Sunrise Senior Living
(400 N. Washington Street)

City of Alexandria, Virginia
WSSI #22975.02

Archaeological Evaluation and Mitigation

September 2019
Final Report January 2020

Prepared for:
Sunrise Senior Living Facility, LLC
7902 Westpark Drive
McLean, Virginia 22102

Prepared by:
Dan Baicy, M.A. RPA

With contributions by
Ed McMullen M.A. RPA, John P. Mullen, M.A. RPA
and Susan Andrew Travers

Thunderbird Archeology
A Division of Wetland Studies and Solutions, Inc.®

5300 Wellington Branch Drive, Suite 100
Gainesville, Virginia 20155
Tel: 703-679-5600 Email: contactus@wetlandstudies.com
www.wetlandstudies.com

ABSTRACT

Thunderbird Archeology, a division of Wetland Studies and Solutions, Inc., of Gainesville, Virginia, conducted an *Archaeological Evaluation* for Sunrise Development Inc. of McLean, Virginia, in anticipation of new construction at 400 N. Washington Street in Alexandria, Virginia. The study was required under the City of Alexandria Archaeological Protection Code prior to development of the property and followed a Scope of Work approved by Alexandria Archeology. The archeological work was conducted in April and May of 2018 and the subsequent mitigation of one significant feature, following an approved Resource Management Plan, was completed in June of 2019.

Site 44AX0239 spanned the entirety of the property at 400 N. Washington Street and contained a buried ground surface (Apb) and ten archeological features. The ground surface had been disturbed by the continued occupation and subsequent construction on the property and contained mixed 19th and 20th century artifacts. Most of the archeological features were the architectural remnants of the former 19th century dwellings on the property, including the foundations of the rear wing of 414 North Washington, and an associated intact brick cistern. The cistern is likely associated with the circa 1850 dwelling, which was later used during the Civil War as Grosvenor Hospital.

The cistern had integrity and was archeologically mitigated following an approved *Resource Management Plan*. It was hoped that the data recovery excavation would find a possible relationship between the construction of the cistern and the use of the main dwelling as a Civil War hospital, add to the understanding of 19th century water management practices in the City of Alexandria, and answer research questions about the occupants of the dwelling.

Documentary evidence suggests that William Hoxton, whose family resided at 414 North Washington from 1839-1849, likely constructed the cistern. He served as a surgeon in the US Army from 1835 to 1841 and may have placed a high priority on clean water at his home. Archeological evidence revealed that the cistern was open for much of the 19th century before it was filled with gravel sometime before 1937. The thin soil layer beneath the gravel contained artifacts that suggests the cistern was in use no later than 1860, but primarily contained miscellaneous kitchen waste artifacts (4,971 bones and bone fragments) that were deposited after it was no longer used to store water. The food waste was small enough to empty into a drain leading into the cistern and was not the entire diet of occupants of the house at that time. One intriguing discovery was the recovery of frog remains and specifically frog legs, some of which were burned; this may be indicative of changing dietary preferences in Alexandria at the time the cistern was used for food waste rather than drinking water.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

INTRODUCTION

This report presents the results of an *Archaeological Evaluation* (Phase I/II Archeological Investigations) of Site 44AX0239 and subsequent mitigation (Phase III Archeological Data Recovery) of one significant archeological feature identified during the evaluation. The archeological site spans the entirely of the ±0.72-acre Sunrise Senior Living property at 400 N. Washington Street in the City of Alexandria, Virginia (Figure 1). The work was conducted in advance of the construction of an approximately 80,000 square foot building with a one-story underground parking garage

Thunderbird Archeology, a division of Wetland Studies and Solutions, Inc., of Gainesville, Virginia, conducted the study described in this report for Sunrise Development Inc. of McLean, Virginia. The fieldwork was carried out in May and June of 2018 and April and May of 2019.

John P. Mullen, M.A., RPA served as Principal Investigator on this project and edited the report. The fieldwork was conducted by Edward McMullen, M.A., RPA with the assistance of Caleb Jeck, Catherine Herring, Robin Ramey, Anton Motivans, and Vincent Gallacci. Elizabeth Waters Johnson, M.A. served as Laboratory Supervisor and conducted the artifact analysis with the assistance of Amber Nubgaard, M.A., RPA.

The fieldwork followed a Scope of Work (SOW) and Resource Management Plan approved by Alexandria Archaeology. Additionally, fieldwork and report contents conformed to the guidelines set forth by the Virginia Department of Historic Resources (DHR) as outlined in their 2017 *Guidelines for Conducting Historic Resources Survey in Virginia* (DHR 2017) as well as the *Secretary of the Interior's Standards and Guidelines for Archeology and Historic Preservation* (*DOI 1983).*

The purpose of the Archaeological Evaluation was to locate any cultural resources within the impact area and to provide a preliminary assessment of their potential significance in terms of eligibility for inclusion on the National Register of Historic Places. The ultimate goal of the mitigation of the one significant archeological feature was to make a record of the feature prior to its destruction and to recover sufficient data from the site to address defined research questions.

Thunderbird Archeology conducted a *Documentary Study* on the Sunrise Senior Living property prior to the archeological fieldwork. The resulting report, *Sunrise Senior Living Documentary Study, City of Alexandria, Virginia* (Maas 2017)was prepared and includes a complete historic and cultural contextual study of the project area. As such, the background chapters of this report will be limited to a general and brief summary of the historic context related to the project area.

All artifacts, research data, and field data resulting from this project are currently on repository at the Thunderbird offices in Gainesville, Virginia; the final repository will be with Alexandria Archaeology.

C:\WSSI-L\22000s\22900\22975.01\Proposal\ARCH\01_VicinityADC.mxd

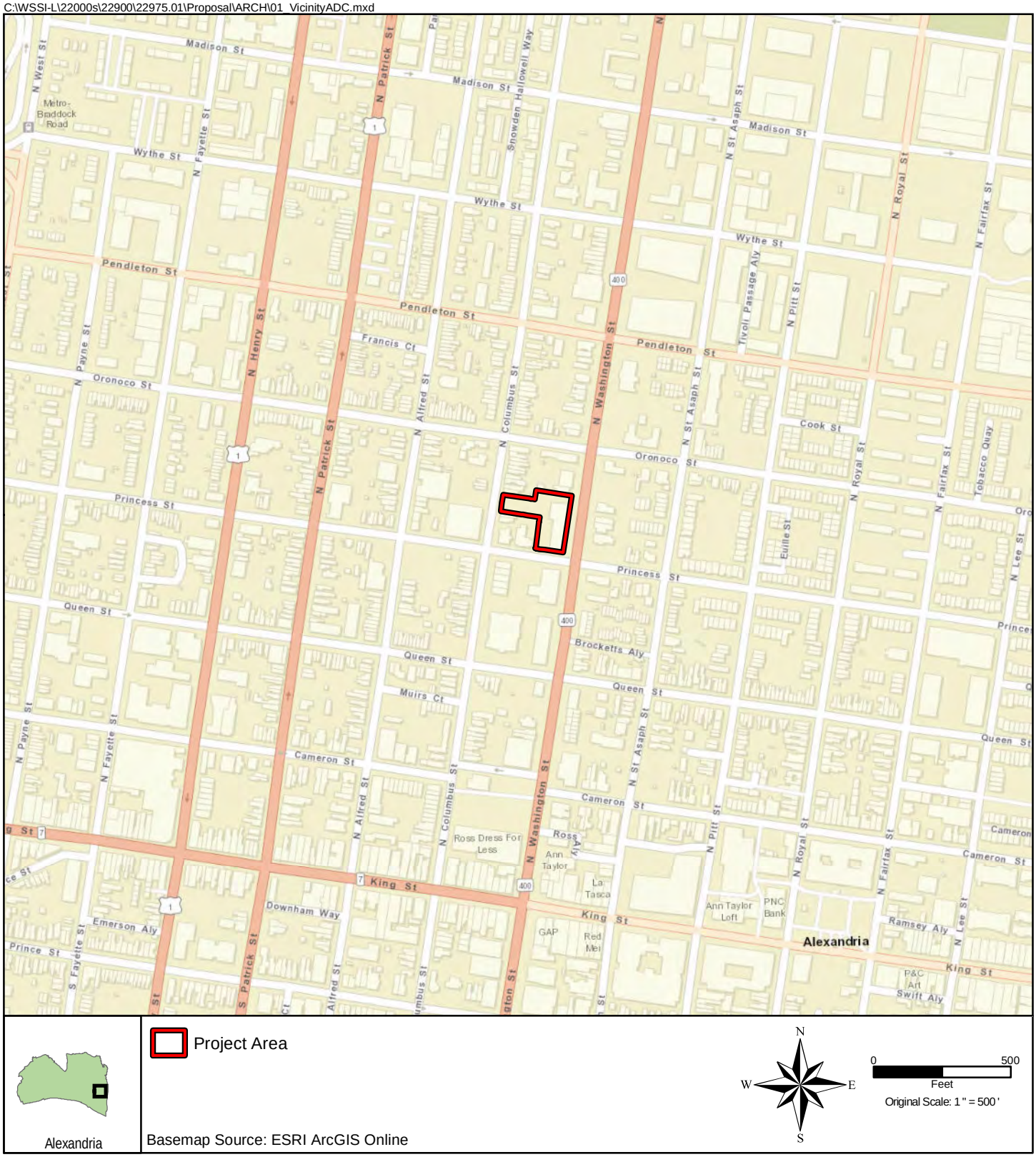


Figure 1: Vicinity Map, Alexandria, Virginia

ENVIRONMENTAL SETTING

The City of Alexandria is located within the Coastal Plain, which is underlain by sediments that have been carried from the eroding Appalachian Mountains to the west, and includes layers of Jurassic and Cretaceous clays, sands and gravels. These are overlain by fossiliferous marine deposits, and above these, sands, silts and clays continue to be deposited. The Coastal Plain is the youngest of Virginia's physiographic provinces and elevations range from 0 to 200/250 feet above sea level (a.s.l.). It is characterized by very low relief broken by several low terraces. The province runs west to the Fall Line, a low escarpment at ±200 feet a.s.l., which formed where the softer sedimentary rocks of the Coastal Plain abut the more resistant rocks of the Piedmont. Where rivers cross this juncture, rapids or falls have developed.

HISTORIC CONTEXT

Historic Native American Occupants & Early Contact

Although European exploration of the Chesapeake Bay area began in the late 1500s, there is minimal evidence for contact between Europeans and the native populations in the Chesapeake before the 17th century. French or Spanish explorers likely observed the Chesapeake Bay earlier in the 16th century; circa 1527 the Chesapeake was marked on the official Spanish *Padrón General* maps as the *Bahia de Santa Maria* (Potter 1993:161). French, Spanish, Portuguese, and Italian ships sailed the lower Chesapeake throughout the remainder of the 16th century but none appear to have ventured as far north as Maryland. These ships were probably involved in slave hunting, missionary work, and mapping (Potter 1993:162). During this period, Spanish colonialism focused on *La Florida*, where several mission settlements were established by 1570.

In the early 1600s, Captain John Smith made contact with local populations in the Upper Potomac Coastal Plain and Henry Fleet lived among and traded with the Native Americans on the Chesapeake. Based on their comments, the upper Potomac may have served as a gateway location where Native Americans from diverse regions came to trade (see Potter 1993; Rountree et al. 2007) Native Americans along the Potomac appear to have adopted a range of social strategies during this period based on varying archeological evidence for European trade goods in aboriginal household assemblages and interpretations of how such goods were incorporated into traditional practices and social relations (Gallivan 2011).

The most numerous Native Americans along the Potomac at the time of the initial reported contact were part of a chiefdom called the Conoy by their Iroquoian adversaries; the Piscataway, descendants, evidently, of the prehistoric Potomac Creek populations, made up the largest group with the Conoy (Potter 1993:19). They dominated the eastern bank of the Potomac River and are generally believed to have been comprised of Coastal Algonquian linguistic group peoples (Humphrey and Chambers 1977, 1985; Potter 1993). Following his voyage up the Potomac in 1608, Captain John Smith described several substantial aboriginal occupations along the banks of the Potomac and Anacostia Rivers.

Smith mapped a group of five towns along the Potomac River in the vicinity of Alexandria. These included *Nacotchtank*, near Joint Base Anacostia-Bolling; an unnamed town along the Anacostia to the north; an unnamed town at Broad Creek on the Maryland side of the Potomac River; *Assaomeck*, on the south side of Hunting Creek in Fairfax County; and *Namoraughquend*, near present day Washington Reagan National Airport (Rountree et al. 2007:278).

To the south of Alexandria, were several hamlets or villages associated with the Tauxenent, Taux, or Dogue Indians, including *Namassingakent* on the north bank of Dogue Run; *Pamacocack*, on Quantico Creek; and the village of *Tauxenent*, near lands that would become George Washington's Mount Vernon plantation on Dogue Run (Rountree et al. 2007:279). This area lay at the northern fringe of the Powhatan Confederacy, a large polity centralized in Tidewater Virginia (Rountree 1989). The Tauxenent or Dogue were also possibly Algonquian speakers allied with the Piscataway (Cissna 1986; Mayre 1935). Potter (1993:197) states that around 1650, the Dogue were still living in what is now Mason Neck and by 1654 some may have moved to lands along the Rappahannock River. The Indian groups of this region effectively disappeared from the historic record in the beginning of the 18th century, although small groups of Native Americans likely remained after that time (Cissna 1986).

The riverine and estuarine resources associated with the Potomac River would have been utilized by Native American populations in the Alexandria area throughout most of the known prehistoric past. With the limited floodplain along the Potomac suitable for farming, the tidal marshes or "breadbaskets" located in the embayed section of the Potomac and its main tributary streams became important as a source wild rice, tuckahoe or cow lily; seasonal anadromous fish runs in the spring and summer were another important localized resources in this area (Pulliam 2011:6; Rountree et al. 2007:278-280).

Exploration & Early Settlement (1607-1731)

European colonization of the Chesapeake Bay region began in the first decade of the 1600s. In 1606, King James I of England granted to Sir Thomas Gates and others of The Virginia Company of London the right to establish two colonies or plantations in the Chesapeake Bay region of North America in order to search "…for all manner of mines of gold, silver, and copper" (Hening 1823:57). In the spring of 1607, three English ships – the Susan Constant, the Godspeed, and the Discovery, under the command of Captains Christopher Newport, Bartholomew Gosnole, and John Smith – anchored at Cape Henry in the lower Chesapeake Bay. After a hostile reception from native inhabitants, exploring parties were sent out to sail north of Cape Henry. Following explorations in the lower Chesapeake, the colonists selected an island 60 miles up the James River for settlement (Kelso 1995:6-7) and began building a palisaded fort later called Jamestown.

In 1608, Captain Smith surveyed and mapped the Potomac River, locating the various native villages on both sides of the waterway. The extensive village network along the river was described as the "trading place of the natives" (Gutheim 1986:22). After 1620, Indian

trade with the lower Coastal Plain English became increasingly intense. Either in response to the increased trade, or to earlier intra-Native American hostilities, formerly disparate aboriginal groups formed confederations. Several early English entrepreneurs traded for provisions and furs along the Potomac River in the early 1600s. One of the better known of the early Potomac River traders, Henry Fleet, worked as far north as Great Falls in 1625, as well as conducting trade in the English colonies in New England, settlements in the West Indies, and across the Atlantic to London (Gutheim 1986:28-39). Trade in furs became an important economic activity. European goods such as iron axes, kettles, guns, bottles, beads, trinkets, clothing, and blankets were viewed favorably by the Native populations. The Native Americans wanted the trade goods supplied by the Europeans and the Europeans wanted furs. Much of this trade was likely limited to the forts and other trading posts located at the Fall Lines on major streams.

As a result of trade with Europeans in the early 17th century, the balance of power among Native American groups in the area shifted. Early accounts note that the Susquehannock, an Iroquoian speaking group, moved down the main stem of the Susquehanna from present-day Binghamton, New York, to the mouth of that river at Havre de Grace, Maryland, in order to control the fur trade. Locally, in the Baltimore-Washington region, the Susquehannocks became the most powerful group, at least in the north. To the south in the Tidewater vicinity, the Powhatan Confederacy increased from the inherited group of approximately five villages to upwards of 50. Captain John Smith informs us in his writings that Powhatan had inherited a group of five "tribes" or villages from his father and by the time of Smith's visit, Powhatan's position as ruler or "king" already existed. In the decades following European settlement, the Confederacy dominated the area and formed a coercive kingdom that was much more powerful than the loose alliances of chiefdoms of Piscataways, Dogues and others in Northern Virginia. The Dogues (Tauxenents) were not considered part of "Powhatan's ethnic fringe" and were likely more influenced by the Conoy chiefdom (Potter 1993:19).

In contrast to the Tidewater region in which the Powhatan Confederacy and the colonists engaged in active conflict, the interaction between the colonists and the Native American groups within the Potomac region are generally thought to be more peaceful (Hodges 1993:14). Nevertheless, one result of European settlement in the Potomac region was the death or emigration of the native inhabitants. By 1675, the Piscataway had left the region, only to return and once again leave circa 1700. The Piscataway and other Native American groups effectively disappeared from the historic record by 1700, although some groups did remain in the area and have evolved into a rather large local population (Cissna 1986). Many Piscataway descendants still live on the Maryland side of the Potomac River.

The first Virginia Assembly, convened by Sir (Governor) George Yeardley at James City in June of 1619, increased the number of corporations or boroughs in the colony from seven to eleven. In 1623, the first laws were enacted by the Virginia Assembly establishing the Church of England in the colony. These regulated the colonial settlements in relationship to Church rule, established land rights, provided some directions on tobacco and corn planting, and included other miscellaneous items such as the provision "…That every

dwelling house shall be pallizaded in for defence against the Indians" (Hening 1823:119-129). Present-day Alexandria was incorporated into the English political system in 1617 as part of the Chicacoan (or Kikotan) parish or district. One of four parishes established in the Virginia colony that year, Chicacoan encompassed the land between the Rappahannock and Potomac rivers; the other three parishes – James City, Charles City, and Henrico – were located south of the Rappahannock.

By 1630, the colony had expanded and comprised a population of about 5,000 persons; this necessitated the creation of new shires, or counties, to compensate for the existing courts, which had become inadequate (Greene 1932:136; Hiden 1980:3-6). In 1634, the Virginia House of Burgesses divided the part of Virginia located south of the Rappahannock River into eight shires. Ten years later, in 1645, Northumberland County, located on the north side of the Rappahannock River, was established "…for the reduceing [sic] of the inhabitants of Chickcouan [district] and other parts of the neck of land between Rappahanock River and Potomack River", thus enabling European settlement north of the Rappahannock River and Northern Virginia (Hening 1823:352-353). In 1653, Westmoreland County was carved from Northumberland, and a year later, the first land grant containing present-day Alexandria was patented.

The first permanent settlement in present-day Alexandria occurred on Daingerfield Island in 1696, and by 1715, much of the future city was under cultivation (Cox et al. 1999). John Summers established a plantation near the subject area at this time. Moving upriver from the Coastal Plains, European colonists began to acquire the land along the Potomac to establish tobacco plantations. The soil was well-suited for growing the crop, and the river made it easy to export to overseas markets. Landed Virginia estates, bound to the tobacco economy, became self-sufficient, and few substantial towns were established in colonial Virginia. The growth of the labor-intensive tobacco horticulture necessitated large numbers of field workers and a reliable source for such labor. Indentured servants from England made up much of the early work force in Virginia's tobacco fields, as economic distress fueled emigration from England during this period. With improving economic conditions in England, however, and cheap land available in Virginia, fewer English indentured servants were available, and the number of enslaved Africans in the colony increased. The importation of Africans ultimately resulted in the institution of permanent slavery and, by the end of the 17th century, slavery as a race-based hereditary status had become entrenched in the economic and cultural fabric of the colony.

Tobacco Port & Early Growth (1732-1770)

In 1730, Prince William County was formed from Stafford County, and the Tobacco Inspection Act was passed by the Virginia Assembly, appointing Inspectors for public tobacco warehouses to "prevent frauds in his Majesties Customs." In May 1732, the House of Burgesses noted, "And whereas, by the said act, public warehouses were appointed to be built and established at Quantico upon Robert Brent's land, and Great Hunting Creek, upon Broadwater's land, in Prince William County, under one inspection; and houses were built accordingly upon Robert Brent's land, which have been since burnt; but Broadwater's land being found very inconvenient, no house was built there, pursuant to the said act, but a warehouse in the room of it, was built upon Simon Pearson's land, upon the upper side of Great Hunting Creek" (Hening 1820:268).

Pearson's 100 acres contained the subject area. The northern most inspection station was the first major development in present-day Alexandria outside of plantations, the post became a focal point for commerce and was purchased by Hugh West in the late 1730s. As Alexandria's population and economic influence increased, Fairfax County was carved from Prince William in 1742, although the county courthouse was built near present-day Vienna and not Alexandria (Smith and Miller 1989).

The act for erecting the town at "Hunting Creek Warehouse" on 60 acres of land owned by Phillip Alexander, Jr., John Alexander, and Hugh West was passed on May 11, 1749. According to the act, it would both benefit trade and navigation and be to the advantage of the "frontier inhabitants." Phillip Alexander, Jr. initially opposed the establishment of a town on his estate but was evidently placated by naming the town for his family (Pippenger 1990:322). At this time the Alexandria waterfront consisted of high bluffs overlooking the river; the banks of the bay rose abruptly above the tidal flats, perhaps as much as 15-20 feet. Hugh's son John West and a 17-year-old assistant, George Washington, surveyed 60 acres of land between West's Point and Point Lumley on either side of a crescent shaped bay on the west bank of the Potomac (Figure 2). The streets were laid in a grid pattern bound by Duke, Royal, and Oronoco Streets, and the blocks were subdivided into four half-acre lots to a block (Cressey et al. 1982:150). Purchasers of each lot were required to erect one house of brick, stone, or wood, "well framed," with a brick or stone chimney, in the dimensions of 20 feet square, "or proportionably [sic] thereto" if the purchaser had two contiguous lots. The survey did not extend to present-day Washington Street.

In 1751, John Carlyle, who married Sybil West [Jr.], cleared Duke Street to Point Lumley, and by 1759, the town built a public wharf at its terminus. The following year, the trustees authorized waterfront landowners to extend lots or "bank out" into the bay and improve their properties for personal use (City of Alexandria Minutes 1760). To create additional acreage, owners cut land from the bluffs and spread it out over wrecked ships and other salvaged material. In 1763, additional lots were platted on the south, west, and north sides of the original town limits. While West's Point and its tobacco warehouses and inspection station formed the early economic hub of Alexandria, Point Lumley became the center of the town's shipbuilding and mercantile trade industry (Smith and Miller 1989).

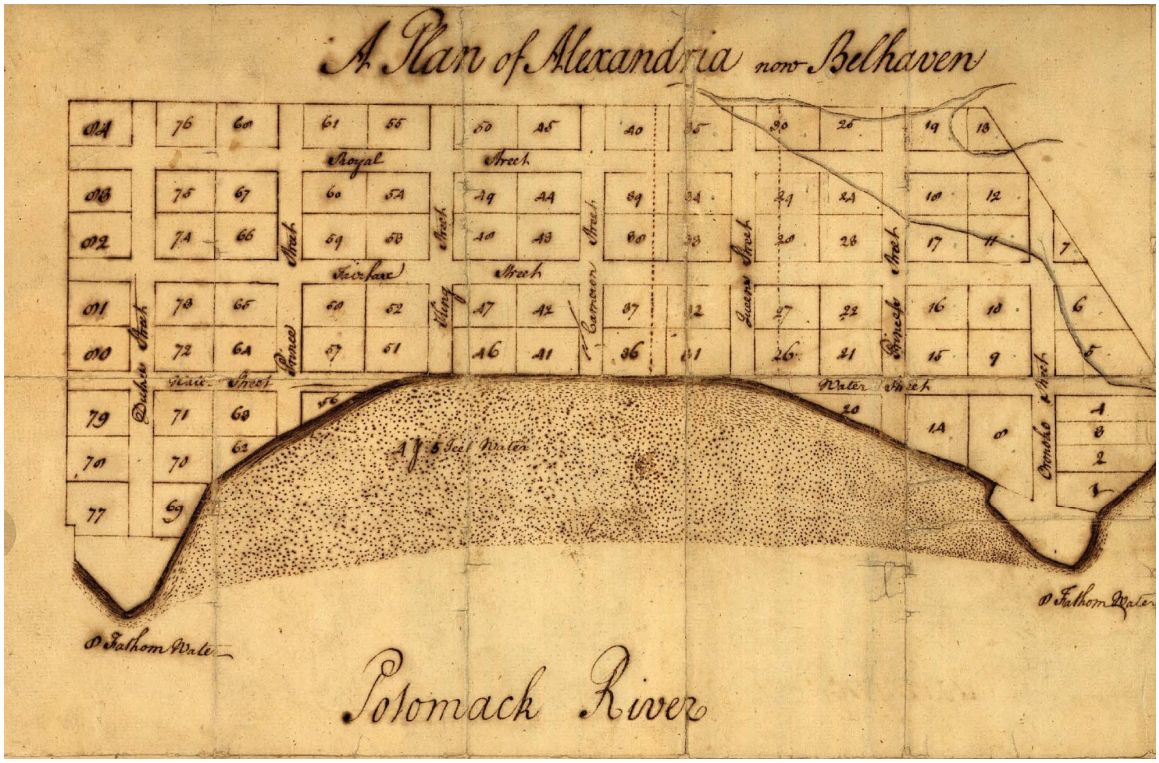


Figure 2: 1749 Plan of Alexandria by George Washington

In 1754, the Fairfax County courthouse was moved to Alexandria from its location near the current town of Vienna. In the 1750s, Alexandria contained the courthouse, a jail, six taverns or ordinaries, a kiln, and small houses as well as the more substantial ones of wealthier landowners (Crowl 2002:43). The town grew quickly, and in 1762, it was reported to the Virginia Assembly that the bounds of the town of Alexandria established at the Hunting Creek Warehouse had:

> already built upon except such of them as are situated in a low wet marsh which will not admit of such improvements, and that diverse traders and others are desirous of settling there if a sufficient quantity of the lands of Baldwin Dade, Sibel West, John Alexander the elder and John Alexander the younger, which lie contiguous to the said town, were laid off into lots & streets, and added to, and made a part thereof.... (Hening 1820:604-607).

The area described included Ralph's Gutt and the subject area. The plan for enlarging the town of Alexandria was passed by an act of the Virginia Assembly approved at the November session of 1762.

Birth of the Nation (1771-1814)

By 1770, Alexandria was the largest town on the Potomac River and was becoming an important center for maritime trade with Europe and the Caribbean. In 1774, John Alexander laid out and sold 18 new lots and gave the town land for Wilkes and St. Asaph Streets (Crowl 2002:124). In 1779, the town of Alexandria was incorporated, which allowed it to have its own local government, as opposed to being governed by Fairfax County. A second extension of the boundaries was approved on May 6, 1782, authorizing the mayor, recorder, aldermen and common council to lay a wharfage tax and to extend Water and Union Streets, providing that the proprietors of the ground on which Union Street was extended would have the "… liberty of making use of any earth which it may be necessary to remove in regulating the said street" (Hening 1823:44-45). The new streets within the expanded area were named for Revolutionary War heroes including Greene, Lafayette, Jefferson, Patrick Henry, Washington, and Wythe.

During this period, many local planters, in the second half of the eighteenth century, began growing wheat and corn rather than tobacco. Tobacco depleted the soil, and profits from the grains eventually exceeded those for tobacco. Alexandria merchants shipped corn and wheat as grain and in the form of flour to Europe and to the West Indies and sold imported manufactured goods and foodstuffs. By 1775, there were "20 major mercantile firms in Alexandria, 12 of which were involved in the transshipment of wheat" (Smith and Miller 1989).

Although Alexandria flour was not considered as fine as that from Philadelphia, New York, and Baltimore, flour milling served as a chief industry during the early 1780s and again in the 1790s (Smith and Miller 1989). In 1791, the total value of the town's exports was $381,000, and four years later it had grown to $948,000. By 1795, Alexandria had closed its tobacco warehouses. From 1800 to 1820, it was fourth behind Baltimore, Philadelphia, and New York in wheat exports (Cox et al. 1999; MacKay 1995:55). With the shift from a tobacco economy to a wheat economy, some enslaved laborers were no longer needed on plantations and were manumitted. Those who were not manumitted were "hired out" to business owners and manufacturers in the rapidly growing port town (Bloomburg 1988:57-62). By 1790, 525 enslaved African Americans lived within Alexandria and comprised more than one-fifth of the population of the city (Bertsch 2006:1). Most resided within the homes of their owners (Cressey et al. 1982:149).

In 1791, Alexandria was ceded to the federal government to become part of the newly established District of Columbia, however, the Fairfax County Courthouse remained in Alexandria until 1799 when it was moved to its current location, now within the City of Fairfax. The town self-governed until the District officially took over on February 27, 1801 (Smith and Miller 1989). By 1798, much of the waterfront was banked out, though much of Ralph's Gutt remained, and the town extended north to Montgomery Street and included the subject area (Figure 3).

At the turn of the century, agricultural land transitioned yet again from large plantations producing wheat for interstate and international trade to smaller farms, which supported the growing town of Alexandria. Farmers grew produce to sell locally, and wealthy townspeople kept gardens, orchards, and small farms (Crowl 2002:123). The population and the county increased as people moved in from outlying western areas to work as merchants, hotel proprietors, and cooks in local restaurants or to seek employment on the docks or in factories.

International Port (1815-1861)

As commerce in Alexandria grew and traffic on the roads between the surrounding rural areas and markets and shipping in the city increased, plans for developing turnpikes were also taking shape. The Little River Turnpike (Routes 236 and 50) connected Duke Street with Fairfax Courthouse and eventually Aldie. Construction began on the Little River Turnpike at the Duke Street bridge over Hooff's Run in 1803 and was completed to Aldie in 1812 (Schweigert 1998). The Leesburg Turnpike (Route 7) was established along the route of the East Ridge Road. The turnpike was incorporated in 1809 and was completed to Leesburg in the late 1830s (Poland 1976:115-118). The southern end of the turnpike connected with the westward extension of King Street.

At the same time, Alexandria suffered a prolonged economic decline until about 1842. Contributing agricultural factors were depletion of soils and the division of plantations into smaller, supporting tracts of farmlands among planters' sons. Newly available lands in the west claimed by the United States after its victory over the British in the Revolutionary War, the Ordinance of 1787 establishing the Northwest Territory, and the circa 1800 Virginia Military Bounty, establishing lands set aside for settlement by Virginians and Kentuckians, factored into a change in settlement patterns. All of these spurred a migration of third and fourth generations of Fairfax County (and Alexandria) residents during the post-Revolutionary War period. Other influences included international conflicts following the Revolutionary War and the effects of French privateer ships on Alexandria shipping, along with embargoes (Smith and Miller 1989).

Despite the depressed economy, commerce remained steady on the waterfront while small farms persisted in the western lots of the town. The slave trade flourished, even after a Congressional ban on importing enslaved people into the United States in 1808. The ban discouraged manumissions by raising the value of enslaved people; the illicit importation of the enslaved persisted until the beginning of the Civil War; and the domestic slave trade prospered through intentional breeding. Many slave owners in northern Virginia seized the opportunity to sell surplus enslaved people into the southern market. Franklin & Armfield, one of the largest slave trading firms in America, opened an office in Alexandria in the 1830s.

C:\WSSI-L\22000s\22900\22975.01\Proposal\ARCH\08_1798 Alexandria Plan Gilpin.mxd

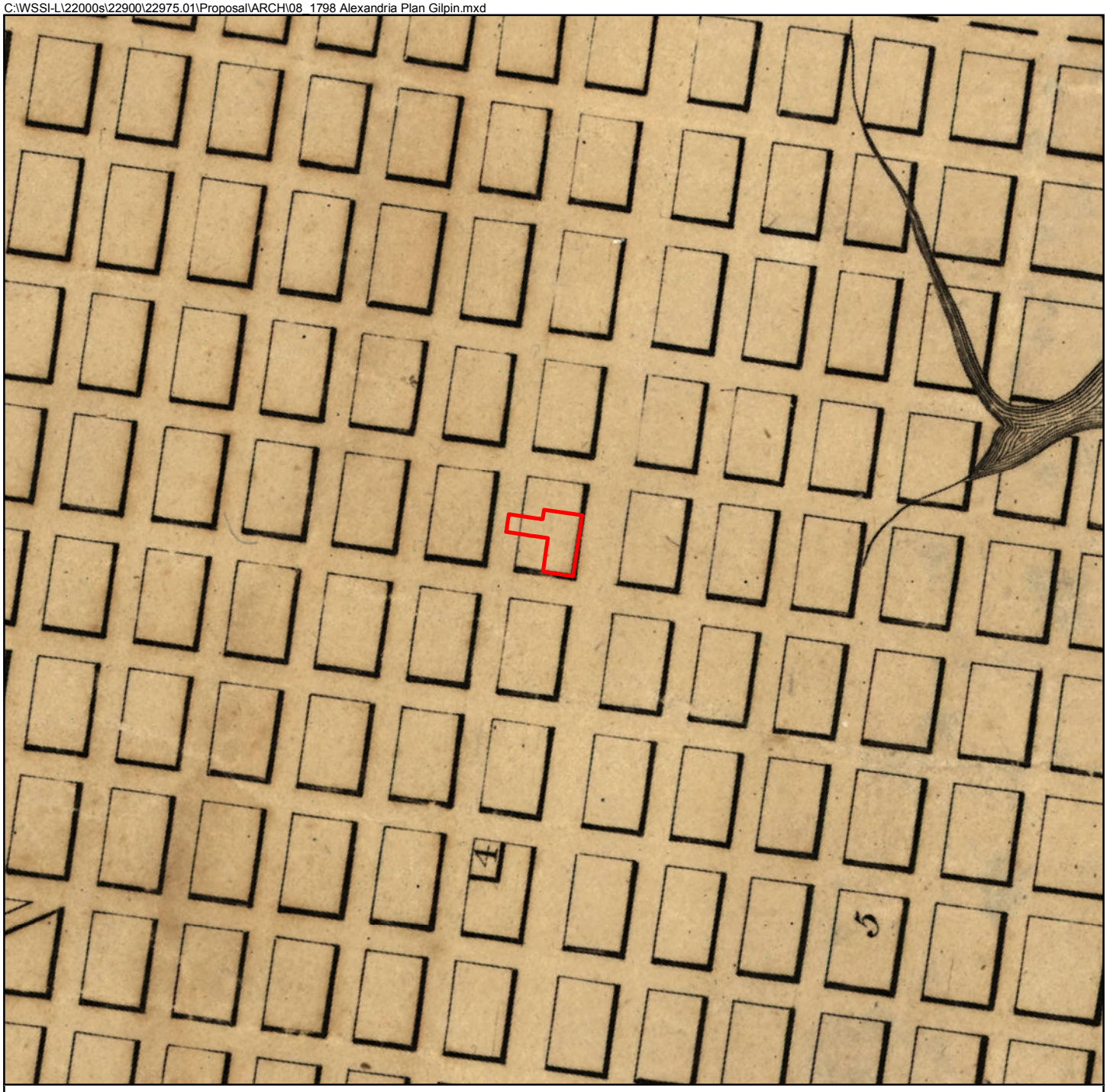


Figure 3: 1798 George Gilpin Plan of the Town of Alexandria in the District of Columbia

By 1830, a variety of industrial facilities had been established, including a rope walk located west of West Street from Oronoco to Queen Streets, an icehouse at 218 North Columbus Street, Jacob Hoffman's sugar refinery at 220 North Washington Street, a tannery, and several furniture factories. The Alexandria Canal was built in the 1830s and 1840s, linking Alexandria to other port towns on the Potomac and beyond. A steam engine factory was set up in 1830 on Union Street, and several coal yards were created to power the steam engines. In 1847, the Cotton Manufacturing Company opened, and later a gas works, plaster mill, bakery, foundry, and more tanneries were in operation (Bloomburg 1988:64). These employed white and free black workers.

With the arrival of the railroads in the 1850s, Alexandria experienced an industrial and commercial boom. Its population swelled from 8,734 in 1850 to 12,652 in 1860. Statistics from the 1850 census reveal there were 6,390 whites; 1,301 free blacks, and 1,061 enslaved people. In 1858, with the approval of a new charter, Alexandria officially became a city (Cox, et al. 1995). The waterfront was almost completely banked out by this time (Figure 4).

Secession & Civil War (1861-1865)

On May 23, 1861, Virginia formally seceded from the Union by a vote of 97,000 to 32,000. In a public referendum, Alexandrians voted 958 for and only 106 against secession (Smith and Miller 1989). The morning after Virginia voted to secede; Federal troops entered Alexandria as Confederate troops exited the city to the west. "This was done without opposition, capturing in the town a few rebel cavalry. Some 700 rebel infantry in the town had received notice of the approach of the troops and were ready to take the [railroad] cars. They escaped on the O&A, burning the bridges behind them. Our [Union] troops pursued a short distance, also burning such bridges as they had spared..." (Scott 1880:37-41). Alexandria would remain an occupied city throughout the duration of the War. Private homes, including those in the subject area, and businesses were taken over by the occupying army, and the city was used as a staging point for the various military campaigns in Virginia.

No major Civil War battles were fought in the City of Alexandria, although its railroads, waterways, and roadways figured in major troop movements into and out of the Washington, D.C., area. A few intermittent Confederate raids were made into the western end of Alexandria, mostly along the O&A. One skirmish was reported on the Little River Turnpike (Duke Street) in June of 1863. As in other war-torn areas, different categories of hospitals were created to manage army needs. Field hospitals served as on-the-move stations for short-term care. Camp or post hospitals were intended for military units stationed at that post. Longer term care required general hospitals: permanent facilities out of the direct line of fighting. Washington D.C. became an important waypoint for long-term care. At the end of the war, there were 17 general hospitals in D.C. In addition, 23 hospitals opened in Alexandria over the course of the war.

C:\WSSI-L\22000s\22900\22975.01\Proposal\ARCH\09_1845_Ewing.mxd

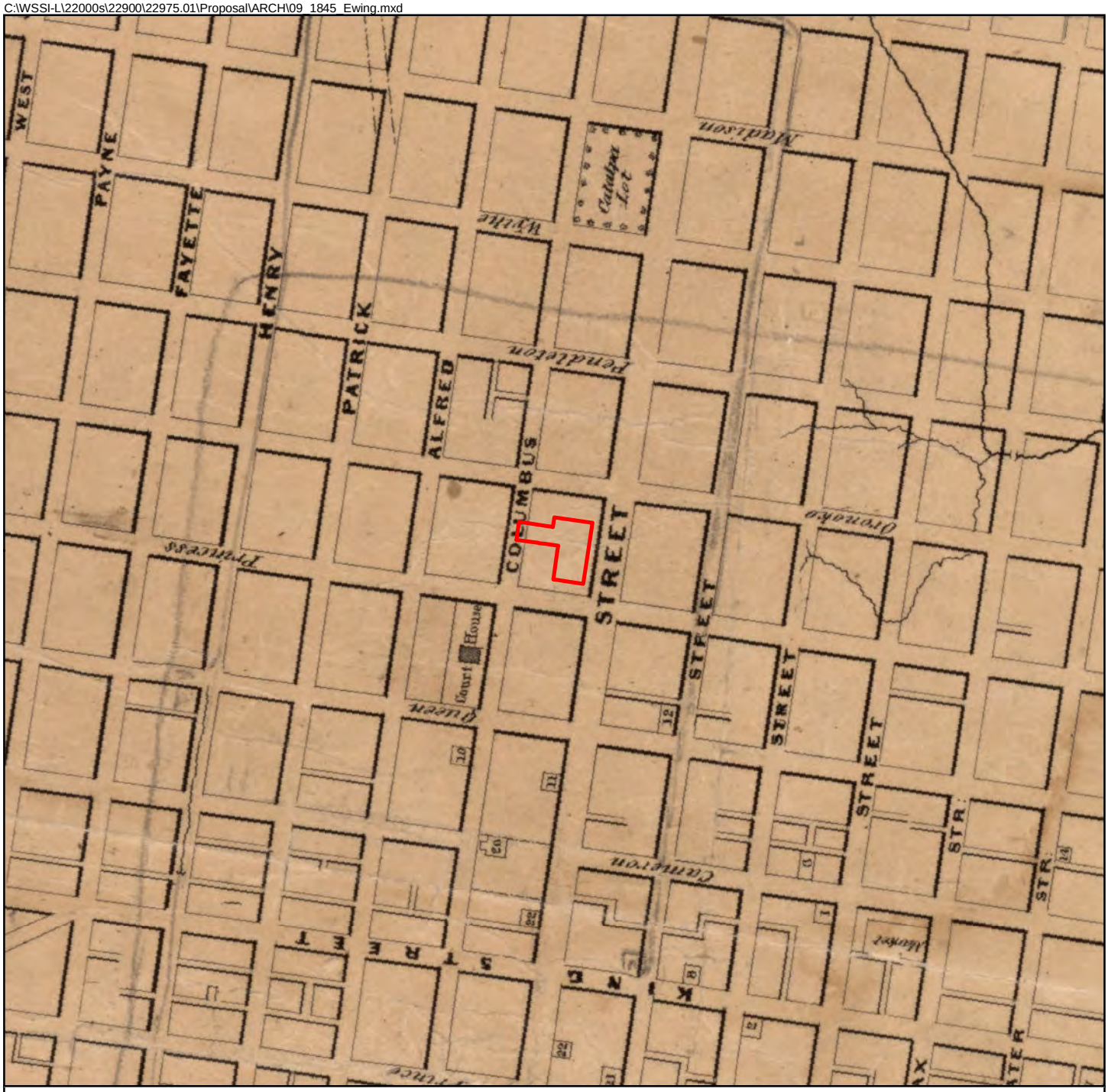


Figure 4: 1845 Ewing Map, Alexandria, Virginia

Of the general hospitals in D.C. and Alexandria, only five were purpose-built as hospitals (Lawrence et al. 2010). The Army Quartermaster General commandeered civil buildings, churches, and large private houses and oversaw the construction of special outbuildings to serve these adapted hospitals. Maps were drawn of military facilities, showing the location, size, and type of structures used during the war. It was the Quartermaster's responsibility to oversee the supply and distribution of food, water, construction and transportation materials, and horses.

In addition, Federal military authorities recognized the strategic and tactical importance of maps of the United States, and the dearth of detailed and accurate maps available. The Army's Corps of Topographical Engineers and Corps of Engineers, the Treasury Department's Coast Survey, and the Navy's Hydrographic Office, were quickly mobilized to prepare new maps for the war effort. As a result, several detailed maps of the vicinity of Alexandria were made in the 1860s (Figure 5).

The Union army's occupation of Alexandria during the Civil War effected Alexandria's African American population, both freed and enslaved. Although exact numbers are unknown, as many as 20,000 African American refugees may have come to Alexandria during the war. The majority of the African American refugees that migrated to Alexandria probably fled from nearby plantations in northern Virginia, but former enslaved people from other parts of Virginia, Maryland and even remote parts of the Confederacy also made their way to the city. Initially, U.S. officials were required to send "fugitive slaves" back to their owners, but by mid-1861 the government began to refer to freedom-seekers as "contraband of war." This status as property provided a legal basis through which Union officers could refuse to return refugees to their Confederate owners. Contrabands became known as "freedmen" during the later years of the war and into Reconstruction.

On March 13, 1862, Congress passed the Confiscation Act, which prohibited officers or military personnel from using force to return fugitives. In a city occupied by the Union army, this meant that the government no longer enforced the laws that required that fugitive slaves be captured and returned to their owners. At the beginning of the War, African Americans could not lawfully join the military. By 1862, the number of qualified recruits declined and in response, African-American men were allowed to join the ranks (Miller 1998:1).

The dwelling at 414 N. Washington Street was commandeered and converted into the Grosvenor Hospital. Several structures were erected around the dwelling including a Dead House, a two-story ward for patients, a Laundress Quarters, and other outbuildings which are depicted on an 1864 Quartermaster Map (Figure 6).

C:\WSSI-L\22000s\22900\22975.01\Proposal\ARCH\14_1864_AlexandriaPlan.mxd

Figure 5: 1864 Plan of Alexandria, Virginia

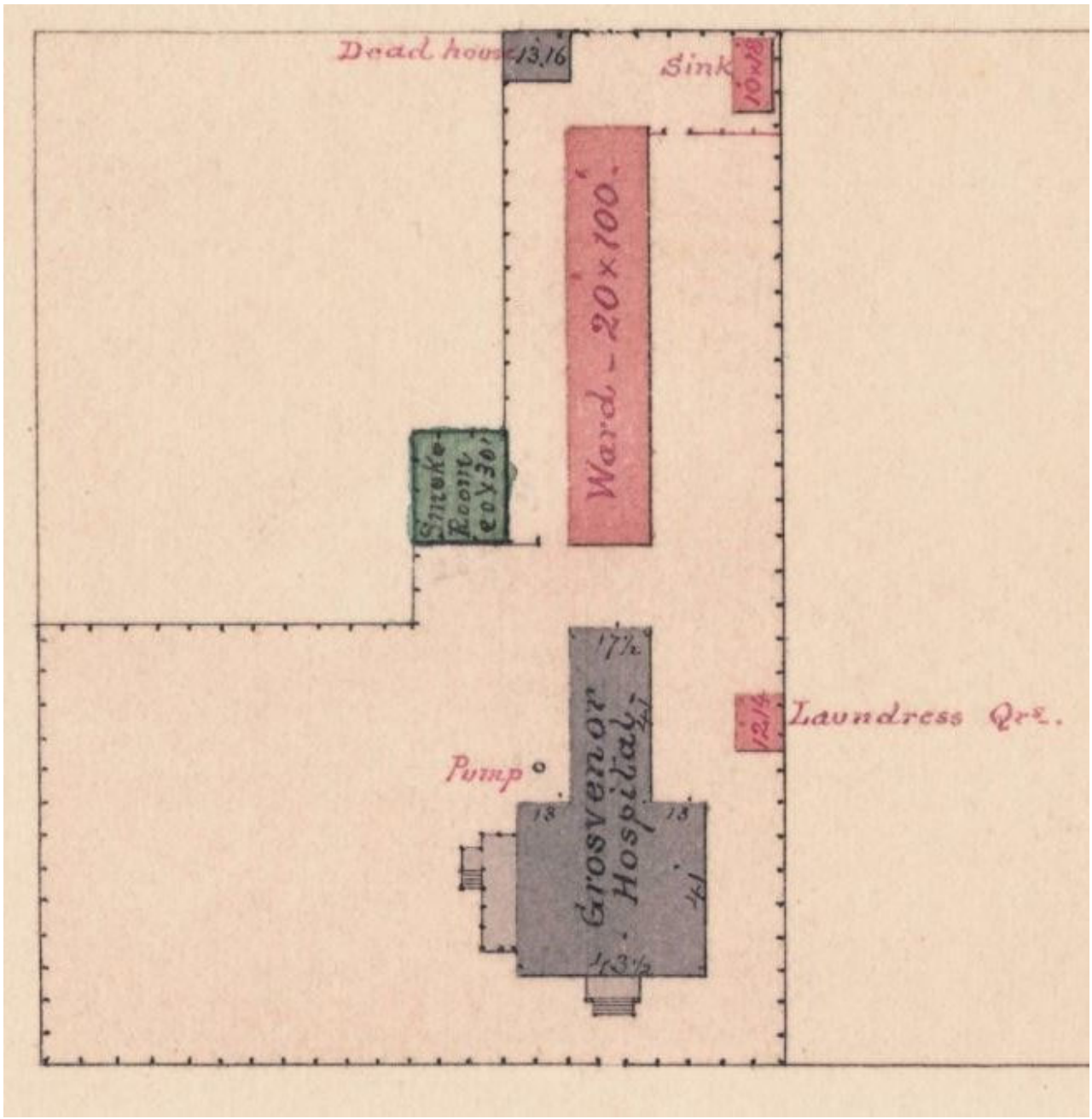


Figure 6: Detail of 1864 Quartermaster Map Showing Grosvenor Hospital

General Robert E. Lee's surrender of the Confederate Army on April 9, 1865, was followed by Confederate General Joseph E. Johnston's surrender to Union General Major-General William T. Sherman on April 26, ending the Confederate resistance east of the Mississippi River. By the end of April and early May, the area around Washington filled with soldiers; Colonel Gregg of the 179th New York Regiment reported of the 21st that the area from Baileys Crossroads to Washington that the "whole country...around as he could see in every direction is one vast encampment." Rose Hill, to the north of Bush Hill, was "...literally covered with Sherman's army" (Frobel 1992:219-230). In the summer of 1865, the Union Army dismantled temporary structures and withdrew from Alexandria, and Confederate sympathizers who had fled south at the start of the war began returning to the town.

Reconstruction & Expansion of African-American Neighborhoods (1865-1890)

In the years immediately following the end of the Civil War, the citizens of Alexandria struggled to revive the Alexandria Canal, in hopes of regaining the commerce that the town lost during the war by re-connecting Alexandria to the Chesapeake & Ohio (C&O) Canal. The local newspaper advertised in that year that with the re-opening of the Alexandria Canal, every aspect of commerce and trade was in place to make Alexandria the main shipping port for Washington. In 1873, the city touted its prime location as a north-south transportation corridor, highlighting the canal, five rail lines and easy access to the Potomac River (Miller 1987:245).

Considerable capital was expended in maintaining the Alexandria Canal after 1865, yet in the decades after the Civil War, canals throughout the country closed as railroads assumed most of the overland shipping traffic. The Alexandria Canal was no exception, as it was increasingly unable to compete with the Baltimore & Ohio Railroad (B&O) for the western coal trade. The B&O, which followed much the same route as the C&O Canal, was more reliable than the canal system, which suffered from unreliable water flow, floods, poor maintenance, and labor strikes (Cressey et al. 1984:3) (Cressey 1984:3; Morgan 1966:11-13).

In 1870, the Pennsylvania Railroad (PRR) assumed the construction of a previously authorized but never built railroad, the Alexandria & Fredericksburg Railway (A&F) and, on April 28, 1871, the City of Alexandria authorized the A&F to build a single track up Fayette Street (Baer 2005). In 1872, the Pennsylvania Railroad acquired the Alexandria and Washington Railroad, and the St. Asaph Street entrance to the city was abandoned in favor of the two acquired lines running down Fayette and Henry streets (Cox 1996)

During the Civil War, the African American communities of Cross Canal and the Berg developed nearby along with the seasonal village of Fishtown. These continued to flourish with the arrival of new industry after the war. By the late 1880s, new residential development exclusively for whites was occurring north and west of the subject area and some of the larger homes were no longer residences as they were converted to offices or storage, though in and near the project area, they remained residential (Figure 7).

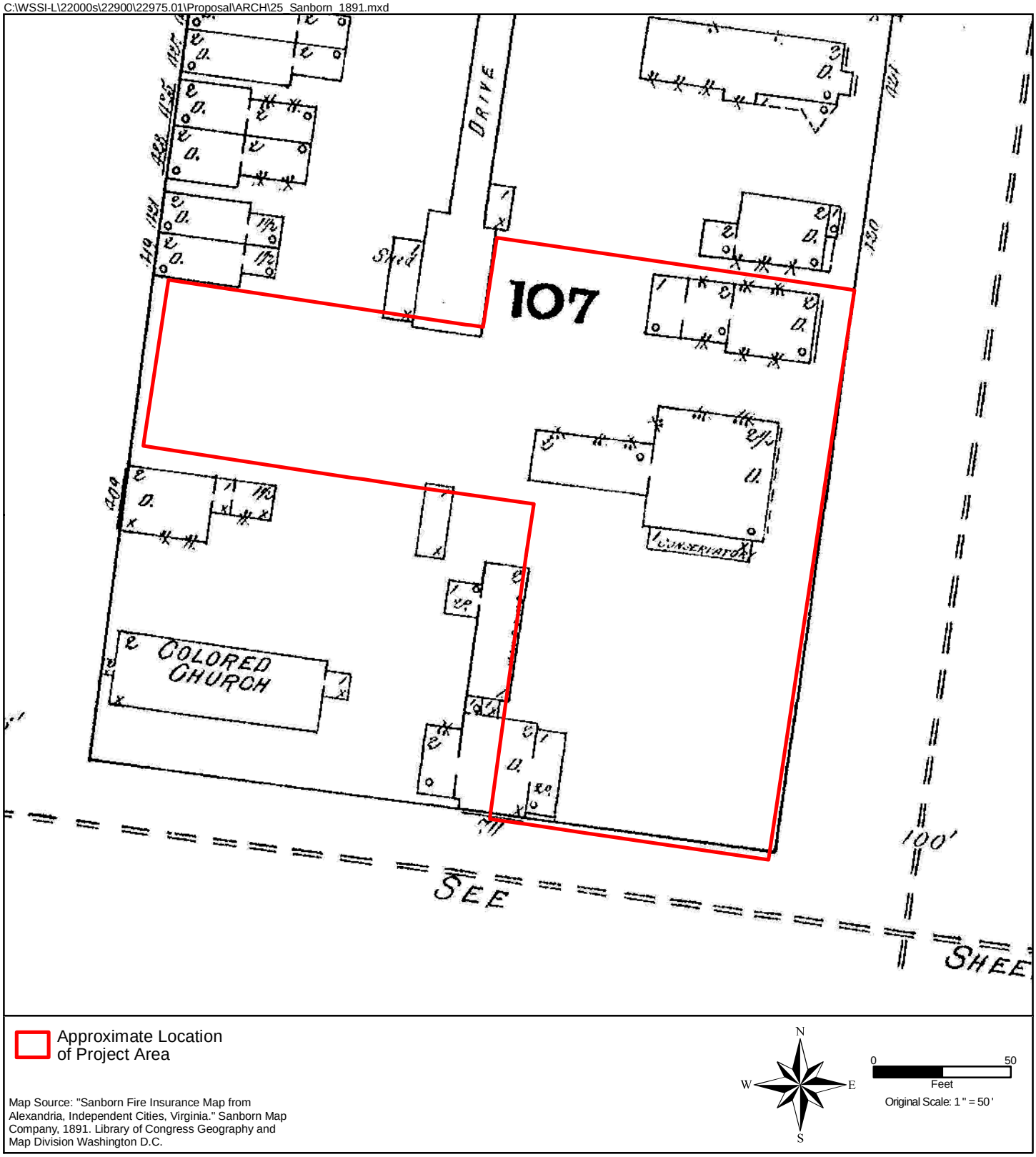


Figure 7: 1891 Sanborn Fire Insurance Map, Alexandria, Virginia

By the 1890s, smaller rows houses were being constructed in old neighborhoods as in the project area (see Figure 7), and in 1894, two planned residential developments – Del Ray and St. Elmo – were established on the west side of the Alexandria Turnpike and restricted to whites only. Beginning in 1896, the Washington, Alexandria and Mount Vernon Railway (WA&MV), an electric railway that ran along present-day Commonwealth Avenue, provided commuter rail service. Yet lots sold slowly, as the national economy was still recovering from a financial panic in 1893, and Alexandria area remained in an economic slump through the 1890s. In addition, unlike Alexandria, where several houses were built in the subject area around 1900, Del Ray and St. Elmo lacked public utilities such as water and sewer service (Escherich 1992).

Early 20th-Century Industrialization & Processing (1891-1929)

The transportation developments of the early 20th century brought economic relief to Alexandria. Left relatively intact were the shipyards and railroad tracks that serviced the waterfront, which with continued expansion were vital to business operations on the waterfront. Between World War I and World War II, the last vestiges of the agricultural landscape began to disappear. With well-established rail networks and commuter lines, industry continued to expand especially along the waterfront and the commercial corridor extended farther out from the city. Roads in the City of Alexandria were paved, creating smooth wide expanses between street blocks. This activity and the proximity of the city to Washington, D.C. spurred further infill within the historic grid and the development of large subdivisions on the surrounding farmland (Sheely 1966) (Figure 8).

The Depression & Center for National Defense (1930-1950)

In response to the crises of the Depression and World War II, Federal and state governments increased both in the numbers of employees and offices, as well as in the scope of their activities during this time. Federal projects in Virginia during the Depression created new highways and parks and helped to establish a textiles industry.

World War II brought thousands of newcomers to the suburbs of Washington and many continued as residents of Virginia when the war ended. It was during this time that one of the nation's oldest historic overlay districts was created in Old Town Alexandria to protect historic properties from unchecked development and attempt to retain the historic character of the area in the face of major wartime and post-war development.

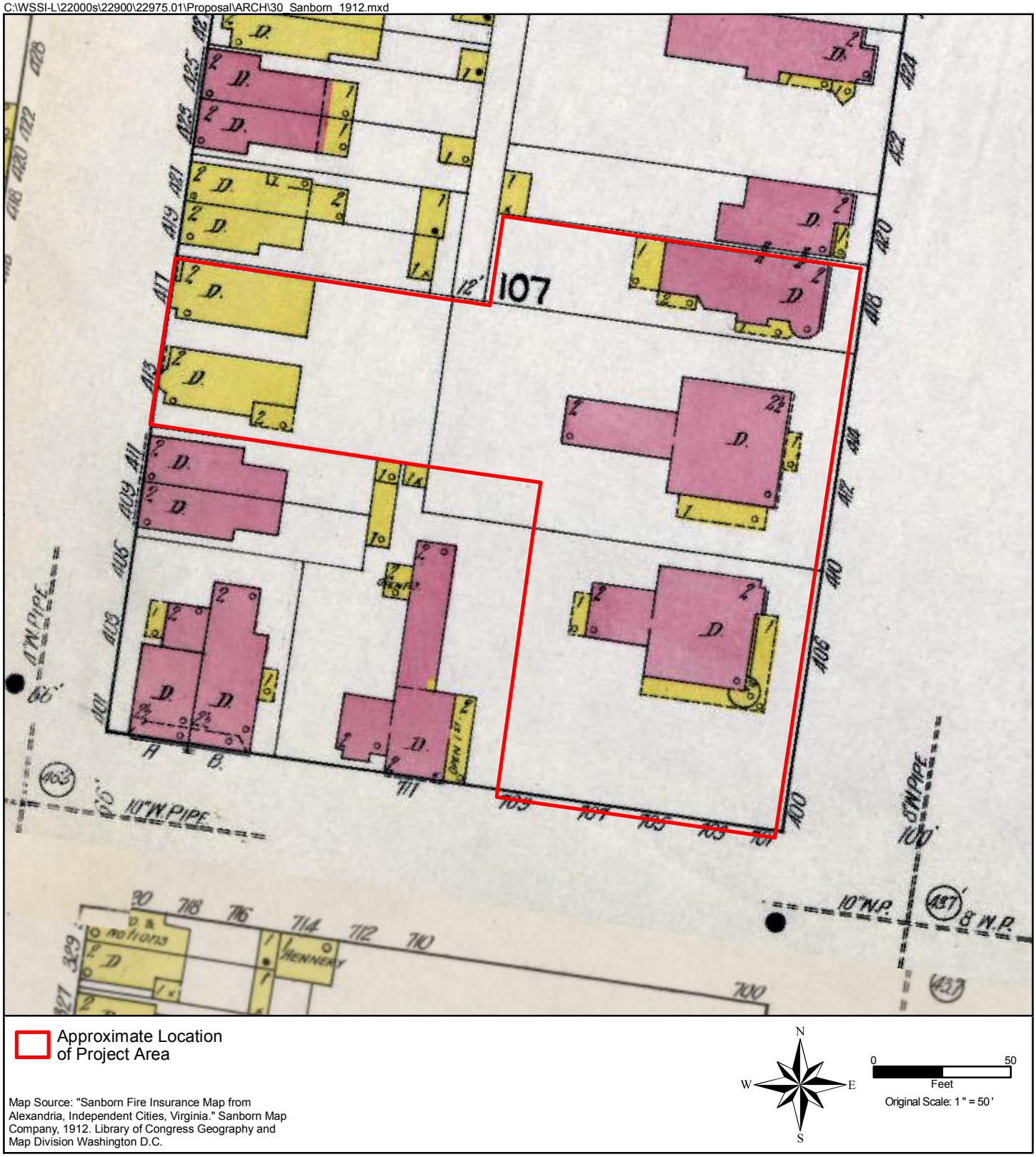


Figure 8: 1912 Sanborn Fire Insurance Map, Alexandria, Virginia

Bedroom Suburb/Urban Renewal/Modern Historic Preservation (1950-1985)

The history of Northern Virginia after World War II can be summarized as an era of population growth and increasing suburbanization. Urban renewal became prevalent as historic city centers were increasingly abandoned for the suburbs after the mid-century and city planners targeted historically poor neighborhoods for transportation expansion or housing projects. Interconnections with Washington, D.C. and the adjacent Maryland suburbs gained strength during this period as a result of increasing diffusion of federal agencies and employment throughout the region. The number of federal workers did not fall after World War II, as it had after World War I, and new jobs were created in the region by private companies that contracted for the government or subsisted on federal spending (Melder et al. 1983:339-441).

This period saw the creation of a recognizable geographic and political bloc within the state known as "Northern Virginia". At first, this included only the City of Alexandria and Arlington and Fairfax Counties, but the definition of Northern Virginia grew, as population and suburbanization grew, to include Prince William, Loudoun, Stafford and Fauquier Counties (Moore 1985:7, 10).

With the increase in population came an increase in the need for high-density office space. The maturity of suburban sprawl and the decrease of urban retail in the mid-20th century led to the increase of downtown office space (Putnam et al. 2014). Office space became important real estate in cities, and area available for parking was coveted. As a result, many historic resources were razed, and office complexes were built with accompanying parking lots and decks (Figure 9). The subject property, built in the early 1960s, is one such example of a free-standing multi-story office building with an adjacent parking lot.

Figure 9: March 1964 Black and White Imagery

ARCHEOLOGICAL EVALUATION

The documentary research revealed that the study area has a moderate to high probability of containing mid-19th century –20th century artifact deposits and archeological features that could potentially provide significant information about the residents of this block, and about the use of the property as a hospital during the Civil War (Maas 2017).

The demolition, grading, and construction of parking lots and buildings in the late 20th century likely disturbed historic contexts, though the degree of disturbance is unknown. Deep fill deposits were identified during geotechnical testing in the western end of the study area; shallower deposits were found at the eastern end of the property. Because of the possibility of deep subsurface features within the study area, we recommend the mechanical excavation of test trenches following the demolition of the extant buildings to determine if significant subsurface remnants of the previously discussed archeological resources are present.

Fieldwork Methodology

A Scope of Work was designed by Thunderbird Archeology and approved by Alexandria Archaeology prior to the onset of the archeological work. The work involved a combination of the hand-excavation of shovel test pits and machine trenching, in order to determine if significant archeological resources were present within the study area. A Resource Management Plan was prepared for all significant resources. As a result of the fieldwork, the archeological site was registered with the Virginia Department of Historic Resources and copies of the site form registration were sent to Alexandria Archaeology.

Shovel test pits measured at least 15 inches in diameter and were excavated at 25-foot intervals across the site following the demolition of the asphalt parking lot. All excavated soils were screened through 1/4-inch mesh hardware cloth screens and were classified and recorded according to standard pedological designations (A, Ap, B, C, etc.); excepting the terms Fill and Fill horizon, which are used to describe culturally modified, disturbed, or transported sediments and soils. The use of these terms is consistent with use in standard geomorphological studies and recordation of geo-boring profiles in environmental studies. Soil colors were described using Munsell Soil Color Chart designations and soil textures were described using the United States Department of Agriculture soil texture triangle. Artifacts recovered during shovel testing were bagged and labeled by unit number and soil horizon. The location of each shovel test pit was mapped; unless otherwise noted, the graphic representation of the test pits and other features depicted in this report are not to scale and their field location is approximate.

Five trenches varying in length but approximately 4-5 feet in width were excavated across the parking lot. At least one soil strata column profile was drawn for every trench. If features or buried ground surfaces were encountered, additional work was completed to assess the significance of the findings. The trenches were backfilled after recordation of the soil profiles if features/buried surfaces were not located or required not further work.

All archeological work was documented by field notes, sketch plans and photographs.

Laboratory Methodology

All recovered artifacts were cleaned, inventoried, and curated in accordance with the guidelines set forth in the City of Alexandria Archaeological Standards. Historic artifacts were separated into four basic categories: glass, metal, ceramics, and miscellaneous. The ceramics were identified as to ware type, method of decoration, and separated into established types, following South (1977), Miller (1992), and Magid (1990). All glass was examined for color, method of manufacture, function, etc., and dated primarily on the basis of method of manufacture when the method could be determined (Hurst 1990). Metal and miscellaneous artifacts were generally described; the determination of a beginning date is sometimes possible, as in the case of nails. Unless otherwise noted, a representative sample of recovered brick and oyster shell was retained for curation; the remainder was discarded after being counted and weighed.

Any recovered prehistoric artifacts were classified by cultural historical and functional types and lithic material. In addition, the debitage was studied for the presence of striking platforms and cortex, wholeness, quantity of flaking scars, signs of thermal alteration, size, and presence or absence of use. Chunks are fragments of lithic debitage which, although they appear to be culturally modified, do not exhibit clear flake or core morphology.

Recovered artifacts were entered into a Structured Query Language (SQL) Server database in order to record all aspects of an artifact description. For each artifact, up to 48 different attributes are measured and recorded in the database. Several pre-existing report templates are available, or users can create custom queries and reports for complex and unique analyses. The use of a relational database system to store artifact data permits a huge variety of options when storing and analyzing data. A complete inventory of all the artifacts recovered can be found in Appendix I of this report.

RESULTS OF ARCHEOLOGICAL EVALUATION

Thunderbird Archeology, a division of Wetland Studies and Solutions, Inc., of Gainesville, Virginia, conducted an *Archaeological Evaluation* for Sunrise Development Inc. in anticipation of new construction at 400 N. Washington Street in Alexandria, Virginia. The archeological work was completed in July of 2018 and resulted in the identification of one new archeological site, 44AX0239 (Appendix II).

Previous documentary research revealed that the study area had a moderate to high probability of containing mid-19th to 20th century archeological features that could potentially provide information about the residents of the block and the use of the property as a hospital during the Civil War. The purpose of the archeological investigation was to identify any cultural resources within the study area and to provide a preliminary assessment of the potential significance of these resources.

Following a Scope of Work approved by Alexandria Archaeology, the archeological investigation included a combination of mechanical and hand testing. Sixteen shovel test pits and five machine trenches were excavated in the existing asphalt parking lot at the 400 block of North Washington Street (Figure 10).

Shovel Test Pit Excavation

Although geotechnical testing at the site revealed potentially deep fill deposits, the city required the hand excavation of shovel test pits. A total of 16 shovel test pits (STPs) were excavated to record the stratigraphy across the site prior the trench excavation. The asphalt and underlying gravel and sand subgrade was mechanically stripped prior to the excavation of test pits. STPs were excavated by natural soil levels and soil profiles were recorded. Soils were sieved through a ¼ inch mesh and artifacts were bagged and labelled corresponding with associated fill levels. Each test pit was halted when subsoil was reached or when depths exceeded 3 feet.

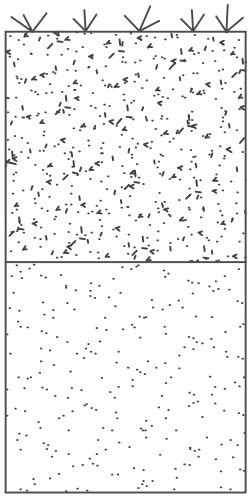
The typical soil sequence at the site consisted of several shallow fill horizons (Fill) overlying a buried ground surface (Apb) and subsoil (B horizon). The buried ground surface was identified in most STPs across the site, as seen in the profile of STP 13 (see Figure 11 on preceding page). The Apb, however, was variable in thickness and missing in many places, particularly at the locations of modern buildings it was not present, as seen in STP 3 (Figure 11).

The Apb horizon contained a mixture of 19th-century and 20th-century materials. The artifact assemblage included wrought iron nails, redware, pearlware, and whiteware. Most of the shovel tests contained a wide variety of artifacts from the late 18th century through the 20th century (Table 1).

Figure 10
Overview of STPs and Test Trenches

L:\22000s\22900\22975.02\CADD\03-ARCH\2019-12-31_Phase3_Map.dwg

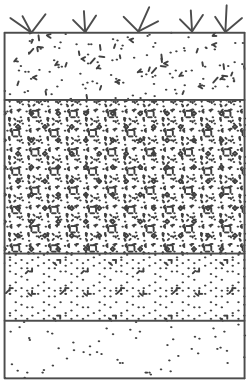
STP 3



Fill horizon: 2.5Y 5/4 light olive brown silty loam w/1% brick inclusion

B horizon: 10YR 4/6 dark yellowish brown silty clay loam

STP 13



Fill 1 horizon: 10YR 5/4 yellowish brown clay

Apb horizon: 2.5 Y 5/4 light olive brown silty clay loam

Fill 2 horizon: 2.5Y 5/3 light olive brown clay

B horizon: 2.5Y 5/6 light olive brown clay

0 1
Feet
Original Scale: 1" = 1'

Figure 11
Representative Shovel Test Profiles

Table 1: Artifacts Recovered from Site 44AX0239
From STPs and Machine Trenching

Artifact Description	Apb	Fill 1	Fill 2	Fill 3	Fill 5	Fill 7	General Collection
Ceramics							
hard paste porcelain	6	2				1	
kaolin pipe bowl	2						
Jackfield ware (1740-1780)		1					
pearlware (1780-1830)	9	2	1	1	1		
whiteware (1820-1900+)	8	3	2	2			2
ironstone (1840-1900+)		6					1
refined white earthenware	1						2
redware	4	2					
redware (1792-1809)							1
stoneware	3						1
Glass							
bottle, bottle/jar, tableware	30	3	2				
bottle, contact mold (1810-1880)		11					1
jar, ground lip finish (1850s-1910)		1					
bottle/jar, (ABM)* (post-1907)	21	40					1
safety glass (post-1915)	7						
bottle, duraglas (post-1940)	4						
unidentified glass	42	15	4				
windowpane, potash (pre-1864)	2	1	1				
windowpane, lime soda (post-1864)	2	1					
Metal							
brass button							1
brass shotgun shell casing (post-1958)							1
brass tack	1						
copper alloy pendant		1					
ferrous metal crown bottle cap (post-1890)		1					
lead dress/coat hem weight							1
nail, wrought	4	1	1		1		
nail, cut (post-1790)		4					
nail, wire (post-1890)		5					
unidentified ferrous metal		1			1		
wire	6		1				

Table 1: Artifacts Recovered from Site 44AX0239
From STPs and Machine Trenching (continued)

Miscellaneous							
bone	3		6				
brick**	11	7	1		7		
charcoal**	2						
coal**	2		1				
composite**	3						
mortar**	11	1					
oyster shell**	30	5			1		
plastic**	3	1					
plastic button		1					
slag**		2					
Prehistoric							
quartz primary reduction flake		1					
Site 44AX0239	**217**	**119**	**20**	**3**	**11**	**1**	**12**

*automatic bottle machine
**discarded

Trench Excavation

In accordance with the approved Scope of Work, five trenches varying in length were excavated across the study area (see Figure 10). The trenches were deliberately placed over historic building locations and designed to identify the footprints of these buildings and any other cultural resources. The trenches were excavated with a small backhoe outfitted with a 2-foot wide grading (smooth bladed) bucket. All trenches were excavated to subsoil (B horizon).

All five trench profiles consisted of mixed urban fills overlying a buried ground surface (Apb) and subsoil (B horizon). The buried ground surface (Apb) appears to represent the historic ground surface that was continuously occupied through the 20th century when the city block was levelled and paved over with asphalt. Archeological features were identified in all trenches but are discussed in depth in a subsequent section.

Trench 1

Trench 1 measured approximately 50 feet by 4 feet and was excavated diagonally across the western extent of the study area to a maximum depth of 6 feet below the ground surface. The trench was designed to locate evidence of a Civil War hospital ward depicted on the Quartermaster Map of 1864 (see Figure 6) and to evaluate the stratigraphy and potential for intact features in this portion of the project area (see Figure 10).

The profile of Trench 1 exhibited a similar profile to the STPs excavated nearby that contained evidence of the buried ground surface (Apb) and subsoil (B-horizon) overlain by asphalt (Figure 12). The northern end of the trench was impacted by extant portions of the basement of the rowhouse (417 North Columbus Street), which was designated as Feature 1. The basement fills (Fills 2 and 3) contained brick and concrete rubble that overlies a concrete slab. Feature 2 and Feature 3 were also recorded on the southern end of the trench and likely represent the remnants of another rowhouse (413 North Columbus Street) (Figure 13). These features are discussed in depth in a subsequent section of the report.

Trench 1 East Profile

Asphalt
Fill 1: 0.6-1.0 feet below surface – [10YR 5/8] yellowish brown sand with 20% gravel (subgrade for parking lot)
Apb: 1.0-2.2 feet below surface – [10YR 5/4] yellowish brown silty clay loam
B horizon: 2.6-6.0 feet below surface – [10YR 6/6] brownish yellow clay

Trench 2

Trench 2 measured approximately 50 feet in length by four feet in width and was excavated to a maximum depth of five feet. The trench was positioned directly to the east of Trench 1 in the back lots of 413 and 417 North Columbus Street (see Figure 10). It was positioned to evaluate stratigraphy and potentially locate the eastern extent of the Civil War hospital ward (see Figure 6), as well as buildings located on 20th century Sanborn maps.

The soil profile consisted of variable clay fills overlying subsoil across most of the trench. The buried ground surface (Apb), which was only present in the southernmost end of the trench, was truncated measuring only 0.4 feet thick and consisted of [10YR 4/3] brown silty clay loam. A small dark grayish brown (10YR 3/2) silty loam lens mottled with 20% charcoal flecking and 10% mortar was noted in the profile at the northern end of the trench (Figure 14).

Trench 2 West Profile

Asphalt
Fill 1: 0.6-1.0 feet below surface – [10YR 5/8] yellowish brown sand with 20% gravel (subgrade for parking lot)
Fill 2: 1.0-2.2 feet below surface – [10YR 5/3] brown clay mottled with [10YR 4/2] dark grayish brown silty clay
B horizon: 2.0-5.0 feet below surface – [10YR 6/6] brownish yellow clay

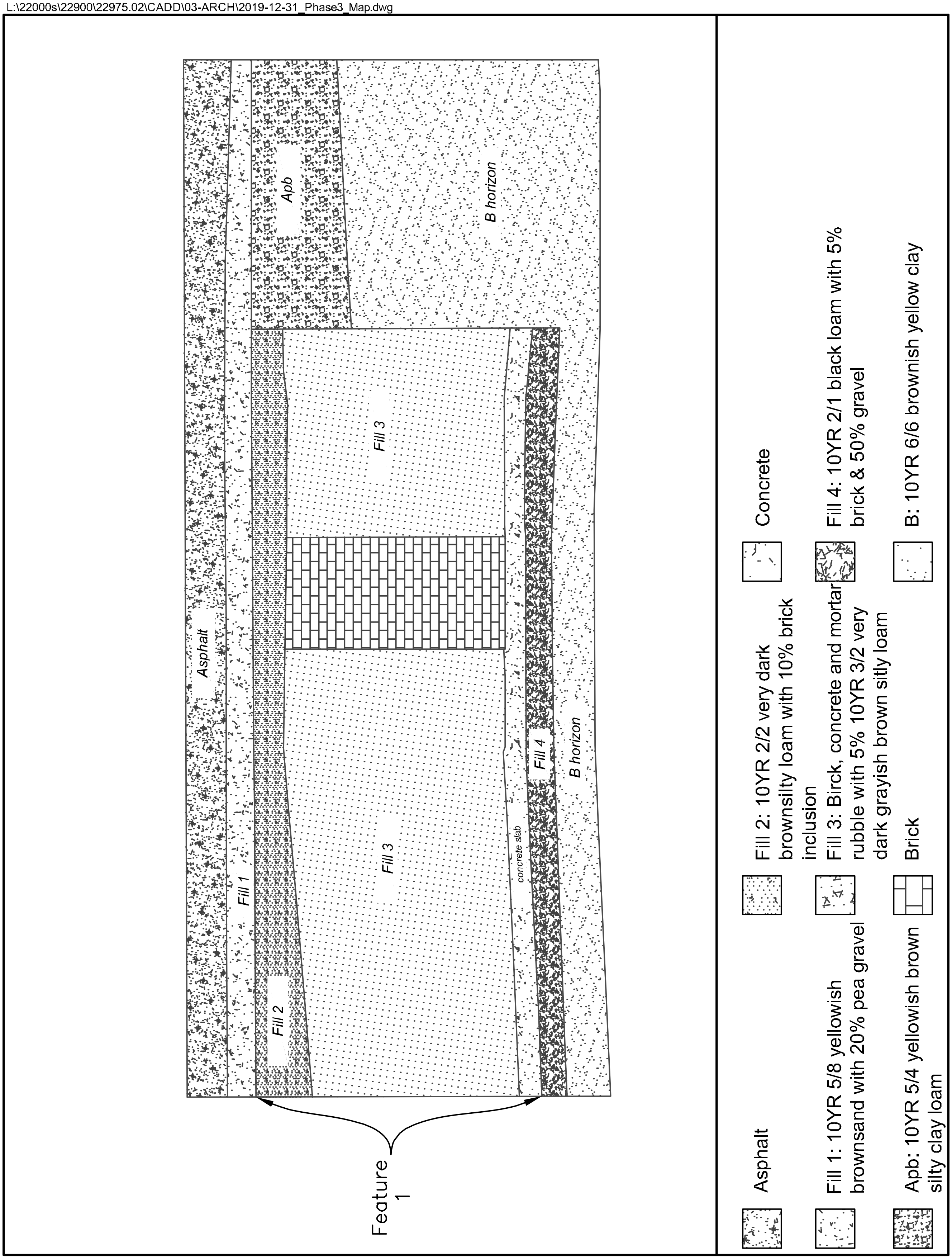


Figure 12
Trench 1, East Profile

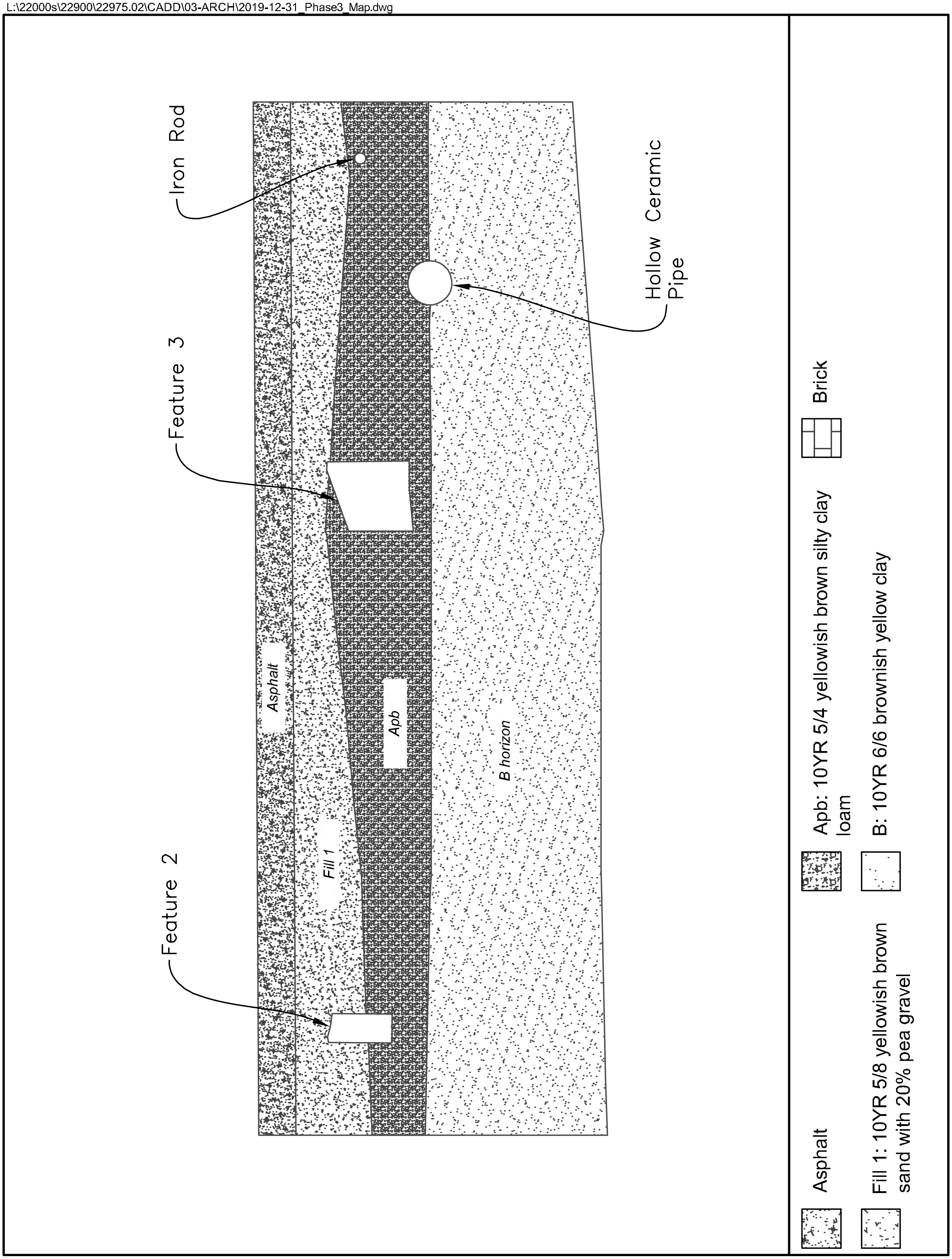


Figure 13
Trench 1, Features 2 & 3
East Profile

L:\22000s\22900\22975.02\CADD\03-ARCH\2019-12-31_Phase3_Map.dwg

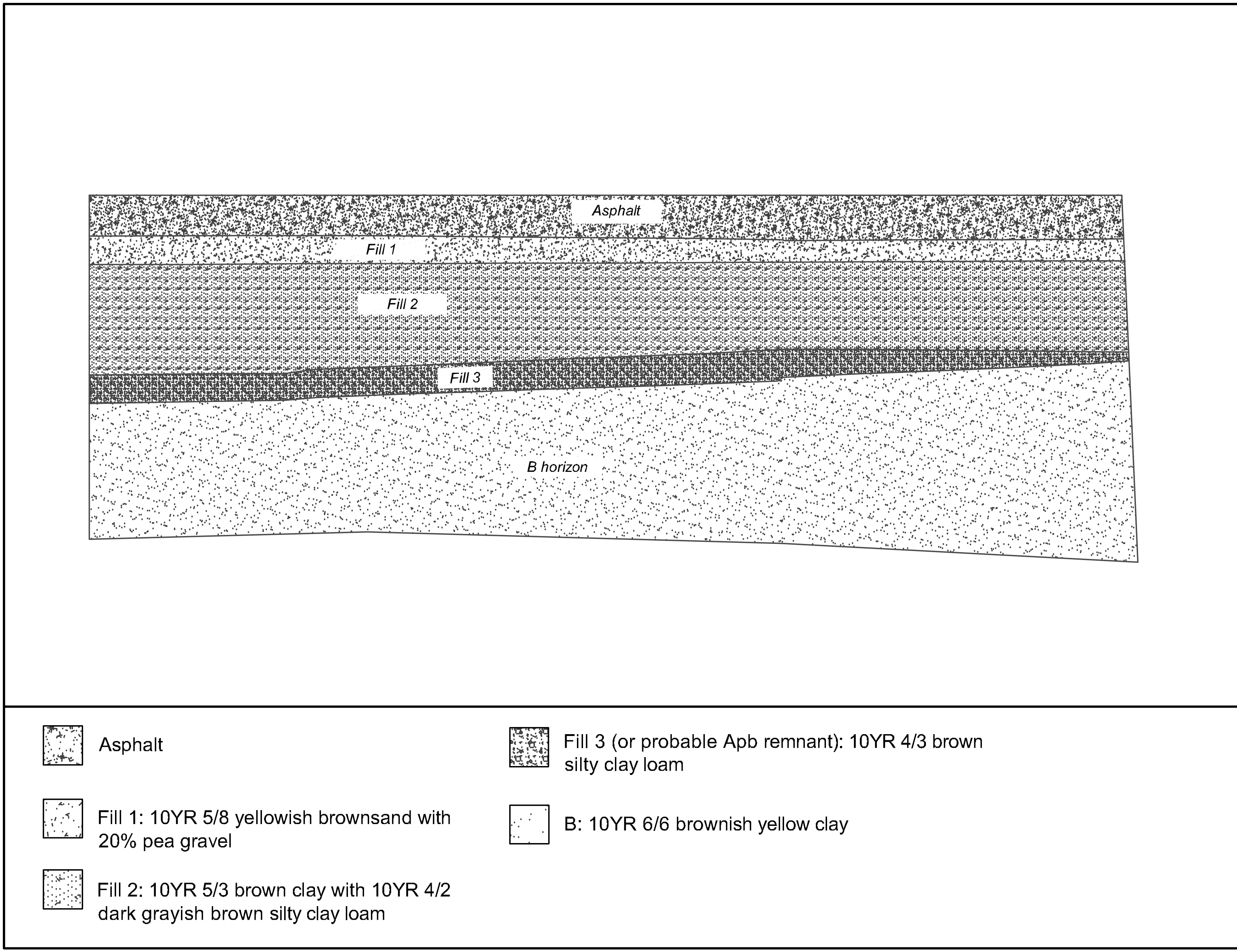


Figure 14
Trench 2, West Profile

Trench 3

Trench 3 was excavated diagonally in a similar northwest-southeast orientation as Trenches 1 and 2 and measured approximately 50 feet long, 4 feet wide, and was excavated to a maximum depth of 4.4 feet. Trench 3 was placed to evaluate the stratigraphy within the project area and the potential for outbuildings or other features in the rear yard of the known buildings along North Washington Street (see Figure 10).

The profile of Trench 3 exhibited approximately three feet of varied fills underlain by a buried ground surface (Apb) consisting of dark yellowish brown [10YR 4/4] silt loam mottled with gray [10YR 5/1] silty clay loam. The thickness and depth of the Apb is variable throughout the trench and is underlain by subsoil (B-horizon) in most places (Figure 15).

Trench 3 West Profile

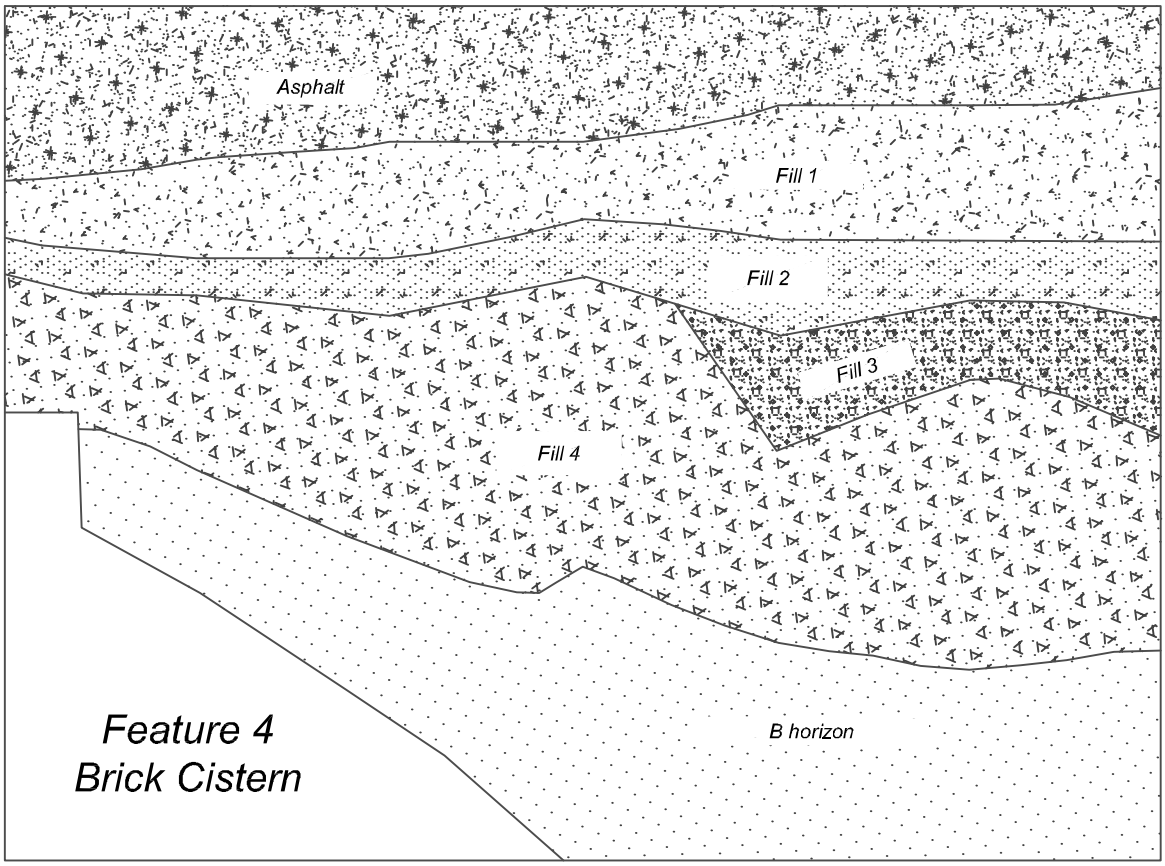
Fill 1: 0.7-1.1 feet below surface – [10YR 5/8] yellowish brown sand with 20% gravel
Fill 2: 1.1-1.4 feet below surface – [10YR 2/1] black silty loam clay
Fill 3: 1.4-2.9 feet below surface – [10YR 5/6] yellowish brown with [10YR 5/1] gray silty loam
Apb: 1.5-2.3 feet below surface – [10YR 4/4] dark yellowish brown with [10YR 5/1] gray silty clay loam
B: 2.9-4.4 feet below surface – [10YR 4/6] dark yellowish brown mottled with [10YR 5/1] gray clay

A small portion of a brick cistern and associated drains, identified as Feature 4, was identified in the southern third of Trench 3. Only the top foot of the feature was uncovered, and a mitigation plan was developed in consultation with Alexandria Archaeology, after which Feature 4 was fully exposed and recorded. This feature is discussed in depth in the MITIGATION section of the report.

Trench 4

Trench 4 was excavated parallel to the existing building on 400 N. Washington Street, and measured approximately 40 feet in length, 4 feet wide, and reached a maximum depth of 5 feet. The trench was designed to locate the evidence of the rear extent of 414 N. Washington Street, a structure recorded on the several Sanborn maps, and assess the stratigraphy of that portion of the project area (see Figure 10).

L:\22000s\22900\22975.02\CADD\03-ARCH\2019-12-31_Phase3_Map.dwg



Fill 1: 10YR 5/8 yellowish brown sand with 20% gravel

Fill 2: 10YR 2/1 black silty loam

Fill 3: 10YR 5/6 yellowish brown with 10YR 5/1 gray silty loam

Apb: 10YR 4/4 dark yellowish brown with 10YR 5/1 gray silty clay loam

B: 10YR 4/6dark yellowish brown mottled with 10YR 5/1 gray clay

0 1
Feet
Original Scale: 1" = 1'

Figure 15
Trench 3, West Profile

The stratigraphic profile of Trench 4 was similar to the previous three trenches and exhibited several fills with disarticulated brick debris overlying a buried ground surface (Apb) and subsoil (B horizon). The Apb showed less signs of disturbance than areas to the west of the trench (Figure 16)

Trench 4 East Profile

Asphalt/Fill 1: 0-1.1 feet below surface – [2.5Y 5/2] grayish brown silt loam
Apb: 1.1-1.9 feet below surface – [2.5Y 5/6] light olive brown with [10YR 6/2] light brownish gray silty loam clay
B: 1.9-5 feet below surface – [10YR 5/6] yellowish brown silty clay loam with [10YR 6/1] gray clay

The north and south walls of a portion of the structure at 414 N. Washington Street were recorded within the trench and designated as Feature 5. The walls were exposed within the trench down to subsoil. No intact stratigraphic levels were recorded on the interior of the feature. This feature will be discussed in depth in a subsequent section.

Trench 5

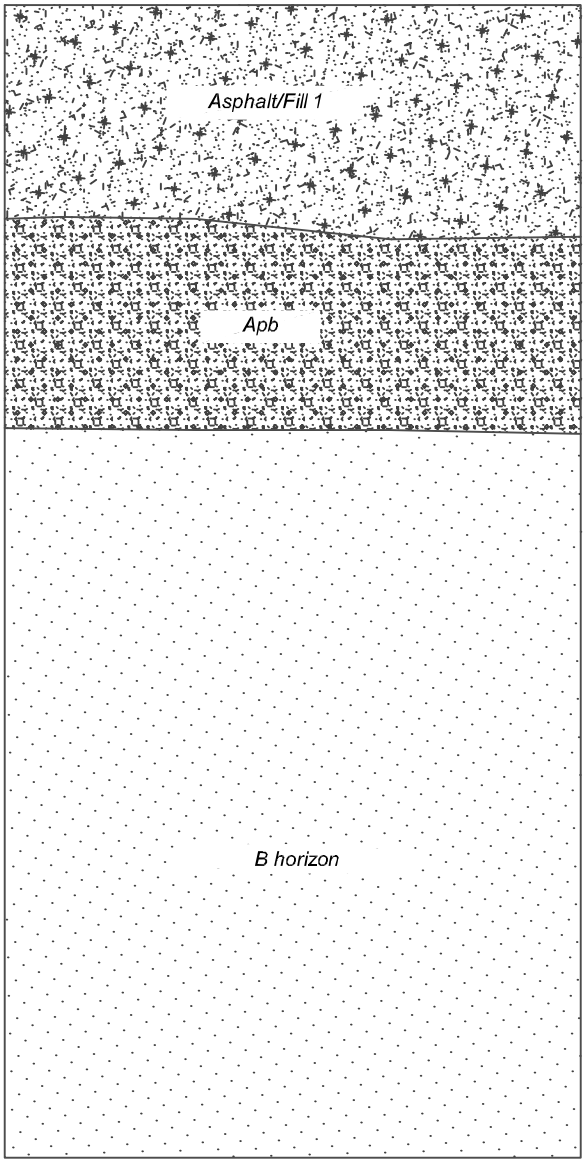
Trench 5 was excavated diagonally across the southeastern portion of the site. The trench was approximately 70 feet in length, four feet wide, and excavated to a maximum depth of 5.3 feet (see Figure 10). The excavation was designed to locate evidence of the rear foundations of 406 N. Washington Street, which is recorded on several Sanborn maps, that may not have been disturbed by the construction of the modern buildings fronting North Washington Street (see Figure 7 and Figure 8).

The stratigraphic profile of Trench 5 exhibited a fill layer directly under the asphalt that is underlain by the buried ground surface (Apb) that has been encountered at varying depths across the project area (Figure 17). The Apb was present only in the northern portion of the trench, though it was significantly disturbed by modern utility pipes. Two small sections of articulated brick foundation were encountered on the north end of the trench and designated as Feature 7. This feature will be discussed in depth in a subsequent section.

Trench 5 North Profile

Fill 1: 0.6-1.1 feet below surface – [10YR 6/8] brownish yellow silty loam
Apb: 1.1-2.0 feet below surface – [2.5Y 4/4] olive brown silty clay
B: 2-5.3 feet below surface – [10YR 6/6] olive yellow with [10YR 6/1] gray clay

L:\22000s\22900\22975.02\CADD\03-ARCH\2019-12-31_Phase3_Map.dwg



Asphalt/Fill1: 2.5Y 5/2 grayish brown silt loam

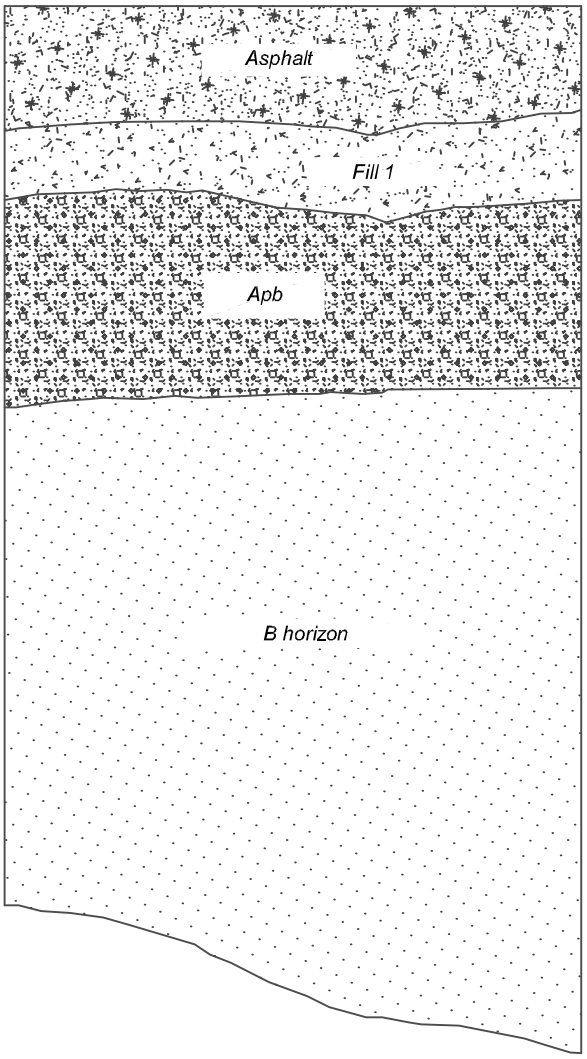
Apb: 2.5Y 5/6 light olive brown with 10YR 6/2 light brownish gray silty loam clay

B: 10YR 5/6 yellowish brown with 10YR 6/1 gray clay

0 1
Feet
Original Scale: 1" = 1'

Figure 16
Trench 4, East Profile

L:\22000s\22900\22975.02\CADD\03-ARCH\2019-12-31_Phase3_Map.dwg



Asphalt

Apb: 2.5Y 4/4 olive brown silty clay

Fill 1: 10YR 6/8 brownish yellow silty loam

B: 10YR 6/6 brownish yellow clay with 10YR 6/1 gray clay

0 1
Feet
Original Scale: 1" = 1'

Figure 17
Trench 5, South Profile

General Excavation Monitoring and Feature Excavation

Subsequent to the test trenches the entire project area was stripped down to subsoil. A few artifacts were collected from the soils during machine stripping, including an entire stoneware bottle with a cobalt hand painted lip that was stamped "D.W.TARR 7 CO./ BOTTLES NOT SOLD" (Figure 18). The bottle had been manufactured by D.W. Tarr and Company of Boston, Massachusetts between c. 1851 and c. 1854 (von Mechow 2010).

Figure 18: Stoneware Bottle
Cobalt Hand Painted Stoneware Bottle Manufactured by
D.W. Tarr & Company, Boston, Massachusetts (c. 1851- c. 1854)

Features or potential features recorded during trenching were fully exposed, recorded, and evaluated, as were any additional features exposed during the mechanical stripping. A total of 10 features were located and investigated during the project (Figure 19), one of which was subject to mitigation efforts (Feature 4). The following is a discussion of the all of the features that were evaluated during this investigation. Feature 4, which was subject to archeological mitigation, is discussed in a separate section.

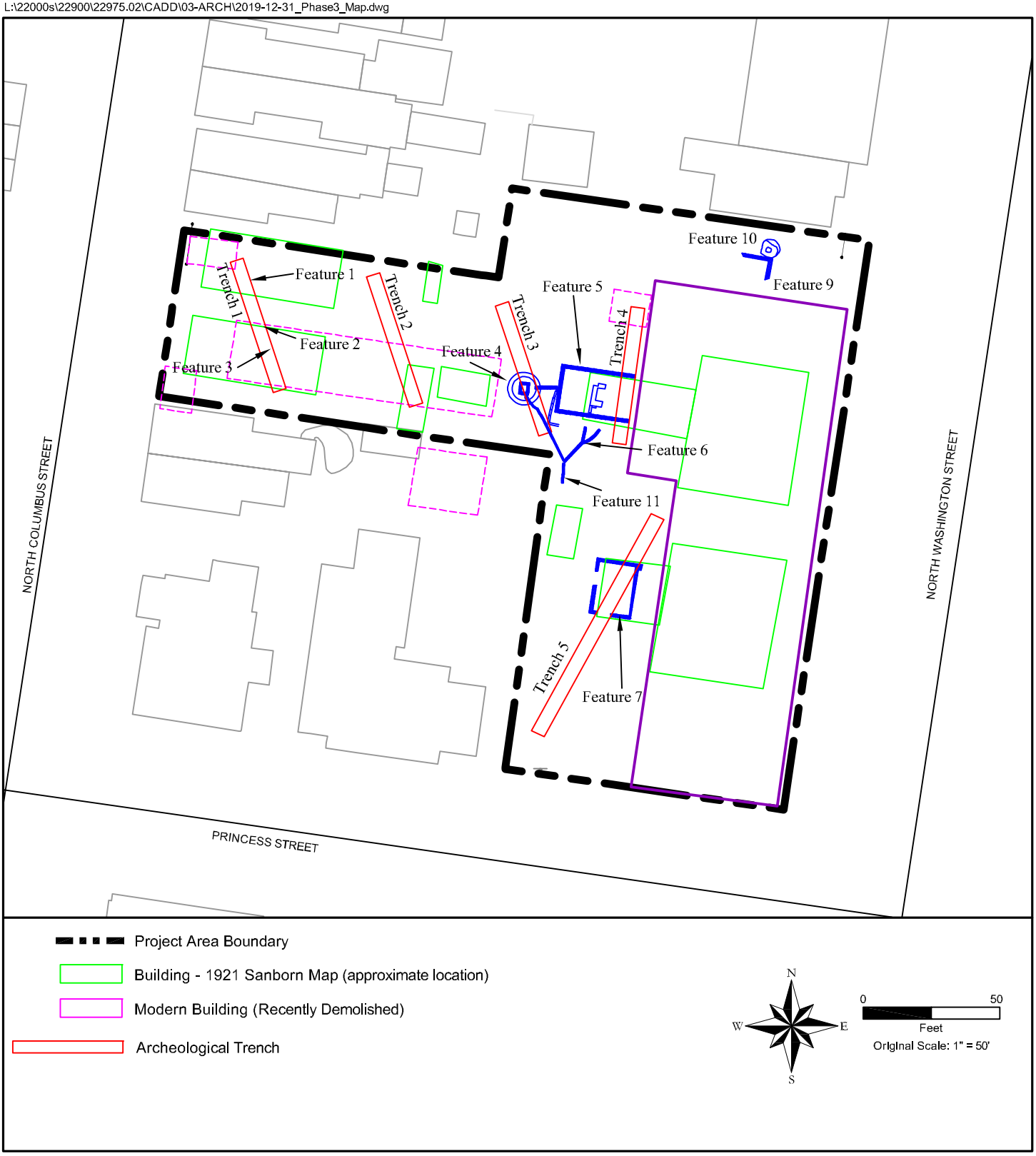


Figure 19
Overview of Features

Feature 1

Feature 1 was initially discovered during the mechanical trench excavation of Trench 1 on the west end of the project area adjacent to N. Columbus Street (see Figure 19). The feature is comprised of a poured concrete slab, a brick foundation wall, and brick piers associated with the foundations of the townhome that stood at 417 N. Columbus Street and demolished in the 20th century (Figure 20). Amber bottle glass fragments were recovered from soils surrounding the feature, but overtly 19th century artifacts were not noted.

The concrete slab forming the basement of 417 N. Columbus St. was located at a depth of 4.5 feet below the ground surface. A brick and mortar pillar 1.6 feet in width extended from the concrete slab with the top of the pier resting directly beneath the asphalt. No intact occupational soils were noted within or surrounding Feature 1 in Trench 1. Mechanical stripping around Trench 1 to expose other potential elements of Feature 1 resulted in no other architectural elements related to the house at 417 Columbus Street except the concrete pad.

As presented in the Documentary Study (Maas 2017), 417 N. Columbus Street was a small townhouse constructed after 1904 with an addition added by 1912. Finally, by 1961 the lot was sold and then demolished and paved over for office parking.

Figure 20: Photograph of Feature 1
View to the East

Feature 2

Feature 2 is a small collection of bricks that was recorded in the east wall of Trench 1 (see Figure 19). The small section of articulated, but damaged, bricks measures 1 ft in height and 0.5 feet wide and is surrounded by fill soils (Figure 21). This feature is likely a smaller brick pier associated with the basement and brick pillar at Feature 1, which is approximately 30 feet to the south.

Figure 21: Photograph of Feature 2
View to East

Feature 3

Feature 3 is a probable damaged pier of brick and mortar that was recorded in the east wall of Trench 1 (see Figure 19). The small section of articulated, but damaged, bricks measures 1.5 ft in height and 1.0-foot-wide and is surrounded by fill soils (Figure 22). This feature is likely a brick pier associated with the basement and brick pillar at Feature 1, which is approximately 37 feet to the south.

Figure 22: Photograph of Feature 3
View to East

Feature 5

Feature 5 is a brick foundation and chimney base associated with the building at 414 N. Washington Street (see Figure 19). The foundation initially discovered in Trench 4 and the area was expanded to expose all remaining portions of the feature. The feature consists of three sides of a brick foundation. The two east/west walls measure approximately 27 feet long and the north/south wall measures 17 feet long. Feature 5a is a U-shaped brick chimney hearth pad in the center of the foundation (Figure 23 and Figure 24).

The two east/west foundation walls of Feature 5 were exposed to their full depth and measured approximately 1.5 feet consisting of 7 courses of articulated brick and mortar (Figure 25). The walls were cut directly into the subsoil (B horizon). No intact soil horizons were recorded in the profile in conjunction with the foundations. The rest of the structure was negatively impacted by the modern building fronting North Washington Street that was demolished during the project. No associated features were recorded with Feature 5a and no additional work was undertaken.

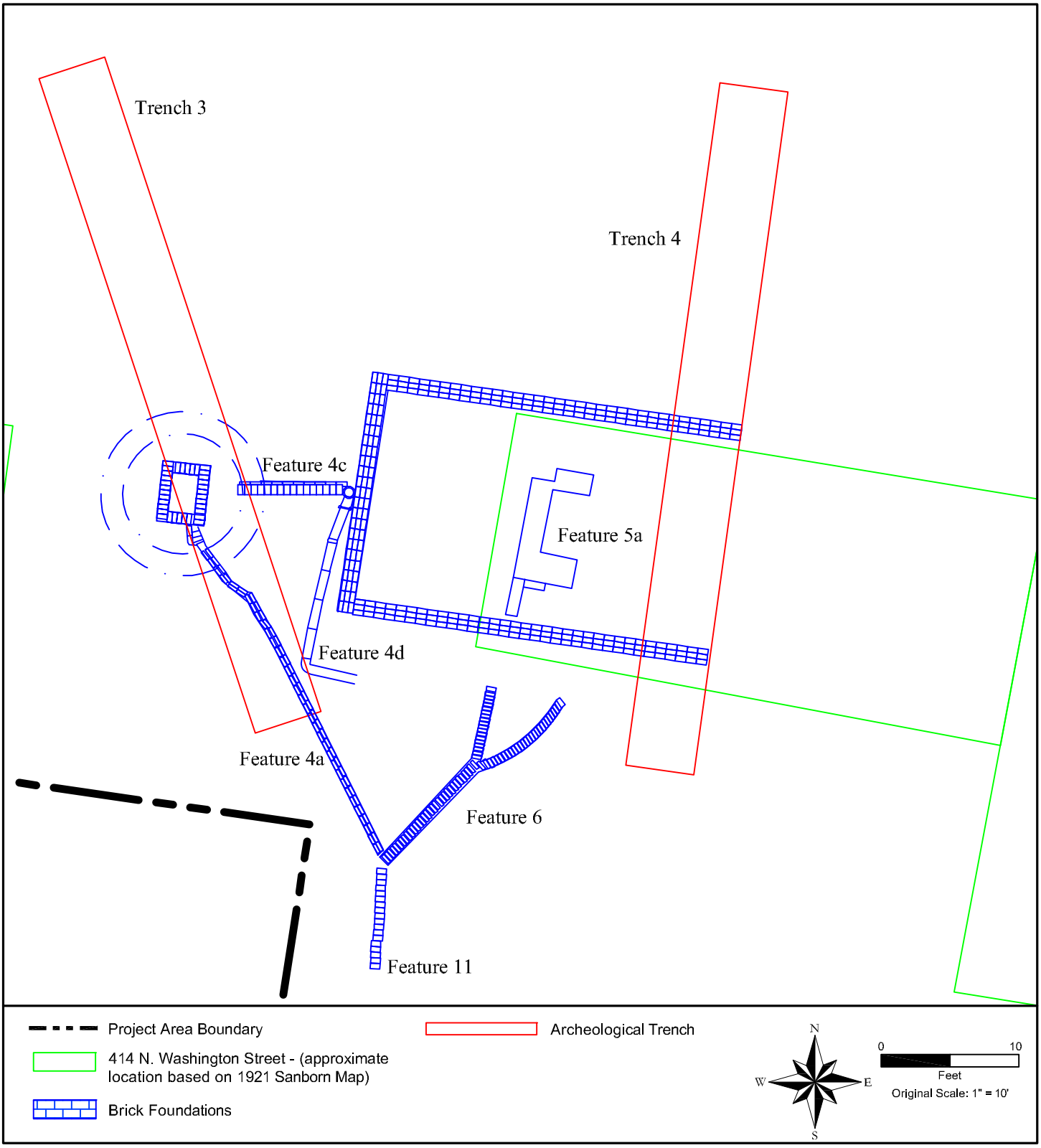


Figure 23
Feature 5 and Feature 6 Plan View

Figure 24: Photograph of Feature 5
View to North

Figure 25: Photograph of Feature 5 Profile
View to North

Features 5 and 5a represent the back portion of the house at 414 N. Washington Street. The building had two chimneys on the main portion of the building, which was demolished and the third chimney for the house is represented as Feature 5a. This part of the foundation is attached via a drain to the cistern in the rear at Feature 4. Feature 4 is discussed in a different section. The building was constructed circa 1840 by William Hoxton and expanded by William Cazenove in 1850. It served as a hospital during the Civil War and then a dwelling for several families until it was demolished in 1960. A more in depth review of the chain of title is available in the Documentary Study (Maas 2017).

Feature 6

Feature 6 is a one course line of bricks located on the south side of the dwelling at 414 N. Washington Street (see Figure 19). The feature appears to be connected to Feature 4a, which in turn connects to the cistern. Feature 6 measures approximately 10 feet from the southwest at the conjunction with Feature 4a to the northeast where in branches into two sections that proceed another 5.4 and 7.5 feet, respectively towards the foundation wall of the dwelling at Feature 5 (Figure 26).

Figure 26: Photograph of Feature 6
View to Northwest

The feature consists of one course of bricks set into the surrounding subsoil (B horizon). Additional excavation revealed no other associative features or additional portions of the feature. Feature 6 is clearly associated with the cistern and may be the link between the pump indicated on the 1864 Quartermaster map and the cistern (see Figure 6). The feature, like most of the drains, has been subject to significant disturbance from modern construction and demolition activities.

Feature 7

Feature 7 is a brick foundation located approximately 50 feet south of Feature 5 (see Feature 19). Feature 7 was initially recorded within Trench 5 and was fully exposed to subsoil within that trench. No further features associated with the foundation were recorded. The entire feature was exposed during the mechanical stripping process (Figure 27 and Figure 28).

Feature 7 consists of a square brick and mortar foundation approximately 20 by 15 feet. The walls are characterized by eight courses of brick set into subsoil approximately 2 feet in height. The structure was negatively impacted by gas and utility pipes that created gaps in the south and west walls. The interior of the foundation contained only fill soils. No intact soil horizons were recorded, and no additional features were revealed.

The foundation falls within the footprint of the rear component at 406 N. Washington, which was constructed by 1902. The footprint of the current foundation does not fit exactly into the rear component as it is depicted on the Sanborn map, but it is close enough to account for errors. There is a small extension on the northern wall that goes slightly passed the eastern wall that suggests that eastern wall may be an interior wall. Unfortunately, the same building that impacted the foundations at the 414 N. Washington Street building also impacted this structure. A detailed history and chain of title was prepared for the Documentary Study of the project area (Maas 2017).

Feature 9

Feature 9 is a brick foundation located approximately 63 feet northeast of the foundation for 414 N. Washington Street (Feature 5) (see Figure 19). The foundation remnant measures 8 feet north and south and 12 feet east to west.

The wall consists of two courses of brick that extend less than one foot into the subsoil (B horizon) and was overlain by 20th century fill soils (Figure 28). This foundation is located in the same place as the dwelling at 418 N. Washington Street, which was constructed in 1886, when it appears on a Sanborn map (Figure 29). The house went through numerous upgrades and additions until it was demolished in 1979. A for sale advertisement indicates the building had a large 2 room cellar, which is the likely interpretation of the foundations at Feature 9 (Maas et al 2017). No intact soils or interior features were recorded within the foundations.

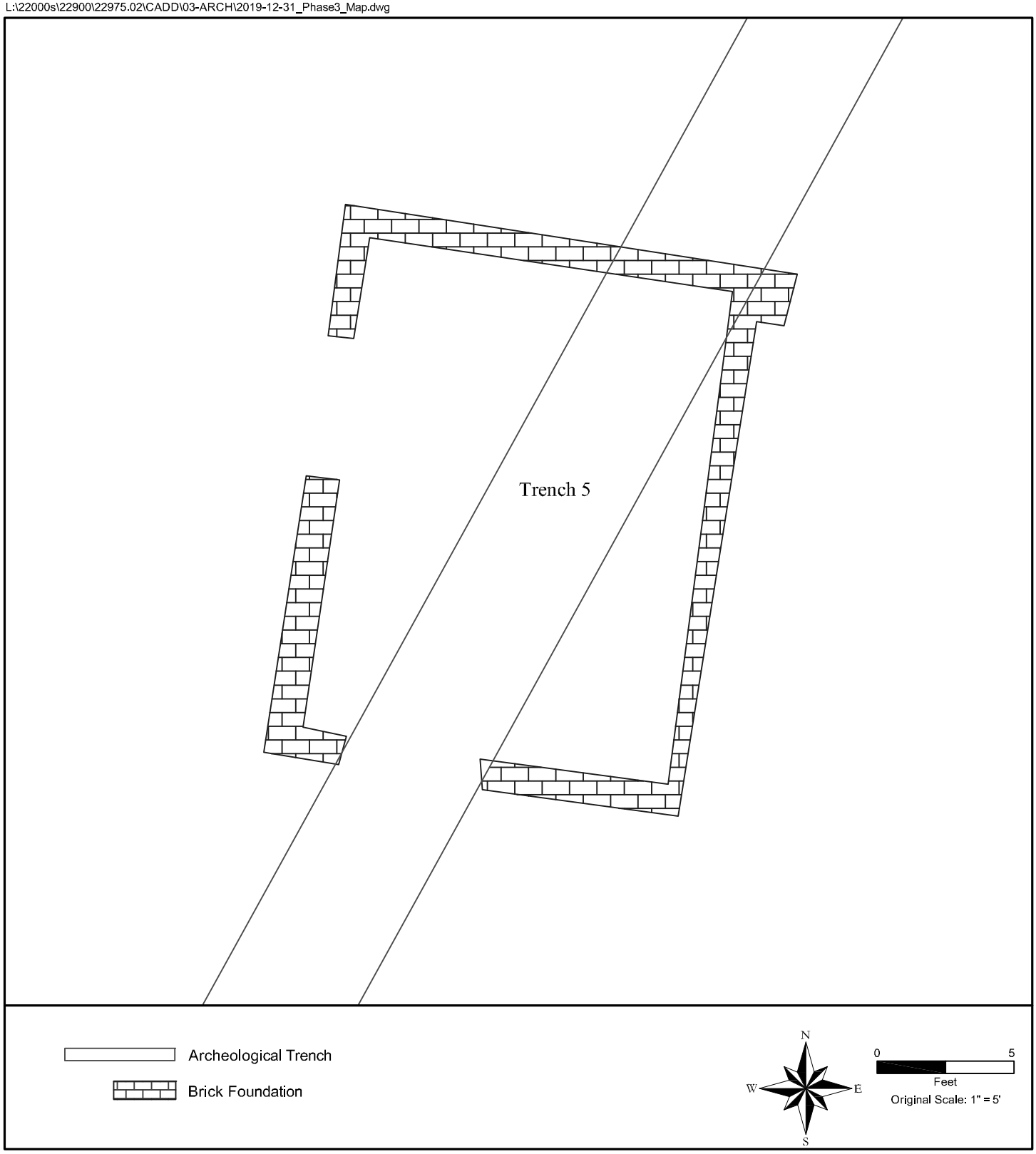


Figure 27
Overview of Feature 7

Figure 28: Photograph of Feature 7
View to Northwest

Feature 10

Feature 10 is a large, 6.5 by 6.5 ft, circular soil feature located at the northeast corner of the brick foundations at Feature 9 (see Figure 19). The circular feature consists of two sandy loam fills surrounding a small circle of a third fill in center. Fill 1 consists of a brown (7.5YR 4/4) sandy loam mixed with 30% oyster shell; Fill 2 consists of yellowish red (5YR 4/6) sandy loam mixed with 10% brick fragments; and Fill 3 consists of dark yellowish brown sandy loam. The overall shape of the feature is reminiscent of a post hole on a larger structural scale or an auger hole (Figure 29 and Figure 30).

The feature was bisected on a north-south axis and the east half was removed and screened to a maximum depth of 4 feet. The excavation of the feature did not reach subsoil but was discontinued due to safety concerns over undermining the structural integrity of the building immediately to the north of the project area. The exposed portion of the profile exhibits a cylindrical fill that extends from the center and tapers down to the base (Fill 3). That cylinder is surround by a fill characterized by large brick fragments (Fill 2). On the exterior are variable fills and soil lenses mixed with large amounts of oyster shell and brick (Fill 4, Fill 5, and Fill 6). Fill 1 is not depicted in the profile because that stratigraphic level was only found on the far south side of feature and did not extend to the bisection line. The entire profile is surrounded by subsoil (B horizon) (Figure 31 and Figure 32).

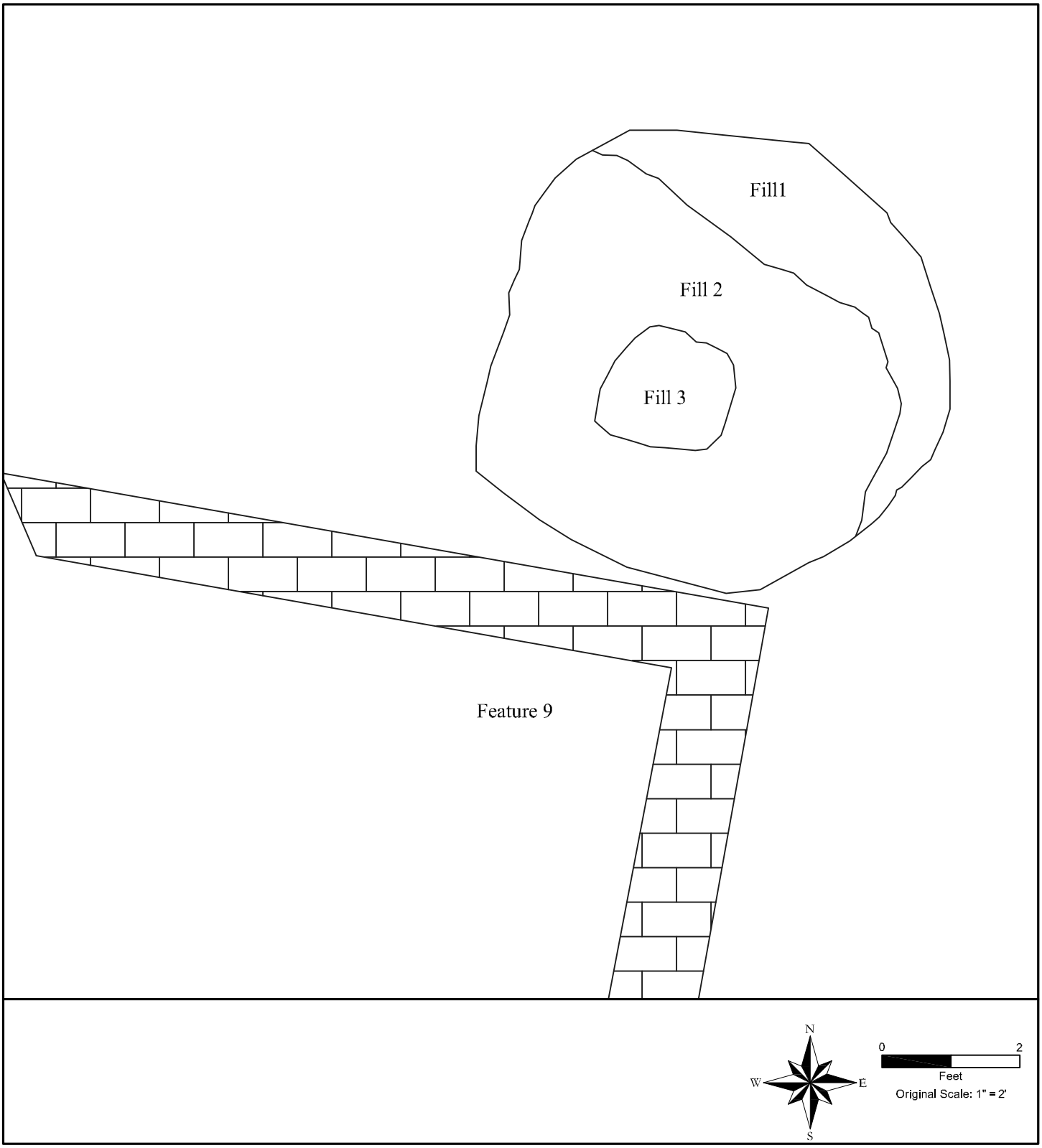
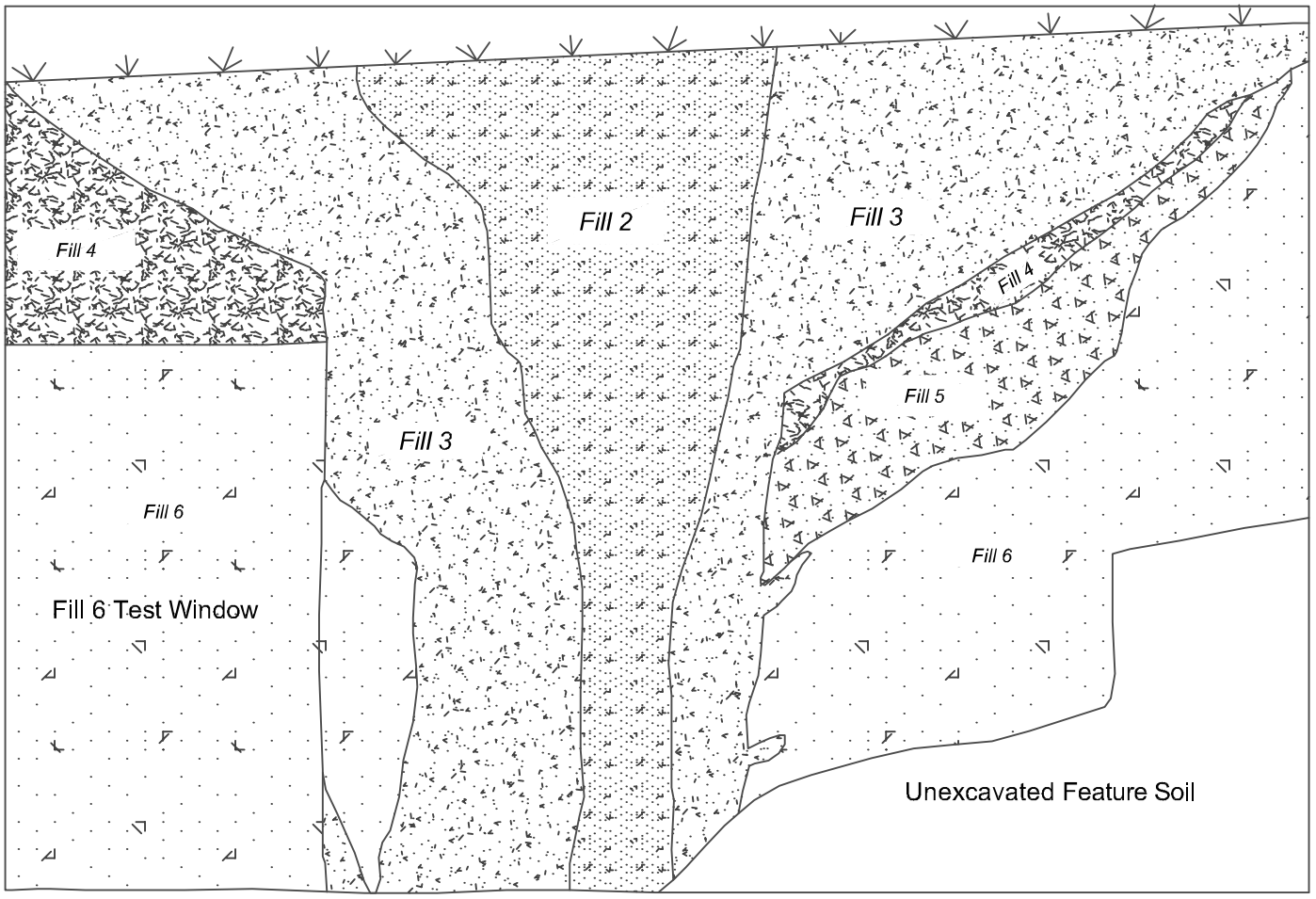


Figure 29
Feature 10 Plan View

Figure 30: Plan of Feature 10 Looking North

Figure 31: West Profile of Feature 10

L:\22000s\22900\22975.02\CADD\03-ARCH\2019-12-31_Phase3_Map.dwg



Fill 2: 5YR 4/6 reddish brown sandy loam with 5% shell and 25% brick

Fill 3: 10YR 4/6 dark yellowish brown sandy loam with 15 % shell

Fill 4: 7.5YR 4/6 sand with 20% to 40% shell

Fill 5: 2.5Y 5/3 light olive brown clay loam with 10% oyster and shell

Fill 6: 2.5Y 5/3 light olive brown clay with 10% oyster and brick

0 1
Feet
Original Scale: 1" = 1'

Figure 32
Feature 10 West Profile

A total of 162 artifacts were recovered from Feature 10, most of which were recovered from Fill 6 (n=101, 62%) (Table 2). Creamware (1762-1820) is the only temporally diagnostic ceramic within the assemblage. The glass assemblage includes 4 fragments of freeblown bottle glass, 3 fragments of lime soda (post-1864) windowpane, 8 fragments of potash (pre-1864) windowpane, and 1 fragment of soda (pre-1864) windowpane.

The metal assemblage includes a high proportion of wrought nails (n=37), but also includes iron cut nails (post-1790) (n=4), and 1 wire nail (post 1890). The single wire nail appears to be anomalous to the assemblage and may have been a contaminant due to flooding of the site during excavation.

The remainder of the artifacts include large amounts of brick, oyster shell, mortar, and charcoal that were weighed and discarded in the field. Two prehistoric artifacts were also recovered including a fragment of Late Woodland Keyserware ceramic and a quartz primary reduction flake.

Feature 10 is a large and deep pit feature potentially representing fill surrounding a post mold, which either rotted in place or was removed. The fill includes artifacts that potentially pre-date any known building on the lot. The structure at 418 N. Washington Street, the first dwelling constructed on the small lot in 1896, was likely built over top of this feature. The structure immediately to the south at 414 N. Washington Street was erected between 1830 and 1840 with additions in 1850.

Aside from the creamware, the artifact assemblage that makes up the various fills inside this pit could be from initial construction activities, though the wrought nails had typically fallen out of favor and were used in only specialized instances after cut iron nails became the norm. There is a possibility that this pit is associated with the Grosvenor Hospital, which was housed in the dwelling to the south at 414 N. Washington Street in 1862 until the end of the Civil War. The single wire nail notwithstanding, this feature was likely filled at least by 1864 based on the lime soda windowpane fragments. The early artifacts could have been present in the surrounding soil when the feature was filled.

Unfortunately, the entire feature was not exposed due to safety constraints related to the proximity of extant buildings adjacent to the project area. Therefore, the function of Feature 10 cannot be determined but it is potentially a structural feature in place before the first building is constructed on the lot in 1896 and was likely not open beyond the immediate aftermath of the Civil War.

Table 2: Artifacts Recovered from Feature 10, East Bisection

Artifact Description	Fill 1	Fill 2	Fill 3	Fill 4	Fill 4/5	Fill 6, Window	Fill 6, Level 1	Fill 6, Level 2
Ceramics								
hard paste porcelain			1					
creamware (1762-1820)		1	5				2	1
redware			1				1	
Glass								
bottle		1	1		9	24		1
bottle, freeblown (pre-1860)	1	2				1		
unidentified glass							3	
windowpane, lime soda (post-1864)							3	
windowpane, potash (pre-1864)						8		
windowpane, soda (pre-1864)			1					
Metal								
nail, wrought			2		5	9	21	
nail, cut (post-1790)		2		1	1			
nail, wire (1890-present)						1		
unidentified ferrous metal							1	
Miscellaneous								
bone		1	8		4	4	7	1
brick**	5	5				1		
building material**					1			
charcoal**				1				
mortar	7			4	1		9	
oyster shell**							1	
Prehistoric								
quartz primary reduction flake							1	
Keyser ware, Late Woodland (AD 1400- AD 1550)							1	
Total Feature 10	**13**	**12**	**19**	**6**	**21**	**48**	**50**	**3**

**discarded

Feature 11

Feature 11 is a single course of articulated brick located at the southeast end of Feature 4a and extending # feet to the south (see Figure 19). This feature appears to be a continuation of the drain at Feature 4a that runs from the square opening at the cistern. Feature 11 is similar construction and consists of a single course wide line of articulated bricks set into subsoil approximately 2 courses deep.

No additional features were recorded in conjunction with Feature 11 and no additional work was conducted.

RESULTS OF ARCHEOLOGICAL MITIGATION

Brick Cistern (Feature 4)

Feature 4 is a brick cistern and associated drains immediately west of and attached to the building at 414 North Washington Street (Feature 5) (see Figure 19). The feature was initially recorded during the excavation of Trench 3 and a mitigation plan was developed in consultation with Alexandria Archaeology. The mitigation plan consisted of fully exposing the exterior of the cistern in a bisection profile and then bisecting the interior of feature using a combination of mechanical and hand excavation. The remaining southern half of feature was excavated and dry screened through ¼ inch mesh hardware cloth screen unless soils with superior integrity were encountered, in which case the soils were water screen through 1/16-inch mesh.

Feature 4 consists of the brick dome and cylinder, approximately 12 feet in diameter that tapers to a squared off opening at the top (designated as Feature 4b) (Figure 33 and Figure 34). The entire cistern cylinder was 10 feet in height with an additional two-foot tapering dome to the square opening at the top (Figure 35 and Figure 36). Feature 4b is the opening of the cistern, measuring approximately four by four feet square. The opening was capped with a concrete slab and filled in with gravel, likely during 20th century prior to the paving for the current parking lot. Two brick drains (Feature 4a and 4c) are associated with the cistern and appear to empty into the cylinder.

Both drains were likely of similar construction, roughly square in shape and one-course of two bricks on all four sides. Feature 4a originates at the cistern square opening (Figure 37) and extends southeastward for approximately 30 feet where it intersects Feature 6 (see Figure 26). This drain was likely similarly constructed as Feature 4c, but the cover and sides were not as well-preserved within the fill. Feature 4c is much better preserved and runs from the back of the building at 414 North Washington Street approximately 8 feet down to the dome of the cistern where it empties into the northern partition (Figure 38 and Figure 39). Feature 4d is a glazed ceramic sewer pipe that leads from the connection at the house south along the wall for 12 feet and turns east towards North Washington Street (Figure 40). The pipe depicted on the map in front of Feature 4c is a broken piece of Feature 4d, which may have replaced Feature 4c once the cistern was no longer in use (Figure 41).

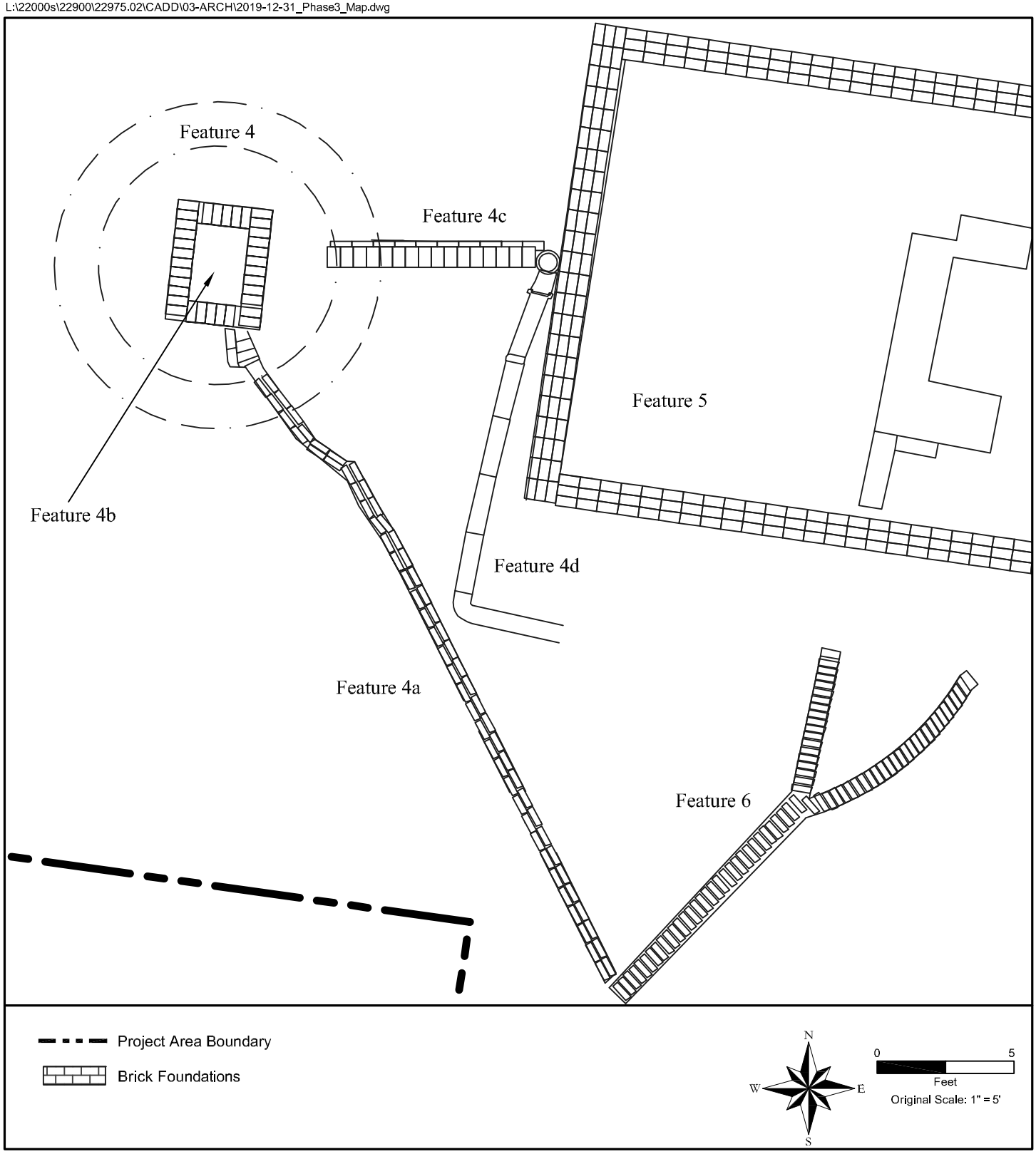


Figure 33
Overview of Feature 4, Brick Cistern

Figure 34: Overview of Feature 4, Feature 4a, Feature 4b, and Feature 4d

Figure 35: Feature 4 and Feature 4c, View to South

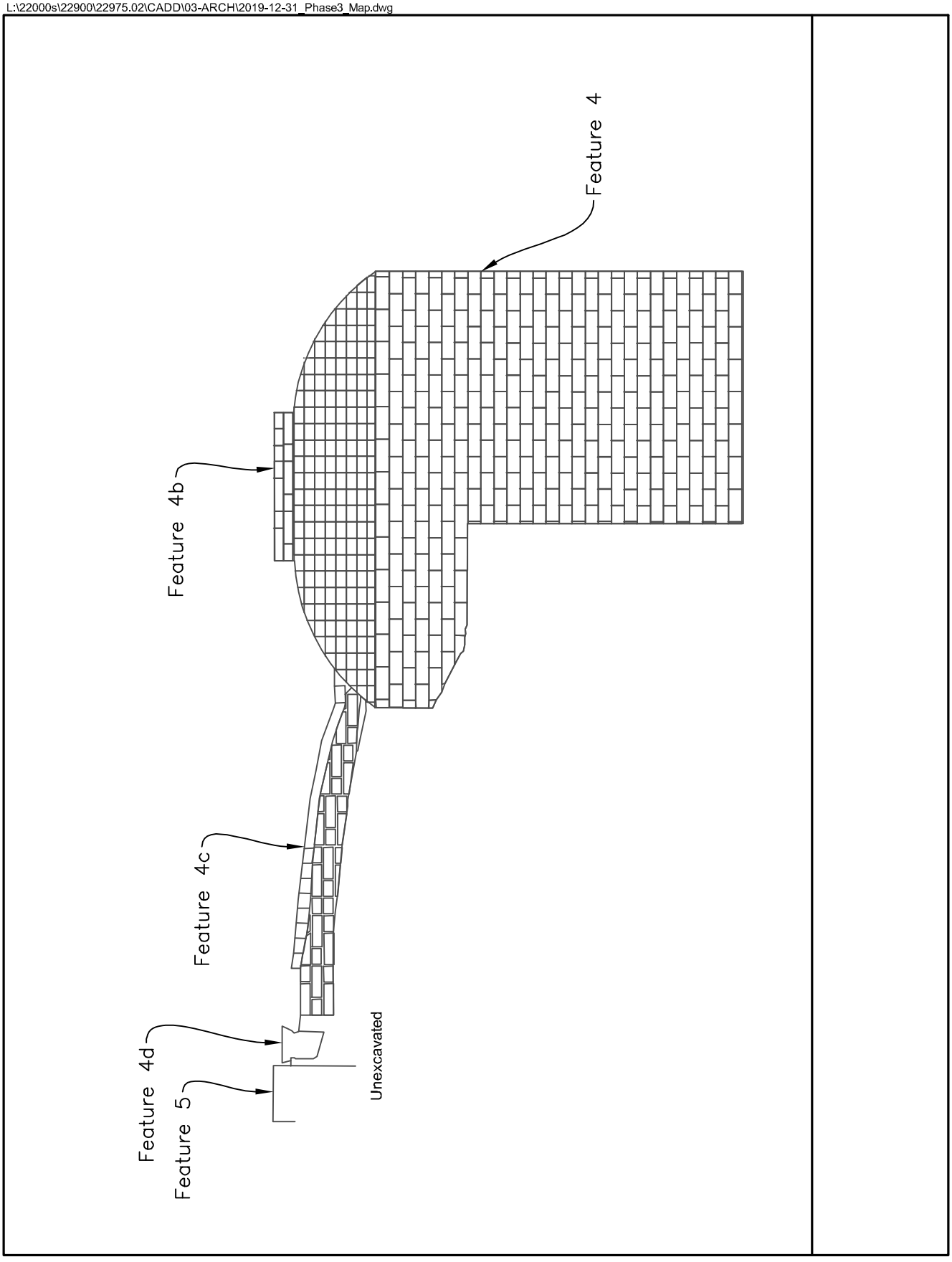


Figure 36
Feature 4, Exterior North Profile

Figure 37: Feature 4a at the intersection with Feature 4b
View to Northeast

Figure 38: Feature 4c, Intersection with Dome of Cistern in Background
View to Northwest

Figure 39: Feature 4c emptying into Brick Cistern
View to South

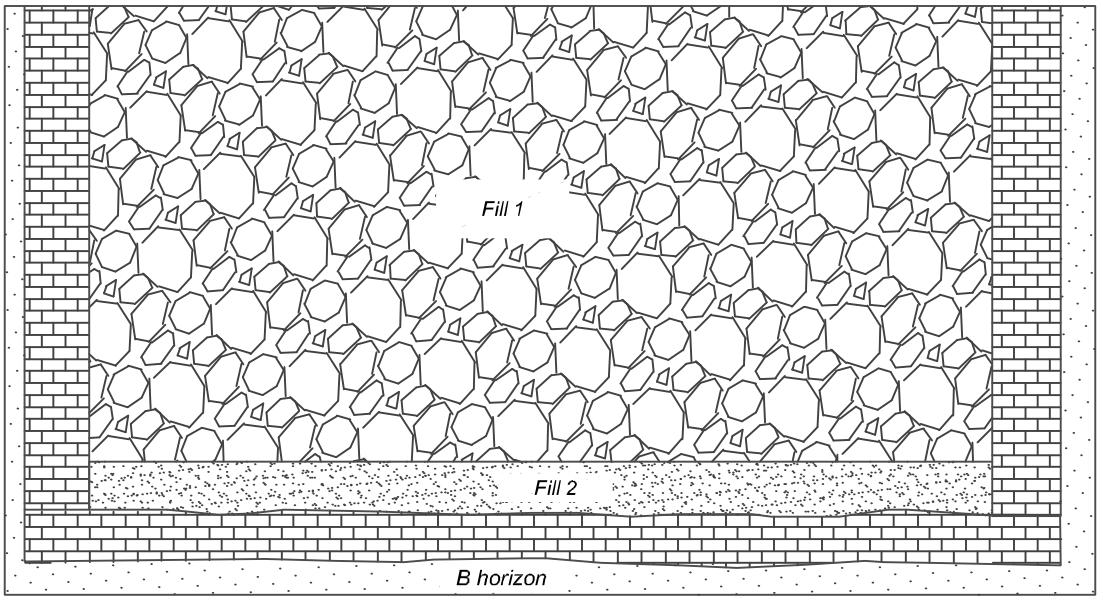
Figure 40: Feature 4d at the corner of Feature 5

Figure 41: Feature 4d (left) intruding on Feature 4c (right)

Feature 4 was bisected on the east-west axis creating a profile of the south half of the feature (Figure 42). The exterior cylinder and the dome are constructed of brick two courses thick. The dome of the feature is surround by fill soils while the cylinder is surrounded by thick sandy clay subsoil. No discernable builder's trench was observed, indicating the hole for the cistern was excavated to the exact size of the planned structure and was built inside the excavation.

The interior of the feature contained little to no soil and was instead filled with quarter-sized sandy gravel (designated Fill 1) (Figure 43). No artifacts were recovered from the gravel matrix, which was not subject to screening. The interior of the cylinder was bisected east-west by a slightly curving brick partition that started at the intersection of the dome and the cylinder (Figure 44 and Figure 45). The single course brick partition wall created two chambers with the south chamber being only slightly larger than the northern chamber, which along with, the cylinder wall and the dome were all plastered on the interior (Figure 46). This partition wall was dismantled to facilitate the removal of the gravel in order to record the features at the base of the cylinder.

L:\22000s\22900\22975.02\CADD\03-ARCH\2019-12-31_Phase3_Map.dwg



Fill 1: 10YR 6/4 light yellowish brown sand with 70% large pebbles

Fill 2: 10YR 2/1 black sandy silt mixed with charcoal

Brick Cistern Foundation

B horizon:10YR 6/6 brownish yellow clay

0 2
Feet
Original Scale: 1" = 2'

Figure 42
Feature 4, Interior North Profile

Figure 43: Fill 1 through Feature 4b
View to North

Figure 44: Interior Partition Wall, View to South

Figure 45: Partition Wall Partially Removed, Fill 1 in Background View to South

Figure 46: Close-up of Partition Wall showing Plaster

A thin, approximately 0.15-foot layer of black decomposed wood and soil, designated Fill 2, was exposed underneath the gravel in the various chambers of cistern cylinder (Figure 47). A square chamber, approximately 2.3 feet by 1.3 feet, was located against the western wall of the cylinder. The chamber itself was approximately 1.5 feet deep (four courses of brick and mortar) and bisected by the partition wall into two nearly equal sub-chambers (Figure 48 and Figure 49). The two sub-chambers created by the partition wall were designated SW Chamber and NW Chamber, respectively. These sub-chambers represent the filter box; however, the filter medium is no longer present. There are three gaps or holes, approximately 0.3 feet by 0.5 feet, in the partition wall within the filter box that allows the filtered water to move from the south chamber to the north chamber before extraction.

Finally, a lead metal pipe was threaded through the dome at the approximately interface of the drain at Feature 4c, surrounded by the gravel of Fill 1, with the open end resting on the base of the cistern in the Southern Chamber (see Figure 47 and Figure 48). On the exterior of the cistern, the metal pipe was crimped off indicating the pump for extracting the filtered water may have been immediately adjacent to the cistern or it was cut-off after the cistern was no longer in use.

The small 0.15-foot layer of soil and decomposed wood at the base of the cistern in the northern bisection was removed by hand excavation and dry-screened through ¼ inch mesh. The remainder in the SE and SW bisections and the NW and SW chambers were removed by hand excavation and water-screened through 1/16th inch mesh.

Artifact Assemblage

A total of 6,504 artifacts were recovered from the Fill 2 context within the cistern feature (Table 3 and Appendix I). The ceramic assemblage consists of 103 sherds, the majority of which are yellowware (1830-1940) constituting 64.1% of the ceramic assemblage (Figure 50). The yellowware sherds were found primarily in the main chambers of the North and South bisects, though three sherds were also found in the NW Chamber. Small amounts of ironstone (1840-1900+) and Rockingham/Bennington (1845-1900+) were recovered from the South bisection. Representative Rockingham/Bennington sherds are depicted in Figure 51. Finally, two sherds of hard paste porcelain (1775-1810) were recovered in the SE quadrant of the South Chamber. The porcelain sherds are likely from a curated piece as the associated dwelling was built on this lot until 1830-1840. The ceramics suggest mid to late 19th century to mid-20th century use period for the cistern and are likely kitchen refuse from the rear of the dwelling at 414 North Washington Street that either were deposited via the drains emptying into the cistern or dumped in through the opening (Feature 4b).

Figure 47: Fill 2 Removed from Northern Chamber
View to South

Figure 48: Cistern with Fill 2 Removed, Filter Box to Right
View to South

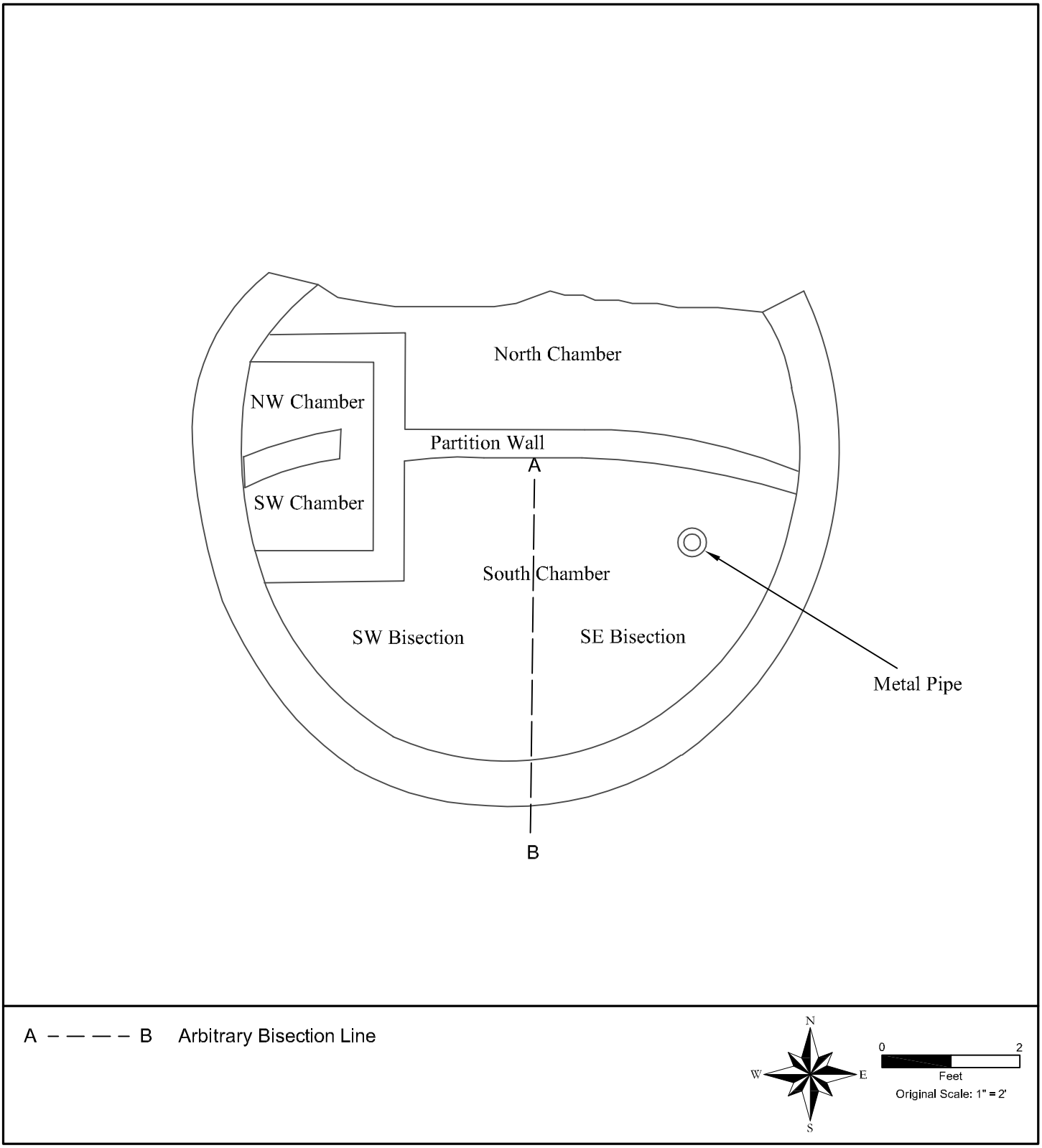


Figure 49
Feature 4, Interior Plan

Table 3: Artifacts Recovered from Feature 4 Fill 2

Artifact Description	SE Bisection	SW Bisection	North Bisection	NW Chamber	SW Chamber
Ceramics					
kaolin pipe bowl	1				
hard paste porcelain	2	2			
hard paste porcelain (1775-1810)	2				
ironstone (1840-1900+)	2				
refined white earthenware	4	3			
Rockingham/Bennington (1845-1900+)		6			
yellowware (1830-1940)	40	12	11	3	
redware	5	4	1		
stoneware	5				
Glass					
bottle, bottle/jar, tableware	24	17	2		1
bottle, freeblown (1850-1860)	2	2			
tableware (c. 1850-1860)	9	1	1		
jar, (ABM)* (1932-1982)	1				
unidentified glass	6	4			
Metal					
brass straight pin	1				
cast iron oven grate	1				
ferrous metal pen (post-1937)		1			
nail, cut (post-1790)	2	2		1	
nail, cut, machine headed (post-1830)	2				
nail, wire (post-1890)	1	1			
unidentified ferrous metal	15	1			17
Miscellaneous					
bead		1			
bone	1819	815	2	135	
brick**	103			1	
charcoal**	1				
cherry pit	194	32		1	
coal**	14	2			
coke**		1			
crab claw	15	14			

Table 3: Artifacts Recovered from Feature 4 Fill 2 * (continued)**

Artifact Description	SE Bisection	SW Bisection	North Bisection	NW Chamber	SW Chamber
Miscellaneous					
egg shell	357	86		92	
fish scale	1893	392			
leather		4			
marble		1			
marble tile	1				
mortar, mortar/plaster, plaster	206	3	1	1	
oyster shell**	6				
peach pit	5	4			
peanut shell	13	6		7	
seed/pit	5	2			
slag	2				
squash seeds	6	11		3	
wood bung		1			
wood spool			1		
Prehistoric					
chert primary reduction flake		3			
chert biface thinning flake				2	
quartz decortication flake	1			1	
quartz primary reduction flake	2	4		3	
quartz biface thinning flake		1		9	
quartzite biface thinning flake		1			
Total Feature 4	**4768**	**1440**	**19**	**259**	**18**

*automatic bottle machine

**discarded

***51.4 grams of mortar/plaster were recovered from Dome, Feature Fill and 61.4 grams of plaster were recovered from Fill 1**

.

Figure 50: Yellowware Chamber Pot (1830-1940

Figure 51: American Rockingham/Bennington Handles (1845-1900+)

The glass assemblage is much smaller than the ceramics and primarily consists of bottle and tableware glass fragments that cannot be identified. However, nine glass tableware fragments with a press molded thumbprint were recovered from the South Chamber (Figure 52). They were manufactured by Bakewell, Pears and Company of Pittsburgh, Pennsylvania between 1850-1860 (Schroy 1993). Additionally, three paneled and embossed rectangular bottle sherds were recovered from the South Chamber of Feature 4 (Figure 53). The freeblown sherds, embossed with W.MORROW/...NNONS/ ... PTIC BITTERS/WASHINGTON D.C.", also date between 1850 and 1860.

Few metal artifacts were recovered, and most could not be identified. Thirty three of the 45 metal fragments were unidentifiable; however, five cut iron nails, two machine-headed cut iron nails, and two wire nails were recovered. A single cut iron nail was recovered from the NW Chamber of the filter box. Finally, a pen with text and phone number of crane company from Maryland that was established in 1937 was found in the soil at the bottom of the South bisection. This pen was likely deposited when the cistern was filled with gravel (Fill 1) in the mid-20th century, at least after 1937, perhaps even by said company.

The largest sub-set of artifacts that were recovered from the cistern belong to the miscellaneous group, which is dominated by faunal and floral waste products including bone (n=2771), cherry pits (n=227), crab claws (n=29), egg shells (n=835), fish scales (2285), oyster shell (n=6), peanuts shells (n=26), seeds (n=7), squash seeds (n=20), and peach pits (n=9). It is possible the small fragments of food waste are draining from the kitchen of the building at 414 North Washington Street which is connected to the cistern by Feature 4c. The other option is that after the cistern was no longer being used, the items were dumped into the drains at Feature 4a and/or Feature 4c or into the cistern itself via the opening at Feature 4b. Finally, 27 prehistoric artifacts consisting of chert and quartz flakes from various stages of tool production were recovered from Fill 2. These artifacts were likely brought in with the gravel (Fill 1) that was used to fill the cistern in the 20th century and do not represent prehistoric activity at this location.

As previously described, Feature 4 has several ancillary features attached to it, all of which are drains. Features 4a, 4b, and 4d were too damaged to excavate and contained no intact soils. As such, they produced only minimal artifacts such as mortar fragments and two ceramic sewer tile fragments, of which Feature 4d is composed. Feature 4c, which is the drain leading from the rear of 414 North Washington Street to the dome of the cistern. was sectioned and the soil in that section was (screened) resulting in 20 artifacts (Table 4).

The temporally diagnostic artifacts include a sherd of pearlware, a sherd of whiteware, a wrought nail, a fragment of lime soda windowpane, and a fragment of soda windowpane. This is a very small sample of artifacts, but the overall dates represented by this small assemblage fit within the early history of the house which was built around 1830 and was in use well after the Civil War. The lack of artifacts is likely indicative of the drain being periodically cleaned.

Figure 52: Tableware, Clear Flint Highball Glass and Press Molded Stemware (ca. 1850-1860)

Figure 53: Aqua Bottle, Freeblown and Paneled bottle (1850-1860)

Table 4: Artifacts Recovered from Feature 4a, 4b, 4c, and 4d

Artifact Description	Feature 4a, Feature Fill	Feature 4b, Feature Fill	Feature 4c, Feature Fill	Feature 4d, Feature Fill
Ceramics				
kaolin pipe bowl				
hard paste porcelain			1	
pearlware (1780-1830)			1	
whiteware (1820-1900+)			1	
stoneware sewer pipe			2	2
Glass				
bottle/jar			1	
unidentified glass			1	
windowpane, lime soda (post-1864)			2	
windowpane, soda (pre-1864)			1	
Metal				
nail, wrought			1	
brick**			1	
mortar	14	4	8	
Total Feature 4 Sub features	**14**	**4**	**20**	**2**

**discarded

Faunal Analysis

Faunal materials including bone fragments, teeth or tooth fragments, amphibian bones, crustacean remains, fish scales, eggshell and peanut shell fragments were recovered from Feature 4. A total of 4,971 bones and bone fragments were submitted for analysis. The formal analysis of the faunal remains from Feature 4 and the other features at site 44AX02379, is presented in Appendix III. A summary of the results of this analysis follows.

The techniques used to analyze the faunal assemblage include determining the Number of Identified Species (NISP), the Minimum Number of Individuals (MNI), Usable Meat Weight and Biomass. The assemblage was also examined for evidence of butchering, and to determine if possible, the choices of types and cuts of meat, and the "kill off" pattern or when the animal was slaughtered.

Only 25.8% (n=1,286) of the feature's faunal assemblage (n=4,981) could be identified. At least 13 different species - one crustacean, eight fish, one reptile or amphibia, two birds, and four mammals- were included. The crustacean and fish species included blue crab, shad or herring, temperate bass and bass, spot, red drum, mackerel, weakfish or seatrout and Atlantic croaker. Of the reptile/amphibian species, 675 from bones were recovered, representing a minimum of 50 individuals. Sixteen bones from mice represent the

commensal assemblage. Commensal species are defined as those which live with another species and share its food; they are not considered food remains. Finally, the domestic species included sheep/goat and cattle, with the majority either indeterminate or attributable only broadly to sheep, goat, deer, or pig.

The data from Feature 4 represents food waste that was small enough to empty into the drain and not the entire diet of occupants of the house at this time; however, shows some interesting details. For example, the diversity of species points to the wide variety available to the consumer in Alexandria, but also shows changing environmental conditions Smallmouth and largemouth bass are not native to Virginia and were introduced into the Chesapeake regions in 1854 and 1874 respectively, and eventually spread into the Potomac River.

Perhaps more intriguing, the presence of so many frog remains and specifically frog legs, some of which were burned, may be indicative of changing dietary preferences. Frog legs may have become acceptable cuisine in Alexandria at the time the cistern was used for food waste rather than drinking water.

Feature Discussion and Comparative Analysis

Cisterns are large rainwater collection assemblies, typically used to provide water to the inhabitants or users of the immediate location. Many cisterns only provided water useful for washing or disposing of waste, rather than drinking water. Typically, the water was drawn out through a faucet in the basement of the associated building or via a hand pump. Many cisterns were partitioned to help filter the water through porous brick and still others came equipped with filters, which were partitions of brick filled with sand, gravel, and/or charcoal.

In this case, Feature 4 is a large, brick, partitioned cistern with two nearly equal partitions and filter box straddling said partition up against the western wall. The cylinder is approximately 12 feet in diameter and 10 feet in depth topped by a brick dome approximately 2 feet in height. A square brick lined opening is located in the center of the dome allowing access to both partitions. The entire interior was plastered including the dome. A damaged brick drain leads from the opening south east into the side yard of the attached dwelling and then turns back to the northeast towards said dwelling. Another drain leads from the back of the house straight to the dome of the cistern and empties into the northern partition. A metal pipe was observed leading from the base of the southern partition through the dome and out of the cistern. The dark fill soil that covers the base of the entire cylinder suggests that crushed charcoal was likely the filter medium. The crushed sand and rock used to fill the cisterns in the 20th century obscures the possibility that other media layered with the charcoal was present in the filter box.

The artifact assemblage suggests that the cistern was installed and likely in use no later than 1860 and was filled with gravel no earlier than 1937. It is possible that the miscellaneous kitchen waste artifacts in the cistern were deposited after it was no longer

used to store water, in which case the artifact assemblage is less useful in determining the initial period of use.

Several cisterns have been archeologically investigated in the City of Alexandria that allow for comparative analysis, including the cisterns at,

1. South Fairfax Street (600 block)
2. 108-110 South Asaph Street (Robert H. Miller/Courthouse cistern)
3. 909 Cameron Street
4. Duke Street (1300 block – the John Emerson cistern)

The cistern excavated at the 600 block of South Fairfax Street consisted of a brick dome capping a cylinder of parged subsoil and was attached to a dwelling built about 1845. The cylinder was divided into two unequal chambers, unlike Feature 4 in which the chambers are nearly equal sized. The partition wall at 600 South Fairfax was constructed of brick and not plastered on the small chamber side. The excavator indicated that the water flowed through an iron intake pile into the large chamber and then a lead outtake pipe from the smaller chamber (Shephard n.d.). No filter box was indicated due to the excavations being discontinued prior to reaching the base of the cistern. Feature 4 was a much more complex construction compared to this cistern but was attached to a home built at approximately the same time.

The Robert H. Miller/Courthouse cistern was excavated in 1977 and expounded upon via a documentary study conducted by Melissa McCloud in 1980 (McCloud 1980). According to that study, the cistern was believed to have been constructed between 1834 and 1836. The cistern consisted of a large, underground brick cylinder lined on the interior with plaster. The interior was divided into two chambers, one larger than the other, by a straight partition wall. The partition wall divides the centrally located filter box into two unequal chambers, the larger chamber on the side of the larger partition. There were small holes in the base of the partition wall inside the filtration box to allow water to pass from one side to the other. The box itself was filled with alternating layers of sand, charcoal, gravel, and mixtures of charcoal with gravel and sand overlying a base layer of gravel. According to McCloud's research this type of two-stage filtration system was common between 1824 and 1836. Around 1825 the medium for filtration shifted from multiple layers of different media to just charcoal. The other shift in methodology came in 1836 where prior to that date many layers of filtration was conducted and afterwards only one or two layers of filtering medium were used (McCloud 1980).

This cistern is very similar in construction to Feature 4, much more so than the cistern at 600 South Fairfax. In Feature 4, the double stage filtration box is located against the wall of the cylinder, rather than centrally located, and the partitions are roughly equal as opposed to the clearly unequal partitions of the Courthouse cistern. The partition wall in Feature 4 is curved rather than straight and the filter box was more evenly divided in Feature 4 and nearly half as large. There was not enough soil left in the filter box to

compare with the 7-layer mixed media used at the Courthouse cistern, though the matrix of Fill 2 which is present in all parts of Feature 4 appears to be finely ground charcoal.

The 909 Cameron Street cistern is similar to both Feature 4 and the previously described Courthouse cistern. Excavated by Alexandria Archaeology (Shephard 2002), this cistern is an underground brick cylinder approximately 7 feet in height, 9 feet in diameter with a dome that adds another 2.5 feet to the height. A square opening was centered on the dome and the cylinder is divided into two equal chambers. The filter box is bisected by that same partition wall with holes at the base to allow the water to flow from one chamber to the other. The filter box, centered within the cylinder, was filled with quartz and quartzite pebbles mixed with large chunks of charcoal, some of which were recognizable and burnt tree branches. The city archaeologists did not determine a date of construction for this cistern but suggested that based on the previous research by McLoud (1980) that this type of cistern and filtration suggested a post-1836 construction date. Documentary evidence led the researchers to suggest an 1851 for a possible construction date since it coincides with major renovations, though the proximity to being connected to a newly created water company in town makes this date problematic.

The differences between Feature 4 and this cistern are similar to that of the differences with the Courthouse cistern. Feature 4 has a smaller filter box oriented against the wall of the cylinder, a curved partition wall, and no solid evidence of quartz and sand filter media. The overall construction method with the two-stage filter box in domestic rather than commercial settings at the rear of upper-class housing, however, indicates Feature 4, the 909 Cameron Street cistern, and the Courthouse cistern are not that disparate temporally.

Finally, Thunderbird Archeology (Johnson 2008) excavated a large brick cistern in 2007 in the 1300 block of Duke Street. This cistern was an underground, large (10 ft diameter) brick cylinder partitioned into two nearly equal chambers. The dome, if the structure had one, was missing, probably removed by modern activity on the site. The filter box was also missing, but the mortared square was still present at the center of the cylinder and also bisected into two equal chambers by the partition wall. Despite the missing elements, this cistern shares more in common with the cistern at 909 Cameron Street, than with Feature 4. As such, the researchers hypothesize that a similar date range for construction post-1836 and pre-1854 based on Dr. Shepard's work at the 909 Cameron Street cistern (Shephard 2002), and McLoud's extensive research in 1980 as a supplement to the work at the Courthouse cistern (McCloud 1980).

Feature 4 possesses a similar shape to the other mid-19th century domestic cisterns that have been excavated within the City of Alexandria, but it exhibits several unique characteristics including its large size, curved partition wall, and a filter box constructed against the wall of the cylinder. It has enough in common with the other cylinders and the research done by McLoud (1980) that Feature 4 likely fits within the post-1836 construction date for cisterns that have the double filtration box. The artifact debris recovered from the cistern contained small kitchen debris like small bones, fish scales, and various seeds. It also produced an artifact assemblage that corresponds with a mid- to late

19th century period of use, though since the cistern was open until at least 1937 the assemblage could be considered somewhat problematic. The lack of a large 20th century assemblage, however, suggests that the cistern was not open for trash deposition and Feature 4b may have been sealed closed.

The construction date for the dwelling at 414 North Washington is unknown, several newspaper articles attribute the building to William Cazenove in 1830, but Cazenove did not own the property until 1849 (Maas 2017) The property was originally owned by the Griffith family and was sold by Sally Griffith to William Hoxton in 1839 after a court case between various members of the Griffith family. According to tax records, Hoxton appears to be the first person to live on the lot along with his wife, Elizabeth Griffith. William Hoxton served as a surgeon in the US Army from 1835 to 1841. It is likely that an educated surgeon would place a high priority on clean water at his home and may have installed the cistern during his eight-year tenure on the property. William Gardner Cazenove (1819-1877), also a well-educated man, purchased 414 North Washington Street in 1849 from Sally Griffith and Elizabeth Griffith Hoxton. In 1850, tax records for the property contain a note detailing "building underway," which contributed to the $900 property value (Maas 2017). This may represent improvements and additions to the house that could include the brick cistern. However, it was also a year prior to the establishment of the Alexandria Water Company in 1851, after this date, the construction of a large cistern for a private non-commercial dwelling would be less likely.

In 1853, a permit was issued to Jane Beverly (the same year her husband both bought the property and later died) to bring water pipes from the Alexandria Water Company to the house (Erickson 1988). This may be the point the cistern falls out of use on the property as a source for drinking water, but certainly could be a source for water for washing and other activities. 414 N. Washington Street was commandeered by the Union Army in August of 1862 and served as the 160-bed Grosvenor Hospital. The US Quartermaster map from 1864 (see Figure 6) details the house, a large Ward in the rear yard, a Smoke Room, a Sink, a Dead House, and a Laundress Quarter. The map does not show the cistern and only depicts a pump on the west side of the house in the approximate location of Feature 6. It is probable that even though the cistern itself is not on the map that this pump was drawing water from pipes possibly laid within the drainage features represented by Feature 4A and Feature 6. However, no metal pipes were recovered linking the potential location of this pump and the metal outtake pipe at the cistern.

Thus, the cistern was most likely constructed with the original building in 1840 by William Hoxton for use by his family or was part of the additions indicated in tax records in 1850 by William Cazenove. It may have been still in use by the Grosvenor Hospital in 1864 as indicated by the Quartermaster Map. The artifact assemblage within the small soil layer suggests that the cistern was open for deposit either through the access hatch at the top of the dome or through the connecting drains through the 19th century, but the low density of those deposits suggest it was sealed and fell out of use shortly after the Grosvenor Hospital was closed, and was finally filled with gravel no earlier than 1937.

(This page left intentionally blank)

SUMMARY AND CONCLUSIONS

An *Archaeological Evaluation* (Phase I/II Archeological Investigations) conducted within a portion of the 400 block of North Washington Street resulted in the identification of ten archeological features and a buried ground surface (Apb) within the borders of site 44AX0239 in Alexandria, Virginia. One feature, the brick cistern (Feature 4) was subject to archeological mitigation, which was conducted according to a *Resource Management Plan* that was developed in coordination with Alexandria Archaeology.

Although a buried surface (Apb) was discovered to be intact throughout the site, the data from the initial testing show that the surface has been disturbed from modern demolition and construction activity. Artifact frequency was generally low across the site and 20th century cultural material was discovered in the same contexts as 19th century artifacts.

Three features (Feature 1, Feature 2, and Feature 3) were 20th century structural elements likely associated with the former rowhouse at 417 Columbus Street. However, most features were related to three former buildings along N. Washington Street (506 N. Washington, 414 North Washington, and 418 N. Washington). Modern construction has impacted the remains of all three structures, but portions of each historic building survived below ground and were documented during the current investigations.

The foundations of the back end of 406 N. Washington Street, which was built circa 1840, was recorded as Feature 7. The basement and foundations associated with 418 N. Washington Street, constructed in 1896, were designated Feature 9. Feature 10, the large pit feature located beneath 418 N. Washington Street, appears to represent a large pole/post or the construction of a well that was abandoned and was filled in by 1864 or shortly thereafter. The feature may represent the location of a telegraph pole or other such structural element related to the Civil War use of the property.

Finally, Feature 5 is the foundation and chimney pad of the back portion of 414 N. Washington Street, which was built in 1840 and renovated in 1850. Part of those renovations in 1850 may have culminated in the construction of a large underground brick cistern (Feature 4) that is attached to the house by a series of brick drains (Feature 4a, 4b, 4c, 4d, and 11).

This intact cistern had integrity and was fully excavated following an approved *Resource Management Plan*. Research questions to be addressed from the data recovery excavation included finding a possible relationship between the construction of the cistern and the use of the main dwelling as a Civil War hospital and adding to the understanding of 19th century water management practices in the City of Alexandria.

Documentary evidence suggests that William Hoxton, whose family resided at 414 North Washington from 1839-1849, likely constructed the cistern. He served as a surgeon in the US Army from 1835 to 1841 and may have placed a high priority on clean water at his home. Archeological evidence revealed that the cistern was open for much of the 19th

century before it was filled with gravel sometime before 1937. The artifacts and the 1865 US Quartermaster map suggest that cistern may have been in use throughout the operation of Grosvenor Hospital during the Civil War.

The cistern was similar to several others archeologically excavated in the city, though the filtering media was no longer present in the filter box. The thin soil layer beneath the gravel contained artifacts that suggests that the cistern was in use no later than 1860, but primarily contained miscellaneous kitchen waste artifacts (4,971 bones and bone fragments) that were deposited after it was no longer used to store water. The food waste was small enough to empty into a drain leading into the cistern and was not the entire diet of occupants of the house at that time. One intriguing discovery was the recovery of frog remains and specifically frog legs, some of which were burned, which can be indicative of changing dietary preferences in Alexandria at the time the cistern was used for food waste rather than drinking water.

REFERENCES CITED

Baer, Christopher T.
2005 PRR Chronology 1905. March 2005 Edition. http://www.prrths.com/Hagley/PRR1905%20Mar%2005.pdf, accessed January 6, 2009.

Bertsch, Amy
2006 Negro Moses and Slave Jenny: The Cases of Two Alexandria Slaves Who Killed Whites Class Paper, Northern Virginia Community College.

Bloomburg, Belinda
1988 Free Black Adaptive Responses to the Antebellum Urban Environment: Neighborhood Formation and Socioeconomic Stratification in Alexandria, Virginia 1790-1850. Ph.D., American University.

Cissna, Paul Byron
1986 The Piscataway Indians of Southern Maryland: An Ethnohistory from pre-European Contact to the Present. Ph.D., Anthropology, American University.

Cox, Al, Pamela J. Cressey, Timothy J. Dennee, T. Michael Miller, and Peter Smith
1999 Discovering the Decades. Alexandria Archaeology https://www.alexandriava.gov/historic/info/default.aspx?id=28254, accessed December 31, 2019.

Cressey, Pamela J., Barbara H. Magid, and Steven Shephard
1984 *Urban Development in North America: Status, Distance and Material Differences in Alexandria, Virginia*. Submitted to Alexandria Archeology. Copies available from National Endowment for the Humanities.

Cressey, Pamela J., John F. Stephens, Steven J. Shepard, and Barbara H. Magid
1982 The Core-Periphery Relationship and the Archaeological Record in Alexandria, Virginia. In *Archaeology of Urban America: The Search for Pattern and Process*, edited by Roy S. Dickens Jr. Academic Press, New York.

Crowl, Heather K.
2002 A History of Roads in Fairfax County, Virginia: 1608-1840. Ph.D., History, American University, Ann Arbor.

Erickson, Philip M. Cdr.
1988 Alexandria Water Company Permits: The First 1000 "Pipers". Alexandria Archaeology, Office of Historic Alexandria, City of Alexandria, Virginia.

Escherich, Susan
1992 Town of Potomac, Alexandria, Virginia. *National Register of Historic Places Registration Form*.

Frobel, Ann S.
1992 *The Civil War Diary of Anne S. Frobel* EPM Publications, McLean, Virginia.

Gallivan, Martin
2011 The Archaeology of Native Societies in the Chesapeake: New Investigations and Interpretations *Journal of Archaeological Research* 19(3):281-325.

Greene, Evarts B.
1932 *American Population before the Federal Census of 1790*. Columbia University Press, New York.

Gutheim, Frederick
1986 *The Potomac*. Johns Hopkins University Press, Baltimore.

Hening, William Waller (editor)
1820 *The Statutes at Large; Being a Collection of All the Laws of Virginia, from the First Session of the Legislature, in the Year 1619. [1756-1763]*. Vol 7. Franklin Press, Richmond.

Hening, William Waller (editor)
1823 *The Statutes at Large; Being a Collection of All the Laws of Virginia, from the First Session of the Legislature, in the Year 1619. [1684-1710]*. Vol 3. Thomas Desilver, Philadelphia.

Hiden, Martha Woodroof
1980 *How Justice Grew: Virginia Counties: An Abstract of their Formation*. Library of Alexandria.

Hodges, Mary Ellen N.
1993 *The Archaeology of Native American Life in Virginia in the Context of European Contact: Review of Past Research*. Theodore Reinhart and Dennis Pogue. The Archaeology of 17th-Century Virginia. Dietz Press, Richmond.

Humphrey, Robert L.and Mary E. Chambers
1977 Ancient Washington; American Indian Cultures of the Potomac Valley. In *George Washington Studies No. 6*. George Washington University, Washington, DC.

Humphrey, Robert L.and Mary E. Chambers
1985 Ancient Washington; American Indian Cultures of the Potomac Valley. In *George Washington Studies No. 6*. [Second Edition]. George Washington University, Washington, DC.

Hurst, Gwen J.
1990 *U.S. Bottle Chronology*. Submitted to B.P. Bishop Museum, Honolulu, Hawaii.

Johnson, Edward and John Mullen
2008 *Results of Construction Monitoring of the 1300 Block of Duke Street, Alexandria, Virginia*. Submitted to Report prepare for Van Metre Companies of Burke, Virginia. Copies available from Archeology Thunderbird, a divsion of Wetland Studies and Solutions, Inc., Gainesville, Virginia.

Kelso, William M.
1995 *Jamestown Rediscovery I: Search for 1607 James Fort*. Association for the Preservation of Virginia Antiquities, Jamestown.

Lawrence, Susan C., Elizabeth Lorang, Kenneth M. Price, and Kenneth J. Winkle
2010 Organization of the Hospitals in the Department of Washington. In *Civil War Washington*. Center for Digital Research in the Humanities.

Maas, Anna, Jean Stoll and John P. Mullen
2017 *Documentary Study of the Sunrise Senior Living, City of Alexandria, Virginia*. Copies available from a division of Wetland Studies and Solutions Thunderbird Archeology, Inc., Gainesville, Virginia

MacKay, James Cobham
1995 *The Development of Taverns in Alexandria, Virginia, 1750-1810*. Alexandria Library Special Collections, Alexandria, Virginia.

Magid, Barbara H.
1990 Alexandria Archeology Artifact Code Books. Vol. Alexandria Archeology Publications Alexandria Archeology Office of Historic Alexandria, City of Alexandria, Virginia.

Mayre, William B.
1935 Piscataway. *Maryland Historical Magazine* 30(3):183-240.

McCloud, Melissa
1980 Urban Water Technology: an Alexandria Cistern and Filtration System. Office of Historic Alexandria, Alexandria Archaeology, City of Alexandria, Virginia.

Melder, Keith, Kathryn Schneider Smith, Peter H. Share, and Associates for Renewal in Education.
1983 *City of Magnificent Intentions : a History of the District of Columbia*. Published for ARE by Intac, Inc., Washington, D.C.

Miller, Edward A. Jr.
1998 Volunteers for Freedom: Black Civil War Soldiers in Alexandria National Cemetery, Part I *Historic Alexandria Quarterly*.

Miller, George L.
1992 Refinement of South's Types and Median Dates. Univeristy of Delaware Center for Archeological Research, Newark, Deleware.

Moore, John Hammond
1985 Creating Northern Virginia. *Northern Virginia Heritage*.

Pippenger, Wesley E.
1990 *John Alexander: A Northern Neck Proprietor: His Family, Friends, and Kin*. Gateway Press, Baltimore.

Poland, Charles Preston
1976 *From frontier to suburbia*. Walsworth Pub. Co., Marceline, Mo.

Potter, Stephen R.
1993 *Commoners, Tribute and Chiefs: The Development of Algonquian Culture in the Potomac Valley*. University Press of Virginia, Charlottesville.

Pulliam, Ted
2011 *Historic Alexandria: An Illustrated History*. Historic Publishing Network, San Antonio.

Putnam, Robert G., Frank J. Taylor, and Philip K. Kettle
2014 *A Geography of Urban Places*. Methuen Publications, Toronto.

Rountree, Helen C.
1989 *The Powhatan Indians of Virginia: Their Traditional Culture*. University of Oklahoma Press, Norman, Oklahoma

Rountree, Helen C., Wayne E. Clark and, and Kent Mountford
2007 *John Smith's Chesapeake Voyages 1607-1609*. Univerity of Virginia Press, Charlottesville and London.

Schroy, Ellen Ticshbein
1993 *Warman's Pattern Glass*. Wallace-Homestead Book Company, Radnor, Pa.

Schweigert, Kurt P.
1998 *West End*. Submitted to Norfolk Southern Corporation.

Scott, Lieutenant-Colonel Robert N.
1880 *The War of the Rebellion: A Compilation of the Official Records of the Union and Confederate Armies*. I. U.S. Government Printing Office, Washington, D.C.

Sheely, Horace
1966 Alexandria Historic District. *National Historic Landmark Registration Form*.

Shephard, Steven J.
2002 *A Nineteenth Century Water Filtration Cistern at 909 Cameron Street, Alexandria*. Copies available from Office of Historic Alexandria Alexandria Archaeology, City of Alexandria, Virginia.

Shephard, Steven J.
n.d. A Water Cistern on South Fairfax. Alexandria Archaeology, Office of Historic Alexandria, City of Alexandria Virginia.

Smith, William Francisand T. Michael Miller
1989 *A seaport saga : portrait of Old Alexandria, Virginia*. Donning Co., Norfolk, Va.

South, Stanley
1977 *Method and Theory in Historical Archeology*. University of Illinois Press, Urbana, Illinois.

von Mechow, Tod
2010 Tarr, Daniel W., & Company, Soda & Beer Bottles of North America http://www.sodasandbeers.com/SABSearchResults.aspx?Source=Firms&Firm=54045&SourceDesc=Tarr%2c+Daniel+W.%2c+%26+Company accessed January 3, 2020.

APPENDIX I
Artifact Inventory

SUNRISE OLD TOWN
SITE 44AX0239
PHASE I-III ARTIFACT INVENTORY

Columbus Street, General Collection, Lot 1

Ceramics

- 1 gray bodied coarse stoneware bottle, cobalt hand painted lip finish, clear salt glazed exterior, body stamped "D.W.TARR 7 CO./ BOTTLES NOT SOLD", manufactured by D.W. Tarr and Company, Boston, Massachusetts (c. 1851- c. 1854, Von Mechow 2010)
- 1 ironstone sherd, undecorated, flat vessel, stamped "PEARL WARE/J Heath" with royal arms maker's mark "IRONSTONE CHINA/J. HEATH.", manufactured by Joseph Heath (1840-1900+, Miller 1992; 1845-1853, Godden 1991:318)
- 1 refined white earthenware sherd, undecorated, flat vessel, burned
- 1 whiteware lid, whole, undecorated, hollow vessel, 3.0 inch diameter, stained (1820-1900+, South 1977; Miller 1992)
- 1 whiteware sherd, blue transfer printed geometric and floral decoration interior, scalloped rim fragment, plate, indeterminate rim diameter (1820-1900+, South 1977; 1830-1865+, Miller 1992)

Glass

- 1 green cylindrical bottle sherd, contact mold, applied double tapered collar lip finish, patinated (1840s-1880, Lindsey 2019)

Metal

- 1 brass shotgun shell casing, plastic bodied, unidentified headstamp (post-1958) (discarded in lab)
- 1 lead dress or coat hem weight- 3.1 cm diameter

Columbus Street, Apb, Lot 2

Metal

- 1 brass button- 1.3 cm diameter

STP 01, Apb, Lot 3

Ceramics

- 1 redware sherd, dark brown glazed interior and exterior, hollow vessel
- 1 whiteware sherd, brown hand painted decoration exterior, hollow vessel (1820-1900+, South; 1825-1860+, Miller 1992)

Glass

- 1 amber cylindrical bottle sherd, patinated
- 1 clear cylindrical bottle/jar sherd, base fragment, patinated
- 6 clear cylindrical bottle/jar sherds, automatic bottle machine (1910-present)
- 6 clear cylindrical bottle/jar sherds, automatic bottle machine, patinated (1910-present)

6 clear cylindrical bottle/jar sherds, automatic bottle machine, scratched (1910-present)
3 clear cylindrical bottle/jar sherds, base fragments, duraglas stippling, automatic bottle machine, scratched (1940-present)
15 clear cylindrical bottle/jar sherds, patinated
1 dark aqua cylindrical bottle/jar sherd, scratched
1 green cylindrical bottle sherd, duraglas stippling, automatic bottle machine (1940-present)
7 safety glass sherds, patinated (post-1915)
15 unidentified light aqua sherds, flat, patinated
17 unidentified light aqua sherds, flat, scratched
3 white milk glass cylindrical tableware sherds
1 windowpane sherd, lime soda, scratched (1864-present)

Metal

1 brass tack fragment, wood attached
6 wire fragments, curved

Miscellaneous

5 brick fragments (discarded in lab), 9.4 grams
8 mortar fragments, plaster attached (discarded in lab), 8.6 grams
3 plastic handle fragments (mend), black, stained, screw attached, embossed "PRESS/COTTON/SILK/OFF" (discarded in lab)
3 unidentified composite fragments, flat (discarded in lab), 5.3 grams

STP 02, Fill 3, Lot 4

Ceramics

1 pearlware sherd, underglaze blue hand painted decoration interior, flat vessel, stained (1780-1820, South 1977; 1780-1830, Miller 1992)
1 whiteware sherd, green hand painted decoration interior, rim fragment, hollow vessel, indeterminate rim diameter, stained (1820-1900+, South; 1825-1860+, Miller 1992)
1 whiteware sherd, undecorated, indeterminate vessel shape (1820-1900+, South 1977; Miller 1992)

STP 02, Apb, Lot 5

Ceramics

4 hard paste porcelain sherds (Continental European), undecorated, flat vessels
2 hard paste porcelain sherds (Continental European), undecorated, rim fragments, flat vessels, indeterminate rim diameters
1 pearlware sherd, underglaze brown hand painted decoration exterior, hollow vessel (1795-1815, South 1977; 1780-1835, Miller 1992)
1 whiteware sherd, polychrome floral hand painted decoration interior, rim fragment, hollow vessel, 3 inch rim diameter, stained (1820-1900+, South; 1825-1860+, Miller 1992)

Glass

3 aqua cylindrical bottle/jar sherds, automatic bottle machine, scratched, patinated (1907-present)
2 unidentified light aqua sherds, flat, patinated
1 windowpane sherd, potash, scratched (pre-1864)

Miscellaneous

1 bone fragment, calcined, 0.5 grams
1 brick fragment (discarded in lab), 29.7 grams
2 charcoal fragments (discarded in lab), 4.5 grams
3 oyster shell fragments (discarded in lab), 19.4 grams

STP 04, Fill 1, Lot 6

Ceramics

1 ironstone sherd, undecorated, base fragment, flat vessel, indeterminate base diameter (1840-1900+, Miller 1992)
1 pearlware sherd, undecorated, hollow vessel (1780-1830, South 1977; Miller 1992)
1 whiteware sherd, undecorated, indeterminate vessel shape (1820-1900+, South 1977; Miller 1992)

Glass

4 clear cylindrical bottle/jar sherds (mend), base fragments, unidentified embossing, automatic bottle machine (1910-present)
2 clear cylindrical bottle/jar sherds (mend), external threading/molding, automatic bottle machine (1910-present)
19 clear cylindrical bottle/jar sherds, automatic bottle machine (1910-present)
9 clear cylindrical bottle/jar sherds, automatic bottle machine, stained, patinated (1910-present)
3 clear cylindrical bottle/jar sherds, molded, automatic bottle machine (1910-present)
3 clear cylindrical bottle/jar sherds, unidentified embossing, automatic bottle machine (1910-present)
1 clear cylindrical jar sherd, ground lip finish fragment, patinated (1850s-1910)
1 light aqua cylindrical bottle/jar sherd, patinated
1 unidentified clear sherd, curved, patinated
1 unidentified clear spall, patinated
1 unidentified pale aqua sherd, flat
9 unidentified pale green sherds, flat, patinated
1 windowpane sherd, lime soda (1864-present)

Metal

1 copper alloy pendant, embossed with The Lord's Prayer, possible rolled penny
1 cut nail fragment, unidentified head (post-1790)
1 cut nail fragment, unidentified head, pulled (post-1790)
1 ferrous metal crown bottle cap fragment

1 wire nail fragment (1890-present)
1 wire nail fragment, pulled (1890-present)
1 wrought nail fragment, unidentified head

Miscellaneous

1 plaster fragment, mortar attached (discarded in lab), 0.1 grams
1 plastic 2-hole sew through button -- 1.9 cm diameter

STP 06, Fill 1, Lot 7

Ceramics

1 whiteware sherd, violet transfer printed decoration interior and exterior, rim fragment, hollow vessel, indeterminate rim diameter, burned (1820-1900+, South; 1825-1875+, Miller 1992)

Glass

1 unidentified light aqua sherd, flat, scratched

Miscellaneous

1 brick fragment (discarded in lab), 4.9 grams
1 slag fragment (discarded in lab), 2.9 grams

STP 07, Fill 1, Lot 8

Ceramics

1 pearlware sherd, undecorated, indeterminate vessel shape, stained (1780-1830, South 1977; Miller 1992)
1 redware sherd, mottled brown glazed interior, unglazed exterior, flat vessel

STP 08, Fill 1, Lot 9

Ceramics

1 redware sherd, brown glazed exterior, hollow vessel

Glass

1 olive green cylindrical bottle sherd, scratched

Miscellaneous

1 brick fragment (discarded in lab), 1.2 grams
1 brick fragment, glazed (discarded in lab), 0.9 grams
1 slag fragment (discarded in lab), 7.9 grams

STP 10, Fill 1, Lot 10

Ceramics

1 hard paste porcelain sherd (Continental European), undecorated, rim fragment, hollow vessel, 5 inch rim diameter
1 Jackfield ware sherd, undecorated, rim fragment, hollow vessel, 4 inch rim diameter (1740-1780, South 1977; Miller 1992)

Glass

1 windowpane sherd, potash, scratched (pre-1864)

Miscellaneous

3 brick fragments (discarded in lab), 55.4 grams

STP 10, Fill 5, Lot 11

Miscellaneous

7 brick fragments (discarded in lab), 42.2 grams

STP 11, Fill 7, Lot 12

Ceramics

1 hard paste porcelain sherd (Chinese export), undecorated, flat vessel

STP 11, Apb, Lot 13

Glass

1 clear cylindrical tableware sherd, scratched
1 unidentified aqua sherd, flat, patinated
1 unidentified clear sherd, heat melted

Metal

1 wrought nail fragment, pulled
3 wrought nail fragments

Miscellaneous

1 bone fragment, 0.4 grams
1 brick fragment (discarded in lab), 16.5 grams
1 coal fragment, (discarded in lab), 0.1 grams

STP 12, Fill 1, Lot 14

Ceramics

1 hard paste porcelain sherd (Continental European), hollow vessel, stained
1 ironstone sherd, undecorated, hollow vessel, stained (1840-1900+, Miller 1992)
1 ironstone sherd, undecorated, indeterminate vessel shape, stained (1840-1900+, Miller 1992)
1 ironstone sherd, undecorated, rim fragment, hollow vessel, 8 inch rim diameter, stained (1840-1900+, Miller 1992)
2 ironstone sherds (mend), undecorated, rim fragment, hollow vessel, indeterminate rim diameter, stained (1840-1900+, Miller 1992)
1 whiteware sherd, polychrome floral hand painted decoration exterior, hollow vessel (1820-1900+, South; 1825-1860+, Miller 1992)

Glass

11 olive amber cylindrical bottle sherds, contact mold (1810-1880)
1 unidentified light green sherd, flat, patinated, scratched

Metal

1 cut nail fragment (post-1790)
1 cut nail fragment, pulled (post-1790)

Miscellaneous

1 plastic comb tooth, black

STP 12, Fill 5, Lot 15

Ceramics

1 pearlware sherd, undecorated, base fragment, hollow vessel, indeterminate base diameter, stained (1780-1830, South 1977; Miller 1992)

Metal

1 unidentified ferrous metal fragment
1 wrought nail fragment, rosehead

Miscellaneous

1 oyster shell fragment (discarded in lab), 0.9 grams

STP 12, Apb, Lot 16

Ceramics

1 gray bodied coarse stoneware sherd, clear glazed interior, clear salt glazed exterior, hollow vessel
1 pearlware sherd, undecorated, flat vessel (1780-1830, South 1977; Miller 1992)
1 pearlware sherd, underglaze polychrome hand painted decoration exterior, hollow vessel (1795-1815, South 1977; 1780-1835, Miller 1992)
2 pearlware sherds, undecorated, hollow vessels (1780-1830, South 1977; Miller 1992)
1 whiteware sherd, brown transfer printed decoration interior and exterior, rim fragment, hollow vessel, indeterminate rim diameter (1820-1900+, South; 1825-1875+, Miller 1992)
2 whiteware sherds, undecorated, flat vessels (1820-1900+, South 1977; Miller 1992)

Glass

1 windowpane sherd, lime soda, scratched (1864-present)

Miscellaneous

1 brick fragment (discarded in lab), 32.8 grams
1 brick fragment, glazed (discarded in lab), 104.0 grams
2 mortar fragments (discarded in lab), 4.9 grams
25 oyster shell fragments (discarded in lab), 275.6 grams

STP 13, Fill 1, Lot 17

Glass

1 clear cylindrical tableware sherd, scratched

Miscellaneous

1 brick fragment (discarded in lab), 4.0 grams
5 oyster shell fragments (discarded in lab), 13.4 grams

STP 13, Apb, Lot 18

Ceramics

2 gray bodied coarse stoneware sherds (mend), clear salt glazed, rim fragment, hollow vessel, 8 inch rim diameter
1 pearlware sherd, undecorated, hollow vessel, stained (1780-1830, South 1977; Miller 1992)
1 redware sherd, brown glazed interior and exterior, hollow vessel
2 redware sherds, unglazed interior and exterior, indeterminate vessel shapes
3 whiteware sherds, undecorated, indeterminate vessel shapes, stained (1820-1900+, South 1977; Miller 1992)

Glass
1 dark green cylindrical bottle sherd, scratched
Miscellaneous
1 bone fragment, 1.0 grams
1 brick fragment (discarded in lab), 1.6 grams
1 coal fragment (discarded in lab), 2.2 grams
2 oyster shell fragments (discarded in lab), 2.9 grams

STP 13, West Half, Apb, Lot 19

Ceramics
1 pearlware sherd, undecorated, flat vessel (1780-1830, South 1977; Miller 1992)
1 pearlware sherd, underglaze brown hand painted decoration interior, hollow vessel (1795-1815, South 1977; 1780-1835, Miller 1992)
Glass
1 clear cylindrical bottle/jar sherd

STP 14, Fill 2, Lot 20

Ceramics
1 pearlware sherd, undecorated, flat vessel, stained (1780-1830, South 1977; Miller 1992)
2 whiteware sherds, blue hand painted decoration exterior, hollow vessels, stained (1820-1900+, South 1977; 1830-1860+, Miller 1992)
Glass
2 clear cylindrical bottle/jar sherds, scratched
2 unidentified clear sherds, flat, scratched
1 windowpane sherd, potash, scratched (pre-1864)
Metal
1 wire fragment
1 wrought nail fragment
Miscellaneous
6 bone fragments, 47.4 grams
1 coal fragment (discarded in lab), 0.4 grams

STP 15, Fill 2, Lot 21

Glass
1 unidentified aqua sherd, flat
1 unidentified clear sherd, flat, scratched
Miscellaneous
1 brick fragment (discarded in lab), 0.4 grams

STP 15, Apb, Lot 22

Glass
1 amber cylindrical bottle sherd
1 amber cylindrical bottle sherd, patinated, scratched
1 aqua cylindrical bottle sherd, rounded lip finish, scratched
2 unidentified light aqua sherds, flat, patinated

4 unidentified light aqua sherds, flat, scratched
1 white milk glass cylindrical tableware sherd, rim fragment, stained
1 windowpane sherd, potash, scratched (pre-1864)

Miscellaneous
1 brick fragment (discarded in lab), 1.6 grams

STP 16, Fill 1, Lot 23

Glass
1 unidentified pale aqua sherd, flat, scratched

Metal
1 unidentified ferrous metal fragment, flat, rectangular, four holes along shaft
1 wire 16d nail, pulled (1890-present)
2 wire 6d nails (1890-present)

Prehistoric
1 quartz primary reduction flake, medial

STP 16, Apb, Lot 24

Ceramics
2 kaolin pipe bowl fragments (mend)
1 pearlware sherd, undecorated, flat vessel, stained (1780-1830, South 1977; Miller 1992)
1 refined white earthenware sherd, blue hand painted decoration interior and exterior, flat vessel, stained

Glass
1 clear cylindrical bottle/jar sherd, scratched
1 clear cylindrical tableware sherd, rim fragment, scratched

Miscellaneous
1 mortar fragment, plaster attached (discarded in lab), 5.0 grams

Trench 1, General Collection, Lot 25

Glass
1 amber cylindrical bottle (whole), side embossed "FEDERAL LAW FORBIDS SALE OR RE-USE OF THIS BOTTLE/E-1 4/5 QUART," base embossed "D-2/35-45," small mouth external thread lip finish, automatic bottle machine, patinated (1907-present)

Trench 3, General Collection, Lot 26

Ceramics
1 redware sherd, annular trailed slip decoration interior, unglazed exterior, rim fragment, hollow vessel, indeterminate rim diameter, burned (1792-1809, Magid et al. 2003)
1 refined white earthenware sherd, blue hand painted decoration interior, hollow vessel, burned

Feature 04, Feature Fill, Lot 27

Miscellaneous
plaster fragments (sample), 61.4 grams

Feature 04, Dome, Feature Fill, Lot 28

Miscellaneous

mortar/plaster fragments (sample), 51.4 grams

Feature 04, North Bisection, Feature Fill 2, Lot 29

Ceramics

1 redware sherd, unglazed interior and exterior, rim fragment, hollow vessel, 7 inch rim diameter

11 yellowware sherds (mend), polychrome annular decoration exterior, rim and base fragment, chamber pot, 8 inch rim and 6 inch base diameters, burned (mends with sherds from Southeast bisection, Fill 2 and Southwest bisection, Fill 2) (1830-1940, Miller 1992)

Glass

1 clear cylindrical bottle sherd, patent lip finish fragment, patinated (post- 1850, Lindsey 2018)

1 clear flint cylindrical tableware sherd, press molded thumbprint decoration, stemware fragment, manufactured by Bakewell, Pears and Company of Pittsburgh, Pennsylvania, heavily stained (c. 1850-1860, Schroy 1993)

1 clear flint cylindrical tableware sherd, stemware base fragment, heavily stained

Miscellaneous

2 bone fragments, 6.2 grams

1 mortar fragment, 29.7 grams

1 wood spool (wet) (conservation necessary)

Feature 04, Northwest Chamber, Feature Fill 2, Lot 30

Ceramics

1 yellowware sherd, undecorated, indeterminate vessel shape (1830-1940, Miller 1992)

2 yellowware sherds, undecorated, rim fragments, indeterminate vessel shapes and rim diameters (1830-1940, Miller 1992)

Metal

1 cut nail fragment (post-1790)

Miscellaneous

135 bone fragments, 120 burned, 7.0 grams

1 brick fragment (discarded in lab), 2.1 grams

1 cherry pit, 0.1 grams

92 egg shell fragments, 4.4 grams

1 mortar fragment (discarded in lab), 33.1 grams

7 peanut shells, 0.9 grams

3 squash seeds, 0.05 grams

Prehistoric

2 chert biface thinning flakes, proximal

9 quartz biface thinning flakes, proximal

1 quartz decortication flake, proximal

3 quartz primary reduction flakes, proximal

Feature 04, Southeast Bisection, Feature Fill 2, Lot 31

Ceramics

5 gray bodied coarse stoneware sherds (mend), brownish red glazed interior, salt glazed exterior, lip fragment, jug, 1.5 inch lip diameter
1 hard paste porcelain sherd (Chinese export), underglaze blue hand painted decoration exterior, hollow vessel (1775-1810, MACL 2017)
1 hard paste porcelain sherd (Chinese export), underglaze blue hand painted decoration exterior, rim fragment, hollow vessel, indeterminate rim diameter (1775-1810, MACL 2017)
1 hard paste porcelain sherd (Continental European), undecorated, base fragment, hollow vessel, indeterminate base diameter
1 hard paste porcelain sherd (Continental European), undecorated, flat vessel
1 ironstone sherd, undecorated, flat vessel (1840-1900+, Miller 1992)
1 ironstone sherd, undecorated, indeterminate vessel shape (1840-1900+, Miller 1992)
1 kaolin pipe bowl fragment, molded
5 redware sherds (mend), unglazed, rim and base fragment, hollow vessel, 7 inch rim diameter, 5 inch base diameter (mends with sherds from Feature 4, Southeast Bisection, Fill 2)
4 refined white earthenware sherds, unidentified blue decoration, indeterminate vessel shapes
35 yellowware sherd, polychrome annular decoration exterior, rim fragment, chamber pot, 8 inch rim diameter, burned (mends with sherds from North bisection, Fill 2 and Southwest bisection, Fill 2) (1830-1940, Miller 1992)
1 yellowware sherd, polychrome hand painted decoration, indeterminate vessel shape (1830-1940, Miller 1992)
4 yellowware sherds, undecorated, indeterminate vessel shapes (1830-1940, Miller 1992)

Glass

1 amber cylindrical bottle sherd, scratched
6 aqua cylindrical bottle/jar sherds, patinated
1 aqua multi-sided bottle sherd, patinated
2 aqua square/rectangular bottle sherds (mend), paneled, embossed "W MORROW/...NNONS/...PTIC BITTERS/WASHINGTON D.C.", patinated, freeblown (mends with sherds from Feature 4, Southwest Bisection, Fill 2) (1850-1860)
1 clear cylindrical bottle sherd, patinated
2 clear cylindrical bottle sherds, stained
1 clear cylindrical bottle/jar sherd, stained
1 clear cylindrical jar, whole, capseat lip finish, molded, side

embossed "5674", base embossed "10", "H" over "A" maker's mark, manufactured by Hazel-Atlas Glass Company, automatic bottle machine (1932-1982, Lindsey 2018)
1 clear flint cylindrical tableware sherd, press molded thumbprint decoration, stemware base fragment, manufactured by Bakewell, Pears and Company of Pittsburgh, Pennsylvania, heavily stained (c. 1850-1860, Schroy 1993)
1 clear flint cylindrical tableware sherd, press molded thumbprint decoration, stemware rim fragment, manufactured by Bakewell, Pears and Company of Pittsburgh, Pennsylvania, heavily stained (c. 1850-1860, Schroy 1993)
1 clear flint cylindrical tableware sherd, stemware base fragment, heavily stained
3 clear flint cylindrical tableware sherds (mend), press molded decoration, highball glass, heavily stained
7 clear flint cylindrical tableware sherds, press molded thumbprint decoration, stemware fragments, manufactured by Bakewell, Pears and Company of Pittsburgh, Pennsylvania, heavily stained (c. 1850-1860, Schroy 1993)
2 clear flint cylindrical tableware sherds, stemware rim fragments, heavily stained
1 clear flint multi-sided tableware sherd, stemware base fragment, heavily stained
1 clear flint multi-sided tableware sherd, stemware fragment, heavily stained
2 clear flint multi-sided tableware sherds (mend), stemware fragment, heavily stained
1 green cylindrical bottle sherd, base fragment, patinated
1 olive green cylindrical bottle sherd, heavily patinated
3 unidentified clear spalls
2 unidentified light aqua sherds, flat, patinated
1 unidentified olive green spall

Metal

1 brass straight pin - 0.8 mm length
1 cast iron oven grate fragment
1 cut 12d nail, machine headed, mortar attached (post-1830)
1 cut nail fragment, machine headed (post-1830)
2 cut nail fragments, unidentified heads (post-1790)
12 unidentified ferrous metal fragments
3 unidentified ferrous metal fragments (mend)
1 wire 6d nail, clinched (1890-present)

Miscellaneous

1,819 bone fragments, two calcined, 134.9 grams
103 brick fragments (discarded in field), 1,800.0 grams
1 charcoal fragment (discarded in lab), 0.1 grams

194 cherry pits, 20.4 grams
14 coal fragments (discarded in lab), 3.2 grams
15 crab claw fragments, 3.0 grams
357 egg shell fragments, 6.8 grams
1,893 fish scale fragments, 12.3 grams
1 marble tile fragment, 130.5 grams
206 mortar fragments (discarded in field), 2,100.0 grams
6 oyster shell fragments (discarded in lab), 12.9 grams
5 peach pits, 14.7 grams
13 peanut shell fragments, 0.8 grams
2 slag fragments (discarded in lab), 27.4 grams
6 squash seeds, 0.1 grams
5 unidentified seeds, 0.1 grams

Prehistoric

1 quartz decortication flake, proximal, cortex proximal/platform
1 quartz primary reduction flake, proximal
1 quartz primary reduction flake, whole, 0.9 mm x 0.7 mm

Feature 04, Southwest Bisection, Feature Fill 2, Lot 32

Ceramics

2 American Rockingham/Bennington sherds (mend), molded, handle fragment, hollow vessel, burned (1800-1912, Miller 1992; 1845-1900+, Magid 1990)
2 American Rockingham/Bennington sherds (mend), molded, rim fragment, hollow vessel, indeterminate rim diameter, burned (1800-1912, Miller 1992; 1845-1900+, Magid 1990)
2 American Rockingham/Bennington spalls, indeterminate vessel shapes (1800-1912, Miller 1992; 1845-1900+, Magid 1990)
1 hard paste porcelain sherd (Continental European), undecorated, hollow vessel
1 hard paste porcelain sherd (Continental European), undecorated, rim fragment, hollow vessel, indeterminate rim diameter
4 redware sherds (mend), unglazed, rim fragment, hollow vessel, 7 inch rim diameter (mends with sherds from Feature 4, Southeast Bisection, Fill 2)
1 refined white earthenware sherd, green luster decoration interior and exterior, base fragment, hollow vessel, indeterminate base diameter
1 refined white earthenware sherd, unidentified green decoration interior and exterior, base fragment, hollow vessel, indeterminate base diameter
1 refined white earthenware sherd, unidentified green decoration, indeterminate vessel shape

9 yellowware sherds (mend), polychrome annular decoration exterior, rim and base fragment, chamber pot, 8 inch rim and 6 inch base diameters, burned (mends with sherds from North Bisection, Fill 2 and Southeast Bisection, Fill 2) (1830-1940, Miller 1992)
3 yellowware spalls, undecorated, indeterminate vessel shapes (1830-1940, Miller 1992)

Glass

4 aqua cylindrical bottle/jar sherds, patinated
2 aqua square/rectangular bottle sherds (mend), paneled, embossed "W MORROW/...NNONS/...PTIC BITTERS/WASHINGTON D.C.", freeblown, patinated (mends with sherds from Feature 4, Southeast Bisection, Fill 2) (1850-1860)
3 clear cylindrical bottle/jar sherds, stained
1 clear cylindrical tableware sherd, base fragment, stained
1 clear cylindrical tableware sherd, molded decoration, rounded rim fragment, heavily stained
2 clear cylindrical tableware sherds, heavily stained
3 clear cylindrical tableware sherds, molded decoration, heavily stained
1 clear flint cylindrical tableware sherd, press molded thumbprint decoration, stemware rim fragment, manufactured by Bakewell, Pears and Company of Pittsburgh, Pennsylvania, heavily stained (c. 1850-1860, Schroy 1993)
1 dark olive green cylindrical bottle sherd, heavily patinated
1 olive green cylindrical bottle sherd
1 unidentified amber spall
1 unidentified clear spall
2 unidentified pale aqua sherds, flat, patinated
1 white milk glass cylindrical tableware sherd

Metal

1 cut nail fragment, unidentified head, burned (post-1790)
1 cut nail fragment, unidentified head, pulled, burned (post-1790)
1 ferrous metal pen, plastic casing, embossed "CRANE RENTAL CO., INC.-- WASH. 18, D.C./ "TRUCK CRANES"/ OFFICE PHONE CO. 5-1203/ RESIDENCE MA. 2-1404-- MA. 0608 -- HE. 4-9420 (post-1937)
1 unidentified ferrous metal fragment
1 wire nail fragment (1890-present)

Miscellaneous

1 blue spherical bead, 6.25PB 3/12 ultramarine - 2.0 mm diameter
815 bone fragments, 166.1 grams
32 cherry pits, 3.6 grams
2 coal fragments (discarded in lab), 0.8 grams
1 coke fragment (discarded in lab), 9.2 grams

14 crab claw fragments, 3.7 grams
86 egg shell fragments, 3.6 grams
392 fish scale fragments, 377.1 grams
3 leather grommet fragments (mend), 0.1 grams
1 leather grommet, 0.1 grams
1 marble tile fragment, 215.9 grams
3 mortar fragments, 1.7 grams
4 peach pit fragments, 11.8 grams
6 peanut shell fragments, 0.5 grams
11 squash seeds, 0.3 grams
2 unidentified seeds, 1.3 grams
1 wood bung - 2.4 cm diameter

Prehistoric

3 chert primary reduction flakes, proximal
1 quartz biface thinning flake, whole, 19.1 mm x 12.9 mm
1 quartz primary reduction flake, distal
3 quartz primary reduction flakes, proximal
1 quartzite biface thinning flake, proximal

Feature 04, Southwest Chamber, Feature Fill 2, Lot 33

Glass

1 clear flint cylindrical tableware sherd, molded, rim fragment, tumbler, stained, patinated

Metal

17 unidentified ferrous metal fragments, thin, curved, probable can

Feature 04a, Feature Fill, Lot 34

Miscellaneous

14 mortar fragments (sample), 104.8 grams

Feature 04b, Feature Fill, Lot 35

Miscellaneous

4 mortar fragments (sample), 130.8 grams

Feature 04c, Feature Fill, Lot 36

Ceramics

2 gray bodied coarse stoneware sewer pipe sherds, mottled brown glazed, rim fragments, hollow vessels, indeterminate rim diameters
1 hard paste porcelain sherd (Continental European), undecorated, lattice fruit basket
1 pearlware sherd, undecorated, hollow vessel (1780-1830, South 1977; Miller 1992)
1 whiteware sherd, undecorated, hollow vessel, stained (1820-1900+, South 1977; Miller 1992)

Glass

1 clear cylindrical bottle/jar sherd, scratched
1 unidentified light aqua sherd, flat, patinated
2 windowpane sherd, lime soda (1864-present)
1 windowpane sherd, soda, patinated, scratched (pre-1864)

Metal

1 wrought nail fragment

Miscellaneous

1 brick fragment, 0.2 grams

8 mortar fragments (sample), 207.9 grams

Feature 04d, Feature Fill, Lot 37

Ceramics

1 gray bodied coarse stoneware sewer pipe fragment, mottled brown glazed interior and exterior

1 red bodied coarse stoneware sewer pipe fragment, brown glazed interior and exterior

Feature 05, Feature Fill, Lot 38

Miscellaneous

mortar fragments (sample), 117.7 grams

Feature 07, North Wall, Feature Fill, Lot 39

Miscellaneous

mortar fragments (sample), 35.5 grams

Feature 10, East Bisection, Feature Fill 1, Lot 40

Glass

1 olive green cylindrical bottle sherd, base fragment, freeblown, dome-shaped push-up, sand pontil, heavily patinated (pre-1860)

Miscellaneous

5 brick fragments (sample), 88.4 grams

7 mortar fragments (sample), 4831 grams

Feature 10, East Bisection, Feature Fill 2, Lot 41

Ceramics

1 creamware sherd, undecorated, indeterminate vessel shape (1762-1820, South 1977; Miller 1992)

Glass

1 olive green cylindrical bottle sherd, base fragment, freeblown, rounded heel, dome-shaped push-up, sand pontil, heavily patinated (pre-1860)

1 olive green cylindrical bottle sherd, freeblown, cracked off and fire polished down-tooled lip finish, applied v-shaped string rim, heavily patinated (pre-1860)

1 olive green cylindrical bottle sherd, heavily patinated

Metal

2 cut nail fragments (mend), unidentified head (post-1790)

Miscellaneous

1 bone fragment, 89.5 grams

5 brick fragments, glazed, 66.8 grams

Feature 10, East Bisection, Feature Fill 3, Lot 42

Ceramics

- 1 creamware sherd, undecorated, rim fragment, flat vessel, indeterminate rim diameter (1762-1820, South 1977; Miller 1992)
- 2 creamware sherds (mend), undecorated, base fragment, hollow vessel, 3 inch foot ring diameter (1762-1820, South 1977; Miller 1992)
- 2 creamware sherds, undecorated, hollow vessels (1762-1820, South 1977; Miller 1992)
- 1 hard paste porcelain sherd (Continental European), underglaze blue hand painted decoration exterior, hollow vessel
- 1 redware sherd, dark brown glazed interior and exterior, rim fragment, hollow vessel, indeterminate rim diameter

Glass

- 1 olive green cylindrical bottle sherd, heavily patinated
- 1 windowpane sherd, soda, scratched (pre-1864)

Metal

- 1 wrought nail fragment
- 1 wrought nail fragment, spatulate tip, pulled

Miscellaneous

- 7 bone fragments, three calcined, 34.6 grams
- 1 tooth fragment, 1.9 grams

Feature 10, East Bisection, Feature Fill 4, Lot 43

Metal

- 1 cut nail fragment, unidentified head, burned (post-1790)

Miscellaneous

- 1 charcoal fragment, 0.2 grams
- 4 mortar fragments, 24.9 grams

Feature 10, East Bisection, Feature Fill 4/5, Lot 44

Glass

- 1 olive green cylindrical bottle sherd, base fragment, heavily patinated
- 1 olive green cylindrical bottle sherd, patinated, attached to mortar fragment
- 7 olive green cylindrical bottle sherds, heavily patinated

Metal

- 1 cut nail fragment (post-1790)
- 1 wrought nail fragment, spatulate tip, pulled
- 4 wrought nail fragments

Miscellaneous

- 4 bone fragments, one calcined, 55.3 grams
- 1 mortar fragment, olive green cylindrical bottle sherd attached, 221.9 grams
- 1 quartz building material, clear glazed

Feature 10, East Bisection, Feature Fill 6, Window, Lot 45

Glass

1 olive green cylindrical bottle sherd, freeblown, cracked off and fire polished v-shaped lip finish, applied down-tooled string rim, heavily patinated (pre-1860)
2 olive green cylindrical bottle sherds (mend), base fragment, heavily patinated
22 olive green cylindrical bottle sherds, heavily patinated
8 windowpane sherds, potash, patinated (pre-1864)

Metal

1 wrought nail fragment, spatulate tip
7 wrought nail fragments
2 wrought nail fragments, pulled

Miscellaneous

4 bone fragments, 51.3 grams
1 brick fragment, 40.3 grams

Feature 10, East Bisection, Feature Fill 6, Level 1, Lot 46

Ceramics

1 creamware sherd, undecorated, hollow vessel (1762-1820, South 1977; Miller 1992)
1 creamware sherd, undecorated, rim fragment, flat vessel, indeterminate rim diameter (1762-1820, South 1977; Miller 1992)
1 redware sherd, dark brown glazed interior and exterior, hollow vessel

Glass

2 unidentified light aqua sherds, flat, patinated
1 unidentified pale aqua sherd, flat, patinated
3 windowpane sherds, lime soda, patinated (1864-present)

Metal

1 unidentified ferrous metal fragment, possible bolt
1 wrought nail fragment, pulled
1 wrought nail fragment, unidentified head, pulled
12 wrought nail fragments
5 wrought nail fragments, spatulate tips, pulled
2 wrought nail fragments, unidentified heads

Miscellaneous

6 bone fragments, one calcined, 46.3 grams
9 mortar fragments, 40.9 grams
1 oyster shell fragment, 2.0 grams
1 tooth fragment, 1.8 grams

Prehistoric

1 Keyser ware body sherd, shell tempered, smoothed cordmarked surface treatment, interior and exterior 2.5YR5/6, Late Woodland (AD 1400- AD 1550, MACL 2018)

1 quartz primary reduction flake, proximal

Feature 10, East Bisection, Feature Fill 6, Level 2, Lot 47

Ceramics

1 creamware sherd, undecorated, rim fragment, flat vessel, indeterminate rim diameter (1762-1820, South 1977; Miller 1992)

Glass

1 olive green cylindrical bottle sherd, scratched

Miscellaneous

1 bone fragment, 5.4 grams

APPENDIX II
Cultural Resource Form

Snapshot

Date Generated: September 29, 2019

Site Name: 400 North Washington Street
Site Classification: Terrestrial, open air
Year(s): No Data
Site Type(s): Dwelling, multiple
Other DHR ID: No Data
Temporary Designation: Site 1

Site Evaluation Status

Not Evaluated

Locational Information

USGS Quad: ALEXANDRIA
County/Independent City: Alexandria (Ind. City)
Physiographic Province: Coastal Plain
Elevation: No Data
Aspect: No Data
Drainage: Potomac
Slope: 0 - 2
Acreage: 0.720
Landform: Urban
Ownership Status: Private
Government Entity Name: No Data

Site Components

Component 1

Category: Domestic
Site Type: Dwelling, multiple
Cultural Affiliation: Euro-American
DHR Time Period: Antebellum Period, Civil War, Early National Period, Reconstruction and Growth
Start Year: No Data
End Year: No Data
Comments: No Data

Bibliographic Information

Bibliography:

Sunrise Senior Living (SSL)
400 North Washington Street, Alexandria, Virginia
Archeological Evaluation

June 2019

John P. Mullen, M.A., RPA
Edward H. McMullen, M.A., RPA

Informant Data:

No Data

CRM Events

Event Type: Survey:Phase III/Archaeological Data Recovery

Project Staff/Notes:

John P. Mullen, M.A., RPA - Principal Investigator
Edward H. McMullen, M.A., RPA - Senior Archeologist
Thunderbird Archeology, WSSI
Gainesville, VA

Project Review File Number: No Data

Sponsoring Organization: No Data

Organization/Company: Thunderbird Archeology, a division of Wetland Studies and Solutions, Inc.

Investigator: Edward McMullen

Survey Date: 4/1/2019

Survey Description:

July 2018 - Phase I Archeological Investigation
Mechanical trenching and archeological monitoring, including shovel test pit excavation and feature evaluation. Recording of 19th century foundation walls and cistern beneath parking lot of 400 N Washington Street, Alexandria, VA

April 2019 - Phase II/III - Archeological Evaluation and Mitigation
Mechanical stripping of parking lot and archeological monitoring. Feature excavation of brick cistern and pit feature.

Current Land Use	Date of Use	Comments
Dwelling, multiple	5/1/2019 12:00:00 AM	*No Data*

Threats to Resource: Demolition, Development

Site Conditions: Site Totally Destroyed

Survey Strategies: Historic Map Projection, Subsurface Testing

Specimens Collected: Yes

Specimens Observed, Not Collected: No

Artifacts Summary and Diagnostics:

Ceramics
1 whiteware (1820-1900+)
14 pearlware (1780-1830)
9 hard paste porcelain
6 ironstone (1840-1900+)
6 redware
3 stoneware
2 kaolin pipe bowl
2 refined white earthenware
1 Jackfield ware (1740-1780)
1 redware (1792-1809)
Glass
62 bottle/jar, automatic bottle machine (post-1907)
61 unidentified glass
35 bottle, bottle/jar, tableware
11 bottle, contact mold (1810-1880)
7 safety glass (post-1915)
4 bottle, duraglas (post-1940)
4 windowpane, potash (pre-1864)
3 windowpane, lime soda (post-1864)
1 jar, ground lip finish (1850s-1910)
Metal
7 nail, wrought
7 wire
5 nail, wire (post-1890)
4 nail, cut (post-1790)
2 unidentified ferrous metal
1 brass tack
1 copper alloy pendant
1 ferrous metal crown bottle cap (post-1890)
Miscellaneous
36 oyster shell (discarded)
26 brick (discarded)
12 mortar (discarded)
9 bone
7 plastic, composite (discarded)
5 charcoal, coal (discarded)
2 slag (discarded)
1 plastic button

Prehistoric
1 quartz primary reduction flake

*For full inventory, see Archeological Evaluation Report

Summary of Specimens Observed, Not Collected:

No Data

Current Curation Repository: WSSI

Permanent Curation Repository: WSSI

Field Notes: Yes

Field Notes Repository: WSSI

Photographic Media: Digital

Survey Reports: Yes

Survey Report Information:

Sunrise Senior Living
400 North Washington Street, Alexandria, Virginia
Archeological Evaluation

Thunderbird Archeology, WSSI

John P. Mullen, M.A., RPA
Edward H. McMullen, M.A., RPA

June 2019

Survey Report Repository: WSSI

DHR Library Reference Number: No Data

Significance Statement:

Thunderbird Archeology, a division of Wetland Studies and Solutions, Inc. (WSSI) conducted an Archeological Evaluation for the Sunrise Senior Living (SSL) properties, at 400 North Washington Street, Alexandria, Virginia. The archeological work took place before and during the demolition of an existing building and associated parking lot at the address ahead of the development of an 80,000 square foot building and parking garage. Initial investigations sought to discover the level of preservation of a Civil War hospital and associated buildings included on historic maps of the property.

Several 19th century foundation walls and a brick cistern were identified during Phase I trench excavations of the parking lot. The initial investigations led to the further evaluation and mitigation of the brick cistern and one pit feature. The brick cistern and associated brick foundation walls were systematically demolished after they were evaluated and mitigated.

An Apb (buried plow zone) yielded a low-density artifact assemblage with a wide 19th century date-range during the initial investigations. With consultation with Alexandria Archaeology it was decided that mechanical stripping of the site would continue with archaeological monitoring and that the identified cistern and any other identified features with a potential of containing a sealed context would be properly mitigated.

The excavation of the cistern proved that it was infilled sometime in the 1930s as artifacts at the base of the feature fills contained artifacts from this time period. Therefore only a terminus post quem can be established for the infilling of the cistern. The use of the cistern is likely contemporary with the 19th century home, but cannot be definitively determined from the investigations.

Surveyor's Eligibility Recommendations: Recommended Not Eligible

Surveyor's NR Criteria Recommendations, : No Data

Surveyor's NR Criteria Considerations: No Data

APPENDIX III
Faunal Analysis - Susan Trevarthen Andrews

Faunal Analysis for Site 44AX0239

Report submitted to:

John Mullen
Principal Archaeologist/Assistant Manager
Thunderbird Archaeology
Wetland Studies and Solutions, Inc.
5300 Wellington Branch Drive
Suite 100
Gainesville, VA 20155

Report Submitted by:
Susan Trevarthen Andrews

August 2019

Table of Contents

List of Tables

List of Figures

Acknowledgements

I would like to thank Thunderbird Archaeology, a division of Wetlands Studies and Solutions, Inc. for giving me the opportunity to analyze the faunal remains recovered from Site 44AX0239. I would also like to thank Derek Wheeler from Monticello's Department of Archaeology, for developing a microcomputer program to store and manipulate faunal data from archaeological sites. Without his help with the faunal program, analysis could not have been completed.

Introduction and Description of Site

This report describes the zooarchaeological analysis of faunal remains recovered from Site 44AX0239, located in Alexandria, Virginia. While nine bones were recovered during shovel test pits of the site, the remaining faunal remains were excavated from two features. Feature 10 produced 24 bones and is described as a circle shaped midden filled with a significant amount of building material and oyster shells. The majority of the remains were excavated from Feature 4, a brick cistern and associated drains related to a building. A bisection of the feature on the east-west axis revealed the entire cistern was ten feet high with a two foot dome on the top. Most of the artifacts recovered from the feature include a mixture of faunal and floral waste products such as fish remains, frog bones, seeds, cherry pits, crab claws, egg shells, and peanut shell fragments. The excavated food waste appear to have come from the kitchen associated with a building near the cistern (Mullen 2019).

When combined together, the two features and shovel test pits from Site 44AX0239 produced a total of 5,004 faunal remains (see Table 1). Based on the excellent preservation, the lack of major recovery bias, and the high percentage of identifiable bones, both parties agreed that all the bones from the site would be analyzed. The first section of this report will discuss the specific laboratory and analytical techniques used to examine the faunal remains from Site 44AX0239. The second section of the report will then examine the results from the faunal analysis including identified taxa, taphonomic influences, relative dietary importance, element distribution patterns, and butchering evidence.

Table 1
Faunal Remains from Site 44AX0239

	Identifiable Bone	Indeterminate Bone	Total Bone
Feature 4 Totals	**1,286**	**3,685**	**4,971**
North Bisection, Feature Fill 2			
Northwest Chamber, Feature Fill 2			
Southeast Bisection, Feature Fill 2			
Southwest Bisection, Feature Fill 2			
Feature 10 Totals	**13**	**11**	**24**
East Bisection, Feature Fill 2			
East Bisection, Feature Fill 3			
East Bisection, Feature Fill 4/5			
East Bisection, Feature Fill 6, Level 1			
East Bisection, Feature Fill 6, Level 2			
East Bisection, Feature Fill 6, Window			
Shovel Test Pits Totals	**3**	**6**	**9**
STP 2			
STP 11			
STP 13			
STP 14			
TOTALS	**1,302**	**3,702**	**5,004**

** Identifiable bone is defined as bone identifiable to at least the taxonomic level of family.

Recovery Methods

Quarter-inch screening is a standard technique used on prehistoric and historic period sites. As early as 1969, David Hurst Thomas demonstrated screening has an enormous positive influence on the recovery of bone, particularly the recovery of smaller or more fragile elements. The smaller the screen size, the better the recovery rate, but screening through very fine mesh is often cost-prohibitive. Combining flotation sampling and ¼-inch screening is a responsible compromise that allows comparison with a large number of sites that have been excavated similarly.

At Site 44AX0239 excavated soils from the features were primarily screened through 1/4" screen. For Feature 4, soils with superior integrity were water screened through 1/16" mesh (Mullen 2019). Although some of the faunal material from the feature and shovel test pits was fragmentary and not identifiable to species, the presence of some bird, small mammal, and crab remains combined with large numbers of frog and fish bones suggests that a fair sample of the original assemblage was recovered during excavation and water screening.

Laboratory Techniques

Analysis of the bones began with sorting the faunal fragments into "identifiable" and "indeterminate" categories. The indeterminate bone—that which could not be taken at least to the taxonomic level of order—was further sorted into broad taxon groupings such as fish, reptile, amphibian, bird, small mammal, medium mammal, and large mammal. Finally, within their taxon groupings, the bones were sorted into broad element categories such as limb bones, teeth, ribs, and cranial fragments. All of the indeterminate bones were then counted, weighed, and examined for evidence of burning, butchering, or other types of modification. This data was then entered into a custom-designed microcomputer program.

Each of the identifiable bones was assigned a "unique bone number." By working with a comparative skeletal collection maintained by Susan Andrews, the "identifiable" bone fragments were identified to the lowest taxonomic level possible. The taxon, bone element, symmetry (side), location, weight, fusion state, tooth type and wear, relative age, butchering marks, and evidence of burning, weathering, and gnawing were recorded and entered into a computer program. Once entered, the data was then manipulated to provide the summary information described in this report.

Analytic Techniques

Zooarchaeologists have devised several methods of quantification to estimate relative dietary importance. These quantification methods include determining the Number of Identified Specimens (NISP), Minimum Number of Individuals (MNI), Usable Meat Weight, and Biomass. The most common goal of these measures is to identify the relative dietary importance, but zooarchaeologists have long debated their relative strengths and weaknesses (Wing and Brown 1979; Reitz and Cordier 1983; Grayson 1984). Other analytic techniques completed during the analysis include measuring relevant domestic mammal faunal specimens and documenting evidence of burning, gnawing, and weathering for the domestic species. These analytic techniques will be discussed in the following paragraphs.

NISP

At the simplest level, the Number of Identified Specimens (NISP) is used to calculate the relative abundance of any species within a faunal assemblage. After identification, all the bones within each species are added together to determine the frequency of fragments for each animal. Though still perhaps the most frequently used measure of abundance, this method has several shortcomings, most notably its assumption that the bones being counted are representative of the sampled population, and that each item is independent of every other item. There is no method, however, to demonstrate which bone fragments came from different individuals across an entire faunal sample. Other problems with this method include the unequal numbers of elements per individual, differential preservation rates, uneven fragmentation rates that occur with different classes and sizes of animals, and misrepresentation of complete skeletons that are often intermixed with fragmented pieces from an indeterminate number of individuals (Grayson 1984).

From an interpretive standpoint, NISP represents only the number of fragments identified to taxon. It does not directly consider the differences in size and meat weight between various classes of animals. For this reason, as well as the potential biases described above, many zooarchaeologists have come to the conclusion that this technique alone cannot provide an accurate assessment of the relative dietary importance of various species.

MNI

One popular method for estimating species abundance is the method called Minimum Number of Individuals (MNI). While NISP attempts to calculate the maximum number of individuals on a site, MNI most often establishes the minimum number of animals by examining the most common element for each taxon. Taking into consideration differences in age, sex, and size for each taxon, the rights and lefts of each of the main elements are carefully matched. Once comparisons are completed, the individual MNI for each element is considered, and by taking into consideration gross size and age differences, a figure representing the entire animal is derived.

The MNI effectively corrects for the differential number of bones found in bird, mammal, and fish skeletons, as it also corrects for the presence of complete skeletons. But the thoroughness of the analyst, the units of aggregation, and the sample size all affect the interpretation of an MNI figure. Accurate estimations of dietary importance based on MNI require a large number of bones, since in small assemblages infrequently occurring animals are over-represented. As Grayson (1984) pointed out, MNI values are intimately tied to units of aggregation, and therefore, in small samples the least common species on a site will be overemphasized. While this problem is greatly diminished in larger samples, the MNIs, no matter how well executed, do not provide a true dietary estimate. For example, one deer and one fish are presented as equally important in dietary terms, despite the differences in pounds of meat (Grayson 1984). Since large and small taxa are given equal weight, this method produces a skewed picture of the relative dietary importance.

Usable Meat Weight

In the 1950s Theodore White introduced to the field a method that would translate MNIs into dietary estimates (White 1953). To obtain a rough estimate of the relative importance of different taxa, the MNI for a given taxon is multiplied by the average amount of usable meat derived from an estimate of meat yield. Average values are based on the average weight of modern wild birds, mammals, and turtles (only rough estimates are given for fish since their weight typically increases as they age). Also, modern domesticated species can be quite large in comparison to colonial animals, therefore we use colonial weights for domesticated species. Since this method relies on MNI directly, usable meat weight estimates suffer from the same problems inherent in the MNI method. In small assemblages, particularly those where even the more frequently occurring taxa are represented by only one or two MNI, the least frequently occurring taxa are grossly inflated.

Biomass

Known as "biomass" or "skeletal mass allometry," this technique that has become a standard procedure in zooarchaeological analysis. Developed for zooarchaeology by Elizabeth Reitz and others, this method is based on the biological premise that the weight of bone is also related to the amount of flesh it supports. Using a specific formula for each type of taxon, body size and body weight are then determined from the size of a bone element. Since a specific quantity of bone represents a predictable amount of tissue this can be roughly translated into the ranked dietary importance of each species (Reitz and Cordier 1983; Reitz and Scarry 1985). This estimate, therefore, provides a balance to the NISP and MNI methods. It helps to counter the problem of interdependence, since it accounts for the presence/absence of partial and complete skeletons. An additional advantage is that it does not rely on thoroughness or assemblage composition, and fragmentation is not a problem. It does, however, require that each bone (or group of bones) be weighed individually.

In a later section biomass estimates are used, despite the fact that all of the early analyses by many zooarchaeologists are based on usable meat weight. Recent research by Bowen and others have shown biomass estimates to be far more consistent than meat weight estimates, particularly when large numbers of fish are present in assemblages (Bowen in Walsh et al. 1997). In general, it allows the weight of the fragments identified only to class to become part of the dietary estimates, it avoids the idiosyncrasies of the MNI method, and it circumvents the "averaging" problem that plagues any assemblage containing a large proportion of fish.

Element Distribution

Many historical zooarchaeologists have focused their analysis of faunal remains on determining the social and economic status of households (Schulz and Gust 1983; Lyman 1987; Crader 1984, 1990; Reitz 1987; Bowen 1992). By looking at the presence or absence of various cuts of meat in an assemblage, they interpret the presence of feet and heads to be less valuable cuts and therefore indicators of low social and economic status. Consequently, the presence of fleshier cuts of meat, indicated by body elements, is more valuable and in turn, an indicator of a household with high status (Crader 1984; Miller 1984; Bowen 1992, 1994). However, preferences for heads and feet as cuts of meat have changed throughout history. For example, during the colonial and nineteenth centuries, heads, particularly those of swine and calves, were considered to be delicacies, not necessarily a less valuable cut of meat.

In general, zooarchaeologists have not been able to identify distinctive characteristics of ethnic groups or high- and low-status diets (Bowen 1992; 1994). For example, in faunal assemblages from seventeenth though early nineteenth centuries assemblages from the Chesapeake, "low" and "high" quality cuts of meat are found intermingled in both high- and low-status assemblages (Walsh et al. 1997). In his comparisons of known high-status and low-status seventeenth-century sites in Virginia, Henry Miller found very few differences in the distribution of particular elements. Similar species and cuts of meat were present in similar proportions on both types of sites, and in both, elements from "high-quality" cuts made up the majority of the bones (Miller 1984:360).

In studies of the enslaved African-American diet, zooarchaeologists have assumed the enslaved (presumably "low status") received primarily cuts of meat their owners did not want. Attempting to demonstrate heads and feet were low status, Diana Crader looked for the presence of different cuts of meat to define the status of enslaved households associated with Monticello. In her comparative study of enslaved individuals associated with Thomas Jefferson's main house and separate enslaved households, she found a greater number of "low-quality" cuts in faunal assemblages from cabins of the enslaved, and a greater number of "high-quality" cuts in faunal assemblages associated with the main household. But like Miller, Crader found both high-quality cuts in assemblages related to enslaved individuals and low-quality cuts in the main household assemblage (Crader 1984, 1990).

In assessing possible patterns in the cuts of meat for Site 44AX0239, the domestic mammal bones were examined using a method called element distribution analysis. This method is similar to other approaches such as the minimum number of elements (MNE), which is derived by determining how many elements are represented in a sample of fragmented bones (Reitz and Wing 2008). Both approaches share the goal of attempting to quantify the relative representation of skeletal elements in a faunal assemblage. For the purpose of this report, element distribution analysis was chosen as a valid measurement for examining differential representation of body elements for the domestic species. This method can expose possible patterns in the fragmented bones to determine how provisioning may have been influenced either by the scale of regional provisioning system or status of the occupants of the site (Bowen 1992; Walsh et. al. 1997).

Element distributions, derived from NISP, compares the distribution of elements found in a normal skeleton with those present in the faunal assemblage. For example, in cattle skeletons, 29.7% of the bones are from the cranium, 42.2% of the bones are from the body, and 28.1% of the bones are from feet. When the distribution patterns of cattle remains from archaeological sites are similar, it suggests the entire animal was consumed, while dissimilarities suggests certain parts of the carcass were being selected over others or were not available to the occupants of the site. While there are only three swine, eleven cattle, and twelve sheep/goat bones from the combined features and shovel test pits from Site 44AX0239, some generalizations about element distribution will be discussed in the results section of this report.

Kill-Off Data

To help understand husbandry techniques underlying the availability of food, aging methods were employed to the domestic mammal remains recovered from Site 44AX0239. There is a direct relationship between agricultural economies and how farmers breed, raise, and slaughter their livestock. In subsistence farming, animal husbandry focuses on raising livestock to serve multiple purposes. For example, a farmer might raise cattle for milk, meat, and draft uses, or sheep for both their wool and their meat. Farmers typically raise livestock to provide for their own household's needs, selling any surplus. On the other hand, specialized farming focuses on raising livestock to produce a product directly for market, and the focus shifts to managing livestock to produce the greatest profit. In this commercially-oriented farming, the focus shifts from managing livestock for personal use to producing livestock for the greatest profit.

As an example, in the Chesapeake region, specialized production of livestock evolved directly out of the region's plantation economy. Livestock first arrived with the earliest of settlers at Jamestown and by the 1620s herds of cattle and swine were thriving within a protected woodland environment. Domestic herds were doing so well that in 1619 John Pory wrote that cattle "do mightily increase here, both kine, hogges and goates, and are much greater in stature, than the race of them first brought out of England "(Tyler 1946: 213).

During the mid-seventeenth century, tobacco became an established, profitable crop in the Chesapeake, as farmers began to cut down more forests to make room for more fields. Before long, tobacco farming depleted the soil in fields, and the lush environment that livestock had thrived upon began to disappear. By the late seventeenth century, references to domestic herds reflect this degradation by describing a decline in the size and health of the animals. In 1688, John Clayton wrote in a letter that the cattle "have little or no Grass in winter, so that (they) are pinned and starved, and many that are brought low and weak, when the Spring begins, venture too far into the Swamps after the fresh Grass, where they perish; so that several Persons lose ten, twenty or thirty heads of Cattle in a Year" (Force 1947: 25-26). During the eighteenth century, when cities in the West Indies market had grown, planters began to grow grain and raise livestock not only for food but also for profit. In response to these developments in the new market, farmers began to provide animals with specialized feed, construct pens to hold large animals, and build stalls with roofs to keep their livestock and food warm and dry. This more intensive form of animal husbandry allowed livestock to reach a good slaughter weight faster than if they simply free-ranged without supplemental feed (Walsh et al. 1997; Carson et al. 2008).

Kill-off patterns studied from eighteenth century sites in the Chesapeake, have reflected these changes that occurred in animal husbandry techniques. Slaughter ages of cattle from sites dating from the early seventeenth century show typically 51% of the cattle population killed when they were four years and older. By the late seventeenth century, the number of cattle killed at greater than four years of age increased to 68%. This pattern has been attributed to grass feeding, where it takes about four years for cattle to reach their mature slaughter weight. Faunal assemblages from the eighteenth and early nineteenth centuries include larger percentages of younger cattle aged between 24-28 months. This reflects a more specialized form of cattle husbandry that allowed the cattle to mature to a slaughter weight in less than four years of age (Walsh et al. 1997).

The kill-off patterns for swine from sites from the seventeenth century show that during the first half of the century, almost half of the population of slaughtered swine was less than a year old. Over the next hundred and fifty years, this number decreased until by the last half of the eighteenth century only 19%-28% of the killed swine were less than a year old. In contrast, swine between the ages of 12-24 months increased from 11%-17% in the seventeenth century to 31%-38% in the late eighteenth/early nineteenth centuries. Again, this change reflects a shift in husbandry patterns related to the introduction of commercial markets and the increase of specialized farming (Walsh et al. 1997).

In accessing the husbandry patterns from Site 44AX0239, the slaughter ages presented in Appendix A of this report are based on epiphyseal fusion of long bones. Like every aging method, fusion patterns also have biases. First, long bone epiphyses fuse at different times in the

maturation of the mammalian skeleton, making it difficult to establish precise age groups; the exact age at which individual epiphyses fuse varies according to health, breed, and diet. Studies on bone fusion have also shown that immature bones degrade more rapidly than mature bone. Taking all these factors into consideration, analysts opted to group fusion data into broadly defined age groups using numerical designations given by Reitz and Wing (2008). These groups will be defined in more detail for each of the domestic mammal species for the kill-off analysis.

Another bias to consider in accurately assessing the kill-off patterns from an assemblage, is that large numbers of elements are needed in proportions that are roughly even to that of a normal skeleton. Unfortunately, since Site 44AX0239 only produced one ageable swine, two ageable cattle, and three ageable sheep/goat bones, it was not possible to accurately determine kill-off data. However, for the purpose of future comparative work, the epiphyseal fusion tables for swine, cattle, and sheep/goat remains are included in Appendix A, Tables 12-13.

Taphonomy and the Analysis of Butchering

There are many physical, chemical, and biological processes that impact the preservation of bones and by extension, the interpretation of faunal assemblages. The study of these mechanisms is known as "taphonomy," or the study of environmental phenomena and processes that affect organic remains after death (Efremov 1940).

The determination of, for example, which cuts of meat are represented in a faunal assemblage cannot reasonably proceed without the careful analysis of taphonomic modifications. Identifying alterations resulting from natural processes such as temperature variation that can dry out, split, or otherwise degrade bone, carnivores and rodents that gnaw bone, and human feet that can further fragment bone, is the important first step to looking at purposeful modifications such as butchery and intentional burning (Gifford 1981; Lyman 1987; Johnson 1985; Bonnichsen and Sorg 1989; Reitz and Wing 2008).

During the identification phase of this project, burn marks, evidence of gnawing by carnivores and rodents, weathered appearance, and butchering evidence were recorded. Bones recorded as "burned" include those with distinctive charring or scorched marks. Experiments on cooking bones, by either roasting or boiling, has shown that it often takes extreme temperatures to produce burn marks on a bone. The size and density of the bone combined with the temperature and type of cooking, influences the appearance of burn marks on bones (Pearce and Luff 1994).

Evidence of gnawing on bones can be seen as puncture holes made by canine teeth or by specific gnawing patterns left on the surface of the bone. Carnivores such as dogs will typically gnaw on the soft ends of long bones to create channels that allow them to get at the marrow. Smaller bones belonging to fish, birds, and small mammals are easily broken and digested by carnivores, so there is rarely any evidence of carnivore gnawing on these bones. Gnaw marks left by rodents leave a characteristic pattern made by incisor teeth.

Cracking or flaking on the surface of the bone is attributed to weathering. A weathered appearance on the surface of a specimen often occurs on bones left in the open, where exposure to extreme temperatures and the changing elements effects its appearance. Usually, bones left exposed for a period of time are susceptible to gnawing by animals and fragmentation due to the

trampling of feet. Weathering can also occur due to the actual chemistry of the soil, which has a direct influence on bone preservation. Generally speaking, the ideal pH for bone preservation is between 7.8 and 7.9 (Reitz and Wing 2008).

Finally, butchering leaves obvious taphonomic signs on the bone, including hack marks made by axes or cleavers, or saw marks left by hand or mechanical saws. Evidence of butchering was seen on several of the identified domestic mammal bones from Site 44AX0239 and carefully recorded. A more in depth discussion of butchery is addressed in a later section of this report.

Identified Taxa

A total of 5,004 bones were submitted for analysis from Site 44AX0239. From the excavated features and shovel test pits, the combined assemblage has at least sixteen different species including one crustacean, eight fish, one reptile/amphibian, two birds, and four mammals. To facilitate discussion of diet and environmental exploitation, a brief general description of each taxon's habitat is given after Table 2.

Table 2
Identified Taxa from Features and Shovel Test Pits from Site 44AX0239
Feature 4 (F4), Feature 10 (F10), Shovel Test Pits (STP)

Taxonomic Name	Common Name	Site 44AX0239
SHELL/CRUSTACEAN		
Callinectes sapidus	blue crab	F4
FISH		
class Osteichthyes	bony fish (indeterminate)	F4
family Clupeidae	herring	F4
Alosa spp.	shad or herring	F4
family Percichthyidae	temperate bass	F4
Micropterus spp.	bass	F4
Micropogon undulates	Atlantic croaker	F4
Sciaenops ocellatus	red drum	F4
Cynoscion spp.	weakfish or seatrout	F4
Leiostomus xanthurus	spot	F4
family Scombridae	mackerel	F4
REPTILES/ AMPHIBIANS		
Rana spp.	frog	F4
BIRDS		
class Aves	domestic/wild bird (indeterminate)	F4
class Aves/Mammalia III	bird or small mammal (indeterminate)	F4
duck spp.	duck	STP
Gallus gallus	chicken	F4

Taxonomic Name	Common Name	Site 44AX0239
MAMMALS		
class Mammalia	mammal (indeterminate)	F4, F10, STP
class Mammalia I	large mammal (indeterminate)	F10
class Mammalia II	medium mammal (indeterminate)	F4, F10, STP
mouse spp.	mouse	F4
order Artiodactyla I	sheep, goat, deer, or swine (indeterminate)	F4, F10
Sus scrofa	domestic swine	F10
Bos taurus	domestic cattle	F4, F10, STP
Capra hircus	domestic goat	F10
Ovis aries/Capra hircus	domestic sheep or goat	F4, STP

Shell/Crustacean

Blue Crab. A total of 42 calcined pincers from blue crabs (*Callinectes sapidus*) were identified in the Feature 4 assemblage. The blue crab is distributed along the Atlantic coast, and is most prevalent in the Chesapeake area, including the Potomac River (Lippson and Lippson 1984). They are generally classified as omnivorous scavengers eating both live and decaying plant and animal matter. Crabs are harvested from the water primarily during the summer months, but also on a limited basis during spring and fall; during the winter months they become dormant, burrowing into the sandy bottom. Due to the fragile quality of the claws, crab remains typically survive only if they have been burned.

Fish

Shad/Herring. The Feature 4 assemblage included nine fish elements identified to the herring family (family Clupeidae) and more specifically to shad/herring (*Alosa* spp.). The biology and the ecology of clupeids vary: some species live predominately in freshwater, and some only enter fresh water to feed or spawn. Although this family comprises of at least 180 species, only 10 species frequent the waterways associated with the Chesapeake Bay. The alewife (*Alosa pseudoharengus*), the American shad (*Alosa sapidissima*), the Atlantic menhaden (*Brevoortia tyrannus*), and the Atlantic herring (*Clupea harengus*) are the most common (Murdy et al. 1997).

The alewife and Atlantic herring spawn from late March through April in locations of large rivers and small streams, returning to the ocean by summer. The American shad also prefers to spawn in fresh to low-salinity waters of tributaries during the spring months, while the Atlantic menhaden spawn during the early spring and again in the fall in shelf waters off the bay (Murdy et al. 1997).

While herring and shad could have been caught in local waters and eaten fresh, they could have also been salted down and purchased as an imported fish. Unfortunately, it was not possible to determine if the herring bones recovered from Site 44AX0239 were from a local source or represent an imported product.

Temperate Bass. Temperate bass (*Morone* spp.) was represented by at least four bones from the Feature 4 assemblage. Members of the temperate bass family include moderate to large-sized

fish that occur in marine, brackish, and freshwater habitats. The two most prevalent species found in waters of the Chesapeake include the white perch (*Morone americana*) and the striped bass (*Morone saxtilis*) (Murdy et al. 1997).

Tolerating a wide range of salinities, the white perch prefers level bottoms of silt, sand, mud, or clay. The fish migrate to fresh or low-salinity waters of large rivers to spawn from April through June. After spawning, adults move back downstream toward the coastal waters to spend the summer feeding in richer waters, while the young gradually move down to join them. Due to their value as a food fish, white perch have long been one of the most important recreational and commercial fishes in the Chesapeake (Hildebrand and Schroeder 1972).

Although the striped bass can be found along the Atlantic coast, the tributaries of the Chesapeake are the main spawning areas for the striped bass. Preferring to spawn in sand or mud bottoms in the spring, they are carnivorous, feeding on various kinds of animal life such as fish, crustaceans, worms, and insects (Murdy et al. 1997).

Freshwater Bass. The faunal assemblage from Feature 4 also produced a total of 141 elements identified as the remains of freshwater bass (*Micropterus* spp.). Members of this family are not native to the waters of Virginia but were introduced to the Chesapeake Bay during the nineteenth century (Love et al. 2014). Considered nest builders, they can often be seen in the spring hollowing out depressions along the water's bottom. After their eggs are deposited, the males continue to guard the nests until the young are born. The most common species of this family found in the waters of the Chesapeake include the largemouth bass (*Micropterus salmoides*) and the smallmouth bass (*Micropterus dolomieu*) (Murdy et al. 1997).

Atlantic Croaker. At least 96 elements from Feature 4 were identified as Atlantic croaker (*Micropogon undulates*). Their common name comes from the large swim bladder that produces a croaking or drumming sound. Adult croakers move into the Chesapeake Bay during the early spring and can be found in waters with salinity levels above 5%. By mid to late summer they move into tidal rivers to spawn, inhabiting areas with sandy or muddy bottoms. The young fish winter in these waters and then leave the bay with the adults the following fall (Murdy et al. 1997).

Red Drum. Three elements from Feature 4 were identified as belonging to red drum (*Sciaenops ocellatus*). Adult red drums are most commonly found near the shorelines of marine waters and, during the spawning season, can be found in the inlets of the Chesapeake Bay from May through November. They are considered bottom feeders that thrive on small crabs, fish, and shrimp. When feeding in shallow water, the red drum can be seen "tailing" with their heads down in the grass and their tails exposed to the air. Red drums are primarily caught by surf casting from beaches along the Chesapeake Bay and occasionally by bait fishing (Murdy et al. 1997).

Weakfish/ Spotted Seatrout. As the most frequently identified fish from Feature 4, weakfish or spotted seatrout (*Cynoscion* spp.) were identified by the presence of at least 166 elements. Spotted seatrout (*Cynoscion nebulosus*) are typically found in tributaries of the Chesapeake Bay in shallow water with sandy bottoms near submerged vegetation or structures. Spawning occurs at night from late May through July near the mouth of the bay or in coastal waters. In summer

and early fall, the young can be commonly found in intertidal creeks or in submerged vegetation near the shore. They are considered opportunistic carnivores that change their diet depending on their size. While young spotted seatrout feed primarily on crustaceans, adults can be found eating fish or shrimp (Murdy et al. 1997).

Weakfish (*Cynoscion regalis*), found north of Cape Hatteras, migrate north and inshore during the spring and summer, and move southward and offshore in the fall and winter. Adults are usually found in schools and like to frequent shallow, sandy bottom areas where they feed on small fish, shrimp, crab, and large zooplankton. Spawning, between April and August, takes place near the mouth of the bay and in nearshore waters. Young fish can then be found in low salinity waters of river habitats. They grow rapidly during the fall months and move into more saline waters in the early winter (Maurdy et al. 1997).

Spot. Another fish species identified from Feature 4 is spot (*Leiostomus xanthurus*), represented by at least 26 elements. While spot can be found in waters off of northern Mexico to the Gulf of Maine, they are most abundant in the Chesapeake Bay and its tributaries. Spot move between coastal and estuarine waters depending on the season. During the spawning season, they are found in offshore coastal waters from late fall to early spring. After spawning, the adults may remain offshore while the larval spot enter the bay during winter and spring to live in low salinity tidal creeks. They remain in these waters throughout the summer until fall and early winter when they return to the offshore waters (Murdy et al. 1997)

Mackerel. Two elements from Feature 4 were identified as belonging to the family of mackerel fish (family Scombridae). These are typically medium to large size fish known for their speed and efficiency in swimming. In the Chesapeake Bay there are eight identified species with the most common being the Spanish mackerel (*Scomberomorus maculatus*). After making a long-distance migration off the coast of Florida, this species is typically found in the waters of the middle to lower Chesapeake Bay from spring to autumn. Spawning takes place during these months before returning to Florida during the winter months. The Spanish mackerel has long been a commercially important fish for the Chesapeake fishermen. In the late 1800s, the largest mackerel fishery in the United States was found in the Chesapeake Bay (Murdy et al. 1997).

Reptile/Amphibian

Frog. The most numerous identified elements from Feature 4 were the remains of frogs (family Ranidae). There are at least ten frog species found in northern Virginia including the northern green frog (*Lithobates clamitans*), the pickerel frog (*Lithobates palustris*), and the southern leopard frog (*Lithobates sphenocephalus*). These species typically grow to reach a length between three and four inches. Due to the size of the 675 frog elements, the majority of these remains are probably from bullfrogs (*Rana catesbeiana*). As the largest member of the frog family, bullfrogs grow to be approximately eight inches in length and can weigh up to one and a half pounds. They are primarily nocturnal and prefer to eat insects, crayfish, minnows, and small fish. They have also been known to eat other bullfrogs, small birds, and snakes (Behler and King 1979).

In the south and southeast, bullfrogs have played an interesting role in American cuisine. Frog legs were common on the tables of Europeans in the seventeenth and eighteenth centuries and were often classified as a type of fish. Recipes for frog legs did not begin to appear in American cookbooks until the late nineteenth century, where they were eaten fried, sautéed, or part of a gumbo or stew (Smith 2013). As an excellent source of protein, frogs were and still are captured using a multipronged tool known as a "gig." Frog gigging has typically been a nighttime event when the frogs are most active and can be found along the banks of lakes and streams. Using a bright light or torch, the animals are blinded and easily caught (Deutsch and Murakhuer 2012).

While the frog remains from Feature 4 may represent individuals who once inhabited the cistern, the large number of frog bones, evidence of possible scorch marks on some of the elements, and the presence of large amounts of fish remains with the frog bones, suggests the frog bones are the remains of a meal.

Birds

Duck. A single ulna fragment from Shovel Test Pit 11 could only be identified as duck spp., meaning the element did not contain sufficient attributes to determine the exact species. Due to its size, habitat diversity, and waterways filled with submerged vegetation and shellfish, the Chesapeake Bay region and its tributaries are primary wintering areas for a large variety of duck species. Duck spp. includes the genus of dabbling ducks, stiff-tailed ducks, perching ducks, pochards, and mergansers. Some of the most common ducks in the Chesapeake region include the genus of dabbling ducks (*Anas* spp.). The dabbling or surface-feeding ducks feed by tipping tail-up to reach aquatic plants, seeds, and snail. They can be found primarily in freshwater shallows, but in winter they can also be found in salt marshes. Some of the more common dabbling ducks include the mallard (*Anas platyrhynchos*), the American black duck (*Anas rubripes*), the gadwell (*Anas strepera*), the green-winged teal (*Anas crecca*), and the American widgeon (*Anas penelope*). All of these species, with the exception of the mallard, are typically winter inhabitants of the Chesapeake (National Geographic Society 1983). It is recommended that to accurately identify the exact species of duck, the bone should be taken to the Division of Birds at the Smithsonian's National Museum of Natural History for comparison.

Chicken. As the only identified bird species from Feature 4, chicken (*Gallus gallus*) is represented by at least 95 elements. During the nineteenth centuries, chickens were raised on many rural farms and even on some urban properties. Chickens were easy to raise and though often kept in hen houses, they were also allowed to roam free. The chickens and their eggs could have been prepared in a number of ways including roasted, boiled, fried, broiled, and minced (Noël Hume 1978).

Commensal Mammals

Commensal species are those that live with another species and share its food, both animals possibly benefiting from each other through this association (Davis 1987).

Mouse. The faunal assemblages from Feature 4 also produced the remains of mice (Mouse spp.) There are several species of mouse that can be found throughout Virginia, including the eastern harvest mouse (*reithrodontomys humulis*), the white-footed mouse (*Peromyscus leucopus*), and the golden mouse (*Ochrotomys nuttalli*). Considering these bones were found in a cistern associated with a dwelling, the bones are probably the remains of a house mouse (*Mus musculus*), a species of mouse introduced from Europe during the American Revolution. This species is typically found in close proximity to humans and can be found in man-made structures where food and space are available. House mice consume anything edible and can be highly destructive to stored grains and food. Due to their highly reproductive rate, their adaptability, and their destructive habits, these small mammals are typically controlled with traps, poison, and cats (Webster et al. 1985).

Domestic Livestock

Swine. A total of three long bones from Feature 10 were identified as the remains of swine (*Sus scrofa*). Although the ranking of pork among early diets may be argued by some, it is clear that the domestic swine was an important food source from the initial years of settlement on through the twentieth century. A prolific breeder that thrived on mast, roots, and tubers in an open woodland setting, they were born in the spring and by the next winter had grown to a good slaughter weight. In comparison to cattle that provided only about 50-60% of dressed meat per individual after slaughter, swine provided 65-80% and its flesh when salted was perfect for use as a year-round source of preserved meat (Reitz, Gibbs, and Rathbun 1985; Bowen 1990a, 1990b).

Archaeologically swine are omnipresent, and in every faunal assemblage, both urban and rural, their remains account for a substantial proportion, either in terms of NISP, MNI, usable meat weight, or biomass. From the early years, pork contributed 10% of the biomass, by 1620-50 anywhere from 6 to 17%, by 1660-1700 an average of 11%, and throughout the eighteenth and early nineteenth centuries anywhere from 12 to 17% (Walsh et. al. 1997:351).

Cattle. Domestic cattle (*Bos taurus*) remains, a total of 11 bones, were identified from Feature 4, Feature 10, and Shovel Test Pit 14. By 1608, and possibly earlier, cattle arrived on Jamestown Island. They flourished in the woodland environment, and as early as the 1620s, herds had become so large that beef became the mainstay of the colonists' diet, a pattern that stood firm throughout the colonial period (Miller 1984; Bowen 1990a). Throughout the colonial period cattle provided primarily meat, but also some milk and dairy products, and beginning in the late-seventeenth and early-eighteenth centuries they were used to plow fields (Miller 1984; Bowen 1994). In terms of their contribution to the meat diet, in c. 1610 cattle contributed 14% to the total biomass, by 1620-1650 anywhere from 37 to 57%, by 1660-1700 47%, and throughout the eighteenth century and early nineteenth century on rural plantations anywhere from 34 to 56% of the total biomass (Walsh et al. 1997:351). For a more complete discussion of cattle husbandry, see *Provisioning Early American Towns. The Chesapeake: A Multidisciplinary Case Study* (Walsh et al. 1997).

Sheep/Goat. Ten bones from Feature 4 and one bone from Shovel Test Pit 14 were identified as belonging to either sheep (*Ovis aries*) or goat (*Capra hircus*). These species, despite their

outward appearance, are usually grouped together (*Ovis aries/Capra hircus*) by faunal analysts because they are almost skeletally indistinguishable. However, a distal end of a metacarpal from Feature 10 did contain enough distinguishing characteristics to identify it as the remains of a goat (*Capra hircus*).

Starting in the mid-seventeenth century sheep were more commonly raised. While pigs and cows were allowed to roam free, sheep never became really profitable since they were unable to defend themselves from predators and would not freely reproduce (Reitz 1979). It was not until the 1690s that it became viable to raise sheep, because of the decline in the wolf population (Walsh 1988). While sheep were raised primarily for their wool, the by-product, mutton, remained a relatively small but important meat in the diet of individuals throughout the colonial period (Noël Hume 1978: Walsh et al. 1997).

Goats were introduced to the New World, possibly with the first arrivals, but certainly with the first supplies. Goats were hardy, they browsed on undergrowth, and they were better able to protect themselves from predators than sheep (Dandoy 1997; Walsh et al. 1997). With the first years of colonization, they supplied both milk and meat, but as fields were established and predators brought under better control, sheep were introduced in increasingly large numbers. By the mid-seventeenth century sheep had begun to replace most of the goats, though occasionally they still were raised primarily for their milk (Walsh et. al. 1997).

Taphonomic Influences

As mentioned earlier in this report, all of the identifiable bones from Site 44AX0239 were examined for taphonomic influences, including scorch marks, gnaw marks, signs of weathering, and butchering evidence. The following section will examine the taphonomic influences recorded for identifiable bones found in Features 4 and 10.

Feature 4. Out of the 1,286 identified bones from Feature 4, at least 239 bones exhibit signs of taphonomic influences (see Table 3). While none of the bones show signs of weathering or gnawing, scorch marks were recorded for all of the identified crab pincers, a single mouse cranium, and at least 184 of the frog bones. It must be kept in mind that it takes high temperatures to leave scorch marks on a bone, so while obvious marks may not be there, it does not mean they were not exposed to high temperatures. Also, the lack of scorch marks is not a sign that the bones are not the remains of a meal. For example, frogs and frog legs can be prepared in a variety of ways, including pan fried, sautéed, over an open flame, or in a soup or stew. Not all of these methods would leave scorch marks on the bones. Likewise, the scorch marks on the mouse skull does not necessarily indicate that mice were part of the diet.

Evidence of butchering was also seen on at least seven sheep/goat bones and five bones identified as Artiodactyla I (sheep, goat, deer, or pig). The butchering marks for the sheep/goat include five vertebrae, a sacrum, and an innominate bone all hacked with either an ax or a cleaver. The butchered Artiodactyla I bones include five vertebrae also hacked with an ax or a

cleaver. A more detailed description of the butchery evidence from Feature 4 is discussed in the following section of this report.

Table 3
Taphonomic Influences on Identifiable Bones
Feature 4

Taxon	Total Count	Gnawed No.	Gnawed Pct.	Hacked No.	Hacked Pct.	Sawn No.	Sawn Pct.	Weathered No.	Weathered Pct.	Burned No.	Burned Pct.
Sheep/Goat	10	0	0.0%	7	70.0%	0	0.0%	0	0.0%	0	0.0%
Artiodactyla I	13	0	0.0%	5	38.5%	0	0.0%	0	0.0%	0	0.0%
Crab	42	0	0.0%	0	0.0%	0	0.0%	0	0.0%	42	100.0%
Frog	675	0	0.0%	0	0.0%	0	0.0%	0	0.0%	184	27.2%
Mouse	16	0	0.0%	0	0.0%	0	0.0%	0	0.0%	1	6.2%

Feature 10. Feature 10 produced only 13 identifiable bones from cattle, swine, and goat (see Table 4). Eight of these bones show signs of taphonomic influences including the 3rd phalanx of a cow with gnaw marks that are consistent with patterns made by rodent teeth. Another carpal bone from a cow has scorch marks on the surface indicating it was exposed to high temperatures. Butchering, the most frequently recorded taphonomic influence, was seen on at least three cattle bones, two swine bones, and one goat bone. All of the bones had been hacked with either an ax or a cleaver. A more detailed description of the butchery marks is discussed in the following section.

Table 4
Taphonomic Influences on Identifiable Bones
Feature 10

Taxon	Total Count	Gnawed No.	Gnawed Pct.	Hacked No.	Hacked Pct.	Sawn No.	Sawn Pct.	Weathered No.	Weathered Pct.	Burned No.	Burned Pct.
Cattle	9	1	11.1%	3	33.3%	0	0.0%	0	0.0%	1	11.1%
Swine	3	0	0.0%	2	66.6%	0	0.0%	0	0.0%	0	0.0%
Goat	1	0	0.0%	1	100.0%	0	0.0%	0	0.0%	0	0.0%

Butchering and Cuts of Meat

Although every zooarchaeologist must deal with butchery on a daily basis when analyzing faunal remains, few working with historical sites have dealt with butchery-related problems in print. With notable exceptions such as Lyman (1987, 1996) and Crader (1990), zooarchaeologists have tended to leave their observations as only a laboratory function. Yet butchering data holds

fascinating information on the transformation in foodways that occurred during the eighteenth and nineteenth centuries, along with the commercialization and industrialization of food production, distribution, processing, and consumption of foods.

As faunal assemblages have been analyzed, it has become apparent that a fundamental change occurred in butchering techniques during the seventeenth, eighteenth, and early nineteenth centuries. By working closely with the archaeologists to create tightly dated assemblages, we have had the opportunity to observe when the butchering technique shifted from chopping to sawing and formulate ideas on how and why this change occurred.

In his illustrative encyclopedia, Diderot (1978) depicts butchers in the seventeenth century with cleavers, knives, and broad axes, but no saws. Drawings of markets and butcher shops from eighteenth-century London also show broad axes and cleavers, not saws. Saws begin to appear only during the late eighteenth century or early nineteenth century. In fact, the earliest evidence of a saw is a 1799 drawing of Philadelphia, where a butcher is holding a saw (Bowen and Manning 1993).

Faunal assemblages have indicated the earliest sawn food remains appear to be mainly from urban sites. In an assemblage dating to the turn of the century, the Narbonne House in Salem, Massachusetts, there are several sawn veal bones (Bowen 1982). In every nineteenth century faunal assemblage there are sawn bones, mixed in varying proportions with chopped bone. It appears that in the nineteenth century saws were increasingly used to butcher meat, particularly cattle bones and occasional pig and sheep/goat bones. In the early nineteenth century, the bones appear to have been sawn into cuts that were much like the large cuts common during the previous century, but over the century meat cuts decreased into smaller pieces closely resembling the thin steaks and chops that we find in the grocery stores today (Bowen and Manning 1993).

During the nineteenth century, cuts of meat gradually became "sanitized," losing any resemblance to the live animal it came from. Classically, chopping followed the internal structure of the mammalian skeleton, so that even stress breaks tended to follow the natural contours of the bone. The saw, on the other hand, allowed butchers to slice through joints, long bones, and other compact bones to produce "neat" individual portions, so much so that today only the most skeletally-aware urban consumer can distinguish the fragment of bone imbedded in a ham or a roast. This method of butchering also removed the last trace of the live animal from the dinner table—bone chips that had been the by-product of the chopping technique were gone. No longer did diners have to either consume bone chips or extract them from their mouths.

Characteristic of nineteenth century rural assemblages, the butchered bones from Site 44AX0239 are primarily hacked bones. Overall the bones from swine and sheep/goat were chopped in similar forms to the butchering patterns recorded for cattle bones. One major difference, however, is that long bones tended to be slightly more complete in the swine since their bones are relatively smaller in size. Given the fundamental similarity in approach to butchering, the following butchering descriptions for Site 44AX0239 have been generalized, with any exceptions noted.

Feature 4

Sheep/Goat. The butchered sheep/goat bones from Feature 4 include five lumbar vertebrae and one sacrum hacked with either an ax or a cleaver. All of the vertebrae and the sacrum had been cut either through the centrum or along the edge of the centrum. This cut was probably made in the process of splitting the carcass in two pieces. Another butchered sheep/goat bone includes an innominate bone hacked through the illium.

Artiodactyla I. Butchered Artiodactyla I bones include five vertebrae butchered similarly to the sheep/goat remains. They have all been hacked with either an ax or a cleaver through the centrum.

Feature 10

Cattle. Butchered cattle bones from Feature 10 include a scapula hacked with either an ax or a cleaver just below the proximal end of the bones. By the end of the nineteenth century a cut of meat including the scapula would have been considered chuck shoulder section of beef, a mid-range cut of meat (Schulz and Gust 1983). Another butchered cattle bone includes a metacarpal bone hacked mid-shaft below the proximal end. This cut is probably the result of separating the feet from the body and would have been included in a foreshank cut of meat, a lesser quality of meat for nineteenth century standards (Schulz and Gust 1983). Finally, a butchered cervical vertebra hacked through the centrum is probably the result of splitting the carcass in two or it could have been included in a neck cut of meat, another cut of meat considered less desirable in the nineteenth century.

Swine. The butchered swine elements from Feature 10 include one radius hacked with an ax or a cleaver mid-shaft below the proximal end and a fragment of a tibia hacked on either side representing a portion of the shaft. The radius would have all been considered part of a shoulder cut of meat while the tibia fragment may have been part of a leg shank cut.

Goat. The only goat bone identified from Feature 10 is a metacarpal hacked with either an ax or a cleaver mid-shaft above the distal end. While this cut may have been made in the process of separating the feet from the body, it might have also been included in a foreshank cut of meat.

Relative Dietary Importance

The following section combines the faunal material from all test units and features and discusses the relative dietary importance of each taxon based on each of the quantification methods mentioned earlier in the "Analytic Techniques" section of this report. It must be realized that these are relative measures and they do not reflect anything absolute about the amount of meat consumed.

Feature 4. The faunal assemblage from Feature 4 includes a total of 4,971 recovered faunal remains identifiable to at least 14 different species (see Table 5). As with most other faunal

assemblages, indeterminate remains are the most frequently identified bones making up 74.1% of the NISP figures. The remaining 25.8% of the NISP total consists mainly of frog (13.5%), weakfish/spotted seatrout (3.3%), and freshwater bass (3.8%) bones. All other identified species contribute less than 1% to the NISP totals. With such a high number of fish and frog remains, it is not surprising that wild species make up 96.6% of the NISP totals.

When the MNIs were done to determine the minimum number of individuals present in the Feature 4 assemblage, it became clear that frogs were the most numerous species accounting for at least 50 individuals. As it can be difficult to determine the side (left or right) for some of the frog elements, the MNIs were determined by the ilium bones. These elements were the most numerous of the identified frog remains and the easiest to use to determine MNIs. Besides frogs, other significant contributors to the MNI totals include weakfish/spotted trout with nine individuals, Atlantic croaker with six individuals, freshwater bass with four individuals, chicken with four individuals, and blue crab with four individuals. All other identified species are represented by one or two individuals. In total, there are at least 88 individuals in the assemblage, with 90.9% from wild species, 6.8% from domestic birds and mammals, and 2.2% from commensal mammals.

When the average meat weight is considered for each species, the presence of one calf accounts for beef making up 25.2% of the meat totals. Beef is closely followed by weakfish/spotted seatrout at 22.7%, red drum at 18.2%, and mutton at 17.6%. Although there are at least 50 frogs in the assemblage, contributing at least 100 frog legs and 50 bodies, they only make up about 10 pounds of the meat weight totals. Overall, the combined fish account for 47.9% of the meat weight, followed by domestic mammals at 42.9%, frog at 5.0%, and chicken at 4.0%.

As mentioned in the analytical techniques section of this report, the biomass results are based on the biological premise that the weight of bone is also related to the amount of flesh it supports. In most historic faunal assemblages, domestic species dominate the biomass totals, often accounting for over 90% of the biomass results. For Feature 4, domestic and wild species contribute similar amounts making up 52.3% and 45.5% to the biomass. While these percentages are unusual, it is probably related to where these bones were excavated and how they came to be deposited there. Frog and fish bones are typically quite smaller than bones from mammals and could have easily been put down the drain which eventually connected to the cistern. The larger mammal and bird bones, representing food waste, would have probably been deposited elsewhere.

Although these biomass results are probably not showing the true representation of the diet for the individuals who utilized this feature, this assemblage shows domestic sheep/goat contributing the greatest amount to the biomass at 25.7%, followed by chicken at 13.4%, freshwater bass at 11.4%, and weakfish/spotted seatrout at 7.8%. All other identified species make up less than 5.0% of the biomass totals. It must also be kept in mind that the domestic mammal figures can be somewhat masked by the "other mammal" category, composed of indeterminate mammal bones that are almost certainly mostly cattle, swine, and sheep/goat which are simply too fragmentary to identify to specie. Indeterminate mammal remains make up 2.1% and medium mammals make up 6.5% of the biomass figures.

Table 5
Bone Summary
Site 44AX0239, Feature 4

	NISP		MNI		Meat Weight		Biomass	
	No.	Pct.	MNI	Pct.	Lbs.	Pct.	Kg	Pct.
Shell/Crustacean								
Callinectes sapidus (blue crab)	42	0.84	4	4.55	0.00	0.00	0.000	0.00
Fish								
class osteichthyes (bony fish) (indeterminate)	3640	73.22	—	——	——	——	1.023	19.71
family Clupeidae (herring)	3	0.06	—	——	——	——	0.005	0.09
Alosa spp. (shad or herring)	6	0.12	1	1.14	0.00	0.00	0.023	0.44
family Percichthyidae (temperate bass)	2	0.04	1	1.14	0.00	0.00	0.007	0.14
cf. family Percichthyidae (temperate bass)	2	0.04	—	——	——	——	0.004	0.08
Micropterus spp. (bass)	140	2.82	4	4.55	8.00	4.04	0.588	11.34
cf. *Micropterus* spp. (bass)	1	0.02	—	——	——	——	0.004	0.08
Micropogon undulatus (Atlantic croaker)	93	1.87	6	6.82	6.00	3.03	0.223	4.30
cf. *Micropogon undulatus* (Atlantic croaker)	3	0.06	—	——	——	——	0.000	0.00
Sciaenops ocellatus (red drum)	2	0.04	2	2.27	36.00	18.18	0.039	0.75
cf. *Sciaenops ocellatus* (red drum)	1	0.02	—	——	——	——	0.007	0.14
Cynoscion spp. (weakfish or seatrout)	161	3.24	9	10.23	45.00	22.72	0.392	7.55
cf. *Cynoscion* spp. (weakfish or seatrout)	5	0.10	—	——	——	——	0.015	0.30
cf. *Leiostomus xanthurus* (spot)	26	0.52	2	2.27	0.00	0.00	0.023	0.44
family Scombridae (mackerel)	2	0.04	1	1.14	0.00	0.00	0.007	0.14
Reptile/Amphibian								
Rana spp. (frog)	675	13.58	50	56.82	10.00	5.05	0.000	0.00
Bird								
class Aves (bird) (indeterminate)	2	0.04	—	——	——	——	0.011	0.21
Galus gallus (chicken)	94	1.89	4	4.55	8.00	4.04	0.683	13.15
cf. *Galus gallus* (chicken)	1	0.02	—	——	——	——	0.011	0.21
Commensal Mammal (Non Food)								
mouse spp. (mouse)	16	0.32	2	2.27	0.00	0.00	0.003	0.06
Domestic Mammal (Livestock)								
class Mammalia II (medium mammal) (indeterminate)	13	0.26	—	——	——	——	0.337	6.49
order Artiodactyla I (sheep, goat, deer, or pig) (indeterminate)	13	0.26	—	——	——	——	0.292	5.62
Bos taurus, calf (domestic cattle, calf)	1	0.02	1	1.14	50.00	25.25	0.051	0.99
Ovis aries/Capra hircus (domestic sheep/goat)	10	0.20	1	1.14	35.00	17.67	1.333	25.69
Other Bone Identified to Class								
class Aves/Mammalia III (bird/small mammal) (indeterminate)	1	0.02	—	——	——	——	0.000	0.00
class Mammalia (mammal) (indeterminate)	16	0.32	—	——	——	——	0.108	2.08
Totals								
Shell/Crustacean	42	0.84	4	4.55	0.00	0.00	0.000	0.00
Fish	4087	82.21	26	29.56	95.00	47.98	2.360	45.50
Reptiles/Amphibians	675	13.58	50	56.82	10.00	5.05	0.000	0.00
Bird	97	1.95	4	4.55	8.00	4.04	0.705	13.57
Commensal Mammal (Non Food)	16	0.32	2	2.27	0.00	0.00	0.003	0.06
Domestic Mammal (Livestock)	37	0.74	2	2.27	85.00	42.93	2.013	38.79
Other Bone Identified to Class	17	0.34	—	——	——	——	0.108	2.08
Wild (fish, reptiles/amphibians)	4804	96.64	80	90.91	105.00	53.03	2.360	45.50
Domestic (bird, mammal)	134	2.69	6	6.82	93.00	46.97	2.718	52.38
Identified	1286	25.87	88	100.00	198.00	100.0	3.418	65.87
Indeterminate	3685	74.13	—	——	——	——	1.771	34.13
Totals	4971	100.00	88	100.00	198.00	100.00	5.189	100.00

Note: NISP= Number of identified specimens; MNI=Minimum number of individuals. "2/2" under MNI means 2 adult, 2 immature; "1" means 1 adult.

Feature 10. Feature 10 produced 24 bones with at least 13 bones identifiable to three mammals including swine, cattle, and goat (see Table 6). The remaining 11 bones are indeterminate remains making up 45.8% of the NISP totals. Each of the three mammals are represented by one adult individual. Together these mammals account for 535 pounds of potential useable meat with cattle contributing 74.7% to this total. It is not surprising that when the weight of the bone is also taken into consideration, cattle also contribute the greatest amount to the biomass totals. Cattle make up 60.1% of the biomass, followed by swine at 12.7%, and goat at 4.7%. As with Feature 4, it must be kept in mind that the domestic mammal totals for Feature 10 are somewhat masked by the "other mammal" category. This category is composed of indeterminate mammal bones that are almost certainly mostly cattle, swine, and sheep/goat which are simply too fragmentary to identify to specie. Indeterminate mammal remains make up 12.5%, indeterminate large mammal bones make up 16.6%, and medium mammals make up 12.5% of the biomass figures.

Table 6
Bone Summary
Site 44AX0239, Feature 10

	NISP		MNI		Meat Weight		Biomass	
	No.	Pct.	MNI	Pct.	Lbs.	Pct.	Kg	Pct.
Domestic Mammal (Livestock)								
class Mammalia I (large mammal) (indeterminate)	4	16.67	—	——	——	——	0.749	15.36
class Mammalia II (medium mammal) (indeterminate)	3	12.50	—	——	——	——	0.198	4.05
order Artiodactyla I (sheep, goat, deer, or pig) (indeterminate)	1	4.17	—	——	——	——	0.051	1.05
Sus scrofa (domestic swine)	3	12.50	1	33.33	100.00	18.69	0.622	12.76
Bos taurus (domestic cattle)	9	37.50	1	33.33	400.00	74.77	2.928	60.06
Capra hircus (domestic goat)	1	4.17	1	33.33	35.00	6.54	0.230	4.71
Other Bone Identified to Class								
class Mammalia (mammal) (indeterminate)	3	12.50	—	——	——	——	0.098	2.00
Totals								
Domestic Mammal (Livestock)	21	87.50	3	100.00	535.00	100.00	4.778	98.00
Other Bone Identified to Class	3	12.50	—	——	——	——	0.098	2.00
Wild	0	0.00	—	——	——	——	0.000	0.00
Domestic	21	87.50	3	100.00	535.00	100.00	4.778	98.00
Identified	13	54.16	3	100.00	535.00	100.0	3.780	77.52
Indeterminate	11	45.83	—	——	——	——	1.096	22.48
Totals	24	100.00	3	100.00	535.00	100.00	4.876	100.00

Note: NISP= Number of identified specimens; MNI=Minimum number of individuals. "2/2" under MNI means 2 adult, 2 immature; "1" means 1 adult.

Element Distributions

As mentioned in the Analytic Techniques section, the goal of analysis of the cuts of meat represented in an assemblage, which is based on NISP, is to compare the distribution of elements found in a normal skeleton with those present in the faunal assemblage. When the distributions are similar it is interpreted that the entire animal was consumed, while dissimilarities are interpreted to mean that certain parts of the carcass were being selected over others or were not available to the occupants of the site. As an example, in cattle skeletons, 29.7% of the bones are from the cranium, 42.2% of the bones are from the body, and 28.1% of the bones are from feet. These percentages are then compared to the percentages of the cattle elements recovered from Site 44AX0239. Unfortunately, Features 4 and 10 only produced a total of ten cattle, three swine, and eleven sheep/goat bones for element analysis. Despite the low number of domestic mammal bones, the following paragraphs will examine the element distribution figures and make some generalizations for the cattle, swine, and sheep/goat remains.

Cattle Element Distribution. Analysis of cattle elements from sites located in the coastal Chesapeake region has shown that from the early seventeenth century through the nineteenth century, rural households consumed all parts of the animal, even heads and feet. Urban assemblages dating from 1700 to 1800s have also shown that residents consumed all parts of cattle but in different percentages than their rural neighbors. Urban sites typically contain a greater than normal proportion of body cuts, a slightly less than normal proportion of head elements, and a far less than normal proportion of feet elements, a pattern that has been attributed to the emergence of a market economy, where middlemen assumed the role of butcher and meat distributor (Walsh et al. 1997).

As Table 7 shows, while Feature 4 only produced a single foot bone from a calf, Feature 10 produced nine bones including two teeth, three body elements, and four bones from the foot region. With so few bones, it is not possible to accurately determine element distribution patterns but the type of cattle bones found in Feature 10 does suggest that the individuals who utilized this feature had access to the entire animal.

Table 7
Site 44AX0239, Features 4 and 10
Element Distribution for Domestic Cattle Remains

	Head		Body		Feet		
	No.	%	No.	%	No.	%	NISP
Cattle Normal		29.7		42.2		28.1	
Feature 4	0	0.0	0	0.0	1	100.0	1
Feature 10	2	22.2	3	33.3	4	44.4	9

Swine Element Distribution. In the Chesapeake region, the element distributions for swine has shown that in urban and rural sites from eighteenth through nineteenth centuries distributions are very similar to each other. One possible interpretation for these similarities is that urban residents may have been obtaining swine from their own personal rural connections (Walsh et al.

1997). Another possibility is that hogs were brought whole to town and sold to individual purchasers in the fall and early winter, allowing the family to salt the meat themselves. Whatever the conditions were the element distributions for swine does suggest that urban residents were not only purchasing individual cuts of meat but also had access to larger portions of the animal. Faunal analysis from rural sites suggest rural occupants appear to have had access to the entire animal (Walsh et al. 1997).

As Table 8 shows, there were no swine bones recovered from Feature 4 and only three body elements from Feature 10. Again, with so few bones, it is not possible to make definitive remarks regarding what portions of the animal were available to the consumer and whether the occupants of the site were raising their own animals or if they purchasing pork from a local market or butcher. Also, it should be kept in mind that distribution patterns do not reflect contributions made by bacon and salt pork, which would have also played an essential role in the diet.

Table 8
Site 44AX0239, Feature 4 and 10
Element Distribution for Domestic Swine Remains

	Head		Body		Feet		
	No.	%	No.	%	No.	%	NISP
Swine Normal		28.2		34.5		37.3	
Feature 4	0	0.0	0	0.0	0	0.0	0
Feature 10	0	0.0	3	100.0	0	0.0	3

Sheep/Goat Element Distribution

Extensive analysis of sites in the Chesapeake from the eighteenth through early nineteenth centuries have shown the element distribution patterns for sheep/goat remains reflect percentages that are similar to the normal skeletal distribution of elements (Walsh et al. 1997). While variability in the percentages does exist, for the most part this is often related to sample size and the percentages still show that all parts of the animal were consumed by everyone.

Totaling 10 bones, Feature 4 produced the greatest amount of sheep/goat elements (see Table 9). As with the other domestic mammals, there are not enough bones to accurately determine the element distribution patterns for sheep/goat. Most of the bones from Feature 4 were vertebrae which accounts for body elements making up 90% of the element totals. It is not clear whether the occupants who utilized this feature were raising their own animals or purchasing select parts from the local markets and butchers in Alexandria.

Table 9
Site 44AX0239, Features 4 and 10
Element Distribution for Domestic Sheep/Goat Remains

	Head		Body		Feet		
	No.	%	No.	%	No.	%	NISP
Sheep/Goat Normal		29.7		42.2		28.1	
Feature 4	1	10.0	9	90.0	0	0.0	10
Feature 10	0	0.0	0	0.0	1	100.0	1

Summary

Site 44AX0239, particularly Feature 4, produced a faunal assemblage very unique from other nineteenth century assemblages. Typically, in faunal material from nineteenth century sites, domestic species dominate the assemblage with wild species contributing less than 2% to the biomass totals. In Feature 4, wild species, such as fish, crab, and frog, contribute at least 4,804 elements to the NISP totals and make up 45.5% of the biomass totals. With only 106 domestic mammal and chicken bones identified from the cistern, it is clear that this assemblage does not represent the whole diet of the individuals who utilized this feature. It appears to be mainly food waste that was small enough to put down the drain.

This assemblage does, however, provide a glimpse into the environmental conditions and the diversity of species found in the Potomac River and the Chesapeake region during the nineteenth century. At the beginning of the 1800s, the living resources in the Chesapeake Bay were very diverse and plentiful, but has the century progressed many changes occurred which affected the availability of certain fish species and saw the introduction of others. Initially, only a few fishing methods were available, including the use of small seines, wiers, as well as, the hook and line. Fishing, in the early nineteenth century, was mainly seasonal and fairly modest, relying on the spring runs of the anadromous fish. At that time, the human population in Maryland and Virginia was still fairly small with clusters of people moving to towns along the waterways of the Chesapeake. As the populations increased and more land was cleared of trees, the amount of run-off, erosion, and waste in the rivers and estuaries intensified. Methods of fishing also began to change as the number of fisheries in the Chesapeake quickly expanded, focusing on shad, bluefish, sea trout, menhaden, and mackerel. The use of new fishing gear such as gill nets, pound nets, and mile long seines, let fishermen block large bodies of both shallow and deep water allowing them to catch more fish during the spring and fall runs. By the end of the 1800s, some fish populations, such as shad, were severely depleted and almost nonexistent (Cronion 1986).

In the Feature 4 assemblage, shad/herring remains are present but in numbers a lot lower than many of the other identified fish species. While the low number of herring/shad bones may be a result of the consumer's choice, it may also be a reflection of the changing fishing practices that

were occurring in the waters of the Potomac River. Another species present in the Feature 4 assemblage may also provide evidence to the changing environment of the Chesapeake waterways. *Micropterus* spp., which includes both smallmouth and largemouth bass, was identified by at least 141 elements. Neither of these species is native to Virginia and both were introduced to the Chesapeake waterways during the nineteenth century. Smallmouth bass was introduced in 1854 and rapidly spread throughout the Potomac River. Largemouth bass was first introduced to the tidal rivers of southern Maryland in 1874, and later to the Potomac River. The population of both species grew fast and quickly expanded their distribution (Love et al. 2014). As the second most frequently identified fish species in the assemblage, it is clear that freshwater bass, most likely smallmouth bass, were quite prevalent in the waterways of the Chesapeake when the remains were deposited.

Other fish species identified in the Feature 4 assemblage demonstrate how rich the Chesapeake waters were even though environmental changes were happening throughout the nineteenth century. In addition to the shad/herring and freshwater bass, other species such as croaker, red drum, spotted trout, spot, mackerel and temperate bass species, like white perch and striped bass, are all present in the assemblage. So many fish species in the assemblage suggests the consumer living in nineteenth century Alexandria, Virginia had a diverse selection of fish species to choose from for their diet.

While the Feature 4 faunal assemblage provides some environmental clues to which species were present in the Chesapeake waters during the nineteenth century, the assemblage also provides some evidence to changing dietary preferences. The presence of at least 675 frog remains, some of them burned, suggests that frog legs or whole frogs were also on the menu for the individuals who utilized the cistern. In colonial times, frog legs were being consumed regularly by the Chinese, Spanish, Dutch, and French, but Americans and British were historically suspicious of French cookery. One of the first known accounts of frogs being served for a meal occurred around 1778, when the French became allies of the Americans during the Revolutionary War. At this time, many French naval and military officers arrived in Boston. Nathaniel Tracy, a wealthy Cambridge resident, hosted a dinner for the French Admiral and his officers. Believing frogs were the French national dish, he had his servants search all the local lakes and ponds to catch as many frogs as possible. Unfortunately, his hospitality was met with laughter as the French officers found whole frogs floating in their soup (Smith 2013).

Figure 1
Frog Illiums Recovered from
Feature 4, SW Bisection, Fill 2

Frog legs appear to have first became common in the south and southeast, particularly in areas, such as Louisiana, where frog legs were often used as the protein in the making of gumbo (Deutsch and Murakhuer 2012). Frog legs were not considered a delicacy until well into the nineteenth century when they began to be sold in French restaurants in America and when recipes for preparing frog legs began to appear in American cookbooks (Smith 2013). So, the presence of so many frog bones from Feature 4 suggests that by the time these bones were deposited, frog legs had become an acceptable dish to serve in Alexandria, Virginia.

Overall, the faunal material from Site 44AX0239 shows that domestic mammals, such as cattle, swine, and sheep/goat provided the majority of the meat for the occupants who lived there, but the identified species from Feature 4 show that wild species also played a significant role in the diet. The diverse fish species, as well as, the crab and frog remains indicate that consumers in nineteenth century Alexandria had many options in the local markets. The identified species from Feature 4 also show that changes were occurring in the fishing industry of the Chesapeake Bay, new species were being introduced to the local waters, and new cuisine options were being established.

References

Behler, John, and F. Wayne King
1995 *The Audubon Society Field Guide to North American Reptiles and Amphibians*. Alfred A. Knopf, New York.

Bonnichsen, Robson, and Marcella Sorg
1989 *Bone Modification.* Center for the Study of the First Americans, Institute for Quaternary Studies, University of Maine, Orono, Maine.

Bowen, Joanne
1982 "Faunal Analysis of Two Trash Pits," In *Archaeological Investigations at the Narbonne House*, by Geoffrey P. Morgan, Edward Zimmer, and Anne Yentsch. Cultural Resources Management Study No. 6, Salem Maritime National Historic Site, Massachusetts. National Park Service.

1990a *A Study of Seasonality and Subsistence: Eighteenth-Century Suffield, Connecticut.* Ph.D. dissertation, Brown University.

1990b "The Social Importance of Pork in the Southern Diet." Paper presented to the Society for Historical Archaeology, Richmond.

1990c "Discovering Colonial Butchering Techniques." Paper presented to the ALHFAM Conference, Providence, Rhode Island.

1992 "Faunal Remains and Urban Household Subsistence in New England." In *The Art and Mystery of Historical Archaeology: Essays in Honor of James Deetz*, edited by Anne Elizabeth Yentsch and Mary C. Beaudry. Department of Archaeology, Boston University, Boston.

1994 "A Comparative Analysis of the New England and Chesapeake Herding Systems." In *The Historic Chesapeake: Archaeological Contributions*, edited by Paul A. Shackel and Barbara J. Little, pp. 155-168. Smithsonian Institution Press, Washington, D.C.

Bowen, Joanne, and Elise Manning
1993 "Harpers Ferry and Bones that Talk: Acquiring Meat in a Changing World." Report on file, Harpers Ferry National Park, Harpers Ferry, West Virginia.

Carson, Cary, Joanne Bowen, Willie Graham, Martha McCartney, and Lorena Walsh
2008 "New World, Real World: Improvising English Culture in Seventeenth-Century Virginia," in the *Journal of Southern History*, Vol. 74, No. 1, February 2008, pp. 31-88. Southern Historical Association

Chaplin, R. E.
1971 *The Study of Animal Bones from Archaeological Sites*. Seminar Press, New York.

Crader, Diana
1984 "The Zooarchaeology of the Storehouse and the Dry Well at Monticello." *American Antiquity* 49(3):542-558.

1990 "The Slave Diet at Monticello." *American Antiquity* 55(4):690-717.

Cronion, L. Eugene
1986 "Chesapeake Fisheries and Resource Stress in the 19th Century," in the *Journal Of the Washington Academy of Sciences*. Vol.76, No.3:188-198.

Dandoy, Jeremiah
1997 *Goats in the 17th Century Chesapeake*. Manuscript on file, Department of Archaeological Research, Colonial Williamsburg Foundation.

Davis, Simon J.M.
1987 *The Archaeology of Animals.* Yale University Press, New Haven.

Deutsch, Jonathan and Natalya Murakhuer
2012 *They Eat That? A Cultural Encyclopedia of Weird and Exotic Food From Around the World.* ABC-CLIO, Santa Barbara, California.

Diderot, Denis
1978 *Diderot Encyclopedia: The Complete Illustration, 1762-1777*. Abrams, New York.

Efremov, J.A.
1940 "Taphonomy: New Branch of Paleontology." *Pan-American Geologist,* 74:81-93.

Force, Peter
1947 *Tracts and Other Papers, Relating Principally to the Origin, Settlement, and Progress of the Colonies of North America, from the Discovery of the Country to the Year 1776*. Originally published in 1844. Reprinted, Peter Smith, New York.

Gifford, Diana
1981 "Taphonomy and Paleoecology: A Critical Review of Archaeology's Sister Disciplines." In *Advances in Archaeological Method and Theory*, Vol. 4, edited by Michael B. Schiffer, pp. 365-438. University of Arizona Press, Tucson.

Grayson, Donald K.
1984 *Quantitative Zooarchaeology: Topics in the Analysis of Archaeological Faunas*. Academic Press, Orlando.

Hildebrand, Samuel F. and William C. Schroeder
1972 *Fishes of Chesapeake Bay*. T.F.H. Publications, Neptune, New Jersey.

Johnson, Eileen
1985 "Current Developments in Bone Technology." In *Advances in Archaeological Method and Theory*, Vol. 8, edited by Michael B. Schiffer, pp. 157-235. Academic Press, Inc., New York.

Lippson, A., and R. Lippson
1984 *Life in the Chesapeake Bay.* Johns Hopkins University Press, Baltimore.

Love, Joseph W., Don Cosden, Nancy Butowski, and Charlie Gougeon
2014 *Fishery Management Plan for Largemouth Bass in Maryland Tidewater*. Report Prepared for the Maryland Department of Natural Resources, Fisheries Service.

Lyman, R. Lee
1987 "On Zooarchaeological Measures of Socioeconomic Position and Cost-Efficient Meat Purchases." *Historical Archaeology* 21(1):58-66.

1996 "Feeding Colonial Boston: A Zooarchaeological Study." In *Historical Archaeology*, Volume 30, Number 1.

Maltby, Mark
1979 *Faunal Studies on Urban Sites: The Animal Bones from Exeter, 1971- 1975*. Exeter Archaeological Reports, Volume 2. Department of Prehistory and Archaeology, University of Sheffield.

Miller, Henry M.
1984 *Colonization and Subsistence Change on the 17th Century Chesapeake Frontier*. Ph.D. dissertation, Michigan State University, Lansing. University Microfilms, Ann Arbor, Michigan.

Mullen, John
2019 Personal Communications.

Murdy, Edward O., Ray Birdsong, and John A. Musick
1997 *Fishes of Chesapeake Bay*. Smithsonian Institution Press, Washington, D.C.

National Geographic Society
1983 *Field Guide to the Birds of North America*. Washington, D.C., National Geographic Society.

Noël Hume, Audrey
1978 *Food*. Colonial Williamsburg Archaeological Series No. 9. Colonial Williamsburg Foundation, Williamsburg.

Pearce, John, and Rosemary Luff
1994 "The Taphonomy of Cooked Bone." In *Whither Environmental Archaeology*, edited by Rosemary Luff and Peter Rowley-Conway, pp. 51-56. Oxbow Books, Exeter.

Reitz, Elizabeth J.
1987 "Vertebrate Fauna and Socioeconomic Status." In *Consumer Choice in Historical Archaeology,* edited by Suzanne Spencer-Wood, pp. 101-119. Plenum Press, New York.

Reitz, Elizabeth J., and Dan Cordier
1983 "Use of Allometry in Zooarchaeological Analysis." In *Animals and Archaeology*: 2. *Shell Middens, Fishes and Birds*, edited by Caroline Grigson and Julia Clutton-Brock, pp. 237-252. B.A.R. International Series 183, London.

Reitz, Elizabeth J., and C. Margaret Scarry
1985 "Reconstructing Historic Subsistence with an Example from Sixteenth-Century Spanish Florida." *Special Publication Series, Society for Historical Archaeology No. 3. Society for Historical Archaeology,* Ann Arbor, Michigan.

Reitz, Elizabeth J., and Elizabeth S. Wing
2008 *Zooarchaeology*. Cambridge University Press, New York.

Reitz, Elizabeth J., Tyson Gibbs, and Ted A. Rathbun
1985 "Archaeological Evidence for Subsistence on Coastal Plantations." In *The Archaeology of Slavery and Plantation Life*, edited by Theresa Singleton, pp.163-191. Academic Press, New York.

Schulz, Peter and Sherri Gust
1983 "Faunal Remains and Social Status in 19th Century Sacramento." In *Historical Archaeology* 17(1):44-53.

Silver, I.A.
1969 "The Aging of Domestic Animals." In *Science in Archaeology*, edited by Donald Brothwell and Eric Higgs, pp. 250-267. Thames and Hudson, London.

Smith, Andrew
2013 *Food and Drink in American History: A "Full Course" Encyclopedia*. ABC-CLIO, Santa Barbara, California.

Thomas, David Hurst
1969 "Great Basin Hunting Patterns: A Quantitative Method for Treating Faunal Remains." *American Antiquity* 34(4):393-401.

Tyler, Lyon Gardiner (editor)
1946 *Narratives of Early Virginia 1606-1625*. Barnes and Noble, New York.

Von Den Driesch, Angela
1976 *A Guide to the Measurement of Animal Bones from Archaeological Sites.* Peabody Museum Bulletin 1, Harvard University.

Walsh, Lorena S., Ann Smart Martin, and Joanne Bowen
1997 *Provisioning Early American Towns. The Chesapeake: A Multidisciplinary Case Study*. Unpublished report prepared for the National Endowment for the Humanities. Manuscript on file, Department of Archaeological Research, Colonial Williamsburg Foundation, Williamsburg.

Webster, David, James Parnell, and Walter Biggs
1985 *Mammals of the Carolinas, Virginia, and Maryland*. The University of North Carolina Press, Chapel Hill, NC.

Wing, Elizabeth, and Antoinette Brown
1979 *Paleonutrition: Method and Theory in Prehistoric Foodways.* Academic Press, New York.

White, T.E.
1953 "A Method of Calculating the Dietary Percentages of Various Food Animals Utilized by Aboriginal Peoples." *American Antiquity* 18:396-398.

APPENDIX A:
Kill-Off Data for
Feature 4 and Feature 10

Table 10
Age Distribution Based on Epiphyseal Fusion
***Ovis aries/Capra hircus* (Domestic Sheep or Goat)**
Feature 4
N=2

Age of Fusion - 6 to 10 Months

Bone and Epiphysis	Fused	Not Fused
Scapula	0	0
Innominate	1	0
Humerus - distal	0	0
Radius - proximal	0	0
	1	0
Percent of Age Range	**100.0%**	**0.0%**

Age of Fusion - 12 to 36 Months

Bone and Epiphysis	Fused	Not Fused
Ulna - proximal	0	0
Ulna - distal	0	0
Metacarpal	0	0
Femur - proximal	0	0
Tibia - distal	0	0
Metatarsal	0	0
Metapodial	0	0
Calcaneus	0	0
First Phalange - proximal	0	0
Second Phalange - proximal	0	0
	0	0
Percent of Age Range	**0.0%**	**0.0%**

Age of Fusion - 36 to 42 Months

Bone and Epiphysis	Fused	Not Fused
Humerus - proximal	0	0
Radius - distal	0	0
Femur - distal	0	0
Tibia - proximal	1	0
	1	0
Percent of Age Range	**100.0%**	**0.0%**

Source of Fusion Ages: Silver 1969; Chaplin 1970; Maltby 1979.

Table 11
Age Distribution Based on Epiphyseal Fusion
***Bos taurus* (Domestic Cattle)**
Feature 10
N=2

Group I/Age of Fusion - 0 to 12 Months

Bone and Epiphysis	Fused	Not Fused
Scapula	1	0
Innominate	0	0
	1	0
Percent of Age Range	100.0%	0.0%

Group II/Age of Fusion - 12 to 24 Months

Bone and Epiphysis	Fused	Not Fused
Humerus - distal	0	0
Radius - proximal	0	0
First Phalange - proximal	1	0
Second Phalange - proximal	0	0
	1	0
Percent of Age Range	100.0%	0.0%

Group III/Age of Fusion - 24 to 36 Months

Bone and Epiphysis	Fused	Not Fused
Metacarpal	0	0
Tibia - distal	0	0
Metatarsal	0	0
Metapodial	0	0
	0	0
Percent of Age Range	0.0%	0.0%

Group IV/Age of Fusion - 36 to 48 Months

Bone and Epiphysis	Fused	Not Fused
Humerus - proximal	0	0
Ulna - proximal	0	0
Ulna - distal	0	0
Radius - distal	0	0
Femur - proximal	0	0
Femur - distal	0	0
Tibia - proximal	0	0
Calcaneus	0	0
	0	0
Percent of Age Range	0.0%	0.0%

Source of Fusion Ages: Silver 1969; Chaplin 1970; Maltby 1979; Reitz and Wing 2008.

Table 12
Age Distribution Based on Epiphyseal Fusion
***Sus scrofa* (Domestic Swine)**
Feature 10
N=1

Group I/Age of Fusion - 0 to 12 Months

Bone and Epiphysis	Fused	Not Fused
Scapula	0	0
Innominate	0	0
Humerus - distal	0	0
Radius - proximal	1	0
Second phalange - proximal	0	0
	1	
Percent of Age Range	**100.0%**	**0.0%**

Group II/Age of Fusion - 12 to 24 Months

Bone and Epiphysis	Fused	Not Fused
Metacarpal	0	0
First phalange - proximal	0	0
Tibia - distal	0	0
	0	0
Percent of Age Range	**0.0%**	**0.0%**

Group III/Age of Fusion - 24 to 36 Months

Bone and Epiphysis	Fused	Not Fused
Calcaneus	0	0
Metatarsal	0	0
Fibula - distal	0	0
	0	0
Percent of Age Range	**0.0%**	**0.0%**

Group IV/Age of Fusion - 36 to 42 Months

Bone and Epiphysis	Fused	Not Fused
Humerus - proximal	0	0
Radius - distal	0	0
Ulna - proximal	0	0
Ulna - distal	0	0
Femur - proximal	0	0
Femur - distal	0	0
Tibia - proximal	0	0
Fibula - proximal	0	0
	0	0
Percent of Age Range	**0.0%**	**0.0%**

Source of Fusion Ages: Silver 1969; Chaplin 1970; Maltby 1979; Reitz and Wing 2008.

Table 13
Age Distribution Based on Epiphyseal Fusion
***Ovis aries/Capra hircus* (Domestic Sheep or Goat)**
Feature 10
N=1

Age of Fusion - 6 to 10 Months

Bone and Epiphysis	Fused	Not Fused
Scapula	0	0
Innominate	0	0
Humerus - distal	0	0
Radius - proximal	0	0
	0	0
Percent of Age Range	**0.0%**	**0.0%**

Age of Fusion - 12 to 36 Months

Bone and Epiphysis	Fused	Not Fused
Ulna - proximal	0	0
Ulna - distal	0	0
Metacarpal	1	0
Femur - proximal	0	0
Tibia - distal	0	0
Metatarsal	0	0
Metapodial	0	0
Calcaneus	0	0
First Phalange - proximal	0	0
Second Phalange - proximal	0	0
	0	0
Percent of Age Range	**100.0%**	**0.0%**

Age of Fusion - 36 to 42 Months

Bone and Epiphysis	Fused	Not Fused
Humerus - proximal	0	0
Radius - distal	0	0
Femur - distal	0	0
Tibia - proximal	0	0
	0	0
Percent of Age Range	**0.0%**	**0.0%**

Source of Fusion Ages: Silver 1969; Chaplin 1970; Maltby 1979.

APPENDIX B:
Bone Measurements

Key to Bone Measurements

From

A Guide to the Measurement of Animal Bones
From Archaeological Sites

By Angela Von Den Driesch

1st Phalanx

GLpe – Greatest length of the peripheral half
Bp – Greatest breadth of the proximal end
SD – Smallest breadth of the diaphysis
Bd – Greatest breadth of the distal end

3rd Phalanx

DLS – Greatest diagonal length of the sole
Ld – Length of the dorsal surface
MBS – Middle breadth of the sole

Metacarpal

SD – Smallest breadth of the diaphysis
Bd – Greatest breadth of the distal end

Taxon Description:

Bos = *Bos taurus* (Domestic Cattle)
Sus = *Sus scrofa* (Domestic Swine)
Ovis/Capra = *Ovis aries/Capra hircus* (Domestic Sheep/Goat)

Table 14
Bone Measurements

Site	UBNo	Context	Taxon	Element	Location	Measurement (mm)
44AX0239	102	F4SWBisc.Fill2	Ovis/Capra	Innominate	SB	10.0
44AX0239	102	F4SWBisc.Fill2	Ovis/Capra	Innominate	LA	27.1
44AX0239	102	F4SWBisc.Fill2	Ovis/Capra	Innominate	LAR	23.4
44AX0239	263	F4SWBisc.Fill2	Ovis/Capra	Tibia	Bp	43.9
44AX0239	352	F10EBisc.Fill2	Bos	Metacarpal	SD	35.1
44AX0239	357	F10EBisc.Fill4/5	Bos	3rd Phalanx	DLS	77.0
44AX0239	357	F10EBisc.Fill4/5	Bos	3rd Phalanx	MBS	25.9
44AX0239	357	F10EBisc.Fill4/5	Bos	3rd Phalanx	Ld	60.9
44AX0239	368	F10EBisc.Fill6LV1	Bos	1st Phalanx	GLpe	61.7
44AX0239	368	F10EBisc.Fill6LV1	Bos	1st Phalanx	Bp	25.5
44AX0239	368	F10EBisc.Fill6LV1	Bos	1st Phalanx	SD	24.8
44AX0239	368	F10EBisc.Fill6LV1	Bos	1st Phalanx	Bd	27.3
44AX0239	373	F10EBisc.Fill6LV1	Capra	Metacarpal	Bd	27.2
44AX0239	373	F10EBisc.Fill6LV1	Capra	Metacarpal	SD	14.4