



Massachusetts Department of Environmental Protection
Bureau of Waste Site Cleanup

BWSC 105

Immediate Response Action (IRA) Transmittal Form

Pursuant to 310 CMR 40.0424 - 40.0427 (Subpart D)

Release Tracking Number

4 - 26179

A. SITE LOCATION:

1. Release Name/Location Aid: BARNSTABLE COUNTY FIRE TRAINING ACADEMY
2. Street Address: 155 SOUTH FLINT ROCK ROAD
3. City/Town: BARNSTABLE 4. Zip Code: 026300000
- ☐ 5. Check here if this location is Adequately Regulated, pursuant to 310 CMR 40.0110-0114.
- ☐ a. CERCLA ☐ b. HSWA Corrective Action ☐ c. Solid Waste Management
- ☐ d. RCRA State Program (21C Facilities)

B. THIS FORM IS BEING USED TO: (check all that apply)

1. List Submittal Date of Initial IRA Written Plan (if previously submitted): 9/26/2016
- ☐ 2. Submit an **Initial IRA Plan**.
- ☐ 3. Submit a **Modified IRA Plan** of a previously submitted written IRA Plan.
- ☐ 4. Submit an **Imminent Hazard Evaluation**. (check one)
- ☐ a. An Imminent Hazard exists in connection with this Release or Threat of Release.
- ☐ b. An Imminent Hazard does not exist in connection with this Release or Threat of Release.
- ☐ c. It is unknown whether an Imminent Hazard exists in connection with this Release or Threat of Release, and further assessment activities will be undertaken.
- ☐ d. It is unknown whether an Imminent Hazard exists in connection with this Release or Threat of Release. However, response actions will address those conditions that could pose an Imminent Hazard.
- ☐ 5. Submit a request to **Terminate an Active Remedial System or Response Action(s) Taken to Address an Imminent Hazard**.
- ☐ 6. Submit an **IRA Status Report**
- ☒ 7. Submit a **Remedial Monitoring Report**. (This report can only be submitted through eDEP.)
- a. Type of Report: (check one) ☐ i. Initial Report ☒ ii. Interim Report ☐ iii. Final Report
- b. Frequency of Submittal: (check all that apply)
- ☒ i. A Remedial Monitoring Report(s) submitted monthly to address an Imminent Hazard.
- ☐ ii. A Remedial Monitoring Report(s) submitted monthly to address a Condition of Substantial Release Migration.
- ☐ iii. A Remedial Monitoring Report(s) submitted every six months, concurrent with an IRA Status Report.
- ☐ iv. A Remedial Monitoring Report(s) submitted annually, concurrent with an IRA Status Report.
- c. Number of Remedial Systems and/or Monitoring Programs: 1

A separate BWSC105A, IRA Remedial Monitoring Report, must be filled out for each Remedial System and/or Monitoring Program addressed by this transmittal form.



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☐ 8. Submit an **IRA Completion Statement**.

☐ a. Check here if future response actions addressing this Release or Threat of Release notification condition will be conducted as part of the Response Actions planned or ongoing at a Site that has already been Tier Classified under a different Release Tracking Number (RTN)

b. Provide Release Tracking Number of Tier Classified Site (Primary RTN): _____

These additional response actions must occur according to the deadlines applicable to the Primary RTN. Use the Primary RTN when making all future submittals for the site unless specifically relating to this Immediate Response Action.

☐ 9. Submit a **Revised IRA Completion Statement**.

☐ 10. Submit a **Plan for the Application of Remedial Additives** near a sensitive receptor, pursuant to 310 CMR 40.0046(3).

(All sections of this transmittal form must be filled out unless otherwise noted above)

C. RELEASE OR THREAT OF RELEASE CONDITIONS THAT WARRANT IRA:

1. Media Impacted and Receptors Affected: (check all that apply)

☐ a. Paved Surface ☐ b. Basement ☐ c. School

☒ d. Public Water Supply ☒ e. Surface Water ☒ f. Zone 2 ☒ g. Private Well ☐ h. Residence ☒ i. Soil

☒ j. Groundwater ☒ k. Sediments ☐ l. Wetland ☐ m. Storm Drain ☐ n. Indoor Air ☐ o. Air

☐ p. Soil Gas ☐ q. Sub-Slab Soil Gas ☐ r. Critical Exposure Pathway ☐ s. NAPL ☐ t. Unknown

☐ r. Others Specify: _____

2. Sources of the Release or TOR: (check all that apply)

☐ a. Transformer ☐ b. Fuel Tank ☐ c. Pipe

☐ d. OHM Delivery ☐ e. AST ☐ f. Drums ☐ g. Tanker Truck ☐ h. Hose ☐ i. Line

☐ j. UST Describe: _____ ☐ k. Vehicle ☐ l. Boat/Vessel

☐ m. Unknown ☒ n. Other: FIREFIGHTING FOAM

3. Type of Release or TOR: (check all that apply)

☐ a. Dumping ☐ b. Fire ☐ c. AST Removal ☐ d. Overfill

☐ e. Rupture ☐ f. Vehicle Accident ☐ g. Leak ☐ h. Spill ☐ i. Test failure ☐ j. TOR Only

☐ k. UST Removal Describe: _____

☐ l. Unknown ☒ m. Other: HISTORIC FOAM USE

4. Identify Oils and Hazardous Materials Released: (check all that apply)

☐ a. Oils ☐ b. Chlorinated Solvents

☐ c. Heavy Metals ☒ d. Others Specify: PFAS

D. DESCRIPTION OF RESPONSE ACTIONS: (check all that apply, for volumes list cumulative amounts)

☒ 1. Assessment and/or Monitoring Only

☐ 2. Temporary Covers or Caps

☐ 3. Deployment of Absorbent or Containment Materials

☐ 4. Temporary Water Supplies

☐ 5. Structure Venting System/HVAC Modification System

☐ 6. Temporary Evacuation or Relocation of Residents

☐ 7. Product or NAPL Recovery

☐ 8. Fencing and Sign Posting

☒ 9. Groundwater Treatment Systems

☐ 10. Soil Vapor Extraction

☐ 11. Remedial Additives

☐ 12. Air Sparging

☐ 13. Active Exposure Pathway Mitigation System

☐ 14. Passive Exposure Pathway Mitigation System



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D. DESCRIPTION OF RESPONSE ACTIONS: (cont.)

☒ 15. Excavation of Contaminated Soils.

☐ a. Re-use, Recycling or Treatment ☐ i. On Site Estimated volume in cubic yards _____

☐ ii. Off Site Estimated volume in cubic yards _____

iiia. Receiving Facility: _____ Town: _____ State: _____

iiib. Receiving Facility: _____ Town: _____ State: _____

iiic. Describe: _____

☐ b. Store ☐ i. On Site Estimated volume in cubic yards _____

☐ ii. Off Site Estimated volume in cubic yards _____

iiia. Receiving Facility: _____ Town: _____ State: _____

iiib. Receiving Facility: _____ Town: _____ State: _____

☒ c. Landfill ☐ i. Cover Estimated volume in cubic yards _____

Receiving Facility: _____ Town: _____ State: _____

☒ ii. Disposal Estimated volume in cubic yards 200

Receiving Facility: TAUNTON LANDFILL Town: TAUNTON State: MA

☐ 16. Removal of Drums, Tanks, or Containers:

a. Describe Quantity and Amount: _____

b. Receiving Facility: _____ Town: _____ State: _____

c. Receiving Facility: _____ Town: _____ State: _____

☐ 17. Removal of Other Contaminated Media:

a. Specify Type and Volume: _____

☐ 18. Other Response Actions:

Describe: _____

☐ 19. Use of Innovative Technologies:

Describe: _____



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E. LSP SIGNATURE AND STAMP:

I attest under the pains and penalties of perjury that I have personally examined and am familiar with this transmittal form, including any and all documents accompanying this submittal. In my professional opinion and judgment based upon application of (i) the standard of care in 309 CMR 4.02(1), (ii) the applicable provisions of 309 CMR 4.02(2) and (3), and 309 CMR 4.03(2), and (iii) the provisions of 309 CMR 4.03(3), to the best of my knowledge, information and belief,

> if Section B of this form indicates that an **Immediate Response Action Plan** is being submitted, the response action(s) that is(are) the subject of this submittal (i) has (have) been developed in accordance with the applicable provisions of M.G.L. c. 21E and 310 CMR 40.0000, (ii) is(are) appropriate and reasonable to accomplish the purposes of such response action(s) as set forth in the applicable provisions of M.G.L. c. 21E and 310 CMR 40.0000 and (iii) complies(y) with the identified provisions of all orders, permits, and approvals identified in this submittal;

> if Section B of this form indicates that an **Imminent Hazard Evaluation** is being submitted, this Imminent Hazard Evaluation was developed in accordance with the applicable provisions of M.G.L. c. 21E and 310 CMR 40.0000, and the assessment activity(ies) undertaken to support this Imminent Hazard Evaluation comply(ies) with the applicable provisions of M.G.L. c. 21E and 310 CMR 40.0000;

> if Section B of this form indicates that an **Immediate Response Action Status Report** and/or a **Remedial Monitoring Report** is(are) being submitted, the response action(s) that is (are) the subject of this submittal (i) is (are) being implemented in accordance with the applicable provisions of M.G.L. c. 21E and 310 CMR 40.0000, (ii) is (are) appropriate and reasonable to accomplish the purposes of such response action(s) as set forth in the applicable provisions of M.G.L. c. 21E and 310 CMR 40.0000 and (iii) comply(ies) with the identified provisions of all orders, permits, and approvals identified in this submittal;

> if Section B of this form indicates that an **Immediate Response Action Completion Statement** or a request to **Terminate an Active Remedial System or Response Action(s) Taken to Address an Imminent Hazard** is being submitted, the response action(s) that is(are) the subject of this submittal (i) has (have) been developed and implemented in accordance with the applicable provisions of M.G.L. c. 21E and 310 CMR 40.0000, (ii) is(are) appropriate and reasonable to accomplish the purposes of such response action(s) as set forth in the applicable provisions of M.G.L. c. 21E and 310 CMR 40.0000 and (iii) comply(ies) with the identified provisions of all orders, permits, and approvals identified in this submittal.

I am aware that significant penalties may result, including, but not limited to, possible fines and imprisonment, if I submit information which I know to be false, inaccurate or materially incomplete.

1. LSP #: 1443

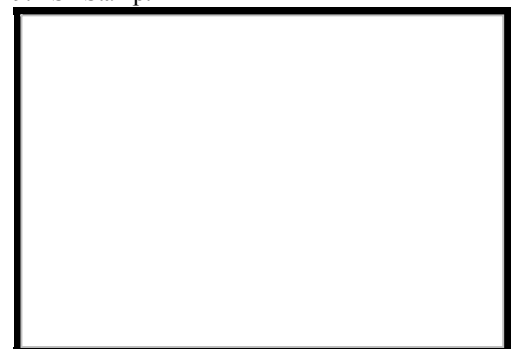
2. First Name: ROGER P 3. Last Name: THIBAUT

4. Telephone: 508-331-2700 5. Ext: 6. Email:

7. Signature:

8. Date: (mm/dd/yyyy)

9. LSP Stamp:





Massachusetts Department of Environmental Protection
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F. PERSON UNDERTAKING IRA:

1. Check all that apply: ☐ a. change in contact name ☐ b. change of address ☐ c. change in the person undertaking response actions
2. Name of Organization: BARNSTABLE COUNTY COMMISSIONERS
3. Contact First Name: JACK 4. Last Name: YUNITS
5. Street: 3195 MAIN ST 6. Title: _____
7. City/Town: BARNSTABLE 8. State: MA 9. Zip Code: 026300000
10. Telephone: 508-375-6643 11. Ext: _____ 12. Email: JYUNITS@BARNSTABLECOUNTY.ORG

G. RELATIONSHIP TO RELEASE OR THREAT OF RELEASE OF PERSON UNDERTAKING IRA:

- ☐ Check here to change relationship
- ☒ 1. RP or PRP ☒ a. Owner ☐ b. Operator ☐ c. Generator ☐ d. Transporter
☐ e. Other RP or PRP Specify Relationship: _____
- ☐ 2. Fiduciary, Secured Lender or Municipality with Exempt Status (as defined by M.G.L. c. 21E, s. 2)
- ☐ 3. Agency or Public Utility on a Right of Way (as defined by M.G.L. c. 21E, s. 5(j))
- ☐ 4. Any Other Person Undertaking Response Actions: Specify Relationship: _____

H. REQUIRED ATTACHMENT AND SUBMITTALS:

- ☐ 1. Check here if any Remediation Waste, generated as a result of this IRA, will be stored, treated, managed, recycled or reused at the site following submission of the IRA Completion Statement. If this box is checked, you must submit one of the following plans, along with the appropriate transmittal form.
☐ a. A Release Abatement Measure (RAM) Plan (BWSC106) ☐ b. Phase IV Remedy Implementation Plan (BWSC108)
- ☐ 2. Check here if the Response Action(s) on which this opinion is based, if any, are (were) subject to any order(s), permit(s) and/or approval(s) issued by MassDEP or EPA. If the box is checked, you MUST attach a statement identifying the applicable provisions thereof.
- ☐ 3. Check here to certify that the Chief Municipal Officer and the Local Board of Health were notified of the implementation of an Immediate Response Action taken to control, prevent, abate or eliminate an Imminent Hazard.
- ☐ 4. Check here to certify that the Chief Municipal Officer and the Local Board of Health were notified of the submittal of a Completion Statement for an Immediate Response Action taken to control, prevent, abate or eliminate an Imminent Hazard.
- ☐ 5. Check here if any non-updatable information provided on this form is incorrect, e.g. Release Address/Location Aid. Send corrections to BWSC.eDEP@state.ma.us.
- ☒ 6. Check here to certify that the LSP Opinion containing the material facts, data, and other information is attached.



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Bureau of Waste Site Cleanup

BWSC 105

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Pursuant to 310 CMR 40.0424 - 40.0427 (Subpart D)

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I. CERTIFICATION OF PERSON UNDERTAKING IRA:

1. I, _____, attest under the pains and penalties of perjury (i) that I have personally examined and am familiar with the information contained in this submittal, including any and all documents accompanying this transmittal form; (ii) that, based on my inquiry of the/those individual(s) immediately responsible for obtaining the information, the material information contained herein is, to the best of my knowledge, information and belief, true, accurate and complete; (iii) that, to the best of my knowledge, information and belief, I/the person(s) or entity(ies) on whose behalf this submittal is made satisfy(ies) the criteria in 310 CMR 40.0183(2); (iv) that I/the person(s) or entity(ies) on whose behalf this submittal is made have provided notice in accordance with 310 CMR 40.0183(5); and (v) that I am fully authorized to make this attestation on behalf of the person(s) or entity(ies) legally responsible for this submittal. I/the person(s) or entity(ies) on whose behalf this submittal is made is/are aware that there are significant penalties, including, but not limited to, possible fines and imprisonment, for willfully submitting false, inaccurate, or incomplete information.

2. By: _____ 3. Title: _____

4. For: BARNSTABLE COUNTY COMMISSIONERS 5. Date: _____ (mm/dd/yyyy)

☐ 6. Check here if the address of the person providing certification is different from address recorded in Section F.

7. Street: _____

8. City/Town: _____ 9. State: _____ 10. Zip Code: _____

11. Telephone: _____ 12. Ext: _____ 13. Email: _____

YOU ARE SUBJECT TO AN ANNUAL COMPLIANCE ASSURANCE FEE OF UP TO \$10,000 PER BILLABLE YEAR FOR THIS DISPOSAL SITE. YOU MUST LEGIBLY COMPLETE ALL RELEVANT SECTIONS OF THIS FORM OR DEP MAY RETURN THE DOCUMENT AS INCOMPLETE. IF YOU SUBMIT AN INCOMPLETE FORM, YOU MAY BE PENALIZED FOR MISSING A REQUIRED DEADLINE.

Date Stamp (DEP USE ONLY:)



Massachusetts Department of Environmental Protection
Bureau of Waste Site Cleanup
IRA REMEDIAL MONITORING REPORT

BWSC105 -A

Pursuant to 310 CMR 40.0400 (SUBPART D)

Release Tracking Number

Remedial System or Monitoring Program: of:

-

A. DESCRIPTION OF ACTIVE OPERATION AND MAINTENANCE ACTIVITY:

1. Type of Active Operation and Maintenance Activity: (check all that apply)

☒ a. Active Remedial System: (check all that apply)

☐ i. NAPL Recovery

☐ ii. Soil Vapor Extraction/Bioventing

☐ iii. Vapor-phase Carbon Adsorption

☒ iv. Groundwater Recovery

☐ v. Dual/Multi-phase Extraction

☒ vi. Aqueous-phase Carbon Adsorption

☐ vii. Air Stripping

☐ viii. Sparging/Biosparging

☐ ix. Cat/Thermal Oxidation

☐ x. Other Describe: _____

☐ b. Active Exposure Pathway Elimination Measure

Active Exposure Pathway Mitigation System to address (check one): ☐ i. Indoor Air ☐ ii. Drinking Water

☐ c. Application of Remedial Additives: (check all that apply)

☐ i. To the Subsurface

☐ ii. To Groundwater (Injection)

☐ iii. To the Surface

☐ d. Active Remedial Monitoring Program Without the Application of Remedial Additives: (check all that apply; Sections C, D and E are not required; attach supporting information, data, maps and/or sketches needed by checking Section G5)

☐ i. Reactive Wall

☐ ii. Natural Attenuation

☐ iii. Other

Describe: _____

2. Mode of Operation: (check one)

☒ a. Continuous

☐ b. Intermittent

☐ c. Pulsed

☐ d. One-time Event Only

☐ e. Other: _____

3. System Effluent/Discharge: (check all that apply)

☐ a. Sanitary Sewer/POTW

☒ b. Groundwater Re-infiltration/Re-injection: (check one)

☐ i. Downgradient

☒ ii. Upgradient

☐ c. Vapor-phase Discharge to Ambient Air: (check one)

☐ i. Off-gas Controls

☐ ii. No Off-gas Controls

☐ d. Drinking Water Supply

☐ e. Surface Water (including Storm Drains)

☐ f. Other Describe: _____

B. MONITORING FREQUENCY:

1. Reporting period that is the subject of this submittal:

From: 8/1/2019

To: 8/31/2019

(mm/dd/yyyy)

(mm/dd/yyyy)

2. Number of monitoring events during the reporting period: (check one)

☐ a. System Startup: (if applicable)

☐ i. Days 1, 3, 6, and then weekly thereafter, for the first month.

☐ ii. Other Describe: _____

☒ b. Post-system Startup (after first month) or Monitoring Program:

☒ i. Monthly

☐ ii. Quarterly

☐ iii. Annually

☐ iv. Other Describe: _____

☐ 3. Check here to certify that the number of required monitoring events were conducted during the reporting period.

C. EFFLUENT/DISCHARGE REGULATION: (check one to indicate how the effluent/discharge limits were established)

☐ 1. NPDES: (check one)

☐ a. Remediation General Permit

☐ b. Individual Permit

☐ c. Emergency Exclusion

Effective Date of Permit: _____

(mm/dd/yyyy)

☐ 2. MCP Performance Standard

MCP Citations(s): _____

☒ 3. DEP Approval Letter

Date of Letter: 11/18/2016

(mm/dd/yyyy)

☐ 4. Other Describe: _____



Massachusetts Department of Environmental Protection
Bureau of Waste Site Cleanup

IRA REMEDIAL MONITORING REPORT

Pursuant to 310 CMR 40.0400 (SUBPART D)

Remedial System or Monitoring Program: 1 of 1

BWSC105 -A

Release Tracking Number

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D. WASTEWATER TREATMENT PLANT OPERATOR: (check one)

☒ 1. Required due to Remedial Wastewater Treatment Plant in place for more than 30 days.

a. Name: TJMCGOFF

b. Grade: 4

c. License No: 15570

d. License Exp. Date: 12/31/2019

(mm/dd/yyyy)

☐ 2. Not Required

☐ 3. Not Applicable

E. STATUS OF ACTIVE REMEDIAL SYSTEM OR ACTIVE REMEDIAL MONITORING PROGRAM DURING REPORTING PERIOD: (check all that apply)

☒ 1. The Active Remedial System was functional one or more days during the Reporting Period.

a. Days System was Fully Functional: 31

b. GW Recovered (gals): 2968560

c. NAPL Recovered (gals):

d. GW Discharged (gals): 2968560

e. Avg. Soil Gas Recovery Rate (scfm):

f. Avg. Sparging Rate (scfm):

☐ 2. Remedial Additives: (check all that apply)

☐ a. No Remedial Additives applied during the Reporting Period.

☐ b. Enhanced Bioremediation Additives applied: (total quantity applied at the site for the current reporting period)

☐ i. Nitrogen/Phosphorus:

☐ ii. Peroxides:

Name of Additive	Date	Quantity	Units

Name of Additive	Date	Quantity	Units

☐ iii. Microorganisms:

☐ iv. Other:

Name of Additive	Date	Quantity	Units

Name of Additive	Date	Quantity	Units

☐ c. Chemical oxidation/reduction additives applied: (total quantity applied at the site for the current reporting period)

☐ i. Permanganates:

☐ ii. Peroxides:

Name of Additive	Date	Quantity	Units

Name of Additive	Date	Quantity	Units

☐ iii. Persulfates:

☐ iv. Other:

Name of Additive	Date	Quantity	Units

Name of Additive	Date	Quantity	Units



Massachusetts Department of Environmental Protection
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IRA REMEDIAL MONITORING REPORT

Pursuant to 310 CMR 40.0400 (SUBPART D)

Remedial System or Monitoring Program: 1 of 1

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E. STATUS OF ACTIVE REMEDIAL SYSTEM OR ACTIVE REMEDIAL MONITORING PROGRAM DURING REPORTING PERIOD: (cont.)

☐ d. Other additives applied: (total quantity applied at the site for the current reporting period)

Name of Additive	Date	Quantity	Units

Name of Additive	Date	Quantity	Units

☐ e. Check here if any additional Remedial Additives were applied. Attach list of additional additives and include Name of Additive, Date Applied, Quantity Applied and Units (in gals. or lbs.)

F. SHUTDOWNS OF ACTIVE REMEDIAL SYSTEM OR ACTIVE REMEDIAL MONITORING PROGRAM: (check all that apply)

☐ 1. The Active Remedial System had unscheduled shutdowns on one or more occasions during the Reporting Period.

a. Number of Unscheduled Shutdowns: _____ b. Total Number of Days of Unscheduled Shutdowns: _____

c. Reason(s) for Unscheduled Shutdowns: _____

☐ 2. The Active Remedial System had scheduled shutdowns on one or more occasions during the Reporting Period.

a. Number of Scheduled Shutdowns: _____ b. Total Number of Days of Scheduled Shutdowns: _____

c. Reason(s) for Scheduled Shutdowns: _____

☐ 3. The Active Remedial System or Active Remedial Monitoring Program was permanently shutdown/discontinued during the Reporting Period.

a. Date of Final System or Monitoring Program Shutdown: _____
(mm/dd/yyyy)

☐ b. No Further Effluent Discharges.

☐ c. No Further Application of Remedial Additives planned; sufficient monitoring completed to demonstrate compliance with 310 CMR 40.0046.

☐ d. No Further Submittals Planned.

☐ e. Other: Describe: _____

G. SUMMARY STATEMENTS: (check all that apply for the current reporting period)

☒ 1. All Active Remedial System checks and effluent analyses required by the approved plan and/or permit were performed when applicable.

☒ 2. There were no significant problems or prolonged (>25% of reporting period) unscheduled shutdowns of the Active Remedial System.

☒ 3. The Active Remedial System or Active Remedial Monitoring Program operated in conformance with the MCP, and all applicable approval conditions and/or permits.

4. Indicate any Operational Problems or Notes:

☒ 5. Check here if additional/supporting Information, data, maps, and/or sketches are attached to the form.



Massachusetts Department of Environmental Protection
Bureau of Waste Site Cleanup
IRA REMEDIAL MONITORING REPORT
MEASUREMENTS

BWSC105 -B

Pursuant to 310 CMR 40.0400 (SUBPART D)

Remedial System or Monitoring Program: 1 of 1

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For each Point of Measurement, related to concentration indicate the highest concentration detected during the reporting period, of each oil, hazardous material and/or remedial additive.

For each Point of Measurement for pressure differentials, indicate the lowest pressure differential detected during the reporting period.

Point of Measurement	Date (mm/dd/yyyy)	Contaminant, Measurement and/or Indicator Parameter	Influent Concentration (where applicable)	Midpoint Concentration (where applicable)	(check one)	Check here, if ND/BDL	Permissible Concentration or Pressure Differential	Units	Within Permissible Limits? (Y/N)
					<input type="checkbox"/> Discharge <input type="checkbox"/> GroundWater Concentration <input type="checkbox"/> Pressure Differential				
SYSTEM	08/22/2019	PFAS	8787			<input checked="" type="checkbox"/>	0.070	UG/L	YES

☐ Check here if any additional BWSC105 B, Measurements Form(s), are needed.

Table 1 - Summary of Groundwater Pump and Treatment System Total PFAs Analytical Data
Barnstable Country Fire and Rescue Training Academy
155 Flint Rock Road, Barnstable, MA
RTN 4-26179

SAMPLE ID	INFLUENT (PRW-4)						MIDPOINT						EFFLUENT					
	PFOS (ng/L)	PFOA (ng/L)	PFNA (ng/L)	PFHxS (ng/L)	PFHpA (ng/L)	PFDA (ng/L)	PFOS (ng/L)	PFOA (ng/L)	PFNA (ng/L)	PFHxS (ng/L)	PFHpA (ng/L)	PFDA (ng/L)	PFOS (ng/L)	PFOA (ng/L)	PFNA (ng/L)	PFHxS (ng/L)	PFHpA (ng/L)	PFDA (ng/L)
	70 ng/L						70 ng/L						70 ng/L					
SAMPLE DATE																		
4/1/2015	760	60	.. ^A	.. ^A	.. ^A	.. ^A	..	..	..^A	.. ^A	.. ^A	.. ^A	..	..	..^A	.. ^A	.. ^A	.. ^A
7/17/2015	5600	460	.. ^A	.. ^A	.. ^A	.. ^A	..	..	..^A	.. ^A	.. ^A	.. ^A	..	..	..^A	.. ^A	.. ^A	.. ^A
8/4/2015	5900	550	.. ^A	.. ^A	.. ^A	.. ^A	..	..	..^A	.. ^A	.. ^A	.. ^A	..	..	..^A	.. ^A	.. ^A	.. ^A
9/30/2015	17000	840	.. ^A	.. ^A	.. ^A	.. ^A	..	..	..^A	.. ^A	.. ^A	.. ^A	..	..	..^A	.. ^A	.. ^A	.. ^A
10/15/2015	9900	560	.. ^A	.. ^A	.. ^A	.. ^A	BRL (-9.4)	BRL (-5.3)	.. ^A	.. ^A	.. ^A	.. ^A	9.4	BRL (-5.8)	.. ^A	.. ^A	.. ^A	.. ^A
11/12/2015	9000	BRL (-2000)	.. ^A	.. ^A	.. ^A	.. ^A	BRL (-3.3)	..	..^A	.. ^A	.. ^A	.. ^A	..	..	..^A	.. ^A	.. ^A	.. ^A
1/6/2016	7600	260	.. ^A	.. ^A	.. ^A	.. ^A	120	75	.. ^A	.. ^A	.. ^A	.. ^A	..	..	..^A	.. ^A	.. ^A	.. ^A
1/21/2016	5200	160	.. ^A	.. ^A	.. ^A	.. ^A	270	16	.. ^A	.. ^A	.. ^A	.. ^A	..	..	..^A	.. ^A	.. ^A	.. ^A
2/3/2016	3500	140	.. ^A	.. ^A	.. ^A	.. ^A	540	26	.. ^A	.. ^A	.. ^A	.. ^A	..	..	..^A	.. ^A	.. ^A	.. ^A
2/17/2016	4500	140	.. ^A	.. ^A	.. ^A	.. ^A	520	24	.. ^A	.. ^A	.. ^A	.. ^A	..	..	..^A	.. ^A	.. ^A	.. ^A
3/8/2016	3700	140	.. ^A	.. ^A	.. ^A	.. ^A	420	19	.. ^A	.. ^A	.. ^A	.. ^A	BRL (-3.3)	BRL (-5.3)	.. ^A	.. ^A	.. ^A	.. ^A
3/23/2016	5000	150	.. ^A	.. ^A	.. ^A	.. ^A	650	39	.. ^A	.. ^A	.. ^A	.. ^A	BRL (-3.3)	BRL (-5.3)	.. ^A	.. ^A	.. ^A	.. ^A
4/14/2016	4800	140	.. ^A	.. ^A	.. ^A	.. ^A	610	26	.. ^A	.. ^A	.. ^A	.. ^A	BRL (-3.3)	BRL (-5.3)	.. ^A	.. ^A	.. ^A	.. ^A
4/28/2016	6300	BRL (-200)	.. ^A	.. ^A	.. ^A	.. ^A	..	..	..^A	.. ^A	.. ^A	.. ^A	BRL (-20)	BRL (-20)	.. ^A	.. ^A	.. ^A	.. ^A
5/12/2016	6800	BRL (-200)	.. ^A	.. ^A	.. ^A	.. ^A	..	..	..^A	.. ^A	.. ^A	.. ^A	BRL (-20)	BRL (-20)	.. ^A	.. ^A	.. ^A	.. ^A
5/25/2016	6900	BRL (-210)	.. ^A	.. ^A	.. ^A	.. ^A	..	..	..^A	.. ^A	.. ^A	.. ^A	BRL (-3.3)	BRL (-5.3)	.. ^A	.. ^A	.. ^A	.. ^A
6/16/2016	7800	160	.. ^A	.. ^A	.. ^A	.. ^A	..	..	..^A	.. ^A	.. ^A	.. ^A	BRL (-3.3)	BRL (-5.3)	.. ^A	.. ^A	.. ^A	.. ^A
7/6/2016	7600	270	.. ^A	.. ^A	.. ^A	.. ^A	..	..	..^A	.. ^A	.. ^A	.. ^A	10	BRL (-5.3)	.. ^A	.. ^A	.. ^A	.. ^A
8/11/2016	13000	160	.. ^A	.. ^A	.. ^A	.. ^A	1600	54	.. ^A	.. ^A	.. ^A	.. ^A	BRL (-3.3)	BRL (-5.3)	.. ^A	.. ^A	.. ^A	.. ^A
Carbon change conducted after sample collection on 08/11/16.																		
8/18/2016	9500	210	.. ^A	.. ^A	.. ^A	.. ^A	BRL (-3.3)	BRL (-5.3)	.. ^A	.. ^A	.. ^A	.. ^A	BRL (-3.3)	BRL (-5.3)	.. ^A	.. ^A	.. ^A	.. ^A
9/8/2016	9500	190	.. ^A	.. ^A	.. ^A	.. ^A	8.5	5.3	.. ^A	.. ^A	.. ^A	.. ^A	BRL (-3.3)	BRL (-5.3)	.. ^A	.. ^A	.. ^A	.. ^A
10/6/2016	17000	250	.. ^A	.. ^A	.. ^A	.. ^A	110	8.3	.. ^A	.. ^A	.. ^A	.. ^A	BRL (-3.3)	BRL (-5.3)	.. ^A	.. ^A	.. ^A	.. ^A
10/20/2016	7200	130	.. ^A	.. ^A	.. ^A	.. ^A	1000	BRL (-5.3)	.. ^A	.. ^A	.. ^A	.. ^A	BRL (-3.3)	BRL (-5.3)	.. ^A	.. ^A	.. ^A	.. ^A
11/3/2016	7900	110	.. ^A	.. ^A	.. ^A	.. ^A	650	BRL (-5.3)	.. ^A	.. ^A	.. ^A	.. ^A	BRL (-3.3)	BRL (-5.3)	.. ^A	.. ^A	.. ^A	.. ^A
11/17/2016	5400	99	.. ^A	.. ^A	.. ^A	.. ^A	1200	NA	.. ^A	.. ^A	.. ^A	.. ^A	17	NA	.. ^A	.. ^A	.. ^A	.. ^A
12/1/2016	5300	100	.. ^A	.. ^A	.. ^A	.. ^A	400	14	.. ^A	.. ^A	.. ^A	.. ^A	..	..	..^A	.. ^A	.. ^A	.. ^A
12/14/2016	5700	95	.. ^A	.. ^A	.. ^A	.. ^A	82	BRL (-5.3)	.. ^A	.. ^A	.. ^A	.. ^A	8.1	BRL (-5.3)	.. ^A	.. ^A	.. ^A	.. ^A
1/4/2017	4900	95	.. ^A	.. ^A	.. ^A	.. ^A	360	15	.. ^A	.. ^A	.. ^A	.. ^A	BRL (-3.3)	BRL (-5.3)	.. ^A	.. ^A	.. ^A	.. ^A
2/16/2017	2800	88	.. ^A	.. ^A	.. ^A	.. ^A	1000	39	.. ^A	.. ^A	.. ^A	.. ^A	25	BRL (-5.3)	.. ^A	.. ^A	.. ^A	.. ^A
3/1/2017	3700	120	.. ^A	.. ^A	.. ^A	.. ^A	1400	47	.. ^A	.. ^A	.. ^A	.. ^A	150	6.5	.. ^A	.. ^A	.. ^A	.. ^A
3/23/2017	3800	87	.. ^A	.. ^A	.. ^A	.. ^A	2000	71	.. ^A	.. ^A	.. ^A	.. ^A	160	9.5	.. ^A	.. ^A	.. ^A	.. ^A
5/3/2017	2400	86	.. ^A	.. ^A	.. ^A	.. ^A	..	..	..^A	.. ^A	.. ^A	.. ^A	BRL (-2.6)	BRL (-4.6)	.. ^A	.. ^A	.. ^A	.. ^A
Carbon change conducted on 04/13/17.																		
4/19/2017	3200	110	.. ^A	.. ^A	.. ^A	.. ^A	160	BRL (-4.6)	.. ^A	.. ^A	.. ^A	.. ^A	BRL (-2.6)	BRL (-4.6)	.. ^A	.. ^A	.. ^A	.. ^A
5/18/2017	3000	110	.. ^A	.. ^A	.. ^A	.. ^A	570	32	.. ^A	.. ^A	.. ^A	.. ^A	BRL (-2.6)	BRL (-4.6)	.. ^A	.. ^A	.. ^A	.. ^A
6/1/2017	3200	110	.. ^A	.. ^A	.. ^A	.. ^A	730	33	.. ^A	.. ^A	.. ^A	.. ^A	4.1	BRL (-4.6)	.. ^A	.. ^A	.. ^A	.. ^A
6/27/2017	2600	99	.. ^A	.. ^A	.. ^A	.. ^A	..	..	..^A	.. ^A	.. ^A	.. ^A	210	15	.. ^A	.. ^A	.. ^A	.. ^A
7/18/2017	3500	97	.. ^A	.. ^A	.. ^A	.. ^A	2300	72	.. ^A	.. ^A	.. ^A	.. ^A	49	25	.. ^A	.. ^A	.. ^A	.. ^A
Carbon change conducted on 8/09/17																		
8/16/2017	3000	110	.. ^A	.. ^A	.. ^A	.. ^A	BRL (-2.3)	BRL (-4.1)	.. ^A	.. ^A	.. ^A	.. ^A	BRL (-2.3)	BRL (-4.1)	.. ^A	.. ^A	.. ^A	.. ^A
8/28/2017	2900	100	.. ^A	.. ^A	.. ^A	.. ^A	27	BRL (-20)	.. ^A	.. ^A	.. ^A	.. ^A	..	..	..^A	.. ^A	.. ^A	.. ^A
10/2/2017	3200	85	.. ^A	.. ^A	.. ^A	.. ^A	510	25	.. ^A	.. ^A	.. ^A	.. ^A	BRL (-2.6)	BRL (-4.6)	.. ^A	.. ^A	.. ^A	.. ^A
10/12/2017	4500	110	.. ^A	.. ^A	.. ^A	.. ^A	960	29	.. ^A	.. ^A	.. ^A	.. ^A	BRL (-2.6)	BRL (-4.6)	.. ^A	.. ^A	.. ^A	.. ^A
11/9/2017	2400	77	.. ^A	.. ^A	.. ^A	.. ^A	..	..	..^A	.. ^A	.. ^A	.. ^A	BRL (-6.0)	BRL (-3.3)	.. ^A	.. ^A	.. ^A	.. ^A
11/20/2017	2000	64	.. ^A	.. ^A	.. ^A	.. ^A	520	15	.. ^A	.. ^A	.. ^A	.. ^A	BRL (-6.0)	BRL (-3.3)	.. ^A	.. ^A	.. ^A	.. ^A
12/7/2017	1600	64	.. ^A	.. ^A	.. ^A	.. ^A	780	34	.. ^A	.. ^A	.. ^A	.. ^A	11	BRL (-3.3)	.. ^A	.. ^A	.. ^A	.. ^A
2/5/2018	2100	27	.. ^A	.. ^A	.. ^A	.. ^A	390	13	.. ^A	.. ^A	.. ^A	.. ^A	BRL (-6.0)	BRL (-3.3)	.. ^A	.. ^A	.. ^A	.. ^A
2/14/2018	2100	30	.. ^A	.. ^A	.. ^A	.. ^A	850	27	.. ^A	.. ^A	.. ^A	.. ^A	11	BRL (-3.3)	.. ^A	.. ^A	.. ^A	.. ^A
System shutdown on 2/14/18 due to transfer pump failure: system restart on 4/9/18																		
4/9/2018	2,600	79	.. ^A	.. ^A	.. ^A	.. ^A	990	25	.. ^A	.. ^A	.. ^A	.. ^A	BRL (-20)	BRL (-20)	.. ^A	.. ^A	.. ^A	.. ^A
4/13/2018	3100	62	.. ^A	.. ^A	.. ^A	.. ^A	1500	35	.. ^A	.. ^A	.. ^A	.. ^A	30	BRL (-33)	.. ^A	.. ^A	.. ^A	.. ^A
5/9/2018	1800	73	.. ^A	.. ^A	.. ^A	.. ^A	490	26	.. ^A	.. ^A	.. ^A	.. ^A	BRL (-6.0)	BRL (-33)	.. ^A	.. ^A	.. ^A	.. ^A
System shutdown on 5/9/18 after sampling collection due to carbon breakthrough and influent pump alarm fail.																		
Carbon change conducted on 06/05/18: system restarted on 06/07/18.																		
6/14/2018	2800	120	79	540	110	.. ^A	200	9.4	BRL (-8.7)	38	11	.. ^A	BRL (-6.0)	BRL (-3.3)	BRL (-8.7)	BRL (-5.6)	BRL (-7.4)	.. ^A
7/13/2018	2400	100	73	600	90	.. ^A	1100	44	27	24	35	.. ^A	BRL (-20)	BRL (-20)	BRL (-20)	BRL (-20)	BRL (-20)	.. ^A
8/7/2018	2900	95	73	460	86	.. ^A	630	31	22	130	34	.. ^A	27	5.3	BRL (-8.7)	9.1	BRL (-7.4)	.. ^A
9/27/2018	4300	69	50	360	190	.. ^A	3600	69	49	330	65	.. ^A	81	BRL (-3.3)	BRL (-8.7)	14	BRL (-7.4)	.. ^A
Carbon change conducted on 09/28/18: system restarted on 09/29/18.																		
10/30/2018	2800	65	46	320	71	.. ^A	100	6	8.7	16	78	.. ^A	BRL (-6.0)	BRL (-3.3)	BRL (-8.7)	BRL (-5.6)	BRL (-7.4)	.. ^A
11/16/2018	2900	62	50	290	77	.. ^A	460	24	19	94	26	.. ^A	BRL (-6.0)	BRL (-3.3)	BRL (-8.7)	BRL (-5.6)	BRL (-7.4)	.. ^A
12/14/2018	1900	62	49	300	70	.. ^A	1200	40	30	180	45	.. ^A	BRL (-6.0)	BRL (-3.3)	BRL (-8.7)	BRL (-5.6)	BRL (-7.4)	.. ^A
1/10/2019	2400	84	68	410	96	.. ^A	2200	71	54	360	82	.. ^A	21	BRL (-3.3)	BRL (-8.7)	BRL (-5.6)	BRL (-7.4)	.. ^A
Carbon change conducted on 2/4/19: system restarted on 2/5/19.																		
2/15/2019	4600	130	120	550	110	.. ^A	560	14	14	62	14	.. ^A	BRL (-6.0)	BRL (-3.3)	BRL (-8.7)	BRL (-6.2)	BRL (-7.4)	.. ^A
3/11/2019	5600	120	120	520	98	.. ^A	63	BRL (-3.3)	BRL (-4.9)	BRL (-5.6)	BRL (-7.1)	.. ^A	BRL (-6.0)	BRL (-3.3)	BRL (-4.9)	BRL (-5.6)	BRL (-7.1)	.. ^A
Iron sediments buried out of influent tank and associated piping.																		
4/9/2019	6600	140	180	580	99	.. ^A	400	7.4	9.9	31	BRL (-7.1)	.. ^A	BRL (-5.2)	BRL (-7.4)	BRL (-4.9)	BRL (-5.2)	BRL (-7.1)	.. ^A
5/21/2019	2500	83	59	290	100	8.6	3400	72	69	260	7.8	12	BRL (-12)	BRL (-7.4)	BRL (-4.9)	BRL (-5.2)	BRL (-7.1)	BRL (-4.1)
Carbon change conducted on 06/13/19: system restarted on 06/14/19.																		
6/27/2019	8400	86	120	340	68	26	BRL (-5.2)	BRL (-7.4)	BRL (-4.9)	BRL (-5.2)	BRL (-7.1)	BRL (-4.1)	BRL (-5.2)	BRL (-7.4)	BRL (-4.9)	BRL (-5.2)	BRL (-7.1)	BRL (-4.1)
7/29/2019	9500	78	100	290	72	16	BRL (-5.2)	BRL (-7.4)	BRL (-4.9)	BRL (-5.2)	BRL (-7.1)	BRL (-4.1)	BRL (-5.2)	BRL (-7.4)	BRL (-4.9)	BRL (-5.2)	BRL (-7.1)	BRL (-4.1)
8/22/2019	8300	64	100	260	63	20	BRL (-5.2)	BRL										

Table 2 - Summary of Groundwater Pump and Treatment System Operating and Maintenance Data
Barnstable Country Fire and Rescue Training Academy
155 Flint Rock Road, Barnstable, MA
RTN 4-26179

Date	Operator ¹	System Operating on Arrival	Influent Bag Filter Differential Pressure (psi) ⁷		Pre-Filter Changeout Differential Pressure (psi)		Post-Filter Changeout Differential Pressure (psi)		6" Influent Tank Fill Rate (min)	Influent Flow Rate (GPM) ²	Days System Operating	Effluent Flow Rate (GPM) ²	Totalizer (Gal)	Total Gallons Treated	Estimated Total PFAs Removal (kg) ³	System Operating on Departure	System Sampled	Comments
			Pre	Post	Gauge: P1	Gauge: P2	Gauge: P1	Gauge: P2										
4/9/2018	CE	No	75	NA	NA	NA	75	NA			0	--				Yes	Yes	Conducted system pressure checks after restart.
4/10/2018	CE	Yes	94	74	NA	NA	77	74	2.07	59.3	1	--			0.001	Yes	No	Changed 3 bag filters (5 µm) and conducted system pressure checks.
4/11/2018	CE	Yes	76	NA	NA	NA	76	NA	2.78	44.0	2	--			0.001	Yes	No	PRW-4 well pump is operating at high level, high level float is not triggering pump to shut off. CS turned off PRW-4 manually at 1243 and restarted at 14:32. Carbon vessels were backwashed individually from 1313 to 1427.
4/12/2018	CE	Yes	NA	NA	NA	NA	75	75	2.78	44.0	3	--			0.002	Yes	No	Transfer pump is drawing down influent/holding tank faster than PRW-4 well is filling tank. No bag filter changes.
4/13/2018	CE	Yes	88	74	NA	NA	75	74	2.80	43.8	4	--			0.003	Yes	Yes	Changed 3 bag filters (5 µm) and conducted system pressure checks.
4/16/2018	CE	Yes	86	74	NA	NA	74	74	2.83	43.2	7	--			0.005	Yes	No	Pressure differential at 8 psi, no bags change. PRW-4 well high level float not triggering pump to shut off. Changed 3 bag filters (5 µm) and conducted system pressure checks.
4/19/2018	CE	Yes	83		NA	NA	75		NA	NA	10	--			NA	Yes	No	Transfer pump is maintaining drawdown and flow through system ahead of the PRW-4 well pump, no bag changes.
4/20/2018	CE	Yes	89	75	NA	NA	75	75	3.07	39.9	11	--			0.007	Yes	No	Changed 3 bag filters (5 µm) and conducted system pressure checks.
4/23/2018	CE	Yes	92	76	NA	NA	77	76	3.18	38.5	14	--			0.009	Yes	No	High level float not triggering PRW-4 to shut down. Sean (B&B Electric) on site to inspect high float electrical issues. PRW-4 shut off at 13:40 to inspect control panel, PRW-4 restarted at 14:55. Transfer pump maintaining flow ahead of PRW-4 well pump. Both carbon vessels backwashed. Changed 3 bag filters (5 um).
4/24/2018	CE	Yes	74	NA	NA	NA	76		3.18	38.5	15	--			0.009	Yes	No	No bag change, conducted system pressure checks.
4/25/2018	CE	Yes	79	NA	NA	NA	75		3.30	37.1	16	--			0.009	Yes	No	Pressure differential of 4 psi, no bag filter change, transfer pump is maintaining flow ahead of the PRW-4 well pump.
4/26/2018	CE	Yes	83	NA	NA	NA	76		3.37	36.4	17	--			0.010	Yes	No	Pressure differential of 7 psi, no bag filter change, transfer pump is maintaining flow ahead of the PRW-4 well pump. While both the system transfer pump and PRW-4 well pump are on and operating, treatment takes 28 seconds to drawn down 1 inch in influent tank (~17.5 gallons)
4/27/2018	CE	Yes	84	73	NA	NA	75	75	3.42	35.8	18	--			0.010	Yes	No	Changed 3 bag filters (5 µm) and conducted system pressure checks.
4/30/2018	CE	Yes	87	73	NA	NA	75	75	3.53	34.7	21.00	--			0.012	Yes	No	Changed 3 bag filters (5 µm) and conducted system pressure checks.
Totals for April 2018							Average Flow Rate (gpm)			41.3	21.00				0.014			
5/1/2018	CS	Yes	83		NA	NA	75		3.83	32.0	0.00	--			0.0000	Yes	No	Adjusted /increased VFD of transfer pump from 35 psi to 40 psi to maintain drawdown ahead of PRW-4 well pump . No bag change. 1" drawdown ~ 1:41
5/2/2018	CS	Yes	94	75	NA	NA	80	75	3.63	33.7	1.00	--			0.0006	Yes	No	Changed 3 bag filters (5 µm) and conducted system pressure checks. Conducted a backwash on both carbon vessels, PRW-4 well pump would not shut off, float switch relay stuck in on position, PRW-4 shutoff at 0733 and restarted at 08:26 with float switch working properly. Adjusted transfer pump rate back to 35 psi.
5/4/2018	JES	Yes	110	73	NA	NA	73	75	3.65	33.6	3.00	--			0.0017	Yes	No	Changed 3 bag filters (10 um) and conducted system pressure checks.
5/7/2018	JES	Yes	110	73	NA	NA	74	74	3.7	33.1	6.00	--			0.0034	Yes	No	Changed 3 bag filters (5 um) and conducted system pressure checks.
Totals for May 2018							Average Flow Rate (gpm)			33.1	8.00				0.004			
6/5/2018	CE/MM	No	--	--	NR	NR	NR	NR	--	--	0	--			0	--	--	Carbon Change out- filled vessels with water and let to sit for ~24 hours, changed 3 bag filters (5 um)
6/6/2018	CE	Yes	--	--	NR	NR	NR	NR	3.45	35.5	1	--			0.001	No	No	Pump floats not operating correctly, low float turns pump off and when low float is in water again, transfer pump starts. System remained off.
6/7/2018	CE	Yes	62	52	NR	NR	NR	NR	3.18	38.5	2	--			0.001	Yes	No	Electrician on site in morning to correct float error; system operating normally.
6/11/2018	CE	Yes	56	61	NR	NR	NR	NR	3.63	33.7	6	--			0.003	Yes	No	No bag change, conducted system pressure checks.
6/12/2018	CE	Yes	56	63	NR	NR	NR	NR	3.68	33.3	7	--			0.004	Yes	No	No bag change, conducted system pressure checks.
6/13/2018	CE	Yes	58	54	NR	NR	NR	NR	3.46	35.4	8	--			0.005	Yes	No	Changed 3 bag filters.
6/13/2018	MM	Yes	--	--	NR	NR	NR	NR	--	--	8	--			--	--	Yes	Did not collect system data, only collected samples from Influent, Midpoint, and Effluent sample ports/locations.
6/16/2018	CE	Yes	77	60	NR	NR	NR	NR	--	--	11	--			--	--	No	Changed 3 bag filters.
6/19/2018	CE	Yes	92	65	NR	NR	NR	NR	--	--	14	--			--	No	No	Changed 3 bag filters and repaired holding basket for bags. Recovery well was not running, went out to the well and checked power, turned power to well on/off and did not hear contact relay pull in. System remained off until electrical issue in recovery well is fixed. Fixed at 15:45
6/20/2018	CE	Yes	72	60	NR	NR	NR	NR	3.73	32.8	15	--			0.008	Yes	No	No bag change, conducted system pressure checks.
6/21/2018	CE	Yes	79	60	NR	NR	NR	NR	--		16	--						No bag change, conducted system pressure checks. Worked by phone with Bob Simmonds on Control panel for transfer pump, pump will not change speed.
6/22/2018	CE	Yes	87	67	NR	NR	NR	NR	3.72	32.9	17	--			0.009	Yes	No	Changed 3 bag filters, conducted system pressure checks.
6/25/2018	CE	Yes	81	68	NR	NR	NR	NR	3.77	32.5	20	--			0.011	Yes	No	Changed 3 bag filters, conducted system pressure checks.
6/27/2018	CE	Yes	79	68	NR	NR	NR	NR	3.73	32.8	22	--			0.012	Yes	No	Changed 3 bag filters, conducted system pressure checks.
6/29/2018	CE	Yes	78	68	NR	NR	NR	NR	3.68	33.3	24	--			0.014	Yes	No	Changed 3 bag filters, conducted system pressure checks.
Totals for June 2018							Average Flow Rate (gpm)			33.9	24				0.013			
7/2/2018	CE	Yes	83	69	NR	NR	NR	NR	3.95	31.0	2	--			0.001	Yes	No	Changed 3 bag filters, conducted system pressure checks.
7/5/2018	CE	No	--	--	NR	NR	NR	NR	--	--	5	--			--	No	No	No power supplied to the recovery well.
7/6/2018	CE	Yes	86	69	NR	NR	NR	NR	3.87	31.7	5	--			0.003	Yes	No	Changed 3 bag filters, conducted system pressure checks.
7/9/2018	CE	Yes	89	72	NR	NR	NR	NR	3.77	32.5	8	--			0.004	Yes	No	Changed 3 bag filters, conducted system pressure checks.
7/11/2018	CE	Yes	88	72	NR	NR	NR	NR	3.85	31.8	10	--			0.005	Yes	No	Changed 3 bag filters, conducted system pressure checks.
7/13/2018	CE	Yes	89	72	NR	NR	NR	NR	4.08	30.0	12	--			0.006	Yes	Yes	Changed 3 bag filters, conducted system pressure checks.
7/16/2018	CE	Yes	98	70	NR	NR	NR	NR	3.97	30.9	15	--			0.007	Yes	No	Changed 3 bag filters, conducted system pressure checks.
7/18/2018	CE	No	--	--	NR	NR	NR	NR	--	--	--	--			--	No	No	No power supplied to the recovery well. Contact relay at recovery well pump out.
7/19/2018	CE	Yes	94	72	NR	NR	NR	NR	4.03	30.4	17	--			0.008	Yes	No	Electrician replaced the contact relay; recovery well operating again. Changed 3 bag filters and collected system pressure checks.
7/20/2018	CE	Yes	81	72	NR	NR	NR	NR	--	--	--	--			--	Yes	No	Changed 3 bag filters, conducted system pressure checks. Backwashed carbon vessels.
7/23/2018	CE	Yes	84	72	NR	NR	NR	NR	4.47	27.4	21	--			0.009	Yes	No	Changed 3 bag filters, conducted system pressure checks.
7/25/2018	CE	Yes	84	72	NR	NR	NR	NR	--	--	--	--			--	Yes	No	Collected system pressure checks.
7/26/2018	CE	Yes	80	72	NR	NR	NR	NR	--	--	--	--			--	Yes	No	Collected system pressure checks.
7/27/2018	CE	Yes	88	72	NR	NR	NR	NR	4.8	25.5	25	--			0.010	Yes	No	Changed 3 bag filters, conducted system pressure checks.
7/30/2018	CE	Yes	91	71	NR	NR	NR	NR	4.95	24.7	28	--			0.011	Yes	No	Changed 3 bag filters, conducted system pressure checks.
Totals for July 2018							Average Flow Rate (gpm)			29.6	28				0.015			
8/2/2018	CE	Yes	89	70	NR	NR	NR	NR	5.17	23.7	2	--			0.001	Yes	No	Changed 3 bag filters, conducted system pressure checks.
8/6/2018	CE	Yes	94	72	NR	NR	NR	NR	5.22	23.5	6	--			0.003	Yes	No	Changed 3 bag filters, conducted system pressure checks.
8/10/2018	CE	Yes	98	72	NR	NR	NR	NR	4.32	28.4	10	--			0.006	Yes	No	Changed 3 bag filters, conducted system pressure checks. System was sampled on August 7, 2018.
8/14/2018	CE	Yes	82	69	NR	NR	NR	NR	4.8	25.5	14	--			0.007	Yes	No	Changed 3 bag filters, conducted system pressure checks.
8/17/2018	CE	Yes	81	64	NR	NR	NR	NR	5.0	24.5	17	--			0.008	Yes	No	Changed 3 bag filters, conducted system pressure checks. Backwashed carbon vessels.
8/21/2018	CE	No	78	68	NR	NR	NR	NR	5.2	23.6	20	--			0.009	Yes	No	Recovery well down. due to contactor burnout/failure. System restarted at 14:45.
8/24/2018	CE	Yes	77	68	NR	NR	NR	NR	5.32	23.0	23	--			0.010	Yes	No	Changed 3 bag filters, conducted system pressure checks.
8/28/2018	CE	Yes	89	69	NR	NR	NR	NR	6.03	20.3	27	--			0.011	Yes	No	Changed 3 bag filters, conducted system pressure checks.
Totals for August 2018							Average Flow Rate (gpm)			24.1	30				0.014			

Table 2 - Summary of Groundwater Pump and Treatment System Operating and Maintenance Data
Barnstable Country Fire and Rescue Training Academy
155 Flint Rock Road, Barnstable, MA
RTN 4-26179

Date	Operator ¹	System Operating on Arrival	Influent Bag Filter Differential Pressure (psi) ²		Pre-Filter Changeout Differential Pressure (psi)		Post-Filter Changeout Differential Pressure (psi)		6" Influent Tank Fill Rate (min)	Influent Flow Rate (GPM) ²	Days System Operating	Effluent Flow Rate (GPM) ²	Totalizer (Gal)	Total Gallons Treated	Estimated Total PFAs Removal (kg) ³	System Operating on Departure	System Sampled	Comments
			Pre	Post	Gauge: P1	Gauge: P2	Gauge: P1	Gauge: P2										
9/4/2018	CE	Yes	89	67	NR	NR	NR	NR	5.87	20.9	4	--			0.002	Yes	No	Changed 3 bag filters, conducted system pressure checks.
9/7/2018	CE	Yes	82	70	NR	NR	NR	NR	6.52	18.8	7	--			0.004	Yes	No	Changed 3 bag filters, conducted system pressure checks.
9/11/2018	CE	Yes	88	70	NR	NR	NR	NR	7.03	17.4	11	--			0.005	Yes	No	Changed 3 bag filters, conducted system pressure checks.
9/14/2018	CE	Yes	86	70	NR	NR	NR	NR	7.18	17.1	14	--			0.006	Yes	No	Changed 3 bag filters, conducted system pressure checks.
9/18/2018	CE	Yes	91	74	NR	NR	NR	NR	8.02	15.3	18	--			0.007	Yes	No	Changed 3 bag filters, conducted system pressure checks.
9/21/2018	CE	No	74	70	NR	NR	NR	NR	--	--	--	--			--	No	No	Recovery well down.
9/24/2018	CE	Yes	94	70	NR	NR	NR	NR	8.03	15.3	23	--			0.010	Yes	No	Changed 3 bag filters, conducted system pressure checks.
9/28/2018	CE	Yes	--	--	NR	NR	NR	NR	--	--	--	--			--	--	--	Carbon Change out- filled vessels with water and let to sit for ~24 hours, changed 3 bag filters (5 um), system sampled on 09/27/18.
Totals for September 2018							Average Flow Rate (gpm)			17.4	28				0.010			
10/1/2018	CE	No	78	57	NR	NR	NR	NR	5.83	21.0	1	--			0.000	Yes	No	System restarted after scheduled shutdown for carbon exchange. Changed 3 bag filters, conducted system pressure checks.
10/5/2018	CE	Yes	65	55	NR	NR	NR	NR	6.35	19.3	5	--			0.002	Yes	No	Changed 3 bag filters, conducted system pressure checks.
10/10/2018	CE	Yes	56	57	NR	NR	NR	NR	6.95	17.6	10	--			0.003	Yes	No	Changed 3 bag filters, conducted system pressure checks.
10/12/2018	CE	Yes	60	55	NR	NR	NR	NR	--	--	12	--			--	Yes	No	No bag change necessary.
10/15/2018	CE	Yes	70	60	NR	NR	NR	NR	6.9	17.8	15	--			0.005	Yes	No	Changed 3 bag filters, conducted system pressure checks. Repaired filter basket.
10/19/2018	CE	Yes	71	60	NR	NR	NR	NR	7.12	17.2	19	--			0.006	Yes	No	Changed 3 bag filters, conducted system pressure checks.
10/23/2018	CE	Yes	76	63	NR	NR	NR	NR	7.73	15.8	23	--			0.007	Yes	No	Changed 3 bag filters, conducted system pressure checks. Repaired holding basket in filter vessel.
10/26/2018	CE	Yes	72	64	NR	NR	NR	NR	8.83	13.9	26	--			0.007	Yes	No	Changed 3 bag filters, conducted system pressure checks.
10/30/2018	CE	Yes	80	65	NR	NR	NR	NR	7.52	16.3	30	--			0.009	Yes	Yes	Changed 3 bag filters, conducted system pressure checks. Repaired bag holder (basket) in filter vessel.
Totals for October 2018							Average Flow Rate (gpm)			17.4	31				0.011			
11/2/2018	CE	Yes	71	62	NR	NR	NR	NR	7.86	15.6	2	--			0.001	Yes	No	Changed 3 bag filters, conducted system pressure checks.
11/6/2018	CE	Yes	71	62	NR	NR	NR	NR	--	--	6	--				No	No	Changed 3 bag filters, conducted system pressure checks. Backwashed both carbon vessels. System shutdown at 10:00 for force main descaling and flush.
11/8/2018	CE	Yes	65	45	NR	NR	NR	NR	5.25	23.3	6	--			0.004	Yes	No	Changed 3 bag filters, conducted system pressure checks. System restarted at 12:40 following the completion of the force main descaling.
11/9/2018	CE	Yes	55	44	NR	NR	NR	NR	5.2	23.6	7	--			0.004	Yes	No	Changed 3 bag filters, conducted system pressure checks.
11/12/2018	CE	Yes	51	47	NR	NR	NR	NR	5.03	24.4	10	--			0.007	Yes	No	Conducted system pressure checks.
11/13/2018	CE	Yes	52	47	NR	NR	NR	NR	4.88	25.1	11	--			0.007	Yes	No	Conducted system pressure checks.
11/14/2018	CE	Yes	54	47	NR	NR	NR	NR	4.92	24.9	12	--			0.008	Yes	No	Conducted system pressure checks.
11/15/2018	CE	Yes	55	47	NR	NR	NR	NR	--	--	13	--			--	Yes	No	Conducted system pressure checks.
11/16/2018	CE	Yes	54	50	NR	NR	NR	NR	4.63	26.5	14	--			0.010	Yes	Yes	Changed 3 bag filters, conducted system pressure checks.
11/21/2018	CE	Yes	63	53	NR	NR	NR	NR	5.08	24.1	19	--			0.012	Yes	No	Changed 3 bag filters, conducted system pressure checks.
11/27/2018	CE	Yes	69	55	NR	NR	NR	NR	5.75	21.3	25	--			0.014	Yes	No	Changed 3 bag filters, conducted system pressure checks.
11/30/2018	CE	Yes	77	58	NR	NR	NR	NR	5.85	20.9	28	--			0.016	Yes	No	Changed 3 bag filters, conducted system pressure checks.
Totals for November 2018							Average Flow Rate (gpm)			23.0	28				0.012			
12/3/2018	CE	Yes	63	62	NR	NR	NR	NR	5.33	23.0	3	--			0.001	Yes	No	Changed 3 bag filters, conducted system pressure checks.
12/7/2018	CE	Yes	83	67	NR	NR	NR	NR	5.58	22.0	7	--			0.002	Yes	No	Changed 3 bag filters, conducted system pressure checks.
12/11/2018	CE	Yes	75	65	NR	NR	NR	NR	5.8	21.1	11	--			0.003	Yes	No	Changed 3 bag filters, conducted system pressure checks.
12/14/2018	CE	Yes	70	63	NR	NR	NR	NR	5.4	22.7	14	--			0.004	Yes	Yes	Changed 3 bag filters, conducted system pressure checks.
12/18/2018	CE	Yes	70	65	NR	NR	NR	NR	6.72	18.2	18	--			0.004	Yes	No	Changed 3 bag filters, conducted system pressure checks.
12/21/2018	CE	Yes	70	67	NR	NR	NR	NR	6.7	18.3	21	--			0.005	Yes	No	Changed 3 bag filters, conducted system pressure checks.
12/26/2018	CE	Yes	78	71	NR	NR	NR	NR	7.38	16.6	26	--			0.006	Yes	No	Changed 3 bag filters, conducted system pressure checks.
12/28/2018	CE	Yes	82	70	NR	NR	NR	NR	7.35	16.7	28	--			0.006	Yes	No	Changed 3 bag filters, conducted system pressure checks.
12/31/2018	CE	Yes	82	71	NR	NR	NR	NR	7.38	16.6	31	--			0.007	Yes	No	Changed 3 bag filters, conducted system pressure checks.
Totals for December 2018							Average Flow Rate (gpm)			19.5	31				0.008			
1/4/2019	RPT	Yes	72	72	NR	NR	NR	NR	6.5	18.8	4	--			0.001	Yes	No	Changed 3 bag filters, conducted system pressure checks, observed hole in pre-filter basket.
1/7/2019	PCB	Yes	80	71	NR	NR	NR	NR	6.2	19.8	7	--			0.002	Yes	No	Change 3 bag filters, conducted system pressure checks.
1/10/2019	RPT	Yes	75	70	NR	NR	NR	NR	7.03	17.4	10	--			0.003	Yes	No	Conducted system pressure checks.
1/11/2019	MDM	Yes	79	71	NR	NR	NR	NR	7.62	16.1	11	--			0.003	Yes	Yes	Change 3 bag filters, conducted system pressure checks.
1/14/2019	PCB	Yes	76	71	NR	NR	NR	NR	--	--	14	--			--	Yes	No	Conducted system pressure checks.
1/15/2019	PCB	Yes	80	71	NR	NR	NR	NR	--	--	15	--			--	Yes	No	Change 3 bag filters, conducted system pressure checks.
1/18/2019	PCB	Yes	76	71	NR	NR	NR	NR	8.65	14.2	18	--			0.004	Yes	No	Change 3 bag filters, conducted system pressure checks.
1/21/2019	SCT	Yes	80	71	NR	NR	NR	NR	8.15	15.0	21	--			0.005	Yes	No	Change 3 bag filters, conducted system pressure checks.
1/24/2019	SCT	Yes	85	69	NR	NR	NR	NR	9.1	13.5	24	--			0.005	Yes	No	Change 3 bag filters, conducted system pressure checks.
1/27/2019	SCT	Yes	85	68	NR	NR	NR	NR	8.25	14.8	27	--			0.007	Yes	No	Change 3 bag filters, conducted system pressure checks.
1/30/2019	PCB	Yes	86	71	NR	NR	NR	NR	9	13.6	30	--			0.007	Yes	No	Change 3 bag filters, conducted system pressure checks.
1/31/2019	PCB	Yes	83	71	NR	NR	NR	NR	--	--	31	--			--	Yes	No	Change 3 bag filters, conducted system pressure checks.
Totals for January 2019							Average Flow Rate (gpm)			14.5	31				0.008			
2/4/2019	RPT	Yes	--	--	NR	NR	NR	NR	--	--	--	--			--	--	No	Carbon Change out- filled vessels with water and let to sit for ~24 hours, changed 3 bag filters (5 um).
2/5/2019	RPT	No	52	35	NR	NR	NR	NR	7.33	16.7	4	222.7			0.002	Yes	No	System restarted after scheduled shutdown for carbon exchange. Changed bag filters and conducted system pressure checks.
2/11/2019	PCB	Yes	83	45	NR	NR	NR	NR	11.58	10.6	10	--			--	Yes	No	Changed 3 bag filters, conducted system pressure checks.
2/13/2019	ST	Yes	55	43	NR	NR	NR	NR	8.12	15.1	12	--			--	Yes	No	Changed 3 bag filters, conducted system checks.
2/15/2019	MDM	Yes	--	--	NR	NR	NR	NR	7.5	16.3	14	131.7			0.007	Yes	Yes	Sampled system and collected system pressure checks.
2/22/2019	ST	Yes	--	--	NR	NR	NR	NR	10.75	11.4	21	43.75			0.007	Yes	No	Changed 3 bag filters, repaired filter basket, adjusted and lowered the speed drive on the transfer/discharge pump.
2/25/2019	MDM	Yes	25	15	NR	NR	NR	NR	7.5	16.3	23	--			--	Yes	No	System shutdown at 09:33 for the replacement of the submersible pump at PRW-4 and restarted at 14:04.
Totals of February 2019							Average Flow Rate (gpm)			14.4	26	132.7			0.011	Yes	No	
3/1/2019	ST	Yes	43	40	NR	NR	NR	NR	7.55	16.2	1	76.6			0.001	Yes	No	Conducted system pressure checks.
3/3/2019	ST	Yes	45	40	NR	NR	NR	NR	--	--	3	--			--	Yes	No	Conducted system pressure checks, changed bag filters, installed/replaced filters baskets with new stainless steel filter baskets.
3/5/2019	PCB	Yes	46	40	NR	NR	NR	NR	--	--	5	--			--	Yes	No	Conducted system pressure checks.
3/7/2019	PCB/ST	Yes	50	40	NR	NR	NR	NR	8.16	15.0	7	--			0.004	Yes	No	Conducted system pressure checks and changed bag filters.
3/9/2019	ST	Yes	44	41	NR	NR	NR	NR	7.75	15.8	9	--			0.005	Yes	No	Changed bag filters.
3/11/2019	ST	Yes	58	50	NR	NR	NR	NR	7.92	15.5	11	68.1			0.006	Yes	Yes	Changed bag filters
3/13/2019	ST	Yes	65	50	NR	NR	NR	NR	4.62	26.5	13	--			--	Yes	No	Noticed low speed on transfer pump, adjusted VFD to increase pump speed to 55 Hz. Changed 3 bag filters twice.
3/14/2019	ST	Yes	75	50	NR	NR	NR	NR	5.16	23.7	14	70.0			0.012	Yes	No	Conducted system pressure checks and collected samples from EQ tank for analysis at County lab for disposal criteria.
3/16/2019	PCB	No	62	60	NR	NR	NR	NR	--	--	15	--			--	Yes	No	Pump at PRW-4 shut off upon arrival to system, contact relay failure, possibly due to power surge from thunderstorm. Restarted system after contact relay was replaced.
3/22/2019	ST	Yes	28	20	NR	NR	NR	NR	2.38	51.5	21	51.5			0.038	Yes	No	Replaced VFD drive for effluent transfer pump inside system shed.
3/23/2019	ST	Yes	23	20	NR	NR	NR	NR	--	--	22	--			--	No	No	Changed bag filters before system shutdown. System shutdown due to slow flow rate from transfer pump as a result of accumulating iron sediments in EQ tank from slow influent flow rate as a result of a the failing PRW-4 well pump.
3/29/2019	RPT/ST	No	--	--	NR	NR	NR	NR	--	--	23	--			--	Yes	No	Removed/pumped out the contents of the influent equalization (EQ) tank, repaired the system's pump electrical components, adjusted VFD on transfer pump, installed unions on influent piping manifold, replaced bag filters at discharge into the EQ tank, and restarted the system at 1645.
Totals of March 2019							Average Flow Rate (gpm)			29.3	25	63.2			0.022			

Table 2 - Summary of Groundwater Pump and Treatment System Operating and Maintenance Data
Barnstable Country Fire and Rescue Training Academy
155 Flint Rock Road, Barnstable, MA
RTN 4-26179

Date	Operator ¹	System Operating on Arrival	Influent Bag Filter Differential Pressure (psi) ⁷		Pre-Filter Changeout Differential Pressure (psi)		Post-Filter Changeout Differential Pressure (psi)		6" Influent Tank Fill Rate (min)	Influent Flow Rate (GPM) ²	Days System Operating	Effluent Flow Rate (GPM) ²	Totalizer (Gal)	Total Gallons Treated	Estimated Total PFAs Removal (kg) ³	System Operating on Departure	System Sampled	Comments
			Pre	Post	Gauge: P1	Gauge: P2	Gauge: P1	Gauge: P2										
4/1/2019	ST	Yes	--	--	40	28	40	39	2.25	54.4	1	--			0.002	Yes	No	Conducted system pressure checks and changed bag filters.
4/3/2019	ST	Yes	--	--	40	39	--	--	--	--	3	--			--	Yes	No	Conducted system pressure checks.
4/6/2019	ST	Yes	--	--	50	41	50	50	2.23	54.9	6	--			0.014	Yes	No	Conducted system pressure checks and changed bag filters.
4/9/2019	GWTT	Yes	--	--	40	50	--	--	1.6	76.6	9	18.85			0.029	Yes	Yes	Conducted system pressure checks, backwashed the primary carbon vessel for ~30 minutes; inspected the transfer pump and removed excess iron oxide sedimentation from the inlet piping.
4/10/2019	ST	Yes	--	--	50	15	23	25	--	--	10	--			--	Yes	No	Conducted system pressure checks and changed bag filters.
4/11/2019	ST	Yes	--	--	40	35	35	35	--	--	11	--			--	Yes	No	Conducted system pressure checks and changed bag filters.
4/12/2019	GWTT	Yes	--	--	50	40	44	46	3	40.8	12	--			0.020	Yes	No	Conducted system pressure checks and changed bag filters.
4/15/2019	GWTT	Yes	--	--	55	45	55	55	4.08	30.0	15	--			0.019	Yes	No	Conducted system pressure checks and changed bag filters.
4/19/2019	GWTT	Yes	--	--	58	55	35	40	2.5	49.0	19	--			0.039	Yes	No	Conducted system pressure checks and changed bag filters.
4/23/2019	GWTT	Yes	--	--	48	47	50	55	4.00	30.6	23	33.4			0.029	Yes	No	Conducted system pressure checks and changed bag filters.
4/26/2019	GWTT	Yes	--	--	58	50	55	60	--	--	26	20.3			--	Yes	No	Conducted system pressure checks and changed bag filters, conducted general housekeeping duties.
4/30/2019	GWTT	No	--	--	--	--	--	--	--	--	29	--			--	--	Yes	System off on arrival due to contact relay failure for transfer pump operation; system restarted at 16:29 after contact relay was replaced.
Totals of April 2019									Average Flow Rate (gpm)	48.1	29	24.2			0.058			
5/3/2019	GWTT	Yes	--	--	55	35	45	50	2.18	56.2	3	32.93			0.003	Yes	No	Conducted system pressure checks and changed bag filters.
5/7/2019	GWTT	Yes	--	--	58	38	50	55	2.05	59.8	7	31.57			0.007	Yes	No	Conducted system pressure checks and changed bag filters.
5/10/2019	GWTT	No	--	--	--	--	--	--	--	--	--	--			--	--	--	System down as a result of failed VFD for transfer pump operation, changed bag filters.
5/17/2019	GWTT	No	--	--	55	38	--	--	--	--	10	--			--	Yes	No	Installed new VFD drive, system shutdown due to power surge from thunderstorm. Electrician added 15 minute- electrical control delay at the control panel in the system shed; creating a 15 minute delay before the pump at PRW-4 powers on at the "high level" float switch.
5/21/2019	MDM	No	--	--	57	30	57	60	1.83	66.9	14	33.38			0.016	Yes	Yes	Power surge from rogue ground voltage at electrical easement "fried" the electrical delay at control panel in system shed. Electrician bypassed delay to allow system restart at 11:15. Electrician will change coil at PRW-4 panel to lower voltage at later date. Conducted system pressure checks and changed bag filters.
5/24/2019	GWTT	Yes	--	--	58	35	58	60	2.083	58.8	17	25.36			0.017	Yes	No	Conducted system pressure checks and changed bag filters. Bypass installed to allow 15 minute delay on PRW-4 submersible pump float switch.
5/28/2019	GWTT	Yes	--	--	56	46	55	60	2.65	46.2	21	52.10			0.016	Yes	No	Conducted system pressure checks and changed bag filters twice. Backwashed both carbon vessels.
5/31/2019	GWTT	Yes	--	--	58	35	55	60	2.17	56.5	24	36.90			0.022	Yes	No	Conducted system pressure checks and changed bag filters, 3" butterfly valve on INF of LGACS #2 replaced.
Totals of May 2019									Average Flow Rate (gpm)	57.4	24	35.4			0.023			
6/4/2019	GWTT	Yes	--	--	57	48	57	62	2.46	49.8	4	20.2			0.010	Yes	No	Conducted system pressure checks and changed bag filter. Replaced 4" flow meter and associated piping to 3" meter/pipe size.
6/7/2019	GWTT	Yes	--	--	57	45	57	62	2.43	50.4	7	16.2			0.017	Yes	No	Conducted system pressure checks and changed bag filters.
6/11/2019	GWTT	Yes	--	--	76	78	70	82	2.53	48.4	11	17.3			0.026	Yes	No	Conducted system pressure checks and changed bag filters. System shutdown due to high pressure measurement on the LGAC vessels, (from iron fouling); carbon change to occur on 6/13/19.
6/13/2019	MDM	No	--	--	--	--	--	--	--	--	11	--			--	No	No	System off for carbon change out.
6/14/2019	GWTT	No	--	--	--	--	25	28	2.3	53.3	12	167.12			0.032	Yes	No	System restarted at 13:00; adjusted flow rate via VFD.
6/18/2019	GWTT	Yes	--	--	25	10	11	15	2.23	54.9	16	56.2			0.043	Yes	No	Conducted system checks, changed bag filters, adjusted VFD to 55 GPM.
6/21/2019	GWTT	Yes	--	--	17	15	17	20	2.12	57.8	19	58.6			0.054	Yes	No	Conducted system checks, changed bag filters, adjusted VFD to 28 Hz.
6/25/2019	GWTT	Yes	--	--	20	18	20	25	2.3	53.3	23	59.0			0.060	Yes	No	Conducted system checks, changed bag filters, adjusted VFD from 28 to 35 Hz.
6/27/2019	MDM	Yes	--	--	33	21	--	--	3.2	38.3	25	17.5			0.047	Yes	Yes	Conducted system checks, system VFD at 35 Hz; pressure gauges at LGAC 2 are 0 psi.
6/28/2019	GWTT	Yes	--	--	33	22	30	35	2.4	51.0	26	60.9			0.065	Yes	No	Conducted system checks, changed bag filters, VFD at 35 Hz. Effluent flow rate increased after bag filter changeout.
Totals of June 2019									Average Flow Rate (gpm)	50.8	27	62.4			0.068			
7/2/2019	GWTT	Yes	--	--	32	20	30	32	2.52	48.6	2	52.6	20575.0		0.005	Yes	No	Conducted system checks, changed bag filters.
7/5/2019	GWTT	Yes	--	--	25	23	30	35	2.53	48.4	5	52.6	242970.0	222395.0	0.013	Yes	No	Conducted system checks, changed bag filters, VFD at 35 Hz. Effluent flow rate increased after bag filter changeout.
7/9/2019	GWTT	Yes	--	--	32	25	36	40	2.35	52.1	9	58.6	311680.0	68710.0	0.026	Yes	No	Conducted system checks, changed bag filters, VFD at 35 Hz. Effluent flow rate increased after bag filter changeout. Primary LGAC vessel requires a
7/12/2019	GWTT	Yes	--	--	39	35	39	43	2.42	50.6	12	55.7	407920.0	96240.0	0.033	Yes	No	Conducted system checks, changed bag filters, adjusted VFD to 42 Hz.
7/15/2019	GWTT	Yes	--	--	46	40	35	50	3.00	40.8	15	55.7	587740.0	179820.0	0.034	Yes	No	Conducted system checks, changed bag filters, adjusted VFD from 42 Hz to 40 Hz.
7/18/2019	GWTT	Yes	--	--	45	28	55	60	2.83	43.3	18	41.25	587740.0	0.0	0.043	Yes	No	Conducted system checks, changed bag filters, adjusted VFD from 40 Hz to 45 Hz.
7/23/2019	GWTT	Yes	--	--	56	43	55	61	3.22	38.0	23	25.63	587740.0	0.0	0.048	Yes	No	Conducted system checks, changed bag filters, adjusted VFD from 40 Hz to 45 Hz.
7/26/2019	GWTT	Yes	--	--	56	50	56	60	--	--	26	11.93	722700.0	134960.0	--	Yes	No	Conducted system checks, changed bag filters.
7/29/2019	GWTT	Yes	--	--	--	--	56	60	2.50	49.0	29	53.3	723360.0	660.0	0.078	Yes	Yes	Pumped out contents of exterior totes and conducted backwash of system (6,800 gallons removed by Global). Shutdown system for ~2 hours. VFD at 23 Hz on departure.
Totals of July 2019									Average Flow Rate (gpm)	46.9	31	44.3			0.079			
8/2/2019	GWTT	Yes	--	--	15	5	18	9	2.68	50.6	2	19.68	723960.0	0.0	0.006	Yes	No	Conducted system checks, changed bag filters, adjusted VFD from 23 Hz to 28 Hz.
8/5/2019	GWTT	Yes	--	--	21	8	16	20	2.50	52.8	5	52.80	726280.0	2320.0	0.014	Yes	No	Conducted system checks, changed bag filters, VFD at 28 Hz.
8/8/2019	GWTT	Yes	--	--	20	19	22	27	2.23	54.9	8	53.50	729450.0	3170.0	0.024	Yes	No	Conducted system checks, changed bag filters, adjusted VFD to 32 Hz and 31 Hz. Visibility of site glass impaired due to iron fouling, possible obstruction in site glass causing error in flow calculations.
8/13/2019	GWTT	Yes	--	--	27	23	28	30	2.17	56.5	13	50.41	738390.0	8940.0	0.040	Yes	No	Conducted system checks, changed bag filters, adjusted VFD to 23 Hz. Obstruction in site glass seems apparent, affecting flow rate calculations.
8/16/2019	GWTT	Yes	--	--	32	26	30	35	1.04	117.8	16	36.00	744020.0	5630.0	0.103			Conducted system checks, changed bag filters, adjusted VFD from 23 Hz to 28 Hz.
8/20/2019	GWTT	Yes	--	--	40	27	36	38	--	--	20	50.00	757990.0	13970.0	0.055	Yes	No	Conducted system checks, changed bag filters, adjusted VFD from 38 Hz to 39 Hz. Could not calculate influent flow rate due to obstruction in site glass
8/23/2019	GWTT	Yes	--	--	41	29	38	44	--	--	23	50.00	790720.0	32730.0	0.063	Yes	Yes	Conducted system checks, changed bag filters, and adjusted VFD from 39 Hz to 40 Hz. Collected montly system samples on 8/22/19.
8/27/2019	GWTT	Yes	--	--	45	35	44	49	--	--	27	50.00	873750.0	83030.0	0.074	Yes	No	Conducted system checks, changed bag filters, adjusted VFD from 40 Hz to 42 Hz.
8/30/2019	GWTT	Yes	--	--	49	37	8	10	--	--	30	49.00	976540.0	102790.0	0.081	Yes	No	Conducted system checks, changed bag filters after backwash of primary vessel.
Totals of August 2019									Average Flow Rate (gpm)	66.5	31	49.0		252,580	0.113			

Notes:
1. CE - Coastal Engineering.
2. GWTT - Groundwater Treatment Technologies
3. The influent flow rate is calculated based on the cross-sectional volume per vertical foot of the influent tank and the measured/timed filling rate of the tank. The diameter of the influent tank is approximately 78 inches. The cross-sectional volume of the tank is approximately 33.1 cubic feet per vertical linear foot. Therefore the flow rate calculation factor is approximately 122.5 gallons per 6 inches.
4. Total mass of PFAs removed is calculated based on the calcuated influent flow rate, the number of days the system has been operating, and the average total Influent PFAs concentration for the month. For the month of April, the average Influent PFAs concentration was 7,599 ng/L.
5. NA or -- Not Applicable, (not measured).
6. NR - Not Reported
7. As of April 1, 2019; the system's O&M data reporting was changed to include the differential pressure readings from the bag filter unit's pressure gauges before and after the bag filters are changed/replaced, if applicable.



Your Project #: BARNSTABLE COUNTY
Site Location: BARNSTABLE FIRE TRAINING ACADEMY
Your C.O.C. #: 710219-01-01

Attention: Steven Tebo

Barnstable County
3195 Main Street
PO Box 427
Barnstable, MA
USA 02630

Report Date: 2019/09/11
Report #: R5875127
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: B9N9810

Received: 2019/08/28, 13:41

Sample Matrix: Water
Samples Received: 3

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
PFAS in water by SPE/LCMS (1)	3	2019/09/05	2019/09/09	CAM SOP-00894	EPA 537 m

Remarks:

Bureau Veritas Laboratories are accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by BV Labs are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in BV Labs profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and BV Labs in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

BV Labs liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. BV Labs has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by BV Labs, unless otherwise agreed in writing. BV Labs is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.

Results relate to samples tested. When sampling is not conducted by BV Labs, results relate to the supplied samples tested.

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Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) Per- and polyfluoroalkyl substances (PFAS) identified as surrogates on the certificate of analysis represent the extracted internal standard.



Your Project #: BARNSTABLE COUNTY
Site Location: BARNSTABLE FIRE TRAINING ACADEMY
Your C.O.C. #: 710219-01-01

Attention: Steven Tebo

Barnstable County
3195 Main Street
PO Box 427
Barnstable, MA
USA 02630

Report Date: 2019/09/11
Report #: R5875127
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: B9N9810
Received: 2019/08/28, 13:41

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Patricia Legette, Project Manager
Email: Patricia.Legette@bvlabs.com
Phone# (905)817-5799

=====

This report has been generated and distributed using a secure automated process.

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.



BUREAU
VERITAS

BV Labs Job #: B9N9810

Report Date: 2019/09/11

Barnstable County

Client Project #: BARNSTABLE COUNTY

Site Location: BARNSTABLE FIRE TRAINING ACADEMY

Sampler Initials: MM

RESULTS OF ANALYSES OF WATER

BV Labs ID		KQF168			KQF169	KQF170			
Sampling Date		2019/08/22 14:35			2019/08/22 14:25	2019/08/22 14:15			
COC Number		710219-01-01			710219-01-01	710219-01-01			
	UNITS	INFLUENT (PRW-4)	RDL	MDL	MIDPOINT	EFFLUENT	RDL	MDL	QC Batch
Perfluorinated Compounds									
Perfluorobutanoic acid	ug/L	0.030	0.020	0.0070	<0.0070	<0.0070	0.020	0.0070	6316682
Perfluoropentanoic Acid (PFPeA)	ug/L	0.11	0.020	0.0041	<0.0041	<0.0041	0.020	0.0041	6316682
Perfluorohexanoic Acid (PFHxA)	ug/L	0.12	0.020	0.0064	<0.0064	<0.0064	0.020	0.0064	6316682
Perfluoroheptanoic Acid (PFHpA)	ug/L	0.063	0.020	0.0071	<0.0071	<0.0071	0.020	0.0071	6316682
Perfluorooctanoic Acid (PFOA)	ug/L	0.064	0.020	0.0074	<0.0074	<0.0074	0.020	0.0074	6316682
Perfluorononanoic Acid (PFNA)	ug/L	0.10	0.020	0.0049	<0.0049	<0.0049	0.020	0.0049	6316682
Perfluorodecanoic Acid (PFDA)	ug/L	0.020	0.020	0.0041	<0.0041	<0.0041	0.020	0.0041	6316682
Perfluoroundecanoic Acid (PFUnA)	ug/L	0.061	0.020	0.0043	<0.0043	<0.0043	0.020	0.0043	6316682
Perfluorododecanoic Acid (PFDoA)	ug/L	<0.0068	0.020	0.0068	<0.0068	<0.0068	0.020	0.0068	6316682
Perfluorotridecanoic Acid	ug/L	<0.0069	0.020	0.0069	<0.0069	<0.0069	0.020	0.0069	6316682
Perfluorotetradecanoic Acid	ug/L	<0.0067	0.020	0.0067	<0.0067	<0.0067	0.020	0.0067	6316682
Perfluorobutanesulfonic acid	ug/L	0.011	0.020	0.0051	<0.0051	<0.0051	0.020	0.0051	6316682
Perfluorohexanesulfonic acid	ug/L	0.26	0.020	0.0052	<0.0052	<0.0052	0.020	0.0052	6316682
Perfluoroheptanesulfonic acid	ug/L	0.026	0.020	0.0033	<0.0033	<0.0033	0.020	0.0033	6316682
Perfluorooctanesulfonic acid	ug/L	8.3	0.20	0.052	<0.0052	<0.0052	0.020	0.0052	6316682
Perfluorodecanesulfonic acid (PFDS)	ug/L	<0.0072	0.020	0.0072	<0.0072	<0.0072	0.020	0.0072	6316682
Perfluorooctane Sulfonamide (PFOSA)	ug/L	<0.0066	0.020	0.0066	<0.0066	<0.0066	0.020	0.0066	6316682
EtFOSA	ug/L	<0.0090	0.020	0.0090	<0.0090	<0.0090	0.020	0.0090	6316682
MeFOSA	ug/L	<0.0035	0.020	0.0035	<0.0035	<0.0035	0.020	0.0035	6316682
EtFOSE	ug/L	<0.0094	0.020	0.0094	<0.0094	<0.0094	0.020	0.0094	6316682
MeFOSE	ug/L	<0.0066	0.020	0.0066	<0.0066	<0.0066	0.020	0.0066	6316682
6:2 Fluorotelomer sulfonic acid	ug/L	0.26	0.020	0.0059	<0.0059	<0.0059	0.020	0.0059	6316682
8:2 Fluorotelomer sulfonic acid	ug/L	0.60	0.020	0.0059	<0.0059	<0.0059	0.020	0.0059	6316682
Surrogate Recovery (%)									
13C2-6:2-Fluorotelomersulfonic Acid	%	99	N/A	N/A	103	95	N/A	N/A	6316682
13C2-8:2-Fluorotelomersulfonic Acid	%	103	N/A	N/A	104	97	N/A	N/A	6316682
13C2-Perfluorodecanoic acid	%	103	N/A	N/A	106	95	N/A	N/A	6316682
13C2-Perfluorododecanoic acid	%	96	N/A	N/A	92	87	N/A	N/A	6316682
13C2-Perfluorohexanoic acid	%	109	N/A	N/A	114	100	N/A	N/A	6316682
13C2-perfluorotetradecanoic acid	%	82	N/A	N/A	80	65	N/A	N/A	6316682
13C2-Perfluoroundecanoic acid	%	98	N/A	N/A	98	90	N/A	N/A	6316682
13C3-Perfluorobutanesulfonic acid	%	100	N/A	N/A	103	95	N/A	N/A	6316682
13C4-Perfluorobutanoic acid	%	107	N/A	N/A	112	101	N/A	N/A	6316682
RDL = Reportable Detection Limit									
QC Batch = Quality Control Batch									
N/A = Not Applicable									



RESULTS OF ANALYSES OF WATER

BV Labs ID		KQF168			KQF169	KQF170			
Sampling Date		2019/08/22 14:35			2019/08/22 14:25	2019/08/22 14:15			
COC Number		710219-01-01			710219-01-01	710219-01-01			
	UNITS	INFLUENT (PRW-4)	RDL	MDL	MIDPOINT	EFFLUENT	RDL	MDL	QC Batch
13C4-Perfluoroheptanoic acid	%	110	N/A	N/A	112	101	N/A	N/A	6316682
13C4-Perfluorooctanesulfonic acid	%	84	N/A	N/A	101	91	N/A	N/A	6316682
13C4-Perfluorooctanoic acid	%	107	N/A	N/A	110	97	N/A	N/A	6316682
13C5-Perfluorononanoic acid	%	107	N/A	N/A	111	99	N/A	N/A	6316682
13C5-Perfluoropentanoic acid	%	104	N/A	N/A	108	97	N/A	N/A	6316682
13C8-Perfluorooctane Sulfonamide	%	98	N/A	N/A	97	88	N/A	N/A	6316682
18O2-Perfluorohexanesulfonic acid	%	99	N/A	N/A	101	93	N/A	N/A	6316682
D3-MeFOSA	%	66	N/A	N/A	59	63	N/A	N/A	6316682
D5-EtFOSA	%	67	N/A	N/A	58	64	N/A	N/A	6316682
D7-MeFOSE	%	85	N/A	N/A	77	80	N/A	N/A	6316682
D9-EtFOSE	%	86	N/A	N/A	76	77	N/A	N/A	6316682
RDL = Reportable Detection Limit QC Batch = Quality Control Batch N/A = Not Applicable									



BV Labs Job #: B9N9810
Report Date: 2019/09/11

Barnstable County
Client Project #: BARNSTABLE COUNTY
Site Location: BARNSTABLE FIRE TRAINING ACADEMY
Sampler Initials: MM

TEST SUMMARY

BV Labs ID: KQF168
Sample ID: INFLUENT (PRW-4)
Matrix: Water

Collected: 2019/08/22
Shipped:
Received: 2019/08/28

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
PFAS in water by SPE/LCMS	LCMS	6316682	2019/09/05	2019/09/09	Marian Godax

BV Labs ID: KQF169
Sample ID: MIDPOINT
Matrix: Water

Collected: 2019/08/22
Shipped:
Received: 2019/08/28

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
PFAS in water by SPE/LCMS	LCMS	6316682	2019/09/05	2019/09/09	Marian Godax

BV Labs ID: KQF170
Sample ID: EFFLUENT
Matrix: Water

Collected: 2019/08/22
Shipped:
Received: 2019/08/28

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
PFAS in water by SPE/LCMS	LCMS	6316682	2019/09/05	2019/09/09	Marian Godax



BUREAU
VERITAS

BV Labs Job #: B9N9810

Report Date: 2019/09/11

Barnstable County

Client Project #: BARNSTABLE COUNTY

Site Location: BARNSTABLE FIRE TRAINING ACADEMY

Sampler Initials: MM

GENERAL COMMENTS

Sample KQF168 [INFLUENT (PRW-4)] : Per- and polyfluoroalkyl substances (PFAS): Due to high concentrations of the target analytes, a reduced sample volume was extracted and analyzed. Detection limits were adjusted accordingly.

Results relate only to the items tested.



**BUREAU
VERITAS**

BV Labs Job #: B9N9810
Report Date: 2019/09/11

Barnstable County
Client Project #: BARNSTABLE COUNTY
Site Location: BARNSTABLE FIRE TRAINING ACADEMY
Sampler Initials: MM

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
6316682	M_G	Spiked Blank	13C2-6:2-Fluorotelomersulfonic Acid	2019/09/09		102	%	50 - 150
			13C2-8:2-Fluorotelomersulfonic Acid	2019/09/09		107	%	50 - 150
			13C2-Perfluorodecanoic acid	2019/09/09		104	%	50 - 150
			13C2-Perfluorododecanoic acid	2019/09/09		94	%	50 - 150
			13C2-Perfluorohexanoic acid	2019/09/09		103	%	50 - 150
			13C2-perfluorotetradecanoic acid	2019/09/09		91	%	50 - 150
			13C2-Perfluoroundecanoic acid	2019/09/09		101	%	50 - 150
			13C3-Perfluorobutanesulfonic acid	2019/09/09		101	%	50 - 150
			13C4-Perfluorobutanoic acid	2019/09/09		104	%	50 - 150
			13C4-Perfluoroheptanoic acid	2019/09/09		103	%	50 - 150
			13C4-Perfluorooctanesulfonic acid	2019/09/09		104	%	50 - 150
			13C4-Perfluorooctanoic acid	2019/09/09		104	%	50 - 150
			13C5-Perfluorononanoic acid	2019/09/09		107	%	50 - 150
			13C5-Perfluoropentanoic acid	2019/09/09		102	%	50 - 150
			13C8-Perfluorooctane Sulfonamide	2019/09/09		94	%	50 - 150
			18O2-Perfluorohexanesulfonic acid	2019/09/09		98	%	50 - 150
			D3-MeFOSA	2019/09/09		64	%	50 - 150
			D5-EtFOSA	2019/09/09		66	%	50 - 150
			D7-MeFOSE	2019/09/09		87	%	50 - 150
			D9-EtFOSE	2019/09/09		87	%	50 - 150
			Perfluorobutanoic acid	2019/09/09		102	%	70 - 130
			Perfluoropentanoic Acid (PFPeA)	2019/09/09		99	%	70 - 130
			Perfluorohexanoic Acid (PFHxA)	2019/09/09		100	%	70 - 130
			Perfluoroheptanoic Acid (PFHpA)	2019/09/09		102	%	70 - 130
			Perfluorooctanoic Acid (PFOA)	2019/09/09		102	%	70 - 130
			Perfluorononanoic Acid (PFNA)	2019/09/09		103	%	70 - 130
			Perfluorodecanoic Acid (PFDA)	2019/09/09		97	%	70 - 130
			Perfluoroundecanoic Acid (PFUnA)	2019/09/09		99	%	70 - 130
			Perfluorododecanoic Acid (PFDoA)	2019/09/09		100	%	70 - 130
			Perfluorotridecanoic Acid	2019/09/09		100	%	70 - 130
			Perfluorotetradecanoic Acid	2019/09/09		100	%	70 - 130
			Perfluorobutanesulfonic acid	2019/09/09		96	%	70 - 130
			Perfluorohexanesulfonic acid	2019/09/09		102	%	70 - 130
			Perfluoroheptanesulfonic acid	2019/09/09		97	%	70 - 130
			Perfluorooctanesulfonic acid	2019/09/09		99	%	70 - 130
			Perfluorodecanesulfonic acid (PFDS)	2019/09/09		93	%	70 - 130
			Perfluorooctane Sulfonamide (PFOSA)	2019/09/09		100	%	70 - 130
			EtFOSA	2019/09/09		90	%	70 - 130
			MeFOSA	2019/09/09		98	%	70 - 130
			EtFOSE	2019/09/09		90	%	70 - 130
			MeFOSE	2019/09/09		98	%	70 - 130
			6:2 Fluorotelomer sulfonic acid	2019/09/09		99	%	70 - 130
			8:2 Fluorotelomer sulfonic acid	2019/09/09		98	%	70 - 130
6316682	M_G	Spiked Blank DUP	13C2-6:2-Fluorotelomersulfonic Acid	2019/09/09		98	%	50 - 150
			13C2-8:2-Fluorotelomersulfonic Acid	2019/09/09		102	%	50 - 150
			13C2-Perfluorodecanoic acid	2019/09/09		99	%	50 - 150
			13C2-Perfluorododecanoic acid	2019/09/09		91	%	50 - 150
			13C2-Perfluorohexanoic acid	2019/09/09		99	%	50 - 150
			13C2-perfluorotetradecanoic acid	2019/09/09		88	%	50 - 150
			13C2-Perfluoroundecanoic acid	2019/09/09		94	%	50 - 150
			13C3-Perfluorobutanesulfonic acid	2019/09/09		95	%	50 - 150



BUREAU
VERITAS

BV Labs Job #: B9N9810
Report Date: 2019/09/11

Barnstable County
Client Project #: BARNSTABLE COUNTY
Site Location: BARNSTABLE FIRE TRAINING ACADEMY
Sampler Initials: MM

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
6316682	M_G	RPD	13C4-Perfluorobutanoic acid	2019/09/09		102	%	50 - 150
			13C4-Perfluoroheptanoic acid	2019/09/09		101	%	50 - 150
			13C4-Perfluorooctanesulfonic acid	2019/09/09		96	%	50 - 150
			13C4-Perfluorooctanoic acid	2019/09/09		103	%	50 - 150
			13C5-Perfluorononanoic acid	2019/09/09		104	%	50 - 150
			13C5-Perfluoropentanoic acid	2019/09/09		100	%	50 - 150
			13C8-Perfluorooctane Sulfonamide	2019/09/09		90	%	50 - 150
			18O2-Perfluorohexanesulfonic acid	2019/09/09		94	%	50 - 150
			D3-MeFOSA	2019/09/09		74	%	50 - 150
			D5-EtFOSA	2019/09/09		77	%	50 - 150
			D7-MeFOSE	2019/09/09		87	%	50 - 150
			D9-EtFOSE	2019/09/09		86	%	50 - 150
			Perfluorobutanoic acid	2019/09/09		105	%	70 - 130
			Perfluoropentanoic Acid (PFPeA)	2019/09/09		102	%	70 - 130
			Perfluorohexanoic Acid (PFHxA)	2019/09/09		106	%	70 - 130
			Perfluoroheptanoic Acid (PFHpA)	2019/09/09		105	%	70 - 130
			Perfluorooctanoic Acid (PFOA)	2019/09/09		105	%	70 - 130
			Perfluorononanoic Acid (PFNA)	2019/09/09		108	%	70 - 130
			Perfluorodecanoic Acid (PFDA)	2019/09/09		102	%	70 - 130
			Perfluoroundecanoic Acid (PFUnA)	2019/09/09		104	%	70 - 130
			Perfluorododecanoic Acid (PFDoA)	2019/09/09		103	%	70 - 130
			Perfluorotridecanoic Acid	2019/09/09		104	%	70 - 130
			Perfluorotetradecanoic Acid	2019/09/09		104	%	70 - 130
			Perfluorobutanesulfonic acid	2019/09/09		104	%	70 - 130
			Perfluorohexanesulfonic acid	2019/09/09		106	%	70 - 130
			Perfluoroheptanesulfonic acid	2019/09/09		100	%	70 - 130
			Perfluorooctanesulfonic acid	2019/09/09		110	%	70 - 130
			Perfluorodecanesulfonic acid (PFDS)	2019/09/09		96	%	70 - 130
			Perfluorooctane Sulfonamide (PFOSA)	2019/09/09		104	%	70 - 130
			EtFOSA	2019/09/09		95	%	70 - 130
			MeFOSA	2019/09/09		101	%	70 - 130
			EtFOSE	2019/09/09		95	%	70 - 130
			MeFOSE	2019/09/09		101	%	70 - 130
			6:2 Fluorotelomer sulfonic acid	2019/09/09		105	%	70 - 130
			8:2 Fluorotelomer sulfonic acid	2019/09/09		105	%	70 - 130
			Perfluorobutanoic acid	2019/09/09	3.5		%	30
			Perfluoropentanoic Acid (PFPeA)	2019/09/09	3.1		%	30
			Perfluorohexanoic Acid (PFHxA)	2019/09/09	5.9		%	30
			Perfluoroheptanoic Acid (PFHpA)	2019/09/09	2.8		%	30
			Perfluorooctanoic Acid (PFOA)	2019/09/09	3.0		%	30
			Perfluorononanoic Acid (PFNA)	2019/09/09	4.7		%	30
			Perfluorodecanoic Acid (PFDA)	2019/09/09	5.5		%	30
			Perfluoroundecanoic Acid (PFUnA)	2019/09/09	4.8		%	30
			Perfluorododecanoic Acid (PFDoA)	2019/09/09	3.2		%	30
			Perfluorotridecanoic Acid	2019/09/09	3.7		%	30
			Perfluorotetradecanoic Acid	2019/09/09	4.1		%	30
			Perfluorobutanesulfonic acid	2019/09/09	7.3		%	30
			Perfluorohexanesulfonic acid	2019/09/09	4.3		%	30
			Perfluoroheptanesulfonic acid	2019/09/09	2.6		%	30
			Perfluorooctanesulfonic acid	2019/09/09	11		%	30
			Perfluorodecanesulfonic acid (PFDS)	2019/09/09	3.3		%	30



BUREAU
VERITAS

BV Labs Job #: B9N9810
Report Date: 2019/09/11

Barnstable County
Client Project #: BARNSTABLE COUNTY
Site Location: BARNSTABLE FIRE TRAINING ACADEMY
Sampler Initials: MM

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
6316682	M_G	Method Blank	Perfluorooctane Sulfonamide (PFOSA)	2019/09/09	3.6		%	30
			EtFOSA	2019/09/09	4.8		%	30
			MeFOSA	2019/09/09	3.8		%	30
			EtFOSE	2019/09/09	5.7		%	30
			MeFOSE	2019/09/09	2.6		%	30
			6:2 Fluorotelomer sulfonic acid	2019/09/09	6.0		%	30
			8:2 Fluorotelomer sulfonic acid	2019/09/09	6.9		%	30
			13C2-6:2-Fluorotelomersulfonic Acid	2019/09/09		105	%	50 - 150
			13C2-8:2-Fluorotelomersulfonic Acid	2019/09/09		107	%	50 - 150
			13C2-Perfluorodecanoic acid	2019/09/09		98	%	50 - 150
			13C2-Perfluorododecanoic acid	2019/09/09		92	%	50 - 150
			13C2-Perfluorohexanoic acid	2019/09/09		106	%	50 - 150
			13C2-perfluorotetradecanoic acid	2019/09/09		81	%	50 - 150
			13C2-Perfluoroundecanoic acid	2019/09/09		93	%	50 - 150
			13C3-Perfluorobutanesulfonic acid	2019/09/09		100	%	50 - 150
			13C4-Perfluorobutanoic acid	2019/09/09		104	%	50 - 150
			13C4-Perfluoroheptanoic acid	2019/09/09		106	%	50 - 150
			13C4-Perfluorooctanesulfonic acid	2019/09/09		97	%	50 - 150
			13C4-Perfluorooctanoic acid	2019/09/09		103	%	50 - 150
			13C5-Perfluorononanoic acid	2019/09/09		103	%	50 - 150
			13C5-Perfluoropentanoic acid	2019/09/09		101	%	50 - 150
			13C8-Perfluorooctane Sulfonamide	2019/09/09		91	%	50 - 150
			18O2-Perfluorohexanesulfonic acid	2019/09/09		98	%	50 - 150
			D3-MeFOSA	2019/09/09		69	%	50 - 150
			D5-EtFOSA	2019/09/09		71	%	50 - 150
			D7-MeFOSE	2019/09/09		85	%	50 - 150
			D9-EtFOSE	2019/09/09		85	%	50 - 150
			Perfluorobutanoic acid	2019/09/09	<0.0070		ug/L	
			Perfluoropentanoic Acid (PFPeA)	2019/09/09	<0.0041		ug/L	
			Perfluorohexanoic Acid (PFHxA)	2019/09/09	<0.0064		ug/L	
			Perfluoroheptanoic Acid (PFHpA)	2019/09/09	<0.0071		ug/L	
			Perfluorooctanoic Acid (PFOA)	2019/09/09	<0.0074		ug/L	
			Perfluorononanoic Acid (PFNA)	2019/09/09	<0.0049		ug/L	
			Perfluorodecanoic Acid (PFDA)	2019/09/09	<0.0041		ug/L	
			Perfluoroundecanoic Acid (PFUnA)	2019/09/09	<0.0043		ug/L	
			Perfluorododecanoic Acid (PFDoA)	2019/09/09	<0.0068		ug/L	
			Perfluorotridecanoic Acid	2019/09/09	<0.0069		ug/L	
			Perfluorotetradecanoic Acid	2019/09/09	<0.0067		ug/L	
			Perfluorobutanesulfonic acid	2019/09/09	<0.0051		ug/L	
			Perfluorohexanesulfonic acid	2019/09/09	<0.0052		ug/L	
			Perfluoroheptanesulfonic acid	2019/09/09	<0.0033		ug/L	
			Perfluorooctanesulfonic acid	2019/09/09	<0.0052		ug/L	
			Perfluorodecanesulfonic acid (PFDS)	2019/09/09	<0.0072		ug/L	
			Perfluorooctane Sulfonamide (PFOSA)	2019/09/09	<0.0066		ug/L	
			EtFOSA	2019/09/09	<0.0090		ug/L	
			MeFOSA	2019/09/09	<0.0035		ug/L	
			EtFOSE	2019/09/09	<0.0094		ug/L	
			MeFOSE	2019/09/09	<0.0066		ug/L	
			6:2 Fluorotelomer sulfonic acid	2019/09/09	<0.0059		ug/L	



BUREAU
VERITAS

BV Labs Job #: B9N9810

Report Date: 2019/09/11

Barnstable County

Client Project #: BARNSTABLE COUNTY

Site Location: BARNSTABLE FIRE TRAINING ACADEMY

Sampler Initials: MM

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC	Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
				8:2 Fluorotelomer sulfonic acid	2019/09/09	<0.0059		ug/L	
Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.									
Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.									
Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.									
Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.									



BUREAU
VERITAS

BV Labs Job #: B9N9810

Report Date: 2019/09/11

Barnstable County

Client Project #: BARNSTABLE COUNTY

Site Location: BARNSTABLE FIRE TRAINING ACADEMY

Sampler Initials: MM

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

Colm McNamara, Senior Analyst, Liquid Chromatography

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.



Maxxam Analytics International Corporation o/a Maxxam Analytics
6740 Campbell Road, Mississauga, Ontario Canada L5N 2L8 Tel: (905) 817-5700 Toll-free 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

28-Aug-19 13:41

Patricia Legette

B9N9810

ENV-1151

Page 1 of 1

Bottle Order #:

710219

Project Manager:

Patricia Legette

INVOICE TO:
Company Name: #29803 Barnstable County
Attention: Accounts Payable
Address: 3195 Main Street PO Box 427
Barnstable MA 02630
Tel: (508) 362-3828 Ext: 1234 Fax:
Email: eoconnell@barnstablecounty.org, stebo@barnstableco

REPORT TO:
Company Name: BETA Group
Attention: Steven Tebo / Roger Thibault
Address: 101 George Washington Hwy, Lincoln, RI
rthibault@beta-inc.com
(508) 375-6603 Alt. Tel: 401-833-2382
Email: stebo@barnstablecounty.org, rthibault@everarmstrong

PROJECT INFORMATION:
Quotation #: B57344
P.O. #:
Project: Barnstable Fire Training Academy
Site #: Mykel Mendes
Sampled By:

MOE REGULATED DRINKING WATER OR WATER INTENDED FOR HUMAN CONSUMPTION MUST BE SUBMITTED ON THE MAXXAM DRINKING WATER CHAIN OF CUSTODY

Regulation 153 (2011)	Other Regulations	Special Instructions
<input type="checkbox"/> Table 1 <input type="checkbox"/> Table 2 <input type="checkbox"/> Table 3 <input type="checkbox"/> Table	<input type="checkbox"/> Res/Park <input type="checkbox"/> Ind/Comm <input type="checkbox"/> Agri/Other <input type="checkbox"/> Medium/Fine <input type="checkbox"/> Coarse <input type="checkbox"/> For RSC <input type="checkbox"/> CCME <input type="checkbox"/> Reg 558 <input type="checkbox"/> MISA <input type="checkbox"/> PWGO <input type="checkbox"/> Other	<input type="checkbox"/> Sanitary Sewer Bylaw <input type="checkbox"/> Storm Sewer Bylaw Municipality: _____

Include Criteria on Certificate of Analysis (Y/N)?

Sample Barcode Label	Sample (Location) Identification	Date Sampled	Time Sampled	Matrix
1	INFLUENT (PRW-4)	19/08/22	1435	GW
2	MIDPOINT	19/08/22	1425	GW
3	EFFLUENT	19/08/22	1415	GW
4				
5				
6				
7				
8				
9				
10				

Field Filtered (please circle):

Metals / Hg / Cr-VI

USEPA 537
(PEAS)

ANALYSIS REQUESTED (PLEASE BE SPECIFIC)

Turnaround Time (TAT) Required:

Please provide advance notice for rush projects

Regular (Standard) TAT:

(will be applied if Rush TAT is not specified)

Standard TAT = 5-7 Working days for most tests.

Please note: Standard TAT for certain tests such as BOD and Dioxins/Furans are > 5 days - contact your Project Manager for details.

Job Specific Rush TAT (if applies to entire submission)

Date Required: Time Required:

Rush Confirmation Number: (call lab for #)

of Bottles: Comments:

RELINQUISHED BY: (Signature/Print) Date: (YY/MM/DD) Time: RECEIVED BY: (Signature/Print) Date: (YY/MM/DD) Time: # Jars used and not submitted

Jars used and not submitted

Laboratory Use Only

Time Sensitive Temperature (°C) on Reel

Custody Seal Present Intact Yes No

* UNLESS OTHERWISE AGREED TO IN WRITING, WORK SUBMITTED ON THIS CHAIN OF CUSTODY IS SUBJECT TO MAXXAM'S STANDARD-TERMS AND CONDITIONS. SIGNING OF THIS CHAIN OF CUSTODY DOCUMENT IS ACKNOWLEDGMENT AND ACCEPTANCE OF OUR TERMS WHICH ARE AVAILABLE FOR VIEWING AT WWW.MAXXAM.CA/TERMS.
* IT IS THE RESPONSIBILITY OF THE RELINQUISHER TO ENSURE THE ACCURACY OF THE CHAIN OF CUSTODY RECORD. AN INCOMPLETE CHAIN OF CUSTODY MAY RESULT IN ANALYTICAL TAT DELAYS.
** SAMPLE CONTAINER, PRESERVATION, HOLD TIME AND PACKAGE INFORMATION CAN BE VIEWED AT HTTP://WWW.MAXXAM.CA/CONTENT/UPLOADS/ONTARIO-COC.PDF.

SAMPLES MUST BE KEPT COOL (< 10° C) FROM TIME OF SAMPLING UNTIL DELIVERY TO MAXXAM

White: Maxxa Yellow: Client