

**FINAL**

**PERFLUORINATED COMPOUNDS PRELIMINARY ASSESSMENT  
SITE VISIT REPORT**

**BARNES AIR NATIONAL GUARD BASE  
WESTFIELD, MASSACHUSETTS**



**Prepared For:**

**Headquarters Air National Guard  
Joint Base Andrews, Maryland**

**January 2016**

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**Prepared By:**

**BB&E, Inc.  
January 2016**

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## LIST OF ACRONYMS

AFB	Air Force Base
AFFF	Aqueous Film Forming Foam
ANG	Air National Guard
AOC	Area of Concern
AVGAS	aviation gas
BB&E	BB&E, Inc.
bgs	below ground surface
CAD	Computer-Aided Design & Drafting
ERP	Environmental Restoration Program
ft	feet
FD	Fire Department
FTA	Fire Training Area
FW	Fighter Wing
GIS	Geographic Information System
GPS	Global Positioning System
HEF	high expansion foam
JP-4	jet fuel #4
MA	Massachusetts
µg/L	micrograms per liter
NFA	No Further Action
OWS	oil/water separator
PA	Preliminary Assessment
PFCs	Perfluorinated Compounds
PFOA	perfluorooctanoic acid
PFOS	perfluorooctane sulfonate
PHAL	Provisional Health Advisory Levels
RI	Remedial Investigation
SI	Site Investigation
USEPA	United States Environmental Protection Agency
USGS	United States Geological Survey

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## 1.0 INTRODUCTION

A preliminary assessment (PA) site visit was conducted by BB&E, Inc. (BB&E) on August 18 and 19, 2015 at the Barnes Air National Guard (ANG) Base (the Base) in Westfield, Hampden County, Massachusetts; home of the 104th Fighter Wing (FW). The site location is shown on Figure 1. The purpose of the visit was to identify potential sites of historic environmental releases of perfluorinated compounds, specifically from Aqueous Film Forming Foam (AFFF) usage and storage, as shown on Figure 2. Prior to the site visit, BB&E conducted research of any documented Fire Training Areas (FTAs) in operation since 1970, or any other use or release of AFFF in accordance with the Final Perfluorinated Compound (PFC) Preliminary Assessment Work Plan (BB&E, 2015). During the site visit, BB&E conducted personnel interviews, reviewed on-site documentation, and toured each potential site.

Individuals contributing to this PA effort included the following:

John Richardson – 104th FW, Base Environmental Manager

Jennifer Baker – 104th FW, State Environmental Officer

Travis Raby – 104th FW, Base Fire Chief

Major Jeremy Dugan – 104th FW, Base Civil Engineer

Brian Mosio – 104th FW, Computer-Aided Design & Drafting/Geographic Information System (CADD/GIS) Technician

Representative photos of the subject sites taken during the site visit are attached as Appendix A, and the records of communication are attached as Appendix B.

The Barnes ANG has maintained operations at the Barnes Municipal Airport since 1947. It occupies approximately 186 acres on two parcels of land leased from the City of Westfield and is located in the northern end of the Barnes Municipal Airport (URS, 2011).

Sections 2.0 and 3.0 of this report outline the potential PFC sources identified at the Base during the records review and site visit, while Section 4.0 provides conclusions and recommendations for potential follow-on actions. References are included in Section 5.0 and supporting documentation in the Appendices.

## **1.1 Hydrogeologic Setting**

Surface runoff at the Barnes Municipal Airport is collected by a series of streams and ponds in the area. The airport is split by a watershed divide running approximately north-south along the airport's major runway. Surface water flow on the western side of the divide is predominantly westward toward Arm Brook. East of the watershed divide, surface water flow is eastward, toward Pond Brook. Arm Brook and Pond Brook flow south and discharge to the Westfield River, approximately 8,000 feet south of the airport boundary. Stormwater drains to various basins designated as DA-001 through DA-007. The drainage basins discharge runoff from the Base into on-site retention ponds (Retention Pond #1 through Retention Pond #7) (Aneptek, 2004).

The airport and its vicinity have been designated as a Primary Aquifer Recharge Area based on the City of Westfield Aquifer Characteristics Map. The groundwater beneath the Base has been designated a Zone II aquifer by the Commonwealth of Massachusetts, meaning that the area around and including the Base is a contributing zone to a drinking water aquifer. The primary water sources for the city of Westfield and Barnes Municipal Airport is groundwater from a series of nine municipal wells screened in surficial deposits of glacial sands and gravels (Aneptek, 2004). Two of the municipal wells (Numbers 7 and 8) are located approximately 1,000 feet north of Runway 15-33 as shown in Appendix C-1.

The primary water-bearing formation in the vicinity of the Base is the glacial outwash sands and gravels. These sands range in thickness from 50 to 150 feet in the vicinity of the Base. The entire water-saturated overburden is considered one aquifer, and is characterized as unconfined. The average linear velocity for groundwater across the Base was estimated to be 290 feet per year. The depth to groundwater on Base typically ranges from 25 to 35 feet below ground surface (bgs). Groundwater flow is generally southeast. A slight downward groundwater gradient was identified during the original Base Remedial Investigation (RI) throughout the main (western)

portion of the Base (Aneptek, 2004). Appendix C-2 shows groundwater contours from the 1997 RI report and a 2005 Final Annual Summary Report of Environmental Restoration Program (ERP) Sites 2, 5, 6, and 7.

Further discussion of onsite and area wells is included in Section 3.2.1 of this report.

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## 2.0 FIRE TRAINING AREAS

Based on this PA investigation, there were two FTA areas historically operated at the Base. These two FTAs are identified as Environmental Restoration Program (ERP) Site 1 (Former FTA-01) located at the southern end of the main Base and ERP Site 6 (Former FTA-06) located in the eastern portion of the Base.

Former FTA-01 was used from approximately 1950 through 1987. The site consisted of a burn pit, a fire extinguisher training pit, a drum storage area, and a bermed area. The site received aviation gasoline (AVGAS), waste oils, solvents, and jet fuel #4 (JP-4). Approximately 300-500 gallons of mixed liquid wastes were used during each fire training exercise. The site was identified during the 1988 PA. In the spring of 2000, impacted soils from previous fire training activities were excavated and removed from the site. Groundwater investigation activities were conducted and the results indicated that the groundwater at the site was not impacted by fuel and chlorinated constituents likely used during fire training exercises. Site closure was obtained in 2002 (URS, 2011). Portions of site were redeveloped as part of the MA Army National Guard facility renovations including a new approach ramp and parking apron for Army National Guard aircraft. The site is generally covered with grass along with airfield pavements. Due to the timeframe of use, AFFF was likely utilized at Former FTA-01 during fire training exercises. Historic information regarding Former FTA-01 is included in Appendix C-3. It should be noted that there are discrepancies on whether Former FTA-01 was on or off the Base. Information from the original PA indicated ERP Site 1 (Former FTA-01) was located off-Base and not on current ANG property (HMTC, 1988). Information from the Final RI Report indicated FTA-01 extended onto the Base (Earth Tech, 1997) with portions of the Former FTA both on and off-Base. This was confirmed by Base personnel.

Former FTA-06 consisted of two areas referred to as Site 6 North (6N) and Site 6 South (6S). The ERP Site 6 FTAs were operational in the late 1950s and early 1960s (HMTC, 1988). Based on their operational timeframe, it was unlikely that AFFF was used at the Former FTA-06 during fire training exercises. Soil removal activities were conducted at ERP Site 6 (6N only) in 2003 to address apparent residual fuel constituents. Site investigation activities indicated no impacts

to groundwater. Site closure for was obtained in 2005 (AMEC, 2005). Historic information regarding Former FTA-06 is included in Appendix C-3.

### **3.0 NON-FIRE TRAINING AREAS**

Non-FTA Areas of Concern (AOCs) are sites where AFFF has been stored or released and may include crash sites, hangars, fuel spill areas, hazardous waste storage facilities, firefighting equipment testing areas, etc. The following section includes a description of any Non-FTA AOCs identified during this PA effort including operational history, waste characteristics, and pathway evaluations, as applicable.

#### **3.1 AOC Description, Operational History, and Waste Characteristics**

The following are the Non-FTA AOCs that were identified during this PA investigation. Appendix A includes photos of these areas from the August 2015 site visit.

##### ***3.1.1 Stormwater Drainage Basin (ERP Site 4)***

The Base stormwater drainage retention basin located adjacent to the POL was formerly investigated as ERP Site 4. The retention basin is approximately 100 feet (ft) wide by 200 ft long and 10 ft deep, lined with crushed rock and dirt. It is almost always dry. Stormwater which enters the drainage basin percolates to the subsurface through the generally permeable and sandy surface soils. Discussions with Base personnel indicated the Base utilized septic systems for all sanitary wastes up until the early 1980s when portions of the Base were converted to the City sanitary sewer system. Completion of the conversion from septic to sanitary sewers occurred in the early 1990s. Prior to connection to the sanitary sewer, floor drains within the hangars and buildings in the flight line area would have all drained to the drainage basin at ERP Site 4. Any AFFF releases (and other releases to the floor drains) would likely have drained to the ERP Site 4 drainage basin. The site was investigated under the ERP and closed in 1998 with no further action determined. There are no documented AFFF releases to the drainage basin.

##### ***3.1.2 Hangars 27A and 27B***

Hangars 27A and 27B serve as the Base Fuels and Corrosion Control Facilities. These hangars, which were renovated in the late 1990s, currently have automatic high expansion foam (HEF) fire suppression systems which were installed in the early 2000s. In addition, manually operated AFFF deck guns (two located in Building 27A and two located in Building 27B) are also present.

Each AFFF deck gun has an approximate 50-gallon AFFF reservoir. There are no documented releases of AFFF within these facilities. Releases that occurred in flight line area buildings before the early 1990s would have drained to the building floor and trench drains that drained to the drainage retention basin located at ERP Site 4 (discussed above). Building floor drains now go to the sanitary sewer system via an oil/water separator (OWS) system.

### ***3.1.3 Former Fire Station – Building 004***

The former base fire station was in use from the 1940s until approximately 1992 when the new fire station was built. A review of old drawings and discussions with Base personnel indicated that the station's floor drains were connected to an OWS that discharged to the sanitary sewer system. Incidental spills and releases within the old fire station would likely have drained to the floor drains and entered the sanitary sewer system. There is no record of releases of AFFF within the former station. Based on the timeframe of use, the former station likely handled and stored AFFF. Various details of the old fire station are provided in Appendix C-4.

### ***3.1.4 Current Fire Station – Building 040***

AFFF is stored by the Fire Department (FD) at the current crash fire station (Building 040) which was built in 1992 and occupied since. Renovations to the building were conducted in 2010. There are three FD crash trucks that hold 3% AFFF for a total of approximately 320 gallons of AFFF. There are also 5-gallon totes of 3% AFFF solution (approximately 250 gallons total) in inventory if needed to refill the crash trucks. All the trucks and AFFF storage areas are contained inside the fire station. The AFFF transfers occur via hand: either manually pouring the 5-gallon AFFF totes into the crash trucks or via a hand transfer pump within the fire station which has no floor drains. No spills or releases have been reported in the fire station.

### ***3.1.5 Hush House***

The Base's jet engine test cell facility or Hush House was constructed approximately in 1995. Initially, the Hush House had an AFFF fire suppression system from 1995 until the early 2000s when the system was converted to HEF. Only one AFFF release is known to have occurred during acceptance testing approximately in 1995. AFFF released during this event would have

predominately gone to the City's sanitary sewer system via the building floor drains which connect to an OWS.

### ***3.1.6 Fire Department Equipment Test Area***

FD equipment testing occurred at the far east end of the Sierra Taxiway located on the far eastern portion of the Base. Testing was predominately done on the paved taxiway area with resulting spills or releases draining off the edges of the taxiway onto the ground surface or infiltrating through cracks in the paved surface. Three known foam tests or AFFF releases occurred in the mid-1990s with the last one occurring in 1996 or 1997. Quantities of AFFF utilized or released are unknown. No AFFF foam testing has been done in more than 15 years at this location. More recent fire equipment testing typically involves only water or if AFFF is utilized, very small amounts are used and captured in a portable drum for disposal or reuse. Fire equipment testing prior to current Base fire personnel being on duty (before 1993) is not clear. Based on the time frame of usage for FTA-01, fire equipment testing would likely have occurred at FTA-01 until at least 1987 (for actual fire training and fire equipment tests) but may have been used longer for just fire equipment testing including foam tests until the mid-1990s. Per Barnes ANG personnel, the Massachusetts DEP issued a letter in April 1987 informing the Base to cease all fire training activities.

## **3.2 Pathway and Environmental Hazard Assessment**

The following is a preliminary evaluation of the threats and targets associated with each potential exposure pathway.

### ***3.2.1 Groundwater***

No documentation was available showing that groundwater at the Base has been tested for PFCs; therefore it is unknown whether PFCs are present in the groundwater. However, based on historical practices, they may be present in the groundwater in the following locations:

- Former FTA-01
- Stormwater Drainage Basin (ERP Site 4)
- Hangars 27A and 27B

- Former Fire Station – Building 004
- Current Fire Station – Building 040
- Hush House
- Fire Department Test Area

In general, groundwater contamination associated with historic contaminated sites at the Base does not migrate significantly either vertically or horizontally. Based on this, potential releases of AFFF to groundwater also may not migrate significantly. Additionally, historic groundwater sampling at FTA-01 completed under the ERP for non-AFFF related compounds indicated there were minimal to no impacts to groundwater in this area. This might also indicate AFFF potentially associated with FTA-01 might not have migrated significantly into the groundwater at this location.

#### *3.2.1.1 Water Wells*

There are currently no potable water wells on the Base. The Base currently receives drinking water from the City of Westfield's municipal water supply. In March 2015, the City of Westfield's Water Department notified the MA ANG that their municipal well No. 7 had trace amounts of PFCs (including perfluorooctane sulfonate [PFOS]). Well No. 7 and 8 are located less than 5,000 ft from the southeastern corner of the Base (see Appendix C-1 for the location of these potable wells relative to the Base). Data regarding the actual PFC levels was not available. It is not known if concentrations detected were above the U.S. Environmental Protection Agency's (USEPA's) provisional health advisory levels (PHALs) for PFOS (0.2 micrograms per liter [ $\mu\text{g}/\text{l}$ ]) or for perfluorooctanoic acid (PFOA) (0.4  $\mu\text{g}/\text{l}$ ) (USEPA, 2014).

Based on the general groundwater flow at the Base toward the south or southeast, constituents entering the groundwater upgradient on or near the Base could be transported in the general direction of the City Wells No. 7 and No. 8.

A review of the EDR Radius Map<sup>TM</sup> Report with Geocheck® dated July 21, 2015 shows several water wells within a one-mile radius of the Base (Appendix C-5) (EDR, 2015). Five wells appear

in the state database, but it is unclear if they are private water wells. These are in addition to the City of Westfield Municipal Well No. 7 and 8 discussed above.

### **3.2.2 Soil**

No documentation was available showing that soils at the Base have been tested for PFCs; therefore it is unknown whether PFCs are present in the soil. However, based on historical practices, they are most likely to be present in the soil in the following areas:

- Former FTA-01
- Hangars 27A and 27B
- Former Fire Station – Building 004
- Current Fire Station – Building 040
- Hush House
- Fire Department Equipment Test Area

In their anionic forms, PFOS and PFOA are water soluble and can migrate readily from soil to groundwater. The USEPA has not established PHALs for PFOS and PFOA in soil (USEPA, 2014). The primary exposure pathway for PFOS and PFOA would be the ingestion of contaminated drinking water.

### **3.2.3 Sediment**

No documentation was available showing that sediments at the Base have been tested for PFCs; therefore it is unknown whether PFCs are present in sediments. However, based on historical practices, PFCs could be present in sediment in locations that have received drainage from the Base stormwater system, particularly at the Stormwater Drainage Basin (ERP Site 4) which historically received stormwater runoff and historical discharges from flight line building floor and trench drains. In general, surface releases at the Base will predominately infiltrate into the sandy and permeable surface soils. Releases to paved surfaces could enter the storm drains which ultimately discharge to the various stormwater retention basins on Base that ultimately allow water collected to percolate to the subsurface.

### **3.2.4 *Surface Water***

Surface water is not present on Base. There are no designated wetlands on the installation (ANG, 2003). A north-south surface water drainage divide is generally present on Base. Stormwater on the west side of the divide generally drains westerly while stormwater east of the divide general drains easterly. Stormwater is routed to various storm drains that discharge to various on-Base retention basins that allow accumulated water to percolate into the subsurface through the permeable surface soils. Drainage patterns at the Base and immediate surrounding areas are included in Appendix C-6.

Several potential environmentally sensitive areas surrounding the Base are identified to be on the National Wetland Inventory according to the EDR report, as shown in Appendix C-7.

## **3.3 *Notable Offsite AOCs***

### **3.3.1 *Civilian Aircraft Fire***

In 2013, a civilian aircraft fire occurred in the vicinity of the intersection of Runways 02 and 15. This location is off-Base, approximately 1,500 ft southeast of the current Base fire station. Per FD personnel, approximately five gallons of 3% AFFF (mixed with water) was utilized to fight the fire. The firefighting liquids (water with AFFF) were allowed to dissipate after the incident, likely infiltrating through cracks in the runway and surrounding permeable surface soils.

### **3.3.2 *Civilian Airplane Crash into HFP Sprinkler Corporation***

In July 2001, a civilian aircraft crashed into the HFP Sprinkler Corporation located approximately 0.5 mile northeast of the northeast corner of the base. The base FD assisted local fire departments in combatting the blaze. Approximately 50-60 gallons of 3% AFFF was utilized in combatting the fire. Resulting AFFF and water was released to the nearby parking lot, storm drains, and ground surface.

### **3.3.3 *Northern Soccer Fields***

In the late 1990s, an accidental release of approximately 5 gallons of 3% AFFF occurred while providing temporary irrigation support to newly seeded community soccer fields located north of



the Base approximately 0.5 mile north of Falcon Drive. This one-time release dissipated and soaked into the permeable ground surface.

Of these three offsite AOCs, the Civilian Airplane Crash into HFP Sprinkler Corporation may have impacted the groundwater in the vicinity of the crash. In addition, all three sites had significant releases of AFFF which might have impacted soils. However, these sites do not require any action on the part of the ANG.

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#### **4.0 FINDINGS AND CONCLUSIONS**

Eight potential areas of concern have been identified at the Base during this PA as summarized in Table 1 below. Of these eight sites, seven are recommended for further investigation. Included in this list is Former FTA-01 (ERP Site 1), located at the southern end of the Base boundary. The exact extents of Former FTA-01 are unclear. Fire training activities conducted at this location by the ANG likely included AFFF foam training and may have extended onto the current Base boundary.

Further investigation is recommended at the Base to characterize potential soil, groundwater, surface water, and sediment PFC contamination. Table 1 summarizes the recommendation and rationale for each potential AOC identified at the Base.

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**Table 1: Preliminary Assessment Report Summary and Recommendations**

No.	Potential AFFF PFC AOC	GPS Coordinates		Rationale	Recommendation
		Latitude	Longitude		
1	Former FTA-01 (ERP Site 1)	42.163943°	-72.718612°	AFFF likely utilized at this FTA located on or just south of ANG boundary, exact footprint unclear. FTA activities appear to have extended onto current ANG installation.	Proceed to SI, focus on soil and groundwater.
2	Former FTA-06 (ERP Site 6)	42.164233°	-72.709567°	AFFF likely not utilized due to age of FTAs.	NFA
3	Stormwater Drainage Basin (ERP Site 4)	42.170343°	-72.719542°	Received AFFF discharges from the flight line area and from former floor and trench drains located in the hangars and buildings on the flight line.	Proceed to SI, focus on sediments and groundwater.
4	Hangars 27A and 27B	42.170529°	-72.716208°	No documented AFFF releases.	Proceed to SI, focus on soil and groundwater.
5	Former Fire Station – Building 004	42.166498°	-72.718292°	Floor drains in former station likely went to drywell associated the former facility. Facility used from the 1940s to approximately 1990.	Proceed to SI, focus on soil and groundwater.
6	Current Fire Station – Building 040	42.165504°	-72.717890	No documented AFFF releases. No floor drains.	Proceed to SI, focus on soil and groundwater.
7	Hush House	42.162205°	-72.711083°	One potential documented release likely from original fire suppression test. Any releases would have gone to the sanitary sewer.	Proceed to SI, focus on soil and groundwater.
8	Fire Department Equipment Test Area	42.162271°	-72.705777°	At least three AFFF foam tests conducted; possible earlier use as fire equipment test area in early 1990s.	Proceed to SI, focus on soil and groundwater.

AFFF – Aqueous Film Forming Foam  
PFC – Perfluorinated Compound  
AOC – Area of Concern  
GPS – Global Positioning Satellite  
FTA – Fire Training Area  
ERP – Environmental Restoration Program  
SI – Site Investigation  
NFA – No Further Action

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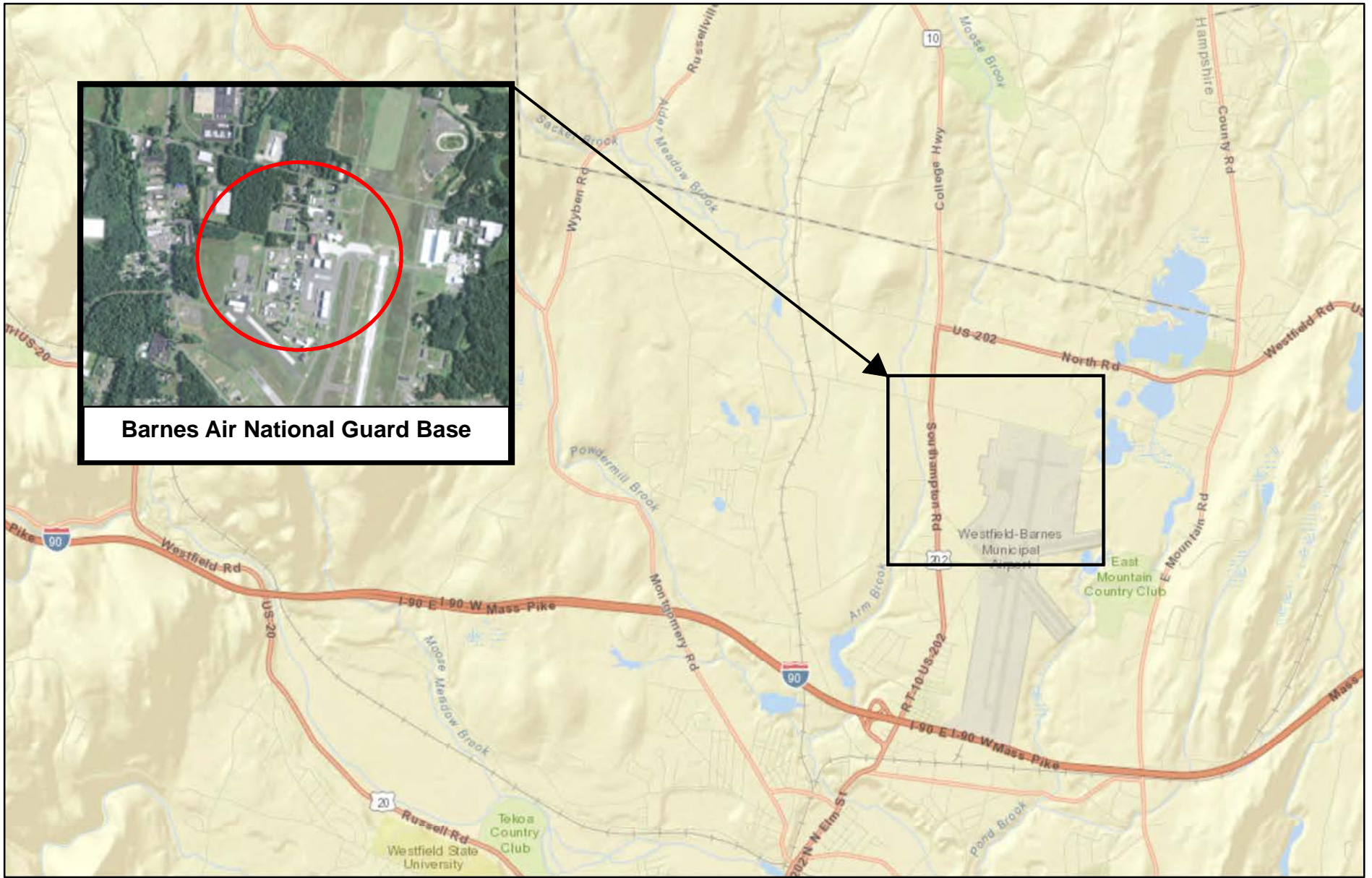
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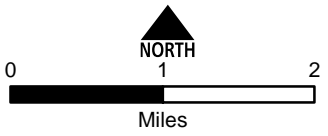
## **FIGURES**



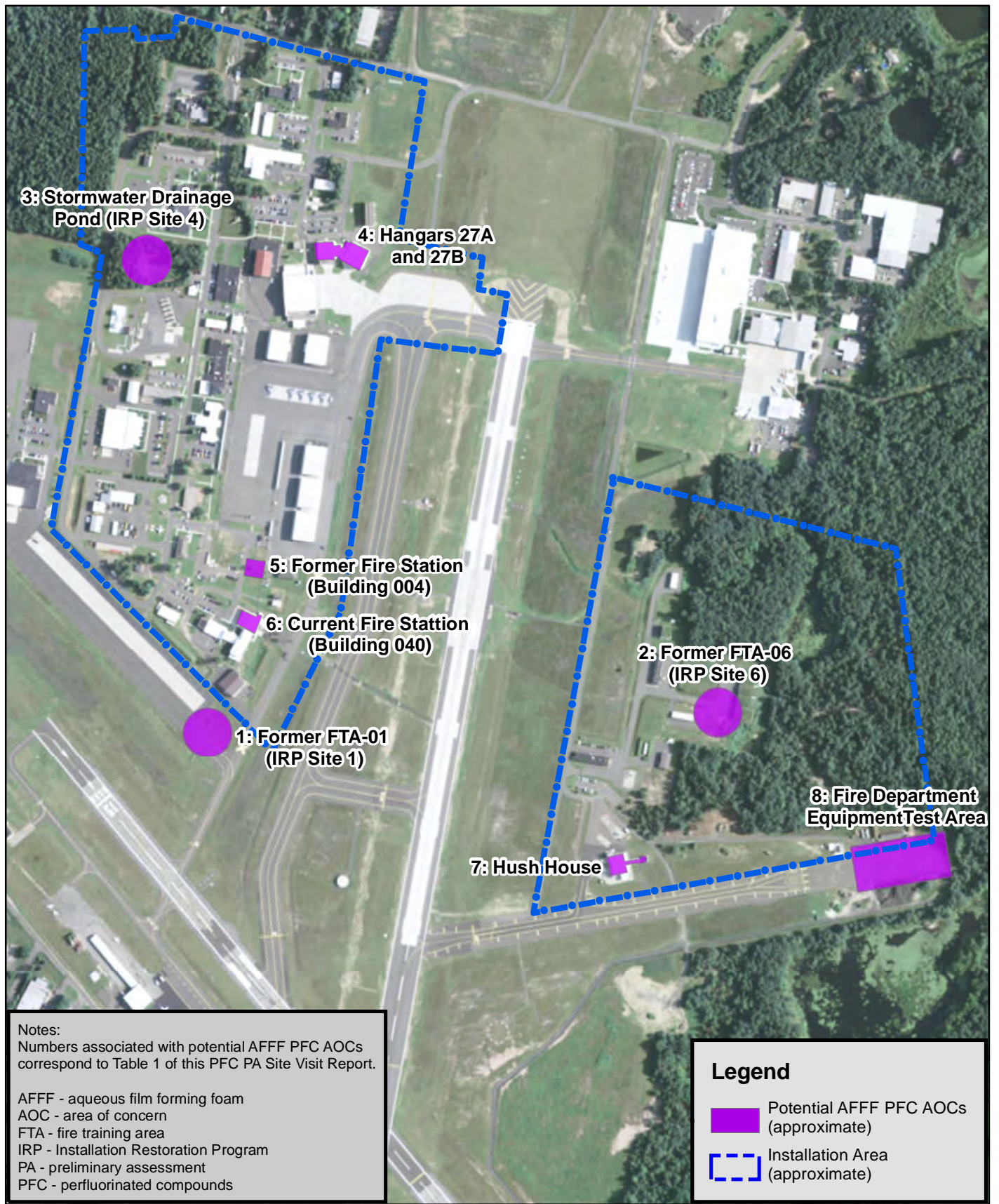
**Barnes Air National Guard Base**

**Figure 1  
Site Location Map**

**Barnes Air National Guard Base  
Westfield, Massachusetts**







**Figure 2**  
**Site Features and Potential AOCs**  
**Barnes Air National Guard Base**  
**Westfield, Massachusetts**



**APPENDIX A**

**PHOTO DOCUMENTATION**

**Appendix A**  
**Barnes Municipal Airport, PFC PA Site Visit, Westfield, MA – August 2015**



Photo 1: Former FTA-01 (IRP Site 1) Looking South



Photo 2: Former FTA-01 (IRP Site 1) Looking Southeast



**Appendix A**  
**Barnes Municipal Airport, PFC PA Site Visit, Westfield, MA – August 2015**



Photo 3: Former FTA-06 (IRP Site 6)



Photo 4: AFFF Deck Gun (four total) - Hangars 27A and 27B

**Appendix A**  
**Barnes Municipal Airport, PFC PA Site Visit, Westfield, MA – August 2015**



Photo 5: Fire Department Equipment Test Area – East End of Sierra Taxiway



Photo 6: Fire Department Equipment Test Area – East End of Sierra Taxiway

**Appendix A**  
**Barnes Municipal Airport, PFC PA Site Visit, Westfield, MA – August 2015**



Photo 7: Hush House



Photo 8: Hush House Looking North from Front Door



**Appendix A**  
**Barnes Municipal Airport, PFC PA Site Visit, Westfield, MA – August 2015**



Photo 9: Approximate Former Location of Bldg 004 – Former Fire Station



Photo 10: Stormwater Drainage Pond (IRP Site 4)

**Appendix A**  
**Barnes Municipal Airport, PFC PA Site Visit, Westfield, MA – August 2015**



Photo 11: Current Fire Station (Bldg 040)



Photo 12: Current AFFF Storage in Fire Station

## **APPENDIX B**

### **INTERVIEW QUESTIONS AND RECORDS OF COMMUNICATION**

From: Travis Raby 104 CES/CEF - Installation RMC Chief  
Phone: (413) 568-9151 x 6981602  
Email: travis.j.raby.nfg@mail.mil

Interview Questions regarding AFFF use  
(At Present and back to 1970)

w/ANG @ Bates - 22 years (last 5 years as Fire Chief)

1. When did AFFF first start being used on this installation?

**Circa 1970**

2. What are the years of active use for each Fire Training Area (FTA), Aircraft Hangar, Fire Department, other places AFFF may have been used (collectively Potential Areas of Concern (PAOC))?

**The first FTA where AFFF was used was located near the MUNS area, and AFFF was used there from c.1970 to c.1980.**

**Another FTA in which AFFF was used was located near where the AASF on Gulf Taxiway is located now. AFFF was used there from c.1981 to c.1989.**

**Secondary FTA is Sierra Taxiway, but AFFF was rarely used, and now only used for annual foam quality testing purposes.**

**Building 013, Ready Shelter, has an HEF system installed.**

**Building 019, Ready Shelter, Has an HEF system installed.**

**Building 015, the Main Hangar, has never had a AFFF or HEF system installed.**

**Building 027A & 027B, Fuels and Corrosion Control Facilities, have HEF systems installed.**

**The Hush House Engine Testing Facility has an HEF system installed.**

**Building 023, Weapons Facility, has an HEF system installed.**

**Buildings 045,046,047, ACA Hangars, have HEF systems installed.**

3. What type of AFFF is used or has been used on this installation (i.e. 3%, 6%, High Expansion Foam)?

**This installation uses both 3% AFFF and 2% HEF.**

4. What manufacturer's AFFF products are used or were used on this installation (i.e. 3M, Ansul, Chemguard, etc.)?

**This installation has used 3M, Ansul, Jet-X, and Chemguard AFFF and HEF.**

5. Did you ever dispose of old bulk AFFF, if so, when and where?

**Yes, through DLA Disposition Services 2012 thru 2015. The amounts are as follows;**

**Sept 2012  
1,200 lbs**

**Nov 2014  
8,640 lbs**

**Dec 2014  
3,800 lbs**

**Jan 2015  
58 lbs**

6. Is the AFFF stored as a mixed solution (3% or 6%) or do you formulate the AFFF on the installation?

**Stored in 3% mixed solution in Building 040, Base Fire Department.**

7. If AFFF is formulated on base, where is the solution mixed, contained, transferred, etc.?

**N/A**

8. Are your automated fire suppression systems currently charged with AFFF or have they been retrofitted for use of high expansion foam? If retrofitted, when was that done?

**Retro-fitting on AFFF systems to HEF systems occurred in Buildings 027A & 027B, and the Hush House. Retrofitting occurred in the early 2000s. See the answer for Question 2 for a breakdown of buildings with installed HEF systems.**

9. Do you have an inventory of the amount of AFFF stored on the installation, now and in the past, or present in automated fire suppression systems? Were retention ponds built to store discharged AFFF? Was the AFFF trickled to the sanitary sewer or left in the pond to infiltrate?

**Building 013 - HEF 400 gal tank 2% Chemguard C2**

**Building 019 - HEF 400 gal tank 2% Cbemguard C2**

**Building 023 - HEF 150 gal tank 2% Chemguard C2**

**ASA (045, 046, 047) - HEF 250 gal tank 2% Chemguard C2**

**Building 027 - HEF approx. 400-500 gal tank 2%? Ansul HEF JET-X P/N 42009 and (4) AFFF stand-alone self-contained foam monitors with approx. 50 gal tanks each**

**Hush House - HEF approx. 400-500 gal tank 2%? Foam type unknown**

10. Provide a list of vehicles that carried AFFF, now and in the past, and where are/were they located? Any vehicles have a history of leaking AFFF?

**Past Inventory:**            P-4, 130 gallons, no leaks  
                                     P-2, 200 gallons, leaked foam  
                                     P-19, 180 gallons, leaked foam  
                                     P-19, 180 gallons, no leaks  
                                     P-23, 500 gallons, no leaks

**Current Inventory:**    P-34, 56 gallons, no leaks  
                                     P-34, 56 gallons, no leaks  
                                     P-19H, 210 gallons, no leaks

**Vehicles have been located primarily at Building 040.**

11. How much AFFF (gallons) is/was carried/stored in the specified vehicles?

**See above answer.**

12. Do you ever dispose of unused AFFF? If so, how and where?

**Through DLA disposition services.**

13. Has unused AFFF ever been disposed of in the past? If so, how and where?

**Through DLA disposition services.**

14. Do you/did you test the vehicles spray patterns to make sure equipment is working properly?

**When spray patterns are tested, only water is used.**

15. How often are/were these spray tests performed and can you provide the locations of these tests, now and in the past?

**Pattern testing is conducted daily on Sierra Taxiway. Again, only water is used for these tests.**

16. Can you describe the procedure on how vehicles and systems are/were supplied with AFFF?

**Vehicles are gravity fed from 5 gallon buckets, or, transferred via hand pump.**

17. Can you provide the procedures on how these vehicles are/were cleaned/decontaminated and where vehicle cleaning is performed currently as well as performed in the past?

**Prior to the construction of the Vehicle Wash Rack, fire vehicles were washed/cleaned/decontaminated in the old Fire Station Apparatus Bays. Now, all vehicles are washed in the Snow Barn.**



18. Is/was there a specified area on the installation where vehicles are filled with AFFF and does this area have secondary containment in case of spills?

**No specific area with secondary containment has been identified for filling vehicles with AFFF, but we would use the Snow Barn, as it has an oil/water separator.**

19. When a release of AFFF occurs during a fire training exercise, now and in the past, how is the AFFF cleaned and disposed of?

**Currently, we do not expend AFFF on this installation for training exercises, and have not for at least 15 years. Prior to that, expended AFFF was merely sprayed down the drains with water, or allowed to evaporate on its own.**

20. How many FTAs are/were on this installation and where are they?

**Three are FTAs, two of which are now inactive. The active FTA is on Sierra Taxiway, but no AFFF is used for training purposes. One of the now inactive sites was at the end of the AASF taxiway towards Taxiway Gulf. The other was located out at the MUNS area, known as ERP Site 6 North.**

21. How many FTAs are active and inactive?

**See above answer.**

22. What types of fuels/flammables were used at the FTAs?

**JP4, Diesel, Gasoline, and Class A materials were used at the FTAs.**

23. For inactive FTAs, when was the last time that fire training using AFFF was conducted at them? Find out ahead of time in Admin Record for former FTAs.

**Use of the MUNS FTA was discontinued in the early 1980s, and the use of Gulf Taxiway FTA was discontinued in the mid-1990s.**

24. What are/were the non-FTA locations where PFCs or AFFF release systems are installed (i.e. Hangars, Wastewater Treatment Plants, Fire Stations, etc.)? Where are/were these locations (Building numbers)?

**Building 027A & 027B, Fuels and Corrosion Control Facilities, have HEF systems installed.**

**The Hush House Engine Testing Facility has an HEF system installed.**

**Building 023, Weapons Facility, has an HEF system installed.**

**Buildings 013 and 019, Ready Shelters, have HEF systems installed.**

**Buildings 045,046,047, ACA Hangars, have HEF systems installed.**

25. Do you have a list (Building names and numbers, current and demolished) where the fire suppression systems either currently contain or have contained AFFF?

**Building 027A & 027B, Fuels and Corrosion Control Facilities, have HEF systems installed.**

**The Hush House Engine Testing Facility has an HEF system installed.**

**Building 023, Weapons Facility, has an HEF system installed.**

**Buildings 013 and 019, Ready Shelters, have HEF systems installed.**

**Buildings 045,046,047, ACA Hangars, have HEF systems installed.**

26. Do you have records of fuel spill logs and emergency response logs? Knowledge of aircraft mishaps/crashes?

**ASEC-FD has records of our emergency responses.**

27. Do you have recollection or records of AFFF being used as a precaution in response to fuel releases to prevent fires?

**Within the last 21 years, AFFF has not been used as a precaution in response to fuel releases to prevent fires.**

28. Do you have recollection or records of historical emergency response sites (i.e. crash sites and fires) where AFFF was used?

**On this installation, AFFF was used in 2013 for a civilian aircraft fire at the intersection of runways 02 and 15. Approximately 5 total gallons of 3% AFFF was used, and allowed to evaporate at the conclusion of the emergency.**

**Off this installation, AFFF was used in July of 2001 when a civilian aircraft crashed into HFP Sprinkler Corporation. Approximately 50-60 gallons of 3% AFFF were used to combat that fire.**

29. Do you have recollection or record of emergency runway landings where foam might have been used as a precaution?

**Foam has not been used as a precaution for emergency runway landings.**

30. If not written records or incomplete written records, do you have anecdotal/verbal information and locations of spills or other emergency response incidents where AFFF was used?

**An accidental discharge of AFFF occurred in the late 1990s at the North end of the Base. Approximately 5 gallons of 3% AFFF was discharged on the newly-seeded soccer fields.**

31. What is the typical procedure for removing dispensed AFFF from an area where it has been used?

**The typical procedure for removing dispensed AFFF from an area has been allowing it to evaporate over time.**



32. Can you provide any other locations where AFFF has been stored, released, or used (i.e. hangars, buildings, fire stations, firefighting equipment testing and maintenance areas, emergency response sites, storm water/surface water, waste water treatment plants, and AFFF ponds)?

**The Hush House system has been fired at least twice in the last 21 years, resulting in the facility filling with foam.**

**Building 047, ACA Shelter, experienced an unintended HEF system activation in February 2010, resulting in the facility filling with HEF.**

33. Do you have or did you have a chrome plating shop on base? If no, skip to Question #38.

**Not that I am aware of.**

34. What were/are the years of operation of that chrome plating shop?

35. Do you know whether the shop has/had a foam blanket mist suppression system or used a fume hood for emissions control?

36. If foam blanket mist suppression was used, where was the foam stored, mixed, applied, etc.?

37. Is there anyone else or other base organization personnel that you would recommend we interview? Name, organization, position, phone number, e-mail.

38. Was it common practice to wash away fuel spills with AFFF?

**Fuel Spills were and still are cleaned using absorbent blanket materials. AFFF was not used to wash them away.**

39. Identify drainage patterns around flightline/ramp area. Point source discharge is likely AFFF Area of Concern (AOC).

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- Following Q&A generated during AFFF-PRC, PA visit & mtg on 8/19/15. Attended by John Richardson, Jennifer Baker, Jeremy Duzin, Travis Raby, & Tom Barzyle (BB&E) - see attached sign-in.

**Interview Questions regarding AFFF use  
(At Present and back to 1970)**

1. When did AFFF first start being used on this installation?

**Circa 1970**

2. What are the years of active use for each Fire Training Area (FTA), Aircraft Hangar, Fire Department, other places AFFF may have been used (collectively Potential Areas of Concern (PAOC)?

**The first FTA where AFFF was used was located near the MUNS area, and AFFF was used there from c.1970 to c.1980.**

*- clarify this is site 6 (LRP)*

**Another FTA in which AFFF was used was located near where the AASF on Gulf Taxiway is located now. AFFF was used there from c.1981 to c.1989.**

*- clarify this is site 1 (LRP)*

**Secondary FTA is Sierra Taxiway, but AFFF was rarely used, and now only used for annual foam quality testing purposes.**

*- no fires, just foam testing; last used for major foam flow test in ~1996*

**Building 013, Ready Shelter, has an HEF system installed.**

*only 3 - total foam events, rest minor test, capture in drum*

**Building 019, Ready Shelter, Has an HEF system installed.**

**Building 015, the Main Hangar, has never had a AFFF or HEF system installed.**

**Building 027A & 027B, Fuels and Corrosion Control Facilities, have HEF systems installed. (Also have 4 - Total AFFF Deck Guns, 50 gallons - 3% AFFF each)**

**The Hush House Engine Testing Facility has an HEF system installed.**

*(2 in 27A)  
(2 in 27B)*

**Building 023, Weapons Facility, has an HEF system installed.**

**Buildings 045,046,047, ACA Hangars, have HEF systems installed.**

3. What type of AFFF is used or has been used on this installation (i.e. 3%, 6%, High Expansion Foam)?

**This installation uses both 3% AFFF and 2% HEF.**

4. What manufacturer's AFFF products are used or were used on this installation (i.e. 3M, Ansul, Chemguard, etc.)?

**This installation has used 3M, Ansul, Jet-X, and Chemguard AFFF and HEF.**

*Note: Hush House had AFFF system installed before current HEF system. AFFF system in-place from approx. 1995 through early 2000s. Hush house built in 1995. Likely release or acceptance test in 1995-1996. Drains inside Hush house go to sanitary.*

5. Did you ever dispose of old bulk AFFF, if so, when and where?

**Yes, through DLA Disposition Services 2012 thru 2015. The amounts are as follows;**

**Sept 2012**

**1,200 lbs**

**Nov 2014**

**8,640 lbs**

**Dec 2014**

**3,800 lbs**

**Jan 2015**

**58 lbs**

6. Is the AFFF stored as a mixed solution (3% or 6%) or do you formulate the AFFF on the installation?

**Stored in 3% mixed solution in Building 040, Base Fire Department.**

7. If AFFF is formulated on base, where is the solution mixed, contained, transferred, etc.?

**N/A**

8. Are your automated fire suppression systems currently charged with AFFF or have they been retrofitted for use of high expansion foam? If retrofitted, when was that done?

**Retro-fitting on AFFF systems to HEF systems occurred in Buildings 027A & 027B, and the Hush House. Retrofitting occurred in the early 2000s. See the answer for Question 2 for a breakdown of buildings with installed HEF systems.**

9. Do you have an inventory of the amount of AFFF stored on the installation, now and in the past, or present in automated fire suppression systems? Were retention ponds built to store discharged AFFF? Was the AFFF trickled to the sanitary sewer or left in the pond to infiltrate?

**Building 013 - HEF 400 gal tank 2% Chemguard C2**

**Building 019 - HEF 400 gal tank 2% Chemguard C2**

**Building 023 - HEF 150 gal tank 2% Chemguard C2**

**ASA (045, 046, 047) - HEF 250 gal tank 2% Chemguard C2**

**Building 027 - HEF approx. 400-500 gal tank 2%? Ansul HEF JET-X P/N 42009 and (4) AFFF stand-alone self-contained foam monitors with approx. 50 gal tanks each**

**Hush House - HEF approx. 400-500 gal tank 2%? Foam type unknown**

10. Provide a list of vehicles that carried AFFF, now and in the past, and where are/were they located? Any vehicles have a history of leaking AFFF?

**Past Inventory:** P-4, 130 gallons, no leaks  
P-2, 200 gallons, leaked foam  
P-19, 180 gallons, leaked foam  
P-19, 180 gallons, no leaks  
P-23, 500 gallons, no leaks

**Current Inventory:** P-34, 56 gallons, no leaks  
P-34, 56 gallons, no leaks  
P-19H, 210 gallons, no leaks

**Vehicles have been located primarily at Building 040.**

11. How much AFFF (gallons) is/was carried/stored in the specified vehicles?

**See above answer.**

12. Do you ever dispose of unused AFFF? If so, how and where?

**Through DLA disposition services.**

13. Has unused AFFF ever been disposed of in the past? If so, how and where?

**Through DLA disposition services.**

14. Do you/did you test the vehicles spray patterns to make sure equipment is working properly?

**When spray patterns are tested, only water is used.**  
*- Eastern end of Sierra Taxiway used.*

15. How often are/were these spray tests performed and can you provide the locations of these tests, now and in the past?

**Pattern testing is conducted daily on Sierra Taxiway. Again, only water is used for these tests.** *Only 3- larger foam test events on Sierra Taxiway, stopped doing in ~1996.*

16. Can you describe the procedure on how vehicles and systems are/were supplied with AFFF?

**Vehicles are gravity fed from 5 gallon buckets, or, transferred via hand pump.**

17. Can you provide the procedures on how these vehicles are/were cleaned/decontaminated and where vehicle cleaning is performed currently as well as performed in the past?

**Prior to the construction of the Vehicle Wash Rack, fire vehicles were washed/cleaned/decontaminated in the old Fire Station Apparatus Bays. Now, all vehicles are washed in the Snow Barn.**

*- note, current Fire Station has no floor drains.*

18. Is/was there a specified area on the installation where vehicles are filled with AFFF and does this area have secondary containment in case of spills?

**No specific area with secondary containment has been identified for filling vehicles with AFFF, but we would use the Snow Barn, as it has an oil/water separator.**

19. When a release of AFFF occurs during a fire training exercise, now and in the past, how is the AFFF cleaned and disposed of?

**Currently, we do not expend AFFF on this installation for training exercises, and have not for at least 15 years. Prior to that, expended AFFF was merely sprayed down the drains with water, or allowed to evaporate on its own.**

20. How many FTAs are/were on this installation and where are they?

**Three are FTAs, two of which are now inactive. The active FTA is on Sierra Taxiway, but no AFFF is used for training purposes. One of the now inactive sites was at the end of the AASF taxiway towards Taxiway Gulf. The other was located out at the MUNS area, known as ERP Site 6 North.**

21. How many FTAs are active and inactive?

**See above answer.**

22. What types of fuels/flammables were used at the FTAs?

**JP4, Diesel, Gasoline, and Class A materials were used at the FTAs.**

23. For inactive FTAs, when was the last time that fire training using AFFF was conducted at them? Find out ahead of time in Admin Record for former FTAs.

**Use of the MUNS FTA was discontinued in the early 1980s, and the use of Gulf Taxiway FTA was discontinued in the mid-1990s.**

24. What are/were the non-FTA locations where PFCs or AFFF release systems are installed (i.e. Hangars, Wastewater Treatment Plants, Fire Stations, etc.)? Where are/were these locations (Building numbers)?

**Building 027A & 027B, Fuels and Corrosion Control Facilities, have HEF systems installed. (I have 4 AFFF deck guns in addition to HEF) - 50 gallons of 30% AFFF ea.**  
**The Hush House Engine Testing Facility has an HEF system installed.**  
**Building 023, Weapons Facility, has an HEF system installed.**  
**Buildings 013 and 019, Ready Shelters, have HEF systems installed.**  
**Buildings 045,046,047, ACA Hangars, have HEF systems installed.**

25. Do you have a list (Building names and numbers, current and demolished) where the fire suppression systems either currently contain or have contained AFFF?

**Building 027A & 027B, Fuels and Corrosion Control Facilities, have HEF systems installed.**

**The Hush House Engine Testing Facility has an HEF system installed.**

**Building 023, Weapons Facility, has an HEF system installed.**

**Buildings 013 and 019, Ready Shelters, have HEF systems installed.**

**Buildings 045,046,047, ACA Hangars, have HEF systems installed.**

26. Do you have records of fuel spill logs and emergency response logs? Knowledge of aircraft mishaps/crashes?

**ASEC-FD has records of our emergency responses.**

27. Do you have recollection or records of AFFF being used as a precaution in response to fuel releases to prevent fires?

**Within the last 21 years, AFFF has not been used as a precaution in response to fuel releases to prevent fires.**

28. Do you have recollection or records of historical emergency response sites (i.e. crash sites and fires) where AFFF was used?

**On this installation, AFFF was used in 2013 for a civilian aircraft fire at the intersection of runways 02 and 15. Approximately 5 total gallons of 3% AFFF was used, and allowed to evaporate at the conclusion of the emergency.**

**Off this installation, AFFF was used in July of 2001 when a civilian aircraft crashed into HFP Sprinkler Corporation. Approximately 50-60 gallons of 3% AFFF were used to combat that fire.**

*- HFP located off installation to Northeast*

29. Do you have recollection or record of emergency runway landings where foam might have been used as a precaution?

**Foam has not been used as a precaution for emergency runway landings.**

30. If not written records or incomplete written records, do you have anecdotal/verbal information and locations of spills or other emergency response incidents where AFFF was used?

**An accidental discharge of AFFF occurred in the late 1990s at the North end of the Base. Approximately 5 gallons of 3% AFFF was discharged on the newly-seeded soccer fields.**

*- Note, off installation to north*

31. What is the typical procedure for removing dispensed AFFF from an area where it has been used?

**The typical procedure for removing dispensed AFFF from an area has been allowing it to evaporate over time.**

32. Can you provide any other locations where AFFF has been stored, released, or used (i.e. hangars, buildings, fire stations, firefighting equipment testing and maintenance areas, emergency response sites, storm water/surface water, waste water treatment plants, and AFFF ponds)?

**The Hush House system has been fired at least twice in the last 21 years, resulting in the facility filling with foam.**

*1st release AFFF approx- 1996  
2nd " HEF*

**Building 047, ACA Shelter, experienced an unintended HEF system activation in February 2010, resulting in the facility filling with HEF.**

33. Do you have or did you have a chrome plating shop on base? If no, skip to Question #38.

**Not that I am aware of.**

34. What were/are the years of operation of that chrome plating shop?

*- NA -*

35. Do you know whether the shop has/had a foam blanket mist suppression system or used a fume hood for emissions control?

36. If foam blanket mist suppression was used, where was the foam stored, mixed, applied, etc.?

37. Is there anyone else or other base organization personnel that you would recommend we interview? Name, organization, position, phone number, e-mail.

38. Was it common practice to wash away fuel spills with AFFF?

**Fuel Spills were and still are cleaned using absorbent blanket materials. AFFF was not used to wash them away.**

39. Identify drainage patterns around flightline/ramp area. Point source discharge is likely AFFF Area of Concern (AOC).

*(see Spill Plan + SWPPP from Base EM)*

*Note: per John R., floor drains in 27A + 27B originally would have drained to storm sewer system and discharged into stormwater retention pond located north of PDL (same as IRP Site 4)*



Barnes AFFF  
PA Meeting

Date: 8/19/15  
Time: 0800

Attendees:

1. Tom Barzyk, BBE, 248-489-9636 x 302 tbarzyk@bbdo.com
2. Jennifer Baker, EM 413-568-9151 x 698-1753 (2006)  
(State Env.) jennifer.m.baker90.nfg@mail.mil
3. JEREMY DUGAN, 104 CSS, 413-568-9151 x 698-1737 (1.5 years)  
(Base CE) jeremy.j.dugan2.mil@mail.mil (1.5 years)
4. TRAVIS RASY 104 CES/CEF 413 568-9151 x 6981602 (22 years)  
(Installation Fire Chief) TRAVIS.J.RASY.NFG@mail.mil (5 years)
5. John Richardson 104FW/EM John.W.Richardson78.CIV@mail.mil (1991)  
(Base EM) 413 568-9151 x 698-1710

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## **Richardson, John W Civ USAF ANG 104 FW/EM**

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**From:** Ware, Ann C Col USAF ANG 104 FW/MSGCC  
**Sent:** Friday, March 06, 2015 8:37 AM  
**To:** Richardson, John W Civ USAF ANG 104 FW/EM; Hendricksen, Brenda C LtCol USAF ANG 104 FW/CCE; Dugan, Jeremy J Maj USAF 104 FW (US)  
**Subject:** RE: Fluorinated Compounds (PFOS and others)

Hi John - thanks for heads-up. Are the trace amounts allowed or is this a scenario of zero discharge from these PFOSs?

Thanks

Ann C. Ware, Col, MA ANG  
Commander, 104th Mission Support Group  
Massachusetts Air National Guard  
Phone: (413) 568-9151 x698-1361  
DSN: 698-1361  
Cell: (413) 209-4938

-----Original Message-----

**From:** Richardson, John W Civ USAF ANG 104 FW/EM  
**Sent:** Thursday, March 05, 2015 5:15 PM  
**To:** Ware, Ann C Col USAF ANG 104 FW/MSGCC; Hendricksen, Brenda C LtCol USAF ANG 104 FW/CCE  
**Subject:** Fluorinated Compounds (PFOS and others)  
**Importance:** High

Col Ware,

I received a call from Charles Darling Westfield Water Department Superintendent. He informed me the analysis results from a water sample taken from Westfield water supply well 7 had trace amounts of fluorinated compounds (PFOS). Well 7 is located on the east end of runway 10-33. These compounds are part of the formulation of the older AFFF the Fire Department uses in their fire trucks. I know small amounts are discharged annually to "test" the truck AFFF system. The base EM office disposed of several drums of the old AFFF this past fall. Mr. Darling isn't pointing fingers but this may become a minor issue and don't want to be caught off guard on this. If you want we can meet on this to discuss background information and a way forward on AFFF system testing.

Mr. John W. Richardson  
Base Environmental Coordinator  
104th Fighter Wing (MA ANG)  
Comm: 413-568-9151, ext. 6981710  
DSN: 698-1710  
COMM FAX: 413-572-1565  
DSN Fax: 698-1565  
Cell Phone: 413-563-4615

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**Richardson, John William (john) CIV USAF 104 FW (US)**

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**From:** Baker, Jennifer M NFG USAF 104 FW (US)  
**Sent:** Tuesday, August 18, 2015 9:02 AM  
**To:** Richardson, John William (john) CIV USAF 104 FW (US)  
**Subject:** AFFF disposed amounts

Sept 2012  
1,200 lbs

④ Went to DLA-DS (@Gorton)  
AFFF disposal

Nov 2014  
8,640 lbs

Dec 2014  
3,800 lbs

Jan 2015  
58 lbs

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104th Fighter Wing  
MA ANG  
RY2014 EPCRA 311/312

CHEMICALS NOT IN EESOH-MIS  
BARNES  
2014

CAS No.	Hazardous Chemicals (tracked in gallons)	Specific Gravity	Maximum Gallons On-Site	Maximum Pounds On-Site <sup>1</sup>	Comments/ Notes
NA	JP-8	0.8915	263,000	1,956,606	107,000 gallon AST at Bldg 035 (POL); 107,000 gallon AST at Bldg 035 (POL); 1,000 gallon UST at Bldg 035 (POL); 1,000 gallon AST at Bldg 21 (AGE); 2,500 gallon AST at Bldg. 107 (Hush House); 1,000 gallon AST at Bldg 027 (Fuel Cell) 3 x 300 gallon bowser at Bldg 010 (POL.) 600 gallon refueling bowser at Flightline 7 x 6,000 gallon R-11 Aircraft Refuelers
NA	Plus 100 Additive	0.899	1,120	8,402	2 x 550 gallon tanks at Bldg 035 (POL)
NA	Diesel Fuel	0.8795	10,653	78,187	5,000 gallon AST at Bldg. 054 (Vehicle Maintenance); 1,200 gallon C301 Diesel Refueler Truck 2,000 gallon diesel tank Bldg 020 (AGE); 43 gallon diesel MEP 806; 43 gallon diesel MEP 806; 23 gallon diesel MEP 805. 500 gallon generator tank PPI Main Gate 500 gallon generator tank PPII (POL) 230 gallon CE Portable Genset tank(Bldg 042) 660 gallon Emergency Generator tank(ASA Complex) 214 gallon generator tank at Bldg 025 (Command Post) 214 gallon generator tank at Bldg 029 (Comm/Clinic)
NA	Gasoline	0.7396	5,000	30,860	5,000 gallon AST at Bldg. 054 (Vehicle Maintenance
NA	No. 2 Fuel Oil	0.8515	22,275	158,281	1,000 gallon AST at Bldg 001 (HQ Building); 1,000 gallon AST at Bldg 003 (Dining Facility) 500 gallon AST at Bldg 008 (Mobility Processing); 500 gallon AST at Bldg 012 (Base Gym) 2,000 gallon AST at Bldg 016 (Main Hangar); 2,000 gallon AST at Bldg 020 (AGE/Engine Shops) 1,000 gallon AST at Bldg 025 (Base OPS); 1,000 gallon AST at Bldg 026 (Avionics) 1,000 gallon AST at Bldg 027 (Corr/Fuel Cell Hangar); 500 gallon AST at Bldg 028 (R&R); 4,000 gallon UST at Bldg 029 (Comm/Clinic); 1,000 gallon AST at Bldg 031 (Security Forces); 1,000 gallon AST at Bldg 054 (Base Supply); 1,000 gallon AST at Bldg 055 (Vehicle Maint); 2,500 gallon UST at Bldg 040 (CE/Fire Dept); 1,000 gallon AST at Bldg 064 (Munitions); 1,000 gallon AST at Bldg 065 (Munitions); 275 gallon AST at Bldg 069 (M&I Facility);
NA	Propane	0.5	560	2,337	Bldg 001 40lb; Bldg 003 120lb; Bldg 008 100lb; Bldg 015 40lb; Bldg 020 100lb; Bldg 023 40lb; Bldg 025 20lb; Bldg 026 60lb; Bldg 027 20lb; Bldg 028 20lb; Bldg 029 20lb; Bldg 030 20lb; Bldg 031 20lb; Bldg 033 20lb; Bldg 040 100lb; Bldg 054 60lb; Bldg 055 40lb; Bldg 065 80lb; ASA (Bldg 048) 40lb
NA	Kerosene	0.85	0	0	Not present at this base
302012	Hydrazine (EHS)	1.011	0	0	Not present at this base
NA	Lubricating Oil	0.879	0	0	All oil at the base is accounted for in EESOH-MIS. Therefore, the threshold calculation for oil is accounted for in EESOH-MIS
NA	Used Oil/Waste Oil	0.879	0	0	Waste oil is exempt from EPCRA reporting requirements. Any hazardous waste as such term is defined by the Solid Waste Disposal Act, as amended by the Resource Conservation and Recovery Act of 1976, as amended (42 U.S.C. 6901 et seq.), when subject to regulations issued under that Act by the Environmental Protection Agency. Ref. 1910.1200(b)(6)(i).
NA	Transformer Oil	0.92	6,142	47,155	34 transformers with sizes varying from 10 to 1,000 KVA with a oil volume of approximately 175 gallons each.
NA	Deicing Fluid	1.105	660	6,086	660 gallons Tactical Deicer Truck Bldg 055 (Vehicle Maint)
NA	Aqueous Film Forming Foam (AFFF)	1.02	2,112	17,977	880 gallons total in 55 gal drums at Bldg. 40 (Fire Department); 910 gallons total in 5-gallon containers at Bldg. 054 (Base Supply); 56 total gallons in Crash 3 at the Fire Station (040); 56 total gallons in Crash 4 at the Fire Station (040); 210 total gallons in Crash 5 at the Fire Station (040).

*note some of this not disclosed later in 2014*

104th Fighter Wing  
MA ANG  
RY2014 EPCRA 311/312

NA	High Expansion Foam (HEF)	1.02	1,850	15,747	150 gallon tank located in Bldg 023 Weapons Hanger; 200 gallon tank located in bldg 107 Hush House; 300 gallon tank located in bldg 027 Fuel Cell; 400 gallon tank located in bldg 046 ACA 2 x 400 gallon tanks located in flightline ready shelters
7782447	Liquid Oxygen (LOX)	1.1	6,165	56,592	2 X 3,000 gallon tanks at Bldg 038 (POL), and 3 50-gallon carts at Bldg 038 (LOX Pad)
7727379	Liquid Nitrogen (LIN)	0.81	0	0	Not stored or used by this base.
NA	Parts washing - solvent	0.8	280	1,866	7 x 30 gal Pd-680 SystemOne, 1 x 30 gal Naphtha Med Alph Dyna 143, 1 x 2 gal Carbon Remover, 1 x 1 gal Fingerprint remover, 1 x 1.5 gal Mineral Sprits, 1 x 5 gal EP-921, 1 x 30 gal BREAKTHROUGH
NA	Parts washing - aqueous	1.05	435	3,812	2 x 75 gl. BE Aqueous parts washer (AGE & VM), 1 x 200 gl. BE Aqueous parts washer (Propulsion), 1 x PMW Aqueous parts washer (Gun Shop), & 1 x 60 gl Snacon Aqueous parts washer (R&R)
NA	IRP Remediation Chemical	0	0	0	No IRP Remediation Chemical present at the base.



**APPENDIX C**

**SUPPORTING DOCUMENTATION**

**APPENDIX C-1**

**LEIDOS WATER WELLS MAP**

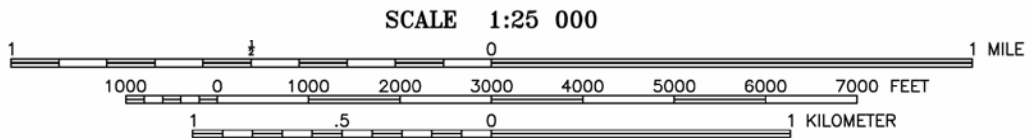
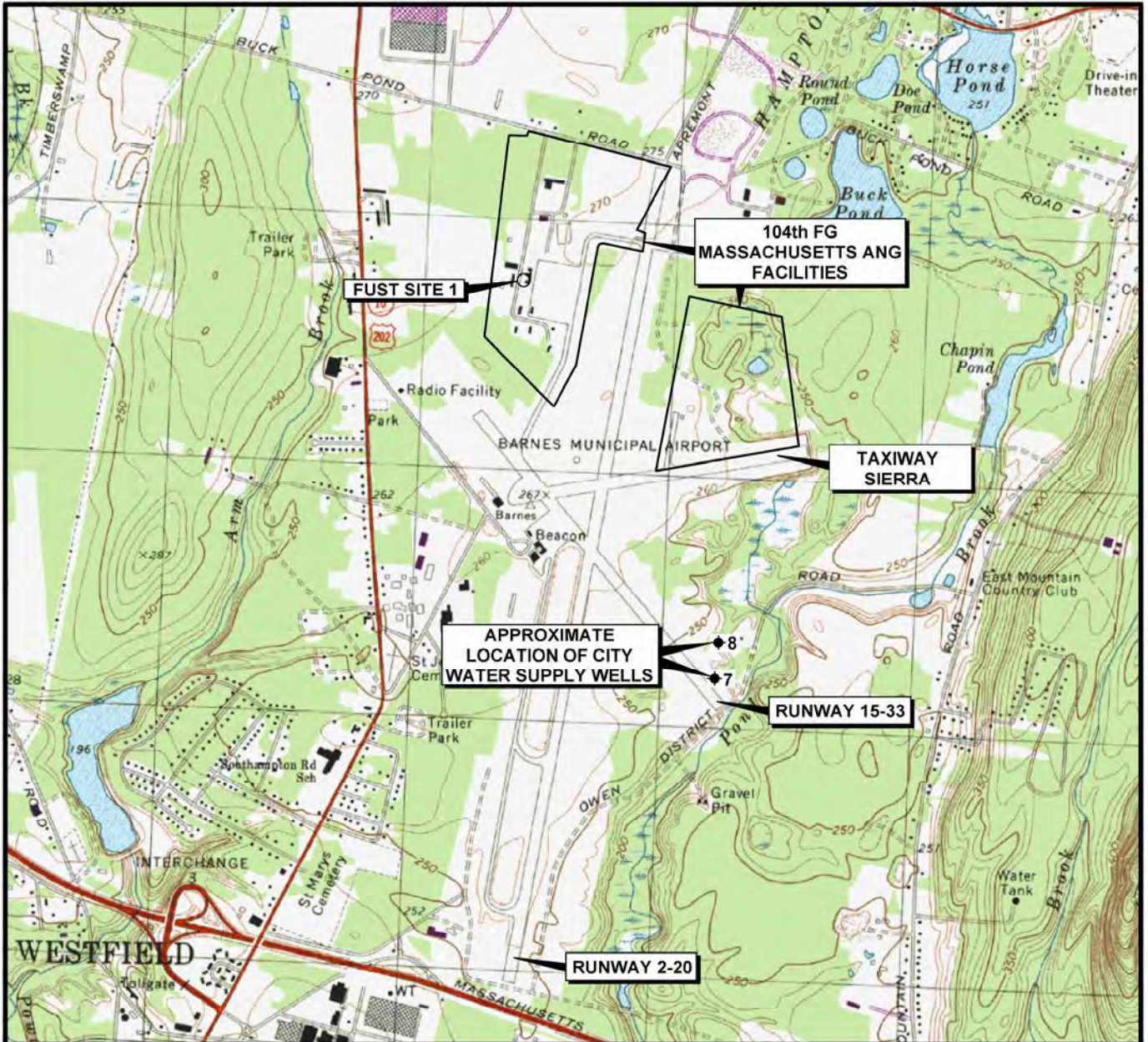
**FINAL**

**SEVENTH SEMIANNUAL  
GROUNDWATER MONITORING REPORT  
FOR  
FORMER UNDERGROUND STORAGE TANK – SITE 1  
(INSTALLATION RESTORATION PROGRAM SITE 9)  
RELEASE TRACKING NUMBER 1-0288**



**104<sup>th</sup> Fighter Wing  
Massachusetts Air National Guard  
Barnes Municipal Airport  
Westfield, Massachusetts**

**November 2014**



CONTOUR INTERVAL 10 FEET  
 NATIONAL GEODETIC VERTICAL DATUM OF 1929




	<p><b>FIGURE 1</b>  <b>BASE LOCATION MAP</b>  <b>FUST SITE 1</b>  <b>BARNES AIR NATIONAL GUARD BASE</b>  <b>WESTFIELD, MASSACHUSETTS</b></p>		
	 <p>QUADRANGLE LOCATION</p>	<p><b>MOUNT TOM, MASS.</b>  <b>N4207.5-W7237.5/7.5</b>  <b>1972</b>  <b>PHOTOREVISED 1979</b>  <b>QUADRANGLE NAME</b></p>	
<p>CAD FILE: 09017/DWGS/P40-FIG1.DWG          DRAWN BY: P. HOLM          REV. NO./DATE: REV. 0/11-14-2013</p>			

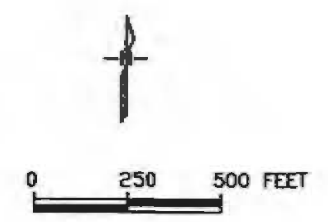
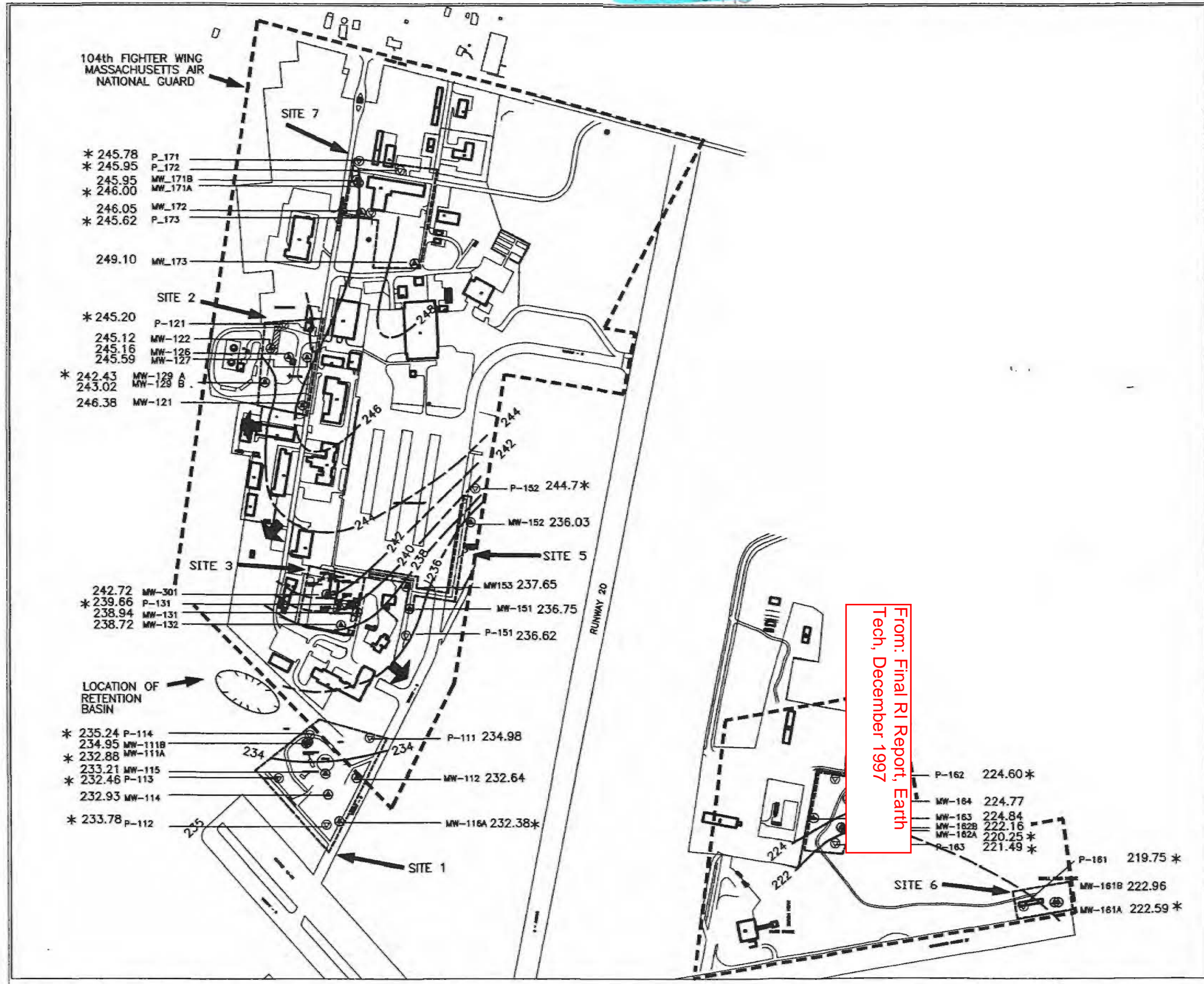
Figure 1. Base Location Map

**APPENDIX C-2**

**GROUNDWATER ELEVATION CONTOURS**



DM # 321995



LEGEND

- [ ] SITE BOUNDARY
- [ 37 ] BUILDING AND NUMBER
- \*-\*- FENCE
- == ROAD
- - - ANG BOUNDARY
- 235.02 GROUNDWATER ELEVATION
- GROUNDWATER ELEVATION CONTOUR  
DASHED WHERE INFERRED
- ⊙ EXISTING MONITORING WELL
- ⊕ EXISTING WATER TABLE PIEZOMETER

- P-161 219.75\* GROUNDWATER ELEVATIONS NOT USED TO DEVELOP CONTOURS
- ↑ INFERRED GROUNDWATER FLOW DIRECTION

EARTH TECH

INSTALLATION RESTORATION PROGRAM  
104th FIGHTER WING  
WESTFIELD, MASSACHUSETTS

GROUNDWATER COUNTOUR MAP  
SHALLOW WELLS  
MASSACHUSETTS AIR NATIONAL GUARD  
BARNES MUNICIPAL AIRPORT

**ENVIRONMENTAL RESTORATION PROGRAM**

**FINAL ANNUAL SUMMARY REPORT  
ERP SITES 2, 5, 6 AND 7  
RTN: 1-0288**

**104<sup>TH</sup> FIGHTER WING  
MASSACHUSETTS AIR NATIONAL GUARD  
BARNES MUNICIPAL AIRPORT  
WESTFIELD, MASSACHUSETTS**

**Contract No. DAHA92-01-D-0006  
Delivery Order No. 0005**

**Prepared for:**

**ANG/CEVR  
Andrews AFB, Maryland 20762-5157**

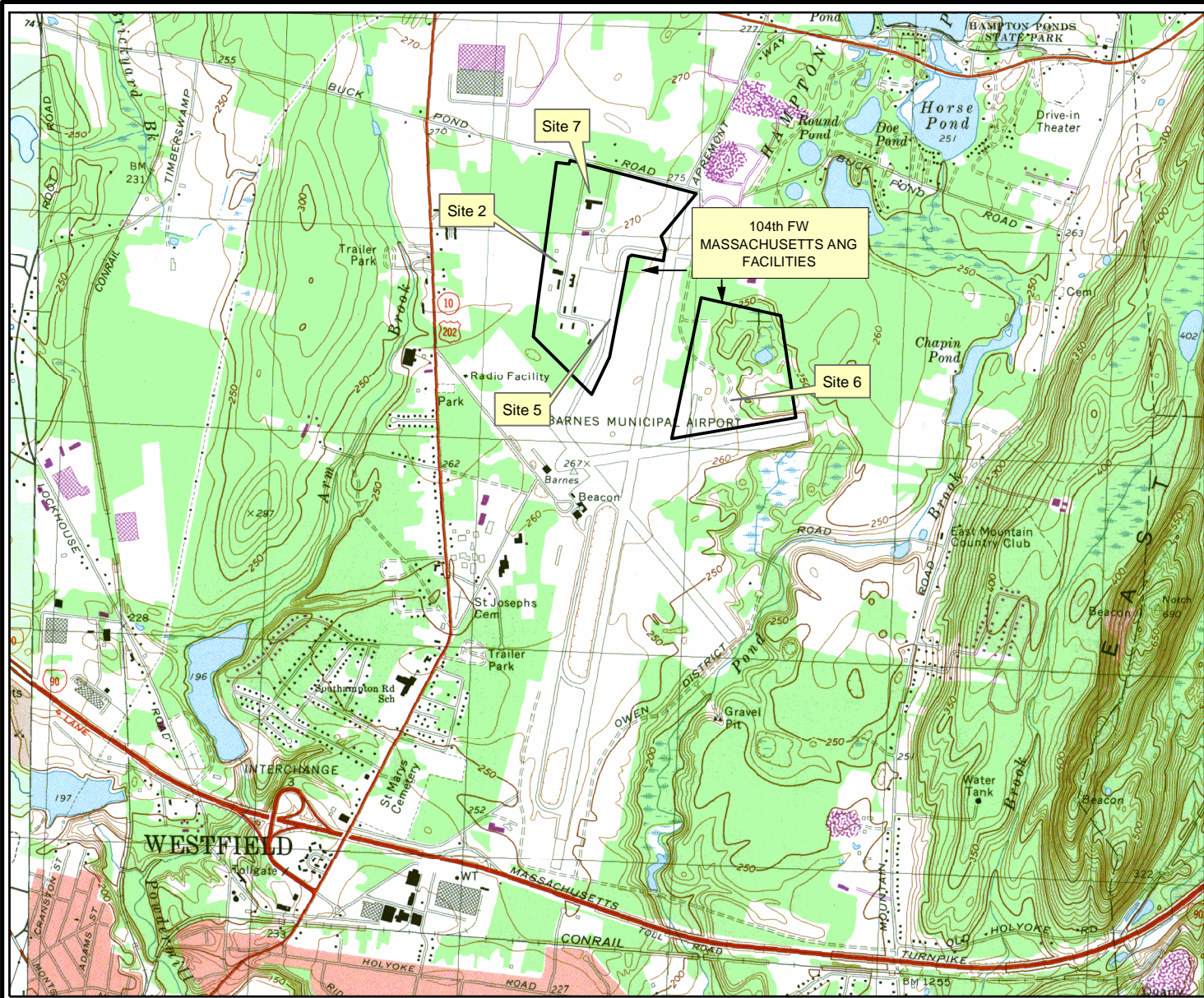
**Prepared by:**

**AMEC Earth & Environmental, Inc.  
239 Littleton Road, Suite 1B  
Westford, MA 01886  
AMEC Project No. 27622-0005**

**January 2005**







**SITE LOCUS MAP**  
 104th FIGHTER WING  
 BARNES AIR NATIONAL GUARD BASE  
 WESTFIELD, MASSACHUSETTS

**Location of Site Westfield, Massachusetts**

Source of Basemap  
 Massachusetts Geographic Information System  
 Boston, MA

Stateplane, NAD83, Meters

**FIGURE 2 - 1**  
 DATE: 8/20/04

**SCALE**

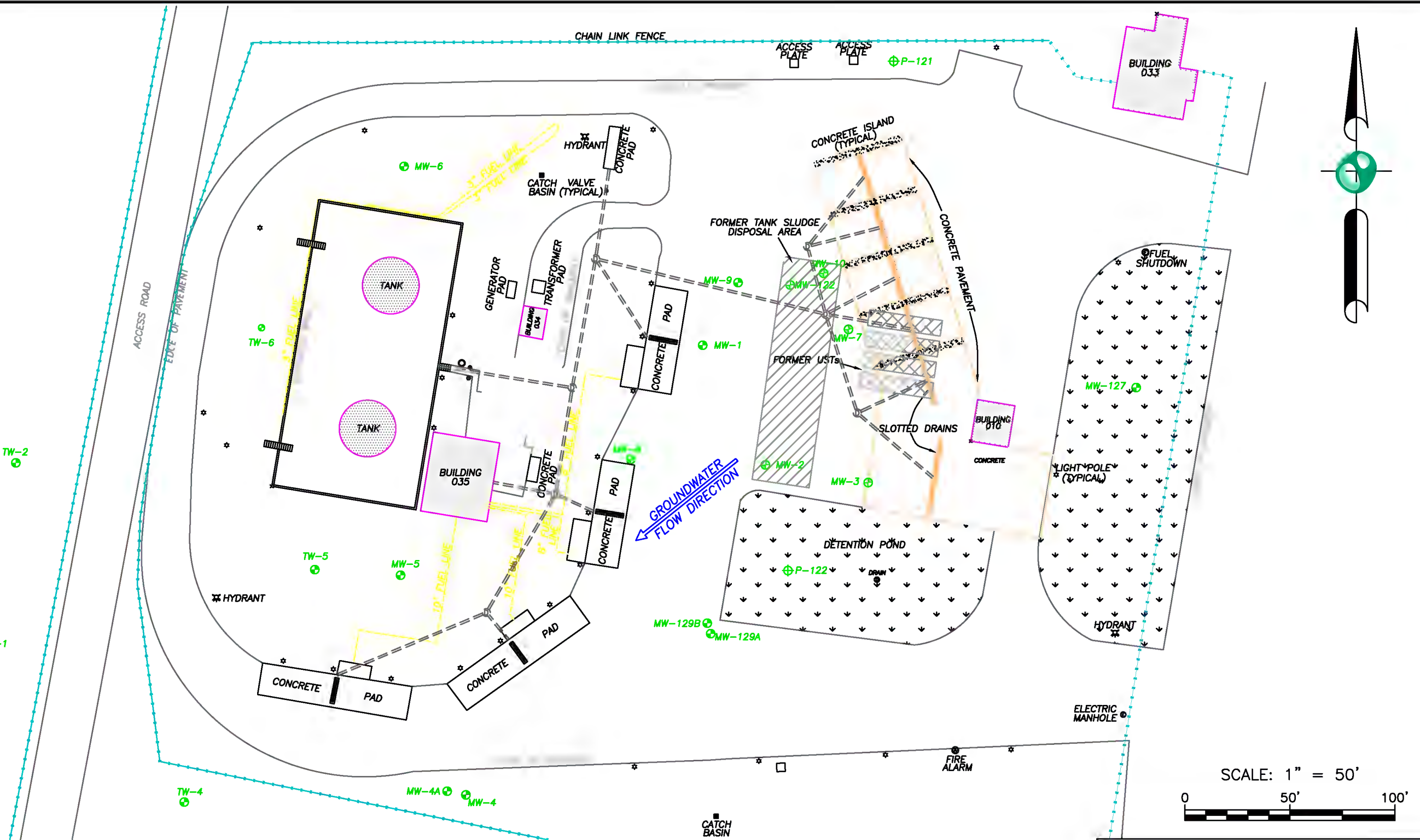
0.5 0 0.5 1 Miles

2,000 0 2,000 Feet

1 0.5 Kilometers

P:\AirNationalGuard\Barnes\GIS\Barnes\_locus082004.mxd  
 P:\AirNationalGuard\Barnes\GIS\Barnes\_locus082004.pdf





**LEGEND**

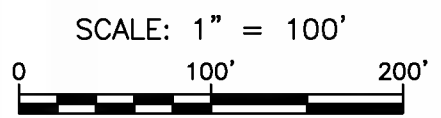
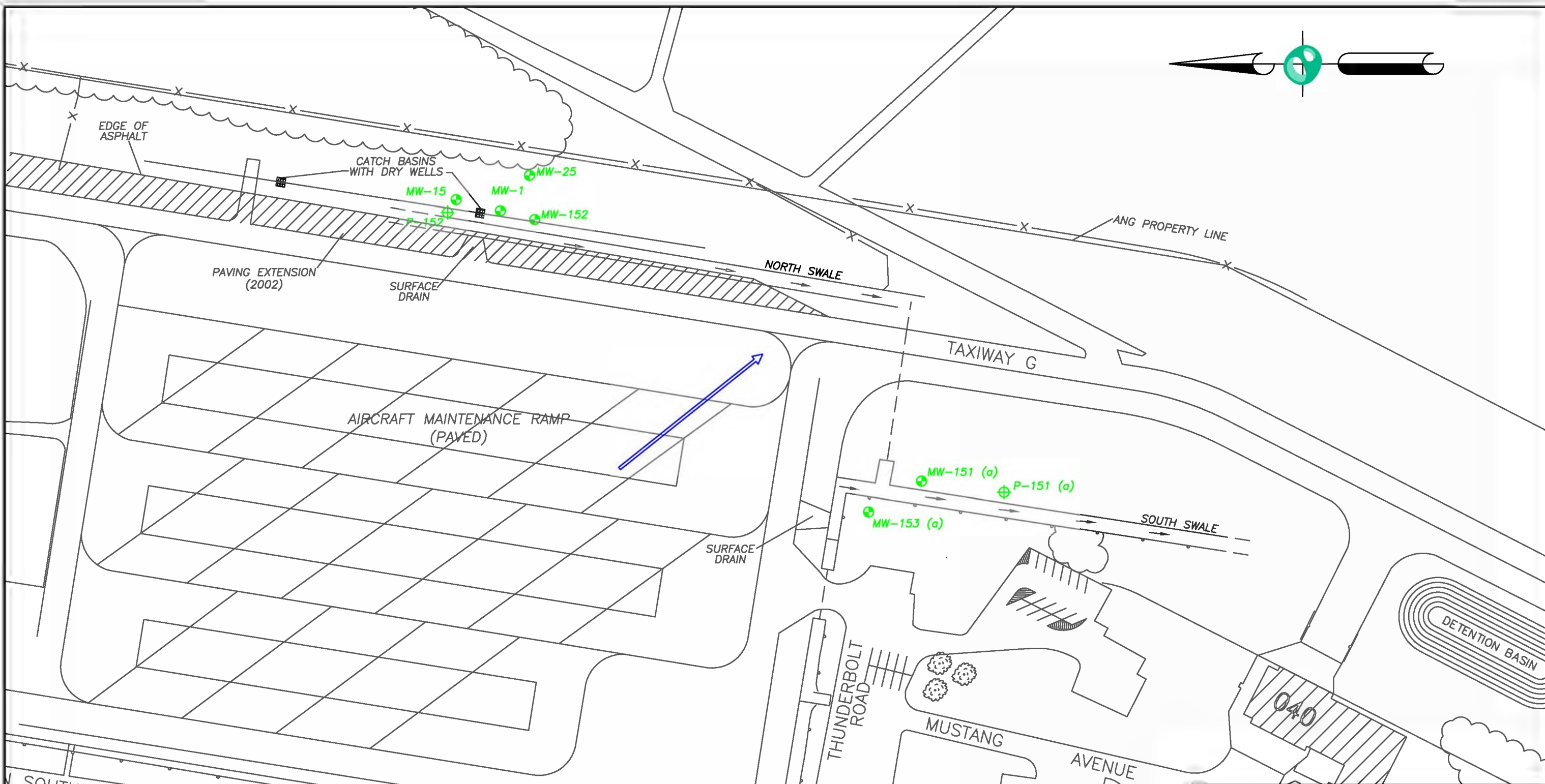
- APPROXIMATE LOCATION OF FORMER UST
- GRASS
- BLDG
- APPROXIMATE LOCATION OF FORMER TANK SLUDGE DISPOSAL AREA
- MONITORING WELL
- WATER TABLE PIEZOMETER
- MANHOLES FOR DRAIN LINE
- APPROXIMATE LOCATION OF DRAIN LINE
- ABOVE GROUND FUEL LINE

DRAIN LINES FROM: "POL SITE PLAN, PREPARED BY OP-TECH ENVIRONMENTAL SERVICES JULY 2003"

SITE PLAN ERP SITE 2	
BARNES MUNICIPAL AIRPORT WESTFIELD, MASSACHUSETTS	
PROJECT MANAGER R. FERSON	DRAWING NUMBER Fig 2-2, ERP 2 Site Plan
CHECKED BY E. JOHNSON	PROJECT NUMBER 2-7622-0005
DRAWN BY R. BOWMAN	FIGURE NUMBER <b>2-2</b>
DATE DRAWN 08/18/04	

239 LITTLETON ROAD  
SUITE 1B  
WESTFORD, MASSACHUSETTS 01886  
Earth & Environmental  
Phone: (978) 692-9090 Fax: (978) 692-6633 www.amec.com

FILE: P:\NationalGuard\Barnes\Deliverables\Monitoring Reports\Annual Summary Report\Figures\Fig 2-3, ERP 5 Site Plan.dwg PRINTED BY: eric.x.johnson - 19 Jan 2005 - 3:23pm



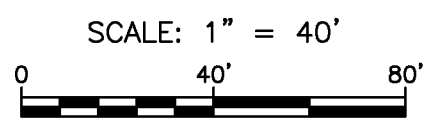
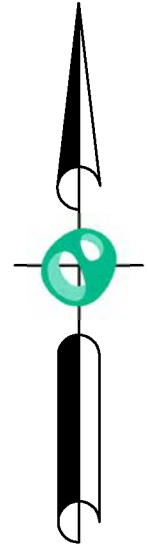
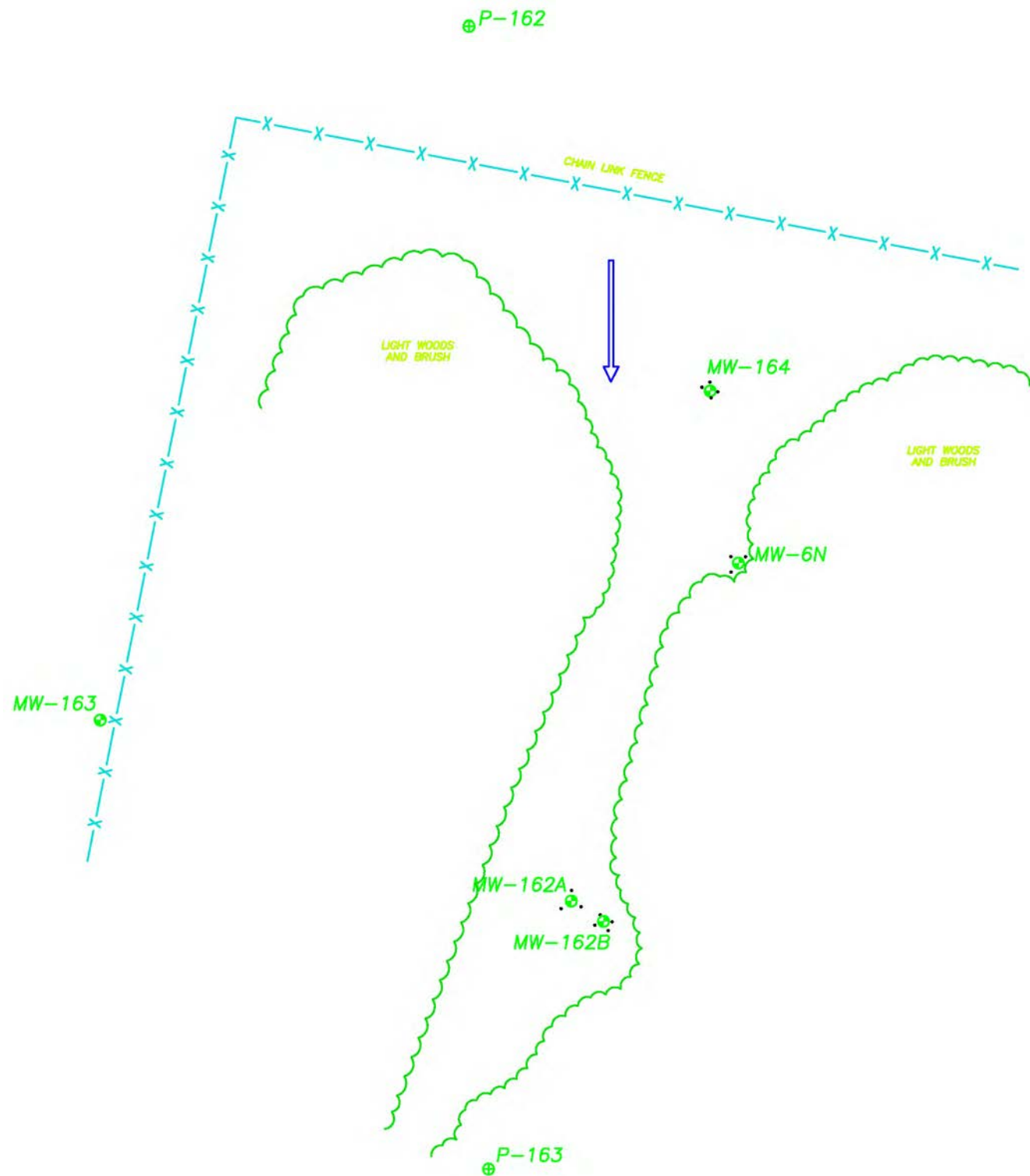
- LEGEND**
- BLDG
  - MONITORING WELL
  - WATER TABLE PIEZOMETER
  - CULVERT
  - (a) - APPROXIMATE LOCATION OF MONITORING WELL OR PIEZOMETER
  - GROUNDWATER FLOW DIRECTION
  - CATCH BASIN
  - RUNOFF FLOW DIRECTION

<b>SITE PLAN ERP SITE 5</b>	
BARNES MUNICIPAL AIRPORT WESTFIELD, MASSACHUSETTS	
PROJECT MANAGER R. FERSON	DRAWING NUMBER Fig 2-3, ERP 5 Site Plan
CHECKED BY E. JOHNSON	PROJECT NUMBER 2-7622-0005
DRAWN BY R. BOWMAN	FIGURE NUMBER <b>2-3</b>
DATE DRAWN 08/18/04	





239 LITTLETON ROAD  
SUITE 1B  
WESTFORD, MASSACHUSETTS 01886

Earth & Environmental  
Phone: (978) 692-9090 Fax: (978) 692-6633 www.amec.com

FILE: P:\NationalGuard\Barnes\Deliverables\Monitoring Reports\Annual Summary Report\Figures\Fig 2-4, ERP 6 Site Plan.dwg PRINTED BY: eric.x.johnson - 19 Jan 2005 - 3:23pm



LEGEND

-  - MONITORING WELL
-  - WATER TABLE PIEZOMETER
-  - BOLLARDS
-  - GROUNDWATER FLOW DIRECTION

**amec**  
Earth & Environmental

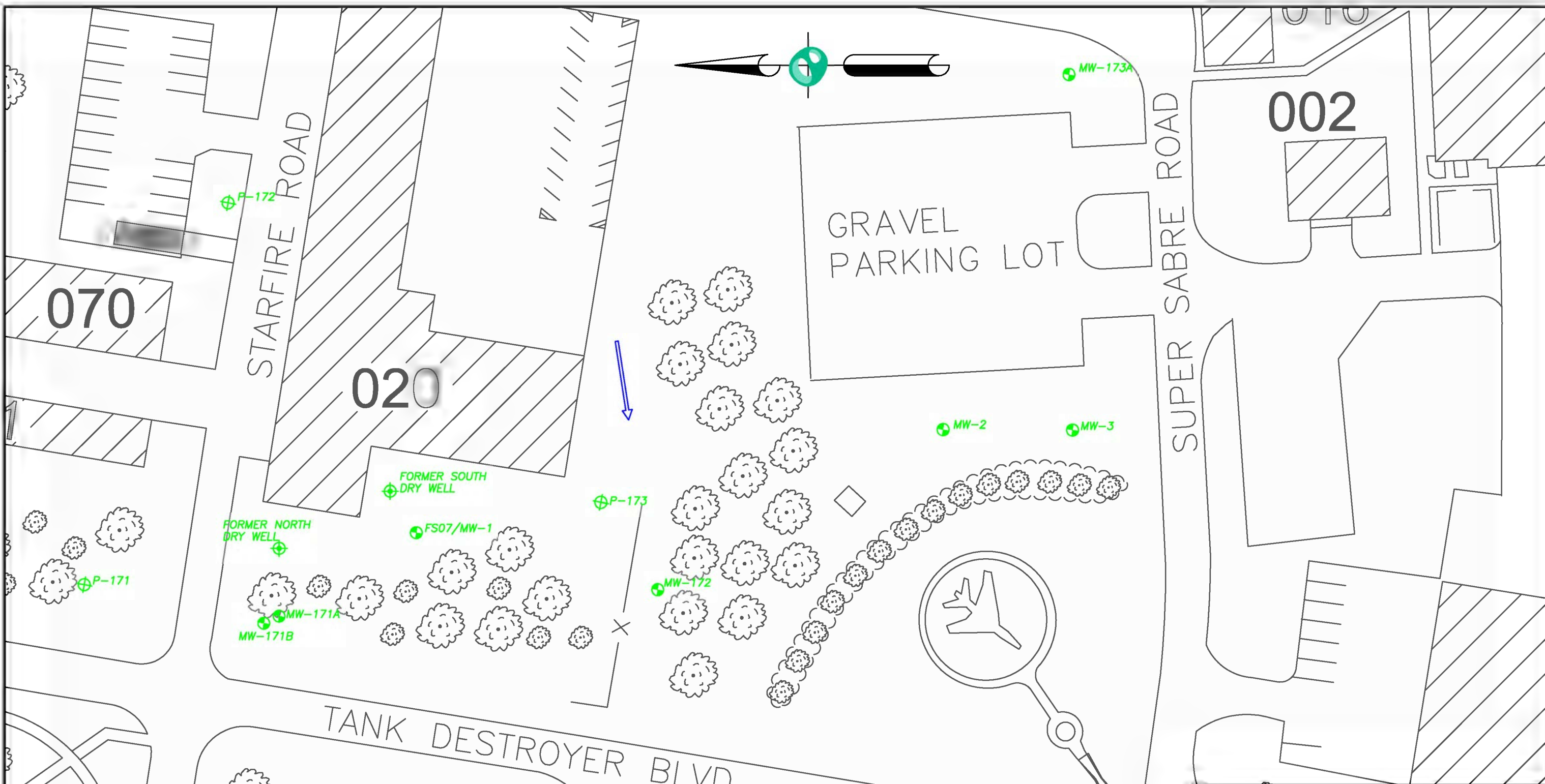
239 LITTLETON ROAD  
SUITE 1B  
WESTFORD, MASSACHUSETTS 01886

Phone: (978) 692-9090 Fax: (978) 692-6633 www.amec.com

<b>SITE PLAN ERP SITE 6N</b>	
BARNES MUNICIPAL AIRPORT WESTFIELD, MASSACHUSETTS	
PROJECT MANAGER R. FERSON	DRAWING NUMBER Fig 2-4, ERP 6 Site Plan
CHECKED BY E. JOHNSON	PROJECT NUMBER 2-7622-0005
DRAWN BY R. BOWMAN	FIGURE NUMBER <b>2-4</b>
DATE DRAWN 08/18/04	

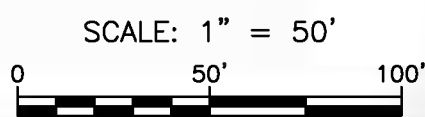


FILE: P:\NationalGuard\Barnes\Deliverables\Monitoring Reports\Annual Summary Report\Figures\Fig 2-5, ERP 7 Site Plan.dwg PRINTED BY: eric.x.johnson - 19 Jun 2005 - 3:24pm



**LEGEND**

- BLDG
- MONITORING WELL
- WATER TABLE PIEZOMETER
- FORMER DRY WELL
- GROUNDWATER FLOW DIRECTION



<b>SITE PLAN ERP SITE 7</b>	
BARNES MUNICIPAL AIRPORT WESTFIELD, MASSACHUSETTS	
PROJECT MANAGER R. FERSON	DRAWING NUMBER Fig 2-5, ERP 7 Site Plan
CHECKED BY E. JOHNSON	PROJECT NUMBER 2-7622-0005
DRAWN BY R. BOWMAN	FIGURE NUMBER <b>2-5</b>
DATE DRAWN 08/18/04	

239 LITTLETON ROAD  
SUITE 1B  
WESTFORD, MASSACHUSETTS 01886  
Phone: (978) 692-9090 Fax: (978) 692-6633 www.amec.com

**APPENDIX C-3**

**FIRE TRAINING AREAS – ERP INFORMATION**

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# INSTALLATION RESTORATION PROGRAM

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COPY

DCN: Barnes 4 28654

Title: RI Report, Volume I

ARF Final

03 Dec 1997

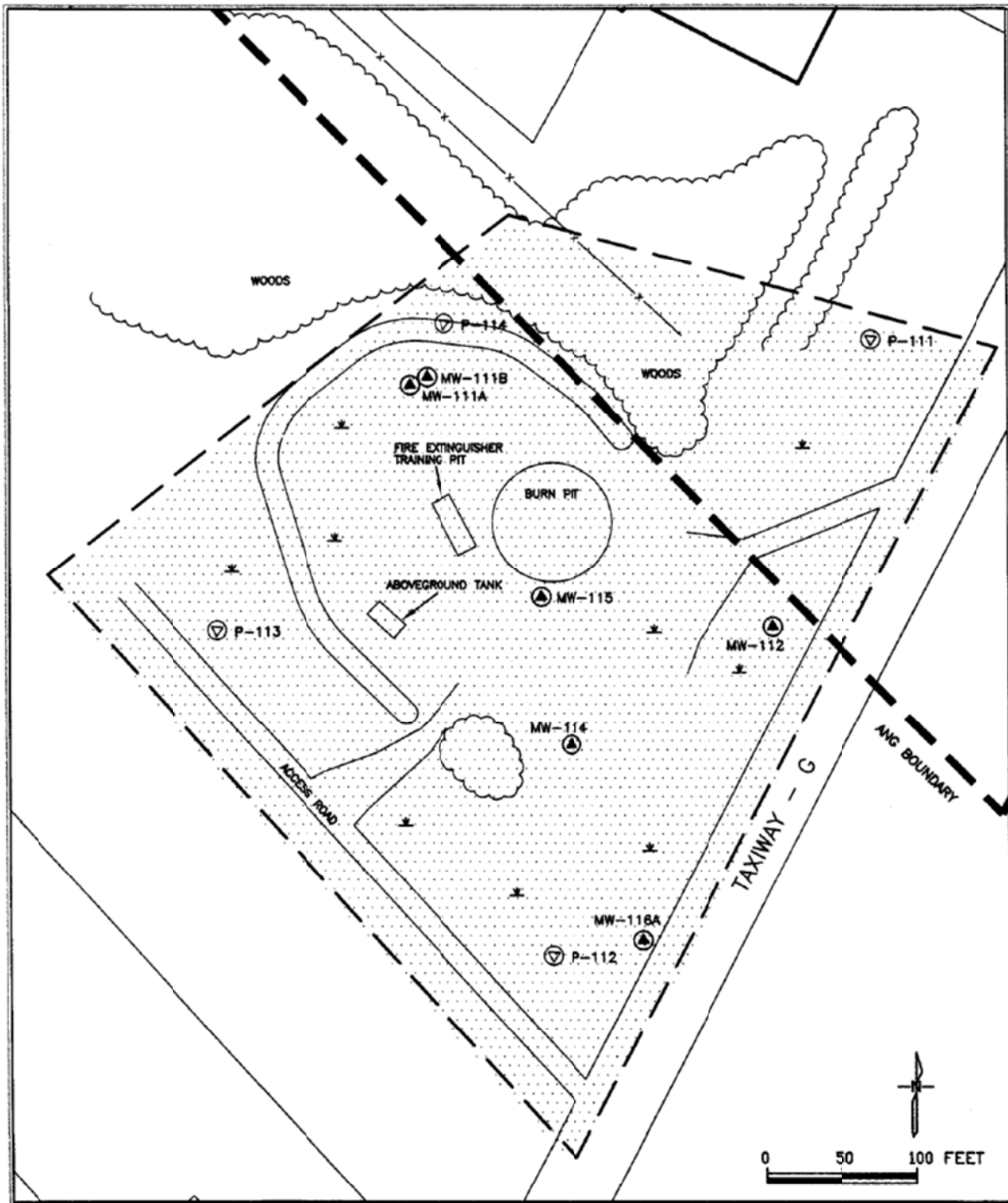
## FINAL REMEDIAL INVESTIGATION REPORT

SECTIONS 1-12  
MASSACHUSETTS AIR NATIONAL GUARD  
104TH FIGHTER WING  
BARNES MUNICIPAL AIRPORT  
WESTFIELD, MASSACHUSETTS

DECEMBER 1997



**HAZARDOUS WASTE REMEDIAL ACTIONS PROGRAM**  
**Environmental Restoration and Waste Management Programs**  
Oak Ridge, Tennessee 37831-7606  
managed by LOCKHEED MARTIN ENERGY SYSTEMS, INC.  
for the U.S. DEPARTMENT OF ENERGY under contract DE-AC05-84OR21400



LEGEND	
	SITE BOUNDARY
	BUILDING AND NUMBER
	FENCE
	ROAD
	ANG BOUNDARY
	GRASS
	TREE
	EXISTING WATER TABLE PIEZOMETER
	EXISTING MONITORING WELL

EARTH TECH

INSTALLATION RESTORATION PROGRAM  
104th FIGHTER WING  
WESTFIELD, MASSACHUSETTS

**SITE 1 - SITE PLAN  
FIRE TRAINING AREA  
MASSACHUSETTS AIR NATIONAL GUARD  
BARNES MUNICIPAL AIRPORT**

6/97 FIGURE 2-3

**Table 2-1 Status of IRP Sites**  
104th FW, MA ANG, WESTFIELD, MASSACHUSETTS

	SITE NAME	SITE STATUS
→	SITE 1 FIRE TRAINING AREA	RI PHASE
	SITE 2 TANK SLUDGE DISPOSAL AREA	RI PHASE
	SITE 3 MOTOR POOL EXCAVATION AREA	RI PHASE
	SITE 4 STORMWATER RETENTION POND	NFA DD PREPARED
	SITE 5 ORIGINAL AIRCRAFT MAINTENANCE AREA/GRASS SWALE	RI PHASE
	SITE 6 OLD FIRE TRAINING AREA	RI PHASE
	SITE 7 DRY WELL AREA	RI PHASE

a soil organic vapor (SOV) survey, installation of piezometers and monitoring wells, and the collection of soil and groundwater samples. The Final Site Investigation Report was issued by ABB-ES in February 1992 and recommended that RI activities be implemented at Sites 1, 2, 5, and 6. Sites 3 and 7 were recommended for FFS/RM. Subsequent to the issuance of the SI report, sites 5 and 6 were also recommended for FFS/RM.

### 2.2.3 Removal Actions

Removal action field investigations were completed at Sites 3, 5, 6, and 7 by an ANG contractor and EARTH TECH in September 1991. Activities included the installation of monitoring wells, the collection of soil samples, and the collection of groundwater samples (from new and existing wells). A Removal Action Field Investigation Technical Memorandum was completed by EARTH TECH in December 1991 for Site 7 and in March 1992 for Sites 3, 5, and 6.

## 2.3 SITE DESCRIPTIONS

Site descriptions, histories, and findings of previous investigations for the six IRP sites investigated during the RI are presented in the following subsections.

### → 2.3.1 Site 1 - Fire Training Area

Site 1 is located on MAP property near the southwestern portion of the base and is currently abandoned (Figure 2-3). The site consists of a circular, flat, grassy to unvegetated area approximately 150 ft in diameter that was used for fire training activities from 1950 to 1987. A relatively impermeable traprock (basalt) base was installed at the site in the late 1970s. The soil removed from the fire training area was used to create an earthen berm, approximately 6 ft high, along the northern and western sides of the site. Three areas of concern have been identified at Site 1: a burn pit, a fire extinguisher training pit, and a former drum storage area.



The drum storage area was located to the southeast of the burn pit. As many as 200 drums containing spent oils, solvents, and fuels were held in this area between training exercises. An aboveground storage tank (AST) used to hold Jet Propulsion Fuel #4 (JP-4) for training exercises and the earthen berm containing soil removed from the fire training area have also been identified as potential sources of contamination.

Beginning in the 1950s, fire training exercises were held at Site 1 approximately every six weeks during the summer months. The procedure was to soak the ground with water from a tanker truck, release flammable liquids onto the ground, and then ignite the liquids.

Prior to 1979, waste oils and solvents were mixed with aviation gasoline (AVGAS), and/or JP-4 for the burns. JP-4 was used exclusively from 1979 to 1987. On average, 300 to 500 gallons of flammable liquids were released onto the ground surface, ignited, and extinguished. An estimated 75 to 85% of the liquid was burned off each time. In addition to fire training exercises, oil-contaminated surface soil was reportedly excavated from the base Motor Pool (Site 3) and disposed of at Site 1 (ABB-ES, 1992).

The SOV survey conducted during the SI detected volatile organic compounds (VOCs) in the site soils, with the highest soil vapor concentrations near the former drum storage area. Laboratory analyses of surface samples detected lead, total petroleum hydrocarbons (TPH), VOCs, and the semivolatile organic compound (SVOC), 2-methylnaphthalene. Subsurface soil samples contained TPH and the VOC, tetrachloroethylene (PCE). Lead concentrations in the subsurface soils were at background levels, and SVOCs were not detected. One VOC and several SVOCs were detected in groundwater samples at concentrations below their quantitation limit. Analytical results from these samples are included in Table A-1 in Appendix A. These data indicate that soils in the vicinity of the burn pit, fire extinguisher training pit, and the former drum storage area were contaminated by fuel and solvent related chemicals. The SI recommended further investigations for Site 1 in order to define contamination sources and to support the risk characterization and FS.

### **2.3.2 Site 2 - Tank Sludge Disposal Area**

Site 2 is located within the Jet Fuel Storage Area, near the western boundary of the base as shown on Figure 2-4. The area is fenced, and bound to the north by a stormwater retention pond, and to the west by an open field. Near the center of the site are four abandoned 25,000 gallon underground storage tanks (USTs), last containing JP-4 and a fuel pump control building (Building 010). Water separation equipment and electrical pump controls are housed in the building, which is currently out of service. A floor drain in the center of the control building floor discharged to an on-site dry well. MA ANG personnel sealed the floor drain leading from the control building to the dry well in December 1990. The four USTs, originally used to store AVGAS, were installed in 1947. They were taken out of service in September 1992. At this time, the Jet Fuel Storage Area was expanded, and two 107,000 gallon ASTs containing JP-4 and Jet Propulsion Fuel #8 (JP-8) were installed. These tanks have stored JP-8 only since April 1994. Upon completion of the RI, the USTs and control building are scheduled for removal.

The SOV survey conducted during the SI did not detect VOCs in site soils. Surface and near-surface soil samples were collected from hand auger borings and analyzed for VOCs, TPH, and lead. Groundwater samples were collected and analyzed for VOCs, SVOCs, and lead. TPH was detected in the first round groundwater sample collected from MW-152. No contaminants were detected in the second round of groundwater samples. Analytical results from these samples are included in Table A-1 in Appendix A. These data indicate that polycyclic aromatic hydrocarbons (PAHs), lead, and TPH are present in the ditch soils. There is no evidence to suggest that VOCs are present in Site 5 soils. The contamination is thought to be the result of chemical releases or discharges of chemical-bearing stormwater from the aircraft maintenance ramp. Contamination appears to be greatest near the ramp and extends into the subsurface. Groundwater contamination at the site was not confirmed. The SI recommended further investigations for Site 5 in order to define contaminant sources and to support the risk characterization and FS.

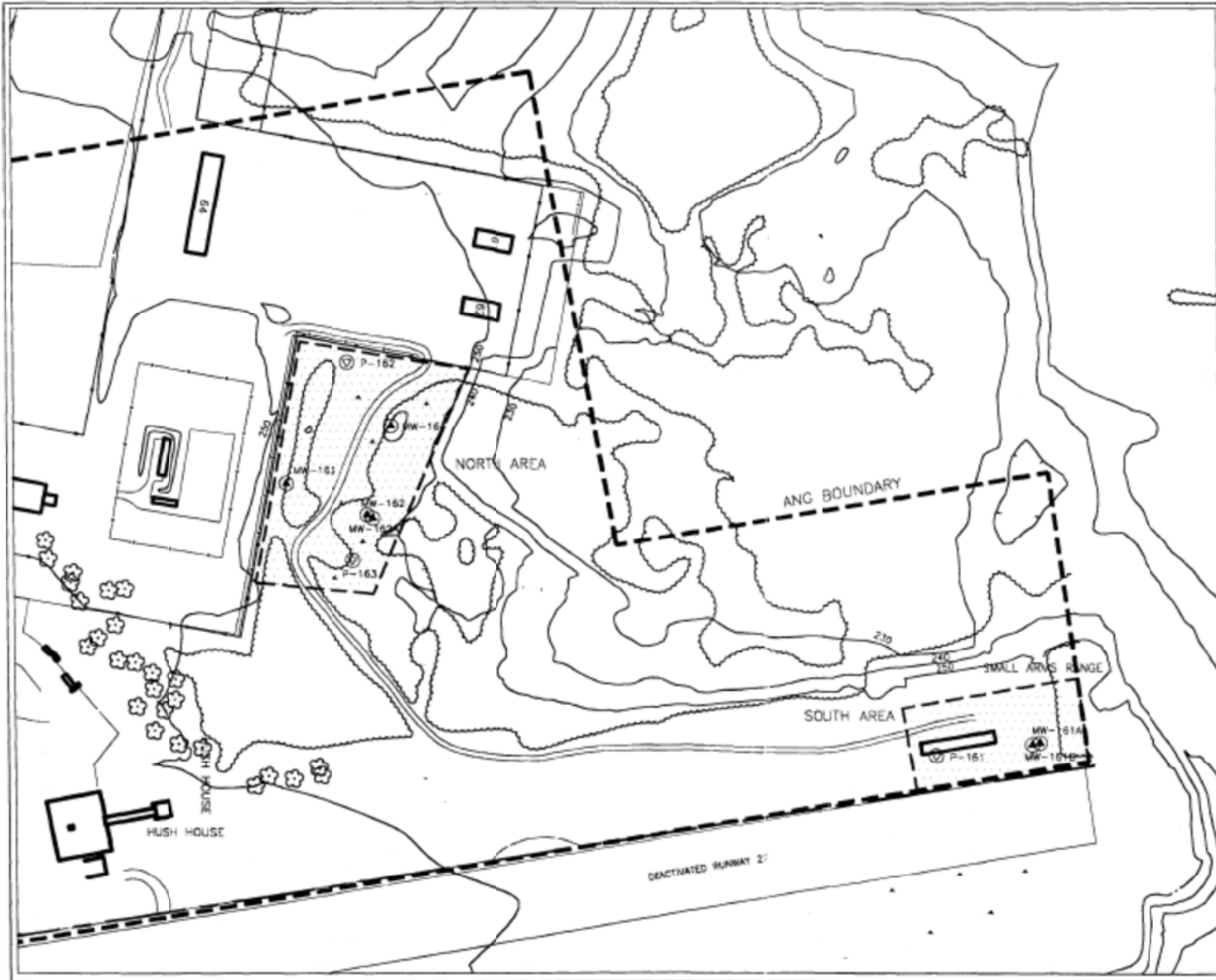
Additional data were collected during the removal action field investigation. TPH, SVOC, and lead contamination was identified in surface soil samples collected from the north and south swales. VOC, SVOC, and TPH contamination in the subsurface soils was limited to the north swale. TPH were present at concentrations near the detection limit in groundwater samples collected at Site 5. Analytical results from these samples are included in Table A-2 in Appendix A. These data indicate that limited VOC, SVOC, TPH, and lead contamination are present in the surface soils at the site. The Technical Memorandum recommended that a risk characterization be completed for Site 5 in order to evaluate the effects of confirmed contamination on human health and the environment.

### → 2.3.5 Site 6 - Old Fire Training Area

Site 6 is located on the eastern boundary of the base, near deactivated Runway 27, as shown on Figure 2-7. Site 6 consists of two areas which were reportedly used for fire training exercises. Site 6 North consists of an area approximately 200 ft by 200 ft which is located north of the abandoned runway and west of the ammunition storage facility. It is surrounded by trees and bordered by a steep escarpment to the east. The ground surface at the North Area is stained and the vegetation appears to be stressed. Some construction debris and scrap metal are also present. According to aerial photographs, the North Area is built on fill material. Site 6 South is a smaller grassy area approximately 150 ft by 65 ft located adjacent to the abandoned runway.

Site 6 North was used for fire training exercises for a period of approximately three years during the 1950s. During this time, exercises at Site 1 had been suspended in response to a request from the MAP manager. Site 6 South was reportedly used once for fire-training exercises in the late 1950s. The site may have also been used for waste storage during fire training exercises at Site 6 North.

The SOV survey performed during the SI did not detect VOCs in the soils at Site 6 South; elevated levels of trichloroethene (TCE) and PCE were detected at Site 6 North directly southwest of the former fire training area. Surface and near surface soil samples collected at the site contained VOCs, TPH, and lead. Subsurface soil samples contained lead at background concentrations. Contaminants were not detected in the groundwater at either



0 100 200 FEET

LEGEND

SITE BOUNDARY	TOPOGRAPHIC CONTOUR CONTOUR INTERVAL 10'
BUILDING AND NUMBER	EXISTING WATER TABLE PIEZOMETER
FENCE	EXISTING MONITORING WELL
ROAD	
TREES	
ANG BOUNDARY	
GRASS	

NOTE: MW-152A AND MW-154 WERE INSTALLED DURING FIELD ACTIVITIES.

EARTH TECH      INSTALLATION RESTORATION PROGRAM  
104th FIGHTER WING  
WESTFIELD, MASSACHUSETTS

**SITE 6 - SITE PLAN**  
**OLD FIRE TRAINING AREA**  
**MASSACHUSETTS AIR NATIONAL GUARD**  
**BARNES MUNICIPAL AIRPORT**

area. Analytical results from these samples are included in Table A-1 in Appendix A. These data confirm that soils at Site 6 North contain VOCs, TPH, and lead. The SI recommended further investigations at Site 6 in order to define contaminant sources and to support the risk characterization and FS.

Additional data were collected during the removal action field investigation. Surface soil samples collected at Site 6 North contained TPH, SVOCs, and lead. These contaminants were not present in surface soil samples collected at Site 6 South. Contamination was not identified in the subsurface soils at either area. Analytical results from these samples are included in Table A-2 in Appendix A. These data indicate that limited TPH, SVOC, and lead contamination are present in the surface soils at Site 6 North. No surface or subsurface soil contamination is present at Site 6 South. The Technical Memorandum recommended that a risk characterization be completed for Site 6 in order to evaluate the effects of confirmed contamination on human health and the environment.

### 2.3.6 Site 7 - Dry Well Area/Septic System

Site 7 is located near the northern boundary of the base as shown on Figure 2-8. Two abandoned dry wells (north and south) are located on the western side of the Aircraft Maintenance Building (Building 020). The dry wells are marked at the ground surface by openings, approximately 2 ft in diameter, which are covered by steel plates. The dry wells appear to be constructed of concrete blocks and are filled to within a foot of the ground surface with cobbles. Stained surface soil has been observed at the dry well locations (ABB-ES, 1992). An abandoned underground septic field is located southeast of Building 020.

Based upon discussions held during the August 4, 1994, Regulatory Agency Update Meeting, it was recommended that the abandoned septic field be investigated as part of the site.

The dry wells received effluent from the floor drains in Building 020, which includes various aircraft maintenance shops, the non-destructive inspection laboratory, and the aerospace ground equipment shop. The floor drain system was disconnected from the dry wells in 1989 and connected to the base sewer system. Effluent from Building 020 included penetrants, emulsifiers, film developer and fixer, and potentially the solvent 1,1,1-trichloroethane (TCA) (HMTG, 1988). The septic system received sanitary wastes from Buildings 016 and 020.

The SOV survey conducted during the SI detected VOCs in the soil vapor near the dry wells; however, VOCs were not found in the surface soils. TPH was found to be present in the surface soils at the site. Bis(2-ethylhexyl)phthalate was detected in one surface soil sample. Di-n-butylphthalate was detected in subsurface soil samples. Lead concentrations were at background levels in both surface and subsurface soils. 1,1,1-TCA was detected at a concentration below the quantitation limit in a groundwater sample collected from MW-172. Analytical results from these samples are included in Table A-1 in Appendix A. These data do not show evidence of contamination in surface and subsurface soils near the dry wells. Confirmation samples were not collected from the dry wells; however, screening activities suggested the potential for these structures to contain VOCs. The SI recommended further investigations at Site 7 in order to define contaminant sources and to support the risk characterization and FS.

**APPENDIX C-4**

**FORMER FIRE STATION – HISTORIC INFORMATION**



⑤ LIMIT OF WORK FOR DEMOLITION, SITE AND UTILITY DEMOLITION, SEE DWG D1.3 - ABI #7

BLDG. 004

NORTH

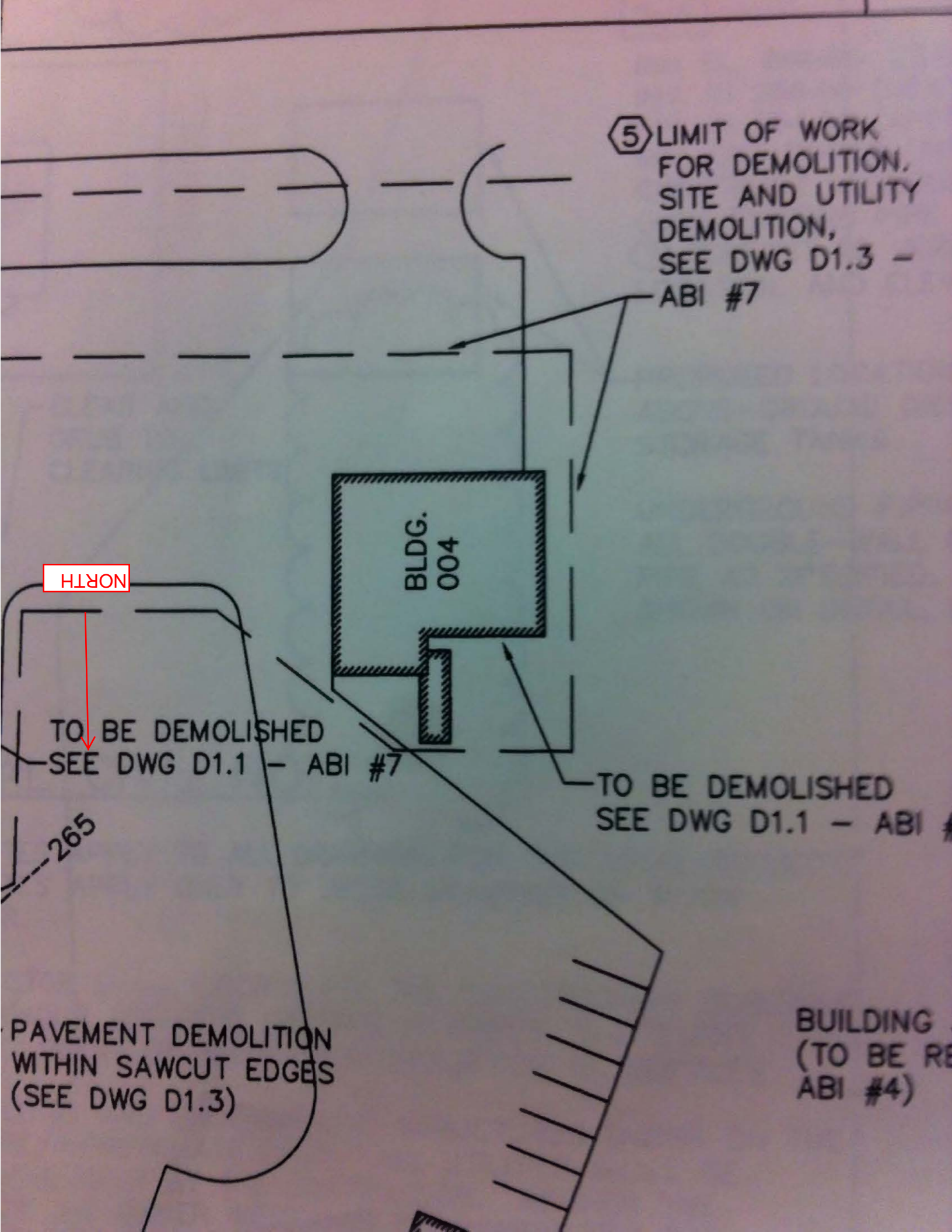
TO BE DEMOLISHED SEE DWG D1.1 - ABI #7

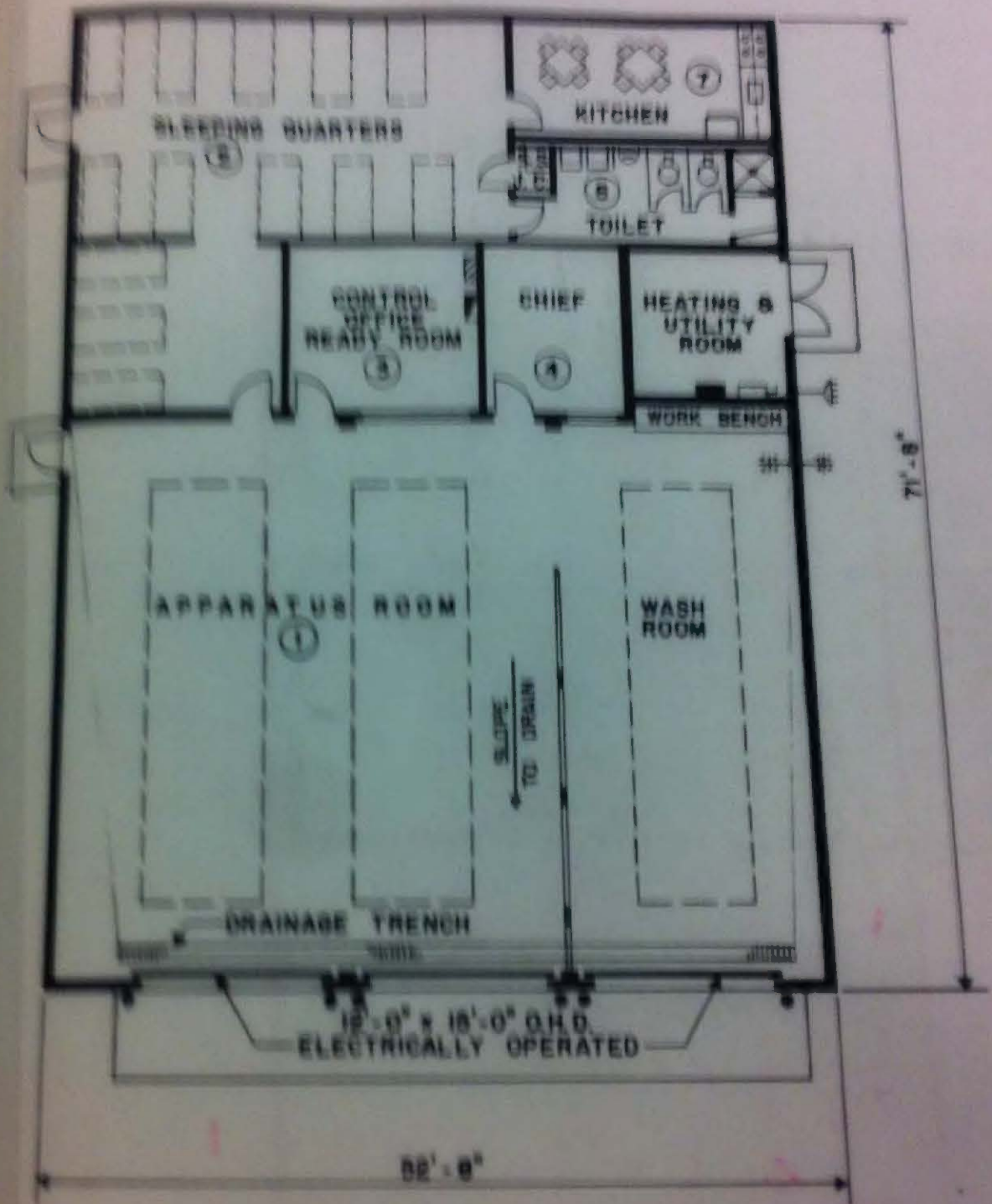
TO BE DEMOLISHED SEE DWG D1.1 - ABI #7

265

PAVEMENT DEMOLITION WITHIN SAWCUT EDGES (SEE DWG D1.3)

BUILDING (TO BE RE ABI #4)





FLOOR PLAN  
SCHEME "A"  
SCALE 1/8" = 1'-0"



DIT

FIRE STATION

3/4" Water

NORTH

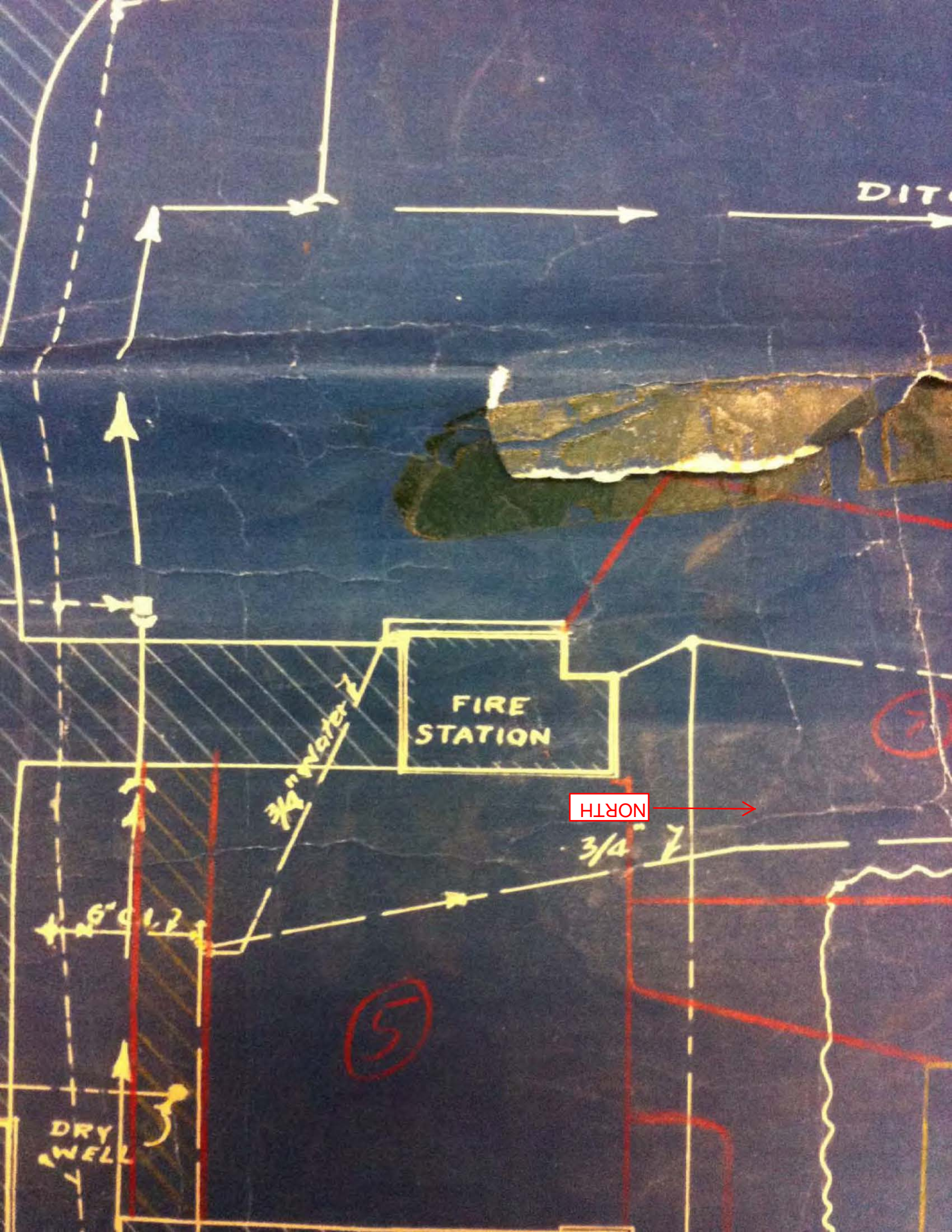
3/4"

6' 0" 1/2

DRY WELL

5

7





**APPENDIX C-5**

**EDR ONE-MILE RADIUS WATER WELLS MAP**

# GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

extremely gravelly - sand  
coarse sand  
silt loam

## LOCAL / REGIONAL WATER AGENCY RECORDS

EDR Local/Regional Water Agency records provide water well information to assist the environmental professional in assessing sources that may impact ground water flow direction, and in forming an opinion about the impact of contaminant migration on nearby drinking water wells.

## WELL SEARCH DISTANCE INFORMATION

<u>DATABASE</u>	<u>SEARCH DISTANCE (miles)</u>
Federal USGS	1.000
Federal FRDS PWS	Nearest PWS within 1 mile
State Database	1.000

## **FEDERAL USGS WELL INFORMATION**

<u>MAP ID</u>	<u>WELL ID</u>	<u>LOCATION FROM TP</u>
A1	USGS40000468610	0 - 1/8 Mile North
A2	USGS40000468611	0 - 1/8 Mile NW
4	USGS40000468643	1/4 - 1/2 Mile WNW
7	USGS40000468691	1/2 - 1 Mile WNW
B8	USGS40000468304	1/2 - 1 Mile SW
10	USGS40000468228	1/2 - 1 Mile SW
11	USGS40000453208	1/2 - 1 Mile East
13	USGS40000469008	1/2 - 1 Mile NW

## **FEDERAL FRDS PUBLIC WATER SUPPLY SYSTEM INFORMATION**

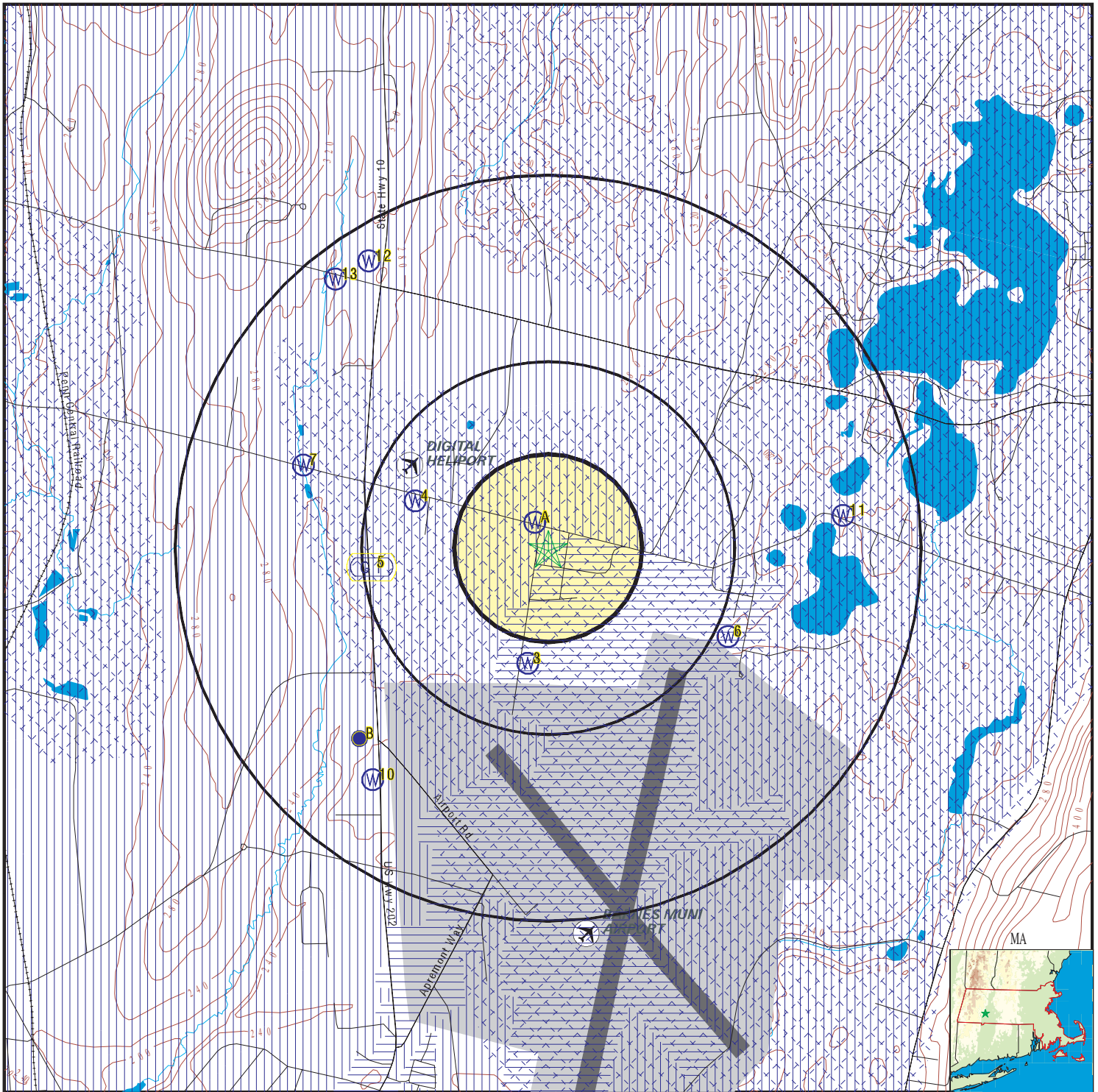
<u>MAP ID</u>	<u>WELL ID</u>	<u>LOCATION FROM TP</u>
No PWS System Found		

Note: PWS System location is not always the same as well location.

## **STATE DATABASE WELL INFORMATION**

<u>MAP ID</u>	<u>WELL ID</u>	<u>LOCATION FROM TP</u>
3	MA8000000000637	1/4 - 1/2 Mile South
6	MA8000000000678	1/2 - 1 Mile ESE
B9	MA8000000001614	1/2 - 1 Mile SW
12	MA8000000003695	1/2 - 1 Mile NNW

# PHYSICAL SETTING SOURCE MAP - 4359499.1s



- |  |  |  |                                     |
|--|--|--|-------------------------------------|
| County Boundary                            |  | Groundwater Flow Direction                 | Potentially Productive Aquifers     |
| Major Roads                                |  | Indeterminate Groundwater Flow at Location | Not Potentially Productive Aquifers |
| Contour Lines                              |  | Groundwater Flow Varies at Location        | DEP Approved Zone IIs               |
| Airports                                   |  |  | EPA Designated Sole Src. Aq.        |
| Earthquake epicenter, Richter 5 or greater |  |  |                                     |
| Water Wells                                |  |  |                                     |
| Public Water Supply Wells                  |  |  |                                     |
| Cluster of Multiple Icons                  |  |  |                                     |

SITE NAME: Barnes ANGB  
 ADDRESS: 175 Falcon Drive  
 Westfield MA 01085  
 LAT/LONG: 42.1727 / 72.7176

CLIENT: B.B. & E  
 CONTACT: Veronica Allen  
 INQUIRY #: 4359499.1s  
 DATE: July 21, 2015 9:21 am

# GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Map ID  
 Direction  
 Distance  
 Elevation

Database      EDR ID Number

**3**  
**South**  
**1/4 - 1/2 Mile**  
**Higher**

**MA WELLS      MA8000000000637**

Fid:	636	Fac name:	MA AIR NATIONAL GUARD
Address:	175 FALCON DR	Town:	WESTFIELD
Region:	Western	Rtn:	Not Reported
Hw id:	MV4135689151	Sw id:	Not Reported
Sseis id:	420288	Npdes id:	Not Reported
Air:	Not Reported	Gwd:	Not Reported
Hwr:	Not Reported	Lqg ma:	Y
Lqg rcra:	Y	Lqtu:	Not Reported
Tsdf:	Not Reported	Swd:	Not Reported
Fac id:	50211	Source id:	Not Reported
Site name:	Not Reported		
Latitude:	0		
Longitude:	0		
Type:	Not Reported	Zii num:	0
Pws id:	Not Reported	Site id:	MA8000000000637

# GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Map ID  
Direction  
Distance  
Elevation

Database

EDR ID Number

**5**  
**West**  
**1/4 - 1/2 Mile**  
**Lower**

Site ID: 1-0453  
Groundwater Flow: VARIES  
Shallowest Water Table Depth: 8.73  
Deepest Water Table Depth: 35.82  
Date: 1/1995

**AQUIFLOW**    **2470**

## GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Map ID  
 Direction  
 Distance  
 Elevation

Database      EDR ID Number

**6**  
**ESE**  
**1/2 - 1 Mile**  
**Lower**

**MA WELLS      MA8000000000678**

Fid:	677	Fac name:	GULFSTREAM AEROSPACE SERVICES CORP
Address:	33 ELISE ST	Town:	WESTFIELD
Region:	Western	Rtn:	Not Reported
Hw id:	MAD980914964	Sw id:	Not Reported
Sseis id:	420213	Npdes id:	Not Reported
Air:	Not Reported	Gwd:	Not Reported
Hwr:	Not Reported	Lqg ma:	Y
Lqg rcra:	Y	Lqtu:	Not Reported
Tsdf:	Not Reported	Swd:	Not Reported
Fac id:	33304	Source id:	Not Reported
Site name:	Not Reported		
Latitude:	0		
Longitude:	0		
Type:	Not Reported	Zii num:	0
Pws id:	Not Reported	Site id:	MA8000000000678

# GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Map ID  
 Direction  
 Distance  
 Elevation

Database      EDR ID Number

**B9**  
**SW**  
**1/2 - 1 Mile**  
**Lower**

**MA WELLS      MA8000000001614**

Fid:	1613	Fac name:	MICRO ABRASIVES CORP
Address:	720 SOUTHAMPTON RD	Town:	WESTFIELD
Region:	Western	Rtn:	Not Reported
Hw id:	Not Reported	Sw id:	Not Reported
Sseis id:	0	Npdes id:	Not Reported
Air:	Not Reported	Gwd:	Not Reported
Hwr:	Not Reported	Lqg ma:	Not Reported
Lqg rcra:	Y	Lqtu:	Not Reported
Tsdf:	Not Reported	Swd:	Not Reported
Fac id:	132741	Source id:	Not Reported
Site name:	Not Reported		
Latitude:	0		
Longitude:	0		
Type:	Not Reported	Zii num:	0
Pws id:	Not Reported	Site id:	MA8000000001614

## GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Map ID  
 Direction  
 Distance  
 Elevation

Database      EDR ID Number

**12**  
**NNW**  
**1/2 - 1 Mile**  
**Higher**

**MA WELLS      MA8000000003695**

Fid:	3694	Fac name:	Not Reported	
Address:	Not Reported	Town:	WESTFIELD	
Region:	Western	Rtn:	Not Reported	
Hw id:	Not Reported	Sw id:	Not Reported	
Sseis id:	0	Npdes id:	Not Reported	
Air:	Not Reported	Gwd:	Not Reported	
Hwr:	Not Reported	Lqg ma:	Not Reported	
Lqg rcra:	Not Reported	Lqtu:	Not Reported	
Tsdf:	Not Reported	Swd:	Not Reported	
Fac id:	0	Source id:	1329003-01G	
Site name:	1144 SOUTHAMPTON ROAD LLC			
Latitude:	42.18385683			
Longitude:	-72.72696078			
Type:	Transient Non-Community	Zii num:	0	
Pws id:	1329003	Site id:	MA8000000003695	
Objectid:	531	Source id:	1329003-01G	
L base:	DOQ	L acc est:	100	
L type:	GW	L meth:	PHO	
L src 1:	AP_DOQ	L src 2:	Not Reported	
L src 3:	Not Reported			
Objectid:	4413	Source id:	1329003-01G	
Pws name:	1144 SOUTHAMPTON ROAD LLC		S name:	WELL 1
Pws status:	Inactive	S status:	I	
Pws class:	Transient Non Community	S availabi:	INACT	



**APPENDIX C-6**

**STORMWATER DRAINAGE BOUNDARY MAP**

**MASSACHUSETTS AIR NATIONAL GUARD  
104<sup>th</sup> Fighter Wing  
Barnes Air National Guard Base  
Westfield, Massachusetts**



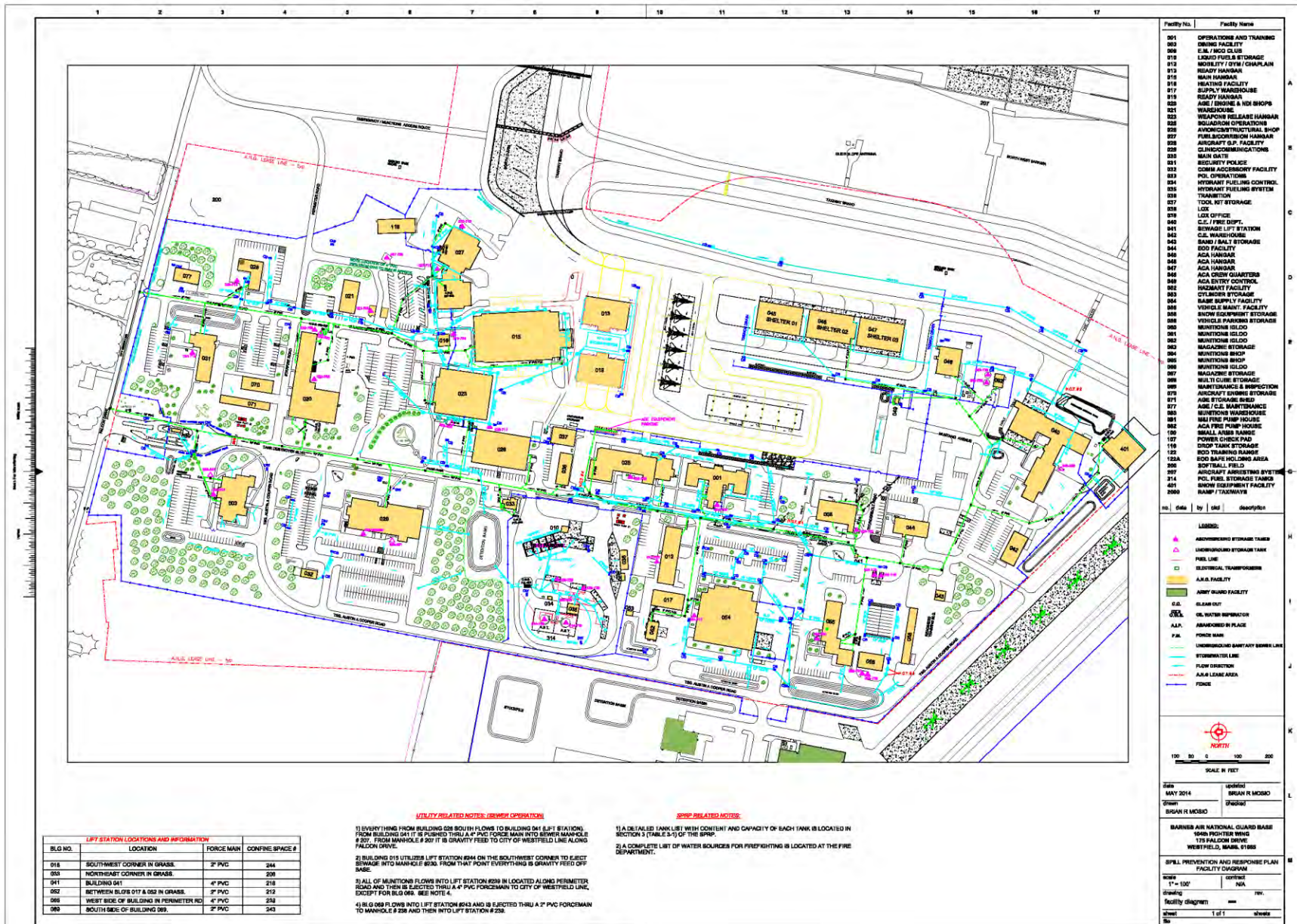
**Oil and Hazardous Substance  
Spill Prevention and Response Plan**

Prepared for

**DLA-Energy  
8725 John J. Kingman Road  
Suite 2833  
Fort Belvoir, VA 22060-6222**

**Contract Number:  
No. SP0600-06-D-5608  
Delivery Order: ACO - 0067**

February 15, 2012



Facility No.	Facility Name
001	OPERATIONS AND TRAINING
002	DRIVING FACILITY
006	EAL / BOD CLUB
010	LARGE TUBS & STORAGE
013	MOBILITY / OVM / CHAPLAIN
013	READY HANGAR
016	MAIN HANGAR
018	HEATING FACILITY
017	SUPPLY WAREHOUSE
019	READY HANGAR
020	AGE / SMOKE & NOI SHOPS
021	WAREHOUSE
022	WEAPON RELEASE HANGAR
028	SQUADRON OPERATIONS
028	AVIONICS/STRUCTURAL SHOP
027	FUEL/SUPPORTION HANGAR
028	AIRCRAFT O.P. FACILITY
028	GLINDCOMMUNICATIONS
033	MARK QALTS
031	RESURVLY POLICE
033	COMM ACCORDARY FACILITY
033	POL OPERATIONS
034	HYDRANT FUELING CONTROL
035	HYDRANT FUELING SYSTEM
038	TRANSMISSION
037	TOOL KIT STORAGE
038	LOK
038	LOK OFFICE
040	C.E. / FIRE DEPT.
041	STORAGE LIFT STATION
042	C.E. WAREHOUSE
042	SAWY / MALL STORAGE
044	BOO FACILITY
046	ACA HANGAR
046	ACA HANGAR
047	ACA HANGAR
048	ACA CREW QUARTERS
048	ACA ENTRY CONTROL
048	HANGAR SUPPLY FACILITY
053	CYLINDER STORAGE
054	BASE SUPPLY FACILITY
058	VEHICLE MAINT. FACILITY
058	SNOW EQUIPMENT STORAGE
058	VEHICLE PARKING STORAGE
060	MENTIONS ISOLD
061	MENTIONS ISOLD
062	MENTIONS ISOLD
062	MASSAGE STORAGE
064	MENTIONS BRDP
066	MENTIONS ISOLD
067	MASSAGE STORAGE
068	MULTI CLUBE STORAGE
068	MAINTENANCE & INSPECTION
070	AIRCRAFT ENIGNE STORAGE
071	AGE STORAGE REED
071	AGE C.E. MAINTENANCE
080	MENTIONS WAREHOUSE
081	ACA FIRE PUMP HOUSE
082	ACA FIRE PUMP HOUSE
100	POWER CHECK PAD
107	POWER CHECK PAD
108	BOO BANG HOLDING AREA
122	BOO TRAINING RANGE
150A	BOO BANG HOLDING AREA
300	SOFTBALL FIELD
307	AIRCRAFT ARMSTRONG SYSTEM
314	POL FUEL STORAGE TANKS
401	SNOW EQUIPMENT FACILITY
408	RAMP / TAXIWAY

Facility No.	Grid	by	date	description
<b>LEGEND:</b>				
▲				UNDERGROUND STORAGE TANKS
△				UNDERGROUND STORAGE TANK
—				PURV. LINE
□				ELECTRICAL TRANSDUCERS
■				A.K.A. FACILITY
■				ARMY QUART FACILITY
○				GLASS DOOR
■				OL WATER REPARATOR
▲				ARMORED BY PLACE
■				FORCE BARR
—				UNDERGROUND BATTERY BORME LINE
—				STORMWATER LINE
—				FLOW DIRECTION
—				A.K.A. LEAK AREA
—				FENCE

  
 100 50 0 50 100  
 SCALE IN FEET

DATE	ISSUED
MAY 2014	BRIAN R MOBIO
DRAWN	CHANG
BRIAN R MOBIO	

**BARNES AIR NATIONAL GUARD BASE**  
 1380 PIONEER BLVD  
 175 FALCON DRIVE  
 WESTFIELD, MASS. 01086

<b>SPILL PREVENTION AND RESPONSE PLAN</b>	
FACILITY DIAGRAM	
SCALE	1" = 100'
DATE	N/A
DRAWING	REV.
FACILITY DIAGRAM	REV.
SHEET	1 of 1 sheets
NO.	

BLDG NO.	LOCATION	FORCE MAIN	CONFIRE SPACE #
016	SOUTHWEST CORNER IN GRASS.	2" PVC	244
033	NORTHEAST CORNER IN GRASS.	2" PVC	208
041	BUILDING 041	4" PVC	216
052	BETWEEN BLDG 017 & 053 IN GRASS.	2" PVC	212
068	WEST SIDE OF BUILDING IN PERIMETER NO. 2	4" PVC	253
080	SOUTH SIDE OF BUILDING 089.	2" PVC	243

**UTILITY RELATED NOTES: (SEWER OPERATION)**

1) EVERYTHING FROM BUILDING 028 SOUTH FLOWS TO BUILDING 041 LIFT STATION. FROM BUILDING 041 IT IS PUMPED THRU A 4" PVC FORCE MAIN INTO SEWER MANHOLE # 207. FROM MANHOLE # 207 IT IS GRAVITY FEED TO CITY OF WESTFIELD LINE ALONG FALCON DRIVE.

2) BUILDING 016 UTILIZES LIFT STATION #84 ON THE SOUTHWEST CORNER TO EJECT SEWAGE INTO MANHOLE # 8536 FROM THAT POINT EVERYTHING IS GRAVITY FEED OFF BASE.

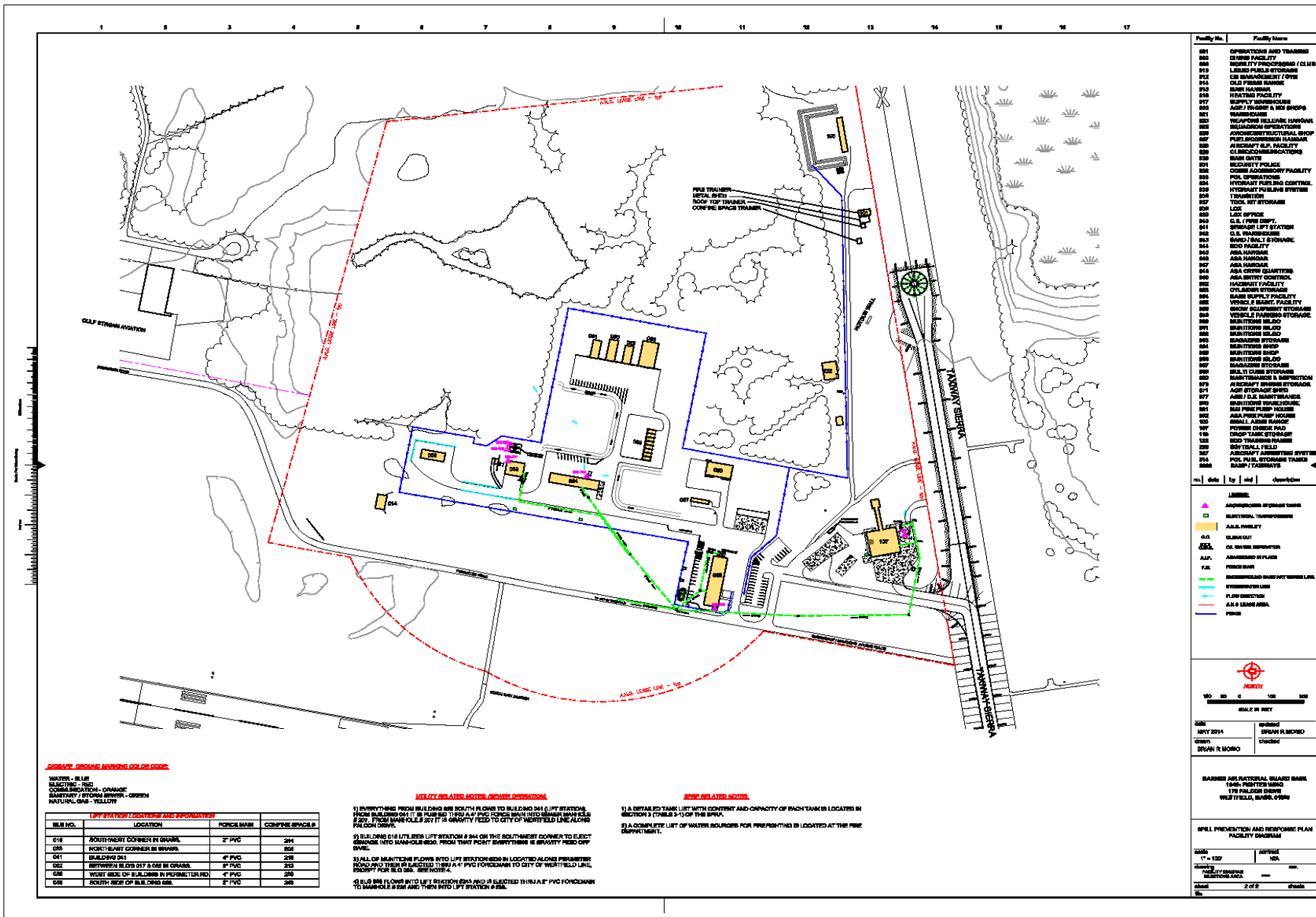
3) ALL OF MUTTONS FLOWS INTO LIFT STATION #238 IN LOCATED ALONG PERIMETER ROAD AND THEN IS EJECTED THRU A 4" PVC FORCEMAIN TO CITY OF WESTFIELD LINE, EXCEPT FOR BLDG 089. SEE NOTE 4.

4) BLDG 068 FLOWS INTO LIFT STATION #843 AND IS EJECTED THRU A 2" PVC FORCEMAIN TO MANHOLE # 238 AND THEN INTO LIFT STATION # 238.

**BRPP RELATED NOTES:**

1) A DETAILED TANK LIST WITH CONTENT AND CAPACITY OF EACH TANK IS LOCATED IN SECTION 3 (TABLES 3-1) OF THE BRPP.

2) A COMPLETE LIST OF WATER SOURCES FOR PREPARING IS LOCATED AT THE FIRE DEPARTMENT.

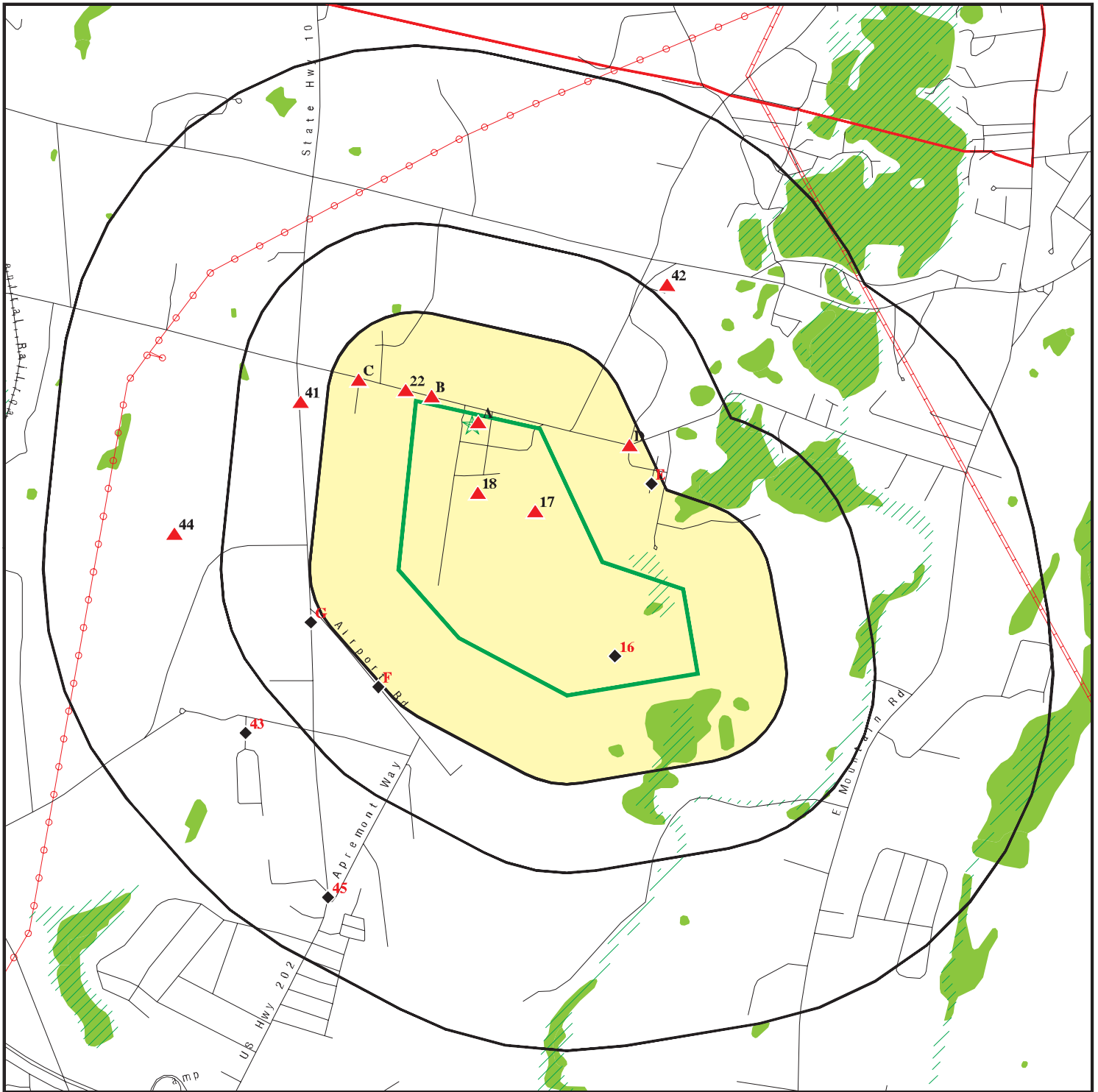


**APPENDIX C-7**

**EDR POTENTIAL ENVIRONMENTALLY SENSITIVE AREAS MAP**



# OVERVIEW MAP - 4359499.1S



Target Property

Sites at elevations higher than or equal to the target property

Sites at elevations lower than the target property

Manufactured Gas Plants

National Priority List Sites

Dept. Defense Sites

Indian Reservations BIA

County Boundary

Power transmission lines

Pipelines

100-year flood zone

500-year flood zone

National Wetland Inventory

Areas of Critical Environmental Concern

This report includes Interactive Map Layers to display and/or hide map information. The legend includes only those icons for the default map view.

SITE NAME: Barnes ANGB  
 ADDRESS: 175 Falcon Drive  
 Westfield MA 01085  
 LAT/LONG: 42.1727 / 72.7176

CLIENT: B.B. & E  
 CONTACT: Veronica Allen  
 INQUIRY #: 4359499.1s  
 DATE: July 21, 2015 9:19 am