



IMMEDIATE RESPONSE ACTION PLAN

Barnstable Municipal Airport
Hyannis, Massachusetts

RTN 4-26347

December 2016



Prepared for:
Barnstable Municipal Airport
480 Barnstable Road
Hyannis, MA 02840

Prepared by:
Horsley Witten Group, Inc.
90 Route 6A
Sandwich, MA 02563

**IMMEDIATE RESPONSE ACTION PLAN
BARNSTABLE MUNICIPAL AIRPORT
HYANNIS, MASSACHUSETTS
RTN 4-26347**

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Proposed Sampling Locations for PFOS/PFOA and 1,4 Dioxane Barnstable Municipal Airport, Hyannis, MA

ATTACHMENTS

DEP November 10, 2016 NOR
June 9, 2015 1,4-Dioxane Results Letter to DEP
July 28, 2016 PFOA/PFOS Results Memo

**IMMEDIATE RESPONSE ACTION PLAN
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1.0 INTRODUCTION

The Horsley Witten Group, Inc. (HW) has been retained by the Barnstable Municipal Airport (the Airport) to develop this Immediate Response Action (IRA) Plan for its property at 480 Barnstable Road, Hyannis, Massachusetts (Figure 1). HW has prepared this IRA Plan in accordance with the Massachusetts Contingency Plan 310 CMR 40.0000 (MCP) on behalf of:

Ms. Katie Servis, Assistant Airport Manager
Barnstable Municipal Airport
Hyannis, Massachusetts 02601
(508) 775-2020

2.0 Purpose of the IRA Plan

This IRA Plan has been prepared in response to a Notice of Responsibility (NOR) dated November 10, 2016, issued to the Airport by the Massachusetts Department of Environmental Protection (DEP). The NOR requests that the Airport conduct additional field investigations to evaluate sources of two types of contaminants previously detected at the Airport and on several adjacent properties, and to identify potential impacts to public water supply wells operated by the Hyannis Water District at the Mary Dunn and Maher wellfields (Figure 1).

The NOR specifically requests that the Airport investigate perfluoroalkyl substances including perfluorooctane sulfonic acid (PFOS) and perfluorooctanoic acid (PFOA) detected in groundwater at the Airport and several adjacent properties. It also requests further evaluations on the presence of 1, 4-Dioxane previously detected in a monitoring well downgradient of the Airport and upgradient of the Maher wellfield.

The Airport has conducted investigations on both contaminants in the past and provided this information to DEP. In July 2015, HW sampled groundwater from seven wells for analysis of 1,4-Dioxane. The contaminant was detected in well OW-9DD at a concentration of 0.93 ug/L, above the 0.30 ug/L standard for 1,4-Dioxane. This well is screened from 77 to 87 feet below the ground surface. Samples taken from the other wells at the Airport did not contain 1,4-Dioxane above laboratory reporting levels (See attached June 9, 2015 letter from HW to Gerard Martin of DEP).

A potential source of 1,4-Dioxane at the Airport is a historic release of 1,1,1-trichloroethane (1,1,1-TCA) from an oil water separator associated with a floor drain in the former Provincetown Boston Airlines hangar (currently leased to Cape Air). Contaminated

groundwater emanated from this source area and traveled across Airport property to the southeast. 1,4-Dioxane can be associated with chlorinated solvents, including 1,1,1-TCA. Another possible source is deicing fluids used at the Airport. Both of these sources will be evaluated as described in Section 3.0.

On August 4, 2016 DEP issued a NOR/ Request for Information (RFI) to the Airport requiring investigation of PFOS/PFOA. In response, the Airport contracted with HW to collect groundwater samples. On July 1 and 5, 2016, HW collected samples from six monitoring wells and submitted samples for laboratory analysis for the presence of PFOS and PFOA. These compounds were detected in each of the wells tested. At monitoring wells HW-3 and HW-5, concentrations were 0.084 and 0.12 ug/L respectively, above the EPA health advisory limit of 0.07 ug/L. Because of the extremely low detection requirements, HW collected confirmatory samples from these two wells. Results showed 0.16 ug/l in HW-3 and 0.12 ug/L in HW-5. The concentrations detected in all the other wells were below the standard. It should be noted that these compounds were also detected in well HW-1, located at the upgradient, western, boundary of the Airport.

Fire fighting foams are one of the many products known to potentially contain PFOS and PFOA. The use and testing of fire fighting foam is a requirement of the Federal Aviation Administration (FAA). The September 2016 response to the RFI described five locations where Airport records indicated that fire fighting foams have been used (Figure 1). This includes an area on the east side of the Airport where tri-annual drills and annual testing is conducted and foam is deployed. These sites will be investigated as described in Section 3.0. In addition, Section 3.0 describes how water quality samples will be taken in upgradient locations of the Airport to evaluate the potential of other sources of these compounds. This will include an evaluation of the potential transport of PFOS and PFOA from a known release at the Barnstable Fire Training Academy north of Airport property.

Groundwater flow modeling will be conducted to evaluate contaminant transport pathways. The modeling scenarios will be determined based on the results of the field investigations as described further in Section 4.0.

This IRA Plan is based on the recognition that the immediate threat of exposure to these compounds has been eliminated by the Hyannis Water District. Water withdrawn from the Mary Dunn and Maher wellfields is either treated or blended with clean water to meet the drinking water standards for 1,4-Dioxane, PFOS, and PFOA. Therefore, the primary goal of the work proposed under this plan is to identify potential sources of the contamination, and evaluate their impact to the public supply wells. The information developed here will be used to evaluate the extent of the Airport's responsibility (if any) for the contamination and identify long term options to remediate any contamination associated with current or past Airport activities.

The work proposed here is separate from the ongoing remediation of oil and hazardous materials at the Airport currently managed under Release Tracking Number 4-0823.

3.0 Proposed Field Investigations

A proposed investigation plan is described below, organized into sampling planned for each of the contaminant groups. The proposed investigations will be undertaken within the 120 day status report time period.

3.1 1,4-Dioxane

Thirteen existing monitoring wells will be sampled and the groundwater samples will be analyzed for 1,4-Dioxane by ESS laboratory using Method 8270 SIMS. A field blank and duplicate sample will also be taken for analysis. The locations of the monitoring wells are within the historic plume of 1,1,1-TCA, and include both shallow and deep wells (Figure 1 and Attachments). Shallow, intermediate and deep wells at the original source of 1,1,1-TCA contamination adjacent to the Cape Air hangar will be sampled as part of this assessment (wells OW-4,s,m, d).

In response to the requirements of the NOR, a sample of airplane deicing fluid will also be taken to confirm/deny the presence of 1,4-Dioxane. Please note that this is a centralized deicing area where any fluid or water is collected through a catchbasin system and piped to the municipal wastewater pollution control facility as previously permitted by the Town of Barnstable.

3.2 PFOS and PFOA

Samples will be collected from suspected PFOS and/or PFOA contamination locations based on our understanding of past use or potential release locations. HW will collect a sample of the FAA required aircraft fire fighting foam (foam) as it is applied during accident response or training. We will also collect soil samples from areas of application during accident response or training.

We will also collect groundwater samples from existing and proposed monitoring wells from locations across the Airport to determine the potential presence of on-site and off-site sources (Figure 1). This will allow for a better understanding of the connection of PFOS and any application of foam, or other uses in the vicinity of the Airport.

Samples will be collected, submitted for laboratory analysis by EPA Method 537 (modified) with field and trip blanks, and results will be summarized and compared to applicable standards.

4.0 Contaminant Transport Analysis

A transport analysis will be conducted to determine groundwater flow direction. HW will modify an existing MODFLOW groundwater flow model developed by the U.S. Geological Survey (USGS) for this portion of Cape Cod. HW has used this model for other water quality

assessments in the Hyannis area and can adapt it for this use without having to develop a new model.

HW will collect available data on water withdrawal rates from Hyannis Water District production wells. Recent water quality data for the wells will also be collected. HW will also obtain water withdrawal and water quality data from the Barnstable Fire District Water Department and will collect available data related to contamination at the fire training academy.

HW will run four to five separate groundwater modeling scenarios to document groundwater flow and contaminant transport. These scenarios will take into account water withdrawal rates from the public supply wells in the area over the last ten years. HW will utilize the particle tracking software MODPATH that is part of the MODFLOW model to trace groundwater flow. A report will be prepared describing the methods and outputs from the model scenarios.

5.0 IRA Status Report and Project Schedule

HW will prepare an IRA status report on behalf of the Airport and submit this within 120 days of submission of the IRA Plan. The status report will describe the results of the field investigations proposed here. It will also provide an update on the groundwater modeling described in Task 4.0. It is anticipated that the modeling component of the work will be completed in April, 2017.

6.0 Potential Next Steps

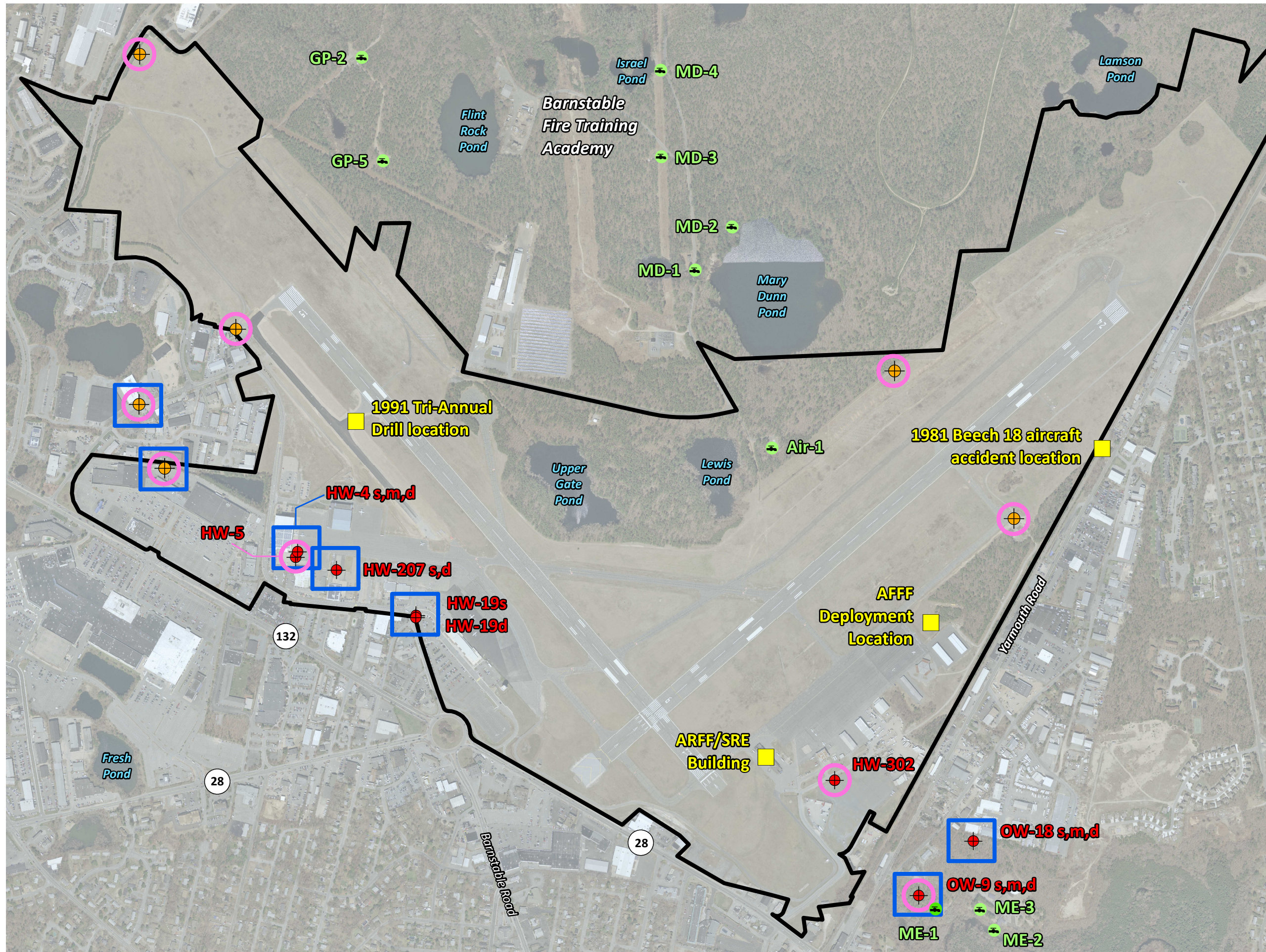
HW will summarize the results of the overall investigation in the IRA Status report and subsequent updates to DEP. Based on the results, there may be additional testing or modeling to further understand contaminant sources and transport pathways. The Airport will also coordinate with the Town of Barnstable and the Hyannis Water District, as necessary, on the next steps for managing the Mary Dunn and Maher Wellfields.

7.0 Remediation Waste

No remediation waste is expected to be generated during the field investigations proposed here.

8.0 Federal, State or Local Permits

No federal state or local permits are needed to conduct the work proposed here. The need for permits for any follow-on activities will be evaluated at the appropriate time.



Legend

- Proposed New Wells
- PFOS/PFOA Soil Samples
- PFOS/PFOA Groundwater Samples
- 1,4-Dioxane Groundwater Samples
- Monitoring Wells
- Drinking Water Wells
- Property Boundary

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Proposed Sampling Locations
 for PFOS/PFOA and 1,4 Dioxane
 Barnstable Municipal Airport
 Hyannis, MA

Date: 12/8/2016 Figure 1

ATTACHMENTS

DEP November 10, 2016 NOR



Commonwealth of Massachusetts
Executive Office of Energy & Environmental Affairs

Department of Environmental Protection

Southeast Regional Office • 20 Riverside Drive, Lakeville MA 02347 • 508-946-2700

Charles D. Baker
Governor

Karyn E. Polito
Lieutenant Governor

Matthew A. Beaton
Secretary

Martin Suuberg
Commissioner

November 10, 2016

Barnstable Municipal Airport
480 Barnstable Road
Hyannis, MA 02601
ATTN: Mr. Roland Breault, Manager

RE: **BARNSTABLE - HYANNIS**
Release Tracking Number (RTN) 4-0026347
Barnstable Municipal Airport
**NOTICE OF RESPONSIBILITY/
REQUEST FOR IMMEDIATE RESPONSE
ACTION/INTERIM DEADLINE**

**This is an important notice.
Failure to take appropriate action in response
to this notice could result in serious legal consequences**

Dear Mr. Breault:

The Massachusetts Department of Environmental Protection (MassDEP or the Department), Bureau of Waste Site Cleanup is tasked with ensuring the cleanup of oil and hazardous material releases pursuant to the Massachusetts Oil and Hazardous Material Release Prevention and Response Act (M.G.L. Chapter 21E). This law is implemented through regulations known as the Massachusetts Contingency Plan (310 CMR 40.0000 et seq. – the MCP). Both M.G.L. c. 21E and the MCP require the performance of response actions to provide for the protection of harm to health, safety, public welfare and the environment which may result from releases and/or threats of releases of oil and/or hazardous material (OHM) at disposal sites.

MassDEP has reason to believe that there has been a release to the environment which has resulted in designating the Barnstable Municipal Airport (BMA) as a disposal site as defined by the MCP. Specifically, 1,4-dioxane and perfluoroalkyl substances (PFAS), including perfluorooctanoic acid (PFOA) and perfluorooctanesulfonic acid (PFOS) and other related compounds that are contained in aqueous film-forming foam (AFFF), have been released to the groundwater at or near BMA (the Site) and thereby impacted the groundwater source which supplies the Maher Public Water Supply Wells located southeast of BMA. The Site is defined by M.G.L. c. 21E and the MCP as any place where OHM have come to be located. MassDEP has assigned Release Tracking Number (RTN) 4-0026347 to this release/Site.

Further, MassDEP has reason to believe that you (as used in this letter, "you" refers to the Barnstable Municipal Airport) are a Potentially Responsible Party (PRP) with liability under M.G.L. c.21E §5, for response action costs. The purpose of this notice is to inform you of your legal responsibilities under State

This information is available in alternate format. Call Michelle Waters-Ekanem, Diversity Director, at 617-292-5751. TTY# MassRelay Service 1-800-439-2370
MassDEP Website: www.mass.gov/dep

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law for assessing and/or remediating the release at the Site. For purposes of this Notice of Responsibility (NOR), the terms and phrases used herein shall have the meaning ascribed to such terms and phrases by the MCP unless the context clearly indicates otherwise.

BACKGROUND INFORMATION

EPA UCMR3 Program

In May 2012, the United States Environmental Protection Agency (EPA) published the final rule "Revisions to the Unregulated Contaminant Monitoring Rule (UCMR3) for Public Water Systems" indicating that thirty chemical constituents, that have not historically been considered as drinking water contaminants, would be analyzed in samples collected from wells serving large public water systems and a representative number of public water systems serving less than 10,000 people from 2013 to 2015.

The contaminants analyzed included, among other compounds, 1,4-dioxane and PFAS, including PFOS and PFOA. Collectively, PFAS and 1,4-dioxane are considered "emerging contaminants" which are contaminants that are/were previously unregulated by any state or the federal government, but due to increasing concerns about their widespread use, reports of their presence in public water supplies, and a growing body of information that the toxicity, mobility and bioaccumulation potential of these compounds have the potential to pose adverse effects to human health and the environment, the EPA included 1,4-dioxane and PFAS in their UCMR3 sampling program.

1,4-Dioxane

In June 2014, MassDEP lowered the Reportable Concentration and Method 1 Groundwater Category GW-1 Standard for 1,4-dioxane from 3.0 micrograms per liter ($\mu\text{g/L}$) to 0.3 $\mu\text{g/L}$ based on new toxicological information and improved laboratory analytical methods. Information available for 1,4-dioxane indicates it is present in airport deicing fluids and is typically associated with chlorinated solvents, particularly 1,1,1-trichloroethane (1,1,1-TCA), a solvent that has been documented to have been released to the groundwater at the BMA.

The compound 1,4-dioxane has been detected in the Maher public drinking water wells located southeast of BMA. In addition, MassDEP has been provided with analytical data from BMA that indicates that on May 28, 2015, 1,4-dioxane was detected at 0.962 $\mu\text{g/L}$ in the groundwater from monitoring well OW-9DD, a deep well (87' below the ground surface) located 250 feet upgradient of the Maher Wellfield on property owned by the Town of Barnstable. Hydrogeological data compiled for BMA for previous releases indicate that groundwater is migrating from the BMA in a southeasterly direction toward the Maher Wellfield.

Given the presence of 1,4-dioxane in the groundwater immediately upgradient of the Maher Wellfield, the hydrogeologic connection between BMA and the Maher Wellfield, and the potential sources of 1,4-dioxane at BMA, MassDEP has reason to believe that 1,4-dioxane has migrated to the Town of Barnstable property and to the Maher Wellfield via groundwater from the BMA property.

PFAS

In May 2016, the EPA promulgated a Health Advisory (HA) for PFAS of 0.07 micrograms per liter ($\mu\text{g/L}$) for PFOS and PFOA combined. The EPA "Fact Sheet, PFOS and PFOA Drinking Water Health Advisories" states that if both PFOS and PFOA are detected, the combined concentrations should be compared to the 0.07 $\mu\text{g/L}$ lifetime HA. The EPA HA is based on the best available peer-reviewed studies of the effects of PFOA and PFOS on laboratory animals (rats and mice), and was also informed by epidemiological studies of

human populations that have been exposed to PFAS. These studies indicate that exposure to PFOA and PFOS above certain concentrations may result in adverse health effects, including developmental effects to fetuses during pregnancy or to breastfed infants (e.g., low birth weight, accelerated puberty, skeletal variations), cancer (e.g., testicular, kidney), liver effects (e.g., tissue damage), immune effects (e.g., antibody production and immunity), thyroid effects and other effects (e.g., cholesterol changes).

PFAS have been widely used in industrial and consumer applications, including stain- and water-resistant coatings for fabrics and carpets, oil-resistant coating for paper products approved for food contact, mining and oil well surfactants, floor polishes, insecticide formulations and AFFF.

Given the above, PFAS are therefore considered a hazardous material pursuant to the MCP, specifically 310 CMR 40.0342(1)(a), and is therefore subject to the requirements of M.G.L. c. 21E and the MCP.

RELEASE/SITE SPECIFIC INFORMATION

Analytical data from EPA’s UCMR3 program and analytical data from sampling completed by MassDEP for the Maher Wells has been summarized in the following table:

Detections of 1,4-Dioxane and PFAS in the Maher Wells, Barnstable, MA (µg/L)

| Sample Location: | Maher Treatment Plant (UCMR3) | | Maher 1 (MassDEP) | | Maher 2 (MassDEP) | | Maher 3 (MassDEP) | | MCP RCGW-1 or EPA HA |
|------------------|-------------------------------|--------------|-------------------|--------|-------------------|-------------|-------------------|-------------|----------------------|
| | 11/20/13 | 5/22/14 | 3/4/15 | 5/1/15 | 3/4/15 | 5/1/15 | 3/4/15 | 5/1/15 | |
| 1,4-dioxane | 0.26 | 0.37 | 0.28 | 0.26 | 0.86 | 0.44 | 0.35 | 0.36 | 0.3 |
| PFOA | <0.02 | 0.02 | NS | NA | NS | NS | NS | NS | .07* |
| PFOS | 0.06 | 0.086 | NS | NA | NS | NS | NS | NS | .07* |
| PFHpA | .014 | .02 | NS | NA | NS | NS | NS | NS | NA |
| PFHxS | 0.032 | 0.049 | NS | NA | NS | NS | NS | NS | NA |

PFOA: Perfluorooctane sulfonic acid

PFOS: Perfluorooctanoic acid

PFHpA: Perfluoroheptanoic acid

PFHxS: Perfluorohexane sulfonic acid

NS: Not sampled

NA: Not available

*This value should be compared to the sum of PFOS and PFOA if both are present

Bold values indicate an exceedance of either the MCP RCGW-1 or the EPA Health Advisory

On May 19, 2015, Horsley Witten Group, on your behalf, submitted 1,4-dioxane analytical data results to MassDEP for groundwater sampling collected from selected monitoring wells at the BMA. None of the samples had concentrations of 1,4-dioxane above the detection limit of 0.15 µg/L. These four wells are located at least 5,000 feet northwest of the Maher Wells and are screened in the shallow aquifer.

On June 9, 2015, Horsley Witten Group, on your behalf, submitted additional analytical data results to MassDEP that summarized the results of groundwater sampling for three additional monitoring wells from a single well cluster located on the Town of Barnstable property, immediately upgradient of the Maher Wellfield and downgradient of the southeastern edge of the BMA property. The results indicate that 1,4-dioxane was not present above detection limits in the groundwater from the shallow and intermediate monitoring wells, but was detected at 0.926 µg/L in the groundwater from the deep

monitoring well. This concentration exceeds the MassDEP Reportable Concentration and Groundwater Category GW-1 Standard.

In May 2016, when the EPA published the Health Advisory for PFOS and PFOA, the detected PFAS concentrations in the Maher Treatment Well exceeded the EPA Health Advisory. As a result of the exceedance, MassDEP issued a Request for Information/Interim Deadline letter (RFI/IDL) on August 4, 2016, to you requesting information specific to the use of AFFF at BMA and any sampling and analytical data for PFAS at BMA.

MassDEP received a response to the RFI on September 14, 2016. According to the response, AFFF containing PFAS have been used and stored at the BMA. In addition, analytical results for PFAS sampling in monitoring wells at the BMA and from monitoring wells associated with the Maher Wells were presented in the response. According to the analytical data, PFAS have been detected in all the groundwater from monitoring wells sampled at the North Ramp of BMA, the Steamship Parking Lot, and the Maher Wells. The monitoring wells located at the North Ramp and Steamship Authority contained PFAS at concentrations above the EPA HA. The monitoring wells associated with the Maher Wells contained PFAS, but below the EPA HA.

Based on the information contained in the response to the RFI issued by MassDEP on August 4, 2016; the groundwater flow direction in the vicinity of the airport; and analytical results for groundwater samples collected from monitoring wells on and downgradient of the BMA property, MassDEP has reason to believe that PFAS has been released to the environment at the BMA. MassDEP has assigned Release Tracking Number (RTN) 4-0026347 to the release of PFAS and 1,4-dioxane.

STATUTORY LIABILITIES

M.G.L. c. 21E and the MCP require the performance of response actions to prevent harm to health, safety, public welfare and the environment which may result from this release and/or threat of release and govern the conduct of such actions.

As a current owner of the property where a release has occurred, you are a Potentially Responsible Party (PRP) with liability under M.G.L. c.21E §5, for response action costs. Section 5 makes the following parties liable under the Commonwealth of Massachusetts: current owners or operators of a site from or at which there is or has been a release or threat of release of oil and/or hazardous material; any person who has owned or operated a site at the time hazardous material was stored or disposed of; any person who arranged for the transport, disposal, storage or treatment of hazardous material to or at a site; any person who transported hazardous material to a transport, storage or treatment site from which there is or has been a release or threat of release of such material; and any person who otherwise caused or is legally responsible for a release or threat of release of oil or hazardous material at a site.

This liability is "strict", meaning that it is not based on fault, but solely on your status as owner, operator, generator, transporter, disposer or other person specified in M.G.L. c.21E §5. This liability is also "joint and several", meaning that you may be liable for all response action costs incurred at a disposal site regardless of the existence of any other liable parties.

The MCP requires PRPs to take necessary response actions at properties where there is, or has been, a release and/or threat of release of oil and/or hazardous material. If you do not take the necessary response actions, or fail to perform them in an appropriate and timely manner, MassDEP is authorized by M.G.L. c. 21E to perform the work. By taking such actions, you can avoid liability for response action costs incurred

by MassDEP in performing these response actions and any sanctions that may be imposed for failure to perform response actions under the MCP.

The MCP requires PRPs and any other person undertaking response actions to perform Immediate Response Actions (IRAs) in response to sudden releases, Imminent Hazards (IH) and Conditions of Substantial Release Migration (SRM). Such persons must continue to evaluate the need for IRAs and notify MassDEP immediately if such a need exists.

If you are a PRP and you have reason to believe that your performance of the necessary response actions is beyond your technical, financial or legal ability, you should promptly notify MassDEP in writing of your inability in accordance with M.G.L. c. 21E, subsection 5(e), and 310 CMR 40.0172. If you assert or demonstrate in compliance therewith that performing or paying for such response action is beyond your ability, subsection 5(e) provides you with a limited defense to an action by the Commonwealth for recovery of two to three times MassDEP's response action costs and 310 CMR 40.0172 provides you with a limited defense to MassDEP's assessment of civil administrative penalties.

You should be aware that you may have claims against third parties for damages, including claims for contribution or reimbursement for the costs of cleanup. Such claims do not exist indefinitely but are governed by laws that establish the time allowed for bringing litigation. MassDEP encourages you to take any action necessary to protect any such claims you may have against third parties.

You must employ or engage a Licensed Site Professional (LSP) to manage, supervise or actually perform the necessary response actions at this site. You may obtain a list of the names and addresses of licensed professionals from the Board of Registration of Hazardous Waste Site Cleanup Professionals by calling (617) 556-1091, or visiting <http://www.state.ma.us/lsp>.

Response actions at the Site will not be deemed to be completed unless and until a level of No Significant Risk as defined at 310 CMR 40.0900 exists or has been achieved in compliance with the MCP. The MCP requires persons undertaking response actions at a disposal site to submit to MassDEP a Permanent Solution Statement prepared by a LSP upon determining that a level of No Significant Risk exists or has been achieved at the Site. You will be required to pay Annual Compliance Assurance Fees for the Site until a Permanent Solution is achieved.

NECESSARY IMMEDIATE RESPONSE ACTIONS AND INTERIM DEADLINE

The Town of Barnstable has addressed the detection of PFAS and 1,4-dioxane in the Maher Wells by blending the Maher well water with drinking water from the Yarmouth public water supply wells via an overland water line. However, additional evaluation of the presence of PFAS and 1,4-dioxane are necessary to further evaluate the extent of contamination. Based on hydrogeological information, portions of the BMA property where PFAS contamination is documented is upgradient of the Mary Dunn wells. In addition, the Zone II for the Mary Dunn well field includes portions of the airport property. Therefore, additional assessment is necessary to evaluate whether PFAS releases at BMA could be contributing to PFAS in the Mary Dunn Wells.

Releases of OHM that impact public and private water supplies are releases that could pose an Imminent Hazard and, pursuant to 310 CMR 40.0311(7), require notification to MassDEP within two hours. As such these releases require that an Immediate Response Action (IRA) be conducted pursuant to 310 CMR 40.0412(1).

Therefore, MassDEP hereby requests that you submit an IRA Plan prepared in compliance with 310 CMR 40.0424 to evaluate whether Imminent Hazards exist relative to public and private water supply wells downgradient of BMA. The IRA Plan should identify all public and private water supply wells located downgradient of BMA or if any portion of the BMA property located within the Zone II of any wells contains PFAS or 1,4-dioxane. BMA should provide any analytical data for any of these wells that have been sampled and analyzed for PFAS and/or 1,4-dioxane. If any public or private water supply well has not been sampled and analyzed for PFAS and 1,4-dioxane, the IRA Plan should include a schedule for conducting this work. The IRA Plan should also include the measures that BMA will conduct to prevent, eliminate, and/or abate any hazards associated with consumption of the drinking water impacted by PFAS above the HA of 0.07 µg/L and/or 1,4-dioxane above the Method 1 GW-1 standard of 0.3 µg/L. Such measures can include, but are not limited to, provision of bottled water, installation of GAC system(s), or connection of private water supply wells to public water. A schedule for implementing these measures should be included in the IRA Plan.

In addition, MassDEP is of the opinion that soil analyses, focusing on the areas where AFFF has been used and/or stored, should be completed for PFAS. Immediate Response Actions should be implemented if the soil is found to contain PFAS.

MassDEP hereby requests that you submit the IRA Plan **on or before December 15, 2016**.

INTERIM DEADLINE

The date established above constitutes an Interim Deadline established pursuant to 310 CMR 40.0167. Failure to comply with an Interim Deadline may result in enforcement actions by the MassDEP, including, but not limited to, the issuance of a Notice of Noncompliance, an Administrative Penalty, and/or Enforcement Orders, or, referral to the Massachusetts Attorney General's Office.

ADDITIONAL RESPONSE ACTIONS

Additional submittals are necessary with regard to this notification, including, but not limited to, the filing of a written IRA Plan, IRA Completion Statement and/or a Permanent Solution Statement (PSS). The MCP requires that a fee of \$1,200.00 be submitted to the Department when a Permanent Solution Statement is filed greater than 120 days from the date of initial notification. Specific approval is required from the Department for the implementation of all IRAs and may be required for Release Abatement Measures (RAMs). RAMs may not be conducted until a RAM Plan is submitted pursuant to 310 CMR 40.0443. Assessment activities, the construction of a fence and/or the posting of signs are actions that are exempt from this approval requirement.

The MCP requires persons undertaking response actions to perform IRAs in response to sudden releases, IHs and Conditions of SRM. In accordance with 310 CMR 40.0426, an IH Evaluation shall be performed as part of an IRA within 14 days of obtaining knowledge of such a condition and shall be submitted to the Department within 60 days.

In addition to verbal notification, 310 CMR 40.0333 requires that a completed Release Notification Form (RNF) be submitted to MassDEP **within sixty (60) calendar days of receipt of this Notice of Responsibility**.

This site shall not be deemed to have had all the necessary and required response actions taken unless and until all substantial hazards presented by the release and/or threat of release have been eliminated and a level of No Significant Risk exists or has been achieved in compliance with M.G.L. c. 21E and the MCP.

If you have any questions relative to this Notice, please contact Angela Gallagher at the letterhead address or by calling (508) 946-2790. All future communication regarding this release must reference the following Release Tracking Number: **4-0026347**.

Sincerely,



Gerard M.R. Martin
Deputy Regional Director
Bureau of Waste Site Cleanup

M/H/AG/lg

CERTIFIED MAIL # 7016 0750 0000 1748 8981
RETURN RECEIPT

ec: Town of Barnstable
Board of Health
Selectmen's Office

Barnstable Department of Public Works, Water Supply Division
Dan Santos, DPW Director, Daniel.Santos@town.barnstable.ma.us
Hans Keijser, Water Superintendent, Hans.Keijser@town.barnstable.ma.us

DEP – SERO

Millie Garcia-Serrano, Regional Director
David Johnston, Deputy Regional Director, BWR
Jonathan Hobill, Regional Engineer, BWR
John Handrahan, Chief, Brownfields, C&E and Risk Reduction Section
Angela Gallagher, Project Manager, BWSC, Brownfields, C&E, and Risk Reduction Section
Lisa Ramos, Regional Enforcement Office

DEP – Boston

Paul Locke, BWSC Assistant Commissioner

LSP

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mnelson@horsleywitten.com

cc: DEP - SERO
Regional Enforcement Office

June 9, 2015 1,4-Dioxane Results Letter to DEP

Horsley Witten Group

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June 9, 2015

Mr. Gerard Martin
Massachusetts Department of Environmental Protection
Southeast Region
20 Riverside Drive
Lakeville, MA 02347

Re: Barnstable Municipal Airport
1,4-dioxane Groundwater Investigation

Dear Mr. Martin:

On behalf of the Barnstable Municipal Airport (Airport), Horsley Witten Group, Inc. (HW) has sampled four groundwater monitoring wells located on the North Ramp of the Airport (Figure 1) and a multi-level monitoring well cluster located on Hyannis Water Supply Division (Hyannis Water). These monitoring well locations were approved by Massachusetts Department of Environmental Protection (DEP) during an April 17, 2015 meeting between DEP, Airport Manager Bud Breault, and HW. The groundwater investigation was undertaken to evaluate the presence of 1,4-dioxane (1,4-D), and determine if historic releases of oil or hazardous materials (OHM) at the North Ramp of the Airport could potentially be associated with recent detections of 1,4-D in the Maher Wellfield public drinking water supply wells, which are located approximately 6,000 feet hydrologically downgradient of the North Ramp (Figure 1).

Laboratory analysis did not indicate the presence of 1,4-D above laboratory reporting limits in any of the groundwater samples that were collected from the four locations on the North Ramp. At the monitoring well cluster on Hyannis Water property, 1,4-D was detected in the deepest screen interval, but was not detected in two shallower screen intervals.

1,4-D was historically used as a stabilizer for the solvent 1,1,1-trichloroethane (1,1,1-TCA), a compound detected in groundwater at the Airport prior to October 2000. Three of the North Ramp monitoring wells sampled by HW (HW-5, HW-12, and OW-6) were locations where 1,1,1-TCA was detected historically. HW was also able to locate and sample monitoring well HW-1,

located hydrologically upgradient of the Cape Air hangar (Figure 1). All four North Ramp monitoring wells are all screened within the shallow aquifer and would be representative of local groundwater conditions.

Monitoring well cluster OW-9 is located approximately 5,600 feet hydrologically downgradient of the North Ramp, and approximately 250 northwest of Maher wellfield supply well ME-1. OW-9 Medium (OW-9M) is screened from 46 to 56 feet below ground surface (BGS), OW-9 Deep (OW-9D) is screened from 58 to 68 feet BGS, and OW-9 Deep/Deep (OW-9DD) is screened from 77 to 87 feet BGS. Historically, 1,1,1-TCA and several other volatile organic compounds (VOCs) were detected in groundwater samples collected from OW-9 DD.

Groundwater Sampling and Results

Groundwater samples were collected from monitoring wells in accordance with Massachusetts Department of Environmental Protection (DEP) groundwater sampling procedures. Each monitoring well was developed using a submersible pump, and a minimum of three well volumes was removed from each well prior to sample collection with a disposable polyethylene bailer. Samples were submitted to Alpha Analytical, Westborough, Massachusetts, for analysis of 1,4-D by Environmental Protection Agency (EPA) method 8270. A copy of the Alpha Analytical laboratory analysis reports for the May 8 and 28, 2015 sampling events are attached.

Table 1. Groundwater Sampling Results

| Location | Sample Date | Result | Laboratory Reporting Limit | MCP GW-1 Standard |
|----------|-------------|--------|----------------------------|-------------------|
| HW-1 | 5/8/2015 | ND | 0.152 | 0.30 |
| HW-12 | | ND | 0.15 | |
| HW-5 | | ND | 0.15 | |
| OW-6 | | ND | 0.15 | |
| OW-9 M | 5/28/2015 | ND | 0.141 | |
| OW-9 D | | ND | 0.141 | |
| OW-9 DD | | 0.926 | 0.141 | |

Notes:

1. Samples collected by Horsley Witten and analyzed by Alpha Analytical, Westborough, MA.
2. All concentrations expressed in micrograms per liter (ug/L).
3. ND = Analyte was not detected above laboratory reporting limit.


The Airport has completed the limited investigation scope initially agreed to in our April 27 meeting. We would like to schedule a meeting in the near future to review the data collected thus far and discuss any additional progress that DEP has made in their ongoing investigation. Should you have any immediate questions concerning the data gathered thus far, please

Mr. Gerard Martin
June 9, 2015
Page 3 of 3

contact us at 508-833-6600. We will contact you in the next few days to schedule a meeting time that works for all parties.

SINCERELY,

HORSLEY WITTEN GROUP, INC.



Mark E. Nelson, PG, LSP
Principal



Gary W.T. Hedman
Project Scientist

Enclosures

Cc:




Mr. Roland Breault, Manager
Barnstable Municipal Airport

Ms. Katie Servis, Assistant Manager
Barnstable Municipal Airport



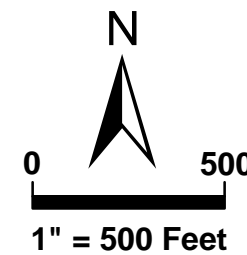
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Legend

-  Monitoring Wells
-  Drinking Water Wells
-  Barnstable Municipal Airport Property Boundary

Horsley Witten Group
Sustainable Environmental Solutions
90 Route 6A • Sandwich, MA • 02563
Tel: 508-833-6600 • Fax: 508-833-3150 • www.horsleywitten.com

Groundwater Sampling Program
Barnstable Municipal Airport
Hyannis, MA



Date: 6/8/2015

Figure 1

July 28, 2016 PFOA/PFOS Results Memo

Horsley Witten Group

Sustainable Environmental Solutions

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508-833-6600 • horsleywitten.com



MEMORANDUM

TO: Mr. Roland Breault, Airport Manager
FROM: Mark Nelson, P.G., Gary Hedman
DATE: July 28, 2016
RE: PFOA – PFOS Sampling Results
CC:

Horsley Witten Group, Inc. (HW) is pleased to provide this summary of groundwater sampling activities undertaken on behalf of the Barnstable Municipal Airport in conjunction with the Town of Barnstable Department of Public Works. The groundwater sampling was completed to evaluate whether or not perfluorinated chemicals (PFCs), including perfluorooctanoic acid (PFOA) and perfluorooctanesulfonic acid (PFOS), are present within the aquifer below the Airport.

In 2016, the United States Environmental Protection Agency (EPA) has issued a lifetime drinking water Health Advisory (HA) for PFOA and PFOS of 70 nanograms per liter (ng/L), or parts per trillion (ppt), either individually or when concentrations of PFOA and PFOS are combined. A Health Advisory identifies the concentration of a contaminant in drinking water at which adverse health effects are not anticipated to occur.

On July 1st and 5th, 2016, HW staff collected groundwater samples from six monitoring wells located on Airport property, and two multi-level monitoring wells at the Hyannis Water District's wellfield (Figure 1). Each monitoring well was developed using a submersible pump and disposable tubing. A minimum of three well volumes was removed from each well prior to sample collection with a disposable polyethylene bailer. An equipment blank and duplicate sample were also collected as a quality control measure. Samples were submitted to Eurofins Eaton Analytical, of South Bend, Indiana, for analysis.

Laboratory analysis indicated the presence of PFCs in every groundwater sample that was collected. In samples collected from HW-5, located on the North Ramp of the Airport, and HW-3, located in the Steamship Authority Parking Lot, PFOA and PFOS were detected at concentrations above the EPA HA of 70 ng/L, at 120 and 84 ng/L, respectively. Laboratory analytical results are summarized in Table 1.

Please let us know if you have any questions, 508-833-6600.

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Groundwater Sampling Results
 Barnstable Municipal Airport and Maher Wellfield Monitoring Wells
 July 2016

| | Units | Method Reporting Limit | North Ramp | | Steamship Parking Lot | | | | |
|--------------------------------------|-------|------------------------|------------------|------------------|-----------------------|------------------|--------------------|--------------------|--------------------|
| | | | HW-1 7/1/2016 | HW-5 7/1/2016 | HW-2 7/1/2016 | HW-3 7/1/2016 | HW-300 7/1/2016 | HW-301 7/1/2016 | HW-302 7/1/2016 |
| Perfluorobutanesulfonic acid (PFBS) | ng/L | 9 | 9 (ND) | 9 (ND) | 9 (ND) | 9 (ND) | 9 (ND) | 9 (ND) | 9 (ND) |
| Perfluoroheptanoic acid (PFHpA) | ng/L | 1 | 10 | 4.1 | 7.1 | 16 | 9.6 | 2 | 19 |
| Perfluorohexanesulfonic acid (PFHxS) | ng/L | 3 | 18 | 11 | 3.5 | 4.3 | 12 | 38 | 6.3 |
| Perfluorononanoic acid (PFNA) | ng/L | 2 | 2 (ND) | 2 (ND) | 2 (ND) | 6.3 | 2 (ND) | 2 (ND) | 54 |
| Perfluorooctane sulfonate (PFOS) | ng/L | 4 | 17 | 120 | 12 | 84 | 17 | 11 | 14 |
| Perfluorooctanoic acid (PFOA) | ng/L | 2 | 33 | 31 | 6.3 | 9.1 | 5.2 | 3.7 | 33 |

| | Units | Method Reporting Limit | Maher Wells | | | | | | Quality Control | | |
|--------------------------------------|-------|------------------------|-------------------|-------------------|--------------------|--------------------|--------------------|---------------------------------|---------------------------------|----------------------------|--------------------------|
| | | | OW-9S 7/5/2016 | OW-9D 7/5/2016 | OW-18S 7/5/2016 | OW-18M 7/5/2016 | OW-18D 7/5/2016 | OW-18D Duplicate 7/5/2016 | Field Trip Blank 7/5/2016 | Water Blank 7/1/2016 | Equip. Blank 7/1/2016 |
| Perfluorobutanesulfonic acid (PFBS) | ng/L | 9 | 9 (ND) | 9 (ND) | 9 (ND) | 9 (ND) | 9 (ND) | 9 (ND) | 9 (ND) | 9 (ND) | |
| Perfluoroheptanoic acid (PFHpA) | ng/L | 1 | 14 | 2.8 | 7.1 | 2.9 | 7.1 | 6.3 | 1 (ND) | 1 (ND) | |
| Perfluorohexanesulfonic acid (PFHxS) | ng/L | 3 | 3 (ND) | 12 | 6.8 | 16 | 10 | 11 | 3 (ND) | 3 (ND) | |
| Perfluorononanoic acid (PFNA) | ng/L | 2 | 7.7 | 3.6 | 2 (ND) | 7.6 | 6.5 | 5.8 | 2 (ND) | 2 (ND) | |
| Perfluorooctane sulfonate (PFOS) | ng/L | 4 | 7.4 | 41 | 8.3 | 44 | 18 | 19 | 4 (ND) | 4 (ND) | |
| Perfluorooctanoic acid (PFOA) | ng/L | 2 | 7 | 5.2 | 18 | 5.8 | 5.9 | 5.9 | 2 (ND) | 2 (ND) | |

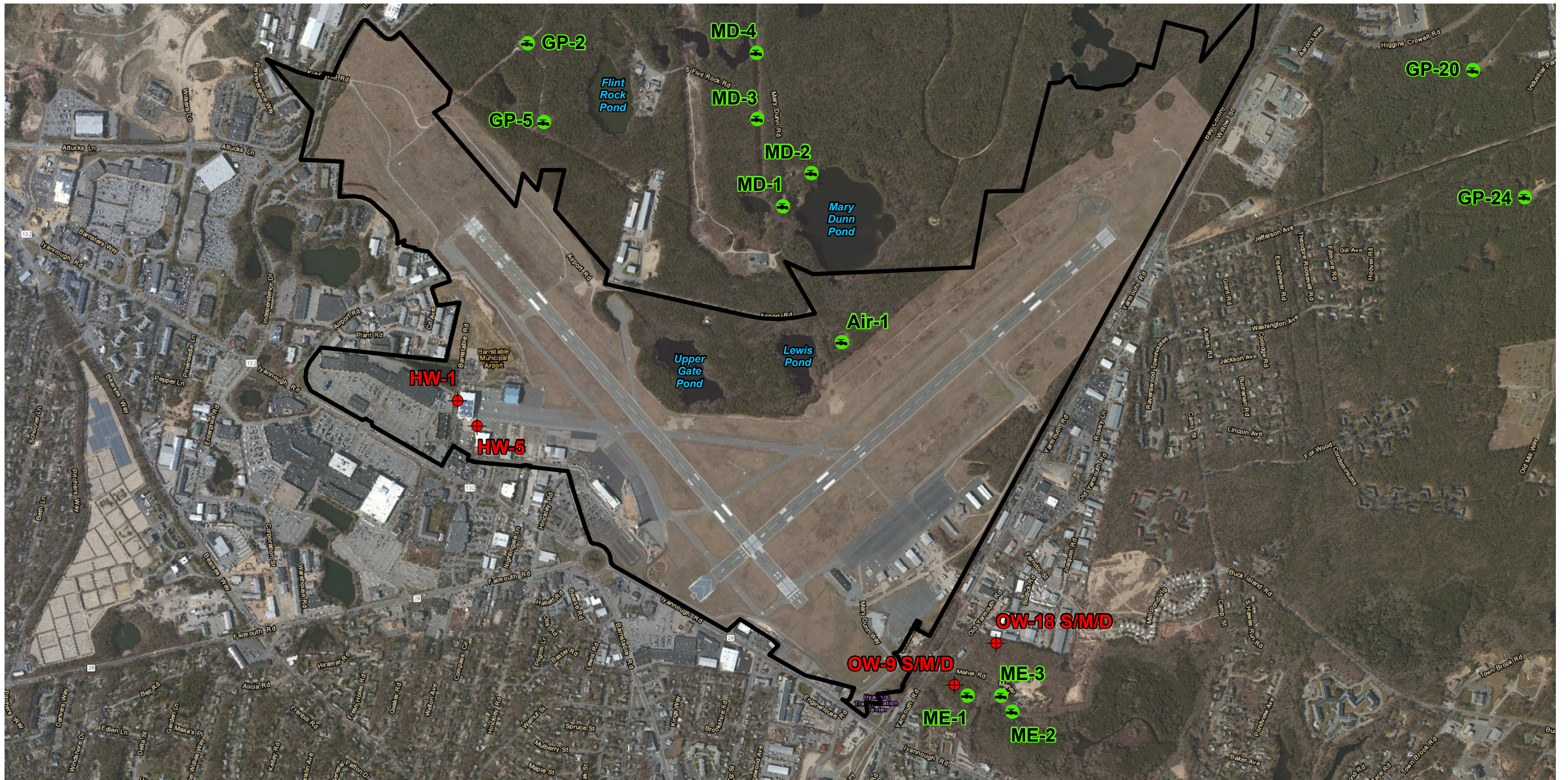
Notes:

All samples collected by Horsley Witten Group, Inc., and analyzed by Eurofins Eaton Analytical, South Bend, Indiana.

ND - Analyte not detected above the Method Reporting Limit




ng/L - nanograms per liter or parts per trillion

Bold text and shaded box denotes analyte detected above U.S. Environmental Protection Agency Drinking Water Health Advisory level of 70 ng/L



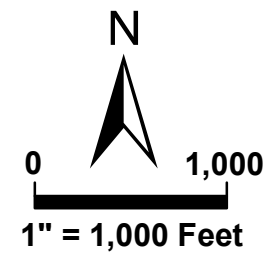
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Legend

-  Monitoring Wells
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Groundwater Sampling Program
Barnstable Municipal Airport
Hyannis, MA



Date: 6/23/2016

Figure 1