# FINAL REPORT

## PHASE I ARCHAEOLOGICAL SURVEY OF THE SM-1 REACTOR FACILITY

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# ABSTRACT

Under contract to the United States Army Corps of Engineers (USACE), Baltimore District, AECOM-Tidewater Joint Venture conducted a Phase I archaeological survey at the SM-1 (Stationary Medium-sized prototype 1) Reactor Facility site on U.S. Army Garrison Fort Belvoir (Fort Belvoir) in Fairfax County, Virginia. The USACE is proposing to decommission the SM-1 Reactor Facility, an undertaking that may require demolishing the facility and significant ground disturbance across the site. This archaeological survey was initiated in order to assist the USACE in meeting regulatory obligations under Section 106 of the National Historic Preservation Act of 1966, as amended. The survey's principal objective was to identify potentially significant archaeological resources, if any, within the Area of Potential Effects (APE).

A pedestrian survey within the immediate vicinity of the SM-1 Reactor Facility was undertaken in 1987 and resulted in the identification of archaeological site 44FX1331. This site was described as a surface scatter of prehistoric lithic artifacts recovered from the beach and terrace near the confluence of Gunston Cove and a small drainage located immediately northwest of the SM-1 Reactor Facility. The area was noted as disturbed in 1987, so this study was undertaken to determine if any intact subsurface deposits associated with 44FX1331 are present within the 1.84-hectare (4.54-acre) archaeological APE and to determine if other potentially significant archaeological resources are present.

Twenty-seven shovel test pits (STPs) were excavated. Due to extremely dense fill deposits in many locations, it was not possible to manually excavate into natural soils in 13 STPs. Primary STPs were placed at 15-meter (m) (49.21-foot [ft]) intervals and radial STPs were placed at 7.5-m (24.61-ft) intervals. Judgmental STPs were excavated as necessary to provide additional coverage.

Nine historic, two prehistoric, and 18 likely modern artifacts (e.g., concrete, asphalt, shingles) were recovered. The 18 likely modern artifacts were discarded in the field. All artifacts were recovered from fill, with the exception of a single quartzite flake recovered from potentially natural soils in the southwest portion of the APE. This location falls within the 44FX1331 site boundaries. Extensive ground disturbances associated with the SM-1 Reactor Facility construction have severely impacted the landform and may have destroyed much of the site's subsurface integrity. As a result, the site is recommended not eligible for inclusion on the National Register of Historic Places and no further archaeological study is recommended.

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# 1.0 INTRODUCTION

AECOM-Tidewater Joint Venture was contracted by the United States Army Corps of Engineers (USACE), Baltimore District to conduct a Phase I archaeological survey within the SM-1 (Stationary Medium-sized prototype 1) Reactor Facility site at U.S. Army Garrison Fort Belvoir (Fort Belvoir) in Fairfax County, Virginia. The USACE is proposing to decommission the SM-1 Reactor Facility, an undertaking that may require demolishing the facility and a significant degree of ground disturbance across the site. The Area of Potential Effects (APE) for this proposed undertaking includes 4.35 hectares (ha) (10.76 acres [ac]) encompassing Buildings 349, 350, 371, 372, 375, and 380, though the archaeology APE is limited to a 1.84-ha (4.54-ac) area in which ground disturbance may occur and within the vicinity of Buildings 349, 350, 372, and 375 in the southwestern part of the APE (Figures 1-1 and 1-2). One prehistoric archaeological site, 44FX1331, was identified by former Fairfax County Archaeologist Michael Johnson via pedestrian survey in 1987 and lies partially within the APE. The current investigation included systematic shovel test pit (STP) excavations to determine if any potentially significant archaeological resources are located within the APE.

Work was conducted in accordance with Section 106 of the National Historic Preservation Act of 1966, as amended (NHPA), the Archaeological Resources Protection Act (U.S. Department of the Interior [USDI] 1979), and the Advisory Council on Historic Preservation's "Protection of Historic and Cultural Properties" (36 Code of Federal Regulations [CFR] 800; USDI 2004). The study also conformed to Army Regulation (AR) 200-1 and the Virginia Department of Historic Resources' *Guidelines for Conducting Cultural Resource Survey in Virginia* (Virginia Department of Historic Resources [DHR] 2011).

Field investigations were conducted on March 2 and 3, 2016. Varna Boyd served as the Principal Investigator. Pete Regan served as the Field Director with support from Field Technician Benjamin Stewart. Lisa Guerre served as the Laboratory Director with assistance from Laboratory Technicians Lora Hull and Benjamin Stewart. Kathy Furgerson served as the GIS Specialist.

Following this Introduction, the report contains seven sections of text: Project Location and Description; Cultural Context; Previous Investigations; Research Design; Results; Summary and Recommendations; and References Cited. Two appendices follow: Appendix A contains the Qualifications of the Investigators and Appendix B contains the Artifact Catalog.


Project APE

Kilometers

0 0.5 1

0 0.25 0.5

Miles

**Figure 1-1. APE Location**

Source: ESRI 2016; Fort Belvoir


**Figure 1-2. APE Boundaries**

Source: ESRI Digital Imagery 2016; Fort Belvoir

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# 2.0 PROJECT LOCATION AND DESCRIPTION

## 2.1 GEOLOGY AND TOPOGRAPHY

Fort Belvoir is located along the west bank of the Potomac River in Fairfax County, Virginia. A physiographic divide splits the county along a southwest-northeast axis dictated by the fall line that approximately follows the Interstate 95 corridor (Hobson 1996; Fairfax County Department of Public Works and Environmental Services [FCDPWES] and Northern Virginia Soil and Water Conservation District [NVSWCD] 2013). To the west of the line, the Piedmont physiographic province rises into uplands and is underlain by resistant, metamorphic parent materials. To the east, the Atlantic Coastal Plain physiographic province extends to the Atlantic Ocean and is underlain by sedimentary rocks and unconsolidated sediments (FCDPWES and NVSWCD 2013).

Fort Belvoir, located immediately east of the fall line, lies within the high and low Coastal Plain Terrace subsections of the Atlantic Coastal Plain physiographic province. Underlying these areas, unconsolidated sand, silt, and clay formations rest atop weathered crystalline rocks, most of which belong to the Potomac Formation Group (Hobson 1996). This group includes interbedded sediments of non-marine origin that reach depths of 183 meters [m] (600 feet [ft]) below the surface throughout most of the post (U.S. Army 2001). Clays, sands, and silts of riverine origin underlie the post's uplands, while its valleys and lowlands are underlain by sedimentary deposits created by moving water (U.S. Army 2001).

Topographic variations within Fort Belvoir include gently undulating uplands, plateaus, steep-walled valleys, riverine terraces, and floodplains. Uplands and lowlands each account for approximately 40 percent of the post's topography, while the remaining 20 percent consists of steeply-sloped ravines and valleys. Elevations range from 0.3 m (1 ft) above mean sea level (AMSL) at the Potomac River shoreline to 70 m (230 ft) AMSL in the uplands. A considerable amount of military engineering has greatly altered many of the post's natural landforms, particularly as ridges were leveled for construction purposes (AECOM 2015). Topographic variations within the APE include terraces above Gunston Cove and heavily modified slopes rising northeast to the upland plateaus.

## 2.2 HYDROLOGY

The Pohick, Accotink, and Dogue Creek watersheds, along with several small, unnamed drainages, drain most of Fort Belvoir and ultimately discharge into the Potomac River either directly or via one of the peninsula's embayments. The Pohick and Accotink Bays are tidal estuaries forming the drowned mouths of their eponymous creeks, both of which form the much larger Gunston Cove estuary that borders the APE to the southwest. Fort Belvoir's watersheds are part of the Middle Potomac-Anacostia-Occoquan hydrologic unit (AECOM 2015). Gunston Cove bounds the APE to the southwest, while a small unnamed drainage is located immediately to the northwest of the APE.

## 2.3 ARCHAEOLOGY APE SOILS

The entirety of the archaeology APE has been mapped as urban land by the United States Department of Agriculture's Natural Resources Conservation Service (USDA NRCS 2016a). Urban soils consist of disturbed deposits with a high degree of taxonomic variability and may be redeposited from local material or entirely exogenous. Because urban soil structure and formation cannot be predicted, it is not possible to define the structure of a typical soil column, though it is expected that non-native urban soils will present as mottled, compacted horizons possibly containing modern debris, cobbles, and gravel superposed above natural strata.

Natural soils are mapped immediately beyond the archaeology APE boundaries and thus provide the best predictive basis for the structure and typology of intact soil underlying the fill deposits. The Sassafras-Marumsco soil complex is the dominant local series. It is well-drained and typically found on terraces and slopes. Tables 2-1 and 2-2 provide a summary of the individual soil series that comprise the complex (USDA NRCS 2016b).

**Table 2-1. Sassafras Series Typical Pedon**

| Horizon | Depth (cm) | Color | Texture |
|---|---|---|---|
| Ap | 0-23 | Brown (10YR 5/3) | Sandy Loam |
| Ba | 23-53 | Yellowish Brown (10YR 5/4) | Loam |
| Bt1 | 53-81 | Brown (7.5YR 5/4) | Sandy Clay Loam |
| Bt2 | 81-102 | Strong Brown (7.5YR 5/6) | Sandy Loam |
| C1 | 102-132 | Strong Brown (7.5YR 5/6) | Gravelly Sandy Loam |
| C2 | 132-178 | Brownish Yellow (10YR 6/8) | Loamy Sand |

**Table 2-2. Marumsco Series Typical Pedon**

| Horizon | Depth (cm) | Color | Texture |
|---|---|---|---|
| Oi | Surface | Variable | Decomposing Organics |
| A | 0-3 | Very Dark Grayish Brown (10YR 3/2) | Loam |
| E | 3-18 | Pale Brown (10YR 6/3) | Loam |
| Bt1 | 18-26 | Brownish Yellow (10YR 6/6) | Clay Loam |
| Bt2 | 26-74 | Brownish Yellow (10YR 6/6) | Clay |
| Btg | 74-119 | Gray (10YR 5/1) | Sandy Clay Loam |
| Cg | 119-191 | Gray (10YR 6/1) | Sandy Clay Loam |

## 2.4 FLORA AND FAUNA

Over a dozen plant communities have been identified on Fort Belvoir, including oak/ericad, beech-mixed oak, tulip poplar-mixed hardwood, Virginia pine, and floodplain hardwood forests among several others. Submerged aquatic vegetation is also present within the Potomac River in the vicinity of Fort Belvoir. The post also supports a wide variety of aquatic, terrestrial, and avian fauna, including river herring, beavers, white-tailed deer, eastern towhee, and Baltimore orioles among many others (AECOM 2015).

## 2.5 CURRENT CONDITIONS AND LAND USE

The archaeology APE includes several structures (Buildings 349, 350, 372, 375), gravel roads and parking areas, asphalt surfaces, fences/gates, infrastructural corridors, and heavily modified landforms associated with its military use. These disturbances have significantly altered natural the topography and soils. Today the area is sparsely used with the exception of occasional vehicular traffic and grounds maintenance.

# 3.0 CULTURAL CONTEXT

## 3.1 PREHISTORIC CONTEXT

The prehistory of the Mid-Atlantic is traditionally divided into three major periods known as Paleoindian (10,000–8,000 B.C.), Archaic (8,000–1,000 B.C.), and Woodland (1,000 B.C.–A.D. 1600) periods. The Archaic and Woodland periods are further subdivided into Early, Middle, and Late periods. These periods are characterized by changes in material culture and/or subsistence strategies.

### 3.1.1 Paleoindian Period (10,000–8,000 B.C.)

The Paleoindian period traditionally begins in North America with the arrival of the first humans from Asia across Beringia, a 1,609-kilometer [km] (1,000-mile [mi]) wide, ice-age land bridge connecting Siberia with British Columbia and Alaska. Microblade technology similar to that discovered at D'uktai Cave in Siberia (circa [ca.] 16,000 B.C.) has been found in the Yukon (e.g., Bluefish Caves), Alaska (e.g., Tanana Valley sites), and the eastern United States (e.g., Meadowcroft Rockshelter and Cactus Hill; Adovasio et al. 1998; Fagan 2000). The peopling of North America is often debated and a number of migration routes have been proposed.

While definitive evidence of human occupation in the Mid-Atlantic region is generally attributed to the Clovis culture with its signature fluted projectile point/knives (PPKs), beginning about 10,000 B.C., traces of earlier occupation are present at a number of regional sites. The Cactus Hill site in southern Virginia (McAvoy and McAvoy 1997), the Meadowcroft Rockshelter site in southwestern Pennsylvania (Adovasio et al. 1998), and the Barton site in western Maryland have all yielded carbon-dates pre-dating Clovis occupation, although no clear diagnostic artifacts have been identified in the earliest deposits at these sites (Wall 2008).

Paleoindian cultures in Virginia are represented largely by isolated surface finds of distinctive fluted projectile points. Brennan (1982) describes numerous finds in the Coastal Plain province likely representing small transient groups of peoples moving through the landscape, as opposed to established populations (Gardner 1989; Turner 1989).

More recent models of Paleoindian societies (e.g., Waguespack and Surovell 2003) describe them as very mobile generalist hunter/gatherers dependent on a broad range of natural resources ranging from large prey to smaller fauna and plant resources. Diets almost certainly included some degree of extinct Pleistocene megafauna (e.g., mammoth and mastodon), though these were not likely the prime dietary sources once thought (e.g., Alroy 1998; Boyd 1989). Gardner (1974) describes a regional settlement pattern for these foragers based on access to outcroppings of high quality stone used in tool making rather than on food resource availability. Jasper outcrops appear to have been favored for quarries and lithic reduction stations. Large multi-use base camp sites were located in floodplains near the quarries where there was access to numerous resources. Smaller transient camps were located around second and third order streams (Gardner 1977).

Gardner's (1977) model was based in large part on his excavations of the Flint Run complex sites in the Shenandoah River Valley. A similar large-sized quarry/base camp complex was identified in eastern Virginia at the Williamson Site in Dinwiddie County, near the city of Petersburg. The 22.25- to 30.35-ha (55- to 75-ac) site is one of the largest Paleoindian sites in eastern North America (Barber and Barfield 1989). Surface finds included approximately 175 fluted PPKs and over 1,000 end and side scrapers. Paleoindian stone tools were also identified in buried contexts at the site (Barber and Barfield 1989). A large number of the isolated fluted PPKs found in eastern Virginia have been sourced to the Williamson quarry. Sites like the Williamson quarry may have served as a central nexus for small, far-ranging populations moving through the landscape but tethered to the quarries. These groups would periodically return after collecting resources and coalesce at the larger base camp sites (Gardner 1977).

It is worth noting that during the Pleistocene period the continental coastline would have been located farther east than it is today. The Chesapeake Bay did not exist in its current configuration at this time, and the tidal tributaries such as the Potomac River would likewise have been lower order watercourses. Rising sea levels during the Early Holocene period flooded former stream margins leaving only sites located in highland regions exposed (Lowery 2000, 2001).

### 3.1.2 Archaic Period (8,000 –1,000 B.C.)

The Archaic period is conventionally sub-divided into the Early (ca. 8,000–6,000 B.C.), Middle (ca. 6,000–3,000 B.C.), and Late/Transitional (ca. 3,000–1,000 B.C.) periods. The Archaic period generally refers to pre-ceramic sites associated with hunter-gatherers that occupied the emerging deciduous forests of the Eastern Woodlands. Human populations living in the region during the Archaic period were adapting to major changes in the environment.

#### 3.1.2.1 Early Archaic Period (8,000–6,000 B.C.)

The Early Archaic period is marked by human adaptations to climate change. With temperature rise came the retreat of glaciers, sea level rise, and changes in the floral and faunal communities (Cleland 1966). These changes manifest in the archaeological record by way of noticeable shifts in settlement and subsistence patterns along with changes in toolkits, reflecting a broader range of resource use.

In the Coastal Plain province, the Early Archaic stone tool tradition is represented by the Palmer and Kirk complexes. Both PPK types are triangular with corner notches and featuring serrated edges (Egloff and McAvoy 1989). The Palmer complex has been dated to the period from approximately 8,000-7,300 B.C., while the Kirk complex has been dated between 7,300 and 6,800 B.C. (Egloff and McAvoy 1989). The Early Archaic toolkit also contained tools such as end and side scrapers, which were also part of the Paleoindian toolkit. Ground stone adzes and other woodworking tools reflect increased woodworking practices (Opperman and Polk 1989; Custer 1989). There was an apparent shift in lithic raw material preferences during the Early Archaic period. At the beginning of the Early Archaic period, there was still a focus on imported stone for tool manufacturing. Tools produced using locally available stone became more prevalent by the time the bifurcate tradition appeared.

Settlement patterns in this period were dictated by the distribution of floral and faunal resources and are therefore scattered across a wider range of environmental zones (Barse and Harbison 2000). The number and distribution of Early Archaic sites across the region likely reflects an adaptation to the abundant and diverse game species that inhabited the rapidly spreading deciduous forests.

White-tailed deer was the most commonly exploited game animal during this period, but the analyses of faunal assemblages from other Early Archaic sites indicate that a wide variety of species were exploited (Formica et al. 2010). The easy availability of animal proteins directly led to a population increase (Formica et al. 2010; Barse and Harbison 2000). Plants in common use at this time included squash, mash, amaranth, and chenopod, which were all indigenous to the East Coast region (Lowery and Custer 1990).

Custer (1990) interpreted available settlement data as indicating a cyclical settlement system model for the Early Archaic period. In this model, Early Archaic groups began a movement "cycle" at the quarries where they produced their lithic toolkit. This toolkit was then carried with the group as they moved among various camps to exploit available resources. While this interpretation demonstrates the continuity between the "tethered nomadic" system seen in the Paleoindian period, it allows for the incorporation of resource seasonality as a determining factor within Early Archaic settlement systems.

The settlement system in the Coastal Plain became characterized by semi-sedentary base camps located along the confluences of major and tributary streams, typically near wetlands (Opperman and Polk 1989). Smaller, extractive camps were located in upland ridges and near smaller tributary streams.

#### 3.1.2.2 Middle Archaic Period (6,000–3,000 B.C.)

During the Middle Archaic period, the Atlantic climatic episode characterized by the continued spread of deciduous forests, an increase in deciduous species, and marked seasonality of plant resources significantly altered the Mid-Atlantic region (Barse and Harbison 2000). The start of the Middle Archaic period coincides with the Altithermal (also known as the Hypsithermal), a significant warming trend. During this time, the effects of sea level rise following deglaciation were visible; extensive riverine swamps formed and river and estuary systems took on their modern configurations.

Stemmed and side-notched projectile point forms are characteristic of the Middle Archaic period. Diagnostic PPKs include Stanly, Morrow Mountain, Guilford, Halifax, Otter Creek, and Brewerton series (Coe 2006; Dent 1995; Hranicky 1994; Klein and Klatka 1991). Mid-Atlantic Middle Archaic sites show considerable regional variability in styles. Monroe and Birkett (2012) argue that this variability results from cultural traditions becoming more geographically circumscribed as repeated use of formal group territories became established.

Increased reliance on collecting and harvesting plant resources also required the development of a more specialized toolkit to process diverse resources. This included the introduction of ground stone tools, which permitted the exploitation of floral resources in new ways (Chapman 1975; Barse and Harbison 2000).

A rise in the number of Middle Archaic sites is indicative of steady population growth. Settlement patterns of the period are defined by a foraging subsistence strategy that emphasized the use of seasonally available floral and faunal resources (Barse and Harbison 2000). Base camps were no longer located adjacent to lithic sources, but were situated near seasonally available resources (Formica et al. 2010). Rising sea levels created numerous freshwater wetlands, swamps, and bogs along the Coastal Plain of Virginia and Maryland. Large Middle Archaic occupations have been identified around Zekeiah and Mattawoman Swamps in southern Maryland and the Dismal Swamp in Virginia as Middle Archaic populations expanded into these newly emerging, ecologically productive environments (Custer 1990).

Nevertheless, the Middle Archaic period is not well represented in the Mid-Atlantic region (Monroe and Birkett 2012). Most period sites have been identified based on diagnostic PPK surface finds. McAvoy (1988) points to a notable increase in the use of hickory nuts at the Slade and Doershuk sites in southern Virginia and northern North Carolina (Coe 1964). Characteristic PPK styles from these sites include the stemmed Morrow Mountain and Stanley points (Egloff and McAvoy 1989).

#### 3.1.2.3 Late Archaic Period (3,000–1,000 B.C.)

The Late Archaic period coincides with the Atlantic Sub-Boreal Transition (ca. 3,000–700 B.C.). This was a warm, dry period during in which open grasslands reappeared throughout parts of the Mid-Atlantic region (Barse et al. 2006). Mouer (1991) divides the Late Archaic into two stages. His Late Archaic stage encompasses the end of the Middle Archaic and continues to ca. 2,500 B.C., at which point there is a shift in settlement and subsistence systems referred to as the Transitional period.

The first Late Archaic stage is characterized by continuity with earlier Archaic cultures and by the exploitation of sylvan resources. The Laurentian Tradition (ca. 4,000–2,000 B.C.) began at the end of the Middle Archaic period and continued into the early Late Archaic period. This tradition is represented by Otter Creek, Vosburg, and Brewerton corner-and side-notched PPK types (Ritchie 1980). Other diagnostic PPKs of the Late Archaic period include the Piscataway, Vernon, and Bare Island/Holmes types of the Piedmont Tradition (Steponaitis 1983). However, Mouer (1991) assigns Piscataway and Vernon points to the Early Woodland period.

In the Coastal Plain province, these cultures are exemplified by the use of side-notched Halifax PPKs and a settlement system strongly adapted to upper river terrace woodlands, with extensions into stream bottomland environments (Mouer 1991). Halifax societies consisted of small forest-adapted groups who intensively exploited local resources and developed strong regional variations of their parent cultures. Interactions were limited between neighboring groups (Mouer 1991). In the Coastal Plain province, these cultures are best represented in the Inner Coastal Plain, particularly along reaches of the James and Chickahominy Rivers in Henrico County (Mouer 1991).

Mouer's (1991) Transitional period (ca. 2,500–1,000 B.C.) is marked by a shift to riverine settlements. This adaptation is viewed as a response to a rise in sea level between 4,000 and 5,000 years ago. Higher sea levels resulted in the saline cline moving upriver in tidal environments. The movement of the saline cline meant that fresh-water spawning fish had to travel further upstream to spawn resulting in seasonal fish runs in the rivers and streams along the coastal plain. Brackish water estuaries developed in the greater Chesapeake area which encouraged the spread of aquatic food species, including oysters and blue crabs (Barse et al. 2006; Gardner 1982; Gardner and Curry 1977).

By this time, the diversity of natural resources being exploited was reflected in the toolkit and the increased number of site types and site locations. Typical of this stage of the Late Archaic period are artifacts that include the multipurpose, broad-bladed PPKs known as broadspears. In addition to their probable use as a hunting tool, Witthoft (1953) has argued that the broadspear PPKs served as fish processing blades, while Catlin et al. (1982) argue for their use in shaping wooden and bone fishing implements. Other finds from period sites include scrapers and drills (often fashioned from re-sharpened PPKs), adzes, celts, net sinkers, anvil stones, and steatite bowls (McLearen 1991). Large shallow stone mortars and grinding stones have been found at Piedmont and Coastal Plain province sites, indicating processing of seeds and mast (Mouer 1991).

The steatite bowls from Late Archaic sites represent the first archaeologically visible, durable container technology in the Mid-Atlantic. It is believed that prior to the appearance of steatite bowls, the prehistoric inhabitants of the region had been using containers made from more perishable organic materials such as wood or woven baskets (Fagan 2000). The most common steatite vessel form is the shallow, round to oblong, thick-walled bowl with an unrestricted opening and opposing lug handles on the side (Dent 1995). Traditionally, these bowls have been interpreted as cooking vessels used in indirect heat cooking, whereby the contents of the bowl were boiled by the addition of heated stones (Dent 1995; Klein 1997).

Other characteristics of the period are increased population density and increased sedentism. This settlement system is characterized by seasonally occupied base camps and associated smaller resource procurement camps as well as relatively large, seasonally occupied macro-band base camps. Base camps are interpreted as representing seasonally shifting occupations consisting of bands comprised of multiple family groups. Macro-band base camps represent seasonal aggregations of multiple bands at sites that were re-occupied each year (Dent 1995; Mouer 1991).

The subsistence base associated with the Broad Blade Tradition riverine settlement system represents a departure from the earlier Narrow Blade Tradition. Broad Blade groups appear to have focused on riverine and inland wetlands with a particular focus on estuarine environments (Dent 1995; Mouer 1991). Estuarine environments seem to have been the preferred location of macro-band camp sites and were most likely associated with harvesting seasonally available resources such as anadromous fish runs and shellfish beds.

Population growth correlates with the intensification of fish harvests and mast and seed processing. These reliable resources would have supported larger populations in one area for a longer period of time. It is not possible to say at this point whether growing populations led to intensified exploitation of a wider resource base or if resource surplus allowed the population to grow; most likely, the two factors were coeval.

A notably higher frequency of Savannah River components, relative to Halifax components, was found at the Doershuk site (Mouer 1991). The same pattern holds true for much of the Coastal Plain and Piedmont provinces (Klein and Klatka 1991). The largest Late Archaic sites on the James River are the Deep Bottom and Bremo sites, located near Richmond, Virginia. These sites are approximately 2.02 ha (5 ac) in size, and contain communal platform hearth features. Mouer (1991) argues that these reflect locations where populations coalesced during spring and summer fish runs. Smaller base camps occupied by extended families or small bands, include sites such as Four Mile Creek in Henrico County. Large steatite bowls found at this site suggest resources gathered from extraction camps were processed at the site, since the large bowls would have been impractical to transport to more transient occupations (Gleach 1986).

### 3.1.3 Woodland Period (1,000 B.C. –A.D. 1600)

The Woodland period is divided into the Early (1,000–500 B.C.), Middle (500 B.C.–A.D. 900), and Late (A.D. 900–1600) periods based on changes in ceramic types, lithic technologies, subsistence patterns, and social development. The Woodland period is marked by the introduction of ceramics, significant population growth, and the development of semi-sedentary and sedentary ways of life. Production innovations, as reflected in ceramic types, have become a significant basis for dating Woodland period site components.

#### 3.1.3.4 Early Woodland Period (1,000–500 B.C.)

There appears to have been little change from the Transitional Late Archaic period and the Early Woodland period. The major distinguishing characteristic is the introduction of ceramic vessels; however, this did not appear to fundamentally change lifeways in the Mid-Atlantic region.

Mouer (1991) argues for continued refinement of the cultural trajectories established during the preceding period.

The earliest ceramic types from the area are the steatite-tempered Bushnell wares, which are followed by sand or crushed quartz-tempered Accokeek wares (Egloff 1991). These ceramics are associated with fishtail and corner-notched PPK types. In particular, Accokeek ceramics are often associated with Calvert and Rossville points (Wesler et al. 1981). Pope's creek ceramic can occur in the Early Woodland period, continuing into the Middle Woodland (Egloff and Potter 1982).

Artifacts characteristic of the Early Woodland period include Calvert, Rossville, Potts, and Piscataway PPK types, some of which are also found in Late Archaic contexts (Dent 1995; Hranicky 1991, 1993, 1994; Hranicky and Painter 1989). Other artifact types include drills, perforators, flake tools, scrapers, bifaces, anvil stones, net sinkers, mortars, pestles, manos, metates, groundstone tools (e.g., axes, adzes, celts), ground slate, gorgets, and tools made from animal bone and teeth.

Settlement patterns in the Early Woodland period are similar to those of the Late Archaic. Early Woodland occupations succeed earlier Late Archaic occupations with little to no evidence of a break in occupation.

Sites are typified by large base camps located in riverine settings, especially near the junction of fresh and brackish water streams (Barse and Harbison 2000). Smaller sites generally associated with specialized ventures are found on or near interior drainages. The hearth features found at Late Archaic sites continue into the Early Woodland and pit features for both storage and cooking become much more common at Early Woodland sites (Klein and Klatka 1991). These features are indicative of an increasingly sedentary lifestyle as greater amounts of labor were invested in non-portable processing and storage facilities.

Mouer (1991) has posited that territorial boundaries were becoming more firmly established during the period and that maintenance of group territories was accomplished by means of buffer zones or overlapping frontiers.

Marcy Creek vessels were fashioned to resemble the flat-bottomed steatite Late Archaic vessel forms. In fact, the clay paste of many of the early vessels was tempered with crushed steatite (Egloff and Potter 1982). Marcy Creek wares are typically recovered from sites dated ca. 1,200–800 B.C.

#### 3.1.3.5 Middle Woodland Period (500 B.C.–A.D. 900)

The Middle Woodland period is not well-defined, and researchers disagree about the exact boundaries of the period. Dent (1995) has referred to this as a period of "technological homogenization" during which "ceramic and PPK variability becomes limited to fewer types" (Dent 1995:235). Despite the presence of fewer ceramic and PPK styles, the Middle Woodland period represents a continuation and further development of cultural complexity that culminated in the Late Woodland period. This is also a time during which large regional trade networks intensified. It is thought that warmer and drier conditions may have prevailed during this period (Kellogg and Custer 1994).

The Middle Woodland period in the Coastal Plain province of Virginia was a period of elaboration of earlier developments. Long-distance contacts and trade networks are indicated by stylistic similarities in artifacts over a broad region, and through the presence of exotic materials at sites. Larger semi-permanent settlements and the possible emergence of an elite class of leaders also points to the development of new ways of managing people and resources (McLearen 1992).

The earliest stages of the Middle Woodland period in the Mid-Atlantic are defined by the presence of crushed quartz or sand tempered ceramics with net impressed exterior surfaces. These ceramics include Broadhead ware in the Delaware Valley, Wolf Net and Colburn wares on Maryland’s Eastern Shore, Pope’s Creek wares on the Delmarva Peninsula, and Prince George net-impressed vessels in southern Virginia (Barse et al. 2006). By ca. A.D. 200, theses wares were replaced throughout the region by the more homogeneous Mockley ceramics.

McLearen (1992) describes a Middle Woodland, Pan-Chesapeake cultural interaction sphere which extended from north of the James River, into northern Maryland, and up to the Delmarva Peninsula. Sites participating in the interaction sphere are defined by the presence of distinctive Mockley ceramics. These are hemispherical or cylindrical vessels that taper into a semi-conical base. They are fashioned from shell-tempered clay and decorated with net-impressed or cord-marked exterior surfaces (McLearen and Mouer 1989). Sites from which these vessels have been recovered generally date between ca. A.D. 200 and A.D. 800 (McLearen and Mouer 1989).

Different diagnostic PPK types are associated with the Pope’s Creek and Mockley phases of the Middle Woodland period. Rossville and Adena points are found at early Middle Woodland sites in association with Pope’s Creek ceramics. Lithic artifacts associated with Mockley ceramics include crudely flaked, side notched and parallel stemmed Selby Bay points or Fox Creek points. These PPK types are followed by terminal Middle Woodland styles such as Jack’s Reef corner-notched (Barse and Harbison 2000; Sperling 2008; Wright 1973).

Trade extended beyond the core of the interaction sphere. Mockley ceramics sometimes exhibit zoned punctate decorations reminiscent of Abbot styles found in the Delaware River Valley region of what is now southern New Jersey (McLearen 1992). These sherds are recovered most frequently from sites close to the James River, as well as from sites in the Inner Coastal Plain (McLearen 1992). Square stemmed, lanceolate Fox Creek and Selby Bay style PPKs fashioned from Pennsylvania metarhyolites frequently co-occur with Mockley sherds (McLearen 1992). Finally, exotic materials and artifacts, reminiscent of the Adena mortuary ritual in the Ohio Valley, have been recovered from some sites, though generally from those on the Delmarva Peninsula (Dent 1995). Access to exotic artifacts is viewed by some authors (e.g., Dent 1995) as evidence for the emergence of social ranking.

Artifacts associated with the Early-Middle Woodland Adena culture of the Ohio River Valley have been recovered at mortuary sites in these areas. Grave goods, such as large ovate late-stage bifaces made from Ohio cherts and chalcedony, tubular pipes made from Ohio pipestone, and ornaments made from Upper Great Lakes copper, have been found at distinct mortuary sites (Dent 1995). These sites have been described as “mortuary-exchange centers” by Custer (1984) based on the presence of imported, exotic exchange goods found at mortuary centers lacking any evidence of habitation.

McLearen (1992) proposes the emergence of a system in which the possession of rare goods would have imbued their owners with increased social status. The increased status may have been earned or inherited, but the occurrence of large sites where populations would have seasonally aggregated (e.g., during fish spawning runs) would have provided opportunity for, and required the care of, managers to successfully exploit the resource base.

The Middle Woodland settlement system and subsistence practices are viewed as a transitional period in Mid-Atlantic prehistory between more mobile collectors of the Late Archaic/Early Woodland periods and the fully sedentary villages of the Late Woodland period (Sperling 2008). Middle Woodland period sites from the Coastal Plain include large macro-social unit settlements, moderately sized, seasonal to semi-permanent seasonal base camps occupied by smaller groups, and small foray or specialized resource extraction camps (Potter 1982). The largest sites are usually near tidal estuaries where access to fresh and salt water resources would have been available. Sites like the Great Neck site near Virginia Beach and the 44HT36 and 44HT37 sites in Hampton Roads include deep, rubbish filled storage pits indicating prolonged occupation (Stewart 1992). These sites also frequently feature dense shell midden deposits. The Maycock's Point site in Tar Bay, Virginia features a deep mussel shell midden dating to ca. A.D. 300–800 (McLearen 1992). A large number of Mockley-ware sherds, including some with Abbot-ware-like designs, were recovered from the site.

Smaller sites, like the Plum Nelly site in Northumberland County, were located along streams associated with marshlands and also include shell midden deposits (Potter 1982). In addition to shellfish, the remains of lowland and upland game, fish, waterfowl, and starchy wetland tubers indicate a rich and varied resource base. Stewart (1992) argues that Middle Woodland populations, though not outright farmers or gardeners, most likely tended to and encouraged stands of economically important plant resources.

#### 3.1.3.6 Late Woodland Period (A.D. 900–1600)

The Coastal Plain during the Late Woodland period is characterized by an increased reliance upon agriculture, more sedentary settlement patterns, and increasing political complexity (Turner 1992). The second half of the period is marked by increased warfare. The last of these societies were those described by English settlers in the early seventeenth century.

Late Woodland sites in the Coastal Plain province are identified by the presence of small triangular and pentagonal PPKs (most likely used with bow and arrow), chipped stone blades, ground stone axes and pipes; shell beads, pendants and gorgets; bone tools like fish hooks and pins; as well as rare exotic materials such as copper beads and pendants (Turner 1992). Ceramics from period sites are shell-tempered, globular vessels with plain, fabric impressed, or incised surfaces. These are collectively known as Townsend wares and their distribution closely mirrors that of the Middle Woodland Mockley ceramics. The distribution of Townsend wares became restricted in the later part of the period as ceramic production became more regionalized and trade decreased (Turner 1992).

While trade between neighbors might have become restricted, the long distance exchange of exotic materials (possibly relating to elites) continued. For example, steatite from West Virginia was used to carve smoking pipes, and at least some of the copper artifacts may be sourced to Great Lakes region quarries (Turner 1992). Potter (1989) described a shell gorget discovered in Stafford County in 1869 as being decorated with an incised weeping eye motif common in the iconography of the Mississippian chiefly societies stretching from Georgia to Oklahoma and as far north as southeastern Wisconsin. Specialized goods were also produced locally. Turner (1992) describes a possible shell-bead workshop at the Great Neck site near Virginia Beach. Shell dust paste, shell cores, and lithic microdrills were all recovered from the workshop area. The refined shells may have been exported out of the area, but may have also been used by local elites. For example, Powhatan's preserved mantle features thousands of marginella shell beads sewn into patterns on a cloak fashioned from four sewn deer hides (Potter 1982). Similarly, the

"Great King of Great Neck" burial featured over 15,000 shell beads in a child's grave (Turner 1992).

Late Woodland people were horticulturists and agriculturalists who relied heavily on tropical cultigens (e.g., maize, beans, and squash). An example of the early use of tropical cultigens exists in the form of cucurbit and legume seeds found at the Reynolds-Alvis site in southern Virginia. The seeds were found in a pit feature radiocarbon dated to ca. A.D. 920 (Gleach 1986). Ethnohistoric data indicate that tropical cultigens comprised a large part of local diets and Turner (1978) suggests the heavy reliance on cultigens may have coincided with local over-exploitation of game. At the Great Neck site, remains of cultigens were identified from 54 percent of all flotation samples (Turner 1992).

Site types range from small extraction camps, agricultural hamlets and dispersed villages, to larger villages (both nucleated and internally dispersed) that were sometimes palisaded. Potter's (1982) survey of the Coan River drainage in Northumberland County identified two general settlement trends. During the first half of the Late Woodland (ca. A.D. 900–1300) the formerly nucleated Middle Woodland populations had dispersed into long arrangements of farming hamlets located along the Coan River's banks. This settlement pattern would have facilitated self-sufficient agricultural families. After A.D. 1300, the society began to coalesce once again into large, mostly sedentary and sometimes internally dispersed villages supported by briefly occupied resource extraction camps.

The nucleated, palisaded villages are characterized by a circular palisade wall enclosing a series of elongated circular wooden post structures arranged around a ring of storage/trash pits which encircles a small open space (Dent 1995). The Late Woodland component of the Great Neck site for example has large palisade posts forming a defensive perimeter around a nucleated village (Egloff and Turner 1984).

The internally dispersed village settlement type is characterized by widely separated residential structures dispersed within a core area and is associated with Townsend/Rappahannock ceramic wares (Potter 1993). These settlements are not bound by a palisade and individual residences may be nucleated or widely dispersed over multiple acres, but are not as rigidly organized and are more widely separated than those found at palisaded villages sites (Turner 1992). Examples of this type of settlement include the White Oak Point site in Westmorland County and the Boathouse Pond site in Northumberland County (Potter 1982). These types of sites have a wider distribution throughout the Coastal Plain compared to the palisaded villages (Turner 1992).

In addition to villages, hamlets, and specialized extraction camps, the Late Woodland period archaeological record includes large ossuary sites. Large ossuaries containing human remains and few grave goods have been found throughout the Mid-Atlantic (Dent 1995). Exotic items, such as those found in Early and Middle Woodland period mortuary contexts, are absent from Late Woodland ossuaries. The ossuary tradition involved the disinterment, bundling, and re-interment of individuals into a single burial. One of the largest concentrations of single internments was found at the Hatch site in Prince George's County near the city of Petersburg (Peebles 1983). The site also included over 100 ritual dog burials, two of which were associated with articulated human forearms.

The coalescence of settlements into larger villages corresponds to developing social hierarchies and possibly warfare. The former is best known from the ethnohistoric record of the late sixteenth and early seventeenth centuries. The Powhatan chiefdom was perhaps the most complex and widespread in the region. It had developed only decades prior to sustained European contact by absorbing many of the smaller local polities (Feest 1978; Turner 1992). The chiefdoms were inherently short-lived and unstable, and lacked the material signatures of many ranked societies located elsewhere (e.g., monumental architecture, an elaborate mortuary tradition for the elites in southeastern societies).

The rise of elites and the introduction of a reliable food source coincided with increased warfare in the area. Not only did fortified villages become more common, but less porous regional boundaries appear to have formed. Archaeologically, this is visible in the restricted range of the formerly widespread Townsend wares, which are found only in what were historically known as Powhatan territories by the end of the Late Woodland period (Turner 1992). Inter-tribal warfare also is evident following European contact and in the century preceding it. For example, Feest (1978) writes of the Powhatan expansion at the end of the sixteenth century and of the depopulation of the Virginia Peninsula by Chesapeake tribes shortly before 1607.

### 3.1.4 Contact Period

The Contact Period marks the entrance of Europeans into North America. Early exploration of the Chesapeake Bay area began in the late 1500s. Shortly thereafter, in 1608, Captain John Smith documented contact with local populations along the Potomac and Patuxent Rivers.

Native American culture at the time of contact was a continuation of the Late Woodland lifeways. Artifact assemblages and site types from the Contact period are not unlike those from Late Woodland sites, with the exception of the presence of variable amounts of European-manufactured goods or objects fashioned from repurposed European materials (Hodges 1993). These include brass gorgets, English and Dutch shell and glass beads, copper and brass kettles, as well as axes and knives, among others. For example, excavations at the Potomac Creek site in Stafford County, led to the recovery of glass beads, copper and lead buttons, hawk bells, copper chains, scissors, an abacus and other copper ornaments, from within a palisaded Late Woodland village (Hodges 1993). Down-the-line exchange with other Native American groups meant that access to European goods often preceded contact with actual Europeans (Hodges 1993). The European goods and materials did not dramatically affect existing lifeways following their incorporation into existing indigenous cultural systems (Hodges 1993).

European exploration and settlement of the Mid-Atlantic region continued through the 1600s. Relations between the Native Americans and the Europeans were marked by periods of peaceful coexistence interrupted by times of tension and hostility. Europeans had taken an aggressive role in claiming lands and driving the Native Americans out by the 1650s. Disease and warfare virtually exterminated the extant cultures, and those that survived were eventually forced out of their homelands or integrated into European society (Hodges 1993).

## 3.2 HISTORIC CONTEXT

DHR (2011) has developed eight historic periods that form the basis for the development of historic contexts. These periods and themes reveal the patterns of historic development both at the local and state levels and aid in the identification and evaluation of archaeological resources. These periods include Settlement to Society (A.D. 1607–1750); Colony to Nation (A.D. 1751–1789); Early National (A.D. 1790–1829); Antebellum (A.D. 1830–1860); Civil War (A.D. 1861–1865); Reconstruction and Growth (A.D. 1866–1916); World War I to World War II (A.D. 1917–1945); New Dominion (A.D. 1946–Present). For the purposes of this discussion, the twentieth century periods have been condensed into a single World War I to Present period.

### 3.2.1 Settlement to Society (A.D. 1607–1750)

From the time of English settlement in Virginia, the area that includes Fairfax County was a part of the vast region known as the Northern Neck. Beginning at the Chesapeake Bay, between the mouths of the Potomac and Rappahannock Rivers, the Northern Neck extended west to the rivers' headwaters in the Allegheny Mountains. In 1648, the entire Neck became Northumberland County. Westmoreland County was taken from Northumberland County in 1653, and Stafford was formed in 1664.

European settlement in Northern Virginia began with fur trading in the early seventeenth century. One early pattern of trade between English and Dutch settlers and native groups was the exchange of European commodities (e.g., pots, hardware, foodstuffs, and guns) for beaver pelts, which were taken to Europe and manufactured into felt, primarily for use in hat manufacture. Terms for commerce were dictated by an alliance between the Susquehannock Indians of the Upper Chesapeake Bay and Dutch and English traders (Harrison 1987).

The earliest colonial settlement in Fairfax County was along the Potomac River during the 1640s and 1650s. Like elsewhere in Virginia, early settlement in the Northern Neck centered along the major navigable rivers, including the Potomac and Occoquan Rivers. One of the first land grants in what would become Fairfax County was issued to Robert Turney in 1651 for 853.48 ha (2,109 ac) on the peninsula bounded by Pohick Creek, the Potomac River, and Occoquan River (where the historic Gunston Hall now stands; Netherton et al. 1978). The court had granted more than one hundred patents for land along the Potomac River from the Occoquan to Great Falls by 1680. Most of these grants were speculative. The grantees generally did not occupy the land, but instead sent slaves or tenants to establish a residence and claim the land (Netherton et al. 1978). All of the land that would eventually comprise Fort Belvoir was patented and subdivided by 1690 (Fort Belvoir 2016a).

In 1702, when Robert Carter became an agent for the Northern Neck proprietors, there were few Europeans living in what is now Fairfax County. Carter began an aggressive campaign to acquire and seat the lower Piedmont area. He patented land in the names of his sons, daughters, and grandchildren, eventually obtaining 133,546.62 ha (330,000 ac) of land in Virginia, including land along Kettle Run, Broad Run, Bull Run, and the Occoquan River. He became known as "King" Carter as a result of his land dealings. The Northern Neck, more specifically the acreage between the Potomac and Rappahannock Rivers, was given to Thomas Lord Culpepper. Later conveyed to his daughter, the Lady of Fairfax, it became known as the Fairfax Proprietary (Traver and Ralph 1988).

Virginia Governor Alexander Spotswood made a treaty that forced tribes of five Indian nations to move west of the Blue Ridge Mountains in 1722 (Harrison 1987). Once the threat of Indian confrontations had decreased, Piedmont land grants were easier to obtain, and settlement of Piedmont Virginia followed. From the river, the colonists spread out into the backcountry using smaller tributaries of the Potomac River as access routes.

A population increase led to the formation of Prince William County from the northern part of Stafford County in 1731. The new Prince William courthouse was situated on the Occoquan River. The presence of the courthouse near what would become Fairfax County spurred an expansion of settlement in the area. Early eighteenth century land grants included tracts of 4,451.54 to 8,093.71 ha (11,000 to 20,000 ac) issued to land speculators like the Carter family. Numerous 80.94- to 202.34-ha (200- to 500-ac) tracts were issued to people actually seeking to reside in northern Virginia (Netherton et al. 1978). In 1742, Fairfax County was formed out of the northern half of Prince William County. The first courthouse in the newly formed Fairfax County was located along the Eastern Ridge Rolling Road (now Route 7) near what is now Tyson's Corner.

During this period, tobacco plantations and their owners dominated the economic, judicial, and social life in the county. Towns were developing as commercial centers and tobacco warehouses were established in these areas. Early public warehouses in what is now Fairfax County were located on the Occoquan River, Pohick Creek, Hunting Creek, and Pimmit Run (Netherton et al. 1978). Virginia planters relied on seagoing vessels for the transport of goods to the English consumers, but for local traffic roadways were of equal importance. The King's Highway (now Route 1) was one of the first roads established for postal service to the developing towns in northern Virginia. The highway crossed the Occoquan River at Colchester and led to Alexandria, one of the region's largest ports (Harrison 1987).

During the 1730s Colonel William Fairfax developed his Belvoir plantation on 890.31 ha (2,200 ac), much of which would eventually become Fort Belvoir (Figure 3-1). The Belvoir manor house was completed in 1741 and became a symbol of elegance and prosperity alongside Fairfax's fellow northern Virginia elite landholders. Fairfax departed for England in 1773, offering his home for rent in his absence. Ten years later, the mansion and many of the surrounding buildings burned and fell into ruin. The lost buildings were not reconstructed, and what little remained was devastated during the War of 1812. A four-day engagement between British and American forces on Belvoir's shore resulted in British shells obliterating the ruined manor house (Fort Belvoir 2016b, 2016c).

### 3.2.2 Colony to Nation (A.D. 1750 –1789)

The eighteenth century saw a significant increase in population and wealth in Fairfax County, including the formation of port towns like Colchester and Alexandria. The population of Fairfax County increased by 85 percent between its 1742 formation and 1754 (Netherton et al. 1978). The population of Fairfax County increased by an additional 95 percent between 1757, when Loudon County was formed from western Fairfax County, and 1773 (Netherton et al. 1978).

The House of Burgesses issued a charter for the town of Alexandria in 1749. As a port city, Alexandria took a central place in the commerce, trade, and economy of Fairfax County. A class of wealthy citizens arose in the county. The Fairfax County courthouse was moved to Alexandria in 1753, encouraging new business and settlement in the town. Alexandria boasted a courthouse, jail, six ordinaries, warehouses, a kiln, and both small, rustic houses and more substantial brick, Georgian style houses by the 1750s. By the 1760s, the town included carpenters, merchants, doctors, wig makers, and a school. By the end of the eighteenth century, Alexandria ranked third in traffic among port cities in the new United States.

England increased its demand for grains and flours during the late eighteenth century. In response, farming practices gradually changed and grains were produced in greater quantities. New market outlets developed and grains were transported to market primarily by wagons. In order to process this grain, grist mills sprang up along the Fall Line. These mills continued to be prevalent in the region well into the nineteenth century. The water-powered mills often spawned new communities as other merchants began to locate near the mills. The landscape underwent change as cultivated fields replaced forests and new infrastructure led to the development of burgeoning communities (Netherton et al. 1978).

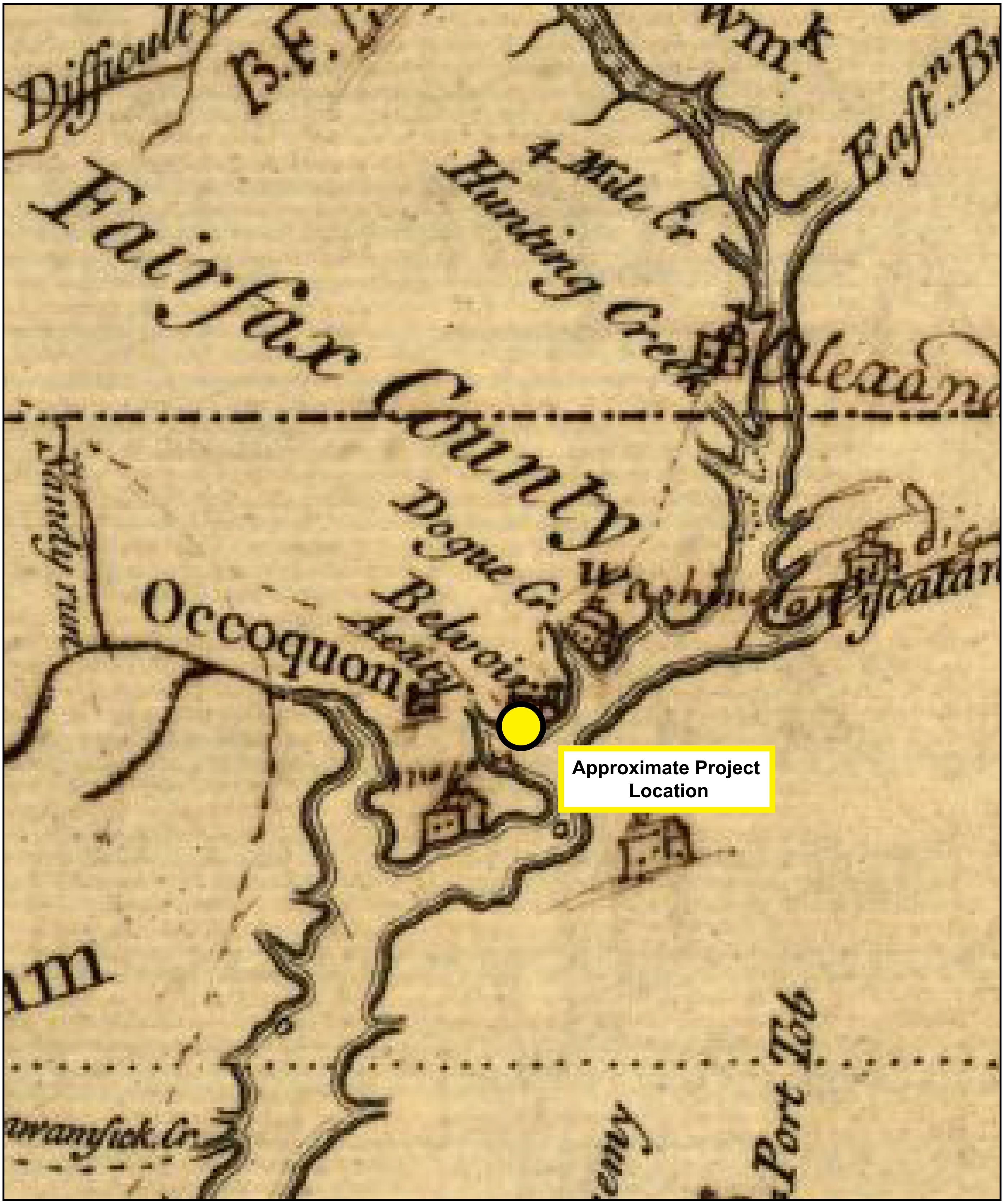



**Figure 3-1. Belvoir Plantation Shown on 1736-1737 Survey of Northern Neck**

Source: Warner 1736-1737

Colonists signed the Declaration of Independence in 1776, starting the Revolutionary War. The residents of the Potomac River towns and outlying areas came together in opposition to British colonial practices, joined by the slogan of “no taxation without representation.” The Fairfax Militia was involved in skirmishes with British troops along the Potomac by 1776. In August, the British fleet was situated off the coast of Virginia. Merchants and British natives unsympathetic to the revolutionary movement were required to leave the country. Generals Washington and Rochambeau and their troops traveled along the King’s Highway en route to and from the battle of Yorktown. They camped at Alexandria and Colchester in Fairfax County, and the generals spent time at Mount Vernon.

### 3.2.3 Early National and Antebellum Period (A.D. 1789–1860)

In Fairfax County, citizens were focused on rebuilding the economic base of the county following the Revolutionary War. Previously wealthy landowning families experienced hardship due to soil depletion, collapse of the tobacco trade, and division of farms into smaller and smaller parcels, generally through inheritance (Netherton et al. 1978). Some experimentation in different agricultural techniques, including the use of fertilizers, a diversified crop base, and implementation of a crop rotation system, resulted in higher crop yields. The earlier trend away from tobacco cultivation toward wheat and corn cultivation continued, intensified by the break with England.

New mills were built to process the increasing amounts of grain harvested in the region. This led to an eventual shift away from family or neighborhood mills toward merchant milling, where millers bought grain and sold flour products for profit (Netherton et al. 1978). Grist mills were often located near or combined with other types of mills and other businesses.

A segment of eastern Loudoun County was returned to Fairfax County in 1797, a change that was originally proposed in 1789. The Fairfax County courthouse was then moved from Alexandria to the center of the newly expanded county. The courthouse was built on Richard Radcliff's property along Ox Road and opened in 1800 (Netherton et al. 1978). The courthouse complex included the courthouse, jail, clerk’s office, brick tavern, kitchen, stable, and storehouse; a poorhouse and gallows were added by 1803 (Fairfax County Deed Book B-2; Netherton et al. 1978). The town of Providence grew around the courthouse complex and the intersection of Ox Road and the Little River Turnpike, begun in 1802. The town was incorporated as Providence in 1805 and renamed Fairfax in 1875.

Rapid progress was made in transportation throughout Northern Virginia. The Potomac Canal Company was formed in 1785 with the goal of creating a canal system to improve navigation on the Potomac River. The State of Virginia poured funds into the project that eventually opened its locks at Potomac's Great Falls. This canal system was not extensive or reliable enough to meet the needs of large ports such as Dumfries or Alexandria. The C&O Canal and Alexandria Canal systems, engineered during the early nineteenth century, were more successful. With increased settlement of the fertile piedmont areas in northern Virginia, new turnpike roads were built using a combination of private and public funds to facilitate the carriage transport of raw produce and goods to commercial centers where secondary processing, packaging, and shipping could follow. The Little River Turnpike (U.S. Route 50), completed in 1806, was one of the first to be constructed. Work on the Middle Turnpike, also known as the Leesburg Turnpike (Virginia Route 7), began in 1818 and provided a thoroughfare between Leesburg and Alexandria. The Orange and Alexandria Railroad and the Manassas Gap Railroad were built by the late 1850s to link western Virginia to commercial centers such as Alexandria.

With improved agricultural methods, less land could support more people. Better roads also facilitated the transportation and marketing of crops. A natural outgrowth of the combination of these improvements was the division of land into smaller farms. The 15 parcels of original land grants had been divided into nearly sixty parcels by 1830–1850. Salient changes in agricultural techniques had led to relative prosperity in the agricultural community by the 1860s. The use of modern machinery, such as improved plows, superseded the use of hand tools. Corn was planted with mechanical drills and the cradle replaced the scythe or sickle in harvesting grains (Poland 1976). As witness to this rural prosperity, the area boasted numerous “large and exuberant” antebellum farmhouses (Chittenden et al. 1985).

The economic improvements of the region were not shared by all segments of the population. Slavery continued to be a common practice in the state, but not to the extent that it was in states farther south. Virginia’s small farmers had gradually discovered that there was no economic incentive to maintaining enslaved African-Americans and had begun to shift away from their reliance on enslaved labor. Nonetheless, Virginia was a slave-holding state in the national debates on slavery, and in debates about the power of the central government to control the growth of the nation and the rights of individual states and citizens. Shortly after the first shots were fired in the Civil War, Virginia seceded from the United States with the rest of the South.

### 3.2.4 Civil War (A.D. 1861–1865)

Considerable military activity took place in eastern Loudoun and western Fairfax counties during the Civil War because of its proximity to Washington, D.C. Both the Confederacy and the Union had troops in these counties at different times during the Civil War. Battles, raids, and retreats took place in and around the rolling fields and towns of Loudoun and Fairfax counties. Farmhouses served as camps and field hospitals. The roads and railroads in Fairfax County provided access routes for soldiers and supplies. Open agricultural lands were often used as troop assembly and staging areas. Skirmishes and raids on the countryside led to destruction of farm buildings, houses, crops, and herds. The devastation wrought by these activities severely limited the ability of the area to produce food and clothing (Wagstaff 1974).

### 3.2.5 Reconstruction and Growth (A.D. 1865–1914)

The post-Civil War period was a difficult time for Virginia. Although efforts were made to repair the damage caused by the war, the devastation was too extensive to make that task either easy or short. Farmers resumed production, but the cash needed to rebuild the buildings and for necessary improvements was not always available. The labor force had also been severely stressed by losses during the war and by the abolition of enslaved labor. Plantation agriculture was replaced with tenant farming. For the first post-war years, farm produce brought good prices. Prices fell to pre-war levels within a few years. As time passed, improvements were made in agricultural techniques and machinery and new livestock breeds were introduced.

The state began to improve its economic situation by the last decades of the nineteenth century. New roads and railroads were constructed. Manufacturing increased in the large cities such as Richmond and Petersburg. Rural industries dependent on local agricultural products improved and contributed to the economic health of the general population. The major railroad systems extended their tracks into small northern Virginia towns. With the advent of refrigerated box cars in the 1870s, the first commercial dairies were established.

### 3.2.6 World War I to Present (A.D. 1915–Present)

Prior to World War I (WWI), northern Virginia experienced a period of growth. Technology developed quickly as telephones, electricity, and automobiles became more common. The major impact of WWI was an increase in prices for farm commodities and the solidification of national unity. Much of the income of Fairfax County farmers at this time came from dairying.

Following WWI, the area witnessed the rise of the city and its suburbs and the slow decline of the family farm. After World War II (WWII), land development in the county increased and the construction of suburban homes proceeded rapidly. An intense period of development, coupled with dramatically rising land prices, made farming difficult following WWII and many of the county's farms simply vanished (Netherton et al. 1978).

By the 1950s, the trend was moving away from agriculture and dairy farming. New schools and churches were established to accommodate the post-war population increase. The expansion of the Federal Government and the addition of large corporate offices and new highways in the late 1960s and early 1970s facilitated the movement of people into the county. During the last two decades, commercial and residential development has been extensive throughout Fairfax County.

### 3.2.7 Fort Belvoir

The origins of Fort Belvoir date to 1910 when the federal government acquired large swaths of land on and near the present-day post (R.C. Goodwin and Associates, Inc. [RCGA] 2001). Engineers from the Washington Barracks began using the grounds in 1912 for training exercises, which were converted into Camp A.A. Humphreys in January 1918 following America's entry into WWI the preceding year. An additional 1,335 ha (3,300 ac) were added to the camp in 1918, and a large-scale construction program was initiated to accommodate a predicted influx of 20,000 service members. The Washington-Richmond Highway (U.S. Route 1) was paved and linked to the camp via a plank road and 790 temporary wood-frame buildings were erected to house camp facilities, staff, and service members. The camp was fully operational within four months and served as the operational base for a variety of schools, including the Army Gas School and the School of Military Mining. At the end of WWI, the camp became a demobilization center for returning troops (AECOM 2015).

Following WWI, the Engineer School relocated to Camp A.A. Humphreys, which had grown to include approximately 2,428 ha (6,000 ac) by 1919. A few years later, the camp was redesignated Fort Humphreys when it was accorded permanent status in 1922. In 1926, the army began a massive building program across the nation, and many of the fort's notable buildings owe their creation to this initiative. Wrought in the colonial revival style, these iconic buildings include a hospital, administrative facilities, barracks, and officer housing among others (AECOM 2015).

The name Fort Belvoir was adopted in 1935, possibly as a result of President Franklin D. Roosevelt's visit to nearby Gunston Hall, an iconic eighteenth century mansion located across Gunston Cove. As Gunston Hall's owner Louis Hertle expounded on the area's rich history, the President may have been inspired to rename the fort for the Belvoir estate which once stood on its grounds (AECOM 2015).

With the onset of WWII, an additional 1,214 ha (3,000 ac) were acquired for the new Engineer Replacement Training Center which, at the war's height, trained approximately 5,000 engineer soldiers each month. The influx of WWII soldiers required a second massive construction program in which wood-frame housing units were built for approximately 24,000 service members (AECOM 2015).

Following WWII, Fort Belvoir became a research and development facility. This new mission is embodied in the SM-1 nuclear power plant, which served as the first national nuclear training facility for military personnel (AECOM 2015). The reactor was constructed in 1957 as the U.S. Army's first nuclear power plant prototype and served as a national military training facility and constitutes the first water-pressurized nuclear reactor to operate within the U.S. (Figure 3-2) The nuclear fission of Uranium 235 generated in the plant's core heated water to produce steam, thereby turning a turbine and associated generator to produce electricity (Friedlander et al. 1992).

The plant symbolizes technological advances in the pursuit of nuclear power as well as Fort Belvoir's role as a premier research and development facility for the U.S. Army's engineers. The Atomic Energy Commission and the Department of Defense jointly developed the SM-1 as a power plant that could be airlifted piecemeal to remote military bases and reassembled (RCGA 2001). This meant that isolated military installations no longer had to rely on vulnerable supply lines and on-site fuel storage facilities.

The SM-1 Reactor Facility was nominated for inclusion in the NRHP in 1992 under Criterion A for its association with significant events in military and industrial history (Friedlander et al. 1992). At the time of its nomination, the 12.14-ha (30-ac) facility included five contributing buildings and two contributing structures. In addition to the power plant, the facility included a sewage pump station, a sentry station, a pumphouse, a waste retention building, an electronic equipment facility, and an emergency siren, all of which date to the early 1960s. The SM-1 reactor was initially decommissioned in 1973.

Between 1950 and 1980, Fort Belvoir became host to several organizations, including the Defense Mapping School, the Defense Systems Management College, and the DeWitt Hospital. Despite its sprawling campus of several thousand acres, a shortage of available training land at Fort Belvoir prompted the Engineer School to relocate to Fort Leonard Wood, Missouri, in 1988. As the installation's role as a training facility waned, the post continued to operate in a support and administrative capacity for its partner organizations. A series of Base Realignment and Closure (BRAC) legislations between 1989 and 1995 resulted in the relocation of several large agencies to Fort Belvoir, including the Defense Logistics Agency. Other agencies were relocated to Fort Belvoir for increased security after the September 11, 2001 terrorist attacks, including the Army Materiel Command and the Defense Threat Reduction Agency (AECOM 2015).

These influxes were followed by another BRAC action in 2005 which resulted in a near doubling of the post's size. A $4 billion construction program ensued during which new buildings, roadways, and infrastructure were built while many existing facilities were extensively renovated. This construction program stands as the largest of its kind in U.S. military history, helping the fort to maintain its position as a strategic base for the support of American military forces across the globe (AECOM 2015).

### 3.2.8 Historic Maps and Aerial Photographs

Historic maps and aerial photographs were examined in an effort to determine if any historic occupations were present within the vicinity of the SM-1 Reactor Facility prior to its development. Robert Knox Sneden's March 1861 Map of Mount Vernon, Virginia and Vicinity provides the earliest depiction of nineteenth century settlement along the Belvoir peninsula. The map shows three residences on the peninsula in addition to a hotel and the "White House

**Figure 3-2. 1957 Photograph of the SM-1 Reactor Facility**

Source: U.S. Army n.d.

Pavilion" (Figure 3-3). One of the residences, attributed to the Blackburn family, is shown within the vicinity of the APE while those of the Burke and Nicholson families are located to the north and northwest. A more detailed image of the west half of the peninsula is provided in Sneden's January 1862 Map of the Lower Potomac River Picket Lines, which shows the Blackburn and Nicholson residences along with a clear depiction of the roads leading to them (Figure 3-4).

G.M. Hopkins' 1879 map of the Mount Vernon District does not depict the Blackburn, Burke, or Nicholson residences (Figure 3-5). The only dwellings shown within the vicinity of the APE are those attributed to B.L. Otterback. These are located near the coast to the southeast of the SM-1 Reactor Facility and to the north on the upland plateau.

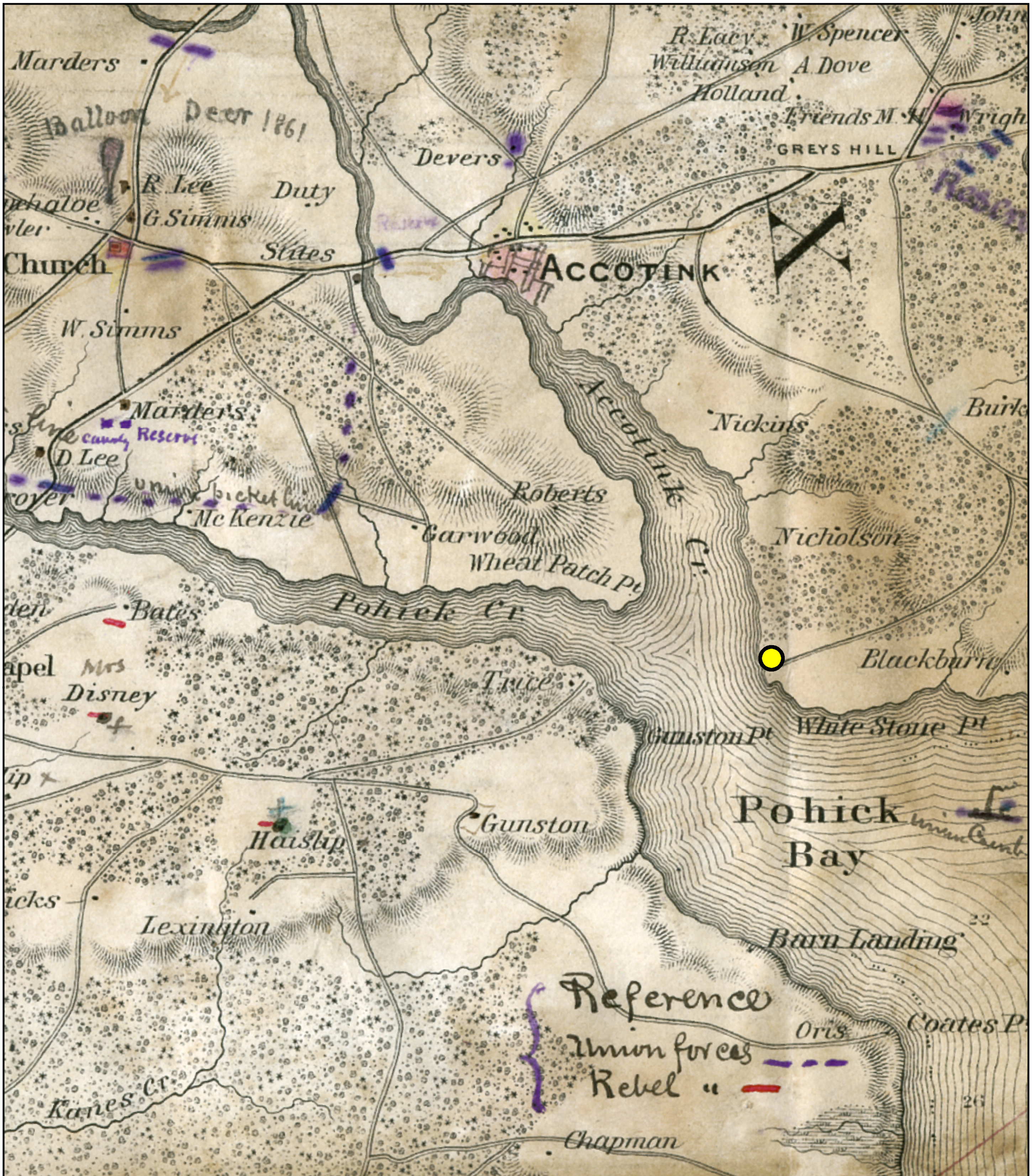
United States Geological Survey maps prior to 1956 show no structures within the vicinity of the APE. After this date, all USGS maps show the SM-1 Reactor Facility. No aerial photographs predating the military acquisition of the Belvoir peninsula were located. All historic aerials inclusive of the APE show the SM-1 Reactor Facility and provide no indication of alternative land use patterns or previous occupations.


Approximate Project Location

Kilometers
0 1 2
0 0.5 1
Miles

**Figure 3-3. 1861 Sneden Map**

Source: Sneden 1861




Approximate Project Location

Kilometers
0 1 2
0 0.5 1
Miles

**Figure 3-4. 1862 Sneden Map**

Source: Sneden 1862


**Figure 3-5. 1879 Hopkins Map**

Source: Hopkins 1879

# 4.0 PREVIOUS INVESTIGATIONS

Research on previous investigations was conducted using the Virginia Cultural Resource Information System (V-CRIS) electronic database and information available from the Environmental and Natural Resources Division of Fort Belvoir's Directorate of Public Works. The primary goal of this research was to identify previously recorded archaeological sites, above-ground resources, and cultural resource investigations within 0.8-km (0.5-mi) of the archaeology APE.

## 4.1 PREVIOUS CULTURAL RESOURCE INVESTIGATIONS

In the early 1980s, Soil Systems, Inc. conducted a large scale cultural resources survey of Fort Belvoir that resulted in the identification of 18 isolated finds, 34 previously unrecorded archaeological sites, and the inventory of 204 buildings (LeeDecker et al. 1984). The archaeological survey covered 574.65 ha (1,420 ac), including areas slated for developed, areas of known/suspected cultural resources, and a stratified random sampling of the post's total acreage. The work included pedestrian survey and STP excavation. Newly recorded sites included 13 historic, 12 prehistoric, and nine multicomponent sites. The historic sites dated from the eighteenth to the twentieth centuries and represent domestic sites and refuse scatters while the prehistoric sites dated from the Late Archaic to the Late Woodland periods and represent small encampments.

A survey of the archaeological resources along Fort Belvoir's shoreline was conducted by former Fairfax County Archaeologist Michael Johnson (Johnson 1988). This survey resulted in the identification of 45 new archaeological sites and the reassessment of 12 previously recorded sites. Most represent prehistoric occupations, and those with diagnostic artifacts indicate occupations ranging from the Archaic to Woodland periods. Historic components were identified at 13 sites and range from late seventeenth to early twentieth century occupations (Johnson 1988). This survey was the first to identify site 44FX1331, which lies within the current APE and is described in greater detail in subsection 4.2.

In 1991, Mid-Atlantic Archaeological Research Associates, Inc. (MAAR) conducted Phase II evaluations at 12 sites on Fort Belvoir, including 44FX1327 and 44FX1328 located in the Castle Club Park 0.8 km (0.5 mi) northwest of the current APE (Traver and Polk 1991). Surface collection, shovel testing, and test unit excavation revealed Late Archaic through Late Woodland period artifacts at both sites along with prehistoric pit features. An eighteenth century historic component, including artifacts and pit features, was also identified at 44FX1328. Site 44FX1327 was recommended not eligible for listing in the NRHP while 44FX1328 was recommended eligible. Consultation with DHR resulted in both sites being combined under the 44FX1328 designation and recommended eligible for listing in the NRHP.

Mid-Atlantic Archaeological Research Associates, Inc. (MAAR) conducted an archaeological survey of Fort Belvoir that resulted in the identification of 166 previously unrecorded archaeological sites (Polk et al. 1993). Prehistoric sites range from Paleoindian to the Contact periods and include small encampments, larger base camps, and possible horticultural villages. Historic sites ranged from the late seventeenth to the first half of the twentieth century and include domestic dwellings, farmsteads, WWI trenches, cemeteries, industrial sites, a school, and a shipwreck. Together with previously recorded sites, this survey brought the number of archaeological sites on Fort Belvoir to 301, of which MAAR recommended 185 for additional investigation to determine NRHP eligibility (Polk et al. 1993).

In 1998, Dames and Moore conducted a disturbance assessment of sites 44FX1327 and 44FX1328 at the Castle Club Park along Gunston Cove following the unplanned demolition of nearby Building 699 (Dames and Moore 1999). These sites were initially identified during Johnson's (1988) study and subjected to Phase II evaluations during MAAR's 1991 assessment of 12 Fort Belvoir sites (Traver and Polk 1991). The disturbance assessment stated that the sites had not been significantly compromised, but that any additional ground disturbances would require archaeological monitoring (Dames and Moore 1999).

Dames and Moore conducted a Phase III data recovery at site 44FX1328 in 1999 in advance of modifications to the Castle Club Park (Mock et al. 2000). This investigation augmented earlier site studies, indicating a Middle Archaic through Late Woodland prehistoric occupation as well as an early to mid-eighteenth century historic occupation. The prehistoric component was interpreted as a seasonal base-camp, partially based on the identification of a prehistoric pit feature. The historic component was interpreted as a tenant occupation as indicated by a refuse pit, possible post molds, and large quantities of domestic and architectural artifacts.

John Milner Associates, Inc. (JMA) conducted a historic resource survey and evaluation of Fort Belvoir's 300 Area, which includes the SM-1 Reactor Facility (JMA 2008). Fifteen resources were evaluated for individual NRHP eligibility or as contributing elements to a recommended historic district for the 300 Area. The resources included a loading dock, entrance gate, pedestrian bridge, bridge testing hangar, two storage buildings, three flammable storage buildings, and six laboratories. Six resources (Buildings 336, 347, 361, 363, 371, and 383) were determined contributing elements of the proposed 300 Area historic district. The report also evaluated the recommendation of a 300 Area historic district, which includes the SM-1 Reactor Facility (JMA 2008).

In 2015, Amec Foster Wheeler Environment and Infrastructure, Inc. (AFW) conducted Phase II archaeological investigations at prehistoric sites 44FX0035, 44FX1330, and 44FX1500 (Simpson and Mocas 2015). Sites 44FX1330 and 44FX1550 are located within 0.8 km (0.5 mi) of the current APE. Site 44FX1330 was identified as a series of Middle Archaic to Middle Woodland occupations located along the shoreline northwest of the current APE. The site contained a rock midden and hearth as well as a variety of diagnostic artifacts. Given these attributes, together with excellent vertical and horizontal integrity, AFW recommended 44FX1330 eligible to the NRHP under Criterion D. Site 44FX1550 was identified as the location of multiple ephemeral prehistoric camps in an unplowed woodlot southeast of the current APE. A scatter of lithic material and a single Middle Archaic period Stanly Stemmed PPK were identified, but no cultural features or meaningful distributional patterns were evident. Therefore, AFW determined the site to have limited research value and recommended 44FX1550 not eligible for listing on the NRHP (Simpson and Mocas 2015).

## 4.2 PREVIOUSLY RECORDED ARCHAEOLOGICAL RESOURCES

As of 2015, 303 archaeological sites have been recorded at Fort Belvoir. Site 44FX0004, the Belvoir manor ruins and Fairfax gravesite, is the only site currently listed on the NRHP. Another 12 sites have been determined eligible for the NRHP, 140 have been determined not eligible, and the remaining 150 sites have not been assessed (AECOM 2015). Table 4-1 provides a summary of the NRHP-eligible archaeological sites on Fort Belvoir.

**Table 4-1. NRHP-Eligible Archaeological Sites on Fort Belvoir**

| Site Number | Site Name | Site Type | Temporal Affiliation |
|---|---|---|---|
| 44FX0012 | Shop Point | Prehistoric Base Camp / Military Base Facility | Early Archaic–Late Woodland / 20th C. |
| 44FX1208 | None | Cemetery | Unknown Historic |
| 44FX1305 | None | Prehistoric Camp / Unidentified Quarry | Middle Archaic–Early Woodland / Unspecified |
| 44FX1314 | None | Camp | Middle Archaic–Late Woodland |
| 44FX1326 | Barnes-Owsley | Prehistoric Camp / Historic Dwelling | Middle Archaic–Late Woodland / 18th C. |
| 44FX1328 | None | Prehistoric Camp / Historic Dwelling / Historic Recreational Facility | Late Archaic–Late Woodland / 18th C. / 20th C. |
| 44FX1340 | None | Prehistoric Camp / Historic Dwelling | Late Woodland / 18th–19th C. |
| 44FX1621 | None | Prehistoric Temporary Camp / Historic Dwelling | Unknown Prehistoric / 18th C. |
| 44FX1908 | None | Prehistoric Base Camp | Unknown Prehistoric |
| 44FX1925 | None | Prehistoric Base Camp | Unknown Prehistoric |
| 44FX1929 | None | Prehistoric Camp | Unknown Prehistoric |
| 44FX3253 | FTB Site 1 | Prehistoric Hamlet | Woodland |

Nineteen archaeological sites have been registered with DHR within a 0.8-km (0.5-mi) radius of the archaeology APE (Table 4-2). These include 15 prehistoric and four multicomponent prehistoric/historic sites. The prehistoric components typically represent small, temporary camps dating from the Early Archaic to the Late Woodland periods. The historic components include a late nineteenth to early twentieth century trash scatter, an eighteenth century domestic occupation, twentieth century recreation facilities, and an undefined eighteenth century component. None of these 19 sites is listed on the NRHP.

**Table 4-2. Previously Recorded Archaeological Resources**

| Site Number | Site Type | Temporal Affiliation |
|---|---|---|
| 44FX0633 | No Data | Unknown Prehistoric |
| 44FX0634 | Prehistoric Temporary Camp / Historic Trash Scatter | Unknown Prehistoric / Late 19th–Early 20th C. |
| 44FX1327 | Prehistoric Temporary Camp / Historic Recreation Facility | Early Archaic and Middle Woodland / 20th C. |
| 44FX1328 | Prehistoric Temporary Camp / Historic Dwelling / Historic Recreation Facility | Late Archaic–Late Woodland / 18th C. / 20th C. |
| 44FX1329 | Prehistoric Temporary Camp and Lithic Workshop | Late Archaic–Late Woodland |
| 44FX1330 | Prehistoric Temporary Camp | Middle Archaic–Middle Woodland |
| 44FX1331 | Prehistoric Temporary Camp | Early Woodland |
| 44FX1332 | No Data | Unknown Prehistoric |
| 44FX1338 | No Data | Unknown Prehistoric |
| 44FX1499 | Prehistoric Temporary Camp | Unknown Prehistoric |

| Site Number | Site Type | Temporal Affiliation |
|---|---|---|
| 44FX1500 | Prehistoric Temporary Camp | Middle Archaic |
| 44FX1501 | Prehistoric Temporary Camp | Unknown Prehistoric |
| 44FX1502 | Prehistoric Temporary Camp | Unknown Prehistoric |
| 44FX1622 | Prehistoric Temporary Camp / Unknown Historic | Woodland / $18^{th}$ C. |
| 44FX1654 | Prehistoric Temporary Camp | Middle Archaic |
| 44FX1715 | Prehistoric Temporary Camp | Unknown Prehistoric |
| 44FX1812 | No Data | Unknown Prehistoric |
| 44FX1931 | Prehistoric Temporary Camp | Unknown Prehistoric |
| 44FX1932 | Prehistoric Temporary Camp | Unknown Prehistoric |

Site 44FX1331 partially lies within the western corner of the APE. A preliminary site form compiled in November 1987 describes the site as a prehistoric surface scatter of lithic material, much of which was found on the beach or adjacent terrace slopes (Johnson 1987). The artifact assemblage included 94 quartzite, quartz, rhyolite, and unidentified flakes; five “worn lithics” including a “knife” and a core; one unidentified lanceolate PPK; and one Piscataway PPK. The Piscataway PPK indicates a Late Archaic period occupation. The report states that “the majority of the site appears to be severely disturbed by recent base related construction” but noted that the strip of land between the SM-1 Reactor Facility fence line and the shore has potential vertical and horizontal integrity (Johnson 1987:n.p.).

The site’s precise location is unclear, given that the Fairfax County, Fort Belvoir, and V-CRIS boundaries vary somewhat (Figure 1-2). The Fairfax County boundaries show the site as a partially eroded area along the shoreline that bends inland where a small drainage discharges into Gunston Cove. The Fort Belvoir boundaries show the site as an oblong area largely within the archaeology APE, extending from the bluffs along the shoreline up to 30 m (98.43 ft) inland. The V-CRIS boundaries show the site as an elliptical area originating near the bluffs and extending up to 60 m (196.85 ft) inland. While these delineations differ in size and conformation, there is general agreement that at least some portion of 44FX1331 is located within the southwestern boundary of the APE.

## 4.3 PREVIOUSLY RECORDED ABOVE-GROUND RESOURCES

Dozens of above-ground resources on Fort Belvoir have been previously registered with the DHR, several of which are included within the Fort Belvoir Historic District (DHR No. 029-0209). The district encompasses the core of the 1930s engineer training center and includes a variety of historic housing units, administrative buildings, and warehouses among other resources. At the time of its nomination to the NRHP in 1996, the district contained 196 contributing and 11 non-contributing resources representative of the post’s role as a major training facility for engineers in the period between WWI and WWII (Harnsberger and Hubbard 1996). The historic district nomination was updated in 2010 to include 213 contributing and 92 noncontributing resources, significant for its military, educational, and architectural qualities representative of its 1921–1953 period of significance (Peeler 2010). Other NRHP-eligible above-ground resources include the U.S. Army Package Power Reactor (SM-1; DHR No. 029-0193); the Camp A.A. Humphreys Pump Station and Filter Building (DHR No. 029-0096); the

Thermo-Con House (Building 172; DHR No. 029-5001); the Amphitheater (Facility 2287; DHR No. 029-0209-0386); and the Fort Belvoir Military Railroad Multiple Property Listing (DHR No. 029-5648).

Seven above-ground resources have been registered with the DHR within a 0.8-km (0.5-mi) radius of the archaeology APE. These include infrastructural elements such as pump stations, a steam trap, and an electric transformer in addition to a boat pier, fire suppression laboratory, and the U.S. Army Package Power Reactor (Table 4-3). The entirety of the archaeology APE lies within the boundaries of the reactor facility which is described in greater detail in subection 3.2.7. The reactor was recommended NRHP-eligible in 1992 (Friedlander et al. 1992). At the time of its nomination, it included the reactor (Building 372); a sewage pump station (Building 350); a sentry station (Building 373; demolished); a pump house (Building 375); a waste retention building (Building 376; demolished); an electronic equipment facility (Building 384; demolished); and an emergency siren adjacent to the sentry station

**Table 4-3. Previously Recorded Above-Ground Resources**

| DHR Number | Resource Name | Resource Type | Temporal Affiliation |
|---|---|---|---|
| 029-0193 | U.S. Army Package Power Reactor Facility | Power Plant | 1957 |
| 029-5417 | Boat Pier (Facility No. 645) | Pier/Boat Ramp | 1949 |
| 029-5479 | Steam Trap (Resource No. 7383) | Steam Trap | 1941 |
| 029-5483 | Waste Water Pump Station (Resource No. 698) | Pump Station | Pre-1979 |
| 029-5503 | Water Waste Pump Station (Resource No. 7336) | Pump Station | 1962 |
| 029-5504 | Electric Transformer (Resource No. 7337) | Electric Transformer | 1941 |
| 029-5593 | Building 336; Fire Suppression Lab | Research Facility/Laboratory | 1959 |

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# 5.0 RESEARCH DESIGN

## 5.1 RESEARCH

Background research was conducted to develop a cultural context for archaeological resources potentially located within the APE. This information was gathered from electronic resources as well as materials available from the Fairfax County Public Library. Information from the V-CRIS database was utilized to characterize local archaeological resources by examining previously recorded cultural resources site files and previous cultural surveys.

## 5.2 FIELD METHODS

Subsurface testing within the archaeology APE consisted of STP excavation. STPs measured 45 centimeters [cm] (1.48 ft) in diameter and were stratigraphically excavated up to 1 m (3.28 ft) below ground surface (bgs) or 10 cm (0.33 ft) into culturally sterile Pleistocene-era subsoil. In some instances, impassable fill deposits were encountered that prevented excavation into natural soils. STPs were placed at 15-m (49.21-ft) intervals along a controlled grid and radial STPs were excavated at 7.5-m (24.61-ft) intervals around positive STPs with intact archaeological contexts. Judgmental STPs were also excavated as necessary to provide additional survey coverage. Soils were screened through 0.63-cm (0.25-inch [in]) hardware mesh in order to ensure uniform artifact recovery.

Because of the potential for low-dose exposure to radiologically-contaminated soils, full Tyvek suits, disposable rubber boots, nitrile gloves, and eye protection were worn by each excavator. A cold zone was established for donning all protective equipment prior to entering the hot zone (all areas of excavation). All artifacts, equipment, and clothing were screened for contamination in a warm zone prior to exiting the hot zone. Any contaminated items were disposed of on site. All STP locations were tested using a Geiger counter prior to and during excavation. Areas with a high radiological signal were avoided.

Field data were recorded on standard field forms and in general field notes. The forms included Munsell soil color, soil texture, profiles, features present, artifacts recovered, excavator's initials and the date of excavation. The locations of STPs were noted on field maps and recorded using a Trimble GPS data logger. Artifacts were placed in plastic sealing bags labeled with all relevant provenience information and transported to the AECOM archaeology laboratory in Gaithersburg, Maryland. Obviously modern materials were noted on field forms and discarded in the field.

## 5.3 LABORATORY METHODS

The artifacts were cleaned, analyzed, cataloged in accordance with DHR curation guidelines and the Secretary of the Interior's *Standards and Guidelines for Curation* (USDI 1991; 36 CFR Part 79). Artifacts were gently washed using plain water and a soft-bristled brush then air dried; delicate or unstable materials were carefully cleaned with a dry, soft brush. Provenience and artifact information was entered into a Microsoft Access 2010 database. The objectives of laboratory analysis and cataloging were to determine, to the extent possible, the date, function, cultural affiliation, and significance of the documented archaeological resources. Following analysis, all artifacts and associated records were prepared for final curation at the Fairfax County Cultural Resources Management and Protection Branch Offices in Falls Church, Virginia.

### 5.3.1 Prehistoric Artifacts

Lithics represent the only prehistoric artifact class identified during the investigation. The following basic information was recorded for lithic artifacts: count, weight, material type, group, class, and, as applicable, subclass. Weight was recorded to the nearest hundredth of a gram (g) (0.0004 ounces [oz]) using a digital Sartorius scale calibrated to 800.00 g (28.22 oz). A four-tiered system of classification (group, material, class, and subclass) was used for any prehistoric lithic artifacts recovered. The broadest level of classification is the group. Potential prehistoric lithic groups include core/tested material, debitage, flaked stone tool, fire-cracked rock, ground/battered stone, and unmodified cultural. The debitage and flaked stone tool groups are the only ones represented in this study's assemblage.

#### 5.3.1.1 Identification of Raw Material Types

Quartz and quartzite were the only raw materials identified during the current survey. Stone material identification was based primarily on macroscopic observation; when necessary, a hand lens (10x) or stereomicroscope (10 to 40x) was used to aid determination.

#### 5.3.1.2 Flaked Stone Tools

Artifacts classified as flaked stone tools are the result of reductive bipolar, knapping, or pressure flaking processes; flaked stone tools exhibit edge modification and/or use-wear. Flaked stone tools are organized into classes and subclasses based on overall design and shape; tool types identified in the lithic assemblage are defined below.

Bifaces are tools that have been flaked across two opposing faces that meet to form an edge that circumscribes the entire artifact (Crabtree 1972). A PPK is a finished biface. It exhibits distally converging lateral margins that meet at an acute angle (i.e., the point) and a haft element at the opposing end (e.g., stem or notches). PPKs are analyzed based on morphology and attributes of manufacture. Cultural and temporal stylistic differences serve as diagnostic chronological markers, providing a means of relative site dating. Interpretations of morphology and temporal affiliation follow nomenclature by Hranicky (1994).

#### 5.3.1.3 Debitage

Debitage are sorted into classes based on percent body cortex on the dorsal surface, and include: primary cortex (retain ≥50 percent dorsal cortex), secondary cortex (retain <50 percent dorsal cortex), and non-cortex. Debitage subclasses are based on general morphology and/or completeness. Possible subclasses include complete/mostly complete flake, flake fragment, debris/shatter, blade/microblade, bipolar flake, and too small/indeterminate. Complete/mostly complete flakes possess striking platforms and have no more than lateral or distal portions absent. Flake fragments are the distal or lateral portions of flakes with either a missing or partially missing striking platform.

### 5.3.2 Historic Artifacts

Historic artifacts were classified using Orser's (1988) functional typology, which provides a means for interpreting the function of specific historic artifact classes (Table 5-1). Orser's typology was used as opposed to South's (1977) as it was specifically designed for post-Civil War assemblages, can be easily translated into South's typology, and given that mid- to late nineteenth artifacts were expected. Thus, the system allows for easier classification of mid-nineteenth to twentieth century artifacts while retaining the ability to translate artifacts from earlier components into the South system for inter-site comparison. Within Orser's system, historic artifacts were analyzed according to material type and function, when possible. One additional category, 6. Miscellaneous, is included in the functional typology to better capture unidentified artifacts. Additional subcategories are added to the labor category, 5c. Household, to capture artifacts used during household work (e.g., cleaning products, etc.); and 5d. General, to capture artifacts used in multiple labor related activities but unable to be specifically assigned (e.g., coal, slag, etc.).

**Table 5-1. Functional Typology (modified from Orser 1988)**

| Category | Subcategory | Examples |
|---|---|---|
| 1. Foodways | a. Procurement | Ammunition, fishhooks, fishing weights |
| | b. Preparation | Baking pans, cooking vessels, large knives |
| | c. Service | Fine earthenware, flatware, tableware |
| | d. Storage | Coarse earthenware, stoneware, glass bottles, canning jars, bottle stoppers |
| | e. General foodways | Unidentified glass and ceramic containers |
| Foodways | f. Floral | Nut shells, seeds, fruit pits, phytoliths, pollen |
| | g. Faunal | Animal bones, antlers, horns, shells and other remains |
| 2. Clothing | a. Fasteners | Buttons, eyelets, snaps, hooks, eyes |
| | b. Manufacture | Needles, pins, scissors, thimbles |
| | c. Other | Shoe leather, metal shoe shanks, clothes hangers |
| 3. Household/Structural | a. Architectural/ construction | Nails, flat glass, spikes, mortar, bricks, slate |
| | b. Hardware | Hinges, tacks, nuts, bolts, staples, hooks, brackets |
| | c. Furnishings/ accessories | Stove parts, furniture pieces, lamp parts, fasteners |
| 4. Personal | a. Medicinal | Medicine bottles, droppers |
| | b. Cosmetic | Hairbrushes, hair combs, jars |
| | c. Recreational | Smoking pipes, toys, musical instruments, souvenirs |
| | d. Monetary | Coins |
| | e. Decorative | Jewelry, hairpins, hatpins, spectacles |
| | f. Other | Pocketknives, fountain pens, pencils, ink wells |
| 5. Labor | a. Agricultural | Barbed wire, horse shoes, harness buckles, hoes, plow blades, scythe blades |
| | b. Industrial | Tools |
| | c. Household | Household cleaning products, Iron |
| | d. General | Coal, slag, clinker |
| 6. Miscellaneous | a. Unknown | Unidentifiable and miscellaneous artifacts |

Many of the historic artifacts were identifiable as to material, form, and function. The only diagnostic historic artifacts recovered were nails, which were assigned a temporal classification based on Visser (2016).

The same attributes were recorded for all artifacts, including: count; material (i.e., the main material composition of the artifact); and form. The form was often difficult to determine given the fragmentary nature of artifacts. Identical, or nearly identical, artifacts within a provenience were grouped together under the same catalog number. (Note: The catalog number is the bag number followed by artifact number.) For example, all the window glass fragments within a single bag number (i.e., all from the same provenience) would be given the same artifact number. Whenever possible, mendable artifacts were grouped together.

# 6.0 RESULTS

Twenty-seven STPs were excavated within the archaeology APE, including 18 primary, five judgmental, and four radial STPs resulting in the recovery of nine historic, two prehistoric, and 18 likely modern artifacts (e.g., concrete, asphalt, shingles) discarded in the field (Figure 6-1).

Substantial portions of the archaeology APE were excluded from subsurface investigation due to visible ground disturbances and areas of greater than 15 percent slope. In the northeast half of the archaeology APE, disturbances include the SM-1 reactor and a surrounding asphalt apron/parking area; an artificial, elevated earthen platform and retaining wall northwest of the reactor; and a large concrete pad northwest of the reactor (Figures 6-2 and 6-3). This area also contained a natural slope rising to the upland northwest of the reactor as well as a steep, artificial slope that declines southwest and west of the reactor (Figure 6-4).

In the southwest half of the archaeology APE, visible disturbances include the gravel road transecting the facility; Buildings 349 (shed) and 350 (sewage pump station); a large, open concrete mixing sump and associated infrastructure; and a densely compacted gravel parking area northwest of Building 349 (Figures 6-5 and 6-6). Some sloping areas between the facility's southwest fence lines were also excluded from excavation.

Given these limitations, shovel testing was limited to two areas within the archaeology APE. Five judgmental STPs were placed along the perimeter of a small grassy area northwest of the reactor (Figure 6-7). No STPs were placed in the center of this grassy area due to a high radiological signal. None of these five STPs contained artifacts. Twenty-two STPs were placed in the grassy area south of the gravel road (Figures 6-8 and 6-9). Eleven of these STPs contained artifacts.

## 6.1 STRATIGRAPHY

Excavation revealed impassable fill deposits in 13 STPs, fill overlying natural soil in 12 STPs, and exclusively natural soil in two STPs (Table 6-1; Figure 6-10). The extensive ground disturbances are attributable to the construction of the SM-1 Reactor Facility.

**Table 6-1. Summary of Site Stratigraphy**

| STP | | Soils | | |
|---|---|---|---|---|
| Northing | Easting | Fill to BOE* | Fill to Natural | Natural |
| 980 | 1038 | | X | |
| 982 | 1020 | | X | |
| 982.5 | 1076.5 | | X | |
| 990 | 987 | | X | |
| 990 | 992.5 | | | X |
| 990 | 1000 | X | | |
| 990 | 1015 | X | | |
| 990 | 1030 | X | | |
| 990 | 1045 | X | | |
| 990 | 1060 | | X | |
| 990 | 1067.5 | | X | |


Archaeology APE

Concrete Pad

Gravel Parking Area

Fence

Open Well

Negative STP

Positive Historic STP

Positive Prehistoric STP

Meters

0 10 20 30

0 50 100

Feet

**Figure 6-1. STP Locations**

Source: ESRI 2016; Fort Belvoir

Figure 6-2.  Retaining Wall and Artificial Platform Northwest of the Reactor, Facing Northeast

Figure 6-3.  Large Concrete Pad Northwest of the Reactor, Facing Northwest

**Figures 6-2 and 6-3. Project Area Photographs**

Figure 6-4.  Slope Surrounding the Reactor, Facing Southeast

Figure 6-5.  Concrete Mixing Sump in Southwest Corner of Archaeology APE, Facing Northwest

**Figures 6-4 and 6-5. Project Area Photographs**

Figure 6-6.  Building 349 and Gravel Parking Area, Facing South

Figure 6-7.  Grassy Area Northwest of the Reactor, Facing Northwest

**Figures 6-6 and 6-7. Project Area Photographs**

Figure 6-8. Open Grassy Area Southwest of Gravel Road, Facing Northwest

Figure 6-9. Grass and Shrubs Southwest of Gravel Road, Facing Northwest

**Figures 6-8 and 6-9. Project Area Photographs**

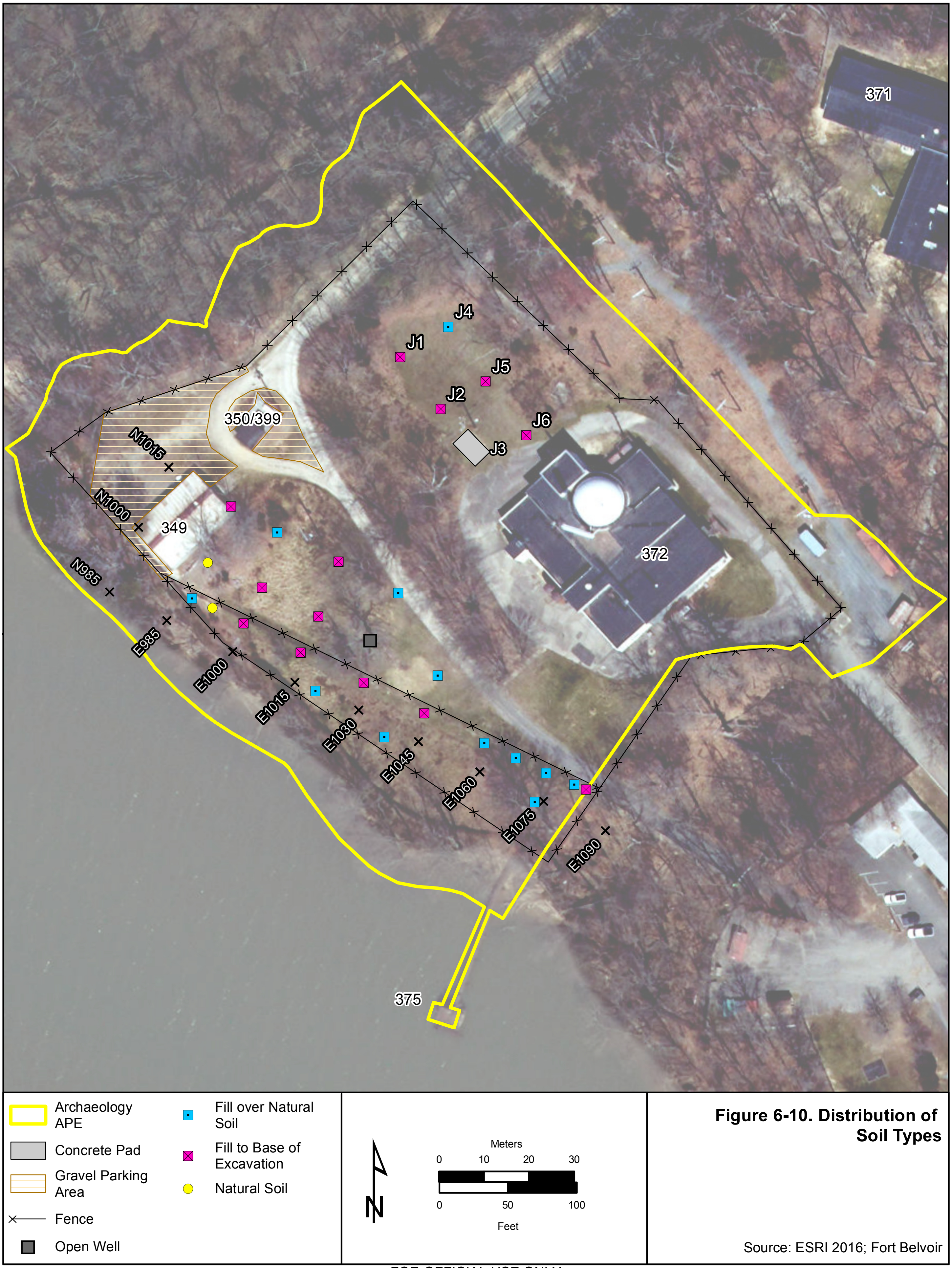



**Figure 6-10. Distribution of Soil Types**

Source: ESRI 2016; Fort Belvoir

| STP | | Soils | | |
|---|---|---|---|---|
| Northing | Easting | Fill to BOE* | Fill to Natural | Natural |
| 990 | 1075 | | X | |
| 990 | 1082.5 | | X | |
| 990 | 1085 | X | | |
| 1000 | 988 | | | X |
| 1000 | 1000 | X | | |
| 1000 | 1015 | X | | |
| 1000 | 1045 | | X | |
| 1015 | 988 | X | | |
| 1015 | 1000 | | X | |
| 1015 | 1015 | X | | |
| 1015 | 1030 | | X | |
| J-1 | | X | | |
| J-2 | | X | | |
| J-4 | | | X | |
| J-5 | | X | | |
| J-6 | | X | | |

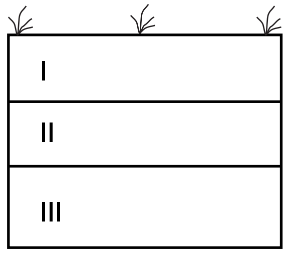
*Base of Excavation

The 13 STPs that revealed fill to the base of excavation cluster in the center of the southwest half of the archaeology APE as well as in the grassy area west of the reactor. In most cases, the fill deposits were too densely compacted to permit manual excavation into natural soils or to the 1-m (3.28-ft) vertical limit of manual excavation. In the southwest half of the archaeology APE, the depth to impasse ranged between 20 and 43 cm (0.66 and 1.41 ft) bgs while in the grassy area west of the reactor, impasses ranged between 45 and 75 cm (1.48 and 2.46 ft) bgs. Soil profiles varied among these STPs given differential fill sources and deposition processes. Nonetheless, most STPs contained two to three strata of fill. STP N1000 E1015 provides a representative profile (Figure 6-11).

The 12 STPs that had fill over natural soil were scattered throughout the southwest half of the archaeology APE, most tightly clustering in the south corner. A single judgmental STP in the grassy area west of the reactor also reached natural soil. Five STPs revealed a buried surface (Apb Horizon) directly underlying the fill overburden, indicating that these areas were filled but minimally graded, if at all. These include STPs N982.5 E1076.5, N990 E1060, and N990 E1075 south of the inner fence line in addition to STPs N1015 E1000 and N1015 E1030 southwest of the gravel road. STPs south of the inner fence line all revealed an eluvial or transitional layer (E or BA Horizon) between the Apb Horizon and subsoil (Bt Horizon); those between the fence line and gravel road revealed the Apb Horizon directly atop the Bt Horizon. STP N990 E1060 provides representative profiles (Figure 6-11).

Three STPs revealed an E or BA Horizon and underlying Bt Horizon below the fill, indicating that grading removed the original surface but has only moderately impacted the underlying natural stratigraphy. These include STPs N980 E1038, N982 E1020, and N990 E1067.5 south of the inner fence line. STP N990 E1067.5 provides a representative profile (Figure 6-11).

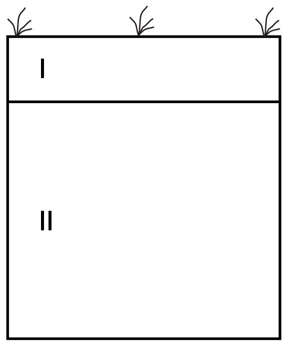
**STP N1000 E1015**




Rock Impasse

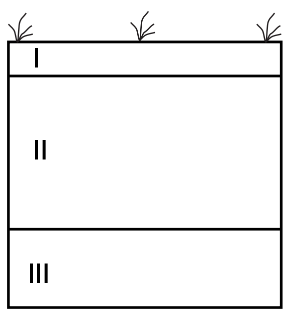
I - Dark Brown (10YR 3/3) Gravelly Loam Fill
II - Yellowish Brown (10YR 5/6) Gravelly Sandy Clay Loam Fill
III - Strong Brown (7.5YR 5/8) Gravelly Sandy Clay Loam Fill

**STP N990 E987**

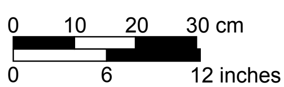



I - Very Dark Grayish Brown (10YR 3/2) Loam Fill
II - Yellowish Brown (10YR 5/4) Sandy Clay Loam Bt Horizon

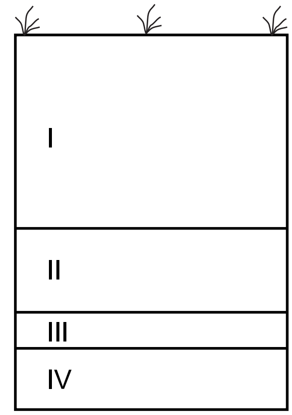
**STP N1000 E988**




I - Very Dark Grayish Brown (10YR 3/2) Loam Ao Horizon
II - Yellowish Brown (10YR 5/4) Sandy Loam E Horizon
III - Brownish Yellow (10YR 6/6) Sandy Loam Bt Horizon

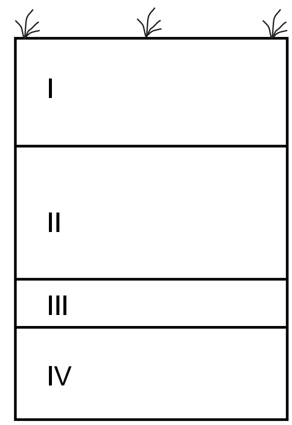



**STP N990 E1060**




I - Brown (10YR 4/3) Gravelly Sandy Loam Fill
II - Dark Grayish Brown (10YR 4/2) Loamy Sand Apb Horizon
III - Pale Brown (10YR 6/3) Loamy Sand E Horizon
IV - Yellowish Brown (10YR 5/6) Sandy Clay Loam Bt Horizon

**STP N990 E1067.5**




I - Dark Brown (10YR 3/3) Gravelly Sandy Loam Fill
II - Yellowish Brown (10YR 5/4 and 5/8) Mottled with Dark Grayish Brown (10YR 4/2) Sandy Clay Fill
III - Light Yellowish Brown (10YR 6/4) Loamy Sand E Horizon
IV - Yellowish Brown (10YR 5/8) Lightly Mottled with Light Brownish Gray (10YR 6/2) Sandy Loam Bt Horizon

**Figure 6-11. Representative STP Profiles**

Four STPs revealed the Bt Horizon directly below fill, indicating that grading has significantly impacted the natural stratigraphy, likely removing all post-Pleistocene soils. These include STPs N990 E987, N990 E-1082.5 south of the inner fence, STP N1000 E1045 north of the inner fence, and STP J-4 in the grassy area west of the reactor. STP N990 E987 provides a representative profile (Figure 6-11).

Exclusively natural soils were identified in STPs N990 E992.5 and N1000 E988. Both revealed an Ao-E-Bt Horizon stratigraphic sequence and suggest that a small area south of Building 349 has not been subjected to the ground disturbances evident elsewhere in the archaeology APE. STP N1000 E988 provides a representative profile (Figure 6-11).

## 6.2 ARTIFACTS

Nine historic and two prehistoric artifacts were recovered from seven STPs (Table 6-2; Figure 6-12). An additional 18 artifacts were discarded in the field, including concrete, brick, and asphalt fragments. With the exception of the single quartzite flake, all artifacts were recovered in fill.

**Table 6-2. Artifact Summary**

| STP | | Stratum | Soil | Artifact | Date | Total |
|---|---|---|---|---|---|---|
| Northing | Easting | | | | | |
| 990 | 967.5 | II | Fill | Wire Nail | 1890+ | 2 |
| | 987 | II | Bt Horizon | Quartzite Flake | | 1 |
| | 1045 | I | Fill | Ceramic Drain Pipe | | 1 |
| | | | | Wire Nail | 1890+ | 1 |
| | 1075 | I | Fill | Quartz Bear Island PPK | Late Archaic | 1 |
| | 1082.5 | I | Fill | Bolt | | 1 |
| | 1085 | II | Fill | Bottle Glass | | 1 |
| | | | | Wire Nail | 1890+ | 2 |
| 1000 | 1045 | II | Fill | Cut Nail | 1790 - 1900s | 1 |
| **Total** | | | | | | **11** |

The historic artifacts include five wire nails, a piece of bottle glass, a bolt, a cut nail, and a ceramic drainage pipe fragment. While these all originated in fill, it is possible that some are associated with the construction or maintenance of the SM-1 Reactor Facility.

The prehistoric artifacts include a quartzite flake and a Late Archaic period Bear Island PPK. The quartzite flake was recovered from the top of the Bt Horizon in STP N990 E987. A single radial excavated grid east was negative. Radials could not be excavated grid south or west due to severe slope/APE boundaries or grid north due to a high radiological signal. While the Bear Island PPK was recovered from fill in STP N990 E1075, radials were excavated to ensure that it was not affiliated with intact archaeological deposits in the immediate vicinity. Radials excavated grid west, south, and east were negative for intact archaeological deposits; no radial was excavated grid north due to the presence of the gravel road.

## 6.3 INTERPRETATION

Shovel testing revealed extensive levels of ground disturbance throughout the testable portions of the SM-1 Reactor Facility. STP profiles indicate that much of the facility has been subjected to

**Top Row**: Cut Nail (2.1); Wire Nail (10.2); Glass Fragment (1.1); Ceramic Drain Pipe (7.2); and Bolt (9.1)
**Bottom Row**: Quartzite Flake (3.2); Bear Island PPK (4.1)

**Figure 6-12. Representative Artifacts**

cutting/grading and filling, often resulting in the removal of the original ground surface. These disturbances are attributable to the construction of the SM-1 Reactor Facility and have significantly impacted the area's archaeological potential. While impassable fill deposits precluded the examination of the underlying soil's integrity and archaeological potential in many cases, excavations that breeched the fill suggest there is a low potential for intact archaeological resources. In all cases, Apb and E/BA Horizons identified directly below the fill were culturally sterile. Even the two STPs that revealed exclusively natural soils were devoid of artifacts. These data suggest that even in locations where the fill could not be excavated, there is very little chance that potentially significant archaeological resources are present beneath the overburden.

A single quartzite flake recovered from the Bt Horizon near the APE's western corner may be attributable to previously recorded site 44FX1331. Johnson (1987) reported that numerous quartzite flakes were recovered from the surface nearby, but these appear to have originated along the shoreline and terrace slopes beyond the SM-1 Reactor Facility boundary. Within the SM-1 Reactor Facility, shovel testing indicates that 44FX1331 has been severely impacted by ground disturbing activities, and any surviving portions of the site are likely limited to highly localized areas preserved by chance. The potential for significant components of the site to have survived intact within the facility is very low, as the current study revealed no evidence of prehistoric cultural features, meaningful artifact distributions, or contextually intact diagnostic artifacts.

# 7.0 SUMMARY AND RECOMMENDATIONS

The USACE, Baltimore District contracted AECOM-Tidewater Joint Venture to conduct a Phase I archaeological survey of the SM-1 Reactor Facility at Fort Belvoir in Fairfax County, Virginia. The USACE is proposing to decommission the SM-1 Reactor Facility, an undertaking that may require demolishing the facility and entail a significant degree of ground disturbance across the site. The archaeological APE is defined as a 1.84-ha (4.54-ac) area of proposed ground disturbance within the larger 4.35-ha (10.76-ac) APE. The primary objectives of this survey were to determine if potentially significant archaeological resources are present within the archaeological APE and if so, define their extent.

Twenty-seven STPs were excavated, resulting in the recovery of nine historic, two prehistoric, and 18 likely modern artifacts. One quartzite flake was recovered from natural soils, while the remaining artifacts originated in fill and therefore have no archaeological integrity. Given its location within the boundaries of 44FX1331, the quartzite flake is likely associated with the surface finds described by Johnson (1987). However, it is unclear if these surface finds originated in disturbed or in situ contexts.

Excavation revealed that the majority of the SM-1 Reactor Facility has been subjected to a considerable degree of ground disturbance. Extensive fill deposits were identified in 25 STPs and are indicative of cutting, grading, and filling activities associated with the construction and maintenance of SM-1. The impact these disturbances have had on the natural stratigraphy is variable. In some places, densely compacted layers of rocky fill could not be manually excavated and the integrity of the underlying soils therefore could not be assessed. Where the fill could be removed, underlying Apb and E Horizons were present in some locations while in others the soil had been graded down to the Bt Horizon. It is apparent that buried surfaces have survived intact, but these layers were culturally sterile.

Two STPs within the 44FX1331 boundary revealed natural soils without a fill overburden, suggesting that small, isolated loci of undisturbed stratigraphy are present within the SM-1 Reactor Facility. Given the degree of disturbance observed elsewhere, however, such areas likely comprise only a very small portion of the facility.

Because fill compaction prevented an assessment of the underlying stratigraphy in several locations, mechanical excavation would be necessary to investigate the potential for buried surfaces throughout much of the archaeology APE. Such areas include the center of the southeastern half of the archaeology APE, the grassy area northwest of the reactor, and the gravel parking area in the western corner of the facility. However, given that the Apb Horizon was only identified in a minority of STPs and largely restricted to the south corner of the facility, the potential for encountering a buried surface elsewhere is likely to be low.

Given these considerations, together with very limited evidence that 44FX1331 retains good subsurface integrity and research potential within the archaeology APE, it is unlikely that additional investigations of the SM-1 Reactor Facility have the potential to yield information important to history or prehistory. The probability for intact sub-fill archaeological resources is very low and any intact components of 44FX1331 are likely located on the potentially undisturbed terraces beyond the APE boundaries. Given the extensive disturbances, limited research potential, and low probability of intact archaeological deposits, site 44FX1331 is recommended as not eligible for listing on the NRHP and no additional work is recommended.

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# Appendix A:
# Qualifications of Investigators

**Varna Boyd, MA, RPA** is a Registered Professional Archaeologist with 35 years of experience in cultural resources management, and exceeds the *Secretary of the Interior's Professional Qualification Standards* (36CFR Part 61) for archaeology and history. Ms. Boyd has extensive experience in the design, management, and technical execution of historical and archaeological investigations. She has managed reconnaissance and intensive investigations throughout the United States. She received her Master's Degree in Anthropology from the College of William and Mary in 1988 and her Bachelor's Degree in Prehistory from Mary Washington College in 1982.

**Peter Regan, MA** has over eight years of experience in cultural resource management and meets the *Secretary of the Interior's Professional Qualification Standards* (36 CFR Part 61) for archaeology and history. He has worked extensively on excavations in the Mid-Atlantic, providing support on historic and prehistoric excavations in all phases of archaeological investigation for municipal, state, and federal clients. Among his responsibilities are project direction and execution, artifact analysis, and generating technical reports. Mr. Regan received his BA degrees in History and Anthropology from St. Mary's College of Maryland in 2007 and his MA in Historical Archaeology from the College of William and Mary in 2010.

# Appendix B:
# Artifact Catalog

# Ft. Belvoir SM1 Phase I

**Northing: 990** **Easting: 967.5** **Stratum: II**

| Catalog # | Count | Group | Subgroup | Material | Form | Color | Comments |
|---|---|---|---|---|---|---|---|
| 10.1 | 1 | Household/ Structural | Architectural/ Construction | Iron | Wire nail | | |
| 10.2 | 1 | Household/ Structural | Architectural/ Construction | Iron | Wire nail | | |

**Northing: 990** **Easting: 987** **Stratum: II**

| Catalog # | Count | Group | Subgroup | Material | Form | Color | Comments |
|---|---|---|---|---|---|---|---|
| 3.1 Discard | 1 | Household/ Structural | Architectural/ Construction | Concrete | Concrete | | |
| 3.2 | 1 | Debitage | | Quartzite | Non-Cortex Complete/Mostly Complete | | |

**Northing: 990** **Easting: 1015** **Stratum: II**

| Catalog # | Count | Group | Subgroup | Material | Form | Color | Comments |
|---|---|---|---|---|---|---|---|
| 8.1 Discard | 10 | Household/ Structural | Architectural/ Construction | Asphalt | Asphalt | | |

**Northing: 990** **Easting: 1045** **Stratum: I**

| Catalog # | Count | Group | Subgroup | Material | Form | Color | Comments |
|---|---|---|---|---|---|---|---|
| 5.1 | 1 | Household/ Structural | Architectural/ Construction | Iron | Wire nail | | |

*Note: Additional attribute data is recorded in the electronic database.*

| Catalog # | Count | Group | Subgroup | Material | Form | Color | Comments |
|---|---|---|---|---|---|---|---|
| 5.2 | 1 | Household/ Structural | Architectural/ Construction | Ceramic | Pipe | | |

**Northing: 990** **Easting: 1075** **Stratum: I**

| Catalog # | Count | Group | Subgroup | Material | Form | Color | Comments |
|---|---|---|---|---|---|---|---|
| 4.1 | 1 | Flaked Stone Tool | | Quartz | Projectile Point/Knife Unidentified-Stemmed | | Bear Island type, late Archaic. Basal grinding and reworking on both edges |

**Northing: 990** **Easting: 1082.5** **Stratum: I**

| Catalog # | Count | Group | Subgroup | Material | Form | Color | Comments |
|---|---|---|---|---|---|---|---|
| 9.1 | 1 | Household/ Structural | Hardware | Iron | Bolt | | |

**Northing: 990** **Easting: 1085** **Stratum: II**

| Catalog # | Count | Group | Subgroup | Material | Form | Color | Comments |
|---|---|---|---|---|---|---|---|
| 1.1 | 1 | Foodways | General | Glass | Fragment | Aqua | Embossed "….OFF…" |
| 1.2 | 1 | Household/ Structural | Architectural/ Construction | Iron | Wire nail | | |
| 1.3 | 1 | Household/ Structural | Architectural/ Construction | Iron | Wire nail | | |

**Northing: 1000** **Easting: 1045** **Stratum: I**

| Catalog # | Count | Group | Subgroup | Material | Form | Color | Comments |
|---|---|---|---|---|---|---|---|
| 6.1 Discard | 5 | Household/ Structural | Architectural/ Construction | Asphalt | Shingle | | |

*Note: Additional attribute data is recorded in the electronic database.*

**Northing: 1000** **Easting: 1045** **Stratum: II**

| Catalog # | Count | Group | Subgroup | Material | Form | Color | Comments |
|---|---|---|---|---|---|---|---|
| 2.1 | 1 | Household/ Structural | Architectural/ Construction | Iron | Cut nail | | |

**Northing: 1015** **Easting: 1000** **Stratum: II**

| Catalog # | Count | Group | Subgroup | Material | Form | Color | Comments |
|---|---|---|---|---|---|---|---|
| 7.1 Discard | 1 | Household/ Structural | Architectural/ Construction | Iron | Wire nail | | |
| 7.2 Discard | 1 | Household/ Structural | Architectural/ Construction | Brick | Brick | | |

**Grand Total** 29