Electronic Submittal (NPDES.Generalpermits@epa.gov)
November 6, 2020

U.S. Environmental Protection Agency
Office of Eco System Protection
EPA/OEP Application Coordinator
5 Post Office Square - Suite 100 (OEP06-01)
Boston, MA 02109-3912
Attn: Remediation General Permit NOI Processing

Re: RGP Notice of Intent
Hanscom Air Force Base
Construct Express/Gas + Renovate Exchange/Service Mall
Contract Number 170035 4563
1709 Griffiss Street
Bedford, MA 01730

Dear Sir / Madam:

CarriageHouse Consulting, Inc. (CHCI) has prepared this revised correspondence as requested by SRS Petroleum Services, Corporation on behalf of the U.S. Air Force, who is seeking coverage under the U.S. Environmental Protection Agency's (USEPA) 2017 National Pollutant Discharge Elimination System (NPDES) Remediation General Permit (RGP) for discharge of treated groundwater from the above-referenced project location within the Hanscom Air Force Base (AFB) in Bedford, Massachusetts (the "site") to the Shawsheen River. Excavation dewatering and discharge of treated groundwater from the site is necessary to allow for the installation of an underground storage tank (UST) system in a location with no known historical storage of oil and/or hazardous materials.

In accordance with Part 1of the RGP Notice of Intent (NOI) instructions, general facility/site information is included in Section A of the enclosed Suggested Format for the RGP NOI form, receiving water information in Part B, source water information in Part C, discharge information in Part D, treatment system information in Part E, chemical & additive information in Part F, Endangered Species Act information in Part G, and National Historic Act information in Part H. We are seeking coverage for this short-term (less than 7 days) discharge under the RGP because the Dewatering General Permit, under which this discharge would otherwise qualify, expired and the USEPA has instructed applicants to seek coverage under the RGP. Activity Category II – Non-Petroleum-Related Site Remediation with Contamination Type A – Inorganics has been selected as the best-fit category for the discharge activities, although dewatering is related to construction only (not remediation).

The treated effluent will be discharged into the Hanscom AFB small municipal separate storm sewer system covered under the Massachusetts Small MS4 General Permit. Figures/plans illustrating the information required by the general permit are attached hereto. Documentation related to Endangered Species Act eligibility determination and National Historic Preservation Act eligibility determination are all enclosed.

Should you have any questions, comments, or concerns, please do not hesitate to contact us directly by telephone at (508) 315-3146, or by email at jwiggin@carriagehouseinfo.com.

Sincerely,
CarriageHouse Consulting, Inc.

Jason T. Wiggin, EIT
Senior Project Manager

Brian D. Moore, LSP, PG
President

Enclosure

cc: Catherine Vakalopoulos, Massachusetts Department of Environmental Protection *(Catherine.Vakalopoulos@state.ma.us)*
Jeffrey Liquori, SRS Petroleum Services, Corp. (*jeff@srspetroleum.com*)
Rick Magliozzi, Integrated Facilities Construction Corp *(Rick@ifc-corp.com)*
Scott Sheehan, E GS-12 USAF AFMC 66 ABG/CEIE *(scott.sheehan.1@us.af.mil)*
Thomas Schluckebier, Base Civil Engineer *(thomas.schluckebier.1@us.af.mil)*

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:
Hanscom Air Force Base</td><td colspan="3">Site address: Hanscom AFB AAFES B1709
35 Griffis Street
Street:</td></tr>
<tr><td>City: Hanscom AFB</td><td>State: MA</td><td>Zip: 01731</td></tr>
<tr><td rowspan="4">2. Site owner
U.S. Air Force

Owner is (check one): ■ Federal ☐ State/Tribal ☐ Private
☐ Other; if so, specify:</td><td colspan="3">Contact Person: Thomas Schluckebier, PE, LEED AP, CFM</td></tr>
<tr><td colspan="2">Telephone: 781-225-2999</td><td>Email: thomas.schluckebier.1@us.af.mil</td></tr>
<tr><td colspan="3">Mailing address: 120 Grenier Street
Bldg 1810
Street:</td></tr>
<tr><td>City: Hanscom AFB</td><td>State: MA</td><td>Zip: 01731</td></tr>
<tr><td rowspan="4">3. Site operator, if different than owner</td><td colspan="3">Contact Person:</td></tr>
<tr><td colspan="2">Telephone:</td><td>Email:</td></tr>
<tr><td colspan="3">Mailing address:

Street:</td></tr>
<tr><td>City:</td><td>State:</td><td>Zip:</td></tr>
<tr><td>4. NPDES permit number assigned by EPA:
N/A

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

☐ 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):
Shawsheen River	MA83-08	Class B

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

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

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

If yes, specify: Natural Heritage and Endangered Species Program Priority Habitat 1555 to the north of discharge activities

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. Yes, Category 5. Pollutants: D.O., E. Coli, Fecal Coliform, physical substrate habitat alterations. TMDL for bacteria.

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.	0.00097 MGD
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.	0

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): Not contaminated, coverage under RGP because dewatering general permit has expired

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

2. Source water contaminants:	
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): OF6	Outfall location(s): (Latitude, Longitude) 42 degrees, 28 minutes, 0.1 seconds North, 71 degrees, 16 minutes, 37.1 seconds West
Discharges enter the receiving water(s) via (check any that apply): ☐ Direct discharge to the receiving water ■ Indirect discharge, if so, specify: Into existing catch basin through Hanscom's Small MS4 to the outfall designated OF6 ☐ A private storm sewer system ■ A municipal storm sewer system If the discharge enters the receiving water via a private or municipal storm sewer system: Has notification been provided to the owner of this system? (check one): ■ Yes ☐ No Has the operator has received permission from the owner to use such system for discharges? (check one): ■ Yes ☐ No, if so, explain, with an estimated timeframe for obtaining permission: Has the operator attached a summary of any additional requirements the owner of this system has specified? (check one): ☐ Yes ■ No No additional requirements apply to discharge	
Provide the expected start and end dates of discharge(s) (month/year): Start and end November 2020, estimated 2-3 days of discharge Indicate if the discharge is expected to occur over a duration of: ■ less than 12 months ☐ 12 months or more ☐ is an emergency discharge	
Has the operator attached a site plan in accordance with the instructions in D, above? (check one): ■ Yes ☐ No	

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

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

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

4. Influent and Effluent Characteristics

Parameter	Known or believed absent	Known or believed present	# of samples	Test method (#)	Detection limit (µg/l)	Influent		Effluent Limitations	
						Daily maximum (µg/l)	Daily average (µg/l)	TBEL	WQBEL
A. Inorganics									
Ammonia		✓	1	4500NH3	75	85	85	Report mg/L	---
Chloride		✓	1	300.0	12,500	654,000	654,000	Report µg/l	---
Total Residual Chlorine	✓		1	4500CL	20	<20	<20	0.2 mg/L	
Total Suspended Solids		✓	1	4500CN	10,000	65,000	65,000	30 mg/L	---
Antimony		✓	1	200.8	4	9.53	9.53	206 µg/L	
Arsenic		✓	1	200.8	1	31.81	31.81	104 µg/L	
Cadmium	✓		1	200.8	0.2	<0.2	<0.2	10.2 µg/L	
Chromium III		✓	1	200.8	1	5.83	5.83	323 µg/L	
Chromium VI	✓		1	7196A	10	<10	<10	323 µg/L	
Copper		✓	1	200.8	1	11.15	11.15	242 µg/L	
Iron		✓	1	200.7	50	3,300	3,300	5,000 µg/L	
Lead		✓	1	200.8	1	12.35	12.35	160 µg/L	
Mercury	✓		1	245.1	0.2	<0.2	<0.2	0.739 µg/L	
Nickel		✓	1	200.8	2	7.99	7.99	1,450 µg/L	
Selenium	✓		1	200.8	5	<5	<5	235.8 µg/L	
Silver	✓		1	200.8	0.4	<0.4	<0.4	35.1 µg/L	
Zinc		✓	1	200.8	10	13.84	13.84	420 µg/L	
Cyanide	✓		1	4500CN	5	<5	<5	178 mg/L	
B. Non-Halogenated VOCs									
Total BTEX			1					100 µg/L	---
Benzene	✓		1	624.1	1,000	<1,000	<1,000	5.0 µg/L	---
1,4 Dioxane	✓		1	624.1	50,000	<50,000	<50,000	200 µg/L	---
Acetone	✓		1	624.1	10,000	<10,000	<10,000	7.97 mg/L	---
Phenol	✓		1	625.1	1,000	<1,000	<1,000	1,080 µg/L	

Parameter	Known or believed absent	Known or believed present	# of samples	Test method (#)	Detection limit (µg/l)	Influent		Effluent Limitations	
						Daily maximum (µg/l)	Daily average (µg/l)	TBEL	WQBEL
C. Halogenated VOCs									
Carbon Tetrachloride	✓		1	624.1	1,000	<1,000	<1,000	4.4 µg/L	
1,2 Dichlorobenzene	✓		1	624.1	5,000	<5,000	<5,000	600 µg/L	---
1,3 Dichlorobenzene	✓		1	624.1	5,000	<5,000	<5,000	320 µg/L	---
1,4 Dichlorobenzene	✓		1	624.1	5,000	<5,000	<5,000	5.0 µg/L	---
Total dichlorobenzene	✓		1	624.1	5,000	<5,000	<5,000	763 µg/L in NH	---
1,1 Dichloroethane	✓		1	624.1	1,500	<1,500	<1.500	70 µg/L	---
1,2 Dichloroethane	✓		1	624.1	1,500	<1,500	<1,500	5.0 µg/L	---
1,1 Dichloroethylene	✓		0					3.2 µg/L	---
Ethylene Dibromide	✓		0					0.05 µg/L	---
Methylene Chloride	✓		1	624.1	1,000	<1,000	<1,000	4.6 µg/L	---
1,1,1 Trichloroethane	✓		1	624.1	2,000	<2,000	<2,000	200 µg/L	---
1,1,2 Trichloroethane	✓		1	624.1	1,500	<1,500	<1,500	5.0 µg/L	---
Trichloroethylene	✓		0					5.0 µg/L	---
Tetrachloroethylene	✓		0					5.0 µg/L	
cis-1,2 Dichloroethylene	✓		0					70 µg/L	---
Vinyl Chloride	✓		1	624.1	1,000	<1,000	<1,000	2.0 µg/L	---
D. Non-Halogenated SVOCs									
Total Phthalates	✓		0					190 µg/L	
Diethylhexyl phthalate	✓		0					101 µg/L	
Total Group I PAHs	✓		1					1.0 µg/L	---
Benzo(a)anthracene	✓		1	625.1	100	<100	<100	As Total PAHs	
Benzo(a)pyrene	✓		1	625.1	100	<100	<100		
Benzo(b)fluoranthene	✓		1	625.1	100	<100	<100		
Benzo(k)fluoranthene		✓	1	625.1	100	110	110		
Chrysene	✓		1	625.1	100	<100	<100		
Dibenzo(a,h)anthracene	✓		1	625.1	100	<100	<100		
Indeno(1,2,3-cd)pyrene	✓		1	625.1	100	<100	<100		

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	100	<100	<100	100 µg/L	---
Naphthalene	✓		1	625.1	100	<100	<100	20 µg/L	---
E. Halogenated SVOCs									
Total PCBs	✓		0					0.000064 µg/L	---
Pentachlorophenol	✓		1	625.1	100	<100	<100	1.0 µg/L	---
F. Fuels Parameters									
Total Petroleum Hydrocarbons	✓		0					5.0 mg/L	---
Ethanol	✓		1					Report mg/L	---
Methyl-tert-Butyl Ether	✓		1	624.1	10,000	<10,000	<10,000	70 µg/L	
tert-Butyl Alcohol	✓		1	624.1	100,000	<100,000	<100,000	120 µg/L in MA 40 µg/L in NH	---
tert-Amyl Methyl Ether	✓		1	624.1	20,000	<20,000	<20,000	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:									

E. Treatment system information

1. Indicate the type(s) of treatment that will be applied to effluent prior to discharge: (check all that apply)

☐ Adsorption/Absorption ☐ Advanced Oxidation Processes ☐ Air Stripping ☐ Granulated Activated Carbon ("GAC")/Liquid Phase Carbon Adsorption
☐ Ion Exchange ☐ Precipitation/Coagulation/Flocculation ■ Separation/Filtration ☐ Other; if so, specify:

2. Provide a written description of all treatment system(s) or processes that will be applied to the effluent prior to discharge.
Settling through 18,000-gallon weir tank, and filtration through Dirtbag prior to discharge to catch basin

Identify each major treatment component (check any that apply):
■ Fractionation tanks☐ Equalization tank ☐ Oil/water separator ☐ Mechanical filter ☐ Media filter
☐ Chemical feed tank ☐ Air stripping unit ■ Bag filter ☐ Other; if so, specify:

Indicate if either of the following will occur (check any that apply):
☐ Chlorination ☐ De-chlorination

3. Provide the **design flow capacity** in gallons per minute (gpm) of the most limiting component. Indicate the most limiting component: >200 gpm, Dirtbag Is use of a flow meter feasible? (check one): ■ Yes ☐ No, if so, provide justification:	>200
Provide the proposed maximum effluent flow in gpm.	100
Provide the average effluent flow in gpm.	25
If Activity Category IV applies, indicate the estimated total volume of water that will be discharged:	

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

F. Chemical and additive information

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

☐ Algaecides/biocides ☐ Antifoams ☐ Coagulants ☐ Corrosion/scale inhibitors ☐ Disinfectants ☐ Flocculants ☐ Neutralizing agents ☐ Oxidants ☐ Oxygen ☐ scavengers ☐ pH conditioners ☐ Bioremedial agents, including microbes ☐ Chlorine or chemicals containing chlorine ☐ Other; if so, specify:

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

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

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

G. Endangered Species Act eligibility determination

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

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

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

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

☐ **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.

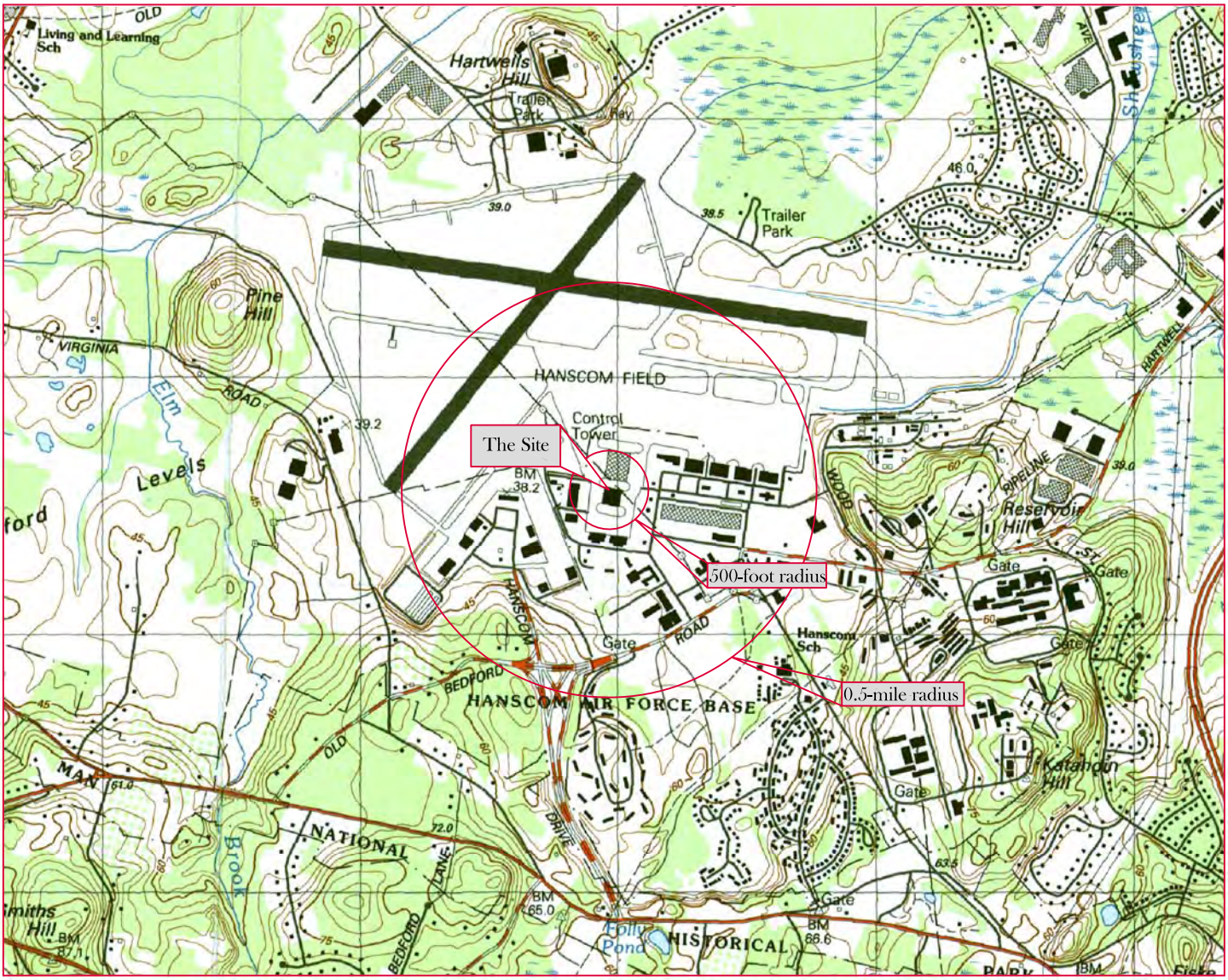
Has the operator attached data, including any laboratory case narrative and chain of custody used to support the application? (check one): ■ Yes ☐ No

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 this general permit will be in place upon initiation of discharge (Hanscom AFB Illicit Discharge Detection Elimination Program, dated July 2019)	
Notification provided to the appropriate State, including a copy of this NOI, if required.	Check one: Yes ■ No ☐
Notification provided to the municipality in which the discharge is located, including a copy of this NOI, if requested.	Check one: Yes ☐ No ■
Notification provided to the owner of a private or municipal storm sewer system, if such system is used for site discharges, including a copy of this NOI, if requested.	Check one: Yes ☐ No ☐ NA ■
Permission obtained from the owner of a private or municipal storm sewer system, if such system is used for site discharges. If yes, attach additional conditions. If no, attach explanation and timeframe for obtaining permission.	Check one: Yes ☐ No ☐ NA ■
Notification provided to the owner/operator of the area associated with activities covered by an additional discharge permit(s). Additional discharge permit is (check one): ☐ RGP ☐ DGP ☐ CGP ☐ MSGP ☐ Individual NPDES permit ☐ Other; if so, specify:	Check one: Yes ☐ No ☐ NA ■
Signature: SCHLUCKEBIER.THOMAS.J.1092804255 Digitally signed by SCHLUCKEBIER.THOMAS.J.1092804255 Date: 2020.11.06 19:31:40 -05'00'	Date: 6 November 2020
Print Name and Title: Thomas Schluckebier, PE, LEED AP, CFM	



Universal Transverse Mercator Coordinates:

4 703 692 m North
312 043 m East
Grid Zone 19

Latitude: 42° 27' 46" N
Longitude: 71° 17' 10" W

N

Scale 1 : 25,000

1000 0 1000 2000 3000 4000 FEET

Contour Intervals are 3 meters based on National Geodetic Vertical Datum of 1929 (Refer to References)

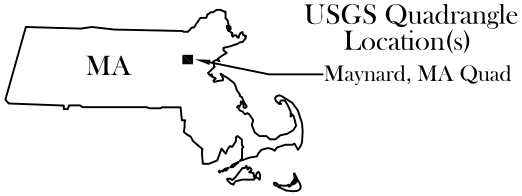


FIGURE 1

LOCUS PLAN
Hanscom Air Force Base
1709 Griffiss Street
Bedford, Massachusetts

Ref.: Locus Plan	Checked By: JTW
Drafted By: TJG	Date: 10/26/20
Revised By:	Date:

Source(s): United States Geologic Survey 7.5 x 15 Minute Series Topographic Maps - Maynard, MA Quadrangle (1987)

Location of discharge to Shawsheen River through 48-inch outfall pipes (OF6)

Receiving water sample SWS-1 from culverted/ upstream location of Shawsheen River

Source of groundwater to be extracted from excavation and discharged to nearby storm sewer catch basin

Water flow back to Shawsheen River

Shawsheen River

Legend

- Manhole
- Outfall
- Inlet
- Open Drainage
- Culvert
- Gravity Line

Property Boundaries

- Installation Boundary
- MS4 Exempt

Transportation

- Bridge

Real Property

- Building
- Other Structure

Pavements

- Pavement

Natural Resources

- Impairment
- River
- Water Body
- Wetland
- Vegetation

FIGURE 2

Stormwater Features Map

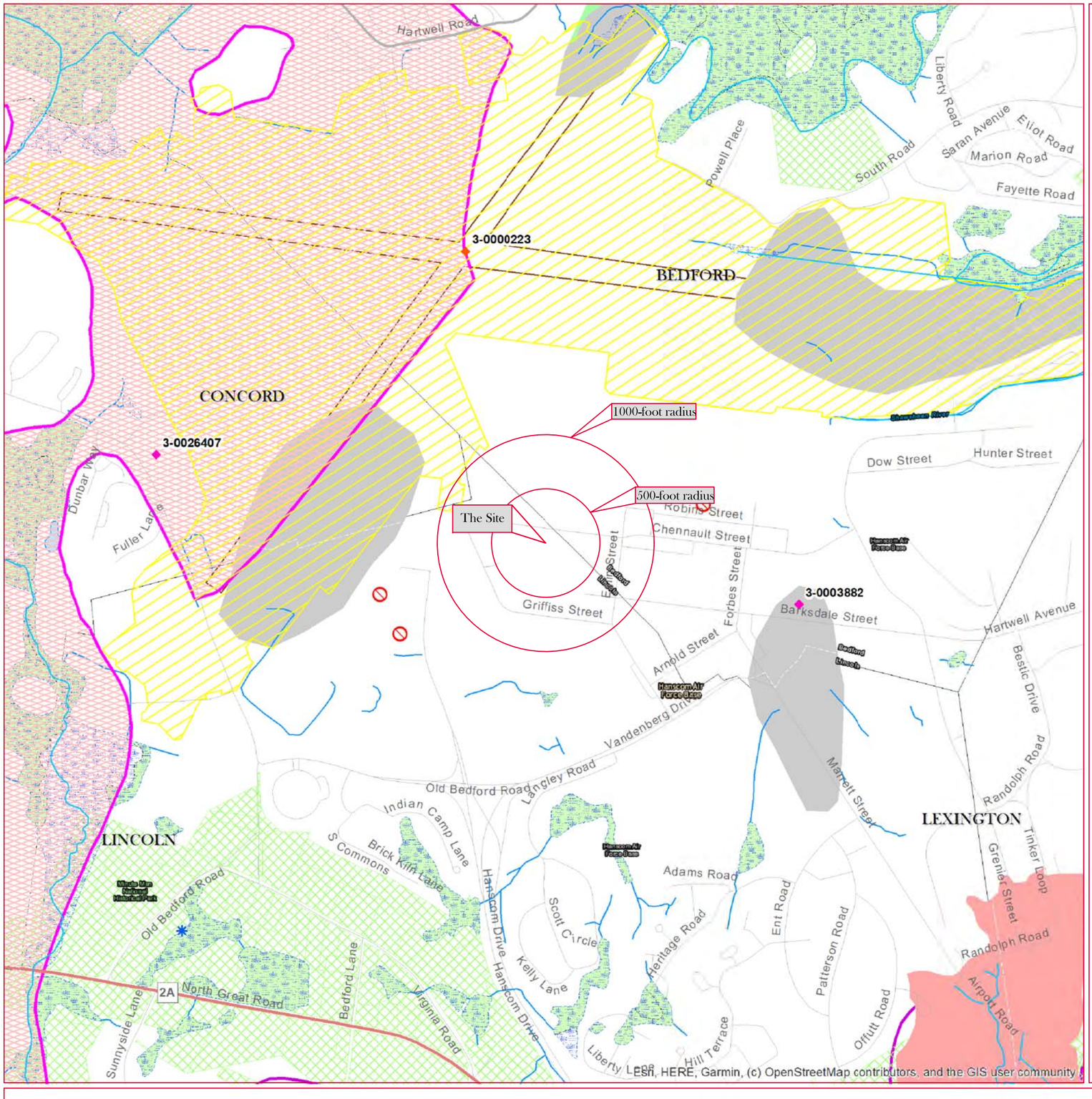
Hanscom Air Force Base
66 ABG/CEIE
Concord, Massachusetts

NORTH

BB&E

0 1,000 2,000
Feet

Document Path: H:\IT\GIS\GSA\02067002 - Hanscom\figures\Fig 1 - GSA Hanscom - SWMP Features.mxd JMS 5/30/19



Legend

- AUL Sites
- **21E Tier Classified Sites**
- **Regulated Status**
  - TIER I
  - TIER II
  - TIER1D
- Hydrographic Linear Features
- Railroads
- **MassDOT Roads**
- **Road Type**
  - Limited Access Highway
  - Multi-lane Hwy, not limited access
  - Other Numbered Highway
  - Major Road, Collector
  - Minor Road, Arterial
  - Ramp
  - Tunnel
  - Tunnel (Limited Access Hwy)
  - Tunnel (Multi-lane Hwy)
  - Tunnel (Other Numbered Hwy)
- Community Groundwater Source
- Surface Water Intake
- Non-Community Groundwater Source
- Emergency Surface Water
- Surface Water Protection Zone A
- ZONE A
- ZONE B
- ZONE C
- NHESP Certified Vernal Pools
- NHESP Estimated Habitats of Rare Wildlife
- NHESP Priority Habitats of Rare Species
- Area of Critical Environmental Concern
- Solid Waste Facilities
- Sole Source Aquifers
- DEP Approved Zone I
- DEP Approved Zone II
- IWPA
- Shoreline
- Hydrologic Connection
- Mean Low Water Line
- Wetland Limit
- Closure Line
- Marsh/Bog
- Wooded marsh
- Cranberry Bog
- Salt Marsh
- Open Water
- Reservoir (with PWSID)
- Tidal Flats
- Beach/Dune
- High Yield
- Medium Yield
- High Yield
- Medium Yield
- Protected Open Space
- Major Basins
- Transmission Lines

This image based on GIS data obtained: October 26, 2020.

GIS data provided by Office of Geographic and Environmental Information (MassGIS), Commonwealth of Massachusetts Executive Office of Environmental Affairs.

500 0 500 1000 1500 2000 FEET

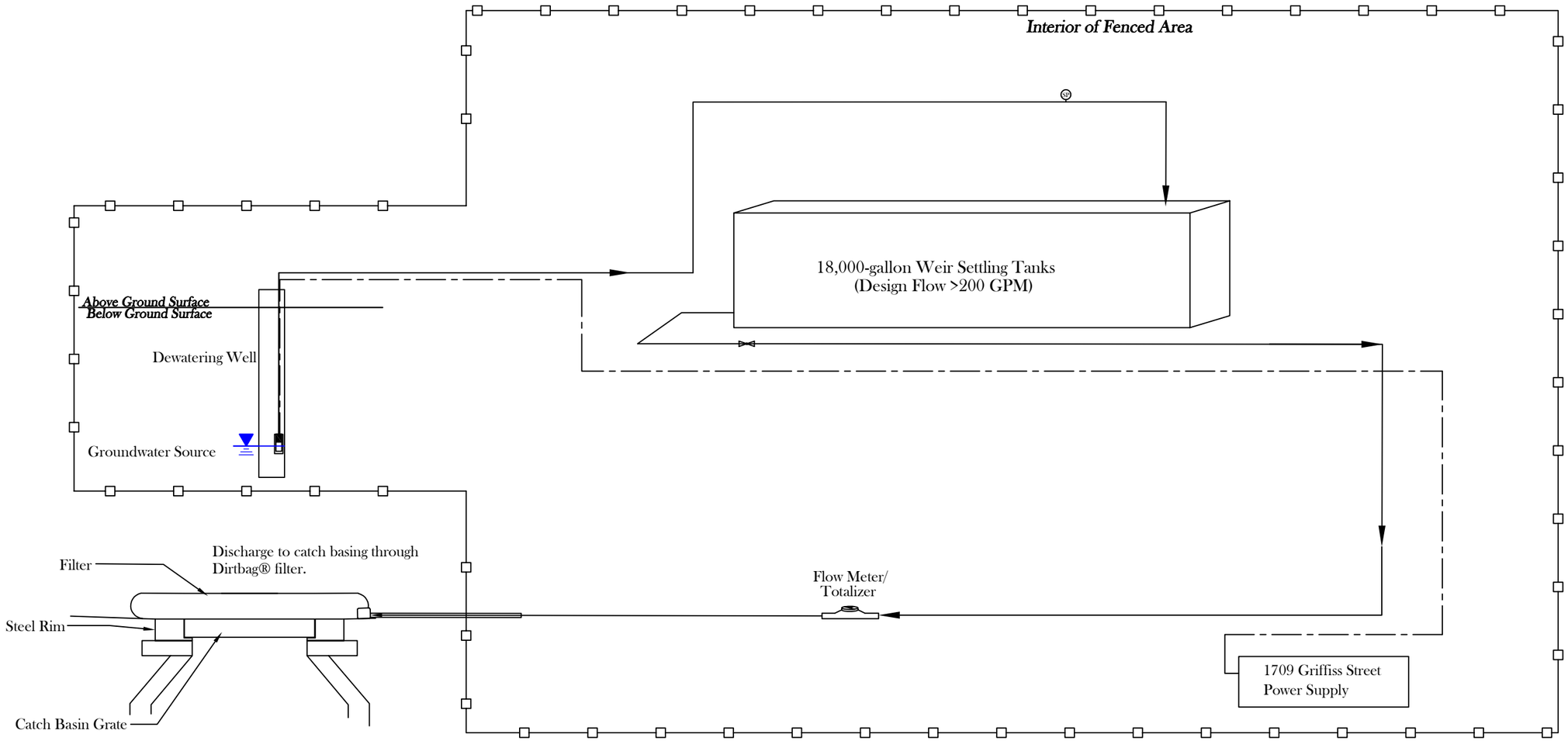
Scale 1 : 12,000

North

FIGURE 3

ENVIRONMENTAL RESOURCES PLAN
Hanscom Air Force Base
1709 Griffiss Street
Bedford, Massachusetts

Ref.: 2020 10 26 ERP	Checked By: JTW
Drafted By: TJG	Date: 10/26/20
Revised By:	Date:
Source: Massachusetts Geographic Information System	



KEY

	Gate Valve		Flow Direction
PG	Pressure Gauge		Piped Connection
SP	Sampling Port		Electrical Connection

FIGURE 4
DISCHARGE SCHEMATIC DIAGRAM
Hanscom Air Force Base
1709 Griffiss Street
Bedford, Massachusetts

Ref.: Discharge Schematic	Checked By: JTW
Drafted By: HKY	Date: 10/05/17
Revised By: BDM	Date: 10/27/20
Source: CHCI	

Enter number values in green boxes below

Enter values in the units specified

↓

0.00097	Q_R = Enter upstream flow in **MGD**
0.288	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

↓

661	C_d = Enter influent hardness in **mg/L** $CaCO_3$
21.3	C_s = Enter receiving water hardness in **mg/L** $CaCO_3$

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

↓

7.08	pH in **Standard Units**
15.91	Temperature in **°C**
0.257	Ammonia in **mg/L**
109	Hardness in **mg/L** $CaCO_3$
0	Salinity in **ppt**
0	Antimony in **µg/L**
2.22	Arsenic in **µg/L**
0	Cadmium in **µg/L**
0	Chromium III in **µg/L**
0	Chromium VI in **µg/L**
1.08	Copper in **µg/L**
995	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**
15.96	Zinc in **µg/L**

Enter **influent** concentrations in the units specified

↓

0	TRC in **µg/L**
0.085	Ammonia in **mg/L**
9.53	Antimony in **µg/L**
31.81	Arsenic in **µg/L**
0	Cadmium in **µg/L**
5.83	Chromium III in **µg/L**
0	Chromium VI in **µg/L**
11.15	Copper in **µg/L**
3300	Iron in **µg/L**
12.35	Lead in **µg/L**
0	Mercury in **µg/L**
7.99	Nickel in **µg/L**
0	Selenium in **µg/L**
0	Silver in **µg/L**
13.84	Zinc in **µg/L**
0	Cyanide in **µg/L**
0	Phenol in **µg/L**
0	Carbon Tetrachloride in **µg/L**
0	Tetrachloroethylene in **µg/L**
0	Total Phthalates in **µg/L**
0	Diethylhexylphthalate in **µg/L**
0	Benzo(a)anthracene in **µg/L**
0	Benzo(a)pyrene in **µg/L**
0	Benzo(b)fluoranthene in **µg/L**
110	Benzo(k)fluoranthene in **µg/L**
0	Chrysene in **µg/L**
0	Dibenzo(a,h)anthracene in **µg/L**
0	Indeno(1,2,3-cd)pyrene in **µg/L**
0	Methyl-tert butyl ether in **µg/L**

Notes:

Freshwater: Q_R equal to the 7Q10; enter alternate Q_R if approved by the State; enter 0 if no dilution factor 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	1.0					
A. Inorganics	TBEL applies if bolded		WQBEL applies if bolded		Compliance Level applies if shown	
Ammonia	**Report**	mg/L	---			
Chloride	**Report**	µg/L	---			
Total Residual Chlorine	0.2	mg/L	**11**	µg/L	50	µg/L
Total Suspended Solids	**30**	mg/L	---			
Antimony	**206**	µg/L	642	µg/L		
Arsenic	104	µg/L	**10**	µg/L		
Cadmium	**10.2**	µg/L	1.0940	µg/L		
Chromium III	**323**	µg/L	405.0	µg/L		
Chromium VI	**323**	µg/L	11.5	µg/L		
Copper	**242**	µg/L	46.9	µg/L		
Iron	5000	µg/L	**1000**	µg/L		
Lead	**160**	µg/L	35.19	µg/L		
Mercury	**0.739**	µg/L	0.91	µg/L		
Nickel	**1450**	µg/L	257.9	µg/L		
Selenium	**235.8**	µg/L	5.0	µg/L		
Silver	**35.1**	µg/L	97.2	µg/L		
Zinc	**420**	µg/L	593.9	µg/L		
Cyanide	**178**	mg/L	5.2	µg/L	---	µg/L
B. Non-Halogenated VOCs						
Total BTEX	**100**	µg/L	---			
Benzene	**5.0**	µg/L	---			
1,4 Dioxane	**200**	µg/L	---			
Acetone	**7970**	µg/L	---			
Phenol	**1,080**	µg/L	301	µg/L		
C. Halogenated VOCs						
Carbon Tetrachloride	**4.4**	µg/L	1.6	µg/L		
1,2 Dichlorobenzene	**600**	µg/L	---			
1,3 Dichlorobenzene	**320**	µg/L	---			
1,4 Dichlorobenzene	**5.0**	µg/L	---			
Total dichlorobenzene	**---**	µg/L	---			
1,1 Dichloroethane	**70**	µg/L	---			
1,2 Dichloroethane	**5.0**	µg/L	---			
1,1 Dichloroethylene	**3.2**	µg/L	---			
Ethylene Dibromide	**0.05**	µg/L	---			
Methylene Chloride	**4.6**	µg/L	---			
1,1,1 Trichloroethane	**200**	µg/L	---			
1,1,2 Trichloroethane	**5.0**	µg/L	---			
Trichloroethylene	**5.0**	µg/L	---			
Tetrachloroethylene	**5.0**	µg/L	3.3	µg/L		
cis-1,2 Dichloroethylene	**70**	µg/L	---			
Vinyl Chloride	**2.0**	µg/L	---			
D. Non-Halogenated SVOCs						
Total Phthalates	**190**	µg/L	---	µg/L		
Diethylhexyl phthalate	**101**	µg/L	2.2	µg/L		
Total Group I Polycyclic Aromatic Hydrocarbons	**1.0**	µg/L	---			
Benzo(a)anthracene	**1.0**	µg/L	0.0038	µg/L	---	µg/L
Benzo(a)pyrene	**1.0**	µg/L	0.0038	µg/L	---	µg/L
Benzo(b)fluoranthene	**1.0**	µg/L	0.0038	µg/L	---	µg/L
Benzo(k)fluoranthene	1.0	µg/L	**0.0038**	µg/L	0.1	µg/L
Chrysene	**1.0**	µg/L	0.0038	µg/L	---	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	---	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	---			

Jason Wiggin

From: Ruan, Xiaodan (DEP) <xiaodan.ruan@state.ma.us>
Sent: Wednesday, November 04, 2020 11:07 PM
To: jwiggin@carriagehouseinfo.com
Cc: Vakalopoulos, Catherine (DEP)
Subject: RE: Express/Exchange Hanscom AFB (Water Test Results Dated 10/7/20 - Request for Base/AAFES Approval)

Hi Jason,

Yes, it is common for the consultant to submit/pay using ePLACE. Also, U.S. Air Force is not fee exempt.

I can confirm the 7Q10 of 0.00097 MGD in the NOI is correct. However, the dilution factor in the RGP is calculated based on the worst-case scenario; therefore, the design flow 200 gpm provided in the NOI should be used.

After the calculation, the dilution factor is close to 1, so there is no dilution for this proposed discharge to the Shawsheen River.

I also checked the water quality information for the receiving water, and they look correct.

Please let me know if you have any questions.

Thanks,
Xiaodan

From: Jason Wiggin <jwiggin@carriagehouseinfo.com>
Sent: Wednesday, November 4, 2020 1:34 PM
To: Ruan, Xiaodan (DEP) <xiaodan.ruan@mass.gov>
Cc: Vakalopoulos, Catherine (DEP) <catherine.vakalopoulos@mass.gov>
Subject: RE: Express/Exchange Hanscom AFB (Water Test Results Dated 10/7/20 - Request for Base/AAFES Approval)

Hi Xiaodan,

Thanks so much for getting back to me. I appreciate all the info so far and will wait to hear on the 7Q10/dilution factor.

One follow up question – is it typical for consultant to submit/pay using ePLACE? I (CarriageHouse) would prefer to complete the process because it will be quicker than having the owner do it. Please advise.

Thanks again,
Jason

Jason T. Wiggin
CarriageHouse Consulting, Inc.
Office: 508.315.3146

Shawsheen River, Hanscom AFB

Region ID: MA
Workspace ID: MA20201026141809684000
Clicked Point (Latitude, Longitude): 42.46672, -71.27322
Time: 2020-10-26 10:18:26 -0400

Basin Characteristics

Parameter Code	Parameter Description	Value	Unit
DRNAREA	Area that drains to a point on a stream	0.0649	square miles
BSLDEM250	Mean basin slope computed from 1:250K DEM	2.315	percent
DRFTPERSTR	Area of stratified drift per unit of stream length	0.26	square mile per mile
MAREGION	Region of Massachusetts 0 for Eastern 1 for Western	0	dimensionless

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

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	0.0649	square miles	1.61	149
BSLDEM250	Mean Basin Slope from 250K DEM	2.315	percent	0.32	24.6
DRFTPERSTR	Stratified Drift per Stream Length	0.26	square mile per mile	0	1.29
MAREGION	Massachusetts Region	0	dimensionless	0	1

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

One or more of the parameters is outside the suggested range. Estimates were extrapolated with unknown errors

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

Statistic	Value	Unit
7 Day 2 Year Low Flow	0.00411	ft^3/s
7 Day 10 Year Low Flow	0.0015	ft^3/s

Low-Flow Statistics Citations

Ries, K.G., III,2000, Methods for estimating low-flow statistics for Massachusetts streams: U.S. Geological Survey Water Resources Investigations Report 00-4135, 81 p. (http://pubs.usgs.gov/wri/wri004135/)

Application Version: 4.4.0

Table 1
Receiving Water Data Summary
Hanscom Air Force Base
1709 Griffiss Street
Bedford, MA

Sample Location [1]:		**Shawsheen River**
Sample Name:		**SWS-1**
Sample Date:		**October 21, 2020**
Sample Time:		**14:30**
Laboratory Sample No.		**L2045647-01**
Analyte (Laboratory)	**Units**	**Result**
Ammonia as N	ug/L	257
Antimony, Total	ug/L	<4.00
Arsenic, Total	ug/L	2.22
Cadmium, Total	ug/L	<0.20
Chromium, Total	ug/L	<1.00
Copper, Total	ug/L	1.08
Hardness, Total	ug/L	109,000
Iron, Total	ug/L	995
Lead, Total	ug/L	<1.00
Mercury, Total	ug/L	<0.20
Nickel, Total	ug/L	<2.00
Selenium, Total	ug/L	<5.00
Silver, Total	ug/L	<0.40
Zinc, Total	ug/L	15.96
pH[2]	Standard Units	7.08
Temperature[2]	Fahrenheit	60.64

Notes:

ug/L - micrograms per liter

<# - analyte not detected at presented quantitation limit

1. Sample collected upstream of proposed discharge location.

2. Temperature and pH measured in the field with a Hanna-brand HI9829 multi-parameter probe on the date indicated.

18,000 gallon weir tank

RECON OUTFITTERS
VETERAN OWNED BUSINESS

Epoxy lined smooth wall for ease of cleaning

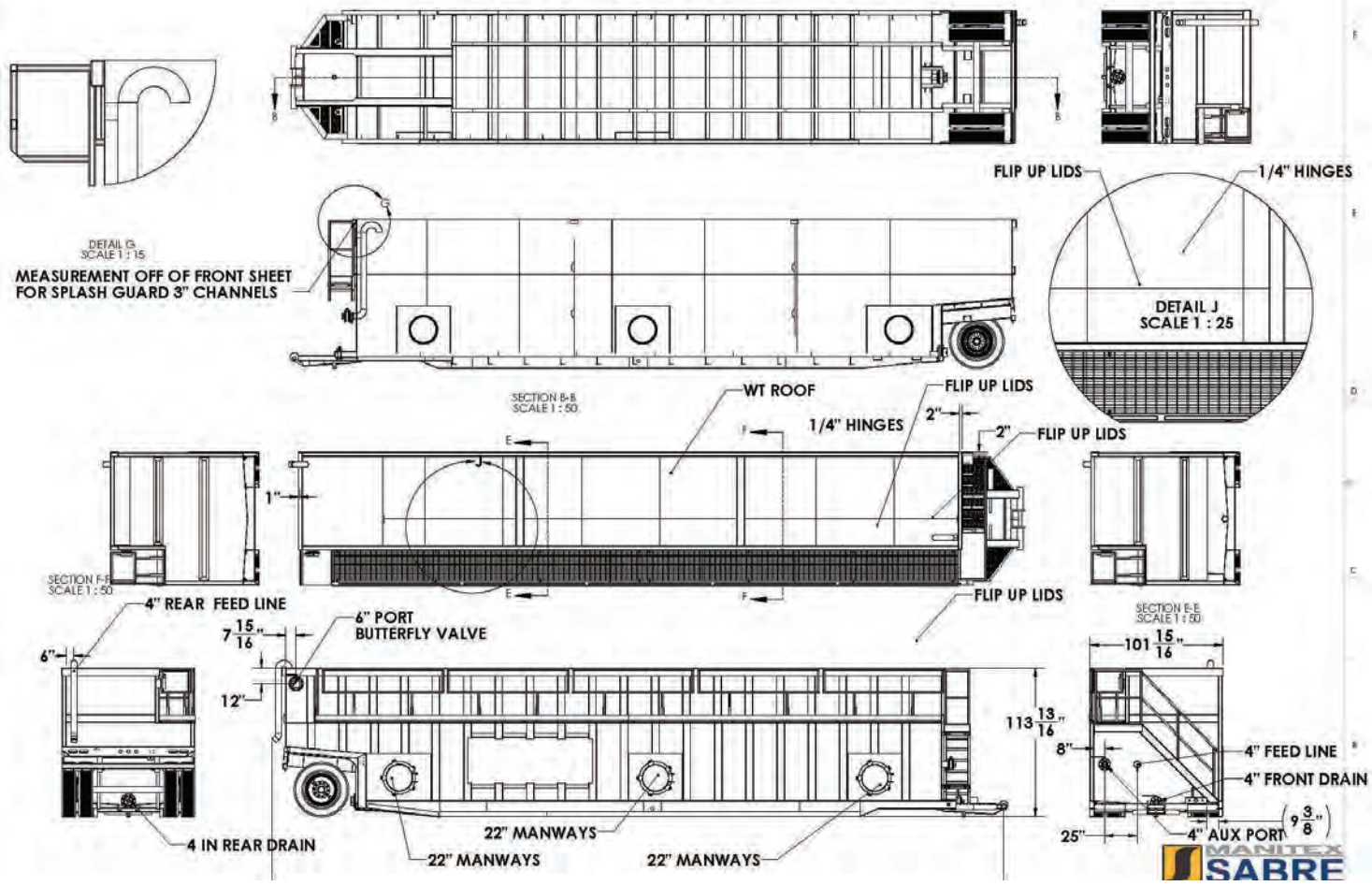
Lockable Flip-top or open top

"RECON Ready" fixed handrails

Sediment removal / oil-water separation

Floc logs to enhance sediment removal

Tank connections allow for manifolding multiple tanks together



DIRTBAG
PUMPED SEDIMENT REMOVAL SYSTEM

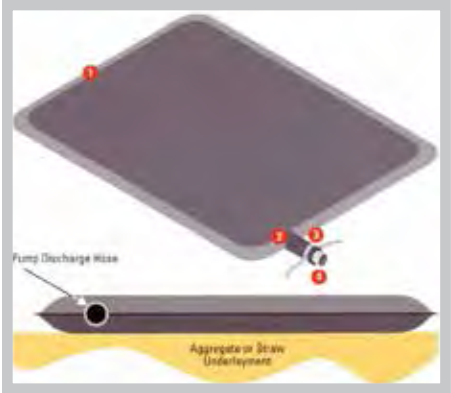
SEDIMENT & PERIMETER CONTROL

Retains the silt, sand and fines while allowing the filtered water to drain out into the drainage system.

Protect the environment effectively and economically with the ACF Dirtbag®!

The ACF Dirtbag® collects sand, silt and fines, while regulating that enters streams, surrounding property and storm sewers. ACF can make custom Dirtbags® to suit your needs. ACF Environmental manufactures the Dirtbag® using a variety of woven and nonwoven geotextile fabrics. We can produce any size, dimension, or fabric weight requested.

Each standard Dirtbag® has a fill spout large enough to accommodate a 4" discharge hose. Straps are attached to secure the hose and prevent pumped water from escaping without being filtered. To increase the efficiency of filtration, place the bag on an aggregate or haybale bed to maximize water flow through the surface area of the bag. Dirtbag® is full when it no longer can efficiently filter sediment or pass water at a reasonable rate. Flow and removal rates will vary depending on the size of Dirtbag®, the type and amount of sediment discharged into Dirtbag®, the type of surface, rock or other substance under the bag. Under most circumstances Dirtbag® will accommodate flow rates of 500 gallons per minute. Use of excessive flow rates or overfilling Dirtbag® with sediment will cause ruptures of the bags or failure of the hose attachment straps.



Dirtbag® must be monitored during use.
The ACF Dirtbag® has been tested under ASTM D-7880 and ASTM D-7701, which are Standard Test Methods for Determining Flow Rate of Water and Suspended Solids Retention from a Closed Geosynthetic Bag. Testing summary available upon request.

For more information about Sediment Perimeter Control, contact Inside Sales at 800.448.3636 or email at info@acfenv.com

ACF ENVIRONMENTAL
LET'S GET IT DONE

DIRTBAG® SPECIFICATIONS

LET'S GET IT DONE

DIRTBAG 53-NON-DOT

Standard Sizes:
4′ x 6′
5′ x 5′
8′ x 10′
10′ x 15′
15 x 15′
Custom Sizes available upon request.

Geotextile Properties - DB53

Property	Test Method	Units	Test Results
Weight	ASTM D-3776	oz/yd	8
Grab Tensile	ASTM D-4632	lbs.	205
CBR Puncture	ASTM D-6241	lbs.	525
Flow Rate	ASTM D-4491	gal/min/ft^2	90
Permittivity	ASTM D-4491	sec.$^{-1}$	1.4
UV Resistance	ASTM D-4355	%	70
AOS %	ASTM D-4751	US Sieve	80

DIRTBAG 55-DOT

Standard Sizes:
4′ x 6′
5′ x 5′
8′ x 10′
10′ x 10′
15′ x 15′
Custom Sizes available upon request.

Geotextile Properties - DB55

Property	Test Method	Units	Test Results
Weight	ASTM D-3776	oz/yd	10
Grab Tensile	ASTM D-4632	lbs.	250
CBR Puncture	ASTM D-6241	lbs.	625
Flow Rate	ASTM D-4491	gal/min/ft^2	80
Permittivity	ASTM D-4491	sec.$^{-1}$	1.2
UV Resistant	ASTM D-4355	%	70
AOS %	ASTM D-4751	US Sieve	100

Dirtbag® Test Results

Property	Test Method	Units	Results
Average Removal Efficiency	ASTM D-7701	%	99.6
Residual Low-Head	ASTM D-7701	gpm	<0.001
CBR Puncture	ASTM D-6241	lbs.	97.98

Dirtbag® Seam Test Results (under ASTM D4884)

Dirtbag 55
Maximum Load 786 lbs
Maximum Strength 1178 lb/ft
NOTE: Each test result was derived from a material failure rather than a stitch failure.

All properties are Minimum Average Roll Value (MARV) except the weight of the fabric, which is given for information purposes only. Depending on soil conditions and filtration requirements, additional geotextile options are available. All test methods are ASTM or industry standard, and have been verified by a third party testing facility. Test data is available upon request.

ACF ENVIRONMENTAL
LET'S GET IT DONE
800.448.3636
acfenvironmental.com

5 2016

Notice of Intent (NOI) for coverage under Small MS4 General Permit

Part I: General Conditions

General Information

Name of Municipality or Organization: HANSCOM AIR FORCE BASE State: MA

EPA NPDES Permit Number (if applicable): MAR042029

Primary MS4 Program Manager Contact Information

Name: SCOTT SHEEHAN Title: ENVIRONMENTAL ENGINEER

Street Address Line 1: 66 ABG/CEI

Street Address Line 2: 120 GRENIER STREET, BLDG 1810

City: HANSCOM AFB State: MA Zip Code: 01731-1910

Email: SCOTT.SHEEHAN.1@US.AF.MIL Phone Number: (781) 225-6144

Fax Number: (781) 225-2230

Other Information

Stormwater Management Program (SWMP) Location (web address or physical location, if already completed): 66 ABG/CEIE; 72 DOW STREET, BLDG 1825; HANSCOM AFB, MA 01731

Eligibility Determination

Endangered Species Act (ESA) Determination Complete? Yes

Eligibility Criteria (check all that apply): ☐ A ☐ B ☒ C

National Historic Preservation Act (NHPA) Determination Complete? Yes

Eligibility Criteria (check all that apply): ☒ A ☐ B ☐ C

☑ Check the box if your municipality or organization was covered under the 2003 MS4 General Permit

MS4 Infrastructure (if covered under the 2003 permit)

Estimated Percent of Outfall Map Complete? *(Part II, III, IV or V, Subpart B.3.(a.) of 2003 permit)* 100%

If 100% of 2003 requirements not met, enter an estimated date of completion (MM/DD/YY):

Web address where MS4 map is published:

If outfall map is unavailable on the internet an electronic or paper copy of the outfall map must be included with NOI submission (see section V for submission options)

HANSCOM AFB BASE AND UTILITY MAPS ARE PROTECTED FROM PUBLIC RELEASE FOR REASONS OF NATIONAL SECURITY AND ARE NOT AVAILABLE ONLINE; SEE ATTACHED

Regulatory Authorities (if covered under the 2003 permit)

Illicit Discharge Detection and Elimination (IDDE) Authority Adopted? *(Part II, III, IV or V, Subpart B.3.(b.) of 2003 permit)* Yes

Effective Date or Estimated Date of Adoption (MM/DD/YY): 12/10/2003

Construction/Erosion and Sediment Control (ESC) Authority Adopted? *(Part II,III,IV or V, Subpart B.4.(a.) of 2003 permit)* Yes

Effective Date or Estimated Date of Adoption (MM/DD/YY): 12/10/2003

Post- Construction Stormwater Management Adopted? *(Part II, III, IV or V, Subpart B.5.(a.) of 2003 permit)* Yes

Effective Date or Estimated Date of Adoption (MM/DD/YY): 03/24/2003

Notice of Intent (NOI) for coverage under Small MS4 General Permit

Part II: Summary of Receiving Waters

Please list the waterbodies to which your MS4 discharges. For each waterbody, please report the number of outfalls discharging into it and, if applicable, the segment ID and any impairments.

Massachusetts list of impaired waters: Massachusetts 2014 List of Impaired Waters- http://www.mass.gov/eea/docs/dep/water/resources/07v5/14list2.pdf

Waterbody that receives flow from the MS4 and segment ID if applicable	Number of outfalls into receiving water segment	Chloride	Chlorophyll-a	Dissolved Oxygen/ DO Saturation	Nitrogen	Oil & Grease/ PAH	Phosphorus	Solids/ TSS/ Turbidity	E. coli	Enterococcus	Other pollutant(s) causing impairments
SHAWSHEEN RIVER; MA83-08	22	☐	☐	☐	☐	☐	☐	☐	☐	☐	FECAL COLIFORM (EPA TMDL 2587); PHYSICAL SUBSTRATE HABITAT ALTERATIONS - CHANNELIZATION (NO TMDL)
		☐	☐	☐	☐	☐	☐	☐	☐	☐	
		☐	☐	☐	☐	☐	☐	☐	☐	☐	
		☐	☐	☐	☐	☐	☐	☐	☐	☐	
		☐	☐	☐	☐	☐	☐	☐	☐	☐	
		☐	☐	☐	☐	☐	☐	☐	☐	☐	
		☐	☐	☐	☐	☐	☐	☐	☐	☐	
		☐	☐	☐	☐	☐	☐	☐	☐	☐	
		☐	☐	☐	☐	☐	☐	☐	☐	☐	
		☐	☐	☐	☐	☐	☐	☐	☐	☐	
		☐	☐	☐	☐	☐	☐	☐	☐	☐	
		☐	☐	☐	☐	☐	☐	☐	☐	☐	
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		☐	☐	☐	☐	☐	☐	☐	☐	☐	
		☐	☐	☐	☐	☐	☐	☐	☐	☐	
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		☐	☐	☐	☐	☐	☐	☐	☐	☐	
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Click to lengthen table

Notice of Intent (NOI) for coverage under Small MS4 General Permit

Part III: Stormwater Management Program Summary

Identify the Best Management Practices (BMPs) that will be employed to address each of the six Minimum Control Measures (MCMs). For municipalities/organizations whose MS4 discharges into a receiving water with an approved Total Maximum Daily Load (TMDL) and an applicable waste load allocation (WLA), identify any additional BMPs employed to specifically support the achievement of the WLA in the TMDL section at the end of part III.

For each MCM, list each existing or proposed BMP by category and provide a brief description, responsible parties/departments, measurable goals, and the year the BMP will be employed (public education and outreach BMPs also requires a target audience). **Use the drop-down menus in each table or enter your own text to override the drop down menu.**

MCM 1: Public Education and Outreach

BMP Media/Category (enter your own text to override the drop down menu)	**BMP Description**	**Targeted Audience**	**Responsible Department/Parties** (enter your own text to override the drop down menu)	**Measurable Goal**	**Beginning Year of BMP Imple-mentation**
Brochures/Pamphlets	Pet Waste Flyer	Residents	ENVIROMENTAL SECTION (66 ABG/CEIE)	Every other year, HAFB will provide a brochure to all dormitory residents regarding handling of pet waste and provide a copy to temporary lodging facilities to place inside check-in information.	2019
Meeting	Facility Manager's Briefing Presentation	Businesses, Institutions, Commercial Facilities	ENVIROMENTAL SECTION (66 ABG/CEIE)	HAFB will brief storm water quality issues and guidance once every other year at facility manager's briefing.	2020
Meeting	Construction Project Kick-Off Meetings	Developers (construction) and Contractors	ENVIRONMENTAL SECTION (66 ABG/CEIE)	HAFB will brief storm water quality issues, permit requirements, and inspection reporting at the kick-off meetings for each construction project on base that has potential to affect storm water.	2019

Meeting	Annual Industrial Operational Unit Briefings	Industrial Facilities (CE Roads and Grounds) (CE Operations Supervisors) (Auto Hobby Shop) (Logistics Readiness Squadron)	ENVIRONMENTAL SECTION (66 ABG/CEIE)	HAFB will brief equipment inspection and maintenance; proper storage of industrial materials; proper management and disposal of wastes; proper management of dumpsters; minimization of use of salt or other de-icing/antiicing materials; proper storage of salt or other de-icing/anti-icing materials; and proper maintenance of parking lot surfaces (sweeping) to the identified audience annually	2019
School Curricula/Programs	Annual Middle School Earth Day River and/or Beach Clean-up and Educational Program	Students	ENVIRONMENTAL SECTION (66 ABG/CEIE)	HAFB will organize and host an annual river and/or beach clean-up day.	2019
Newspaper Articles/Press Releases	Annual news paper article, press release, and/or social media posting	Employees	PUBLIC AFFAIRS (66 ABG/PA)	Each year, HAFB will issue at least one press release, article in the base paper, and/or social media posting discussing storm water quality.	2019
Hotline	24/7 Storm water hotline	All audiences	CE CUSTOMER SERVICE (66 ABG/CEO)	HAFB will continue to operate a storm water hot-line as a part of its 24/7 customer service phone line.	2019

Displays/Posters/Kiosks	Annual Educational Display	Visitors and General Public	ENVIRONMENTAL SECTION (66 ABG/CEIE)	Each year HAFB will set up an annual educational display that increases awareness of storm water-related issues. The display will be appropriate for presentation at appropriate base and regional venues such as Earth Day activities, science fairs, school programs, etc	2019

Notice of Intent (NOI) for coverage under Small MS4 General Permit

Part III: Stormwater Management Program Summary (continued)

MCM 2: Public Involvement and Participation

BMP Categorization	Brief BMP Description (enter your own text to override the drop down menu)	Responsible Department/Parties (enter your own text to override the drop down menu)	Additional Description/ Measurable Goal	Beginning Year of BMP Imple-mentation
Public Review	SWMP Review	ENVIRONMENTAL SECTION (66 ABG/CEIE)	HAFB will conduct and annual review of its storm water management plan and post public notice of availability in a local paper or on the HAFB public website.	2019
Public Participation	SWMP Review	ENVIRONMENTAL SECTION (66 ABG/CEIE)	In conjunction with the previous line item, HAFB will allow public to comment on its storm water management plan annually	2019

Notice of Intent (NOI) for coverage under Small MS4 General Permit

Part III: Stormwater Management Program Summary (continued)

MCM 3: Illicit Discharge Detection and Elimination (IDDE)

BMP Categorization (enter your own text to override the drop down menu)	**BMP Description**	**Responsible Department/Parties** (enter your own text to override the drop down menu)	**Measurable Goal** (all text can be overwritten)	**Beginning Year of BMP Imple-mentation**
SSO inventory	Develop SSO inventory in accordance with permit conditions	ENVIRONMENTAL SECTION (66 ABG/CEIE)	Complete within 1 year of effective date of permit	2019
Storm sewer system map	Create map and update during IDDE program completion	ENGINEERNG SECTION GEOBASE (66 ABG/CENME)	Update map within 2 years of effective date of permit and complete full system map 10 years after effective date of permit	2020
Written IDDE program	Create written IDDE program	External CEIE Contractor	Complete within 1 year of the effective date of permit and update as required	2019
Implement IDDE program	Implement catchment investigations according to program and permit conditions	External CEIE Contractor	Complete 10 years after effective date of permit	2028
Employee training	Train employees on IDDE implementation	ENVIRONMENTAL SECTION (66 ABG/CEIE)	Train annually	2019
Conduct dry weather screening	Conduct in accordance with outfall screening procedure and permit conditions	External CEIE Contractor	Complete 3 years after effective date of permit	2021
Conduct wet weather screening	Conduct in accordance with outfall screening procedure	External CEIE Contractor	Complete 10 years after effective date of permit	2028
Ongoing screening	Conduct dry weather and wet weather screening (as necessary)	External CEIE Contractor	Complete ongoing outfall screening upon completion of IDDE program	2028

Notice of Intent (NOI) for coverage under Small MS4 General Permit

Part III: Stormwater Management Program Summary (continued)

MCM 4: Construction Site Stormwater Runoff Control

BMP Categorization (enter your own text to override the drop down menu or entered text)	**BMP Description**	**Responsible Department/Parties** (enter your own text to override the drop down menu)	**Measurable Goal** (all text can be overwritten)	**Beginning Year of BMP Imple-mentation**
Site inspection and enforcement of Erosion and Sediment Control (ESC) measures	Complete written procedures of site inspections and enforcement procedures	External CEIE Contractor	Complete within 1 year of the effective date of permit	2019
Site plan review	Complete written procedures of site plan review and begin implementation	ENGINEERNG SECTION (66 ABG/CENMP)	Complete within 1 year of the effective date of permit	2019
Erosion and Sediment Control	Adoption of requirements for construction operators to implement a sediment and erosion control program	External CEIE Contractor	Complete within 1 year of the effective date of permit	2019
Waste Control	Adoption of requirements to control wastes, including but not limited to, discarded building materials, concrete truck wash out, chemicals, litter, and sanitary wastes	External CEIE Contractor	Complete within 1 year of the effective date of permit	2019

Notice of Intent (NOI) for coverage under Small MS4 General Permit

Part III: Stormwater Management Program Summary (continued)

MCM 5: Post-Construction Stormwater Management in New Development and Redevelopment

BMP Categorization (enter your own text to override the drop down menu or entered text)	**BMP Description**	**Responsible Department/Parties** (enter your own text to override the drop down menu)	**Measurable Goal** (all text can be overwritten)	**Beginning Year of BMP Imple-mentation**
As-built plans for on-site stormwater control	The procedures to require submission of as-built drawings and ensure long term operation and maintenance will be a part of the SWMP	ENGINEERNG SECTION (66 ABG/CENMP)	Require submission of as-built plans for completed projects	2019
Target properties to reduce impervious areas	Identify at least 5 permittee-owned properties that could be modified or retrofitted with BMPs to reduce impervious areas and update annually	External CEIE Contractor	Complete 4 years after effective date of permit and report annually on retrofitted properties	2022
Allow green infrastructure	Develop a report assessing existing local regulations to determine the feasibility of making green infrastructure practices allowable when appropriate site conditions exist	External CEIE Contractor	Complete 4 years after effective date of permit and implement recommendations of report	2022
Street design and parking lot guidelines	Develop a report assessing requirements that affect the creation of impervious cover. The assessment will help determine if changes to design standards for streets and parking lots can be modified to support low impact design options.	External CEIE Contractor	Complete 4 years after effective date of permit and implement recommendations of report	2022

Ensure any stormwater controls and/or management practices for new development and redevelopment meet the retention or treatment requirements of the permit and all applicable requirements of the Massachusetts Stormwater Handbook	Adoption, amendment, or modification of a regulatory mechanism to meet permit requirements	External CEIE Contractor	Complete 2 years after effective date of permit	2020

Notice of Intent (NOI) for coverage under Small MS4 General Permit

Part III: Stormwater Management Program Summary (continued)

MCM 6: Municipal Good Housekeeping and Pollution Prevention

BMP Categorization (enter your own text to override the drop down menu or entered text)	**BMP Description**	**Responsible Department/Parties** (enter your own text to override the drop down menu)	**Measurable Goal** (all text can be overwritten)	**Beginning Year of BMP Imple-mentation**
O&M procedures	Create written O&M procedures including all requirements contained in 2.3.7.a.ii for parks and open spaces, buildings and facilities, and vehicles and equipment	External CEIE Contractor	Complete and implement 2 years after effective date of permit	2020
Inventory all permittee-owned parks and open spaces, buildings and facilities, and vehicles and equipment	Create inventory	External CEIE Contractor	Complete 2 years after effective date of permit and implement annually	2020
Infrastructure O&M	Establish and implement program for repair and rehabilitation of MS4 infrastructure	External CEIE Contractor	Complete 2 years after effective date of permit	2020
Stormwater Pollution Prevention Plan (SWPPP)	Create SWPPPs for maintenance garages, transfer stations, and other waste-handling facilities	External CEIE Contractor	Complete and implement 2 years after effective date of permit	2020
Catch basin cleaning	Establish schedule for catch basin cleaning such that each catch basin is no more than 50% full and clean catch basins on that schedule	CE OPERATIONS SECTION (66 ABG/CEO)	Clean catch basins on established schedule and report number of catch basins cleaned and volume of material moved annually	2019
Street sweeping program	Sweep all streets and permitee-owned parking lots in accordance with permit conditions	CE OPERATIONS SECTION (66 ABG/CEO)	Sweep all streets and permitee-owned parking lots at least once per year in the spring	2019
Road salt use optimization program	Establish and implement a program to minimize the use of road salt	CE OPERATIONS SECTION (66 ABG/CEO)	Implement salt use optimization during deicing season	2019

Inspections and maintenance of stormwater treatment structures	Establish and implement inspection and maintenance procedures and frequencies	External CEIE Contractor	Inspect and maintain treatment structures at least annually	2019

Notice of Intent (NOI) for coverage under Small MS4 General Permit

Part III: Stormwater Management Program Summary (continued)

Actions for Meeting Total Maximum Daily Load (TMDL) Requirements

Use the drop-down menus to select the applicable TMDL, action description to meet the TMDL requirements, and the responsible department/parties. If no options are applicable, or more than one, **enter your own text to override drop-down menus.**

Applicable TMDL	Action Description	Responsible Department/Parties (enter your own text to override the drop down menu)
Shawsheen River (Bacteria/Pathogen)	Adhere to requirements in part A.III of Appendix F	ENVIRONMENTAL SECTION (66 ABG/CEIE)

Notice of Intent (NOI) for coverage under Small MS4 General Permit

Part III: Stormwater Management Program Summary (continued)

Actions for Meeting Requirements Related to Water Quality Limited Waters

Use the drop-down menus to select the pollutant causing the water quality limitation and enter the waterbody ID(s) experiencing excursions above water quality standards for that pollutant. In addition, if you are subject to additional requirements due to a downstream nutrient impairment (see Part 2.2.2 of the permit) select the pollutant of concern and indicate applicable waterbody IDs or write "all waterbodies" if applicable. Choose the action description from the dropdown menu and indicate the responsible party. If no options are applicable, or more than one, **enter your own text to override drop-down menus.**

Pollutant	Waterbody ID(s)	Action Description	Responsible Department/Parties (enter your own text to override the drop down menu)
Fecal Coliform	MA83-08 (SHAWSHEEN RIVER)	Adhere to requirements in part III of Appendix H	ENVIRONMENTAL SECTION (66 ABG/CEIE)
Phosphorus	SHAWSHEEN RIVER (See Note 4)	Adhere to requirements in part II of Appendix H	ENVIRONMENTAL SECTION (66 ABG/CEIE)

Part IV: Notes and additional information

Use the space below to indicate the part(s) of 2.2.1and 2.2.2 that you have identified as not applicable to your MS4 because you do not discharge to the impaired water body or a tributary to an impaired water body due to nitrogen or phosphorus. Provide all supporting documentation below or attach additional documents if necessary. Also, provide any additional information about your MS4 program below.

Note 1: As as Federal agency which is financed entirely by Federal appropriations, Hanscom AFB is not subject to Commonwealth of Massachusetts open meeting and public notice requirements identified in MGL Chapter 30A, Sections 18 – 25 and therefore takes exception to permit requirements in section 2.3.3(a). Hanscom AFB will utilize the public notice and commenting procedures defined in the Federal National Environmental Policy Act in place of these requirements.

Note 2: In 2008, Hanscom Air Force Base's military family housing area was privatized under the Congressionally-approved Military Housing Privatization Initiative. All infrastructure including streets, utilities, and housing, was transferred to private ownership and is now owned by Hunt Military Communities, a subsidiary of Hunt Companies, Inc. The storm water infrastructure is separate and distinct from the system that remains under USAF ownership. One connection between the base system and the Hunt system currently exists and will be severed within 12 months of this NOI. Therefore, the housing area portion of the system will be exempt from coverage under the Hanscom AFB MS4 permit commencing on the date that the system connection is severed. Until separation of two system is complete, Hanscom will continue to cover the Hunt-owned housing area under its current SWMP consistent with paragraph 1.10(b) of the general permit

Note 3: In Section III "Stormwater Management Plan Program Summary", all agencies listed as "responsible department/parties"exist as organizations within the Hanscom AFB organizational structure. Where the responsible party is identified as "External CEIE Contractor", is is anticipated that the Air Force Environmental Fence to Fence Contractor will provide services to assist in the substantial accomplishment of these requirements under the guidance and direction of the USAF. The HAFB Water Quality Program Manager will provide oversight of all activities necessary to comply with this permit.

Note 4: Related to phosphorus impairments - As indicated in Part 2.2.2 of the 2016 MA MS4 General Permit, if the MS4 is located in a designated town, the permittee must comply with the provisions of Appendix H of the 2016 MA MS4 General Permit. Hanscom AFB is located within the Bedford municipality, which is listed in Part 2.2.2.b. Discharges from MS4s within municipalities listed in Part 2.2.2.b are to waterbodies, or their tributaries, that are impaired due to phosphorus (Total Phosphorus). According to the MassDEP Massachusetts Nutrient Management Map, dated 2013, the Shawsheen River is labeled as “nutrient impaired without TMDL”. Therefore, control measures to achieve 2016 MA MS4 Appendix H Part III provisions are applicable and will be incorporated into the SWMP.

Notice of Intent (NOI) for coverage under Small MS4 General Permit

Part V: Certification

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 gather and evaluate 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, I certify that the information submitted is, to the best of my knowledge and belief, 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.

Name:	THOMAS J. SCHLUCKEBIER, P.E., CFM, LEED AP	Title:	BASE CIVIL ENGINEER
Signature:	SCHLUCKEBIER.THOMAS.J.1092804255 Digitally signed by SCHLUCKEBIER.THOMAS.J.1092804255 Date: 2018.09.28 13:21:44 -04'00'	Date:	09/28/18

[To be signed according to Appendix B, Subparagraph B.11, Standard Conditions]

Note: When prompted during signing, save the document under a new file name

Attachment 1 - Endangered Species Act (ESA) Determination

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 66TH AIR BASE GROUP
HANSCOM AIR FORCE BASE MASSACHUSETTS

August 1, 2018

Mr. Scott E. Sheehan
66 ABG/CEIE
120 Grenier Street
Hanscom AFB, MA 01731-1910

Ms. Susi von Oettingen
Endangered Species Program
US Fish and Wildlife Service
70 Commercial Street, Suite 300
Concord, NH 03301-5094

Dear Ms. von Oettingen

Hanscom Air Force Base (AFB) is proposing to renew its Small Municipal Separate Storm Sewer System (MS4) general permit coverage with the Environmental Protection Agency (EPA). In order to obtain coverage, Hanscom AFB must submit a Notice of Intent (NOI) to EPA no later than 1 Sep 2018. This permit authorizes the discharge of non-industrial stormwater from small MS4s as defined at 40 CFR §122.26(b)(16).

In order to meet its obligations under the Clean Water Act and the Endangered Species Act (ESA), the EPA is seeking to ensure the activities regulated by this general permit do not adversely affect endangered and threatened species or critical habitat. Hanscom AFB has determined though professional experience and by preparing a current IPaC report, that the Northern-Long Eared Bat (NLEB) is a protected species within the permit coverage area. Therefore, Hanscom AFB is required to make a determination of affect and, if necessary, obtain concurrence from the USFWS. In summer 2017, Hanscom AFB conducted a bat study. The results of this study (included herein) indicate that the NLEB is not present on Hanscom AFB which includes the area of affect for permit coverage. As a result of these findings, Hanscom AFB has made a determination that the renewal of this permit will have "no effect" on the NLEB nor would it result in a take, prohibited or otherwise, of a Federally-listed species.

While we are not required to formally consult as a result of our determination, we are providing you with an opportunity to review and provide comments prior to NOI submittal. If you have any questions please contact me at (781) 225-6144 or scott.sheehan.1@us.af.mil.

SCOTT E. SHEEHAN, GS-12, DAF
Hanscom AFB Natural Resources Manager

Attachment:
Project Information

Project Information:

Hanscom Air Force Base (AFB) is proposing to renew its Small Municipal Separate Storm Sewer System (MS4) general permit coverage with the Environmental Protection Agency (EPA). The notice of intent must be submitted to EPA no later than 1 Sep 2018. This permit authorizes the discharge of stormwater from small MS4s as defined at 40 CFR §122.26(b)(16). This 5-year permit, jointly issued by EPA and MassDEP, requires permittees to meet six minimum control measures in order to discharge stormwater runoff from streets and facilities into state and Federal waters. Hanscom AFB stormwater system discharges its stormwater to the Shawsheen River, the headwaters of which originate on Hanscom AFB. The current MS4 permit coverage for Hanscom AFB was granted in 2008 which was a renewal from its 2003 permit coverage. The 2008 permit has been administrative continued to the present day pending litigation filed by several Massachusetts municipalities against EPA which has recently been resolved.

In order to meet its obligations under the Clean Water Act and the Endangered Species Act (ESA), the EPA is seeking to ensure the activities regulated by this general permit do not adversely affect endangered and threatened species or critical habitat. Applicants applying for permit coverage must assess the impacts of their stormwater discharges and discharge-related activities on federally listed endangered and threatened species ("listed species") and designated critical habitat ("critical habitat") to ensure that those goals are met. Prior to obtaining general permit coverage, applicants must meet the ESA eligibility provisions of this permit by following the steps in this Appendix C of the general permit, a copy of which immediately follows this project description (Exhibit 1).

Hanscom AFB has determined though professional experience and by preparing a current IPaC report (Exhibit 2), that the Northern-Long Eared Bat (NLEB) is a protected species within the permit coverage area. Therefore, Hanscom AFB is required to make a determination of affect and, if necessary, obtain concurrence from the USFWS.

In summer 2017, Hanscom AFB conducted a bat study. The results of this study for Hanscom AFB Main Base (Exhibit 3) indicate that the NLEB is not present on Hanscom AFB. As a result of these findings, Hanscom AFB has made a determination that the renewal of this permit will have "no effect" on the NLEB nor would it result in a take, prohibited or otherwise, of Federally listed species.

Hanscom AFB seeks USFWS concurrence on this determination under Criterion C of the permit application which is defined as: "Using the best scientific and commercial data available, the effect of the stormwater discharge and discharge related activities on listed species and critical habitat have been evaluated. Based on those evaluations, a determination is made by EPA, or by the applicant and affirmed by EPA, that the stormwater discharges and discharge related activities will have "no affect" on any federally threatened or endangered listed species or designated critical habitat under the jurisdiction of the USFWS".

Please contact Scott Sheehan, Hanscom AFB Natural Resources Manager, at (781) 225-6144 or via email at scott.sheehan.1@us.af.mil with any questions.

Exhibit 1: Appendix C of MS4 Permit Renewal Guidance
Exhibit 2: Are of Potential Effect IPaC Report
Exhibit 3: USAF Bat Study (Draft) 2017, relevant to Hanscom AFB

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 01, 2018
Consultation Code: 05E1NE00-2018-SLI-2585
Event Code: 05E1NE00-2018-E-06046
Project Name: Hanscom AFB - Renewal of MS4 Stormwater Permit - 2018

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

To Whom It May Concern:

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

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

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

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

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

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

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

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

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

Attachment(s):

- Official Species List

Official Species List

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

This species list is provided by:

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

Project Summary

Consultation Code: 05E1NE00-2018-SLI-2585

Event Code: 05E1NE00-2018-E-06046

Project Name: Hanscom AFB - Renewal of MS4 Stormwater Permit - 2018

Project Type: ** OTHER **

Project Description: Hanscom Air Force Base (AFB) is proposing to renew its Small Municipal Separate Storm Sewer System (MS4) general permit coverage with the Environmental Protection Agency (EPA). In order to obtain coverage, Hanscom AFB must submit a Notice of Intent (NOI) to EPA no later than 1 Sep 2018. This permit authorizes the discharge of non-industrial stormwater from small MS4s as defined at 40 CFR §122.26(b)(16).

Project Location:

Approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/place/42.46149054288284N71.27622766477738W

Counties: Middlesex, MA

Endangered Species Act Species

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

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

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

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

---

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

Mammals

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

Critical habitats

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

SHEEHAN, SCOTT E GS-12 USAF AFMC 66 ABG/CEIE

From: Susi vonOettingen <susi_vonoettingen@fws.gov>
Sent: Wednesday, August 08, 2018 9:35 AM
To: SHEEHAN, SCOTT E GS-12 USAF AFMC 66 ABG/CEIE
Subject: [Non-DoD Source] Fwd: [EXTERNAL] Hanscom AFB - EPA Stormwater Permit Renewal - No Effect Determination

If EPA gives you push back because you don't have a letter, David suggested you get a form letter from us. See:

https://www.fws.gov/newengland/pdfs/no_spp_present_ltr_2018.pdf

Susi

****

Susi von Oettingen
Endangered Species Biologist
New England Field Office
70 Commercial Street, Suite 300
Concord, NH 03301
(W) 603-227-6418
(Fax) 603-223-0104

www.fws.gov/newengland <http://www.fws.gov/newengland>

---------- Forwarded message ---------

From: David Simmons <David_Simmons@fws.gov <mailto:David_Simmons@fws.gov> >
Date: Tue, Aug 7, 2018 at 9:52 AM
Subject: RE: [EXTERNAL] Hanscom AFB - EPA Stormwater Permit Renewal - No Effect Determination
To: Susi vonOettingen <susi_vonoettingen@fws.gov <mailto:susi_vonoettingen@fws.gov> >

EPA likely won't accept the Air Force's letter as proof of consultation, so recommend Mr. Sheehan submit our "no species present" letter with the NOI to EPA. EPA added a link to our letter on its MS4 website for MA and NH (https://www.epa.gov/npdes-permits/small-ms4-noi-resources-list-ma-nh#ma).

---------- Forwarded message ---------
From: SHEEHAN, SCOTT E GS-12 USAF AFMC 66 ABG/CEIE <scott.sheehan.1@us.af.mil
<mailto:scott.sheehan.1@us.af.mil> >

Date: Thu, Aug 2, 2018 at 2:12 PM
Subject: [EXTERNAL] Hanscom AFB - EPA Stormwater Permit Renewal - No Effect Determination
To: vonOettingen, Susi <susi_vonoettingen@fws.gov <mailto:susi_vonoettingen@fws.gov> >
Cc: WELCH, RENATA N NH-03 USAF AFMC 66 ABG/CEIE <renata.welch@us.af.mil <mailto:renata.welch@us.af.mil> >

Susi,
Per our discussion and for your information, attached is our documentation regarding our MS4 permit renewal and no effect determination.

Kind regards,
Scott Sheehan

//signed//
SCOTT E. SHEEHAN, GS-12, DAF
66 ABG/CEIE
Commercial 781.225.6144
DSN 845.6144

United States Department of the Interior

FISH AND WILDLIFE SERVICE

New England Field Office
70 Commercial Street, Suite 300
Concord, NH 03301-5087
http://www.fws.gov/newengland

January 8, 2018

To Whom It May Concern:

This project was reviewed for the presence of federally listed or proposed, threatened or endangered species or critical habitat per instructions provided on the U.S. Fish and Wildlife Service's New England Field Office website:

http://www.fws.gov/newengland/EndangeredSpec-Consultation.htm (accessed January 2018)

Based on information currently available to us, no federally listed or proposed, threatened or endangered species or critical habitat under the jurisdiction of the U.S. Fish and Wildlife Service are known to occur in the project area(s). Preparation of a Biological Assessment or further consultation with us under section 7 of the Endangered Species Act is not required. No further Endangered Species Act coordination is necessary for a period of one year from the date of this letter, unless additional information on listed or proposed species becomes available.

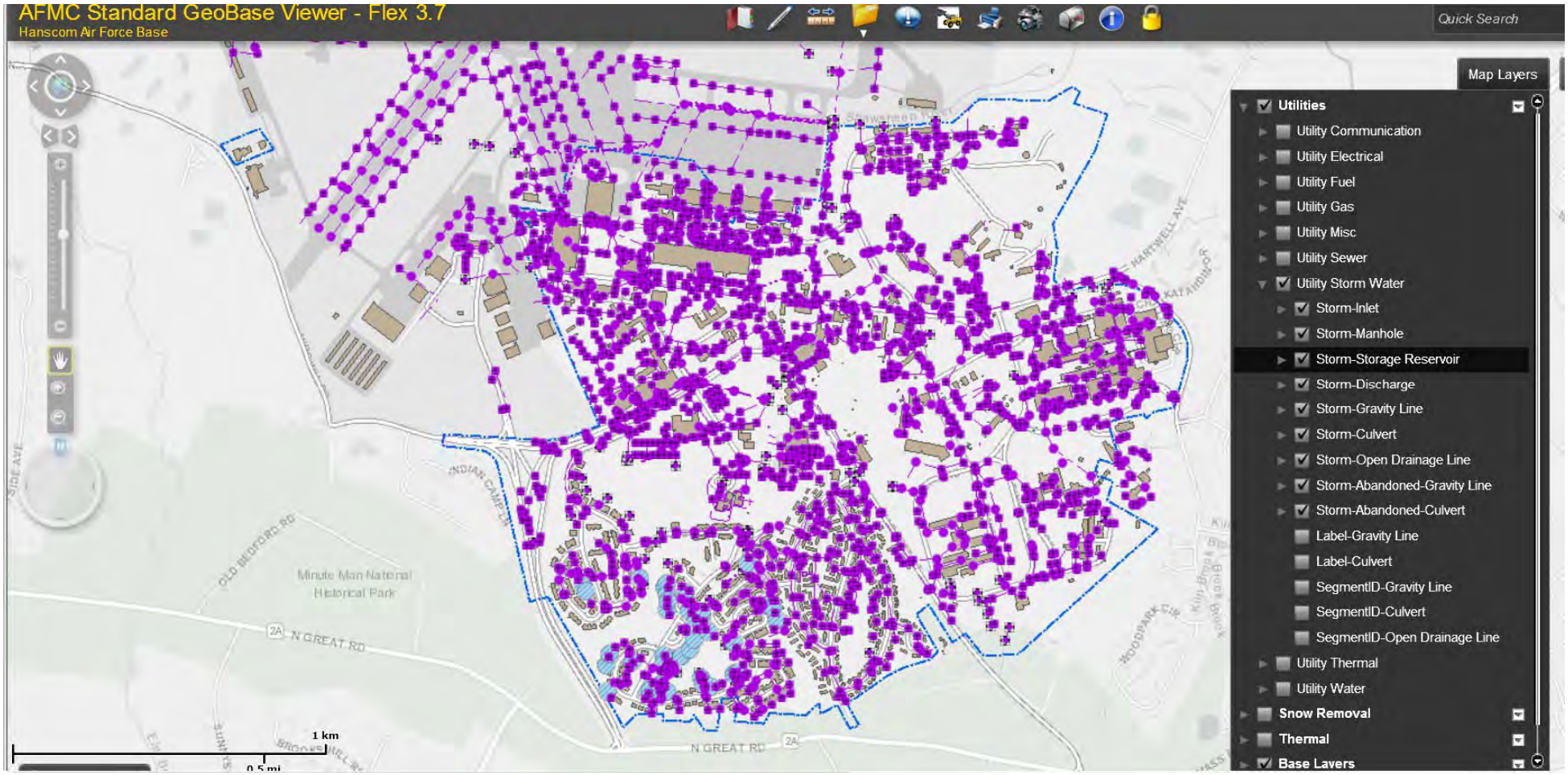
Thank you for your cooperation. Please contact David Simmons of this office at 603-227-6425 if we can be of further assistance.

Sincerely yours,

Thomas R. Chapman
Supervisor
New England Field Office

Attachment 2 - MS4 Map

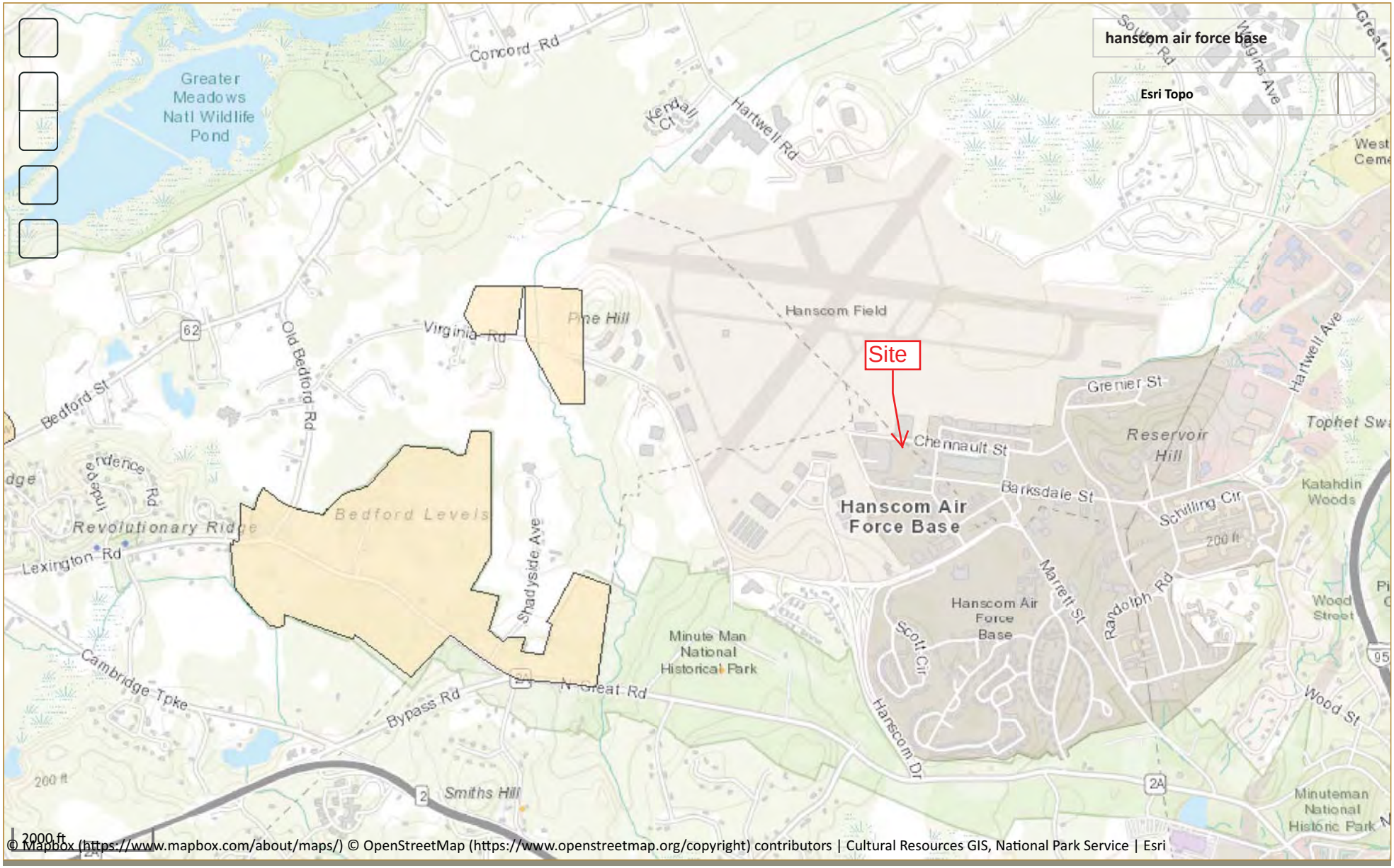
Hanscom AFB maintains a detailed accurate map and inventory of its stormwater infrastructure and outfalls in its internal Geographical Information System (GIS) known as GeoBASE. Hanscom AFB installation and utility maps are prohibited from public release for reasons of national security and are not available online. This information is available upon a regulator's request on a per-request and need-to-know basis. Attached is a non-sensitive depiction of the type of stormwater data included within the Hanscom AFB GeoBASE system.


AFMC Standard GeoBase Viewer - Flex 3.7
Hanscom Air Force Base
Quick Search
Map Layers
Utilities
Utility Communication
Utility Electrical
Utility Fuel
Utility Gas
Utility Misc
Utility Sewer
Utility Storm Water
Storm-Inlet
Storm-Manhole
Storm-Storage Reservoir
Storm-Discharge
Storm-Gravity Line
Storm-Culvert
Storm-Open Drainage Line
Storm-Abandoned-Gravity Line
Storm-Abandoned-Culvert
Label-Gravity Line
Label-Culvert
SegmentID-Gravity Line
SegmentID-Culvert
SegmentID-Open Drainage Line
Utility Thermal
Utility Water
Snow Removal
Thermal
Base Layers
Minute Man National Historical Park
N GREAT RD
OLD BEDFORD RD
1 km
0.5 mi

National Register of Historic Places

National Park Service
U.S. Department of the Interior

Public, non-restricted data depicting National Register spatial data processed by the Cultural Resources GIS facility. …



Contact Us (https://www.nps.gov/contacts.htm)

Appendix F
IDDE Program

APPENDIX F

ILLICIT DISCHARGE DETECTION ELIMINATION PROGRAM

HANSCOM AIR FORCE BASE

Contract No. GS-10F-0103N

Prepared for:

Hanscom Air Force Base
66 ABG/CEIE, Middlesex County, Massachusetts

Prepared by:

BB&E
CONSULTING ENGINEERS & PROFESSIONALS

BB&E, Inc.

July 2019

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FIGURES

TABLES

ATTACHMENTS

ABBREVIATIONS AND ACRONYMS

°C	Degrees Centigrade
AFB	Air Force Base
AFCEC	Air Force Civil Engineer Center
BB&E	BB&E, Inc
BOH	Board of Health
BMP	Best Management Practice
CCTV	Closed-circuit television
CFR	Code of Federal Regulations
CFU	Colony-forming unit
CMRSWC	Central Massachusetts Regional Stormwater Coalition
CFR	Code of Federal Regulations
IDDE	Illicit Discharge Detection and Elimination
LOS	level of service
MA	Massachusetts
Mass DEP	Massachusetts Department of Environmental Protection
mg/l	milligrams per liter
MPN	Most Probable Number
MS4	Municipal Separate Storm Sewer System
msl	mean sea level
NA	not applicable
NPDES	National Pollution Discharge Elimination System
O&M	operations and maintenance
SM	Standard Methods
SOP	Standard Operating Procedure
SSO	Sanitary Sewer Overflow
SVF	System Vulnerability Factor
SWMP	Stormwater Management
Plan TMDL	total maximum daily load
µs/cm	Microsiemens per centimeter
U.S.	United States
USEPA	United States Environmental Protection Agency

1 Introduction

The Air Force Civil Engineer Center (AFCEC) has contracted BB&E, Inc. (BB&E) to provide a Stormwater Management Plan (SWMP) update for Hanscom Air Force Base (AFB), under Contract Number GS-10F-0103N. This Illicit Discharge Detection and Elimination (IDDE) Program was developed as an appendix to the SWMP, to meet the Minimum Control Measures outlined in the General Permit for Stormwater Discharges from Small Municipal Separate Storm Sewer Systems in Massachusetts (2016 MA MS4 General Permit). This IDDE program is based on the template provided by the *Illicit Discharge Detection and Elimination (IDDE) Plan* (Fuss & O'Neill, 2016), developed by Central Massachusetts Regional Stormwater Coalition (CMRSWC) and Fuss & O'Neill. The Draft Hanscom IDDE Program was initially developed in 2017 by Cape Environmental Management Inc.

1.1 MS4 Program

This IDDE Program has been developed by BB&E on behalf of Hanscom Air Force Base to address the requirements of the United States Environmental Protection Agency's (USEPA's) 2016 National Pollutant Discharge Elimination System (NPDES) General Permit for Stormwater Discharges from Small Municipal Separate Storm Sewer Systems (MS4) in Massachusetts, hereafter referred to as the "2016 Massachusetts MS4 Permit" or "MS4 Permit".

The 2016 Massachusetts MS4 Permit requires that each permittee implement an IDDE Program to systematically find and eliminate sources of non-stormwater discharges to its municipal separate storm sewer system and implement procedures to prevent such discharges. The IDDE Program must also be recorded in a written (hardcopy or electronic) document. This IDDE Program has been prepared to address this requirement.

1.2 Illicit Discharges

An "illicit discharge" is any discharge to a drainage system that is not composed entirely of stormwater, with the exception of discharges pursuant to a NPDES permit (other than the NPDES permit for discharges from the MS4) and discharges resulting from fire-fighting activities.

Illicit discharges may take a variety of forms. Illicit discharges may enter the drainage system through direct or indirect connections. Direct connections may be relatively obvious, such as cross-connections of sewer services to the storm drain system. Indirect illicit discharges may be more difficult to detect or address, such as failing septic systems that discharge untreated sewage to a ditch within the MS4, or a sump pump that discharges contaminated water on an intermittent basis.

Some illicit discharges result from illegal activity , such as dumping used oil (or other pollutant) into catch basins, a resident or contractor illegally tapping a new sewer lateral into a storm drainpipe to avoid the costs of a sewer connection fee and service, and illegal dumping of yard wastes into surface waters. Some illicit discharges are related to the unsuitability of original infrastructure to the modern regulatory environment. Examples of illicit discharges in this category include connected floor drains in old buildings, as well as sanitary sewer overflows that enter the

drainage system. Sump pumps legally connected to the storm drain system may be used inappropriately, such as for the disposal of floor wash water or old household products, in many cases due to a lack of understanding on the part of the homeowner.

Elimination of some discharges may require substantial costs and efforts, such as funding and designing a project to reconnect sanitary sewer laterals. Others, such as improving self- policing of dog waste management, can be accomplished by outreach in conjunction with the minimal additional cost of dog waste bins and the municipal commitment to disposal of collected materials on a regular basis.

Regardless of the intention, when not addressed, illicit discharges can contribute high levels of pollutants, such as heavy metals, toxics, oil, grease, solvents, nutrients, and pathogens to surface waters.

1.3 Allowable Non-Stormwater Discharges

The following categories of non-stormwater discharges are allowed under the MS4 Permit unless the permittee, USEPA or Massachusetts Department of Environmental Protection (MassDEP) identifies any category or individual discharge of non-stormwater discharge as a significant contributor of pollutants to the MS4.

- Water line flushing
- Landscape irrigation
- Diverted stream flows
- Rising ground water
- Uncontaminated ground water infiltration (as defined at 40 CFR 35.2005(20))
- Uncontaminated pumped groundwater
- Discharge from potable water sources
- Foundation drains
- Air conditioning condensation
- Irrigation water, springs
- Water from crawl space pumps
- Footing drains
- Lawn watering
- Individual resident car washing
- De-chlorinated swimming pool discharges
- Street wash waters

If these discharges are identified as significant contributors to the MS4, they must be considered an “illicit discharge” and addressed in the IDDE Plan (i.e., control these sources so they are no longer significant contributors of pollutants, and/or eliminate them entirely).

1.4 Receiving Waters and Impairments

Table 1-1 lists the “impaired waters” within the boundaries of Hanscom AFB’s regulated area based on the Proposed 2016 Massachusetts Integrated List of Waters produced by MassDEP

every two years. Impaired waters are water bodies that do not meet water quality standards for one or more designated use(s) such as recreation or aquatic habitat.

Table 1-1. Impaired Waters Bedford, Massachusetts

Water Body Name	Segment ID	Category	Impairment(s)	Associated Approved TMDL
Shawsheen River	MA83-08	5	Escherichia coli	2587
			Fecal Coliform	2587
			Oxygen, Dissolved	
			Physical substrate habitat alterations	

Category 5 Waters – impaired water bodies that require a TMDL.
"Approved TMDLs" are those that have been approved by EPA as of the date of issuance of the 2016 MS4 Permit.

The TMDL for Bacteria in the Shawsheen River Basin lists control measures for the TMDL as watershed management, stormwater management, illicit discharge detection and elimination, combined and sanitary sewer overflow abatement, and septic system maintenance. Illicit sewer connections and sanitary sewer overflow have zero waste load allocations and load allocations.

Illicit sewer connections and sewer line breaks were determined to be the source components of greatest significance during dry weather, low flow conditions. Reductions from sewer breaks and illicit sewer connections are required to achieve compliance with the water quality standards during dry weather. The TMDL indicates a broken sewage main was discovered at Hanscom AFB and was fixed in 1997. Three additional sewer line breaks occurred outside the Hanscom AFB boundary along Hartwell Ave. in 2014, 2017 and 2018. These incidences are recorded in Table 4-1. Further examination of the sewer lines should be conducted to identify any additional leaks or breaks.

The TMDL recommends communities implement illegal connection identification and removal program.

1.5 IDDE Program and Goals, Framework, and Timeline

The goals of the IDDE program are to find and eliminate illicit discharges to municipal separate storm sewer system and to prevent illicit discharges from happening in the future. The program consists of the following major components as outlined in the MS4 Permit:

- Legal authority and regulatory mechanism to prohibit illicit discharges and enforce this prohibition
- Storm system mapping
- Inventory and ranking of outfalls

- Dry weather outfall screening
- Catchment investigations
- Identification/confirmation of illicit sources
- Illicit discharge removal
- Follow-up screening
- Employee training.

The IDDE investigation procedure framework is shown in **Figure 1-1**. The required timeline for implementing the IDDE program is shown in **Table 1-2**.

Figure 1-1. IDDE Investigation Procedure Framework

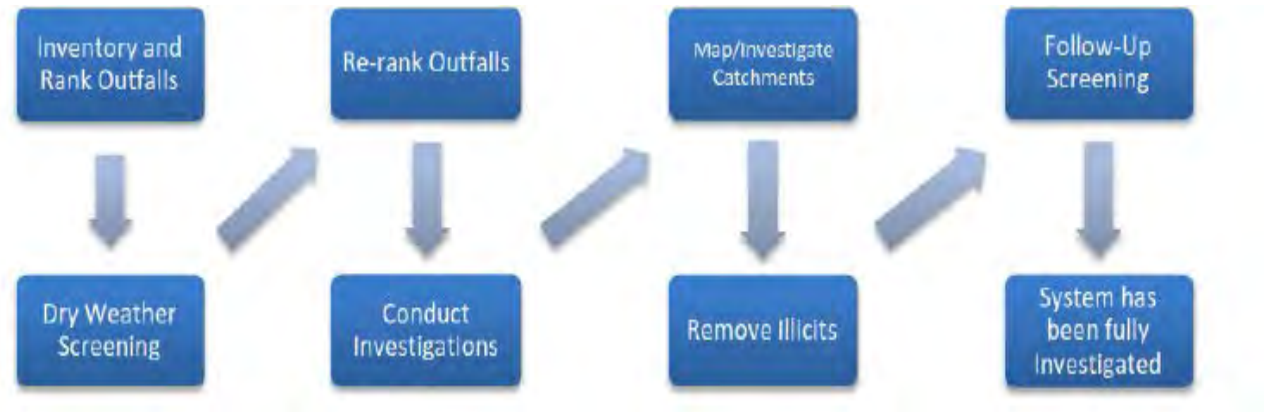

Table 1-2. IDDE Program Implementation Timeline

IDDE Program Requirement	Completion Date from Effective Date of Permit					
	1 Year	1.5 Years	2 Years	3 Years	7 Years	10 Years
Written IDDE Program Plan	X					
SSO Inventory	X					
Written Catchment Investigation Procedure		X				
Phase I Mapping			X			
Phase II Mapping						X
IDDE Regulatory Mechanism or By-law (if not already in place)				X		
Dry Weather Outfall Screening				X		
Follow-up Ranking of Outfalls and Interconnections				X		
Catchment Investigations – Problem Outfalls					X	
Catchment Investigations – all Problem, High and Low Priority Outfalls						X

2 Authority and Statement of IDDE Responsibility

2.1 Legal Authority

Hanscom AFB, which is owned and operated by the United States (Federal Facility), qualifies as a Non-Traditional MS4. Therefore, Hanscom AFB has adopted a Stormwater Illicit Discharge Prohibition Policy Statement **(Attachment A)** to provide adequate legal authority to:

- Prohibit illicit discharges
- Investigate suspected illicit discharges
- Eliminate illicit discharges, including discharges from properties not owned by or controlled by the MS4 that discharge into the MS4 system
- Implement appropriate enforcement procedures and actions.

2.2 Statement of Responsibilities

The Hanscom AFB Stormwater Coordinator is responsible for implementing the IDDE program provisions. The Hanscom AFB Civil Engineering or Department of Public Works may provide support if needed.

3 Stormwater System Mapping

Hanscom AFB maintains a current stormwater system map in GIS format. The stormwater system map is intended to facilitate the identification of key infrastructure, factors influencing proper system operation, and the potential for illicit discharges.

The 2016 MS4 Permit requires the storm system map be updated in two phases as outlined below. Hanscom AFB has completed all applicable Phase I mapping requirement and will update the stormwater system map pursuant to Phase II requirements by July 1, 2028. Hanscom AFB will report on the progress towards completion of the storm system map in each annual report. Updates to the stormwater mapping will be included in **Attachment B**.

3.1 Phase I Mapping

Phase I mapping requirements are identified on the stormwater system map in **Attachment B** and include the following information as applicable:

- Outfalls and receiving waters (previously required by the MS4-2003 permit)
- Open channel conveyances (swales, ditches, etc.)
- Interconnections with other MS4s and other storm sewer systems
- Municipally owned stormwater treatment structures
- Water bodies identified by name and indication of all use impairments as identified on the most recent EPA approved Massachusetts Integrated List of Waters report
- Initial catchment delineations. Topographic contours and drainage system information may be used to produce initial catchment delineations.

3.2 Phase II Mapping

Phase II mapping must be completed within 10 years of the effective date of the permit (July 1, 2028) and include the following information as applicable:

- Outfall spatial location (latitude and longitude with a minimum accuracy of +/-30 feet)
- Pipes
- Manholes
- Catch basins
- Refined catchment delineations. Catchment delineations must be updated to reflect information collected during catchment investigations.
- Municipal Sanitary Sewer system (if available)
- Municipal combined sewer system (if applicable).

Hanscom AFB will update its stormwater mapping by July 1, 2028 to include the remaining Phase II information.

3.3 Additional Recommended Mapping Elements

The 2016 MS4 Permit recommends but does not require the addition of the following elements to the storm system mapping. Hanscom AFB will evaluate including these recommended elements:

- Storm sewer material, size (pipe diameter), age
- Sanitary sewer system material, size (pipe diameter), age
- Privately owned stormwater treatment structures
- Where a municipal sanitary sewer system exists, properties known or suspected to be served by a septic system, especially in high density urban areas
- Area where the permittee's MS4 has received or could receive flow from septic system discharges
- Seasonal high-water table elevations impacting sanitary alignments
- Topography
- Orthophotography
- Alignments, dates and representation of work completed of past illicit discharge investigations
- Locations of suspected confirmed and corrected illicit discharges with dates and flow estimates.

4 Sanitary Sewer Overflows

The 2016 MS4 Permit requires municipalities to prohibit illicit discharges, including sanitary sewer overflows (SSOs), to the separate storm sewer system. SSOs are discharges of untreated sanitary wastewater from a municipal sanitary sewer that can contaminate surface waters, cause serious water quality problems and property damage, and threaten public health. SSOs can be caused by blockages, line breaks, sewer defects that allow stormwater and groundwater to overload the system, power failures, improper sewer design, and vandalism.

Hanscom AFB has completed an inventory of SSOs that have discharged to the MS4 within the five years prior to the effective date of the 2016 MS4 Permit, based on review of available documentation pertaining to SSOs (**Table 4-1**). The inventory includes all SSOs that occurred in the past five years during wet or dry weather resulting from inadequate conveyance capacities or where interconnectivity of the storm and sanitary sewer infrastructure allows for transfer of flow between systems.

Upon detection of an SSO, Hanscom AFB will eliminate it as expeditiously as possible and take interim measures to minimize the discharge of pollutants to and from its MS4 until the SSO is eliminated. Upon becoming aware of an SSO to the MS4, Hanscom AFB will provide oral notice to EPA within 24 hours and written notice to EPA and MassDEP within five days of becoming aware of the SSO occurrence.

The inventory in **Table 4-1** will be updated by Hanscom AFB when new SSOs are detected. The SSO inventory will be included in the annual report, including the status of mitigation and corrective measures to address each identified SSO.

Table 4-1. SSO Inventory
Hanscom AFB, Massachusetts
Revision Date: July 2019

SSO Location[1]	Discharge Statement[2]	Date[3]	Time Start[3]	Time End[3]	Estimated Volume[4]	Description[5]	Mitigation Completed[6]	Mitigation Planned[7]
Along Hartwell Ave, near Wood St.	Entered wetlands feeding Kiln Brook	9/23/2014	9/23/2014 8:15 AM	9/23/20148 11:45 AM	37,000 gal	Broken Force Main	Broken line repaired, discussion with regulators and community advised no further disinfection actions in the wetlands to avoid greater damage.	Initiating request to higher HQ for resources to conduct assessment of line to determine condition and potential need for additional repairs or replacement to prevent future leaks.
Along Hartwell Ave, near 110 Hartwell Ave.	Entered storm drain and wetlands feeding Kiln Brook	2/16/2017	2/16/2017 2:30 PM	2/16/2017 6:05 PM	8,200 gal	Broken Force Main. Discovered to be a 2” hole in pipe	Broken line repaired, discussion with regulators and community advised no further disinfection actions in the wetlands to avoid greater damage.	N/A
Along Hartwell Ave, near 110 Hartwell Ave.	Entered wetlands feeding Kiln Brook	12/4/2017	12/4/2017 11:50 AM	12/6/2017 6:00 PM	25,500 gal	Broken Force Main	Broken line repaired, discussion with regulators and community advised no further disinfection actions in the wetlands to avoid greater damage.	As a result of numerous incidents of sewer force main breaks along Hartwell Avenue, Hanscom AFB recently received funding for and awarded a construction project for replacement of portions of this line. Construction is anticipated to start in mid-June 2018.

Along Hartwell Ave, near 110 Hartwell Ave.	Entered wetlands feeding Kiln Brook	4/30/2018	4/30/2018 12:00 PM	4/30/2018 4:30 PM	35,000 gal	Broken Force Main	Broken line repaired, discussion with regulators and community advised no further disinfection actions in the wetlands to avoid greater damage. Force main replacement project initiated in June 2018 and completed Aug 28, 2018.	No further action planned

[1] Location (approximate street crossing/address and receiving water, if any)
[2] A clear statement of whether the discharge entered a surface water directly or entered the MS4
[3] Date(s) and time(s) of each known SSO occurrence (i.e., beginning and end of any known discharge)
[4] Estimated volume(s) of the occurrence
[5] Description of the occurrence indicating known or suspected cause(s)
[6] Mitigation and corrective measures completed with dates implemented
[7] Mitigation and corrective measures planned with implementation schedules

5 Assessment and Priority Ranking of Outfalls

The 2016 MS4 Permit requires an assessment and priority ranking of outfalls in terms of their potential to have illicit discharges and SSOs and the related public health significance. The ranking helps determine the priority order for performing IDDE investigations and meeting permit milestones.

5.1 Outfall Catchment Delineations

A catchment is the area that drains to an individual outfall or interconnection. The catchments for each of the MS4 outfalls will be delineated to define contributing areas for investigation of potential sources of illicit discharges. Catchments are typically delineated based on topographic contours and mapped drainage infrastructure, where available.

As described in Section 3, initial catchment delineations were completed as part of the Phase I mapping. However, the catchments were not delineated based on each individual outfall due to large number of outfalls and small catchments within Hanscom AFB. The Shawsheen River runs through the center of Hanscom AFB. Therefore, over 25 individual outfalls drain into an approximately one-mile section of the Shawsheen River. Many of these outfalls drain only parking lots or roof runoff. Additionally, many of the stormwater drainage systems are interconnected with multiple outfall locations. Delineating each of these catchments was deemed to be impractical in an area as small as Hanscom AFB. Instead catchment delineations were based on topography and stormwater drainage grouping. Each catchment basin has 2 to 12 outfalls. It is assumed that each catchment basin is small enough to trace illicit discharges and will be effective in remaining in compliance with the goals of the MS4 permit. Each outfall and its corresponding catchment basin are identified in **Table 5-1.**

A refined catchment delineation will be completed as part of the Phase II mapping to reflect information collected during catchment investigations

5.2 Outfall and Interconnection Inventory and Initial Ranking

Hanscom AFB has completed an initial outfall and interconnection inventory and priority ranking to assess illicit discharge potential based on existing information. An updated inventory and ranking will be provided in each annual report. The inventory will be updated annually to include data collected in connection with dry weather screening and other relevant inspections. The ranking will be continuously updated as dry weather screening information becomes available but shall be completed within three years of effective permit date (July 1, 2021).

The majority of the stormwater drainage network on Hanscom AFB outfalls to the Shawsheen River. Approximately, 0.5 miles of the Shawsheen River is culverted through the center of Hanscom AFB and contains many stormwater drainage discharge points. It is not possible to screen or sample all of these outfalls at the point where they exit into the culverted stream. Therefore, the nearest manhole upstream in the stormwater drainage network will be selected as a sample point. These outfalls and the upstream manhole sampling points are labeled with both an Outfall ID and Manhole No. in **Table 5-1.** Some small stormwater drainage systems, which

drain parking lots, roofs, and green spaces close to the culverted stream, do not have a manhole access point anywhere in the system. These portions of the stormwater drainage system are excluded from the IDDE plan due to low likelihood of illicit discharge and impracticality of collecting a dry weather screening sample.

The outfall and interconnection inventory identifies each outfall and interconnection discharging from the MS4 and records its location on the Stormwater System Map located in **Attachment B**. The condition of each outfall and screening results will be documented on inspections forms and filed in **Attachment C**, as well as submitted in each annual report.

Outfalls and interconnections are classified into one of the following categories:

1. **Problem Outfalls**: Outfalls/interconnections with known or suspected contributions of illicit discharges based on existing information shall be designated as Problem Outfalls. This shall include any outfalls/interconnections where previous screening indicates likely sewer input. Likely sewer input indicators are any of the following:

    - Olfactory or visual evidence of sewage,
    - Ammonia ≥ 0.5 mg/L, surfactants ≥ 0.25 mg/L, and bacteria levels greater than the water quality criteria applicable to the receiving water, or
    - Ammonia ≥ 0.5 mg/L, surfactants ≥ 0.25 mg/L, and detectable levels of chlorine.

    Dry weather screening and sampling, as described in **Section 6** of this IDDE Plan and Part 2.3.4.7.b of the MS4 Permit, is not required for Problem Outfalls.

2. **High Priority Outfalls**: Outfalls/interconnections that have not been classified as

    Problem Outfalls and that are:

    - Discharging to an area of concern to public health due to proximity of public beaches, recreational areas, drinking water supplies or shellfish beds
    - Determined by the permittee as high priority based on the characteristics listed below or other available information.

3. **Low Priority Outfalls**: Outfalls/interconnections determined by the permittee as low priority based on the characteristics listed below or other available information.

4. **Excluded outfalls**: Outfalls/interconnections with no potential for illicit discharges

    may be excluded from the IDDE program. This category is limited to roadway drainage in undeveloped areas with no dwellings and no sanitary sewers; drainage for athletic fields, parks or undeveloped green space and associated parking without services; cross-country drainage alignments (that neither cross nor are in proximity to sanitary sewer alignments) through undeveloped land.

Outfalls will be ranked into the above priority categories (except for excluded outfalls, which may be excluded from the IDDE program) based on the following characteristics of the defined initial catchment areas, where information is available. Additional relevant characteristics, including location-specific characteristics, may be considered but must be documented in this IDDE Plan. The following characteristics may be deleted where data is not available or that do not apply.

- **Previous screening results** – previous screening/sampling results indicate likely sewer

input (see criteria above for Problem Outfalls).

- **Past discharge complaints and reports.**
- **Poor receiving water quality** – the following guidelines are recommended to identify waters as having a high illicit discharge potential:
    - Exceeding water quality standards for bacteria
    - Ammonia levels above 0.5 mg/l
    - Surfactants levels greater than or equal to 0.25 mg/l

  Density of generating sites – Generating sites are those places, including institutional, municipal, commercial, or industrial sites, with a potential to generate pollutants that could contribute to illicit discharges. Examples of these sites include, but are not limited to, car dealers; car washes; gas stations; garden centers; and industrial manufacturing areas.
- **Age of development and infrastructure** – Industrial areas greater than 40 years old and areas where the sanitary sewer system is more than 40 years old will probably have a high illicit discharge potential. Developments 20 years or younger will probably have a low illicit discharge potential.
- **Sewer conversion** – Contributing catchment areas that were once serviced by septic systems, but have been converted to sewer connections may have a high illicit discharge potential.
- **Historic combined sewer systems** – Contributing areas that were once serviced by a combined sewer system, but have been separated may have a high illicit discharge potential.
- **Surrounding density of aging septic systems** – Septic systems thirty years or older in residential land use areas are prone to have failures and may have a high illicit discharge potential.
- **Culverted streams** – Any river or stream that is culverted for distances greater than a simple roadway crossing may have a high illicit discharge potential.
- **Water quality limited waterbodies** that receive a discharge from the MS4 or waters with approved TMDLs applicable to the permittee, where illicit discharges have the potential to contain the pollutant identified as the cause of the water quality impairment.

Table 5-1 provides an outfall inventory and priority ranking matrix.

Table 5-1. Outfall Inventory and Priority Ranking Matrix
Hanscom AFB, Massachusetts
Revision Date: July 2019

Outfall ID	Receiving Water	Previous Screening Results Indicate Likely Sewer Input? [1]	Discharging to Area of Concern to Public Health? [2]	Frequency of Past Discharge Complaints	Receiving Water Quality [3]	Density of Generating Sites [4]	Age/ Type of Development/ Infrastructure [5]	Historic Combined Sewers or Septic? [6]	Aging Septic?[7]	Culverted Streams?[8]	Sub-Watershed Basin	Additional Characteristics	Score	Priority Ranking[9]
Information Source		Outfall inspections and sample results	GIS Maps	Base Staff	Impaired Waters List	Land Use/GIS Maps, Aerial Photography	Land Use Information, Visual Observation	Base Staff, GIS Maps	Land Use, Base Staff	GIS and Storm System Maps		Other		
Scoring Criteria		Yes = 3 (Problem Outfall) No = 0	Yes = 3 No = 0	Frequent = 3 Occasional = 2 None = 0	Poor = 3 Fair = 2 Good = 0	High = 3 Medium = 2 Low = 1	High = 3 Medium = 2 Low = 1	Yes = 3 No = 0	Yes = 3 No = 0	Yes = 3 No = 0		TBD		
OF 1	Shawsheen River	NA	0	0	2	1	3	0	3	0	6	Drains Outdoor storage area in CEU	9	Low
OF 2	Shawsheen River	NA	3	0	2	2	3	0	3	0	6	Drains CEU roads and parking, chemical storage in area	13	High
OF 3	Shawsheen River	NA	0	0	2	2	3	0	3	0	6	Drains CEU roads and parking, chemical storage in area	10	Low
OF 4	Shawsheen River	NA	0	0	2	1	1	0	3	0	6	Drains one CEU parking lot	7	Low
OF 5	Shawsheen River	NA	0	0	2	1	2	0	3	0	6	Drains CEU roads	8	Low
OF 6 – MH192A	Shawsheen River	NA	0	0	2	3	3	0	3	0	1A	Drains commissary, parking lots, fire station, Aero Club, automotive hobby shop, and waste treatment building.	11	High
OF 6 – MH84	Shawsheen River	NA	0	0	2	2	2	0	3	0	1A	Drains commissary, parking lots, research buildings.	9	Low
OF 7	Shawsheen River Culvert	NA	0	0	2	2	1	0	3	0	2A_1	Drains large roadway area, research buildings, and security buildings	8	Low
OF 8	Shawsheen River Culvert	NA	0	0	2	2	2	0	3	0	2A_1	Drains large portion of roads, parking lots, and research buildings.	9	Low
OF 9 – M501, 502, 607	Shawsheen River Culvert	NA	0	0	2	3	3	0	3	0	2A_2	Drains portion of vehicle maintenance shop, officers' quarters, and Eng. Storage	11	High
OF 10 – M34	Shawsheen River Culvert	NA	0	0	2	1	1	0	3	0	2A_1	Drains roadways and storage building	7	Low
OF 11 – M290	Shawsheen River Culvert	NA	0	0	2	1	1	0	3	0	2A_1	Drains parking lots and gym buildings	7	Low
OF 12	Shawsheen River Culvert	NA		0	2	2	1	0	3	3	2A_2	Drains wetland, roads, storage,	11	High
OF 13 – M506	Shawsheen River Culvert	NA	0	0	2	1	1	0	3	0	2A_1	Drains roads and gym building	7	Low
OF 14 – M308	Shawsheen River Culvert	NA	0	0	2	1	1	0	3	0	2A_1	Drains roadway and recreation building	7	Low
OF 15 – M438	Shawsheen River Culvert	NA	0	0	2	3	2	0	3	3	2A_3	Drains wetland, roadways, swimming	13	High
OF 16	Shawsheen River	NA	3	0	2	2	2	0	3	0	2A_3	Drains roadways and research/admin	12	High
OF 17	Shawsheen River	NA	3	0	2	1	1	0	3	0	2A_1	Drains small park and road	10	Low
OF 18	Shawsheen River	NA	3	0	2	1	1	0	3	0	2A_3	Drains small parking lot	10	Low
OF 19	Shawsheen River	NA									2A_1	Drains only parks		Excluded
OF 20	Shawsheen River	NA	3	0	1	1	2	0	3	0	2A_1	Drains multiple roads and office buildings	10	Low
OF 21	Shawsheen River	NA	3	0	2	1	1	0	3	0	2A_1	Drains roadways	10	Low

Outfall ID	Receiving Water	Previous Screening Results Indicate Likely Sewer Input? [1]	Discharging to Area of Concern to Public Health? [2]	Frequency of Past Discharge Complaints	Receiving Water Quality [3]	Density of Generating Sites [4]	Age/ Type of Development/ Infrastructure [5]	Historic Combined Sewers or Septic? [6]	Aging Septic?[7]	Culverted Streams?[8]	Sub-Watershed Basin	Additional Characteristics	Score	Priority Ranking[9]
Information Source		Outfall inspections and sample results	GIS Maps	Base Staff	Impaired Waters List	Land Use/GIS Maps, Aerial Photography	Land Use Information, Visual Observation	Base Staff, GIS Maps	Land Use, Base Staff	GIS and Storm System Maps		Other		
Scoring Criteria		Yes = 3 (Problem Outfall) No = 0	Yes = 3 No = 0	Frequent = 3 Occasional = 2 None = 0	Poor = 3 Fair = 2 Good = 0	High = 3 Medium = 2 Low = 1	High = 3 Medium = 2 Low = 1	Yes = 3 No = 0	Yes = 3 No = 0	Yes = 3 No = 0		TBD		
OF 22	Shawsheen River	NA	3	0	2	2	2	0	3	0	2A_1	Drains Med Clinic	12	High
OF 23	Shawsheen River	NA	3	0	2	2	1	0	3	3	2A_1	Drains Med Clinic, Temp School and wetland	14	High
OF 24	Shawsheen River	NA	3	0	2	1	1	0	3	0	2A_4	Drains new middle school	10	Low
OF 25	Shawsheen River	NA	3	0	2	1	1	0	3	0	2A_4	Drains new middle school	10	Low
OF 26	Shawsheen River	NA	3	0	2	1	1	0	3	0	2A_5	Drains parking lot	10	Low
OF 27	Shawsheen River		3	0	2	1	1	0	3	0	2A_4	Drain south side of school	10	Low
OF 28	Shawsheen River	NA	3	0	2	1	1	0	3	0	2A_5	Drains childcare center parks	10	Low
OF 29	Wetlands feeding Kiln Brook	NA	0	0	2	3	3	0	3	0	3	Drains multiple roads and facilities on east of Base	11	High
OF 30	Wetlands feeding Kiln	NA	0	0	2	3	2	0	3	0	3	Drains most of MIT area	10	Low
OF 31	Wetlands feeding Kiln	NA	0	0	2	1	2	0	3	0	3	Drain roads off base	8	Low
OF 32	Wetlands feeding Kiln	NA	0	0	2	1	2	0	3	0	3	Drains small portion of off base road	8	Low
OF 33	Wetlands exiting Hanscom AFB to south	NA	0	0	2	1	2	0	3	0	4	Drains southeast corner of base, maintenance shop, research buildings	8	Low

Scoring Criteria:

[1] Previous screening results indicate likely sewer input if any of the following are true:

- Olfactory or visual evidence of sewage,
- Ammonia ≥ 0.5 mg/L, surfactants ≥ 0.25 mg/L, and bacteria levels greater than the water quality criteria applicable to the receiving water, or
- Ammonia ≥ 0.5 mg/L, surfactants ≥ 0.25 mg/L, and detectable levels of chlorine

[2] Outfalls/interconnections that discharge to or in the vicinity of any of the following areas: public beaches, recreational areas, drinking water supplies, or shellfish beds

[3] Receiving water quality based on latest version of MassDEP Integrated List of Waters.

- Poor = Waters with approved TMDLs (Category 4a Waters) where illicit discharges have the potential to contain the pollutant identified as the cause of the impairment
- Fair = Water quality limited waterbodies that receive a discharge from the MS4 (Category 5 Waters)
- Good = No water quality impairments

[4] Generating sites are institutional, municipal, commercial, or industrial sites with a potential to contribute to illicit discharges (e.g., car dealers, car washes, gas stations, garden centers, industrial manufacturing, etc.)

[5] Age/Type of development and infrastructure:

- High = Industrial areas greater than 40 years old, areas where the sanitary sewer system is more than 40 years old, and areas with SPCCPs
- Medium = Developments 20-40 years old
- Low = Developments less than 20 years old

[6] Areas once served by combined sewers and but have been separated, or areas once served by septic systems but have been converted to sanitary sewers.

[7] Aging septic systems are septic systems 30 years or older in residential areas.

[8] Any river or stream that is culverted for distance greater than a simple roadway crossing. Hanscom AFB will included culverted wetland flow in this category.

[9]Problem outfall = Previous Screening Result indicating Sewer input. High Priority Outfall=Score greater than 11. Low Priority Outfall= Score less than 11. This scoring criteria may be updated annually by Hanscom AFB Stormwater Manager as new information becomes available.

6 Dry Weather Outfall Screening and Sampling

Dry weather flow is a common indicator of potential illicit connections. The MS4 Permit requires all outfalls/interconnections (excluding Problem and Excluded Outfalls) to be inspected for the presence of dry weather flow within three years of the effective permit date (July 1, 2021). Hanscom AFB will conduct dry weather outfall screening, starting with High Priority outfalls, followed by Low Priority outfalls in accordance with the procedure outlines in **Attachment C** and based on the initial priority rankings described in the previous section.

Outfalls 7-15 drain into a culverted section of the Shawsheen River running through the center of the MS4 area. At Outfall 7, 8, and 12 a manhole is present in the culvert in the location of the outfall. For these outfalls a sample will be taken from the culvert manhole. Flow will likely always be present due to stream flow and possible dilution of illicit discharge could occur. For this reason, further manhole investigation is important and will be prioritized for these drainage systems. Outfall 9, 10, 11, 13, 14 and 15 enter into the culverted stream section where no manholes are present. For these outfalls the nearest upstream manhole in the stormwater drainage system will be used for observation and sampling. These sampling manhole locations are indicated on **Attachment B: Figure 1 and 2** and **Table 5-1.** If any outfall is inaccessible or submerged at time of sampling, the permittee may proceed to the first accessible upstream manhole in accordance this MA MS4 General Permit section 2.3.4.7 (b)(iii)(2).

Several outfalls in the Hanscom AFB drainage system drain both stormwater and naturally occurring wetlands. Due to this, flow may be observed at outfalls during dry weather which does not necessarily indicate an illicit discharge. When flow is observed at an outfall a sample will be collected in accordance with the procedures presented in **Attachment C.**

6.1 Weather Conditions

Dry weather outfall screening and sampling may occur when no more than 0.1 inches of rainfall has occurred in the previous 24-hour period and no significant snow melt is occurring. For purposes of determining dry weather conditions, program staff will use precipitation data from a local weather station. If the weather station is not available, a backup weather station will be used.

6.2 Performing Dry Weather Screening

Dry weather outfall screening and sampling will be performed in accordance with the procedures presented in **Attachment C** by trained Hanscom AFB personnel or qualified contractors. Checklist 1: Dry Weather Outfall Inspection Survey will be completed for all outfalls to record dimensions, shape, material, spatial location, physical condition, indicators of potential illicit discharges, and flow of the Outfall. If observable flow is noted, Checklist 2: Dry Weather Outfall Inspection Survey for Observable Flow will be completed. A sample will be collected from the Outfall flow and analyzed for ammonia, surfactants, chlorine, total

phosphorus (pollutant of concern), and indicator bacteria (E. coli). If no flow is observed, but evidence of illicit flow exists, Hanscom AFB will repeat the Dry Weather Screening within one week of initial observation. All sample gathering and laboratory analysis will comply with suggested U.S. EPA methods. The completed checklists will be stored in **Attachment C** of the IDDE Plan. **Attachment C Table 4** will be used to track and annually report the dry weather screening status of all outfalls.

6.3 Interpreting Outfall Sampling Results

Outfall analytical data from dry weather sampling can be used to help identify the major type or source of discharge. **Table 6-1** shows values identified by the U.S. EPA and the Center for Watershed Protection as typical screening values for select parameters. These represent the typical concentration or value of each parameter expected to be found in stormwater. Screening values that exceed these benchmarks may be indicative of pollution and/or illicit discharges.

Table 6-1. Benchmark Field Measurements for Select Parameters

Analyte or Parameter	Benchmark
Ammonia	>0.5 mg/L
Conductivity	>2,000 µS/cm
Surfactants	>0.25 mg/L
Chlorine	>0.02 mg/L (detectable levels per the 2016 MS4 Permit)
Indicator Bacteria[1]: *E. coli* *Enterococcus*	*E. coli*: the geometric mean of the five most recent samples taken during the same bathing season shall not exceed 126 colonies per 100 ml and no single sample taken during the bathing season shall exceed 235 colonies per 100 ml *Enterococcus:* the geometric mean of the five most recent samples taken during the same bathing season shall not exceed 33 colonies per 100 ml and no single sample taken during the bathing season shall exceed 61 colonies per 100 ml

6.4 Follow-up Ranking of Outfalls and Interconnections

Hanscom AFB will update and re-prioritize the initial outfall and interconnection rankings in **Table 5-1** based on information gathered during dry weather screening. The rankings will be updated periodically as dry weather screening information becomes available but will be completed within three years of the effective date of the permit (July 1, 2021).

Outfalls/interconnections where relevant information was found indicating sewer input to the MS4 or sampling results indicating sewer input are highly likely to contain illicit discharges from sanitary sources.

Such outfalls/interconnections will be ranked as Problem Outfalls for investigation. Other outfalls and interconnections may be re-ranked based on any new information from the dry weather screening.

[1] Massachusetts Water Quality Standards: http://www.mass.gov/eea/docs/dep/service/regulations/314cmr04.pdf

7 Catchment Investigations

Once stormwater outfalls with evidence of illicit discharges have been identified, various methods can be used to trace the source of the potential discharge within the outfall catchment area. Catchment investigation techniques include but are not limited to review of maps, historic plans, and records; manhole observation; dry and wet weather sampling; video inspection; smoke testing; and dye testing. This section outlines a systematic procedure to investigate outfall catchments to trace the source of potential illicit discharges. All data collected as part of the catchment investigations will be recorded and reported in each annual report.

7.1 System Vulnerability Factors

Hanscom AFB will review relevant mapping and historic plans and records to identify areas within the catchment with higher potential for illicit connections. The following information will be reviewed:

- Plans related to the construction of the drainage network
- Plans related to the construction of the sewer drainage network
- Prior work on storm drains or sewer lines
- Board of Health (BOH) or other municipal data on septic systems
- Complaint records related to SSOs
- Septic system breakouts.

Based on the review of this information, the presence of any of the following System Vulnerability Factors (SVFs) will be identified for each catchment:

- History of SSOs, including, but not limited to, those resulting from wet weather, high water table, or fat/oil/grease blockages.
- Common or twin-invert manholes serving storm and sanitary sewer alignments.
- Common trench construction serving both storm and sanitary sewer alignments.
- Crossings of storm and sanitary sewer alignments where the sanitary system is shallower than the storm drain system.
- Sanitary sewer alignments known or suspected to have been constructed with an underdrain system.
- Inadequate sanitary sewer level of service (LOS) resulting in regular surcharging, customer back-ups, or frequent customer complaints.
- Areas formerly served by combined sewer systems.
- Sanitary sewer infrastructure defects such as leaking service laterals, cracked, broken, or offset sanitary infrastructure, directly piped connections between storm drain and sanitary sewer infrastructure, or other vulnerability factors identified through Inflow/Infiltration Analyses, Sanitary Sewer Evaluation Surveys, or other infrastructure investigations.
- Sewer pump/lift stations, siphons, or known sanitary sewer restrictions where power/equipment failures or blockages could readily result in SSOs.

- Any sanitary sewer and storm drain infrastructure greater than 40 years old.
- Widespread code-required septic system upgrades required at property transfers (indicative of inadequate soils, water table separation, or other physical constraints of the area rather that poor owner maintenance).
- History of multiple Board of Health actions addressing widespread septic system failures (indicative of inadequate soils, water table separation, or other physical constraints of the area rather that poor owner maintenance).

A SVF inventory will be documented for each catchment (see **Table 7-1**), retained as part of this IDDE Plan, updated annually based on sampling dry, wet, and manhole sampling results and included in the annual report

Table 7-1. Outfall Catchment System Vulnerability Factor Inventory

Hanscom AFB, Massachusetts
Revision Date: May 2019

Outfall ID	Receiving Water	1 History of SSOs	2 Common or Twin Invert Manholes	3 Common Trench Construction	4 Storm/Sanitary Crossings (Sanitary Above)	5 Sanitary Lines with Underdrains	6 Inadequate Sanitary Level of Service	7 Areas Formerly Served by Combined Sewers	8 Sanitary Infrastructure Defects	9 SSO Potential in Event of System Failures	10 Sanitary and Storm Drain Infrastructure >40 years Old	11 Septic with Poor Soils or Water Table Separation	12 History of BOH Actions Addressing Septic Failure
Sample 1	XYZ River	Yes/No	Yes/No	Yes/No	Yes/No	Yes/No	Yes/No	Yes/No	Yes/No	Yes/No	Yes/No	Yes/No	Yes/No

Presence/Absence Evaluation Criteria:

1. History of SSOs, including, but not limited to, those resulting from wet weather, high water table, or fat/oil/grease blockages
2. Common or twin-invert manholes serving storm and sanitary sewer alignments
3. Common trench construction serving both storm and sanitary sewer alignments
4. Crossings of storm and sanitary sewer alignments where the sanitary system is shallower than the storm drain system
5. Sanitary sewer alignments known or suspected to have been constructed with an underdrain system
6. Inadequate sanitary sewer level of service (LOS) resulting in regular surcharging, customer back-ups, or frequent customer complaints
7. Areas formerly served by combined sewer systems
8. Sanitary sewer infrastructure defects such as leaking service laterals, cracked, broken, or offset sanitary infrastructure, directly piped connections between storm drain and sanitary sewer infrastructure, or other vulnerability factors identified through Inflow/Infiltration Analyses, Sanitary Sewer Evaluation Surveys, or other infrastructure investigations
9. Sewer pump/lift stations, siphons, or known sanitary sewer restrictions where power/equipment failures or blockages could readily result in SSOs
10. Any sanitary sewer and storm drain infrastructure greater than 40 years old
11. Widespread code-required septic system upgrades required at property transfers (indicative of inadequate soils, water table separation, or other physical constraints of the area rather that poor owner maintenance)
12. History of multiple Board of Health actions addressing widespread septic system failures (indicative of inadequate soils, water table separation, or other physical constraints of the area rather that poor owner maintenance)

7.2 Dry Weather Manhole Inspections

Hanscom AFB will implement a dry weather storm drain network investigation that involves systematically and progressively observing, sampling and evaluating key junction manholes in the MS4 to determine the approximate location of suspected illicit discharges or SSOs. Infrastructure information will be incorporated into the storm system map, and catchment delineations will be refined based on the field investigation, where necessary. The SVF inventory will also be updated based on information obtained during the field investigations, where necessary.

Several important terms related to the dry weather manhole inspection program are defined by the MS4 Permit as follows:

- **Junction Manhole** is a manhole or structure with two or more inlets accepting flow from two or more MS4 alignments. Manholes with inlets solely from private storm drains, individual catch basins, or both are not considered junction manholes for these purposes.
- **Key Junction Manholes** are those junction manholes that can represent one or more junction manholes without compromising adequate implementation of the illicit discharge program. Adequate implementation of the illicit discharge program would not be compromised if the exclusion of a particular junction manhole as a key junction manhole would not affect the permittee's ability to determine the possible presence of an upstream illicit discharge. A permittee may exclude a junction manhole located upstream from another located in the immediate vicinity or that is serving a drainage alignment with no potential for illicit connections.

For all catchments identified for investigation, during dry weather, field crews will systematically inspect key junction manholes for evidence of illicit discharges. This program involves progressive inspection and sampling at manholes in the storm drain network to isolate and eliminate illicit discharges.

The manhole inspection methodology will be conducted in one of two ways (or a combination of both):

- By working progressively up from the outfall and inspecting key junction manholes along the way, or
- By working progressively down from the upper parts of the catchment toward the outfall.

For most catchments, manhole inspections will proceed from the outfall moving up into the system.

However, the decision to move up or down the system depends on the nature of the drainage system and the surrounding land use and the availability of information on the catchment and drainage system. Moving up the system can begin immediately when an illicit discharge is detected at an outfall, and only a map of the storm drain system is required. Moving down the system requires more advance preparation and reliable drainage system information on the upstream segments of the storm drain system, but may be more efficient if the sources of illicit discharges are believed to be located in the upstream portions of the catchment area. Once a manhole inspection

methodology has been selected, investigations will continue systematically through the catchment.

Inspection of key junction manholes will proceed as follows:

1 Manholes will be opened and inspected for visual and olfactory evidence of illicit connections. A sample field inspection form is provided in **Attachment C – Checklist 4**.
2 If flow is observed, a sample will be collected and analyzed at a minimum for ammonia, chlorine, and surfactants. Field kits can be used for these analyses. Sampling and analysis will be in accordance with procedures outlined in the field form. Additional indicator sampling may assist in determining potential sources (e.g., bacteria for sanitary flows, conductivity to detect tidal backwater, etc.). **Attachment C – Checklist 5** will be completed if observable flow is present.
3 Where sampling results or visual or olfactory evidence indicate potential illicit discharges or SSOs, the area draining to the junction manhole will be flagged for further upstream manhole investigation and/or isolation and confirmation of sources.
4 Subsequent key junction manhole inspections will proceed until the location of suspected illicit discharges or SSOs can be isolated to a pipe segment between two manholes.
5 If no evidence of an illicit discharge is found, catchment investigations will be considered complete upon completion of key junction manhole sampling.

7.3 Wet Weather Outfall Sampling

Where a minimum of one SVF is identified based on previous information or the catchment investigation, a wet weather investigation must also be conducted at the associated outfall. Hanscom AFB will conduct a wet weather outfall sampling program and make updates as necessary.

Outfalls will be inspected and sampled under wet weather conditions, to the extent necessary, to determine whether wet weather-induced high flows in sanitary sewers or high groundwater in areas served by septic systems result in discharges of sanitary flow to the MS4. The Wet Weather Sampling field form is provided in **Attachment C – Checklist 3.** The CMRSWC SOPs *Wet Weather Outfall Inspection* and *Catch Basin Inspection and Cleaning* are provided in **Attachment E**.

Wet weather outfall sampling will proceed as follows:

1 At least one wet weather sample will be collected at the outfall for the same parameters required during dry weather screening.
2 Wet weather sampling will occur during or after a storm event of sufficient depth or intensity to produce a stormwater discharge at the outfall. There is no specific rainfall amount that will trigger sampling, although minimum storm event intensities that are likely to trigger sanitary sewer interconnections are preferred. To the extent feasible, sampling should occur during the spring (March through June) when groundwater levels are relatively high.

3 If wet weather outfall sampling indicates a potential illicit discharge, then additional wet weather source sampling will be performed, as warranted, or source isolation and confirmation procedures will be followed as described in **Section 7.4**.

4 If wet weather outfall sampling does not identify evidence of illicit discharges, and no evidence of an illicit discharge is found during dry weather manhole inspections, catchment investigations will be considered complete.

7.4 Source Isolation and Confirmation

The source of some illicit connections or discharges can be located by systematically isolating the area from which the polluted discharge originates. This process involves progressive investigation at manholes and catch basins in the storm drain network to narrow down the location where the illegal discharge is entering the drainage system. This method is best used to identify constant or frequent discharge sources such as an illicit connection with the sanitary sewer system.

Field crews will work progressively upstream from the Problem Outfall and inspect stormwater structures (e.g., manholes, catch basins, junctions) looking for the presence of flow during dry weather, foul odors, colors or stained deposits, oily sheen, floatable materials, and/or other indicators of an illicit discharge. The observations are continued at each upstream structure until a structure is found with no evidence of discharge. This indicates the discharge source is likely located between the structure with no evidence of discharge and the next downstream structure.

Once the source of an illicit discharge is approximated between two manholes, more detailed investigation techniques will be used to isolate and confirm the source of the illicit discharge. The following methods may be used in isolating and confirming the source of illicit discharges

- Sandbagging
- Smoke Testing
- Dye Testing
- Closed-circuit television (CCTV)/ Video Inspections
- Optical Brightener Monitoring
- IDDE Canines

These methods are described in the sections below. The SOP *Locating Illicit Discharges* is provided in **Attachment E**.

Public notification is an important aspect of a detailed source investigation program. Prior to smoke testing, dye testing, or TV inspections, the Hanscom AFB will notify property owners in the affected area. Smoke testing notification will include calls, notifications, or emails for single family homes, businesses and building lobbies for multi-family dwellings.

7.4.1 Sandbagging

This technique can be particularly useful when attempting to isolate intermittent illicit discharges or those with very little perceptible flow. The technique involves placing sandbags or similar

barriers (e.g., caulking, weirs/plates, or other temporary barriers) within outlets to manholes to form a temporary dam that collects any intermittent flows that may occur. Sandbags are typically left in place for 48 hours, and should only be installed when dry weather is forecast. If flow has collected behind the sandbags/barriers after 48 hours it can be assessed using visual observations or by sampling. If no flow collects behind the sandbag, the upstream pipe network can be ruled out as a source of the intermittent discharge. Finding appropriate durations of dry weather and the need for multiple trips to each manhole makes this method both time-consuming and somewhat limiting.

7.4.2 Smoke Testing

Smoke testing involves injecting non-toxic smoke into drain lines and noting the emergence of smoke from sanitary sewer vents in illegally connected buildings or from cracks and leaks in the system itself. Typically, a smoke bomb or smoke generator is used to inject the smoke into the system at a catch basin or manhole and air is then forced through the system. Test personnel are place in areas where there are suspected illegal connections or cracks/leaks, noting any escape of smoke (indicating an illicit connection or damaged storm drain infrastructure). It is important when using this technique to make proper notifications to area residents and business owners as well as local police and fire departments.

If the initial test of the storm drain system is unsuccessful then a more thorough smoke-test of the sanitary sewer lines can also be performed. Unlike storm drain smoke tests, buildings that do not emit smoke during sanitary sewer smoke tests may have problem connections and may also have sewer gas venting inside, which is hazardous.

It should be noted that smoke may cause minor irritation of respiratory passages. Residents with respiratory conditions may need to be monitored or evacuated from the area of testing altogether to ensure safety during testing.

7.4.3 Dye Testing

Dye testing involves flushing non-toxic dye into plumbing fixtures such as toilets, showers, and sinks and observing nearby storm drains and sewer manholes as well as stormwater outfalls for the presence of the dye. Similar to smoke testing, it is important to inform local residents and business owners. Police, fire, and local public health staff should also be notified prior to testing in preparation of responding to citizen phone calls concerning the dye and their presence in local surface waters.

A team of two or more people is needed to perform dye testing (ideally, all with two-way radios). One person is inside the building, while the others are stationed at the appropriate storm sewer and sanitary sewer manholes (which should be opened) and/or outfalls. The person inside the building adds dye into a plumbing fixture (i.e., toilet or sink) and runs a sufficient amount of water to move the dye through the plumbing system. The person inside the building then radios to the outside crew that the dye has been dropped, and the outside crew watches for the dye in the storm sewer and sanitary sewer, recording the presence or absence of the dye.

The test can be relatively quick (about 30 minutes per test), effective (results are usually definitive), and inexpensive. Dye testing is best used when the likely source of an illicit discharge has been narrowed down to a few specific houses or businesses.

7.4.4 CCTV/Video Inspection

Another method of source isolation involves the use of mobile video cameras that are guided remotely through stormwater drain lines to observe possible illicit discharges. IDDE program staff can review the videos and note any visible illicit discharges. While this tool is both effective and usually definitive, it can be costly and time consuming when compared to other source isolation techniques.

7.4.5 Optical Brightener Monitoring

Optical brighteners are fluorescent dyes that are used in detergents and paper products to enhance their appearance. The presence of optical brighteners in surface waters or dry weather discharges suggests there is a possible illicit discharge or insufficient removal through adsorption in nearby septic systems or wastewater treatment. Optical brightener monitoring can be done in two ways. The most common, and least expensive, methodology involves placing a cotton pad in a wire cage and securing it in a pipe, manhole, catch basin, or inlet to capture intermittent dry weather flows.

The pad is retrieved at a later date and placed under UV light to determine the presence/absence of brighteners during the monitoring period. A second methodology uses handheld fluorometers to detect optical brighteners in water sample collected from outfalls or ambient surface waters. Use of a fluorometer, while more quantitative, is typically costlier and is not as effective at isolating intermittent discharges as other source isolation techniques.

7.4.6 IDDE Canines

Dogs specifically trained to smell human related sewage are becoming a cost-effective way to isolate and identify sources of illicit discharges. While not widespread at the moment, the use of IDDE canines is growing as is their accuracy. The use of IDDE canines is not recommended as a standalone practice for source identification; rather it is recommended as a tool to supplement other conventional methods, such as dye testing, in order to fully verify sources of illicit discharges.

7.5 Illicit Discharge Removal

When the specific source of an illicit discharge is identified, Hanscom AFB will exercise its authority as necessary to require its removal. The annual report will include the status of IDDE investigation and removal activities including the following information for each confirmed source:

- The location of the discharge and its source(s)
- A description of the discharge
- The method of discovery
- Date of discovery
- Date of elimination, mitigation or enforcement action OR planned corrective measures and a schedule for completing the illicit discharge removal
- Estimate of the volume of flow removed.

7.5.1 Confirmatory Outfall Screening

Within one year of removal of all identified illicit discharges within a catchment area, confirmatory outfall or interconnection screening will be conducted. The confirmatory screening will be conducted in dry weather unless System Vulnerability Factors have been identified, in which case both dry weather and wet weather confirmatory screening will be conducted. If confirmatory screening indicates evidence of additional illicit discharges, the catchment will be scheduled for additional investigation.

7.6 Ongoing Screening

Upon completion of all catchment investigations and illicit discharge removal and confirmation (if necessary), each outfall or interconnection will be re-prioritized for screening and scheduled for ongoing screening once every five years. Ongoing screening will consist of dry weather screening and sampling consistent with the procedures described in **Section 6** of this plan. Ongoing wet weather screening and sampling will also be conducted at outfalls where wet weather screening was required due to System Vulnerability Factors and will be conducted in accordance with the procedures described in **Section 7.3**. All sampling results will be reported in the annual report.

8 Training

Annual IDDE training will be made available to all employees involved in the IDDE program. This training will at a minimum include information on how to identify illicit discharges and SSOs and may also include additional training specific to the functions of particular personnel and their function within the framework of the IDDE program. Training records will be maintained in **Attachment E**. The frequency and type of training will be included in the annual report.

9 Progress Reporting

The progress and success of the IDDE program will be evaluated on an annual basis. The evaluation will be documented in the annual report and will include the following indicators of program progress:

- Number of SSOs and illicit discharges identified and removed
- Number and percent of total outfall catchments served by the MS4 evaluated using the catchment investigation procedure
- Number of dry weather outfall inspections/screenings
- Number of wet weather outfall inspections/sampling events
- Number of enforcement notices issued
- All dry weather and wet weather screening and sampling results
- Estimate of the volume of sewage removed, as applicable
- Number of employees trained annually.

The success of the IDDE program will be measured by the IDDE activities completed within the required permit timelines.

References

Fuss and O'Neill, 2016. *Illicit Discharge Detection and Elimination (IDDE) Plan*. June.

USEPA and MassDEP, 2016. *General Permits for Stormwater Discharges from Small Municipal Separate Storm Sewer Systems in Massachusetts*. April.

ATTACHMENTS

Attachment A
Legal Authority

DEPARTMENT OF THE AIR FORCE
Hanscom Air Force Base
66 ABG/CEIE Concord, Massachusetts

DRAFT MEMORANDUM FOR ALL HANSCOM AFB PERSONNEL

SUBJECT: Stormwater Illicit Discharge Prohibition Policy Statement

1. Hanscom AFB is committed to water quality protection and meeting the goals of Massachusetts General Permit for Stormwater Discharges from Small Municipal Separate Storm Sewer Systems (MS4). Stormwater runoff from developed land can harm surface water resources by changing natural hydrologic patterns and elevating pollutant levels.

2. Discharges to surface water from Hanscom AFB are authorized by the Massachusetts Department of Environmental Protection (MASSDEP) under two separate permitting programs. The discharge permits limit the types and quantities of allowable discharges and establish monitoring and record keeping requirements in compliance with provisions of the Clean Water Act.

PERMIT TITLE	PERMIT NUMBER	PERMIT PURPOSE
National Pollutant Discharge Elimination System (NPDES)	MAR042029	The NPDES permits allow Hanscom AFB to discharge stormwater runoff from industrial areas to the stormwater outfalls specified in the permit.
General Permit for Discharge of Stormwater from Small Municipal Separate Storm Sewer Systems (MS4)	MAR042029	The MS4 permits allow Hanscom AFB to discharge stormwater runoff from urbanized areas in accordance with conditions set forth in the permit.

3. The MS4 permit requires Hanscom AFB to effectively prohibit illicit discharges into the storm sewer system, including illicit discharges from properties not owned by Hanscom AFB that discharge into the Hanscom AFB MS4. An illicit discharge can be any discharge to the storm sewer that is not composed entirely of stormwater, unless otherwise allowed under discharge permits. **Illicit discharges to the stormwater system are prohibited at Hanscom AFB.**

4. It is the responsibility of all military personnel, civilian employees and support contractors to perform their duties in a manner that prevents surface water pollution and protects this important natural resource. Suspected illicit discharges should be reported to Hanscom AFB Stormwater Coordinator at [phone number]. All suspected illicit discharges and sanitary sewer overflows into the Hanscom AFB MS4 shall be detected, located, identified and eliminated as expeditiously as possible. Questions regarding allowable stormwater discharges should be directed to Environmental staff at [phone number].

[name]
Deputy Base Civil Engineer

Attachment B

Storm System Mapping and Catchment Delineation

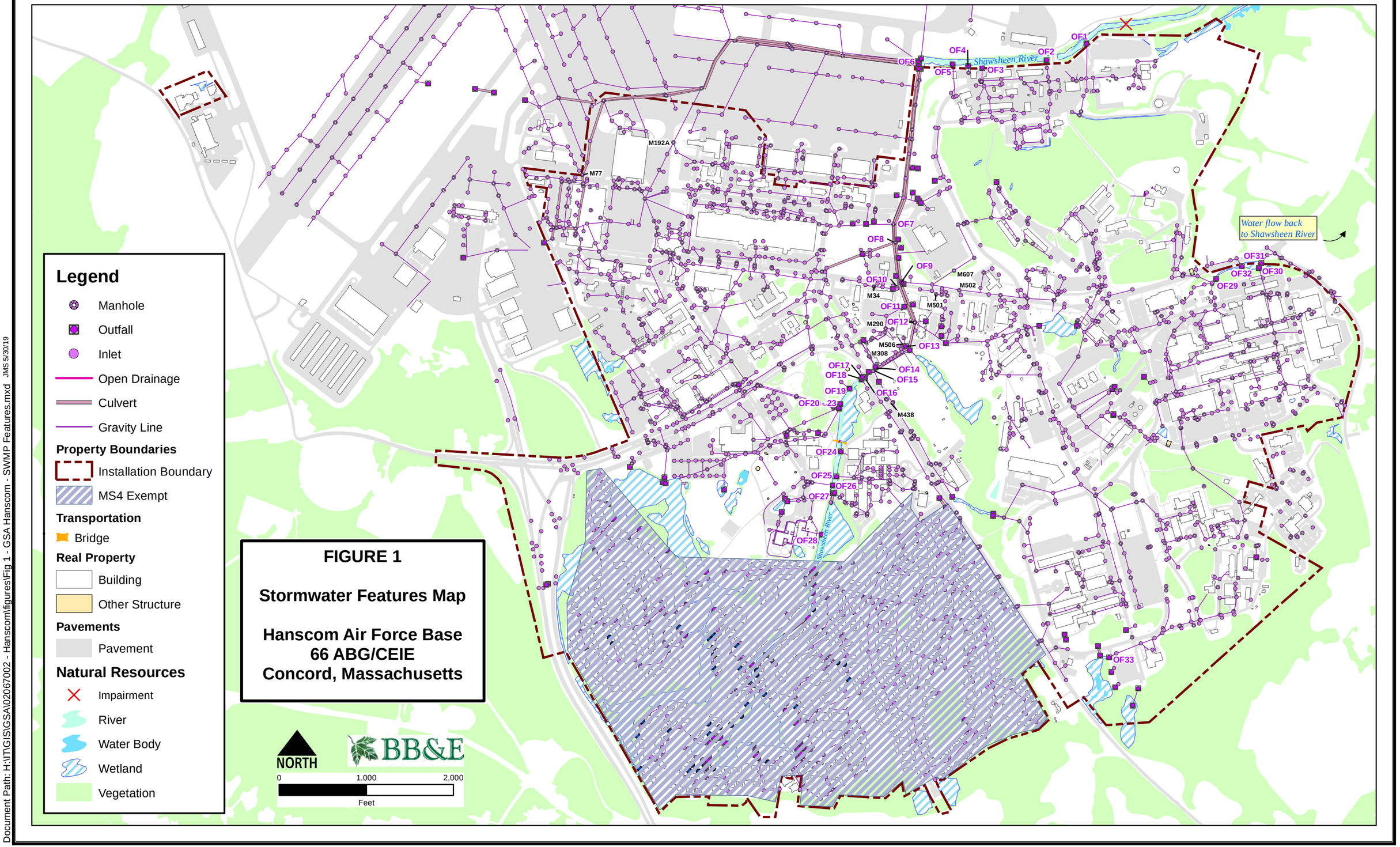

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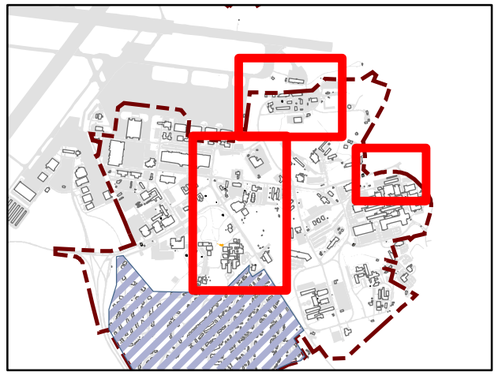
FIGURE 2

Outfalls

Hanscom Air Force Base
66 ABG/CEIE
Concord, Massachusetts



Legend

- Manhole
- Outfall
- Inlet
- Open Drainage
- Culvert
- Gravity Line

Property Boundaries
- Installation Boundary
- MS4 Exempt

Transportation
- Bridge

Real Property
- Building
- Other Structure

Pavements
- Pavement

Natural Resources
- Impairment
- River
- Water Body
- Wetland
- Vegetation

NORTH

BB&E

OF7
OF8
OF9
OF10
OF11
OF12
OF13
OF14
OF15
OF16
OF17
OF18
OF19
OF20 - 23
OF24
OF25
OF26
OF27
OF28
M34
M501
M502
M607
M290
M506
M308
M438
Shawsheen River

0 300 600
Feet

OF1
OF2
OF3
OF4
OF5
OF6
Shawsheen River

0 320 640
Feet

Water flow back to Shawsheen River

OF29
OF30
OF31
OF32

0 300 600
Feet

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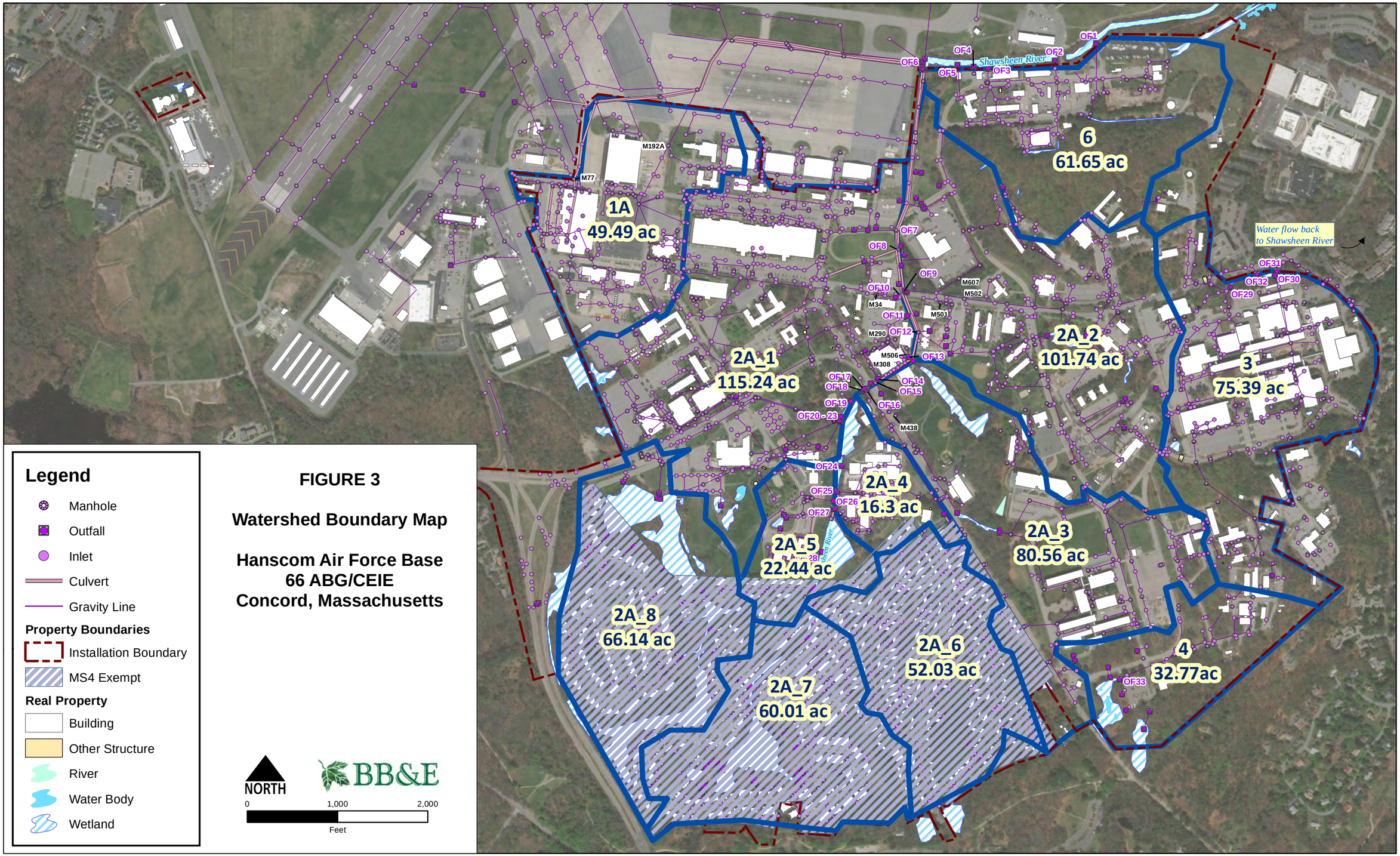


Legend

- Manhole
- Outfall
- Inlet
- Culvert
- Gravity Line

Property Boundaries

- Installation Boundary
- MS4 Exempt

Real Property

- Building
- Other Structure
- River
- Water Body
- Wetland

NORTH

0 1,000 2,000

Feet

BB&E

FIGURE 3

Watershed Boundary Map

Hanscom Air Force Base
66 ABG/CEIE
Concord, Massachusetts

Attachment C

Stormwater Sampling Procedures and Field Forms

Dry Weather Screening/ Sampling Procedure

The dry weather outfall inspection and sampling procedure consists of the following general steps:

1. Identify outfall(s) to be screened/sampled based on initial inventory and priority ranking. Use **Table 5-1** in the IDDE Plan to identify and track Outfalls.
2. Acquire the necessary staff, mapping, and field equipment (see **Table 1** for list of potential field equipment).
3. Conduct the outfall inspection during dry weather (less than 0.1 inch of rain in the last 24 hours) by completing the following:
    a. Identify and photograph the outfall.
    b. Note the physical attributes of each outfall and sampling location including dimensions, shape, construction materials, spatial location (GPS with a minimum accuracy of +/- 30 feet), physical condition and flow volume. Record all observations and measurements on **Checklist 1.**
    c. Look for and record visual/olfactory evidence of pollutants in flowing outfalls including odor, color, turbidity, and floatable matters (suds, bubbles, excrement, toilet paper or sanitary products). Also observe outfalls for deposits and stains, vegetation, and damage to outfall structures. Record all observations and measurements on **Checklist 1.**
4. If flow is present during a dry weather outfall inspection, samples will be collected and analyzed for the required permit parameters listed in **Table 2** (ammonia, surfactants, chlorine, conductivity, temperature, salinity, indicator bacteria and pollutants of concern). The general procedure for collection of outfall samples is as follows:
    a. Calibrate field instrumentation in lab.
    b. Fill out all sample information on sample bottles and field sheets.
    c. Put of protective gloves (nitrile/latex/other) before sampling.
    d. If using a dipper or other device, triple rinse the device with distilled water and then in water to be sampled (not for bacteria sampling).
    e. Samples will be collected with dipper or directly in sample containers. If possible, collect water from the flow directly in the sample bottle. Be careful not to disturb sediments.

f. Collect bacterial sample first, using sample container or rinsed dipper, with care not to disturb the sediment material or to collect surface debris/scum.

g. Use a separate bottle to collect a single water sample from which aliquots will be analyzed for surfactants, ammonia, and total chlorine. Use field test strips or portable meters to test for chlorine, surfactants, and ammonia. See **Table 2** for options of approved portable meters or field test kits. Fill out appropriate fields in **Checklist 2.**

h. Use calibrated field meter to record temperature, conductivity, and salinity directly from the stream or outfall. The field meter should be operated based on the instructions provided by the instrument supplier. When flow depth is insufficient to immerse the field meter probe, a clean sample bottle may be utilized to collect sufficient volume of water to immerse the probe. In such instances, meter readings should be taken immediately upon collection from stream. Fill out appropriate fields in **Checklist 2.**

i. Place laboratory samples on ice for analysis or bacteria and pollutants of concern. Fill out chain-of-custody form for laboratory samples. Deliver samples to the selected laboratory.

j. Dispose of test strips and test kit ampules properly. Decontaminate all testing personnel and equipment.

5. If no flow is observed, but evidence of illicit flow exists (illicit discharges are often intermittent or transitory), revisit the outfall during dry weather within one week of the initial observation, if practicable, to perform a second dry weather screening and sample any observable flow. Other techniques can be used to detect intermittent or transitory flows including conducting inspections during evenings or weekends (high sewage flow periods) and using optical brighteners.
6. Input results from screening and sampling into spreadsheet/database. Include pertinent information in the outfall/interconnection inventory and priority ranking **Table 5-1.**
7. Include all screening data in annual report. **Table 4** should be used to schedule and track completion of dry weather outfall screening for each outfall.

In the event that an outfall is submerged, either partially or completely, or inaccessible, field staff will process to the first accessible upstream manhole or structure for the observation and sampling

and report the location with the screening results. Field staff will continue to the next upstream structure until there is no longer an influence from the receiving water on the visual inspection or sampling

Field test kits of field instrumentation are permitted for all parameters except indicator bacteria and any pollutant of concern. Field kits need to have appropriate detection limits and ranges. T**able 2** lists various field test kits and field instruments that can be use for outfall sampling associated with the 2016 MS4 Permit parameters, other than indicator bacteria and any pollutants of concern.

Testing for indicator bacteria and any pollutants of concern must be conducted using analytical methods and procedures found in 40 CFR § 1362. Samples for laboratory analysis must also be stored and preserved in accordance with procedures found in 40 Code of Federal Regulations (CFR) § 136. **Table 3** lists analytical methods, detection limits, hold times, and preservatives for laboratory analysis of dry weather sampling parameters.

A Chain of Custody form will be added. The CMRSWC Standard Operating Procedures (SOPs) Dry Weather Outfall Inspection and Water Quality Screening in The Field are provided in **Attachment E.**

Table 1. Field Equipment – Dry Weather Outfall Screening and Sampling

Equipment	Use/Notes
Clipboard	For organization of field sheets and writing surface
Field Sheets	Field sheets for both dry weather inspection and Dry weather sampling should be available with extras
Chain of Custody Forms	To ensure proper handling of all samples
Pens/Pencils/Permanent Markers	For proper labeling
Nitrile Gloves	To protect the sampler as well as the sample from contamination
Flashlight/headlamp w/batteries	For looking in outfalls or manholes, helpful in early mornings as well
Cooler with Ice	For transporting samples to the laboratory
Digital Camera	For documenting field conditions at time of inspection
Personal Protective Equipment (PPE)	Reflective vest, Safety glasses and boots at a minimum
GPS Receiver	For taking spatial location data
Water Quality Sonde	If needed, for sampling conductivity, temperature, pH
Water Quality Meter	Hand held meter, if available, for testing for various water quality parameters such as ammonia, surfactants and chlorine
Test Kits	Have extra kits on hand to sample more outfalls than are anticipated to be screened in a single day
Label Tape	For labeling sample containers
Sample Containers	Make sure all sample containers are clean. Keep extra sample containers on hand at all times. Make sure there are proper sample containers for what is being sampled for (i.e., bacteria requires sterile containers).
Pry Bar or Pick	For opening catch basins and manholes when necessary
Sandbags	For damming low flows in order to take samples
Small Mallet or Hammer	Helping to free stuck manhole and catch basin covers
Utility Knife	Multiple uses
Measuring Tape	Measuring distances and depth of flow
Safety Cones	Safety
Hand Sanitizer	Disinfectant/decontaminant
Zip Ties/Duct Tape	For making field repairs
Rubber Boots/Waders	For accessing shallow streams/areas
Sampling Pole/Dipper/Sampling Cage	For accessing hard to reach outfalls and manholes

[1] Other potentially useful parameters, although not required by the MS4 Permit, include **fluoride** (indicator of potable water sources in areas where water supplies are fluoridated), **potassium** (high levels may indicate the presence of sanitary wastewater), and **optical brighteners** (indicative of laundry detergents).

Table 2. Sampling Parameters and Analysis Methods

Analyte or Parameter	Instrumentation (Portable Meter)	Field Test Kit
Ammonia	CHEMetrics™ V-2000 Colorimeter Hach™ DR/890 Colorimeter Hach™ Pocket Colorimeter™ II	CHEMetrics™ K-1410 CHEMetrics™ K-1510 (series) Hach™ NI-SA Hach™ Ammonia Test Strips
Surfactants (Detergents)	CHEMetrics™ I-2017	CHEMetrics™ K-9400 and K-9404 Hach™ DE-2
Chlorine	CHEMetrics™ V-2000, K-2513 Hach™ Pocket Colorimeter™ II	NA
Conductivity	CHEMetrics™ I-1200 YSI Pro30 YSI EC300A Oakton 450	NA
Temperature	YSI Pro30 YSI EC300A Oakton 450	NA
Salinity	YSI Pro30 YSI EC300A Oakton 450	NA
Indicator Bacteria: *E. coli* (freshwater) or Enterococcus (saline water)	EPA certified laboratory procedure (40 CFR § 136)	NA
Pollutants of Concern[1]	EPA certified laboratory procedure (40 CFR § 136)	NA

[1] Where the discharge is directly into a water quality limited water or a water subject to an approved TMDL, the sample must be analyzed for the pollutant(s) of concern identified as the cause of the water quality impairment.

Table 3. Required Analytical Methods, Detection Limits, Hold Times, and Preservatives[4]

Analyte or Parameter	Analytical Method	Detection Limit	Max. Hold Time	Preservative
Ammonia	**EPA**: 350.2, **SM**: 4500-NH3C	0.05 mg/L	28 days	Cool ≤6°C, H_2SO_4 to pH <2, No preservative required if analyzed immediately
Surfactants	**SM**: 5540-C	0.01 mg/L	48 hours	Cool ≤6°C
Chlorine	**SM**: 4500-Cl G	0.02 mg/L	Analyze within 15 minutes	None Required
Temperature	**SM**: 2550B	*NA*	Immediate	None Required
Specific Conductance	**EPA**: 120.1, **SM**: 2510B	0.2 µs/cm	28 days	Cool ≤6°C
Salinity	**SM**: 2520	-	28 days	Cool ≤6°C
Indicator Bacteria: *E. coli* Enterococcus	*E. coli* **EPA**: 1603 **SM**: 9221B, 9221F, 9223 B **Other**: Colilert®, Colilert-18® *Enterococcus* **EPA**: 1600 **SM**: 9230 C **Other**: Enterolert®	*E. coli* **EPA**: 1 cfu/100 mL **SM**: 2 MPN/100 mL **Other**: 1 MPN/100 mL *Enterococcus* **EPA**: 1 cfu/100 mL **SM**: 1 MPN/100 mL **Other**: 1 MPN/100 mL	8 hours	Cool ≤10°C, 0.0008% $Na_2S_2O_3$
Total Phosphorus	**EPA**: Manual-365.3, Automated Ascorbic acid digestion-365.1 Rev. 2, ICP/AES4-200.7 Rev. 4.4 **SM**: 4500-P E-F	**EPA**: 0.01 mg/L **SM**: 0.01 mg/L	28 days	Cool ≤6°C, H_2SO_4 to pH <2
Total Nitrogen (Ammonia + Nitrate/Nitrite, methods are for Nitrate-Nitrite and need to be combined with Ammonia listed above.)	**EPA**: Cadmium reduction (automated)-353.2 Rev. 2.0, **SM**: 4500-NO_3 E-F	**EPA**: 0.05 mg/L **SM**: 0.05 mg/L	28 days	Cool ≤6°C, H_2SO_4 to pH <2

SM=Standard Methods

Table 4. Tracking Sheet for Dry Weather Outfall Screening

Outfall ID	Outfall Priority	Scheduled Date of Screening	Actual Date of Screening	Field Forms saved in Appendix C	Outfall ID	Outfall Priority	Scheduled Date of Screening	Actual Date of Screening	Field Forms saved in Appendix C
OF 1	**High/ Low**			**Yes/ No**	**OF 18**				**Yes/ No**
OF 2				**Yes/ No**	**OF 19**				**Yes/ No**
OF 3				**Yes/ No**	**OF 20**				**Yes/ No**
OF 4				**Yes/ No**	**OF 21**				**Yes/ No**
OF 5				**Yes/ No**	**OF 22**				**Yes/ No**
OF 6				**Yes/ No**	**OF 23**				**Yes/ No**
OF 7				**Yes/ No**	**OF 24**				**Yes/ No**
OF 8				**Yes/ No**	**OF 25**				**Yes/ No**
OF 9				**Yes/ No**	**OF 26**				**Yes/ No**
OF 10				**Yes/ No**	**OF 27**				**Yes/ No**
OF 11				**Yes/ No**	**OF 28**				**Yes/ No**
OF 12				**Yes/ No**	**OF 18**				**Yes/ No**
OF 13				**Yes/ No**	**OF 19**				**Yes/ No**
OF 14				**Yes/ No**	**OF 20**				**Yes/ No**
OF 15				**Yes/ No**	**OF 21**				**Yes/ No**
OF 16				**Yes/ No**	**OF 22**				**Yes/ No**
OF 17				**Yes/ No**	**OF 23**				**Yes/ No**

Outfall ID	Outfall Priority		Date of Screening	Field Forms saved in Appendix C	Outfall ID	Outfall Priority		Date of Screening	Field Forms saved in Appendix C
OF 24				**Yes/ No**					
OF 25				**Yes/ No**					
OF 26				**Yes/ No**					
OF 27				**Yes/ No**					
OF 28				**Yes/ No**					
OF 29				**Yes/ No**					
OF 30				**Yes/ No**					
OF 31				**Yes/ No**					
OF 32				**Yes/ No**					
OF 33				**Yes/ No**					

Outfall ID: _____ **Town:** _____

Inspector: _____ **Date:** _____

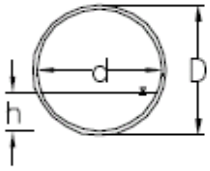
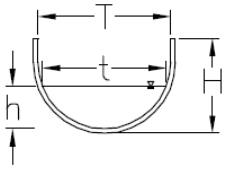
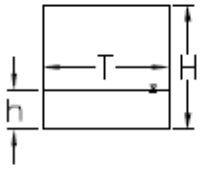
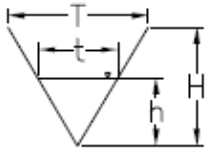
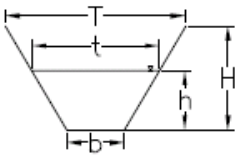
Street Name: _____

Last Rainfall Event: _____

Checklist 1: DRY WEATHER OUTFALL INSPECTION SURVEY

Type of Outfall (check one):		**Pipe Outfall** ☐	**Open Swale Outfall** ☐
Outfall Label:	**Stencil** ☐ **Ground Inset** ☐ **Sign** ☐ **None** ☐ **Other**_____		
Pipe Material:	Concrete ☐ Corrugated metal ☐ Clay Tile ☐ Plastic ☐ Other: _____ ☐	**Pipe Condition:**	Good ☐ Poor ☐ Fair ☐ Crumbling ☐
Swale Material:	Paved (asphalt) ☐ Concrete ☐ Earthen ☐ Stone ☐ Other: _____ ☐	**Swale Condition:**	Good ☐ Poor ☐ Fair ☐ Crumbling ☐

Shape of Pipe/Swale (check one)

 ☐	 ☐	 ☐	 ☐	 ☐
Rounded Pipe/Swale		**Rectangular Pipe/Swale**	**Triangular Swale**	**Trapezoidal Swale**

Pipe Measurements:	**Swale Measurements:**	**Is there a headwall?**	**Location Sketch**
Inner Dia. (in): d= _____	Swale Width (in): T= _____	Yes ☐ No ☐	
Outer Dia. (in): D= _____	Flow Width (in): t = _____	**Condition:**	
Pipe Width (in): T= _____	Swale Height (in): H= _____	Good ☐ Poor ☐ Fair ☐ Crumbling ☐	
Pipe Height (in): H= _____	Flow Height (in): h= _____*		
Flow Width (in): h= _____*	Bottom Width (in): b=_____		Photographs taken shall be attached.

Description of Flow: Heavy ☐ Moderate ☐ Trickling ☐ Dry ☐

If the outlet is submerged check yes and indicate approximate height of water above the outlet invert. h above invert (in):

Circle All Materials Present:

Odor:	Yes ☐ No ☐	Rip rap	Sheen: Bacterial
Optical enhancers suspected?	Yes ☐ No ☐	Excessive sediment	Sheen: Petroleum
Has channelization occurred?	Yes ☐ No ☐	Foam	Floatables
Has scouring occurred below the outlet?	Yes ☐ No ☐	Sanitary Waste	Algae
Required Maintenance:	Tree Work, Ditch Work, Structural Corrosion, N/A, Remove Trash/Debris, Blocked Pipe, Erosion at Structure, Other	Orange Staining	Excessive Vegetation

Comments:

Form Prepared By: BB&E, Inc. Date: May 2019

Reference: Central Massachusetts Regional Stormwater Coalition (CMRSWC) Dry Weather Outfall Inspection Survey July 2013

Outfall I.D.: _____ **Date:** _____

Inspector: _____

Time of Inspection: _____

Street Name &Town: _____

Last Rainfall Event: _____

Checklist 2: DRY WEATHER OUTFALL INSPECTION SURVEY FOR OBSERVABLE FLOW

Visual Inspection:	**Yes**	**No**	**Comments (Include probable source of observed contamination):**
Color	☐	☐	
Odor	☐	☐	
Turbidity	☐	☐	
Excessive Sediment	☐	☐	
Sanitary Waste	☐	☐	
Pet Waste	☐	☐	
Floatable Solids	☐	☐	
Oil Sheen	☐	☐	
Bacterial Sheen	☐	☐	
Foam	☐	☐	
Algae	☐	☐	
Orange Staining	☐	☐	
Excessive Vegetation	☐	☐	
Optical Enhancers	☐	☐	
Other _____			

Sample Parameters	**Analytical Test Method**	**Benchmark***	**Field Screening Result**	**Full Analytical?**
Ammonia[1]	EPA 350.2;SM4500-NH3C	> 0.5 mg/L		☐ Yes ☐ No
Surfactants[2]	SM5540C	> 0.25 mg/L		☐ Yes ☐ No
Chlorine	SM4500-CI Q	> 0.02 mg/L		☐ Yes ☐ No
Temperature	SM2550B	-		☐ Yes ☐ No
Specific Conductance[1]	EPA120.1;SM 2510B	>2,000 µs/cm		☐ Yes ☐ No
Salinity	SM2520	-		☐ Yes ☐ No
Total Phosphorous (Pollutant of Concern)	EPA Manual-365.3; EPA Automated Ascorbic Acid Digestion-365.1 Rev. 2; EPA ICP/AES4-200.7 Rev. 4.4; SM4500-P E-F	-		☐ Yes ☐ No

Continued on reverse

Sample Parameters	Analytical Test Method	Benchmark*	Field Screening Result	Full Analytical?
Indicator Bacteria *E.coli (freshwater)* *Enterococcus (saltwater)*	*E.coli*: EPA1603; SM9221B; SM9221F; SM9223B; Colilert ®; Colilert-18® *Enterococcus*: EPA1600; SM9230C; Enterolert®	See Below[3]		☐ Yes ☐ No
Total Nitrogen (Pollutant of Concern) (Ammonia + Nitrate/Nitrite, methods are for Nitrate-Nitrite and need to be combined with Ammonia listed above)	EPA Cadmium Reduction (automated)-353.2 Rev. 2.0; SM4500-NO_3 E-F	-		☐ Yes ☐ No
Comments:				

EPA = EPA Method SM = Standard Methods

[1] – *Illicit Discharge Detection and Elimination: A Guidance Manual for Program Development and Technical Assessments*, Center for Watershed Protection and Robert Pitt of University of Alabama, 2004, p. 134, Table 45.

[2] – *Appendix I – Field Measurements, Benchmarks and Instrumentation*, Draft Massachusetts North Coastal Small MS4 General Permit, 2009.

[3] – *Benchmark E. coli* – the geometric mean of the five most recent samples taken during the same bathing season shall not exceed 126 colonies per 100 ml and no single sample taken during the bathing season shall exceed 235 colonies per 100 ml for designated swimming areas, 410 colonies per 100 ml for non-designated swimming areas, and 576 colonies per 100 ml for all other uses. *Benchmark Enterococcus* – the geometric mean of the five most recent samples taken during the same bathing season shall not exceed 35 colonies per 100 ml and no single sample taken during the bathing season shall exceed 104 colonies per 100 ml for designated swimming areas and 500 colonies per 100 ml for all other uses.

Outfall I.D.: _____ **Date:** _____

Inspector: _____

Time of Inspection: _____

Street Name & Town: _____

Last Rainfall Event: _____

Checklist 3: WET WEATHER OUTFALL INSPECTION SURVEY

Visual Inspection:	**Yes**	**No**	**Comments (Include probable source of observed contamination):**
Color	☐	☐	
Odor	☐	☐	
Turbidity	☐	☐	
Excessive Sediment	☐	☐	
Sanitary Waste	☐	☐	
Pet Waste	☐	☐	
Floatable Solids	☐	☐	
Oil Sheen	☐	☐	
Bacterial Sheen	☐	☐	
Foam	☐	☐	
Algae	☐	☐	
Orange Staining	☐	☐	
Excessive Vegetation	☐	☐	
Optical Enhancers	☐	☐	
Other _____			

Sample Parameters	**Analytical Test Method**	**Benchmark***	**Field Screening Result**	**Full Analytical?**
Ammonia[1]	EPA 350.2;SM4500-NH3C	> 0.5 mg/L		☐ Yes ☐ No
Surfactants[2]	SM5540C	> 0.25 mg/L		☐ Yes ☐ No
Chlorine	SM4500-CI Q	> 0.02 mg/L		☐ Yes ☐ No
Temperature	SM2550B	-		☐ Yes ☐ No
Specific Conductance[1]	EPA120.1;SM 2510B	>2,000 µs/cm		☐ Yes ☐ No
Salinity	SM2520	-		☐ Yes ☐ No
Total Phosphorous (Pollutant of Concern)	EPA Manual-365.3; EPA Automated Ascorbic Acid Digestion-365.1 Rev. 2; EPA ICP/AES4-200.7 Rev. 4.4; SM4500-P E-F	-		☐ Yes ☐ No

Continued on reverse

Sample Parameters	Analytical Test Method	Benchmark*	Field Screening Result	Full Analytical?
Indicator Bacteria *E.coli (freshwater)* *Enterococcus (saltwater)*	*E.coli*: EPA1603; SM9221B; SM9221F; SM9223B; Colilert ®; Colilert-18® *Enterococcus*: EPA1600; SM9230C; Enterolert®	See Below[3]		☐ Yes ☐ No
Total Nitrogen (Pollutant of Concern) (Ammonia + Nitrate/Nitrite, methods are for Nitrate-Nitrite and need to be combined with Ammonia listed above)	EPA Cadmium Reduction (automated)-353.2 Rev. 2.0; SM4500-NO_3 E-F	-		☐ Yes ☐ No
Comments:				

EPA = EPA Method SM = Standard Methods

[1] – *Illicit Discharge Detection and Elimination: A Guidance Manual for Program Development and Technical Assessments*, Center for Watershed Protection and Robert Pitt of University of Alabama, 2004, p. 134, Table 45.

[2] – *Appendix I – Field Measurements, Benchmarks and Instrumentation*, Draft Massachusetts North Coastal Small MS4 General Permit, 2009.

[3] – *Benchmark E. coli* – the geometric mean of the five most recent samples taken during the same bathing season shall not exceed 126 colonies per 100 ml and no single sample taken during the bathing season shall exceed 235 colonies per 100 ml for designated swimming areas, 410 colonies per 100 ml for non-designated swimming areas, and 576 colonies per 100 ml for all other uses. *Benchmark Enterococcus* – the geometric mean of the five most recent samples taken during the same bathing season shall not exceed 35 colonies per 100 ml and no single sample taken during the bathing season shall exceed 104 colonies per 100 ml for designated swimming areas and 500 colonies per 100 ml for all other uses.

Manhole No.: _____ **Town:** _____

Inspector: _____ **Date:** _____

Checklist 4: MANHOLE INSPECTION FORM

Manhole I.D.	_____	**Final Discharge from Structure?** Yes ☐ No ☐ **If Yes, Discharge to Outfall No:**_____	
Manhole Label:	**Stencil** ☐ **Ground Inset** ☐ **Sign** ☐ **None** ☐ **Other**_____		
Manhole Material:	Concrete ☐ Corrugated metal ☐ Stone ☐ Brick ☐ Other: _____ ☐	**Manhole Condition:**	Good ☐ Poor ☐ Fair ☐ Crumbling ☐
Pipe Material:	Concrete ☐ HDPE ☐ PVC ☐ Clay Tile ☐ Other:_____	**Pipe Measurements:**	Inlet Dia. (in): d= ____ Outlet Dia. (in): D= ____

Required Maintenance/ Problems (check all that apply):

- ☐ Tree Work Required
- ☐ New Cover is Required
- ☐ Pipe is Blocked
- ☐ Frame Maintenance is Required
- ☐ Remove Accumulated Sediment
- ☐ Pipe Maintenance is Required
- ☐ Manhole Undermined or Bypassed
- ☐ Cannot Remove Cover
- ☐ Ditch Work
- ☐ Corrosion at Structure
- ☐ Erosion Around Structure
- ☐ Remove Trash & Debris
- ☐ Need Cement Around Cover

Other: _____

Manhole Cover Alignment :	**Sediment Buildup Depth :**	**Description of Flow:**	**Street Name/ Structure Location:**
Properly Aligned: Yes ☐ No ☐	0-6 (in): _____ 6-12(in): _____ 12-18 (in): _____ 18-24 (in): _____ 24 + (in): _____	Heavy ☐ Moderate ☐ Slight ☐ Trickling ☐	Photographs taken shall be attached.

***If the outlet is submerged check yes and indicate approximate height of water above the outlet invert.** h above invert (in):___ Yes ☐ No ☐

☐ **Flow**

☐ **Standing Water**

(check one or both)

Observations:	
Color:	
Odor:	

Weather Conditions : Dry > 24 hours ☐ Wet ☐

Sample of Screenings Collected for Analysis? Yes ☐ No ☐

Comments:

Circle those present:

Foam	Oil Sheen
Sanitary Waste	Bacterial Sheen
Orange Staining	Floatables
Excessive sediment	Pet Waste
Other:_____	Optical Enhancers

Form Prepared By: BB&E Inc. Date: May 2019

Reference: Central Massachusetts Regional Stormwater Coalition (CMRSWC) Catch Basin Inspection Form dated July 2013

Manhole No.: _____ **Date:** _____

Inspector: _____

Time of Inspection: _____

Street Name &Town: _____

Last Rainfall Event: _____

Checklist 5: DRY WEATHER MANHOLE INSPECTION SURVEY FOR OBSERVABLE FLOW

Visual Inspection:	**Yes**	**No**	**Comments (Include probable source of observed contamination):**
Color	☐	☐	
Odor	☐	☐	
Turbidity	☐	☐	
Excessive Sediment	☐	☐	
Sanitary Waste	☐	☐	
Pet Waste	☐	☐	
Floatable Solids	☐	☐	
Oil Sheen	☐	☐	
Bacterial Sheen	☐	☐	
Foam	☐	☐	
Algae	☐	☐	
Orange Staining	☐	☐	
Excessive Vegetation	☐	☐	
Optical Enhancers	☐	☐	
Other _____			

Sample Parameters	**Analytical Test Method**	**Benchmark***	**Field Screening Result**	**Full Analytical?**
Ammonia[1]	EPA 350.2;SM4500-NH3C	> 0.5 mg/L		☐ Yes ☐ No
Surfactants[2]	SM5540C	> 0.25 mg/L		☐ Yes ☐ No
Chlorine	SM4500-CI Q	> 0.02 mg/L		☐ Yes ☐ No
Temperature	SM2550B	-		☐ Yes ☐ No
Specific Conductance[1]	EPA120.1;SM 2510B	>2,000 µs/cm		☐ Yes ☐ No
Salinity	SM2520	-		☐ Yes ☐ No
Total Phosphorous (Pollutant of Concern)	EPA Manual-365.3; EPA Automated Ascorbic Acid Digestion-365.1 Rev. 2; EPA ICP/AES4-200.7 Rev. 4.4; SM4500-P E-F	-		☐ Yes ☐ No

Continued on reverse

Sample Parameters	Analytical Test Method	Benchmark*	Field Screening Result	Full Analytical?
Indicator Bacteria *E.coli (freshwater)* *Enterococcus (saltwater)*	*E.coli*: EPA1603; SM9221B; SM9221F; SM9223B; Colilert ®; Colilert-18® *Enterococcus*: EPA1600; SM9230C; Enterolert®	See Below[3]		☐ Yes ☐ No
Total Nitrogen (Pollutant of Concern) (Ammonia + Nitrate/Nitrite, methods are for Nitrate-Nitrite and need to be combined with Ammonia listed above)	EPA Cadmium Reduction (automated)-353.2 Rev. 2.0; SM4500-NO_3 E-F	-		☐ Yes ☐ No
Comments:				

EPA = EPA Method SM = Standard Methods

[1] – *Illicit Discharge Detection and Elimination: A Guidance Manual for Program Development and Technical Assessments*, Center for Watershed Protection and Robert Pitt of University of Alabama, 2004, p. 134, Table 45.

[2] – *Appendix I – Field Measurements, Benchmarks and Instrumentation*, Draft Massachusetts North Coastal Small MS4 General Permit, 2009.

[3] – *Benchmark E. coli* – the geometric mean of the five most recent samples taken during the same bathing season shall not exceed 126 colonies per 100 ml and no single sample taken during the bathing season shall exceed 235 colonies per 100 ml for designated swimming areas, 410 colonies per 100 ml for non-designated swimming areas, and 576 colonies per 100 ml for all other uses. *Benchmark Enterococcus* – the geometric mean of the five most recent samples taken during the same bathing season shall not exceed 35 colonies per 100 ml and no single sample taken during the bathing season shall exceed 104 colonies per 100 ml for designated swimming areas and 500 colonies per 100 ml for all other uses.

Attachment D
IDDE Employee Training Record

Illicit Discharge Detection and Elimination (IDDE)
Employee Training Record

Hanscom AFB

Date of Training: _____

Duration of Training: _____

Instructor Name & Title: _____

Instructor Signature: _____

Name	Title	Signature

Attachment E

Massachusetts Field Standard Operating Procedures

SOP 1: DRY WEATHER OUTFALL INSPECTION

Introduction

Outfalls from an engineered storm drain system can be in the form of pipes or ditches. Under current and pending regulations, it is important to inspect and document water quality from these outfalls under both dry weather and wet weather conditions. SOP 2, "Wet Weather Outfall Inspection", covers the objectives of that type of inspection. This SOP discusses the dry weather inspection objectives, and how they differ from wet weather inspection objectives.

During a dry weather period, it is anticipated that minimal flow from stormwater outfalls will be observed. Therefore, dry weather inspections aim to characterize any/all flow observed during a dry weather period and identify potential source(s) of an illicit discharge through qualitative testing; further described in SOP 13, "Water Quality Screening in the Field".

Objectives of Dry Weather Inspections

A dry weather period is a time interval during which less than 0.1 inch of rain is observed across a minimum of 72 hours. Unlike wet weather sampling, dry weather inspections are not intended to capture a "first flush" of stormwater discharge, rather they are intended to identify any/all discharges from a stormwater outfall during a period without recorded rainfall. The objective of inspections during a dry weather period is to characterize observed discharges and facilitate detection of illicit discharges.

Visual Condition Assessment

The attached Dry Weather Outfall Inspection Survey is a tool to assist in documenting observations related to the both quantitative and qualitative characteristics of any/all flows conveyed by the structure during a dry period.

For any visual observation of pollution in a stormwater outfall discharge, an investigation into the pollution source should occur, but the following are often true:

1. Foam: indicator of upstream vehicle washing activities, or an illicit discharge.
2. Oil sheen: result of a leak or spill.
3. Cloudiness: indicator of suspended solids such as dust, ash, powdered chemicals and ground up materials.
4. Color or odor: Indicator of raw materials, chemicals, or sewage.
5. Excessive sediment: indicator or disturbed earth of other unpaved areas lacking adequate erosion control measures.
6. Sanitary waste and optical enhancers (fluorescent dyes added to laundry detergent and some toilet paper): indicators of illicit discharge.
7. Orange staining: indicator of high mineral concentrations.

Many of these observations are indicators of an illicit discharge. Examples of illicit discharges include: cross-connections of sewer services to engineered storm drain systems; leaking septic systems; intentional discharge of pollutants to catch basins; combined sewer overflows; connected floor drains; and sump pumps connected to the system (under some circumstances). Additional guidelines for illicit discharge investigations are included in SOP 10, "Locating Illicit Discharges".

The Wet Weather Outfall Inspection Survey includes fields where these and other specific observations can be noted. The inspector shall indicate the presence of a specific water quality indicator or parameter by marking "Yes". If "Yes" is marked, provide additional details in the comments section. If the indictor in question is not present mark "No".

Within the comments section, provide additional information with regard to recorded precipitation totals, or more detailed descriptions of observations made during the inspection and corrective actions taken.

Conditional and Qualitative Considerations

Although many of the parameters listed above are considered to be indicators of illicit discharge, the presence of a parameter is not absolute evidence of an illicit discharge.

Some of these indicators may occur naturally. Orange staining may be the result of naturally occurring iron, and therefore unrelated to pollution. Foam can be formed when the physical characteristics of water are altered by the presence of organic materials. Foam is typically found in waters with high organic content such as bog lakes, streams that originate from bog lakes, productive lakes, wetlands, or woody areas. To determine the difference between natural foam and foam cause by pollution, consider the following:

1. Wind direction or turbulence: natural foam occurrences on the beach coincide with onshore winds. Often, foam can be found along a shoreline and/or on open waters during windy days. Natural occurrences in rivers can be found downstream of a turbulent site.
2. Proximity to a potential pollution source: some entities including the textile industry, paper production facilities, oil industries, and firefighting activities work with materials that cause foaming in water. If these materials are released to a water body in large quantities, they can cause foaming. Also, the presence of silt in water, such as from a construction site can cause foam.
3. Feeling: natural foam is typically persistent, light, not slimy to the touch.
4. Presence of decomposing plants or organic material in the water.

Some of the indicators can have multiple causes or sources. For example, both bacteria and petroleum can create a sheen on the water surface. The source of the sheen can be differentiated by disturbing it, such as with a pole. A sheen caused by oil will remain intact and move in a swirl pattern; a sheen caused by bacteria will separate and appear "blocky". Bacterial or naturally occurring sheens are usually silver or relatively dull in color and will break up into a number of small patches of sheen. The cause may be

presence of iron, decomposition of organic material or presence of certain bacteria. Bacterial sheen is not a pollutant but should be noted.

Optical enhancers at high concentrations are sometimes visible to the naked eye as a bluish-purple haze in the water. However, due to physiological variation of the human eye, not all inspectors may be able to identify the presence of these materials, and quantitative testing is the preferred method to confirm the presence of these compounds. Optical enhancers are typically detected through the use of clean, white cotton pads placed within the discharge for several days, dried, and viewed under a fluorometer. If the cotton pad fluoresces, optical enhancers are assumed to be present. The magnitude of the fluorescence, as measured in fluorescent units, can be used to correlate the concentration of optical enhancers in water to other samples collected locally.

Measuring Water Quality

Based on the results of the Visual Condition Assessment, it may be necessary to collect additional data about water quality. Water quality samples can be in the form of screening using field test kits and instrumentation, or by discrete analytical samples processed by a laboratory.

Information on selecting and using field test kits and instrumentation is included in SOP 13, "Water Quality Screening in the Field." The Inspection Survey also provides values for what can be considered an appropriate benchmark for a variety of parameters that can be evaluated in the field.

If the results of screening using field test kits indicate that the outfall's water quality exceeds the benchmarks provided, collection of discrete analytical samples should be considered.

Analytical Sample Collection

Sample collection methods may vary based on specific outfall limitations, but shall follow test procedures outlined in 40 CFR 136. A discrete manual or grab sample can classify water at a distinct point in time. These samples are easily collected and used primarily when the water quality of the discharge is expected to be homogeneous, or unchanging, in nature. A flow-weighted composite sample will classify water quality over a measured period of time. These samples are used when the water quality of the discharge is expected to be heterogeneous, or fluctuating, in nature. Grab samples are more common for dry weather outfall inspections due to the time-sensitive nature of the process.

Protocols for collecting a grab sample shall include the following:

1. Do not eat, drink or smoke during sample collection and processing.
2. Do not collect or process samples near a running vehicle.
3. Do not park vehicles in the immediate sample collection area, including both running and non-running vehicles.
4. Always wear clean, powder-free nitrile gloves when handling sample containers and lids.
5. Never touch the inside surface of a sample container or lid, even with gloved hands.

6. Never allow the inner surface of a sample container or lid to be contacted by any material other than the sample water.
7. Collect samples while facing upstream and so as not to disturb water or sediments in the outfall pipe or ditch.
8. Do not overfill sample containers, and do not dump out any liquid in them. Liquids are often added to sample containers intentionally by the analytical laboratory as a preservative or for pH adjustment.
9. Slowly lower the bottle into the water to avoid bottom disturbance and stirring up sediment.
10. Do not allow any object or material to fall into or contact the collected water sample.
11. Do not allow rainwater to drip from rain gear or other surfaces into sample containers.
12. Replace and tighten sample container lids immediately after sample collection.
13. Accurately label the sample with the time and location.
14. Document on the Wet Weather Outfall Inspection Survey that analytical samples were collected, specify parameters, and note the sample time on the Inspection Survey. This creates a reference point for samples.

Analytical Sample Quality Control and Assurance

Upon completion of successful sample collection, the samples must be sent or delivered to a MassDEP-approved laboratory for analytical testing. Quality control and assurance are important to ensuring accurate analytical test results.

Sample preservation is required to prevent contaminate degradation between sampling and analysis, and should be completed in accordance with 40 CFR 136.3.

Maximum acceptable holding times are also specified for each analytical method in 40 CFR 136.3. Holding time is defined as the period of time between sample collection and extraction for analysis of the sample at the laboratory. Holding time is important because prompt laboratory analysis allows the laboratory to review the data and if analytical problems are found, re-analyze the affected samples within the holding times.

Chain of custody forms are designed to provide sample submittal information and document transfers of sample custody. The forms are typically provided by the laboratory and must be completed by the field sampling personnel for each sample submitted to the lab for analysis. The document must be signed by both the person releasing the sample and the person receiving the sample every time the sample changes hands. The sampling personnel shall keep one copy of the form and send the remaining copies to the laboratory with the samples. Custody seals, which are dated, signed and affixed to the sample container, may be used if the samples are shipped in a cooler via courier or commercial overnight shipping.

Attachments

1. Dry Weather Outfall Inspection Survey

Related Standard Operating Procedures

1. SOP 2, Wet Weather Outfall Inspection
2. SOP 10, Locating Illicit Discharges
3. SOP 13, Water Quality Screening in the Field

Outfall ID: _____ Date: _____

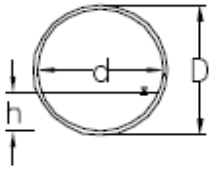
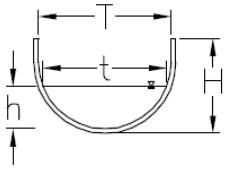
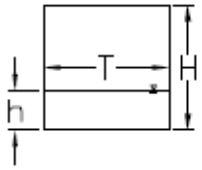
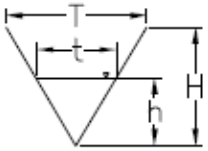
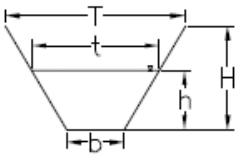
Inspector: _____ Street: _____

Last rainfall event: _____

DRY WEATHER OUTFALL INSPECTION SURVEY

Type of Outfall (check one):		Pipe Outfall ☐	Open Swale Outfall ☐
Outfall Label:	Stencil ☐ Ground Inset ☐ Sign ☐ None ☐ Other_____		
Pipe Material:	Concrete ☐ Corrugated metal ☐ Clay Tile ☐ Plastic ☐ Other: _____ ☐	Pipe Condition:	Good ☐ Poor ☐ Fair ☐ Crumbling ☐
Swale Material:	Paved (asphalt) ☐ Concrete ☐ Earthen ☐ Stone ☐ Other: _____ ☐	Swale Condition:	Good ☐ Poor ☐ Fair ☐ Crumbling ☐

Shape of Pipe/Swale (check one)

 ☐  ☐	 ☐	 ☐	 ☐
Rounded Pipe/Swale	Rectangular Pipe/Swale	Triangular Swale	Trapezoidal Swale

Pipe Measurements: Inner Dia. (in): d= _____ Outer Dia. (in): D= _____ Pipe Width (in): T= _____ Pipe Height (in): H= _____ Flow Width (in): h= _____*	Swale Measurements: Swale Width (in): T= _____ Flow Width (in): t = _____ Swale Height (in): H= _____ Flow Height (in): h= _____* Bottom Width (in): b=_____	Is there a headwall? Yes ☐ No ☐ Condition: Good ☐ Poor ☐ Fair ☐ Crumbling ☐

Location Sketch

Description of Flow: Heavy ☐ Moderate ☐ Trickling ☐ Dry ☐

If the outlet is submerged check yes and indicate approximate height of water above the outlet invert. h above invert (in):

Circle All Materials Present:

Odor:	Yes ☐	No ☐	Rip rap
Optical enhancers suspected?	Yes ☐	No ☐	Excessive sediment
Has channelization occurred?	Yes ☐	No ☐	Foam
Has scouring occurred below the outlet?	Yes ☐	No ☐	Sanitary Waste
			Orange Staining

Sheen: Bacterial
Sheen: Petroleum
Floatables
Algae
Excessive Vegetation

Required Maintenance:
Tree Work
Ditch Work
Structural Corrosion
N/A
Remove Trash/Debris
Blocked Pipe
Erosion at Structure
Other

Comments:

SOP 2: WET WEATHER OUTFALL INSPECTION

Introduction

Outfalls from an engineered storm drain system can be in the form of pipes or ditches. Under current and pending regulations, it is important to inspect and document water quality from these outfalls under both dry weather and wet weather conditions. SOP 1, "Dry Weather Outfall Inspection", covers the objectives of that type of inspection. This SOP discusses wet weather inspection objectives and how they differ from dry weather inspection objectives. The primary difference is that wet weather inspection aims to describe and evaluate the first flush of stormwater discharged from an outfall during a storm, representing the maximum pollutant load managed by receiving water.

Definition of Wet Weather

A storm is considered a representative wet weather event if greater than 0.1 inch of rain falls and occurs at least 72 hours after the previously measurable (greater than 0.1 inch of rainfall) storm event. In some watersheds, based on the amount of impervious surface present, increased discharge from an outfall may not result from 0.1 inch of rain. An understanding of how outfalls respond to different events will develop as the inspection process proceeds over several months, allowing the inspectors to refine an approach for inspections.

Ideally, the evaluation and any samples collected should occur within the first 30 minutes of discharge to reflect the first flush or maximum pollutant load.

Typical practice is to prepare for a wet weather inspection event when weather forecasts show a 40% chance of rain or greater. If the inspector intends to collect analytical samples, coordination with the laboratory for bottleware and for sample drop-off needs to occur in advance.

Visual Condition Assessment

The attached Wet Weather Outfall Inspection Survey should be used to document observations related to the quality of stormwater conveyed by the structure. Observations such as the following can indicate sources of pollution within the storm drain system:

- Oil sheen
- Discoloration
- Trash and debris

For any visual observation of pollution in a stormwater outfall discharge, an investigation into the pollution source should occur, but the following are often true:

1. Foam: indicator of upstream vehicle washing activities, or an illicit discharge.
2. Oil sheen: result of a leak or spill.

3. Cloudiness: indicator of suspended solids such as dust, ash, powdered chemicals and ground up materials.
4. Color or odor: Indicator of raw materials, chemicals, or sewage.
5. Excessive sediment: indicator or disturbed earth of other unpaved areas lacking adequate erosion control measures.
6. Sanitary waste and optical enhancers (fluorescent dyes added to laundry detergent and some toilet paper): indicators of illicit discharge.
7. Orange staining: indicator of high mineral concentrations.

Many of these observations are indicators of an illicit discharge. Examples of illicit discharges include: cross-connections of sewer services to engineered storm drain systems; leaking septic systems; intentional discharge of pollutants to catch basins; combined sewer overflows; connected floor drains; and sump pumps connected to the system (under some circumstances). Additional guidelines for illicit discharge investigations are included in SOP 10, "Locating Illicit Discharges".

The Wet Weather Outfall Inspection Survey includes fields where these and other specific observations can be noted. The inspector shall indicate the presence of a specific water quality indicator or parameter by marking "Yes". If "Yes" is marked, provide additional details in the comments section. If the indictor in question is not present mark "No".

Within the comments section, provide additional information with regard to recorded precipitation totals, or more detailed descriptions of observations made during the inspection and corrective actions taken.

Conditional and Qualitative Considerations

Although many of the parameters listed above are considered to be indicators of illicit discharge, the presence of a parameter is not absolute evidence of an illicit discharge.

Some of these indicators may occur naturally. Orange staining may be the result of naturally occurring iron, and therefore unrelated to pollution. Foam can be formed when the physical characteristics of water are altered by the presence of organic materials. Foam is typically found in waters with high organic content such as bog lakes, streams that originate from bog lakes, productive lakes, wetlands, or woody areas. To determine the difference between natural foam and foam cause by pollution, consider the following:

1. Wind direction or turbulence: natural foam occurrences on the beach coincide with onshore winds. Often, foam can be found along a shoreline and/or on open waters during windy days. Natural occurrences in rivers can be found downstream of a turbulent site.
2. Proximity to a potential pollution source: some entities including the textile industry, paper production facilities, oil industries, and firefighting activities work with materials that cause foaming in water. If these materials are released to a water body in large quantities, they can cause foaming. Also, the presence of silt in water, such as from a construction site can cause foam.
3. Feeling: natural foam is typically persistent, light, not slimy to the touch.

4. Presence of decomposing plants or organic material in the water.

Some of the indicators can have multiple causes or sources. For example, both bacteria and petroleum can create a sheen on the water surface. The source of the sheen can be differentiated by disturbing it, such as with a pole. A sheen caused by oil will remain intact and move in a swirl pattern; a sheen caused by bacteria will separate and appear "blocky". Bacterial or naturally occurring sheens are usually silver or relatively dull in color and will break up into a number of small patches of sheen. The cause may be presence of iron, decomposition of organic material or presence of certain bacteria. Bacterial sheen is not a pollutant but should be noted.

Optical enhancers at high concentrations are sometimes visible to the naked eye as a bluish-purple haze in the water. However, due to physiological variation of the human eye, not all inspectors may be able to identify the presence of these materials, and quantitative testing is the preferred method to confirm the presence of these compounds. Optical enhancers are typically detected through the use of clean, white cotton pads placed within the discharge for several days, dried, and viewed under a fluorometer. If the cotton pad fluoresces, optical enhancers are assumed to be present. The magnitude of the fluorescence, as measured in fluorescent units, can be used to correlate the concentration of optical enhancers in water to other samples collected locally.

Measuring Water Quality

Based on the results of the Visual Condition Assessment, it may be necessary to collect additional data about water quality. Water quality samples can be in the form of screening using field test kits or by discrete analytical samples processed by a laboratory.

Information on how to use field test kits is included in SOP 13, "Water Quality Screening with Field Test Kits", and the Wet Weather Outfall Inspection Survey includes fields to document the results of such screening. The Inspection Survey also provides values for what can be considered an appropriate benchmark for a variety of parameters that can be evaluated with field test kits.

If the results of screening using field test kits indicate that the outfall's water quality exceeds the benchmarks provided, collection of discrete analytical samples should be considered.

Analytical Sample Collection

Sample collection methods may vary based on specific outfall limitations but shall follow test procedures outlined in 40 CFR 136. A discrete manual or grab sample can classify water at a distinct point in time. These samples are easily collected and used primarily when the water quality of the discharge is expected to be homogeneous, or unchanging, in nature. A flow-weighted composite sample will classify water quality over a measured period of time. These samples are used when the water quality of the discharge is expected to be heterogeneous, or fluctuating, in nature. Grab samples are more common for wet weather outfall inspections due to the time-sensitive nature of the process.

Protocols for collecting a grab sample shall include the following:

1. Do not eat, drink or smoke during sample collection and processing.
2. Do not collect or process samples near a running vehicle.
3. Do not park vehicles in the immediate sample collection area, including both running and non-running vehicles.
4. Always wear clean, powder-free nitrile gloves when handling sample containers and lids.
5. Never touch the inside surface of a sample container or lid, even with gloved hands.
6. Never allow the inner surface of a sample container or lid to be contacted by any material other than the sample water.
7. Collect samples while facing upstream and so as not to disturb water or sediments in the outfall pipe or ditch.
8. Do not overfill sample containers, and do not dump out any liquid in them. Liquids are often added to sample containers intentionally by the analytical laboratory as a preservative or for pH adjustment.
9. Slowly lower the bottle into the water to avoid bottom disturbance and stirring up sediment.
10. Do not allow any object or material to fall into or contact the collected water sample.
11. Do not allow rainwater to drip from rain gear or other surfaces into sample containers.
12. Replace and tighten sample container lids immediately after sample collection.
13. Accurately label the sample with the time and location.
14. Document on the Wet Weather Outfall Inspection Survey that analytical samples were collected, specify parameters, and note the sample time on the Inspection Survey. This creates a reference point for samples.

Analytical Sample Quality Control and Assurance

Upon completion of successful sample collection, the samples must be sent or delivered to a MassDEP-approved laboratory for analytical testing. Quality control and assurance are important to ensuring accurate analytical test results.

Sample preservation is required to prevent contaminant degradation between sampling and analysis and should be completed in accordance with 40 CFR 136.3.

Maximum acceptable holding times are also specified for each analytical method in 40 CFR 136.3. Holding time is defined as the period of time between sample collection and extraction for analysis of the sample at the laboratory. Holding time is important because prompt laboratory analysis allows the laboratory to review the data and if analytical problems are found, re-analyze the affected samples within the holding times.

Chain of custody forms are designed to provide sample submittal information and document transfers of sample custody. The forms are typically provided by the laboratory and must be completed by the field sampling personnel for each sample submitted to the lab for analysis. The document must be signed by both the person releasing the sample and the person receiving the sample every time the sample changes hands. The sampling personnel shall keep one copy of the form and send the remaining copies to the

laboratory with the samples. Custody seals, which are dated, signed and affixed to the sample container, may be used if the samples are shipped in a cooler via courier or commercial overnight shipping.

Attachments

1. Wet Weather Outfall Inspection Survey

Related Standard Operating Procedures

1. SOP 1, Dry Weather Outfall Inspection
2. SOP 10, Locating Illicit Discharges
3. SOP 13, Water Quality Screening in the Field

Outfall I.D.: _____ Date: _____

Inspector: _____

Time of Inspection: _____

Street Name _____

Last rainfall event _____

WET WEATHER OUTFALL INSPECTION SURVEY

Visual Inspection:	Yes	No	Comments (Include probable source of observed contamination):
Color	☐	☐	
Odor	☐	☐	
Turbidity	☐	☐	
Excessive Sediment	☐	☐	
Sanitary Waste	☐	☐	
Pet Waste	☐	☐	
Floatable Solids	☐	☐	
Oil Sheen	☐	☐	
Bacterial Sheen	☐	☐	
Foam	☐	☐	
Algae	☐	☐	
Orange Staining	☐	☐	
Excessive Vegetation	☐	☐	
Optical Enhancers	☐	☐	
Other _____			

Sample Parameters	Analytical Test Method	Benchmark	Field Screening Result	Full Analytical?
Ammonia[1]	EPA 350.2/SM4500-NH3C	>0.5 mg/L		☐ Yes ☐ No
Boron[1]	EPA 212.3	>35.0 mg/L		☐ Yes ☐ No
Chloride[2]	EPA 300.0	230 mg/L		☐ Yes ☐ No
Color[1]	EPA 110.1/110.2	>500 units		☐ Yes ☐ No
Detergents & Surfactants[3]	EPA 425.1/SM5540C	>0.25 mg/L		☐ Yes ☐ No
Fluoride[3]	EPA 300.0	>0.25 mg/L		☐ Yes ☐ No
Hardness[1]	EPA 130.2	<10 mg/L or >2,000 mg/L		☐ Yes ☐ No
pH[1]	EPA 150.1/SM 4500H	<5		☐ Yes ☐ No
Potassium[1]	EPA 200.7	>20 mg/L		☐ Yes ☐ No
Specific Conductance[1]	SM 2510B	>2,000 S/cm		☐ Yes ☐ No
Turbidity[1]	EPA 180.1	>1,000 NTU		☐ Yes ☐ No
Comments:				

[1] – Illicit Discharge Detection and Elimination: A Guidance Manual for Program Development and Technical Assessments, Center for Watershed Protection and Robert Pitt of University of Alabama, 2004, p. 134, Table 45.

[2] – Env –Ws 1703.21Water Quality Criteria for Toxic Substances, State of New Hampshire Department of Surface Water Quality Regulations.

[2] – Appendix I – Field Measurements, Benchmarks and Instrumentation, Draft Massachusetts North Coastal Small MS4 General Permit, 2009.

SOP 3: CATCH BASIN INSPECTION AND CLEANING

Introduction

Catch basins help minimize flooding and protect water quality by removing trash, sediment, decaying debris, and other solids from stormwater runoff. These materials are retained in a sump below the invert of the outlet pipe. Catch basin cleaning reduces foul odors, prevents clogs in the storm drain system, and reduces the loading of suspended solids, nutrients, and bacteria to receiving waters.

During regular cleaning and inspection procedures, data can be gathered related to the condition of the physical basin structure and its frame and grate and the quality of stormwater conveyed by the structure. Observations such as the following can indicate sources of pollution within the storm drain system:

- Oil sheen
- Discoloration
- Trash and debris

Both bacteria and petroleum can create a sheen on the water surface. The source of the sheen can be differentiated by disturbing it, such as with a pole. A sheen caused by a oil will remain intact and move in a swirl pattern; a sheen caused by bacteria will separate and appear "blocky". Bacterial sheen is not a pollutant but should be noted.

Observations such as the following can indicate a potential connection of a sanitary sewer to the storm drain system, which is an illicit discharge.

- Indications of sanitary sewage, including fecal matter or sewage odors
- Foaming, such as from detergent
- Optical enhancers, fluorescent dye added to laundry detergent

Each catch basin should be cleaned and inspected at least annually. Catch basins in high-use areas may require more frequent cleaning. Performing street sweeping on an appropriate schedule will reduce the amount of sediment, debris, and organic matter entering the catch basins, which will in turn reduce the frequency with which structures need to be cleaned.

Cleaning Procedure

Catch basin inspection cleaning procedures should address both the grate opening and the basin's sump. Document any and all observations about the condition of the catch basin structure and water quality on the Catch Basin Inspection Form (attached).

Catch basin inspection and cleaning procedures include the following:

1. Work upstream to downstream.
2. Clean sediment and trash off grate.
3. Visually inspect the outside of the grate.

4. Visually inspect the inside of the catch basin to determine cleaning needs.
5. Inspect catch basin for structural integrity.
6. Determine the most appropriate equipment and method for cleaning each catch basin.
    a. Manually use a shovel to remove accumulated sediments, or
    b. Use a bucket loader to remove accumulated sediments, or
    c. Use a high-pressure washer to clean any remaining material out of catch basin while capturing the slurry with a vacuum.
    d. If necessary, after the catch basin is clean, use the rodder of the vacuum truck to clean downstream pipe and pull back sediment that might have entered downstream pipe.
7. If contamination is suspected, chemical analysis will be required to determine if the materials comply with the Massachusetts DEP Hazardous Waste Regulations, 310 CMR 30.000 (http://www.mass.gov/dep/service/regulations/310cmr30.pdf). Chemical analysis required will depend on suspected contaminants. Note the identification number of the catch basin on the sample label, and note sample collection on the Catch Basin Inspection Form.
8. Properly dispose of collected sediments. See following section for guidance.
9. If fluids collected during catch basin cleaning are not being handled and disposed of by a third party, dispose of these fluids to a sanitary sewer system, with permission of the system operator.
10. If illicit discharges are observed or suspected, notify the appropriate Department (see "SOP 10: Addressing Illicit Discharges").
11. At the end of each day, document location and number of catch basins cleaned, amount of waste collected, and disposal method for all screenings.
12. Report additional maintenance or repair needs to the appropriate Department.

Disposal of Screenings

Catch basin cleanings from storm water-only drainage systems may be disposed at any landfill that is permitted by MassDEP to accept solid waste. MassDEP does not routinely require stormwater-only catch basin cleanings to be tested before disposal, unless there is evidence that they have been contaminated by a spill or some other means.

Screenings may need to be placed in a drying bed to allow water to evaporate before proper disposal. In this case, ensure that the screenings are managed to prevent pollution.

Attachments

1. Catch Basin Inspection Form

Related Standard Operating Procedures

1. SOP 10, Addressing Illicit Discharges
2. SOP 13, Water Quality Screening in the Field

Job No.: _____ Town: _____

Inspector: _____ Date: _____

CATCH BASIN INSPECTION FORM

Catch Basin I.D.		Final Discharge from Structure? Yes ☐ No ☐ If Yes, Discharge to Outfall No: Y_____	
Catch Basin Label:	Stencil ☐ Ground Inset ☐ Sign ☐ None ☐ Other_____		
Basin Material:	Concrete ☐ Corrugated metal ☐ Stone ☐ Brick ☐ Other: ☐	Catch Basin Condition:	Good ☐ Poor ☐ Fair ☐ Crumbling ☐
Pipe Material:	Concrete ☐ HDPE ☐ PVC ☐ Clay Tile ☐ Other:E_____	Pipe Measurements:	Inlet Dia. (in): d= ____ Outlet Dia. (in): D= ____

Required Maintenance/ Problems (check all that apply):

- ☐ Tree Work Required
- ☐ New Grate is Required
- ☐ Pipe is Blocked
- ☐ Frame Maintenance is Required
- ☐ Remove Accumulated Sediment
- ☐ Pipe Maintenance is Required
- ☐ Basin Undermined or Bypassed
- ☐ Cannot Remove Cover
- ☐ Ditch Work
- ☐ Corrosion at Structure
- ☐ Erosion Around Structure
- ☐ Remove Trash & Debris
- ☐ Need Cement Around Grate

Other: Y_____ _____ _____

Catch Basin Grate Type :	Sediment Buildup Depth :	Description of Flow:	Street Name/ Structure Location:
Bar: Cascade: Other: ☐ ☐ Properly Aligned: _____ Yes No ☐ ☐	0-6 (in): _____ 6-12(in): _____ 12-18 (in): _____ 18-24 (in): _____ 24 + (in): _____	Heavy ☐ Moderate ☐ Slight ☐ Trickling ☐	

*If the outlet is submerged check yes and indicate approximate height of water above the outlet invert. h above invert (in):___ Yes ☐ No ☐

☐ Flow
☐ Standing Water
(check one or both)

Observations:

Color:

Odor:

Circle those present:

Foam | Oil Sheen | Sanitary Waste | Bacterial Sheen | Orange Staining | Floatables | Excessive sediment | Pet Waste | Optical Enhancers | Other:_____

Weather Conditions : Dry > 24 hours ☐ Wet ☐

Sample of Screenings Collected for Analysis? Yes ☐ No ☐

Comments:

SOP 10: LOCATING ILLICIT DISCHARGES

Introduction

An "illicit discharge" is any discharge to an engineered storm drain system that is not composed entirely of stormwater unless the discharge is defined as an allowable non-stormwater discharge under the 2003 Massachusetts MS4 Permit. Illicit discharges may enter the engineered storm drain system through direct or indirect connections, such as: cross-connections of sewer services to engineered storm drain systems; leaking septic systems; intentional discharge of pollutants to catch basins; combined sewer overflows; connected floor drains; and sump pumps connected to the system (under some circumstances). Illicit discharges can contribute high levels of pollutants, such as heavy metals, toxics, oil, grease, solvents, nutrients, and pathogens to receiving streams.

Illicit discharges can be located by several methods, including routine dry weather outfall inspections and catch basin inspections, which are described in detail in SOP 1, "Dry Weather Outfall Inspection" and SOP 3, "Catch Basin Inspection and Cleaning", respectively, as well as from citizen reports.

This SOP assumes that the municipality has legal authority (i.e., a bylaw or ordinance) in place, per the requirements of the 2003 Massachusetts MS4 Permit, to prohibit the connection of non-stormwater discharges into the storm drain system. The authority or department for addressing illicit discharge reports would be clearly identified in the municipality's legal authority. In Massachusetts, this is typically a combination of the Board of Health, the Department of Public Works (or Highway Department), and the local sanitary sewer department or commission. In some communities, the Conservation Commission may also play a role. This SOP refers to "appropriate authority" generically to reflect differences in how municipalities have identified these roles.

Identifying Illicit Discharges

The following are often indicators of an illicit discharge from stormwater outfall:

1. Foam: indicator of upstream vehicle washing activities, or an illicit discharge.
2. Oil sheen: result of a leak or spill.
3. Cloudiness: indicator of suspended solids such as dust, ash, powdered chemicals and ground up materials.
4. Color or odor: Indicator of raw materials, chemicals, or sewage.
5. Excessive sediment: indicator of disturbed earth of other unpaved areas lacking adequate erosion control measures.
6. Sanitary waste and optical enhancers (fluorescent dyes added to laundry detergent): indicator of the cross-connection of a sewer service.
7. Orange staining: indicator of high mineral concentrations.

Both bacteria and petroleum can create a sheen on the water surface. The source of the sheen can be differentiated by disturbing it, such as with a pole. A sheen caused by oil will remain intact and move in

a swirl pattern; a sheen caused by bacteria will separate and appear "blocky". Bacterial sheen is not a pollutant but should be noted.

Citizen Call in Reports

Reports by residents and other users of a water body can be effective tools in identifying the presence of illicit discharges. Many communities have set up phone hotlines for this purpose, or have provided guidance to local police departments and dispatch centers to manage data reported in this manner. Municipal employees and the general public should receive education to help identify the signs of illicit discharges and should be informed how to report such incidents.

When a call is received about a suspected illicit discharge, the attached IDDE Incident Tracking Sheet shall be used to document appropriate information. Subsequent steps for taking action to trace, document, and eliminate the illicit discharge are described in the following sections.

Potential illicit discharges reported by citizens should be reviewed on an annual basis to locate patterns of illicit discharges, identify high-priority catchments, and evaluate the call-in inspection program.

Tracing Illicit Discharges

Whenever an illicit discharge is suspected, regardless of how it was identified, the attached IDDE Incident Tracking Sheet should be utilized. The Incident Tracking Sheet shall be provided to the appropriate authority (i.e., Board of Health, Department of Public Works, etc.), which shall promptly investigate the reported incident.

If the presence of an illicit discharge is confirmed by the authority, but its source is unidentified, additional procedures to determine the source of the illicit discharge should be completed.

1. Review and consider information collected when illicit discharge was initially identified, for example, the time of day and the weather conditions for the previous 72 hours. Also consider and review past reports or investigations of similar illicit discharges in the area.
2. Obtain storm drain mapping for the area of the reported illicit discharge. If possible, use a tracking system that can be linked to your system map, such as GIS.
3. Document current conditions at the location of the observed illicit discharge point, including odors, water appearance, estimated flow, presence of floatables, and other pertinent information. Photograph relevant evidence.
4. If there continues to be evidence of the illicit discharge, collect water quality data using the methods described in SOP 13, "Water Quality Screening in the Field". This may include using field test kits or instrumentation, or collecting analytical samples for full laboratory analysis.
5. Move upstream from the point of observation to identify the source of the discharge, using the system mapping to determine infrastructure, tributary pipes, and drainage areas that contribute. At each point, survey the general area and surrounding properties to identify potential sources of the illicit discharge. Document observations at each point on the IDDE Incident Tracking Sheet as well as with photographs.
6. Continue this process until the illicit discharge is no longer observed, which will define the boundaries of the likely source. For example if the illicit discharge is present in catch basin 137

but not the next upstream catch basin, 138, the source of the illicit discharge is between these two structures.

If the source of the illicit discharge could not be determined by this survey, consider using dye testing, smoke testing, or closed-circuit television inspection (CCTV) to locate the illicit discharge.

Dye Testing

Dye testing is used to confirm a suspected illicit connection to a storm drain system. Prior to testing, permission to access the site should be obtained. Dye is discharged into the suspected fixture, and nearby storm drain structures and sanitary sewer manholes observed for presence of the dye. Each fixture, such as sinks, toilets, and sump pumps, should be tested separately. A third-party contractor may be required to perform this testing activity.

Smoke Testing

Smoke testing is a useful method of locating the source of illicit discharges when there is no obvious potential source. Smoke testing is an appropriate tracing technique for short sections of pipe and for pipes with small diameters. Smoke added to the storm drain system will emerge in connected locations. A third-party contractor may be required to perform this testing activity.

Closed Circuit Television Inspection (CCTV)

Televised video inspection can be used to locate illicit connections and infiltration from sanitary sewers. In CCTV, cameras are used to record the interior of the storm drain pipes. They can be manually pushed with a stiff cable or guided remotely on treads or wheels. A third-party contractor may be required to perform this testing activity.

If the source is located, follow steps for removing the illicit discharge. Document repairs, new sanitary sewer connections, and other corrective actions required to accomplish this objective. If the source still cannot be located, add the pipe segment to a future inspection program.

This process is demonstrated visually on the last page of this SOP.

Removing Illicit Discharges

Proper removal of an illicit discharge will ensure it does not recur. Refer to Table SOP 10-1, attached for, for examples of the notification process.

In any scenario, conduct a follow up inspection to confirm that the illicit discharge has been removed. Suspend access to the storm drain system if an “imminent and substantial danger” exists or if there is a threat of serious physical harm to humans or the environment.

Attachments

1. Illicit Discharge Incident Tracking Sheet

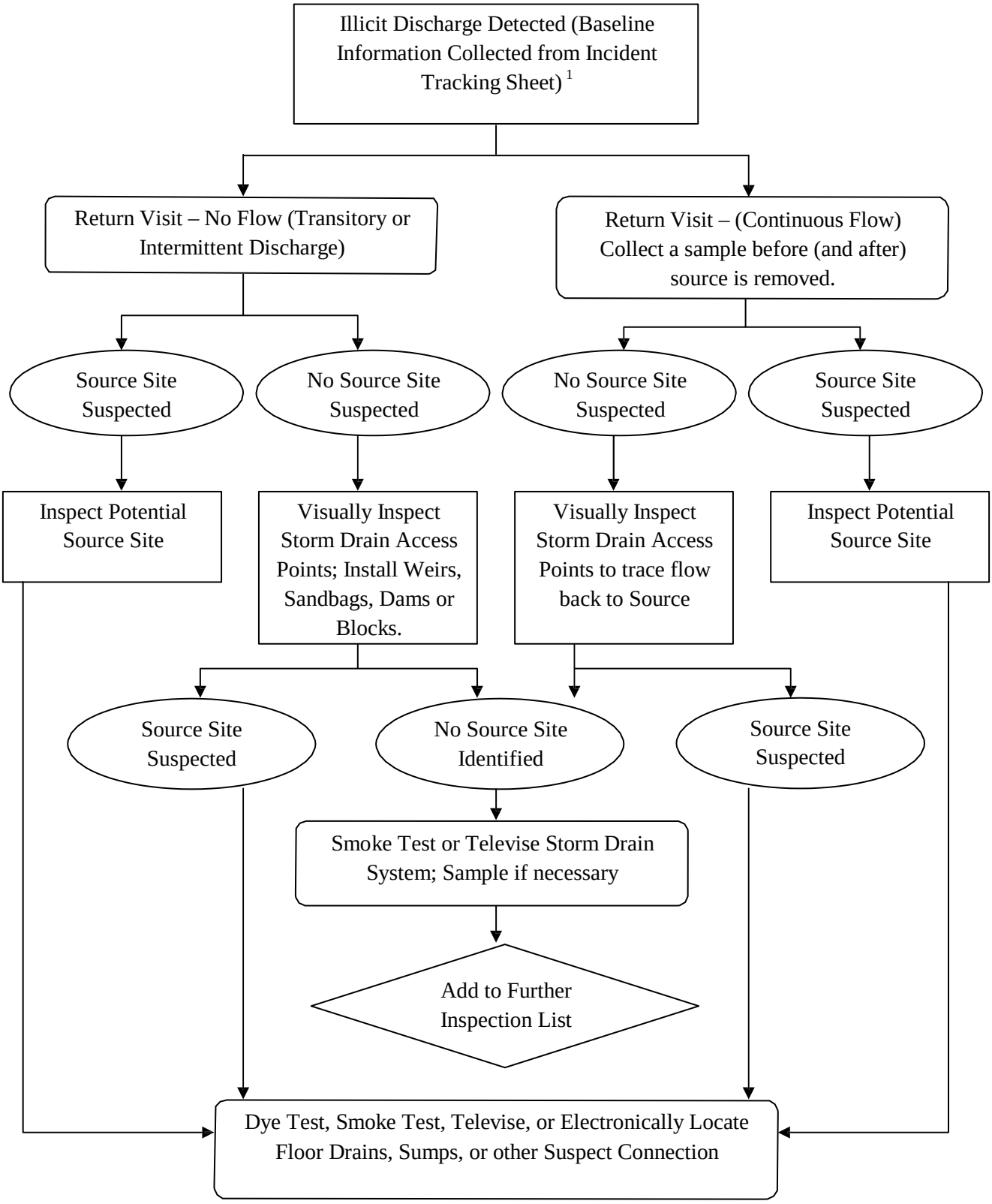
Related Standard Operating Procedures

1. SOP 1: Dry Weather Outfall Inspection
2. SOP 2: Wet Weather Outfall Inspection
3. SOP 3: Catch Basin Inspection
4. SOP 13: Using Field Test Kits For Outfall Screening
5. SOP 15: Private Drainage Connections

Table SOP 10-1

Notification and Removal Procedures for Illicit Discharges into the Municipal Separate Storm Sewer System

Financially Responsible	Source Identified	Enforcement Authority	Procedure to Follow
Private Property Owner	One-time illicit discharge (e.g. spill, dumping, etc.)	Ordinance enforcement authority (e.g. Code Enforcement Officer)	Contact Owner Issue Notice of Violation Issue fine
Private Property Owner	Intermittent or continuous illicit discharge from legal connection	Ordinance enforcement authority (e.g. Code Enforcement Officer)	Contact Owner Issue Notice of Violation Determine schedule for removal Confirm removal
Private Property Owner	Intermittent or continuous illicit discharge from illegal connection or indirect (e.g. infiltration or failed septic)	Plumbing Inspector or ordinance enforcement authority	Notify Plumbing Inspector or ordinance enforcement authority
Municipal	Intermittent or continuous illicit discharge from illegal connection or indirect (e.g. failed sewer line)	Ordinance enforcement authority (e.g. Code Enforcement Officer)	Issue work order Schedule removal Remove connection Confirm removal
Exempt 3rd Party	Any	USEPA	Notify exempt third party and USEPA of illicit discharge


Illicit Discharge Detected (Baseline Information Collected from Incident Tracking Sheet) [1]
Return Visit – No Flow (Transitory or Intermittent Discharge)
Return Visit – (Continuous Flow) Collect a sample before (and after) source is removed.
Source Site Suspected
No Source Site Suspected
No Source Site Suspected
Source Site Suspected
Inspect Potential Source Site
Visually Inspect Storm Drain Access Points; Install Weirs, Sandbags, Dams or Blocks.
Visually Inspect Storm Drain Access Points to trace flow back to Source
Inspect Potential Source Site
Source Site Suspected
No Source Site Identified
Source Site Suspected
Smoke Test or Televise Storm Drain System; Sample if necessary
Add to Further Inspection List
Dye Test, Smoke Test, Televise, or Electronically Locate Floor Drains, Sumps, or other Suspect Connection

[1] – Guidelines and Standard Operating Procedures: Illicit Discharge Detection and Elimination and Pollution Prevention/Good Housekeeping for Stormwater Phase II Communities in New Hampshire, New Hampshire Estuary Project, 2006, p. 25, Figure 2-1.

Illicit Discharge Incident Tracking Sheet

Incident ID:				
Responder Information (for Citizen-Reported issues)				
Call Taken By:		Call Date:		
Call Time:		Precipitation (inches) in past 24-48 hours:		
Observer Information				
Date and Time of Observation:		Observed During Regular Maintenance or Inspections? ☐ Yes ☐ No		
Caller Contact Information (optional) or Municipal Employee Information:				
Observation Location: (complete one or more below)				
Latitude and Longitude:				
Stream Address or Outfall #:				
Closest Street Address:				
Nearby Landmark:				
Primary Location Description		Secondary Location Description:		
☐Stream Corridor (In or adjacent to stream)		☐Outfall	☐In-stream Flow	☐Along Banks
☐Upland Area (Land not adjacent to stream)		☐Near Storm Drain	☐Near other water source (stormwater pond, wetland, ect.):	
Narrative description of location:				
Upland Problem Indicator Description				
☐Dumping	☐Oil/Solvents/Chemicals		☐Sewage	
☐Detergent, suds, etc.	☐Other:_____			
Stream Corridor Problem Indicator Description				
Odor	☐None	☐Sewage	☐Rancid/Sour	☐Petroleum (gas)
	☐Sulfide (rotten eggs); natural gas	☐Other: Describe in "Narrative" section		
Appearance	☐"Normal"	☐Oil Sheen	☐Cloudy	☐Foam
	☐Optical enhancers	☐Discolored		
	☐Other: Describe in "Narrative" section			
Floatables	☐None	☐Sewage (toilet paper, etc)	☐Algae	☐Trash or debris
	☐Other: Describe in "Narrative" section			
Narrative description of problem indicators:				
Suspected Source (name, personal or vehicle description, license plate #, address, etc.):				

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SOP 13: WATER QUALITY SCREENING IN THE FIELD

Introduction

Outfalls from an engineered storm drain system can be in the form of pipes or ditches. Under current and pending regulations, it is important to inspect and document water quality within the MS4 system under both dry weather and wet weather conditions. SOP 1, "Dry Weather Outfall Inspection" and SOP 2, "Wet Weather Outfall Inspection", cover the objectives of these activities and how water quality parameters can be collected during both types of inspections. SOP 3, "Catch Basin Inspection and Cleaning", describes how this operations and maintenance activity can serve as an additional opportunity to collect water quality data.

SOP 2 included detailed information on how to collect discrete analytical samples to be processed by a laboratory. In contrast, this SOP addresses screening-level measurements than can be collected at outfalls, catch basins, receiving waters, or other water bodies. The measurements can be collected with field test kits or with portable meters.

Water quality screening data collected in this manner can feed into an illicit discharge detection and elimination investigation, like the process described in SOP 10, "Locating Illicit Discharges".

Visual Condition Assessment

SOP 1, SOP 2, and SOP 3 describe a Visual Condition Assessment to collect observations related to the quality of stormwater conveyed by an engineered storm drain system. These observations may include such visual evidence and/or potential pollutants as:

- Foaming (detergents)
- Discoloration
- Evidence of sanitary waste
- Optical enhancers (fluorescent dyes added to laundry detergent); and
- Turbidity

If a Visual Condition Assessment indicates the presence of these pollutants, it may be necessary to quantify the extent of each, and gather data on other parameters that cannot be visually observed but can be measured using field kits or meters. These parameters include:

- Ammonia
- Chloride (present in treated drinking water but not groundwater)
- Conductivity
- Fluoride
- Hardness
- pH
- Potassium

Field Kits and Sampling Methods Available

In recent drafts of new MS4 Permits, U.S. EPA Region 1 has identified several test kits that are acceptable for use in the field, and other regulatory agencies have also completed similar reviews. The following table shows field test kits and portable meters that can be used for screening parameters.

Table SOP 13-1
Field Measurements, Test Kits, and Instrumentation

Analyte or Parameter	Instrumentation (Portable meter)	Field Test Kit
Ammonia	CHEMetrics™ V-2000 Colorimeter Hach™ DR/890 Colorimeter Hach™ Pocket Colorimeter™ II	CHEMetrics™ K-1410 CHEMetrics™ K-1510 (series) Hach™ NI-SA Hach™ Ammonia Test Strips
Bacteria	Bacteria field test kits require 24-hour window	
Boron	N/A	Hanna™ HI 38074 Taylor™ K-1541
Chloride	CHEMetrics™ V-2000 Colorimeter Hach™ Pocket Colorimeter™ II LaMotte™ DC1200 Colorimeter	CHEMetrics™ K-2002 through K-2070 Hach™ CDS-DT Hach™ Chloride QuanTab® Test Strips
Color		Hach™ ColorDisc
Conductivity	CHEMetrics™ I-1200	N/A
Detergents (Surfactants)	CHEMetrics™ I-2017	CHEMetrics™ K-9400 and K-9404 Hach™ DE-2
Fluoride	CHEMetrics™ V-2000 Colorimeter Hach™ Pocket Colorimeter™ II	N/A
Hardness	N/A	CHEMetrics™ K-1705 and K-1710 CHEMetrics™ K-4502 through K-4530 Hach™ HA-DT Hach™ Hardness Test Strips
Optical enhancers	Field tests still under development	
pH	CHEMetrics™ I-1000	Hach™ 17J through 17N Hach™ pH Test Strips
Potassium	Horiba™ Cardy C-131	LaMotte™ 3138 KIW
Turbidity	CHEMetrics™ I-1300	N/A

Each field test kit will include instructions specific to that test kit, and most kits are available in configurations that detect different ranges of the parameter. For example, the CHEMetrics™ detergents kit K-9400 shown above detects concentrations of 0 to 3 milligrams per liter (mg/L) while the K-9404 kit detects concentrations of 0 to 1,400 mg/L.

The table below shows values identified by the U.S. EPA and the Center for Watershed Protection as typical screening values for select parameters. These represent the typical concentration (or value) of each parameter expected to be found in stormwater. Screening values that exceed these benchmarks may be indicative of pollution and/or illicit discharges.

Table SOP 13-2
Benchmark Field Measurements for Select Parameters

Analyte or Parameter	Benchmark
Ammonia	>0.5 mg/L
Conductivity	>2,000
Detergents (Surfactants)	> 0.25 mg/L
Fluoride	>0.25 mg/L
pH	<5
Potassium	>20 mg/L

If and when water quality screening samples, whether using field test kits or portable meters, exceed these benchmark concentrations, the inspector should consider collecting analytical samples for laboratory analysis.

Advantages and Disadvantages of Field Testing

Field test kits can be convenient for use as a screening tool, initial purchase costs are low (typically $0.50 to $5.00 for the kits included in Table SOP 13-1), and the costs are far less than full analyses at a laboratory. However, some disadvantages of this screening method include:

- Limited shelf life
- Labor cost associated with inspector's time
- Generation of wastes, including glass vials and used reagent
- Steps and processes for each kit can vary widely, resulting in errors
- Trained staff are required in order to effectively utilize kits
- Not all kits are accepted by all regulatory agencies
- Limited useful detection range

Portable instrumentation such as the colorimeters shown in Table SOP 13-1 have the benefit of providing accurate readings, measure to low detection limits, and can be purchased pre-programmed to measure concentrations of most parameters required. Disadvantages of portable instrumentation include:

- High initial purchase cost
- Requirement for ongoing calibration and maintenance
- Individual probes require periodic replacement
- Specific storage requirements to maintain calibration
- Trained staff are required in order to effectively utilize meters

Related Standard Operating Procedures

1. SOP 1, Dry Weather Outfall Inspection
2. SOP 2, Wet Weather Outfall Inspection
3. SOP 3, Catch Basin Cleaning and Inspection
4. SOP 10, Locating Illicit Discharges

WATER QUALITY SCREENING FORM

Outfall I.D.			
Outfall Location			
Inspector's Name			
Date of Inspection		Date of Last Inspection	
Start Time		End Time	
Type of Inspection: Regular ☐ Pre-Storm Event ☐ During Storm Event ☐ Post-Storm Event ☐			
Most Recent Storm Event			

FIELD WATER QUALITY SCREENING RESULTS

Sample Parameter	Field Test Kit or Portable Instrument Meter	Benchmark	Field Screening Result	Full Analytical Required?
Ammonia[1]		> 0.5 mg/L		☐ Yes ☐ No
Boron[1]		> 0.35 mg/L		☐ Yes ☐ No
Chloride[2]		230 mg/L		☐ Yes ☐ No
Color[1]		> 500 units		☐ Yes ☐ No
Specific Conductance[1]		> 2,000 µS/cm		☐ Yes ☐ No
Detergents & Surfactants[3]		> 0.25 mg/L		☐ Yes ☐ No
Fluoride[3]		> 0.25 mg/L		☐ Yes ☐ No
Hardness[1]		< 10 mg/L or > 2,000 mg/L		☐ Yes ☐ No
pH[1]		< 5		☐ Yes ☐ No
Potassium[1]		> 20 mg/L		☐ Yes ☐ No
Turbidity[1]		> 1,000 NTU		☐ Yes ☐ No

[1] – Illicit Discharge Detection and Elimination: A Guidance Manual for Program Development and Technical Assessments, Center for Watershed Protection and Robert Pitt of University of Alabama, 2004, p. 134, Table 45.

[2] –Env-Ws 1703.21 Water Quality Criteria for Toxic Substances, State of New Hampshire Department Surface Water Quality Regulations.

[3] – Appendix I – Field Measurements, Benchmarks and Instrumentation, Draft Massachusetts North Coastal Small MS4 General Permit, 2009.

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FULL ANALYTICAL TESTING WATER QUALITY RESULTS

Sample Parameter	Analytical Test Method	Sample Collection (Time/Date)	Testing Lab	Analytical Testing Result
Ammonia	EPA 350.2/SM4500-NH3C			
Bacteria	E coli: 1103.1; 1603 Enterococcus: 1106.1; 1600			
Boron	EPA 212.3			
Chloride	EPA 9251			
Color	EPA 110.2			
Specific Conductance	SM 2510B			
Detergents & Surfactants	EPA 425.1/SM5540C			
Fluoride	EPA 300.0			
Hardness	EPA 130.1/SM 2340B			
Optical Enhancers	N/A*			
pH	EPA 150.1/SM 4500H			
Potassium	EPA 200.7			
Turbidity	SM 2130B			

*- There is presently no USEPA Standard Method for analysis of optical enhancers. Typically, sample pads are described as with “Present” or “Not Present” for fluorescing dye when exposed to UV light or a fluorometer.

ANALYTICAL REPORT

Lab Number:	L2041168
Client:	CarriageHouse Consulting Inc. 8A Pleasant Street South Natick, MA 01760
ATTN:	Brian Moore
Phone:	(508) 315-3146
Project Name:	SRS-HANSCOM
Project Number:	Not Specified
Report Date:	10/07/20

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

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

Project Name: SRS-HANSCOM
Project Number: Not Specified

Lab Number: L2041168
Report Date: 10/07/20

Alpha Sample ID	Client ID	Matrix	Sample Location	Collection Date/Time	Receive Date
L2041168-01	WS-1	WATER	BEDFORD, MA	09/29/20 13:30	09/29/20

Project Name:	SRS-HANSCOM	**Lab Number:**	L2041168
Project Number:	Not Specified	**Report Date:**	10/07/20

Case Narrative

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

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

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

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

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

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

Project Name: SRS-HANSCOM **Lab Number:** L2041168
Project Number: Not Specified **Report Date:** 10/07/20

Case Narrative (continued)

Report Submission

October 07, 2020: This final report includes the results of all requested analyses.

October 07, 2020: This is a preliminary report.

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.

Microextractables

The WG1418203-2 LCS recovery, associated with L2041168-01, is above the acceptance criteria for 1,2-dibromo-3-chloropropane (164%); however, the associated sample is non-detect to the RL for this target analyte. The results of the original analysis are reported.

Chlorine, Total Residual

The WG1416063-4 MS recovery, performed on L2041168-01, is outside the acceptance criteria for chlorine, total residual (72%); however, the associated LCS recovery is within criteria. No further action was taken.

Cyanide, Total

WG1417434-1: A Matrix Spike and Laboratory Duplicate were prepared with the sample batch, however, the native sample was not available for reporting; therefore, the results could not be reported.

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

Authorized Signature: Tiffani Morrissey - Tiffani Morrissey

Title: Technical Director/Representative Date: 10/07/20

ORGANICS

VOLATILES

Project Name: SRS-HANSCOM
Project Number: Not Specified
Lab Number: L2041168
Report Date: 10/07/20

SAMPLE RESULTS

Lab ID: L2041168-01
Client ID: WS-1
Sample Location: BEDFORD, MA

Date Collected: 09/29/20 13:30
Date Received: 09/29/20
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 128,624.1
Analytical Date: 09/30/20 20:53
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: SRS-HANSCOM **Lab Number:** L2041168

Project Number: Not Specified **Report Date:** 10/07/20

SAMPLE RESULTS

Lab ID: L2041168-01 Date Collected: 09/29/20 13:30

Client ID: WS-1 Date Received: 09/29/20

Sample Location: BEDFORD, MA Field Prep: Not Specified

Sample Depth:

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

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Pentafluorobenzene	100		60-140
Fluorobenzene	99		60-140
4-Bromofluorobenzene	98		60-140

Project Name: SRS-HANSCOM
Project Number: Not Specified

Lab Number: L2041168
Report Date: 10/07/20

SAMPLE RESULTS

Lab ID: L2041168-01
Client ID: WS-1
Sample Location: BEDFORD, MA

Date Collected: 09/29/20 13:30
Date Received: 09/29/20
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 128,624.1-SIM
Analytical Date: 09/30/20 20:53
Analyst: GT

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

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Fluorobenzene	100		60-140
4-Bromofluorobenzene	105		60-140

Project Name: SRS-HANSCOM
Project Number: Not Specified

Lab Number: L2041168
Report Date: 10/07/20

SAMPLE RESULTS

Lab ID: L2041168-01
Client ID: WS-1
Sample Location: BEDFORD, MA

Date Collected: 09/29/20 13:30
Date Received: 09/29/20
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 14,504.1
Analytical Date: 10/06/20 13:06
Analyst: AMM

Extraction Method: EPA 504.1
Extraction Date: 10/05/20 15:52

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
Microextractables by GC - Westborough Lab							
1,2-Dibromoethane	ND		ug/l	0.010	--	1	A
1,2-Dibromo-3-chloropropane	ND		ug/l	0.010	--	1	A
1,2,3-Trichloropropane	ND		ug/l	0.029	--	1	A

Project Name: SRS-HANSCOM
Project Number: Not Specified
Lab Number: L2041168
Report Date: 10/07/20

Method Blank Analysis
Batch Quality Control

Analytical Method: 128,624.1
Analytical Date: 09/30/20 17:24
Analyst: GT

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by GC/MS - Westborough Lab for sample(s): 01 Batch: WG1416838-4					
Methylene chloride	ND		ug/l	1.0	--
1,1-Dichloroethane	ND		ug/l	1.5	--
Carbon tetrachloride	ND		ug/l	1.0	--
1,1,2-Trichloroethane	ND		ug/l	1.5	--
Tetrachloroethene	ND		ug/l	1.0	--
1,2-Dichloroethane	ND		ug/l	1.5	--
1,1,1-Trichloroethane	ND		ug/l	2.0	--
Benzene	ND		ug/l	1.0	--
Toluene	ND		ug/l	1.0	--
Ethylbenzene	ND		ug/l	1.0	--
Vinyl chloride	ND		ug/l	1.0	--
1,1-Dichloroethene	ND		ug/l	1.0	--
cis-1,2-Dichloroethene	ND		ug/l	1.0	--
Trichloroethene	ND		ug/l	1.0	--
1,2-Dichlorobenzene	ND		ug/l	5.0	--
1,3-Dichlorobenzene	ND		ug/l	5.0	--
1,4-Dichlorobenzene	ND		ug/l	5.0	--
p/m-Xylene	ND		ug/l	2.0	--
o-xylene	ND		ug/l	1.0	--
Xylenes, Total	ND		ug/l	1.0	--
Acetone	ND		ug/l	10	--
Methyl tert butyl ether	ND		ug/l	10	--
Tert-Butyl Alcohol	ND		ug/l	100	--
Tertiary-Amyl Methyl Ether	ND		ug/l	20	--

Project Name: SRS-HANSCOM
Project Number: Not Specified
Lab Number: L2041168
Report Date: 10/07/20

Method Blank Analysis
Batch Quality Control

Analytical Method: 128,624.1
Analytical Date: 09/30/20 17:24
Analyst: GT

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by GC/MS - Westborough Lab for sample(s): 01 Batch: WG1416838-4					

Surrogate	%Recovery	Qualifier	Acceptance Criteria
Pentafluorobenzene	101		60-140
Fluorobenzene	100		60-140
4-Bromofluorobenzene	94		60-140

Project Name: SRS-HANSCOM
Project Number: Not Specified
Lab Number: L2041168
Report Date: 10/07/20

Method Blank Analysis
Batch Quality Control

Analytical Method: 128,624.1-SIM
Analytical Date: 09/30/20 17:24
Analyst: GT

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by GC/MS-SIM - Westborough Lab for sample(s): 01 Batch: WG1416851-4					
1,4-Dioxane	ND		ug/l	50	--

Surrogate	%Recovery	Qualifier	Acceptance Criteria
Fluorobenzene	101		60-140
4-Bromofluorobenzene	109		60-140

Project Name: SRS-HANSCOM
Project Number: Not Specified

Lab Number: L2041168
Report Date: 10/07/20

Method Blank Analysis
Batch Quality Control

Analytical Method: 14,504.1
Analytical Date: 10/06/20 12:03
Analyst: AMM

Extraction Method: EPA 504.1
Extraction Date: 10/05/20 15:52

Parameter	Result	Qualifier	Units	RL	MDL	
Microextractables by GC - Westborough Lab for sample(s): 01 Batch: WG1418203-1						
1,2-Dibromoethane	ND		ug/l	0.010	--	A
1,2-Dibromo-3-chloropropane	ND		ug/l	0.010	--	A
1,2,3-Trichloropropane	ND		ug/l	0.030	--	A

Lab Control Sample Analysis
Batch Quality Control

Project Name: SRS-HANSCOM
Project Number: Not Specified

Lab Number: L2041168
Report Date: 10/07/20

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by GC/MS - Westborough Lab Associated sample(s): 01 Batch: WG1416838-3								
Methylene chloride	105		-		60-140	-		28
1,1-Dichloroethane	105		-		50-150	-		49
Carbon tetrachloride	110		-		70-130	-		41
1,1,2-Trichloroethane	100		-		70-130	-		45
Tetrachloroethene	105		-		70-130	-		39
1,2-Dichloroethane	105		-		70-130	-		49
1,1,1-Trichloroethane	110		-		70-130	-		36
Benzene	110		-		65-135	-		61
Toluene	110		-		70-130	-		41
Ethylbenzene	105		-		60-140	-		63
Vinyl chloride	100		-		5-195	-		66
1,1-Dichloroethene	110		-		50-150	-		32
cis-1,2-Dichloroethene	105		-		60-140	-		30
Trichloroethene	105		-		65-135	-		48
1,2-Dichlorobenzene	100		-		65-135	-		57
1,3-Dichlorobenzene	90		-		70-130	-		43
1,4-Dichlorobenzene	95		-		65-135	-		57
p/m-Xylene	100		-		60-140	-		30
o-xylene	95		-		60-140	-		30
Acetone	104		-		40-160	-		30
Methyl tert butyl ether	95		-		60-140	-		30
Tert-Butyl Alcohol	120		-		60-140	-		30
Tertiary-Amyl Methyl Ether	95		-		60-140	-		30

Lab Control Sample Analysis

Batch Quality Control

Project Name: SRS-HANSCOM

Project Number: Not Specified

Lab Number: L2041168

Report Date: 10/07/20

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by GC/MS - Westborough Lab Associated sample(s): 01 Batch: WG1416838-3								

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
Pentafluorobenzene	103				60-140
Fluorobenzene	103				60-140
4-Bromofluorobenzene	95				60-140

Lab Control Sample Analysis

Batch Quality Control

Project Name: SRS-HANSCOM

Project Number: Not Specified

Lab Number: L2041168

Report Date: 10/07/20

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by GC/MS-SIM - Westborough Lab Associated sample(s): 01 Batch: WG1416851-3								
1,4-Dioxane	100		-		60-140	-		20

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
Fluorobenzene	101				60-140
4-Bromofluorobenzene	112				60-140

Lab Control Sample Analysis

Batch Quality Control

Project Name: SRS-HANSCOM

Project Number: Not Specified

Lab Number: L2041168

Report Date: 10/07/20

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits	Column
Microextractables by GC - Westborough Lab	Associated sample(s): 01		Batch: WG1418203-2						
1,2-Dibromoethane	94		-		80-120	-			A
1,2-Dibromo-3-chloropropane	**164**	Q	-		80-120	-			A
1,2,3-Trichloropropane	81		-		80-120	-			A

Matrix Spike Analysis

Batch Quality Control

Project Name: SRS-HANSCOM

Project Number: Not Specified

Lab Number: L2041168

Report Date: 10/07/20

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits	Column
Microextractables by GC - Westborough Lab	Associated sample(s): 01	QC Batch ID: WG1418203-3	QC Sample: L2040877-01	Client ID: MS Sample									
1,2-Dibromoethane	ND	0.246	0.234	95		-	-		80-120	-		20	A
1,2-Dibromo-3-chloropropane	ND	0.246	0.418	**170**	Q	-	-		80-120	-		20	A
1,2,3-Trichloropropane	ND	0.246	0.178	**72**	Q	-	-		80-120	-		20	A

SEMIVOLATILES

Project Name: SRS-HANSCOM
Project Number: Not Specified

Lab Number: L2041168
Report Date: 10/07/20

SAMPLE RESULTS

Lab ID: L2041168-01
Client ID: WS-1
Sample Location: BEDFORD, MA

Date Collected: 09/29/20 13:30
Date Received: 09/29/20
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 129,625.1
Analytical Date: 10/01/20 10:52
Analyst: JG

Extraction Method: EPA 625.1
Extraction Date: 09/30/20 15:37

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	102		42-122
2-Fluorobiphenyl	76		46-121
4-Terphenyl-d14	81		47-138

Project Name: SRS-HANSCOM
Project Number: Not Specified
Lab Number: L2041168
Report Date: 10/07/20

SAMPLE RESULTS

Lab ID: L2041168-01
Client ID: WS-1
Sample Location: BEDFORD, MA

Date Collected: 09/29/20 13:30
Date Received: 09/29/20
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 129,625.1-SIM
Analytical Date: 10/01/20 18:16
Analyst: JJW

Extraction Method: EPA 625.1
Extraction Date: 09/30/20 15:43

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS-SIM - Westborough Lab						
Acenaphthene	ND		ug/l	0.100	--	1
Fluoranthene	ND		ug/l	0.100	--	1
Naphthalene	ND		ug/l	0.100	--	1
Benzo(a)anthracene	ND		ug/l	0.100	--	1
Benzo(a)pyrene	ND		ug/l	0.100	--	1
Benzo(b)fluoranthene	0.110		ug/l	0.100	--	1
Benzo(k)fluoranthene	ND		ug/l	0.100	--	1
Chrysene	ND		ug/l	0.100	--	1
Acenaphthylene	ND		ug/l	0.100	--	1
Anthracene	ND		ug/l	0.100	--	1
Benzo(ghi)perylene	ND		ug/l	0.100	--	1
Fluorene	ND		ug/l	0.100	--	1
Phenanthrene	ND		ug/l	0.100	--	1
Dibenzo(a,h)anthracene	ND		ug/l	0.100	--	1
Indeno(1,2,3-cd)pyrene	ND		ug/l	0.100	--	1
Pyrene	ND		ug/l	0.100	--	1
Pentachlorophenol	ND		ug/l	1.00	--	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Fluorophenol	33		25-87
Phenol-d6	24		16-65
Nitrobenzene-d5	66		42-122
2-Fluorobiphenyl	64		46-121
2,4,6-Tribromophenol	66		45-128
4-Terphenyl-d14	67		47-138

Project Name: SRS-HANSCOM
Project Number: Not Specified

Lab Number: L2041168
Report Date: 10/07/20

Method Blank Analysis
Batch Quality Control

Analytical Method: 129,625.1
Analytical Date: 10/01/20 11:15
Analyst: ALS

Extraction Method: EPA 625.1
Extraction Date: 09/30/20 02:55

Parameter	Result	Qualifier	Units	RL	MDL
Semivolatile Organics by GC/MS - Westborough Lab for sample(s): 01 Batch: WG1416157-1					
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	103		42-122
2-Fluorobiphenyl	77		46-121
4-Terphenyl-d14	79		47-138

Project Name: SRS-HANSCOM
Project Number: Not Specified

Lab Number: L2041168
Report Date: 10/07/20

Method Blank Analysis
Batch Quality Control

Analytical Method: 129,625.1-SIM
Analytical Date: 10/01/20 12:30
Analyst: JJW

Extraction Method: EPA 625.1
Extraction Date: 09/30/20 02:59

Parameter	Result	Qualifier	Units	RL	MDL
Semivolatile Organics by GC/MS-SIM - Westborough Lab for sample(s): 01 Batch: WG1416158-1					
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	42		25-87
Phenol-d6	32		16-65
Nitrobenzene-d5	78		42-122
2-Fluorobiphenyl	74		46-121
2,4,6-Tribromophenol	63		45-128
4-Terphenyl-d14	75		47-138

Lab Control Sample Analysis
Batch Quality Control

Project Name: SRS-HANSCOM
Project Number: Not Specified

Lab Number: L2041168
Report Date: 10/07/20

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Semivolatile Organics by GC/MS - Westborough Lab Associated sample(s): 01 Batch: WG1416157-2								
Bis(2-ethylhexyl)phthalate	90		-		29-137	-		82
Butyl benzyl phthalate	89		-		1-140	-		60
Di-n-butylphthalate	79		-		8-120	-		47
Di-n-octylphthalate	94		-		19-132	-		69
Diethyl phthalate	79		-		1-120	-		100
Dimethyl phthalate	73		-		1-120	-		183

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
Nitrobenzene-d5	111				42-122
2-Fluorobiphenyl	77				46-121
4-Terphenyl-d14	77				47-138

Lab Control Sample Analysis
Batch Quality Control

Project Name: SRS-HANSCOM
Project Number: Not Specified

Lab Number: L2041168
Report Date: 10/07/20

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Semivolatile Organics by GC/MS-SIM - Westborough Lab Associated sample(s): 01 Batch: WG1416158-3								
Acenaphthene	74		-		60-132	-		30
Fluoranthene	80		-		43-121	-		30
Naphthalene	73		-		36-120	-		30
Benzo(a)anthracene	80		-		42-133	-		30
Benzo(a)pyrene	80		-		32-148	-		30
Benzo(b)fluoranthene	75		-		42-140	-		30
Benzo(k)fluoranthene	82		-		25-146	-		30
Chrysene	82		-		44-140	-		30
Acenaphthylene	83		-		54-126	-		30
Anthracene	83		-		43-120	-		30
Benzo(ghi)perylene	80		-		1-195	-		30
Fluorene	76		-		70-120	-		30
Phenanthrene	76		-		65-120	-		30
Dibenzo(a,h)anthracene	81		-		1-200	-		30
Indeno(1,2,3-cd)pyrene	81		-		1-151	-		30
Pyrene	81		-		70-120	-		30
Pentachlorophenol	74		-		38-152	-		30

Lab Control Sample Analysis
Batch Quality Control

Project Name: SRS-HANSCOM
Project Number: Not Specified

Lab Number: L2041168
Report Date: 10/07/20

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Semivolatile Organics by GC/MS-SIM - Westborough Lab Associated sample(s): 01 Batch: WG1416158-3								

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
2-Fluorophenol	50				25-87
Phenol-d6	38				16-65
Nitrobenzene-d5	82				42-122
2-Fluorobiphenyl	75				46-121
2,4,6-Tribromophenol	72				45-128
4-Terphenyl-d14	77				47-138

PCBS

Project Name: SRS-HANSCOM
Project Number: Not Specified

Lab Number: L2041168
Report Date: 10/07/20

SAMPLE RESULTS

Lab ID: L2041168-01
Client ID: WS-1
Sample Location: BEDFORD, MA

Date Collected: 09/29/20 13:30
Date Received: 09/29/20
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 127,608.3
Analytical Date: 10/01/20 04:26
Analyst: JM

Extraction Method: EPA 608.3
Extraction Date: 09/30/20 12:00
Cleanup Method: EPA 3665A
Cleanup Date: 09/30/20
Cleanup Method: EPA 3660B
Cleanup Date: 10/01/20

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

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	50		37-123	B
Decachlorobiphenyl	40		38-114	B
2,4,5,6-Tetrachloro-m-xylene	55		37-123	A
Decachlorobiphenyl	41		38-114	A

Project Name: SRS-HANSCOM
Project Number: Not Specified
Lab Number: L2041168
Report Date: 10/07/20

Method Blank Analysis
Batch Quality Control

Analytical Method: 127,608.3
Analytical Date: 10/01/20 04:56
Analyst: JM

Extraction Method: EPA 608.3
Extraction Date: 09/30/20 12:00
Cleanup Method: EPA 3665A
Cleanup Date: 09/30/20
Cleanup Method: EPA 3660B
Cleanup Date: 10/01/20

Parameter	Result	Qualifier	Units	RL	MDL	Column
Polychlorinated Biphenyls by GC - Westborough Lab for sample(s): 01 Batch: WG1416400-1						
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	75		37-123	B
Decachlorobiphenyl	78		38-114	B
2,4,5,6-Tetrachloro-m-xylene	81		37-123	A
Decachlorobiphenyl	77		38-114	A

Lab Control Sample Analysis

Batch Quality Control

Project Name: SRS-HANSCOM

Project Number: Not Specified

Lab Number: L2041168

Report Date: 10/07/20

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits	Column
Polychlorinated Biphenyls by GC - Westborough Lab Associated sample(s): 01 Batch: WG1416400-2									
Aroclor 1016	99		-		50-140	-		36	A
Aroclor 1260	87		-		8-140	-		38	A

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	71				37-123	B
Decachlorobiphenyl	76				38-114	B
2,4,5,6-Tetrachloro-m-xylene	78				37-123	A
Decachlorobiphenyl	73				38-114	A

METALS

Project Name: SRS-HANSCOM
Project Number: Not Specified
Lab Number: L2041168
Report Date: 10/07/20

SAMPLE RESULTS

Lab ID: L2041168-01
Client ID: WS-1
Sample Location: BEDFORD, MA
Sample Depth:
Matrix: Water

Date Collected: 09/29/20 13:30
Date Received: 09/29/20
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Antimony, Total	0.00953		mg/l	0.00400	--	1	10/02/20 12:51	10/02/20 20:00	EPA 3005A	3,200.8	AM
Arsenic, Total	0.03181		mg/l	0.00100	--	1	10/02/20 12:51	10/02/20 20:00	EPA 3005A	3,200.8	AM
Cadmium, Total	ND		mg/l	0.00020	--	1	10/02/20 12:51	10/02/20 20:00	EPA 3005A	3,200.8	AM
Chromium, Total	0.00583		mg/l	0.00100	--	1	10/02/20 12:51	10/02/20 20:00	EPA 3005A	3,200.8	AM
Copper, Total	0.01115		mg/l	0.00100	--	1	10/02/20 12:51	10/02/20 20:00	EPA 3005A	3,200.8	AM
Iron, Total	3.30		mg/l	0.050	--	1	10/02/20 12:51	10/05/20 23:22	EPA 3005A	19,200.7	GD
Lead, Total	0.01235		mg/l	0.00100	--	1	10/02/20 12:51	10/02/20 20:00	EPA 3005A	3,200.8	AM
Mercury, Total	ND		mg/l	0.00020	--	1	10/02/20 11:56	10/02/20 16:35	EPA 245.1	3,245.1	AL
Nickel, Total	0.00799		mg/l	0.00200	--	1	10/02/20 12:51	10/02/20 20:00	EPA 3005A	3,200.8	AM
Selenium, Total	ND		mg/l	0.00500	--	1	10/02/20 12:51	10/02/20 20:00	EPA 3005A	3,200.8	AM
Silver, Total	ND		mg/l	0.00040	--	1	10/02/20 12:51	10/02/20 20:00	EPA 3005A	3,200.8	AM
Zinc, Total	0.01384		mg/l	0.01000	--	1	10/02/20 12:51	10/02/20 20:00	EPA 3005A	3,200.8	AM
General Chemistry - Mansfield Lab											
Chromium, Trivalent	ND		mg/l	0.010	--	1		10/02/20 20:00	NA	107,-	

Project Name: SRS-HANSCOM **Lab Number:** L2041168

Project Number: Not Specified **Report Date:** 10/07/20

Method Blank Analysis
Batch Quality Control

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Metals - Mansfield Lab for sample(s): 01 Batch: WG1416914-1										
Iron, Total	ND		mg/l	0.050	--	1	10/02/20 12:51	10/05/20 21:28	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: WG1416917-1										
Antimony, Total	ND		mg/l	0.00400	--	1	10/02/20 12:51	10/02/20 18:47	3,200.8	AM
Arsenic, Total	ND		mg/l	0.00100	--	1	10/02/20 12:51	10/02/20 18:47	3,200.8	AM
Cadmium, Total	ND		mg/l	0.00020	--	1	10/02/20 12:51	10/02/20 18:47	3,200.8	AM
Chromium, Total	ND		mg/l	0.00100	--	1	10/02/20 12:51	10/02/20 18:47	3,200.8	AM
Copper, Total	ND		mg/l	0.00100	--	1	10/02/20 12:51	10/02/20 18:47	3,200.8	AM
Lead, Total	ND		mg/l	0.00100	--	1	10/02/20 12:51	10/02/20 18:47	3,200.8	AM
Nickel, Total	ND		mg/l	0.00200	--	1	10/02/20 12:51	10/02/20 18:47	3,200.8	AM
Selenium, Total	ND		mg/l	0.00500	--	1	10/02/20 12:51	10/02/20 18:47	3,200.8	AM
Silver, Total	ND		mg/l	0.00040	--	1	10/02/20 12:51	10/02/20 18:47	3,200.8	AM
Zinc, Total	ND		mg/l	0.01000	--	1	10/02/20 12:51	10/02/20 18:47	3,200.8	AM

Prep Information

Digestion Method: EPA 3005A

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Metals - Mansfield Lab for sample(s): 01 Batch: WG1416918-1										
Mercury, Total	ND		mg/l	0.00020	--	1	10/02/20 11:56	10/02/20 15:56	3,245.1	AL

Prep Information

Digestion Method: EPA 245.1

Lab Control Sample Analysis

Batch Quality Control

Project Name: SRS-HANSCOM

Project Number: Not Specified

Lab Number: L2041168

Report Date: 10/07/20

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 01 Batch: WG1416914-2								
Iron, Total	96		-		85-115	-		
Total Metals - Mansfield Lab Associated sample(s): 01 Batch: WG1416917-2								
Antimony, Total	102		-		85-115	-		
Arsenic, Total	101		-		85-115	-		
Cadmium, Total	107		-		85-115	-		
Chromium, Total	100		-		85-115	-		
Copper, Total	100		-		85-115	-		
Lead, Total	103		-		85-115	-		
Nickel, Total	95		-		85-115	-		
Selenium, Total	99		-		85-115	-		
Silver, Total	103		-		85-115	-		
Zinc, Total	105		-		85-115	-		
Total Metals - Mansfield Lab Associated sample(s): 01 Batch: WG1416918-2								
Mercury, Total	109		-		85-115	-		

Matrix Spike Analysis
Batch Quality Control

Project Name: SRS-HANSCOM
Project Number: Not Specified

Lab Number: L2041168
Report Date: 10/07/20

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 01 QC Batch ID: WG1416914-3 QC Sample: L2041503-01 Client ID: MS Sample												
Iron, Total	1.48	1	2.45	97		-	-		75-125	-		20
Total Metals - Mansfield Lab Associated sample(s): 01 QC Batch ID: WG1416914-7 QC Sample: L2041503-02 Client ID: MS Sample												
Iron, Total	0.107	1	1.06	95		-	-		75-125	-		20
Total Metals - Mansfield Lab Associated sample(s): 01 QC Batch ID: WG1416917-3 QC Sample: L2041503-01 Client ID: MS Sample												
Antimony, Total	ND	0.5	0.5468	109		-	-		70-130	-		20
Arsenic, Total	ND	0.12	0.1281	107		-	-		70-130	-		20
Cadmium, Total	ND	0.051	0.05263	103		-	-		70-130	-		20
Chromium, Total	0.01055	0.2	0.2050	97		-	-		70-130	-		20
Copper, Total	0.00594	0.25	0.2450	96		-	-		70-130	-		20
Lead, Total	0.00115	0.51	0.5675	111		-	-		70-130	-		20
Nickel, Total	0.00698	0.5	0.4637	91		-	-		70-130	-		20
Selenium, Total	ND	0.12	0.1271	106		-	-		70-130	-		20
Silver, Total	ND	0.05	0.04813	96		-	-		70-130	-		20
Zinc, Total	0.01215	0.5	0.4942	96		-	-		70-130	-		20
Total Metals - Mansfield Lab Associated sample(s): 01 QC Batch ID: WG1416918-3 QC Sample: L2041503-01 Client ID: MS Sample												
Mercury, Total	ND	0.005	0.00501	100		-	-		70-130	-		20
Total Metals - Mansfield Lab Associated sample(s): 01 QC Batch ID: WG1416918-5 QC Sample: L2041503-02 Client ID: MS Sample												
Mercury, Total	ND	0.005	0.00383	77		-	-		70-130	-		20

Lab Duplicate Analysis
Batch Quality Control

Project Name: SRS-HANSCOM
Project Number: Not Specified

Lab Number: L2041168
Report Date: 10/07/20

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 01 QC Batch ID: WG1416914-4 QC Sample: L2041503-01 Client ID: DUP Sample						
Iron, Total	1.48	1.50	mg/l	1		20
Total Metals - Mansfield Lab Associated sample(s): 01 QC Batch ID: WG1416914-8 QC Sample: L2041503-02 Client ID: DUP Sample						
Iron, Total	0.107	0.102	mg/l	5		20
Total Metals - Mansfield Lab Associated sample(s): 01 QC Batch ID: WG1416917-4 QC Sample: L2041503-01 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	0.01055	0.01071	mg/l	2		20
Copper, Total	0.00594	0.00589	mg/l	1		20
Lead, Total	0.00115	0.00116	mg/l	1		20
Nickel, Total	0.00698	0.00689	mg/l	1		20
Selenium, Total	ND	ND	mg/l	NC		20
Silver, Total	ND	ND	mg/l	NC		20
Zinc, Total	0.01215	0.01203	mg/l	1		20
Total Metals - Mansfield Lab Associated sample(s): 01 QC Batch ID: WG1416918-4 QC Sample: L2041503-01 Client ID: DUP Sample						
Mercury, Total	ND	ND	mg/l	NC		20
Total Metals - Mansfield Lab Associated sample(s): 01 QC Batch ID: WG1416918-6 QC Sample: L2041503-02 Client ID: DUP Sample						
Mercury, Total	ND	ND	mg/l	NC		20

INORGANICS
&
MISCELLANEOUS

Project Name: SRS-HANSCOM
Project Number: Not Specified

Lab Number: L2041168
Report Date: 10/07/20

SAMPLE RESULTS

Lab ID: L2041168-01
Client ID: WS-1
Sample Location: BEDFORD, MA

Date Collected: 09/29/20 13:30
Date Received: 09/29/20
Field Prep: Not Specified

Sample Depth:
Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total Suspended	65.		mg/l	10	NA	2	-	10/02/20 10:00	121,2540D	AC
Cyanide, Total	ND		mg/l	0.005	--	1	10/02/20 18:10	10/05/20 10:26	121,4500CN-CE	AG
Chlorine, Total Residual	ND		mg/l	0.02	--	1	-	09/29/20 18:43	121,4500CL-D	AS
Nitrogen, Ammonia	0.085		mg/l	0.075	--	1	10/01/20 15:15	10/01/20 19:52	121,4500NH3-BH	AT
TPH, SGT-HEM	ND		mg/l	4.00	--	1	10/01/20 09:11	10/01/20 12:42	74,1664A	DR
Phenolics, Total	ND		mg/l	0.030	--	1	10/01/20 08:30	10/02/20 07:11	4,420.1	MV
Chromium, Hexavalent	ND		mg/l	0.010	--	1	09/30/20 06:00	09/30/20 06:28	1,7196A	JA
Anions by Ion Chromatography - Westborough Lab										
Chloride	654.		mg/l	12.5	--	25	-	09/30/20 23:51	44,300.0	SH

Project Name: SRS-HANSCOM **Lab Number:** L2041168

Project Number: Not Specified **Report Date:** 10/07/20

Method Blank Analysis
Batch Quality Control

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab for sample(s): 01 Batch: WG1416063-1										
Chlorine, Total Residual	ND		mg/l	0.02	--	1	-	09/29/20 18:43	121,4500CL-D	AS
General Chemistry - Westborough Lab for sample(s): 01 Batch: WG1416219-1										
Chromium, Hexavalent	ND		mg/l	0.010	--	1	09/30/20 06:00	09/30/20 06:26	1,7196A	JA
Anions by Ion Chromatography - Westborough Lab for sample(s): 01 Batch: WG1416640-1										
Chloride	ND		mg/l	0.500	--	1	-	09/30/20 17:13	44,300.0	SH
General Chemistry - Westborough Lab for sample(s): 01 Batch: WG1416725-1										
Phenolics, Total	ND		mg/l	0.030	--	1	10/01/20 08:30	10/02/20 07:09	4,420.1	MV
General Chemistry - Westborough Lab for sample(s): 01 Batch: WG1416784-1										
Nitrogen, Ammonia	ND		mg/l	0.075	--	1	10/01/20 15:15	10/01/20 19:49	121,4500NH3-BH	AT
General Chemistry - Westborough Lab for sample(s): 01 Batch: WG1416792-1										
TPH, SGT-HEM	ND		mg/l	4.00	--	1	10/01/20 09:11	10/01/20 12:42	74,1664A	DR
General Chemistry - Westborough Lab for sample(s): 01 Batch: WG1417296-1										
Solids, Total Suspended	ND		mg/l	5.0	NA	1	-	10/02/20 10:00	121,2540D	AC
General Chemistry - Westborough Lab for sample(s): 01 Batch: WG1417434-1										
Cyanide, Total	ND		mg/l	0.005	--	1	10/02/20 18:10	10/05/20 10:20	121,4500CN-CE	AG

Lab Control Sample Analysis

Batch Quality Control

Project Name: SRS-HANSCOM
Project Number: Not Specified

Lab Number: L2041168
Report Date: 10/07/20

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 01 Batch: WG1416063-2								
Chlorine, Total Residual	104		-		90-110	-		
General Chemistry - Westborough Lab Associated sample(s): 01 Batch: WG1416219-2								
Chromium, Hexavalent	106		-		85-115	-		20
Anions by Ion Chromatography - Westborough Lab Associated sample(s): 01 Batch: WG1416640-2								
Chloride	106		-		90-110	-		
General Chemistry - Westborough Lab Associated sample(s): 01 Batch: WG1416725-2								
Phenolics, Total	108		-		70-130	-		
General Chemistry - Westborough Lab Associated sample(s): 01 Batch: WG1416784-2								
Nitrogen, Ammonia	102		-		80-120	-		20
General Chemistry - Westborough Lab Associated sample(s): 01 Batch: WG1416792-2								
TPH	82		-		64-132	-		34
General Chemistry - Westborough Lab Associated sample(s): 01 Batch: WG1417296-2								
Solids, Total Suspended	101		-		80-120	-		

Lab Control Sample Analysis

Batch Quality Control

Project Name: SRS-HANSCOM

Project Number: Not Specified

Lab Number: L2041168

Report Date: 10/07/20

Parameter	LCS %Recovery	LCSD %Recovery	%Recovery Limits	RPD	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 01 Batch: WG1417434-2					
Cyanide, Total	101	-	90-110	-	

Matrix Spike Analysis
Batch Quality Control

Project Name: SRS-HANSCOM
Project Number: Not Specified

Lab Number: L2041168
Report Date: 10/07/20

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 01 QC Batch ID: WG1416063-4 QC Sample: L2041168-01 Client ID: WS-1												
Chlorine, Total Residual	ND	0.25	0.18	**72**	Q	-	-		80-120	-		20
General Chemistry - Westborough Lab Associated sample(s): 01 QC Batch ID: WG1416219-4 QC Sample: L2041168-01 Client ID: WS-1												
Chromium, Hexavalent	ND	0.1	0.098	98		-	-		85-115	-		20
Anions by Ion Chromatography - Westborough Lab Associated sample(s): 01 QC Batch ID: WG1416640-3 QC Sample: L2041221-01 Client ID: MS Sample												
Chloride	178	20	190	**62**	Q	-	-		90-110	-		18
General Chemistry - Westborough Lab Associated sample(s): 01 QC Batch ID: WG1416725-4 QC Sample: L2041865-02 Client ID: MS Sample												
Phenolics, Total	ND	0.4	0.41	102		-	-		70-130	-		20
General Chemistry - Westborough Lab Associated sample(s): 01 QC Batch ID: WG1416784-4 QC Sample: L2041163-01 Client ID: MS Sample												
Nitrogen, Ammonia	0.434	4	4.06	91		-	-		80-120	-		20
General Chemistry - Westborough Lab Associated sample(s): 01 QC Batch ID: WG1416792-4 QC Sample: L2040604-02 Client ID: MS Sample												
TPH	ND	19.4	17.0	88		-	-		64-132	-		34

Lab Duplicate Analysis
Batch Quality Control

Project Name: SRS-HANSCOM
Project Number: Not Specified

Lab Number: L2041168
Report Date: 10/07/20

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 01 QC Batch ID: WG1416063-3 QC Sample: L2041168-01 Client ID: WS-1						
Chlorine, Total Residual	ND	ND	mg/l	NC		20
General Chemistry - Westborough Lab Associated sample(s): 01 QC Batch ID: WG1416219-3 QC Sample: L2041168-01 Client ID: WS-1						
Chromium, Hexavalent	ND	ND	mg/l	NC		20
Anions by Ion Chromatography - Westborough Lab Associated sample(s): 01 QC Batch ID: WG1416640-4 QC Sample: L2041221-01 Client ID: DUP Sample						
Chloride	178	174	mg/l	2		18
General Chemistry - Westborough Lab Associated sample(s): 01 QC Batch ID: WG1416725-3 QC Sample: L2041865-02 Client ID: DUP Sample						
Phenolics, Total	ND	ND	mg/l	NC		20
General Chemistry - Westborough Lab Associated sample(s): 01 QC Batch ID: WG1416784-3 QC Sample: L2041163-01 Client ID: DUP Sample						
Nitrogen, Ammonia	0.434	0.436	mg/l	0		20
General Chemistry - Westborough Lab Associated sample(s): 01 QC Batch ID: WG1416792-3 QC Sample: L2040604-01 Client ID: DUP Sample						
TPH	ND	ND	mg/l	NC		34
General Chemistry - Westborough Lab Associated sample(s): 01 QC Batch ID: WG1417296-3 QC Sample: L2041036-03 Client ID: DUP Sample						
Solids, Total Suspended	110	130	mg/l	17		29

Project Name: SRS-HANSCOM
Project Number: Not Specified

Lab Number: L2041168
Report Date: 10/07/20

Sample Receipt and Container Information

Were project specific reporting limits specified? YES

Cooler Information

Cooler	Custody Seal
A	Absent

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L2041168-01A	Vial Na2S2O3 preserved	A	NA		4.5	Y	Absent		624.1-RGP(7),624.1-SIM-RGP(7)
L2041168-01A1	Vial Na2S2O3 preserved	A	NA		4.5	Y	Absent		624.1-RGP(7),624.1-SIM-RGP(7)
L2041168-01B	Vial Na2S2O3 preserved	A	NA		4.5	Y	Absent		624.1-RGP(7),624.1-SIM-RGP(7)
L2041168-01B1	Vial Na2S2O3 preserved	A	NA		4.5	Y	Absent		624.1-RGP(7),624.1-SIM-RGP(7)
L2041168-01C	Vial Na2S2O3 preserved	A	NA		4.5	Y	Absent		624.1-RGP(7),624.1-SIM-RGP(7)
L2041168-01C1	Vial Na2S2O3 preserved	A	NA		4.5	Y	Absent		624.1-RGP(7),624.1-SIM-RGP(7)
L2041168-01D	Vial Na2S2O3 preserved	A	NA		4.5	Y	Absent		504(14)
L2041168-01D1	Vial Na2S2O3 preserved	A	NA		4.5	Y	Absent		504(14)
L2041168-01E	Vial unpreserved	A	NA		4.5	Y	Absent		SUB-ETHANOL(14)
L2041168-01E1	Vial unpreserved	A	NA		4.5	Y	Absent		SUB-ETHANOL(14)
L2041168-01E2	Vial unpreserved	A	NA		4.5	Y	Absent		SUB-ETHANOL(14)
L2041168-01F	Plastic 250ml NaOH preserved	A	>12	>12	4.5	Y	Absent		TCN-4500(14)
L2041168-01G	Plastic 250ml HNO3 preserved	A	<2	<2	4.5	Y	Absent		CD-2008T(180),NI-2008T(180),ZN-2008T(180),CU-2008T(180),FE-UI(180),AG-2008T(180),HG-U(28),AS-2008T(180),SE-2008T(180),SB-2008T(180),PB-2008T(180),CR-2008T(180)
L2041168-01H	Plastic 500ml H2SO4 preserved	A	<2	<2	4.5	Y	Absent		NH3-4500(28)
L2041168-01I	Plastic 950ml unpreserved	A	7	7	4.5	Y	Absent		CL-300(28),HEXCR-7196(1),TRC-4500(1)
L2041168-01J	Plastic 950ml unpreserved	A	7	7	4.5	Y	Absent		TSS-2540(7)
L2041168-01K	Amber 950ml H2SO4 preserved	A	<2	<2	4.5	Y	Absent		TPHENOL-420(28)
L2041168-01L	Amber 1000ml Na2S2O3	A	7	7	4.5	Y	Absent		PCB-608.3(365)
L2041168-01L1	Amber 1000ml Na2S2O3	A	7	7	4.5	Y	Absent		PCB-608.3(365)
L2041168-01M	Amber 1000ml Na2S2O3	A	7	7	4.5	Y	Absent		625.1-RGP(7)
L2041168-01M1	Amber 1000ml Na2S2O3	A	7	7	4.5	Y	Absent		625.1-RGP(7)

*Values in parentheses indicate holding time in days

Project Name: SRS-HANSCOM
Project Number: Not Specified

Lab Number: L2041168
Report Date: 10/07/20

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L2041168-01N	Amber 1000ml Na2S2O3	A	7	7	4.5	Y	Absent		625.1-SIM-RGP(7)
L2041168-01N1	Amber 1000ml Na2S2O3	A	7	7	4.5	Y	Absent		625.1-SIM-RGP(7)
L2041168-01O	Amber 1000ml HCl preserved	A	NA		4.5	Y	Absent		TPH-1664(28)
L2041168-01O1	Amber 1000ml HCl preserved	A	NA		4.5	Y	Absent		TPH-1664(28)

*Values in parentheses indicate holding time in days

Project Name:	SRS-HANSCOM	**Lab Number:**	L2041168
Project Number:	Not Specified	**Report Date:**	10/07/20

GLOSSARY

Acronyms

DL	- Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the limit of quantitation (LOQ). The DL includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)
EDL	- Estimated Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The EDL includes any adjustments from dilutions, concentrations or moisture content, where applicable. The use of EDLs is specific to the analysis of PAHs using Solid-Phase Microextraction (SPME).
EMPC	- Estimated Maximum Possible Concentration: The concentration that results from the signal present at the retention time of an analyte when the ions meet all of the identification criteria except the ion abundance ratio criteria. An EMPC is a worst-case estimate of the concentration.
EPA	- Environmental Protection Agency.
LCS	- Laboratory Control Sample: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
LCSD	- Laboratory Control Sample Duplicate: Refer to LCS.
LFB	- Laboratory Fortified Blank: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
LOD	- Limit of Detection: This value represents the level to which a target analyte can reliably be detected for a specific analyte in a specific matrix by a specific method. The LOD includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)
LOQ	- Limit of Quantitation: The value at which an instrument can accurately measure an analyte at a specific concentration. The LOQ includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.) Limit of Quantitation: The value at which an instrument can accurately measure an analyte at a specific concentration. The LOQ includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)
MDL	- Method Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The MDL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
MS	- Matrix Spike Sample: A sample prepared by adding a known mass of target analyte to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available. For Method 332.0, the spike recovery is calculated using the native concentration, including estimated values.
MSD	- Matrix Spike Sample Duplicate: Refer to MS.
NA	- Not Applicable.
NC	- Not Calculated: Term is utilized when one or more of the results utilized in the calculation are non-detect at the parameter's reporting unit.
NDPA/DPA	- N-Nitrosodiphenylamine/Diphenylamine.
NI	- Not Ignitable.
NP	- Non-Plastic: Term is utilized for the analysis of Atterberg Limits in soil.
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:	SRS-HANSCOM	**Lab Number:**	L2041168
Project Number:	Not Specified	**Report Date:**	10/07/20

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. If a 'Total' result is requested, the results of its individual components will also be reported.

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

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

Data Qualifiers

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Report Format: Data Usability Report

Project Name:	SRS-HANSCOM	**Lab Number:**	L2041168
Project Number:	Not Specified	**Report Date:**	10/07/20

Data Qualifiers

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:	SRS-HANSCOM	**Lab Number:**	L2041168
Project Number:	Not Specified	**Report Date:**	10/07/20

REFERENCES

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

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

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

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

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

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

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

107 Alpha Analytical - In-house calculation method.

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

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

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

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

LIMITATION OF LIABILITIES

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

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

Certification Information

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

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

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

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

Westborough Facility:

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

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

Mansfield Facility:

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

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

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

CHAIN OF CUSTODY

PAGE 1 OF 1

Date Rec'd in Lab: 9/29/20

ALPHA Job #: L2041168

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

Project Information
Project Name: SRS-Hanscom
Project Location: Bedford, MA
Project #:
Project Manager: Jason Wiggin
ALPHA Quote #:

Report Information - Data Deliverables
☒ ADEx ☐ EMAIL

Billing Information
☒ Same as Client info PO #:

Client Information
Client: CHCI
Address: 8 Pleasant St
S. Natick, MA 01760
Phone: 508 315 3146
Email: bmoore@chci.com
jwiggin@chci.com

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

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

Additional Project Information:
Total Metals
*Bottle set per Bottle Order 331631

ALPHA Lab ID (Lab Use Only)	Sample ID	Collection Date	Collection Time	Sample Matrix	Sampler Initials	ANALYSIS: VOC: ☐ 8260 ☐ 624 ☐ 524.2 / SVOC: ☐ ABN ☐ PAH / METALS: ☐ MCP 13 ☐ MCP 14 ☐ RCP 15 / METALS: ☐ RCRA5 ☐ RCRA8 ☐ PP13 / EPH: ☐ Ranges & Targets ☐ Ranges Only / VPH: ☐ Ranges & Targets ☐ Ranges Only / ☐ PCB ☐ PEST / TPH: ☐ Quant Only ☐ Fingerprint / Full NPDES RGP Package	SAMPLE INFO: Filtration ☐ Field ☐ Lab to do; Preservation ☐ Lab to do; Sample Comments	TOTAL # BOTTLES
41168-01	WS-1	9/29/20	1330	GW	JTW	X		25

Container Type	*
Preservative	*

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

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

Relinquished By:	Date/Time	Received By:	Date/Time
	9/29/20 15:10		9/29/20 1520

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

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

ALPHA ANALYTICAL
World Class Chemistry

Subcontract Chain of Custody

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

Alpha Job Number
L2041168

Client Information

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

Phone: 508.439.5157
Email: dsanford@alphalab.com

Project Information

Project Location: MA
Project Manager: Dave Sanford

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: L2041168

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
	WS-1	09-29-20 13:30	WATER	Ethanol by EPA 1671 Revision A	

	Relinquished By:	Date/Time:	Received By:	Date/Time:
		9/30/20		
Form No: AL_subcoc				

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

October 07, 2020

Dave Sanford
Alpha Analytical
145 Flanders Road
Westborough, MA 01581
TEL: (508) 439-5157
FAX:

RE: L2041168 **WorkOrder:** 20100011

Dear Dave Sanford:

TEKLAB, INC received 1 sample on 10/1/2020 9:50:00 AM for the analysis presented in the following report.

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

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

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

Sincerely,

Marvin L. Darling II

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

Teklab, Inc.
Environmental Laboratory

Report Contents

http://www.teklabinc.com/

Client: Alpha Analytical
Work Order: 20100011
Client Project: L2041168
Report Date: 07-Oct-2020

This reporting package includes the following:

Teklab, Inc.
Environmental Laboratory

Definitions

http://www.teklabinc.com/

Client: Alpha Analytical **Work Order:** 20100011

Client Project: L2041168 **Report Date:** 07-Oct-2020

Abbr Definition

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

Qualifiers

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

Teklab, Inc. Environmental Laboratory

Case Narrative

http://www.teklabinc.com/

Client: Alpha Analytical

Work Order: 20100011

Client Project: L2041168

Report Date: 07-Oct-2020

Cooler Receipt Temp: 3.8 °C

Locations

Collinsville

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

Springfield

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

Kansas City

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

Collinsville Air

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

Chicago

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

Teklab, Inc. Environmental Laboratory

Accreditations

http://www.teklabinc.com/

Client: Alpha Analytical

Work Order: 20100011

Client Project: L2041168

Report Date: 07-Oct-2020

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

Teklab, Inc. Environmental Laboratory

Laboratory Results

http://www.teklabinc.com/

Client: Alpha Analytical **Work Order:** 20100011

Client Project: L2041168 **Report Date:** 07-Oct-2020

Lab ID: 20100011-001 **Client Sample ID:** WS-1

Matrix: AQUEOUS **Collection Date:** 09/29/2020 13:30

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	10/05/2020 17:33	R282389

CCV and LCS recovered outside upper control limits. Sample results are below the reporting limit. Data is reportable per the TNI Standard.

Teklab, Inc. Environmental Laboratory

Quality Control Results

http://www.teklabinc.com/

Client: Alpha Analytical
Client Project: L2041168

Work Order: 20100011
Report Date: 07-Oct-2020

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

Batch R282389 **SampType:** MBLK Units **mg/L**
SampID: MBLK-100520

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Ethanol	*	20		**ND**						10/05/2020

Batch R282389 **SampType:** LCS Units **mg/L**
SampID: LCS-100520

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Ethanol	*	20	S	**130**	100.0	0	133.4	70	132	10/05/2020

Batch R282389 **SampType:** MS Units **mg/L**
SampID: 20100106-001AMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Ethanol	*	20		**130**	100.0	0	131.0	70	132	10/05/2020

Batch R282389 **SampType:** MSD Units **mg/L** RPD Limit **30**
SampID: 20100106-001AMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Ethanol	*	20	S	**130**	100.0	0	133.2	131.0	1.64	10/05/2020

Teklab, Inc.
Environmental Laboratory

Receiving Check List

http://www.teklabinc.com/

Client: Alpha Analytical
Client Project: L2041168

Work Order: 20100011
Report Date: 07-Oct-2020

Carrier: UPS

Received By: KMT

Completed by: Amber M. Dilallo
On: 01-Oct-2020

Reviewed by: Elizabeth A. Hurley
On: 01-Oct-2020

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

Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐	Temp °C	3.8	
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.

Serial_No:10072013:02

2010011

Subcontract Chain of Custody

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

Alpha Job Number
L2041168

Client Information

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

Phone: 508.439.5157
Email: dsanford@alphalab.com

Project Information

Project Location: MA
Project Manager: Dave Sanford

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: L2041168

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
2010011-001	WS-1	09-29-20 13:30	WATER	Ethanol by EPA 1671 Revision A	

3.8°C UG3
ice

ok HS in lof 3 vials,
remaining ΦHS by 10/1/20

Relinquished By:	Date/Time:	Received By:	Date/Time:
	9/30/20	UPS	10/1/20 0950

Form No: AL_subcoc

10/1/20

ANALYTICAL REPORT

Lab Number:	L2045647
Client:	CarriageHouse Consulting Inc. 8A Pleasant Street South Natick, MA 01760
ATTN:	Brian Moore
Phone:	(508) 315-3146
Project Name:	SRS-HANSCOM
Project Number:	Not Specified
Report Date:	10/23/20

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

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

Project Name: SRS-HANSCOM
Project Number: Not Specified

Lab Number: L2045647
Report Date: 10/23/20

Alpha Sample ID	Client ID	Matrix	Sample Location	Collection Date/Time	Receive Date
L2045647-01	SWS-1	WATER	BEDFORD, MA	10/21/20 14:30	10/21/20

Project Name:	SRS-HANSCOM	**Lab Number:**	L2045647
Project Number:	Not Specified	**Report Date:**	10/23/20

Case Narrative

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

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

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

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

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

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

Project Name: SRS-HANSCOM **Lab Number:** L2045647
Project Number: Not Specified **Report Date:** 10/23/20

Case Narrative (continued)

Total Mercury

The WG1425554-1 Method Blank, associated with L2045647-01, has a concentration above the reporting limit for mercury. Since the sample was non-detect to the RL for this target analyte, no further actions were taken. The results of the original analysis are reported.

Nitrogen, Ammonia

The WG1424890-4 MS recovery, performed on L2045647-01, is outside the acceptance criteria for nitrogen, ammonia (77%); however, the associated LCS recovery is within criteria. No further action was taken.
The WG1424890-3 Laboratory Duplicate RPD for nitrogen, ammonia (51%), performed on L2045647-01, is above the acceptance criteria; however, the sample and duplicate results are less than five times the reporting limit. Therefore, the RPD is valid.

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: Melissa Sturgis Melissa Sturgis

Title: Technical Director/Representative Date: 10/23/20

METALS

Project Name: SRS-HANSCOM
Project Number: Not Specified
Lab Number: L2045647
Report Date: 10/23/20

SAMPLE RESULTS

Lab ID: L2045647-01
Client ID: SWS-1
Sample Location: BEDFORD, MA
Sample Depth:
Matrix: Water

Date Collected: 10/21/20 14:30
Date Received: 10/21/20
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Antimony, Total	ND		mg/l	0.00400	--	1	10/22/20 16:00	10/22/20 20:31	EPA 3005A	3,200.8	AM
Arsenic, Total	0.00222		mg/l	0.00100	--	1	10/22/20 16:00	10/22/20 20:31	EPA 3005A	3,200.8	AM
Cadmium, Total	ND		mg/l	0.00020	--	1	10/22/20 16:00	10/22/20 20:31	EPA 3005A	3,200.8	AM
Chromium, Total	ND		mg/l	0.00100	--	1	10/22/20 16:00	10/22/20 20:31	EPA 3005A	3,200.8	AM
Copper, Total	0.00108		mg/l	0.00100	--	1	10/22/20 16:00	10/22/20 20:31	EPA 3005A	3,200.8	AM
Iron, Total	0.995		mg/l	0.050	--	1	10/22/20 16:00	10/22/20 22:19	EPA 3005A	19,200.7	BV
Lead, Total	ND		mg/l	0.00100	--	1	10/22/20 16:00	10/22/20 20:31	EPA 3005A	3,200.8	AM
Mercury, Total	ND		mg/l	0.00020	--	1	10/23/20 08:59	10/23/20 12:33	EPA 245.1	3,245.1	EW
Nickel, Total	ND		mg/l	0.00200	--	1	10/22/20 16:00	10/22/20 20:31	EPA 3005A	3,200.8	AM
Selenium, Total	ND		mg/l	0.00500	--	1	10/22/20 16:00	10/22/20 20:31	EPA 3005A	3,200.8	AM
Silver, Total	ND		mg/l	0.00040	--	1	10/22/20 16:00	10/22/20 20:31	EPA 3005A	3,200.8	AM
Zinc, Total	0.01596		mg/l	0.01000	--	1	10/22/20 16:00	10/22/20 20:31	EPA 3005A	3,200.8	AM
Total Hardness by SM 2340B - Mansfield Lab											
Hardness	109		mg/l	0.660	NA	1	10/22/20 16:00	10/22/20 22:19	EPA 3005A	19,200.7	BV
General Chemistry - Mansfield Lab											
Chromium, Trivalent	ND		mg/l	0.010	--	1		10/22/20 20:31	NA	107,-	

Project Name: SRS-HANSCOM **Lab Number:** L2045647

Project Number: Not Specified **Report Date:** 10/23/20

Method Blank Analysis
Batch Quality Control

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Metals - Mansfield Lab for sample(s): 01 Batch: WG1425252-1										
Antimony, Total	ND		mg/l	0.00400	--	1	10/22/20 16:00	10/22/20 20:14	3,200.8	AM
Arsenic, Total	ND		mg/l	0.00100	--	1	10/22/20 16:00	10/22/20 20:14	3,200.8	AM
Cadmium, Total	ND		mg/l	0.00020	--	1	10/22/20 16:00	10/22/20 20:14	3,200.8	AM
Chromium, Total	ND		mg/l	0.00100	--	1	10/22/20 16:00	10/22/20 20:14	3,200.8	AM
Copper, Total	ND		mg/l	0.00100	--	1	10/22/20 16:00	10/22/20 20:14	3,200.8	AM
Lead, Total	ND		mg/l	0.00100	--	1	10/22/20 16:00	10/22/20 20:14	3,200.8	AM
Nickel, Total	ND		mg/l	0.00200	--	1	10/22/20 16:00	10/22/20 20:14	3,200.8	AM
Selenium, Total	ND		mg/l	0.00500	--	1	10/22/20 16:00	10/22/20 20:14	3,200.8	AM
Silver, Total	ND		mg/l	0.00040	--	1	10/22/20 16:00	10/22/20 20:14	3,200.8	AM
Zinc, Total	ND		mg/l	0.01000	--	1	10/22/20 16:00	10/22/20 20:14	3,200.8	AM

Prep Information

Digestion Method: EPA 3005A

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Metals - Mansfield Lab for sample(s): 01 Batch: WG1425254-1										
Iron, Total	ND		mg/l	0.050	--	1	10/22/20 16:00	10/22/20 22:10	19,200.7	BV

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: WG1425254-1										
Hardness	ND		mg/l	0.660	NA	1	10/22/20 16:00	10/22/20 22:10	19,200.7	BV

Prep Information

Digestion Method: EPA 3005A

Project Name: SRS-HANSCOM
Project Number: Not Specified
Lab Number: L2045647
Report Date: 10/23/20

Method Blank Analysis
Batch Quality Control

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Metals - Mansfield Lab for sample(s): 01 Batch: WG1425554-1										
Mercury, Total	0.00034		mg/l	0.00020	--	1	10/23/20 08:59	10/23/20 12:28	3,245.1	EW

Prep Information

Digestion Method: EPA 245.1

Lab Control Sample Analysis

Batch Quality Control

Project Name: SRS-HANSCOM

Project Number: Not Specified

Lab Number: L2045647

Report Date: 10/23/20

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 01 Batch: WG1425252-2								
Antimony, Total	102		-		85-115	-		
Arsenic, Total	98		-		85-115	-		
Cadmium, Total	102		-		85-115	-		
Chromium, Total	99		-		85-115	-		
Copper, Total	101		-		85-115	-		
Lead, Total	102		-		85-115	-		
Nickel, Total	96		-		85-115	-		
Selenium, Total	99		-		85-115	-		
Silver, Total	99		-		85-115	-		
Zinc, Total	104		-		85-115	-		
Total Metals - Mansfield Lab Associated sample(s): 01 Batch: WG1425254-2								
Iron, Total	94		-		85-115	-		
Total Hardness by SM 2340B - Mansfield Lab Associated sample(s): 01 Batch: WG1425254-2								
Hardness	97		-		85-115	-		
Total Metals - Mansfield Lab Associated sample(s): 01 Batch: WG1425554-2								
Mercury, Total	115		-		85-115	-		

Matrix Spike Analysis
Batch Quality Control

Project Name: SRS-HANSCOM
Project Number: Not Specified

Lab Number: L2045647
Report Date: 10/23/20

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 01 QC Batch ID: WG1425252-3 QC Sample: L2045647-01 Client ID: SWS-1												
Antimony, Total	ND	0.5	0.5308	106		-	-		70-130	-		20
Arsenic, Total	0.00222	0.12	0.1200	98		-	-		70-130	-		20
Cadmium, Total	ND	0.051	0.05133	101		-	-		70-130	-		20
Chromium, Total	ND	0.2	0.1847	92		-	-		70-130	-		20
Copper, Total	0.00108	0.25	0.2537	101		-	-		70-130	-		20
Lead, Total	ND	0.51	0.5175	101		-	-		70-130	-		20
Nickel, Total	ND	0.5	0.4734	95		-	-		70-130	-		20
Selenium, Total	ND	0.12	0.1187	99		-	-		70-130	-		20
Silver, Total	ND	0.05	0.04584	92		-	-		70-130	-		20
Zinc, Total	0.01596	0.5	0.5277	102		-	-		70-130	-		20
Total Metals - Mansfield Lab Associated sample(s): 01 QC Batch ID: WG1425254-3 QC Sample: L2045647-01 Client ID: SWS-1												
Iron, Total	0.995	1	1.87	88		-	-		75-125	-		20
Total Hardness by SM 2340B - Mansfield Lab Associated sample(s): 01 QC Batch ID: WG1425254-3 QC Sample: L2045647-01 Client ID: SWS-1												
Hardness	109	66.2	169	91		-	-		75-125	-		20
Total Metals - Mansfield Lab Associated sample(s): 01 QC Batch ID: WG1425554-3 QC Sample: L2045647-01 Client ID: SWS-1												
Mercury, Total	ND	0.005	0.00506	101		-	-		70-130	-		20

Lab Duplicate Analysis

Batch Quality Control

Project Name: SRS-HANSCOM
Project Number: Not Specified

Lab Number: L2045647
Report Date: 10/23/20

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 01 QC Batch ID: WG1425252-4 QC Sample: L2045647-01 Client ID: SWS-1						
Antimony, Total	ND	ND	mg/l	NC		20
Arsenic, Total	0.00222	0.00214	mg/l	4		20
Cadmium, Total	ND	ND	mg/l	NC		20
Chromium, Total	ND	ND	mg/l	NC		20
Copper, Total	0.00108	0.00111	mg/l	2		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	0.01596	0.01637	mg/l	3		20
Total Metals - Mansfield Lab Associated sample(s): 01 QC Batch ID: WG1425254-4 QC Sample: L2045647-01 Client ID: SWS-1						
Iron, Total	0.995	0.955	mg/l	4		20
Total Hardness by SM 2340B - Mansfield Lab Associated sample(s): 01 QC Batch ID: WG1425254-4 QC Sample: L2045647-01 Client ID: SWS-1						
Hardness	109	105	mg/l	4		20
Total Metals - Mansfield Lab Associated sample(s): 01 QC Batch ID: WG1425554-4 QC Sample: L2045647-01 Client ID: SWS-1						
Mercury, Total	ND	0.00111	mg/l	NC		20

INORGANICS
&
MISCELLANEOUS

Project Name: SRS-HANSCOM
Project Number: Not Specified

Lab Number: L2045647
Report Date: 10/23/20

SAMPLE RESULTS

Lab ID: L2045647-01
Client ID: SWS-1
Sample Location: BEDFORD, MA

Date Collected: 10/21/20 14:30
Date Received: 10/21/20
Field Prep: Not Specified

Sample Depth:
Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Nitrogen, Ammonia	0.257		mg/l	0.075	--	1	10/21/20 21:50	10/21/20 23:21	121,4500NH3-BH	AT
Chromium, Hexavalent	ND		mg/l	0.010	--	1	10/21/20 19:04	10/21/20 19:23	1,7196A	AS

Project Name: SRS-HANSCOM
Project Number: Not Specified
Lab Number: L2045647
Report Date: 10/23/20

Method Blank Analysis
Batch Quality Control

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab for sample(s): 01 Batch: WG1424863-1										
Chromium, Hexavalent	ND		mg/l	0.010	--	1	10/21/20 19:04	10/21/20 19:22	1,7196A	AS
General Chemistry - Westborough Lab for sample(s): 01 Batch: WG1424890-1										
Nitrogen, Ammonia	ND		mg/l	0.075	--	1	10/21/20 21:50	10/21/20 23:16	121,4500NH3-BH	AT

Lab Control Sample Analysis

Batch Quality Control

Project Name: SRS-HANSCOM
Project Number: Not Specified

Lab Number: L2045647
Report Date: 10/23/20

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 01 Batch: WG1424863-2								
Chromium, Hexavalent	102		-		85-115	-		20
General Chemistry - Westborough Lab Associated sample(s): 01 Batch: WG1424890-2								
Nitrogen, Ammonia	94		-		80-120	-		20

Matrix Spike Analysis
Batch Quality Control

Project Name: SRS-HANSCOM
Project Number: Not Specified

Lab Number: L2045647
Report Date: 10/23/20

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 01 QC Batch ID: WG1424863-4 QC Sample: L2045647-01 Client ID: SWS-1												
Chromium, Hexavalent	ND	0.1	0.091	91		-	-		85-115	-		20
General Chemistry - Westborough Lab Associated sample(s): 01 QC Batch ID: WG1424890-4 QC Sample: L2045647-01 Client ID: SWS-1												
Nitrogen, Ammonia	0.257	4	3.33	**77**	Q	-	-		80-120	-		20

Lab Duplicate Analysis

Batch Quality Control

Project Name: SRS-HANSCOM
Project Number: Not Specified

Lab Number: L2045647
Report Date: 10/23/20

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 01 QC Batch ID: WG1424863-3 QC Sample: L2045647-01 Client ID: SWS-1						
Chromium, Hexavalent	ND	ND	mg/l	NC		20
General Chemistry - Westborough Lab Associated sample(s): 01 QC Batch ID: WG1424890-3 QC Sample: L2045647-01 Client ID: SWS-1						
Nitrogen, Ammonia	0.257	0.152	mg/l	**51**	Q	20

Project Name: SRS-HANSCOM
Project Number: Not Specified

Lab Number: L2045647
Report Date: 10/23/20

Sample Receipt and Container Information

Were project specific reporting limits specified? YES

Cooler Information

Cooler	Custody Seal
A	Absent

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L2045647-01A	Plastic 250ml HNO3 preserved	A	<2	<2	4.7	Y	Absent		CD-2008T(180),NI-2008T(180),ZN-2008T(180),HARDU(180),CU-2008T(180),FE-UI(180),SE-2008T(180),AS-2008T(180),HG-U(28),AG-2008T(180),CR-2008T(180),SB-2008T(180),PB-2008T(180)
L2045647-01B	Plastic 250ml HNO3 preserved	A	<2	<2	4.7	Y	Absent		CD-2008T(180),NI-2008T(180),ZN-2008T(180),HARDU(180),CU-2008T(180),FE-UI(180),SE-2008T(180),AS-2008T(180),HG-U(28),AG-2008T(180),CR-2008T(180),SB-2008T(180),PB-2008T(180)
L2045647-01C	Plastic 500ml H2SO4 preserved	A	<2	<2	4.7	Y	Absent		NH3-4500(28)
L2045647-01D	Plastic 950ml unpreserved	A	7	7	4.7	Y	Absent		HEXCR-7196(1)

*Values in parentheses indicate holding time in days

Project Name:	SRS-HANSCOM	**Lab Number:**	L2045647
Project Number:	Not Specified	**Report Date:**	10/23/20

GLOSSARY

Acronyms

DL	- Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the limit of quantitation (LOQ). The DL includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)
EDL	- Estimated Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The EDL includes any adjustments from dilutions, concentrations or moisture content, where applicable. The use of EDLs is specific to the analysis of PAHs using Solid-Phase Microextraction (SPME).
EMPC	- Estimated Maximum Possible Concentration: The concentration that results from the signal present at the retention time of an analyte when the ions meet all of the identification criteria except the ion abundance ratio criteria. An EMPC is a worst-case estimate of the concentration.
EPA	- Environmental Protection Agency.
LCS	- Laboratory Control Sample: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
LCSD	- Laboratory Control Sample Duplicate: Refer to LCS.
LFB	- Laboratory Fortified Blank: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
LOD	- Limit of Detection: This value represents the level to which a target analyte can reliably be detected for a specific analyte in a specific matrix by a specific method. The LOD includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)
LOQ	- Limit of Quantitation: The value at which an instrument can accurately measure an analyte at a specific concentration. The LOQ includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.) Limit of Quantitation: The value at which an instrument can accurately measure an analyte at a specific concentration. The LOQ includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)
MDL	- Method Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The MDL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
MS	- Matrix Spike Sample: A sample prepared by adding a known mass of target analyte to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available. For Method 332.0, the spike recovery is calculated using the native concentration, including estimated values.
MSD	- Matrix Spike Sample Duplicate: Refer to MS.
NA	- Not Applicable.
NC	- Not Calculated: Term is utilized when one or more of the results utilized in the calculation are non-detect at the parameter's reporting unit.
NDPA/DPA	- N-Nitrosodiphenylamine/Diphenylamine.
NI	- Not Ignitable.
NP	- Non-Plastic: Term is utilized for the analysis of Atterberg Limits in soil.
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:	SRS-HANSCOM	**Lab Number:**	L2045647
Project Number:	Not Specified	**Report Date:**	10/23/20

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. If a 'Total' result is requested, the results of its individual components will also be reported.

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

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

Data Qualifiers

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Report Format: Data Usability Report

Project Name:	SRS-HANSCOM	**Lab Number:**	L2045647
Project Number:	Not Specified	**Report Date:**	10/23/20

Data Qualifiers

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:	SRS-HANSCOM	**Lab Number:**	L2045647
Project Number:	Not Specified	**Report Date:**	10/23/20

REFERENCES

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

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

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.

107 Alpha Analytical - In-house calculation method.

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

LIMITATION OF LIABILITIES

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

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

Certification Information

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

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

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

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

Westborough Facility:

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

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

Mansfield Facility:

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

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

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

CHAIN OF CUSTODY

PAGE 1 OF 1

Date Rec'd in Lab: 10/21/20

ALPHA Job #: L2045647

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

Client Information

Client: CHCI

Address: 8 Pleasant St
S. Natick, MA 01760

Phone: 508 315-3146

Email: jwiggin@carr
bmoore@carr

Additional Project Information:

*Sb, As, Cd, Cr III, Cu, Fe, Pb, Hg, Ni, Se, Ag, Zn

Project Information

Project Name: SRS-Hanscom

Project Location: Bedford, MA

Project #:

Project Manager: Jason Wiggin

ALPHA Quote #:

Turn-Around Time

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

Date Due: 10/22/2020

Report Information - Data Deliverables

☒ ADEx ☐ EMAIL

Billing Information

☒ Same as Client Info PO #:

Regulatory Requirements & Project Information Requirements

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

ALPHA Lab ID (Lab Use Only)	Sample ID	Collection Date	Collection Time	Sample Matrix	Sampler Initials	ANALYSIS: Total Recoverable Metals*	Cr III	Hardness	NH3	SAMPLE INFO: Filtration ☐ Field ☐ Lab to do; Preservation ☐ Lab to do	Sample Comments	TOTAL # BOTTLES
456474	SWS-1	10/21/20	14:30	SW	JW	X	X	X	X			4

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

Container Type										P	P	P	P			
Preservative										C	A	C	D			

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

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

Relinquished By:	Date/Time	Received By:	Date/Time
	10/21/20 15:50		10/21/20 15:50

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

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