

- Final -

ENVIRONMENTAL CONDITION OF PROPERTY REPORT

for the

NAVAL AIR STATION JOINT RESERVE BASE
WILLOW GROVE, PENNSYLVANIA



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ABBREVIATIONS, ACRONYMS, AND SYMBOLS

ACM	Asbestos Containing Material	NAS	Naval Air Station
AHERA	Asbestos Hazard Emergency Response Act	NAS JRB	Naval Air Station Joint Reserve Base
AMSL	above mean sea level	NAVRAMP	Navy Radon Assessment and Mitigation Program
AST	Aboveground Storage Tank	NFA	No Further Action
BFE	Base Flood Elevations	NPDES	National Pollutant Discharge Elimination System
BRAC	Base Realignment and Closure	NPL	National Priorities List
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act	O&M	Operations and Maintenance
CERFA	Community Environmental Response Facilitation Act	OWS	Oil/Water Separator
CFR	Code of Federal Regulations	PACM	Presumed Asbestos Containing Material
CWA	Clean Water Act	PADEP	Pennsylvania Department of Environmental Protection
CWS	Community Water System	PAH	polynuclear aromatic hydrocarbons
DoD	Department of Defense	PaANG	Pennsylvania Air National Guard
DRMO	Defense Reutilization and Marketing Office	PCB	polychlorinated biphenyls
ECP	Environmental Condition of Property	PCE	tetrachloroethylene
ESI	Extended Site Inspection	pCi/L	picoCuries per Liter
FEMA	Federal Emergency Management Agency	PMO	Program Management Office
FFA	Federal Facilities Agreement	PMP	Pest Management Plan
FS	Feasibility Study	PRAP	Proposed Remedial Action Plan
ft.	feet/foot	RAB	Restoration Advisory Board
gpd	gallons per day	RI	Remedial Investigation
gpy	gallons per year	RMC	RMC Environmental
HTMW	Horsham Township Municipal Water	ROD	Record of Decision
IAS	Initial Assessment Study	SDWA	Safe Drinking Water Act
ICRMP	Integrated Cultural Resources Management Plan	STARS	Standard Terminal Automatic Replacement System
IPM	Integrated Pest Management	TCE	trichloroethylene
IRA	Interim Removal Action	U.S.	United States
IRP	Installation Restoration Program	U.S.C.	United States Code
JP	jet petroleum	USEPA	United States Environmental Protection Agency
LNAPL	Light Non-Aqueous Phase Liquid	USGS	U.S. Geological Survey
MEC	Munitions and Explosives of Concern	UST	Underground Storage Tank
NAPL	Non-Aqueous Phase Liquid	VOC	Volatile Organic Compound



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EXECUTIVE SUMMARY

This Environmental Condition of Property (ECP) report for Naval Air Station Joint Reserve Base (NAS JRB) Willow Grove, Pennsylvania summarizes the historical, cultural, and environmental conditions of the property as part of Base Realignment and Closure (BRAC) documentation associated with the closure of NAS JRB Willow Grove. Information was reviewed with installation points of contact to ensure all data are current and accurate. Where information was not available, the sources contacted and reference materials sought were documented.

Originally constructed and occupied in 1942, NAS JRB Willow Grove, Pennsylvania was first commissioned in January 1943 as the Naval Air Station (NAS) Willow Grove. Following World War II, NAS Willow Grove was designated a Naval Air Reserve Training Station. During the Korean War, the NAS Willow Grove increased training and operations support activities at the base. The NAS Willow Grove also saw a significant increase in operation activities during both the Vietnam conflict and the Gulf War.

The name of the NAS Willow Grove was changed to the current NAS JRB Willow Grove in 1994 to more accurately depict the joint composition and mission of the Reservists serving at Willow Grove. The following agencies currently conduct operations at the NAS JRB Willow Grove: United States (U.S.) Navy, U.S. Marine Corps, U.S. Air Force, U.S. Army Reserves, and Pennsylvania Air National Guard (PaANG).

NAS JRB Willow Grove is situated approximately 20 miles north of Philadelphia and presently encompasses approximately 910 acres in Horsham Township, Montgomery County, Pennsylvania. Furthermore, the U.S. Navy owns and maintains the NAS JRB Willow Grove Clear Zone, which is located adjacent to the end of the Runway 15/33. The subject of this report includes the information for the NAS JRB Willow Grove. This report does not describe the environmental condition of the adjacent Air Reserve Station Willow Grove. A separate ECP was prepared for the Off-Base Housing Areas of the NAS JRB Willow Grove and has been included in Appendix C of this report.

A brief summary of ECP findings is provided below by subject area.

- **Classifications of Environmental Conditions.** This ECP Report is not intended to identify uncontaminated property in compliance with the Community Environmental Response Facilitation Act (CERFA) and Department of Defense (DoD) policy. The Navy will comply with its statutory requirement to identify uncontaminated property through additional evaluations and documentation.
- **Installation Restoration Program Sites.** The U.S. Navy has identified 10 Installation Restoration Program (IRP) sites at NAS JRB Willow Grove since 1994; one additional site (potential "Site 11") was studied although was never added to the list of IRP sites or the NPL. NAS JRB Willow Grove currently has four sites in various stages of investigation and cleanup and seven sites, including the potential "Site 11," recommended for No Further Action (NFA) (EA Engineering 2004). According to site personnel, a Federal Facilities Agreement (FFA) was signed in 29 June 2005 by the U.S. Environmental Protection Agency (USEPA), Pennsylvania Department of Environmental Protection (PADEP), and the U.S. Navy addressing each IRP site (Edmond 2005c).



- **Storage Tanks.** There are two regulated underground storage tanks (USTs) at NAS JRB Willow Grove, used for storage of diesel and motor gasoline. All USTs on-site are registered with the PADEP yearly (Edmond 2006a, Weston Solutions 2004). There are currently 74 aboveground storage tanks (ASTs) at NAS JRB Willow Grove.
- **Munitions and Explosives of Concern.** According to site personnel, there are no identified munitions and explosives of concern (MEC) at NAS JRB Willow Grove (Edmond 2005a, Edmond 2005b).
- **Hazardous Wastes.** NAS JRB Willow Grove is classified as a large quantity generator of hazardous waste (#PA4170000158) (Edmond 2005c, Engineering Field Activity 2003). Hazardous waste is managed in Building #633, where it is accumulated for less than 90 days.
- **Medical Wastes.** Medical waste is collected and disposed of by the Regional Medical Dispensary in Bethesda, Maryland (Edmond 2006b).
- **Universal Wastes.** NAS JRB Willow Grove has a Defense Reutilization and Marketing Office (DRMO) contract for the disposal of universal wastes such as used oil, batteries, light bulbs, etc. (Edmond 2006b).
- **Polychlorinated Biphenyls.** According to site personnel, there are no polychlorinated biphenyls (PCB)-containing materials currently located at NAS JRB Willow Grove (Edmond 2005a, Edmond 2005b). All PCB-containing materials historically located at NAS JRB Willow Grove were removed in the late 1990s; however, no documentation exists.
- **Radiological Materials.** According to site personnel, there are no radiological materials located at NAS JRB Willow Grove (Edmond 2005b).
- **Pesticides.** The Draft Pest Management Plan (PMP) for NAS JRB Willow Grove describes the requirements and recommended best practices for all aspects of on-going pest management, in accordance with Federal laws, DoD, and Navy regulations (Kincaid 2001). Records relating to actual use and storage of pesticides on-site prior to 2001 were not available for review.
- **Asbestos.** A 1996 asbestos inventory including 89 of the approximately 150 buildings at NAS JRB Willow Grove indicates that 52 structures contain "identified" asbestos containing material (ACM) or presumed asbestos-containing material (PACM) (Dewberry & Davis 1997).
- **Lead-Based Paint.** According to site personnel, lead-based paint was removed from NAS JRB Willow Grove on-base housing and other buildings frequented by children (Edmond 2005b, Edmond 2005c). All other painted surfaces are assumed to contain lead until a negative determination is made through screening and/or sampling and analysis.
- **Radon.** A radon survey in Quarters "E" was conducted in 1991 identifying radon concentrations of 6.9 picoCuries per Liter (pCi/L), which is above USEPA action level concentrations of 4.0 pCi/L. A Radon Mitigation system was installed in Quarters "E" in 1999 with subsequent sampling conducted in 1999 and 2002. Both surveys indicated radon concentrations less than the USEPA action level. A much larger radon survey was conducted at NAS JRB Willow Grove in 2001. The survey monitored radon levels in approximately 8 percent of the buildings at NAS JRB Willow Grove, and



identified one location (Building #137 – Room 122) with radon gas concentrations above the USEPA action level.

- **Air Quality.** NAS JRB Willow Grove operates fuel burning equipment, emergency diesel generators, and process equipment (i.e., storage tanks, fuel dispensing, jet engine test cells, woodworking operations, painting operations, parts cleaners, and blast booths) under a Commonwealth of PADEP air emission license (Number 46-00079). The air emission license is renewed every 5 years by contract and submitted to PADEP (Lewandowski 2006).
- **Drinking Water.** The potable water supply for NAS JRB Willow Grove is obtained from two on-site groundwater production wells. The water is treated on-site and the system is classified as a Community Water System (CWS) wells (Woodard & Curran 2004).
- **Stormwater.** NAS JRB Willow Grove operates under a multi-sector stormwater National Pollutant Discharge Elimination System (NPDES) permit (Number PA 0022411) issued on 7 December 2001 and has a term of 5 years (PADEP 2001b).
- **Wastewater.** NAS JRB Willow Grove operates an on-site wastewater treatment facility and discharges the treated water into nearby Park Creek which exits the north side of the property. In addition, currently there are 11 oil/water separators (OWSs) located on NAS JRB Willow Grove that are considered wastewater storage tanks (Weston Solutions 2004).
- **Floodplains.** According to Federal Emergency Management Agency (FEMA) mapping, two areas of NAS JRB Willow Grove would be inundated by 100-year flood events: (1) the north side of NAS JRB Willow Grove along Park Creek; and (2) the northwest side of the site from where the Little Neshaminy Creek flows along the edge of NAS JRB Willow Grove. The Little Neshaminy Creek flood area has Base Flood Elevations (BFEs) determined; however, the Park Creek 100-year flood area does not have the BFE determined (Engineering Field Activity 2003).
- **Wetlands and Aquatic Habitats (Special Aquatic Sites).** The main surface water features on and around NAS JRB Willow Grove include Pennypack Creek which runs to the Delaware River and Park Creek, which flows into the Little Neshaminy Creek. Both creeks discharge to the Delaware River watershed (Geo-Marine 2001). Other forms of surface water resources mapped at the NAS JRB Willow Grove include approximately 14.3 acres of separated wetlands.
- **Surface Water.** The main surface water features on and around NAS JRB Willow Grove include Pennypack Creek which runs to the Delaware River and Park Creek, which flows into the Little Neshaminy Creek. Both the Pennypack and Little Neshaminy Creeks discharge into the Delaware River watershed. Other forms of surface water resources mapped at NAS JRB Willow Grove include approximately 14.3 acres of separate freshwater wetlands and two freshwater ponds (Geo-Marine 2001, Weston Solutions 2004).
- **Coastal Zone Areas.** Coastal Zone Protection Act is not applicable to the NAS JRB Willow Grove.
- **Coral Reefs.** Coral reef protection is not applicable to the NAS JRB Willow Grove.



- **Fisheries.** The Magnuson-Stevens Fishery Conservation and Management Act is not applicable to NAS JRB Willow Grove because there are no fisheries located on the site.
- **Marine Mammals.** Marine Mammal Protection Act is not applicable for NAS JRB Willow Grove.
- **Threatened, Endangered, and Other Sensitive Species.** No federally listed threatened or endangered species are known to reside on NAS JRB Willow Grove. One state-recognized rare species, the hairy field bluegrass (*Paspalum laeve* var. *pilosum*), was identified during a 1991 site survey, although this plant species was subsequently removed from Pennsylvania's rare plant list (Geo-Marine 2001).
- **Geological Hazards.** There are no geological hazards at NAS JRB Willow Grove (i.e., landslides, earthquakes, sinkholes) (DCNR 2006).
- **Historic Resources.** A 1996 architectural resources survey conducted for NAS JRB Willow Grove did not identify any buildings or structures that meet National Register criteria for an historic district or individual cultural resources (Louis Berger 1996).
- **Archaeological Resources.** Archeological sites at NAS JRB Willow Grove include four areas with potential for prehistoric sites. There are 11 historic archaeological localities noted as potential, dating to the nineteenth century (Louis Berger 1996).
- **Native American Graves.** Native American graves have not been discovered on NAS JRB Willow Grove (Edmond 2005a, Edmond 2005b). A 1996 cultural resource survey did not document any information specific to Native American graves and there is no other documentation available specific to Native American graves at NAS JRB Willow Grove (Louis Berger 1996).
- **Solid Wastes.** The solid waste at Willow Grove is collected and transported to the Montgomery County Transfer Station by facility personnel (Edmond 2006b).



1.0 Purpose

The Navy Base Realignment and Closure (BRAC) Program Management Office (PMO) prepared this Environmental Condition of Property (ECP) report for Naval Air Station Joint Reserve Base (NAS JRB) Willow Grove, Pennsylvania.

This report used existing information to summarize the historical, cultural, and environmental conditions of NAS JRB Willow Grove property. Information was reviewed with installation personnel to ensure all data are current and accurate. Where information was not available, the sources contacted and reference materials sought were documented.

The purposes of the ECP report are to:

- Provide the BRAC PMO with the information it may use to make disposal decisions regarding the property;
- Provide the public with information relative to the environmental condition of the property;
- Assist the local government in planning for the reuse of BRAC property;
- Assist Federal agencies during the Federal property screening process;
- Provide information for prospective buyers;
- Assist new owners in meeting their obligations under the United States (U.S.) Environmental Protection Agency's (USEPA's) "All Appropriate Inquiry" regulations, at such time as they become final; and
- Assist in determining appropriate responsibilities, asset valuation, liabilities, and liabilities with other parties to a transaction.



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2.0 Background

NAS JRB Willow Grove, Pennsylvania was originally farmland, purchased in 1926 by aviation pioneer Harold F. Pitcairn to develop, build, test, and fly different aircraft. Throughout the 1930s, Pitcairn developed and perfected aviation technology into what would later be used to develop the first helicopter. In 1942, Pitcairn reluctantly sold his airfield to the U.S. Navy to support the war effort. That year, 250 personnel from nearby Philadelphia Naval Shipyard took possession of the airfield, which was then commissioned in January 1943 as the U.S. Naval Air Station (NAS) Willow Grove.

The NAS Willow Grove was designated a Naval Air Reserve Training Station following World War II. During the Korean War, the NAS Willow Grove increased training and operation support activities. To increase the ability of the NAS Willow Grove to affectively train and provide operational support, the Navy purchased additional land in 1957, increasing the NAS Willow Grove to its present approximate 1,088 acres. Later, the air station saw a significant increase in operations during the Vietnam conflict and Gulf War (Global Security 2005).

The NAS Willow Grove's name was changed in 1994 to the current NAS JRB Willow Grove to more accurately depict the joint composition and mission of the Reservists. Currently, the runway at NAS JRB Willow Grove is shared by the Navy, Marine Corp, Air Force, Army Reserves, and the Pennsylvania Air National Guard (PaANG) (Global Security 2005).

In August 1994, NAS JRB Willow Grove became one of only five DoD locations to operate the Standard Terminal Automation Replacement System (STARS) air radar. STARS radar enables the facility to simulate air traffic for training purposes. The STARS radar software allows controllers to simulate any number of inbound and outbound air traffic scenarios, using the same climb, descent, turn rates, and approach speeds as the specific type of aircraft being simulated (Global Security 2005).



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3.0 Property Description

The NAS JRB Willow Grove currently encompasses approximately 910 acres in Horsham Township within Montgomery County, Pennsylvania (see **Figure 3-1**). Furthermore, the U.S. Navy owns and maintains the NAS JRB Willow Grove Clear Zone, which is located adjacent to the end of the Runway 15/33NAS JRB (Geo-Marine 2003).

NAS JRB Willow Grove is situated in southeastern Pennsylvania, approximately 20 miles north of the city of Philadelphia. The station is primarily located on flat, gently rolling terrain with elevations ranging from 240 feet (ft.) above mean sea level (AMSL) along the north boundary (Keith Valley Road) to 360 ft. AMSL at the south end of Runway 15/33 (Geo-Marine 2001). NAS JRB Willow Grove is generally bounded by State Route 611 toward the east, Horsham Road to the southwest, Keith Valley Road to the north, and County Line Road to the northeast (Geo Marine 2001, TtNUS 2004a). NAS JRB Willow Grove is immediately adjacent to the Air Force installation known as the Air Reserve Station Willow Grove.



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4.0 Environmental Condition Overview – Existing Environmental Information

As part of ECP report activities, extensive record reviews were conducted, a meeting at the BRAC PMO Northeast office, an on-site inspection, and personnel interviews were held to document current and historic conditions at NAS JRB Willow Grove. A meeting at the BRAC PMO Northeast office was conducted on 26 September 2005. On-site inspections were conducted on 3 October 2005 and 15 November 2005.

The BRAC PMO Northeast office as well as site personnel located at NAS JRB Willow Grove provided relevant information for this ECP report. Additionally, available reports of previous environmental investigations at NAS JRB Willow Grove were obtained and reviewed. **Appendix A** presents a list of the documents that were reviewed as part of this effort. The information presented in this report was reviewed with installation personnel to ensure all data are current and accurate. Where information was not available, the sources contacted and reference materials sought were documented.

Interviews were conducted with NAS JRB Willow Grove personnel during a site visit and in subsequent telephone conversations and e-mail communications. **Appendix B** presents a list of the people contacted during preparation of the ECP report.

Appendix C presents the Environmental Condition of Property Report for the Off-Site Housing Areas of NAS JRB Willow Grove.

4.1 Classification of Environmental Conditions

The Community Environmental Response Facilitation Act (CERFA) of 1992 (amending the Comprehensive Environmental Response, Compensation, and Liability Act [CERCLA] to add Section 120(h)(4) of CERCLA, 42 United States Code (U.S.C.) Section 9620(h)(4)) requires the identification and documentation of uncontaminated real property controlled by the Department of Defense (DoD) Components where DoD plans to make excess property available for reuse pursuant to a base closure law. Uncontaminated property is defined as any "real property on which no hazardous substances and no petroleum products or their derivatives were known to have been released, or disposed of." This includes aviation fuel and motor oil. This ECP Report is not intended to identify uncontaminated property in compliance with CERFA and DoD policy. The Navy will comply with its statutory requirement to identify uncontaminated property through additional evaluations and documentation.

4.2 Installation Restoration Program Sites

NAS JRB Willow Grove was placed on the National Priorities List (NPL) (USEPA ID# PAD987277837) in 1995 (USEPA 2004). The NPL is a prioritized list of sites with known or threatened releases of hazardous substances, pollutants, or contaminants at locations throughout the U.S. and its territories. The NPL is intended primarily to guide the USEPA in prioritizing sites that warrant further investigation. Since placement of NAS JRB Willow Grove on the NPL in 1995, the air station has rectified identified source areas through activities including excavation, source removal, and underground storage tank (UST) upgrades (EA



Engineering 2004). These cleanup activities were completed as part of the Installation Restoration Program (IRP), a DoD program developed in 1975 to investigate and manage environmental impacts on military bases. The IRP adheres to all applicable regulations, including those issued by the USEPA, CERCLA and the Superfund Amendments and Reauthorization Act of 1986.

The Navy has identified 10 IRP sites at NAS JRB Willow Grove; one additional site (potential "Site 11") was studied although was never added to the list of IRP sites or the NPL. NAS JRB Willow Grove currently has four sites in various stages of investigation and cleanup and seven sites, including the potential "Site 11," recommended for No Further Action (NFA) at NAS JRB Willow Grove (TtNUS 2004b). Details concerning each site including suspected material disposed/released, period of operation, and remedial status are presented in the next sections. **Figure 4-1** presents the locations of the IRP sites at NAS JRB Willow Grove. **Table 4-1** is a summary of the IRP sites.

4.2.1 Site 1 Privet Road Compound

Site 1 is located northeast of steam plant (Building #6) (see **Figure 4-1**). Site 1 is approximately 2 acres in size, and consists of a bowling alley, parking lot, and a 0.5-acre undeveloped area (Rogers, Golden & Halpern 1986, TtNUS 2004b). The Privet Road Compound began as a transfer station following the 1967 closure of the Ninth Street Landfill (Site 3) to handle materials that were not accepted by the local municipal solid waste pick-up service. During the years of Privet Road Compound operations, waste was stored on-site temporarily prior to being disposed off-site, or burned and/or buried on-site. A fence was built around the compound in an effort to control waste disposal and handling to within the compound boundaries in 1972.

Operations continued at the Privet Road compound until 1975, when regular trash collection and off-base disposal services were established for the NAS JRB Willow Grove. Currently the waste generated by NAS JRB Willow Grove is transported to a landfill operated by the local municipality. Although burning and burial ceased by 1975, stored waste material was not completely removed from the compound until 1977.

Wastes disposed at Site 1 reportedly consisted of paint wastes, paint stripper and solvents, Freon, general refuse, asbestos, battery acid, sewage sludge containing heavy metals, oils and lubricants, and mercury-containing dental amalgam. Transformers (containing polychlorinated biphenyls [PCBs]) were also stored at the Privet Road Compound which was later accidentally overturned in the late 1980's, resulting in the release of approximately 840 tons of PCB-containing liquids (Rogers, Golden & Halpern 1986, TtNUS 2004b).

In 1991, B&R Environmental (formerly Halliburton NUS Corporation) conducted Site 1 Remedial Investigation (RI) field activities (Halliburton 1993), including groundwater and soil sampling. The RI report concluded that additional sampling was needed to further delineate the extent of contamination and/or potential sources at the site, but identified the potential for impacts to the downgradient water supply from lead, calcium, and antimony. The RI report concluded that there was a low possibility for soil contamination associated with lead and cadmium. The RI recommended implementation of a Phase II investigation and feasibility study (FS) (B&R Environmental 1998).



Phase II RI fieldwork was conducted in 1997, and a draft Phase II report was submitted to regulators for review in 1998 (B&R Environmental 1998, TtNUS 2004b). During the Phase I, the RI site activities for Sites 1, 2, 3, and 5 were completed as one investigation; however, separate Phase II documents were prepared for each site. An interim removal action (IRA) for PCB-contaminated soil at Site 1 was completed in June 1999, with removal and off-site disposal of approximately 1,100 tons of soil (TtNUS 2004b).

The Site 1 RI report was finalized and submitted to the regulators in 2002 (TtNUS 2002). A 2004 draft Addendum RI Report identified the primary source of chlorinated solvents detected in the local groundwater as an off-base location southeast of Site 1, and identified Site 1 as a potential minor source of chlorinated solvents (TtNUS 2004b).

The Navy submitted the final Proposed Remedial Action Plan (PRAP) for Site 1 soil and conducted a public meeting in September 2004 regarding the proposed NFA determination, based on the completion of PCB-contaminated soil removal (TtNUS 2004a). The U.S. Navy has submitted a NFA Record of Decision (ROD) to the USEPA for Site 1 and the ROD is currently under final review by the regulators (Edmond 2005b, Edmond 2006a).

4.2.2 Site 2 Antenna Field Landfill

Site 2, the Antenna Field Landfill, was operated between 1948 and 1960 as a principle disposal area for solid waste generated by NAS JRB Willow Grove. Located in the southwestern portion of the NAS JRB Willow Grove, the landfill occupies approximately 9 acres (see **Figure 4-1**). The primary historical activities at Site 2 consisted of trench excavation where waste material was typically burned and/or buried. In addition to general wastes, bulk items such as furniture, tires, and shingles were disposed at the Antenna Field Landfill. Furthermore, paint wastes and sewage sludge were also reportedly disposed at Site 2 (Rogers, Golden & Halpern 1986, TtNUS 2004b).

The Antenna Field Landfill was backfilled with soil (Edmond 2005b, TtNUS 2004b), and, during the late 1990's, an array of five antennae was constructed at Site 2 (TtNUS 2004b).

In 1991, B&R Environmental conducted RI field activities at Site 2. The RI report (Halliburton 1993) recommended performance of additional sampling to further delineate the extent and/or potential sources of contamination, and implementation of a Phase II investigation and a FS. Phase II fieldwork was conducted in 1997, and a draft Phase II RI report was submitted to regulators for review in 1998. The U.S. Navy decided to separate the reporting process for the RI sites (1, 2, 3, and 5) in 1999 by preparing separate Phase II documents for each site (B&R Environmental 1998, TtNUS 2004b).

An internal draft Phase II report for Site 2 was completed in 2002. During this time frame, the U.S. Navy also discovered empty drums that had been discarded near the Antenna Field Landfill; therefore, the U.S. Navy contracted with RMC Environmental (RMC) to remove the drums and sample both the drum/contents (residues) and potentially impacted soils. Analytical data and conclusions regarding these soil samples were ultimately incorporated into a revised internal draft Phase II report for Site 2 (B&R Environmental 1998, RMC 2003, TtNUS 2004b). Currently, the U.S. Navy is finalizing the Phase II RI report (Edmond 2005b, Edmond 2006a).



4.2.3 Site 3 Ninth Street Landfill

Site 3 is located at the western boundary of NAS JRB Willow Grove, immediately north of Ninth Street (see **Figure 4-1**). Site 3 is approximately 9 acres in size and began disposal operations in 1960 as a replacement for Site 2. During these operations, wastes disposed were similar to those found at Site 2, including general wastes, bulk items, paint waste, asbestos, and sewage sludge. In addition, a salvage yard was established on the landfill after closure in 1967 where PCB-containing transformers were stored and serviced (TtNUS 2004b).

In 1991, B&R Environmental conducted RI field activities at Site 3. The RI report (Halliburton 1993) recommended performance of additional sampling to further delineate the extent and/or potential sources of contamination at the site and implementation of a Phase II investigation and a FS. Phase II fieldwork was conducted in 1997, and a draft Phase II RI report was submitted to regulators for review in 1998. The U.S. Navy decided to separate the reporting process for four of the RI sites (1, 2, 3, and 5) in 1999, and submit separate Phase II RI documents for each site (B&R Environmental 1998, TtNUS 2004b, EA Engineering 1992).

The U.S. Navy has conducted additional investigations in response to comments after the report was submitted to regulators in 1998. In March of 1998, the U.S. Geological Survey (USGS) conducted geophysical logging of two irrigation wells, owned by the Commonwealth National Country Club, to determine whether groundwater contamination had occurred as a result of the activities at Site 3. In 2002, sediments were analyzed from the recreation pond that is located just north of Site 3, and, in 2003, the U.S. Navy attempted to improve pond dam integrity by executing a major pond maintenance construction project (Woodard & Curran 2002, TtNUS 2004b). Currently, the U.S. Navy is actively investigating contamination of the Ninth Street Landfill (Edmond 2005b).

The RI at Site 3 is underway, however, down gradient access to the CNC Golf Course has not been obtained; therefore, an investigation report for Site 3 has not been prepared for submission to the regulators. Remedial activities at Site 3 have not progressed beyond Phase II remedial investigations (TtNUS 2004b).

4.2.4 Site 4 North End Landfill

Site 4 occupies approximately 3.5 acres and is located between the northern end of Runway 15/33 and the Perimeter Road (see **Figure 4-1**). The North End Landfill site has reportedly been in operation from approximately 1967 to 1969 to receive overflow wastes from Site 1. The primary wastes disposed at Site 4 consisted of items not collected by routine trash pickup such as bulk items, sewage sludge, oils and lubricants. Furthermore, wastes were reportedly covered; however, observations from the Initial Assessment Study (IAS) showed waste materials, including oil, at the surface (EA Engineering 1990, Rogers, Golden & Halpern 1986, TtNUS 2004b). Contaminants discovered during sampling included calcium, lead, benzo(a)pyrene, and antimony (TtNUS 2004b).

The U.S. Navy has recommended NFA at Site 4, based on findings of previous investigations. Previous investigations found that no contaminants are migrating off-site, therefore, Site 4 was designated NFA by the Pennsylvania Department of Environmental Protection (PADEP) prior to being placed on the NPL. The U.S. Navy has been granted concurrence on this conclusion by



the USEPA and has designated Site 4 as NFA in the Federal Facilities Agreement (FFA) (EA Engineering 1990, Edmond 2006a, TtNUS 2004b).

4.2.5 Site 5 Fire Training Area

Site 5 is located in the south-central portion of the NAS JRB Willow Grove, roughly between Runway 10/28 and Horsham Road (see **Figure 4-1**). The Fire Training Area covers an irregularly shaped area of approximately 1.25 acres, immediately south of the Taxiway Juliet. Site 5 was operated from 1942 to 1975 for large-scale firefighting exercises involving the disposal and burning of flammable liquid wastes generated by the NAS Willow Grove, such as solvents, paint chemicals, and various petroleum compounds, consumed at a rate of up to 4,000 gallons per year (gpy). In addition, Site 5 was reportedly used for drum storage of the flammable materials between the burning exercises (Rogers, Golden & Halpern 1986, TtNUS 2004b).

Site 5 is primarily covered by grasses, with some woody and brushy vegetation present in the southern portion of the site. The area where the firefighting exercises took place was located in the south-central portion of the site, with two small wetland areas located immediately to the south (TtNUS 2002, TtNUS 2004b).

In 1991, B&R Environmental conducted RI field activities at Site 5. The RI report (Halliburton 1993) recommended performance of additional sampling to further delineate the extent of contamination and/or potential sources at the site, and implementation of a Phase II investigation and a FS. Phase II fieldwork was conducted in 1997, and the draft Phase II RI report was submitted to regulators for review in 1998. The U.S. Navy decided to separate the reporting process for four of the RI sites (1, 2, 3, and 5) in 1999, by preparing separate Phase II documents for each site (B&R Environmental 1998, TtNUS 2004b).

In 2000, additional fieldwork was completed to assess whether site groundwater contamination was migrating off-base toward the Horsham Township Municipal Water supply well (HTMW 26) located approximately 150 yards from Site 5. Sentinel monitoring wells were installed at NAS JRB Willow Grove to monitor water quality between Site 5 and HTMW 26, and groundwater sampling is performed annually by NAS JRB Willow Grove personnel to monitor contaminant migration (TtNUS 2004b, Edmond 2005c). Current data from monitor well testing does not indicate any impacts on HTMW 26 from Site 5 (Edmond 2006a).

The Final Site 5 RI Report was completed in February 2002, and included documentation on halogenated volatile organic compounds (VOCs) in groundwater and a range of organic compounds (polynuclear aromatic hydrocarbons [PAHs]) in surface soils. The Final Site 5 RI Report combined the results from the draft Phase II RI Report and the previous findings for Site 5 (TtNUS 2002, TtNUS 2004b).

The FS report was finalized in 2002 and submitted to regulators and the Restoration Advisory Board (RAB); however, to address community stakeholders concerns, the U.S. Navy decided to reconsider emerging biological and chemical treatments and resubmit the Site 5 FS for regulatory and public review (TtNUS 2002, TtNUS 2004b). The U.S. Navy later installed an additional airport runway perimeter security fence after submission of the RI and FS reports (TtNUS 2004b). A section of the new security fencing was installed within the area of known PAH soil contamination. As a result of the potential change in the Site 5 surface soil conditions



in the area of PAH soil contamination, samples of surface and shallow subsurface soils were collected in June 2004 to compare with data collected in 1997. Accordingly, a draft Site 5 IR report addendum was submitted to the USEPA containing the new soil data (TtNUS 2002, TtNUS 2004b).

In June 2004, additional groundwater monitoring was conducted to determine the direction of the contaminant plume. A revised FS was developed to evaluate the emerging technology alternatives requested by the RAB that address source control and groundwater remediation for Site 5 (TtNUS 2004b). The revised draft FS for Site 5 groundwater was submitted to the USEPA and PADEP in 2004; the U.S. Navy is currently awaiting comments on the revised draft FS from the USEPA and PADEP (Edmond 2006a). Further, to decrease the potential of groundwater contamination, the U.S. Navy removed the source of contamination, in November 2005, by a soil removal action (Edmond 2005d). Sampling results following the initial soil removal indicates that need for additional soil removal and subsequent confirmatory sampling. The Navy has initiated action to remove additional soil with follow-on sampling (Edmond 2005d).

4.2.6 Site 6 Abandoned Rifle Range No. 1

Site 6 is located adjacent to Horsham Road near the southwestern corner of the Marine Compound (see **Figure 4-1**). Rifle Range No. 1 was built in 1942, consisting of a firing mat and an earthen rampart of approximately 1 acre in size. Activities at the Rifle Range No. 1 are assumed to have lasted until 1965 when the second range was built, although it is not known exactly when Site 6 was closed. After the closure of Site 6, the earthen rampart was re-graded and the Marine Corps Reserve Training Center, built in 1995, currently sits on top of the site (Rogers, Golden & Halpern 1986, TtNUS 2004b, EA Engineering 1992).

The U.S. Navy has recommended NFA at Site 6 based on previous investigations and the results of the site screening process that was completed in 1991; Site 6 was designated NFA by PADEP previous to being placed on the NPL (Edmond 2005b). The U.S. Navy has been granted concurrence on this conclusion by the USEPA and has designated Site 6 as NFA in the FFA (Edmond 2006a).

4.2.7 Site 7 Abandoned Rifle Range No. 2

Site 7, the Abandoned Rifle Range No. 2, is located in the northwestern corner of NAS JRB Willow Grove, west of the north end of Runway 15/33 (see **Figure 4-1**). The construction and operation was similar to Site 6, consisting of an approximate 1 acre earthen rampart for collection of fired rounds of ammunition. The site was operated from 1965 to 1977 when the current range (located in Building #176 at the Army Reserve Compound) was built (Rogers, Golden & Halpern 1986, TtNUS 2004b, EA Engineering 1992). The earthen rampart, along with the spent ammunition, was regraded in 1977. After 1977, Site 7 was used as a landfill for inert materials, including clean fill, broken concrete, asphalt, and cinderblocks. In addition, dry wastewater treatment sludge, emulsified oil, and grease from on-site oil/water separators (OWSs) have reportedly been buried at Site 7 (TtNUS 2004b).

EA Engineering conducted Extended Site Inspection (ESI) fieldwork at Site 7 in 1991. The results indicate that there are no apparent threats to human health or the environment, and recommended NFA; prior to being placed on the NPL, Site 7 had been designated NFA by



PADEP (TtNUS 2004a). The U.S. Navy has been granted concurrence on this conclusion by the USEPA and has designated Site 7 as NFA in the FFA (Edmond 2006a).

4.2.8 Site 8 Building 118 - Abandoned Fuel Tank

Site 8 is located approximately 50 ft. north of Building 118 and consists of an underground 500-gallon heating fuel tank (see **Figure 4-1**). The fuel tank was installed in 1959 to store No. 2 heating fuel for Building 118, and was abandoned in place in 1980 when it was replaced by a 275-gallon aboveground tank (118DIE01). After abandonment in 1980, oil was observed seeping into the basement of Building 118 on an intermittent basis and was removed after each occurrence. As a result of the observed seepage, the tank and surrounding soils were investigated. The tank was found to be empty and the excavated soils did not indicate any presence of released materials; however, the fill and riser pipes were removed and the tank was buried in place (EA Engineering 1990, Rogers, Golden & Halpern 1986, TtNUS 2004b, EA Engineering 1992).

The U.S. Navy has recommended NFA for Site 8 based on previous investigations and the results of the site screening process; Site 8 was designated NFA prior to being placed on the NPL by PADEP. The U.S. Navy has been granted concurrence on this conclusion by the USEPA and has designated Site 8 as NFA in the FFA (Edmond 2006a).

4.2.9 Site 9 Steam Plant Building 6 Tank Overfill

The main steam plant (Building #6) was converted from coal to oil without construction of a spill containment area for fuel oil storage or berms (see **Figure 4-1**) between 1969 and 1970. In 1978, a fuel oil supplier delivered No. 2 fuel oil to a filled tank and left the delivery truck unattended. As a result, the fuel backed up through the vent pipe, spilling approximately 3,000 to 5,000 gallons of fuel oil. The area of the spill is located between Building #6 and Building #114, and has since been modified to contain spills resulting from fuel delivery (Rogers, Golden & Halpern 1986, TtNUS 2004b, EA Engineering 1992).

The NAS JRB Willow Grove fire department responded to the spill and flushed the fuel with water, directing the runoff to drainage areas downstream of the steam plant toward the Air Reserve Facility's detention basin on the northern side of the facility (TtNUS 2004b). The detention basin is equipped with oil spill containment devices. The total affected area was estimated at less than 1 acre.

The U.S. Navy has recommended NFA at Site 9 based on previous investigations and the results of the site screening process; Site 9 was designated NFA by PADEP prior to being placed on the NPL (EA Engineering 1990, TtNUS 2004b). The U.S. Navy has been granted concurrence on this conclusion and has designated Site 9 as NFA in the FFA (Edmond 2006a).

4.2.10 Site 10 Navy Fuel Farm

Site 10, the Navy Fuel Farm, is located along the north side of Privet Road, south of the Air Reserve facility (see **Figure 4-1**). Formerly, the site contained two partially-buried 210,000 gallon fuel tanks (Tank No. 115 and Tank No. 116 containing jet petroleum (JP)-4/JP-5 aviation fuel) and two smaller USTs located in the southeastern corner of the site. One tank contained diesel fuel while the other stored waste oil (formerly used for fuel storage). Tank No. 115 was



overfilled releasing fuel onto the ground in 1986. On the south side of Site 10 that same year, a non-aqueous phase liquid (NAPL) was observed floating on top of water in a trench excavated for utility work. Furthermore, NAPL was also observed in the area of a dry well near the northeastern corner of Building 81, located south of the 210,000 gallon tanks. Previously, the dry well was used to discharge effluent water siphoned from the bottom of the fuel tanks. JP-5 jet fuel was discovered emanating from two areas of dead grass on the west side of Tank No. 115 in March 1989. The two main fuel tanks along with the waste oil and diesel fuel USTs were removed in 1991. Subsequent to the removal of the waste oil tank, an inspection revealed that the tank was not intact; reportedly, holes up to 1 inch in diameter were observed (TtNUS 2004b).

Under the PADEP UST program, the groundwater remediation pilot system was installed in order to investigate petroleum (jet fuel) contamination at the Navy Fuel Farm. The Final Study Report for Product Recovery Pilot System was completed in 1996 (EA Engineering 2003, TtNUS 2004b).

A light non-aqueous phase liquid (LNAPL) recovery system was installed in 1998 to remediate the jet fuel spill. The Navy discontinued the operation of the LNAPL recovery system in 2001. Quarterly floating product recovery continued by bailing, or capture by absorption onto recovery "socks" down well, until January 2003 (TtNUS 2004b).

PADEP approved the final Work Plan, dated March 2003, for the fieldwork efforts at Site 10 including LNAPL monitoring and groundwater sampling. The final RI for Site 10 was submitted in December 2003 in support of no further investigation at this time (Edmond 2005b). In addition, the U.S. Navy submitted a request for NFA for Site 10 Groundwater in September 2004. The PADEP concurred with the U.S. Navy that no further remediation or investigation at this time was appropriate for Site 10 soils or groundwater; however, PADEP noted that groundwater and soil at Site 10 did not meet the criteria for unrestricted use and that full closure under PADEP Act 2 may be appropriate if land use changes occur (TtNUS 2004b).

4.2.11 Potential "Site 11" – Aircraft Parking Apron

While constructing an Air Force Reserve Facility in 1992, the construction crew reportedly detected organic odors. The area of the reported odors is located at the north end of the main runway, between the U.S. Navy and U.S. Air Force parking aprons (TtNUS 2004b) (see **Figure 4-1**). The cause of the odors is suspected to have come from a fuel spillage in the past. Soil samples were collected and analyzed from the suspected contaminated soil in 1992. In addition, the analytical method was not stipulated and the laboratory reporting units were questionable (the samples consisted of soil; however, the units indicated aqueous samples). As a result, PADEP requested that confirmation soil samples be collected and evaluated in attempts to determine if attainment for Act 2 liability protection for closure be demonstrated for the area of concern. Additionally, PADEP requested that the groundwater for the site be sampled downgradient in order to determine if the groundwater in the area was affected by the contaminated soil (TtNUS 2004b). Per PADEP's request, confirmation sampling was performed by EA Engineering in 2003 (EA Engineering 2004, TtNUS 2004b). The U.S. Navy requested and received liability release for closure for this site from PADEP.



4.3 Storage Tanks

4.3.1 Underground Storage Tanks

There are currently two regulated USTs in use at NAS JRB Willow Grove that are registered with the PADEP, containing Bio-diesel and motor gasoline, located next to Building #127. All active USTs on-site are registered with the PADEP annually (Edmond 2006a). In addition, there are 11 underground OWSs located at NAS JRB Willow Grove, eight of which are considered wastewater treatment tanks and are, therefore, not included in **Table 4-2** (Weston Solutions 2004). **Table 4-2** presents all USTs on-site, along with the location, reported volume, and contents of each tank. **Figure 4-2** presents the locations of the active USTs. The largest number of USTs in use at one time at NAS JRB Willow Grove was before 1991 with a total of 16 USTs; including seven heating oil USTs, one diesel UST, one gasoline UST, and seven oil/water separators. The tanks were removed and either replaced by aboveground storage tanks (ASTs) or removed with no replacement where an alternate energy, fuel, or chemical source could be used. **Table 4-3** presents all closed/removed USTs at NAS JRB Willow Grove, including location, reported volume, contents, and the current status of each tank.

Prior to April 2002, NAS JRB Willow Grove operated an additional UST on-site (UST Number 080OWS01) that was inspected by a PADEP certified inspector and found to be noncompliant with state regulations (25 PA Code 245.411). PADEP recommended that the tank classification be changed from holding used motor-oil to an OWS. In 1991, two leaking USTs were removed from the Navy Fuel Farm followed by active soil and groundwater remediation (Weston Solutions 2004). **Section 4.2.10** (Navy Fuel Farm) describes the UST removal, associated soil and groundwater investigations, and remedial actions taken.

4.3.2 Aboveground Storage Tanks

There are currently 74 active ASTs located at NAS JRB Willow Grove. All active ASTs on-site are registered with PADEP annually (Edmond 2006a). **Table 4-4** presents all ASTs on-site, along with the location, reported volume, contents of each tank, and current uses. Refer to **Figure 4-3** for the locations of all active ASTs.

4.4 Munitions and Explosives of Concern

According to site personnel, there are no identified munitions and explosives of concern (MEC) located at NAS JRB Willow Grove (Edmond 2005b).

4.5 Hazardous Substances

4.5.1 Hazardous Wastes

NAS JRB Willow Grove has been classified by the PADEP as a large quantity generator of hazardous waste (#PA4170000158), producing more than 1,000 kilograms per month (Edmond 2005c, Engineering Field Activity 2003). Hazardous waste is generated by a number of different processes at NAS JRB Willow Grove producing wastes, such as solvents, waste paints, adhesives, sealants, contaminated fuel, rags/diapers, and various acids. To manage these hazardous wastes, NAS JRB implemented a hazardous waste program with two hazardous waste handlers to reduce the amount of waste produced over the last several years



(Engineering Field Activity 2003). Hazardous waste is accumulated in Building #633 (see **Figure 4-4**) for less than 90 days, prior to contractor collection for off-site treatments, recycling, and disposal (Edmond 2005c).

4.5.2 Medical Wastes

Medical waste from the Navy Regional Medical and Dental Clinic is disposed of through a U.S. Navy Bureau of Medicine (Bethesda) contract (Edmond 2006b).

4.5.3 Universal Wastes

NAS JRB Willow Grove has a Defense Reutilization and Marketing Office (DRMO) contract for the disposal of universal wastes such as used oil, batteries, light bulbs, etc. (Edmond 2006b).

4.6 Polychlorinated Biphenyls

All PCB-containing materials and equipment formerly located at NAS JRB Willow Grove were removed in the late 1990s; however, no documentation exists (Edmond 2005b). Currently, there are no PCBs located on-site (Edmond 2005a, Edmond 2005b).

4.7 Radiological Materials

According to site personnel, there are no radiological materials currently used or located at NAS JRB Willow Grove (Edmond 2005a, Edmond 2005b). If radiological materials had been used in the past, the material would have been disposed of as hazardous waste (refer to **Section 4.5**).

4.8 Pesticides

This section presents the current pesticide use at the NAS JRB Willow Grove. The 2001 Draft Pest Management Plan (PMP) describes the current pesticide use at NAS JRB Willow Grove for rodent and insect control such as wasps and ants (Kincaid 2001).

The Draft PMP for NAS JRB Willow Grove describes the requirements and recommended best practices for all aspects of pesticide management, in accordance with Federal laws, DoD and U.S. Navy regulations (Kincaid 2001). Integrated Pest Management (IPM) procedures are presented in detail in Appendix C of the Draft Pest Management Plan for NAS JRB Willow Grove (Kincaid 2001). Records relating to actual use and storage of pesticides on-site prior to 2001 were not available for review.

4.9 Asbestos

An asbestos survey conducted at NAS JRB Willow Grove in 1996 included sampling of 89 of the approximately 150 buildings. Sample data indicated that 52 buildings were determined to contain asbestos containing material (ACM) or presumed asbestos-containing material (PACM), which has either been removed or has been placed under the Operations and Maintenance (O&M) program (refer to **Table 4-5**). The asbestos survey was accomplished in accordance with USEPA Title 40 Code of Federal Regulations (CFR) 763 Asbestos Hazard Emergency



Response Act (AHERA) requirements (Dewberry & Davis 1997). The location of the buildings with confirmed or suspected ACMs are depicted in **Figure 4-5**.

4.10 Lead-Based Paint

According to site personnel, lead-based paint was removed from NAS JRB Willow Grove on-base housing and other buildings frequented by children (Edmond 2005b, Edmond 2005c); however, no documentation exists. The USEPA/AHERA requirements only apply to the removal of lead-based paint in housing and other areas frequented by children (e.g., day care centers, playgrounds, etc.). All buildings painted before 1978 that have not been surveyed are assumed to contain lead-based paint until a negative determination is made through screening and/or sampling and analysis.

4.11 Radon

A preliminary radon screening was performed in 2001 in accordance with the U.S. Navy Radon Assessment and Mitigation Program (NAVRAMP) (Di Giantomasso 2001). The 2001 survey monitored radon levels in approximately 8 percent of the buildings at NAS JRB Willow Grove, including collection of 208 radon samples from 14 buildings. Of the 200 samples analyzed (8 samples were lost in transit), only 1 sample contained radon concentrations above the USEPA action level of 4 picoCuries per Liter (pCi/L). This sample, containing 6.0 pCi/L radon, was collected from Room 122 in Building #137, the Medical Dental Building (Di Giantomasso 2001). In addition, another sample collected from Building #137, the Dental Conference Room, contained 4.0 pCi/L radon. Previous to the preliminary radon screening in 2001, a radon screening had taken place in Quarters "E", Building #113, during 1991 (Edmond 2006e, Edmond 2006f). The sample collected in Quarters "E" contained radon concentrations of 6.9 pCi/L, which is above the USEPA action level. Three radon detectors were installed in 1999 as a result of the radon samples collected in 1991. After the installation, two more screenings of radon concentrations took place in Quarters "E" in 1999 and 2002; Building #601 was also tested during the 1999 radon survey. Samples collected in Quarters "E" identified concentrations of radon below 4.0 pCi/L both in 1999 and 2002. Radon concentrations in Building #601 were identified as above the USEPA action levels; however, no abatement was installed (Edmond 2006e, Edmond 2006f). **Figure 4-6** presents the locations tested for radon at NAS JRB Willow Grove. **Table 4-6** summarizes each building and the average detected radon detector(s) results.

4.12 Air Quality

NAS JRB Willow Grove operates under PADEP Title V / State Operating Permit Number 46-00079 (PADEP 2001a, Parsons Engineering Science 1999). Renewal of the Air Title V has been completed by contract and submitted to PADEP (Lewandowski 2006). The emissions-generating equipment addressed in the operating permit includes emergency diesel generators, storage tanks, fuel dispensing, painting operations, and parts cleaners (Edmond 2005b, Parsons Engineering Science 1999).



4.13 Water Quality

4.13.1 Drinking Water

The Safe Drinking Water Act (SDWA) of 1974, amended in 1986 and 1996, was passed to protect public health by regulating the nation's public drinking water supply and its sources including rivers, lakes, reservoirs, springs, and groundwater. The NAS JRB Willow Grove obtains its potable water from two on-site wells and two storage reservoirs presented on **Figure 4-7**. The two 200-gallons per minute drinking wells (well 31 and well 32) pump 167,000 gallons per day (gpd) to meet all of NAS JRB Willow Grove potable water and fire protection demands. A third well (#209), originally built for the U.S. Air Force Water System, has been abandoned (Woodard & Curran 2004). Once pumped, the water is then passed through an air stripper to remove trichloroethylene (TCE) and tetrachloroethylene (PCE), and is then disinfected with chlorine. This type of treatment system is common with the local water authorities, as both TCE and PCE are prevalent in Montgomery County, Pennsylvania (Edmond 2005c). The treated water is then placed in two separate 500,000-gallon underground reservoirs for storage; either the Northern Reservoir (Tank 106) located in the basement of Building 6, or Tank 107 in the southern portion of NAS JRB Willow Grove. This system is classified as a Community Water System (CWS) and serves a population of approximately 6,000 persons (Woodard & Curran 2004).

4.13.2 Stormwater

The Water Pollution Control Act Amendments of 1972, commonly known as the Clean Water Act (CWA), use a variety of regulatory and non-regulatory tools to reduce pollutant discharges into waterways and to manage polluted runoff. A National Pollutant Discharge Elimination System (NPDES) permit is required for all facilities that discharge industrial-related stormwater. In 2001, NAS JRB Willow Grove applied for and received a NPDES permit from USEPA Region 3 for stormwater that drains into the Little Neshaminy and Pennypack Creeks as well as to Park Creek through the Commonwealth National Country Club (Edmond 2005c). The NPDES permit (Number PA 0022411) has a term of 5 years and expires on 7 December 2006 (PADEP 2001b).

4.13.3 Wastewater

According to site personnel, NAS JRB Willow Grove owns and maintains an on-site wastewater treatment facility, at Building #8, which treats all the wastewater generated by NAS JRB Willow Grove (see **Figure 4-8**) (Edmond 2005b). After the wastewater is treated, it is then discharged into the nearby Park Creek. The wastewater treatment facility at NAS JRB Willow Grove is considered a non-industrial treatment facility, operating under a NPDES permit (No. PA 0022411) for the discharge of treated wastewater from the treatment facility (PADEP 2001b, Weston Solutions 2004). In addition, there are currently 11 OWSs located on NAS JRB Willow Grove, eight of which are considered underground wastewater treatment tanks (Weston Solutions 2004). **Table 4-7** presents all OWSs on-site, along with the location, reported volume, contents of each tank, and current uses. Refer to **Figure 4-8** for the locations of all active OWSs.



4.14 Natural Resources

4.14.1 Floodplains

Site personnel did not have information on the locations of floodplain areas at NAS JRB Willow Grove. Federal Emergency Management Agency (FEMA) flood maps of the Horsham area (shown in **Figure 4-9**) indicate that the following two areas of NAS JRB Willow Grove that would be inundated during a 100-year flood event (USDA 2005):

- The north side of NAS JRB Willow Grove along Park Creek from where it exits the property
- The northwest side of the site from where the Little Nashaminy Creek flows along the edge of NAS JRB Willow Grove.

Although Park Creek and the Little Nashaminy Creek are within 100-year flood areas, the Little Nashaminy Creek was the only area where Base Flood Elevations (BFEs) have been determined. The Park Creek 100-year flood area does not have the BFE determined (Engineering Field Activity 2003).

4.14.2 Wetlands and Aquatic Habitats (Special Aquatic Sites)

The main surface water features on and around NAS JRB Willow Grove include the Pennypack Creek and Park Creek which flows into the Little Neshaminy Creek. Both of the Pennypack Creek and the Little Neshaminy Creek flow into the Delaware River watershed (Geo-Marine 2001). Other forms of surface water resources mapped at the NAS JRB Willow Grove include approximately 14.3 acres of separated wetlands (see **Figure 4-10**).

4.14.3 Surface Water

Surface water features at the NAS JRB Willow Grove include two man-made freshwater ponds and separated wetlands, comprising of 14.3 acres of the land area on-site (Geo-Marine 2001, Edmond 2006c). The two freshwater ponds were originally constructed in the late 1980s and were approximately 30 ft. by 30 ft. According to site personnel, the area between the two ponds has since caved in, creating essentially one larger pond approximately 30 ft. by 60 ft. (Edmond 2006c).

Other surface water at NAS JRB Willow Grove includes the main stormwater detention basin located along the northern border within the property owned by the Willow Grove Air Reserve Station as shown on **Figure 4-10**. The detention basin includes oil booms and a sluice gate outlet in order to allow the primary outlet to be closed, if necessary, before flowing into Park Creek (Rogers, Golden & Halpern 1986).

4.14.4 Coastal Zone Areas

Coastal Zone Protection Act is not applicable to the NAS JRB Willow Grove.



4.14.5 Coral Reefs

Coral reef protection is not applicable to the NAS JRB Willow Grove.

4.14.6 Fisheries

The Magnuson-Stevens Fishery Conservation and Management Act is not applicable to NAS JRB Willow Grove because there are no fisheries located on the site.

4.14.7 Marine Mammals

Marine Mammal Protection Act is not applicable for NAS JRB Willow Grove.

4.14.8 Threatened, Endangered and Other Sensitive Species

There are no known populations of rare, threatened, or endangered plant or animal species identified on NAS JRB Willow Grove (either State or Federal). The Pennsylvania Science Office and The Nature Conservancy/Eastern Office of the Pennsylvania Natural Diversity Inventory conducted a thorough on-site survey for species of concern and significant natural communities in 1991. As a result of the survey, only one element found was a rare plant, hairy field bluegrass (*Paspalum laeve* var. *pilosum*); later the hairy field bluegrass was removed from the Pennsylvania rare plant list. The lack of rare species on the property is suspected to result from the previous agricultural use of the land which would cause an almost complete elimination of any indigenous vegetation (Geo-Marine 2001).

4.14.9 Geological Hazards

There are no geological hazards (i.e., landslides, earthquakes, sink holes) present at NAS JRB Willow Grove (DCNR 2006).

4.15 Cultural Resources

4.15.1 Historic Resources

Facility personnel indicated that NAS JRB Willow Grove does not have an Integrated Cultural Resources Management Plan (ICRMP) (Edmond 2005a, Edmond 2005b); however, a Cultural Resources Survey was conducted at the NAS JRB Willow Grove in 1996 with the draft report dated 1996 (Louis Berger 1996). Part of the Cultural Resources Survey included an Architectural Resources Survey. The findings of the Architectural Resources Survey are summarized below:

- Buildings constructed prior to 1946 - none meet the National Register Criteria as individual resources
- Buildings constructed after 1946 - none contain concentrations of resources meeting National Register requirements for a historic district
- Buildings constructed after 1946 - none meet National Register requirements of extraordinary significance for resources less than 50 years of age.



4.15.2 Archeological Resources

Site personnel indicate that NAS JRB Willow Grove does not have an ICRMP (Edmond 2005a, Edmond 2005b); however, a Cultural Resources Survey was conducted in 1995 and 1996 at NAS JRB Willow Grove. The Cultural Resources Survey consisted of a Phase IA archaeological investigation and an architectural resources survey. The findings of the Phase IA archaeological investigation are summarized below (Louis Berger 1996):

- Four locations within the boundaries of NAS JRB Willow Grove have been identified to have potential for prehistoric archaeological resources. Of the four potential sites, only one, Prehistoric Site Area 1 (see **Figure 4-11**), appears to have any integrity.
- There are 15 identified locations of potential historic sites within the boundaries of NAS JRB Willow Grove (see **Figure 4-11**). Of these, 11 are located in areas of severe ground disturbance and, therefore, considered to have low potential for intact archaeological remains. Of the four remaining locations, two are classified as having moderate potential for intact historical archaeological resources (Site Areas 5 and 10), and two are classified with a high potential for intact historical archaeological resources (Site Areas 4 and 7).
- The majority of NAS JRB Willow Grove has been subjected to severe ground disturbance from construction activities beginning in the 1940s, and several locations of less severe (or moderate) disturbances are present along the western edge of NAS JRB Willow Grove.

The results of the Architectural Resources Survey are summarized in **Section 4.15.1**.

4.15.3 Native American Graves

According to facility personnel, Native American graves have not been discovered on NAS JRB Willow Grove (Edmond 2005a, Edmond 2005b). The Cultural Resource Survey conducted in 1996 did not contain any information specific to Native American graves and there was no other documentation available specific to Native American graves (Louis Berger 1996).

4.16 Solid Wastes

The solid waste at Willow Grove is collected and transported to the Montgomery County Transfer Station by facility personnel (Edmond 2006b).

4.17 Summary of Environmental Conditions

Environmental conditions at NAS JRB Willow Grove consist of the following:

- Due to the age of buildings, it is likely that lead paint exists in some of the non-residential buildings
- Presence of ACM and PACM in 52 structures
- Presence of radon above 4 pCi/L in Building 137 room 122
- Portions of NAS JRB Willow Grove are within the 100-year flood boundary



- Existence of 14.3 acres of separated wetlands
- Presence of four potential pre-historic localities and 11 potential historic archaeological localities.

The environmental conditions are summarized in **Figure 4-12**.

Based on the information reviewed, there are locations on the property that have established land use restrictions associated with the IRP sites (**Section 4.2**) that need to be maintained when NAS JRB Willow Grove is transferred to other private and public entities.



5.0 Certification

I certify that the Environmental Condition of Property Report for the Naval Air Station, Joint Reserve Base, Willow Grove, Pennsylvania, May 11, 2006 and its enclosures were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. The information contained within the Environmental Condition of Property Report for the Naval Air Station, Joint Reserve Base, Willow Grove, May 11, 2006 and its enclosures is, to the best of my knowledge and belief, true, accurate and complete and accurately reflects the property's condition as of May 11, 2006 based upon my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information.

DAVID DROZD

Name

David Drozd

Signature

5-15-06

Date



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