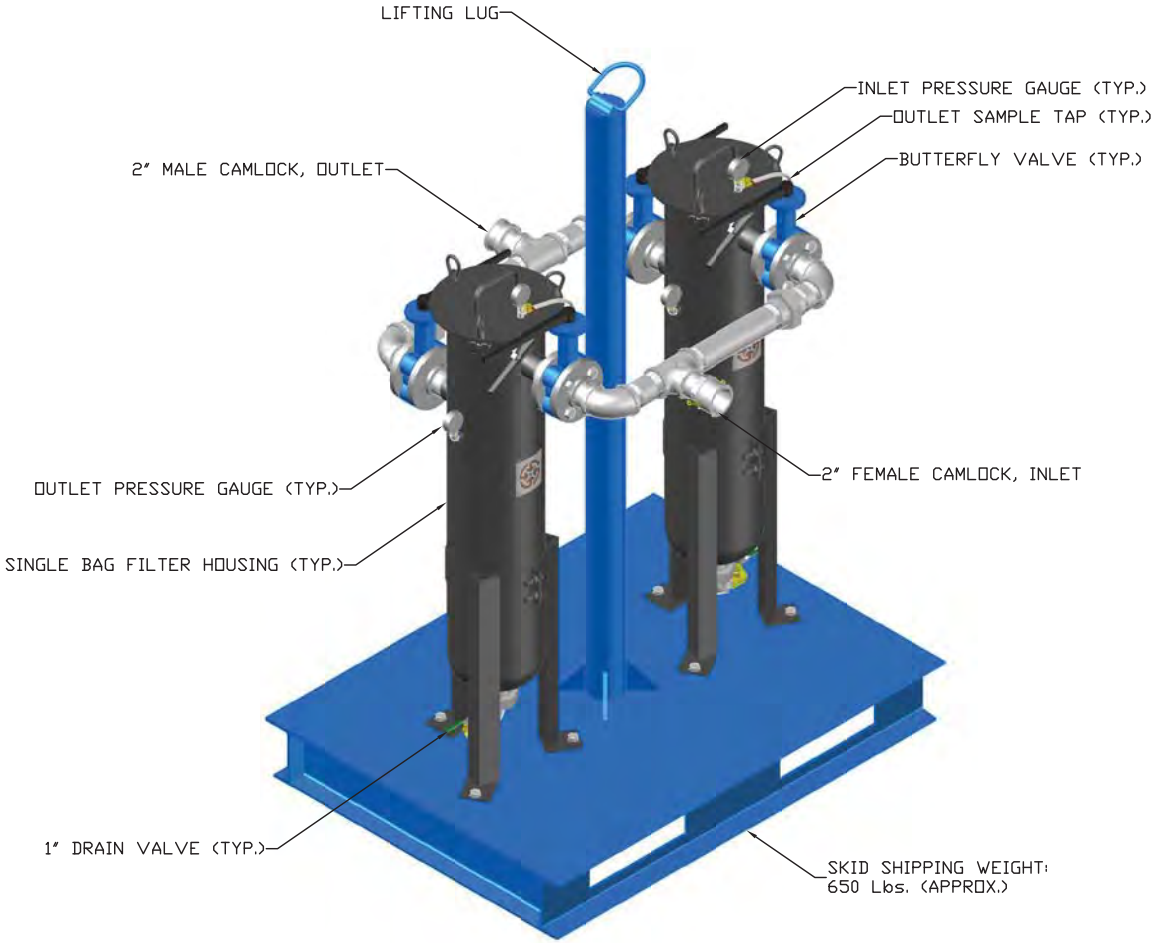
1. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

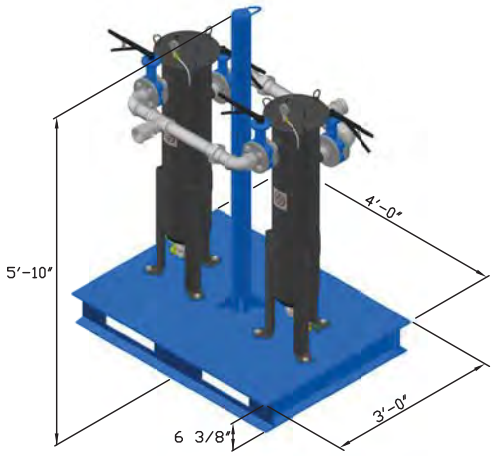
Critical habitats

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

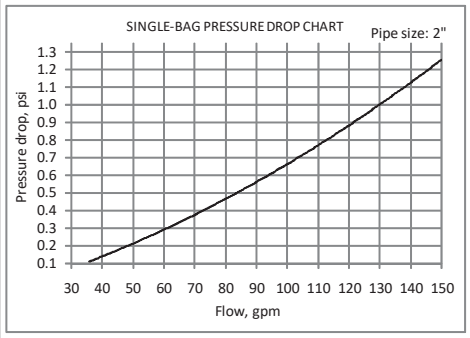
APPENDIX G

Contractor Dewatering Submittal





NOTE: THIS DRAWING DEPICTS A "TYPICAL" SKID.
ACTUAL DETAILS AND DIMENSIONS MAY VARY.

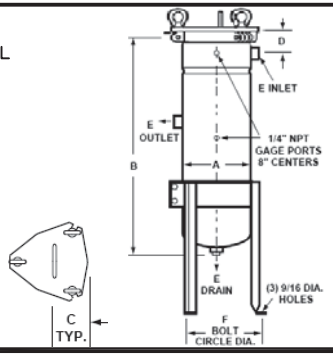


SINGLE BAG FILTER SPECIFICATIONS

- CONSTRUCTION:	CARBON STEEL
- HOUSING STYLE:	STANDARD
- NUMBER OF BASKETS:	1
- STRAINING FILTERING AREA:	26.4 SQR. FT.
- INLET/OUTLET SIZE:	2"
- DRAIN SIZE (1x):	2"
- NOMINAL FLOW RATE:	100 GPM
- STANDARD PRESSURE:	125 PSI
- WEIGHT (PER DRY UNIT):	70 Lbs.

BASIC DIMENSIONS

MODEL NUMBER & A: 8 (8.6")
LEG BOLT CIRCLE F: ø12.0"
B: 35.9" C: 6.0"
D: 3.5" E: 2.0"



NO.	REVISIONS	DATE
C	ADDED SKID WEIGHT	02/18/09

DUPLEX SINGLE BAG FILTER SKID STANDARD EQUIPMENT SPECIFICATION

SCALE: NTS	APPROVED BY: JB	DRAWN BY: AAV	
DATE: 02/18/09			

GROUND/WATER TREATMENT & TECHNOLOGY
P.O. BOX 1174
DENVILLE, NJ 07834

DWG SIZE: A	SHEET: 1 OF 1	DRAWING NUMBER: ST-0002-SPC	C

Lockwood Remediation Technologies, LLC

700 Series Floc Logs

Polyacrylamide Sediment and Turbidity Control Applicator Logs

700 Series Floc Logs are a group of soil-specific tailored log-blocks that contain blends of water treatment components and polyacrylamide co-polymer for water clarification. They reduce and prevent fine particles and colloidal clays from suspension in stormwater. There are several types of Floc Logs designed to treat most water and soil types. Contact Applied Polymer Systems, Inc. or your local distributor for free testing and site-specific application information.

Primary Applications

- Mine tailings and waste pile ditches
- Stormwater drainage from construction and building sites
- Road and highway construction runoff ditches
- Ditch and treatment system placement for all forms of highly turbid waters (less than 4% solids)
- Dredging operations as a flocculent

Features and Benefits

- Removes solubilized soils and clay from water
- Prevents colloidal solutions in water within ditch systems
- Binds cationic metals within water, reducing solubilization
- Binds pesticides and fertilizers within runoff water
- Reduces operational and cleanup costs
- Reduces environmental risks and helps meet compliance

Specifications / Compliances

- ANSI/NSF Standard 60 Drinking water treatment chemical additives
- 48h or 96h Acute Toxicity Tests (*D. magna* or *O. mykiss*)
- 7 Day Chronic Toxicity Tests *(P. promealas* or *C. dubia*

Packaging

700 Series Floc Logs are packaged in boxes of four (4)

Technical Information

Appearance - semi-solid block
Biodegradable internal coconut skeleton
Percent Moisture - 40% maximum
pH 0.5% Solution - 6-8
Shelf Life – up to 5 years when stored out of UV rays

Office: 774-450-7177 • Fax: 888-835-0617 89 Crawford Street • Leominster, MA 01453

Placement

Floc Logs are designed for placement within ditches averaging three feet wide by two feet deep. Floc log placement is based on gallon per minute flow rates. Note: actual GPM or dosage will vary based on site criteria and soil/water testing.

Directions for Use

(Water and Floc Log Mixing is Very Important!)

700 Series Floc Logs should be placed within the upper quarter to half of a *stabilized* ditch system or as close as possible to active earth moving activities. Floc Logs have built in ropes with attachment loops which can be looped over stakes to ensure they remain where placed. Mixing is key! If the flow rate is too slow, adding sand bags, cinder blocks, etc., can create the turbulence required for proper mixing. Floc Logs are designed to treat dirty water, not liquid mud; when the water contains heavy solids (exceeding 4%), it will be necessary to create a sediment or grit pit to let the heavy solids settle before treating the water.

Floc Logs must not be placed in areas where heavy erosion would result in the Floc Logs becoming buried. Where there is heavy sedimentation, maintenance will be required.

700 Series Floc Logs can easily be moved to different locations as site conditions change. Water quality will be improved with the addition of a dispersion field or soft armor covered ditch checks below the Floc Log(s) to collect flocculated particulate. Construction of mixing weirs may be required in areas where short ditch lines, swelling clays, heavy particle concentrations, or steep slopes may be encountered.

Cleanup:

Latex or rubber gloves are recommended for handling during usage. Use soap and water to wash hands after handling.

Precautions / Limitations

- 700 Series Floc Logs are extremely slippery when wet.
- Clean up spills quickly. Do not use water unless necessary as extremely slippery conditions will result and if water is necessary, use pressure washer.
- Floc Log will remain viable for up to 5 years when stored out of UV rays.
- 700 Series Floc Logs have been specifically tailored to specific water and soil types and samples must be tested. Testing is necessary and is free.

Updated November 4, 2015

Applied Polymer Systems, Inc.

Safety Data Sheet

1. IDENTIFICATION OF THE PRODUCT AND THE COMPANY

Product Name: APS 703d #3 Floc Log®

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

2. HAZARD IDENTIFICATION

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

3. COMPOSITION/INFORMAION ON INGREDIENTS

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

4. FIRST AID MEASURES

Inhalation: None

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

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

Ingestion: Consult a physician

5. FIRE-FIGHTING MEASURES

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

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

Protective equipment for firefighters: No special equipment required.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions: No special precautions required.

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

7. HANDLING AND STORAGE

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

Storage: Keep in a cool, dry place.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Engineering controls: Use dry handling areas only.

Personal protection equipment

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

9. PHYSICAL AND CHEMICAL PROPERTIES

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

10. STABILITY AND REACTIVITY

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

Materials to avoid: Oxidizing agents may cause exothermic reactions.

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

11. TOXICOLOGICAL INFORMATION

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

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

12. ECOLOGICAL INFORMATION

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

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

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

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

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

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

13. DISPOSAL CONSIDERATIONS

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

14. TRANSPORT INFORMATION

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

15. REGULATORY INFORMATION

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

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

16. OTHER INFORMATION

NFPA and HMIS ratings:

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

DATE EDITED: Nov 4th 2015

Updated 1-11-16

Applied Polymer Systems, Inc.

Safety Data Sheet

1. IDENTIFICATION OF THE PRODUCT AND THE COMPANY

Product Name: APS 712 Silt Stop

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

2. HAZARD IDENTIFICATION

Aqueous solutions and powders that become wet render surfaces extremely slippery.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Identification of the preparation: Anionic water-soluble co-polymer blend

4. FIRST AID MEASURES

Inhalation: Move to fresh air. Wear dust mask while handling.

Skin contact: Contact with wet skin could cause chapping and dryness. Wash with water and soap. In case of persistent skin irritation, consult a physician.

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

Ingestion: Consult a physician

5. FIRE-FIGHTING MEASURES

Suitable extinguishing media: Water, water spray, foam, carbon dioxide, dry powder.
Special fire-fighting precautions: Aqueous solutions or powders that become wet render surfaces extremely slippery.
Protective equipment for firefighters: No special equipment required.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions: No special precautions required.

Methods for cleaning up: Do Not flush with water. Clean up promptly by sweeping or vacuum. Keep in suitable and closed containers for disposal. After cleaning, flush away traces with water.

7. HANDLING AND STORAGE

Handling: Avoid contact with skin and eyes. Avoid dust formation. Do not breath dust. Use dust mask during handling. Wash hands after handling.

Storage: Keep in a cool, dry place.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Engineering controls: Use local exhaust if dusting occurs. Natural ventilation is adequate in absence of dust.

Personal protection equipment

Respiratory Protection:	Dust safety masks are recommended where dusting may occur.
Hand protection:	Dry cloth, leather or rubber gloves.
Eye Protection:	Safety glasses with side shields or face masks. Do not wear contact lenses.
Skin protection:	No special protective clothing required.
Hygiene measures:	Wash hands before breaks and at end of work day.

9. PHYSICAL AND CHEMICAL PROPERTIES

Form:	Granular solid
Color:	White / Brown
Odor:	None
pH:	7.02
Melting point:	N/A
Flash point:	N/A
Vapor density:	N/A

10. STABILITY AND REACTIVITY

Stability:	Product is stable, no hazardous polymerization will occur.
Materials to avoid:	Oxidizing agents may cause exothermic reactions.
Hazardous decomposition products:	Thermal decomposition may produce nitrogen oxides (NOx), carbon oxides.

11. TOXICOLOGICAL /

Oral:	LD 50 / *Rattus norvegicus* / oral / > 5000 mg / kg
Inhalation:	The product is not expected to be toxic by inhalation. Use dust mask while handling.
Bioaccumulation:	The product is not expected to bioaccumulate.
Persistence / degradability:	Not readily biodegradable: (~40% after 28 days)

Acute toxicity

LC 50 / *Ceriodaphnia dubia* / 48h / 1,617 ppm
LC 50 / *Pimephales promelas* / 48 h / >6,720 ppm
LC 50 / *Pimephales promelas* / 96 h / >6,720 ppm

12. ECOLOGICAL INFORMATION

Chronic toxicity

IC 25 (Survival) / *Ceriodaphnia dubia* / 7day / 122.5 ppm
NOEC (Survival) / *Ceriodaphnia dubia* / 7day / 52.5 ppm

IC 25 (Reproduction) / *Ceriodaphnia dubia* / 7day / 59.3 ppm
NOEC (Reproduction) / *Ceriodaphnia dubia* / 7day / 52.5 ppm

13. DISPOSAL CONSIDERATIONS

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

14. TRANSPORT AND REGULATORY INFORMATION

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

15. TRANSPORT AND REGULATORY INFORMATION

TSCA Chemical Substances Inventory:	**All components of this product are either listed on the inventory or are exempt from listing.**
SARA Section 311 / 312 Hazard Class:	**Not concerned**
RCRA Status:	**Not RCRA hazardous**

16. OTHER INFORMATION

NFPA and HMIS ratings:

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

DATE EDITED: Jan 11th 2016

Updated November 4, 2015

Applied Polymer Systems, Inc.

Safety Data Sheet

1. IDENTIFICATION OF THE PRODUCT AND THE COMPANY

Product Name: APS 706b Floc Log ®

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

2. HAZARD IDENTIFICATION

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

3. COMPOSITION/INFORMATION ON INGREDIENTS

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

4. FIRST AID MEASURES

Inhalation: None

Skin contact: Contact with wet skin can cause dryness and chapping. Wash with water and soap.

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

Ingestion: Consult a physician

5. FIRE-FIGHTING MEASURES

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

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

Protective equipment for firefighters: No special equipment required.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions: No special precautions required.

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

7. HANDLING AND STORAGE

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

Storage: Keep in a cool, dry place.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Engineering controls: Use dry handling areas only.

Personal protection equipment

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

9. PHYSICAL AND CHEMICAL PROPERTIES

Form: Granular semi-solid gel
Color: Blue
Odor: None
pH: 7.66
Melting point: N/A
Flash point: N/A
Vapor density: N/A

10. STABILITY AND REACTIVITY

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

Materials to avoid: Oxidizing agents may cause exothermic reactions.

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

11. TOXICOLOGICAL INFORMATION

Acute toxicity

LC 50 / *Daphnia magna* / 48h / >420mg/L
LC 50 / *Oncorhynchus mykiss* / 96h / 637 ppm

12. ECOLOGICAL INFORMATION

Chronic toxicity

IC 25 (Survival) / P. promelas / 7 day / >1680 ppm
NOEC (Survival) / P. promelas / 7 day / 1680 ppm

IC 25 (Survival) / C. dubia / 7 day / 257.3 ppm
NOEC (Survival) / C. dubia / 7 day / 210 ppm

IC 25 (Growth) / P. promelas / 7 day / >1680 ppm
NOEC (Survival) / P. promelas / 7 day / 1680 ppm

IC 25 (Reproduction) / C. dubia / 7 day / 91.6 ppm
NOEC (Reproduction) / C. dubia / 7 day / 105 ppm

Bioaccumulation: The product is not expected to bioaccumulate.

Persistence / degradability: Not readily biodegradable: (85% after 180 days).

13. DISPOSAL CONSIDERATIONS

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

14. TRANSPORT INFORMATION

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

15. REGULATORY INFORMATION

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

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

16. OTHER INFORMATION

NFPA and HMIS ratings:

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

DATE EDITED: Nov 4th 2015

Updated 10-29-15

Applied Polymer Systems, Inc.

Safety Data Sheet

1. IDENTIFICATION OF THE PRODUCT AND THE COMPANY

Product Name: APS 705 Silt Stop

Supplied:

Applied Polymer Systems, Inc.
519 Industrial Drive
Woodstock, GA 30189

Tel. 678-494-5998
Fax. 678-494-5298
www.siltstop.com

2. HAZARD IDENTIFICATION

Aqueous solutions or powders that become wet render surfaces extremely slippery.

3. COMPOSITION/INFORMATION ON INGREDIENTS

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

4. FIRST AID MEASURES

Inhalation: Move to fresh air. Use dust mask when handling.

Skin contact: Contact with wet skin could cause chapping and dryness. Wash with water and soap. In case of persistent skin irritation, consult a physician.

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

Ingestion: Consult a physician

5. FIRE-FIGHTING MEASURES

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

Special fire-fighting precautions: Aqueous solutions or powders that become wet render surfaces extremely slippery.

Protective equipment for firefighters: No special equipment required.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions: No special precautions required.

Methods for cleaning up: Do Not flush with water. Clean up promptly by sweeping or vacuum. Keep in suitable and closed containers for disposal. After cleaning, flush away traces with water.

7. HANDLING AND STORAGE

Handling: Avoid contact with skin and eyes. Avoid dust formation. Do not breath dust. Use dust mask during handling. Wash hands after handling.

Storage: Keep in a cool, dry place. (0-30^0 C)

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Engineering controls: Use local exhaust if dusting occurs. Natural ventilation is adequate in absence of dust.
Personal protection equipment
Respiratory Protection: Dust safety masks are recommended where dusting may occur.
Hand protection: Dry cloth, leather or rubber gloves.
Eye Protection: Safety glasses with side shields or face masks. Do not wear contact lenses.
Skin protection: No special protective clothing required.
Hygiene measures: Wash hands before breaks and at end of work day.

9. PHYSICAL AND CHEMICAL PROPERTIES

Form: Granular solid
Color: White
Odor: None
pH: 7-8
Melting point: N/A
Flash point: N/A
Vapor density: N/A

10. STABILITY AND REACTIVITY

Stability: Product is stable, no hazardous polymerization will occur.
Materials to avoid: Oxidizing agents may cause exothermic reactions.
Hazardous decomposition products: Thermal decomposition may produce nitrogen oxides (NOx), carbon oxides.

11. TOXICOLOGICAL INFORMATION

Acute toxicity: (EPA/600/4-90/027F)

LD 50 / *Rattus norvegicus* / oral / > 5000 mg/kg
LC 50 / *Oncorhynchus mykiss* / 96h / 530 mg/L
LC 50 / *Daphnia magna* / 48h / >420mg/L
EC 50 / *Selenastrum capricornutum* / 96h / >500mg/L

12. ECOLOGICAL INFORMATION

Chronic Toxicity : (EPA/600/R-98/182)

IC_{25} (Survival) / *P. promelas* / 7 day / 358 ppm
NOEC (Survival) / *P. promelas* / 7 day / 840 ppm

IC_{25} (Survival) / *C. dubia* / 7 day / 157.5 ppm
NOEC (Survival) / *C. dubia* / 7 day / 105 ppm

IC_{25} (Growth) / *P. promelas* / 7 day / 94 ppm
NOEC (Growth) / *P. promelas* / 7 day / 105 ppm

IC_{25} (Reproduction) / *C. dubia* / 7 day / 27.7 ppm
NOEC (Reproduction) / *C. dubia* / 7 day / 26.25 ppm

Inhalation: The product is not expected to be toxic by inhalation.

Dermal: The results of testing on rabbits showed no toxicity even at high dose levels.

Bioaccumulation: The product is not expected to bioaccumulate.

Persistence / degradability: Not readily biodegradable: (~40% after 28 days).

Chronic toxicity: A 2 yr feeding study on rats did not reveal adverse health effects.

13. DISPOSAL CONSIDERATIONS

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

14. TRANSPORT INFORMATION

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

15. REGULATORY INFORMATION

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

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

16. TRANSPORT AND REGULATORY INFORMATION

NFPA and HMIS ratings:

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

DATE EDITED: Oct. 29th 2015

Updated November 4, 2015

Applied Polymer Systems, Inc.

Safety Data Sheet

1. IDENTIFICATION OF THE PRODUCT AND THE COMPANY

Product Name: APS 703d Floc Log®

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

2. HAZARD IDENTIFICATION

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

3. COMPOSITION/INFORMATION ON INGREDIENTS

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

4. FIRST AID MEASURES

Inhalation: None

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

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

Ingestion: Consult a physician

5. FIRE-FIGHTING MEASURES

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

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

Protective equipment for firefighters: No special equipment required.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions: No special precautions required.

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

7. HANDLING AND STORAGE

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

Storage: Keep in a cool, dry place.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Engineering controls: Use dry handling areas only.

Personal protection equipment

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

9. PHYSICAL AND CHEMICAL PROPERTIES

Form:	**Granular semi-solid gel**
Color:	**Blue**
Odor:	**None**
pH:	**7.37**
Melting point:	**N/A**
Flash point:	**N/A**
Vapor density:	**N/A**

10. STABILITY AND REACTIVITY

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

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

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

11. TOXICOLOGICAL INFORMATION

Acute toxicity (EPA/600/4-90/027F)

LD 50 / *Rattus norvegicus* / oral / > 5000 mg/kg
LC 50 / *Daphnia magna* / 48h / >383mg/L
LC 50 / *Oncorhynchus mykiss* / 96h / 1900 mg/L

Chronic toxicity (EPA/600/4-91/002)

IC 25 (Survival) / *P. promelas* / 7 day / 110 ppm
NOEC (Survival) / *P. promelas* / 7 day/ 105 ppm

IC 25 (Survival) / *C. dubia* / 7 day / 99.8 ppm
NOEC (Survival) / *C. dubia* / 7 day/ 52.5 ppm

IC 25 (Growth) / *P. promelas* / 7 day / 130 ppm
NOEC (Growth) / *P. promelas* / 7 day / 105 ppm

IC 25 (Reproduction) / *C. dubia* / 7 day / 58.2 ppm
NOEC (Reproduction) / *C. dubia* / 7 day / 105 ppm

12. ECOLOGICAL INFORMATION

Fish: LC 50 / *Pimephales promelas* / 96h / >1000 mg/l
Water Flea: LC 50 / *Daphnia magna* / 48h / 383mg/l
Algae: EC 50 / *Selenastrum capricornutum* / 96h / >500mg/l

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

13. DISPOSAL INFORMATION

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

14. TRANSPORT INFORMATION

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

15. REGULATORY INFORMATION

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

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

16. OTHER INFORMATION

NFPA and HMIS ratings:

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

DATE EDITED: Nov 4th 2015

Technical Guidance for the Use of Polyacrylamides (PAM) and PAM Blends for Soil Erosion Control and Storm Water clarification

(Courtesy of Applied Polymer Systems, Inc.)

Practice Description

PAM is a water-soluble anionic polyacrylamide product used to minimize soil erosion caused by water and wind to decrease soil sealing by binding soil particles, especially clays, to hold them on site. In addition, these types of materials may also be used as a water treatment additive to remove suspended particles from runoff. When PAM is used on construction sites in the Southeast it is typically applied with temporary seeding and or mulching on areas where the timely establishment of temporary erosion control is so critical that seedings and mulching need additional reinforcement. It may be used alone on sites where no disturbances will occur until site work is continued and channel erosion is not a significant potential problem. Permanent grassing applications can be better established using PAM as a tackifier and soil conditioner.

PAMs are manufactured in various forms to be used on specific soil types, and are generally applied at a rate of up to 25 pounds/acre for dry products and 2 ½ gallons/acre of emulsion-liquid products. Using the wrong form of a PAM on a soil will result in some degree of performance failure, and increase the potential for this material to enter surface waters. PAM used alone may not reduce NTU values resulting in non-compliance water quality discharges or poor soil binding conditions. Site-specific soil-PAM testing must be performed. Exceeding the maximum application rates for this product does not increase the effectiveness of the product.

Block or Log forms of PAM and PAM blends are manufactured for specific use in drainage waterways to remove suspended particulates from runoff.

General Components of the Practice

Prior to the start of construction, a qualified professional should design the application of PAM and plans and specifications should be available to field personnel.

The application should conform to the design and specifications provided in the plans. Typical applications include the following components.

- Site Preparation
- Equipment Preparation
- PAM Application

Application

Site Preparation

Prepare site following design and specifications.

Equipment Preparation

If using a liquid application system, pump a surfactant through the injection system before and after injecting concentrated liquid PAM into sprinkler irrigation systems to help prevent valves and tubing from clogging.

PAM used in hydroseeding applications should be added as the last additive to the mix.

After their use, rinse all PAM mixing and application equipment thoroughly with water to avoid formation of PAM residues. Rinse residue should be applied to soil areas to create binding to the soil structure and increase erosion reduction.

PAM Application- Criteria for Land applied PAM Specifications

PAM shall be mixed and/or applied in accordance with all Occupational Safety and Health Administration (OSHA) Material Safety Data Sheet (MSDS) requirements and the manufacturer's recommendations for the specified use conforming to all federal, state and local laws, rules and regulations.

1.) Toxicity

All venders and suppliers of PAM, PAM mix or blends shall present or supply a written toxicity report which verifies that the PAM, PAM mix or blend exhibits acceptable toxicity parameters which meet or exceed the EPA requirements for the state and federal water quality standards. Whole effluent testing does not meet this requirement as primary reactions have occurred and toxic potentials have been reduced. **Cationic forms of PAM, polymers and chitosan are not allowed for use under this guideline due to their high levels of toxicity to aquatic organisms. Emulsions shall never be applied directly to stormwater runoff or riparian waters due to surfactant toxicity.**

2.) Performance

All venders and suppliers of PAM, PAM mix or blends shall supply written "site specific" testing results demonstrating that a performance of 95% or greater reduction of NTU or TSS from stormwater discharges.

Emulsion batches shall be mixed following recommendations of a testing laboratory that determines the proper product and rate to meet site requirements. Application method shall insure uniform coverage to the target area. **(Emulsions shall never be applied directly to stormwater runoff or riparian waters)**

Dry form (powder) may be applied by hand spreader or a mechanical spreader. Mixing with dry silica sand will aid in spreading. Pre-mixing of dry form PAM into fertilizer, seed or other soil amendments is allowed when specified in the design plan. Application method shall insure uniform coverage to the target area.

Block or Log forms shall be applied following site testing results to assure proper placement and performance and shall meet or exceed state and federal water quality requirements.

Common Problems

Consult with a registered design professional for assistance if any of the following occur:

- Problems with application equipment clogging.
- PAM alone may not meet testing requirements for NTU reduction and soil stabilization. Site specific "blends" may be needed to meet these requirements.
- Application specifications for PAM cannot be met; alternatives may be required. Unapproved application techniques could lead to failure.
- Visible erosion occurs after application.

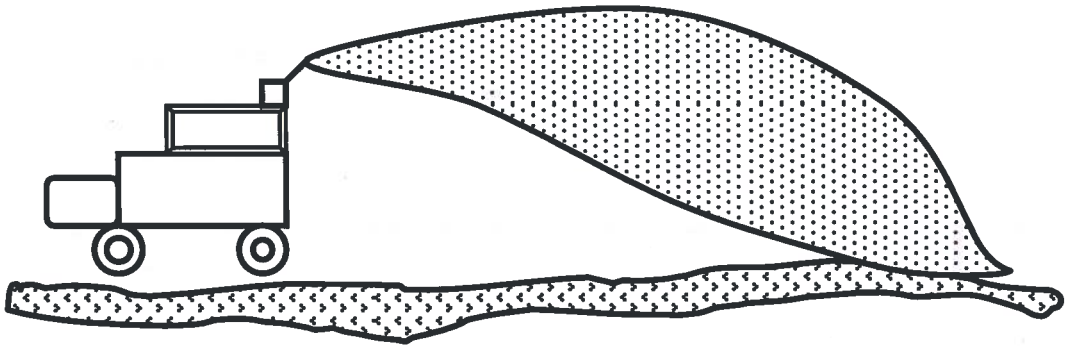
Maintenance

An operation and maintenance plan must be prepared for use by the operator responsible for PAM application. Plan items should include the following items.

- Reapply PAM to disturbed or tilled areas that require continued erosion control.
- Maintain equipment to provide uniform application rates.
- Rinse all PAM mixing and application equipment thoroughly with water to avoid formation of PAM residues and discharge rinse water to soil areas where PAM stabilization may be helpful.
- Downstream deposition from the use of PAM may require periodic sediment removal to maintain normal functions.

PM-H

(Silt Stop Application of Temporary and Permanent Grassing)



Notes:

1) **For use on all slope conditions which are not matted.**

2) **Application rate shall be 1.5 gallons of Silt Stop emulsion/acre or 10 pounds of Silt Stop powder/acre.**

3) **Silt Stop emulsion or powder shall be added to all hydroseeding mixes at a rate of 3000 gallons of mix/acre.**

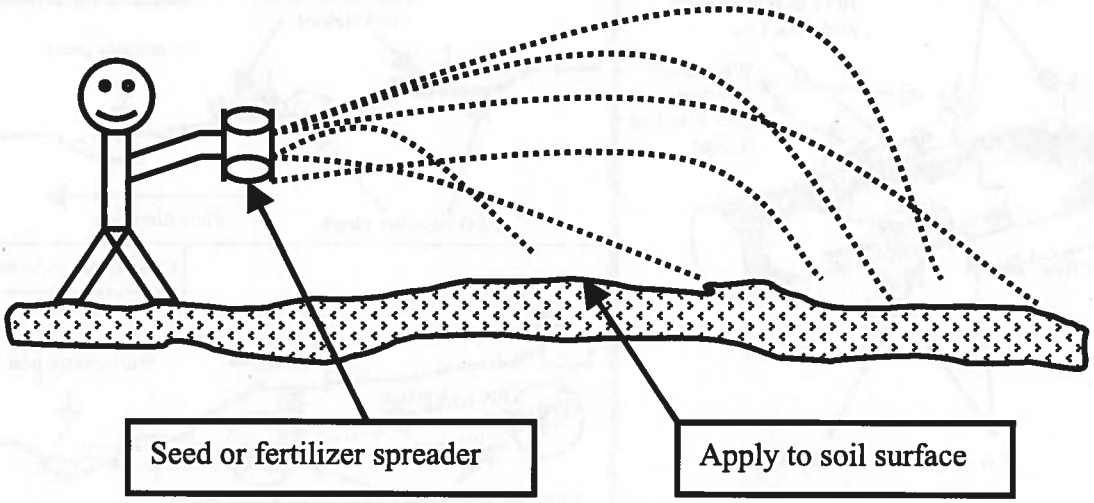
4) **Silt Stop shall be the final additive to the hydroseeding mix.**

5) **Straw cover may be applied over the hydroseeded application.**

(All Silt Stop shall be site specific, soil tested achieving 95% NTU reduction or better and must have acute and chronic toxicity testing reports.)

PM-D

PM (Dry Silt Stop Form)



Notes:

1) **Dry Silt Stop shall be applied using a seed or fertilizer spreader or may be mixed with other dry spread additives.**

2) **Dry Silt Stop shall be covered with straw, mulch, matting or jute.**

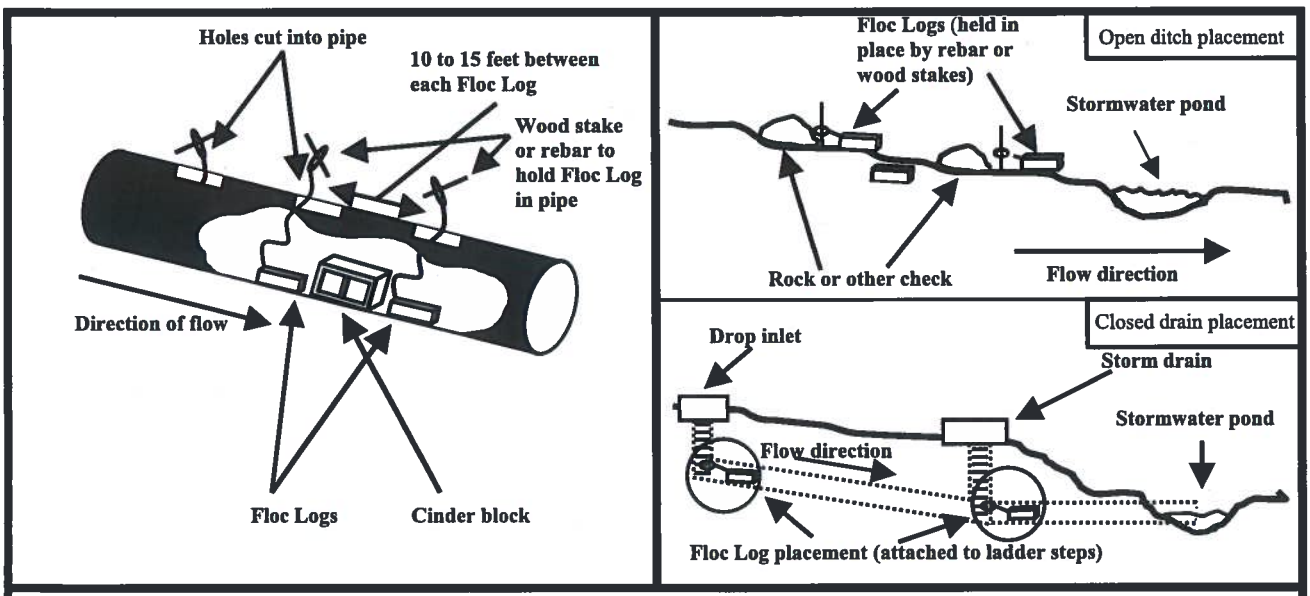
3) **Application rate shall be 10 pounds/acre but not greater than 25 pounds/acre.**

4) **For use on all slope conditions.**

(All Silt Stop shall be site specific, soil tested achieving 95% NTU reduction or better and must have acute and chronic toxicity testing reports.)

PM-F

(Floc Log placement for pipes, ditch and storm drains)



Notes:

1) **Place Floc Logs far enough upstream in turbid flows to allow adequate mixing time. (Mixing time and Floc Log type are determined from the sample analysis.)**

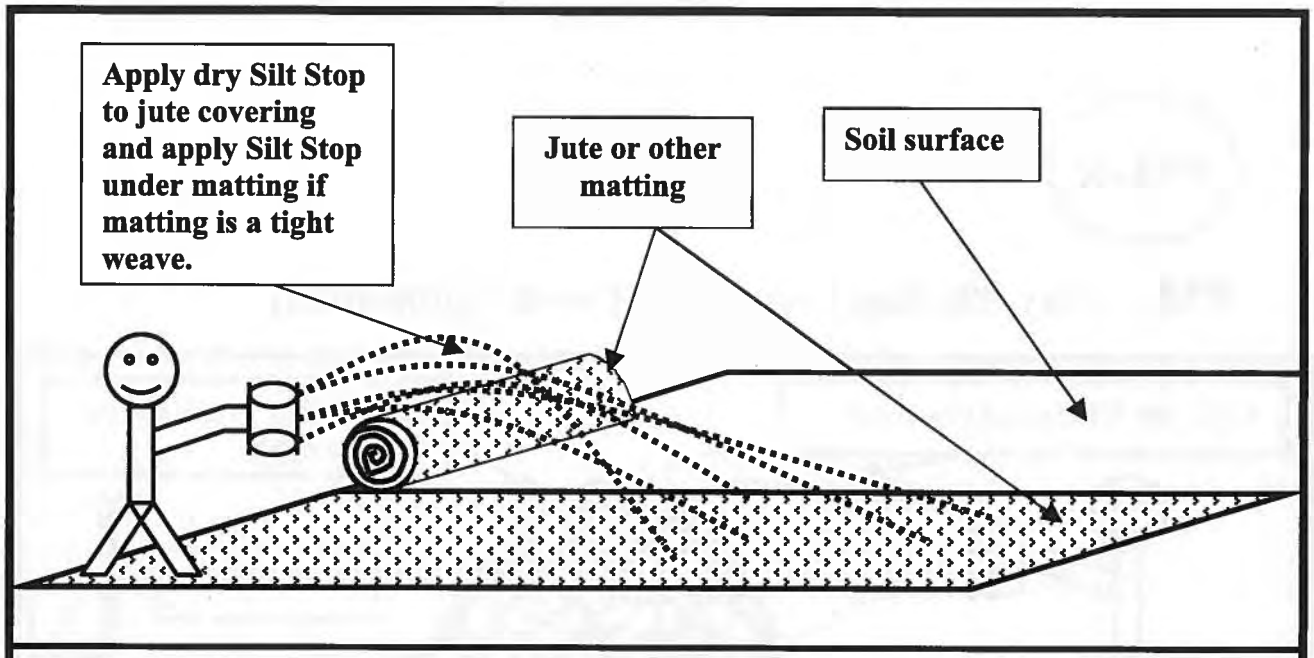
2) **Floc Logs should be placed 10 to 15 feet apart in a row or at points of highest water velocity; whichever is most convenient.**

3) **The number of Floc Logs placed on the site is based on results from the sample analysis. Floc Logs shall be placed in <u>all</u> catch basins and after <u>all</u> downsides of rock checks.**

(All Floc Logs shall be site specific, soil tested achieving 95% NTU reduction or better and must have acute and chronic toxicity testing reports.)

PM-M

(Dry Silt Stop Form Soft Armoring Technique for Matting)



Notes:

1) **For use on all slope conditions.**

2) **One layer of jute or other matting shall be applied to the surface of all exposed soil on 1:1 slopes.**

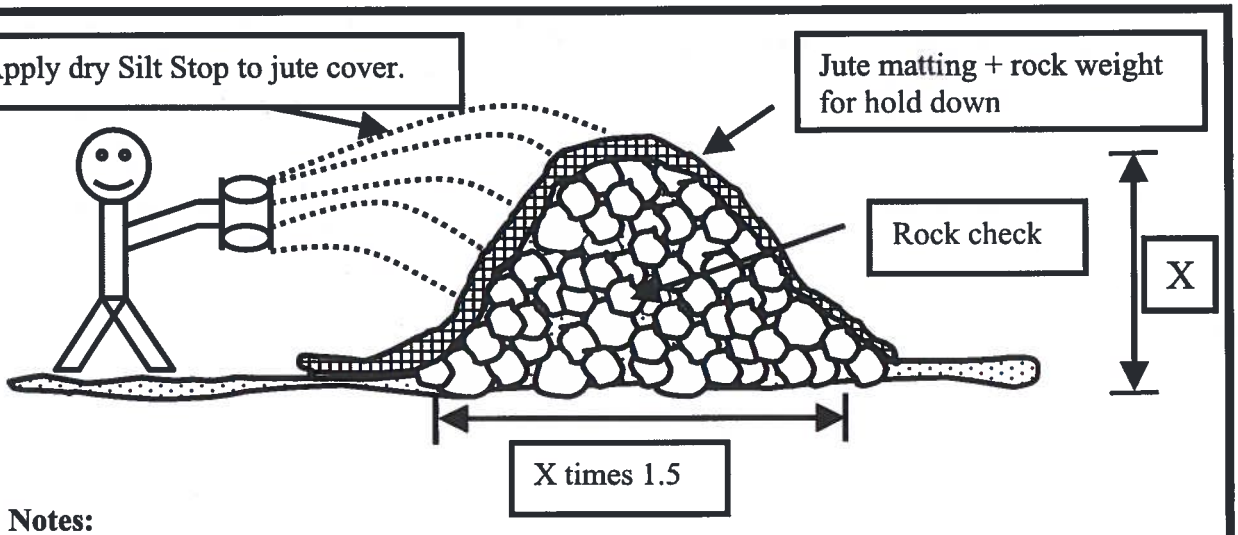
3) **Dry Silt Stop shall be applied to the soil if tight weave matting is used and also to the jute or burlap matting cover using a seed or fertilizer spreader.**

4) **Application rate shall be 10 pounds/acre but not greater than 25 pounds/acre.**

(All Silt Stop shall be site specific, soil tested achieving 95% NTU reduction or better and must have acute and chronic toxicity testing reports.)

PM-R

PM (Dry Silt Stop Form Rock Check Application)



Notes:

1) One layer of jute matting shall be applied to the surface of all rock checks.

2) Dry Silt Stop shall be applied to the jute cover using a seed or fertilizer spreader.

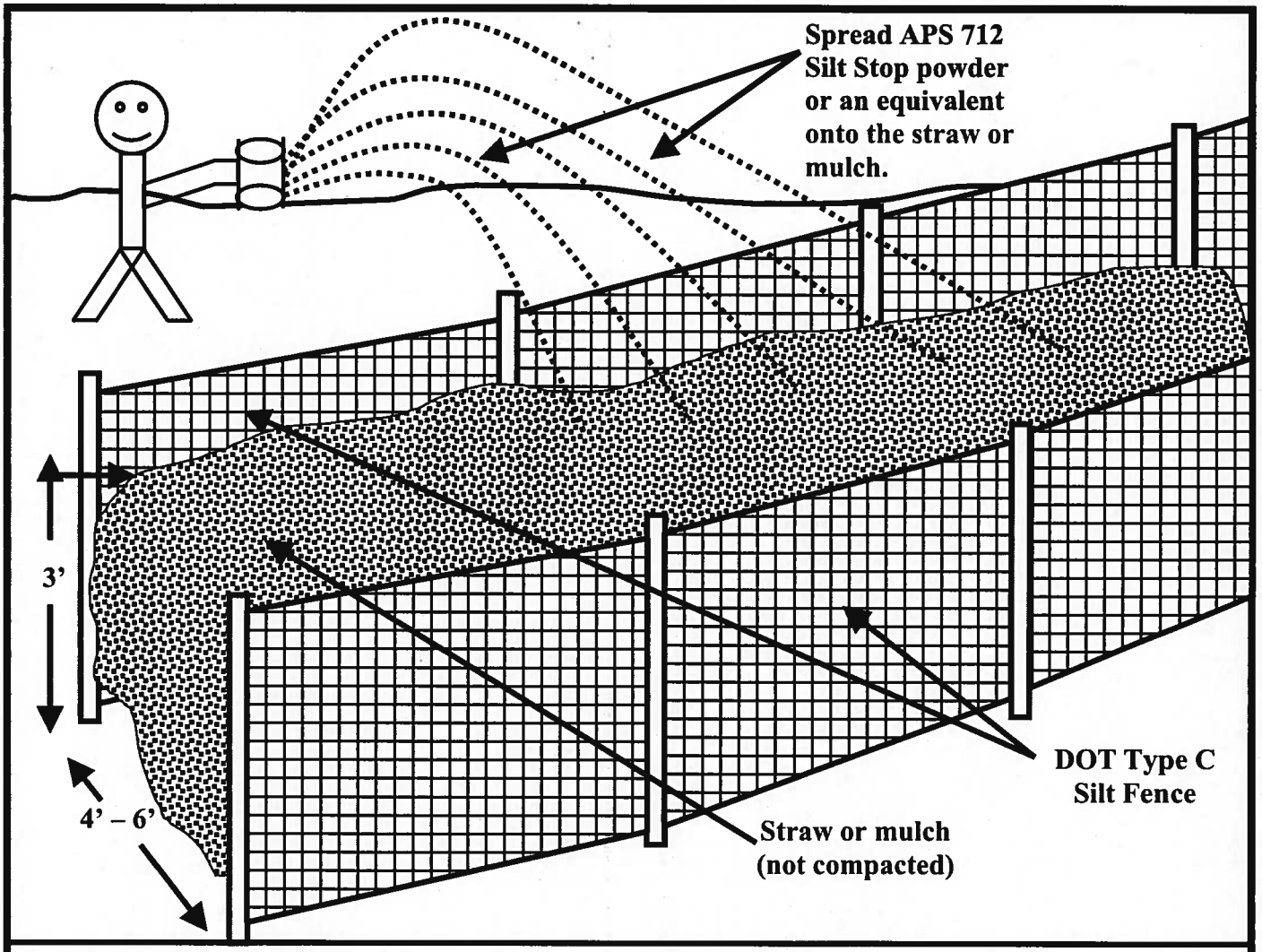
3) Application rate shall be 10 pounds/acre but not greater than 25 pounds/acre.

(All Silt Stop shall be site specific, soil tested achieving 95% NTU reduction or better and must have acute and chronic toxicity testing reports.)

SRB

(SRB) Sediment Retention Barrier

Use for fine sediment retention between silt fences. Install at low areas during grading.



1) Use in all low areas during the grading phase.

2) Place 2 rows of DOT type C silt fence 4 to 6 feet apart. Place straw or mulch 3 feet deep between the silt fences.

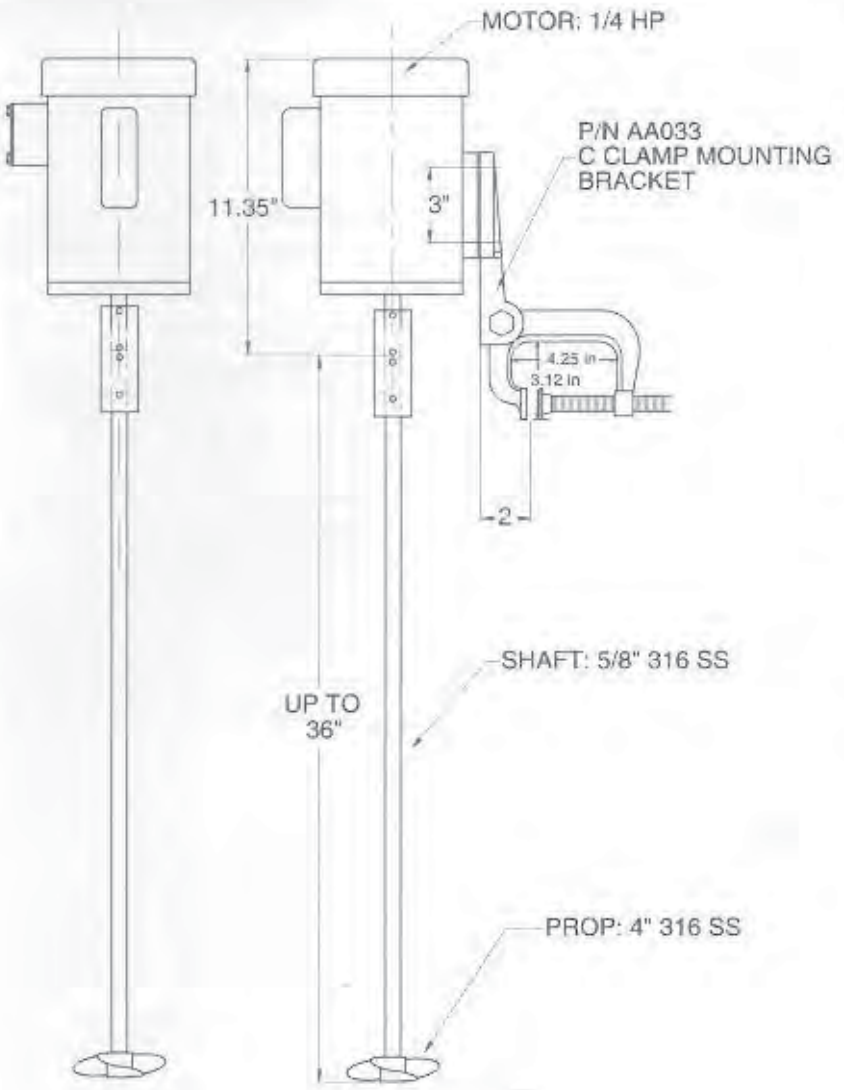
3) Dry Silt Stop powder or an equivalent should be spread throughout the straw or mulch using a seed or fertilizer spreader.

(All Silt Stop shall be site specific, soil tested achieving 95% NTU reduction or better and must have acute and chronic toxicity testing reports.)

pH System Components

MADDEN

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.

PULSAFEEDER®
An IDEX Water & Wastewater Business

pulsafeeder.com

The Pulsatron Series E Plus 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.

Twenty distinct models are available, having pressure capabilities to 300 PSIG (21 BAR) @ 3 GPD (0.5 lph), and flow capacities to 600 GPD (94.6 lph) @ 30 PSIG (2 BAR), with a turndown ratio of 100:1. Metering performance is reproducible to within ± 2% of maximum capacity.
Please refer to the reverse side for Series E PLUS specifications.

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.
- Safe & Easy Priming with durable leak-free bleed valve assembly (standard).

Controls

Manual Stroke Rate
- Turn-Down Ratio 10:1

Manual Stroke Length
- Turn-Down Ratio 10:1

4-20mADC Direct or External Pacing with Stop
- 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)

PULSAtron® Series E Plus Electronic Metering Pumps

PULSAtron® Series E Plus

Specifications and Model Selection

MODEL		LPK2	LPB2	LPA2	LPD3	LPB3	LPA3	LPK3	LPF4	LPD4	LPB4	LPH4	LPG4	LPE4	LPK5	LPH5	LPH6	LPK7	LPH7	LPJ7	LPH8
Capacity	GPH	0.13	0.21	0.25	0.5	0.50	0.50	0.60	0.85	0.90	1.00	1.70	1.75	1.85	2.50	3.15	5.00	8.00	10.00	10.00	25.00
nominal	GPD	3	5	6	12	12	12	14	20	22	24	41	42	44	60	76	120	192	240	240	600
(max.)	LPH	0.5	0.8	0.9	1.9	1.9	1.9	2.3	3.2	3.4	3.8	6.4	6.6	7	9.5	11.9	18.9	30.3	37.9	37.9	94.6
Pressure	PSIG	300	250	150	250	150	100	100	250	150	100	250	150	100	150	150	100	50	35	80	30
(max.)	BAR	21	17	10	17	10	7	7	17	10	7	17	10	7	10	10	7	3.3	2.4	5.5	2
Connections	Tubing	1/4" ID X 3/8" OD 3/8" ID X 1/2" OD													3/8" ID X 1/2" OD 1/2" ID X 3/4" OD (LPH8 ONLY)						
	Piping	1/4" FNPT													1/4" FNPT 1/2" FNPT						

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 :	

For viscosity up to 3000 CPS, select connection size 3, 4, B or C with 316SS ball material. Flow rate will determine connection/ball size. Greater than 3000 CPS require spring loaded ball checks. See Selection Guide for proper connection.

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
Peak Input Power:	300 Watts
Average Input Power @ Max SPM:	130 Watts

Custom Engineered Designs – Pre-Engineered Systems

Pre-Engineered Systems

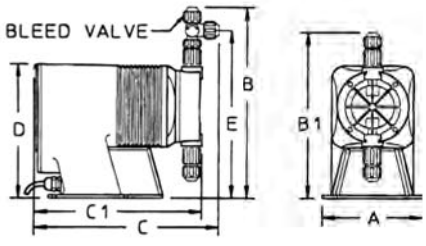
Pulsafeeder's Pre-Engineered Systems are designed to provide complete chemical feed solutions for all electronic metering applications. From stand alone simplex pH control applications to full-featured, redundant sodium hypochlorite disinfection metering, these rugged fabricated assemblies offer turn-key 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 E Plus Dimensions (inches)

Model No.	A	B	B1	C	C1	D	E	Shpg Wt	Model No.	A	B	B1	C	C1	D	E	Shpg Wt
LPA2	5.4	10.3	-	10.8	-	7.5	8.9	13	LPH4	6.2	10.9	-	11.2	-	8.2	9.5	21
LPA3	5.4	10.6	-	10.7	-	7.5	9.2	13	LPH5	6.2	11.3	-	11.2	-	8.2	9.9	21
LPB2	5.4	10.3	-	10.8	-	7.5	8.9	13	LPH6	6.2	11.3	-	11.9	-	8.2	9.9	21
LPB3	5.4	10.6	-	10.7	-	7.5	9.2	13	LPH7	6.1	11.7	-	11.9	-	8.2	10.3	21
LPB4	5.4	10.6	-	10.7	-	7.5	9.2	13	LPH8*	6.1	-	10.9	-	11.3	8.2	-	26
LPD3	5.4	10.6	-	11.2	-	7.5	9.2	15	LPK2	5.4	10.3	-	10.8	-	7.5	8.9	13
LPD4	5.4	10.6	-	11.2	-	7.5	9.2	15	LPK3	5.4	10.6	-	10.7	-	7.5	9.2	13
LPE4	5.4	10.6	-	11.2	-	7.5	9.2	15	LPK5	5.4	10.9	-	11.7	-	7.5	9.5	18
LPF4	5.4	10.6	-	11.7	-	7.5	9.2	18	LPK7	6.1	11.7	-	11.2	-	8.2	10.3	21
LPG4	5.4	10.6	-	11.7	-	7.5	9.2	18	LPJ7	6.1	10	-	10.7	-	-	-	21

NOTE: Inches X 2.54 = cm /* the LPH8 is designed without a bleed valve available



+GF+® Signet pH/ORP Controllers

Versatile mounting options allow you to customize the installation for particular applications

NEW

- Large, scratch-resistant, self-healing display

+GF+ Signet controllers are designed for broad application and ease of setup and operation. Multiple mounting options allow for installation best suited to your particular application. Intuitive software and four-button keypad arrangement make it easy to access important information such as measurement values, calibration data, relay setup menus, and more.

Optional universal mounting kit allows for mounting of field-mount units on pipes, tanks, and walls. RC filter kit prevents premature wearing of the relay outputs by providing protection from electrical noise. Order separately below.

Required *System Components*

1. Controller
2. Preamplifier
3. Electrode

Field-mount controller 56560-20

Panel-mount controller 56560-30

Specifications

ISO9001:2000 CERTIFIED SUPPLIER · c UL us · CE · IP65 Meter only · 2 year warranty Meter only

Model		+GF+ Signet 8750-1	+GF+ Signet 8750-2	+GF+ Signet 8750-3
Range	pH	0.00 to 14.00	0.00 to 14.00	0.00 to 14.00
	mV	–1000 to 2000 mV	–1000 to 2000 mV	–1000 to 2000 mV
	Temperature	–13 to 248°F (–25 to 120°C)	–13 to 248°F (–25 to 120°C)	–13 to 248°F (–25 to 120°C)
Resolution	pH	0.01	0.01	0.01
	mV	1 mV	1 mV	1 mV
	Temperature	0.1°C (0.1°F)	0.1°C (0.1°F)	0.1°C (0.1°F)
Accuracy	pH	±0.03	±0.03	±0.03
	mV	±2 mV	±2 mV	±2 mV
	Temperature	±0.5°C (±1°F)	±0.5°C (±1°F)	±0.5°C (±1°F)
Temperature compensation		Automatic, 3 kΩ Balco	Automatic, 3 kΩ Balco	Automatic, 3 kΩ Balco
Control type		On/off (limit) or proportional	On/off (limit) or proportional	On/off (limit) or proportional
Number of set points		Two (low, high)	Two (low, high)	Two (low, high)
Output	Relay	—	Two SPDT relays, 5 A at 30 VDC or 250 VAC resistive load maximum	—
	Current	One 4 to 20 mA, isolated, fully adjustable and reversible	One 4 to 20 mA, isolated, fully adjustable and reversible	Two 4 to 20 mA, isolated, fully adjustable and reversible
	Open collector	One open-collector, optically isolated, 50 mA max	—	Two open-collector, optically isolated, 50 mA max
Dead band		User adjustable	User adjustable	User adjustable
Housing		NEMA 4X (IP65) front panel	NEMA 4X (IP65) front panel	NEMA 4X (IP65) front panel
Display		2 x 16 alphanumeric LCD	2 x 16 alphanumeric LCD	2 x 16 alphanumeric LCD
Dimensions (W x H x D)		Field-mount: 3 13/16" x 3 13/16" x 4 3/16" (96 x 96 x 106 mm) Panel-mount: 3 13/16" x 3 13/16" x 3 13/16" (96 x 96 x 97 mm)		
Power		12 to 24 VDC	12 to 24 VDC	12 to 24 VDC

1 Controllers

Catalog number	Model	Mounting style	Price
S-56560-18 **S-56560-28**	+GF+ Signet 8750-1 +GF+ Signet 8750-1P	Field mount Panel mount, ¼ DIN	
S-56560-20 **S-56560-30**	+GF+ Signet 8750-2 +GF+ Signet 8750-2P	Field mount Panel mount, ¼ DIN	
S-56560-22 **S-56560-32**	+GF+ Signet 8750-3 +GF+ Signet 8750-3P	Field mount Panel mount, ¼ DIN	

S-05631-50 Universal mounting kit for field-mount units .....

S-19007-52 RC filter kit for relay use. Pack of 2 .....

S-17106-20 NIST-traceable calibration .....

2 Preamplifiers

Preamplifiers protect the relatively weak output signal of the pH or ORP electrode from electrical interferences common in industrial environments and are required for initial system installation. Unique DryLoc® connectors allow you to quickly form robust assemblies for submersible and in-line applications.

Catalog number	Thread size	Price
S-56560-03 **S-56560-04**	¾" NPT(M) ISO 7-1 R¾"	

DryLoc® pH and ORP electrodes

3 Electrodes

Feature-packed pH and ORP electrodes feature unique DryLoc connectors which offer resistance to intrusion from dirt and moisture. Extended reference path length extends electrode life over traditional combination electrodes. Electrode bodies are Ryton® PPS for added chemical resistance and feature a ¾" NPT(M) or ISO 7-1 R¾" threads for in-line installation. Flat-surface electrodes minimize abrasion and breakage problems by allowing sediment to sweep past the measurement surface. Bulb-style electrodes feature quick response and are well-suited to general-purpose applications. HF-resistant electrodes resist hydrofluoric acid in concentration less than 2%. LC-bulb electrodes are designed for ultrapure, low-conductivity water applications. All have a 3 kΩ Balco ATC element and measure 0 to 14 pH.

Catalog number	Type	Thread size	Price
S-56561-02 **S-56561-03**	pH, flat surface	¾" NPT(M) ISO 7-1 R¾"	
S-56561-10 **S-56561-11**	pH, bulb style	¾" NPT(M) ISO 7-1 R¾"	
S-56561-06 **S-56561-07**	pH, HF-resistant bulb	¾" NPT(M) ISO 7-1 R¾"	
S-56561-14 **S-56561-15**	pH, LC bulb	¾" NPT(M) ISO 7-1 R¾"	
S-56561-16 **S-56561-17**	ORP, flat surface	¾" NPT(M) ISO 7-1 R¾"	

NorFalco Inc.
NorFalco Sales Inc.

Material Safety Data Sheet

77% - 100% SULFURIC ACID

SECTION 1. PRODUCT IDENTIFICATION

Trade Name	**77 % - 100 % Sulfuric Acid**
Product Code	None
Manufacturers/Distributors	NorFalco Inc., 6000 Lombardo Center, The Genesis Blg, suite 650 Seven Hills, OH 44131 NorFalco Sales Inc., 6755 Mississauga Road, Suite 304, Mississauga, Ontario L5N 7Y2
Information Contact	André Auger, Administration Assistant
Product Information	1-905-542-6901 (Mississauga)
Phone Number (Transportation Emergency)	Canada 1-877-ERP-ACID (377-2243)
Phone Number (Transportation Emergency)	U.S.A. 1-800-424-9300 CHEMTREC
Phone Number (Medical Emergency)	**1-418-656-8090**
Phone Number (Emergency)	**CANUTEC 1-613-996-6666**
Synonyms	Dihydrogen Sulfate ; Oil of Vitriol ; Vitriol Brown Oil ; Sulphuric Acid. Acide sulfurique (French)
Name / Chemical Formula	Sulfuric Acid / H_2SO_4
Chemical Family	Acid
Utilization	Chemical industries ; Water treatment ; Fertilizer ; Pulp and Paper.
Manufacturers	CEZinc on behalf of Noranda Income Limited Partnership, Salaberry-de-Valleyfield (Quebec) Canada J6T 6L4 Xstrata Copper, Horne Smelter, Rouyn-Noranda (Quebec) J9X 5B6 Xstrata Zinc, Brunswick Smelting, Belledune, New Brunswick E0B 1G0 Xstrata Copper, Kidd Metallurgical Division, Timmins, Ontario P4N 7K1 Xstrata Nickel, Sudbury Operations, Falconbridge, Ontario P0M 1S0

SECTION 2. HAZARDS IDENTIFICATION

WHMIS (Canada) CLASS D-1A : Very toxic material causing immediate and serious effects
CLASS E : Corrosive material

Labeling (EEC) C Corrosive

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Name	CAS #	Percentage (%)	# CE	R Phrases[1]
Sulfuric (Acid)	7664-93-9	77 % to 100 %	231-639-5	R35
60 Deg Technical		77.7		
66 Deg Technical		93.2		
1.835 Electrolyte		93.2		
98 % Technical		98		
99 % Technical		99		
100 % Technical		100		
Water	7732-18-5	0-22		

Note 1 : See section 15 for the complete wording of risk phrases.

SECTION 4. FIRST-AID MEASURES

Eye Contact Remove contact lenses if present. Immediately flush eyes with plenty of water, holding eyelids open for at least 15 minutes. Consult a physician. Possibility of conjonctivitis, severe irritation, severe burns, permanent eye damage.

Skin Contact Remove contaminated clothing and shoes as quickly as possible protecting your hands and body. Place under a deluge shower for 15 minutes. Flush exposed skin gently and thoroughly with running water (Pay particular attention to : Folds, crevices, creases, groin). Call a physician if irritation persists. May irritate skin, cause burns (Highly corrosive) and possibility of some scarring.

Wash contaminated clothing before reusing. While the patient is being transported to a medical facility, continue the application of cold, wet compresses. If medical treatment must be delayed, repeat the flushing with cold water or soak the affected area with cold water to help remove the last traces of sulfuric acid. *Creams or ointments* ***SHOULD NOT*** *be applied before or during the washing phase of treatment.*

Inhalation Take precautions to avoid secondary contamination by residual acids. Remove the person to fresh air. If not breathing, give artificial respiration. Difficult breathing : Give oxygen. Get immediate medical attention. Possibility of damage to the upper respiratory tract and lung tissues. Maintain observation of the patient for delayed onset of pulmonary oedema. May cause irritation to the upper respiratory tract : Coughing, sore throat, shortness of breath.

Ingestion **DO NOT** INDUCE VOMITING. Conscious and alert person : Rinse mouth with water and give ½ to 1 cup of water or milk to dilute material. **Spontaneous vomiting** : Keep head below hips to prevent aspiration ; Rinse mouth and give ½ to 1 cup of water or milk. **UNCONSCIOUS** person : **DO NOT** induce vomiting or give any liquid. **Immediately** obtain medical attention.

Notes to Physicians
Continued washing of the affected area with cold or iced water will be helpful in removing the last traces of sulfuric acid. Creams or ointments should not be applied before or during the washing phase of the treatment.

SECTION 5. FIRE-FIGHTING MEASURES

Flash Point	Not available
Flammable Limits	Not available
Auto-Ignition Temperature	Not available
Products of Combustion	Releases of sulfur dioxide at extremely high temperatures.
Fire Hazard	Not flammable
Explosion Hazard	Reacts with most metals, especially when dilute ; Hydrogen gas release (**Extremely** flammable, explosive). Risk of explosion if acid combined with water, organic materials or base solutions in enclosed spaces (Vaccum trucks, tanks). Mixing acids of different strengths/concentrations can also pose an explosive risk in an enclosed space/container.
Extinguishing media	ERG (Emergency Response Guidebook) : Guide 137 When material is not involved in fire, do not use water on material itself. **Small fire :** Dry chemical or CO_2. Move containers from fire area if you can do it without risk. **Large fire:** Flood fire area with large quantities of water, while knocking down vapors with water fog. If insufficient water supply: knock down vapors only. **Fire involving Tanks or Car/Trailer Loads :** Cool containers with flooding quantities of water until well after fire is out. Do not get water inside containers. Withdraw immediately in case of rising sound from venting safety devices or discoloration of tank. ALWAYS stay away from tanks engulfed in fire.
Protective equipment	Evacuate personnel to a safe area. Keep personnel removed and upwind of fire. Generates heat upon addition of water, with possibility of spattering. Wear full protective clothing. Runoff from fire control may cause pollution. Neutralize run-off with lime, soda ash, etc., to prevent corrosion of metals and formation of hydrogen gas. Wear self-contained breathing apparatus if fumes or mists are present.

SECTION 6. ACCIDENTAL RELEASE MEASURES

Spill	Review **Fire and Explosion Hazards** and **Safety Precautions** before proceeding with clean up. Stop flow if possible. Soak up small spills with dry sand, clay or diatomaceous earth.
Methods	Dike large spills, and cautiously dilute and neutralize with lime or soda ash, and transfer to waste water treatment system. Prevent liquid from entering sewers, waterways, or low areas. If this product is spilled and not recovered, or is recovered as a waste for treatment or disposal, the Reportable Quantity (U.S. DOT) is 1 000 lbs (Based on the sulfuric acid content of the solution spilled). Comply with Federal, State, and local regulations on reporting releases.
Protective equipment	Review Fire Fighting Measures and Handling (Personnel Protection) sections before proceeding with clean-up. Use appropriate PERSONAL PROTECTIVE EQUIPMENT during clean-up.

SECTION 7. HANDLING AND STORAGE

Handling	Do not get in eyes, on skin, or on clothing. Avoid breathing vapours or mist. Wear approved respirators if adequate ventilation cannot be provided. Wash thoroughly after handling. Ingestion or inhalation : Seek medical advice **immediately** and provide medical personnel with a copy of this MSDS.
Conditions for storage	Sulfuric acid must be stored in containers or tanks that have been specially designed for use with sulfuric acid. **DO NOT** add water or other products to contents in containers as violent reactions will result with resulting high heat, pressure and/or generation of hazardous acid mists. Keep containers away from heat, sparks, and flame. All closed containers must be safely vented before each opening. For more information on sulfuric acid tanks, truck tanks and tank cars including safe unloading information go to www.norfalco.com.

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

		Control parameters	
		ACGIH (U.S.A.) 2008	OSHA (U.S.A.)
Name	**# CAS**	**TLV-TWA (mg/m³)**	**PEL - TWA (mg/m³)**
Sulfuric (Acid)	7664-93-9	0.2 (thoracic fr.)	1
60 Deg Technical	7664-93-9	0.2 (thoracic fr.)	1
66 Deg Technical	7664-93-9	0.2 (thoracic fr.)	1
1.835 Electrolyte	7664-93-9	0.2 (thoracic fr.)	1
98 % Technical	7664-93-9	0.2 (thoracic fr.)	1
99 % Technical	7664-93-9	0.2 (thoracic fr.)	1
100 % Technical	7664-93-9	0.2 (thoracic fr.)	1
Water	7732-18-5	Not established	Not established

ACGIH : American Conference of Governmental Industrial Hygienists. OSHA : Occupational Safety and Health Administration.

Note : **Sulfuric (Acid) :** Exposure limits may be different in other jurisdictions. NIOSH REL-TWA (≤10 hours) : 1 mg/m³ ; IDLH : 15 mg/m³. *Consult local authorities for acceptable exposure limits.*

Engineering Controls Good general ventilation should be provided to keep vapour and mist concentrations below the exposure limits.

Individual protection Chemical splash goggles ; Full-length face shield/chemical splash goggles combination ; Acid-proof gauntlet gloves, apron, and boots ; Long sleeve wool, acrylic, or polyester clothing ; Acid proof suit and hood ; Appropriate NIOSH respiratory protection.

In case of emergency or where there is a strong possibility of considerable exposure, wear a complete acid suit with hood, boots, and gloves. If acid vapour or mist are present and exposure limits may be exceeded, wear appropriate NIOSH respiratory protection.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State and Appearance	Liquid (Oily ; Clear to turbid)	**Odour**	Odourless
Molecular Weight	98.08	**Colour**	Colourless to light grey
pH (1% soln/water)	< 1	**Volatility**	< 1 (Butyl Acetate = 1.0)
Boiling Point	193°C to 327 °C (379°F to 621°F) @ 760 mm Hg	**Vapour Density**	3.4
Melting Point	-35°C to 11°C (-31°F to 52°F)	**Dispersion**	Yes (Water)
Vapour Pressure	< 0.3 mm Hg @ 25°C (77 °F) < 0.6 mm Hg @ 38°C (100 °F)	**Solubility**	Yes (Water)

GRADE	Boiling Point		Freezing Point		Specific Gravity
	DEG °C	DEG °F	DEG °C	DEG °F	
60 DEG TECHNICAL	193	380	- 12	10	1.706
66 DEG TECHNICAL	279	535	- 35	- 31	1.835
1.835 ELECTROLYTE	279	535	- 35	- 31	1.835
98 % TECHNICAL	327	621	- 2	29	1.844
99 % TECHNICAL	310	590	4	40	1.842
100 % TECHNICAL	274	526	11	51	1.839

SECTION 10. STABILITY AND REACTIVITY

Stability Yes (Under normal conditions of ambiant temperature)

Reactivity Reacts violently with water, organic substances and base solutions with evolution of heat and hazardous mists.

Conditions to avoid Heat : Possibility of decomposition. Release of dangerous gases (Sulfur oxides SO_2, SO_3)

Polymerization Polymerization will not occur.

Incompatibilities Vigorous reactions with : Water; alkaline solutions ; Metals, metal powder ; Carbides ; Chlorates ; Fulminates ; nitrates ; Picrates ; Strong oxidizing, reducing, or combustible organic materials. Hazardous gases are evolved on contact with chemicals such as cyanides, sulfides, and carbides.

Corrosivity Yes

SECTION 11. TOXICOLOGICAL INFORMATION

Routes of Entry Ingestion. Inhalation. Skin and eye contacts.

Carcinogenicity **Strong inorganic acid mists containing sulfuric acid (Occupational exposures) :** PROVEN (Human, Group 1, IARC) ; SUSPECTED (Human, Group A2, ACGIH) ; Group X (NTP) ; Classification not applicable to sulfuric acid and sulfuric acid solutions.

Mutagenicity Not applicable.

Teratogenicity Not applicable.

Acute toxicity ORAL (LD50) : 2 140 mg/kg (Rat) ; INHALATION (LC50, 2 hours) : 510 mg/m³ (Rat) ; 320 mg/m³ (Mouse). (RTECS).

Acute Effects May be **fatal** if inhaled or ingested in large quantity. Liquids or acid mists : May produce tissue damage : Mucous membranes (Eyes, mouth, respiratory tract). **Extremely** dangerous by eyes and skin contact **(Corrosive)**. Severe irritant for eyes : Inflammation (Redness, watering, itching). Very dangerous in case of inhalation (Mists) at high concentrations : May produce severe irritation of respiratory tract (Coughing, shortness of breath, choking).

Chronic Effects Target organs for acute and chronic overexposure (NIOSH 90-117) : Respiratory system, eyes, skin, teeth.

Acid mists : Overexposure to strong inorganic mists containing sulfuric acid : Possibility of laryngeal cancer (HSBD, IARC). Possibility of irritation of the nose and throat with sneezing, sore throat or runny nose. Headache, nausea and weakness. Gross overexposure : Possibility of irritation of nose, throat, and lungs with cough, difficulty breathing or shortness of breath. Pulmonary edema with cough, wheezing, abnormal lung sounds, possibly progressing to severe shortness of breath and bluish discoloration of the skin. Symptoms may be delayed. Repeated or prolonged exposure to mists may cause : Corrosion of teeth.

Contact (Skin) : Possibility of corrosion, burns or ulcers. Contact with a 1 % solution : Possibility of slight irritation with itching, redness or swelling. Repeated or prolonged exposure (Mist) : Possibility of irritation with itching, burning, redness, swelling or rash.

Contact (Eye) : Possibility of corrosion or ulceration (Blindness may result). Repeated or prolonged exposure (Mist) : Possibility of eye irritation with tearing, pain or blurred vision.

Ingestion : Immediate effects of overexposure : Burns of the mouth, throat, esophagus and stomach, with severe pain, bleeding, vomiting, diarrhea and collapse of blood pressure. Damage may appear days after exposure.

Toxicity

Persons with the following pre-existing conditions warrant particular attention :
Sulfuric (Acid) : Laryngeal irritation.

Eating, drinking and smoking must be prohibited in areas where this material is handled and processed. Wash hands and face before eating, drinking and smoking.

SECTION 12. ECOLOGICAL INFORMATION

Ecotoxicity

Aquatic toxicity : Slightly to moderately toxic.
Bluegill Sunfish (LC50 ; 48 hours) : 49 mg/l (Tap water, 20 °C, conditions of bioessay not specified). (HSBD).
Flounder (LC50 ; 48 hours) : 100-330 mg/l (Aerated water, conditions of bioessay not specified). (HSBD).

Toxicity to Animals

EYE : Concentrated compound is corrosive. 10 % solution : Moderate eye irritant.
SKIN : Concentrated compound is corrosive. 10 % solution : Slight skin irritant.
Single and repeated exposure : Irritation of the respiratory tract ; Corrosion of the respiratory tract ; Lung damage ; Labored breathing ; Altered respiratory rate ; Pulmonary oedema. Repeated exposure : Altered red blood cell count.

Mobility (Soil)

Easy soil seeping under rain action

Persistence and degradability

Sulfate ion : Ubiquitous in the environment. Metabolized by micro-organisms and plants.

Bioaccumulation

Sulfate ion : Ubiquitous in the environment. Metabolized by micro-organisms and plants whitout bioaccumulation.

Biodegradation Products

Not available

Biodegradation Products (Toxicity)

Not applicable

Remarks on Environment

Due to the product's composition, particular attention must be taken for transportation and storage. Protect from rain because the run-off water will become acidic and may be harmful to flora and fauna.

BOD5 and COD

Not available

SECTION 13. DISPOSAL CONSIDERATIONS

Disposal methods

Cleaned-up material may be an hazardous waste on *Resource Conservation and Recovery Act* (RCRA) on disposal due to the corrosivity characteristic. **DO NOT** flush to surface water or sanitary sewer system. Comply with Federal, State, and local regulations. If approved, neutralize and transfer to waste treatment system.

SECTION 14. TRANSPORT INFORMATION

TDG (Canada)

CLASS 8 Corrosives

PIN

UN1830 SULFURIC ACID PG II

Special Provisions (Transport)

None

DOT (U.S.A.)/IMO (Maritime)

Proper Shipping Name	SULFURIC ACID
Hazard Class	8
UN N°	1830
DOT/IMO Label	CORROSIVE
Packing Group	II
Reportable Quantity	1000 lbs (454 kg)
Shipping Containers	Tank Cars, Tank Trucks, Vessel

ERG

Guide 137

SECTION 15 REGULATORY INFORMATION

Labeling (EEC)

EU (Directive 67/548/EEC) :
Sulfuric (Acid) : C Corrosive (Pictogram)
Annex I Index number : 016-020-00-8 ; EU Consolidated Inventories : EC Number 231-639-5
C ≥ 15 % C ; R35 ; S2, 26, 30, 45.

Risk Phrases (EEC)

R35- Causes severe burns

Safety Phrases (EEC)

S26- In case of contact with eyes, rinse immediately with plenty of water and seek medical advice
S30- Nerver add water to this product
S36/37/39- Wear suitable protective clothing, gloves and eye/face protection
S45- In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

CEPA DSL (CANADA)	CANADIAN ENVIRONMENTAL PROTECTION ACT (CEPA) : On the Domestic Substances List (DSL) ; Acceptable for use under the provisions of CEPA. Sulfuric Acid is a Class B Drug Precursor under *Health Canada's Controlled Drugs and Substances Act* and *Precursor Control Regulations*.
Regulations (U.S.A.)	CERCLA Section 103 Hazardous substances (40 CFR 302.4) ; SARA Section 302 Extremely Hazardous Substances (40 CFR 355) : Yes ; SARA Section 313, Toxic Chemicals (40 CFR 372.65) ; US: TSCA Inventory : Listed : **Sulfuric (Acid)** (Final RQ) : 1 000 pounds (454 kg) Sulfuric Acid is subject to reporting requirements of Section 313, *Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA)*, 40 CFR Part 372. Certain companies must report emissions of Sulfuric Acid as required under *The Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA)*, 40 CFR Part 302 For more information call the *SARA Hotline* 800-424-9346. Strong Inorganic Acid Mists Containing Sulfuric Acid : Chemical listed effective March 14, 2003 to the *State of California, Proposal 65.* *U.S. FDA Food Bioterrorism Regulations* : These regulations apply to Sulfuric Acid when being distributed, stored or used for Food or Food Processing.
Classifications HCS (U.S.A.)	Corrosive liquid

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

Fire Hazard	**0**	**Reactivity**	**2**	**Health**	**3**	**Special Hazard**	**ACID**

NPCA- HMIS Rating

Fire Hazard	**0**	**Reactivity**	**2**	**Health**	**3**

SECTION 16. OTHER INFORMATION

References

- TLVs and BEIs (2008). Based on the Documentation of the Threshold Limit Values for Chemical Substances and Physical Agents & Biological Exposure Indices. ACGIH, Cincinnati, OH – http://www.acgih.org
- CCOHS (2008) - Canadian Centre for Occupational Health and Safety - http://www.ccohs.ca/
- CSST (2008) - Commission de la Santé et de la Sécurité du Travail (Québec). Service du répertoire toxicologique - http://www.reptox.csst.qc.ca/
- ERG (2008). Emergency Response Guidebook, Developed by the U.S. Department of Transportation, Transport Canada, and the Secretariat of Communications and Transportation of Mexico
- HSDB (2008) - Hazardous Substances Data Bank. TOXNET® Network of databases on toxicology, hazardous chemicals, and environmental health. NLM Databases & Electronic Resources, U.S. National Library of Medicine, NHI, 8600 Rockville Pike, Bethesda, MD 20894 - http://toxnet.nlm.nih.gov/cgi-bin/sis/htmlgen?HSDB
- IARC - Monographs on the Evaluation of Carcinogenic Risks to Humans (collection) - http://www-cie.iarc.fr/
- Merck Index (1999). Merck & CO., Inc, 12th edition
- NIOSH U.S. (2008) - Pocket Guide to Chemical Hazards - http://www.cdc.gov/niosh/npg/
- Patty's Industrial Hygiene and Toxicology, 3rd Revised Edition
- Règlement sur les produits contrôlés (Canada)
- RTECS (2008). Registry of Toxic Effects of Chemical Substances, NIOSH, CDC
- Toxicologie industrielle & intoxication professionnelle, 3e édition, Lauwerys

Glossary

CSST	: Commission de la Santé et de la Sécurité du Travail (Québec).
HSDB	: Hazardous Substances Data Bank.
IARC	: International Agency for Research on Cancer.
NIOSH	: National Institute of Occupational Safety and Health.
NTP	: U.S. National Toxicology Program.
RTECS	: Registry of Toxic Effects of Chemical Substances

Note

For further information, see NorFalco Inc. Sulfuric Acid « Storage and Handling Bulletin ».

Because of its corrosive characteristics and inherent hazards, Sulfuric Acid should not be used in sewer or drain cleaners or any similar application; regardless of whether they are formulated for residential, commercial or industrial use. NorFalco will not knowingly sell sulfuric acid to individuals or companies who repackage the product for sale as sewer or drain cleaners, or any other similar use.

The data in this Material Safety Data Sheet relates only to the specific material designated herein and does not relate to use in combination with any other material or in any process.

For additional information, please visited our website : www.norfalco.com

Written by : Groupe STEM Consultants / NorFalco Sales Inc.
Complete revision : 2009-01-24 **Partial review :** None **Previous complete revision :** 2008-01-24

Verified by : Guy Desgagnés and Eric Kuraitis, Technical Representative - Sulfuric Acid
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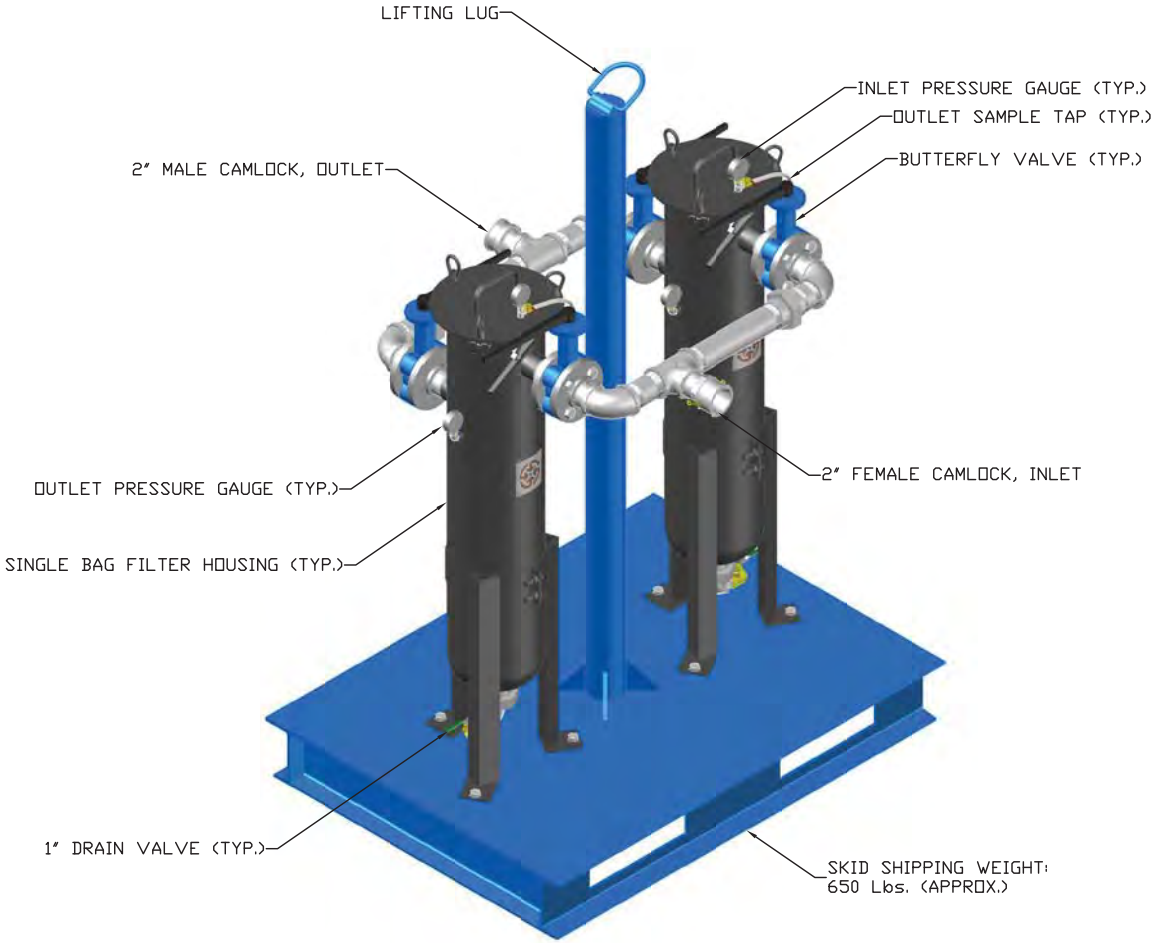
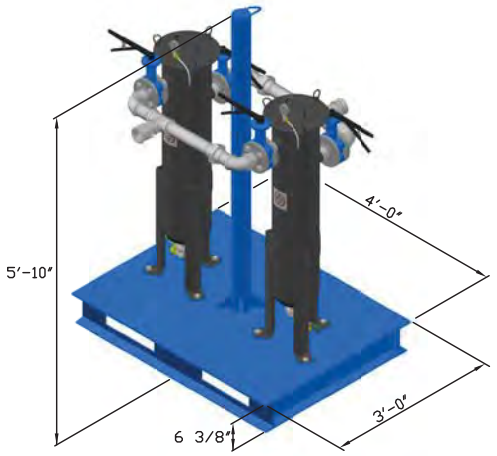
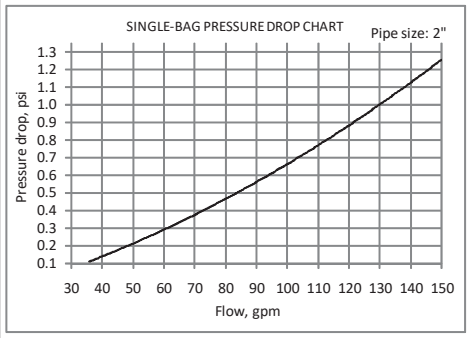
NorFalco Sales Inc., 6755 Mississauga Road, Suite 304, Mississauga, Ontario L5N 7Y2

Notice to Reader





NOTE: THIS DRAWING DEPICTS A "TYPICAL" SKID.
ACTUAL DETAILS AND DIMENSIONS MAY VARY.

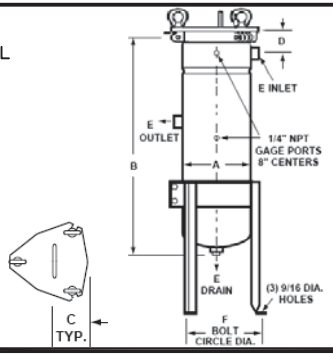


SINGLE BAG FILTER SPECIFICATIONS

- CONSTRUCTION:	CARBON STEEL
- HOUSING STYLE:	STANDARD
- NUMBER OF BASKETS:	1
- STRAINING FILTERING AREA:	26.4 SQR. FT.
- INLET/OUTLET SIZE:	2"
- DRAIN SIZE (1x):	2"
- NOMINAL FLOW RATE:	100 GPM
- STANDARD PRESSURE:	125 PSI
- WEIGHT (PER DRY UNIT):	70 Lbs.

BASIC DIMENSIONS

MODEL NUMBER & A: 8 (8.6")
LEG BOLT CIRCLE F: ø12.0"
B: 35.9" C: 6.0"
D: 3.5" E: 2.0"



NO.	REVISIONS	DATE
C	ADDED SKID WEIGHT	02/18/09

DUPLEX SINGLE BAG FILTER SKID STANDARD EQUIPMENT SPECIFICATION

SCALE: NTS	APPROVED BY: JB	DRAWN BY: AAV	
DATE: 02/18/09			

GROUND/WATER TREATMENT & TECHNOLOGY
P.O. BOX 1174
DENVILLE, NJ 07834

DWG SIZE: A	SHEET: 1 OF 1	DRAWING NUMBER: ST-0002-SPC	C

TENCATE Mirafi®

Mirafi® 140N

Mirafi® 140N is a needlepunched nonwoven geotextile composed of polypropylene fibers, which are formed into a stable network such that the fibers retain their relative position. Mirafi® 140N is inert to biological degradation and resists naturally encountered chemicals, alkalis, and acids. Mirafi® 140N meets Aashto M288-06 Class 3 for elongation > 50%.

Mechanical Properties	Test Method	Unit	Minimum Average Roll Value	
			MD	CD
Grab Tensile Strength	ASTM D4632	lbs (N)	120 (534)	120 (534)
Grab Tensile Elongation	ASTM D4632	%	50	50
Trapezoid Tear Strength	ASTM D4533	lbs (N)	50 (223)	50 (223)
CBR Puncture Strength	ASTM D6241	lbs (N)	310 (1380)	
Apparent Opening Size (AOS)[1]	ASTM D4751	U.S. Sieve (mm)	70 (0.212)	
Permittivity	ASTM D4491	sec^{-1}	1.7	
Flow Rate	ASTM D4491	$gal/min/ft^2$ ($l/min/m^2$)	135 (5500)	
UV Resistance (at 500 hours)	ASTM D4355	% strength retained	70	

[1] ASTM D4751: AOS is a Maximum Opening Diameter Value

Physical Properties	Unit	Typical Value	
Roll Dimensions (width x length)	ft (m)	12.5 x 360 (3.8 x 110)	15 x 360 (4.5 x 110)
Roll Area	yd^2 (m^2)	500 (418)	600 (502)
Estimated Roll Weight	lb (kg)	133 (60)	160 (72)

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Made in USA

TENCATE™
materials that make a difference

`FGS000385
ETQR54

Applied Polymer Systems

519 Industrial Drive, Woodstock, GA 30189
www.siltstop.com
Phone: 678-494-5998
Toll-free: 866-200-9868
Fax: 678-494-5298

APS 700 Series Floc Logs®

Polyacrylamide Sediment and Turbidity Control Applicator Logs

APS 700 Series Floc Logs are a group of soil-specific tailored log-blocks that contain blends of water treatment components and polyacrylamide co-polymer for water clarification. They reduce and prevent fine particles and colloidal clays from suspension in stormwater. There are several types of Floc Logs designed to treat most water and soil types. Contact Applied Polymer Systems, Inc. or your local distributor for free testing and site-specific application information.

Primary Applications

- Mine tailings and waste pile ditches
- Stormwater drainage from construction and building sites
- Road and highway construction runoff ditches
- Ditch and treatment system placement for all forms of highly turbid waters (less than 4% solids)
- Dredging operations as a flocculent

Features and Benefits

- Removes solubilized soils and clay from water
- Prevents colloidal solutions in water within ditch systems
- Binds cationic metals within water, reducing solubilization
- Binds pesticides and fertilizers within runoff water
- Reduces operational and cleanup costs
- Reduces environmental risks and helps meet compliance

Specifications / Compliances

- ANSI/NSF Standard 60 Drinking water treatment chemical additives
- 48h or 96h Acute Toxicity Tests (*D. magna* or *O. mykiss*)
- 7 Day Chronic Toxicity Tests *(P. promealas* or *C. dubia*

Packaging

APS 700 Series Floc Logs are packaged in boxes of four (4)

Technical Information

Appearance - semi-solid block
Biodegradable internal coconut skeleton
Percent Moisture - 40% maximum
pH 0.5% Solution - 6-8
Shelf Life – up to 5 years when stored out of UV rays

Applied Polymer Systems

519 Industrial Drive, Woodstock, GA 30189
www.siltstop.com
Phone: 678-494-5998
Toll-free: 866-200-9868
Fax: 678-494-5298

Placement

Floc Logs are designed for placement within ditches averaging three feet wide by two feet deep. Floc log placement is based on gallon per minute flow rates. Note: actual GPM or dosage will vary based on site criteria and soil/water testing.

Directions for Use

(Water and Floc Log Mixing is Very Important!)

APS 700 Series Floc Logs should be placed within the upper quarter to half of a *stabilized* ditch system or as close as possible to active earth moving activities. Floc Logs have built in ropes with attachment loops which can be looped over stakes to ensure they remain where placed. Mixing is key! If the flow rate is too slow, adding sand bags, cinder blocks, etc., can create the turbulence required for proper mixing. Floc Logs are designed to treat dirty water, not liquid mud; when the water contains heavy solids (exceeding 4%), it will be necessary to create a sediment or grit pit to let the heavy solids settle before treating the water.

Floc Logs must not be placed in areas where heavy erosion would result in the Floc Logs becoming buried. Where there is heavy sedimentation, maintenance will be required.

APS 700 Series Floc Logs can easily be moved to different locations as site conditions change. Water quality will be improved with the addition of a dispersion field or soft armor covered ditch checks below the Floc Log(s) to collect flocculated particulate. Construction of mixing weirs may be required in areas where short ditch lines, swelling clays, heavy particle concentrations, or steep slopes may be encountered.

Cleanup:

Latex or rubber gloves are recommended for handling during usage. Use soap and water to wash hands after handling.

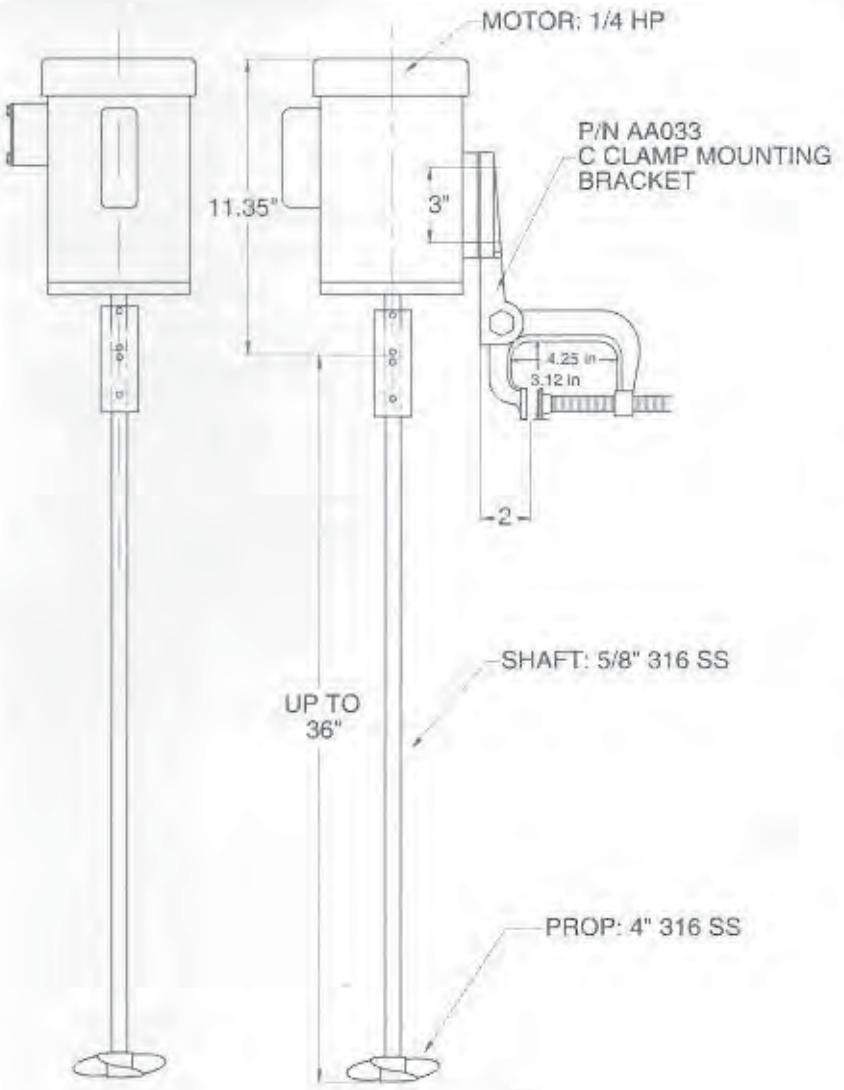
Precautions / Limitations

- APS 700 Series Floc Logs are extremely slippery when wet.
- Clean up spills quickly. Do not use water unless necessary as extremely slippery conditions will result and if water is necessary, use pressure washer.
- APS Floc Log will remain viable for up to 5 years when stored out of UV rays.
- APS 700 Series Floc Logs have been specifically tailored to specific water and soil types and samples must be tested. Testing is necessary and is free.
- For product information, treatment system design assistance, or performance issues, contact Applied Polymer Systems.

pH System Components

MADDEN

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.

PULSAFEEDER®
An IDEX Water & Wastewater Business

pulsafeeder.com

The Pulsatron Series E Plus 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.

Twenty distinct models are available, having pressure capabilities to 300 PSIG (21 BAR) @ 3 GPD (0.5 lph), and flow capacities to 600 GPD (94.6 lph) @ 30 PSIG (2 BAR), with a turndown ratio of 100:1. Metering performance is reproducible to within ± 2% of maximum capacity.
Please refer to the reverse side for Series E PLUS specifications.

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.
- Safe & Easy Priming with durable leak-free bleed valve assembly (standard).

Controls

Manual Stroke Rate
- Turn-Down Ratio 10:1

Manual Stroke Length
- Turn-Down Ratio 10:1

4-20mADC Direct or External Pacing with Stop
- 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)

PULSAtron® Series E Plus Electronic Metering Pumps

PULSAtron® Series E Plus

Specifications and Model Selection

MODEL		LPK2	LPB2	LPA2	LPD3	LPB3	LPA3	LPK3	LPF4	LPD4	LPB4	LPH4	LPG4	LPE4	LPK5	LPH5	LPH6	LPK7	LPH7	LPJ7	LPH8
Capacity	GPH	0.13	0.21	0.25	0.5	0.50	0.50	0.60	0.85	0.90	1.00	1.70	1.75	1.85	2.50	3.15	5.00	8.00	10.00	10.00	25.00
nominal	GPD	3	5	6	12	12	12	14	20	22	24	41	42	44	60	76	120	192	240	240	600
(max.)	LPH	0.5	0.8	0.9	1.9	1.9	1.9	2.3	3.2	3.4	3.8	6.4	6.6	7	9.5	11.9	18.9	30.3	37.9	37.9	94.6
Pressure	PSIG	300	250	150	250	150	100	100	250	150	100	250	150	100	150	150	100	50	35	80	30
(max.)	BAR	21	17	10	17	10	7	7	17	10	7	17	10	7	10	10	7	3.3	2.4	5.5	2
Connections	Tubing	1/4" ID X 3/8" OD 3/8" ID X 1/2" OD													3/8" ID X 1/2" OD 1/2" ID X 3/4" OD (LPH8 ONLY)						
	Piping	1/4" FNPT													1/4" FNPT 1/2" FNPT						

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 :	

For viscosity up to 3000 CPS, select connection size 3, 4, B or C with 316SS ball material. Flow rate will determine connection/ball size. Greater than 3000 CPS require spring loaded ball checks. See Selection Guide for proper connection.

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
Peak Input Power:	300 Watts
Average Input Power @ Max SPM:	130 Watts

Custom Engineered Designs – Pre-Engineered Systems

Pre-Engineered Systems

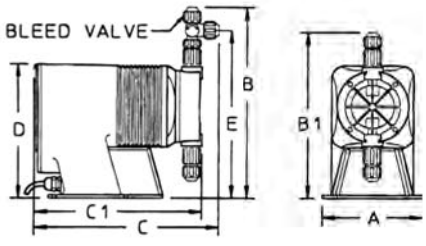
Pulsafeeder's Pre-Engineered Systems are designed to provide complete chemical feed solutions for all electronic metering applications. From stand alone simplex pH control applications to full-featured, redundant sodium hypochlorite disinfection metering, these rugged fabricated assemblies offer turn-key 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 E Plus Dimensions (inches)

Model No.	A	B	B1	C	C1	D	E	Shpg Wt	Model No.	A	B	B1	C	C1	D	E	Shpg Wt
LPA2	5.4	10.3	-	10.8	-	7.5	8.9	13	LPH4	6.2	10.9	-	11.2	-	8.2	9.5	21
LPA3	5.4	10.6	-	10.7	-	7.5	9.2	13	LPH5	6.2	11.3	-	11.2	-	8.2	9.9	21
LPB2	5.4	10.3	-	10.8	-	7.5	8.9	13	LPH6	6.2	11.3	-	11.9	-	8.2	9.9	21
LPB3	5.4	10.6	-	10.7	-	7.5	9.2	13	LPH7	6.1	11.7	-	11.9	-	8.2	10.3	21
LPB4	5.4	10.6	-	10.7	-	7.5	9.2	13	LPH8*	6.1	-	10.9	-	11.3	8.2	-	26
LPD3	5.4	10.6	-	11.2	-	7.5	9.2	15	LPK2	5.4	10.3	-	10.8	-	7.5	8.9	13
LPD4	5.4	10.6	-	11.2	-	7.5	9.2	15	LPK3	5.4	10.6	-	10.7	-	7.5	9.2	13
LPE4	5.4	10.6	-	11.2	-	7.5	9.2	15	LPK5	5.4	10.9	-	11.7	-	7.5	9.5	18
LPF4	5.4	10.6	-	11.7	-	7.5	9.2	18	LPK7	6.1	11.7	-	11.2	-	8.2	10.3	21
LPG4	5.4	10.6	-	11.7	-	7.5	9.2	18	LPJ7	6.1	10	-	10.7	-	-	-	21

NOTE: Inches X 2.54 = cm /* the LPH8 is designed without a bleed valve available



+GF+® Signet pH/ORP Controllers

Versatile mounting options allow you to customize the installation for particular applications

NEW

- Large, scratch-resistant, self-healing display

+GF+ Signet controllers are designed for broad application and ease of setup and operation. Multiple mounting options allow for installation best suited to your particular application. Intuitive software and four-button keypad arrangement make it easy to access important information such as measurement values, calibration data, relay setup menus, and more.

Optional universal mounting kit allows for mounting of field-mount units on pipes, tanks, and walls. RC filter kit prevents premature wearing of the relay outputs by providing protection from electrical noise. Order separately below.

Required *System Components*

1. Controller
2. Preamplifier
3. Electrode

Field-mount controller 56560-20

Panel-mount controller 56560-30

Specifications

ISO9001:2000 CERTIFIED SUPPLIER · c UL us · CE · IP65 Meter only · 2 year warranty Meter only

Model		+GF+ Signet 8750-1	+GF+ Signet 8750-2	+GF+ Signet 8750-3
Range	pH	0.00 to 14.00	0.00 to 14.00	0.00 to 14.00
	mV	–1000 to 2000 mV	–1000 to 2000 mV	–1000 to 2000 mV
	Temperature	–13 to 248°F (–25 to 120°C)	–13 to 248°F (–25 to 120°C)	–13 to 248°F (–25 to 120°C)
Resolution	pH	0.01	0.01	0.01
	mV	1 mV	1 mV	1 mV
	Temperature	0.1°C (0.1°F)	0.1°C (0.1°F)	0.1°C (0.1°F)
Accuracy	pH	±0.03	±0.03	±0.03
	mV	±2 mV	±2 mV	±2 mV
	Temperature	±0.5°C (±1°F)	±0.5°C (±1°F)	±0.5°C (±1°F)
Temperature compensation		Automatic, 3 kΩ Balco	Automatic, 3 kΩ Balco	Automatic, 3 kΩ Balco
Control type		On/off (limit) or proportional	On/off (limit) or proportional	On/off (limit) or proportional
Number of set points		Two (low, high)	Two (low, high)	Two (low, high)
Output	Relay	—	Two SPDT relays, 5 A at 30 VDC or 250 VAC resistive load maximum	—
	Current	One 4 to 20 mA, isolated, fully adjustable and reversible	One 4 to 20 mA, isolated, fully adjustable and reversible	Two 4 to 20 mA, isolated, fully adjustable and reversible
	Open collector	One open-collector, optically isolated, 50 mA max	—	Two open-collector, optically isolated, 50 mA max
Dead band		User adjustable	User adjustable	User adjustable
Housing		NEMA 4X (IP65) front panel	NEMA 4X (IP65) front panel	NEMA 4X (IP65) front panel
Display		2 x 16 alphanumeric LCD	2 x 16 alphanumeric LCD	2 x 16 alphanumeric LCD
Dimensions (W x H x D)		Field-mount: 3 13/16" x 3 13/16" x 4 3/16" (96 x 96 x 106 mm) Panel-mount: 3 13/16" x 3 13/16" x 3 13/16" (96 x 96 x 97 mm)		
Power		12 to 24 VDC	12 to 24 VDC	12 to 24 VDC

1 Controllers

Catalog number	Model	Mounting style	Price
S-56560-18 **S-56560-28**	+GF+ Signet 8750-1 +GF+ Signet 8750-1P	Field mount Panel mount, ¼ DIN	
S-56560-20 **S-56560-30**	+GF+ Signet 8750-2 +GF+ Signet 8750-2P	Field mount Panel mount, ¼ DIN	
S-56560-22 **S-56560-32**	+GF+ Signet 8750-3 +GF+ Signet 8750-3P	Field mount Panel mount, ¼ DIN	

S-05631-50 Universal mounting kit for field-mount units .....

S-19007-52 RC filter kit for relay use. Pack of 2 .....

S-17106-20 NIST-traceable calibration .....

2 Preamplifiers

Preamplifiers protect the relatively weak output signal of the pH or ORP electrode from electrical interferences common in industrial environments and are required for initial system installation. Unique DryLoc® connectors allow you to quickly form robust assemblies for submersible and in-line applications.

Catalog number	Thread size	Price
S-56560-03 **S-56560-04**	¾" NPT(M) ISO 7-1 R¾"	

DryLoc® pH and ORP electrodes

3 Electrodes

Feature-packed pH and ORP electrodes feature unique DryLoc connectors which offer resistance to intrusion from dirt and moisture. Extended reference path length extends electrode life over traditional combination electrodes. Electrode bodies are Ryton® PPS for added chemical resistance and feature a ¾" NPT(M) or ISO 7-1 R¾" threads for in-line installation. Flat-surface electrodes minimize abrasion and breakage problems by allowing sediment to sweep past the measurement surface. Bulb-style electrodes feature quick response and are well-suited to general-purpose applications. HF-resistant electrodes resist hydrofluoric acid in concentration less than 2%. LC-bulb electrodes are designed for ultrapure, low-conductivity water applications. All have a 3 kΩ Balco ATC element and measure 0 to 14 pH.

Catalog number	Type	Thread size	Price
S-56561-02 **S-56561-03**	pH, flat surface	¾" NPT(M) ISO 7-1 R¾"	
S-56561-10 **S-56561-11**	pH, bulb style	¾" NPT(M) ISO 7-1 R¾"	
S-56561-06 **S-56561-07**	pH, HF-resistant bulb	¾" NPT(M) ISO 7-1 R¾"	
S-56561-14 **S-56561-15**	pH, LC bulb	¾" NPT(M) ISO 7-1 R¾"	
S-56561-16 **S-56561-17**	ORP, flat surface	¾" NPT(M) ISO 7-1 R¾"	

NorFalco Inc.
NorFalco Sales Inc.

Material Safety Data Sheet

77% - 100% SULFURIC ACID

SECTION 1. PRODUCT IDENTIFICATION

Trade Name	**77 % - 100 % Sulfuric Acid**
Product Code	None
Manufacturers/Distributors	NorFalco Inc., 6000 Lombardo Center, The Genesis Blg, suite 650 Seven Hills, OH 44131 NorFalco Sales Inc., 6755 Mississauga Road, Suite 304, Mississauga, Ontario L5N 7Y2
Information Contact	André Auger, Administration Assistant
Product Information	1-905-542-6901 (Mississauga)
Phone Number (Transportation Emergency)	Canada 1-877-ERP-ACID (377-2243)
Phone Number (Transportation Emergency)	U.S.A. 1-800-424-9300 CHEMTREC
Phone Number (Medical Emergency)	**1-418-656-8090**
Phone Number (Emergency)	**CANUTEC 1-613-996-6666**
Synonyms	Dihydrogen Sulfate ; Oil of Vitriol ; Vitriol Brown Oil ; Sulphuric Acid. Acide sulfurique (French)
Name / Chemical Formula	Sulfuric Acid / H_2SO_4
Chemical Family	Acid
Utilization	Chemical industries ; Water treatment ; Fertilizer ; Pulp and Paper.
Manufacturers	CEZinc on behalf of Noranda Income Limited Partnership, Salaberry-de-Valleyfield (Quebec) Canada J6T 6L4 Xstrata Copper, Horne Smelter, Rouyn-Noranda (Quebec) J9X 5B6 Xstrata Zinc, Brunswick Smelting, Belledune, New Brunswick E0B 1G0 Xstrata Copper, Kidd Metallurgical Division, Timmins, Ontario P4N 7K1 Xstrata Nickel, Sudbury Operations, Falconbridge, Ontario P0M 1S0

SECTION 2. HAZARDS IDENTIFICATION

WHMIS (Canada) CLASS D-1A : Very toxic material causing immediate and serious effects
CLASS E : Corrosive material

Labeling (EEC) C Corrosive

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Name	CAS #	Percentage (%)	# CE	R Phrases[1]
Sulfuric (Acid)	7664-93-9	77 % to 100 %	231-639-5	R35
60 Deg Technical		77.7		
66 Deg Technical		93.2		
1.835 Electrolyte		93.2		
98 % Technical		98		
99 % Technical		99		
100 % Technical		100		
Water	7732-18-5	0-22		

Note 1 : See section 15 for the complete wording of risk phrases.

SECTION 4. FIRST-AID MEASURES

Eye Contact Remove contact lenses if present. Immediately flush eyes with plenty of water, holding eyelids open for at least 15 minutes. Consult a physician. Possibility of conjonctivitis, severe irritation, severe burns, permanent eye damage.

Skin Contact Remove contaminated clothing and shoes as quickly as possible protecting your hands and body. Place under a deluge shower for 15 minutes. Flush exposed skin gently and thoroughly with running water (Pay particular attention to : Folds, crevices, creases, groin). Call a physician if irritation persists. May irritate skin, cause burns (Highly corrosive) and possibility of some scarring.

Wash contaminated clothing before reusing. While the patient is being transported to a medical facility, continue the application of cold, wet compresses. If medical treatment must be delayed, repeat the flushing with cold water or soak the affected area with cold water to help remove the last traces of sulfuric acid. *Creams or ointments* ***SHOULD NOT*** *be applied before or during the washing phase of treatment.*

Inhalation Take precautions to avoid secondary contamination by residual acids. Remove the person to fresh air. If not breathing, give artificial respiration. Difficult breathing : Give oxygen. Get immediate medical attention. Possibility of damage to the upper respiratory tract and lung tissues. Maintain observation of the patient for delayed onset of pulmonary oedema. May cause irritation to the upper respiratory tract : Coughing, sore throat, shortness of breath.

Ingestion **DO NOT** INDUCE VOMITING. Conscious and alert person : Rinse mouth with water and give ½ to 1 cup of water or milk to dilute material. **Spontaneous vomiting** : Keep head below hips to prevent aspiration ; Rinse mouth and give ½ to 1 cup of water or milk. **UNCONSCIOUS** person : **DO NOT** induce vomiting or give any liquid. **Immediately** obtain medical attention.

Notes to Physicians
Continued washing of the affected area with cold or iced water will be helpful in removing the last traces of sulfuric acid. Creams or ointments should not be applied before or during the washing phase of the treatment.

SECTION 5. FIRE-FIGHTING MEASURES

Flash Point	Not available
Flammable Limits	Not available
Auto-Ignition Temperature	Not available
Products of Combustion	Releases of sulfur dioxide at extremely high temperatures.
Fire Hazard	Not flammable
Explosion Hazard	Reacts with most metals, especially when dilute ; Hydrogen gas release (**Extremely** flammable, explosive). Risk of explosion if acid combined with water, organic materials or base solutions in enclosed spaces (Vaccum trucks, tanks). Mixing acids of different strengths/concentrations can also pose an explosive risk in an enclosed space/container.
Extinguishing media	ERG (Emergency Response Guidebook) : Guide 137 When material is not involved in fire, do not use water on material itself. **Small fire :** Dry chemical or CO_2. Move containers from fire area if you can do it without risk. **Large fire:** Flood fire area with large quantities of water, while knocking down vapors with water fog. If insufficient water supply: knock down vapors only. **Fire involving Tanks or Car/Trailer Loads :** Cool containers with flooding quantities of water until well after fire is out. Do not get water inside containers. Withdraw immediately in case of rising sound from venting safety devices or discoloration of tank. ALWAYS stay away from tanks engulfed in fire.
Protective equipment	Evacuate personnel to a safe area. Keep personnel removed and upwind of fire. Generates heat upon addition of water, with possibility of spattering. Wear full protective clothing. Runoff from fire control may cause pollution. Neutralize run-off with lime, soda ash, etc., to prevent corrosion of metals and formation of hydrogen gas. Wear self-contained breathing apparatus if fumes or mists are present.

SECTION 6. ACCIDENTAL RELEASE MEASURES

Spill	Review **Fire and Explosion Hazards** and **Safety Precautions** before proceeding with clean up. Stop flow if possible. Soak up small spills with dry sand, clay or diatomaceous earth.
Methods	Dike large spills, and cautiously dilute and neutralize with lime or soda ash, and transfer to waste water treatment system. Prevent liquid from entering sewers, waterways, or low areas. If this product is spilled and not recovered, or is recovered as a waste for treatment or disposal, the Reportable Quantity (U.S. DOT) is 1 000 lbs (Based on the sulfuric acid content of the solution spilled). Comply with Federal, State, and local regulations on reporting releases.
Protective equipment	Review Fire Fighting Measures and Handling (Personnel Protection) sections before proceeding with clean-up. Use appropriate PERSONAL PROTECTIVE EQUIPMENT during clean-up.

SECTION 7. HANDLING AND STORAGE

Handling	Do not get in eyes, on skin, or on clothing. Avoid breathing vapours or mist. Wear approved respirators if adequate ventilation cannot be provided. Wash thoroughly after handling. Ingestion or inhalation : Seek medical advice **immediately** and provide medical personnel with a copy of this MSDS.
Conditions for storage	Sulfuric acid must be stored in containers or tanks that have been specially designed for use with sulfuric acid. **DO NOT** add water or other products to contents in containers as violent reactions will result with resulting high heat, pressure and/or generation of hazardous acid mists. Keep containers away from heat, sparks, and flame. All closed containers must be safely vented before each opening. For more information on sulfuric acid tanks, truck tanks and tank cars including safe unloading information go to www.norfalco.com.

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

		Control parameters	
		ACGIH (U.S.A.) 2008	OSHA (U.S.A.)
Name	**# CAS**	**TLV-TWA (mg/m³)**	**PEL - TWA (mg/m³)**
Sulfuric (Acid)	7664-93-9	0.2 (thoracic fr.)	1
60 Deg Technical	7664-93-9	0.2 (thoracic fr.)	1
66 Deg Technical	7664-93-9	0.2 (thoracic fr.)	1
1.835 Electrolyte	7664-93-9	0.2 (thoracic fr.)	1
98 % Technical	7664-93-9	0.2 (thoracic fr.)	1
99 % Technical	7664-93-9	0.2 (thoracic fr.)	1
100 % Technical	7664-93-9	0.2 (thoracic fr.)	1
Water	7732-18-5	Not established	Not established

ACGIH : American Conference of Governmental Industrial Hygienists. OSHA : Occupational Safety and Health Administration.

Note : **Sulfuric (Acid) :** Exposure limits may be different in other jurisdictions. NIOSH REL-TWA (≤10 hours) : 1 mg/m³ ; IDLH : 15 mg/m³. *Consult local authorities for acceptable exposure limits.*

Engineering Controls Good general ventilation should be provided to keep vapour and mist concentrations below the exposure limits.

Individual protection Chemical splash goggles ; Full-length face shield/chemical splash goggles combination ; Acid-proof gauntlet gloves, apron, and boots ; Long sleeve wool, acrylic, or polyester clothing ; Acid proof suit and hood ; Appropriate NIOSH respiratory protection.

In case of emergency or where there is a strong possibility of considerable exposure, wear a complete acid suit with hood, boots, and gloves. If acid vapour or mist are present and exposure limits may be exceeded, wear appropriate NIOSH respiratory protection.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State and Appearance	Liquid (Oily ; Clear to turbid)	**Odour**	Odourless
Molecular Weight	98.08	**Colour**	Colourless to light grey
pH (1% soln/water)	< 1	**Volatility**	< 1 (Butyl Acetate = 1.0)
Boiling Point	193°C to 327 °C (379°F to 621°F) @ 760 mm Hg	**Vapour Density**	3.4
Melting Point	-35°C to 11°C (-31°F to 52°F)	**Dispersion**	Yes (Water)
Vapour Pressure	< 0.3 mm Hg @ 25°C (77 °F) < 0.6 mm Hg @ 38°C (100 °F)	**Solubility**	Yes (Water)

GRADE	Boiling Point		Freezing Point		Specific Gravity
	DEG °C	DEG °F	DEG °C	DEG °F	
60 DEG TECHNICAL	193	380	- 12	10	1.706
66 DEG TECHNICAL	279	535	- 35	- 31	1.835
1.835 ELECTROLYTE	279	535	- 35	- 31	1.835
98 % TECHNICAL	327	621	- 2	29	1.844
99 % TECHNICAL	310	590	4	40	1.842
100 % TECHNICAL	274	526	11	51	1.839

SECTION 10. STABILITY AND REACTIVITY

Stability Yes (Under normal conditions of ambiant temperature)

Reactivity Reacts violently with water, organic substances and base solutions with evolution of heat and hazardous mists.

Conditions to avoid Heat : Possibility of decomposition. Release of dangerous gases (Sulfur oxides SO_2, SO_3)

Polymerization Polymerization will not occur.

Incompatibilities Vigorous reactions with : Water; alkaline solutions ; Metals, metal powder ; Carbides ; Chlorates ; Fulminates ; nitrates ; Picrates ; Strong oxidizing, reducing, or combustible organic materials. Hazardous gases are evolved on contact with chemicals such as cyanides, sulfides, and carbides.

Corrosivity Yes

SECTION 11. TOXICOLOGICAL INFORMATION

Routes of Entry Ingestion. Inhalation. Skin and eye contacts.

Carcinogenicity **Strong inorganic acid mists containing sulfuric acid (Occupational exposures) :** PROVEN (Human, Group 1, IARC) ; SUSPECTED (Human, Group A2, ACGIH) ; Group X (NTP) ; Classification not applicable to sulfuric acid and sulfuric acid solutions.

Mutagenicity Not applicable.

Teratogenicity Not applicable.

Acute toxicity ORAL (LD50) : 2 140 mg/kg (Rat) ; INHALATION (LC50, 2 hours) : 510 mg/m³ (Rat) ; 320 mg/m³ (Mouse). (RTECS).

Acute Effects May be **fatal** if inhaled or ingested in large quantity. Liquids or acid mists : May produce tissue damage : Mucous membranes (Eyes, mouth, respiratory tract). **Extremely** dangerous by eyes and skin contact **(Corrosive)**. Severe irritant for eyes : Inflammation (Redness, watering, itching). Very dangerous in case of inhalation (Mists) at high concentrations : May produce severe irritation of respiratory tract (Coughing, shortness of breath, choking).

Chronic Effects Target organs for acute and chronic overexposure (NIOSH 90-117) : Respiratory system, eyes, skin, teeth.

Acid mists : Overexposure to strong inorganic mists containing sulfuric acid : Possibility of laryngeal cancer (HSBD, IARC). Possibility of irritation of the nose and throat with sneezing, sore throat or runny nose. Headache, nausea and weakness. Gross overexposure : Possibility of irritation of nose, throat, and lungs with cough, difficulty breathing or shortness of breath. Pulmonary edema with cough, wheezing, abnormal lung sounds, possibly progressing to severe shortness of breath and bluish discoloration of the skin. Symptoms may be delayed. Repeated or prolonged exposure to mists may cause : Corrosion of teeth.

Contact (Skin) : Possibility of corrosion, burns or ulcers. Contact with a 1 % solution : Possibility of slight irritation with itching, redness or swelling. Repeated or prolonged exposure (Mist) : Possibility of irritation with itching, burning, redness, swelling or rash.

Contact (Eye) : Possibility of corrosion or ulceration (Blindness may result). Repeated or prolonged exposure (Mist) : Possibility of eye irritation with tearing, pain or blurred vision.

Ingestion : Immediate effects of overexposure : Burns of the mouth, throat, esophagus and stomach, with severe pain, bleeding, vomiting, diarrhea and collapse of blood pressure. Damage may appear days after exposure.

Toxicity

Persons with the following pre-existing conditions warrant particular attention :
Sulfuric (Acid) : Laryngeal irritation.

Eating, drinking and smoking must be prohibited in areas where this material is handled and processed. Wash hands and face before eating, drinking and smoking.

SECTION 12. ECOLOGICAL INFORMATION

Ecotoxicity

Aquatic toxicity : Slightly to moderately toxic.
Bluegill Sunfish (LC50 ; 48 hours) : 49 mg/l (Tap water, 20 °C, conditions of bioessay not specified). (HSBD).
Flounder (LC50 ; 48 hours) : 100-330 mg/l (Aerated water, conditions of bioessay not specified). (HSBD).

Toxicity to Animals

EYE : Concentrated compound is corrosive. 10 % solution : Moderate eye irritant.
SKIN : Concentrated compound is corrosive. 10 % solution : Slight skin irritant.
Single and repeated exposure : Irritation of the respiratory tract ; Corrosion of the respiratory tract ; Lung damage ; Labored breathing ; Altered respiratory rate ; Pulmonary oedema. Repeated exposure : Altered red blood cell count.

Mobility (Soil)

Easy soil seeping under rain action

Persistence and degradability

Sulfate ion : Ubiquitous in the environment. Metabolized by micro-organisms and plants.

Bioaccumulation

Sulfate ion : Ubiquitous in the environment. Metabolized by micro-organisms and plants whitout bioaccumulation.

Biodegradation Products

Not available

Biodegradation Products (Toxicity)

Not applicable

Remarks on Environment

Due to the product's composition, particular attention must be taken for transportation and storage. Protect from rain because the run-off water will become acidic and may be harmful to flora and fauna.

BOD5 and COD

Not available

SECTION 13. DISPOSAL CONSIDERATIONS

Disposal methods

Cleaned-up material may be an hazardous waste on *Resource Conservation and Recovery Act* (RCRA) on disposal due to the corrosivity characteristic. **DO NOT** flush to surface water or sanitary sewer system. Comply with Federal, State, and local regulations. If approved, neutralize and transfer to waste treatment system.

SECTION 14. TRANSPORT INFORMATION

TDG (Canada)

CLASS 8 Corrosives

PIN

UN1830 SULFURIC ACID PG II

Special Provisions (Transport)

None

DOT (U.S.A.)/IMO (Maritime)

Proper Shipping Name	SULFURIC ACID
Hazard Class	8
UN N°	1830
DOT/IMO Label	CORROSIVE
Packing Group	II
Reportable Quantity	1000 lbs (454 kg)
Shipping Containers	Tank Cars, Tank Trucks, Vessel

ERG

Guide 137

SECTION 15 REGULATORY INFORMATION

Labeling (EEC)

EU (Directive 67/548/EEC) :
Sulfuric (Acid) : C Corrosive (Pictogram)
Annex I Index number : 016-020-00-8 ; EU Consolidated Inventories : EC Number 231-639-5
C ≥ 15 % C ; R35 ; S2, 26, 30, 45.

Risk Phrases (EEC)

R35- Causes severe burns

Safety Phrases (EEC)

S26- In case of contact with eyes, rinse immediately with plenty of water and seek medical advice
S30- Nerver add water to this product
S36/37/39- Wear suitable protective clothing, gloves and eye/face protection
S45- In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

CEPA DSL (CANADA)	CANADIAN ENVIRONMENTAL PROTECTION ACT (CEPA) : On the Domestic Substances List (DSL) ; Acceptable for use under the provisions of CEPA. Sulfuric Acid is a Class B Drug Precursor under *Health Canada's Controlled Drugs and Substances Act* and *Precursor Control Regulations*.
Regulations (U.S.A.)	CERCLA Section 103 Hazardous substances (40 CFR 302.4) ; SARA Section 302 Extremely Hazardous Substances (40 CFR 355) : Yes ; SARA Section 313, Toxic Chemicals (40 CFR 372.65) ; US: TSCA Inventory : Listed : **Sulfuric (Acid)** (Final RQ) : 1 000 pounds (454 kg) Sulfuric Acid is subject to reporting requirements of Section 313, *Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA)*, 40 CFR Part 372. Certain companies must report emissions of Sulfuric Acid as required under *The Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA)*, 40 CFR Part 302 For more information call the *SARA Hotline* 800-424-9346. Strong Inorganic Acid Mists Containing Sulfuric Acid : Chemical listed effective March 14, 2003 to the *State of California, Proposal 65.* *U.S. FDA Food Bioterrorism Regulations* : These regulations apply to Sulfuric Acid when being distributed, stored or used for Food or Food Processing.
Classifications HCS (U.S.A.)	Corrosive liquid

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

Fire Hazard	**0**	**Reactivity**	**2**	**Health**	**3**	**Special Hazard**	**ACID**

NPCA- HMIS Rating

Fire Hazard	**0**	**Reactivity**	**2**	**Health**	**3**

SECTION 16. OTHER INFORMATION

References

- TLVs and BEIs (2008). Based on the Documentation of the Threshold Limit Values for Chemical Substances and Physical Agents & Biological Exposure Indices. ACGIH, Cincinnati, OH – http://www.acgih.org
- CCOHS (2008) - Canadian Centre for Occupational Health and Safety - http://www.ccohs.ca/
- CSST (2008) - Commission de la Santé et de la Sécurité du Travail (Québec). Service du répertoire toxicologique - http://www.reptox.csst.qc.ca/
- ERG (2008). Emergency Response Guidebook, Developed by the U.S. Department of Transportation, Transport Canada, and the Secretariat of Communications and Transportation of Mexico
- HSDB (2008) - Hazardous Substances Data Bank. TOXNET® Network of databases on toxicology, hazardous chemicals, and environmental health. NLM Databases & Electronic Resources, U.S. National Library of Medicine, NHI, 8600 Rockville Pike, Bethesda, MD 20894 - http://toxnet.nlm.nih.gov/cgi-bin/sis/htmlgen?HSDB
- IARC - Monographs on the Evaluation of Carcinogenic Risks to Humans (collection) - http://www-cie.iarc.fr/
- Merck Index (1999). Merck & CO., Inc, 12th edition
- NIOSH U.S. (2008) - Pocket Guide to Chemical Hazards - http://www.cdc.gov/niosh/npg/
- Patty's Industrial Hygiene and Toxicology, 3rd Revised Edition
- Règlement sur les produits contrôlés (Canada)
- RTECS (2008). Registry of Toxic Effects of Chemical Substances, NIOSH, CDC
- Toxicologie industrielle & intoxication professionnelle, 3e édition, Lauwerys

Glossary

CSST	: Commission de la Santé et de la Sécurité du Travail (Québec).
HSDB	: Hazardous Substances Data Bank.
IARC	: International Agency for Research on Cancer.
NIOSH	: National Institute of Occupational Safety and Health.
NTP	: U.S. National Toxicology Program.
RTECS	: Registry of Toxic Effects of Chemical Substances

Note

For further information, see NorFalco Inc. Sulfuric Acid « Storage and Handling Bulletin ».

Because of its corrosive characteristics and inherent hazards, Sulfuric Acid should not be used in sewer or drain cleaners or any similar application; regardless of whether they are formulated for residential, commercial or industrial use. NorFalco will not knowingly sell sulfuric acid to individuals or companies who repackage the product for sale as sewer or drain cleaners, or any other similar use.

The data in this Material Safety Data Sheet relates only to the specific material designated herein and does not relate to use in combination with any other material or in any process.

For additional information, please visited our website : www.norfalco.com

Written by : Groupe STEM Consultants / NorFalco Sales Inc.
Complete revision : 2009-01-24 **Partial review :** None **Previous complete revision :** 2008-01-24

Verified by : Guy Desgagnés and Eric Kuraitis, Technical Representative - Sulfuric Acid
Request to : André Auger, Administration Assistant Tel. : (905) 542-6901 extension 0 Fax : (905) 542-6914 / 6924
NorFalco Sales Inc., 6755 Mississauga Road, Suite 304, Mississauga, Ontario L5N 7Y2

Notice to Reader

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

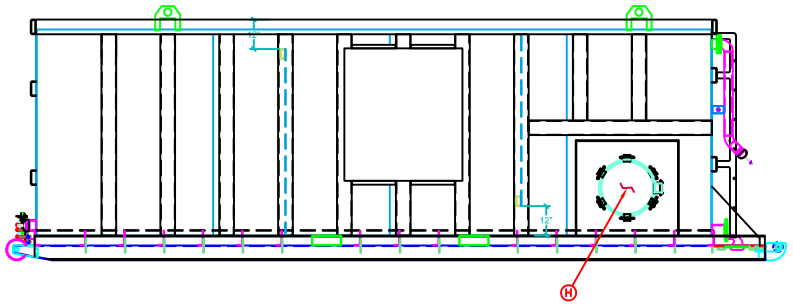
BLAST -
INTERIOR SURFACE PREPARATION - SSPC-SP-10 Near-White Metal Blast
EXTERIOR SURFACE PREPARATION - SSPC-SP-6 Commercial Blast Cleaning

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

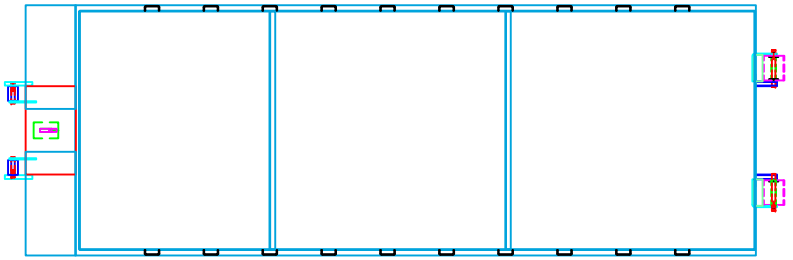
PLACARD - (2) 10 ga. Placard - Drivers & Passenger Side
(Customer Specifications)

HYDRO-TESTED

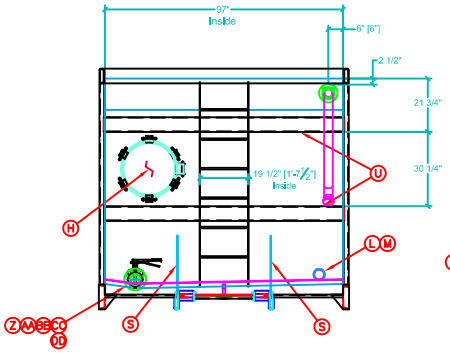
NO.	DESCRIPTION	PART NO.	QTY.	WT.
E	3" FILL LINE (SEE DETAIL DWG.)		1	
H	Ø22" MANWAY		3	
K	3" WELD-NECK FLANGE 150#		1	
L	4" THREADED NIPPLE x 4" LG.		2	
M	4" PIPE CAP		2	
S	PL 3/8" FRONT GUSSET BURNOUT		2	
U	6" x 2" x 1/4" x 97 1/2" LG. FORMED CHANNEL		4	
W	LADDER SIDES PL 1/4" BURNOUT		2	
X	R.B. Ø3/4" 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	



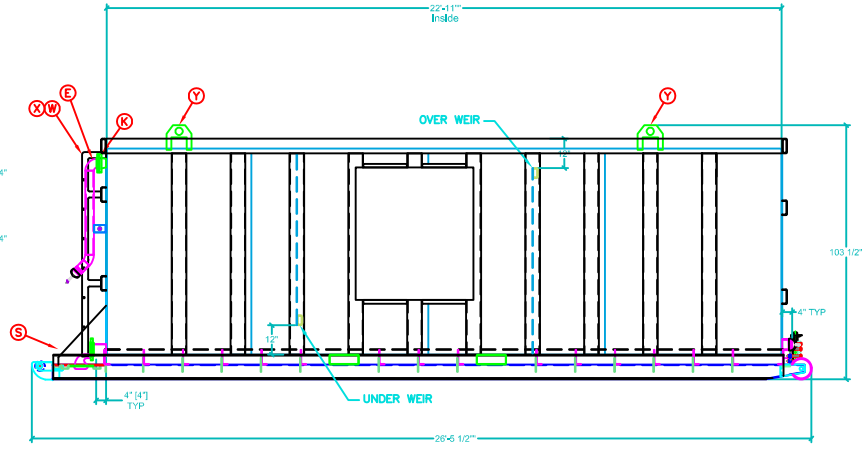
Curb View



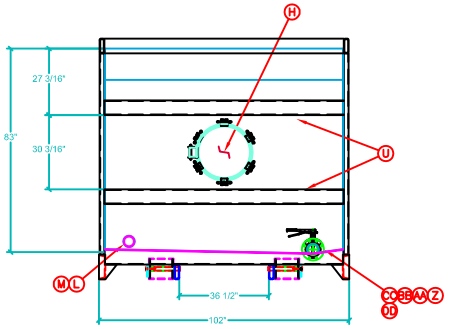
Top View



Front View



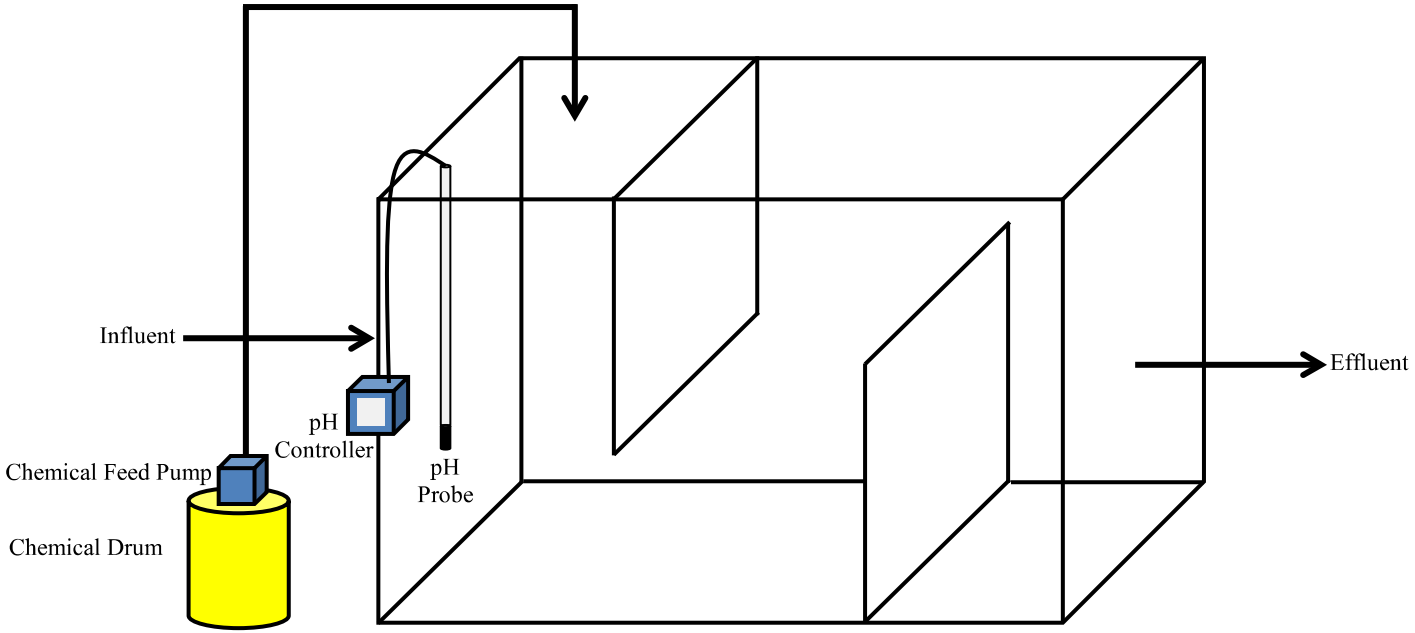
Street View



Rear View

10,000 Gal. Weir Tank

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



Notes:

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

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

Configuration of pH Adjustment System

Lockwood Remediation Technologies, LLC

One Controller for the Broadest Range of Sensors.

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

Maximum Versatility

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

Ease of Use and Confidence in Results

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

Wide Variety of Communication Options

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

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

Controller Comparison

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

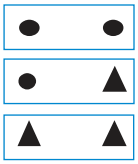
Choose from Hach's Broad Range of Digital and Analog Sensors

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

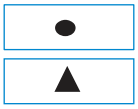
● = Digital ▲ = Analog

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

2 Channel Configurations



1 Channel Configurations



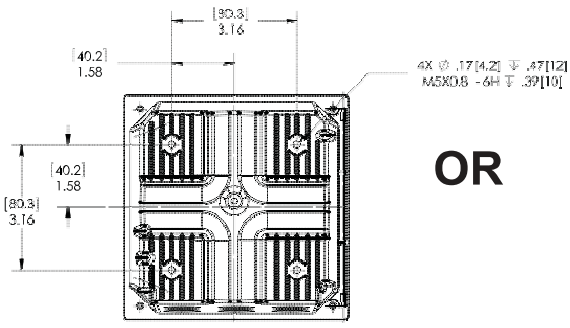
Specifications*

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

**Subject to change without notice.*

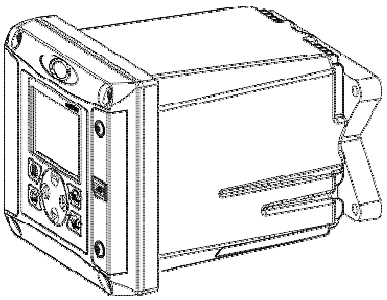
Dimensions

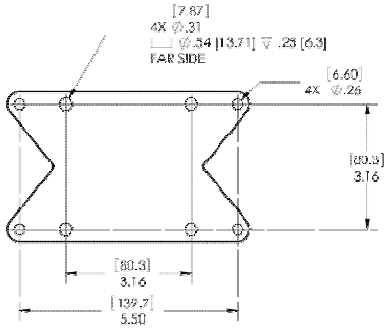
Surface Mounting Dimensions



Mounting Dimensions
(Rear View)

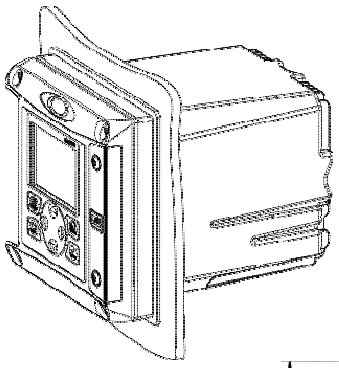
OR

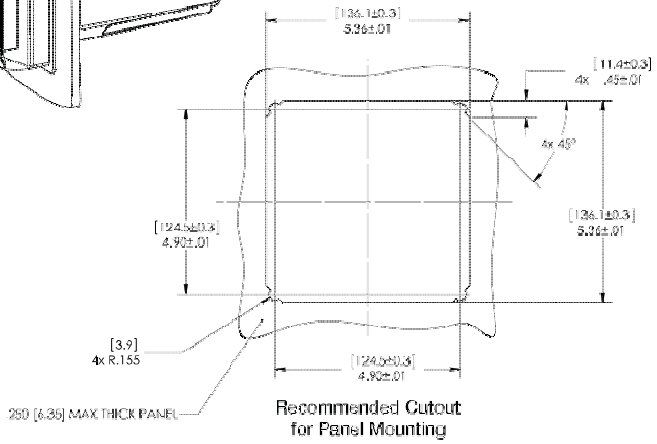




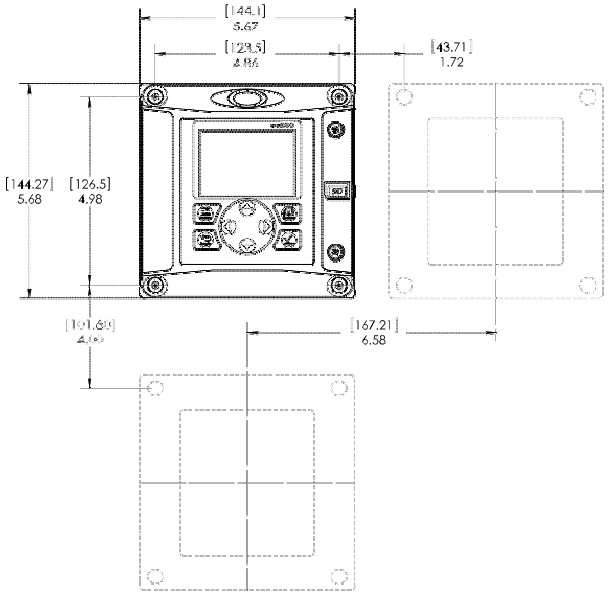
Bracket (supplied) for Surface Mounting
(Not compatible with Weather and Sun Shield
p/n 9220600 when surface mounting.)

Panel Mounting Dimensions



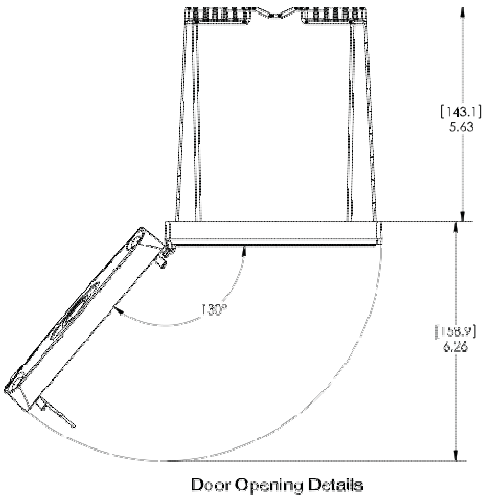


Recommended Cutout
for Panel Mounting

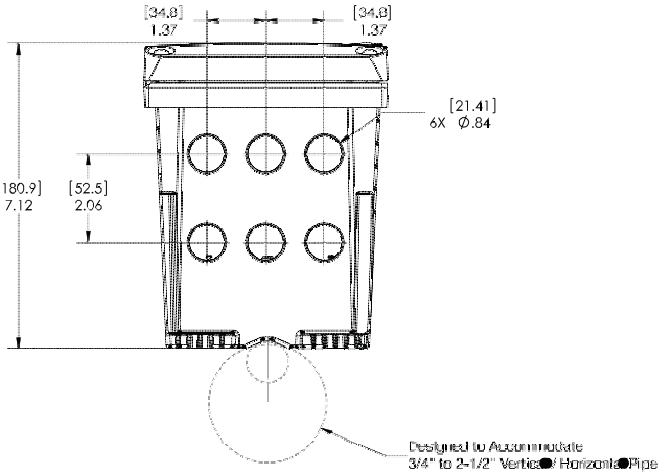


Minimum Spacing Dimensions
for Group Mounting

Top and Bottom Views

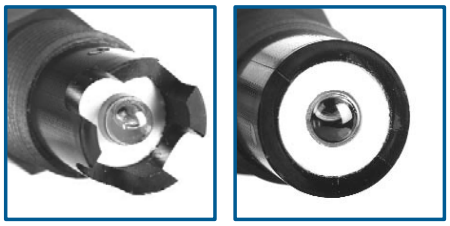


Door Opening Details



3/4-inch Combination pH and ORP Sensor Kits

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



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

Features and Benefits

Low Price—High Performance

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

Special Electrode Configurations

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

Temperature Compensation Element Option

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

Versatile Mounting Styles

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

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

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

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

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

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

Specifications*

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

Combination pH Sensors

Measuring Range
0 to 14 pH

Accuracy
Less than 0.1 pH under reference conditions

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

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

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

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

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

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

Wetted Materials

Convertible style: Ryton® body (glass filled)

Insertion style: PVDF body (Kynar®)

Sanitary style: 316 stainless steel sleeved PVDF body

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

Warranty
90 days

Combination ORP Sensors

Measuring Range
-2000 to +2000 millivolts

Accuracy
Limited to calibration solution accuracy (± 20 mV)

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

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

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

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

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

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

Wetted Materials

Convertible style: Ryton® body (glass filled)

Insertion style: PVDF body (Kynar®)

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

Warranty
90 days

**Specifications subject to change without notice.*

Engineering Specifications

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

Dimensions

Convertible Style Sensor

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

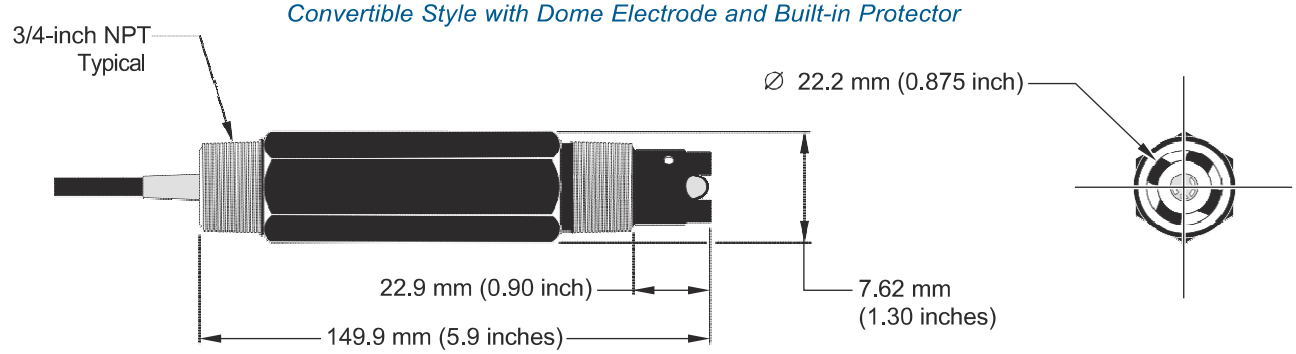
Insertion Style Sensor

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

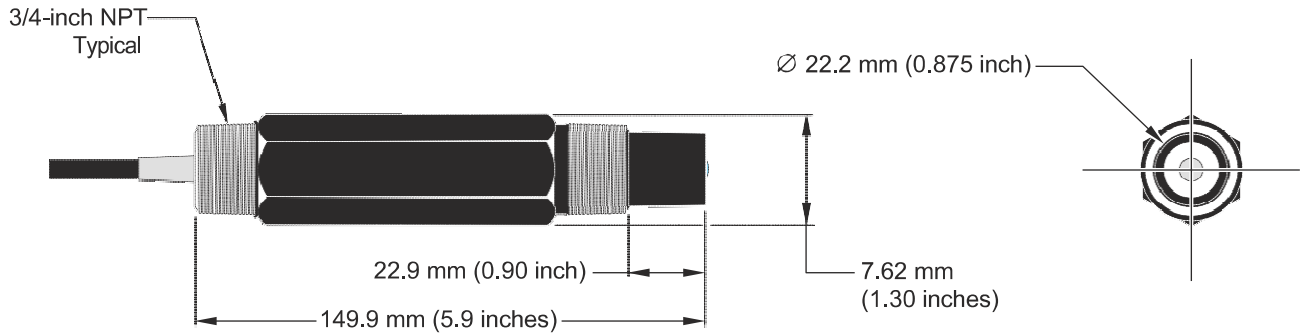
Sanitary Style Sensor

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

Convertible Style with Dome Electrode and Built-in Protector



Convertible Style with Flat Electrode



Lockwood Remediation Technologies, LLC

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

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

Features

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

Controls

Manual Stroke Rate

Manual Stroke Length

External Pacing - Optional

External Pace With Stop - Optional (125 SPM only)

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

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

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

Operating Benefits

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

Aftermarket

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

Series A Plus
Electronic Metering Pumps

Lockwood Remediation Technologies, LLC

Series A Plus

Specifications and Model Selection

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

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

Engineering Data

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

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

Engineering Data

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

Custom Engineered Designs - Pre-Engineered Systems

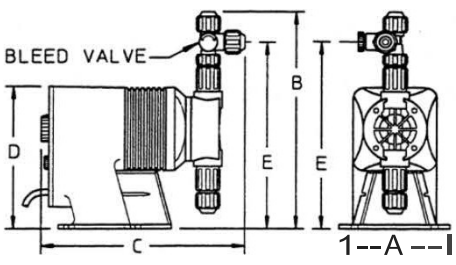
Pre-Engineered Systems

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

Dimensions

Series A PLUS Dimensions (inches)						
Model No.	A	B	C	D	E	Shipping Weight
LB02 IS2	5.0	9.6	9.5	6.5	8.2	10
LBC2	5.0	9.9	9.5	6.5	8.5	10
LBC3	5.0	9.9	9.5	6.5	8.5	10
LB03 IS3	5.0	9.9	9.5	6.5	8.5	10
LB0B4	5.0	9.9	9.5	6.5	8.5	10
LB64	5.0	9.9	9.5	6.5	8.5	10
LBC4	5.0	9.9	9.5	6.5	8.5	10

NOTE: Inches X 2.54 cm



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

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

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

A95OVER Specifications

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

Metric Equivalent Specifications

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

A95OVER Technical Information

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

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

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

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

Electric Motor Driven

Submersible Pump

Models S3B1-E6 *and* S3B1

Size 3”

PUMP SPECIFICATIONS

Suction Head: Aluminum Alloy 356-T6 With Bonded Nitrile Lining; Maximum Operating Pressure 50 psi (345 kPa).*
Impeller: Ductile Iron 65-45-12.
Seal Plate: Aluminum Alloy 356-T6 With Bonded Nitrile Lining.
Intermediate: Aluminum Alloy 356-T6.
Motor Housing: Aluminum Alloy 356-T6.
Motor Shaft: Stainless Steel 416.
Bearings: Upper, Open Single Row Ball Bearing.
Lower, Two Shield, Double Row Ball Bearing.
Shaft Sleeve: Stainless Steel 304.
Discharge Flange: Aluminum Alloy 356-T6.
Gaskets: Cork with Nitrile Binder (NC710).
O-Rings: Buna-N.
Wetted Hardware: Standard Plated Steel and Stainless Steel.
Strainer: Urethane Coated Steel. 51% Open Area, 0.375” (9,5 mm) Diameter Openings.
Hoisting Bail: Urethane Coated Steel.

Standard Equipment

NEMA Type 3R Rainproof Control Box. *(See Section130, Pages 80 and 85.)*
Provides On-Off, Circuit Breaker and Motor Overload Protection.

Optional Equipment

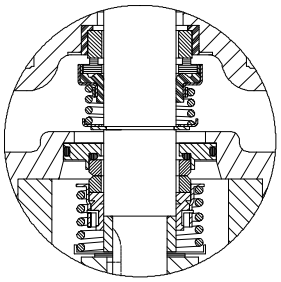
Liquid Level Control: *(See Sec. 130, Page 150.)*
a. Turtle Type Pressure Activated Level Switch.
b. .Float Activated Level Switch.
Staging Adapter Kit.

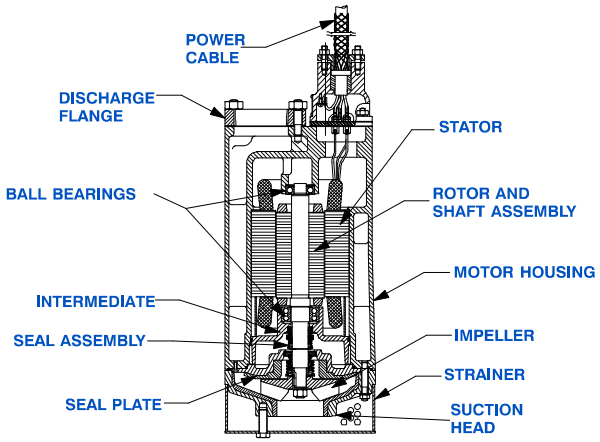
MOTOR/CABLE SPECIFICATIONS

Motor: Oil Filled Enclosure; 6.0 H.P.; 3450 R.P.M.
Single Phase: 230 Volt, 60 Hz, 34 Full Load AMPS, 7.2 kW (Max.)
Three Phase: 200/230/460/575 Volt, 60 Hz, 26.5/23/11.5/9.2 Full Load AMPS, 6.8 kW (Max.)
Power Cable: 4 Wire; Type SO/SOW/SOOW; 10 AWG; 3 Power Conductors, Plus 1 Ground. Nominal Length 50 Feet (15 m). Standard. (*Specify Alternate Length at Time of Order.*)
Recommended Generator Size: 15 kW Across the Line Start.

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

WARNING!
Do not use in explosive atmosphere or for pumping volatile flammable liquids.





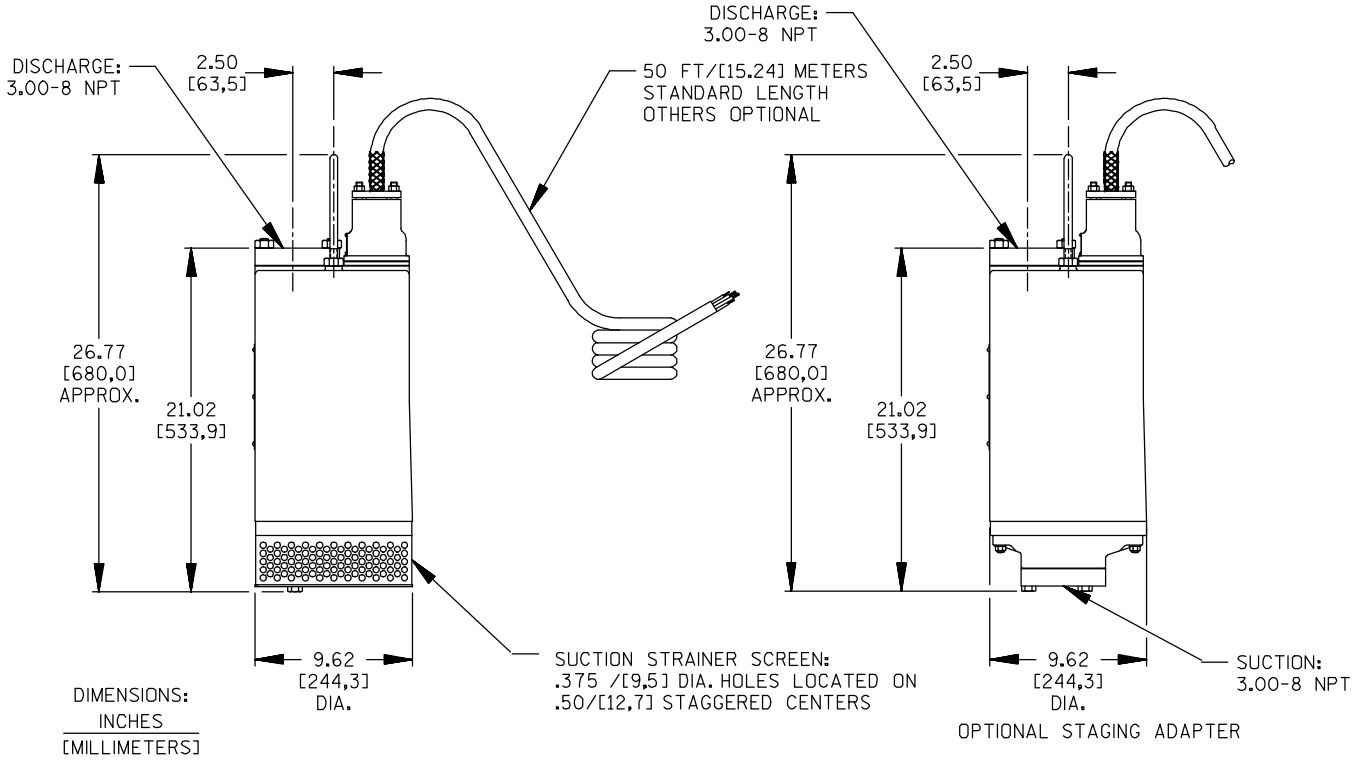
SEAL SPECIFICATIONS
Tandem, Oil Lubricated.

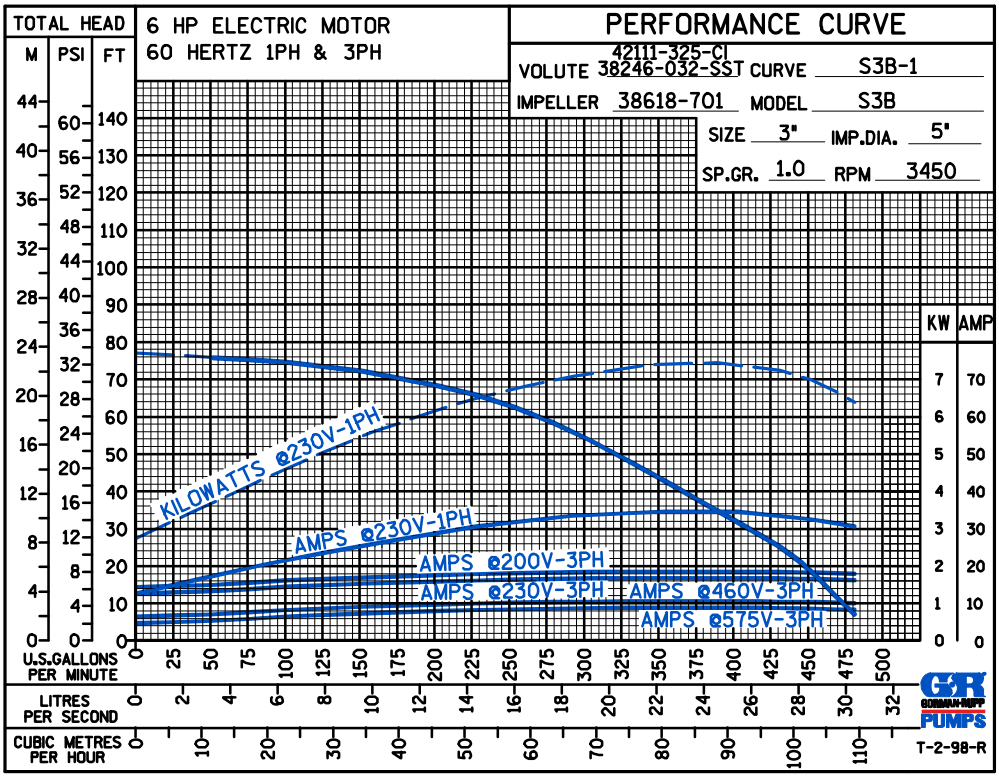
Upper Seal: Type 21, Mechanical. Carbon Rotating Face. Ni-Resist Stationary Face. Buna-N Elastomers. Stainless Steel 18-8 Cage and Spring.

Lower Seal: Type 2, Mechanical. Tungsten Titanium Carbide Rotating and Stationary Faces. Stainless Steel 316 Stationary Seat. Fluorocarbon Elastomers (DuPont Viton® or Equivalent). Stainless Steel 303/304 Cage and Spring.

Maximum Temperature of Liquid Pumped, 122°F (50°C).*

Specification Data	APPROXIMATE DIMENSIONS and WEIGHTS	NET WEIGHT: 145 LBS. (65,8 KG.) SHIPPING WEIGHT: 155 LBS. (70,3 KG.) EXPORT CRATE SIZE: 7.8 CU. FT. (0,22 CU. M.)
SECTION 130, PAGE 660		





GORMAN-RUPP PUMPS

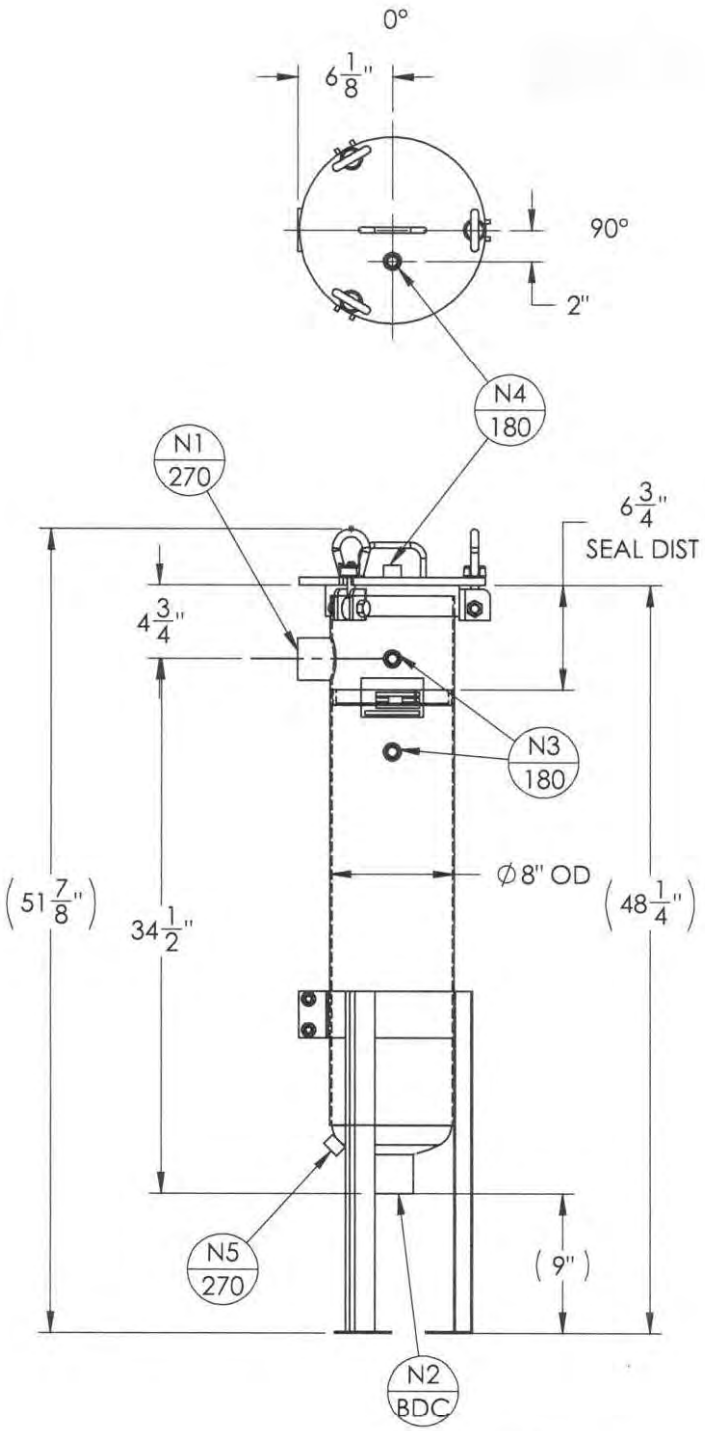
www.grpumps.com

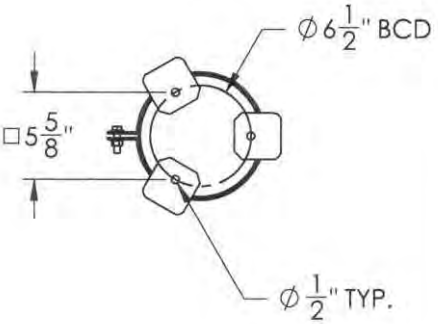
Specifications Subject to Change Without Notice

Printed in U.S.A.

NOZZLE SCHEDULE			
MARK	QTY	SIZE / RATING	DESCRIPTION
N1	1	2" 150# NPT	INLET
N2	1	2" 150# NPT	OUTLET
N3	2	1/2" 3000# NPT	PRESS GA
N4	1	1/2" 3000# NPT	VENT
N5	1	1/2" 3000# NPT	CLEAN DRAIN
N6	-	-	DIRTY DRAIN

VESSEL DESIGN CONDITIONS			
CODE:	BEST COMMERCIAL PRACTICE		
M.A.W.P.:	150 PSI @ 250°F	M.D.M.T.:	-20° F @ 150 PSI
M.A.E.P.:	15 PSI @ 250°F		
CORROSION ALLOWANCE:	NONE	HYDROTEST PRESS:	195 PSI
STAMP:	'NC'	SERVICE:	NON LETHAL
PWHT:	N/A	RADIOGRAPHY:	N/A
MATERIAL:	SS 304/L	GASKET:	BUNA-N





1:1

DRY WEIGHT: 77.62 #'s
FLOODED WEIGHT: 140 #'s
SHIPPING WEIGHT: 100 #'s
VESSEL VOLUME: 1.0 C.F.

NOTES:
- VESSEL WILL HOUSE (QTY=1) DOUBLE LENGTH BASKET.

THIRD ANGLE PROJECTION

TOLERANCES-UNLESS OTHERWISE NOTED
DECIMAL X = ±.1" XX = ±.02" XXX = ±.005"
FRACTIONAL ≤24" = ±1/16" >24" = ±1/8"
ANGULAR = ± 1°
MAX. MACHINED SURFACE FINISH 125

REV.	DATE	REVISION	DRAWN	APP'D

89 Crawford Street
Leominster, MA 01453
Tel: 774.450.7177
Fax: 888.835.0617

LRT Provided Bag Filter Housing

EQUIPMENT:	BAG FILTER HOUSING (EB SERIES)
MODEL NO:	S4EB112-2P-SW
CUSTOMER:	-

PARENT: NONE	DRAWN: CR	DATE: JAN 13 2011	JOB No. V-	DWG. No. 001-0123	REV. No. 0
PAGE: 1 OF 4	CHK'D: JM	SCALE: NTS			

Polyester Liquid Filter Bag

Features

* Polyester liquid bag filter are available with a carbon steel ring, stainless steel ring or plastic flanges.
* Heavy-duty handle eases installation and removal
* Metal ring sewn into bag top for increased durability and positive sealing
* Wide array of media fibers to meet needed temperature and micron specifications

Applications

Polyester liquid filter bags can be used in the filtering of a wide array of industrial and commercial process fluids

Sizes

Our liquid filter bags are available for all common liquid bag housings. Dimensions range from 4.12" diameter X 8" length thru 9" diameter X 32" length.

Micron Ratings

Available fibers range from 1 to 1500 microns

Options

* Bag finish or covers for strict migration requirements.
* Plastic top O.E.M. replacements
* Multi-layered filtering capabilities for higher dirt holding capacities

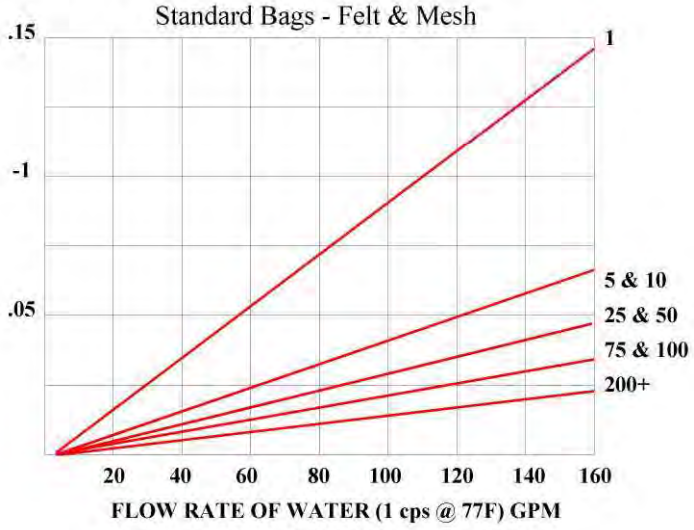
Optional Filter Media

Felt: Nomex, Polyester, Polypropylene

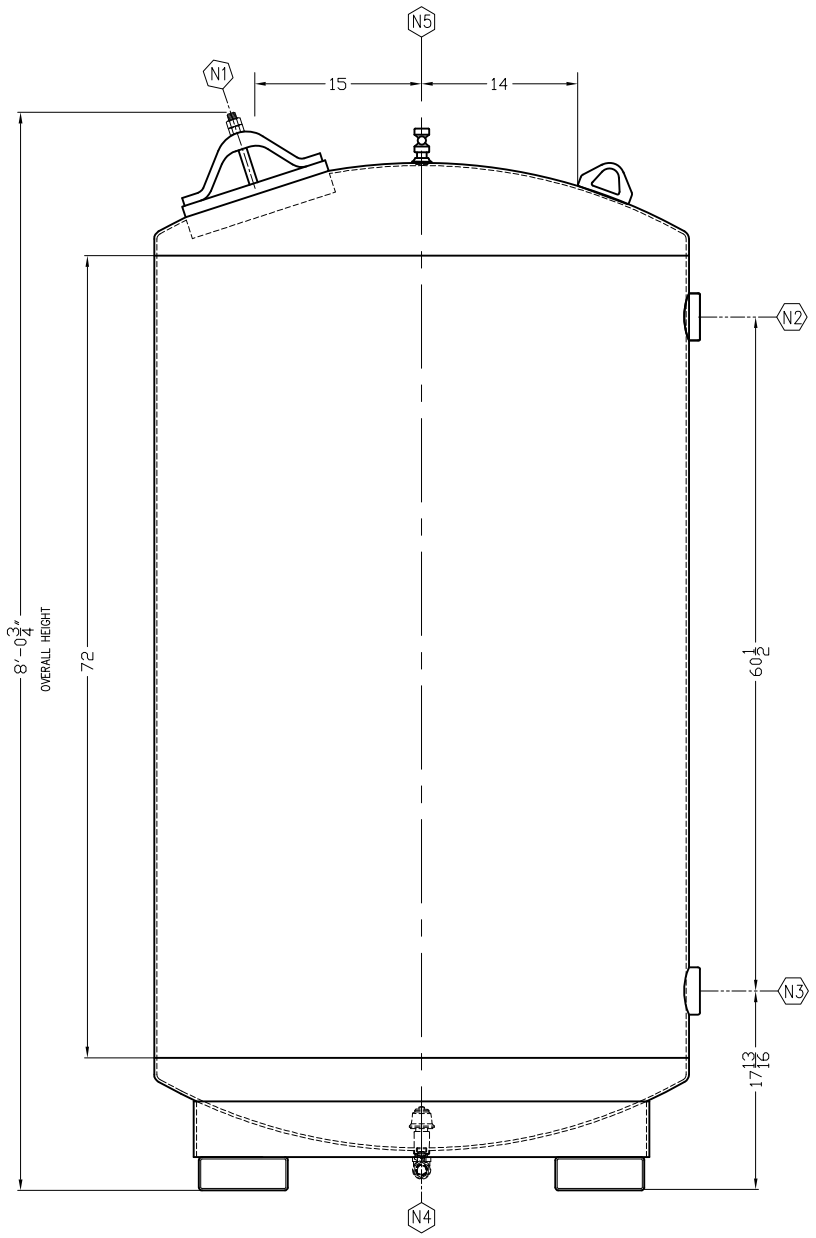
Monofilament: Nylon, Polyester, Polypropylene

Multifilament: Nylon, Polyester

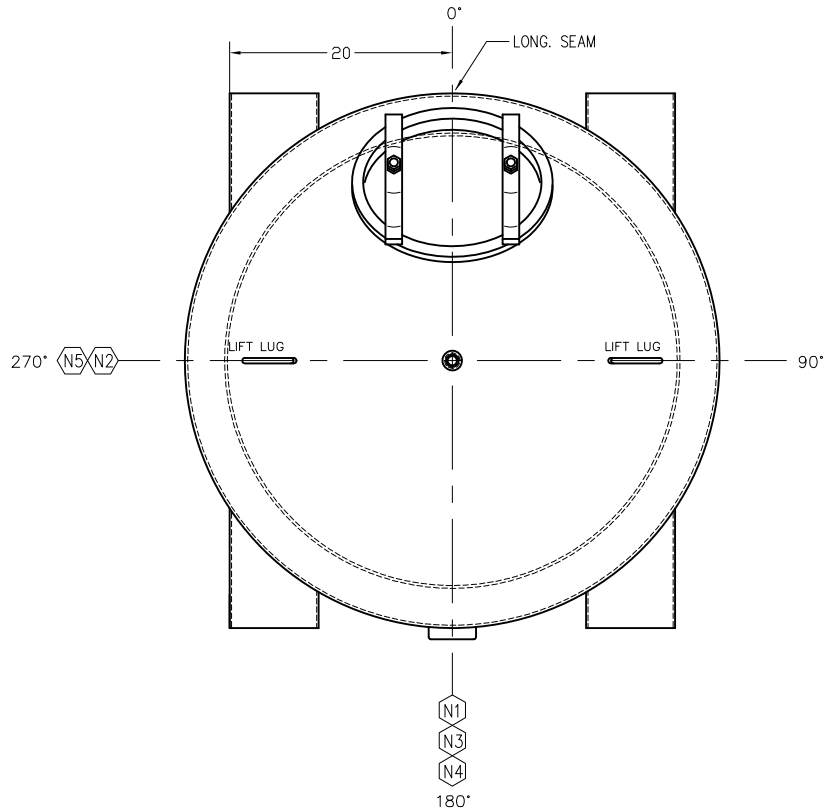
Polypropylene: Oil Removal



RevNo	Revision note	Date	Signature	Checked



ELEVATION VIEW
NOT TRUE ORIENTATION



PLAN VIEW
TRUE ORIENTATION

NOZZLE SCHEDULE

ID	*Description*	*Service*
N1	14" x 18" ELLIPTICAL MANWAY w/COVER	Upper bed access with Cover (SA-36), Bolts, Neoprene Gasket
N2	3" MNPT 3000# Coupling	Process Inlet
N3	3" MNPT 3000# Coupling	Process Outlet
N4	1/2" 150# Thrd Tank Flange	Drain w/1/2" Ball Valve
N5	1/4" 150# Thrd Tank Flange	VENT
N6		
N7		

COATINGS SCHEDULE

Surface	*Surface Preparation*	*Product Specification*
Internal - 1	SSPC-SP6	SW Macropoxy 646 10-20 mils DFT
Internal - 2	Inspect	SW Macropoxy 646 10-20 mils DFT
External - 1	SSPC-SP6	SW Macropoxy 646 5-10 mils DFT
External - 2	n/a	Carboline Carbothane 8845 3-5 mils DFT (Blue)
External - 3	n/a	n/a

NOTES

Item	*Details*
Construction	Non-Code Design Pressure: 75 PSIG @ 140 DEG F.
Mtrls Vessel	Shell: SA-36 Heads: SA-36 Pipe: SA-53 (see nozzle detail for others)
Mtrls Interls	Laterals (.012" Slot),: 304 SS Gaskets: Buna-N
n/a	n/a
n/a	n/a
Media	TBD

2,000 lb. High Pressure
Liquid Media Vessel

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

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

FILTRATION MEDIA :
8x30 RE-ACTIVATED CARBON
4x10 RE-ACTIVATED CARBON

GENERAL DESCRIPTION

Select Re-Activated carbon from domestic sources is quality screened during our purchasing process for activity, density and fines. The use of re-activated carbon is recommended as a lower cost alternative for most sites where drinking water quality is not necessary. In many cases our re-activated carbon meets and exceeds imported virgin carbon. In addition all carbon either sold by itself or installed in our filtration units traced by lot number to the installation or sale.

8x30 (Liquid Phase) Standard Specifications:	Standard	Value
Iodine Number	ASTM D-4607	800 Minimum
Moisture Content	ASTM D-2867	5% Maximum (as packed)
Particle Size	ASTM D-2862	8x30 US Mesh
Ash		10% Maximum
Total Surface Area (N2BET)		1050 Minimum
Pore Volume (cc/g)		0.75

4*10 (Vapor Phase) Standard Specifications:	Standard	Value
Carbon Tetrachloride Activity Level	ASTM D-3467	40 Minimum
Moisture Content	ASTM D-2867	5% Maximum (as packed)
Particle Size	ASTM D-2862	4x10 US Mesh
Ash		10% Maximum
Total Surface Area (N2BET)		1050 Minimum
Pore Volume (cc/g)		0.75

RESINTECH INC
INNOVATIONS IN ION EXCHANGE

CGS

CATION EXCHANGE RESIN
SOFTENING GRADE
Na FORM

RESINTECH CGS is a sodium form standard crosslinked gel strong acid cation resin. *CGS* is optimized for residential applications that require good regeneration efficiency and high capacity. *RESINTECH CGS* is intended for use in all residential and commercial softening applications that do not have significant amounts of chlorine in the feedwater. *CGS* is supplied in the sodium form.

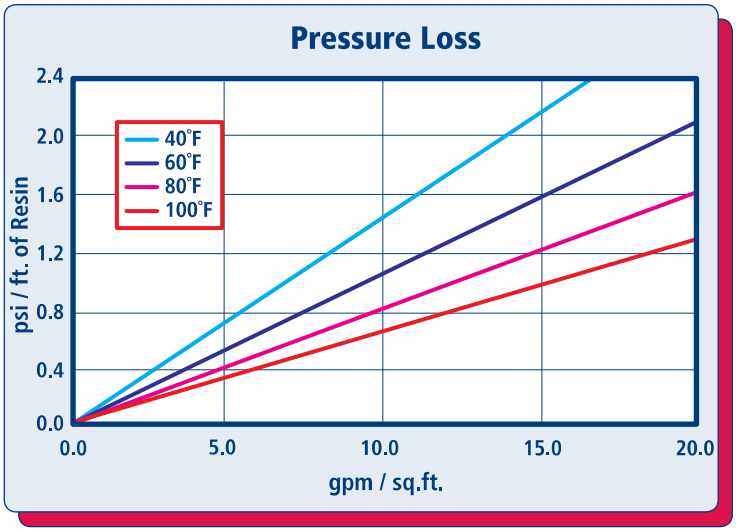
NSF/ANSI 44-61 CERTIFIED FOR MATERIAL SAFETY

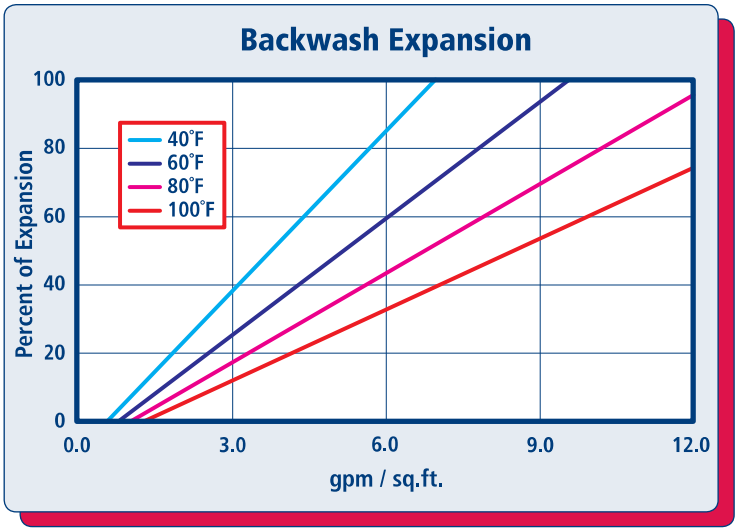
FEATURES & BENEFITS

- **RESIDENTIAL SOFTENING APPLICATIONS**
  Resin parameters are optimized for residential softeners
- **LOW COLOR THROW**
- **SUPERIOR PHYSICAL STABILITY**
  93% plus sphericity and high crush strengths together with carefully controlled particle distribution provides long life and low pressure drop
- **COMPLIES WITH US FDA REGULATIONS**
  Conforms to paragraph 21CFR173.25 of the Food Additives Regulations of the US FDA

Prior to first use for potable water, resin should be backwashed for a minimum of 20 minutes, followed by 10 bed volumes of downflow rinse.

HYDRAULIC PROPERTIES





PRESSURE LOSS

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

BACKWASH

The graph above shows the expansion characteristics of *ResinTech CGS* as a function of flow rate at various temperatures.

160 Cooper Road • West Berlin, NJ 08091 USA • p: 856.768.9600 • f: 856.768.9601 • e: ixresin@resintech.com • w: resintech.com

RESINTECH® CGS

PHYSICAL PROPERTIES

Polymer Structure	Styrene/DVB
Polymer Type	Gel
Functional Group	Sulfonic Acid
Physical Form	Spherical beads
Ionic Form as shipped	Sodium
Total Capacity	
Sodium form	>1.8 meq/mL
Water Retention	
Sodium form	40 to 52 percent
Approximate Shipping Weight	
Sodium form	50 lbs./cu.ft.
Screen Size Distribution (U.S. mesh)	16 to 50
Maximum Fines Content (<50 mesh)	1 percent
Minimum Sphericity	90 percent
Uniformity Coefficient	1.6 approx.
Resin Color	Amber

Note: Physical properties can be certified on a per lot basis, available upon request

SUGGESTED OPERATING CONDITIONS

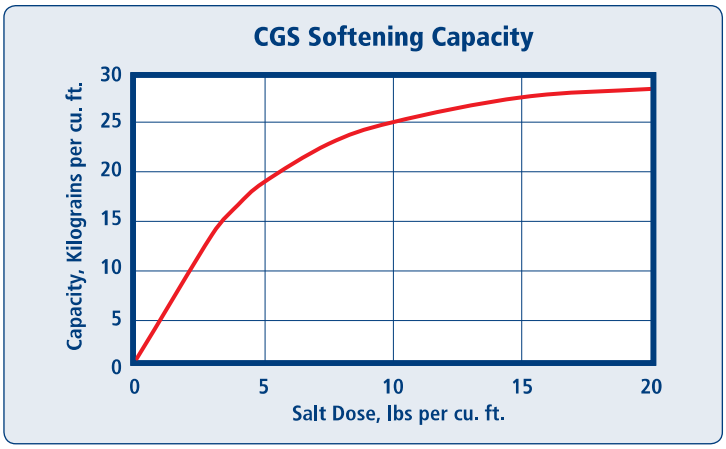
Maximum continuous temperature	
Sodium form	250˚F
Minimum bed depth	24 inches
Backwash expansion	25 to 50 percent
Maximum pressure loss	25 psi
Operating pH range	0 to 14 SU
Regenerant Concentration	
Salt cycle	10 to 15 percent NaCl
Regenerant level	4 to 15 lbs./cu.ft.
Regenerant flow rate.	0.5 to 1.5 gpm/cu.ft.
Regenerant contact time	>20 minutes
Displacement flow rate	Same as dilution water
Displacement volume	10 to 15 gallons/cu.ft.
Rinse flow rate	Same as service flow
Rinse volume	35 to 60 gallons/cu.ft.
Service flow rate	1 to 10 gpm/cu.ft.

Note: These guidelines describe average low risk operating conditions. They are not intended to be absolute minimums or maximums.
For operation outside these guidelines, contact ResinTech Technical Support

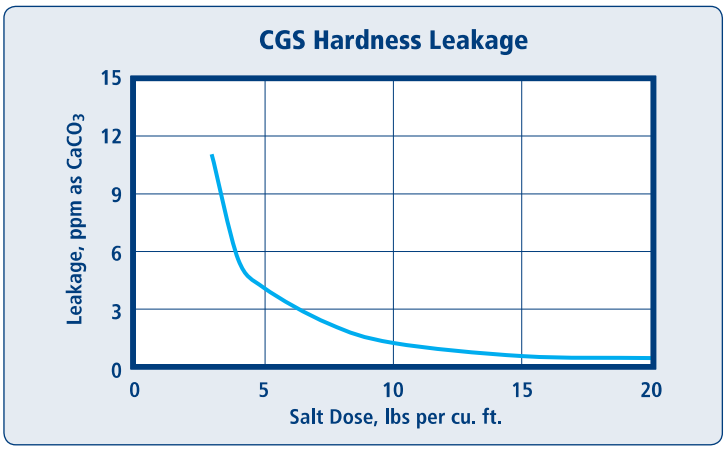
APPLICATIONS

SOFTENING

ResinTech CGS is a standard crosslinked cation resin optimized for residential and commercial applications. This type of resin is easier to regenerate than the higher crosslinked resins. CGS has marginal resistance to chlorine and other oxidants and is not ideal for high temperature and other high stress applications.



Capacity and leakage data are based on the following: 2:1 Ca:Mg ratio, 500 ppm TDS as CaCO3, 0.2% hardness in the salt and 10% brine concentration applied co-currently through the resin over 30 minutes. No engineering downgrade has been applied.



RESINTECH INC.
INNOVATIONS IN ION EXCHANGE
East Coast - West Berlin, NJ p:856.768.9600 • Midwest - Chicago, IL p:708.777.1167 • West Coast - Los Angeles, CA p:323.262.1600

ZENNER PERFORMANCE
Cast Iron Turbine Meters
Sizes 2" through 12"

INTRODUCTION: ZENNER PERFORMANCE Turbine Meters are designed for applications where flows are usually moderate to high and occasionally low. They are used in measurement of potable cold water in commercial and industrial services where flows are in one direction.

OPERATION: Water flows through the turbine section which causes the rotor to turn proportionately to the quantity of water flowing through the meter. A drive magnet transmits the motion of the rotor to a driven magnet located within the hermetically sealed register. The magnet is connected to a gear train which translates the rotations into volume totalization displayed on the register dial face. The only moving parts in the meter are the rotor assembly and vertical shaft .

CONSTRUCTION: ZENNER PERFORMANCE Turbine Meters consist of three basic components: Cast Iron Epoxy Coated main case, measuring element, and sealed register. The measuring element assembly includes the rotor assembly, vertical shaft and a calibration vane which eliminates the need for calibration change gears.

MAINTENANCE: ZENNER PERFORMANCE Turbine Meters are engineered and manufactured to provide long-term service and operate virtually maintenance free. If necessary the universal measuring element (UME) can be removed from the main case for maintenance. Interchangeability of certain parts between like sized meters minimizes spare parts inventory.

CONFORMANCE: ZENNER PERFORMANCE Turbine Meters are tested and comply with AWWA C701 Class II performance standards.

STRAINERS: ZENNER PERFORMANCE recommends the use of a separate strainer upstream from the turbine meter. Strainers reduce the chance of damage to the rotor as well as the frequency in which it must be removed for inspection. The lack of a strainer may void the warranty of the turbine meter.

CONNECTIONS: Companion flanges for installation of meters on various pipe types and sizes are available in bronze or cast iron.

PMT04

PMT06

ZENNER PERFORMANCE
15280 Addison Rd #340, Addison, TX 75001, (972) 386-6611, Fax (972) 386-1814
www.zennerusa.com

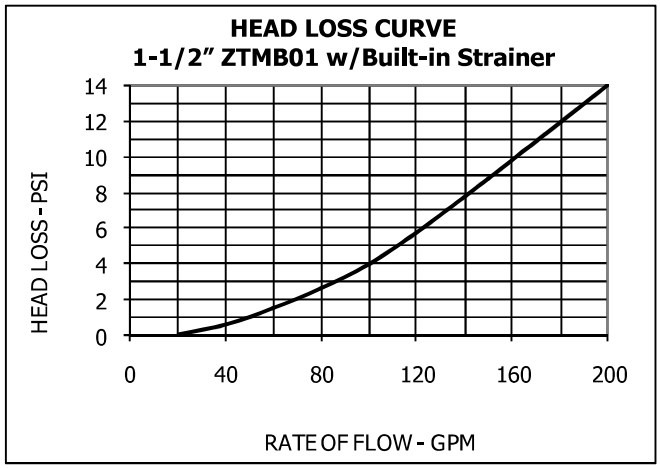
MODEL		PMT02	PMT03	PMT04	PMT06	PMT08	PMT10	PMT12
SIZE		2"	3"	4"	6"	8"	10"	12"
Flow rate maximum intermittent	USGPM	400	550	1250	2500	4500	7000	8800
Maximum continuous	USGPM	200	450	1000	2000	3500	5500	6200
Optimum operating flow range	USGPM	3 - 200	5 - 550	10 - 1250	20 - 2500	30 - 4500	50 - 7000	90 - 8800
Low flow rate	USGPM	2	2-1/2	5	12	20	45	65
Start-up flow rate	USGPM	7/8	1-1/8	1-3/8	7-1/2	8	15	15
Maximum Working Pressure	P.S.I.	160	160	160	160	160	160	160
Maximum Temperature	Deg. F	140	140	140	140	140	140	140
Length	Inches	7-7/8	8-7/8	9-7/8	11-7/8	13-3/4	17-3/4	19-5/8
Height	Inches	9-1/2	10-1/4	11	12-7/8	14-1/4	19	20-1/4
Width	Inches	7	7-1/2	9	11	13-1/2	16	19
Weight	Pounds	24	32	38	84	126	225	255
Number of holes per flange		4	4	8	8	8	12	12

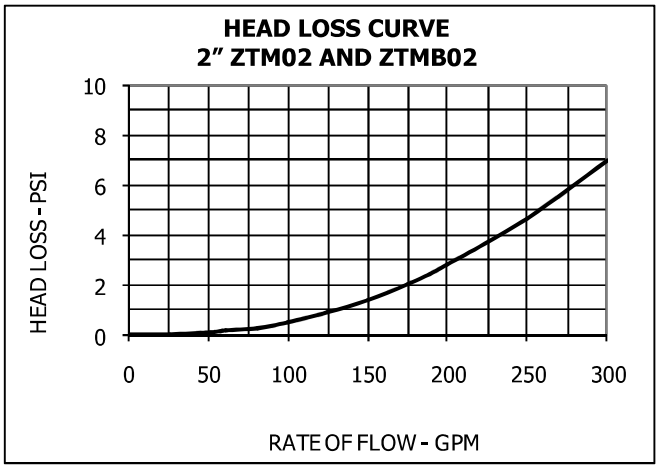
ZENNER PERFORMANCE
15280 Addison Rd #340, Addison, TX 75001, (972) 386-6611, Fax (972) 386-1814
www.zennerusa.com

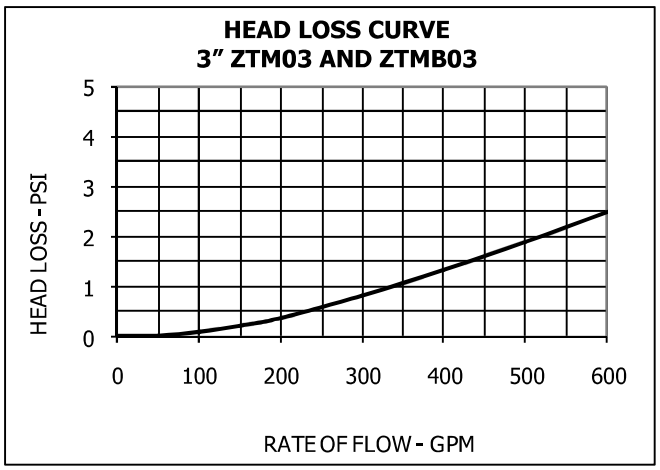
ZENNER ZTM and ZTMB Turbine Water Meters

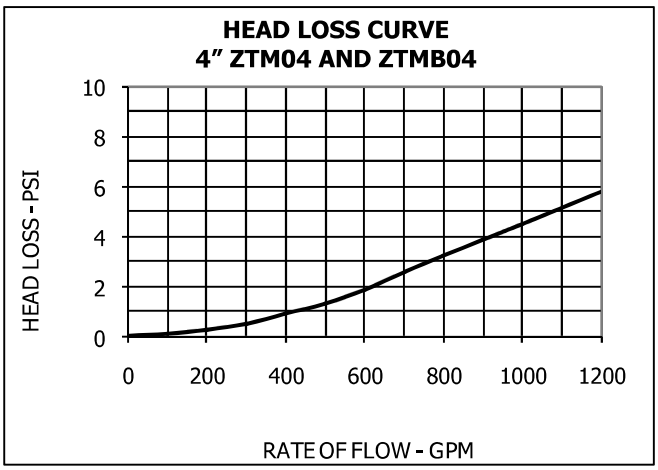
(Without Strainer)

Typical Head Loss Curves









ZENNER USA
15280 Addison Rd #340, Addison, TX 75001, (972) 386-6611, Fax (972) 386-1814
www.zennerusa.com

APPENDIX H

BWSC Permit Application

HALEY & ALDRICH, INC.
465 Medford St.
Suite 2200
Boston, MA 02129
617.886.7400

7 October 2021
File No. 132111-002

Boston Water and Sewer Commission
Engineering Customer Services
900 Harrison Avenue
Boston, MA 02119

Attention: Jodi Dobay

Subject: Request for Approval of Temporary Construction Dewatering
10 World Trade Center
10 World Trade Center Avenue
Boston, Massachusetts

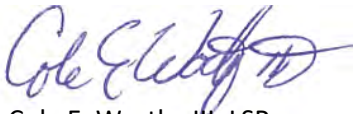
Dear Jodi Dobay:

On behalf of our client, 10 World Trade LHI LLC, this letter submits the Dewatering Discharge Permit Application in support of the proposed 10 World Trade Center development (MassPort Parcel A2 and Triangle Parcel), located at 10 World Trade Center Avenue, in Boston, Massachusetts.

Dewatering is necessary to enable construction excavations in-the-dry and is anticipated to begin in November 2021 and continue for up to 20 months. Prior to discharge, collected water will be routed through a sedimentation tank and bag filter at minimum to remove suspended solids and un-dissolved chemical constituents. The proposed dewatering discharge route and BWSC outfall locations are shown on Figure 1.

A submittal was provided to US EPA for discharge of the dewatering effluent under the Remediation General Permit (RGP). A copy of the submitted RGP application is attached. If you have any questions, please feel free to contact the undersigned at 617-886-7400.

Sincerely yours,
HALEY & ALDRICH, INC.



Cole E. Worthy III, LSP
Senior Associate

Attachments:
Dewatering Discharge Permit Application
Figure 1 – Proposed Discharge Route
Copy of NPDES RGP Permit Application

Boston Water and Sewer Commission
980 Harrison Avenue
Boston, MA 02119-2540

DEWATERING DISCHARGE PERMIT APPLICATION

OWNER / AUTHORIZED APPLICANT PROVIDE INFORMATION HERE:

Company Name: 10 World Trade LHI LLC Address: c/o Boston Global Investors, 55 Seaport Blvd. Boston, MA 02210

Phone Number: (617) 350-7577 Fax number: (617) 350-7571

Contact person name: Scott Summers Title: Vice President

Cell number: (781) 999-0887 Email address: ssummers@bginvestors.com

Permit Request (check one): ☑ New Application ☐ Permit Extension ☐ Other (Specify): _____

Owner's Information (if different from above):

Owner of property being dewatered: _____

Owner's mailing address: _____ Phone number: _____

Location of Discharge & Proposed Treatment System(s):

Street number and name: 10 World Trade Center Avenue Neighborhood Seaport/South Boston

Discharge is to a: ☐ Sanitary Sewer ☐ Combined Sewer ☑ Storm Drain ☐ Other (specify): _____

Describe Proposed Pre-Treatment System(s): Sedimentation tank, bag filter, other components as necessary (refer to RGP application)

BWSC Outfall No. SDO202, SDO3 Receiving Waters Boston Inner Harbor

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Temporary Discharges (Provide Anticipated Dates of Discharge): From 11/01/2021 To 05/31/2023

☐ Groundwater Remediation	☐ Tank Removal/Installation	☑ Foundation Excavation
☐ Utility/Manhole Pumping	☐ Test Pipe	☑ Trench Excavation
☐ Accumulated Surface Water	☐ Hydrogeologic Testing	☐ Other _____

Permanent Discharges

☐ Foundation Drainage	☐ Crawl Space/Footing Drain
☐ Accumulated Surface Water	☐ Non-contact/Uncontaminated Cooling
☐ Non-contact/Uncontaminated Process	☐ Other; _____

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1. Attach a Site Plan showing the source of the discharge and the location of the point of discharge (i.e. the sewer pipe or catch basin). Include meter type, meter number, size, make and start reading. Note. All discharges to the Commission's sewer system will be assessed current sewer charges.
2. If discharging to a sanitary or combined sewer, attach a copy of MWRA's Sewer Use Discharge permit or application.
3. If discharging to a separate storm drain, attach a copy of EPA's NPDES Permit or NOI application, or NPDES Permit exclusion letter for the discharge, as well as other relevant information.
4. Dewatering Drainage Permit will be denied or revoked if applicant fails to obtain the necessary permits from MWRA or EPA.

Submit Completed Application to: Boston Water and Sewer Commission
Engineering Customer Services
980 Harrison Avenue, Boston, MA 02119
Attn: Jodi Dobay, Engineering Customer Service
E-mail: beginj@bwsc.org
Phone: 617-989-7259 Fax: 617-989-7716

Signature of Authorized Representative for Property Owner: _____ Date: 9-29-2021