

EXPLANATION OF SIGNIFICANT DIFFERENCES
TO THE
RECORD OF DECISION

OPERABLE UNIT 4
FIRE FIGHTING TRAINING AREA

FORMER NAVAL AIR STATION SOUTH WEYMOUTH
WEYMOUTH, MASSACHUSETTS

August 2013

STATEMENT OF PURPOSE AND AUTHORIZING SIGNATURES

This decision document explains the basis for the determination to issue the attached Explanation of Significant Differences (ESD) for the Fire Fighting Training Area (FFTA) at the Former Naval Air Station (NAS) South Weymouth, Massachusetts.

For the reasons documented herein, by my signature below, I approve the issuance of this ESD for the FFTA, Operable Unit 4, at the Former NAS South Weymouth Superfund Site and the changes stated therein. Concur and recommended for immediate implementation:

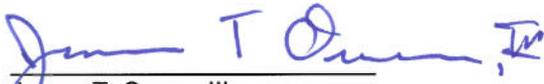
U.S. Department of the Navy

By: 
David A. Barney
NAVFAC BRAC Environmental Coordinator
BRAC PMO East
U.S. Navy

Date: 8/7/13

Concur and recommended for immediate implementation:

U.S. Environmental Protection Agency, Region I

By: 
James T. Owens III
Director, Office of Site Remediation and Restoration
U.S. Environmental Protection Agency, Region I

Date: 8/22/13

**EXPLANATION OF SIGNIFICANT DIFFERENCES
OPERABLE UNIT 4 – FIRE FIGHTING TRAINING AREA
FORMER NAVAL AIR STATION SOUTH WEYMOUTH, MASSACHUSETTS**

1.0 INTRODUCTION TO THE SITE AND STATEMENT OF PURPOSE

1.1 Site Name and Location

Naval Air Station South Weymouth
1134 Main Street
Weymouth, Massachusetts 02190
MA2170022022
Operable Unit 4 – Fire Fighting Training Area

1.2 Identification of Lead and Support Agencies

The U.S. Navy is the lead agency for all environmental investigations and cleanup programs at the Former Naval Air Station (NAS) South Weymouth. The lead regulatory agency is the U.S. Environmental Protection Agency Region 1 (USEPA). The Massachusetts Department of Environmental Protection (MassDEP) provides additional regulatory agency support.

1.3 Legal Authority

Under Section 117(c) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), if new information becomes available that could affect the implementation of a selected remedy for a site, then the nature and significance of such finding(s) must be identified and evaluated in a post-Record of Decision (ROD) document for inclusion in the Administrative Record. In accordance with Section 300.435(c) of the National Contingency Plan (NCP) and USEPA guidance (OSWER Directive 9355.3-02), an Explanation of Significant Differences (ESD) is being issued for the Fire Fighting Training Area (FFTA) Site because the changes do not fundamentally alter the remedy set forth in the ROD with respect to scope, performance, or cost.

In accordance with Section 300.825(a)(2) of the NCP, this ESD will become part of the Administrative Record for the FFTA Site, and will be available for public review at the former NAS South Weymouth Caretaker Site Office (Building 11, Shea Memorial Drive) and the local Information Repositories identified below. In addition, a notice that briefly summarizes this ESD will be published in three major local newspapers.

1.4 Overview of the ESD

The September 2004 ROD (U.S. Navy, 2004) specified a No Action decision for the FFTA Site. The human health and ecological risk assessments performed as part of the remedial investigation (RI) showed no unacceptable risks to human and ecological receptors. The ROD noted however, that residual petroleum compounds were identified in subsurface soils at the Site. Under CERCLA, sites that are exclusively petroleum-contaminated are not subject to assessment under the CERCLA process. On that basis No Action was necessary for the FFTA under CERCLA; the petroleum residuals at the site were addressed pursuant to applicable Massachusetts state law.

Following completion of the ROD and all CERCLA activities, the Navy addressed the petroleum residuals identified at the Site in accordance with the Massachusetts Contingency Plan (MCP). Petroleum-impacted soils were removed and confirmatory samples collected during an MCP Release Abatement Measure (RAM) performed by the Navy from 2005 to 2007. A RAM Completion Report and Response Action Outcome (RAO) were submitted by the Navy; the RAO was approved by MassDEP on August 1, 2008.

Subsequent to issuing the ROD and the MCP RAO, the Navy performed a perfluorinated compound (PFC) investigation for Review Item Area (RIA) 11. The RIA 11 investigation included collection of groundwater, soil, surface water, and sediment samples around Hangar 1 and the FFTA followed by sample analysis for two PFCs: perfluorooctanoic acid (PFOA) and perfluorooctane sulfonate (PFOS). The investigation revealed the presence of PFCs in groundwater in the vicinity of the FFTA at concentrations exceeding the USEPA Provisional Health Advisory (PHA) values for PFOA and PFOS. No significant concentrations of PFCs were detected in soil samples collected at the FFTA and in nearby surface water and sediment samples. The results of the RIA 11 PFC investigation are presented in the RIA 11 Decision Document (Tetra Tech, 2012). Based on the results of the investigation it was determined that a modification to the previous No Action decision was warranted to address potential threats associated with the future use of groundwater. Specifically, the No Action decision will be modified to include an institutional control to restrict the use of groundwater as described in Section 4.2. This action covers groundwater in the 8.8-acre parcel encompassing the FFTA Site. The South Shore Tri-Town Development Corporation (SSTTDC) and the Master Developer of NAS South Weymouth, LNR South Shore, LLC (LNR), have consented to the establishment of this institutional control.

Since the proposed change does not fundamentally alter the overall cleanup approach for the Site, with respect to scope, performance, or cost, the Navy has determined that the issuance of an ESD complies with the aforementioned CERCLA and NCP requirements.

1.5 Availability of Documents

In accordance with Section 300.825(a)(2) of the NCP, this ESD will become part of the Administrative Record for the FFTA Site. This ESD is also available for public review at the following locations:

Department of the Navy
Caretaker Site Office
c/o David Barney
1134 Main Street, Bldg. 11
South Weymouth, MA 02190

Tufts Library
46 Broad Street
Weymouth MA 02188
(781) 337-1402

Abington Public Library
600 Gliniewicz Way
Abington, MA 02351
(781) 982-2139

Hingham Public Library
66 Leavitt Street
Hingham, MA 02043
(781) 741-1405

Rockland Memorial Library
20 Belmont Street
Rockland, MA 02370
(781) 878-1236

2.0 SITE HISTORY, CONTAMINATION, AND SELECTED REMEDY

2.1 Site Description and History

The Former NAS South Weymouth is located approximately 15 miles southeast of Boston, Massachusetts in Norfolk and Plymouth counties and in the Towns of Weymouth, Abington, and Rockland. NAS South Weymouth was operationally closed on September 30, 1996 and administratively closed on September 30, 1997 under the Base Realignment and Closure Act of 1990.

The FFTA Site is located south of Runway 8-26 and east of Taxiway C in the Town of Rockland, Massachusetts (Figure 1). The FFTA was used for an estimated 38 years: between 1950 and 1986; and then again from 1988 through 1990. The primary purpose of the FFTA during its operation was for firefighting training exercises. The Site currently consists of a cracked asphalt pad and concrete containers (burn pits); to the east and/or west of the Site are wetlands, a state-certified vernal pool, a cranberry bog, and woodlands. Fire fighting training operations began in the mid-1950s. Prior to 1986,

waste oil and other fuels were placed in old vehicles and burned. In 1988, concrete burn pits were installed to contain jet fuel; the fuel was ignited and then extinguished to provide fire fighting practice. Reportedly, a spill or release to the pad would have occurred only if water or foam splashed out of the containers during training. Materials used to extinguish the fires included high-pressure water and fire-suppressant foams.

The Navy collected surface water, sediment, soil, and groundwater samples during an RI and conducted geophysical studies to identify the extent of contamination at the FFTA. There were no exceedances of human health or ecological risk thresholds for the current and future use scenarios that were evaluated. The Final RI Report was submitted in April 2001.

At the request of the MassDEP, test pits were excavated and sampled in April 2002 to investigate the potential presence of petroleum residuals. Residual petroleum staining was present immediately below the existing asphalt surface. Analytical results indicated that the stained material had similar properties to petroleum constituents associated with the existing asphalt. The USEPA and Navy concluded that no action under CERCLA was warranted to respond to the petroleum staining. A No Action Proposed Plan was issued in September 2003. The Navy and USEPA signed the ROD in September 2004 that specified No Action under CERCLA.

The Navy addressed the petroleum residuals at the Site in response to a Notice of Responsibility received from MassDEP in November 2004. Petroleum-impacted soils were removed and confirmatory samples collected during an MCP RAM performed by the Navy from 2005 to 2007. A total of 5,582 tons of soil were removed from the Site. The Navy submitted a RAM Completion Report and RAO in July 2008. MassDEP approved the RAO on August 1, 2008.

2.2 Remedy Selected in the 2004 ROD

The September 2004 ROD for the FFTA Site concluded that No Action was appropriate since the risk assessments performed as part of the RI did not identify potential human health or ecological risks in excess of regulatory thresholds. The petroleum residuals identified in 2002 were addressed under the MCP as discussed above.

3.0 BASIS FOR THE DOCUMENT

New environmental data were collected in 2010 at the request of USEPA and MassDEP to investigate the potential presence of PFCs in groundwater. The data were collected to assess the presence and extent of certain PFCs which are components of aqueous film forming foams (AFFF). AFFF was used during training exercises at the FFTA and was released to soils while fighting fires. Prior to the April 2010 PFC field investigation, no environmental samples collected at former NAS South Weymouth had been analyzed for PFCs. PFCs had not been included as parameters for laboratory analysis since they are considered emerging contaminants and are not on the Target Compound List commonly used for environmental investigations. Since the 2010 groundwater results indicated the presence of PFCs at the FFTA, samples were collected in 2011 to determine the extent of PFCs in groundwater. The field program included re-development of existing monitoring wells, installation of new monitoring wells, and sampling of selected new and existing monitoring wells. Figure 2 indicates the locations of monitoring wells in the vicinity of the FFTA Site that were sampled during the PFC investigations in 2010 and 2011.

There are currently no promulgated federal drinking water standards for PFOA and PFOS in groundwater. However, in January 2009, EPA published PHA values for PFOA and PFOS in groundwater used for drinking water: 0.4 µg/L for PFOA and 0.2 µg/L for PFOS (USEPA, 2009).

The FFTA Site is located in a portion of the Base where MassGIS has not mapped any medium- or high-yield aquifers. MassDEP has assigned category GW-3 to groundwater at the Site. The majority of the Site is zoned as open space for use as park land and active and passive recreation. The allowable uses for open space zoning districts in the SSTTDC Zoning and Land Use By-Laws include public infrastructure service, outdoor commercial recreation, and public recreation/open space. A small portion

of the Site lies in the golf course open space zoning district. SSTD and its Master Developer, LNR, have indicated that production, supply, and irrigation water needs for the development can be provided by sources other than groundwater from the FFTA site. Extraction of site groundwater for production, supply or irrigation purposes is therefore not considered a reasonable foreseeable use.

By this ESD, the Navy is addressing concerns about the presence of PFCs in groundwater at concentrations exceeding the USEPA PHA values and their impact on the approximately 8.8-acre parcel encompassing the FFTA Site (see Figure 2). The implementation of institutional controls to restrict the use of groundwater in this parcel further supports the Navy's determination that all remedial actions have been taken and that the parcel is suitable to transfer.

4.0 DESCRIPTION OF SIGNIFICANT DIFFERENCES OR NEW ALTERNATIVES

4.1 Background

Based on the historic use and releases of AFFF in the vicinity of the FFTA, groundwater samples for PFOA and PFOS analysis were collected in April 2010 in accordance with the *Final Sampling and Analysis Plan, Perfluorinated Compounds in Groundwater, Former Naval Air Station South Weymouth, Weymouth, Massachusetts* (Tetra Tech, Inc., 2010a). The groundwater results indicated exceedances of the PHA values at some of the monitoring wells (Tetra Tech, Inc., 2010b). In 2011, a second investigation was conducted in accordance with *Final Sampling and Analysis Plan Addendum, Perfluorinated Compounds, Former Naval Air Station South Weymouth, Weymouth, Massachusetts* (Tetra Tech, Inc., 2011). The April 2011 field program included additional groundwater sample collection from existing and new monitoring wells to delineate the extent of the PFC contamination in groundwater.

Although there are no current complete exposure pathways for exposure to groundwater, it is possible that in the future there could be construction projects that would result in certain receptors being exposed to shallow groundwater. Additionally, use of groundwater for irrigation is possible in the future.

As a conservative measure, risk-based screening levels for PFOA and PFOS were calculated for the future construction worker at the Site who may be exposed to PFCs in shallow groundwater via incidental ingestion. In addition, risk-based screening levels for PFOA and PFOS were calculated for future maintenance workers and residents who may be exposed to PFCs in groundwater used for irrigation via incidental ingestion. Calculations performed by the Navy Marine Corps Public Health Center and reviewed by the USEPA are included in the RIA 11 Decision Document (Tetra Tech, 2012).

The groundwater data collected from the FFTA area have been compared to the USEPA PHA drinking water values and the Navy calculated risk-based screening level values for a potential future construction worker exposed to groundwater via ingestion and potential future maintenance workers or residents exposed to groundwater used for irrigation via incidental ingestion. Table 1 presents the 2010 and 2011 groundwater data compared to the USEPA PHA drinking water values. Table 2 presents the 2010 and 2011 groundwater data compared to the construction worker, maintenance worker and resident risk-based screening level values. The groundwater data presented in Table 1 indicate that the PHA drinking water values for PFOA were exceeded in 5 of the 14 monitoring wells; PHA values for PFOS were exceeded in 6 of the 14 monitoring wells. However, the results in Table 2 indicate that all of the PFOA and PFOS concentrations detected in groundwater are one or more orders of magnitude lower than the construction worker, maintenance worker, and resident risk-based screening level values for PFOA and PFOS.

4.2 Description of Changes

This ESD addresses the potential threat if PFC-impacted groundwater is used in the future for drinking water or other purposes (Table 1). The action to be taken includes implementation of a land use control and monitoring in accordance with a monitoring plan to be developed by the Navy. The land use control will take the form of an institutional control (IC) and deed restriction to restrict the use of groundwater for drinking water purposes and to also restrict the use of groundwater for non-drinking water purposes

unless the Navy, USEPA and MassDEP provide their prior written consent. Once the ESD has been reviewed and signed by the Navy and USEPA, placement of this deed restriction will be the final action for the FFTA Site. With the deed restriction in place, all remedial actions will have been taken and the Navy can support a determination that the parcel is suitable for transfer. The groundwater restrictions will be incorporated in the deed at the time of transfer of the property from the Navy to SSTTDC.

This ESD documents the decision by the Navy to place a land use control and deed restriction on specific uses of groundwater. The restriction will be placed on the approximately 8.8-acre parcel shown on Figure 3 where groundwater data indicate there are exceedances of the USEPA PHA drinking water values for PFOA and PFOS. SSTTDC and LNR have consented to the establishment of this institutional control. A real estate survey plan of the FFTA restricted area parcel will be incorporated in the transfer deed. The administrative change documented in this ESD will include the following Covenant and Restriction Concerning the Use of Groundwater in the deed in a form substantially as follows:

GRANTEE covenants, on behalf of itself, its successors and assigns, for a period of nine hundred and ninety-nine (999) years, that it shall not perform, suffer, allow or cause any person to perform any of the following activities in, on, upon, through, over or under that certain portion of the CONVEYED PROPERTY known as the FFTA Restricted Area (defined below):

- (a) the installation of any wells for drinking water purposes;
- (b) the installation of any wells for any purpose other than drinking water ("Non-Drinking Water Wells), provided, however, that Non-Drinking Water Wells may be installed with Navy's, MassDEP's and USEPA's prior written consent, but only after such consent has been duly recorded or registered with the applicable registry of deeds or registered land section of the Massachusetts Land Court;
- (c) the extraction, consumption or utilization of groundwater for drinking water purposes; and
- (d) the extraction, consumption or utilization of groundwater for any purpose other than drinking water ("Non-Drinking Water Uses"), provided, however, that groundwater water may be extracted, consumed or utilized for Non-Drinking Water Uses with Navy's, MassDEP's and USEPA's prior written consent, but only after such consent has been duly recorded or registered with the applicable registry of deeds or registered land section of the Massachusetts Land Court.

The FFTA Restricted Area is more fully described in Exhibit __ attached hereto [INSERT LEGAL DESCRIPTION OF THE FFTA RESTRICTED AREA ON THIS EXHIBIT], and is also shown as areas "HB-FFTA-E-1 and HB-FFTA-P1" on sheet 5 of 5 of the plan entitled "Property Boundary Survey (F.O.S.T. No 5A), Naval Air Station, South Weymouth," dated September 15, 2008, revised November 4, 2011, prepared by Surveying and Mapping Consultants, Inc., recorded in Plan Book __, Page __. [INSERT PLAN BOOK INFORMATION AT TIME OF RECORDING.] The restrictions created pursuant to this Section __ ("Groundwater Restrictions") shall terminate prior to the nine hundred and ninety-nine (999) year period referred to above only upon a written determination by Navy, USEPA and MassDEP that such termination poses no unacceptable risk to human health or the environment, and such written determinations have been duly recorded or registered with the applicable registry of deeds or registered land section of the Massachusetts Land Court. The Groundwater Restrictions shall run with the FFTA Restricted Area and any portion thereof (however it may be divided). GRANTEE hereby covenants, on behalf of itself, its successors and assigns, to stand seized and hold title to the FFTA Restricted Area, or any portion thereof, subject to the Groundwater Restrictions, and to incorporate the Groundwater Restrictions, either in full or by reference, into all future deeds, easements, mortgages, leases, licenses, occupancy agreements or any other instrument of transfer by which an interest in and/or a right to use the FFTA Restricted Area, or any portion thereof, is conveyed. The GOVERNMENT is hereby deemed the beneficiary of all covenants made by GRANTEE with respect to the Groundwater Restrictions, without regard to whether it remains the owner of any portion of the Restricted Area or has any interest in property in the vicinity, and shall have the right to enforce these covenants in any court of competent jurisdiction, in accordance with M.G.L. c. 184 and other applicable law, including without limitation the right to seek specific performance.

The Groundwater Restrictions shall not apply to the installation of monitoring wells, the extraction of groundwater for monitoring purposes, or any response actions taken by Navy, USEPA, or MassDEP, or their agents, contractors, or employees pursuant to CERCLA or M.G.L. c. 21E.

Attachment 1 to this ESD describes actions to be taken by the Navy to implement, monitor, and enforce the proposed restrictions. The Navy will develop a long-term monitoring plan and implement an annual monitoring program in accordance with the plan. The annual monitoring data will be evaluated as part of the five-year reviews described in Section 6.0 of the ESD. This action will be the final remedy for the 8.8-acre FFTA parcel in which PFOA and PFOS concentrations in groundwater exceed the USEPA PHA drinking water values.

4.3 Changes in Expected Outcomes

As described in Section 4.2, the implementation of a land use control and deed restriction along with an annual monitoring program will not adversely impact the performance or cost of the selected remedy. These changes will allow the Navy to implement and enforce the ICs necessary to protect human health and the environment in the long-term and allow for the beneficial reuse of the 8.8-acre FFTA parcel. The groundwater restriction boundary shown in Figure 3 will be incorporated into property transfer documents.

5.0 SUPPORT AGENCY COMMENTS

USEPA has reviewed, provided comments, and subsequently approved this ESD. In signing the ESD, USEPA concurs with the findings of this document. MassDEP also reviewed this ESD and provided comments to the Navy. The Navy has addressed the comments received from both USEPA and MassDEP.

6.0 STATUTORY DETERMINATIONS

Considering the above-described administrative adjustments to the selected remedy set forth in the 2004 ROD, the Navy believes that the remedy remains protective of human health and the environment. The ICs will provide short- and long-term effectiveness, be cost effective, implementable and be protective of human health and the environment. These changes satisfy CERCLA Section 121(b).

Five-year reviews will be conducted by the Navy, in conjunction with USEPA and MassDEP, until the groundwater conditions are restored such that the Site is suitable for unrestricted use and unlimited exposure in accordance with CERCLA. During such reviews, the Navy, USEPA, and MassDEP will review site conditions and monitoring data to determine whether the continued implementation of the remedy is appropriate. The presence of new groundwater extraction wells in the general vicinity of the FFTA will be determined as part of each five-year review.

7.0 PUBLIC PARTICIPATION

Throughout the site's history, the Navy has kept the community and other interested parties apprised of the FFTA and PFC investigation activities through informational meetings, press releases, public meetings, and contact with local officials. Also, the Navy regularly meets to discuss the status and progress of the Installation Restoration Program with the Restoration Advisory Board (RAB), which includes representatives from the local community. Representatives from the Navy, USEPA, and MassDEP attend these public meetings.

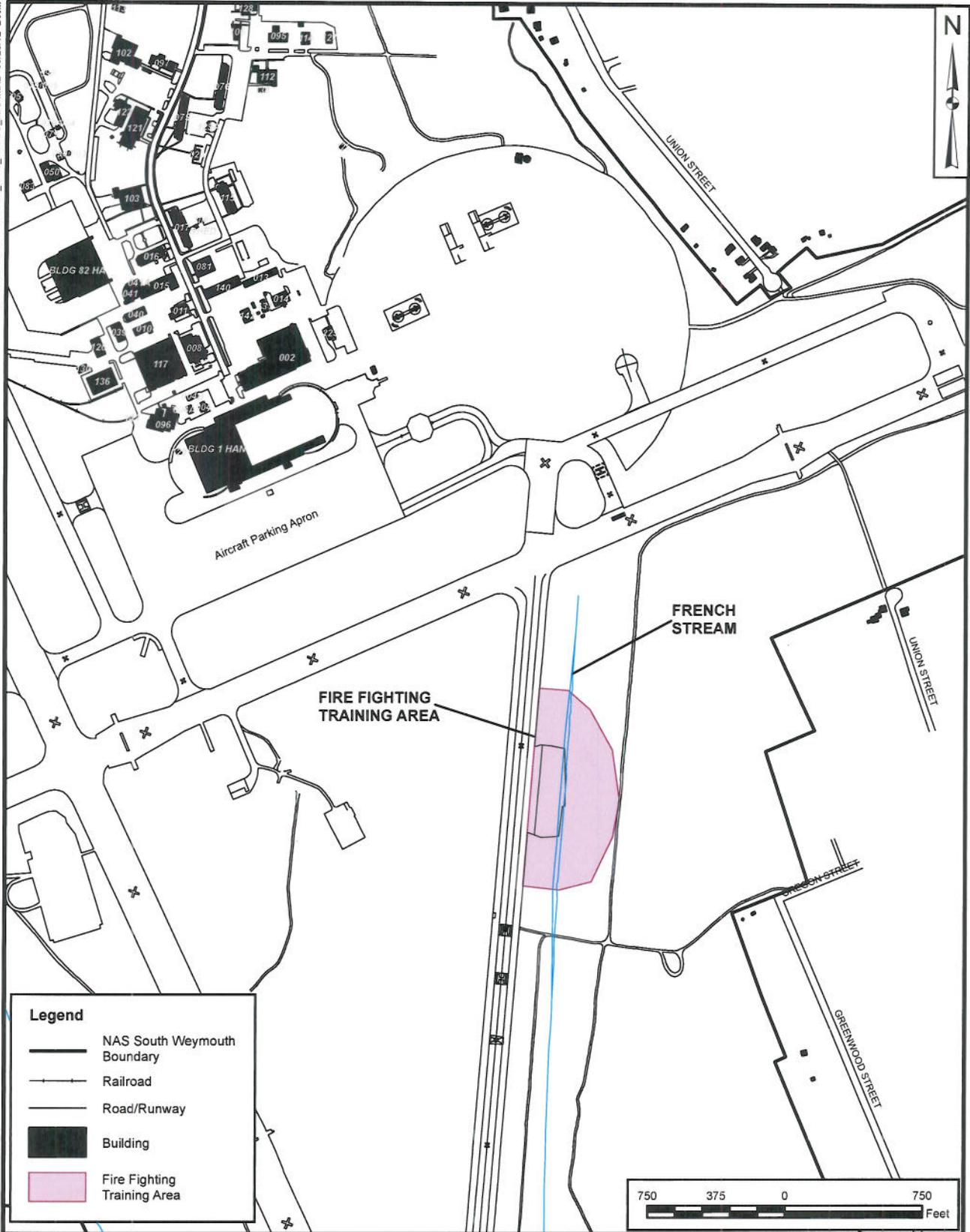
A 15-day public comment period, from February 4 to February 22, 2013, was provided for review of this ESD. The changes in the approach to the Site remedy were presented to the public in the January 2013 RAB update and discussed at the RAB meeting held on February 14, 2013. The Navy's responses to the comments received during the public comment period are presented in Attachment 2.

TABLES

**TABLE 1
GROUNDWATER RESULTS COMPARED TO PROVISIONAL HEALTH ADVISORY VALUES
FIRE FIGHTING TRAINING AREA EXPLANATION OF SIGNIFICANT DIFFERENCES
FORMER NAS SOUTH WEYMOUTH
WEYMOUTH, MASSACHUSETTS**

SAMPLE ID		AFFF-GW- FFTA- MW01- 0511	AFFF-GW- FFTA- MW02- 0511	AFFF-GW- FFTA- MW2D- 0511	AFFF-GW- FFTA- MW11- 0410	AFFF-GW- FFTA- MW12- 0410	AFFF-GW- FFTA- MW13- 0410	AFFF-GW- FFTA- MW13-0410- D	AFFF-GW- FFTA- MW13- 0410-AVG	AFFF-GW- FFTA- MW14- 0410	AFFF-GW- FFTA- MW46- 0410	AFFF-GW- MW46D2- 0511	AFFF-GW- MW46D2- 0511-D	AFFF-GW- MW46D2- 0511-AVG	AFFF-GW- MW51D2- 0511	AFFF-GW- FFTA- MW52D2- 0410	AFFF-GW- MW53D2- 0511	AFFF-GW- MW60- 0511	AFFF-GW- MW61- 0511
LOCATION ID		FFTA-MW- 1	FFTA-MW- 2	FFTA-MW- 2D	FFTA-MW- 11	FFTA-MW- 12	FFTA-MW- 13	FFTA-MW- 13	FFTA-MW- 13	FFTA-MW- 14	FFTA-MW- 46	FFTA-MW- 46D2	FFTA-MW- 46D2	FFTA-MW- 46D2	FFTA-MW- 51D2	FFTA-MW- 52D2	FFTA-MW- 53D2	FFTA-MW- 60	FFTA-MW- 61
SAMPLE DATE		05/09/11	05/09/11	05/09/11	04/22/10	04/22/10	04/22/10	04/22/10	04/22/10	04/21/10	04/22/10	05/05/11	05/05/11	05/05/11	05/04/11	04/21/10	05/04/11	05/05/11	05/05/11
SACODE		NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	ORIG	DUPLICATE	AVERAGE	NORMAL	NORMAL	ORIG	DUPLICATE	AVERAGE	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
CRITERIA	PHA *																		
PARAMETERS (ug/L)																			
PFOA	0.4	0.69	0.008 U	0.0079 U	0.21	0.052	25	23	24	0.95	1.9	1.2	1.3	1.25	0.054	0.036	0.22	0.012 J	0.005 J
PFOS	0.2	0.0068 J	0.0076 U	0.0022 J	0.99	0.26	23	27	25	0.36	0.75	2	2.5	2.25	0.008 J	0.014	0.072	0.057	0.0073 J

* PHA - Provisional Health Advisory for groundwater used for drinking water; USEPA, January 2009.



Legend

-  NAS South Weymouth Boundary
-  Railroad
-  Road/Runway
-  Building
-  Fire Fighting Training Area

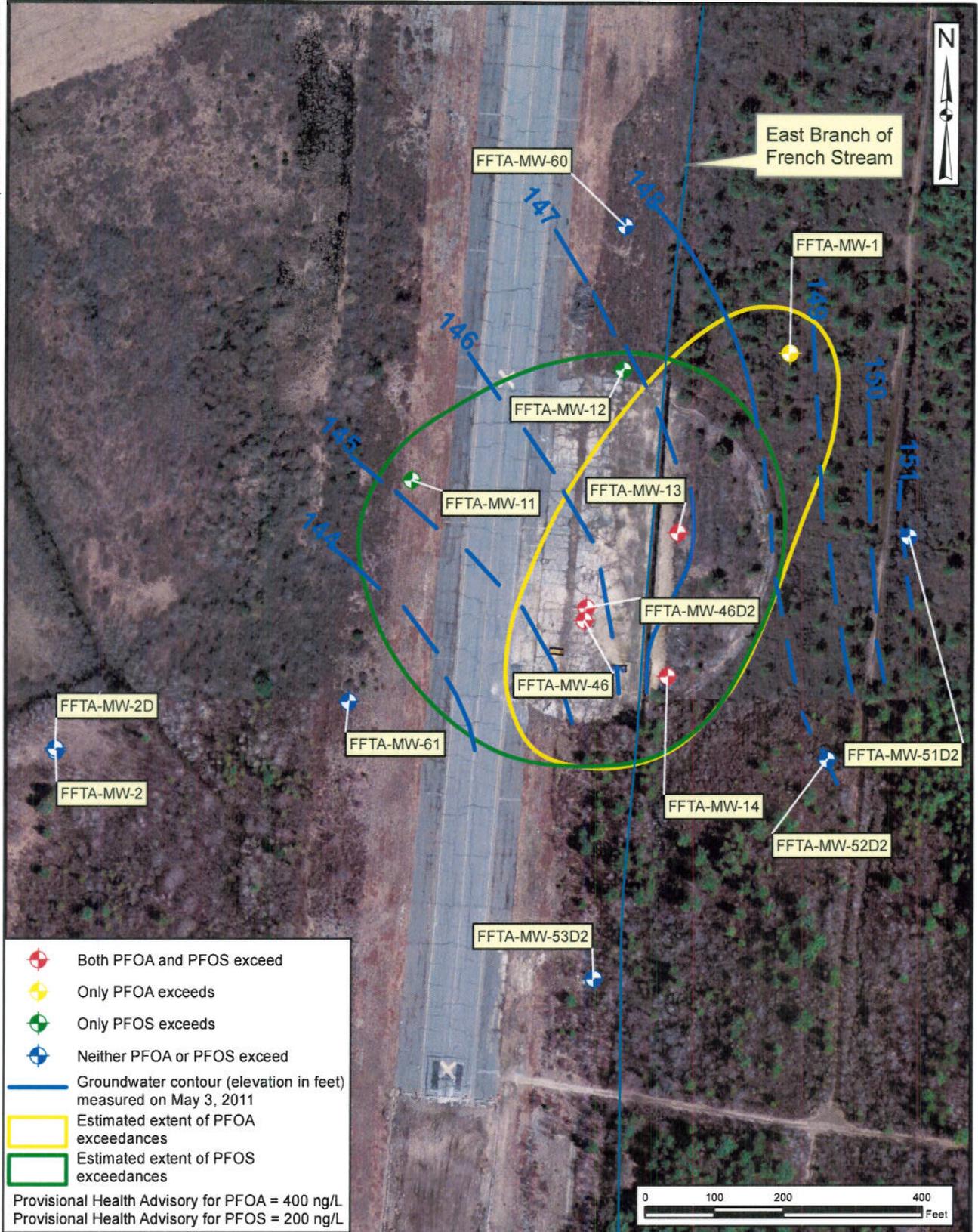


FORMER NAVAL AIR STATION SOUTH WEYMOUTH
WEYMOUTH, MASSACHUSETTS

SITE LOCUS MAP

FIRE FIGHTING TRAINING AREA
EXPLANATION OF SIGNIFICANT DIFFERENCES

SCALE AS NOTED	
FILE I:\FFTA_SITE_LOCUS_MAP.MXD	
REV	DATE
0	09/26/12
FIGURE NUMBER FIGURE NO. 1	



- Both PFOA and PFOS exceed
- Only PFOA exceeds
- Only PFOS exceeds
- Neither PFOA or PFOS exceed
- Groundwater contour (elevation in feet) measured on May 3, 2011
- Estimated extent of PFOA exceedances
- Estimated extent of PFOS exceedances

Provisional Health Advisory for PFOA = 400 ng/L
 Provisional Health Advisory for PFOS = 200 ng/L



FORMER NAVAL AIR STATION SOUTH WEYMOUTH
 WEYMOUTH, MASSACHUSETTS

AREAL DISTRIBUTION OF PFOA AND PFOS

FIRE FIGHTING TRAINING AREA
 EXPLANATION OF SIGNIFICANT DIFFERENCES

SCALE PER SCALE BAR	
FILE I:\pExceedancesAffR3.MXD	
REV 0	DATE 09/26/12
FIGURE NUMBER FIGURE NO. 2	



 Groundwater Monitoring Well
 FFTA Groundwater Restriction Boundary



FORMER NAVAL AIR STATION SOUTH WEYMOUTH
WEYMOUTH, MASSACHUSETTS

GROUNDWATER RESTRICTION AREA

FIRE FIGHTING TRAINING AREA
EXPLANATION OF SIGNIFICANT DIFFERENCES

SCALE PER SCALE BAR	
FILE I:\AffGwRestrictionArea.MXD	
REV 0	DATE 09/26/12
FIGURE NUMBER FIGURE NO. 3	

REFERENCES

REFERENCES

EPA, 2009. *Provisional Health Advisories for Perfluorooctanoic Acid (PFOA) and Perfluorooctane Sulfonate (PFOS)*. January 8.

South Shore Tri-Town development Corporation (SSTTDC), 2005. *Zoning and Land Use By-Laws for the Naval Air Station South Weymouth*. May.

Tetra Tech, Inc., 2010a. *Final Sampling and Analysis Plan, Perfluorinated Compounds in Groundwater, former NAS South Weymouth, Weymouth, Massachusetts*. April.

Tetra Tech, Inc., 2010b. *Perfluorinated Compounds in Groundwater Project Report, Naval Air Station South Weymouth, Weymouth, Massachusetts*. September.

Tetra Tech, Inc., 2011. *Final Sampling and Analysis Plan Addendum, Perfluorinated Compounds, Former NAS South Weymouth, Weymouth, Massachusetts*. April.

Tetra Tech, Inc., 2012. *Review Item Area 11 – Releases of Aqueous Film Forming Foam in Hangar 1 Decision Document, Phase II Environmental Baseline Survey, Former Naval Air Station South Weymouth, Weymouth, Massachusetts*. August.

U.S. Navy, 2004. *Record of Decision, Fire Fighting Training Area, Naval Air Station South Weymouth, Weymouth, Massachusetts*. September.

**ATTACHMENT 1
LAND USE CONTROL IMPLEMENTATION ACTIONS**

Pursuant to this ESD, the Navy is responsible for implementing, inspecting, reporting on, and enforcing the institutional controls in accordance with this Attachment. For purposes of this Attachment, the term "implementation actions" means actions to implement, operate, maintain, and enforce the land use control ("LUC") component of the remedy. The Navy will perform all implementation actions per *The Principles and Procedures for Specifying, Monitoring and Enforcement of Land Use Controls and Other Post-ROD Actions* (2003), the Federal Facilities Agreement (FFA), this ESD, and applicable Navy directives.

As set forth in this Attachment, the following implementation actions will be performed to ensure that the LUC objective, which is to restrict the use of groundwater within the 8.8-acre FFTA Site, is met in accordance with the FFA. Key elements of the Navy Principles for closed, or BRAC, bases have been incorporated into the actions.

1. Prepare a map depicting the FFTA Site LUC Area boundaries (the "LUC Area").
2. Submit a survey plan showing the LUC Area, prepared by a professional land surveyor registered by the Commonwealth of Massachusetts, in the appropriate Registry of Deeds for the limited purpose of providing public notice of the environmental conditions of and limitations on the use of the property. This survey plan shall be placed in the information repository for CERCLA actions at former NAS South Weymouth and copies will be provided to USEPA and the Commonwealth of Massachusetts.
3. Incorporate the proposed LUC into property transfer documents (i.e., deed) including a metes and bounds description and/or surveyed map of the LUC Area, as applicable. The terms of the deed will prohibit land uses inconsistent with the LUC for the LUC Area. Changes in land use for the LUC Area subject to the LUC will require prior approval by the Navy in consultation with USEPA and the Commonwealth of Massachusetts. Ensure that, prior to transfer by the Navy, no interests remain in the land subject to the institutional controls that conflict with those controls.
4. Monitor compliance with the LUC. LUC monitoring will be conducted by the Navy to verify that the LUC is being properly implemented and the LUC objective is being met. The LUC implementation actions will include annual review of permits issued for the installation of groundwater wells. LUC compliance actions will be conducted on an annual basis unless the frequency is reduced by written agreement with the Navy, USEPA, and the Commonwealth of Massachusetts (see 5.d. below).
5. Report and notify regulatory agencies. The notification requirements include the following:
 - a. Notify USEPA Region 1 and the Commonwealth of Massachusetts by telephone and by e-mail as soon as practicable but no longer than 72 hours after discovery of any activity that is inconsistent with or not in compliance with the LUC. Notify USEPA Region 1 and the Commonwealth of Massachusetts regarding how the non-compliance will be or has been addressed within 10 days of sending USEPA Region 1 and the Commonwealth of Massachusetts notification of the non-compliance. Furthermore, any activity that is inconsistent with the LUC will be addressed as soon as practicable, but in no case will the process be initiated later than 10 days after the Navy or other entity becomes aware of the non-compliance.
 - b. Following transfer of the property subject to the LUC, the Navy shall provide a copy of executed deed or transfer documents to USEPA Region 1 and the Commonwealth of Massachusetts. Additional notifications associated with property transfer are discussed below:

- The terms of the LUC will be communicated in writing to the new property owners (SSTTDC and LNR South Shore, LLC), USEPA Region 1, the Commonwealth of Massachusetts, and the public in this ESD to ensure that the agencies can factor such conditions into their oversight and decision-making activities regarding the property. Concurrent with the transfer of fee title from the Navy to SSTTDC, the LUC will be incorporated into the deed and will also be provided to appropriate state and local agencies. Such notice shall be recorded in a manner such that it appears in the chain of title of property that remains subject to the LUC.
 - In accordance with CERCLA 120(h)(3), the transfer of fee title documents (e.g., the deed) from the United States will include those matters required by CERCLA 120(h)(3)(A), including: notice of the type and quantity of hazardous substances stored for 1 year or more, or known to have been released or disposed of on the property and a covenant warranting: a) that all remedial action necessary to protect human health and the environment with respect to any hazardous substances remaining on the property has been taken by the United States before the date of such transfer; and b) that any additional remedial action found to be necessary after the date of such transfer shall be conducted by the Navy. Each deed will also contain a reservation of access to the property for the United States, USEPA Region 1, and the Commonwealth of Massachusetts, and their respective officials, agents, employees, contractors, and subcontractors for purposes consistent with the Navy Installation Restoration Program (IRP) and/or the FFA. The deed will contain appropriate provisions to ensure that the LUC will continue to run with the land and will be enforceable by the Navy.
- c. Submit reports of annual inspection. The results of the annual LUC compliance inspection shall be submitted to the USEPA Region 1 and the Commonwealth of Massachusetts. The annual inspection reports will be used in preparation of the Five Year Reviews to evaluate the effectiveness of the remedy. The annual report will evaluate the status of the LUC and how any LUC deficiencies or inconsistent uses have been addressed. The annual report will also address whether use of the LUC Area has conformed to such restrictions and controls.
 - d. Notify USEPA and the Commonwealth of Massachusetts at least 7 days before any LUC inspection. Both parties will have the opportunity to participate in the LUC inspection if it so chooses.
6. Obtain USEPA Region 1 concurrence, in consultation with the Commonwealth of Massachusetts, prior to modifying the LUC. The Navy or other entity shall seek prior concurrence from USEPA Region 1, in consultation with the Commonwealth of Massachusetts, before taking any anticipated action that may disrupt the effectiveness of the LUC. Termination of the LUC will be governed by the terms of the deed restriction set forth in Section 4.2 of this ESD.
 7. Evaluate effectiveness of the LUC as part of each Five-Year Review. Site remedy reviews are required by CERCLA and the National Contingency Plan as specified in this ESD. The first Five-Year Review for former NAS South Weymouth was completed in July 2009. The next Five-Year Review will be completed in July 2014 and will include an evaluation of this remedy for the LUC Area. Five-Year Reviews will be submitted to USEPA Region I and the Commonwealth of Massachusetts for review.

Should the Navy fail to complete LUC implementation actions, the USEPA shall notify the Navy Remedial Project Manager ("RPM") and seek immediate action. Should there be a failure to complete LUC implementation actions after such notification to the Navy, the USEPA may notify the Deputy Assistant Secretary of the Navy (Environment) who will ensure that LUC implementation actions are taken.

Ultimate responsibility for assuring that all LUC performance objectives are met and LUC implementation actions are taken remains with the Navy as the party responsible under CERCLA for the remedy.

ATTACHMENT 2 RESPONSES TO COMMENTS RECEIVED ON THE ESD

As noted in Section 7 of the ESD, the public was provided an opportunity to comment on the document during a 15-day public comment period from February 4 to February 22, 2013. Comments received during the public comment period are presented below along with the Navy's responses.

U.S. EPA Comments, dated February 5, 2013

Comment 1: EPA has completed its review of the above referenced documents [e.g., responses to comments on draft final ESD and Public Comment version] and accepts both without further comment.

Please be advised, however, that EPA must review and approve the long-term monitoring plan prepared in accordance with the response to comments and requests that annual data reports be provided to the regulators with relevant groundwater, surface water, and sediment sampling results. Although EPA agrees that the data can be "evaluated" in the next five-year review, it wants the opportunity to review actual sampling results in a more timely manner.

Response: After the ESD is completed and signed by the Navy and the EPA, the Navy will prepare a long-term monitoring (LTM) plan. This LTM plan will include collection of groundwater, surface water, and sediment samples. The LTM plan will be provided to EPA and MassDEP for review and approval. Following each LTM event, the validated data will be tabulated and provided to the regulatory agencies in a data report.

Mary Parsons' Comments, dated February 22, 2013

Comment 1: The ESD mentions wetlands and cranberry bogs to the west of the Fire Fighting Training Area (FFTA). It does not mention the much closer wetlands and cranberry bogs to the east of the FFTA. These wetlands are state certified vernal pool 3383.

Response: Section 2.1 of the ESD has been revised to also mention the wetlands and certified vernal pool (CVP) to the east of the FFTA.

Comment 2: I agree with the institutional control for groundwater being used for drinking purposes. I think the institutional control should include groundwater used for irrigation purposes. These are water strapped towns and may find a way in the future to extract the groundwater in the area for irrigation purposes for the proposed golf course. Irrigation is already in place along the section of the east-west parkway closest to the FFTA.

Response: A restriction on the use of groundwater for irrigation would not be required based on the concentrations of PFOA and PFOS in groundwater. The concentrations are one or more orders of magnitude lower than the Navy-calculated risk-based screening levels for a future maintenance worker and resident who may be exposed to PFCs via incidental ingestion of groundwater used for irrigation. The data comparison is presented in Table 2 of the ESD. Please note that the property surrounding the FFTA is zoned for open space and not residential use.

In addition, as stated in Section 3 of the ESD: "SSTTDC and its Master Developer, LNR, have indicated that production, supply, and irrigation water needs for the development can be provided by sources other than groundwater from the FFTA site. Extraction of site groundwater for production, supply or irrigation purposes is therefore not considered a reasonable foreseeable use." Therefore, while an institutional control on the use of groundwater for irrigation is not required based on risk there are no plans to use the FFTA groundwater for irrigation.

However, MassDEP and EPA agreed that the groundwater restriction should be enhanced to ensure protectiveness by adding a provision that would require, at a minimum, EPA and MassDEP written approval for installation of any well for any non-drinking water purposes within the FFTA restricted area shown on Figure 3 of the ESD. The text of the Covenant and Restriction Concerning the Use of Groundwater on page 7 of the ESD has been revised accordingly.

The LTM Plan mentioned in Section 4.2 of the ESD will include a comparison of the groundwater data to both the EPA Provision Health Advisory (PHA) values and the Navy-calculated risk-based screening levels that cover the exposures mentioned above.

Comment 3: There have not been any ecological studies of the effects of these contaminants on wildlife. Also there haven't been any studies on absorption of contaminated water through skin, only through ingestion.

Response: While some research studies have been conducted to evaluate the impact of PFCs on the environment, including wildlife, the majority of the research has been related to PFOA and PFOS in drinking water. PFCs are considered emerging contaminants and as such the focus by the EPA and some states (NJ, NC, and MN) has been on establishing levels for PFCs in groundwater used for drinking water. There is insufficient chemical-specific information on PFOA and PFOS to calculate the absorption of these chemicals from water through the skin.

Mike Bromberg Comments, dated February 22, 2013

Comment 1: Please accept the following comments for the ESD for the FFTA.

My first concern after reading this was, the red stamp "PUBLIC VERSION" of the ESD for the FFTA and is it different than the non-public version?

Response: The ESD was reviewed internally by the Navy, EPA, and MassDEP prior to providing the document for public comment. The 'Public Version' reflects revisions made in response to comments received during the internal reviews. The red stamp was added to differentiate the public comment version from the earlier review versions.

Comment 2: My other concern with the ESD is regarding the fact that there is no mention of any institutional controls or LUC'S mentioned for groundwater use for irrigation at this site.

Response: Please see the Response to M. Parsons' Comment No. 2.

Comment 3: I do notice that there is an institutional control in place to address potential threats associated with the future use of groundwater for drinking water purposes.

Clearly, for this institutional control to be put in place, the Navy believes that the compounds currently in the groundwater may pose a human health risk if it is used for drinking water purposes.

Response: The need for an institutional control on groundwater used for drinking water purposes is based on the comparison of PFOA and PFOS concentrations to the EPA PHA values and Navy-calculated risk-based screening levels. The restriction on use of groundwater for drinking water purposes is based on exceedances of the EPA PHA values. The PFOA and PFOS concentrations in groundwater at the FFTA are one or more orders of magnitude less than the risk-based screening levels that assume exposure via incidental ingestion of groundwater used for irrigation. However, as discussed in the Response to M. Parsons' Comment No. 2, the language of the groundwater restriction has been modified to ensure protectiveness.

Comment 4: From what I understand there has not been any studies by the Navy to determine whether or not there is any ecological health risk associated directly with the consumption of the perfluorinated compounds in this groundwater.

I question how the Navy has determined that there are no potential for any ecological health risk for a couple of reasons.

1) The surface water and sediments samples at the FFTA which the Navy used in the mid 2000's to test the effects on midges to determine ecological risks were tested in the surface water and sediments that have not been saturated with the concerned compounds for at least over twelve years or more.

I would think the remaining perfluorinated compounds found during sampling at the FFTA that have not been washed away or seeped through the soil for over twelve years would be found in much lower concentrations, therefore would not provide an accurate determination of the negative effects it may have on the ecology.

I believe the Navy would need to do more specific ecological testing. For example: Use the two perfluorinated compounds in a lab at the highest concentrations found in the groundwater at the FFTA, on some wildlife determined by a biologist.

My concern in this area is that pumping these compounds to the surface for irrigation purposes may jeopardize the healthy population of the spotted turtle and eastern box turtle. These critters may be showered upon, swallowing and swimming through puddles of irrigation water. If the groundwater is used for irrigated the golf course, know that most of golf course near the FFTA is Box Turtle Core Habitat.

Currently there is no known risk to the ecology from these compounds because they are in the groundwater.

I am asking that the Navy have accurate science behind their determination that there is no ecological health risk and that the Navy not speculate (if you are) what the risks are based on a broad ecological study where samples have been taken in an area which has not been exposed to these compounds for over twelve years.

Response: The Review Item Area 11 Decision Document addressed concerns expressed by EPA on potential ecological impacts of the detected concentrations of PFCs in sediments and surface water in the East Branch of French Stream, specifically on aquatic organisms. The Navy noted that an ecological risk assessment (ERA) was conducted as part of the FFTA Remedial Investigation. The ERA concluded that based on site-specific toxicity testing (including midges as noted in the comment above), potential exposure to chemical stressors in the wetland environments at the FFTA is not likely to result in significant potential risk to wetland vertebrate and invertebrate wildlife receptors. As suggested in the comment, PFC concentrations are likely lower now than they were when the ERA was conducted. Since the toxicity testing conducted over 12 years ago (when more PFCs were likely present) indicated no potential ecological risks, no ecological risk would be expected now. In addition, the French Stream Ecological Risk Assessment Technical Memorandum concluded that while French Stream shows some degree of impairment, this impairment does not appear unique to the Base, does not appear to be directly related to unacceptable exposure to chemical stressors, and is generally similar in reaches upstream of the Base. This information demonstrates that chemicals present in surface water and sediment from operations at FFTA, including the use of AFFF in training exercises, do not pose a significant risk to ecological receptors. The weight of evidence indicates that additional toxicity testing is not warranted. Both EPA and MassDEP have accepted the Decision Document.

In response to the concern regarding potential impacts to terrestrial receptors, such as spotted and Eastern box turtles, from exposure to groundwater used for irrigation, the Navy notes that such impacts are not expected since there are no plans for FFTA groundwater to be used for irrigation purposes. In addition, a restriction on the use of groundwater for non-drinking water purposes as been added to this ESD. Please also see the Responses to Comment No. 2 above and M. Parsons' Comment No. 2.

After the ESD is signed, the Navy will develop a LTM plan which will include collection of groundwater, surface water, and sediment samples.

Comment 5: Seems there should be institutional controls on the groundwater used for irrigation until such time it is proven not to be an ecological risk.

Sorry that I am redundant.

Thank you for allowing me the opportunity to comment.

Response: Please see the Responses to Comment Nos. 2, 3, and 4 above.

Mike Bromberg Comments, Draft Responses to Comments Received During the FFTA ESD Public Comment Period

The Navy provided draft responses to the comments received during the 15-day public comment period to M. Bromberg in response to concerns he expressed at the May 9, 2013 RAB meeting. M. Bromberg provided the comments below via email on May 20, 2013.

Comment 1: I have just read the responses on comments to the ESD for the FFTA and would like to respond to them briefly.

As far as the response to my Comment No. 2, I agree there needs to be a restriction and institutional controls on the groundwater for drinking water purposes "to ensure protectiveness" from human consumption.

I remain perplexed as to why the Navy believes there is no need to have institutional controls on the groundwater for drinking water purposes "to ensure protectiveness" of ecological consumption.

If I am to understand this properly, I'm hearing the groundwater is not safe for human consumption, but it is safe for animal consumption.

I would think anyone on this cc list would be reluctant to allow their prized family pet, be it a cat, dog, bird or whatever, to live under sprinklers and consume the water coming from the groundwater under the FFTA.

Response: The comment appears to be concerned with two different exposure scenarios: exposure via human consumption of groundwater used for drinking water; and exposure of animals and wildlife to groundwater used for irrigation. The quantity of groundwater ingested for drinking water purposes is much greater than incidental ingestion from an irrigation sprinkler system. Since the irrigation season is typically 3 to 4 months, the irrigation exposure frequency is less than daily consumption of drinking water.

The restriction on the use of groundwater extracted from the FFTA for drinking water purposes is based on the exceedances of the EPA PHA values for groundwater used for drinking water. This restriction will ensure that the groundwater will not be used by humans and pets as a source of drinking water.

As noted in the response to M. Parsons' second comment, a second restriction has been added to the ESD that would require Navy, EPA, and MassDEP written approval prior to installation of any well for any non-drinking water purposes.

Comment 2: Also, in the response to my Comment 4. I do get it, that in the ERA for the FFTA RI, it was determined that potential exposure to chemical stressors was not likely to result in significant risk to wetlands vertebrate and invertebrate wildlife receptors based on the midge testing models. But, as I had mentioned, the ERA at the FFTA was done about 12 to 17 years after any PFC's have been used at the site.

I believe to more accurately determine whether or not potential exposure to chemical stressors from the PFC's will result in significant risk to wetland and now non-wetland vertebrate and invertebrate wildlife receptors, the ERA needs to be done again with direct exposure of the PFC's in the groundwater, which would be the case if the groundwater is allowed to be used for irrigation.

I believe if the Navy chooses not to put institutional controls on the groundwater to be used for irrigation, then it needs to be determined what if any risks there will be for direct exposure to these chemical stressors.

Lastly, if the SSTDC and its Master Developer LNR has indicated that production, supply and irrigation water needs for the development can be provided by sources other than groundwater from the FFTA, and it is not considered a reasonable foreseeable use, why would there be a problem with an institutional control placed for irrigation as well?

Response: As noted in the response above, a second restriction has been added to the ESD that groundwater could only be used for non-drinking water purposes, such as irrigation, with the prior written consent of the Navy, MassDEP, and EPA. With this restriction in place, there would not be exposure of any wildlife receptors to groundwater used for irrigation purposes. The Navy, MassDEP, and EPA would ensure that there were no unacceptable risks for any receptors before providing their written consent to allow non-drinking water uses of groundwater, such as for irrigation.

Comment 3: As for the response for Mary Parsons Comment 2, last paragraph, I don't understand how an institutional control can be based on the risk on whether or not there are plans to use the FFTA groundwater for irrigation. Certainly there are no plans now for using the FFTA groundwater for drinking water now, so why is there an institutional control for drinking water?

Response: The ESD includes an institutional control (restriction) on use of groundwater for drinking water because the concentrations of PFOA and PFOS in FFTA groundwater exceed the EPA PHA values which are based on use of groundwater for drinking water purposes. The EPA PHA and other risk-based screening values assume certain potential uses of groundwater, independent of actual or planned groundwater uses. The restriction on use of groundwater for drinking water purposes is in place to ensure protectiveness since plans for use of groundwater may change in the future. While the concentrations of PFOA and PFOS in FFTA groundwater are one or more orders of magnitude lower than the risk-based screening values for exposure via incidental ingestion to groundwater used for irrigation, the additional restriction on such other non-drinking water uses of groundwater, except with prior written consent from the Navy, MassDEP, and EPA ensures greater protectiveness should plans for use of groundwater for other purposes change in the future.