

- Final -

ENVIRONMENTAL CONDITION OF PROPERTY REPORT

for the

NAVAL AIR STATION JOINT RESERVE BASE
WILLOW GROVE, PENNSYLVANIA



Department of the Navy
Base Realignment and Closure
Program Management Office
1455 Frazee Road, Suite 900
San Diego, California 92108-4310



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ABBREVIATIONS, ACRONYMS, AND SYMBOLS

ACM	Asbestos Containing Material	NAS	Naval Air Station
ASHERA	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 Nashaminy Creek flows along the edge of NAS JRB Willow Grove. The Little Nashaminy 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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TABLES



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Table 4-1. Summary of CERCLA Information

IRP Site ID	IRP Site Name	Dates of Operation	Historic Description	Contaminates of Concern	Current Phase of Remedial or Corrective Action
1	<i>Privet Road Compound</i>	Unknown – 1975 (waste material not completely removed until 1977)	Landfill was a transfer station that handled materials not accepted by the local municipal solid waste pick-up service prior to being disposed of off-site, or burned and/or buried on-site. Materials received include paint wastes, paint stripper and solvents, Freon, general refuse, asbestos, battery acid, sewage sludge containing heavy metals, oils and lubricants, PCBs, and mercury-contaminated dental amalgam (TtNUS 2004).	Asbestos, PCBs, and/or metals in soil, groundwater, and sediments (TtNUS 2004).	Active
2	<i>Antenna Field Landfill</i>	1948 – 1960	The primary activities consisted of trench excavation where waste material was typically burned and/or buried. Landfill reportedly received general wastes, furniture, tires, shingles, paint wastes and sewage wastes (TtNUS 2004).	Possible soil contamination.	Active
3	<i>Ninth Street Landfill</i>	1960 – 1967	Landfill that received general wastes, paint waste, asbestos, sewage sludge. In addition, a salvage yard was established where PCB-containing transformers were stored and serviced (TtNUS 2004).	PCB contamination of soil (TtNUS 2004).	Active
4	<i>North End Landfill</i>	1967 – 1969	Disposal included items not collected by routine trash pick-up, such as bulk items, sewage sludge, lubricants and oils (TtNUS 2004).	Possible contamination of soil.	NFA
5	<i>Fire Training Area</i>	1942 – 1975	Used for large-scale firefighting exercises involving disposal and burning of flammable liquids, such as solvents, paint chemicals, xylenes, toluene, various petroleum compounds, and drum storage of the materials between the burning exercises (TtNUS 2004).	VOCs contamination in groundwater and PAHs contamination of surface soils.	Active
6	<i>Abandoned Rifle Range No. 1</i>	1942 - 1965	Assumed lead from the fired rounds was mixed with soil from the rampart (TtNUS 2004).	Assumed lead contamination of soil.	NFA



Table 4-1. Summary of CERCLA Information

IRP Site ID	IRP Site Name	Dates of Operation	Historic Description	Contaminates of Concern	Current Phase of Remedial or Corrective Action
7	<i>Abandoned Rifle Range No. 2</i>	1965 – 1977 used as landfill after 1977	Spent ammunition and inert materials; such as clean fill; broken concrete; asphalt; cinderblocks; dry wastewater treatment sludge; emulsified oil and grease (TtNUS 2004).	Potential soil contamination.	NFA
8	<i>Building 118-Abandoned Fuel Tank</i>	1959 – 1980 fuel tank abandoned underground after 1980	No. 2 fuel oil observed seeping into basement of Building 118 (TtNUS 2004).	Possible contamination of soil.	NFA
9	<i>Steam Plant Building 6 Tank Overfill</i>	1969 – Present	No. 2 fuel oil spillage (3,000 to 5,000 gallons) in 1978 (TtNUS 2004).	Possible contamination of soil and groundwater.	NFA
10	<i>Navy Fuel Farm</i>	Unknown – 1991	JP-4/JP-5 fuel oil spillage onto ground in 1986 (TtNUS 2004).	Possible soil and groundwater contamination.	NFA
11	<i>Aircraft Parking Apron</i>	Unknown – Present	Reported odors, suspected to have resulted from a fuel spillage in the past (TtNUS 2004).	Suspected contaminated soil and groundwater.	NFA

Source: TtNUS 2004.

Notes:

PAH = Polynuclear aromatic hydrocarbons

PCBs = Polychlorinated Biphenyls

VOCs = halogenated volatile organic compounds



Table 4-2. Underground Storage Tanks at NAS JRB Willow Grove

Identification Number	Location	Capacity (gallons)	Contents	Current Use
127DIE01	Building #127	10,000	Bio-Diesel	UST – Service Station
127MOG01	Building #127	10,000	Motor Gasoline	UST – Service Station
080OWS01	Building #80	1,000	Waste Oil	UST- Oil/Water Separator
119OWS01	Building #119	350	Waste Oil	UST- Oil/Water Separator
078OWS01	Building #78	350	Waste Oil	UST – Oil/Water Separator

Source: Weston Solutions 2004.



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Table 4-3. Closed/Removed Underground Storage Tanks at NAS JRB Willow Grove

Location	Capacity (gallons)	Contents	Current Status
Building #3	2,000	#2 Fuel Oil	Removed
Building #6	30,000	#2 Fuel Oil	Removed
Building #6	30,000	2# Fuel Oil	Removed
Building #6	30,000	#2 Fuel Oil	Removed
Building #6	30,000	#2 Fuel Oil	Removed
Building #6	30,000	#2 Fuel Oil	Removed
Building #6	20,000	#2 Fuel Oil	Removed
Building #6	20,000	#2 Fuel Oil	Removed
Building #8	500	Fuel Oil	Removed
Building #8	50	Gasoline	Closed ¹
Building #15A	15,000	#2 Fuel Oil	Removed
Building #20	50	Gasoline	Removed
Building #20	13,500	Aviation Gasoline	Closed ²
Building #20	20,000	Aviation Gasoline	Closed ²
Building #20	20,000	Aviation Gasoline	Closed ²
Building #20	20,000	Aviation Gasoline	Closed ²
Building #43	500	#2 Fuel Oil	Removed
Building #78	500	#2 Fuel Oil	Removed
Building #126	500	#2 Fuel Oil	Removed
Building #164	1,000	#2 Fuel Oil	Removed
Building #176	2,500	#2 Fuel Oil	Removed
Building #176	5,000	#2 Fuel Oil	Closed ¹
Building #190	500	#2 Fuel Oil	Removed
Building #611	2,000	#2 Fuel Oil	Removed
Building #612	1,000	#2 Fuel Oil	Removed
Building #619	500	#2 Fuel Oil	Removed
Adjacent to Quarters "D" on Route #611	500	Unknown	Removed
Navy Fuel Farm Site 10	210,000	JP-4	Removed
Navy Fuel Farm Site 10	210,000	JP-5	Removed
Navy Fuel Farm Site 10	Unknown	Diesel Fuel	Removed
Navy Fuel Farm Site 10	Unknown	Waste Oil	Removed

Sources: Edmond 2006d. Edmond, Jim. 2006. Written correspondence, via email, to Laura Garrett with AMEC Earth & Environmental, Inc. pertaining to the Closed/Removed Underground Storage Tanks and abandoned wastewater system at NAS JRB Willow Grove. 22 February 2006.

Notes:

1. UST's filled in place and abandoned.
2. According to site personnel, the building was demolished in the late 1980's and it is assumed that the UST's were removed; however, documentation does not exist.



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Table 4-4. Aboveground Storage Tanks at NAS JRB Willow Grove

Identification Number	Location	Contents	Capacity (gallons)	Current Use
002DIE01	Building #2	Diesel	350	Base Mounted Generator
003DIE01	Building #3	Diesel	315	Base Mounted Generator
005DIE01	Building #5	Diesel	400	Base Mounted Generator
006DIE01	Building #6	Diesel/Fuel Oil	300	AST- Generator
006DIE02	Building #6	Diesel	300	AST- Generator
006DIE03	Building #6	Diesel	300	AST- Generator
006DIE04	Building #6	Diesel	~10	AST- Make-up Tank for Generator
006FOL01	Building #6	Fuel Oil	10,000	AST – Boiler Supply
008DIE01	Building #8	Diesel	300	AST- Generator
024DIE01	Building #24	Diesel	300	AST- Generator
024DIE02	Building #24	Diesel	150	AST- Generator
024DIE03	Building #24	Diesel	200	AST- Generator
070DIE01	Building #70	Empty	1,000	AST
078DIE01	Building #78	Diesel	300	Base Mounted Generator
080AFF01	Building #80	AFFF	1,500	AST- Fire Suppression
080AFF02	Building #80	AFFF	1,500	AST- Fire Suppression
080AFF03	Building #80	AFFF	1,500	AST- Fire Suppression
080AFF04	Building #80	AFFF	1,500	AST- Fire Suppression
080DIE01	Building #80	Diesel	300	AST- Generator
080DIE03	Building #80	Diesel	120	AST- Generator
080DIE04	Building #80	Diesel	120	AST- Generator
080DIE01	Building #80	Diesel	130	Base Mounted Generator
118DIE01	Building #118	Diesel	275	AST- Generator
126DIE01	Building #126	Diesel	500	AST- Generator
127DIE01	Building #127	Empty	2,000	AST
129LN202	Building #129	Liquid Nitrogen	1,000	AST
129LOX03	Building #129	Liquid Oxygen	1,000	AST
129LOX04	Building #129	Liquid Oxygen	2,000	AST
137DIE01	Building #137	Diesel	230	Base Mounted Generator
139DIE01	Building #139	Diesel	500	AST- Generator
139DIE02	Building #139	Diesel	75	AST- Generator
157FOL01	Building #157	No. 2 Fuel Oil	210,000	AST- Bulk Heating Supply
157KAC01	Building #157	Potassium Acetate	42,000	AST
157XXX01	Building #157	Empty	210,000	AST – Reserve Capacity
157AFF01	Building #157	AFFF	300	AST – Fire Suppression
174DIE01	Building #174	Diesel	400	Base Mounted Generator
177AFF03	Building #177	AFFF	1,600	AST – Fire Suppression
177AFF04	Building #177	AFFF	1,600	AST – Fire Suppression
180DIE01	Building #180	Diesel	315	Base Mounted Generator



Table 4-4. Aboveground Storage Tanks at NAS JRB Willow Grove

Identification Number	Location	Contents	Capacity (gallons)	Current Use
181GLY01	Building #181	Propylene Glycol	3,000	AST
181KAC01	Building #181	Potassium Acetate	3,000	AST
183AFF01	Building #183	AFFF	6,000	AST – Fire Suppression
183AFF02	Building #183	AFFF	6,000	AST – Fire Suppression
183DIE01	Building #183	Diesel	1,400– Multi-compartment	AST – Generator
183DIE02	Building #183	Diesel	350 – Multi-compartment	AST – Generator
183DIE03	Building #183	Diesel	275	AST – Generator
183DIE04	Building #183	Diesel	50	AST- Make-up Tank
190DIE01	Building #190	Diesel	275	AST – Generator
608DIE01	Building #608	Diesel	500	AST – Generator
619DIE01	Building #619	Diesel	500	AST – Generator
621DIE01	Building #621	Diesel	300	AST – Generator
633WSO01	Building #633	Waste Oil	1,000	AST
647DIE01	Building #647	Diesel	100	Base Mounted Generator
649DIE01	Building #649	Diesel	200	Base Mounted Generator
650DIE01	Building #650	Diesel	127	Base Mounted Generator
650AFF01	Building #650	AFFF	400	AST – Fire Suppression
650AFF02	Building #650	AFFF	400	AST – Fire Suppression
653DIE01	Building #653	Diesel	1,000	AST
681AFF01	Building #681	AFFF	2,500	AST – Fire Suppression
681AFF02	Building #681	AFFF	2,500	AST – Fire Suppression
681DIE01	Building #681	Diesel	150	AST – Generator
681DIE02	Building #681	Diesel	500	AST – Generator
681DIE03	Building #681	Diesel	500	AST – Generator
681DIE04	Building #681	Diesel	500	AST – Generator
681DIE05	Building #681	Diesel	500	AST – Generator
681DIE06	Building #681	Diesel	500	AST – Generator
AG1GLY01	RN (N)	Ethylene Glycol	300	AST - Arrester Gear
AG2GLY01	RN (N)	Ethylene Glycol	300	AST - Arrester Gear
AG3GLY01	RN (S)	Ethylene Glycol	300	AST - Arrester Gear
AG4GLY01	RN (S)	Ethylene Glycol	300	AST - Arrester Gear
FC-AVG01	Fly Club	AVGAS	4,000	AST - Re-Fuel Station
TC1JP801	Test Cell	JP-8	1,000	AST - Engine Test Station
TC2JP801	Test Cell	JP-8	1,000	AST - Engine Test Station
TC3JP801	Test Cell	JP-8	1,009	AST - Engine Test Station

Source: Weston Solutions 2004.



Table 4-5. Results of the Station-Wide Asbestos Survey Conducted in 1996

Location	Location Description (Building Name)	Asbestos-Containing Materials Found?
Building #1	Commanding Officer Naval Air Station Administration	Yes
Building #2	Community Services Building	Yes
Building #3	Child Development Center/Chaplains Office/Library	Yes
Building #5	BOQ	Yes
Building #6	Boiler House #1	Yes
Building #7	Public Works Storage	No
Building #8	Sewage Treatment	Yes
Building #13	Hobby Shop/Thrift Store	Yes
Building #15A	Boiler House #2	Yes
Building #15B	Electric Sub-station	Yes
Building #21	Paint Shop	Yes
Building #22	Raytheon Aerospace Warehouse	Yes
Building #24	Pump House	No
Building #29	Weapons	Yes
Building #30	Chlorinator Building	Yes
Building #31	Well House #1	No
Building #32	Well House #2	No
Building #38	Chapel	Yes
Building #39	Gate House/Security	Yes
Building #43	Recruiting	Yes
Building #49	Flight Line Inn	Yes
Building #51	Public Works Warehouse	Yes
Building #56	BOQ Storage	No
Building #59	Mag Electric Building	Yes
Building #63	Captains Barn	No
Building #65	Naval Reserve Intelligence	No
Building #68	Storage	No
Building #70	Sub-station Field Lights	Yes
Building #74	Sub-station	Yes
Building #75	Maintenance Warehouse	Yes
Building #77	AIMD Paraloft	Yes
Building #78	Public Works Department	Yes
Building #79	Public Works Storage Shed	No
Building #80	Hangar, VR/HSL/Tower	Yes
Building #81	Pump House	No
Building #117	Main Sub-station	No
Building #118	Ground Electronics	Yes
Building #119	Flammable Storage	No
Building #126	Emergency Generator	Yes
Building #127	Public Works Dispatcher	Yes



Table 4-5. Results of the Station-Wide Asbestos Survey Conducted in 1996

Location	Location Description (Building Name)	Asbestos-Containing Materials Found?
Building #128	Auto Vehicle Maintenance-Public Works	No
Building #129	LOX Building/AIMD	Yes
Building #137	Hospital Branch Clinic	Yes
Building #139	Approach Lights Vault	No
Building #140A	Reserve Training	Yes
Building #140B	RESASWTRACEN/Trainers	Yes
Building #146	Radio Range Building	No
Building #149	Marine Motor Pool	No
Building #152	Marine Garage	No
Building #159	Fuel Farm Office	Yes
Building #160	Pool Snack House	No
Building #164	Marine Compound	Yes
Building #167	Navy Family Service Center	Yes
Building #171	Supply Warehouse	Yes
Building #171A	Supply Comptroller	Yes
Building #172	Barracks #5	Yes
Building #174	Pitcarin Club	Yes
Building #175	Hangar VP-64/66	Yes
Building #176	79 th ARCOM	Yes
Building #177	Army Hangar	No
Building #178	Army Maintenance Garage	No
Building #179	Handball Court #2	No
Building #180	AIMD	Yes
Building #184	Utilities Building	Yes
Building #185	Utilities Shop/Mag	No
Building #187	MWR Storage	Yes
Building #188	LOX Storage Shed	No
Building #192	Bowling Center	No
Building #193	Bus Shelter	No
Building #601	Reserve Programs	Yes
Building #604	Public Works Storage Shed	No
Building #605	NEX Building	Yes
Building #606	Mag Warehouse	Yes
Building #608	Firehouse	Yes
Building #609	Barracks #6	Yes
Building #611	Pool Heating Plant	No
Building #612	BOQ Boiler House	No
Building #613	Ordinance Assy Area	No
Building #624	T-line Shack	No
Building #625	Administration Concession Stand	No



Table 4-5. Results of the Station-Wide Asbestos Survey Conducted in 1996

Location	Location Description (Building Name)	Asbestos-Containing Materials Found?
Building #626	Galley	No
Building #630	Mag-New Fuel Lab	No
Building #631	Communications Building/Mag	No
Building #632	Communications Building/Mag	No
Building #634	T-line/Mag	No
Building #635	AIMD-Ground Support Equipment	Yes
Building #677	Personnel Support DETAC	No
Building #680	Maine Hangar	Yes
Building #780	Passenger OPS Building	Yes

Source: Dewberry & Davis 1997.



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Table 4-6. Radon Assessment Results

Location	Location Description	Date Tested	Average Radon Level (pCi/L)
Building # 3	Child Development Center and Library ("A" Wing)	24 October 2001	0.0
Building # 3	Child Development Center and Library ("B" Wing)	24 October 2001	0.2
Building # 6	Boiler House	24 October 2001	0.0
Building # 49	Subway Restaurant	24 October 2001	0.1
Building # 113	Quarters "E"	1991	6.9
Building # 113	Quarters "E"	1999	< 4.0
Building # 113	Quarters "E"	2002	< 4.0
Building # 137	Medical Dental Building	24 October 2001 (Confirmation Testing on 14 November 2001)	0.4
Building # 159	Fuel Farm Office	24 October 2001	1.1
Building # 171	Supply Warehouse	24 October 2001	0.0
Building # 174	Pitcarin Club	24 October 2001	0.0
Building # 175	Hanger (VP 64 Wing)	24 October 2001	0.0
Building # 175	Hanger (VP 66 Wing)	24 October 2001	0.1
Building # 192	Bowling Alley	24 October 2001	0.0
Building # 601	Reserve Programs	1999	> 4.0
Building # 606	Mag Warehouse	24 October 2001	1.3
Building # 608	Firehouse	24 October 2001	0.4
Building # 635	AIMD Ground Support	24 October 2001	0.0
Building # 677	Personnel Support Detachment	24 October 2001	0.2
Building # 780	Passenger OPS	24 October 2001	0.0

Source: Di Giantomasso 2001.



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Table 4-7. Active Oil/Water Separators at NAS JRB Willow Grove

OWS Number	Location	Type	Volume (gallons)
078	Building #78	UST	350
080	Building #80	UST	1,000
119	Building #119	UST	350
157	Building #157	OWS	10,000
175	Building #175	OWS Pit	500/500
177	Building #177	OWS	350
178	Building #178	OWS	350
180	Building #180	OWS	500
608	Building #608	O/WS	500
639	Building #639	OWS	1,000
680	Building #680	OWS Pit	2,162

Source: Weston Solutions 2004.



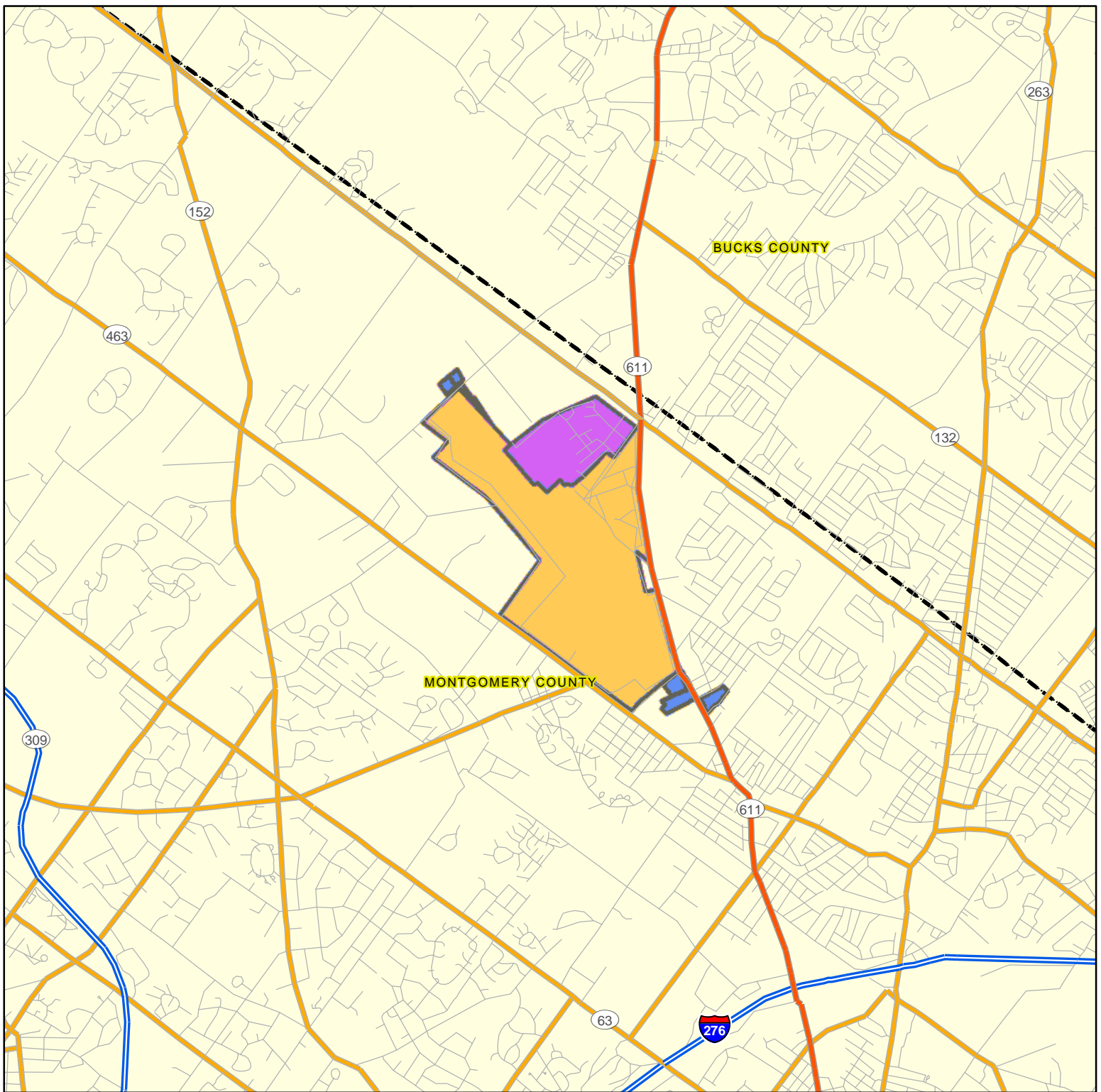
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FIGURES



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LEGEND

- NAS JRB Willow Grove
- U.S. Navy owned
- Willow Grove Air Reserve Station owned
- Limited Access
- Highway
- Major Road
- Local Road
- County Boundary

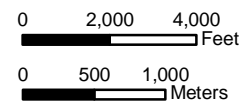
SITE LOCATION MAP



NOTES & SOURCES

Coordinate System: NAD 83, UTM Zone 19
Data Sources: TINUS 2004

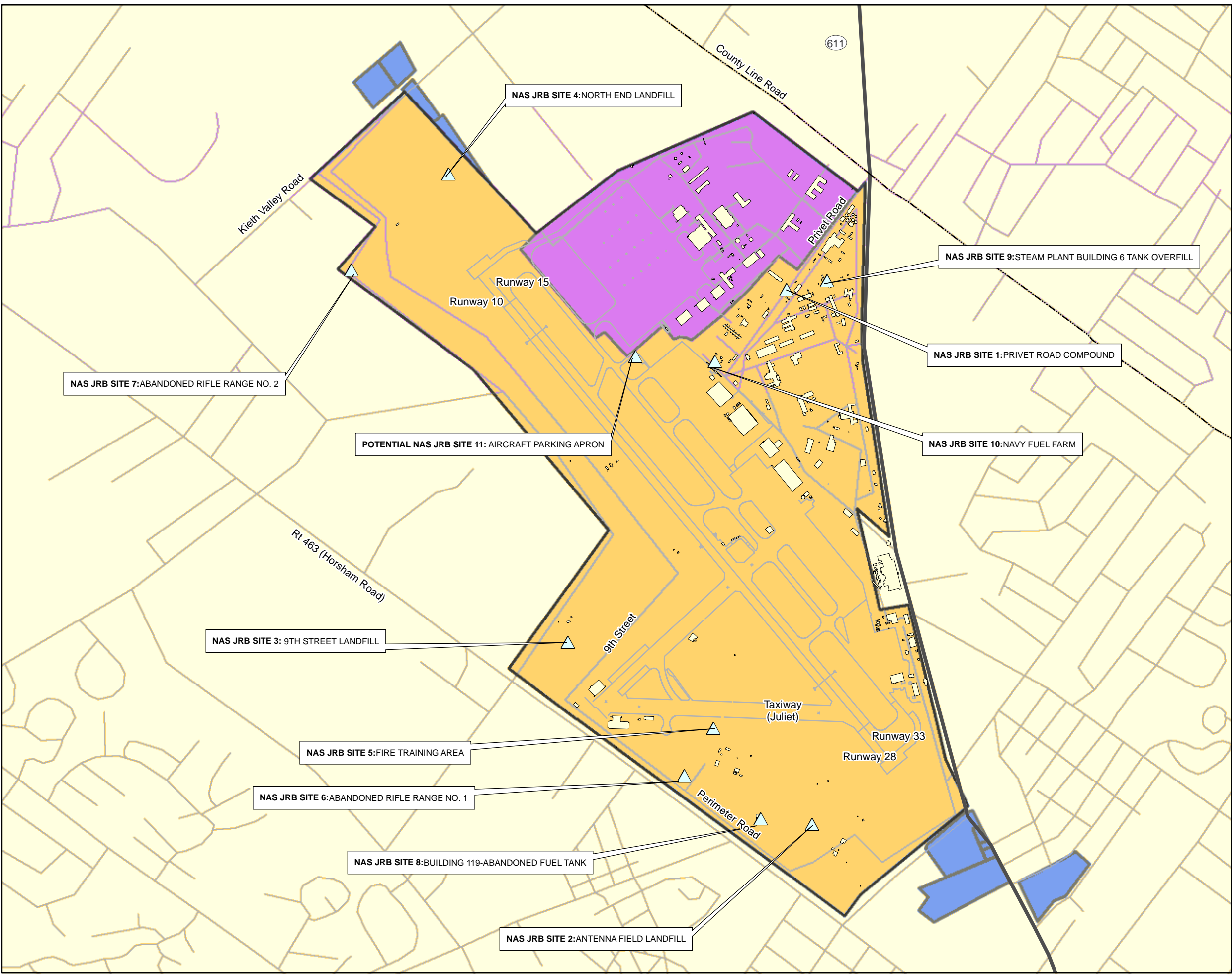
NAS-JRB Willow Grove
Horsham Township, PA



SITE LOCATION MAP

FIGURE

3-1



TITLE

CERCLA SITE LOCATIONS

NAS JRB Willow Grove
Horsham Township, PA

LEGEND

- CERCLA Sites
- County Line
- Roads
- Buildings
- NAS JRB Willow Grove
- U.S. Navy owned
- Willow Grove Air Reserve Station owned

SITE LOCATION MAP



NOTES & SOURCES

Coordinate System: NAD 83, UTM Zone 18
Data Sources: T1NUS 2004

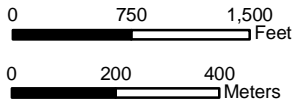
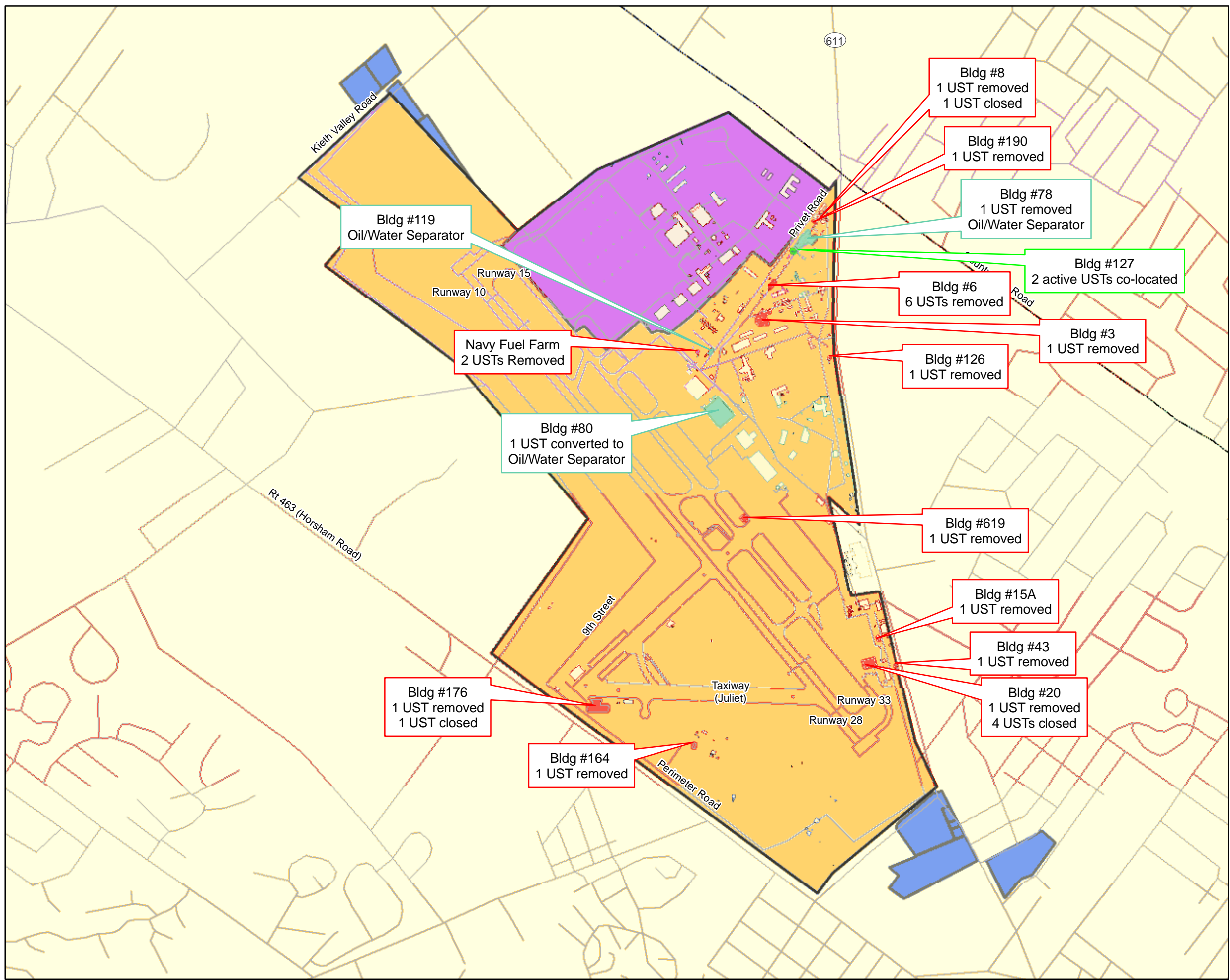


FIGURE
4-1



TITLE

UNDERGROUND STORAGE
TANK LOCATIONS

NAS JRB Willow Grove
Horsham Township, PA

LEGEND

Buildings with Closed/Removed USTs

Buildings with Oil/Water Separators

Buildings with Active USTs

County Line

Roads

Buildings

NAS JRB Willow Grove

U.S. Navy owned

Willow Grove Air Reserve Station owned



NOTES & SOURCES

Coordinate System: NAD 83, UTM Zone 18
Data Sources: TINUS 2004

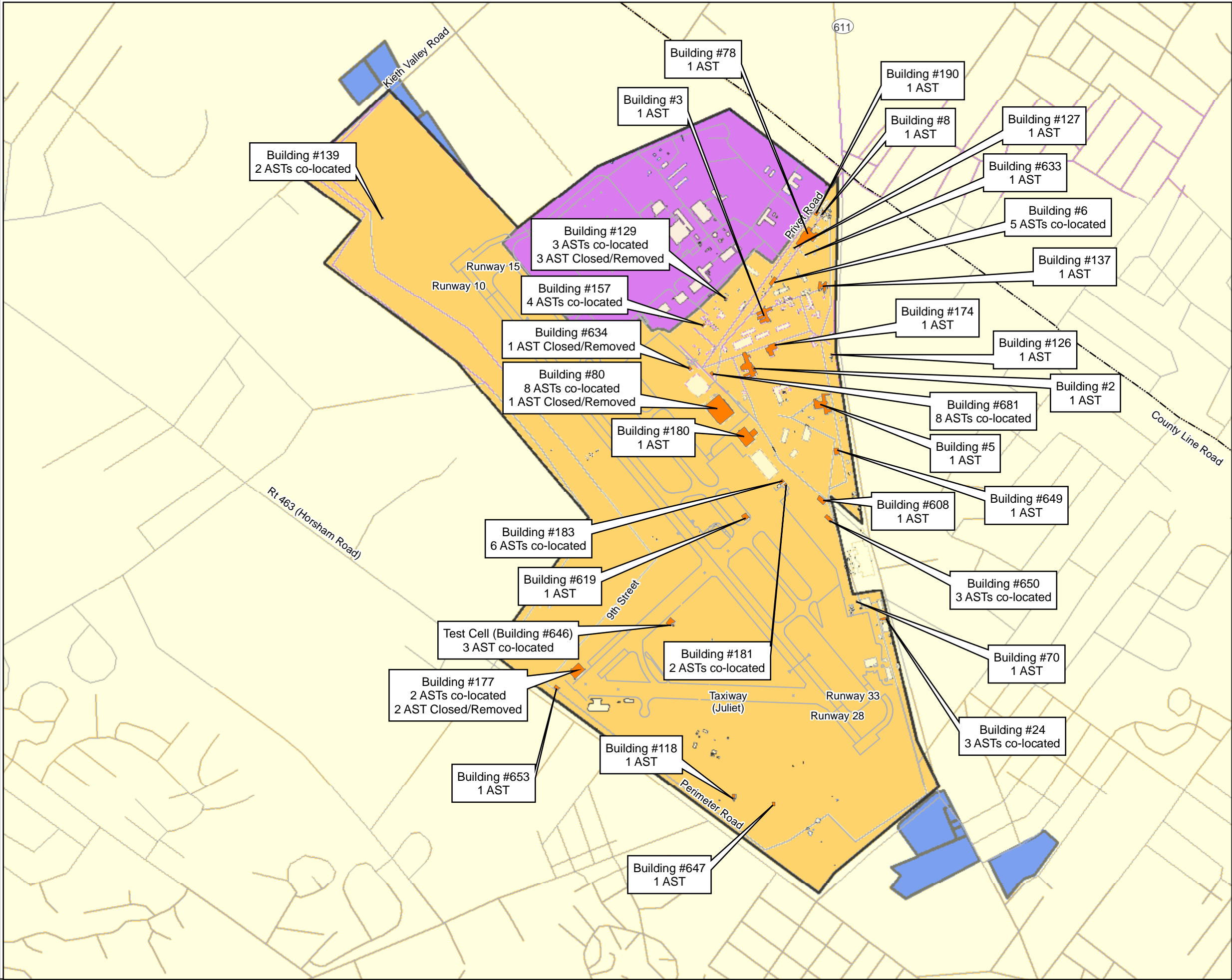
07501,500

Feet

0200400

Meters

FIGURE
4-2



TITLE

**ABOVEGROUND
STORAGE TANK LOCATIONS**

NAS JRB Willow Grove
Horsham Township, PA

LEGEND

- Aboveground Storage Tank Locations*
- County Line
- Roads
- Buildings
- NAS JRB Willow Grove
- U.S. Navy owned
- Willow Grove Air Reserve Station owned

*RN (N), RN (S), Fly Club, and Building #621 not depicted on figure.

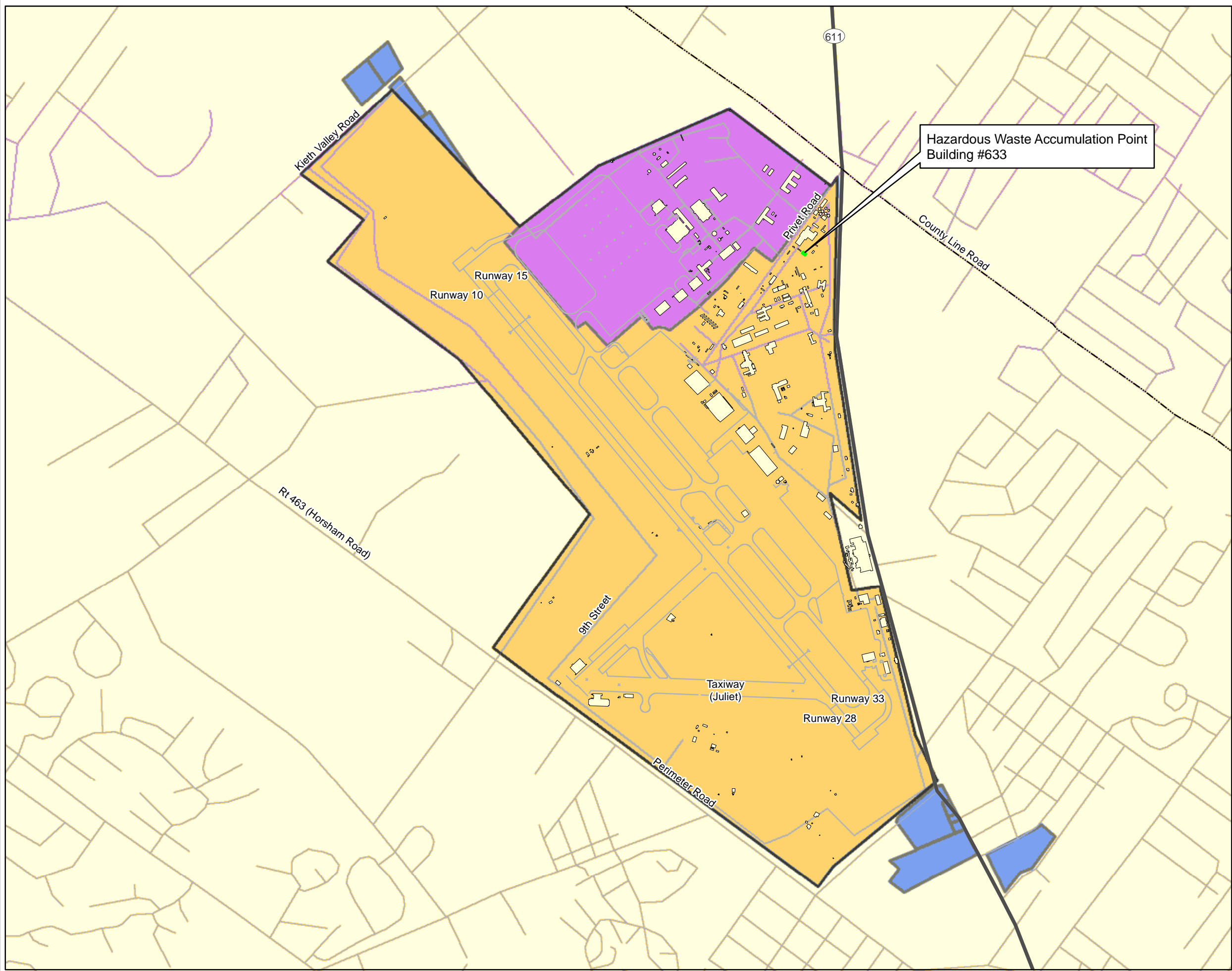


NOTES & SOURCES

Coordinate System: NAD 83, UTM Zone 18
Data Sources: TINUS 2004
Wells - PaGWIS

0 750 1,500 Feet
0 200 400 Meters

FIGURE
4-3



TITLE

HAZARDOUS WASTE
ACCUMULATION POINT

NAS-JRB Willow Grove
Horsham Township, PA

LEGEND

Hazardous Waste Accumulation Point

County Line

Roads

Buildings

NAS JRB Willow Grove

U.S. Navy owned

Willow Grove Air Reserve Station owned

SITE LOCATION MAP

NOTES & SOURCES

Coordinate System: NAD 83, UTM Zone 18
Data Sources: TtNUS 2004
Wetlands - EPA NWI

07501,500

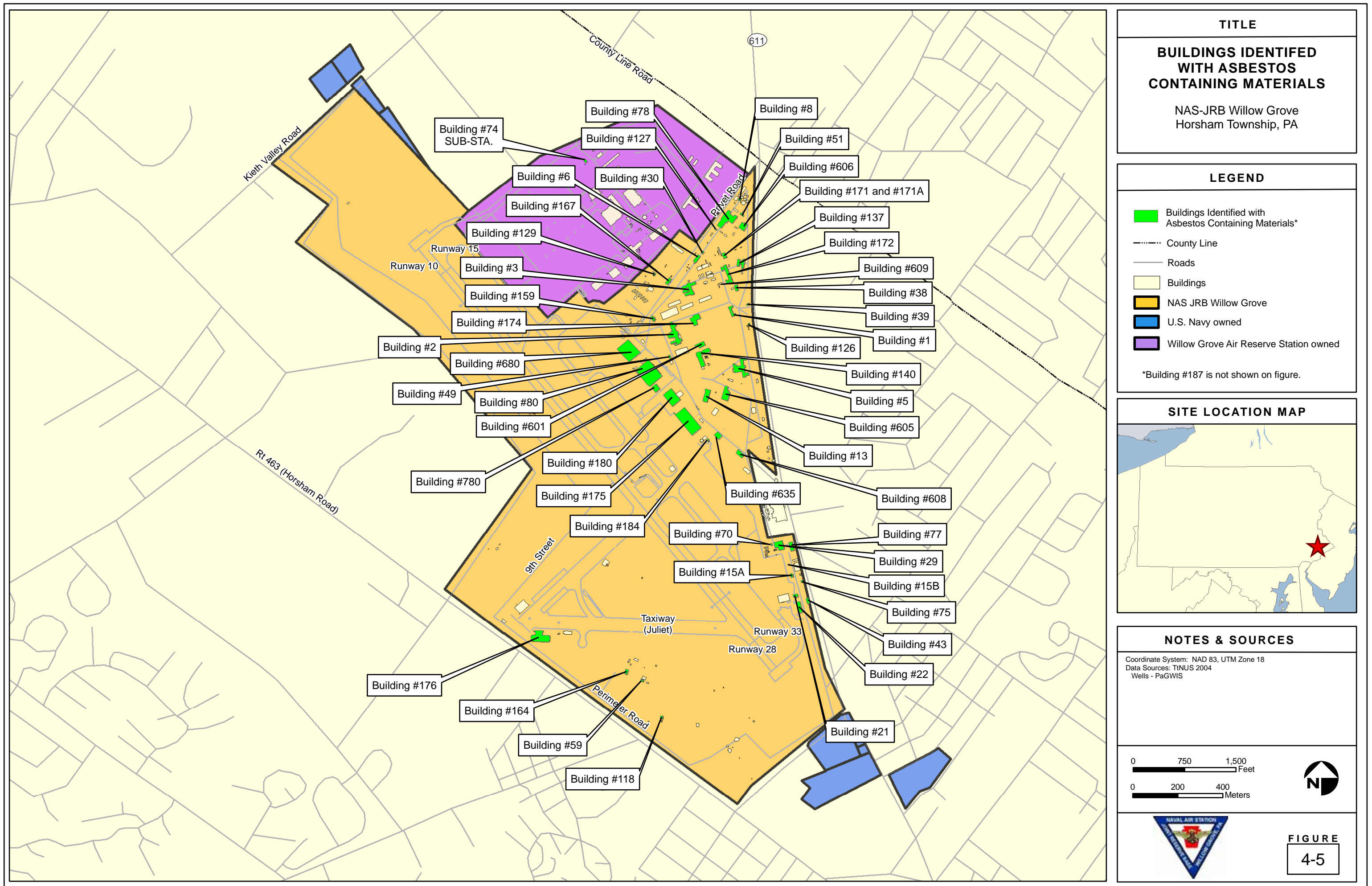
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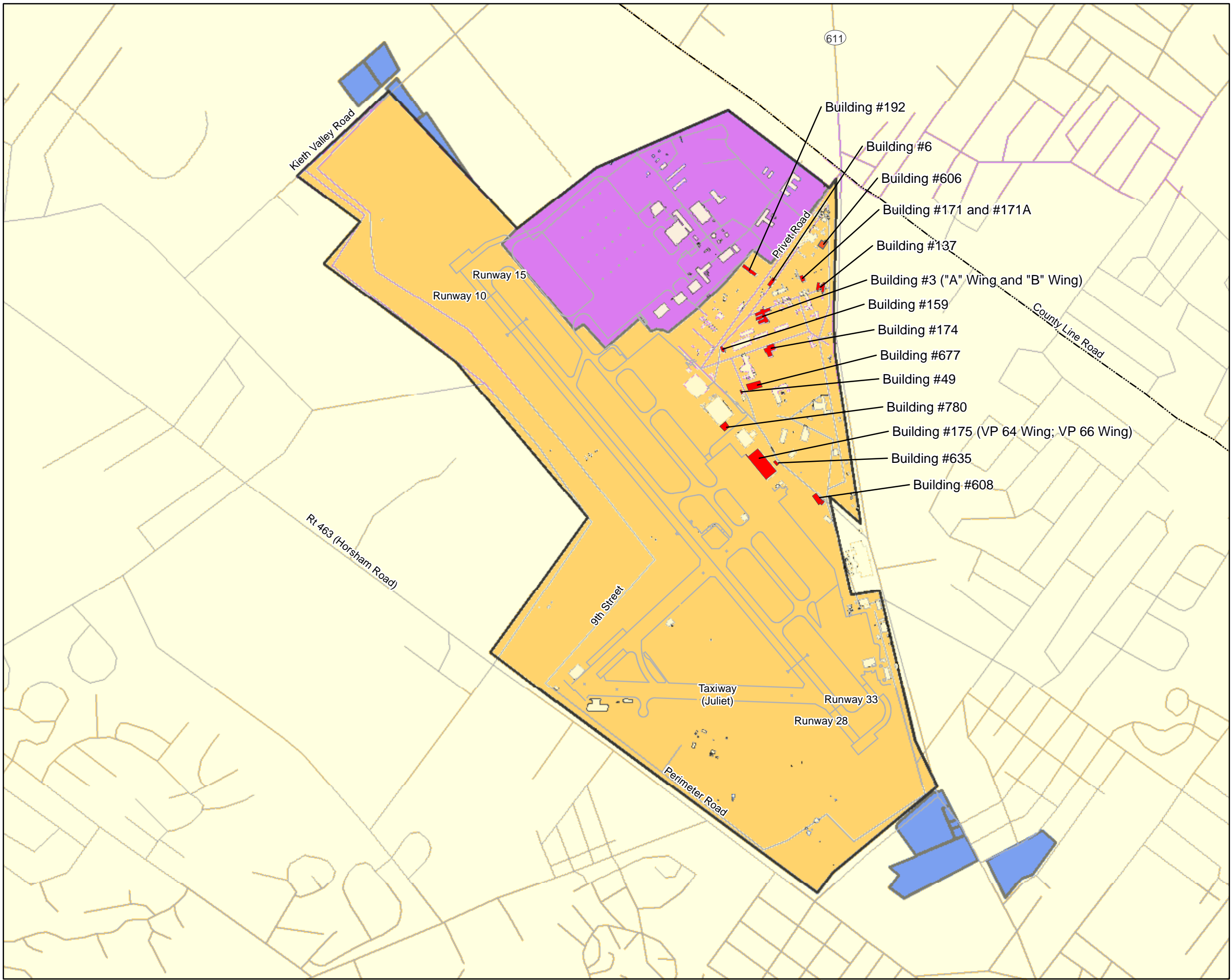
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Meters

N

FIGURE
4-4





TITLE

LOCATIONS TESTED FOR RADON

NAS-JRB Willow Grove
Horsham Township, PA

LEGEND

Buildings Tested for Radon

County Line

Roads

Buildings

NAS JRB Willow Grove

U.S. Navy owned

Willow Grove Air Reserve Station owned

SITE LOCATION MAP

NOTES & SOURCES

Coordinate System: NAD 83, UTM Zone 18
Data Sources: TINUS 2004

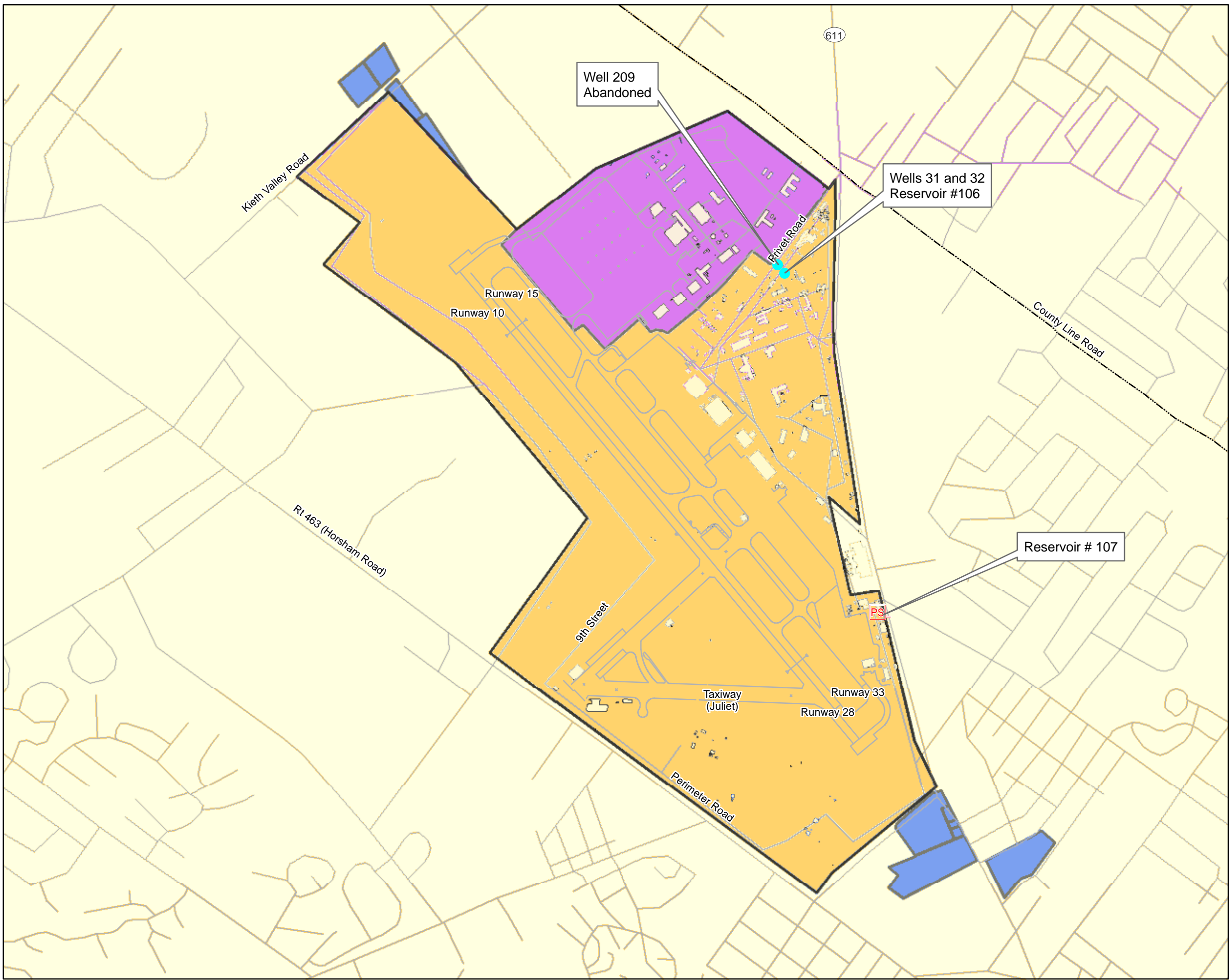
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Feet

0200400

Meters

FIGURE
4-6





TITLE


WATER SUPPLY WELLS


NAS-JRB Willow Grove
Horsham Township, PA


LEGEND


 Water Supply Wells


 Reservoir


 County Line

 Roads

 Buildings

 NAS JRB Willow Grove

 U.S. Navy owned

 Willow Grove Air Reserve Station owned



NOTES & SOURCES

Coordinate System: NAD 83, UTM Zone 18

Data Sources: TtNUS 2004


Wells - PaGWIS

07501,500

Feet

0200400

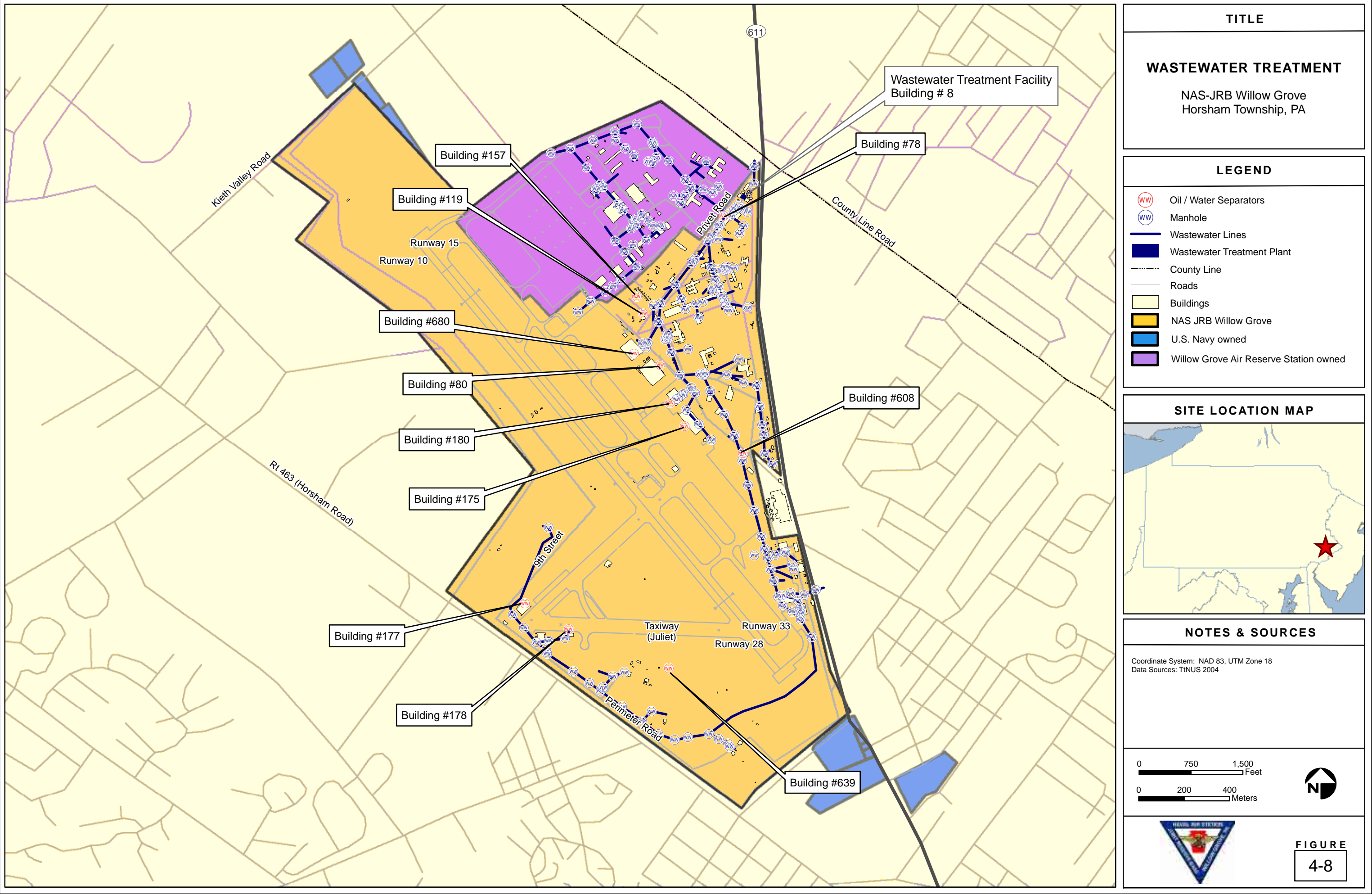
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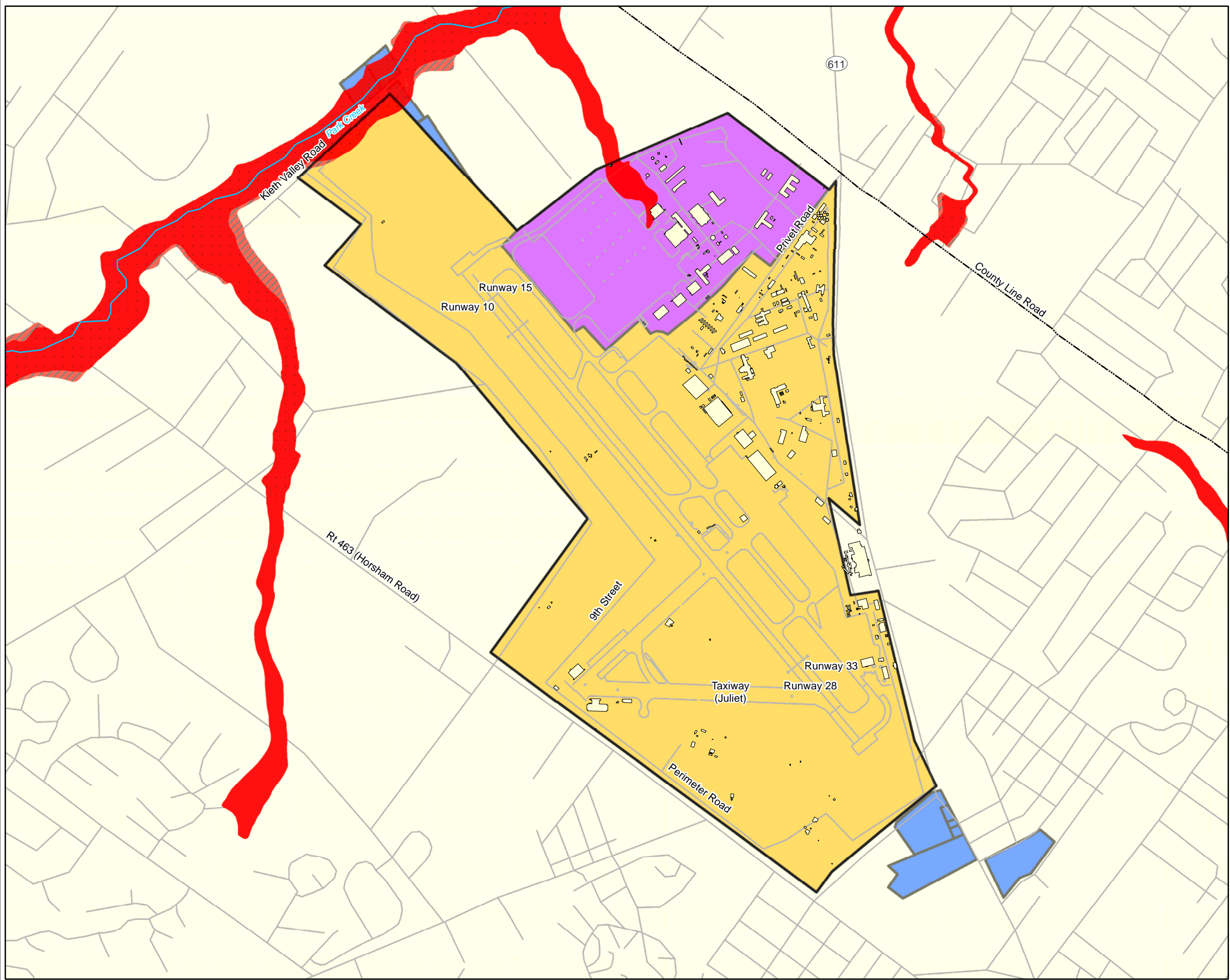




FIGURE

4-7





TITLE

FEMA FLOOD MAP

NAS-JRB Willow Grove
Horsham Township, PA

LEGEND

FEMA Q3 Zones

Area inundated by 100-year flooding, for which no Base Flood Elevations have been determined

An area inundated by 100-year flooding, for which Base Flood Elevations have been determined

500-year

County Line

Roads

Buildings

NAS JRB Willow Grove

U.S. Navy owned

Willow Grove Air Reserve Station owned

SITE LOCATION MAP

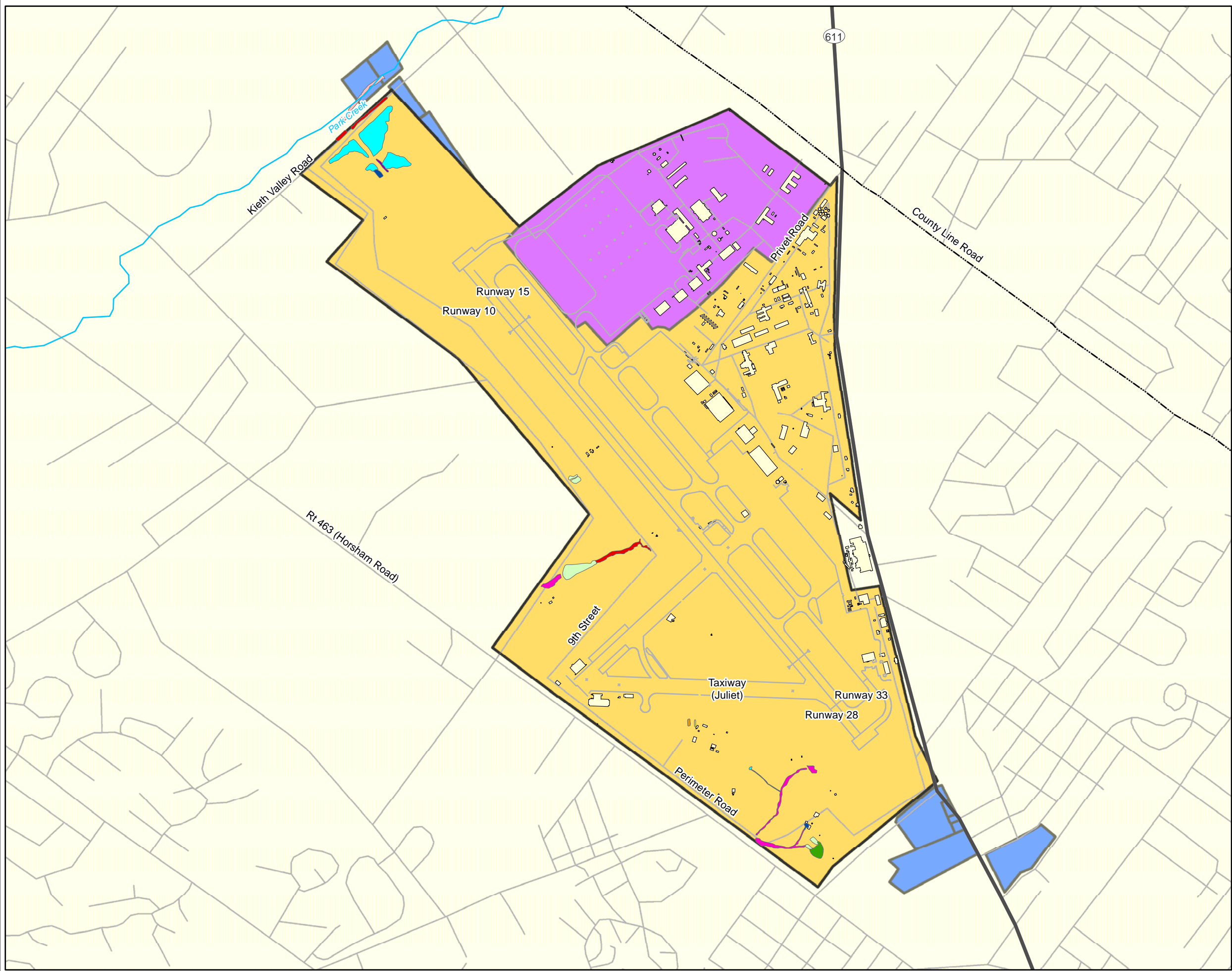
NOTES & SOURCES

Coordinate System: NAD 83, UTM Zone 18
Data Sources: T1NUS 2004
FEMA - Q3 Flood Data

0 750 1,500 Feet

0 200 400 Meters

FIGURE
4-9



TITLE

WETLANDS

NAS-JRB Willow Grove
Horsham Township, PA

LEGEND

WETLAND TYPE

<div>PEM1/SS1C</div>	<div>PEM1Cx</div>
<div>PEM1/SS1Fx</div>	<div>PFO1A</div>
<div>PEM1/UBFx</div>	<div>PFO1C</div>
<div>PEM1A</div>	<div>PUBHx</div>
<div>PEM1C</div>	<div>R2UBH</div>

County Line

Roads

Buildings

NAS JRB Willow Grove

U.S. Navy owned

Willow Grove Air Reserve Station owned

SITE LOCATION MAP

NOTES & SOURCES

Coordinate System: NAD 83, UTM Zone 18
Data Sources: TINUS 2004
Wetlands - EPA NWI

07501,500

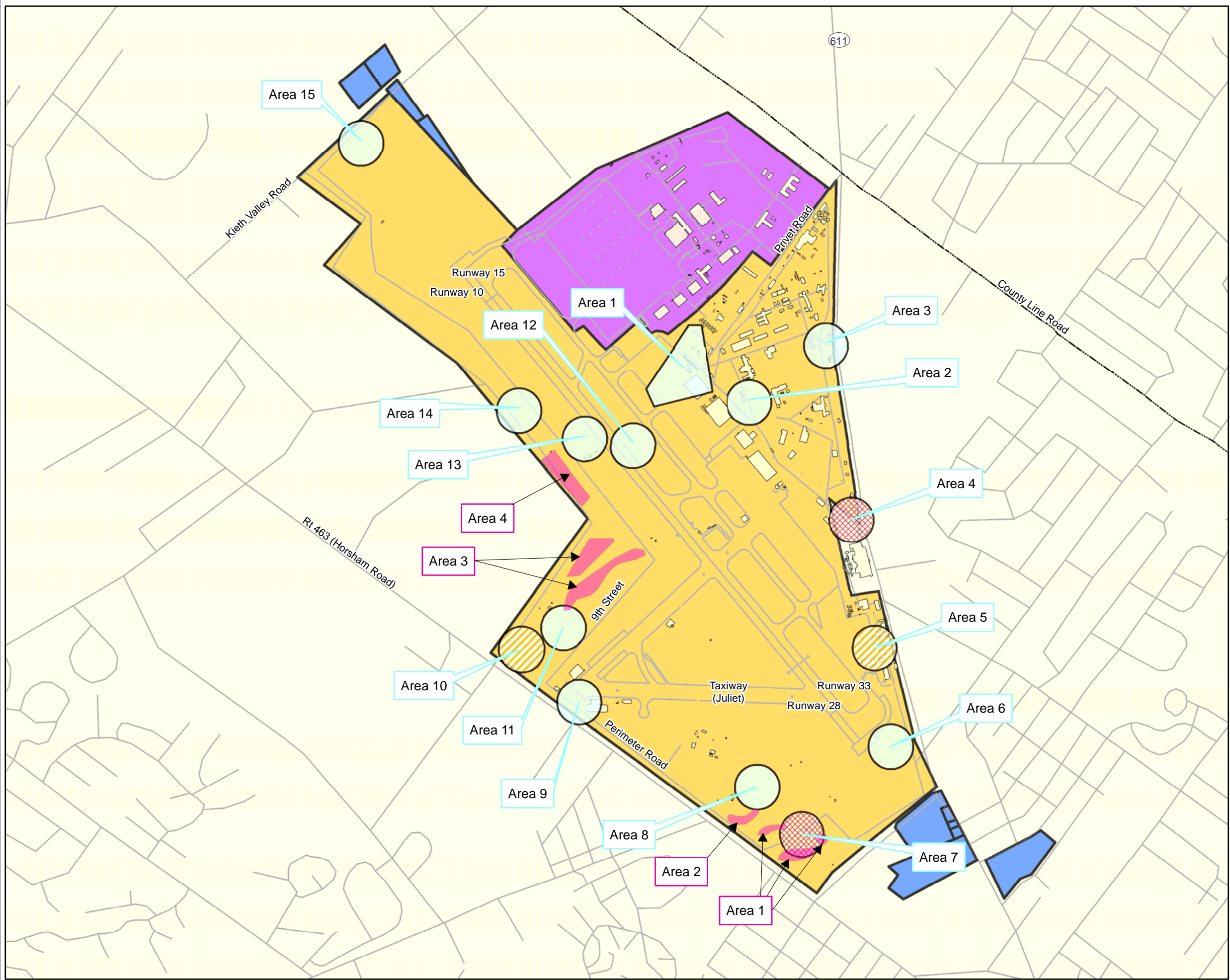
Feet

0200400

Meters

N

FIGURE
4-10



TITLE

ARCHEOLOGICAL SENSITIVE AREAS

NAS-JRB Willow Grove
Horsham Township, PA

LEGEND

Historic Archeological Site Potential

High

Moderate

Low

Prehistoric Archeological Sites Potential

County Line

Roads

Buildings

NAS JRB Willow Grove

U.S. Navy owned

Willow Grove Air Reserve Station owned

SITE LOCATION MAP

NOTES & SOURCES

Coordinate System: NAD 83, UTM Zone 18
Data Sources: TINUS 2004
Wells - PaGWIS

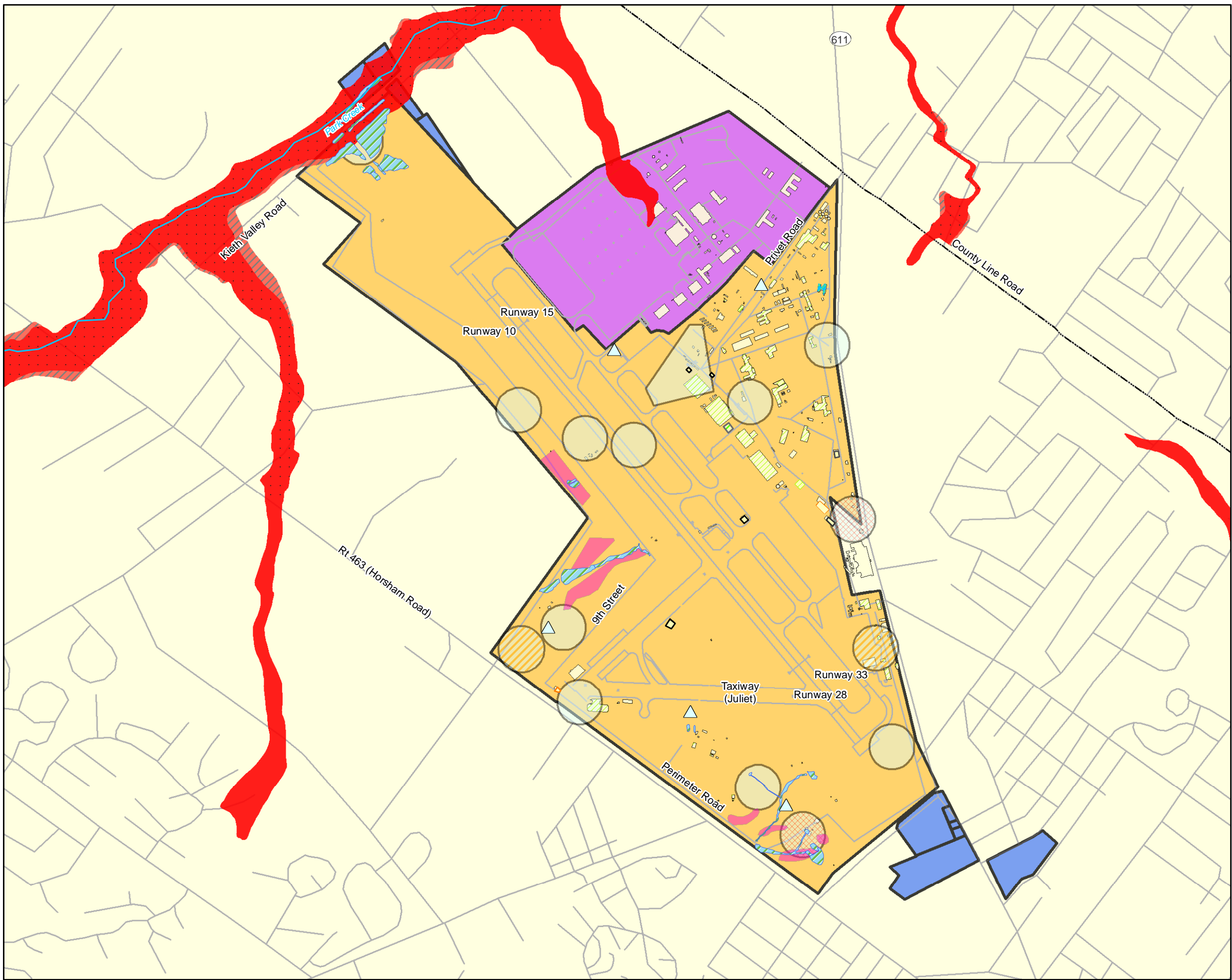
0 750 1,500 Feet

0 200 400 Meters

North arrow pointing up

NAVAL AIR STATION
JOINT RESERVE BASE
WILLOW GROVE, PA

FIGURE
4-11



TITLE

SUMMARY OF ENVIRONMENTAL CONDITIONS

NAS JRB Willow Grove
Horsham Township, PA

LEGEND

Historic Archeological Site Potential

- High
- Moderate
- Low

Prehistoric Archeological Sites Potential

- Wetlands

CERCLA Sites

- Buildings with Asbestos-Containing Materials**
- Radon above 4 pCi/L

FEMA Q3 Zones

- Area inundated by 100-year flooding, for which no Base Flood Elevations have been determined
- An area inundated by 100-year flooding, for which Base Flood Elevations have been determined
- 500-year
- Buildings

County Line

Roads

- NAS JRB Willow Grove
- U.S. Navy owned
- Willow Grove Air Reserve Station owned

**Building #187 is not shown on figure.



NOTES & SOURCES

Coordinate System: NAD 83, UTM Zone 18
Data Sources: TINUS 2004
Wells - PaGWIS

0 750 1,500 Feet

0 200 400 Meters

FIGURE

4-12



APPENDIX A

References



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APPENDIX A

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APPENDIX B

List of Contacts



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APPENDIX B

List of Contacts

Navy ECP Contacts				
Contact Name (Last, First)	Title/Position	Location	Telephone Number	E-mail Address
Edmond, Jim	Environmental Coordinator	NAS JRB Willow Grove	215-443-6939	jim.edmond@navy.mil
Drozd, David	BRAC PMO NE Director	BRAC PMO Northeast	215-897-4909	david.drozd@navy.mil
Kincaid, Dawn	BRAC Environmental Coordinator	BRAC PMO Northeast	215-897-4915	dawn.kincaid@navy.mil
Lewandowski, Bob	BRAC Environmental Coordinator	BRAC PMO Northeast	215-897-4908	robert.f.lewandowski@navy.mil
Boyle, Ed	Former Remedial Project Manager	Engineering Field Activity Northeast (former)	N/A	N/A

N/A = Not Available

AMEC Contacts				
Contact Name (Last, First)	Title/Position	Location	Telephone Number	E-mail Address
Chow, Daniel	Program Manager	San Francisco, CA	415-597-7420	daniel.chow@amec.com
Hunt, Celeste	BRAC ECP NE Project Manager	Westford, MA	978-692-9090 ext. 315	celeste.hunt@amec.com
Michalkiewicz, Robert	Willow Grove ECP Team Leader	Plymouth Meeting, PA	610 828 8100 ext. 141	robert.michalkiewicz@amec.com
Garrett, Laura	Willow Grove ECP Project Team Member	Plymouth Meeting, PA	610 828 8100 ext. 129	laura.garrett@amec.com
Brian Sariano	Willow Grove ECP Project Team Member	Plymouth Meeting, PA	610 828 8100	brian.sariano@amec.com



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APPENDIX C

**Environmental Condition of Property Report
for
Off-Site Housing Areas**



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- Final -

ENVIRONMENTAL CONDITION OF PROPERTY REPORT

for the

**OFF-BASE HOUSING AREAS OF THE
NAVAL AIR STATION
JOINT RESERVE BASE
WILLOW GROVE, PENNSYLVANIA**



Department of the Navy BRAC Program Management Office

Department of the Navy
Base Realignment and Closure
Program Management Office
1455 Frazee Road, Suite 900
San Diego, California 92108-4310



11 May 2006



- Final -

ENVIRONMENTAL CONDITION OF PROPERTY REPORT

for the

**OFF-BASE HOUSING AREAS OF THE
NAVAL AIR STATION
JOINT RESERVE BASE
WILLOW GROVE, PENNSYLVANIA**



Department of the Navy BRAC Program Management Office

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1455 Frazee Road, Suite 900
San Diego, California 92108-4310



11 May 2006



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Attachment B: List of Contacts



ABBREVIATIONS, ACRONYMS, AND SYMBOLS

ACM	Asbestos Containing Material	NADS	Naval Air Development Station
AST	Aboveground Storage Tank	NAMU	Naval Air Material Unit
BCW&SA	Bucks County Water & Sewer Authority	NAWC	Naval Air Warfare Center
BRAC	Base Realignment and Closure	NAS JRB	Naval Air Station Joint Reserve Base
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act	NPL	National Priorities List
CERFA	Community Environmental Response Facilitation Act	OU	Operational Unit
DoD	Department of Defense	PADEP	Pennsylvania Department of Environmental Protection
EBS	Environmental Baseline Survey	PCB	Polychlorinated Biphenyl
ECP	Environmental Condition of Property	pCi/L	picoCuries per Liter
EFH	Essential Fish Habitat	PMO	Program Management Office
EIS	Environmental Impact Statement	ppm	parts per million
FEMA	Federal Emergency Management Agency	RI	Remedial Investigations
ft.	foot/feet	ROD	Record of Decision
IRP	Installation Restoration Program	SDWA	Safe Drinking Water Act
MEC	Munitions and Explosives of Concern	U.S.	United States
NADC	Naval Air Development Center	U.S.C.	United States Code
		USEPA	United States Environmental Protection Agency
		UST	Underground Storage Tank



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EXECUTIVE SUMMARY

This Environmental Condition of Property (ECP) report for the off-base housing areas of the Naval Air Station Joint Reserve Base (NAS JRB) Willow Grove, Montgomery County, Pennsylvania summarizes the historical, cultural, and environmental conditions of the property as part of the United States (U.S.) Navy Base Realignment and Closure (BRAC) documentation associated with 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.

The Naval Air Material Unit (NAMU) was established in 1943 in Warminster, Bucks County, Pennsylvania, where the U.S. Navy coordinated its activities with the National Defense Research Committee and the Special Weapons Experimental Tactical Test Unit (Department of the Navy 1999, UPENN 1982). The NAMU Warminster was then designated the Naval Air Development Station (NADS) Warminster, prior to being changed to the Naval Air Development Center (NADC) Warminster in 1949 (Department of the Navy 1999, UPENN 1982). The NADC Warminster was renamed in January 1993 to the Naval Air Warfare Center (NAWC) Warminster; however, NAWC Warminster was disestablished on September 30, 1996 under the DoD BRAC II program (Department of the Navy 2000). Ownership of two housing areas located on the NAWC Warminster property was transferred to NAS JRB Willow Grove located in nearby Horsham Township, Montgomery County, Pennsylvania. These housing areas include Shenandoah Woods and the Jacksonville Road housing areas (Department of the Navy 1999, Edmond 2006, Szamborski 2006).

The Shenandoah Woods housing area currently encompasses 51 acres in Warminster Township, Bucks County, Pennsylvania, while the housing area on Jacksonville Road covers 2.5 acres in the Borough of Ivyland, Bucks County, Pennsylvania. Both of the housing areas were built prior to 1974 (Department of the Navy 1999).

The Shenandoah Woods housing area contains 199 residential units and includes a youth center, a small store, and a large garage for maintenance equipment (e.g., lawnmowers). The Jacksonville Road housing area includes six single-family houses (Department of the Navy 1999).

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. An Environmental Baseline Survey (EBS) was completed in 1999 for all housing units at NAS JRB Willow Grove including the housing areas on Jacksonville Road and Shenandoah Woods (Department of the Navy 1999).
- **Installation Restoration Program Sites.** The U.S. Navy has identified one Installation Restoration Program (IRP) site, Site 5, known as Operational Unit (OU)-1B (groundwater) and OU-10 (soil) at the Shenandoah Woods housing area. The Navy, in conjunction with the U.S. Environmental Protection Agency (EPA) and Pennsylvania



Department of Environmental Protection (PADEP), issued a No Further Action Record of ROD for OU-1B (groundwater) on 20 June 2000, indicating that no further action is necessary to be protective of human health and the environment (Department of the Navy 2000). The Navy, in conjunction with the USEPA and PADEP issued a No Further Action Record of Decision for OU-10 (soil) on 28 September 2000, indicating that no further action is necessary to be protective of human health and the environment (Department of the Navy 2000).

- **Aboveground Storage Tanks.** There are no historical or existing aboveground storage tanks (ASTs) located at Shenandoah Woods housing area or the Jacksonville Road housing area (Department of the Navy 1999).
- **Underground Storage Tanks.** There are no underground storage tanks (USTs) currently in use at Shenandoah Woods housing area. There are six heating fuel USTs that are no longer in use located at each of the six housing units on Jacksonville Road. Each UST is encased in concrete and located underneath the foundation (Department of the Navy 1999). The tanks have not been cleaned. Removal of the tanks would impact the integrity of the housing structures.
- **Munitions and Explosives of Concern.** According to site personnel, there are no historical or current use or storage of munitions and explosives of concern (MEC) at the Shenandoah Woods housing area or the Jacksonville Road housing area (Szamborski 2006).
- **Hazardous Wastes.** Site personnel have indicated that the Shenandoah Woods and the Jacksonville Road housing areas do not generate hazardous wastes (Szamborski 2006).
- **Polychlorinated Biphenyls.** All transformers within the housing areas are U.S. Navy owned and are considered non-Polychlorinated biphenyls (PCB) (less than 50 parts per million [ppm] PCB or mineral oil). Sampling of the main pad-mounted transformer was conducted at the Shenandoah Woods housing area in 1998. The samples collected indicated that PCBs were found to be less than 1 ppm (Department of the Navy 1999, Reuters 1998).
- **Radiological Materials.** There is no documentation of past or present radiological materials located at the Shenandoah Woods or the Jacksonville Road housing areas (Szamborski 2006).
- **Pesticides.** Pesticide application at the Shenandoah Woods and the Jacksonville Road housing areas are performed by contracted pesticide services, although no documentation was available regarding these activities (Szamborski 2006).
- **Asbestos.** An asbestos survey was conducted as part of a U.S. Navy-wide program to evaluate asbestos in housing areas from 1996 to 1998. The survey indicated that asbestos was found to be present in the Jacksonville Road housing area. Asbestos containing material (ACM) was also determined to be present in the Shenandoah Woods housing area. The two housing areas have been abated by the housing department of NAS JRB Willow Grove and no further action is necessary related to ACM (Department of the Navy 1999).
- **Lead-Based Paint.** A lead-based paint survey has not been conducted for the housing areas (Snyder 2006). Due to the age of initial building construction (prior



to 1974), it is likely that lead paint was used at the housing areas and could still be present.

- **Radon.** A radon survey was conducted including representative sampling of the housing areas with radon levels found to be below the USEPA action level of 4.0 picoCuries per Liter (pCi/L) (Department of the Navy 1999).
- **Air Quality.** The Shenandoah Woods and the Jacksonville Road housing areas do not operate any emissions-generating equipment (Edmond 2006, Szamborski 2006).
- **Drinking Water.** The Shenandoah Woods and the Jacksonville Road housing areas obtain potable water from Bucks County Water & Sewer Authority (BCW&SA), a public utility (BCW&SA 2006, Edmond 2006, Szamborski 2006).
- **Stormwater.** Stormwater at Shenandoah Woods is managed through the use of an existing retention basin, referred to as East Pond, with a 425-foot long drainage swale that directs runoff into the retention basin, and several other storm drains that discharge into the basin (Dewberry & Davis 2005a, Dewberry & Davis 2005b). No information was available on stormwater management at the Jacksonville Road housing area.
- **Surface Water.** There are no surface water features located at the Shenandoah Woods or the Jacksonville Road housing areas (USFWS NWI 2006).
- **Wastewater.** The Shenandoah Woods and the Jacksonville Road housing areas do not operate on-site wastewater treatment facilities. Wastewater generated at the housing areas is conveyed to and treated by BCW&SA, a public utility (BCW&SA 2006, Edmond 2006, Szamborski 2006).
- **Floodplains.** The Federal Emergency Management Agency (FEMA) flood maps of Warminster Township and the Borough of Ivyland areas indicate that there are no portions of housing areas that would be inundated during a 100-year flood event (USDA 2005).
- **Wetlands and Aquatic Habitats.** There are no wetland features or aquatic habitats at the Shenandoah Woods or the Jacksonville Road housing areas (PADEP 2006).
- **Coastal Zone Areas.** The Shenandoah Woods and the Jacksonville Road housing areas are not located in a coastal area; therefore, Coastal Zone Protection Act is not applicable.
- **Coral Reefs.** The Shenandoah Woods and the Jacksonville Road housing areas do not have any coral reef habitat; therefore, coral reef protection is not applicable.
- **Fisheries.** There is no Essential Fish Habitat (EFH) designation for the Shenandoah Woods or Jacksonville Road housing areas due to the absence of on-site surface water features; therefore, the Magnuson-Stevens Fishery Conservation and Management Act is not applicable.
- **Marine Mammals.** The Marine Mammal Protection Act is not applicable for the Shenandoah Woods or the Jacksonville Road housing areas because there is no marine habitat present.
- **Threatened, Endangered, and Other Sensitive Species.** There are no known populations of State or Federally-listed rare, threatened, or endangered plant or animal



species residing at the Shenandoah Woods or the Jacksonville Road housing areas (USFWS 2006).

- **Geologic Hazards.** There are no geological hazards identified at the Shenanhoah Woods or the Jacksonville Road housing areas (PADEP 2006).
- **Historic Resources.** According to the NAWC Warminster Environmental Impact Statement, there are no buildings that possess sufficient integrity required for listing in the National Register (Navy 1998).
- **Archaeological Resources.** The NAWC Warminster Environmental Impact Statement, Phase I Archaeological Survey, indicated that majority of NAWC Warminster was classified as moderate or moderate to low sensitivity for historic or prehistoric resources but there were several areas classified as high sensitivity of historic resources. The Phase 1B Archaeological investigation indicated that these areas did not possess the potential for significant archeological resources due to the extensive subsurface disturbance (Navy 1998).
- **Native American Graves.** According to site personnel, a Final Environmental Impact Statement (EIS), Disposal and Reuse of NAWC Warminster, dated December 1998, concluded that no Native American graves were found at the Shenandoah Woods or the Jacksonville Road housing areas (Szamborski 2006).
- **Solid Wastes.** According to site personnel, the solid waste generated at the Shenandoah Woods housing area is disposed of by J.P. Mascaro and Sons and the housing area along Jacksonville Road is disposed of by Gorski Trash Removal (Borough of Ivyland 2006, Edmond 2006, Szamborski 2006, Warminster Township 2006).
- **Universal Wastes.** According to site personnel, the Shenandoah Woods and the Jacksonville Road housing areas do not generate universal wastes (Szamborski 2006).
- **Medical Wastes.** According to site personnel, the Shenandoah Woods and the Jacksonville Road housing areas do not generate medical wastes (Szamborski 2006).
- **Hazardous Materials.** Shenandoah Woods housing area has a small quantity of hazardous materials associated with the maintenance equipment garage which include fuel and lubricants. Information on the disposal of hazardous materials was not available.



1.0 Purpose

The United States (U.S.) Navy Base Realignment and Closure (BRAC) Program Management Office (PMO) prepared this Environmental Condition of Property (ECP) report for the off-base housing areas (Shenandoah Woods and Jacksonville Road) of the Naval Air Station Joint Reserve Base (NAS JRB) Willow Grove, Montgomery County, Pennsylvania.

This report used existing information to summarize the historical, cultural, and environmental conditions of the housing areas. 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 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

The property of the former Naval Air Warfare Center (NAWC) Warminster, Bucks County, Pennsylvania was originally owned by the Brewster Aeronautical Corporation where aircraft engineering and production was established during the 1940's, and held a contract with the U.S. Navy for the production of Naval aircraft. The U.S. Navy took full control of the property and began a conversion to an aircraft engineering and modification center (UPENN 1982).

The establishment of the Naval Air Material Unit (NAMU) Warminster in 1943, enabled the U.S. Navy to begin mass production of aircraft and eventually become a leader in adapting radar in U.S. Navy planes; NAMU also began to coordinate activities with the National Defense Research Committee and the Special Weapons Experimental Tactical Test Unit during the 1940's (Department of the Navy 1999, UPENN 1982).

The NAMU Warminster was designated the Naval Air Development Station (NADS) Warminster, prior to being changed to the Naval Air Development Center (NADC) Warminster in 1949 (Department of the Navy 1999, UPENN 1982). The NADC Warminster was renamed in January 1993 to the NAWC Warminster; however, NAWC Warminster was disestablished on September 30, 1996, in response to the DoD BRAC II program (Department of the Navy 2000). Ownership of two housing areas, of the original NAWC Warminster property, was transferred to NAS JRB Willow Grove located in nearby Horsham Township, Montgomery County, Pennsylvania. These housing areas include Shenandoah Woods and the Jacksonville Road housing areas (Edmond 2006, Szamborski 2006).



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3.0 Property Description

The NAS JRB Willow Grove off-base housing consists of two non-contiguous land parcels. The Shenandoah Woods housing area currently encompasses 51 acres in Warminster Township, Bucks County, Pennsylvania. The housing area on Jacksonville Road contains six small houses which cover 2.5 acres in the Borough of Ivyland, Bucks County, Pennsylvania (Department of the Navy 1999). Both of the housing areas were built prior to 1974 (Department of the Navy 1999).

The Shenandoah Woods housing area contains 199 residential units and includes a youth center, a small store, and a large garage for maintenance equipment (e.g., lawnmowers). The Jacksonville Road housing area includes six houses (Department of the Navy 1999). Refer to **Figure 3-1** for the locations of the NAS JRB Willow Grove off-site housing areas.

The area of the former NAWC Warminster, including both housing areas, lies within a populated suburban area, containing several acres of a small wooded areas. The Shenandoah Woods housing area is located on Orion Road, Warminster Township, and is generally bound by the former NAWC Warminster and a residential area known as Casey Village (USEPA 2006b).



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4.0 Environmental Condition Overview – Existing Environmental Information

As part of ECP report preparation, activities included record reviews, a meeting at the BRAC PMO Northeast office, a site visit, and personnel interviews to document current and historic conditions of the NAS JRB Willow Grove off-base housing areas including Shenandoah Woods and Jacksonville Road. The meeting at BRAC PMO Northeast office was conducted on 26 September 2005. On-site inspection was conducted on 22 March 2006.

The BRAC PMO Northeast office and personnel located at NAS JRB Willow Grove provided relevant information for this ECP report. Additionally, available reports of previous environmental investigations at the Shenandoah Woods and the Jacksonville Road housing areas were obtained and reviewed. 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 the site visit and in subsequent telephone conversations and e-mail communications.

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.

An Environmental Baseline Survey (EBS) was conducted in 1999 for the housing areas of NAS JRB Willow Grove which included the off-base housing areas of Shenandoah Woods and Jacksonville Road (Department of the Navy 1999).

4.2 Installation Restoration Program Sites

The NAWC Warminster was placed on the National Priorities List (NPL) USEPA ID# PA6170024545) in 1989 (USEPA 2005). 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. NAWC Warminster was placed on the NPL in 1989. The center was subsequently closed under BRAC, and the custody and control of the housing areas were transferred to NAS JRB Willow Grove. One of the sites, Site 5 located at Shenandoah Woods, is currently under the custody of NAS JRB Willow Grove. The identified



source areas have undergone Remedial Investigations (RI) to characterize potential sources of contamination (Department of the Navy 2000). These investigation 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 U.S. Navy has identified one IRP site at the Shenandoah Woods housing area. The IRP site encompasses housing units #401 and #402, paved roadways and walkways, and several housing unit lawns (see **Figure 4-1**). The site originally included trenches that were used as a disposal area for demolition wastes, paints, solvents, scrap metal, aircraft paints, cans and asphalt from the former NAWC Warminster (Department of the Navy 1999, Department of the Navy 2000). Reportedly, the IRP site at the Shenandoah Woods housing area was operated from 1955 to 1970 and was approximately 12 feet (ft.) by 70 ft. by 8 ft. in dimension, and was covered by 2 ft. of fill, graded and seeded.

RI had been conducted in several phases; Phases I, II, and III of the RI were performed at the IRP site between October 1989 and December 1999. The Phase I RI was conducted from 1989 through 1991, and included soil gas sampling, geophysical surveys, air sampling, soil borings, and surface water and sediments sampling (Department of the Navy 2000).

The Phase II RI included the collection of samples of soils, surface water and sediments; in addition, an Aerial Photographic Site Analysis Report was completed during Phase II RI and later resulted in a more comprehensive Phase III RI that began in 1995. The Aerial Photographic Site Analysis Report identified two potential waste trenches, TR3 and TR5, in the area of Site 5. The field activities conducted during the Phase III RI included sampling and analysis of surface soils, subsurface soils, and waste. The results of the Phase III RI field activities were reported and released in a draft Phase III RI report, and resulted in a supplemental soil investigation in December 1999 (Department of the Navy 2000).

The results of all the RI conducted at the IRP site within the Shenandoah Woods housing area were summarized and incorporated into the RI report for the Operational Unit (OU)-10 (soil), which contains several other IRP sites located at NAWC Warminster. The report identifies OU-1B (groundwater), including the site at Shenandoah Woods housing area, and contains an assessment of any risk to human health and the environment (Department of the Navy 2000). The Navy, in conjunction with the U.S. Environmental Protection Agency (USEPA) and Pennsylvania Department of Environmental Protection (PADEP), issued a No Further Action Record of Decision for OU-10 (soil) on 28 September 2000, indicating that no further action is necessary to be protective of human health and the environment (Department of the Navy 2000). A second RI report was released to address the potential impact of the site on area groundwater quality, addressed under OU-1B (groundwater), in August of 2000. The Navy, in conjunction with the USEPA and PADEP, issued a No Further Action Record of ROD for OU-1B (groundwater) on 20 June 2000, indicating that no further action is necessary to be protective of human health and the environment (Department of the Navy 2000).



4.3 Storage Tanks

4.3.1 Aboveground Storage Tanks

There are no historical or existing aboveground storage tanks (ASTs) located at Shenandoah Woods or the Jacksonville Road housing areas (Department of the Navy 1999).

4.3.2 Underground Storage Tanks

There are no underground storage tanks (USTs) in use at Shenandoah Woods housing area; however, heating fuel USTs, that are no longer in use, are located at each of the six housing units on Jacksonville Road. Each UST is encased in concrete and located underneath the foundation (Department of the Navy 1999). The tanks have not been cleaned. Removal of the tanks would impact the integrity of the housing structure.

4.4 Munitions and Explosives of Concern

According to site personnel, there are no munitions and explosives of concern (MEC) at the Shenandoah Woods or the Jacksonville Road housing areas (Szamborski 2006).

4.5 Hazardous Wastes

Site personnel have indicated that neither the Shenandoah Woods or the Jacksonville Road housing areas generate hazardous wastes (Szamborski 2006).

4.6 Polychlorinated Biphenyls

All transformers within the housing areas are U.S. Navy owned and are considered non-polychlorinated biphenyls (PCB) (less than 50 parts per million [ppm] PCB or mineral oil). Sampling of the main pad-mounted transformer was conducted at the Shenandoah Woods housing area in 1998. The samples collected indicated that PCBs were found to be less than 1 ppm (Department of the Navy 1999, Reuters 1998).

4.7 Radiological Materials

There is no documentation of past or present radiological materials located at the Shenandoah Woods or the Jacksonville Road housing areas (Szamborski 2006).

4.8 Pesticides

Pesticide used at the Shenandoah Woods and the Jacksonville Road housing areas are applied by contracted pesticide services, although no documentation was available regarding these activities (Szamborski 2006).



4.9 Asbestos

An asbestos survey was conducted as part of a U.S. Navy-wide program to evaluate asbestos in housing from 1996 through 1998. The survey indicated that asbestos was found to be present in the Jacksonville Road housing area. Asbestos containing material (ACM) was found in roofing materials, wallboard and drywall, as well as piping insulation and expansion joints. ACM was also determined to be present in the Shenandoah Woods housing area in flooring materials, sheet rock, and caulking compound. The housing areas were abated by the housing department of NAS JRB Willow Grove and no further action is necessary related to ACM (Department of the Navy 1999).

4.10 Lead-Based Paint

A lead-based paint survey has not been conducted for the housing areas (Snyder 2006). Due to the age of initial building construction (prior to 1974), it is likely that lead paint was used at the housing areas and could still be present.

4.11 Radon

A radon survey was conducted in a representative sampling of the housing areas with radon levels found to be below the USEPA action level of 4.0 picoCuries per Liter (pCi/L) (Department of the Navy 1999).

4.12 Air Quality

The Shenandoah Woods and the Jacksonville Road housing areas do not operate any emissions-generating equipment (Edmond 2006, Szamborski 2006).

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 drinking wells. The Shenandoah Woods and the Jacksonville Road housing areas obtain potable water from Bucks County Water & Sewer Authority (BCW&SA), a public utility (BCW&SA 2006, Edmond 2006, Szamborski 2006).

4.13.2 Stormwater

Currently, stormwater at the Shenandoah Woods housing area is managed through the use of an existing retention basin, referred to as East Pond, with a 425-foot long drainage swale that directs runoff into the retention basin, and several other storm drains that discharge into the basin (Dewberry & Davis 2005a, Dewberry & Davis 2005b). The retention basin is currently dammed by a 6.5-foot concrete riser and the embankment that supports Patrol Road. The dam outlet consists of a single 30-inch by 52-inch pipe that connects to a municipal stormwater collection system downstream of the basin along Decker Lane (Dewberry & Davis 2005a,



Dewberry & Davis 2005b). Refer to **Figure 4-2** for the location of the stormwater retention basin.

No information was available on stormwater management at the Jacksonville Road housing area.

4.13.3 Surface Water

There are no surface water features located at the Shenandoah Woods or the Jacksonville Road housing areas (USFWS NWI 2006).

4.13.4 Wastewater

The Shenandoah Woods and the Jacksonville Road housing areas do not operate any on-site wastewater treatment facilities. Wastewater generated at the housing areas is conveyed to and treated by BCW&SA, a public utility (BCW&SA 2006, Edmond 2006, Szamborski 2006).

4.14 Natural Resources

4.14.1 Floodplains

The Federal Emergency Management Agency (FEMA) flood maps of the Warminster Township and the Borough of Ivyland indicate that there are no portions of housing areas that would be inundated during a 100-year flood event (**Figure 4-3**) (USDA 2005).

4.14.2 Wetlands and Aquatic Habitats (Special Aquatic Sites)

There are no wetland features or aquatic habitats at the Shenandoah Woods or the Jacksonville Road housing areas (PADEP 2006).

4.14.3 Coastal Zone Areas

The Shenandoah Woods and the Jacksonville Road housing areas are not located in a coastal area; therefore, Coastal Zone Protection Act considerations are not applicable.

4.14.4 Coral Reefs

The Shenandoah Woods and the Jacksonville Road housing areas do not have any coral reef habitat; therefore, coral reef protection issues are not applicable.

4.14.5 Fisheries

There is no Essential Fish Habitat (EFH) designation for the Shenandoah Woods or the Jacksonville Road housing areas due to the absence of on-site surface water features; therefore, the Magnuson-Stevens Fishery Conservation and Management Act is not applicable.



4.14.6 Marine Mammals

The Marine Mammal Protection Act is not applicable for the Shenandoah Woods or the Jacksonville Road housing areas because there is no marine habitat present.

4.14.7 Threatened, Endangered, and Other Sensitive Species

There are no known populations of State or Federally-listed rare, threatened, or endangered plant or animal species residing at the Shenandoah Woods or the Jacksonville Road housing areas (Department of the Navy 2000, USFWS 2006).

4.14.8 Geological Hazards

There are no geological hazards identified at the Shenandoah Woods or the Jacksonville Road housing areas (PADEP 2006).

4.15 Cultural Resources

4.15.1 Historic Resources

According to the NAWC Warminster Environmental Impact Statement, initially there appeared to be several buildings that possessed the required historic or architectural importance necessary to be eligible for listing in the National Register. However, the Pennsylvania Historical and Museum Commission determined that the buildings did not have sufficient integrity required for listing in the National Register (Navy 1998).

4.15.2 Archaeological Resources

The NAWC Warminster Environmental Impact Statement, Phase I Archaeological Survey, indicated that the majority of NAWC Warminster was classified as moderate or moderate to low sensitivity for historic or prehistoric resources but there were several areas classified as high sensitivity of historic resources. The Phase 1B Archaeological investigation for portions of NAWC Warminster was conducted to address the cultural resources issues raised through the Phase I research. The Phase IB survey concluded that these areas did not possess the potential for significant archeological resources due to the extensive subsurface disturbance (Navy 1998).

4.15.3 Native American Graves

According to site personnel, a final Environmental Impact Statement (EIS), Disposal and Reuse of NAWC Warminster, dated December 1998, concluded that no Native American graves were found at the Shenandoah Woods housing area (Szamborski 2006). No information was available on the Jacksonville Road housing areas.

4.16 Solid Wastes

According to site personnel, the solid waste generated at the Shenandoah Woods housing area is disposed of by J.P. Mascaro and Sons while the Jacksonville Road housing area is disposed



of by Gorski Trash Removal (Borough of Ivyland 2006, Edmond 2006, Szamborski 2006, Warminster Township 2006).

4.17 Universal Wastes

According to site personnel, the Shenandoah Woods and the Jacksonville Road housing areas do not generate universal wastes (Szamborski 2006).

4.18 Medical Wastes

According to site personnel, the Shenandoah Woods and the Jacksonville Road housing areas do not generate medical wastes (Szamborski 2006).

4.19 Hazardous Materials

Shenandoah Woods housing area has a small quantity of hazardous materials associated with the maintenance equipment garage which include fuel and lubricants. Information regarding the disposal of the hazardous materials was unavailable.

4.20 Summary of Environmental Conditions

Environmental conditions at the off-base housing areas of the NAS JRB Willow Grove consist of the following:

- Due to the age of initial building construction (prior to 1974), it is likely that lead paint was used at the housing areas and could still be present
- The presence of the six heating fuel USTs at the Jacksonville Road housing area.

Based on the information reviewed, there are no locations on the property that have established land use restrictions that need to be maintained, including the IRP site, when off-base housing areas of the NAS JRB Willow Grove are transferred to other private and public entities.



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5.0 Certification

I certify that the Environmental Conditions of Property Report for the Off-Base Housing Areas of 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 Conditions of Property Report for Off-Base Housing Areas of the Naval Air Station Joint Reserve Base, Willow Grove, Pennsylvania, 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


Signature

5-15-06
Date



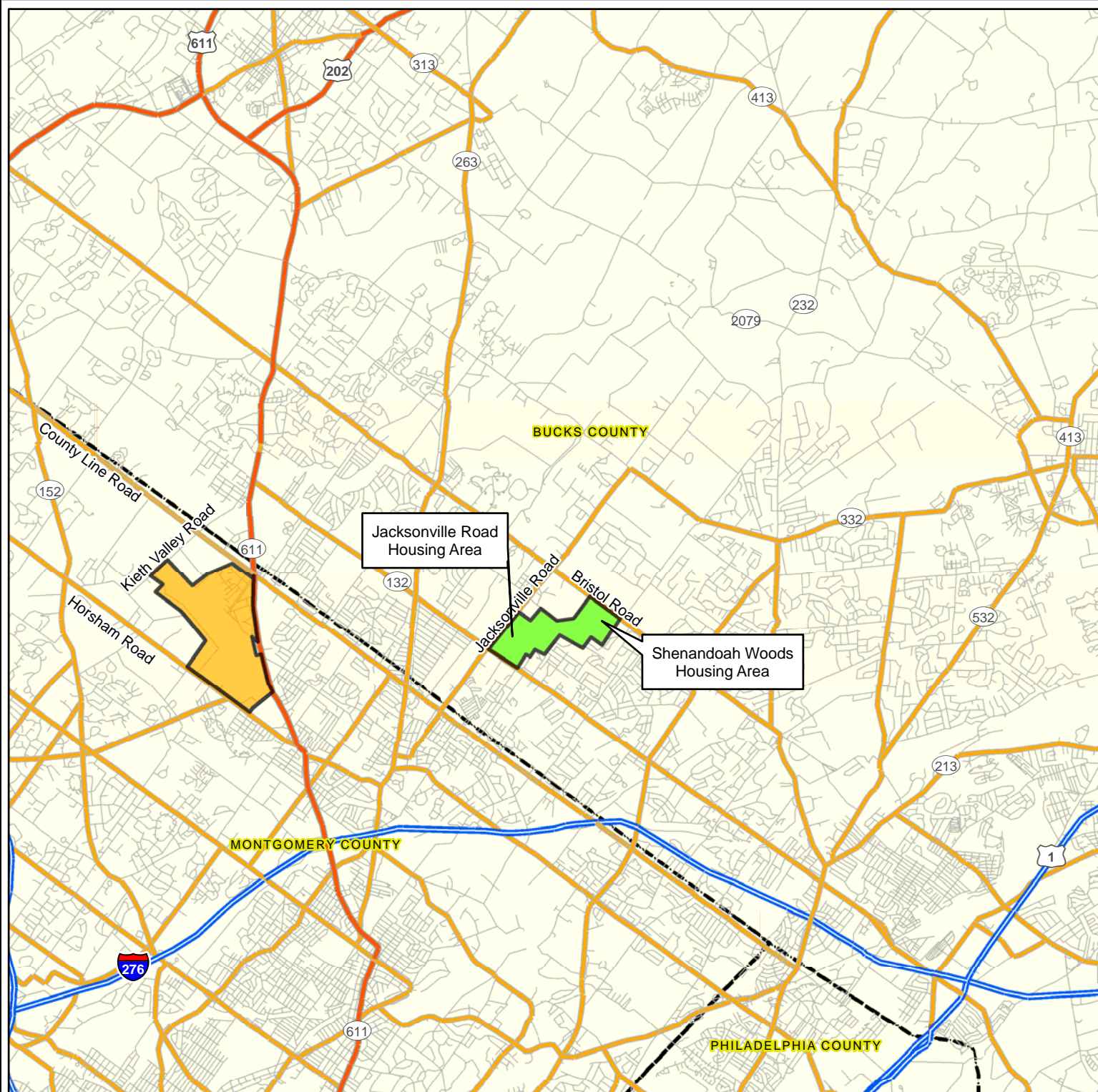
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FIGURES



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LEGEND

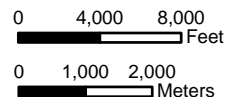
- Former Naval Air Warfare Center Warminster Boundary
- NAS-JRB Willow Grove Boundary
- County Boundary
- Limited Access
- Highway
- Major Road
- Local Road



NOTES & SOURCES

Coordinate System: NAD 83, UTM Zone 19
Data Sources: T1NUS 2004

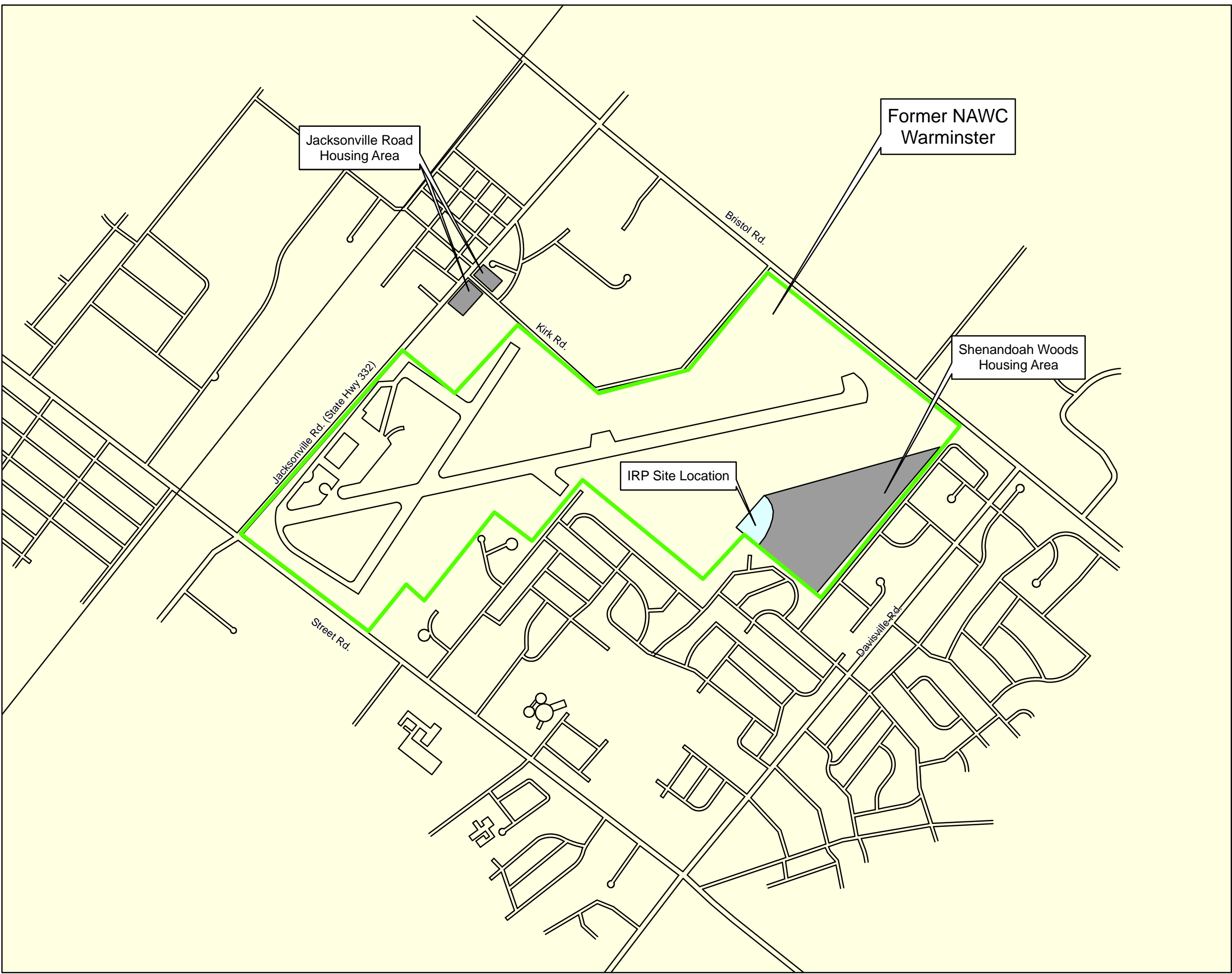
Off-Site Housing Areas
NAS-JRB Willow Grove
Warminster, PA



SITE LOCATION MAP

FIGURE

3-1



TITLE

IRP SITE LOCATION

Off-Site Housing Areas
NAS JRB Willow Grove
Warminster, PA

LEGEND

- IRP Site Location
- NAWC - Former Naval Air Warfare Center Warminster
- Housing Areas

SITE LOCATION MAP



NOTES & SOURCES

Coordinate System: NAD 83, UTM Zone 18
Data Sources: TiNUS 2004, Department of the Navy 2000

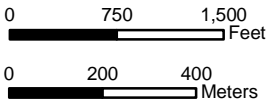


FIGURE
4-1



TITLE

LOCATION OF STORMWATER RETENTION BASIN

Off-Site Housing Areas
NAS JRB Willow Grove
Warminster, PA

LEGEND

Storm Drains

Drainage Swale

Retention Basin

Concrete Riser

NAWC - Former Naval Air Warfare Center Warminster

Housing Areas

Inset Area

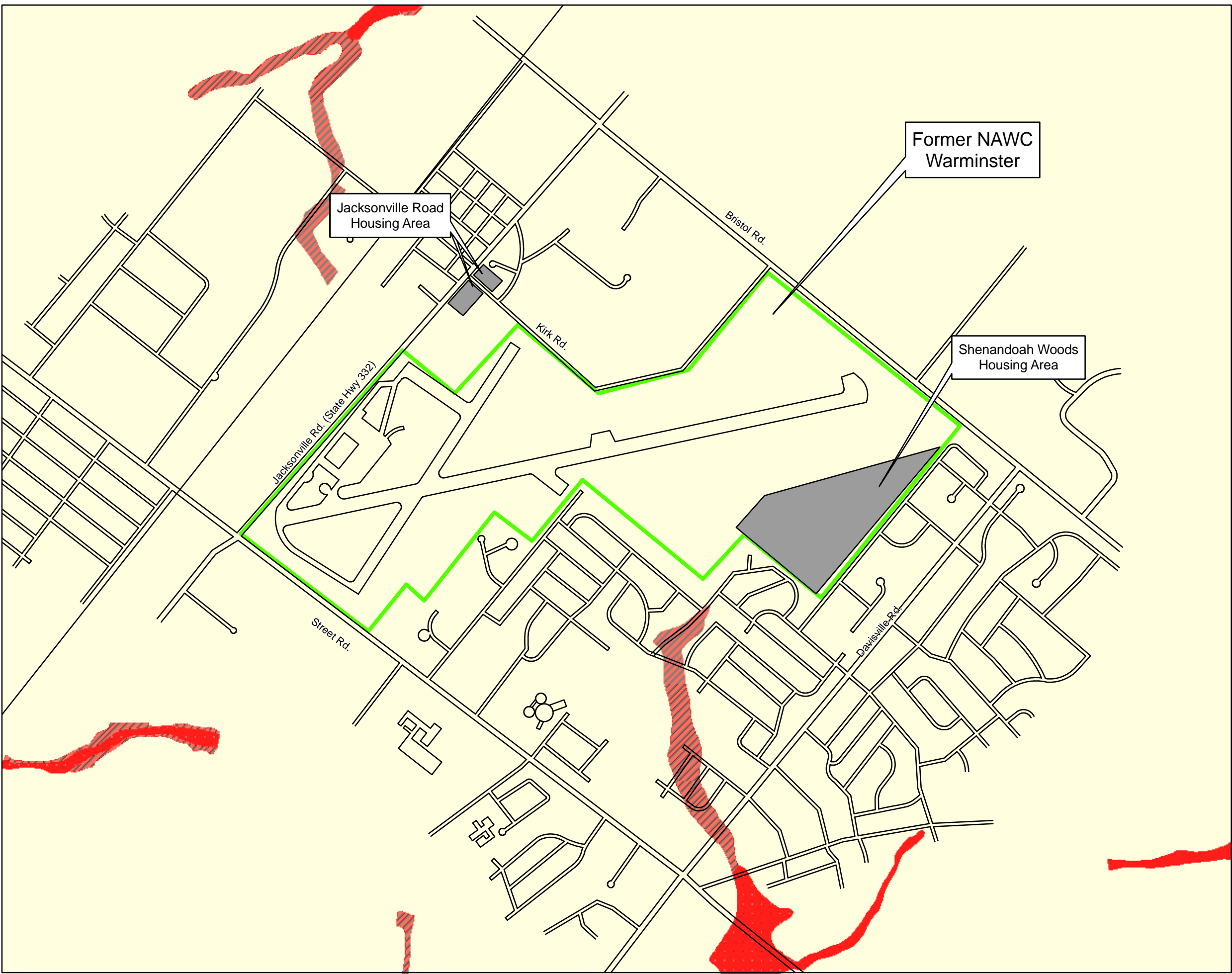
SITE LOCATION MAP

NOTES & SOURCES

Coordinate System: NAD 83, UTM Zone 18
Data Sources: TiNUS 2004, Department of the Navy 2000

0 750 1,500 Feet
0 200 400 Meters

FIGURE
4-2



TITLE

FEMA FLOOD MAP

Off-Site Housing Areas
NAS JRB Willow Grove
Warminster, PA

LEGEND

- FEMA Q3 Zones**
- Area inundated by 100-year flooding, for which no Base Flood Elevations have been determined
 - An area inundated by 100-year flooding, for which Base Flood Elevations have been determined
 - 500-year
- NAWC - Former Naval Air Warfare Center Warminster
- Housing Areas

SITE LOCATION MAP



NOTES & SOURCES

Coordinate System: NAD 83, UTM Zone 18
Data Sources: TtNUS 2004, USDA 2005

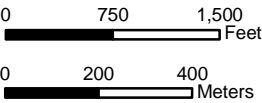


FIGURE
4-3



ATTACHMENT A

References



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ATTACHMENT A

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ATTACHMENT B

List of Contacts



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ATTACHMENT B

List of Contacts

Navy ECP Contacts				
Contact Name (Last, First)	Title/Position	Location	Telephone Number	E-mail Address
DiBuono, John	Engineering	NAS JRB Willow Grove	215-443-6935	john.dibuono@navy.mil
Edmond, Jim	Environmental Coordinator	NAS JRB Willow Grove	215-443-6939	jim.edmond@navy.mil
Hunt, Mary A.	Environmental Engineer	Engineering Field Activity Northeast	610-595-0567, ext. 138	mary.a.hunt@navy.mil
Lewandowski, Bob	BRAC Environmental Coordinator	BRAC PMO Northeast	215-897-4908	robert.f.lewandowski@navy.mil
Monaco, Orlando	Remedial Project Manager	Engineering Field Activity Northeast	610-595-0567, ext. 164	orlando.monaco@navy.mil
Snyder, Thom	Industrial Hygienist	Engineering Field Activity Northeast	(610) 595-0567, ext. 172	thomas.f.snyder@navy.mil
Szamborski, Nancy	Family Housing Director	NAS JRB Willow Grove	215-773-2113	nancy.szamborski@navy.mil

AMEC Contacts				
Contact Name (Last, First)	Title/Position	Location	Telephone Number	E-mail Address
Chow, Daniel	Program Manager	San Francisco, CA	415-597-7420	daniel.chow@amec.com
Hunt, Celeste	BRAC ECP NE Project Manager	Westford, MA	978-692-9090 ext. 315	celeste.hunt@amec.com
Michalkiewicz, Robert	Willow Grove ECP Team Leader	Plymouth Meeting, PA	610-828-8100, ext. 141	robert.michalkiewicz@amec.com
Garrett, Laura	Willow Grove ECP Project Team Member	Plymouth Meeting, PA	610-828-8100, ext. 129	laura.garrett@amec.com



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