ARCHAEOLOGICAL INVESTIGATIONS OF

SITE 44CF7, FALLING CREEK IRONWORKS, AND VICINITY

CHESTERFIELD COUNTY, VIRGINIA

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MANAGEMENT SUMMARY

From October 11 through November 10, 1993, staff members from the William and Mary Center for Archaeological Research (WMCAR) conducted archaeological investigations at Site 44CF7, in Chesterfield County, Virginia. This investigation was undertaken for the Virginia Department of Historic Resources (VDHR) as part of the VDHR's long-term effort to identify and evaluate Virginia Company-period (1607–1624) sites. The purpose of this study was to evaluate the site's eligibility for nomination to the National Register of Historic Places. This work sought to verify archaeological resources reportedly associated with the seventeenth-century ironworks (MacCord 1964), to assess the present integrity of the site, and to define the entire site area through additional survey and testing in an attempt to identify potentially related components, such as workers' housing.

Site 44CF7 was previously investigated by Howard A. MacCord, Sr., with the assistance of members of the Archeological Society of Virginia, during the summer of 1963. MacCord identified several features/deposits related to the ironworks including thick charcoal and slag deposits, a foundation, possibly an auxiliary structure such as a chafery, and rock cuts that may have carried posts for a dam and flume. In addition, MacCord found artifactual evidence including slag-coated bricks, chisels, and iron spikes (MacCord 1964:9–12). Staff members of the VDHR also investigated the site through additional historical research and field checking, concurring that MacCord has identified the early ironworks site.

The results of current research agree with most of the findings of previous studies at 44CF7. The research indicates that 44CF7 is the location of an ironworks established by the Virginia Company on Falling Creek in 1619 and that it contains significant archaeological resources. Although limited testing found no conclusive evidence of structures or domestic areas, thick slag and charcoal deposits associated with the ironworks were identified adjacent to the current access road near the southern boundary of the site. These deposits are relatively intact. Similar deposits have been documented on other ironworks sites (i.e., Saugus) and are usually associated with furnaces and related structures. As a result of both historical and archaeological investigations summarized in this report, the Falling Creek Ironworks recently was nominated for listing on the Virginia Landmarks Register and National Register of Historic Places.

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Chapter 1: Background Information

Introduction

From October 11 through November 10, 1993, staff members from the William and Mary Center for Archaeological Research (WMCAR) conducted archaeological investigations at 44CF7, in Chesterfield County, Virginia (Figures 1 and 2). This investigation was completed for the Virginia Department of Historic Resources (VDHR) as part of the VDHR's long-term effort to identify and evaluate Virginia Company-period (1607–1624) sites. The purpose of this study was to evaluate the site's eligibility for nomination to the National Register of Historic Places. This work sought to verify archaeological resources reportedly associated with the seventeenth-century ironworks (MacCord 1964), to assess the present integrity of the site, and to define the entire site area through additional survey and testing in an attempt to identify potentially related components, such as workers' housing.

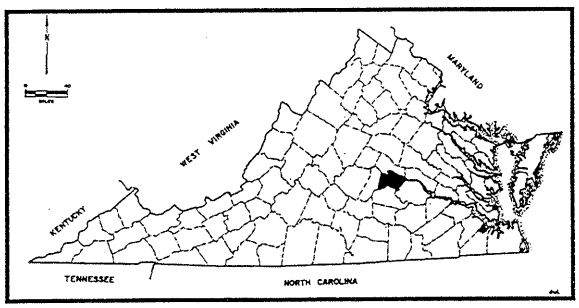


Figure 1. Project area location.

The project was directed by Center Co-Directors Donald W. Linebaugh and Dennis B. Blanton. Thomas F. Higgins III, Project Archaeologist, was responsible for conducting the fieldwork, contributing to the analysis, and writing the final report. Portions of the previous research section presented in Chapter 2 were authored by Donald W. Linebaugh, Antony F. Opperman, and E. Randolph Turner III and taken in part from the forthcoming document *Searching For Virginia Company Period Sites: An Assessment of Surviving Archaeological Manifestations of Powhatan-English Interactions, A.D. 1607–1624* (Turner and Opperman n.d.). Information from the document cited above was integrated into the historical overview section of Chapter 2. Additional archival research was conducted by Charles M. Downing. Mr. Higgins was assisted in the field by WMCAR staff Robert Haas, Christopher L. McDaid, Jesse Zinn, Kenneth Stuck, and Jonathan Matthews. Laboratory processing and preliminary artifact analysis were conducted by Deborah L. Davenport and Veronica Deitrick. Final drawings for this report were prepared by John D. Roberts and Yujin Asai. All project related documents and materials are temporarily stored at the WMCAR and upon completion of the project will be held by the VDHR in Richmond.

Environmental Setting and Project Area Description

Three areas were surveyed along the south bank of Falling Creek in Chesterfield County, Virginia (Figure 3) (see Figure 2). Area A comprised a large parcel (approximately 12 acres) that was located approximately .3 mi. east of 44CF7. This property, presently in use as a marina, is bounded on the north by Falling Creek, on the west by Interstate 95, on the south by a wooded parcel, and on the east by the James River.

Area B is located approximately 300 ft. northwest of Area A on a floodplain of Falling Creek (see Figure 3). Approximately 75% of Area B is wooded with the remaining 25% of the area covered in greenbriar and grass. An abandoned swimming pool and related building are located within this area. Landscaping associated with this facility includes a small berm around the pool fence and remnants of a compact gravel drive/parking lot on the west side of the complex.

Area C is located approximately 670 ft. west of Area B and includes 44CF7. The area consists of a floodplain (200 ft. north–south x 600 ft. east–west), falls, and the grass and wooded slope and hill immediately north of the Falling Creek Apartments (see Figure 3).

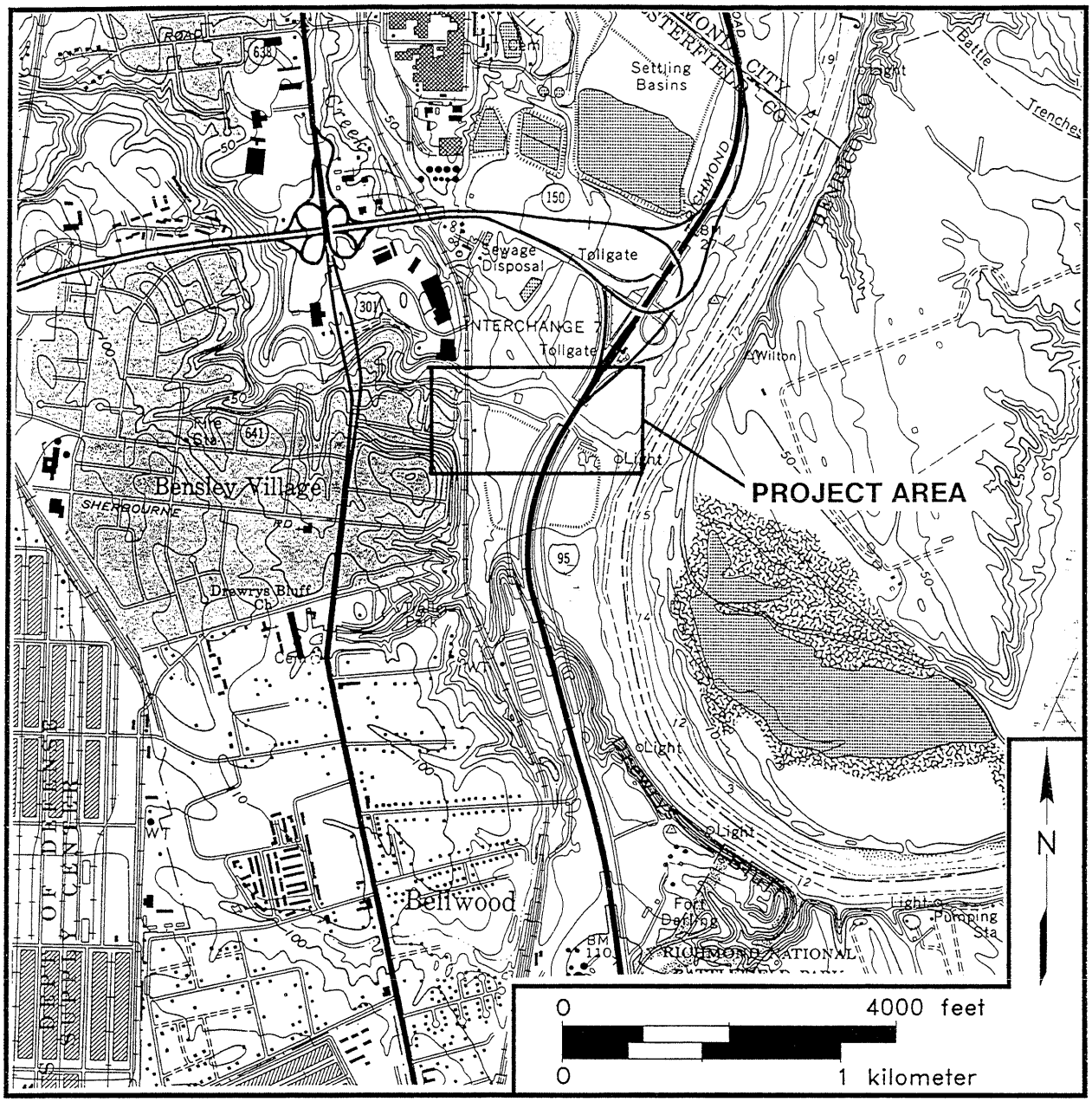


Figure 2. Project area and environs (U.S. Geological Survey [USGS] 7.5-minute Drewrys Bluff topographic quadrangle 1987).

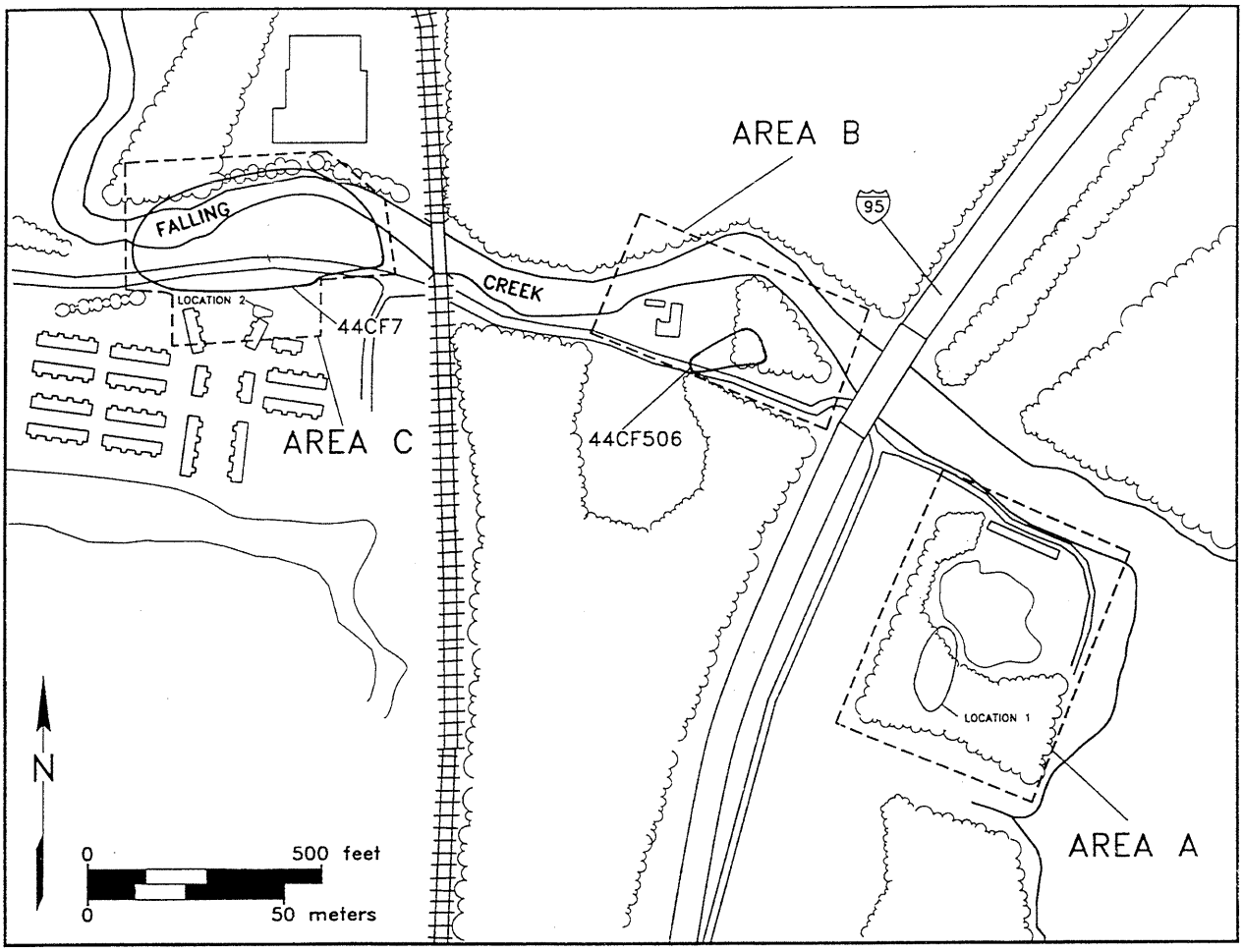


Figure 3. Plan of current investigations showing archaeological areas, sites, and locations.

Site 44CF7, which is located in Area C, lies approximately 6 mi. south of Richmond. The site encompasses approximately 3.5 acres. The main part of the site is located on the south stream bank just below the falls of Falling Creek and approximately .75 mi. west of the creek's confluence with the James River (see Figure 2). Howard A. MacCord, Sr., who investigated the site in 1963, noted that it

> lies in a narrow valley with steep hills abutting on the creek on the north side. On the west, the creek winds through a still more narrow valley before tumbling over two rough ledges of granitic rock which form the fall line and which gave the creek its name. On the south side, steep hills lie about 150 feet from the creek and extend eastward until the hills diminish and the valley widens and merges into the James River Floodplain (MacCord 1964:2).

The project area is located in the Coastal Plain physiographic province of Virginia but is only about 3 mi. east of the transition to the Piedmont Uplands. Soils within the project area consist predominantly of Chewacla loam, which is found along floodplains along streams, and Fluvaquents, which is mixed alluvium found in low-lying areas adjacent to streams and major drainageways (Hodges 1978). Elevations in the project area range from approximately 10 to 50 ft. above mean sea level (amsl).

Chapter 2: Historical Context

Historical Overview

The history of the Falling Creek Ironworks is better known than that of most English settlements established during the Virginia Company period. This is due in large measure to the research of Charles Hatch and Thurlow Gates Gregory (Gregory 1957, 1960; Hatch and Gregory 1962), whose combined works provide considerable historical and technological detail.

The Falling Creek Ironworks is recognized as the first successful, integrated iron production facility in English North America. The exploitation of natural commodities was a principal objective of the Virginia Company of London from the earliest period of their Virginia venture. Samples of iron ore were returned to England with Captain Christopher Newport after the first supply in 1608 and again after the second supply later that year. The latter material, possibly obtained from the Falling Creek area, was apparently processed into iron with considerable success. Archaeological and historical evidence suggests that limited forge experimentation was also conducted in Virginia during the Virginia Company period (Cotter 1958:11).

The onset of Sir Edwin Sandys' term as treasurer of the Virginia Company in London in 1618 resulted in a renewed commitment to industrial development, particularly to iron production. In cooperation with Southampton Hundred plantation, an expedition of 80 persons under the command of a Captain Blewett was dispatched "wth all manner of prouisions for the settinge vp of an Iron Worke in Virginia" (Kingsbury 1906:587–588). Unfortunately, the high mortality rate resulted in the death of Blewett and his principal associates upon their arrival. The importance of the iron-making venture, however, is reflected by the subsequent provision in 1619 of a 150 person relief supply "to set vp three Iron workes; proofe hauing been made of the extraordinary goodnesse of that iron" (Kingsbury 1933:115–118). It should be recognized that the "three Iron workes" almost certainly represented the Company's intent of a single three-component facility of blast furnace, refinery, and chafery (forge?) rather than three separate plants (Hatch and Gregory 1962:269). The relief supply would be placed upon a site for the facility that probably had been selected by Blewett's party because there was "excellent water and good oare" (Kingsbury 1933:128–129).

Despite the death at sea of "the Chiefe men for the Iron worke," the relief supply apparently succeeded in completing a portion of the ironworks in 1620 and producing a sample of iron prior to the arrival of three replacements later that year (Kingsbury 1906:472, 1933:240). In addition to the three replacement workers, by late June 1621 a fourth individual, John Berkeley (along with his son, Maurice, and three family servants), was dispatched to Virginia as Master of the ironworks with 20 men skilled in ironworking. Berkeley's party specifically included workers to "be employed upon the Furnace" and "upon the Forge," explicit evidence for an integrated operation producing both cast and wrought iron (Kingsbury 1906:472). Correspondence received in England from Berkeley indicated his considerable satisfaction with the location of the facility at "The falling Creeke" and that increased production would be achieved by spring of 1622 (Kingsbury 1933:548).

The continued development of the ironworks by Berkeley's party was also linked to a shipbuilding venture proposed by the Virginia Company to commence during the spring of 1622. In August 1621, the governor and Council were directed to commence cutting timber during the winter in anticipation of the arrival of a "Shipwright wth a ginge of thirty or fortie Carpenters and boatwrights" the following spring (Kingsbury 1933:496–497). The colonists were particularly directed to choose the site to be timbered with "respect vnto the nearness of the iron works, and of the Saw Mills" (Kingsbury 1933:496–497). This comment suggests that the Falling Creek Ironworks may have also included a sawmill, or that such a facility was located nearby.

The production of iron was abruptly halted by the Powhatan/English conflict of 1622. Twenty-seven persons were slain at the ironworks, including John Berkeley (Kingsbury 1933:565). Beverley (1947:54)

and Stith (1965:218) reported the escape of two children, indicating a total resident population of 29 persons (23 men, 2 women, and 4 children). The number of men is consistent with the skilled labor force that accompanied Berkeley to Virginia and is indicative of the level of effort needed to maintain production once the facility had been established. The slaughter of the inhabitants of the Falling Creek settlement was compounded by the thorough destruction of the facility by the Indians (Beverley 1947:54–55; Stith 1965:218). Though there was considerable interest in reestablishing the operation through the end of the Virginia Company period, the level of destruction effectively terminated this apparently successful endeavor. Alexander Spotswood's "Tubal Furnace" was to be the next successful iron furnace in colonial Virginia, established over a century later.

There have been several industrial and commercial enterprises along Falling Creek near 44CF7 since the demise of the Virginia Company Ironworks in 1622. According to a 1962 article by Charles E. Hatch and Thurlow Gates Gregory, the English entrepreneur Sir John Zouch attempted and failed in 1634 to re-establish the ironworks on land he had been granted at Falling Creek. Long after Zouch's death in England, his land escheated. While holding office as the colony's escheator, William Byrd I had declared the property to be "King's land" and eventually came to own it. Hatch and Gates cite the nineteenth-century historian R. A. Brock who stated that Byrd purchased the Falling Creek tract from Abel Gower (Hatch and Gregory 1962:279). In Nell Marion Nugent's *Cavaliers and Pioneers* (1992), mention is made of a 4,250-acre patent in Henrico County granted to Byrd in 1682. The Falling Creek site was situated in Henrico until the creation of Chesterfield County in 1749. No physical description of the land is given save that it was situated in Henrico County. According to Nugent's abstract, the immense tract was the same that "John Zouch, Esqr. died seized of & which was found to escheat, as by inquisition under William Bird, Esqr., Escheator." The patent explains that the land had been "Granted to Abell Gower, who assigned to said Bird" (Nugent 1992:II:229). The document presents no dates for these past transactions and seems to suggest that the newly escheated property was granted directly to Gower and then to Byrd. Since no description of the Zouch patent was apparently ever recorded, it is important to consider that other patents were issued in the area which also came to be owned by William Byrd I.

In 1639, a surgeon named Thomas Mathews received a patent for 1,100 acres on the north bank of Falling Creek which probably lay directly across from 44CF7. Mathews' patent bore "westerly on the falls." According to the slightly skewed compass directions, the Mathews patent was bounded "North on the river, South on the woods, and East upon the [Falling] Creek" (Nugent 1992:I:109). In 1646, Jeremiah Blackman, a mariner, obtained 1,337 acres on the south side of Falling Creek. By 1665, Blackman had died and his son then sold the patent to Richard Ward. At that time the Blackman-Ward patent ran "along the river N.N. W. then N.W. by N. & c." which clearly indicates that the boundary line was being described as it extended upriver. The survey line continued "to the mouth of Falling Creek, [and] up the Creek W.N.W. & c." (Nugent 1992:I:103, 447). No indication is given as to how far the line extended up Falling Creek. The Mathews patent recorded in 1639 and the Blackman-Ward patent recorded in 1665 mention neither a shared boundary with Zouch nor do they mention him as a previous owner.

In 1683, William Byrd I obtained three patents in Henrico County totalling almost 8,000 acres. The first two of the three 1683 patents listed included extensive acreage in what was to become Chesterfield County and within the original bounds of the city of Richmond. The third of the patents contained 1,820 acres "in Virina Parish, on the South side of James River" and comprised at least part of what would become Byrd's Falling Creek plantation. Byrd had purchased 300 acres of the total from William Gyles and the "residue" of 1,520 acres had been designated as "King's land." The 1683 survey of the Falling Creek property began "at a corner in Grindon's Run [now Grindall Creek]" and followed the eastern boundaries of three landowners before "crossing the main branch of Falling Creek nigh Seth Ward, to the mouth of Spring Run" (Nugent 1992:II:305). There is no mention of Byrd's 1683 Falling Creek land grant bordering the James River.

From the vague boundary information provided in these records, no absolute connection can be drawn between the patents. If Sir John Zouch initiated (or at least planned) his ironworks on his own land and at the same location as the Virginia Company's operation and if these correspond to 44CF7, then Jeremiah Blackman and Richard Ward also may have owned the property before it was granted to Abel Gower and sold to

William Byrd I. It appears equally likely that the Blackman-Ward patent did not derive from the Zouch patent. If that were the case, then the Zouch patent probably had no river frontage and was only "connected" with the James River shore under the ownership of William Byrd I.

By 1683, William Byrd I apparently owned in excess of 6,000 acres in the Falling Creek area. In 1687 and again in 1693, Byrd at least contemplated erecting an iron-making facility at the site (Hatch and Gregory 1962:280). William Byrd II inherited his father's Falling Creek plantation and made several references to it in his "Secret Diary" covering the years 1709 through 1712. From Byrd's entries it seems he employed several slaves as well as white laborers and artisans at Falling Creek. There Byrd operated a saw mill and tannery (Byrd 1941:121, 227, 529).

In 1732, William Byrd II visited his mills on the south bank of the James River across from the present site of Richmond. Finding that his mills were "both" idle "for the want of Water," he ordered his workmen to "make use of the lowness ... for blowing up the Rocks at the Mouth of the Canal." Byrd directed his "Engineers" to drill holes in the rocks and pack each with a three-ounce powder cartridge. The scheme did not work as well as hoped and Byrd attributed the failure to the fact that his men drilled perpendicular holes in the rocks while they should have "humour'd the grain of the Stone for more effectual Execution" (Byrd 1901:334).

William Byrd eventually began selling off portions of his Falling Creek property to Henry Cary. In 1732, Cary built his Ampthill plantation house on a 306-acre tract he had purchased from Byrd. After Henry Cary had acquired a portion of the Falling Creek property, he established a furnace and foundry. Cary also owned flour mills at Warwick, an eighteenth-century village a short distance up the James River from Ampthill (Brock 1937:12).

In 1749, Archibald Cary inherited his father's Ampthill plantation and "greatly extended" the "manufacturing enterprises" (Brock 1937:12). About 1760, Archibald Cary is believed to have established a foundry on the north bank of Falling Creek. In 1769, a British traveler recorded his favorable impressions of the "extremely valuable mills, iron works & c. ... near the town of Warwick." Cary's ironworks were apparently not as profitable as they appeared at first glance. It is thought that he eventually converted the forge site and pond for use as a grist mill (Hatch and Gregory 1962:281). During the American Revolution Cary's mills were destroyed by British troops under the command of Benedict Arnold. In a letter to Sir Henry Clinton, Arnold stated that his force returned to Warwick on April 30, three days after an engagement at Osborn's. "We destroyed a magazine of five hundred barrels of flour," Arnold reported, "and Colonel Cary's fine mills were destroyed in burning the magazine of flour. We also burned several warehouses" (Tarleton 1787:346). Arnold did not specifically identify the demolition as having occurred on Falling Creek nor, as Hatch and Gregory point out, did he mention the existence of an iron foundry (Hatch and Gregory 1962:281). In his 1919 genealogy of the Cary family, Fairfax Harrison interpreted Arnold's report to indicate that the Falling Creek mill had in fact been destroyed along with those at Warwick (Harrison 1919:92).

Archibald Cary died in 1787. In his will he bequeathed his estate to his three surviving daughters: Anne Randolph, Mary Page, and Betty Cary and the sons of his two deceased daughters: Archibald Cary Randolph and Archibald Cary Bolling (Harrison 1919:177). Research in the Chesterfield County records failed to establish a direct chain of title for 44CF7 back to the Cary period of ownership. The earliest reference dated to 1811 when William Goode owned the 44CF7 property which had by then been separated from Ampthill and was known as Chesterhill (Chesterfield County Records [CCR] Deed Book [DB] 21:360). The deed by which Goode acquired Chesterhill was entered only in the records of the General Court of the Commonwealth. Those records were destroyed in the Richmond fire of 1865. No direct chain could be established through the existing land tax books for that period.

In 1802, a surveyor named H. Winfrey prepared a plat of Ampthill and Chester Hill which may suggest that the former was about to be sold off from the Cary estate. The 1802 Winfrey plat shows the location of both the Chester Hill and Ampthill houses (Winfrey 1802) (Figure 4). Winfrey also depicted the Ampthill "Mill & Houses" on Falling Creek. It is likely that Winfrey's sketches of the mill and houses are fairly

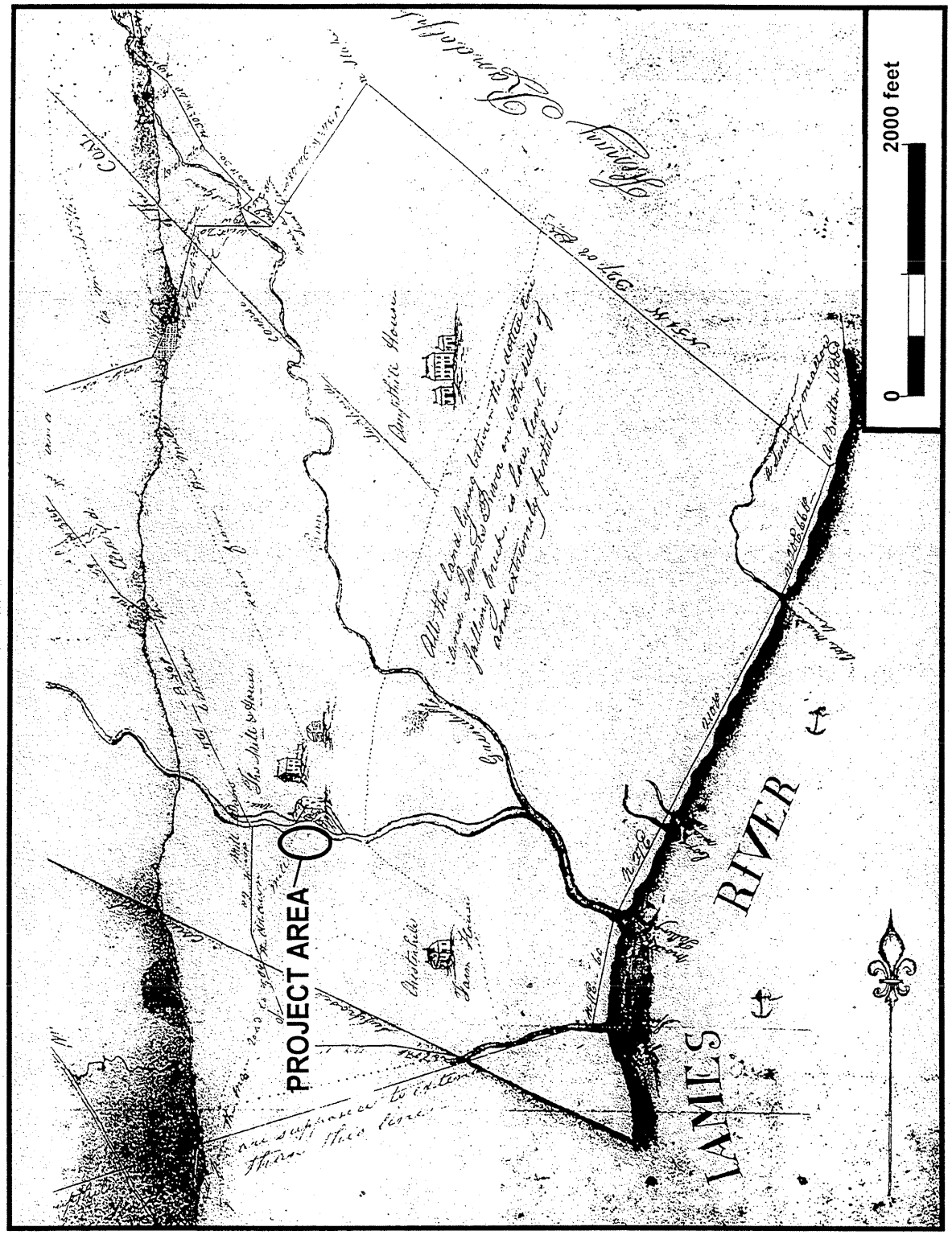


Figure 4. Map of the Ampthill and Chesterhill Lands (Winfrey 1802).

Figure 5. Map of Chesterfield County (Wood 1820).

representational given the relative accuracy of his depiction of the Ampthill mansion. No buildings or other features are shown on the south bank of Falling Creek at 44CF7 (see Figure 4).

As noted above, the earliest deed reference to the Chesterhill tract dated from 1811. In 1816, William Goode and his trustees conveyed Chesterhill and a tract that adjoined it on the south called Auburn Chase to Michael W. Hancock of Richmond. Goode had mortgaged the two tracts to Hancock in 1811 and had failed to pay off his debt (CCR DB 21:360). Hancock held the property for less than one year and then sold the 465-acre Chesterhill farm to William Gay of Manchester for $11,625 (CCR DB 21:547). The 1820 land tax book listed Gay's Chesterhill farm property as containing 565 acres rather than the 465 indicated in the 1817 deed. The buildings on the land were valued at $11,300 (CCR Land Book 1820).

In 1820, John Wood produced a map of Chesterfield County the accuracy of which is highly questionable. Wood showed the Ampthill mill on the south bank of Falling Creek (Wood 1820) (Figure 5). The site of the village of Warwick and the "old wharf" can be seen a short distance to the north (see Figure 5).

William Gay also lost the Chesterhill tract by his failure to pay off a mortgage. In May 1826, Judith Nicholson bought the property at an auction held at the Eagle Hotel in Richmond for the surprisingly low sum of $1,550. Nicholson held four of Gay's notes on the property as executrix of her husband, Andrew Nicholson (CCR DB 27:169). In 1831, Mrs. Nicholson sold Chesterhill to Jeremiah Hobbs for $3,000 (CCR DB 28:487).

D. Le Prade's 1838 map of Ampthill shows the mill tract but does not indicate whether it was still in operation. The Chesterhill property is not depicted on the map. According to Le Prade's map, another mill was in operation on Falling Creek west of the turnpike and railroad and well upstream from 44CF7 (Le Prade 1838) (Figure 6).

In 1842, John E. and Ira M. Hobbs, the sons of Jeremiah Hobbs, sold Chesterhill to Benajah Thomas and John F. Davis of Richmond for $4,250. Thomas was Davis's father-in-law (CCR DB 34:140). Davis and his wife apparently made their home at Chesterhill (CCR DB 45:531). J. F. Gilmer's 1863 map of Chesterfield County shows the Davis house at Chesterhill, but does not show the site of the old Ampthill mill (Gilmer 1863) (Figure 7). Mrs. Davis remained at Chesterhill after she was widowed and finally sold the property in 1884 when Albert W. Bensley paid $6,000 for the 430-acre farm (CCR DB 76:1).

In 1908, Albert Bensley granted his son Roger C. Bensley an "undivided one-half interest" in two tracts of the Chesterhill property and complete ownership of a third parcel. Site 44CF7 is situated on the 22.8-acre tract designated as "Parcel No. 3" which was granted in fee simple to Roger Bensley. Surveyor D. F. Le Prade executed a plat of the tract which shows the site of the old mill on the north bank of Falling Creek (CCR DB 116:304) (Figures 8 and 9). The impact of Roger C. Bensley's excavations on the property and on 44CF7 and his development of the land as "Bensley Village" are discussed below.

In 1910, Bensley conveyed 5.5 acres of riverfront land to the Richmond Yacht Club which did *not* include 44CF7. However, according to an agreement in the deed, the yacht club received permission to "build, maintain, and repair a concrete reservoir around the spring on the hillside above Falling Creek and opposite the old Ampthill Mill." The yacht club was also granted "further right to lay, maintain, and repair a pipe from the said spring and reservoir along the banks of Falling Creek to [their] club house" (CCR DB 121:145). The remains of the reservoir and pipe are almost certainly located within the boundary of 44CF7.

Roger C. Bensley died in 1957. In 1959, William Eldridge Spain, the executor of Bensley's estate, conveyed three tracts including the 22.8-acre tract that contained 44CF7 to George D. Thomas (CCR DB 586:340). In 1962, Thomas sold two tracts of land including 44CF7 to James T. Sloan (CCR DB 694:161). The Central National Bank of Richmond eventually acquired the property. In 1976, the bank sold a 33.18-acre parcel including 44CF7 to Henry A. Houck who is the current owner (CCR DB 1391: 376).

Previous Research

The first contemporary reconnaissance of the Falling Creek Ironworks site was undertaken by R. A. Brock in 1876 (Brock 1885). He identified a location (44CF7) on the "west" (south) bank of Falling Creek approximately 60 yd. from a gristmill, the ruins of which still exist on the north bank opposite the site area. Brock recovered "several small pieces of furnace cinder, presumptive relics of the ironworks of 1622" and observed that the "exact original site" had been covered by "repeated washings of the soil" (1885:79). Of particular significance is the fact that Brock (1885:79–80) distinguished the location of the Virginia Company ironworks from the site of Archibald Cary's forge on the north bank of Falling Creek and east of the gristmill, the latter being manifested by extensive deposits of "slag or cinder" that covered an area of approximately one acre to a depth of 2 ft. Brock also identified a possible ore (limonite) mining site at a nearby tract, known locally as "Iron Bottom, where may be found plentifully what is known as bog iron on the surface" (1885:80).

Nearly half a century later, the site of the Falling Creek Ironworks became subjected to indiscriminate digging that continued sporadically for 30 years. In 1925, Roger C. Bensley, developer of the nearby "Bensley Village" community and owner of the site at that time, "unearthed" apparent industrial remains that he interpreted to be elements of the ironworks complex (Gregory 1957:20–21). These remains were variably described as being between 4 and 11 ft. below the

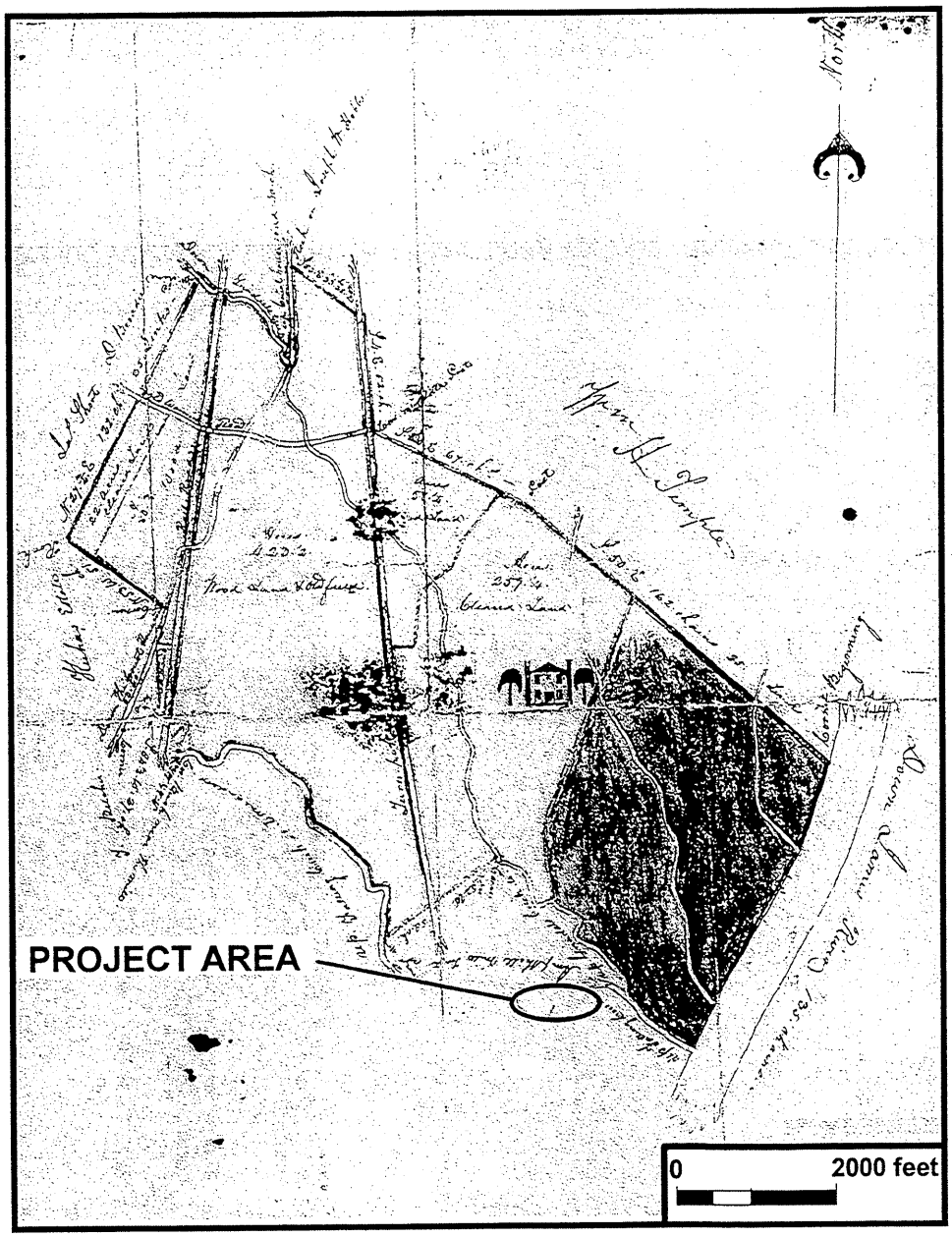


Figure 6. Plat of Ampthill Farm (Le Prade 1838).

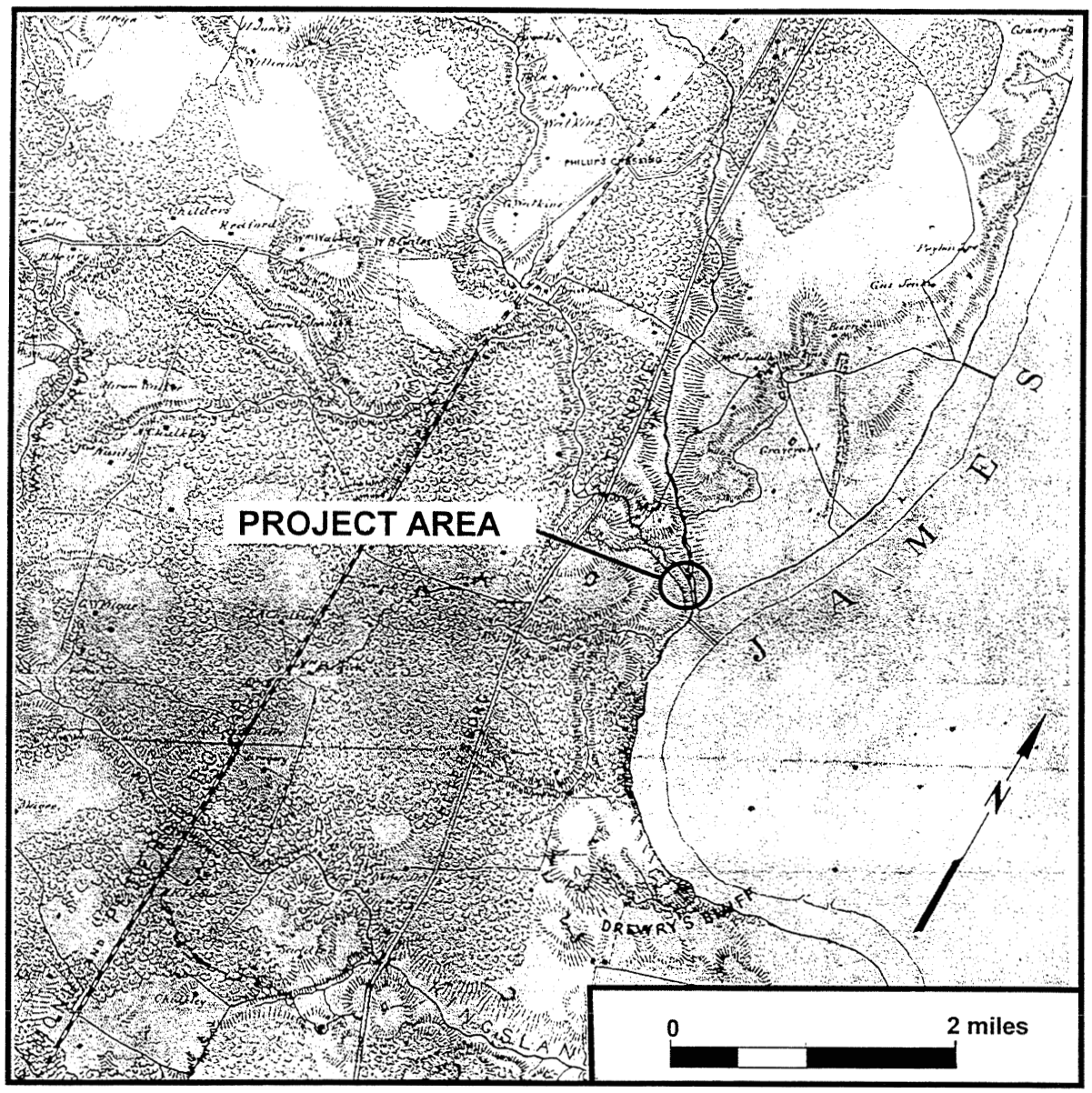


Figure 7. Map of Chesterfield County (Gilmer 1863).

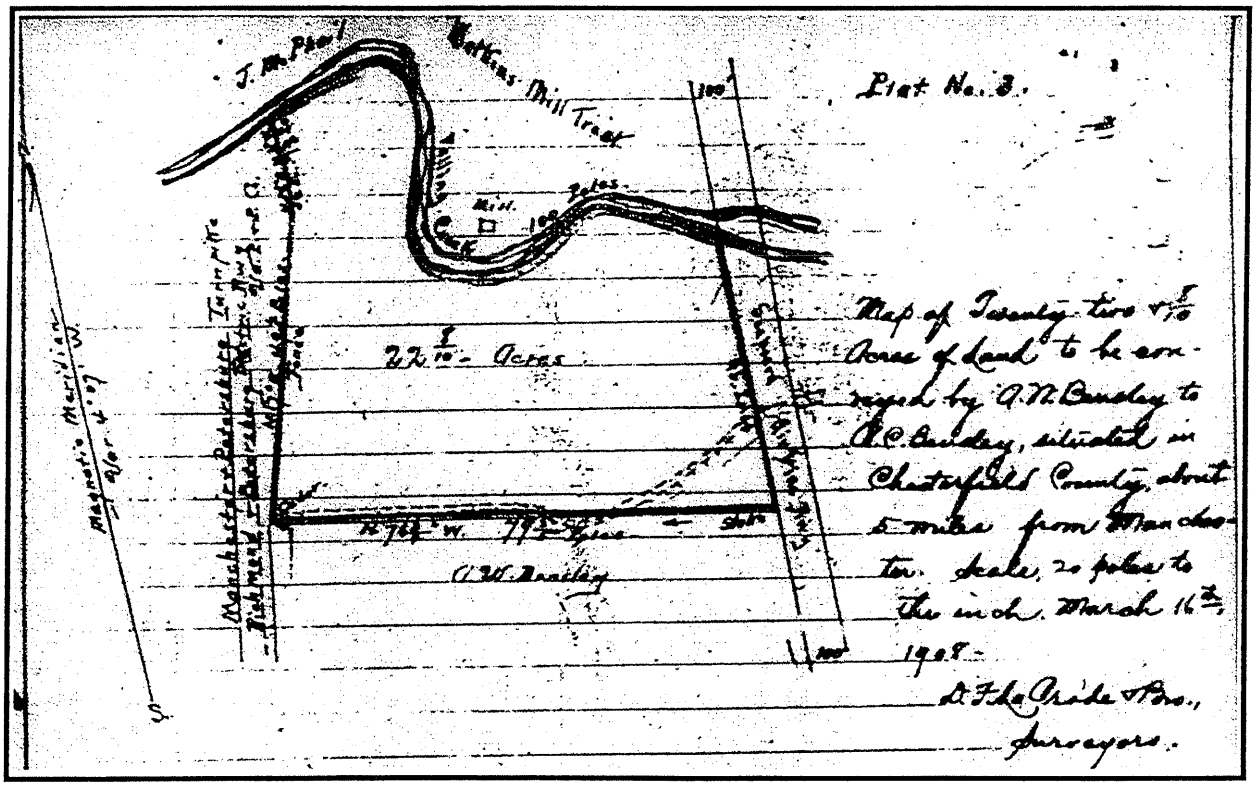


Figure 8. Plat of Parcel No. 3 of Chesterhill property in 1908 (CCR DB 116:306).

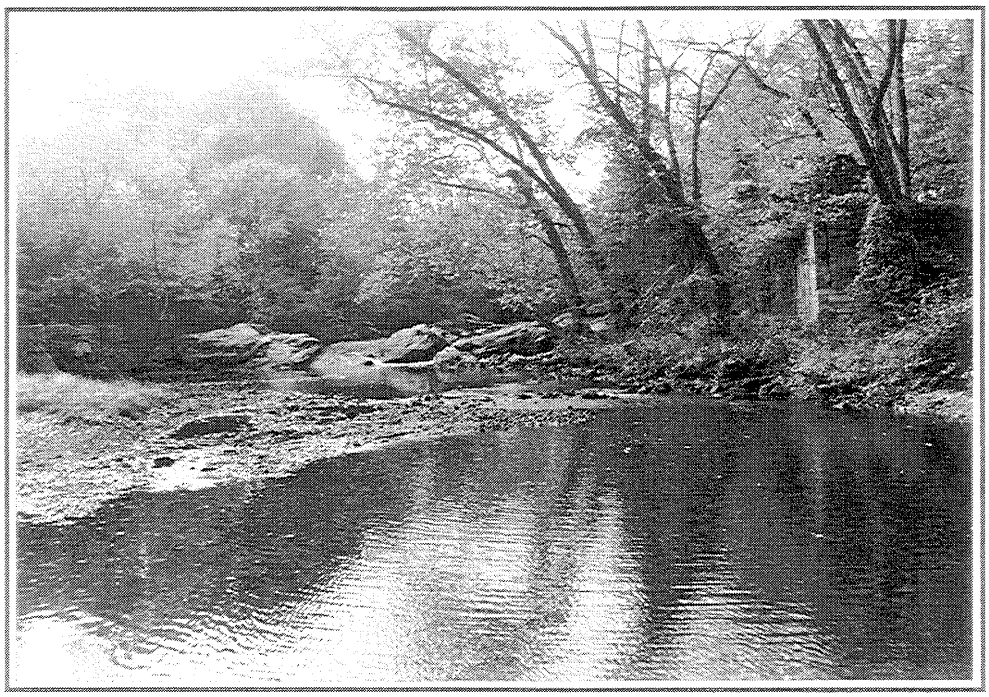


Figure 9. Site 44CF7, falls and mill, looking west (October 1993).

surface of the ground in association with considerable quantities of charcoal, "blast furnace slag," and metallic objects. Bensley apparently observed both undisturbed deposits and structural remains including a "charcoal pit ... about fifty feet in diameter," portions of "the foundation and a part of the walls of the original ironworks," and the remains of a timber frame wharf adjacent to Falling Creek (Gregory 1957:20, 47; *Richmond News Leader* 1925). Digging again in 1942, Bensley "uncovered relatively nearby" the remains of what he referred to as the "hide-out or barricade to protect the workmen ... in the event of Indian attack" (Gregory 1957:21). This "barricade" was described as "built in the general form of a cart wheel with a central room and corridors leading off like spokes of a wheel from a hub" (Gregory 1957:21). Bensley's last episode of digging occurred in 1955 when "he was running a bulldozer doing some landscaping" at the ironworks site (Gregory 1957:21). At that time, he observed "a part of the blast furnace ... and that the inside was circular in shape" (Gregory 1957:21). "A great many pieces...of ancient and original iron works materials" including "rounded billets or pigs" were recovered at that time and distributed to "his acquaintances" (Gregory 1957:21).

Tangible evidence of the Falling Creek Ironworks has also been observed in areas away from 44CF7. Gregory (1957:41–43) suggested that the granite and sandstone used for the construction of the nearby turnpike bridge over Falling Creek and a culvert at Grindall Creek (1828–1829) were salvaged from the remains of the early seventeenth-century blast furnace. Inspection of the bridge by staff members of the VDHR revealed the occasional presence of granite blocks coated with an iron residue indicating that Gregory's suggestion may be correct. According to Howard A. MacCord, Sr. (personal communication 1990), similar remains can be observed in the stonework of the Ampthill Mill ruins on the north side of the creek. Though no direct historical evidence is available to indicate that the furnace remains were salvaged in the early nineteenth century, the reuse of available construction material is a reasonable expectation.

While Bensley's activities certainly affected the integrity of the ironworks site, they did serve to positively identify the presence of industrial remains associated with the operation of a furnace on the south bank of Falling Creek. Several metallurgical assays of specimens recovered from the site revealed that the iron had been in a molten state, which required a furnace temperature of at least 1,500° C (Gregory 1957:17–19). These analyses served to confirm the distinction observed earlier by Brock between the remains of Archibald Cary's forge on the north bank of Falling Creek and the furnace remains on the south bank.

The indiscriminate digging by Bensley is best summarized in a letter from Bensley to archaeologist Roland Wells Robbins in 1952: "this property had a very interesting past and I derive quite a lot of pleasure plundering and digging and dreaming of how it once was" (Roger Bensley to Roland Wells Robbins, 27 July 1952). In 1951, Robbins visited the Falling Creek site at the request of the American Iron and Steel Institute to take a "quick look." Robbins was then excavating the remains of the Saugus Ironworks in Massachusetts for the First Ironworks Association, a project funded by the American Iron and Steel Institute. Both groups were aware of the early Falling Creek site and concerned about their claim that the Saugus facility was the "first" ironworks site in colonial America. Robbins was asked to investigate the site to determine whether evidence existed that would confirm that the Falling Creek site actually operated before its destruction during the 1622 massacre.

Robbins recorded his Falling Creek visit in his Saugus daily log for 1951, providing an interesting sketch map of the site (Robbins 1951:38A) (see Appendix C). He reported that he located evidence of an old dam and deserted canal that ran along the north side of the river from the early dam to the gristmill ruins. Robbins observed that the stream banks from the dam upstream to Route 1 were steeply sloped and that the area "permits no working area for casting, etc." (Robbins 1951:38B) (see Appendix C). He continued his observations by recording that "the general area where the ruins of the grist mill stand [are] most desirable for blast furnace operations. Here, either side of Falling Creek provides ideal elevations for a furnace bridge, as well as working area ...." (Robbins 1951:38B). Robbins further favored this area, he said, because it provided navigable waters that terminate at the falls. He also calculated that a dam at the "cascades" would provide a good head of water to power the furnace (Figure 10). The area between the James River and the railroad trestle could be ruled

Figure 10. Looking west from railroad bridge, 44CF7 area to left of photo and gristmill ruins about 700 ft. west along the north bank of Falling Creek, March 29, 1951. Note that vegetation is similar to present conditions (Photo by Roland Wells Robbins).

out, Robbins determined, because it provided no elevations for the furnace bridge and was prone to flooding.

Robbins stated that he "carefully" looked at the conjectured furnace site area located on Bensley's property, but notes that he found no slag or other evidence. He reported that he found metal waste, metal, brick, and refractory brick, 20 to 25 ft. west of the gristmill ruins, and noted that "this evidence indicates that forge activity took place in this area some time ago" (Robbins 1951:38C). He estimated this site, probably Archibald Cary's forge, as approximately 40 ft. square and about 50 ft. from the north bank of Falling Creek. Robbins ended his report by recommending that further work be concentrated on "the area to either side of Falling Creek at the cascades" (Robbins 1951:38C).

Robbins returned his attention to the Falling Creek site in early 1961, as he neared the end of a five-year project for Sleepy Hollow Restorations at the Phillipsburg Manor Upper Mills site in North Tarrytown, New York. As Robbins began to consider his next project, he wrote to Jamestown curator J. Paul Hudson: "I now want to concentrate on seeing if we can get something going on the Falling Creek site" (Roland Wells Robbins to J. Paul Hudson, 3 January 1961). He went on to request information from Hudson on digging that had occurred at the site since he had last visited and proposed a "walking and probing survey" to determine "what there was to work with" (Roland Wells Robbins to J. Paul Hudson, 3 January 1961). Hudson responded to Robbins by suggesting that he should write to Frederick Pease of the Chesterfield County Historical Society and to state Senator Lloyd C. Bird, to propose his plan and find out who owned the property. He also suggested that Robbins contact John D. Capron of the Lynchburg Foundry Company about possibly funding the work. Hudson ended the letter with the following endorsement, "I don't know of any other archaeologist in America more capable than you to excavate the site of a Colonial period ironworks. Your experience at John Winthrop, Saugus, Sterling,

and elsewhere makes you the only logical choice" (J. Paul Hudson to Roland Wells Robbins, 3 January 1961).

While Robbins spent most of 1961 "renewing" major excavations at Sterling Furnace in New York, he again wrote to Hudson concerning Falling Creek late in the year. In January of 1962, Robbins wrote to Frederick Pease, who responded enthusiastically to Robbins' recommendation for a survey of the site and invited him to visit the site in the near future. Pease wrote Robbins, "anything you can do about restoring the furnace on Falling Creek will meet with much approval with the people of Chesterfield" (Frederick H. Pease to Roland Wells Robbins, 6 January 1962). In a subsequent letter to Hudson, Robbins noted that Pease did not mention financial support for the project, but felt that this was not unexpected as Robbins had not specifically discussed costs. Robbins explained that his normal fee was $100 per day plus expenses, and that the survey that he had in mind would "run under one-thousand dollars" (Robbins to Hudson, 17 January 1962). Robbins continued the letter: "the Falling Creek furnace is a very controversial subject; did it or didn't it exist; if it existed, did it produce? How much? The survey that I want to conduct would probably answer the question whether the site that Mr. Pease, the late Roger Bensley, and others believe to be the site of the 1622 furnace, is just that" (Robbins to Hudson, 17 January 1962).

Robbins continued his correspondence with both Hudson and Pease during January and February attempting to arrange funding for the project through a variety of sources including federal and state government agencies, the county government, and the county historical society. His ongoing discussions with Pease resulted in his return visit to the site in February of 1962. Robbins notes that while he had planned to take transit readings and make tests, the weather was very bad causing him to limit his work. He summarized his 1962 field investigation and thoughts on the Falling Creek site in a March letter to J. Paul Hudson (Figure 11):

> The area containing a deposit of charcoal and slag is located below the roadway to a marina. The iron works evidence extends to the southerly side of this road some 15' to 20', terminating at the base of a knoll. Erosion is, and has been cutting away the northerly slope of the knoll. This has been created by a marsh at the top of the knoll which drains from the northerly slope. While I inspected the top of the knoll for evidence of charcoal, ore, and flux materials, none of these materials were noted. This could have been suitably situated for the charging bridge, although it seemed quite high. The small pond there must not be ruled out as a possible source of water for the furnace waterwheel. To eliminate the knoll as the site of the charging bridge, leaves but one area to be considered. This would be westerly of the possible site of the furnace and below the site of the road to the marina. Maybe I shouldn't say below the roadway, as it would appear that the area was cut down from its original height, grading it to the lower area which, fortunately, was built up. Some 40' or so to the northerly side of the ironworks evidence exists of a partially filled canal [probably the ravine noted on MacCord's map, Figure 12]. This canal originates just to the northwest of the site and runs easterly for 250' to 300,' emptying into the tidal waters. In places it is only 7'-8' wide at the present bottom. This would have given good protection for small boats when the waters of Falling Creek were flooded. If this canal is of early vintage, then the land to the southerly side of the canal over to where the ironworks evidence exists would have been tied in together. This is not the case today. It appears as though it has been both washed out and taken out in places. If this is true, and the furnace units occupied some of the areas, basic foundations were destroyed.
>
> As I studied the elevation of the Falling Creek water and the head it would provide for a waterwheel for a furnace located at the site of the charcoal and slag, it seemed doubtful it would operate even a breastwheel. Also, to run a flume from the stream, just above tide head, to a waterwheel located here presents problems. It would have had to been [sic] a suspended flume, which is not good considering the danger of the flood waters which would harass the uprights. Between the stream water above the tide head, and the possible site of the wheel, protrudes a natural outcrop of ledge which extends into the stream. As its top is higher than the headwaters of Falling Creek, and there is noevidence of the ledge having been cut thru, then the flume would have had to go around the

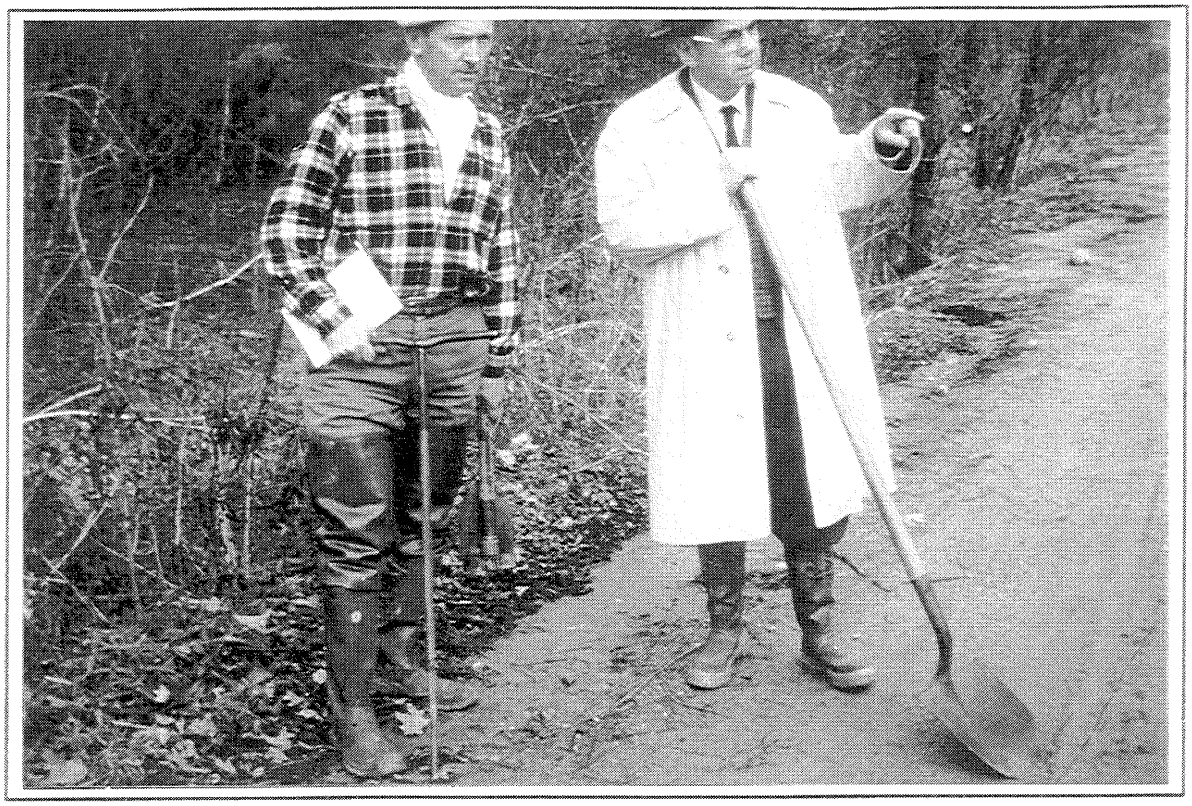


Figure 11. Roland W. Robbins (left) and Frederick Pease (right) standing along access road to marina at "controversial site of Falling Creek," February 22, 1962 (Photo by Roland Wells Robbins).

> ledge. However, if the land was once level over to the canal, a straight flume could have been used.
>
> It is my opinion, based on the limited inspection I made, that if any evidence of a blast furnace and its supporting units are to be found at the controversial site, they will be located below and possibly to the southerly side of the present roadway to the marina. If the furnace stood between the roadway and the canal, remnants may be found. While this site should be carefully tested before other areas should be given consideration, I would not rule out the northerly side of the stream, nor possibly, other sites to the southerly side of the creek (Roland Wells Robbins to J. Paul Hudson, 1 March 1962).

Robbins ends the letter with the observation that grading was taking place on the property along Route 1, probably indicating that development was imminent. He recommended that the furnace site not be purchased until a survey was completed to determine the "potential of the site" (Robbins to Hudson, 1 March 1962).

Following his 1962 visit to the Falling Creek site, Robbins continued his attempts to obtain funds for a survey and excavation project, writing to both J. Paul Hudson at Jamestown about federal and state funding and Mr. Marcus Elcan of the Lynchburg Foundry Company about private donations. He also stayed in touch with Mr. Frederick Pease, who informed him that the property was for sale by the firm of Rucker and Richardson in Richmond. They would sell a 300 ft. wide strip along the river, an 8-acre tract, for approximately $20,000. Robbins corresponded with Thurlow G. Gregory in the fall of 1962 after reading his article in the *Virginia Magazine of History and Biography,* noting that while he was not "close to the Falling Creek Furnace controversy, naturally I have been very much interested in it" (Robbins to Thurlow G. Gregory, 21 September 1962). Gregory responded by challenging Robbins' use of the word controversy,

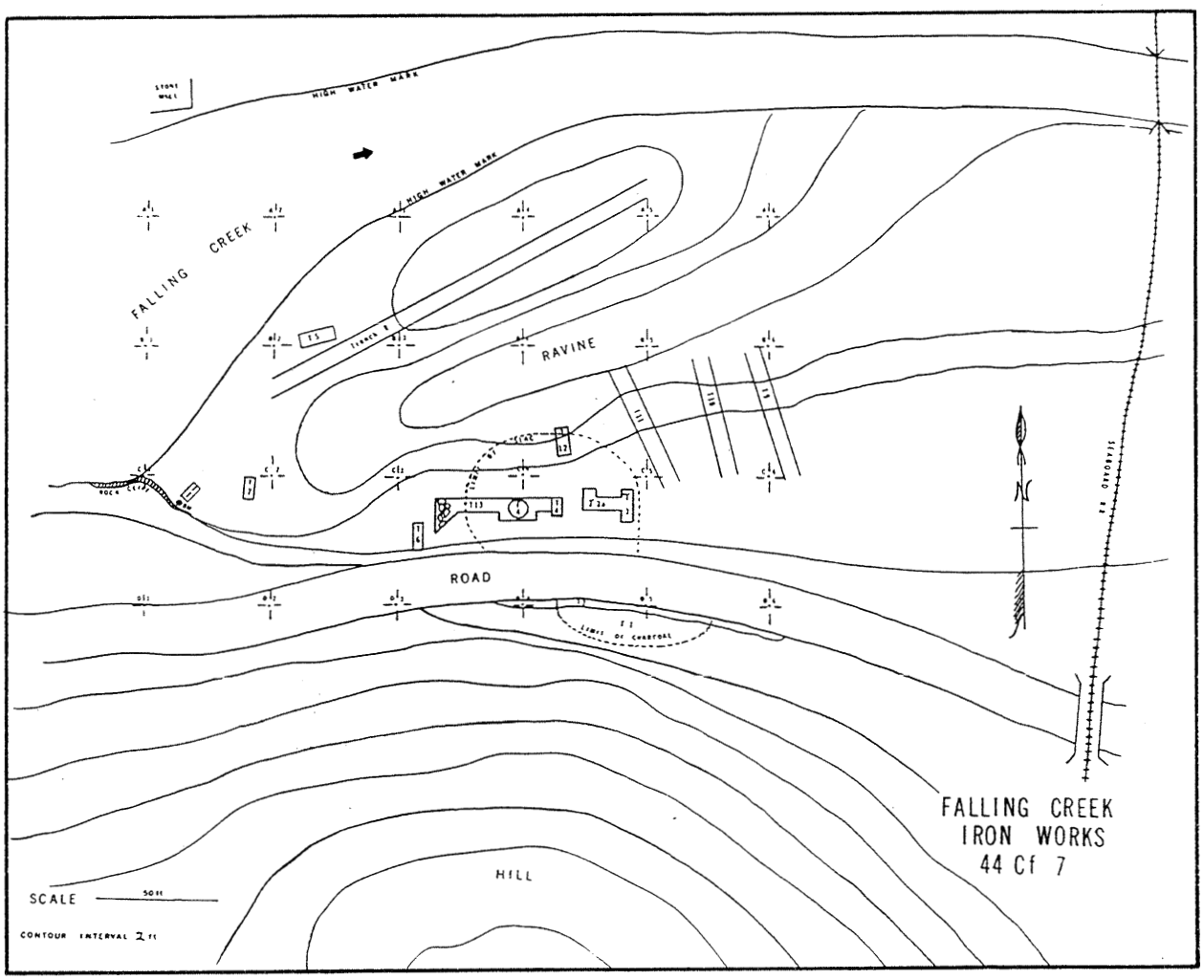


Figure 12. Site 44CF7, plan of previous excavations (MacCord 1964:3).

stating that "I do not concede that there is a controversy.... I accept the Virginia Company of London as being the final authority upon that matter" (Gregory to Robbins, 24 September 1962).

In 1963, Frederick Pease wrote to Robbins to report that he had worked on an excavation of the Falling Creek site conducted by Howard A. MacCord, Sr., of the Virginia State Library (Pease to Robbins, 19 August 1963). This more extensive formal archaeological testing was carried out by MacCord and the Archeological Society of Virginia in July 1963 (MacCord 1964) (see Figure 12). A total of 13 trenches was exposed by a "traxcavator" and hand excavation in the low-lying area between an access road (to a marina) and Falling Creek. Excavation of these trenches revealed the presence of industrial deposits (slag, charcoal) covering an area approximately 75 ft. in diameter immediately adjacent to the access road. A discrete charcoal deposit was also observed nearby on the south side of the road, possibly corresponding to the "charcoal pit" discovered by Bensley. Excavation of the industrial deposits resulted in the identification of possible structural remains, though continued digging appropriately was halted and the remains covered. The industrial debris and the possible structural remains, however, suggested that the "main blast furnace ... will be found under the existing road" immediately to the south (MacCord 1964:12). The location of the principal structural remains under the existing road would be consistent with the report that Bensley "encountered iron ore and slag as he dug a road to his new

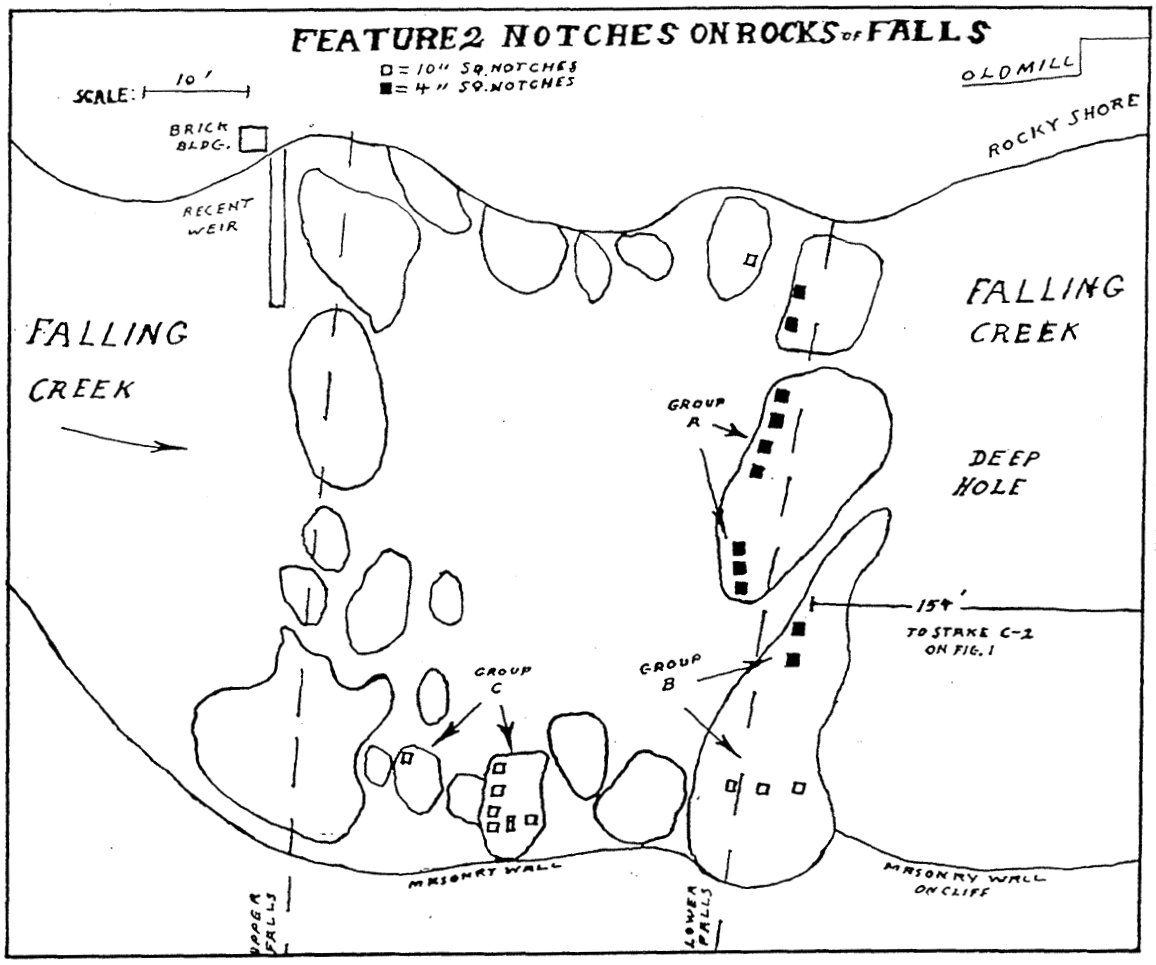


Figure 13. Site 44CF7, plan of rock cuts recorded during previous excavations (MacCord 1964:8).

swimming pool in 1925," and with the observations made by Robbins (*Richmond News Leader* 1925). MacCord also identified three "groups" of notches that were carved into the rocks at the falls of Falling Creek to the west, associated with either the ironworks or with Archibald Cary's gristmill and forge operation on the north bank of the creek (Figure 13). Finally, reexamination of the archaeological assemblage recovered by MacCord (curated by the VDHR, Richmond) revealed the presence of a previously unidentified fragment of iron "pig," further confirmation of the presence of a furnace producing cast-iron from ore at 44CF7.

Following his 1963 excavations, MacCord and Roland Robbins carried on a brief correspondence concerning the ironworks that resulted in Robbins' third and final visit to the site, with MacCord, in 1968. At this point, the site area seems to have been cleared of all vegetation, probably as part of the work for the apartment complex pool (Figures 14 and 15).

To better understand the archaeological character and potential of the Falling Creek Ironworks, VDHR staff conducted a brief on-site reconnaissance on February 1, 1990. Accompanied by Howard A. MacCord, Sr., six auger tests were excavated along the road to the Marina in the approximate area where MacCord had recovered evidence of the ironworks in 1963. Though only limited slag was revealed, an extensive charcoal deposit corresponding to that observed by Bensley and MacCord was identified. That deposit, located on the south shoulder of the marina

Figure 14. "Supposed site of ironworks" looking northeast, Falling Creek, VA, February 24, 1968. Note the basketball and volleyball courts on the site area between the road and the creek (Photo by Roland Wells Robbins).

road at the base of the slope, was found to be up to 2 ft. thick and extended nearly 3 ft. below modern grade. A sample of the charcoal was submitted for radiocarbon analysis and an uncorrected date of 390 +/- 70 years B.P. was obtained (A.D. 1490–1630, Beta-35886). Though "late" radiocarbon dates need to be interpreted with caution, the range reasonably excludes any association of the charcoal with Archibald Cary's forge operation during the eighteenth century.

The land-based reconnaissance was supplemented by an underwater exploration. Underwater archaeologists from the VDHR examined the large pool at the base of the falls adjacent to the Ampthill Mill ruins in an effort to identify any remains of the "tools thrown into the river" by the Indians during the 1622 uprising (Hening 1969:135). Little siltation was observed in the pool due to the continuous scouring of that area by the falls of Falling Creek. At the southern base of the falls, a large stone was observed that exhibited an "L-shaped" notch used to support a dam post, similar to those still in situ above water. The stone, however, appeared to be resting on an iron bar with characteristics suggesting a "pig" of cast iron. The iron bar was left in situ for future recordation and retrieval.

The various episodes of exploration at 44CF7 have demonstrated the presence of undisturbed deposits associated with the Falling Creek Ironworks. Unfortunately, only limited information was obtained under controlled scientific conditions. Existing data also addresses only the industrial component of a much larger community that existed in the vicinity of Falling Creek prior to the uprising of 1622. The location of the residential area has not been determined nor has the presence of suitable limonite deposits at "Iron Bottom" been confirmed. The ironworks site therefore exists as a discrete entity as yet unevaluated in relation to its associated archaeological context.

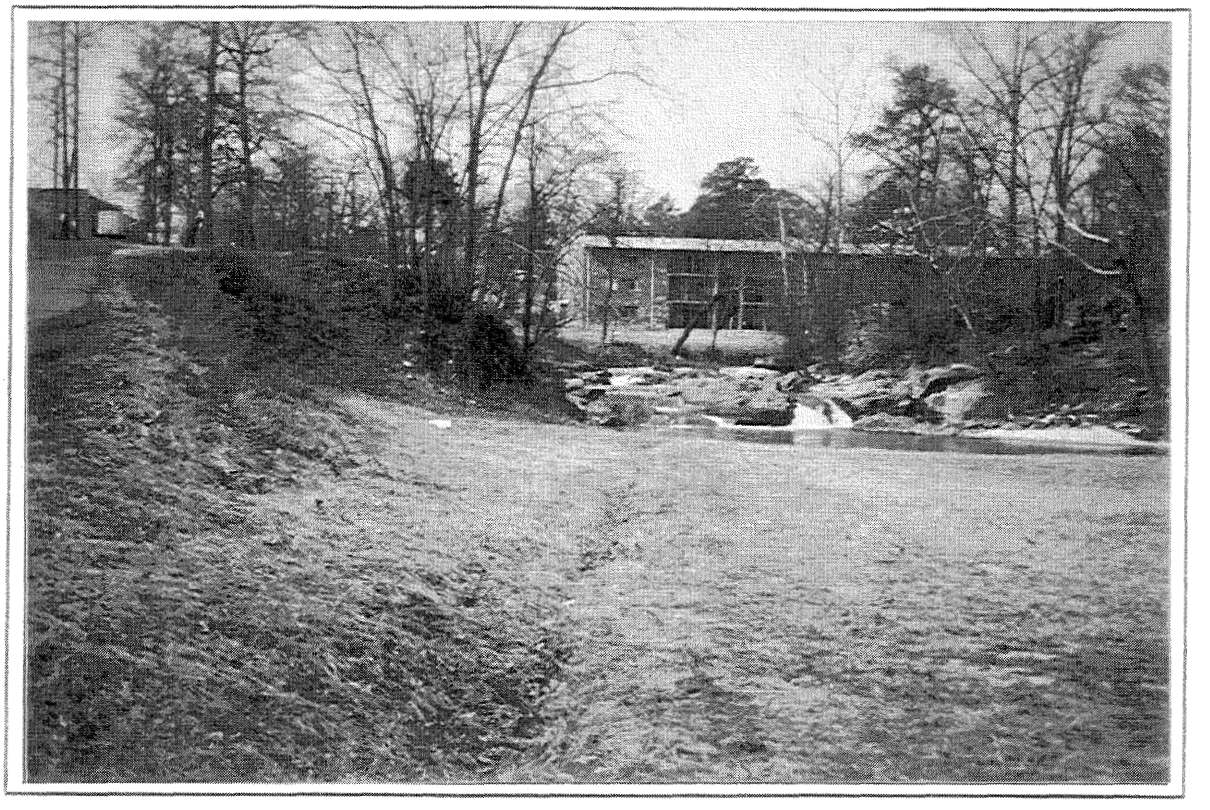


Figure 15. "Supposed site of ironworks" looking northwest toward falls, Falling Creek, VA, February 24, 1968. Note the apartment buildings in background and cleared site area in foreground (Photo by Roland Wells Robbins).

Chapter 3: Research Design and Methods

Introduction

The results of Robbins' 1951, 1962, and 1968 visits, MacCord's 1963 archaeological investigations, and the 1990 VDHR field inspection served as a basis for developing a research design for the present investigation of 44CF7. Previous research established the historical context of the property and documented the presence of features and deposits associated with the Falling Creek Ironworks. As discussed in Chapter 2, 44CF7 reportedly dates to the Virginia Company period (1607–1624) and is the site of the first blast furnace in British America. Comparative archaeological data for 44CF7 is relatively sparse due to its early age and the specific type of ironworks. A review of archaeological research on colonial period ironworks sites in Tidewater Virginia and outside this region, however, provides some indication of the types of (industrial and domestic) resources anticipated for the site. Familiarity with specific research questions raised at similar sites allows the archaeological component of 44CF7 to be evaluated in terms of its research potential. In addition, this information contributes to the larger historical significance of the site as it relates to the development of the first iron industry in Virginia and the English New World during the early seventeenth century, and its relationship to the early development of Tidewater Virginia.

Overview of Historic Resources and Research Considerations

Industrial/Domestic Resources

The archaeological data base for ironworking sites in Virginia is inadequately documented when compared to other historic site types. Iron furnace sites, in particular, have not been subject to extensive archaeological investigation because of the small number of these sites that exist and/or have been identified, and the perception of their research potential (Noël Hume 1975:174–175; Wittkofski et al. 1989).

Site 44CF7 is the only seventeenth-century blast furnace site documented in Virginia; however, historical and archaeological evidence indicates that limited forge experimentation, including some iron smelting, was undertaken earlier at Jamestown (Cotter 1958:110, 165). The best-documented seventeenth-century comparison with 44CF7 is the ca. 1640 Saugus Ironworks located in Massachusetts.

Most of the ironworks sites in Virginia that have been investigated date to the eighteenth and nineteenth centuries. Six of these sites include the Neabsco Mills Ironworks (44PW629) in Prince William County, the Washington Iron Works in Franklin County, the Potts, Wilson Iron Forge/Foundry (44FX7) at Great Falls in Fairfax County, the Accokeek Furnace (44ST53) and Hunter's Iron Works (44ST7) in Stafford County, and Tubal Furnace (44SP12) in Spotsylvania County. Comparatively smaller, yet well-documented late eighteenth-century sites include the Anderson and Draper Forges in Williamsburg (Foss 1977; Brown et al. 1990).

Forges were not as expensive to build or operate as their furnace/foundry counterparts; hence, they were more common. "They [blacksmith shops] existed in every township from coast to coast as well as on most large farms and plantations from the early seventeenth-century to the early twentieth-century" (Noël Hume 1975:179). During the earliest years of colonization "the shortage of pig iron and the difficulties of transporting it ... prompted blacksmiths to make their own iron by the bloomery process" (Noël Hume 1975:181).

Traditional iron making, like other industrial trades, was characterized by different stages and/or processes. To clarify the kind of operation at 44CF7 and its relation to other sites, it is useful to summarize iron production processes, site composition, and variables that influenced the success of ironworks operations. This information, integrated with an overview of other documented sites, helps to explain the technology and production methods probably used at 44CF7.

Capron summarizes the main processes used in the production of wrought and cast iron:

> Iron ore was converted to a usable form as wrought iron or cast iron by quite different procedures.
>
> In making wrought iron, the iron ore was not melted but was heated to a pasty mass which was hammered or rolled to eliminate the impurities and form a bloom or billet. This done in a bloomery. Sometimes specially designed pigs of cast iron were used as raw material for a bloomery. However it was worked in the same way as the ore. In a forge the bloom or billet was brought to a red heat and again hammered or rolled until the final stage was reached.
>
> In making cast iron, the iron ore was melted in the presence of lime. When molten the impurities were skimmed off the top. This process took place in an iron [blast] furnace.
>
> Then the iron was poured into the pig moulds forming the pig iron which was the intermediate product in making castings. Occasionally the molten iron was poured into the moulds at the furnace.
>
> In a foundry the pig iron is remelted and poured into molds forming the finished casting (1968, quoted in Troup et al. 1978:44–45).

Work at 44CF7 probably focused on smelting iron ore for the production of both cast and wrought iron, a process that involved the use of a charcoal-fueled blast furnace (Hatch and Gregory 1962; Kingsbury 1906a:472). Often such production included the refinement of the iron in a refinery furnace on the site. This process involved reheating the iron and subsequently beating out impurities with a waterwheel-driven hammer (Noël Hume 1975:178). The bar iron that resulted from this process eventually made its way to plantation and settlement forges where it was shaped by blacksmiths.

The same type of operation was undertaken at the Saugus Ironworks beginning in the 1640s. The site of the Saugus Ironworks was subject to extensive archaeological and historical research from 1948 to 1953, resulting in the restoration of a large industrial complex. The site consists of blast and refinery furnaces, a rolling and slitting mill, a warehouse, and the ironmaster's house (Hartley 1957:facing page 113, 165–184) (Figure 16).

Most ironworks sites documented in Virginia date to the eighteenth and nineteenth centuries. One of the earliest and best known of these is the Tubal Furnace (44SP12) which was in operation from ca. 1720 until the mid- to late eighteenth century. "Tubal was perhaps the most technologically advanced iron furnace of its time and was the first iron manufacturing facility in Virginia and the Chesapeake to achieve financial success" (Sanford et al. 1993:107).

The Neabsco Mills Ironworks site (44PW629) dates to the mid-eighteenth century and encompasses approximately 150 acres of a 5,000-acre plantation. Archaeological research at Site 44PW629 has identified the remains of several furnaces, pit mines, road traces, and domestic features (Sanford, personal communication 1993; Sanford et al. 1993). Historical and/or archaeological research on the Accokeek Furnace (44ST53), Hunter's Iron Works, and the Washington Iron Works indicates a similar composition (Sanford et al. 1993; Salmon 1986). The latter operation, for example, began as a bloomery in the 1770s but became a larger, more complex operation by the end of the colonial period. As Salmon states:

> In addition to the furnace and forge, a sawmill and gristmill were constructed. To house the increased number of workers new dwellings were built, as were stables for the horses; sheds for storing ore, charcoal, and iron; a blacksmith's shop to shoe the horses and repair the tools; and an office for conducting business of the ironworks (1986:27).

Archaeological research at the Potts and Wilson Ironworks (ca. 1793–1828) indicates that this site was also a substantial operation. Although no evidence of a blast furnace was found at this site, structural remains of a bloomery or refining forge and foundry were identified (Troup et al. 1978).

The blast furnaces represented at the Saugus, Neabsco, and Washington sites were of a fairly standard design and operation for the colonial and early postcolonial periods (Noël Hume 1975:175; French 1858, quoted in Troup et al. 1978; Salmon 1986:24) (Figure 17). In terms of furnace construction:

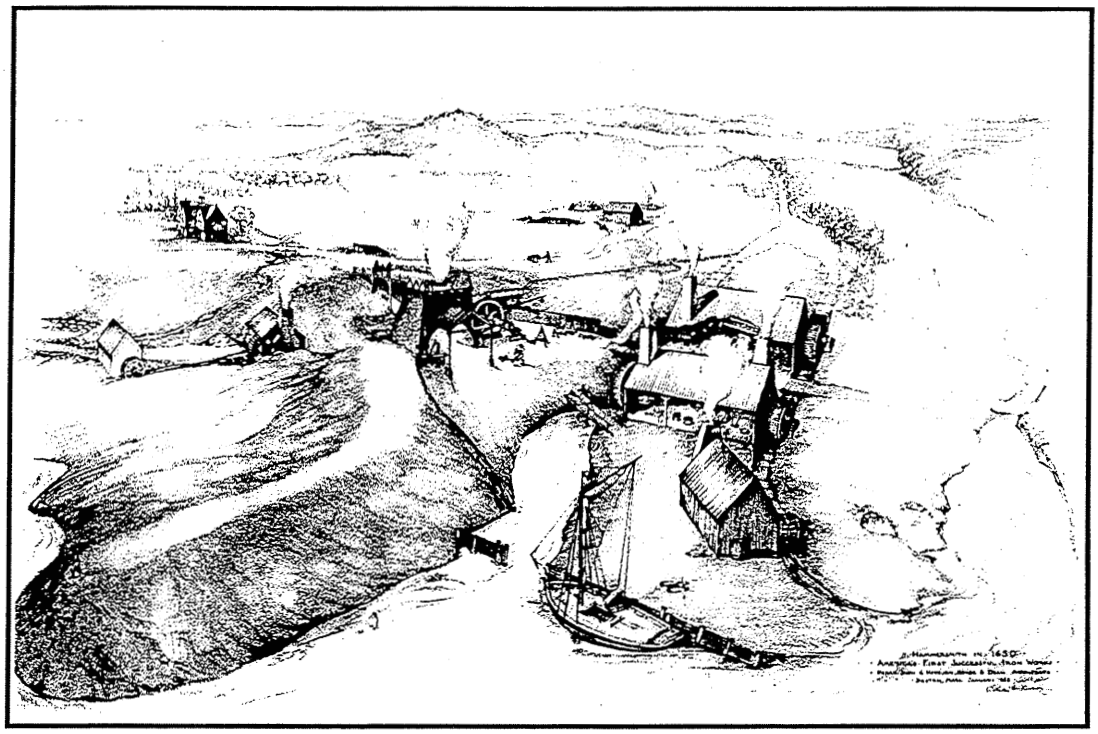


Figure 16. Conjectural drawing of Saugus Ironworks (Hartley 1957:facing p. 113).

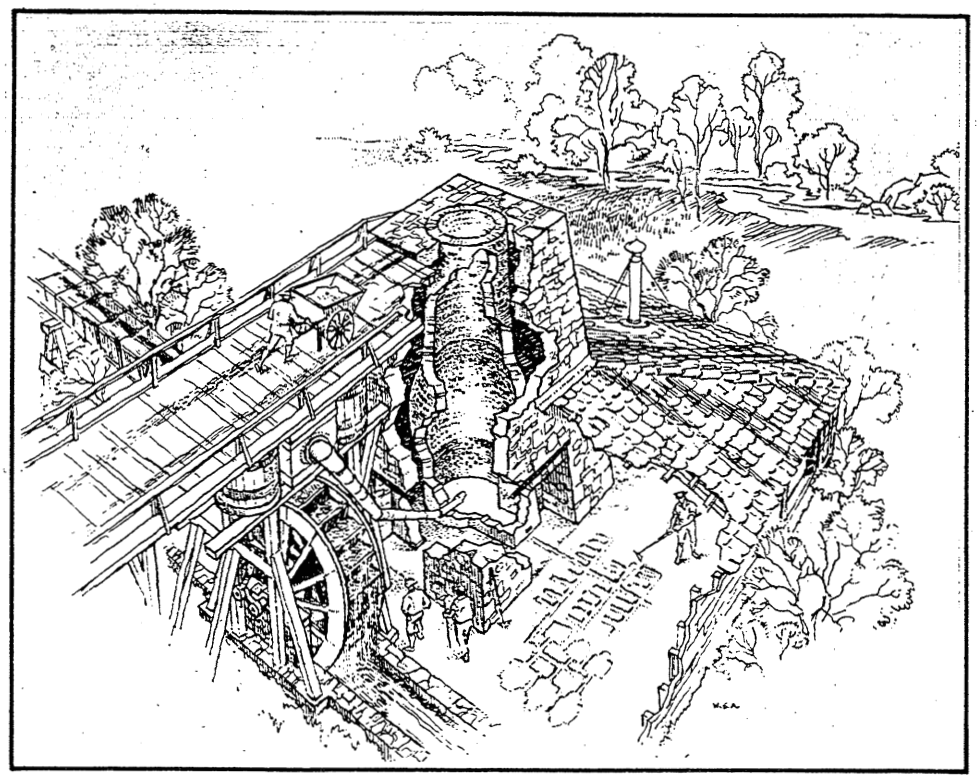


Figure 17. Conjectural drawing of Marlboro Furnace (Salmon 1986:24).

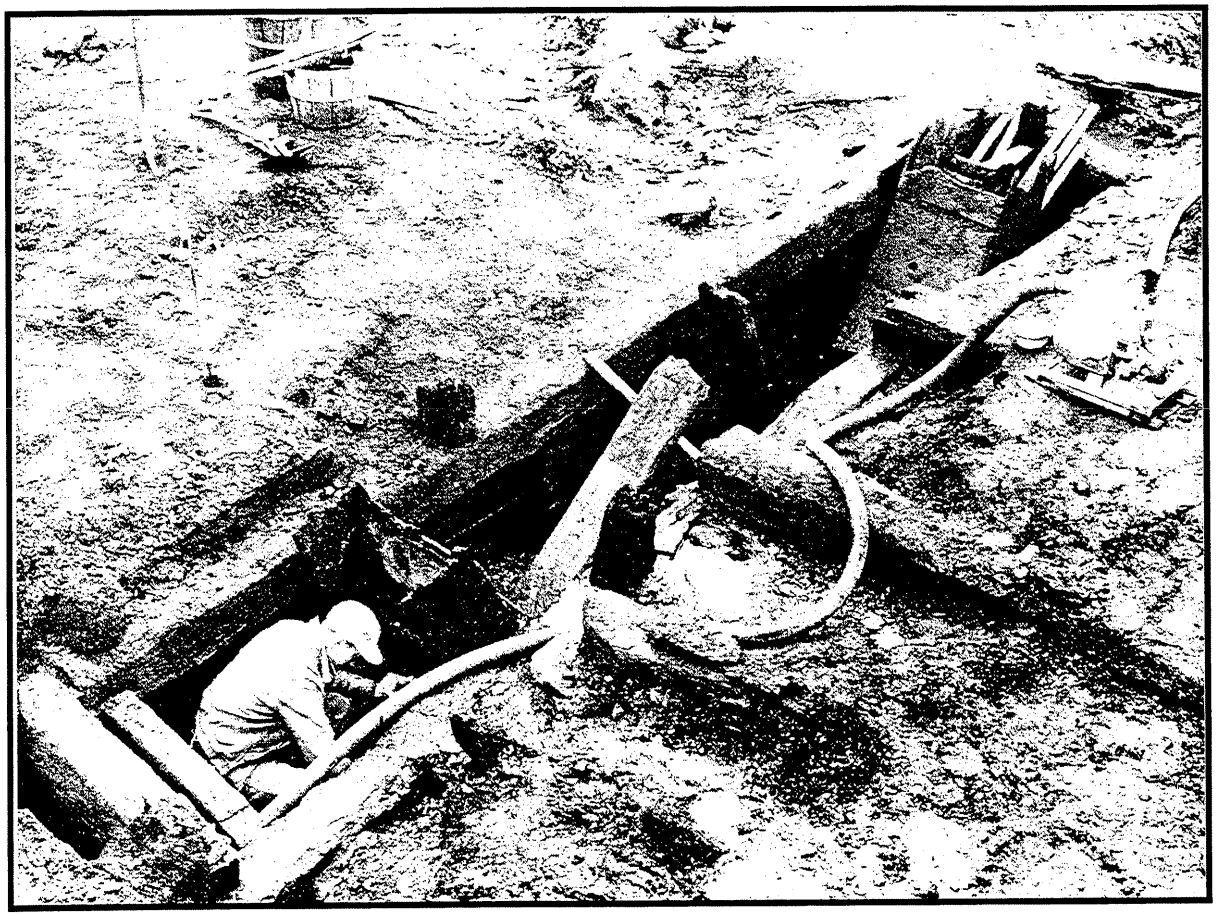


Figure 18. Excavation of waterwheel and timber-lined pit from waterlogged deposits at Saugus (Robbins and Jones 1959:57).

> Where possible, furnaces were built into the side of a hill, for they stood some thirty feet high and had to be charged from the top. They also had to be close to water power to drive the wheel that pumped the bellows. The stacks were usually about twenty-five feet square at the bottom, tapering somewhat toward the top, and with the walls about six feet thick (Noël Hume:1975:175).

A principal component of the furnace was the casting floor, which was generally located opposite the bellows and within an attached shed constructed of heavy timber or stone (Noël Hume 1975:176). The casting floor consisted of

> sand, with a channel scored into it running away from the hearth and with forms molded into the sand from wooden blocks on either side. When the door of the hearth was raised, the molten iron rushed out into the main channel and was skillfully ferried by the workers into the lateral forms or beds. As the level of the iron in the hearth dropped, the last of it emerged mixed with the slag riding on its surface. But by this time the forms had been filled, and the contaminated metal remained in the main channel. The result would closely resemble the way in which the kits for plastic models are sold, the key pieces attached by stalks to a central column of waste. That column was known as the sow and was broken up for remelting, while the good-quality moulded bars were, and still are, called the pigs (Noël Hume 1975:176–177).

The environment can influence the types of archaeological remains that are recovered. Deep, wet deposits, for example, may yield pieces of the wooden waterwheel or other organic components of the works. At the Saugus Ironworks, for example, parts of waterwheels and bellows were found in water-logged deposits (Noël Hume 1975:177; Hartley 1957:facing page 33; Robbins and Jones 1959:57) (Figure 18).

Evidence for the workers' housing and related domestic remains (including dwellings, outbuildings, fences, and trash deposits) may exist near the ironworking complex. While comparatively little is known of this aspect of ironworks operations, workers' housing has been documented for the Saugus Ironworks as well as the Neabsco Mills Ironworks site (44PW629) (Hartley 1957:130–131; Sanford, personal communication 1993). Residential villages at this latter site were linked to principal work areas by a road network (Sanford, personal communication 1993).

Several variables influenced the success or failure of an ironworks, including the skill of the ironworks master and his workers, an adequate source and manipulation of water, close proximity to suitable limonite deposits, and abundant timber for the production of charcoal. The difficulties of iron production were noted by B. F. French in his mid-nineteenth-century publication on the iron industry:

> The furnaces, up to this time were blown by wooden and leather bellows, and the cold blast, and one tuyere, and their working profitably was greatly influenced by the skill and influence of the founder. With the greatest skill and every precaution, the yield still depended much upon the blast, and this was invariably produced by water power, which was often very irregular and weak, and in dry seasons incapable of furnishing the necessary power, it will account for the small annual product of the furnaces of that day (1858:n.p., quoted in Troup et al. 1978:41).

Boyer (1931), in his study of forges and furnaces in New Jersey, commented on important considerations in establishing an ironworks:

> The location for the successful operation of the early charcoal furnaces and forges was determined by two very essential elements—streams and forests. The first furnished the power and the other produced the wood from which charcoal, or "coal," as it was called, was made. To provide sufficient water power at all seasons required an outlay of large sums of money in the building of dams and sluiceways and the installation of water wheels, while the large amount of charcoal needed for even a moderate size furnace or forge necessitated extensive tracts of land (1931:n.p., quoted in Troup et al. 1978:41).

Anticipated Resources

A variety of archaeological deposits and features may be present at 44CF7. As discussed above, previous research at the site has identified charcoal and slag deposits and possible structural remains. It is possible that additional testing may reveal the furnace's trunk and the foundation of the casting shed, and the possible remains of the tuyere arch, crucible, and hearth (Noël Hume 1975:177). In addition, the remains of auxiliary structures like a refining furnace and chafery may be present as well as other work and storage areas. Some evidence for structures may already have been found (MacCord 1964:9).

Furnace sites are usually characterized by substantial deposits of slag and charcoal. MacCord (1964:6–8) found thick slag and charcoal deposits at 44CF7 that most likely represent fuel stockpiles and waste piles. These deposits are concentrated near the base of a hill at the suspected location of the main furnace (MacCord 1964:7, 9).

Less obvious features "but equally important, will be post holes or sockets cut into the native rock that carried the vertical members supporting the flume and charging platform" (Noël Hume 1975:177). Rock cuts, believed to be associated with a trestle/flume and a dam have been identified at 44CF7 (MacCord 1964:8–9).

Domestic resources may also be present in the vicinity of 44CF7. The most probable locations of these remains are on parcels near the site and adjacent to Falling Creek, close to the James River, and/or on the hilltop located immediately south of the site. The workers' housing would be evidenced by artifact scatter, trash deposits, and features (i.e., cellars, postholes) indicative of dwellings, outbuildings, and fences.

Research Goals

The primary goal of the present investigation was to evaluate the eligibility of the site for nomination to the National Register of Historic Places. To this end, the archaeological investigation attempted to verify MacCord's work, to assess the present integrity of the site, and to define the entire site area through

additional survey and testing in an attempt to identify related components, such as workers' housing. The synthesis of the site's historical context with regard to its use as an ironworks permits the identified archaeological resources to be assessed in terms of current research issues pertaining to such sites.

Project Limitations

Relatively extensive work has been completed at 44CF7 during the twentieth century. As discussed in Chapter 2, indiscriminate digging occurred during the first half of this century followed by archaeological testing in the early 1960s. Although the archaeological investigation was well documented and efforts were made to protect potentially significant features for future study (MacCord 1964:7), this work, as is inherent in all archaeological work, had a destructive impact on the site. Disturbances from previous activities on 44CF7 are documented in this study, and subsequent analyses were completed with these impacts in mind.

Field Methods

In view of the amount of previous work at 44CF7, the present study sought to minimize additional impact to the site while providing comprehensive systematic coverage of the core area of the site and adjacent survey areas peripheral to the site (Survey Areas A, B, and C) (see Figure 3). The testing plan utilized a reference baseline and grid transects established at the beginning of the investigation. A combined total of 177 shovel tests was dug at intervals of 30 ft. or less at three locations within the project area (Figures 19, 20, and 21). Fifty-three of the shovel tests were dug in Survey Area A, 27 shovel tests in Survey Area B, and 97 shovel tests in Survey Area C. Site 44CF7 lies within Survey Area C. Seventy-two of the 97 shovel tests were placed at 44CF7 and its immediate environs. The shovel test results were plotted on a site plan to identify areas of artifact concentration. Two 7 x 7 ft. test units, one 5 x 5 ft. test unit, and three 2.5 x 2.5 ft. test units were hand-excavated at 44CF7 in Survey Area C. No test units were excavated in Survey Areas A or B. The placement of the test units at 44CF7 was based on positive shovel tests and the approximate locations of previously identified features and deposits (MacCord 1964) (see Figures 12, 19, 20, and 21). Soil layers were excavated by natural boundaries and removed to subsoil. Upon exposure of the subsoil, the units were cleaned and inspected for cultural deposits/features. All features, including the cut features in the rock ledges along the falls, were documented by measured drawings and by black-and-white and color photography. Soils, profiles, and artifacts were documented on unit/level record forms. In general, features were not excavated; however, features/deposits that could not be identified in plan were tested to determine their age and function. Elevations were recorded from a temporary datum located .5 ft. above ground surface at the southwest corner of each unit. Each temporary datum was then tied into a permanent datum represented by a 1.0 ft. iron pipe at the base of the rock cliff on the western half of the site. The permanent datum (arbitrary elevation of 10 ft. amsl) is located at grid coordinate 1005.5N 962E. All elevations cited in this report are referenced to the permanent datum. Artifacts were collected according to soil layer/level.

Laboratory Methods

All artifacts recovered during the investigation were arranged by provenience each day and processed in that order. Artifacts were washed, sorted into ceramic, glass, metal, and miscellaneous groups, and labeled.

All artifacts were catalogued for analysis according to a standard descriptive format including artifact group, class, object, datable attribute, and quantity (see Appendix A). The WMCAR has developed a hierarchical coding system that operates using Paradox relational database software. With this system, artifacts are coded during analysis on standard data sheets for entry into a data file. Using this file, overall project inventories as well as particularistic data reports can be readily generated for inclusion into reports or routine analysis. Each provenience was assigned a terminus post quem (TPQ) representing the date after which the context was deposited. The TPQ is determined from the artifact recovered with the most recent date of manufacture. All artifacts were placed in polyethylene bags for temporary storage at the WMCAR. The artifacts will ultimately be curated by the VDHR.

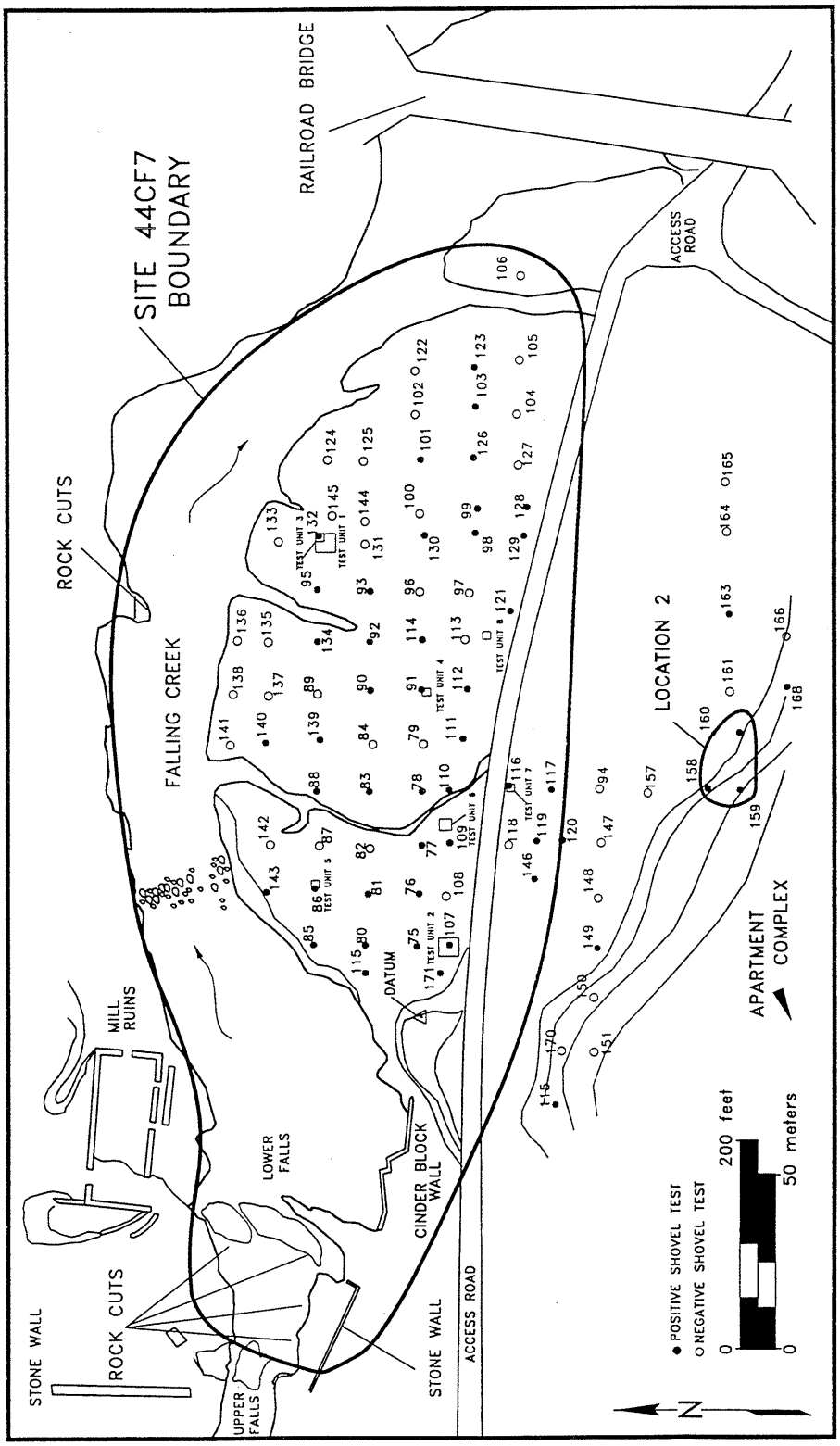


Figure 19. Area C, plan showing Site 44CF7, Location 2, shovel tests, and test units.

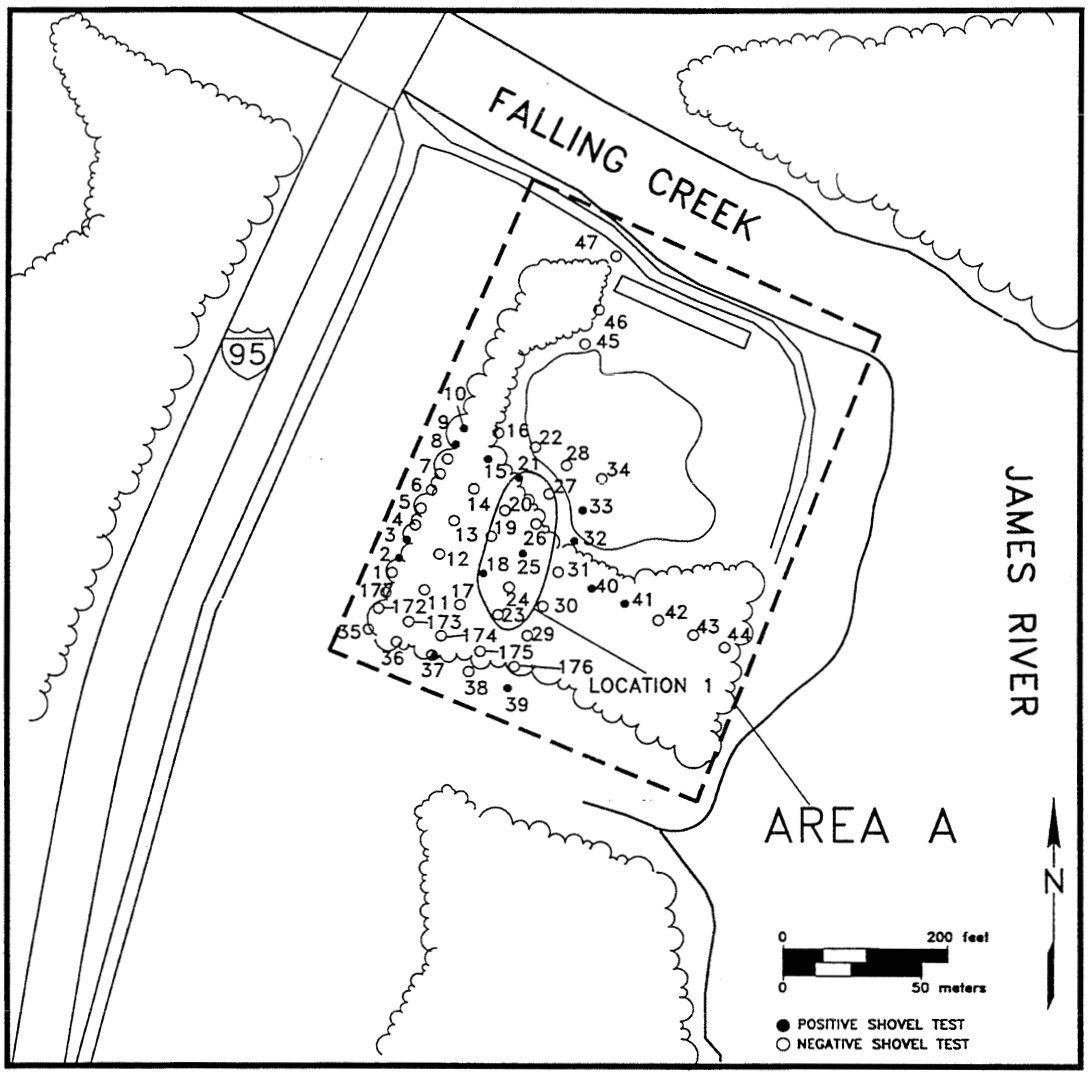


Figure 20. Area A, plan showing Location 1 and shovel tests.

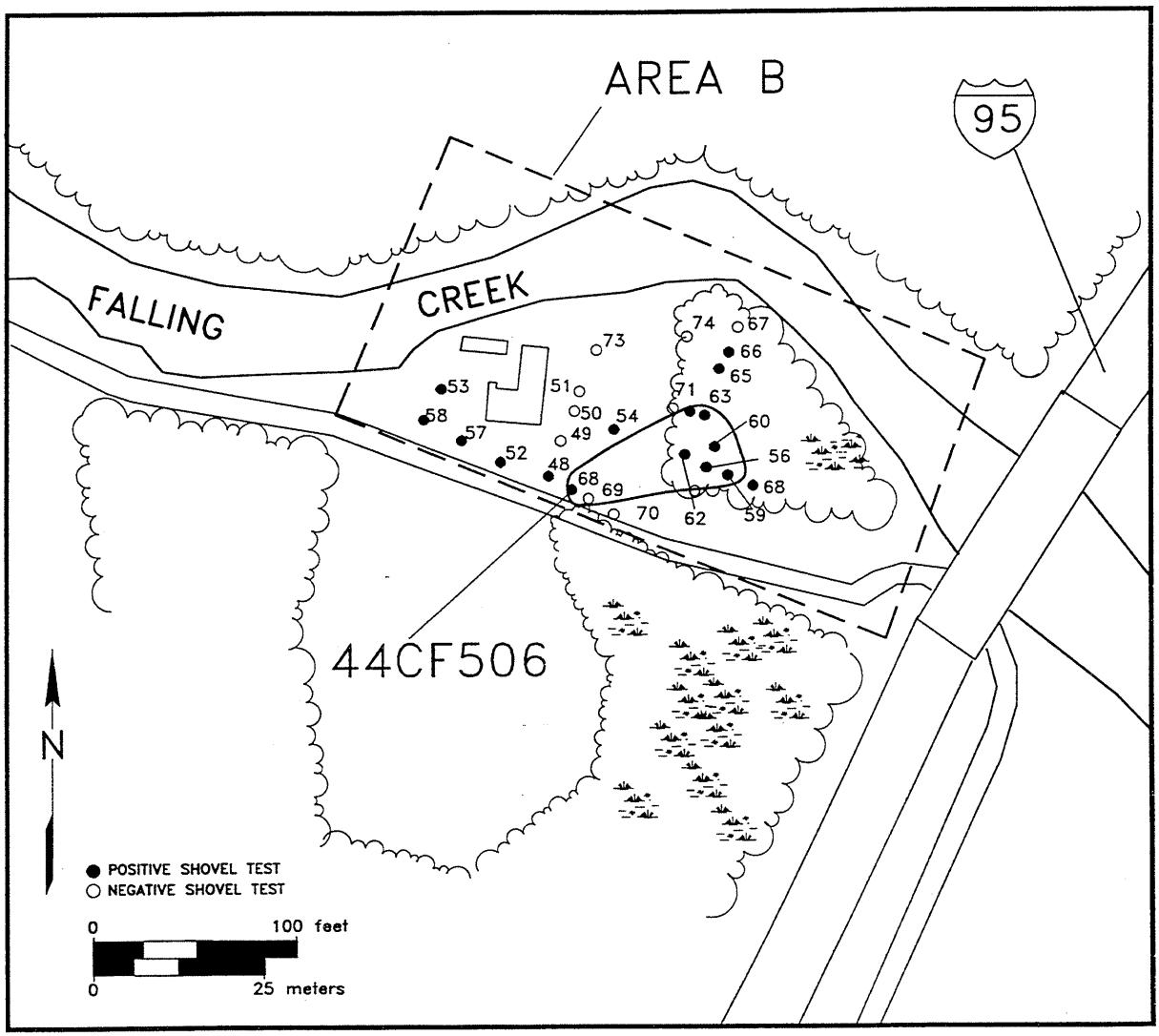


Figure 21. Area B, plan showing Site 44CF506 and shovel tests.

CHAPTER 4: Research Results and Archaeological Evaluation

The evaluation study of 44CF7 included systematic shovel testing of three areas that were peripheral to the site. These areas, designated as Areas A, B, and C, were surveyed in an attempt to identify domestic sites associated with the ironworks. Site 44CF7 is located within Area C and will be discussed within the context of this area.

Shovel Test Results

Area A

Area A comprised a large parcel (approximately 12 acres) that was located approximately .30 mi. east of 44CF7 (see Figures 3 and 20). This property, presently in use as a marina, is bounded on the north by Falling Creek, on the west by Interstate 95, on the south by a wooded parcel, and on the east by the James River.

Fifty-three shovel tests (Shovel Tests 1–47 and 172–177) were systematically placed at intervals of 30 ft. or less along grid transects across this area (see Figure 20). Eighteen of the 53 shovel tests were positive, yielding a combined total of 61 artifacts. All but 2 of the 59 historic artifacts, a fragment of water-worn pearlware ceramic and a piece of handmade brick, date to the twentieth century. Modern artifacts consist primarily of pieces of bottle and window glass, drain pipe, and wire nails (see Appendix A). Prehistoric material was limited to 2 artifacts, 1 single piece of punctate/net-impressed, grog-/grit-tempered ceramic found in Shovel Test 21 and 1 piece of quartz debitage found on the ground surface approximately 15 ft. south of that shovel test. The prehistoric material and historic ceramic were designated as Location 1. Location 1 measures approximately 220 ft. north–south and 120 ft. east–west.

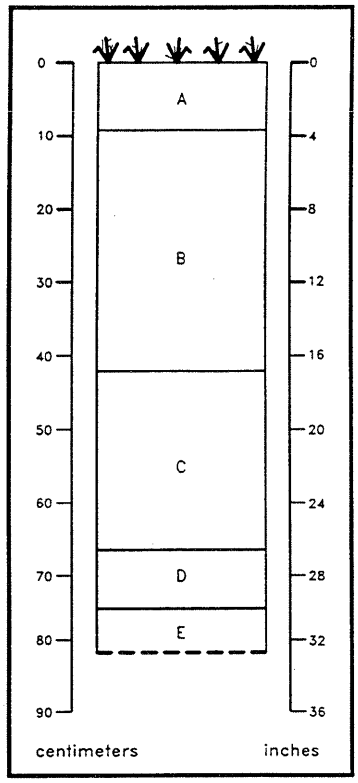
Soils varied across the area; however, all appeared to represent modern fill. In general, the soil profile for the southern half of the area consisted of a top layer of dark yellowish brown (10YR4/4) sand fill (Layer A) (Figure 22). Below the sand was a layer of dark yellowish brown (10YR3/4) sandy clay (Layer B), which in turn was over a dark yellowish brown (10YR4/6) sand mottled with black (10YR2/1) silty sand (Layer C). Below Layer C was a very dark brown (10YR2/2) sandy sludge deposit (Layer D). This deposit was over very dark gray (10YR3/1) silty clay (Layer E). Water was encountered in many of the shovel tests at 2.7 ft. below ground surface.

In the middle of the survey area at Location 1, soils typically consisted of a dark yellow brown (10YR3/6) silty sandy loam fill (Layer A) (Figure 23). Beneath this layer at approximately 1.2 ft. below ground surface was a dark yellowish brown (10YR4/4) sand (Layer B). Layer B was over a dark gray (10YR3/1) silty clay fill (Layer C).

Testing on the extreme northern portion of the area at the location of the marina also revealed modern fill deposits. The soil profile for Shovel Test 46, for example, consisted of a gravel deposit (Layer A) over a dark yellowish brown (10YR4/6) silty clay (Layer B) (Figure 24). Below the clay was a dark yellowish brown (10YR4/4) sand (Layer C). This layer was over a yellowish brown (10YR5/6) sand (Layer D) that extended to at least 2.2 ft. below ground surface.

Shovel tests placed closer to the James River revealed fill typically represented by variations of dark yellowish brown (10YR4/6, 10YR4/4) silty clay soil (Figure 25). This deposit, mixed with pieces of modern bottle glass, large rock, and gravel, measured at least 1.5 ft. below ground surface.

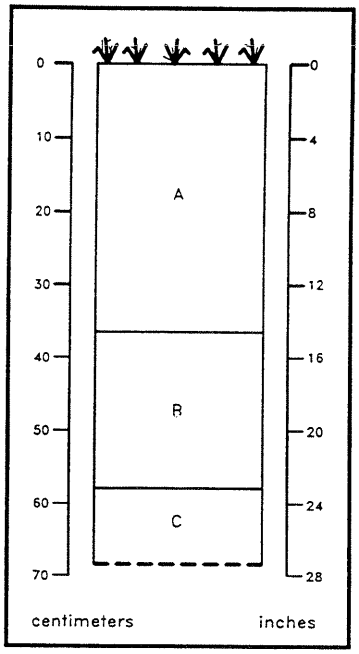
Extensive filling has occurred in Area A during the twentieth century. This is evident from the shovel test results and from the project area base map. The survey area is no longer wooded, as indicated on the base map, nor does the wet, low-lying portion of the survey area shown just south of the large building still exist. According to the property manager, Area A was cleared of trees and portions filled within the past 20 years. Prior to this, dredged sand from the James River was dumped in the area (Waldrop, personal communication 1993).



KEY

A - Dark Yellowish Brown (10YR4/4) Sand (Fill)
B - Dark Yellowish Brown (10YR3/4) Sandy Clay (Fill)
C - Dark Yellowish Brown (10YR4/6) Sand Mottled with Black (10YR2/1) Silty Sand (Fill)
D - Very Dark Brown (10YR2/2) Sandy Sludge (Fill)
E - Very Dark Gray (10YR3/1) Silty Clay (Fill)

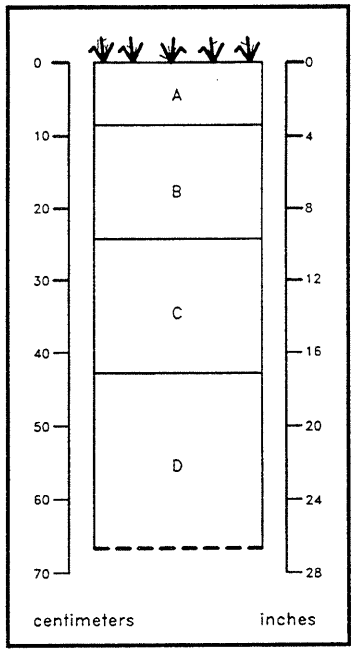
Figure 22. Area A, profile of Shovel Test 2.



KEY

A - Dark Yellow Brown (10YR3/6) Silty Sandy Loam (Fill)
B - Dark Yellowish Brown (10YR4/4) Sand
C - Dark Gray (10YR3/1) Silty Clay (Fill)

Figure 23. Area A, Location 1, profile of Shovel Test 21.



KEY

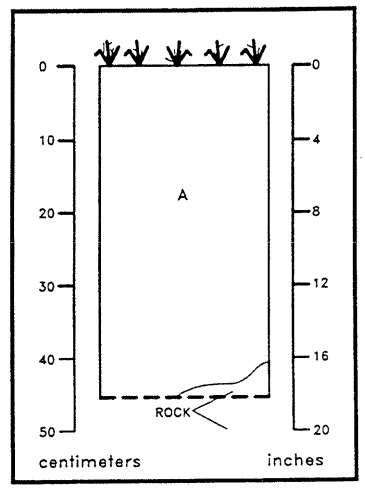
A - Gravel (Fill)
B - Dark Yellowish Brown (10YR4/6) Silty Clay (Fill)
C - Dark Yellowish Brown (10YR4/4) Sand
D - Yellowish Brown (10YR5/6) Sand

Figure 24. Area A, profile of Shovel Test 46.

Area B

Area B is located approximately 300 ft. northwest of Area A on a floodplain of Falling Creek (see Figures 3 and 21). Approximately 75% of Area B is wooded with the remaining 25% of the area covered in greenbriar and grass. An abandoned swimming pool and related building are located within this area. Landscaping associated with this facility includes a small berm around the pool fence and remnants of a compact gravel drive/parking lot on the west side of the complex.

Twenty-seven shovel tests (Shovel Tests 48–74) were systematically placed at intervals of 30 ft. or less along grid transects across this area (see Figure 21). Fifteen of the 27 shovel tests were positive, yielding a total of 66 artifacts. The historic assemblage, consisting of pieces of machine made brick, concrete, asphalt, and modern bottle glass, comprised 41% (n=27) of the total artifact assemblage while the prehistoric material comprised 56% (n=39) of this total. The prehistoric



KEY

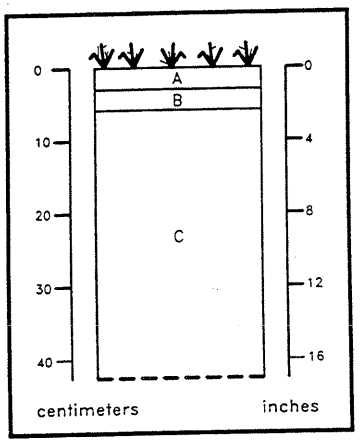
A - Dark Yellowish Brown (10YR4/6) Silty Clay (Fill)

Figure 25. Area A, profile of Shovel Test 41.

artifacts included pieces of quartz, quartzite, and chalcedony debitage, and fire-cracked rock (see Appendix A). The majority of the historic material was scattered in the area immediately adjacent to the swimming pool and road (Shovel Tests 48, 52, 53, 54, 57, and 58) while the prehistoric artifacts were concentrated in Shovel Tests 56, 59, 61, and 71 in the woods near the center of the landform. The largest quantity of prehistoric artifacts (51% [n=20] of the total prehistoric assemblage from Area B, excluding unmodified stone) was found in Shovel Test 61. Almost 50% of the total prehistoric artifacts recovered during the survey was found in Survey Area B.

Soils varied across the survey area. Shovel Test 53, located west of the pool at grid point 560N 530E, contained a thin deposit of black (10YR2/1) sand mixed with pieces of gravel (Layer A) (Figure 26). This layer was over a thin layer of gray (10YR6/1) sand and concrete (Layer B). Beneath this layer was a brown (10YR5/3) sandy clay that extended up to 1.4 ft. below ground surface.

Approximately 180 ft. east of this area and adjacent to the road, soils consisted of fill deposits. Shovel Test 48 (500N 700E) consisted of a dark yellowish brown (10YR4/4) silty clay fill (Layer A) (Figure 27). This deposit was over a dark brown (10YR4/3) sandy silty



KEY

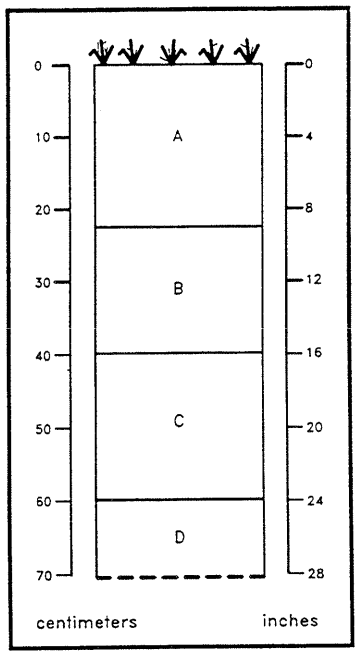
A - Black (10YR2/1) Sand Mixed with Pieces of Gravel
B - Gray (10YR6/1) Sand and Concrete
C - Brown (10YR5/3) Sandy Clay

Figure 26. Area B, profile of Shovel Test 53.

clay (Layer B), which in turn was over a gray (10YR5/1) clay fill (Layer C). Subsoil (Layer D) was characterized by yellowish brown (10YR5/6) clay which was identified at 2.0 ft. below ground surface. Eight pieces of modern bottle glass were recovered from Shovel Test 48.

In general, the soils on the eastern half of Area B at the location of the prehistoric artifact concentration, designated as Site 44CF506, consisted of a top layer of dark yellow brown (10YR4/4) silty clay loam (Layer A) that measured approximately .30 ft. deep (Figure 28). Layer B was a yellowish brown (10YR5/6) silty clay that measured up to 1.0 ft. below ground surface. Beneath Layer B was a yellowish brown (10YR5/8) silty clay subsoil.

Layers A and B were mixed with small fragments of charcoal in three of the shovel tests (Shovel Tests 56, 61, and 63). As discussed above, Shovel Test 61 contained 19 pieces of debitage and 1 piece of fire-cracked rock. Most of the artifacts found in this shovel test appeared to be contained in Layer A. Site 44CF506 measures approximately 100 ft. north-south and 220 ft. east-west. The core of the site appears to be located in the area of Shovel Tests 56, 61, and 71, which had the highest artifact densities.



KEY

A - Dark Yellowish Brown (10YR4/4) Silty Clay (Fill)
B - Dark Brown (10YR4/3) Sandy Silty Clay
C - Gray (10YR5/1) Clay (Fill)
D - Yellowish Brown (10YR5/6) Clay (Subsoil)

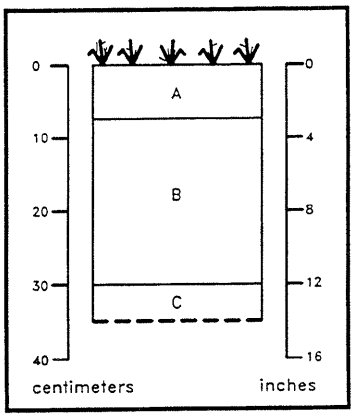
Figure 27. Area B, profile of Shovel Test 48.

The survey results indicate that Site 44CF506 probably served as a campsite for prehistoric groups. The low density and range of artifacts suggest that the site functioned as a procurement camp where activities focused on food processing and to a lesser extent, on tool resharpening. The absence of diagnostic artifacts recovered from the site does not permit its age to be determined.

Area C

Area C is located approximately 670 ft. west of Area B and includes 44CF7. The area consists of a floodplain (200 ft. north-south x 600 ft. east-west), falls, and the grass and wooded slope and hill immediately north of the Falling Creek Apartments (see Figures 3 and 19).

A total of 25 shovel tests was placed on the wooded slope and hill immediately adjacent to the apartment



KEY

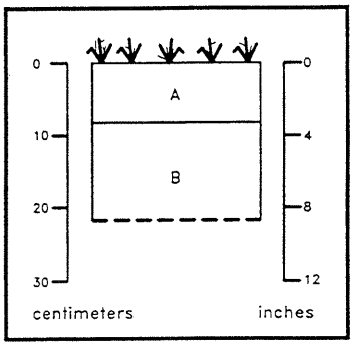
A - Dark Yellow Brown (10YR4/4) Silty Clay Loam
B - Yellowish brown (10YR5/6) Silty Clay
C - Yellowish Brown (10YR5/8) Silty Clay (Subsoil)

Figure 28. Area B, Site 44CF506, profile of Shovel Test 61.

complex. Nine of the 25 shovel tests were positive (see Figure 19). Historic material was characterized mainly by modern construction debris such as pieces of machine-made bricks, asphalt, tiles, and cinder blocks. Mixed with some of this twentieth-century material was a piece of slag from Shovel Test 160 and a piece of cinder from Shovel Test 158. Prehistoric material was limited to an informal tool made of quartz from Shovel Test 159. All of the artifacts were recovered from modern deposits. The location of the prehistoric material and the pieces of slag and cinder was designated as Location 2. Location 2 measures approximately 30 ft. north–south x 50 ft. east–west.

Soils varied across this portion of Area C. The typical soil profile for the southwestern part of the area consisted of a yellowish brown (10YR5/6) compact clay fill (Layer A) (Figure 29). Beneath Layer A was a brownish yellow (10YR6/6) clay subsoil (Layer B).

Soils on the wooded slope on the southeastern part of Area C generally consisted of a thin layer of dark brown (10YR3/3) humus (Layer A) over a thick, yellowish brown (10YR5/6) clay subsoil (Layer B) (Figure 30). This layer was excavated to 3.0 ft. below ground surface to ensure that no cultural deposits were present.



KEY

A - Yellowish Brown (10YR5/6) Compact Clay (Fill)
B - Brownish Yellow (10YR6/6) Clay (Subsoil)

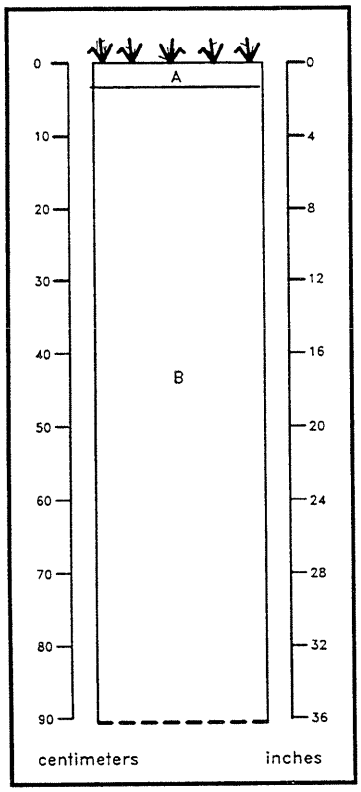
Figure 29. Area C, profile of Shovel Test 155.

The grassy slope east of the woods appeared to be a drainfield for the apartment complex. Soils at this location typically consisted of a top layer of dark brown (10YR3/3) sandy loam ((Layer A) (Figure 31). Beneath this layer at .20 ft. below ground surface was dark yellowish brown (10YR4/6) clay fill mixed with gravel (Layer B). Virtually identical soils less the gravel were found uphill from this area at Location 2.

In summary, the shovel test results indicate that much of Area C is disturbed. The soils on the eastern and western portions of the area, in particular, consist of modern deposits that are probably associated with the construction of the apartment complex in the 1960s.

Site 44CF7, located on the northern half of Area C, consists of approximately 3.5 acres. It is comprised of a large portion of a broad floodplain of the creek and an area that extends southward beneath the paved access road to the adjacent uphill slope (see Figures 3 and 19). The site extends approximately 190 ft. west to the falls and east to within 150 ft. of a railroad bridge. The site measures approximately 800 ft. east–west x 300 ft. north–south.

As discussed in Chapter 2, both Robbins (1951, 1962) and MacCord (1964:7) identified features adjacent to the road on the western half of the site (see Figure 12). These remains included a charcoal (Feature 1) and/or slag deposits in MacCord's Trenches 2, 3, and 13. These deposits measured up to 2.17 ft. thick



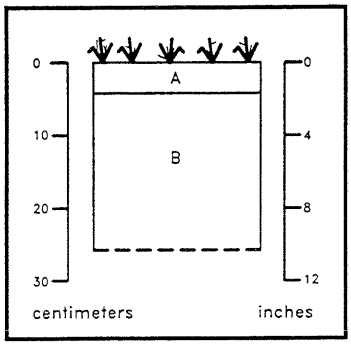
KEY

A - Dark Brown (10YR3/3) Humus
B - Yellowish Brown (10YR5/6) Clay (Subsoil)

Figure 30. Area C, profile of Shovel Test 94.

and were found over an area that was approximately 62 ft. east-west x 50 ft. north-south (MacCord 1964:7). The depth and horizontal extent of Feature 1 indicated that "it was probably the stockpile of charcoal made and maintained for charging the blast furnace and was located near the up-hill side of the furnace for convenience in loading the furnace from the top" (MacCord 1964:8). While the charcoal feature was not dug by MacCord, iron artifacts, i.e., chisels and spikes, were recovered from the slag deposit that he excavated on the north side of the road (MacCord 1964:9-12).

Just west/northwest of Feature 1 were the remains of a possible stone and brick foundation (Feature 4) in Trench 13. "It lies under the undisturbed slag layer at a depth of two and one-half feet from the surface..., and extended downward for over one foot to a wet,



KEY

A - Dark Brown (10YR3/3) Sandy Loam
B - Dark Yellowish Brown (10YR4/6) Clay Mixed with Gravel (Fill)

Figure 31. Area C, profile of Shovel Test 164.

sand subsoil" (MacCord 1964:9). Feature 4 was interpreted as an auxiliary forge to the main furnace. The main furnace was believed to be located beneath the access road (MacCord 1964:12). The location and depths of Features 1 and 4 recorded by MacCord served as a guide for the current examination of the site.

The initial step in the investigation involved intensive shovel testing of the floodplain and part of the area immediately south of the access road. The purpose of these shovel tests was to determine areas of high artifact density that could serve, in conjunction with Robbins' and MacCord's results, as a guide for the placement of test units.

A total of 72 shovel tests was systematically placed at intervals of 30 ft. or less across the site (see Figure 19). Forty-five of the 72 shovel tests were positive, yielding a total of 322 historic artifacts and 11 prehistoric artifacts (see Appendix A). Forty-one percent (n=132) of the historic artifact assemblage dates to the twentieth century. It includes pieces of machine-made brick, concrete, asphalt, and bottle glass. Slag and charcoal, found in 33% (n=24) of the shovel tests, is most heavily concentrated on the western half of the site. In general, charcoal and slag lenses and/or layers were most pronounced near the road; however, they were found across the entire floodplain (Figures 32 and 33). Shovel Test 86, on the northwest portion of the floodplain, for example,

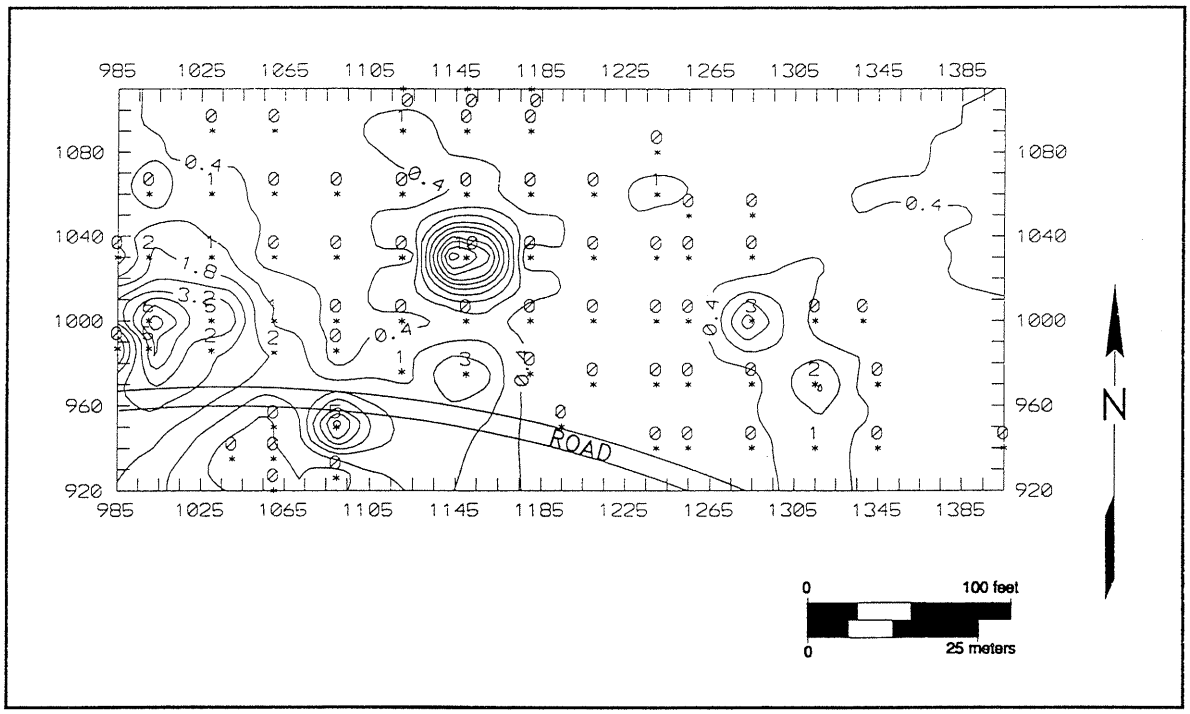


Figure 32. Site 44CF7, distribution of slag by count.

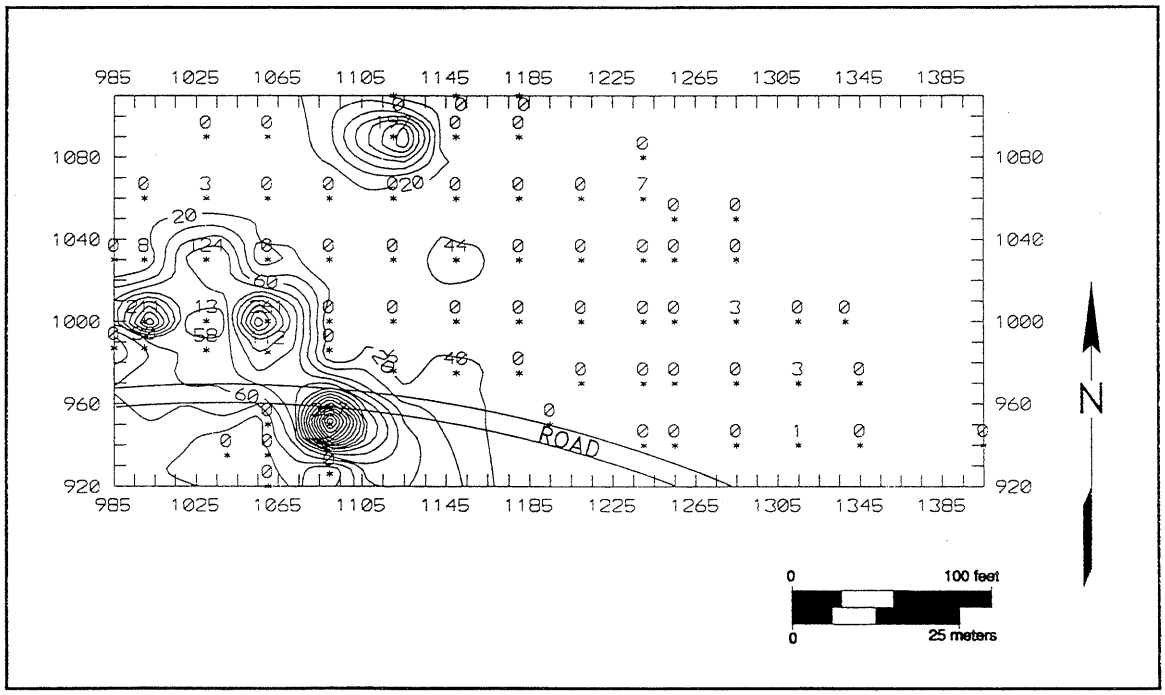
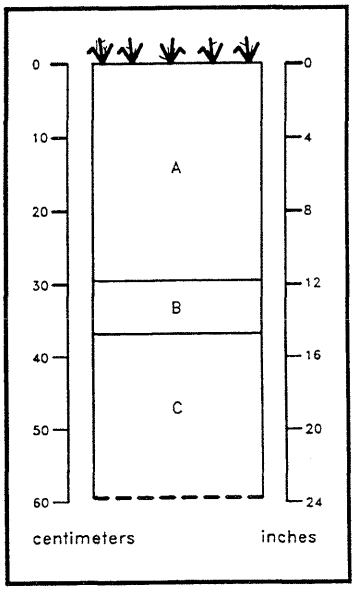


Figure 33. Site 44CF7, distribution of slag by weight (g).



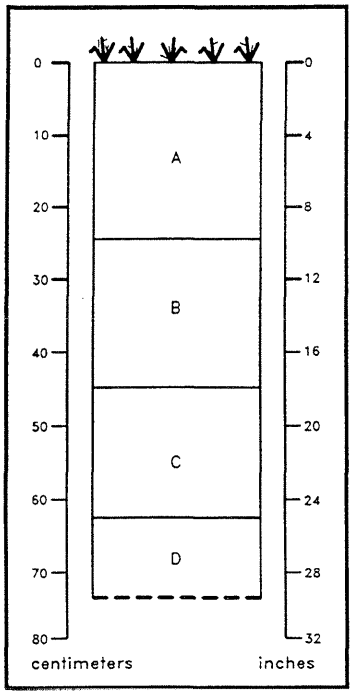
KEY

A - Brown (10YR4/3) Sand
B - Charcoal Mixed with Slag
C - Dark Yellowish Brown (10YR4/6) Sandy Clay (Subsoil)

Figure 34. Site 44CF7, profile of Shovel Test 86.

consisted of a top layer of brown (10YR4/3) sand (Layer A) that was 1.0 ft. thick (Figure 34). Beneath Layer A was a charcoal layer (Layer B) that contained pieces of slag. Layer B was over a dark yellow brown (10YR4/6) sandy clay subsoil (Layer C) at 1.20 ft. below ground surface. Embedded in the subsoil were several medium size cobbles.

Shovel Test 132, located 208 ft. east of Shovel Test 86, consisted of a light yellowish brown (10YR6/4) sand (Layer A) over a dark yellowish brown (10YR4/4) silty sandy clay (Layer B) (Figure 35). Below Layer B was a dark yellowish brown (10YR4/6) silty sand (Layer C). This deposit was over a brown (10YR5/3) silty clay (Layer D) that measured up to at least 2.5 ft. below ground surface. A large piece of unidentified iron was embedded in this layer at 2.3 ft. below ground surface. Artifacts included 18 pieces of iron, 1 fragment of modern bottle glass, and 1 piece of slag (see Appendix A).



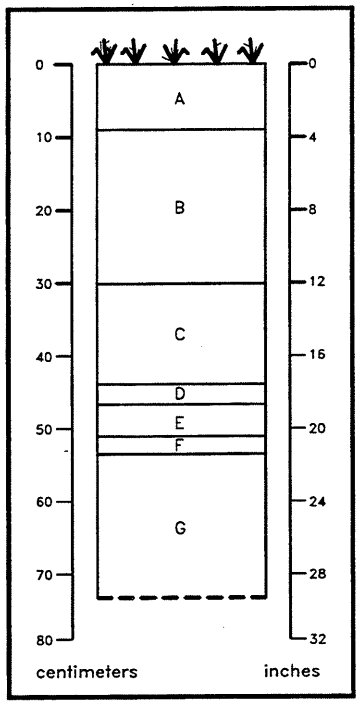
KEY

A - Light Yellowish Brown (10YR6/4) Sand
B - Dark Yellowish Brown (10YR4/4) Silty Sandy Clay
C - Dark Yellowish Brown (10YR4/6) Silty Sand
D - Brown (10YR5/3) Silty Clay

Figure 35. Site 44CF7, profile of Shovel Test 132.

The soil profile for Shovel Test 101, located on the eastern half of the site, consisted of variations of brown sand and sandy clay soils (Layers A–F) over a yellowish brown (10YR4/6) sandy clay subsoil (Layer G) (Figure 36). Layers A and B appeared to be modern fill layers while Layers C–E represented alluvial deposits. These latter deposits contained several pieces of slag and charcoal.

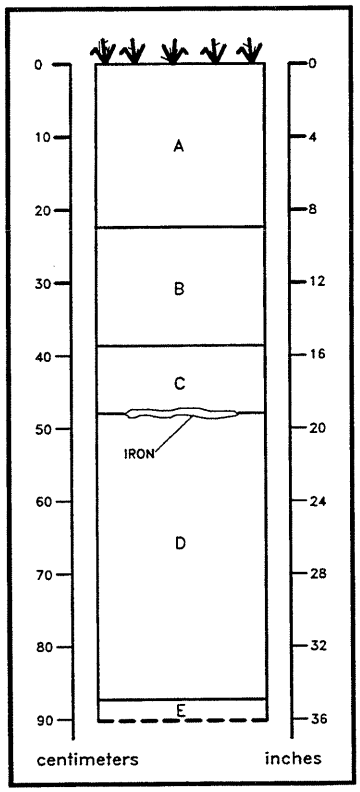
Shovel Test 91, located 134 ft. west of Shovel Test 101, contained no slag or charcoal; however, a large piece of unidentified iron was found at approximately 1.6 ft. below ground surface (Figure 37). The iron object was contained within a brownish yellow (10YR6/6) sand (Layer C) and was beneath yellowish brown (10YR4/4) sandy clay (Layer B) and a yellowish brown (10YR5/4) sand (Layer A). Layer D consisted



KEY

A - Dark Brown (10YR3/3) Sandy Loam (Fill)
B - Brown (10YR4/3) Sand Mottled with Yellowish Brown (10YR5/6) Clay and Dark Brown (10YR3/2) Sand (Fill)
C - Brownish Yellow (10YR6/6) Sand
D - Dark Yellowish Brown (10YR4/4) Sand
E - Brownish Yellow (10YR6/6) Sand
F - Dark Grayish Brown (10YR4/2) Sandy Silty Clay
G - Dark Yellowish Brown (10YR4/6) Sandy Clay

Figure 36. Site 44CF7, profile of Shovel Test 101.



KEY

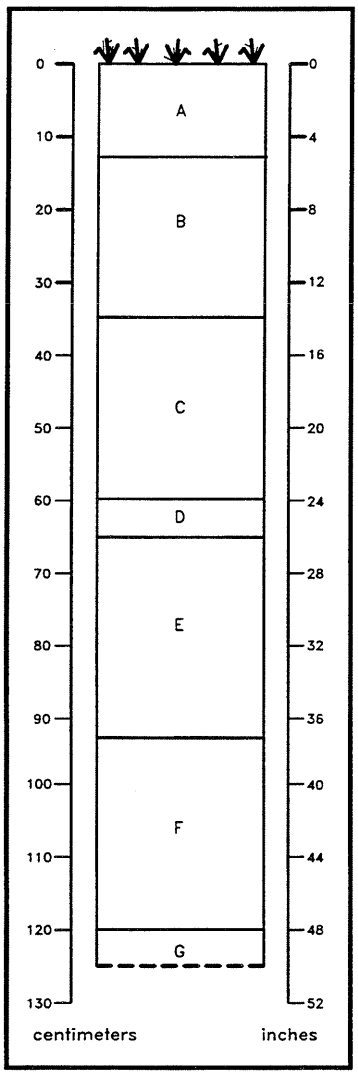
A - Yellowish Brown (10YR5/4) Sand
B - Yellowish Brown (10YR4/4) Sandy Clay
C - Brownish Yellow (10YR6/6) Sand
D - Dark Yellowish Brown (10YR4/6) Sand
E - Dark Grayish Brown (10YR4/2) Sandy Clay

Figure 37. Site 44CF7, profile of Shovel Test 91.

of a dark yellowish brown (10YR4/6) sand. This layer was over a dark grayish brown (10YR4/2) sandy clay (Layer E) that was identified at 2.9 ft. below ground surface.

Shovel tests on the immediate north and south sides of the road contained the heaviest concentrations of slag and charcoal. These deposits were identified in Shovel Tests 75, 90, 107, 109, 111, 112, 113, 116, and 121. The typical soil profile for this group consisted of an upper layer of dark brown (10YR3/3) silty clay fill (Layer A) (Figure 38). Below Layer A was a yellowish brown (10YR5/6) clay fill (Layer B) that measured up to 1.4 ft. below ground surface. This layer was over a very dark grayish brown (10YR3/2) sandy clay (Layer C). Layer D, identified at 2.0 ft. below ground surface, consisted of a layer of charcoal mixed with pieces of slag. Beneath this deposit was a layer of dark grayish brown (10YR4/2) sandy clay (Layer E). Layer E was over a relatively thick (.90 ft.) charcoal layer (Layer F) which also contained pieces of slag. Below this layer was a dark gray (10YR6/1) clay (Layer G). Water was encountered at 4.10 ft. below ground surface.

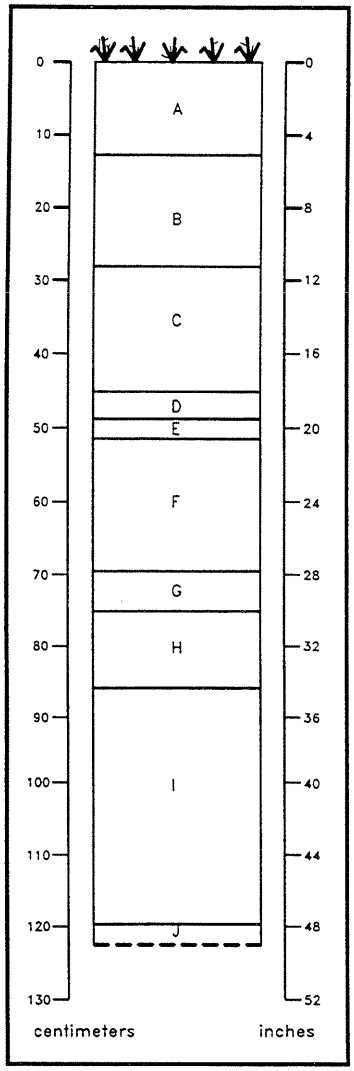
Soils to the far west of this group of shovel tests near Shovel Test 107 were typically characterized by as many as 10 different sandy and silty clay deposits. While the upper two layers (Layers A and B) were



KEY

A - Dark Brown (10YR3/3) Silty Clay (Fill)
B - Yellowish Brown (10YR5/6) Clay (Fill)
C - Very Dark Grayish Brown (10YR3/2) Sandy Clay (Fill)
D - Charcoal Mixed with Pieces of Slag
E - Dark Grayish Brown (10YR4/2) Sandy Clay
F - Charcoal Mixed with Pieces of Slag
G - Dark Gray (10YR6/1) Clay

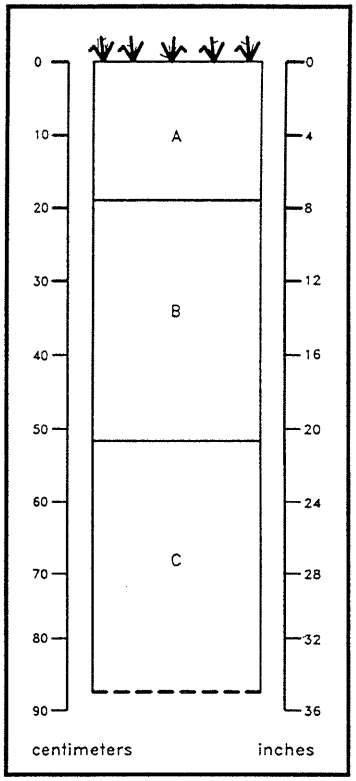
Figure 38. Site 44CF7, profile of Shovel Test 112.



KEY

A - Dark Brown (10YR3/3) Sandy Silty Clay (Fill)
B - Dark Yellowish Brown (10YR4/4) Sandy Clay (Fill)
C - Dark Brown (10YR4/3) Sandy Clay
D - Yellowish Brown (10YR5/8) Sand
E - Black (10YR2/1) Charcoal
F - Yellowish Brown (10YR5/6) Sandy Silty Clay
G - Dark Yellowish Brown (10YR4/6) Clay
H - Dark Grayish Brown (10YR4/2) Silty Clay
I - Yellowish Brown (10YR5/6) Silty Clay
J - Dark Gray (10YR4/1) Sandy Clay

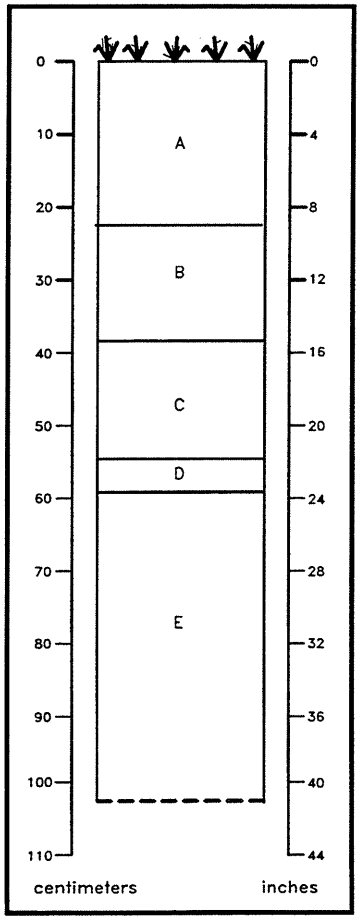
Figure 39. Site 44CF7, profile of Shovel Test 107.



KEY

A - Dark Brown (10YR3/3) Silty Sandy Loam (Fill)
B - Dark Yellowish Brown (10YR4/6) Silty Clay Mottled with Gray (10YR6/1) Clay (Fill)
C - Slag and Charcoal

Figure 40. Site 44CF7, profile of Shovel Test 109.



KEY

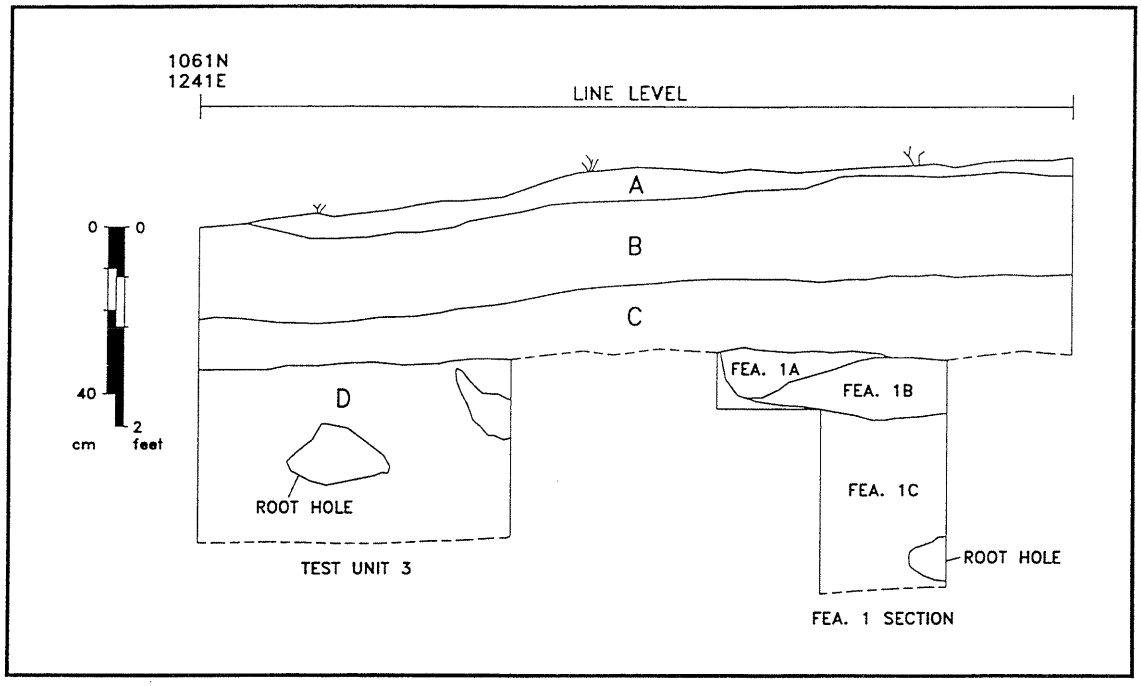
A - Brown (10YR4/3) Silty Sandy Clay (Fill)
B - Reddish Brown (5YR4/4) Clay with Gravel (Fill)
C - Asphalt
D - Dark Yellowish Brown (10YR4/4) Sandy Clay (Fill)
E - Charcoal Mixed with Slag

Figure 41. Site 44CF7, profile of Shovel Test 116.

obviously modern fill, apparent intact layers of slag and charcoal (Layers D and E) were identified at 1.5 ft. below ground surface (Figure 39). Below these layers, Layers F–I contained a light concentration of charcoal and slag and extended up to at least 4.0 ft. below ground surface.

The most distinct slag and charcoal deposits identified during the shovel testing phase were found in Shovel Tests 109 and 116, which were located 60 ft. and 96 ft. east of Shovel Test 107 respectively. The profile for Shovel Test 109 consisted of a top layer of dark brown (10YR3/3) silty sandy loam fill (Layer A) (Figure 40). Layer A was over a dark yellowish brown (10YR4/6) silty clay fill mottled with gray (10YR6/1) clay (Layer B). This layer was mixed with pieces of charcoal as well as fragments of modern bottle glass. Layer C, identified at 1.7 ft. below ground surface, consisted of a deep layer of slag and charcoal (Layer C). This deposit extended at least 2.9 ft. below ground surface.

Shovel Test 116, located 45 ft. southeast of Shovel Test 109 on the south side of the road, contained road-related fill deposits (Layers A–D) that measured up to 2.0 ft. below ground surface (Figure 41). Beneath



KEY

A - Very Dark Grayish Brown (10YR3/2) Silty Loam (Topsoil)
B - Pale Brown (10YR6/3) Sand
C - Brown (10YR4/3) Sand
D - Brown (10YR5/3) Coarse Sand Mottled with Yellowish Brown (10YR5/6) Sandy Clay and Yellowish Brown (10YR5/8) Sand
Feature 1A - Olive Brown (2.5Y4/4) Silty Sand
Feature 1B - Very Pale Brown (10YR7/4) Sand
Feature 1C - Yellowish Brown Silty Sandy Clay Mottled with Brown Silty Clay

Figure 42. Site 44CF7, east profile of Test Units 1 and 3.

these layers was a layer of charcoal and slag (Layer E) that measured at least 1.3 ft. deep. Water was encountered at 3.3 ft. below ground surface.

Test Unit Results

Test units were placed in areas that the shovel test results indicated had the highest potential for containing features and deposits. The results of Robbins' testing and MacCord's excavation work (1964) also factored into the placement of test units. Eight test units were excavated, including two 7 x 7 ft. test units (Test Unit 1 and 2), one 5 x 5 ft. test unit (Test Unit 6), and five 2.5 x 2.5 ft. test units (Test Units 3, 4, 5, 7, and 8) (see Figure 19).

Test Unit 1 was placed at the location of Shovel Test 132. As discussed in the preceding section, this shovel test contained pieces of slag and charcoal as well as an unidentified iron object located approximately 2.3 ft. below ground surface. The soils identified in Test Unit 1 differed from those found in Shovel Test 132. Layer A consisted of a very dark grayish brown (10YR3/2) silty loam topsoil and root mat that ranged from .05 to .50 ft. thick (Figure 42). Beneath Layer A was a pale brown (10YR6/3) sand (Layer B), containing pieces of coal and cinder, machine-made brick, plastic, and unidentified nails. Layer C, consisting of a brown (10YR4/3) sand, was identified at .90 ft. below ground surface (5.92 ft. below datum) and measured from .35 ft. to .60 ft.

thick. Contained within this layer were pieces of slag, charcoal, and coal, as well as pieces of plastic, machine-made brick, and modern bottle glass. Prehistoric artifacts included 2 pieces of quartz debitage and 1 piece of quartz fire-cracked rock. Layer D was identified at 1.2 ft. below ground surface (6.22 ft. below datum). This layer was a brown (10YR5/3), coarse sand mottled with yellowish brown (10YR5/6) sandy clay and yellowish brown (10YR5/8) sand. Layer D was not excavated; however, 19 artifacts were recovered from the surface of the layer. This assemblage included a mix of slag, charcoal, modern bottle glass, and wire nails. Prehistoric artifacts consisted of 3 pieces of quartzite and 1 piece of quartz debitage.

Layers A–D represent grading activities and alluvial deposits that date to the twentieth century (see Figure 14). The mix of charcoal and slag with modern artifacts throughout relatively thick sand and silt layers attests to the extent of wash activity associated with flooding at this location.

A large circular feature was identified at the top of Layer D in the southeast corner of the test unit (Figure 43) (see Figure 42). Partial excavation of the feature revealed three deposits. Layer 1A was a olive brown (2.5Y4/4) silty sand. This layer contained pieces of charcoal and a fragment of asphalt. Layer A was over a very pale brown (10YR7/4) sand (Layer 1B) which in turn, was over a yellowish brown silty, sandy clay mottled with brown silty clay (Layer 1C). Layer 1B contained a piece of coal, and 1C, pieces of slag, modern bottle glass, and unidentified nail fragments.

The feature's sandy/silty deposits, its mixed artifact assemblage, and the presence of apparent root holes near its base indicate that Feature 1 is probably the remains of a tree. It is likely that the feature is a hole left by a tree fall and was subsequently filled by rain wash and flood deposits.

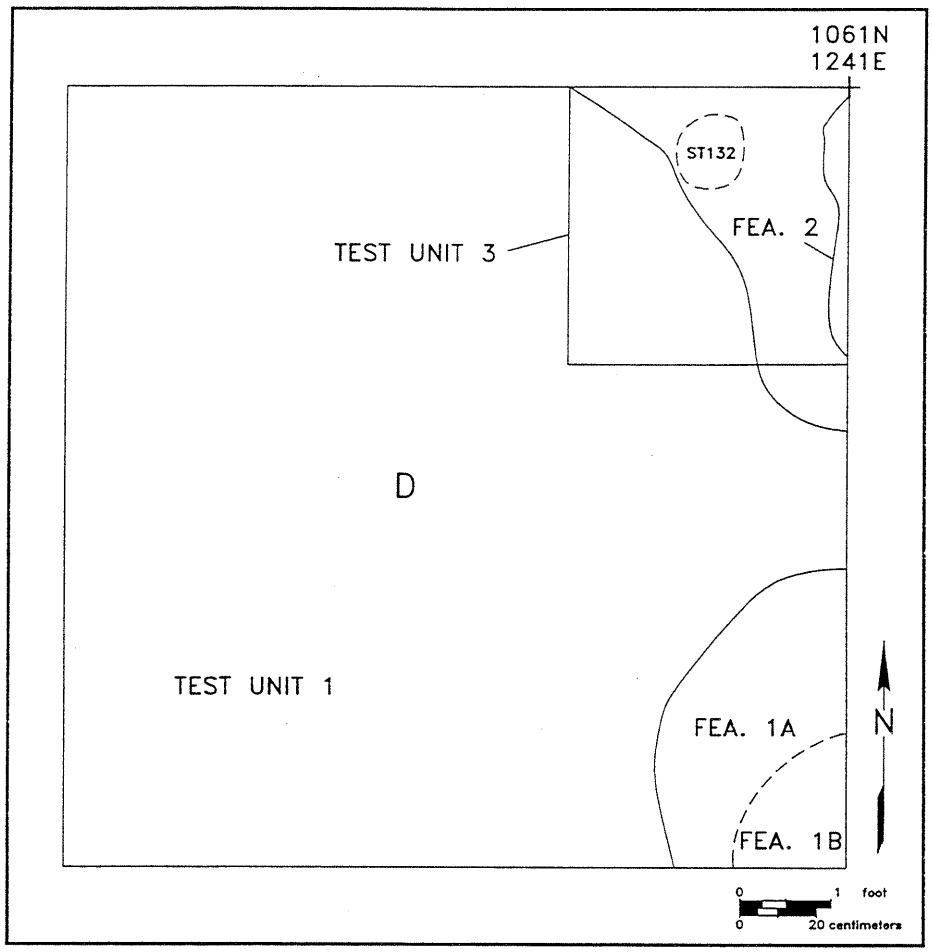
Traces of a second feature (Feature 2) were identified at the surface of Layer D in the northeast quadrant of the unit and corresponded to the location of Shovel Test 132 (Figure 44) (see Figure 43). The shape of the feature and its size could not be clearly discerned; hence, a 2.5 x 2.5 ft. unit (Test Unit 3) was excavated at this location. The grayish brown (10YR5/2) sand fill of Feature 2 dipped to the west and was distinguished from Layer D on the east side of the test unit. The similarity of the fill with Feature 1C suggests that the deposits could be related, perhaps as ditch or gully fill, possibly the edge of the ravine illustrated by MacCord (see Figure 12). Feature 2 dates to the twentieth century as indicated by a large, modern iron artifact recovered from it.

A 2.5 x 2.5 ft. test unit (Test Unit 5) was placed 200 ft. west of Test Unit 1 at the location of Shovel Test 86 (see Figure 19). As discussed above, Shovel Test 86 contained a charcoal-bearing layer and cobbles at its base. Pieces of slag were associated with these deposits. In general, the layers identified in the test unit were consistent with those found in the shovel test. Layer A consisted of a loose brown (10YR4/3) sand (Figure 45). This layer contained pieces of charcoal and a 1974 nickel. Layer B was located at .35 ft. below ground surface (4.66 ft. below datum). This layer consisted of a brown (10YR4/3) sand mixed with lenses of charcoal. Mixed within the layer were twentieth-century artifacts including pieces of machine-made brick, bottle glass, and a 1968 quarter. Layer C was a dark brown (10YR3/3) coarse sand mottled with yellowish brown (10YR5/4) sand and dark yellowish brown (10YR4/4) sandy clay. Layer C contained pieces of slag and charcoal mixed with twentieth-century bottle glass.

Layer C was cut by Feature 4 on the northern half of the test unit (Figure 46). Partial excavation of the feature revealed a dark yellowish brown (10YR4/6) silty sand fill that measured from .10 to .80 ft. deep (see Figure 46). It contained pieces of modern bottle glass as well as chunks of slag and charcoal. At the base of the feature were pieces of a tree stump, indicating that Feature 4 was a tree hole. The cobbles identified along the southern edge of the feature (and at the base of Shovel Test 86) were embedded in strong brown (7.5YR4/6) sandy clay subsoil (Layer D). These stones represented natural deposition.

Layers A–C and feature fill in Test Unit 5 represent twentieth-century rain wash and flood deposits. These deposits are similar to those found in Test Unit 1 on the eastern part of the site.

Test Unit 4 was placed at the location of Shovel Test 91 and was located approximately 128 ft. southeast of Test Unit 5 and 100 ft. from Test Unit 1 (see Figure 19). This 2.5 x 2.5 ft. test unit consisted of five deposits. The top layer consisted of a brown (10YR5/3) sandy loam mixed with gravel (Layer A) (Figure 47). This layer contained twentieth-century



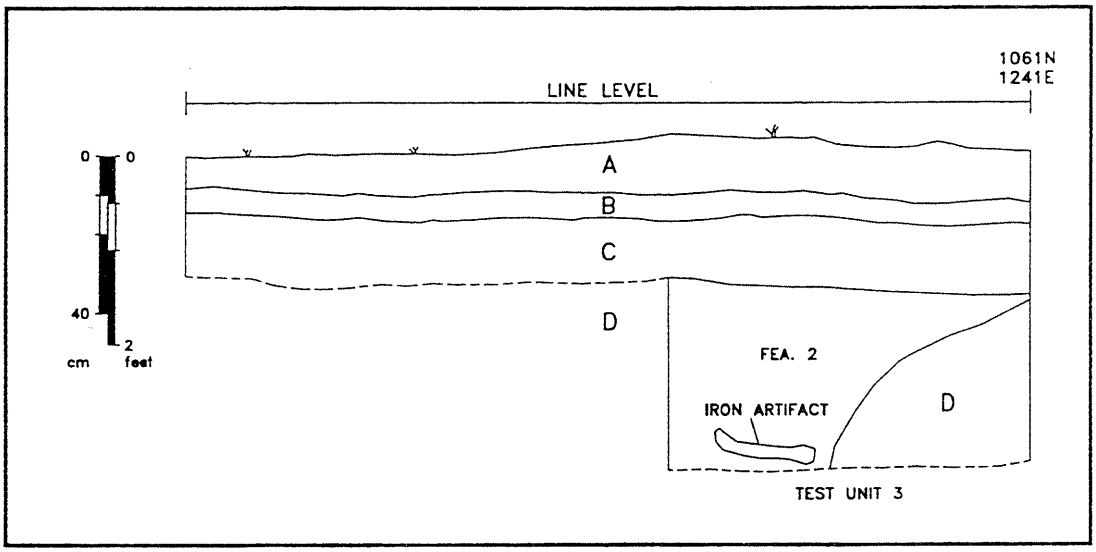
KEY

Layer D - Brown (10YR5/3) Coarse Sand Mottled with Yellowish Brown (10YR5/6) Sandy Clay and Yellowish Brown (10YR5/8) Sand
Feature 1A - Olive Brown (2.5Y4/4) Silty Sand
Feature 1B - Very Pale Brown (10YR7/4) Sand
Feature 2 - Grayish Brown (10YR5/2) Sand

Figure 43. Site 44CF7, plan of Features 1 and 2 in Test Units 1 and 3.

artifacts including 30 pieces of bottle glass. Layer A covered a very dark grayish brown (10YR3/2) sandy loam (Layer B). Beneath Layer B was a dark brown (10YR3/3) sandy loam (Layer C) mottled with variations of brown (10YR4/3, 10YR3/2) and red (5YR5/8) sandy clay. Layer D, located at .10 ft. below ground surface (3.87 ft. below datum), consisted of a brown (10YR5/3) sandy clay mottled with lenses of red (5YR5/8) clay, very dark grayish brown (10YR3/2) clay loam, and grayish brown (10YR5/2) sand. Layer E consisted of a thick layer of very pale brown (10YR7/4) sand. A large iron object, initially identified in Shovel Test 91, was found in Layer E at 1.6 ft. below ground surface (4.47 ft. below datum). The iron was determined to be modern and was not excavated.

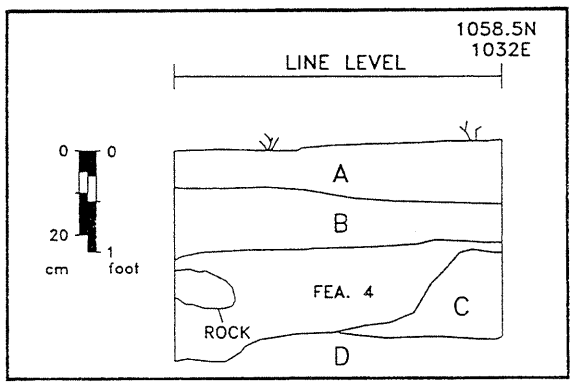
In summary, Layers A–E in Test Unit 4 were twentieth-century fill and flood deposits. This is indicated by the presence of mottled sandy clay and sand deposits, and modern artifacts mixed throughout the layers.



KEY

A - Very Dark Grayish Brown (10YR3/2) Silty Loam (Topsoil)
B - Pale Brown (10YR6/3) Sand
C - Brown (10YR4/3) Sand
D - Brown (10YR5/3) Coarse Sand Mottled with Yellowish Brown (10YR5/6) Sandy Clay and Yellowish Brown (10YR5/8) Sand
Feature 2 - Grayish Brown (10YR5/2) Sand

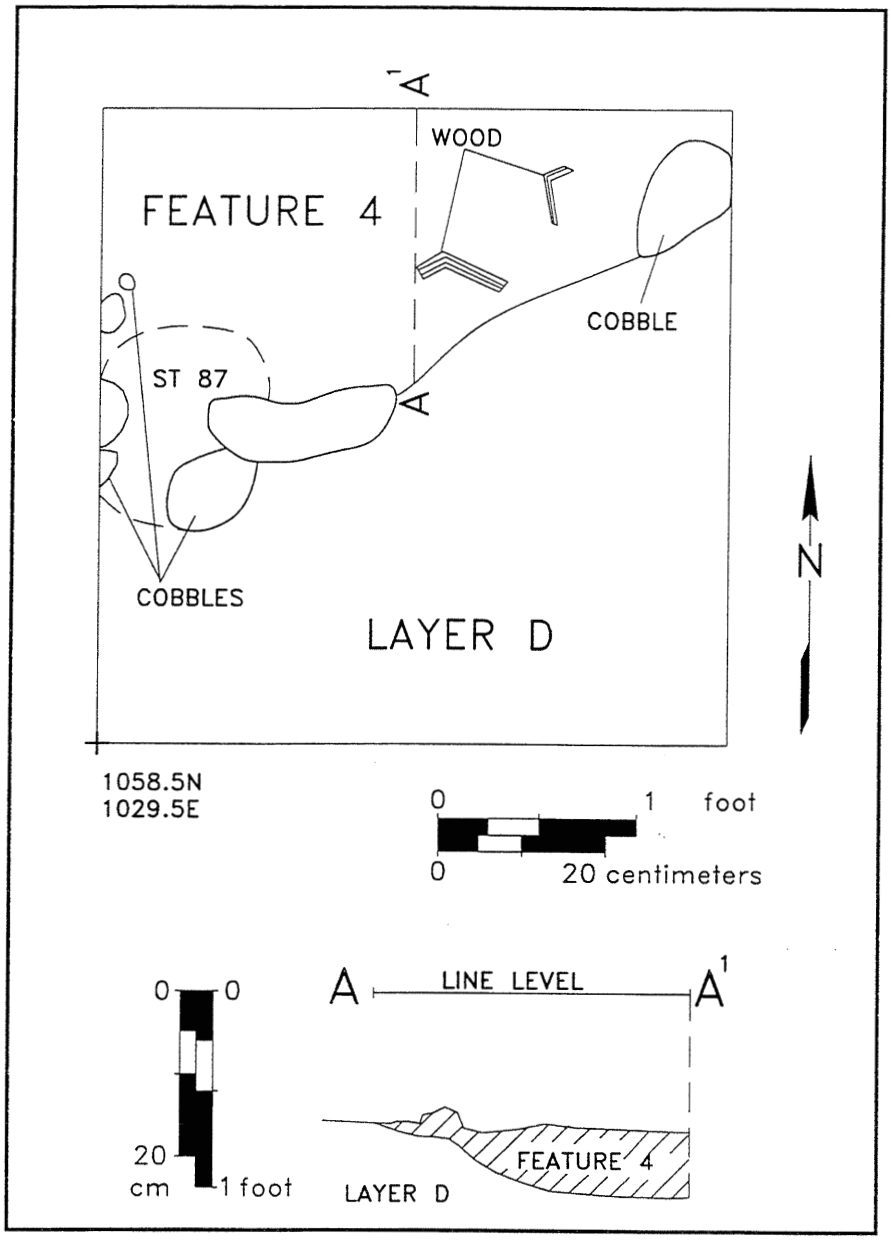
Figure 44. Site 44CF7, north profile of Test Units 1 and 3.



KEY

A - Brown (10YR4/3) Sand
B - Brown (10YR4/3) Sand Mixed with Lenses of Charcoal
C - Dark Brown (10YR3/3) Coarse Sand Mottled with Yellowish Brown (10YR5/4) Sand and Dark Yellowish Brown (10YR4/4) Sandy Clay
D - Strong Brown (7.5YR4/6) Sandy Clay (Subsoil)
Feature 4 - Dark Yellowish Brown (10YR4/6) Silty Sand

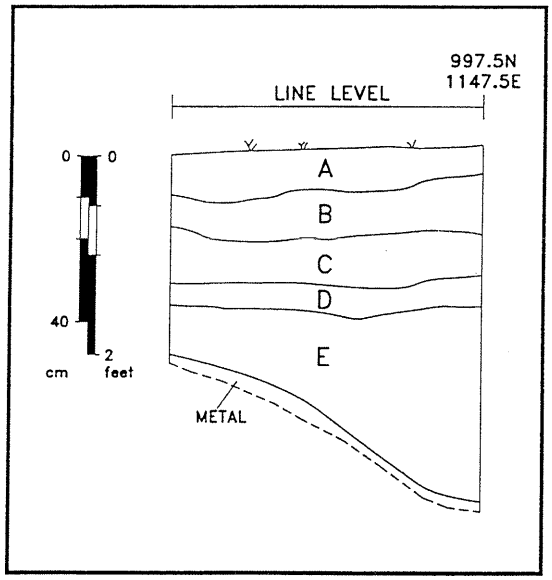
Figure 45. Site 44CF7, east profile of Test Unit 5.



KEY

Layer D - Strong Brown (7.5YR4/6) Sandy Clay (Subsoil)
Feature 4 - Dark Yellowish Brown (10YR4/6) Silty Sand

Figure 46. Site 44CF7, plan and west profile of Feature 4 in Test Unit 5.

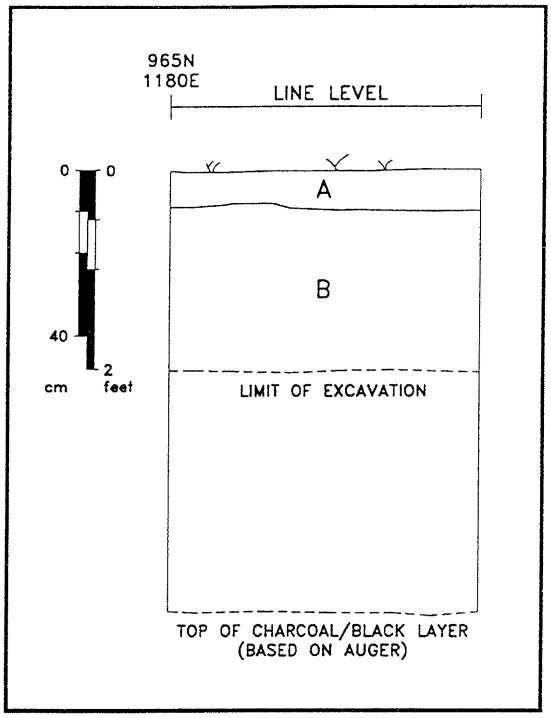


KEY

A - Brown (10YR5/3) Sandy Loam Mixed with Gravel
B - Very Dark Grayish Brown (10YR3/2) Sandy Loam
C - Dark Brown (10YR3/3) Sandy Loam Mottled with Variations of Brown (10YR4/3, 10YR3/2) and Red (5YR5/8) Sandy Clay
D - Brown (10YR5/3) Sandy Clay Mottled with Lenses of Red (5YR5/8) Clay, Very Dark Grayish Brown (10YR3/2) Clay Loam, and Grayish Brown (10YR5/2) Sand
E - Very Pale Brown (10YR7/4) Sand

Figure 47. Site 44CF7, south profile of Test Unit 4.

Test Unit 8 was placed approximately 44 ft. southeast of Test Unit 4 (see Figure 19). This test unit contained modern fill deposits to a depth of at least 1.6 ft. below ground surface (4.44 ft. below datum). The top layer (Layer A) consisted of dark brown (10YR3/3) sandy loam and root mat (Figure 48). Layer B, identified at .30 ft. below ground surface (3.14 ft. below datum) was a brownish yellow (10YR6/8) sandy clay fill mottled with dark yellowish brown (10YR5/6) sandy clay and gray (10YR6/1) clay. Within this layer at 1.30 ft. below ground surface (4.14 ft. below datum) was a large log and decaying wood. The wood was found in association with pieces of modern bottle glass and brick. The size of the log prevented further excavation of the unit.



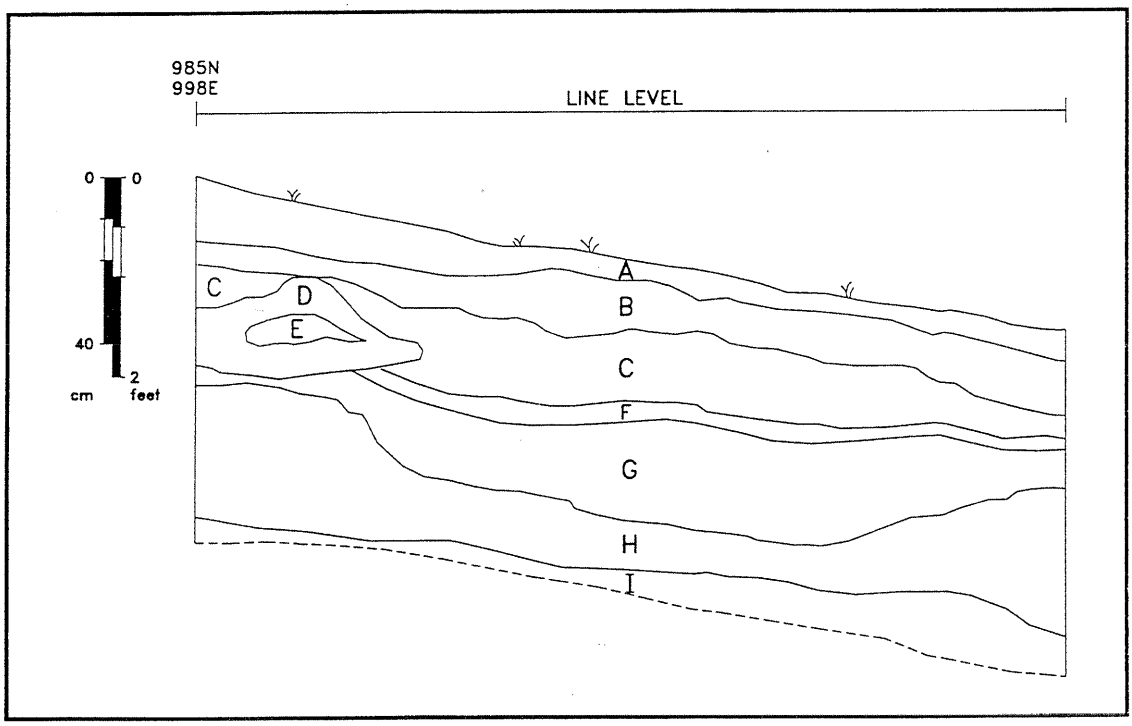
KEY

A - Dark Brown (10YR3/3) Sandy Loam
B - Brownish Yellow (10YR6/8) Sandy Clay Mottled with Dark Yellowish Brown (10YR5/6) Sandy Clay and Gray (10YR6/1) Clay (Fill)

Figure 48. Site 44CF7, north profile of Test Unit 8.

Although the unit was not excavated below this depth, a soil auger test detected a charcoal layer at 3.5 ft. (1.06 m) below ground surface (6.34 ft. below datum). This layer probably corresponds to a charcoal deposit found at the same depth in nearby Shovel Test 113.

Three test units were placed near the road in the approximate area of MacCord's test excavations. Test Unit 2 was located near the rock cliff on the western half of the site (see Figures 12 and 19). This test unit, measuring 7 ft. square, revealed modern fill deposits (Figure 49). These deposits extended up to at least 3.4 ft. below ground surface (3.98 ft. below datum) and consisted of variations of brown sandy and silty clays. Beneath the fill was a damp, dark gray (10YR4/1) sandy clay.



KEY

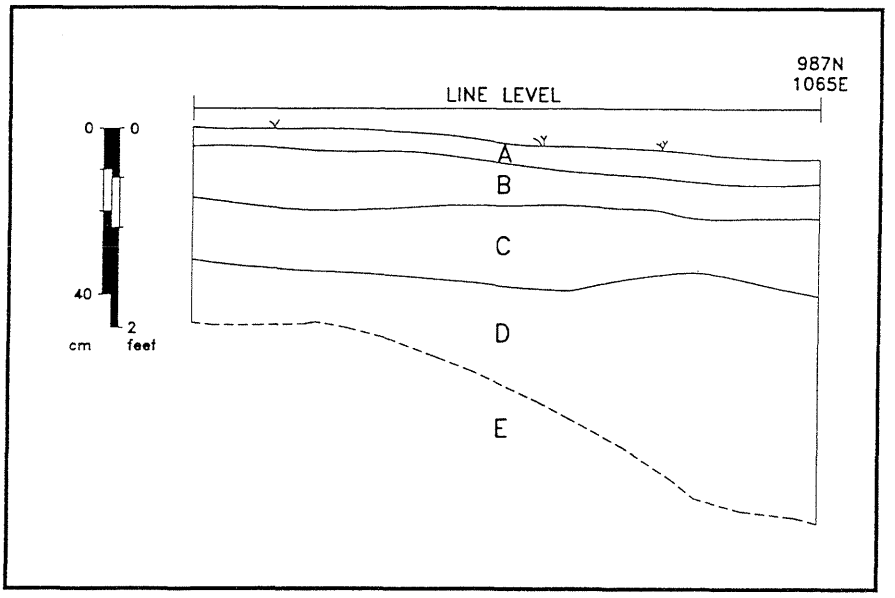
A - Dark Brown (10YR3/3) Silty Loam (Fill)
B - Light Brownish Gray (10YR6/2) Clay Mottled with Yellowish Brown (10YR5/6) Clay and Dark Brown (10YR3/3) Silty Loam (Fill)
C - Dark Brown (10YR3/3) Sandy Loam (Fill)
D - Black (10YR2/1) Charcoal
E - Yellowish Brown (10YR5/4) Sandy Loam
F - Very Dark Grayish Brown (10YR3/2) Sandy Loam (Fill)
G - Yellowish Brown (10YR5/4) Sandy Loam (Fill)
H - Dark Yellowish Brown (10YR4/4) Silty Clay Mottled with Dark Brown (10YR3/3) Sandy Loam (Fill)
I - Dark Gray (10YR4/1) Sandy Clay

Figure 49. Site 44CF7, west profile of Test Unit 2.

Three hundred and ninety-three artifacts were recovered from Test Unit 2. With the exception of 20 pieces of slag, this assemblage is essentially modern, including pieces of bottle glass, machine-made brick, and wire nails (see Appendix A).

The results indicate that this location has been heavily disturbed during the twentieth century. The deposits may be trench backfill associated with MacCord's excavations in 1963, clearing for the apartment complex recreation area, or fill deposits related to machine work on the property during the first half of the century (see Chapter 2).

Test Unit 6 was placed approximately 60 ft. east of Test Unit 2 and near the location of MacCord's Trench 13 (see Figures 12 and 19). Four modern fill deposits were identified within the test unit. The deposits had combined depths ranging from 1.4 ft. below surface on the east to 3 ft. below surface on the west (3.86 ft. to 5.46 ft. below datum) (Figure 50). Layer A consisted of a very dark brown (10YR2/2) sandy loam.



KEY

A - Very Dark Brown (10YR2/2) Sandy Loam (Fill)
B - Gray (10YR6/1) Sand (Fill)
C - Dark Grayish Brown (10YR4/2) Silty Clay (Fill)
D - Yellowish Brown (10YR5/8) Clay (Fill)
E - Slag

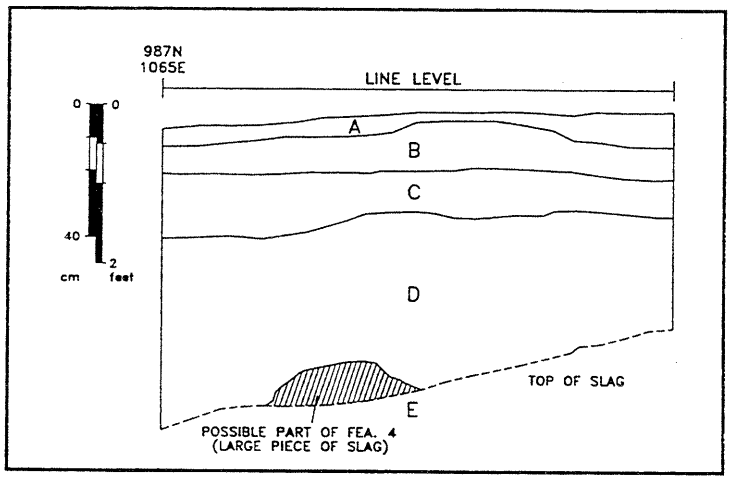
Figure 50. Site 44CF7, south profile of Test Unit 6.

Beneath this layer was a layer of gray (10YR6/1) sand (Layer B). Beneath the sand was a deposit of dark grayish brown (10YR4/2) silty clay (Layer C). Layer C was over a thick layer of yellowish brown (10YR5/8) clay (Layer D).

The recent age of Layers A–D is evident from the artifacts found in the deposits, that include pieces of modern bottle glass, machine-made brick, and asphalt. Of the combined total (n=302), 244 artifacts were found in Layer D. Eighty-three percent (n=203) of this assemblage consists of pieces of slag with the remainder comprised of twentieth-century window and bottle glass fragments, tile, and machine-made brick.

A slag and charcoal layer (Layer E) was identified beneath Layer D at 1.4 ft. below ground surface (3.86 ft. below datum) (Figure 51). This layer was not excavated, but was augured with limited success. Although the slag did not permit the auger to completely penetrate the deposit, the layer measured at least .5 ft. deep on the western half of the unit. The layer contained pieces of charcoal but was made up predominantly of slag. A large chunk of slag, measuring at least 1.5 ft. long and .4 ft. wide was embedded in the surface of Layer E on the west side of the test unit (see Figure 51).

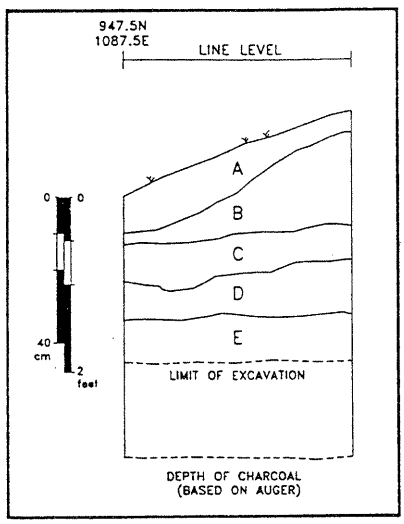
The slag and charcoal dipped beneath the fill to the west, indicating that part of the deposit had been removed during prior excavation. The location of the test unit relative to MacCord's work indicates that Layer E is most likely the same slag and charcoal deposit that he encountered in his Trench 13 (MacCord 1964:6–7). Furthermore, MacCord (1964:7) states that "near the center of the trench [Trench 13], we encountered a concentration of stones, bricks, and large lumps of slag which appeared to be a foundation [Feature 4]." He interpreted this feature as the foundation of "one of the auxiliary forges, possibly the chafery, which complemented the blast furnace" (MacCord 1964:9). The large piece of slag embedded in the surface of Layer E in Test Unit 6 is probably part of the structural feature that he identified. It was



KEY

A - Very Dark Brown (10YR2/2) Sandy Loam (Fill)
B - Gray (10YR6/1) Sand (Fill)
C - Dark Grayish Brown (10YR4/2) Silty Clay (Fill)
D - Yellowish Brown (10YR5/8) Clay (Fill)
E - Slag

Figure 51. Site 44CF7, west profile of Test Unit 6.



KEY

A - Very Dark Gray (10YR3/1) Sandy Clay (Fill)
B - Yellowish Red (5YR5/8) Sandy Clay (Fill)
C - Heavy Concentration of Asphalt Mixed with Yellowish Red (5YR5/8) Clay
D - Pale Brown (10YR6/3) Sand Mixed with Pieces of Asphalt and Gravel
E - Charcoal

Figure 52. Site 44CF7, west profile of Test Unit 7.

located at 2.5 ft. below ground surface, approximately the same depth as Feature 4 (MacCord 1964:7, 9). The results indicate that most of the feature is located immediately west of Test Unit 6.

A 2.5 x 2.5 ft. test unit (Test Unit 7) was placed approximately 41 ft. southeast of Test Unit 6 (see Figure 19). It was situated on the south shoulder of the access road and at the approximate location of MacCord's Trench 2 and the VDHR auger test (1990). The top layer (Layer A) consisted of a very dark gray (10YR3/1) sandy clay fill (Figure 52). This layer contained pieces of plastic and asphalt. Beneath Layer A was a yellowish red (5YR5/8) sandy clay fill (Layer B). Below Layer B was a heavy concentration of asphalt mixed with some yellowish red (5YR5/8) clay (Layer C). Beneath the asphalt layer was a deposit of pale brown (10YR6/3) sand (Layer D) that was mixed with pieces of asphalt and gravel.

Layer E, identified at 1.3 ft. below ground surface (.16 ft. below datum), consisted of charcoal (see Figure 52). This deposit was excavated to .60 ft. below its surface. An auger test at this depth revealed that the charcoal measured an additional 1.3 ft. deep. The depth of the charcoal and its location indicate that it is the same deposit as MacCord's Feature 1 and yielded the charcoal samples collected by VDHR archaeologists. The predominant type of wood identified from the charcoal samples is yellow pine with lesser amounts of red oak and hickory (MacCord 1964:8). Samples recently taken from the deposit have provided a radiocarbon date of A.D. 1490–1630. The period of the ironworks, 1619–1622, falls within this date range.

The research results of the archaeological evaluation correspond with those of MacCord's work and generally support his conclusions about the types and distribution of historic archaeological resources. The thick slag deposit on the north side of the access road and charcoal layer on the south cover an area of approximately 145 ft. east-west x 45 ft. north-south. Although a light scatter of slag and charcoal was found across the site, the materials identified adjacent to the road indicate that it is the main activity area on the site (see Figures 32 and 33). The slag and charcoal deposits appear to be associated with different functional areas. The charcoal "was probably the stockpile of charcoal made and maintained for charging the blast furnace and was located near the up-hill side of the furnace for convenience in loading the furnace from the top" (MacCord 1964:8). The slag deposit identified opposite the charcoal is waste from the furnace as well as the possible location of an auxiliary forge such as a chafery (MacCord 1964:9). Similar deposits have been documented on other ironworks sites, i.e., Saugus, and are usually separated by furnaces and related structures. The research results indicate that the main furnace may be located beneath the road just west of Test Units 6 and 7.

In addition to the historic resources, testing identified the presence of a small prehistoric component at 44CF7. Prehistoric remains are represented by a light (n=41) scatter of artifacts, which consist of quartz, quartzite, and chert debitage, fire-cracked rock, and bifaces. This component most likely represents a campsite. The low density and range of artifacts suggest that the site served as a procurement camp where activities focused on food procurement and to a lesser extent, tool resharpening. The absence of diagnostic artifacts does not permit its age to be determined.

Cut Features in Rocks

The archaeological evaluation of 44CF7 included the reexamination of a series of man-made cuts ("postholes" or sockets) in the rock ledges along the falls (Figure 53) (see Figure 13). The features were first documented by MacCord (1964) as part of his investigation of 44CF7 and believed to have held timber bracing for a dam and flume trestle (see Figure 13). The purpose of the current work was to map the features relative to 44CF7 and the adjacent eighteenth-century gristmill complex and to determine their historical association.

MacCord (1964:8–9) documented three groups of cuts (n=22) at the falls. He noted that the cuts along the central portion of the lower falls measured 4 in. square while those on rocks on the north and south banks measured 10 in. square. The smaller cuts were noticeably lower in elevation than the larger features.

The current investigation identified most of the cuts documented by MacCord; however, the number and precise location of some of the features are different. A total of 50 cuts was identified (see Figure 53). In general, the features were square or rectangular, and the majority were represented by three sides. The features ranged from .4 to 1.5 ft. along their sides. As noted by MacCord, the small cuts were aligned roughly north–south along the three major rocks of the lower

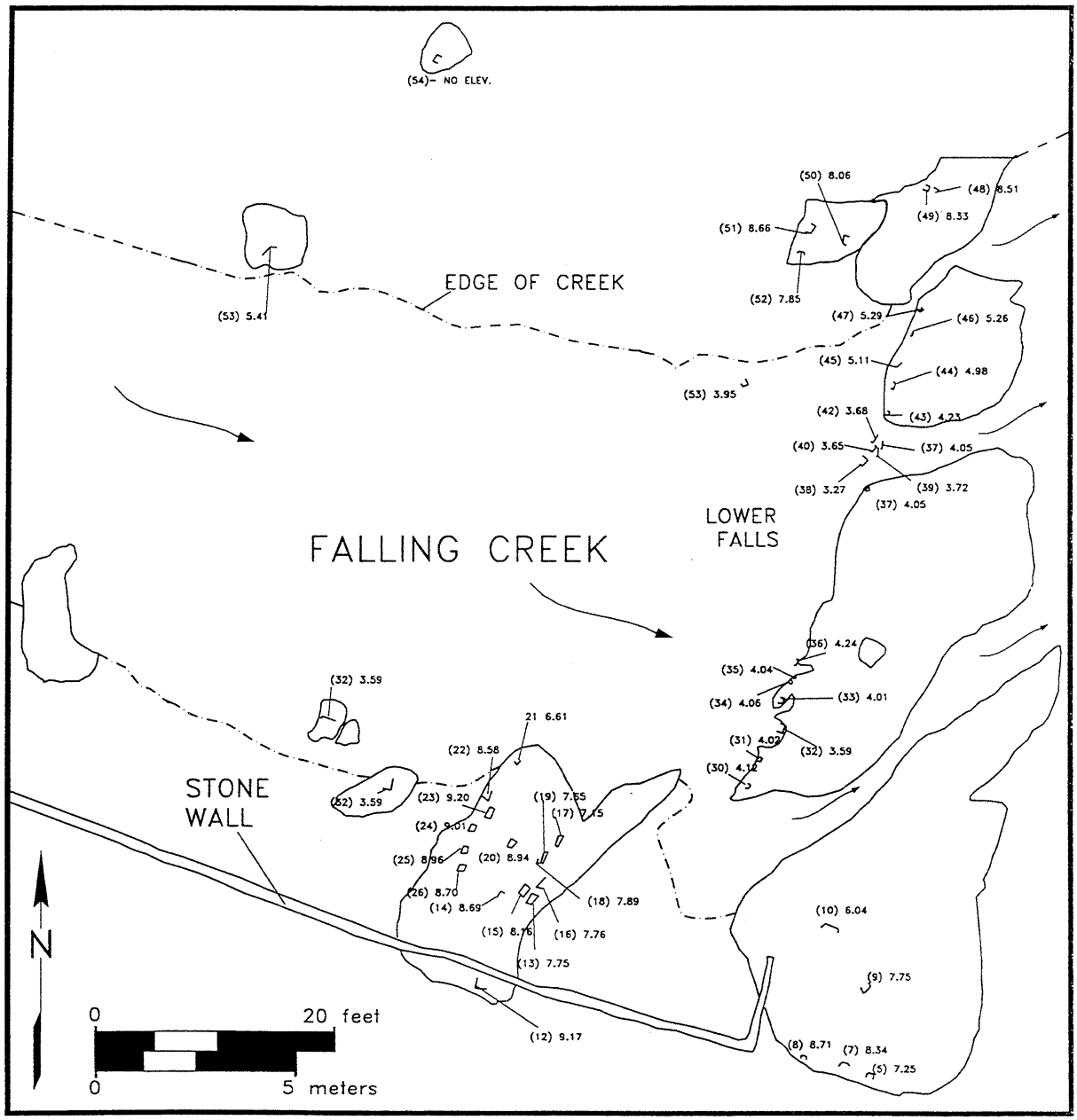


Figure 53. Site 44CF7, plan showing rock cuts. Numbers in parentheses are feature numbers; other numbers are relative elevations based on site datum.

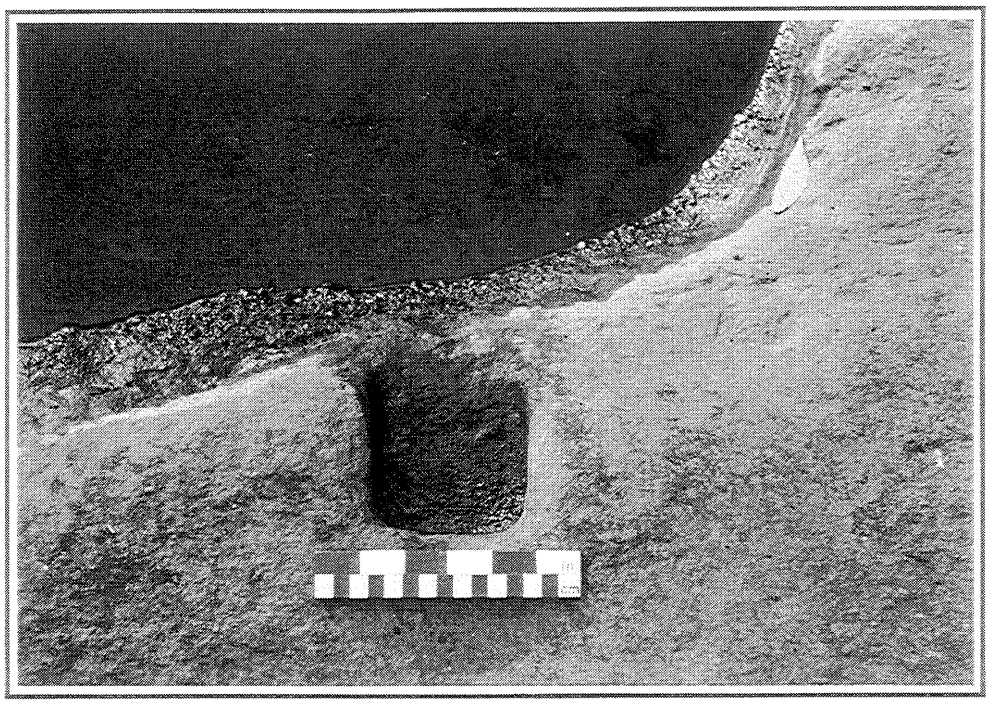


Figure 54. Site 44CF7, Feature 30 rock cut, plan view, looking west.

falls, and the larger features clustered on rock outcrops on the north and south banks of the creek (Figures 54 and 55). The smaller cuts averaged approximately 4 ft. lower than the larger features. Several of the cuts within the smaller group were fairly large (.80 ft.) compared to the typical size (.40 ft.) in this group and were located underwater. These cuts tended to be clustered at the head of a cascade near the north end of the falls.

MacCord (1964:9) concluded that the differences in size, location, and elevation of the features correspond to different functions and construction periods. The small cuts, spaced some 2.5 ft. apart, most likely held timber braces for a dam. The braces probably sat at 45° angles to the dam, which was located slightly upstream from the main line of rocks on the lower falls (MacCord 1964:8). The cuts beneath the water at the head of the cascade may also have held braces for a dam or part of the dam structure such as a watergate. The smaller size and lower elevations of the cuts compared to the larger cuts may be a reflection of the different structures they supported and/or periods of their construction.

The larger cuts may have held trestle posts for a flume that carried water from a pond to an overshot waterwheel at the furnace. The furnace and waterwheel were probably located near Test Unit 6. The ground surface at Test Unit 6 is approximately the same elevation as the large cuts, indicating that the trestle was probably raised several feet higher than its eastern end. This permitted the flume to clear the rock outcrop located between the cuts and the furnace, and to provide an adequate volume of water to operate the wheel. The weight and height of the flume and force of the water would have required stabilization of trestle posts located on the rocks, hence the size of the features (MacCord 1964:9). Several of the larger features share the same spacing and alignment while others do not, which suggests different periods of construction. These data, coupled with the presence of large cuts on both sides of the creek, indicate that the trestle/flume was repaired, replaced, or relocated over time. MacCord concludes:

> There is a good possibility that Group A [smaller cuts] was a first effort—lighter construction, lower elevations, and nearer the furnace. If this combination did not consistently produce the power and volume of water wanted, a relocation to a higher elevation with heavier and stronger construction during a period of rebuilding would not only have been desirable,

but would be in keeping with the usual trend toward improved facilities as time passed (1964:9).

MacCord's interpretation of the features as components of the ironworks is plausible; however, it is possible that they may be associated with later activities. The Ampthill gristmill complex, located adjacent to the falls on the north bank of the creek, was built during the eighteenth century and used well into the nineteenth century. The close proximity of the rock cuts to the mill suggests that these features could have been part of a dam associated with this structure.

The association between the rock cuts and the mill is tenuous at best given the location and elevation of the mill raceway relative to the falls. The raceway/sluice, shown on several historic maps, is presently located at the southwest corner of the mill building (see Figure 3). It has a northwest-southeast orientation and is located several feet above the falls. Archaeologist Roland W. Robbins (1951:38B) (see Appendix C) commented on the source of water for the mill and the apparent age of its raceway in his investigation of the site in 1951:

> I did locate evidence of an old dam just easterly of present army dam. An old, deserted canal led from the site of this early dam along the north side of the creek to the ruins at the grist mill. This canal furnished water for power purposes at the grist mill. Whether or not the canal furnished power for an earlier activity at site of grist mill I cannot say, however, it is possible.

Robbins observed that the canal joined to "a large round sluice (it had been a metal pipe) ..." that carried water below the falls to the water wheel near the southeast corner of the mill (Robbins 1951:38C).

The sluice described by Robbins appears to be associated with a later period of the mill operation, but may have been adapted for use from an earlier feature. The 1802 Winfrey map suggests that the later sluice followed the same path as the original sluice and was associated with either the canal, as Robins indicates, or a large pond dammed at the falls (see Figure 3). The variations in the size and spacing of the cut features in the rocks may indicate that portions of the dam required stronger construction and/or were repaired over time. The earlier ironworks dam adjacent to the mill may have been replaced by a dam and canal upstream to provide the necessary water flow to operate the mill.

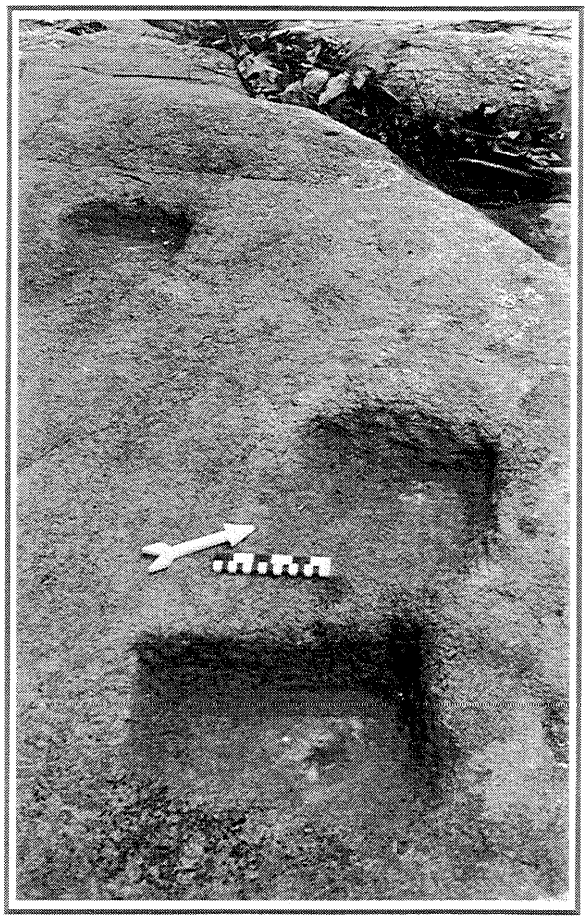


Figure 55. 44CF7, Features 13, 14, and 15 rock cuts, plan view.

During the course of the investigation, rock outcrops located east of the falls on the north bank of the creek were also examined for cut features. A group of six cuts was identified on a large rock approximately 260 ft. east of the mill (see Figure 3). The features are roughly square and measure approximately .3 ft. wide. They range from .2 ft. to .4 ft. apart and are oriented northwest-southeast. The cuts are located approximately 6 ft. from the southern edge of the rock. The age and function of the features are unknown. The features are more crudely made than the cuts at the falls and do not appear to be associated with that complex. Given their relatively close proximity to this latter group and location within the boundaries of 44CF7, however, it is possible that they are associated with the ironworks or later gristmill.

Chapter 5: Research Summary

The primary goal of the present investigation was to evaluate the eligibility of 44CF7 for nomination to the National Register of Historic Places. To this end, the archaeological investigation attempted to verify the results of previous archaeological testing (MacCord 1964) and assess the present integrity of the site. Furthermore, the investigation sought to define the entire site area through additional survey and testing in an attempt to identify potentially related components outside of the known site such as housing or other activity areas or facilities. The synthesis of the site's historical context with regard to its use as an ironworks permitted the archaeological resources identified to be assessed in terms of current research pertaining to such sites.

The Falling Creek Ironworks is recognized as the first successful, integrated iron production facility in English North America. The exploitation of natural commodities was a principal objective of the Virginia Company of London from the earliest period of their Virginia venture.

The onset of Sir Edwin Sandys' term as treasurer of the Virginia Company in London in 1618 resulted in a renewed commitment to industrial development, particularly to iron production. In cooperation with Southhampton Hundred plantation, an expedition of 80 persons under the command of Captain Blewett was dispatched "wth all manner of prouisions for the settinge vp of an Iron Worke in Virginia" (Kingsbury 1906:587–588).

Despite the death at sea of "the Chiefe men for the Iron worke," the relief supply apparently succeeded in completing a portion of the ironworks at Falling Creek in 1620 and produced a sample of iron prior to the arrival of three replacements later that year (Kingsbury 1906:472; 1933:240). In addition to the three replacement workers, by late June 1621 a fourth individual, John Berkeley (along with his son, Maurice, and three family servants), was dispatched to Virginia as Master of the ironworks with 20 men skilled in ironworking. Berkeley's party specifically included workers to "be employed upon the Furnace" and "upon the Forge," explicit evidence for an integrated operation producing both cast and wrought iron (Kingsbury 1906a:472).

The production of iron was abruptly halted by the Powhatan/English conflict of 1622. A total of 27 persons were slain at the ironworks, including John Berkeley (Kingsbury 1933:565). The slaughter of the inhabitants of the Falling Creek settlement was compounded by the thorough destruction of the facility by the Indians (Beverley 1947:54–55; Stith 1965:218). Though there was considerable interest in reestablishing the operation through the end of the Virginia Company period, the level of destruction effectively terminated this apparently successful endeavor.

Extensive work has been undertaken within the project area during the twentieth century. This work includes the construction of bridges over Falling Creek for a railroad and Interstate 95 and commercial development. Part of the latter development involved the construction of the Falling Creek Apartments and an access road paralleling Falling Creek to the James River. A survey of parcels near 44CF7 was conducted in an attempt to identify potentially related housing or other activity areas or facilities associated with the site.

Survey Area A lies at the terminus of the access road and adjacent to the James River. The survey results indicate that extensive modern filling has occurred in this area. Modern fill deposits characterized Location 1, which was identified in the middle of the survey area. This location yielded a fragment of pearlware ceramic, a piece of quartz debitage, and a piece of punctate/net-impressed ceramic.

Survey Area B is located several hundred feet west of Survey Area A on the floodplain of Falling Creek. The survey indicates that the western one-third of Area B has been disturbed by the construction of a swimming pool, parking lot, and access road. A small prehistoric site was identified near the center of the parcel just east of this development. Site 44CF506 probably served as a campsite for prehistoric groups. The low density and range of materials recovered suggest that the site functioned as a procurement camp

where activities focused on food processing and to a lesser extent, tool resharpening. The absence of diagnostic artifacts recovered from the site does not permit its age to be determined.

Survey Area C consists of a floodplain, falls, and the grass and wooded slope and hill immediately north of the Falling Creek Apartments. It also includes 44CF7, which encompasses the northern half of the survey area. The survey indicates that the southern half of Area C has been heavily disturbed by development. The southeastern and southwestern portions of the area, in particular, consist of modern fill deposits that are probably associated with the construction and landscaping for the apartments. No sites were identified on the southern half of Area C; however, Location 2 was found on the southeastern half of the area. Location 2 yielded a prehistoric quartz tool, pieces of slag and cinder, and twentieth-century artifacts.

Site 44CF7 occupies the northern half of Area C. Testing at the site identified both prehistoric and historic resources. Prehistoric remains are represented by a light (n=41) scatter of artifacts which consist of quartz, quartzite, and chert debitage, fire-cracked rock, and bifaces. These materials were concentrated on the eastern and western portions of the site and found in association with modern artifacts. This component most likely represents a campsite. The low density and range of artifacts suggest that the site served as a procurement camp where activities focused on food procurement and, to a lesser extent, tool resharpening. The absence of diagnostic artifacts does not permit its age to be determined.

The historic remains comprise the major component. These resources generally correspond with those found by Robbins and MacCord and support some of their conclusions about the types and distribution of archaeological resources. Analyses of the site's archaeological remains, its physiographic setting, and the historical data, support the interpretation of 44CF7 as the location of the Falling Creek Ironworks established by the Virginia Company in 1619.

Shovel testing revealed a light scatter of charcoal and slag over a floodplain that measured approximately 300 ft. east-west x 100 ft. north-south. This low density scatter generally consisted of small pieces mixed in alluvial deposits. In contrast, virtually pure layers of charcoal and slag were found adjacent to an access road near the southern boundary of the site. A thick deposit of slag was identified on the immediate north side of the road, and the charcoal layer on the south side. Together, these remains extended over an area of approximately 145 ft. east-west x 45 ft. north-south.

The charcoal and slag layers are the same deposits identified by MacCord in 1963. While no artifacts were recovered from these deposits during the current survey, they yielded several wrought-iron tools, spikes, and brick bats during the earlier investigation (MacCord 1964:9-12). Several of the bricks were coated with slag suggesting that the furnace or auxiliary forge may have been brick lined. Traces of crushed oyster shell found beneath the slag during that investigation possibly represent mortar for the furnace brickwork or flux added during the smelting process (MacCord 1964:7).

Analyses of charcoal and slag samples provide information on the age of the deposits as well as the ironworking processes undertaken. It is known, for example, that the predominate type of wood burned for charcoal fuel was yellow pine with lesser amounts of red oak and hickory (MacCord 1964:8). The predominance of pine is unusual given that hardwoods were generally preferred because they burned hotter (Salmon 1986:15).

Radiocarbon analyses of charcoal samples recently collected by VDHR archaeologists provide a date of A.D. 1490-1630, supporting the association of the deposits with the seventeenth-century ironworks. Metallurgical assays of slag specimens indicate that these deposits were by-products of a blast furnace and distinguishes them from the remains of Archibald Cary's eighteenth-century forge on the north bank of Falling Creek (Gregory 1957:17-19).

The separate locations of the slag and charcoal deposits indicate the existence of distinct functional areas and imply a relatively high degree of integrity to this part of the site. The charcoal "was probably the stockpile of charcoal made and maintained for charging the blast furnace and was located near the uphill side of the furnace for convenience in loading the furnace from the top"(MacCord 1964:8). The slag deposit, on the other hand, was a waste pile as well as the possible location of an auxiliary forge. Similar deposits have been documented on other ironworks sites, i.e., Saugus, and are usually separated by furnaces and

related structures. The research results indicate that the main furnace may be located beneath the road just west of Test Units 6 and 7. Although no clear evidence of a structure was found during the current research, a large chunk of slag was identified that may be associated with the building remains described by MacCord (1964:9).

The site chosen for the ironworks and the manner in which the facility was constructed were similar to other colonial furnaces (Hartley 1957; Salmon 1986; Troup, Barnes, and Barka 1978; Sanford, personal communication 1993). The success of this venture was in large measure dependent upon the skill of the ironworks master and his workers. The availability of natural resources also factored into its success including an adequate water source; close proximity to suitable limonite deposits, and abundant timber for the production of charcoal. Site 44CF7 was located relatively close to an ore source, a tract known locally as Iron Bottom. However, the archaeological evidence indicates that this tract is located outside of the surveyed areas. Stone and timber were also available on the 100 acres "surrendered for use of the Iron Works" by property owner, John Blower (Hatch 1957:59). Ironmaster of the Falling Creek works, John Berkeley, and Sir Edwin Sandys, representative of the Virginia Company, considered the Falling Creek site to be ideally suited for the facility (Hartley 1957:36–37).

Stone construction at 44CF7 is not clear from the archaeological evidence; however, furnaces were usually built of stone blocks with lesser amounts of bricks. The typical furnace stack measured about 25 ft. square at its base and tapered toward the top; it usually stood 30 ft. high and often was constructed in the side of a hill. Crossing a wooden bridge from the hilltop to the top of the stack, workmen (known as fillers) charged or fueled the furnace with alternating layers of charcoal and ore. As noted above, the charcoal and slag identified at 44CF7 are the remains of fuel and waste piles associated with this operation.

Site 44CF7's furnace was probably situated at the present location of the access road or immediately adjacent to it on the north. In addition, auxiliary structures such as a refining furnace, chafery, and sheds may have been close by (Hatch and Gregory 1962:269; Noël Hume 1975:177–178). Traces of at least one of these structures may have been found (MacCord 1964:9).

Site 44CF7 was much better suited for a furnace and auxiliary structures in terms of its elevation, working space, and access to navigable water than the creek's banks above (west of) the falls (Robbins 1951) (see Appendix C). The site lay approximate 150 ft. downstream of the falls. The presence of postholes or sockets cut into the stones at the falls are evidence of a dam and possibly a flume that may have been associated with 44CF7. These structures would have been essential components of the ironworks, providing the necessary flow and volume of water to operate the furnace(s).

Historical data suggests that 44CF7 was intended to be an integrated works to include a blast furnace, a refinery furnace, and a chafery. While the establishment of the ironworks was slow to develop, iron was apparently being produced on the site by 1620. It is possible that only part of the facility had been completed at that time. Soon after Berkeley's arrival in the summer of 1621, he indicated that increased iron production would be achieved by the spring of 1622 (Kingsbury 1933:548). This information coupled with the archaeological results raise some question as to the size of the operation at the time of Berkeley's arrival. The principal work area, for example, appears to have been relatively small for a typical complex of furnaces and related structures. It is possible that at least some of the auxiliary structures for the main furnace were still in the planning stages or under construction at the time the site was destroyed in 1622 (Hartley 1957:41–42).

In summary, the research results concur with most of the findings of previous research at 44CF7. The results indicate that the site is the location of the ironworks established by the Virginia Company on Falling Creek in 1619 and that it contains significant archaeological resources. Although the research effort found no conclusive evidence of structures or domestic areas, thick slag and charcoal deposits associated with the blast furnace operation were identified adjacent to the current access road near the southern boundary of the site. These deposits are relatively intact. As a result of both historical and archaeological investigations summarized in this report, the Falling Creek Ironworks, as represented at 44CF7, was recently nominated for listing on the Virginia Landmarks Register and National Register of Historic Places.

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APPENDIX A

Provenience	Class	Subclass 1	Subclass 2	Raw Material	Weight(g)	Quantity
44CF007 ST 086	Debitage	Bipolar Flake		Quartzite		1
44CF007 ST 086	Debitage	Primary/Reduction Flake	Noncortical	Quartzite		1
				Provenience Total:		2
44CF007 ST 093	Misc./Unmodified Stone			Unidentified Material		1
				Provenience Total:		1
44CF007 ST 105	Debitage	Bipolar Flake	1-74% Cortex	Quartzite		1
44CF007 ST 105	Debitage	Flake Frag./Shatter	1-74% Cortex	Unident. Chert		1
				Provenience Total:		2
44CF007 ST 107	Debitage	Angular, Blocky Frag/Chunks	Noncortical	Quartz		1
44CF007 ST 107	Debitage	Flake Frag./Shatter	>75% Cortex	Quartz		1
44CF007 ST 107	Debitage	Flake Frag./Shatter	Noncortical	Quartz		2
44CF007 ST 107	Debitage	Flake Frag./Shatter	Noncortical	Quartzite		1
				Provenience Total:		5
44CF007 ST 112	Debitage	Angular, Blocky Frag/Chunks	Noncortical	Quartz		1
				Provenience Total:		1
44CF007 TU01L.C	Debitage	Bipolar Flake	>75% Cortex	Quartz		1
44CF007 TU01L.C	Debitage	Flake Frag./Shatter	>75% Cortex	Quartz		1
44CF007 TU01L.C	Fire-cracked Rock			Quartz		1
				Provenience Total:		3
44CF007 TU01L.D	Debitage	Bipolar Flake	>75% Cortex	Quartz		1
44CF007 TU01L.D	Debitage	Flake Frag./Shatter	1-74% Cortex	Quartzite		1
44CF007 TU01L.D	Debitage	Flake Frag./Shatter	Noncortical	Quartzite		1
44CF007 TU01L.D	Debitage	Primary/Reduction Flake	>75% Cortex	Quartzite		1
				Provenience Total:		4
44CF007 TU02L.B	Biface	Stage 1	Proximal Fragment	Quartzite		1
44CF007 TU02L.B	Biface	Stage 3	Distal Fragment	Quartz		1
44CF007 TU02L.B	Debitage	Angular, Blocky Frag/Chunks	Noncortical	Quartz		2
44CF007 TU02L.B	Debitage	Bipolar Flake	>75% Cortex	Quartzite		1
44CF007 TU02L.B	Debitage	Flake Frag./Shatter	1-74% Cortex	Quartzite		3
44CF007 TU02L.B	Debitage	Flake Frag./Shatter	Noncortical	Quartz		1
44CF007 TU02L.B	Debitage	Flake Frag./Shatter	Noncortical	Quartzite		2
44CF007 TU02L.B	Debitage	Primary/Reduction Flake	>75% Cortex	Quartzite		3
				Provenience Total:		14
44CF007 TU02L.C	Debitage	Angular, Blocky Frag/Chunks	1-74% Cortex	Quartz		1
44CF007 TU02L.C	Debitage	Angular, Blocky Frag/Chunks	Noncortical	Quartz		1

Provenience	Class	Subclass 1	Subclass 2	Raw Material	Weight(g)	Quantity
44CF007 TU02L.C	Debitage	Bipolar Flake	>75% Cortex	Quartz		1
44CF007 TU02L.C	Debitage	Flake Frag./Shatter	1-74% Cortex	Quartz		1
44CF007 TU02L.C	Debitage	Flake Frag./Shatter	1-74% Cortex	Quartz		2
44CF007 TU02L.C	Debitage	Flake Frag./Shatter	1-74% Cortex	Quartzite		1
44CF007 TU02L.C	Debitage	Flake Frag./Shatter	>75% Cortex	Quartz		1
44CF007 TU02L.C	Debitage	Primary/Reduction Flake	>75% Cortex	Quartzite		1
				Provenience Total:		9
44CF506 ST 056	Debitage	2ndry/Biface Thinning Flake	Noncortical	Chalcedony		1
44CF506 ST 056	Debitage	2ndry/Biface Thinning Flake	Noncortical	Quartzite		1
44CF506 ST 056	Debitage	Flake Frag./Shatter	Noncortical	Quartz		2
44CF506 ST 056	Debitage	Flake Frag./Shatter	Noncortical	Quartzite		3
44CF506 ST 056	Fire-cracked Rock			Quartzite		1
				Provenience Total:		8
44CF506 ST 059	Debitage	Flake Frag./Shatter	Noncortical	Quartz		1
				Provenience Total:		1
44CF506 ST 060	Misc./Unmodified Stone					4
				Provenience Total:		4
44CF506 ST 061	Debitage	2ndry/Biface Thinning Flake	Noncortical	Quartz		1
44CF506 ST 061	Debitage	2ndry/Biface Thinning Flake	Noncortical	Quartzite		5
44CF506 ST 061	Debitage	Flake Frag./Shatter	Noncortical	Quartz		2
44CF506 ST 061	Debitage	Flake Frag./Shatter	Noncortical	Quartzite		9
44CF506 ST 061	Debitage	Tertiary/Retouch Flake	Noncortical	Quartzite		2
44CF506 ST 061	Fire-cracked Rock			Quartzite		1
				Provenience Total:		20
44CF506 ST 063	Debitage	Flake Frag./Shatter	Noncortical	Quartz		1
				Provenience Total:		1
44CF506 ST 068	Debitage	Flake Frag./Shatter	Noncortical	Quartzite		1
				Provenience Total:		1
44CF506 ST 071	Debitage	2ndry/Biface Thinning Flake	1-74% Cortex	Quartzite		5
44CF506 ST 071	Debitage	Flake Frag./Shatter	Noncortical	Quartz		1
44CF506 ST 071	Debitage	Flake Frag./Shatter	Noncortical	Quartzite		2
				Provenience Total:		8
LOC 1 ST 021	Body Sherd	Punctate/Net Impressed	Grog/Grit Tempered			1
				Provenience Total:		1
LOC 1 SURFACE	Debitage	Flake Frag./Shatter	>75% Cortex	Quartz		1
				Provenience Total:		1

Provenience	Class	Subclass 1	Subclass 2	Raw Material	Weight(g)	Quantity
LOC 2 ST 159	Informal Tool	Flake Frag./Shatter	Noncortical	Quartz		1
				Provenience Total:		1
				Site Total:		87

Provenience	Class	Object	Datable Attribute	Comments	Descriptor	Weight(g)	Qty
44CF007 ST 075	Construction Materials	Brick	Machine Made			51.00	1
44CF007 ST 075	Glass Storage Containers	Bottle	Colored Glass	modern	Green		1
44CF007 ST 075	Misc. Material	Mineral	Coal/Cinder	slag		211.40	6
44CF007 ST 075	Misc. Material	Scrap Metal	Ferrous				4
44CF007 ST 075	Misc. Material	Wire	Ferrous				1
44CF007 ST 075	Nails	Nail(s)	Wire				1
					Provenience Total:	14	
44CF007 ST 076	Construction Materials	Brick	Machine Made			97.00	1
44CF007 ST 076	Misc. Items			charcoal		5.90	3
44CF007 ST 076	Misc. Material	Mineral	Coal/Cinder	slag		13.10	5
					Provenience Total:	9	
44CF007 ST 077	Glass Storage Containers	Bottle	Colored Glass	modern	Amber		20
44CF007 ST 077	Glass Storage Containers	Bottle	Colored Glass	modern	Bright Green		9
44CF007 ST 077	Glass Storage Containers	Bottle	Colored Glass	modern	Green		1
44CF007 ST 077	Glass Storage Containers	Bottle	Colorless Glass	modern			14
44CF007 ST 077	Glass Storage Containers	Bottle	Machine Made	amber	Base		1
44CF007 ST 077	Glass Storage Containers	Closure	Crown Cap				1
44CF007 ST 077	Misc. Material	Mineral	Coal/Cinder	slag		261.40	1
					Provenience Total:	47	
44CF007 ST 078	Glass Storage Containers	Bottle	Colored Glass	modern	Amber		1
44CF007 ST 078	Glass Storage Containers	Bottle	Colorless Glass	modern			6
44CF007 ST 078	Window Glass	Pane Glass		modern			2
					Provenience Total:	9	
44CF007 ST 080	Glass Storage Containers	Bottle	Colorless Glass	modern			1
44CF007 ST 080	Misc. Material	Mineral	Coal/Cinder	slag		8.10	2
					Provenience Total:	3	
44CF007 ST 081	Misc. Material	Mineral	Coal/Cinder	slag		123.50	1
					Provenience Total:	1	
44CF007 ST 083	Glass Storage Containers	Bottle	Colorless Glass	modern			1
44CF007 ST 083	Misc. Items			charcoal		4.70	2
					Provenience Total:	3	
44CF007 ST 086	Misc. Material	Mineral	Coal/Cinder	slag		2.80	1
					Provenience Total:	1	
44CF007 ST 088	Misc. Items	Unidentified	Plastic	discarded			1
44CF007 ST 088	Nails	Nail(s)	Unidentified				1
44CF007 ST 088	Nails	Nail(s)	Unidentified Fragments				1

Provenience	Class	Object	Datable Attribute	Comments	Descriptor	Weight(g)	Qty
44CF007 ST 088	Toys and Leisure	Phonograph Record	Plastic	discarded			1
					Provenience Total:	4	
44CF007 ST 090	Glass Storage Containers	Bottle	Colorless Glass	modern			18
44CF007 ST 090	Misc. Material	Mineral	Coal/Cinder	slag		43.90	10
					Provenience Total:	28	
44CF007 ST 091	Glass Storage Containers	Bottle	Colorless Glass	modern			1
44CF007 ST 091	Misc. Material	Unidentified	Ferrous	flat fragments			15
					Provenience Total:	16	
44CF007 ST 092	Misc. Material	Unidentified	Ferrous	flat fragments			18
					Provenience Total:	18	
44CF007 ST 093	Misc. Items			charcoal		2.10	8
					Provenience Total:	8	
44CF007 ST 095	Historic Bone	Unsorted Bone					1
					Provenience Total:	1	
44CF007 ST 098	Misc. Material	Mineral	Coal/Cinder	coal		4.70	3
					Provenience Total:	3	
44CF007 ST 099	Glass Storage Containers	Unidentified	Colored Glass	late 19th-20th c.?	Dark Green		1
44CF007 ST 099	Misc. Items			charcoal		2.80	6
					Provenience Total:	7	
44CF007 ST 100	Glass Storage Containers	Bottle	Colorless Glass	modern			1
44CF007 ST 100	Misc. Material	Mineral	Coal/Cinder	coal		2.20	2
					Provenience Total:	3	
44CF007 ST 101	Misc. Material	Mineral	Coal/Cinder	coal		.70	1
44CF007 ST 101	Misc. Material	Mineral	Coal/Cinder	slag		3.10	3
					Provenience Total:	4	
44CF007 ST 103	Construction Materials	Brick	Machine Made			56.00	2
44CF007 ST 103	Misc. Material	Mineral	Coal/Cinder	coal		.50	1
44CF007 ST 103	Misc. Material	Mineral	Coal/Cinder	slag		2.60	2
					Provenience Total:	5	
44CF007 ST 104	Construction Materials	Brick	Unidentified			1.80	3
44CF007 ST 104	Glass Storage Containers	Bottle	Colorless Glass	modern			1
44CF007 ST 104	Misc. Material	Mineral	Coal/Cinder	cinder		.40	1
44CF007 ST 104	Misc. Material	Mineral	Coal/Cinder	slag		.30	1
					Provenience Total:	6	
44CF007 ST 105	Construction Materials		Concrete				2
44CF007 ST 105	Construction Materials	Brick	Machine Made			42.00	2
44CF007 ST 105	Window Glass	Pane Glass		modern			1

Provenience	Class	Object	Datable Attribute	Comments	Descriptor	Weight(g)	Qty
					Provenience Total:	5	
44CF007 ST 106	Glass Storage Containers	Bottle	Colorless Glass	modern			1
44CF007 ST 106	Misc. Material	Mineral	Coal/Cinder	cinder		3.90	2
					Provenience Total:	3	
44CF007 ST 107	Glass Storage Containers	Bottle	Colored Glass	modern	Amber		1
44CF007 ST 107	Glass Storage Containers	Bottle	Colorless Glass	modern			2
44CF007 ST 107	Misc. Material			charcoal		13.30	
44CF007 ST 107	Misc. Material	Mineral	Coal/Cinder	slag		29.60	5
44CF007 ST 107	Misc. Material	Unidentified	Ferrous	concretion		34.80	1
					Provenience Total:	9	
44CF007 ST 108	Glass Tableware	Tumbler	Colorless Glass	modern	Base		1
44CF007 ST 108	Misc. Material	Mineral	Coal/Cinder	slag		58.20	2
					Provenience Total:	3	
44CF007 ST 109	Glass Storage Containers	Bottle	Colorless Glass	modern			2
44CF007 ST 109	Misc. Material	Mineral	Coal/Cinder	slag		112.30	2
					Provenience Total:	4	
44CF007 ST 110	Misc. Items			charcoal		3.60	
					Provenience Total:	0	
44CF007 ST 111	Misc. Items		Wood	fragments		13.30	
44CF007 ST 111	Misc. Items	Unidentified	Plastic	discarded			1
44CF007 ST 111	Misc. Material		Ferrous	concretion		55.80	1
44CF007 ST 111	Misc. Material	Mineral	Coal/Cinder	slag		5.90	1
					Provenience Total:	3	
44CF007 ST 112	Misc. Material	Mineral	Coal/Cinder	slag		39.70	3
44CF007 ST 112	Misc. Material	Unidentified	Ferrous	concretions		131.90	19
44CF007 ST 112	Misc. Material	Unidentified	Ferrous	nail/spike-likefragment			1
					Provenience Total:	23	
44CF007 ST 113	Construction Materials	Brick	Machine Made			89.70	1
44CF007 ST 113	Window Glass	Pane Glass		modern			1
					Provenience Total:	2	
44CF007 ST 114	Construction Materials	Construction Block	Concrete	cinderblock			1
					Provenience Total:	1	
44CF007 ST 115	Misc. Items	Unidentified	Plastic	discarded			3
					Provenience Total:	3	
44CF007 ST 116	Misc. Items			charcoal		4.30	
44CF007 ST 116	Misc. Material	Mineral	Coal/Cinder	slag		367.20	5
					Provenience Total:	5	

Provenience	Class	Object	Datable Attribute	Comments	Descriptor	Weight(g)	Qty
44CF007 ST 117	Ceramic Tableware	Unidentified	Refined Earthenware	yellow glazed, modern			1
					Provenience Total:	1	
44CF007 ST 119	Misc. Items			charcoal		2.10	
44CF007 ST 119	Window Glass	Pane Glass		modern			1
					Provenience Total:	1	
44CF007 ST 120	Construction Materials	Brick	Machine Made			84.00	1
					Provenience Total:	1	
44CF007 ST 121	Construction Materials	Paving Material	Asphalt	discarded		139.80	11
44CF007 ST 121	Glass Storage Containers	Bottle	Colored Glass	modern	Bright Green		1
44CF007 ST 121	Glass Storage Containers	Bottle	Colorless Glass	modern			7
					Provenience Total:	19	
44CF007 ST 125	Glass Storage Containers	Bottle	Colorless Glass	modern			1
44CF007 ST 125	Misc. Material	Scrap Metal	Ferrous	flat			10
44CF007 ST 125	Misc. Material	Wire	Ferrous				6
					Provenience Total:	17	
44CF007 ST 130	Misc. Items			charcoal		1.30	
44CF007 ST 130	Misc. Material	Mineral	Coal/Cinder	cinder		.60	1
					Provenience Total:	1	
44CF007 ST 132	Glass Storage Containers	Bottle	Colorless Glass	modern			1
44CF007 ST 132	Misc. Material	Mineral	Coal/Cinder	slag		7.00	1
44CF007 ST 132	Misc. Material	Scrap Metal	Ferrous				18
					Provenience Total:	20	
44CF007 ST 139	Misc. Material		Ferrous	concretion		8.40	1
					Provenience Total:	1	
44CF007 ST 140	Misc. Material	Mineral	Coal/Cinder	slag		196.60	1
					Provenience Total:	1	
44CF007 ST 144	Misc. Items			charcoal		.20	
					Provenience Total:	0	
44CF007 ST 145	Agricult/Horticulture	Barbed Wire					1
					Provenience Total:	1	
44CF007 ST 146	Construction Materials	Brick	Machine Made			8.40	4
					Provenience Total:	4	
44CF007 ST 171	Construction Materials	Construction Block	Concrete	cinderblock			1
44CF007 ST 171	Glass Storage Containers	Bottle	Colored Glass	modern	Green		1
44CF007 ST 171	Metal Containers	Can	Ferrous				2
					Provenience Total:	4	
44CF007 TU01F1A	Construction Materials	Paving Material	Asphalt	discarded		2.30	1

Provenience	Class	Object	Datable Attribute	Comments	Descriptor	Weight(g)	Qty
44CF007 TU01F1A	Misc. Items			charcoal		1.20	
					Provenience Total:	1	
44CF007 TU01F1B	Misc. Material	Mineral	Coal/Cinder	coal		1.10	1
					Provenience Total:	1	
44CF007 TU01F1C	Glass Storage Containers	Bottle	Colorless Glass	modern			1
44CF007 TU01F1C	Misc. Material	Mineral	Coal/Cinder	slag		1.80	3
44CF007 TU01F1C	Nails	Nail(s)	Unidentified Fragments				1
					Provenience Total:	5	
44CF007 TU01L.B	Construction Materials	Brick	Machine Made			178.30	3
44CF007 TU01L.B	Misc. Items			charcoal		2.90	
44CF007 TU01L.B	Misc. Items	Unidentified	Plastic	discarded			1
44CF007 TU01L.B	Misc. Material	Mineral	Coal/Cinder	cinder		12.00	2
44CF007 TU01L.B	Misc. Material	Mineral	Coal/Cinder	coal		14.00	8
44CF007 TU01L.B	Nails	Nail(s)	Unidentified	attached to wood			4
44CF007 TU01L.B	Nails	Nail(s)	Unidentified Fragments				2
					Provenience Total:	20	
44CF007 TU01L.C	Construction Materials	Brick	Machine Made			1.20	1
44CF007 TU01L.C	Construction Materials	Brick	Unidentified			4.40	2
44CF007 TU01L.C	Glass Storage Containers	Bottle	Colorless Glass	modern			2
44CF007 TU01L.C	Glass Storage Containers	Jar	Machine Made	threaded finishcolorless	Neck		1
44CF007 TU01L.C	Misc. Items			charcoal		2.70	
44CF007 TU01L.C	Misc. Items	Unidentified	Plastic	discarded			1
44CF007 TU01L.C	Misc. Material	Mineral	Coal/Cinder	coal		.80	1
44CF007 TU01L.C	Misc. Material	Mineral	Coal/Cinder	slag		15.80	3
44CF007 TU01L.C	Misc. Material	Unidentified	Ferrous	nail/wire frag			1
					Provenience Total:	12	
44CF007 TU01L.D	Glass Storage Containers	Bottle	Colorless Glass	modern			6
44CF007 TU01L.D	Misc. Items			charcoal		1.20	
44CF007 TU01L.D	Misc. Material	Mineral	Coal/Cinder	slag		3.30	1
44CF007 TU01L.D	Misc. Material	Scrap Metal	Ferrous				4
44CF007 TU01L.D	Misc. Material	Unidentified	Ferrous	nail/wire frags			3
44CF007 TU01L.D	Nails	Nail(s)	Unidentified				1
					Provenience Total:	15	
44CF007 TU02L.A	Glass Bev. Containers	Pop Bottle	Colored Glass	Dr. Pepper	Green		23
44CF007 TU02L.A	Glass Bev. Containers	Pop Bottle	Colorless Glass	includes Pepsi			88
44CF007 TU02L.A	Glass Bev. Containers	Pop Bottle	Machine Made	Dr. Pepper	Base		1
44CF007 TU02L.A	Glass Bev. Containers	Pop Bottle	Machine Made	includes Pepsi,colorless	Base		4

Provenience	Class	Object	Datable Attribute	Comments	Descriptor	Weight(g)	Qty
44CF007 TU02L.A	Glass Bev. Containers	Pop Bottle	Machine Made	includes Pepsi,colorless	Neck		2
44CF007 TU02L.A	Glass Storage Containers	Bottle	Colored Glass	modern	Amber		7
44CF007 TU02L.A	Glass Storage Containers	Bottle	Colored Glass	modern	Bright Green		2
44CF007 TU02L.A	Window Glass	Pane Glass		modern			1
					Provenience Total:	128	
44CF007 TU02L.B	Agricult/Horticulture	Barbed Wire					1
44CF007 TU02L.B	Ceramic Tableware	Unidentified	Whiteware	modern			2
44CF007 TU02L.B	Construction Materials	Brick	Machine Made			321.90	6
44CF007 TU02L.B	Construction Materials	Paving Material	Asphalt	discarded		97.00	13
44CF007 TU02L.B	Glass Bev. Containers	Pop Bottle	Colorless Glass	Pepsi			1
44CF007 TU02L.B	Glass Bev. Containers	Pop Bottle	Crown Finish	machine-made, colorless	Neck		1
44CF007 TU02L.B	Glass Bev. Containers	Pop Bottle	Machine Made	Dr. Pepper?	Base		1
44CF007 TU02L.B	Glass Storage Containers	Bottle	Colored Glass	modern	Amber		2
44CF007 TU02L.B	Glass Storage Containers	Bottle	Colored Glass	modern	Bright Green		1
44CF007 TU02L.B	Glass Storage Containers	Bottle	Colored Glass	modern	Green		2
44CF007 TU02L.B	Glass Storage Containers	Bottle	Colorless Glass	modern			18
44CF007 TU02L.B	Glass Storage Containers	Closure	Crown Cap				1
44CF007 TU02L.B	Historic Bone	Unsorted Bone					2
44CF007 TU02L.B	Historic Shell	Mollusk		oyster		56.80	
44CF007 TU02L.B	Misc. Hardware	Bolt	Ferrous				1
44CF007 TU02L.B	Misc. Items			charcoal		7.00	
44CF007 TU02L.B	Misc. Material	Mineral	Coal/Cinder	coal		4.80	5
44CF007 TU02L.B	Misc. Material	Mineral	Coal/Cinder	slag		137.60	1
44CF007 TU02L.B	Misc. Material	Mineral	Coal/Cinder	slag		2000.00	1
44CF007 TU02L.B	Misc. Material	Scrap Metal	Ferrous				10
44CF007 TU02L.B	Nails	Nail(s)	Unidentified				3
44CF007 TU02L.B	Pharmaceutical Contain.	Toiletry/Perfume Bottle	Machine Made	colorless	Base		1
					Provenience Total:	73	
44CF007 TU02L.C	Ceramic Bev. Containers	Bottle	Stoneware	late 19th-20th c.?			1
44CF007 TU02L.C	Glass Storage Containers	Bottle	Colored Glass	late 19th-20th c.?	Dark Green		2
44CF007 TU02L.C	Glass Storage Containers	Bottle	Colored Glass	modern	Amber		1
44CF007 TU02L.C	Glass Storage Containers	Bottle	Colored Glass	modern	Aqua		2
44CF007 TU02L.C	Glass Storage Containers	Bottle	Colored Glass	modern	Bright Green		2
44CF007 TU02L.C	Glass Storage Containers	Bottle	Colored Glass	modern	Green		3
44CF007 TU02L.C	Glass Storage Containers	Bottle	Colorless Glass	modern			19
44CF007 TU02L.C	Glass Storage Containers	Bottle	Crown Finish	colorless, modern	Neck		1
44CF007 TU02L.C	Glass Storage Containers	Closure	Glass Lid Liner	modern	Opaque White		1

Provenience	Class	Object	Datable Attribute	Comments	Descriptor	Weight(g)	Qty
44CF007 TU02L.C	Metal Containers	Can	Ferrous				3
44CF007 TU02L.C	Misc. Items			charcoal		9.80	
44CF007 TU02L.C	Misc. Items		Ferrous	nail/wire frags			31
44CF007 TU02L.C	Misc. Material	Mineral	Coal/Cinder	coal		4.20	1
44CF007 TU02L.C	Misc. Material	Mineral	Coal/Cinder	slag		257.40	8
44CF007 TU02L.C	Misc. Material	Scrap Metal	Ferrous	prob. includes tin can fragments			54
44CF007 TU02L.C	Window Glass	Pane Glass		modern			1
					Provenience Total:	130	
44CF007 TU02L.D	Glass Storage Containers	Bottle	Colored Glass	modern	Aqua		4
44CF007 TU02L.D	Glass Storage Containers	Bottle	Colored Glass	modern	Bright Green		1
44CF007 TU02L.D	Glass Storage Containers	Bottle	Colored Glass	modern	Green		2
44CF007 TU02L.D	Glass Storage Containers	Bottle	Colorless Glass	colorless			2
44CF007 TU02L.D	Glass Storage Containers	Bottle	Machine Made	aqua	Base		1
44CF007 TU02L.D	Glass Storage Containers	Bottle	Solarized/Maganese	modern			1
44CF007 TU02L.D	Misc. Items			slate			1
44CF007 TU02L.D	Misc. Material	Mineral	Coal/Cinder	cinder		1.10	3
44CF007 TU02L.D	Misc. Material	Mineral	Coal/Cinder	coal		5.60	3
44CF007 TU02L.D	Misc. Material	Mineral	Coal/Cinder	slag		61.10	2
44CF007 TU02L.D	Misc. Material	Scrap Metal	Ferrous				10
44CF007 TU02L.D	Nails	Nail(s)	Unidentified				1
44CF007 TU02L.D	Nails	Nail(s)	Wire				1
44CF007 TU02L.D	Window Glass	Pane Glass		modern			1
44CF007 TU02L.D	Window Glass	Pane Glass		modern			2
					Provenience Total:	35	
44CF007 TU02L.E	Misc. Hardware	Bolt	Ferrous	?			1
44CF007 TU02L.E	Misc. Items			charcoal		3.90	
44CF007 TU02L.E	Misc. Material	Mineral	Coal/Cinder	slag		108.40	4
44CF007 TU02L.E	Misc. Material	Scrap Metal	Ferrous				2
44CF007 TU02L.E	Misc. Material	Unidentified	Ferrous	concretions		15.10	2
					Provenience Total:	9	
44CF007 TU02L.F	Glass Storage Containers	Bottle	Colorless Glass	modern			2
44CF007 TU02L.F	Misc. Hardware	Unidentified	Ferrous	nail/spike frag			1
44CF007 TU02L.F	Misc. Items			charcoal		1.50	
44CF007 TU02L.F	Misc. Material	Mineral	Coal/Cinder	slag		1.50	5
44CF007 TU02L.F	Misc. Material	Wire	Ferrous	cable			4
					Provenience Total:	12	
44CF007 TU02L.G	Glass Storage Containers	Bottle	Colored Glass	modern	Aqua		1

Provenience	Class	Object	Datable Attribute	Comments	Descriptor	Weight(g)	Qty
44CF007 TU02L.G	Misc. Material	Mineral	Coal/Cinder	slag		5.90	1
					Provenience Total:	2	
44CF007 TU03F2	Misc. Material	Mineral	Coal/Cinder	slag		42.70	2
44CF007 TU03F2	Misc. Material	Scrap Metal	Ferrous				8
44CF007 TU03F2	Misc. Material	Unidentified	Ferrous	concretions			4
44CF007 TU03F2	Misc. Material	Unidentified	Ferrous	modern, 22" x 12"			1
44CF007 TU03F2	Misc. Material	Wire	Ferrous				1
44CF007 TU03F2	Nails	Nail(s)	Unidentified Fragments	?			2
					Provenience Total:	18	
44CF007 TU03L.A	Glass Storage Containers	Bottle	Colorless Glass	modern			1
44CF007 TU03L.A	Glass Storage Containers	Bottle	Colorless Glass	modern			2
44CF007 TU03L.A	Misc. Items			charcoal		.10	
44CF007 TU03L.A	Misc. Material	Mineral	Coal/Cinder	cinder		10.50	4
44CF007 TU03L.A	Misc. Material	Mineral	Coal/Cinder	coal		19.70	1
44CF007 TU03L.A	Misc. Material	Mineral	Coal/Cinder	slag		54.40	2
44CF007 TU03L.A	Nails	Nail(s)	Unidentified				1
					Provenience Total:	11	
44CF007 TU04L.A	Glass Storage Containers	Bottle	Colored Glass	modern	Amber		4
44CF007 TU04L.A	Glass Storage Containers	Bottle	Colored Glass	modern	Bright Green		7
44CF007 TU04L.A	Glass Storage Containers	Bottle	Colorless Glass	modern			15
44CF007 TU04L.A	Glass Storage Containers	Bottle	Crown Finish	colorless	Neck		1
44CF007 TU04L.A	Glass Storage Containers	Bottle	Machine Made	amber	Base		1
44CF007 TU04L.A	Glass Storage Containers	Bottle	Machine Made	bright green	Base		1
44CF007 TU04L.A	Glass Storage Containers	Bottle	Machine Made	colorless	Base		1
44CF007 TU04L.A	Misc. Material	Scrap Metal	Ferrous				14
					Provenience Total:	44	
44CF007 TU04L.B	Glass Storage Containers	Bottle	Colorless Glass	modern			4
44CF007 TU04L.B	Misc. Items			charcoal		3.80	
					Provenience Total:	4	
44CF007 TU04L.C	Ceramic Tableware	Unidentified	Porcelain	decorated, modern	Black		1
44CF007 TU04L.C	Misc. Items			charcoal		11.00	
44CF007 TU04L.C	Misc. Items		Plastic	discarded			1
					Provenience Total:	2	
44CF007 TU04L.D	Misc. Items			charcoal		1.10	
44CF007 TU04L.D	Misc. Material	Scrap Metal	Ferrous				10
					Provenience Total:	10	
44CF007 TU04L.E	Misc. Material	Scrap Metal	Ferrous				1

Provenience	Class	Object	Datable Attribute	Comments	Descriptor	Weight(g)	Qty
					Provenience Total:		1
44CF007 TU05F4	Construction Materials	Brick	Hand Made			334.10	1
44CF007 TU05F4	Glass Storage Containers	Bottle	Colorless Glass	modern			2
44CF007 TU05F4	Glass Storage Containers	Bottle	Machine Made	colorless	Base		1
44CF007 TU05F4	Misc. Items			charcoal		3.60	
44CF007 TU05F4	Misc. Material	Mineral	Coal/Cinder	slag		107.60	2
					Provenience Total:		6
44CF007 TU05L.A	Currency	Coin	> 1950	1974 Jefferson nickel			1
44CF007 TU05L.A	Misc. Items			charcoal		2.20	
					Provenience Total:		1
44CF007 TU05L.B	Construction Materials	Brick	Machine Made			3.10	1
44CF007 TU05L.B	Construction Materials	Brick	Unidentified			.80	1
44CF007 TU05L.B	Currency	Coin	> 1950	1968 quarter			1
44CF007 TU05L.B	Glass Storage Containers	Bottle	Colorless Glass	modern			3
44CF007 TU05L.B	Misc. Items			charcoal		3.10	
44CF007 TU05L.B	Misc. Material	Mineral	Coal/Cinder	slag		366.20	15
44CF007 TU05L.B	Nails	Nail(s)	Unidentified				1
44CF007 TU05L.B	Nails	Nail(s)	Unidentified Fragments				1
					Provenience Total:		23
44CF007 TU05L.C	Construction Materials	Brick	Hand Made	?		12.10	1
44CF007 TU05L.C	Glass Storage Containers	Bottle	Colored Glass	modern	Aqua		1
44CF007 TU05L.C	Glass Storage Containers	Bottle	Colorless Glass	modern			1
44CF007 TU05L.C	Misc. Items			charcoal		13.60	
44CF007 TU05L.C	Misc. Material	Mineral	Coal/Cinder	slag		238.40	12
					Provenience Total:		15
44CF007 TU06L.A	Construction Materials	Brick	Machine Made			80.10	1
44CF007 TU06L.A	Glass Bev. Containers	Beer Bottle	Machine Made	colorless	Neck		1
					Provenience Total:		2
44CF007 TU06L.B	Glass Bev. Containers	Beer Bottle	Colored Glass	modern	Amber		3
					Provenience Total:		3
44CF007 TU06L.C	Ceramic Tableware	Bottle	Colored Glass	modern	Amber		1
44CF007 TU06L.C	Ceramic Tableware	Bottle	Colored Glass	modern	Bright Green		1
44CF007 TU06L.C	Construction Materials	Brick	Unidentified			68.90	3
44CF007 TU06L.C	Construction Materials	Paving Material	Asphalt	discarded		157.00	10
44CF007 TU06L.C	Glass Bev. Containers	Pop Bottle	Colorless Glass	includes Pepsi			27
44CF007 TU06L.C	Glass Storage Containers	Bottle	Machine Made	colorless	Base		2
44CF007 TU06L.C	Glass Storage Containers	Bottle	Machine Made	green	Base		1

Provenience	Class	Object	Datable Attribute	Comments	Descriptor	Weight(g)	Qty
44CF007 TU06L.C	Misc. Hardware	Unidentified	Ferrous	nail/wire frag			1
44CF007 TU06L.C	Misc. Material	Mineral	Coal/Cinder	slag		277.50	3
44CF007 TU06L.C	Misc. Material	Scrap Metal	Ferrous				2
44CF007 TU06L.C	Personal Items	Eyeglass Part	Plastic	discarded	Black		1
44CF007 TU06L.C	Toys and Leisure	Toy	Plastic	ball, discarded	Blue		1
					Provenience Total:	53	
44CF007 TU06L.D	Construction Materials	Brick	Machine Made			1000.00	8
44CF007 TU06L.D	Construction Materials	Wall Finishing	Ceramic	tile, modern			1
44CF007 TU06L.D	Glass Storage Containers	Bottle	Colorless Glass	modern			4
44CF007 TU06L.D	Misc. Hardware	Bolt	Ferrous				1
44CF007 TU06L.D	Misc. Hardware	Unidentified	Ferrous	machinery, modern			1
44CF007 TU06L.D	Misc. Items			charcoal		6.50	
44CF007 TU06L.D	Misc. Material	Mineral	Coal/Cinder	slag		4600.00	203
44CF007 TU06L.D	Misc. Material	Unidentified	Ferrous	concretions		495.40	24
44CF007 TU06L.D	Window Glass	Pane Glass		modern			2
					Provenience Total:	244	
44CF007 TU07L.A	Construction Materials	Paving Material	Asphalt	discarded		32.80	1
44CF007 TU07L.A	Utensils		Plastic	spatula, disc.			1
					Provenience Total:	2	
44CF007 TU07L.C	Construction Materials	Paving Material	Asphalt	discarded		30.30	1
44CF007 TU07L.C	Glass Storage Containers	Bottle	Colorless Glass	modern			1
44CF007 TU07L.C	Misc. Items			charcoal		1.90	
					Provenience Total:	2	
44CF007 TU07L.D	Construction Materials	Paving Material	Asphalt	discarded		6.90	1
					Provenience Total:	1	
44CF007 TU07L.E	Misc. Items			charcoal		45.30	
44CF007 TU07L.E	Misc. Material	Mineral	Coal/Cinder	slag		19.60	2
					Provenience Total:	2	
44CF007 TU08L.A	Glass Storage Containers	Bottle	Colorless Glass	modern			15
44CF007 TU08L.A	Glass Storage Containers	Bottle	Machine Made	colorless	Base		1
44CF007 TU08L.A	Glass Storage Containers	Bottle	Machine Made	colorless	Neck		2
					Provenience Total:	18	
44CF007 TU08L.B	Construction Materials	Brick	Hand Made	?		80.10	2
44CF007 TU08L.B	Construction Materials	Brick	Machine Made			130.70	2
44CF007 TU08L.B	Glass Storage Containers	Bottle	Colored Glass	modern	Green		1
44CF007 TU08L.B	Glass Storage Containers	Bottle	Colorless Glass	modern			1
44CF007 TU08L.B	Misc. Material	Mineral	Coal/Cinder	coal		4.30	1

Provenience	Class	Object	Datable Attribute	Comments	Descriptor	Weight(g)	Qty
					Provenience Total:	7	
44CF506 ST 059	Glass Storage Containers	Bottle	Colorless Glass	modern			1
					Provenience Total:	1	
44CF506 ST 060	Construction Materials	Brick	Machine Made			241.90	2
					Provenience Total:	2	
44CF506 ST 063	Construction Materials	Brick	Hand Made	?, or fired clay		1.80	1
44CF506 ST 063	Misc. Items			charcoal		1.10	2
					Provenience Total:	3	
44CF506 ST 068	Construction Materials		Concrete				2
44CF506 ST 068	Glass Storage Containers	Bottle	Colorless Glass	modern			1
					Provenience Total:	3	
AREA A ST 002	Construction Materials	Drain Pipe/Tile	Ceramic				3
AREA A ST 002	Glass Storage Containers	Bottle	Colored Glass	mocern	Amber		1
AREA A ST 002	Misc. Material	Mineral	Coal/Cinder	coal		11.30	1
					Provenience Total:	5	
AREA A ST 003	Glass Storage Containers	Bottle	Colorless Glass	modern			1
AREA A ST 003	Misc. Material	Mineral	Coal/Cinder	coal		5.90	4
					Provenience Total:	5	
AREA A ST 009	Glass Storage Containers	Bottle	Colorless Glass	modern			2
AREA A ST 009	Window Glass	Plate Glass		modern			1
					Provenience Total:	3	
AREA A ST 010	Construction Materials	Brick	Unidentified			.40	1
					Provenience Total:	1	
AREA A ST 015	Ammunition/Artillery	Bullet	Lead	grooved			1
AREA A ST 015	Glass Storage Containers	Bottle	Colored Glass	late 19th- 20th c.?	Green		1
AREA A ST 015	Glass Storage Containers	Bottle	Colored Glass	modern	Bright Green		1
AREA A ST 015	Glass Storage Containers	Bottle	Colorless Glass	modern			2
					Provenience Total:	5	
AREA A ST 032	Glass Storage Containers	Bottle	Colored Glass	modern	Amber		1
					Provenience Total:	1	
AREA A ST 033	Misc. Items	Unidentified		worked stone, lid-like object fra			1
					Provenience Total:	1	
AREA A ST 037	Glass Storage Containers	Bottle	Colored Glass	modern	Amber		1
AREA A ST 037	Nails	Nail(s)	Unidentified Fragments				1
					Provenience Total:	2	
AREA A ST 039	Misc. Hardware	Bolt	Copper-Alloy	carriage			1
AREA A ST 039	Nails	Nail(s)	Wire				1

Provenience	Class	Object	Datable Attribute	Comments	Descriptor	Weight(g)	Qty
					Provenience Total:	2	
AREA A ST 040	Glass Storage Containers	Bottle	Colorless Glass	modern			1
AREA A ST 040	Misc. Items			fossil rock			1
					Provenience Total:	2	
AREA A ST 041	Glass Storage Containers	Bottle	Colorless Glass	modern			2
AREA A ST 041	Window Glass	Pane Glass		modern			3
					Provenience Total:	5	
AREA A ST 046	Misc. Hardware	Screw		machine, steel			1
AREA A ST 046	Nails	Nail(s)	Wire				1
					Provenience Total:	2	
AREA B ST 048	Glass Storage Containers	Bottle	Colored Glass	modern	Green		2
AREA B ST 048	Glass Storage Containers	Bottle	Colorless Glass	modern			6
					Provenience Total:	8	
AREA B ST 052	Construction Materials	Paving Material	Asphalt	discarded			1
AREA B ST 052	Glass Storage Containers	Bottle	Colorless Glass	modern			1
AREA B ST 052	Glass Storage Containers	Bottle	Machine Made	colorless	Base		1
					Provenience Total:	3	
AREA B ST 053	Construction Materials	Paving Material	Asphalt	discarded			3
					Provenience Total:	3	
AREA B ST 054	Toys and Leisure	Skeet		target, disc.			1
					Provenience Total:	1	
AREA B ST 057	Construction Materials	Paving Material	Asphalt	discarded			1
AREA B ST 057	Misc. Items	Unidentified		tile-like, glazed terracotta			1
					Provenience Total:	2	
AREA B ST 058	Construction Materials	Paving Material	Asphalt	discarded			1
					Provenience Total:	1	
AREA B ST 065	Construction Materials		Concrete				1
AREA B ST 065	Construction Materials	Construction Block	Concrete	cinderblock			1
					Provenience Total:	2	
AREA B ST 066	Construction Materials	Brick	Machine Made			51.20	1
					Provenience Total:	1	
AREA C ST 149	Construction Materials	Brick	Machine Made			5.40	1
AREA C ST 149	Construction Materials	Paving Material	Asphalt	discarded			1
					Provenience Total:	2	
AREA C ST 155	Construction Materials	Brick	Machine Made			100.00	1
AREA C ST 155	Construction Materials	Wall Finishing	Ceramic	tile, modern			8
AREA C ST 155	Glass Storage Containers	Bottle	Colored Glass	modern	Amber		2

Provenience	Class	Object	Datable Attribute	Comments	Descriptor	Weight(g)	Qty
					Provenience Total:		11
AREA C ST 158	Construction Materials	Brick	Machine Made			7.30	8
AREA C ST 158	Glass Storage Containers	Bottle	Colorless Glass	modern			1
AREA C ST 158	Misc. Material	Mineral	Coal/Cinder	cinder			1
					Provenience Total:		10
AREA C ST 160	Construction Materials	Brick	Machine Made			5.30	3
AREA C ST 160	Construction Materials	Mortar	Sand			1.50	1
AREA C ST 160	Misc. Material	Mineral	Coal/Cinder	slag		1.40	1
					Provenience Total:		5
AREA C ST 162	Misc. Material	Scrap Metal	Ferrous				2
					Provenience Total:		2
AREA C ST 163	Construction Materials	Brick	Hand Made	?		7.60	1
AREA C ST 163	Misc. Material	Scrap Metal	Ferrous				8
					Provenience Total:		9
AREA C ST 168	Construction Materials	Brick	Machine Made			7.30	3
					Provenience Total:		3
LOC 1 ST 018	Glass Storage Containers	Bottle	Machine Made	green	Base		1
					Provenience Total:		1
LOC 1 ST 021	Glass Storage Containers	Bottle	Colored Glass	modern	Amber		2
LOC 1 ST 021	Glass Storage Containers	Bottle	Colored Glass	modern	Green		1
LOC 1 ST 021	Glass Storage Containers	Bottle	Colorless Glass	modern			3
					Provenience Total:		6
LOC 1 ST 023	Ceramic Tableware	Unidentified	Pearlware: Painted	very worn	Blue		1
					Provenience Total:		1
LOC 1 ST 025	Glass Storage Containers	Bottle	Colored Glass	modern	Amber		3
LOC 1 ST 025	Glass Storage Containers	Bottle	Colored Glass	modern	Ultramarine		1
LOC 1 ST 025	Glass Storage Containers	Bottle	Colorless Glass	modern			3
LOC 1 ST 025	Misc. Hardware	Bolt	Ferrous				2
LOC 1 ST 025	Misc. Material	Mineral	Coal/Cinder	coal		18.90	1
LOC 1 ST 025	Window Glass	Pane Glass		modern			1
LOC 1 ST 025	Window Glass	Plate Glass		modern			6
					Provenience Total:		17
					Site Total:		1365

APPENDIX B

VIRGINIA DEPARTMENT OF HISTORIC RESOURCES
ARCHAEOLOGICAL SITE INVENTORY FORM
SUPPLEMENTAL FORM

VDHR Site Number: 44CF7
Other VDHR Number:

City/County: Chesterfield County
Site Name:
Temporary Designation:

Cultural/Temporal Affiliation: Euro-American/17th century/1st quarter

Site Class: X **Terrestrial, Open-Air** __**Terrestrial, Cave/Rockshelter** __**Underwater**

Thematic Contexts: Industry/Processing/Extraction

Site Function: Manufacturing facility: furnace

Specialized Contexts: Virginia Company period site

USGS Quadrangle: Drewry's Bluff, VA 7.5 minute 1987 **Loran:**
UTM Zone: 18 **Easting:** 284480 **Northing:** 4146120

(Attach photocopy of appropriate section of USGS 7.5 minute series topographical map showing site boundaries.)

Physiographic Province: Coastal plain but near transition to Piedmont Uplands **Drainage:** Falling Creek/James River
Landform: Floodplain **Aspect:**
Elevation: 10-15 feet amsl **Slope:** <15%
Site Soils: Grover fine sandy loam, 6 to 12 percent slopes **Adjacent Soils:**
Nearest Water Source: Falling Creek **Distance:** Adjacent

Ownership Status: X **Private** __ **Public/Local:**
__ **Public/State:**
__ **Public/Federal:**
Owner Name (if private): **Owner Telephone:**
Owner Address:

Informant Name: **Informant Telephone:**
Informant Address:

Surveyed By: Thomas F. Higgins, III **Affiliation:** William and Mary Center for Archaeological Research (WMCAR) **Date:** 12-16-93
Address: Williamsburg, VA 23187

Site Dimensions: Approximately 3.5 acres

Survey Strategy: __ **Historic Map Projection** __ **Informant** __**Observation**
__ **Surface Testing** X **Subsurface Testing**
Survey Description: Site was previously tested by Howard MacCord (1963) in association with the Archaeological Society of Virginia (ASV). WMCAR investigation consisted of screened (1/4-inch mesh) shovel testing at intervals of 30 feet or less and test units placed at selected locations.

Site Condition: Destruction of surface and subsurface deposits/25-49% of site destroyed.

Current Land Use: Unoccupied land: floodplain, and road-related: road.

Specimens Obtained: X **Yes** __ **No** **Depository:** WMCAR
Assemblage Description: Pieces of slag and charcoal.

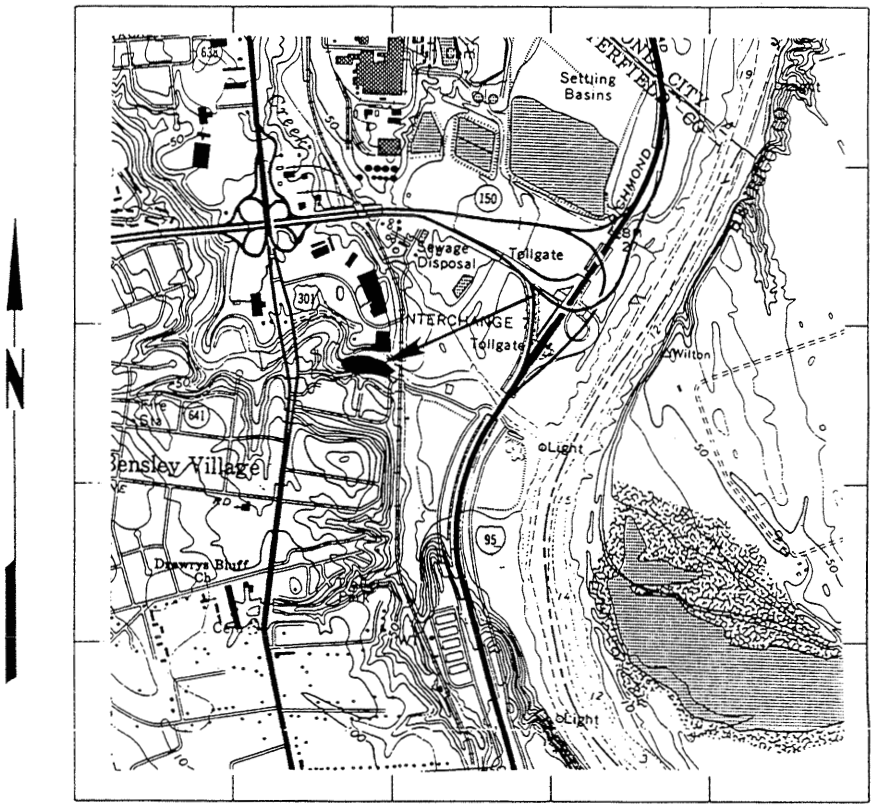
Specimens Reported: X Yes __ No
Owner Name: Stored at VDHR **Owner Address:**
Assemblage Description: Pieces of slag, pig iron, and iron artifacts including spikes, chisel, and brick.

Field Notes: X Yes __ No **Depository:** WMCAR

Photographic Documentation: X Yes __ No **Depository:** WMCAR

Report(s): X Yes __ No **Depository:** WMCAR
Reference(s): See the reports, Exploratory Excavations at the First Ironworks in America (44CF7) by Howard A MacCord. Sr. Archaeological Society of Virginia Quarterly Bulletin, Vol. 19, No. 1 1964. The First American Blast Furnace, 1619-1622: The Birth of a Mighty Industry of Falling Creek in Virginia by Charles E. Hatch, Jr., and Thurlow Gates Gregory, Virginia Magazine of History and Biography, Vol. 70, July 1962, No. 3.

Additional Comments:



Scale: 1:24,000

Form Completed By: Thomas F. Higgins, III **Affiliation:** WMCAR **Date:** 12-16-93
Address: Williamsburg, VA 23187

For VDHR Staff Only

Virginia Register Status:
National Register Status:
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VDHR Library Reference Number(s):
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Revisions/Updates By: Date:

VIRGINIA DEPARTMENT OF HISTORIC RESOURCES
ARCHAEOLOGICAL SITE INVENTORY FORM

VDHR Site Number: 44CF506
Other VDHR Number:

City/County: Chesterfield County
Site Name:
Temporary Designation: Site 1

Cultural/Temporal Affiliation: Native American/Unknown Prehistoric

Site Class: X **Terrestrial, Open-Air** __**Terrestrial, Cave/Rockshelter** __**Underwater**

Thematic Contexts: Settlement Patterns

Site Function: Camp

Specialized Contexts:

USGS Quadrangle: Drewy's Bluff, VA 7.5 minute 1987 **Loran:**
UTM Zone: 18 **Easting:** 284880 **Northing:** 4146120

(Attach photocopy of appropriate section of USGS 7.5 minute series topographical map showing site boundaries.)

Physiographic Province: Coastal Plain, but near transition to Piedmont Uplands **Drainage:** James River
Landform: Floodplain **Aspect:**
Elevation: 9.5 feet amsl **Slope:** <10%
Site Soils: Chewacla loam **Adjacent Soils:** Chastain loam, Fluvaquents
Nearest Water Source: Falling Creek **Distance:** 160 feet

Ownership Status: X **Private** __ **Public/Local:**
__ **Public/State:**
__ **Public/Federal:**
Owner Name (if private): **Owner Telephone:**
Owner Address:

Informant Name: **Informant Telephone:**
Informant Address:

Surveyed By: Thomas F. Higgins, III **Affiliation:** William and Mary Center for Archaeological Research (WMCAR) **Date:** 12-16-93
Address: College of William and Mary
Williamsburg, VA 23187
Site Dimensions: 100 feet (30.48 meters) N/S x 220 feet (67 meters) E/W

Survey Strategy: __ **Historic Map Projection** __ **Informant** __**Observation**
__ **Surface Testing** X **Subsurface Testing**
Survey Description: Site was identified by pedestrian survey and screened (1/4-inch) shovel testing. Shovel tests were placed at intervals of 30 feet or less.

Site Condition: Less than 25% of site destroyed.

Current Land Use: Site is wooded

Specimens Obtained: X **Yes** __ **No** **Depository:** WMCAR
Assemblage Description: 36 pieces of quartz, quartzite, and chalcedony debitage.
2 pieces of quartzite fire-cracked rock.

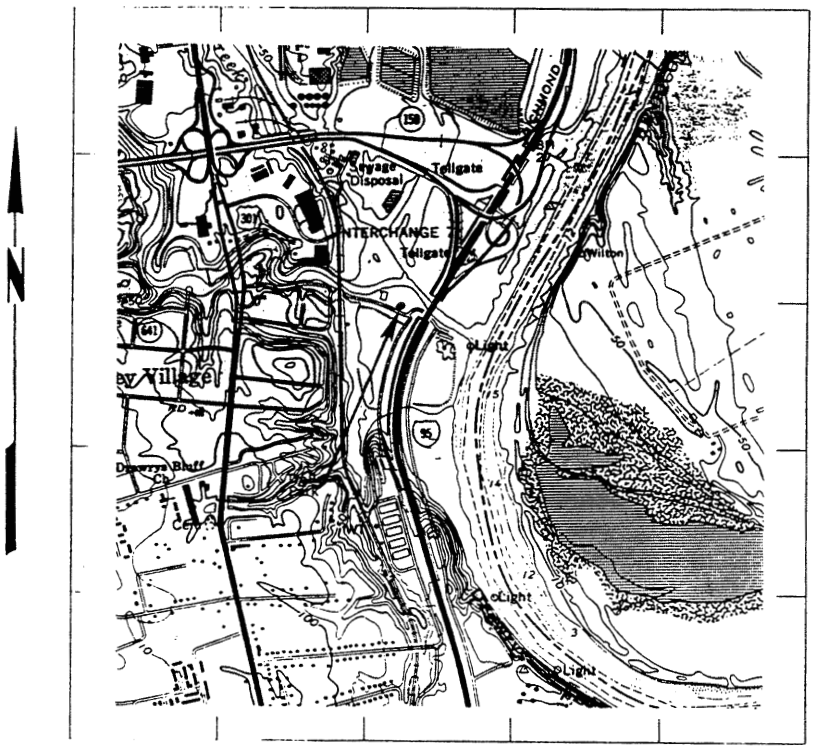
Specimens Reported: __ Yes X No
Owner Name: **Owner Address:**
Assemblage Description:

Field Notes: X Yes __ No **Depository:** WMCAR

Photographic Documentation: X Yes __ No **Depository:** WMCAR

Report(s): X Yes __ No **Depository:** WMCAR
Reference(s): See the report, "Archaeological Investigations of Site 44CF7, Falling Creek Ironworks, Chesterfield County, Virginia" by T.F. Higgins et. al., 1993, on file at Virginia Division of Historic Resources, Richmond, Virginia. Field notes on file at the Center for Archaeological Research, College of William and Mary, Williamsburg, VA.

Additional Comments:



Scale: 1:24,000

Form Completed By: Thomas F. Higgins, III **Affiliation:** WMCAR **Date:** 12-16-93
Address: Williamsburg, VA 23187

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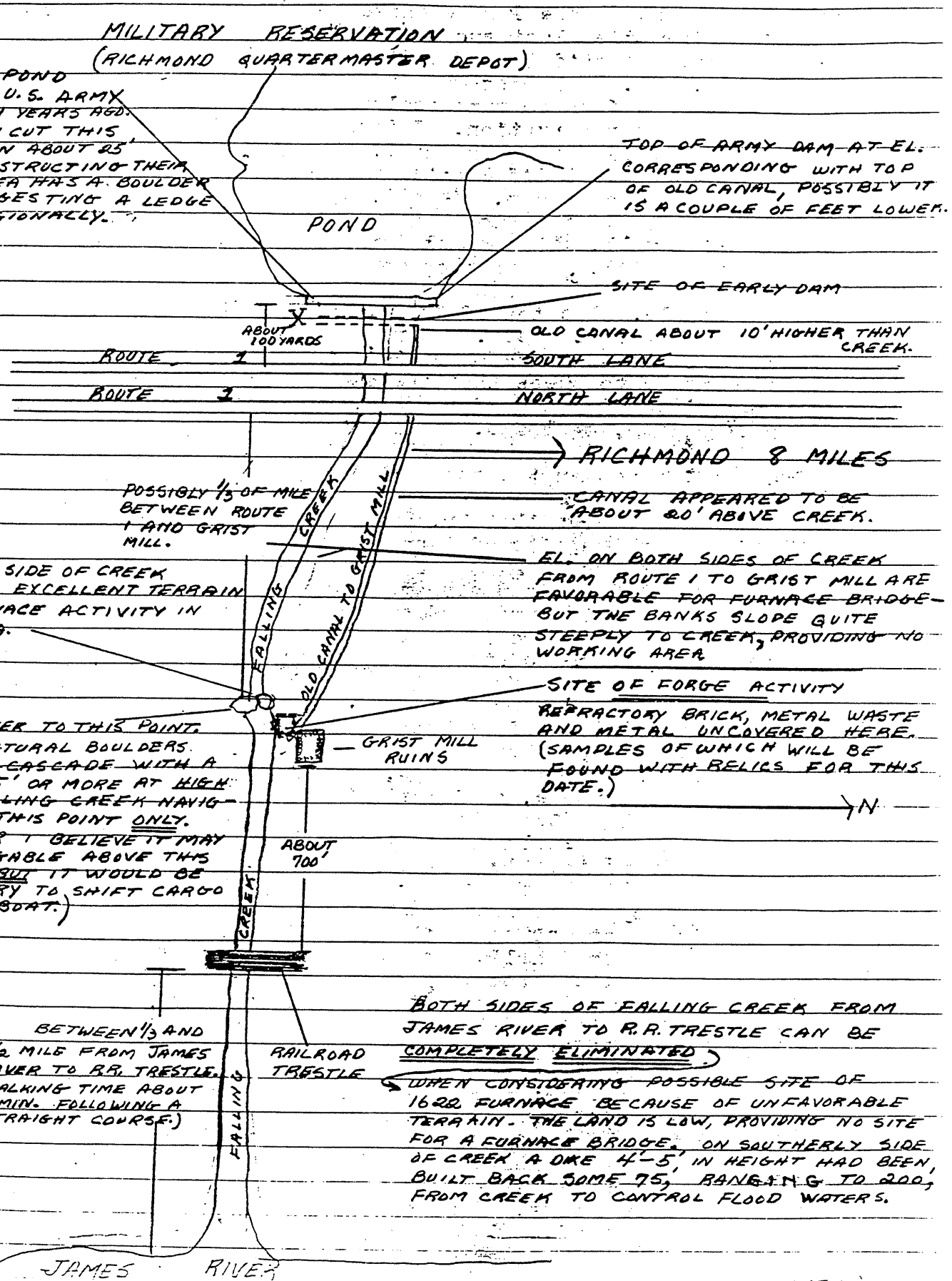
APPENDIX C

THURS., MARCH 29, '51

FOLLOWING IS DATA ~~AND~~ SKETCH SHOWING AREA AT FALLING CREEK, VA. WHICH I INSPECTED TODAY.



I talked with Mr. Fouston Putney, who lives on route I about ¼ of a mile south of Falling Creek. He told me that he had been informed by L.L. Richardson that the furnace had been built in the general area where I have marked X on my plan on page 38A. Mr. Richardson died last summer (1950) at the age of 72, Mr. Putmam informed me. He said that Mr. Richardson had pointed this site out to him. Mr. Richardson had worked for the owners of the property where the furnace supposedly stood, this land becoming part of the Military reservation. I investigated this area quite thoroughly, seeking slag evidence, charcoal, ore, etc.. I found no such evidence. I did locate evidence of an old dam just easterly of present army dam. An old, deserted canal led from the site of this early dam along the north side of the creek to ruins of the grist mill. This canal furnished water for power purposes at the grist mill. Whether or not the canal furnished power for an earlier activity at site of grist mill I cannot say, however it is possible. The top of the canal at the dam end was about 10' higher than the creek. Near the easterly side of route I the canal appeared to be about 20' higher than the creek. I should venture to guess that the old dam possibly was 125' in width. It was an ideal location for a dam, the southerly side being of a large boulder, or ledge. (This was cut down by army engineers about 10 yrs ago when they built their dam.) However I do not believe a furnace on the southerly side of this old dam to be favorably located because of lack of working area for casting. Yet it was this area that Mr. Richardson pointed out to Mr. Putney as having been the site of furnace.

For 100' or more upstream of army dam no favorable elevation was noted. Some 150 yards upstream of army dam Falling Creek turns from its east-west course and runs northerly. At the turn the westerly bank again provides el. suitable for bridge purposes, but the slope is quite steep and permits no working area for casting, etc..

My observations today would favor the general area where the ruins of the grist mill stand as being most desirable for blast furnace operations. Here, either side of Falling Creek provides ideal elevations for a furnace bridge, as well as working area about furnace. Furthermore, an important factor favoring this area is the navigable waters which terminate here because of the cascade. While we can completely eliminate the area between James River and the railroad trestle when considering possible furnace sites, we can give a little thought to the possibilities found on both sides of the creek between the trestle and the grist mill, as well as along both sides of the creek from the grist mill to route I. However I believe careful inspection of these areas will eliminate them from furnace site possibilities. (Their banks are steep and carry to the water, permitting no working area.) Most certainly the area pointed out by Mr. Putney near the army dam will have to be seriously considered.

Yet my first consideration would be given to the area on both sides of the creek at the cascades. The elevations are ideal for a furnace bridge, the waters are navigable to the James River (which in turn takes you to the coast). To dam Falling Creek at the cascades would create a good head. I was told that a Mr. Roger Bensley owns the land along the south side of Falling Creek at the cascades. (In fact I believe he owns land from the cascades to route I.) I was informed that Mr. Bensley is an

"odd stick", and might or might not take to strangers, according to his mood. I was also told that Bensley had filled in his upper land just opposite the cascades, planning to sell house lots. If I am not mistaken, I was given to understand that Bensley claims the old furnace stood on his property just opposite the cascades. I looked this area over quite carefully seeking furnace slag, etc.. Found none. In fact I looked over both shores of the creek all the way from the army dam to James River seeking furnace slag, but found none. Nor did I note evidence of slag dumps. I did find considerable metal waste, metal, brick and refractory brick in area about 20'-25' westerly of western end of old grist mill. This evidence was on the surface, but grass, weeds, etc. covered it. One metal waste piece weighed between 30-50 lbs. and was the size of a football. Considerably more of this evidence was buried in the ground (as evidenced with my probe rod.) I took a refractory brick, metal waste material and a large piece of metal which had considerable impurities in it back to my hotel. I thought I could break a piece from it quite easily. I learned differently. I took the metal piece to the hotel engineer and he had considerable trouble breaking off a piece. Finally he placed it in a vise and used a heavy sledge hammer on it. (Specimens of the refractory brick, metal waste and metal will be found under relics for this day.) This evidence indicates that forge activity took place in this area some time ago, possibly some time previous to the grist mill's first activity. I would venture to say the site of this forge activity was about 40' square and less than 50' from Falling Creek's northerly bank. A large, round sluice (it had been a metal pipe) from the canal cut across the northeasterly corner of the 40' area and had fed the grist mill's water wheel, which had been located in a hutch at southerly side of mill. The canal which brought water from the old dam which stood before the present army dam was between 9'-12' in width across its top, and averaged 4'-5' in depth. Whether this canal had been dug for the early grist mill activity, or for the forge activity which apparently antedates the grist mill-or for even an earlier activity I cannot say.
I will say that if I have the opportunity to continue the Falling Creek investigation I shall first concentrate on the area to either side of Falling Creek at the cascades.

See Kodachromes for this date showing grist mill, army dam, railroad trestle, old canal, site of early dam, Falling Creek and James River, etc.

Friday, 9 A.M., March 30, '51

Took bus to Williamsburg (From Richmond, Va.). Returned to Richmond at 5:30 P.M..

At the Reception Center at Williamsburg I took in the forty-minute movie which is shown in the auditorium. This is free, and it is recommended that all visitors see this film, which will acquaint them with Williamsburg's history and background. It also outlines the restoration program. Thirty minutes of the narration is