

AN ARCHAEOLOGICAL SURVEY OF THE PROPOSED KY 57 BRIDGE REPLACEMENT OVER THE NORTH FORK OF THE LICKING RIVER IN FLEMING AND LEWIS COUNTIES, KENTUCKY (ITEM NO. 9-8507.00)



by
Brian G. DelCastello, RPA

Prepared for



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ABSTRACT

On October 26, 27, and 29 and November 10 and 11, 2015, Cultural Resource Analysts, Inc., personnel conducted an archaeological survey for the proposed rebuilding of the KY 57 Bridge over the North Fork of the Licking River at the Fleming and Lewis County line (Item No. 9-8507.00). The geophysical and archaeological surveys were conducted at the request of David Waldner at the Kentucky Transportation Cabinet. The project entails the reconstruction of the bridge and its approaches. The survey area measured approximately 9.8 ha (24.3 acres) in size, all of which was surveyed. A records review at the Office of State Archaeology did not identify previous archaeological surveys or previously identified archaeological sites within a 2-km radius.

The archaeological field methods were commensurate with the conditions observed, consisting of an intensive pedestrian survey supplemented by screened shovel testing in low visibility areas and bucket augering within the North Fork floodplain. A geophysical survey involving the use of both ground penetrating radar and magnetometry was also conducted at Site 15Lw219 which was an unmarked historic cemetery.

The current survey resulted in the discovery of three previously unrecorded archaeological sites (15Lw218, 15Lw219, and 15F1146). Sites 15Lw218 and 15F1146 were prehistoric open habitation sites without mounds. Neither site contained temporally sensitive artifacts. Site 15F1146 likely extends outside of the current project area to the northeast. It is possible that Site 15Lw218 extends outside of the project area to the east. The portions of both sites situated outside of the project area were not evaluated for the current survey and may need to be assessed at a later date if developments are proposed to impact these areas. Neither of the sites are recommended eligible for listing in the National Register of Historic Places, and no further work is recommended for either site.

Site 15Lw219 was a multicomponent historic cemetery, dating to the mid-nineteenth century, and four nondiagnostic prehistoric flakes. The cemetery likely extends to the northwest outside of the current project area. The geophysical surveys resulted in the identification of at least 7 subsurface features consistent with trenches (i.e., possible graves). The precise nature and integrity of these features cannot be determined until they are confirmed by either unit excavation or monitored mechanical removal of the topsoil. Avoidance of the cemetery is recommended, given the presence of possible graves. If the cemetery cannot be avoided, then the cemetery should be subjected to archaeological excavation and relocation. The prehistoric component is recommended not eligible for listing in the National Register Historic Places.

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Chapter 1. Introduction

October 26, 27, and 29 and November 10 and 11, 2015, Cultural Resource Analysts, Inc. (CRA), personnel conducted an archaeological survey for the proposed bridge reconstruction and realignment on KY 57 in northern Fleming and southern Lewis Counties, Kentucky (Figure 1.1). The project area was situated approximately 13.1 km (8.1 mi) northeast of the town center of Flemingsburg, Kentucky, and approximately 6.9 km (4.3 mi) southwest of Tollesboro, Kentucky. The survey, including both the geophysical and archaeological portions, was conducted at the request of David Waldner of the Kentucky Transportation Cabinet (KYTC). The archaeological survey was conducted by Tommy H. McAlpine and Brian G. DelCastello. The geophysical survey was conducted by Russell S. Quick in an attempt to relocate a historic cemetery known to be in the area. The fieldwork required approximately 40 person hours to complete. The project area measured approximately 9.8 ha (24.3 acres) in size (Figures 1.2 and 1.3).

Office of State Archaeology (OSA) Geographic Information Systems (GIS) data was requested by CRA on October 22, 2015, and was returned on October 29, 2015. The OSA project registration number is FY16_8650.

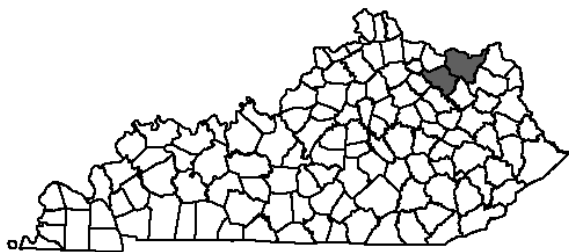


Figure 1.1. Map of Kentucky showing the location of Fleming and Lewis Counties.

Prior to the field investigations, an 811 locate was submitted for the project area. Several underground utilities were marked within the project area, concentrated predominately along the edges of KY 57. Shovel testing was not conducted within close proximity of the marked utilities. The survey

was only conducted after landowner permission was obtained.

Project Description

The project consists of the proposed rebuilding of the KY 57 bridge over the North Fork of the Licking River at the Fleming and Lewis County line. The current bridge (068B00027N) as well as the approaches along KY 57 are narrow and become a choke point for traffic. This choke point poses a safety issue at the Fleming/Lewis County line.

Replacement of the bridge will correct geometric deficiencies present with the existing structure. This will alleviate the traffic flow problems present and replace a structurally deficient bridge. While portions of both sides of KY 57 will be affected by the proposed road construction project, the majority of the disturbances will be situated along the western side of KY 57.

Purpose of Study

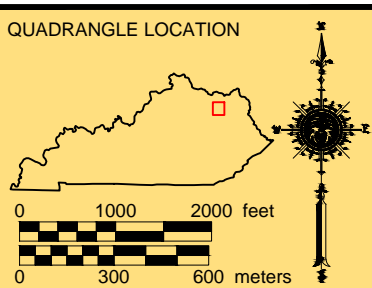
This study was conducted to comply with Section 106 of the National Historic Preservation Act. This transportation project is federally funded, and therefore considered an undertaking subject to 106 review.

The purpose of this survey was to assess any potential effects the new upgrade might have on identified cultural resources. To do this, the archaeological survey followed these objectives:

- identify prehistoric and historic archaeological sites located within the project area;
- determine, to the extent possible, the age and cultural affiliation of sites;
- establish the vertical and horizontal boundaries of sites;
- establish the degree of site integrity and potential for intact cultural deposits to be present.

Orangeburg, KY 1952 (Photorevised 1978)
USGS 7.5 minute series digital topographic
quadrangle. Map F48, Governor's Office for
Technology, Office of Geographic Information.

Tollesboro, KY 1953 (Photorevised 1978)
USGS 7.5 minute series digital topographic
quadrangle. Map F48, Governor's Office for
Technology, Office of Geographic Information.



Flemingsburg, KY 1951 (Photorevised 1979)
USGS 7.5 minute series digital topographic
quadrangle. Map G48, Governor's Office for
Technology, Office of Geographic Information.

Burtonville, KY 1951 (Photorevised 1978)
USGS 7.5 minute series digital topographic
quadrangle. Map G49, Governor's Office for
Technology, Office of Geographic Information.

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Figure 1.2. Location of project area on topographic quadrangle.

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 FSA/NAIP Color Ortho Imagery
 United States Department of Agriculture,
 Aerial Photography Field Office.

2014

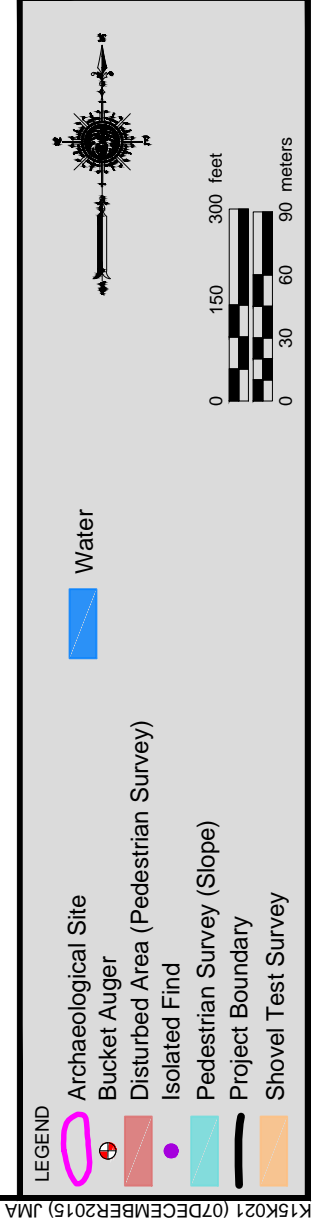


Figure 1.3a. Project area plan map.

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2014
FSA/NAIP Color Ortho Imagery,
United States Department of Agriculture,
Aerial Photography Field Office.

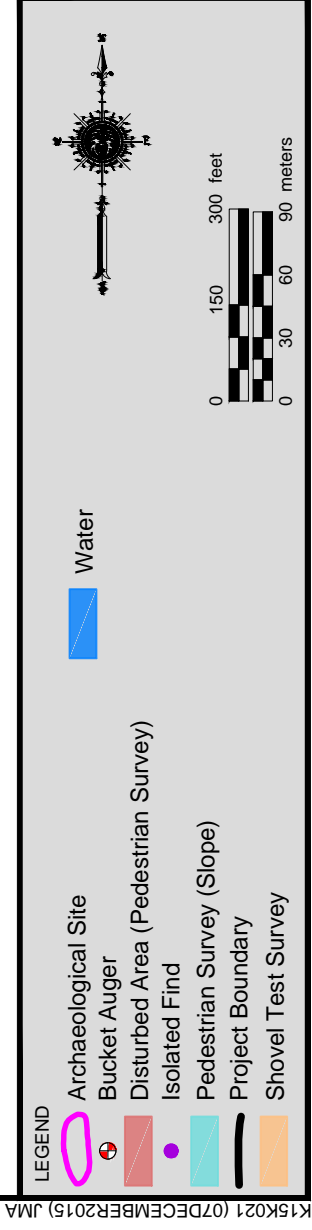


Figure 1.3b. Project area plan map.

For the purposes of this assessment, a site was defined as “any location where human behavior has resulted in the deposition of artifacts, or other evidence of purposive behavior at least 50 years of age” (Sanders 2006:2). Cultural deposits less than 50 years of age were not considered sites in accordance with “Archeology and Historic Preservation: the Secretary of the Interior’s Standards and Guidelines” and were not assessed as part of this study (National Park Service 1983).

The following is a description of the project area, previous research and cultural history of the area, the field and laboratory methods used, and the results of this investigation. It conforms to the *Specifications for Conducting Fieldwork and Preparing Cultural Resource Assessment Reports* (Sanders 2006). Cultural materials, field notes, records, and site photographs will be curated with the William S. Webb Museum at the University of Kentucky in Lexington, Kentucky.

Summary of Findings

Prior to initiating the field investigations, a records review was conducted at the OSA. The review indicated that no archaeological surveys and no archaeological sites were located within a 2.0 km (1.2 mi) radius surrounding the project area.

Prior to the archaeological survey, CRA personnel conducted a near-surface geophysical survey of a reported abandoned cemetery (Site 15Lw219) along the western edge of KY 57. Two survey blocks encompassing .25 ha were surveyed with both radar and magnetometry. The combined geophysical surveys identified at least seven subsurface features consistent with possible graves. The integrity and precise nature of the subsurface features within the field cannot be determined on the basis of the geophysical survey alone; therefore, the anomalies should be ground truthed by unit excavation or monitored mechanical stripping.

Following the geophysical survey, an archaeological survey was conducted for the entire project area, resulting in the identification, documentation, and analysis of three previously undocumented archaeological sites (15Lw218,

15Lw219, and 15F1146) and one prehistoric isolated find (IF2).

Site 15Lw218 consisted of a modest-sized subsurface scatter of lithic artifacts on a terrace overlooking the northern bank of the North Fork of the Licking River. The site may extend to the east beyond KY 57 along the landform; however, this area was not investigated as it was outside of the currently delineated project area. No temporally sensitive artifacts were recovered at the site.

Site 15F1146 consisted of a sparse subsurface scatter of nondiagnostic flake debris situated within a cutout area directly east of KY 57. The site likely extends to the north and east outside of the project area. No temporally sensitive artifacts were recovered at the site.

Site 15Lw219 consists of a multicomponent historic cemetery originally depicted on a Kentucky Transportation Cabinet (KYTC) plan for KY 57 dating to 1934. The cemetery was subject to a geophysical survey (utilizing both ground penetrating radar [GPR] and magnetometry) followed by standard screened shovel testing. Four nondiagnostic prehistoric flakes were recovered from a single shovel test at the cemetery. Based on the 1934 map, the cemetery may extend to the northwest outside of the current project area.

The single isolated find (IF2) was recovered in a bucket auger in the floodplain of the North Fork of the Licking River. It consisted of a single nondiagnostic flake.

The portions of 15Lw218 and 15F1146 located within the current project area are recommended not eligible for listing in the National Register of Historic Places (NRHP) due to the overall sparse artifact assemblages and the lack of research potential. As a result, no further work is recommended for either of the sites. However, as the boundaries for Sites 15Lw218 and 15F1146 likely extend outside the currently defined project area; NRHP eligibility could not be assessed for the unsurveyed portions of those sites. Therefore, if the project corridor is rerouted at the locations of Sites 15Lw218 and 15F1146, then additional archaeological investigations will be needed to

assess the potential impacts to the unrecorded portions of each site if impacted.

Site 15Lw219 consisted of a mid- nineteenth century historic cemetery containing a minor prehistoric component. Several headstones were identified southeast of the cemetery along the eastern side of KY 57. The NRHP status of the historic cemetery was not assessed during the current investigations. Avoidance of the site is recommended, given the likely presence of multiple graves.

If the site cannot be avoided, then the cemetery should be subjected to archaeological excavation and relocation. The prehistoric component is recommended not eligible for listing in the NRHP.

Chapter 2. Environmental Setting

This section of the report provides a description of the modern and prehistoric environment and considers those aspects of the environment that may have influenced the settlement choices of past peoples. Attributes of the physical environment also often guide the methods used to discover archaeological sites. Topography, bedrock geology, vegetation, hydrology, soils, lithic resources, and climate for the Bluegrass region are discussed below.

The Bluegrass region of Kentucky (Figure 2.1) is third in size behind the Mississippian Plateaus and Eastern Kentucky Coal Field regions, but it is larger than the Western Kentucky Coal Field and Mississippi Embayment regions (Raitz 1973:53; Schwendeman 1979:28). The Bluegrass region acquired its name from the appearance of a bluish colored grass that is known botanically as *Poa pratensis* and commonly as Kentucky Bluegrass, and the region is referred to as the “Heart of Kentucky” (Davis 1927:3; Raitz 1973:53). The Bluegrass Region is divided into three subregions: the Inner Bluegrass, Outer Bluegrass, and the Knobs. Each of these subregions has unique physical differences that distinguish them from each other. Montgomery County is located within the Outer portion of the Bluegrass Region.

The Outer Bluegrass

The Outer Bluegrass subregion of Kentucky is similar topographically and geologically to the Inner Bluegrass subregion in that it is somewhat karst and gently rolling, but it is also more rugged and is underlain by Ordovician siltstone, limestone, and shale, as well as by Silurian dolomite on its western edge (Newell 2001; O’Brien 1984:61; Pollack 2008:17). Situated between the Inner and Outer Bluegrass is a belt of shale commonly known as the Eden Shale Belt or Eden Shale Hills (O’Brien 1984:61; Raitz 1973:54; Schwendeman 1979:30). This area has been extensively eroded over time, which has contributed to the exposure of an underlying shale bed that is less resistant than

other rocks (O’Brien 1984:61). The counties located completely within the Outer Bluegrass consist of Boone, Bracken, Campbell, Carroll, Gallatin, Grant, Henry, Kenton, Mason, Oldham, Owen, Robertson, Shelby, Spencer, Trimble, and Washington. Anderson, Clark, Harrison, Mercer, Nicholas, and Pendleton Counties encompass portions of both the Inner and Outer Bluegrass. Portions of Bath, Bullitt, Fleming, Jefferson, and Nelson Counties overlap with the Knobs. Portions of Boyle, Garrard, Madison, and Montgomery Counties are within the Inner Bluegrass, Outer Bluegrass, and Knobs subregions. Finally, Lincoln and Marion Counties overlap with the Knobs subregion, and small portions extend into the Mississippian Plateaus region.

Like the Inner Bluegrass subregion, rivers that cross the Outer Bluegrass flow through meandering courses that are entrenched well below the plains and low hills. River bottoms within the Outer Bluegrass are narrow, discontinuous, and confined by limestone cliffs and wooded slopes, although they widen at their confluence with the Ohio Valley (Newell 2001). The Outer Bluegrass is bordered to the north and west by the Ohio River and to the south and east by the Knobs region. The Outer Bluegrass circumscribes the Inner Bluegrass region on all sides. The Kentucky, Licking, Ohio, and Salt Rivers and their tributaries drain this region (see Figure 2.2).

Vegetation in the Bluegrass

The Inner and Outer Bluegrass and the western portion of the Knobs are located within the Western Mesophytic Forest region as defined by Braun (2001:122–161), whereas the eastern portion of the Knobs is situated within the Mixed Mesophytic Forest region. The Western Mesophytic Forest region offers a mosaic pattern of climax vegetation types that are often less luxuriant than those observed for the Mixed Mesophytic Forest region (Braun 2001:122–123). The Western Mesophytic region is considered a transition zone in which the effects of local environments allow different

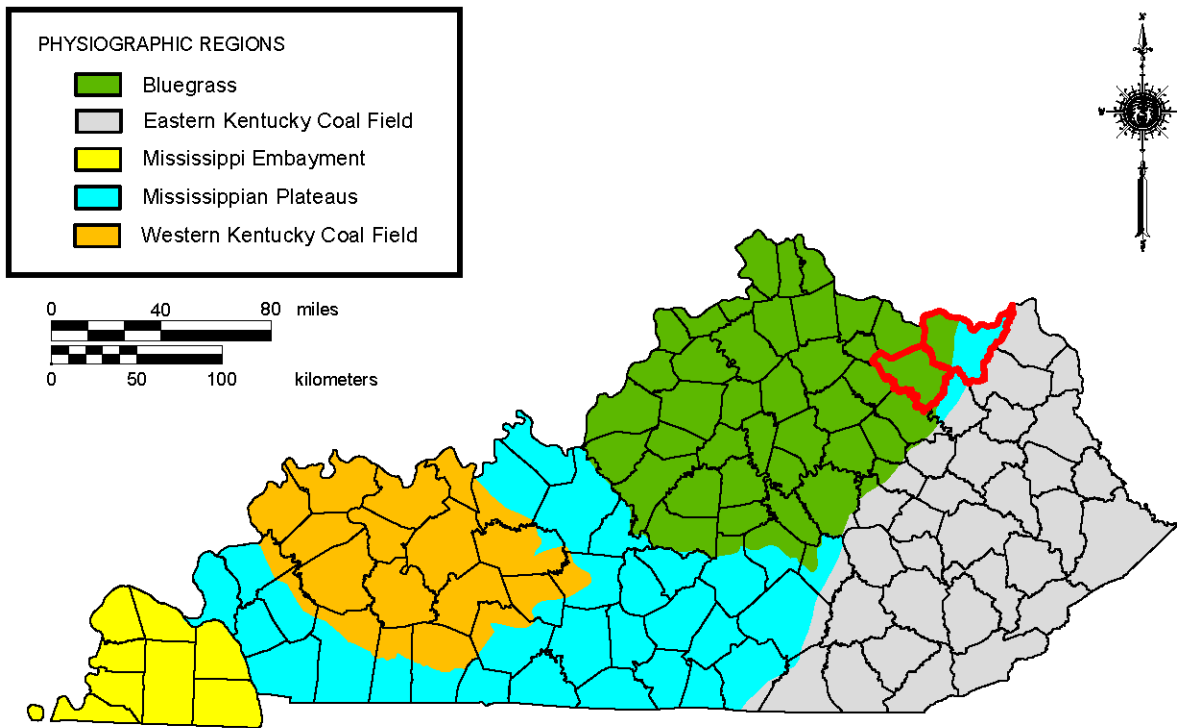


Figure 2.1. The Bluegrass region.

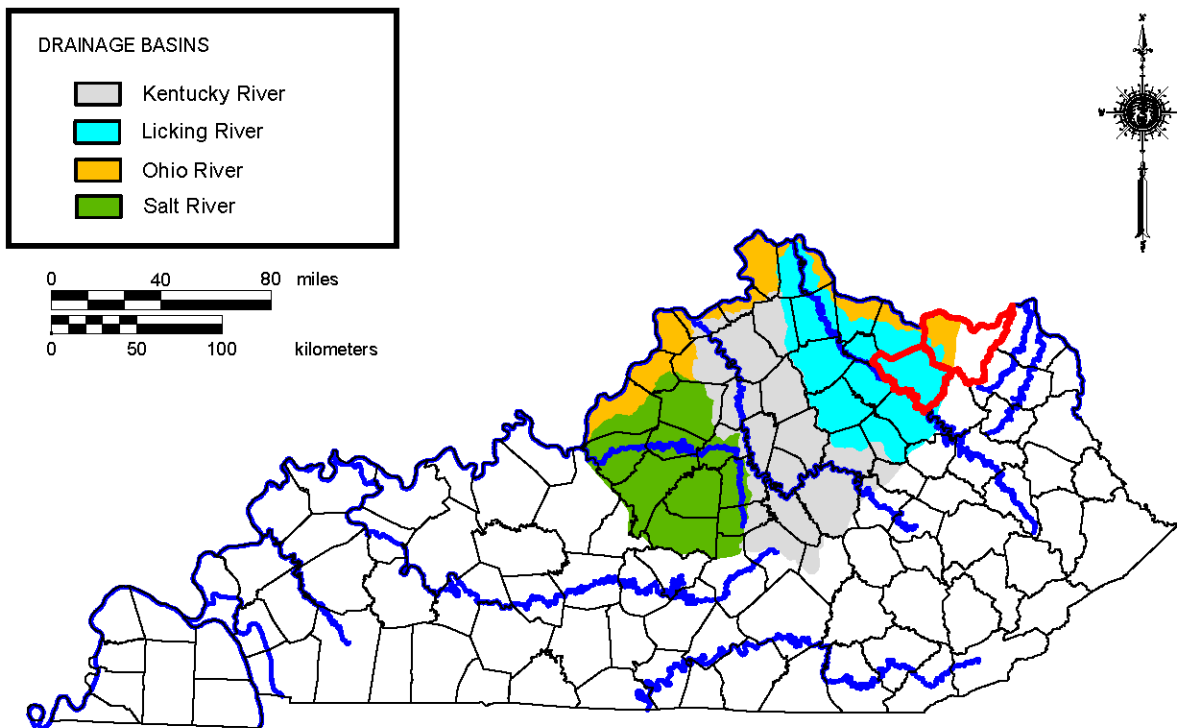


Figure 2.2. Rivers that drain the Bluegrass region.

climax types to exist in proximity. Braun (2001:529) states that the modern pattern of forest distribution is the result of past and present environmental influences, such as changes in climate, topography, or soil, bringing about changes in vegetation.

The Mixed Mesophytic Forest region is described as the most complex and oldest association of the Deciduous Forest Formation (Braun 2001:39). Mixed mesophytic refers to a climax association in which dominance is shared by a number of species, and the dominant trees are beech, tulip tree, basswood, sugar maple, chestnut, sweet buckeye, red oak, white oak, and hemlock (Braun 2001:40). The composition and abundance of dominants in the Mixed Mesophytic Forest region vary by geographic location and correlate to soil moisture, humidity, and the character of underlying rock (Braun 2001:119). Oak-hickory and oak-chestnut communities are typically located along dry slopes and ridges, while scrubby oak thickets and groves of pine can be found along low slopes of wide valleys (Braun 2001:121). Secondary white oak forest occupies much of the valley floors not in pasture or cultivation, whereas swampy valley flats are composed primarily of pin oak, sweet gum, and red maple (Braun 2001:121).

A historic account from 1784 indicates that a variety of vegetation types were abundant in the Bluegrass region in general, including sugar maple, honey locust, mulberry, wild cherry, laurel, buckeye, cane, wild rye, clover, buffalo grass, wild lettuce, and pepper grass (Braun 2001:127–128). Mid-nineteenth-century accounts indicate that at least 25 species of trees were present in the Inner Bluegrass region, including sugar maple, walnut, several oaks, hickories, ash, wild cherry, black locust, honey locust, and mulberry. Notably, beech was not mentioned in the early accounts (Braun 2001:129). Blue ash and bur oak are the dominant tree types in the modern Inner Bluegrass. Interestingly, the bluegrass for which the region is named is not considered an indigenous species (Davis 1927).

Locust, sugar maple, hickory, black walnut, ash, wild cherry, white oak, and an undergrowth

of cane were reported for the Outer Bluegrass during the mid-nineteenth century, and unlike the Inner Bluegrass, the presence of beech was noted in some communities (Braun 2001:130). In areas of the subregion that have a more rolling topography, beech, tulip tree, sugar maple, white oak, and red oak were abundant (Braun 2001:130).

Burroughs (1926:93) states that a late-nineteenth-century account indicated maples and white oak were historically common in the Knobs subregion; that beech and red cedar were common in areas underlain by limestone; that pine, hemlock, laurel, and holly were located along cliffs and peaks; and that chestnut and oak forests were located along plateaus. During the 1920s, the natural forest growth consisted of oaks, hickory, chestnut, and Virginia pine, and sycamores were found along streams. Redbud and dogwood were found along knob slopes, and mistletoe was often seen along the limestone belts (Burroughs 1926:93–94).

Soils of the Bluegrass

In the United States, soils are classified according to the USDA Soil Taxonomy (Soil Survey Staff 1999). In this classification system, soils are classified on the basis of macroscopic and chemical attributes that reflect differing aspects of pedogenic development. Soils are also grouped on the basis of limiting factors that include “specific practical purposes, such as the soil limitations affecting the foundations of buildings” (Soil Survey Staff 1999:15). A significant contribution to this classification scheme is based on the topographic position (or landform) on which the soils are situated and by the length of time it has taken for those soils to have developed (Birkeland 1999; Soil Survey Staff 1999).

Throughout the Outer Bluegrass region of Kentucky, many of the soils are mapped as belonging to the Alfisol Order. These soils have typically developed on Late Pleistocene or older landforms or on erosional surfaces of similar age. They have a thin, dark A-horizon, rich in organic matter and nutrients, and a clay-enriched subsoil, and they are relatively high in fertility due to being only moderately leached (Soil

Survey Staff 1999:163–165). Alfisols may contain intact archaeological deposits very near or on the ground surface, depending upon the landform on which they formed (e.g., sideslope vs. ridgetop). In Montgomery County, Kentucky, a total of six soil associations, most of which are associated with Alfisols, have been identified and mapped in recent years.

Within the project area, all of the soils have been mapped (Jacobs 1993; Jacobs and Jones 2004) (Table 2.1). In Fleming County, the project area is located within the Beasley-Shrouds-Crider Soil Association (Jacobs 1993). This association is identified throughout the region, particularly in the central portion of the county. This association is found in an area characterized by broad ridgetops and relatively long sideslopes (Jacobs 1993:11). These soils are moderately to very deep and are well drained. They also have clay-rich subsoil.

Lithic Resources

The Bluegrass region displays diverse and abundant sources of lithic raw material that could have been exploited by prehistoric inhabitants. Silurian- and Ordovician-age dolomite, limestone, siltstone, and shale deposits outcrop in various areas of the region (United States Geologic Survey [USGS] 2011). These deposits contain Grier cherts, which predominate in the Inner Bluegrass area, and Gilbert, Tyrone, and Salvisa cherts, which predominate in the Outer Bluegrass. In the Knobs area, the Devonian to Mississippian-age limestone and shale deposits contain predominantly Boyle and Brassfield cherts. Pleistocene to Holocene-age glacial deposits in the Louisville area contain a variety of cherts. Grier chert is a low to moderate quality chert; however, it is abundant in some areas and was often used as a source of tool stone for prehistoric groups. Gilbert, Tyrone, and Salvisa cherts exhibit a more restricted geographic range than Grier chert; therefore, they are not as commonly recovered on prehistoric sites in the region. Boyle and Brassfield cherts are both high quality cherts and are abundant in the Outer Bluegrass region. Both of these materials were used by prehistoric people in the region.

As discussed in the Materials Recovered Chapter (Chapter 5), the vast majority of the prehistoric lithic assemblage was manufactured from a single chert type: Brassfield chert. This formation occurs throughout the region and will be described below (Morris 1965; Peck 1967, 1969; Schilling and Peck 1967).

Brassfield Chert

Brassfield chert is present throughout portions of the Eastern Knobs region, the eastern edge of the Outer Bluegrass, and south-central Kentucky. Brassfield chert is generally gray and tan and mottled with occasional blue-gray patches. Fine flecks of white fossil fragments are common. This resource has been described as a fine-grained chert with a moderate to semi-vitreous luster (Amick 1987). Fine flecks of white fossil fragments are common. Brassfield chert occurs as flattened nodules about 4.0 to 7.0 cm (1.6 to 2.8 in) thick and 10.0 cm (3.9 in) long.

Samples of Brassfield chert were identified within the project area. Situated in northern Lewis County, this source was identified in an along a small intermittent drainage along the eastern edge of KY 57. Pieces of this chert were identified eroding from residuum approximately 650 m (2,133 ft) south of the Fleming-Lewis County line.

Based on macroscopic attributes, these nodular samples were atypical of “classic” Brassfield chert in terms of color, texture, and fossil inclusions. These samples were generally off-white to light grey possessing common, irregularly-shaped light grey to light/medium grey mottles. Fossil inclusions were generally lighter than the surrounding matrix, consisting of small flecks of indeterminate fossil bits and larger bryozoan-like structures. Crystalline vugs, commonly following the larger fossil inclusions. Cortex consisted of an admixture of light to medium brown patinated and water-worn cortical surfaces. When matrix cortex was present, it occurred as a gnarly white to light brown/tan surface.

Table 2.1. Soil Families, Series, and Phases Identified in the Project Area.

Soil Family	Soil Series	Soil Phase	Approximate Area Within Project Area (sq m)	Percent Area
-NA-	-NA-	Beasley-Shrouts complex, rocky, 12 to 30 percent slopes, severely eroded	22718	23.04
-NA-	-NA-	Beasley-Shrouts complex, 12 to 30 percent slopes, very rocky, eroded	21267	21.57
fine, mixed, active, mesic Typic Hapludalfs	Beasley	Beasley silty clay loam, 6 to 12 percent slopes, eroded	15971	16.20
fine-silty, mixed, active, mesic Oxyaquic Fragiuudalfs	Otwell	Otwell silt loam, 2 to 6 percent slopes	12559	12.74
fine, mixed, active, mesic Typic Hapludalfs	Beasley	Beasley silt loam, 2 to 6 percent slopes	11061	11.22
fine, mixed, active, mesic Typic Hapludalfs	Beasley	Beasley silt loam, 6 to 12 percent slopes, rocky, eroded	6167	6.26
fine-silty, mixed, active, mesic dystic Fluventic Eutrudepts	Nolin	Nolin silt loam, 0 to 3 percent slopes, occasionally flooded	5165	5.24
-NA-	-NA-	Water	2297	2.33
fine-silty, mixed, active, mesic dystic Fluventic Eutrudepts	Kinnick	Kinnick silt loam, occasionally flooded	1378	1.40
		TOTAL	98584	100.00

Prehistoric and Historic Climate

Climatic conditions during the period of human occupation in the region (Late Pleistocene and Holocene ages) can be described as a series of transitions in temperature, rainfall, and seasonal patterns that created a wide range of ecological variation, altering the survival strategies of human populations (Anderson 2001; Niquette and Donham 1985:6–8; Shane et al. 2001). The landscape during the Pleistocene was quite different from that of today. Much of the mid-continent consisted of periglacial tundra dominated by boreal conifer and jack-pine forests. Eastern North America was populated by a variety of faunal species, including megafaunal taxa such as mastodon, mammoth, saber-toothed tiger, and Pleistocene horse, as well as by modern taxa such as white-tailed deer, raccoon, and rabbit.

The Wisconsinan glacial maximum occurred approximately 21,400 years B.P. (Anderson 2001; Delcourt and Delcourt 1987). By 15,000 B.P., following the Wisconsinan glacial maximum, a general warming trend and concomitant glacial retreat had set in (Anderson 2001; Shane 1994). Towards the end of the Pleistocene and after 14,000 B.P., the boreal forest gave way to a mixed conifer/northern hardwoods forest complex. In the Early Holocene and by 10,000 B.P., southern Indiana was probably on the northern fringes of expanding deciduous forests (Delcourt and Delcourt 1987:92–98). Pollen records from the Gallipolis Lock and Dam on the Ohio River near Putnam County, West Virginia, reveal that all the important arboreal taxa of mixed mesophytic forest had arrived in the region by 9000–8500 B.P. (Fredlund 1989:23). Similarly, Reidhead (1984:421) indicates that the generalized hardwood forests were well established in southeastern Indiana and southwest Ohio by circa 8200 B.P.

Prior to approximately 13,450 B.P., climatic conditions were harsh but capable of supporting human populations (Adovasio et al. 1998; McAvoy and McAvoy 1997). Populations were probably small, scattered, and not reproductively

viable (Anderson 2001). The Inter-Allerød Cold Period, circa 13,450–12,900 B.P., brought about the dispersal of Native Americans across the continent. This period was followed by the rapid onset of a cooling event known as the Younger Dryas (circa 12,900–11,650 B.P.) during which megafauna species became extinct, vegetation changed dramatically, and temperature fluctuated markedly. It was also a period of noticeable settlement shift that marked the appearance of a variety of subregional cultures across eastern North America (Anderson 2001).

In a recent review, Meeks and Anderson (2012:111) described the Pleistocene/Holocene transition as “a period of tremendous environmental dynamism coincident with the Younger Dryas event.” The Younger Dryas (circa 12,900 to 11,600 cal. B.P.) represents one of the largest abrupt climate changes that has occurred within the past 100,000 years. The onset of the Younger Dryas appears to have been a relatively rapid event that may have been driven by a freshwater influx into the North Atlantic as a result of catastrophic outbursts of glacial lakes. “The net effect of these outbursts of freshwater was a reduction in sea surface salinity, which altered the thermohaline conveyor belt; effectively slowing ocean circulation of warmer water (heat) to the north and bringing cold conditions” (Meeks and Anderson 2012:111; though see Meltzer and Bar-Yosef 2012:251–252 for a critique of this view). This resulted in significantly lower temperatures during this time. The Younger Dryas ended approximately 1,300 years later over a several decade period. The onset of the Younger Dryas coincides with the end of Clovis and the advent of more geographically circumscribed cultural traditions.

Pollen records for the Younger Dryas indicate that vegetation shifts were sometimes abrupt and characterized by oscillations. These shifts were not uniform over the entire southeast and indicate that a variety of factors were at play. At Jackson Pond in Kentucky (Wilkins et al. 1991), for example, several pronounced reciprocal oscillations occurred in a large number of spruce and oak. According to Meeks and Anderson, “these oscillations reflect shifts between boreal/deciduous forest ecotones

associated with cool/wet and cool/dry conditions, respectively” (2012:113).

Meeks and Anderson (2012:126–130) define five population events for the Paleoindian–Early Holocene transition. Population Event 1 (circa 15,000–13,800 cal. B.P.) is a pre-Clovis occupation that exhibits a slow rise in population. This event may represent the initial colonization of the southeast region and may represent the basis of later Clovis occupation or a failed migration (Meeks and Anderson 2012:129). Population Event 2 represents an apparent 600 year gap between Events 1 and 3. Population Event 3 (circa 13,200–12,800 cal. B.P.) occurred just prior to, and extended into, the Younger Dryas event. This event represents the “first unequivocal evidence for widespread human occupation across the southeastern United States” (Meeks and Anderson 2012:129). Event 3 coincided with the Clovis occupation in the region. A marked decline in the population is posited for Population Event 4 (12,800–11,900 cal. B.P.). This equates with the early to middle Younger Dryas and relates to a post-Clovis occupation of the region. Meeks and Anderson (2012:129) see a fragmentation of the regional Clovis culture at this time along with “the development of geographically circumscribed subregional, cultural traditions in the southeastern United States.” A marked increase in population density is posited between 11,900 and 11,200 cal. B.P. This coincides with the late portion of the Younger Dryas and the early portion of the Holocene. Population Event 5 is represented by this time frame. Early Side Notched and Dalton are seen during this time.

During the Early Holocene, rapid increases in boreal plant species occurred on the Allegheny Plateau in response to the retreat of the Laurentide ice sheet from the continental United States (Maxwell and Davis 1972:517–519; Whitehead 1973:624). At lower elevations, deciduous species were returning after having migrated to southern Mississippi Valley refugia during the Wisconsinan advances (Delcourt and Delcourt 1981:147). The climate during the Early Holocene was still considerably cooler than the modern climate, and based on species extant at that time in upper altitude zones of the Allegheny Plateau, conditions would have been

similar to the Canadian boreal forest region of today (Maxwell and Davis 1972:515–516). Conditions at lower elevations were less severe and favored the transition from boreal to mixed mesophytic species. At Cheek Bend Cave in the Nashville Basin, an assemblage of small animals from the Late Pleistocene confirms the environmental changes that took place during the Pleistocene to Holocene transition and the resulting extinction of Pleistocene megafauna and establishment of modern fauna in this area (Klippel and Parmalee 1982).

Traditionally, Middle Holocene (circa 8000–5000 B.P., also referred to as the Hypsithermal) climate conditions were thought to be consistently dryer and warmer than the present (Delcourt 1979:271; Klippel and Parmalee 1982; Wright 1968). The influx of westerly winds contributed to periods of severe moisture stress in the Prairie Peninsula and to an eastward advance of prairie vegetation (Wright 1968). More recent research (Anderson 2001; Shane et al. 2001:32–33) suggests that the Middle Holocene was marked by considerable local climatic variability. Paleoclimatic data indicate that the period was marked by more pronounced seasonality characterized by warmer summers and cooler winters.

The earliest distinguishable Late Holocene climatic episode began circa 5000 B.P. and ended around 2800 B.P. This Sub-Boreal episode is associated with the establishment of essentially modern deciduous forest communities in the southern highlands and increased precipitation across most of the mid-continental United States (Delcourt 1979:271; Maxwell and Davis 1972:517–519; Shane et al. 2001; Warren and O'Brien 1982:73). Changes in local and extra-local forests after approximately 4800 B.P. may also have been the result of anthropogenic influences. Fredlund (1989:23) reports that the Gallipolis pollen record showed increasing local disturbance of the vegetation from circa 4800 B.P. to the present, a disturbance that may have been associated with the development and expansion of horticultural activity. Based on a study of pollen and wood charcoal from the Cliff Palace Pond in Jackson County, Kentucky, Delcourt and Delcourt (1997:35–36) recorded the replacement of a red

cedar-dominated forest with a forest dominated by fire-tolerant taxa (oaks and chestnuts) around 3000 B.P. The change is associated with increased local wildfires (both natural and culturally augmented) and coincided with increases in cultural utilization of upland (mountain) forests.

Beginning around 2800 B.P., generally warm conditions, probably similar to those of the twentieth century, prevailed during the Sub-Atlantic and Post-Sub-Atlantic climatic episodes, with the exception of the Neo-Boreal sub-episode, or Little Ice Age (circa 700–100 B.P.), which was coldest from circa 400 until its end. Despite the prevailing trend, brief temperature and moisture variations occurred during this period. Some of these fluctuations have been associated with adaptive shifts in Midwestern prehistoric subsistence and settlement systems (Baerreis et al. 1976; Griffin 1961; Struever and Vickery 1973; Warren and O'Brien 1982).

Studies of historic weather patterns and tree-ring data by Fritts et al. (1979) indicate that twentieth-century climatological averages were “unusually mild” when compared to seventeenth- to nineteenth-century trends (the time period used for comparison represents the coldest period of the Neo-Boreal [400–100 B.P.], or the Little Ice Age) (Fritts et al. 1979:18). The study suggested that winters were generally colder, weather anomalies were more common, and unusually severe winters were more frequent between A.D. 1602 and A.D. 1900 than after A.D. 1900. The effects of the Neo-Boreal sub-episode, which ended during the mid- to late nineteenth century, have not been studied in detail for this region. It appears that the area experienced smaller temperature decreases during the late Neo-Boreal than did the upper Midwest and northern Plains (Fritts et al. 1979), so it follows that related changes in extant vegetation would be more difficult to detect.

Modern Climate

The modern climate of Kentucky is moderate in character and temperature, and precipitation levels fluctuate widely. The

prevailing winds are westerly, and most storms cross the state in a west to east pattern. Low pressure storms that originate in the Gulf of Mexico and move in a northeasterly direction across Kentucky contribute the majority of the precipitation received by the state. Warm, moist, tropical air masses from the Gulf predominate during the summer months and contribute to the high humidity levels experienced throughout the state. As storms move through the state, occasional hot and cold periods of short duration may be experienced. During the spring and fall, storm systems tend to be less severe and less frequent, resulting in less radical extremes in temperature and rainfall (Anderson 1975).

Description of the Project Area

The proposed transportation project consists of the rebuilding of the KY 57 bridge and its northern and southern approaches (see Figures 1.2 and 1.3). The bridge is situated over the north Fork of the Licking River at the Fleming and Lewis County line. The bridge reconstruction will alleviate traffic flow and improve safety conditions.

The project area measures approximately 1.7 km (1.0 mi) in length and approximately 9.8 ha (24.3 acres) in area (including the existing portion of KY 57). Approximately .9 km (.5 mi) of the project area is situated within Fleming County; while the remaining .9 km (.5 mi) is located in Lewis County.

The project area is reflective of the hilly nature of the Outer Bluegrass, consisting of moderately hilly, rolling terrain (Figures 2.3 and 2.4). This rolling terrain is markedly more pronounced in the southern portion of the project area in Fleming County where the proposed realignment transects several ridgespurs. When taken as a whole, the project area slopes downward towards the North Fork. Elevations within the project area range from approximately 259 m (850 ft) above mean sea level (AMSL) along portions of the northern and southern end to approximately 232 m (760 ft) AMSL along the floodplain.



Figure 2.3. Overview of project area showing topography along the northern portion of the project area. Photo facing south.



Figure 2.4. Overview of the southern portion of the project area along the eastern edge of KY 57. Photo facing north.

The vast majority of the disturbances within the project area appear to be directly related to the construction and maintenance of KY 57. The disturbances are most readily apparent directly along the western and eastern edges of KY 57 where various land grading activities had altered the landscape to accommodate the construction of the road bed (as seen along the right edge of Figure 2.3). In addition to the land grading activities, several underground utilities were also located within the project area, concentrated along, and near, KY 57 within the Right-of-Way (ROW) easement. Shovel testing was not conducted in close proximity to these utilities.

Vegetation within the project area generally consisted of a variety of deciduous and herbaceous plants. Most of the project area was dominated by the presence of pasture (see Figure 2.3 and 2.4). The landscape surrounding the North Fork, including the northern and southern banks as well as the floodplain was dominated by a variety of secondary and tertiary growth deciduous trees and weedy understory (Figure 2.5).

As previously mentioned, a total of four soil series, accounting for six soil phases and one soil complex have been identified in the project area (see Table 2.1). These soils belong to the Beasley-Shrouts-Crider Soil Association. This association has been identified throughout the rolling topography along this segment of the two county region. These soils are typically identified along rolling uplands of the region. These soils are generally deep and well drained and have clay-rich subsoils.

The first, and most common, series consists of the Beasley Series. This series is composed of three individual phases: Beasley silt loam (2 to 6 percent slopes), Beasley silt loam (6 to 12 percent slopes, rocky, eroded), and the Beasley silty clay loam (6 to 12 percent slopes, eroded). The soils in this series were classified as fine, mixed, active, mesic Typic Hapludalfs (Soil Survey Staff 2015). Soils in this series are typically situated on ridgetops and sideslopes. Slopes can range from steep to very steep.



Figure 2.5. Overview of the North Fork floodplain showing deciduous trees and weedy undergrowth. KY 57 is located on the right side of the picture along the skyline. Photo facing southwest.

The second series is the Otwell silt loam. This series was classified as a fine-silty, mixed, active, mesic Oxyaquic Fragiudalfs (Soil Survey Staff 2015). These soils occur along stream terraces and are commonly formed in older alluvial sediments. At depths, these soils also possess a fragipan.

The third most common soil series is the Nolin silt loam. This series was classified as a fine-silty, mixed, active, mesic dystric Fluventic Eutrudepts (Soil Survey Staff 2015). They occur on floodplains throughout the county. These soils are very deep and are formed in alluvial sediments deriving from a variety of weathered sedimentary rocks.

The last soil series identified in the project area is the Kinnick silt loam. It was classified as a fine-silty, mixed, active, mesic dystric Fluventic Eutrudepts (Soil Survey Staff 2015). These soils are typical very deep, and are formed in loam alluvial sediments of sedimentary rock origins. These soils typically occur within larger stream valleys within floodplain locales.

The remaining soils are comprised by two complexes: Beasley-Shrouds complex (rocky, 12 to 30 percent slopes, severely eroded) and Beasley-Shrouds complex (12 to 30 percent slopes, very rocky, eroded). These complexes consist of soils comprising two or more recognized soil series (or other taxonomic units) within a small geographic area. Each of these soils are either intricately mixed, or of such small area it would be difficult to map them individually.

As discussed, many portions of the project area are currently used as pasture for cattle grazing. Certain portions may also be currently used (particularly in the last few years) for hay or forage crop harvesting. Given their checkered agricultural histories, these areas had likely been plowed (or otherwise tilled) during historic/modern times, creating an upper horizon that was disturbed by various agricultural activities. Unless otherwise noted, the upper-most horizon will be considered disturbed and will be referred to as the “plow zone.” In addition, these areas had also been likely logged at some point during the eighteenth or nineteenth centuries, further adding to the disturbed nature of the prehistoric materials recovered during the current investigations.

The Geophysical Project Area

The following is a description of the geophysical project area that includes soils and their suitability for geophysical surveying and field conditions noted during this investigation.

General Survey Conditions

The survey conditions at the site were generally good. The only disturbances evident were from agricultural use of the field, a utility pole and its associated metal guy wires, and a wood and metal fence on the east side of the survey area (Figure 2.6). The weather was ideal, with temperatures holding steady throughout the survey at approximately 75 degrees Fahrenheit. The conditions made for comparable data across survey blocks because it was unnecessary to realign the gradiometer sensors repetitively. Although it rained heavily, the GPR portion of the survey had already been completed and was not affected by the change in soil moisture.

Soils

Soils within the geophysical survey area were all mapped as Beasley silt loam, 2 to 6 percent slopes (Soil Survey Staff 2015). Beasley series soils are formed in residuum from soft calcareous shale, siltstone, and limestone. They have a thin Bt horizon directly beneath their Ap through which grave shafts would have to be cut, thus improving the contrast between disturbed and undisturbed soils; however, they also have a BC horizon comprised entirely of clay, which can severely impede the propagation of radar waves. Combined with a wavy boundary that can be as much as 50 cm (20 in) thick, the properties of these soils make them poor to very poor for near-surface sensing methods such as radar and magnetics. This is because the proportions of volcanic rock, sand, silt, and clay affect the physical behavior of a soil. As a result, the National Resource Conservation Service (NRCS) GPR Suitability Map for Kentucky rates the utility of GPR in the area as “very low” (Soil Survey Staff 2006). This did not appear to be the case based on the GPR data observed in the field; however, given the visibly irregular nature of the soils after processing the data, there may be actual physical irregularities in the soils that make them ill-suited for GPR.



Figure 2.6. Overview of geophysical survey area, looking northeast from southwest grid corner.

Chapter 3. Previous Research and Cultural Overview

Prior to initiating fieldwork, a search of records maintained by the NRHP (available online at: <http://nrhp.focus.nps.gov/natreghome.do?searchtype=natreghome>) and the OSA (FY16_8650) was conducted to: 1) determine if the project area had been previously surveyed for archaeological resources; 2) identify any previously recorded archaeological sites that were situated within the project area; 3) provide information concerning what archaeological resources could be expected within the project area; and 4) provide a context for any archaeological resources recovered within the project area.

A search of the NRHP records indicated that no archaeological sites listed on the NRHP were situated within the current project area. In addition, an OSA file search was conducted to further characterize the archaeological resources in the general area, the OSA archaeological site database for the county was reviewed and synthesized. The work at OSA consisted of a review of professional survey reports and records of archaeological sites for an area encompassing a 2.0 km (1.2 mi) radius of the project footprint. The OSA file search indicated that no archaeological sites, or surveys, were present, or had been conducted) within this radius.

A review of the county-wide site data was then examined to provide basic information on the types of archaeological resources that were likely to occur within the project area. This review also examined the landforms that were most likely to contain these resources. The results are discussed below.

Archaeological Site Data

Based on the data provided in Table 3.1, a total of 142 archaeological sites have been recorded for Fleming County; while 210 archaeological sites have been recorded for Lewis County. The data indicates that for either county, prehistoric sites classified as open habitations without mounds are the most

commonly identified site type. In Fleming County, this site type accounts for over two thirds of the identified sites (69.7 percent; n = 99). Historic farms/residences, the second most common site type, comprises less than one-quarter of the sites (21.1 percent; n = 30). The remaining site types make up a much smaller proportion of the total number of sites (see Table 3.1).

According to the OSA records, most of the archaeological sites in Fleming County have been documented in the dissected uplands. In fact, just over half of the archaeological sites in the county (n = 87; 61.3 percent), have been documented along the various upland landforms, including dissected uplands, hillsides, and undissected uplands.

The 142 archaeological sites possessed a total of 170 cultural components. As indicated on Table 3.1, just over half of these components were identified as Indeterminate Prehistoric occupations. Historic components account for approximately one-quarter (n = 45) of the identified components. The remaining components, such as Late Prehistoric and Archaic comprise less than 8 percent; while the remaining cultural components account for less than 3 percent of the total number of components.

In Lewis County, prehistoric open habitations without mounds account for just over half (n = 119; 56.7 percent) of the identified sites. Undetermined sites (n = 36; 17.1 percent) is the second most commonly identified site type in the county; while historic farm/residence (n = 20; 9.5 percent) were the third most common site type. The remaining 55 sites are composed of site types that account for less than 8 percent of the total number.

In contrast to Fleming County, most of the archaeological sites in Lewis County have been documented in floodplain or terraces settings. Upland sites, including dissected uplands, hillsides, and undissected uplands, account for approximately one-third of the total sites (n = 73; 34.8 percent).

Table 3.1. Summary of Selected Information for Previously Recorded Archaeological Sites in Fleming and Lewis Counties, Kentucky. Data Obtained from OSA and May Contain Coding Errors.

	Fleming County		Lewis County	
	N	%	N	%
Open Habitation without Mounds	99	69.72	119	56.67
Historic Farm/Residence	30	21.13	20	9.52
Cemetery	8	5.63	1	0.48
Stone Mound	2	1.41	15	7.14
Earth Mound	1	0.70	2	0.95
Isolated Burials	1	0.70	0	0.00
Undetermined	1	0.70	36	17.14
Other	0	0.00	8	3.81
Open Habitation with Mounds	0	0.00	4	1.90
Isolated Find	0	0.00	2	0.95
Industrial	0	0.00	1	0.48
Mound Complex	0	0.00	1	0.48
Petroglyph/Pictograph	0	0.00	1	0.48
Total	142	100.00	210	100.00
Time Periods Represented	N	%	N	%
Indeterminate Prehistoric	92	54.12	141	59.75
Historic	45	26.47	35	14.83
Late Prehistoric	12	7.06	7	2.97
Archaic	11	6.47	18	7.63
Woodland	5	2.94	14	5.93
Unspecified	3	1.76	18	7.63
Paleoindian	2	1.18	3	1.27
Total	170*	100.00	236*	100.00
Landform	N	%	N	%
Dissected Uplands	72	50.70	65	30.95
Floodplain	36	25.35	113	53.81
Terrace	17	11.97	20	9.52
Hillside	6	4.23	6	2.86
Undissected Uplands	5	3.52	2	0.95
Unspecified	5	3.52	4	1.90
Other	1	0.70	0	0.00
Total	142	100.00	210	100.00

The 210 Lewis County sites account for 236 archaeological components (see Table 3.1). Most of these components are represented by prehistoric open habitations without mounds (59.8 percent). Historic farm/residences were the second most commonly identified cultural component, accounting for less than 15 percent (n = 35; 14.8 percent) of the total identified number of sites. Archaic, Woodland, and Unspecified components comprise approximately equal proportions.

Map Data

In addition to the OSA file search, a review of the available historic maps were initiated to assist with identifying potential historic properties (i.e., structures) or historic archaeological site locations within the proposed project area. The following maps were reviewed during the current investigations.

1884 Bath and Fleming County Atlas (Lathrop and Summers);

1925 Oil and Gas Map of Fleming County, Kentucky (Kentucky Geological Survey [KGS]);

1929 Springdale, Kentucky-Ohio, 15-minute series topographic quadrangle, United States Geological Survey (USGS);

1934 Engineering map of proposed realignment to KY 57 (KYTC);

1935 Springdale, Kentucky-Ohio, 15-minute series topographic quadrangle, United States Geological Survey (USGS);

1937 General Highway Map of Lewis County, Kentucky, Kentucky Department of Highways (KDOH);

1948 General Highway Map of Fleming County, Kentucky (KDOH);

1948 General Highway Map of Lewis County, Kentucky, Kentucky State Highway Department (KSHD);

1951a Burtonville, Kentucky, 7.5-minute series topographic quadrangle, United States Geological Survey (USGS);

1951b Flemingsburg, Kentucky, 7.5-minute series topographic quadrangle, United States Geological Survey (USGS);

1952 Orangeburg, Kentucky, 7.5-minute series topographic quadrangle, United States Geological Survey (USGS);

1953 Tollesboro, Kentucky, 7.5-minute series topographic quadrangle (Photorevised 1978) United States Geological Survey (USGS);

1955a General Highway Map of Fleming County, Kentucky (KDOH);

1955b General Highway Map of Lewis County, Kentucky (KDOH)

The reviewed historic maps provided useful information concerning the general locations of current and former structures located within, and adjacent to, the project area. All areas near possible map structures were investigated for archaeological deposits according to accepted survey methods, as described in the Methods Chapter of this report.

The maps do not depict the presence of historic map structures within the confines of the current project area. The strip map, provided by KYTC, does show that two small unoccupied agricultural structures are situated within the project area. The first is a small barn/utility shed located along the eastern side of KY 57 in the central portion of Parcel 2. The second is a corn crib east of KY 57 in the southern portion of Parcel 4. Neither structure is shown on any of the historic maps and are both considered modern.

The first maps that definitively depict structures adjacent to the project area occur during the early portion of the 1950s with the advent of the 7.5-minute topographic series quadrangles (Figure 3.1). When combined, these maps depict a series of 7 map structures (MS), including both residential and outbuildings, that were located outside and adjacent to the current project area. As none of the map structures are situated within the confines of the current project area, only a superficial discussion of the structures is warranted.

Two of the structures (MS 4 and MS 5) appear to be residences. Both structures are located near the southern portion of the project area along either side of KY 57. Both structures were still present at the time of the current survey. MS 4 appears to have been abandoned; while MS 5 appears to be still occupied.

The remaining five structures consist of various outbuildings. Two of the structures (MS 6 and MS 7) are no longer extant, having been demolished in the intervening years since the 1950s. No archaeological remains were identified within the project area that was associated with either of these former structures. Based on the topographic maps, MS 6 appears to be of a similar size as the other outbuildings near the project area. MS 7, on the other hand, appears to be a larger east-west oriented outbuilding. The remaining five structures are still present, and each appears to be utilized currently (at least in recent years) for a variety of agriculturally-related activities, such as equipment storage or were associated with livestock.

The historic maps also revealed the presence of an unconfirmed cemetery on the 1934 highway plan for the, then proposed, reroute of KY 57 (Figure 3.2). None of the other historic maps consulted during this investigation showed the cemetery.

As this cemetery is situated within the current project area, the landform was surveyed in an attempt to relocate the cemetery and determine whether graves are still present. At the time of the current survey, no physical evidence of this cemetery was noted on the ground surface. Chapter 6 (Results) provides the results of the geophysical and archaeological surveys of the landform and of the site.

Survey Predictions

Considering the known distribution of archaeological sites in both counties, the available information on the site types recorded, the reviewed map data, and the nature of the present project area, certain predictions were possible regarding the kinds of sites that might be encountered within the project area. Prehistoric habitations, including open habitations without

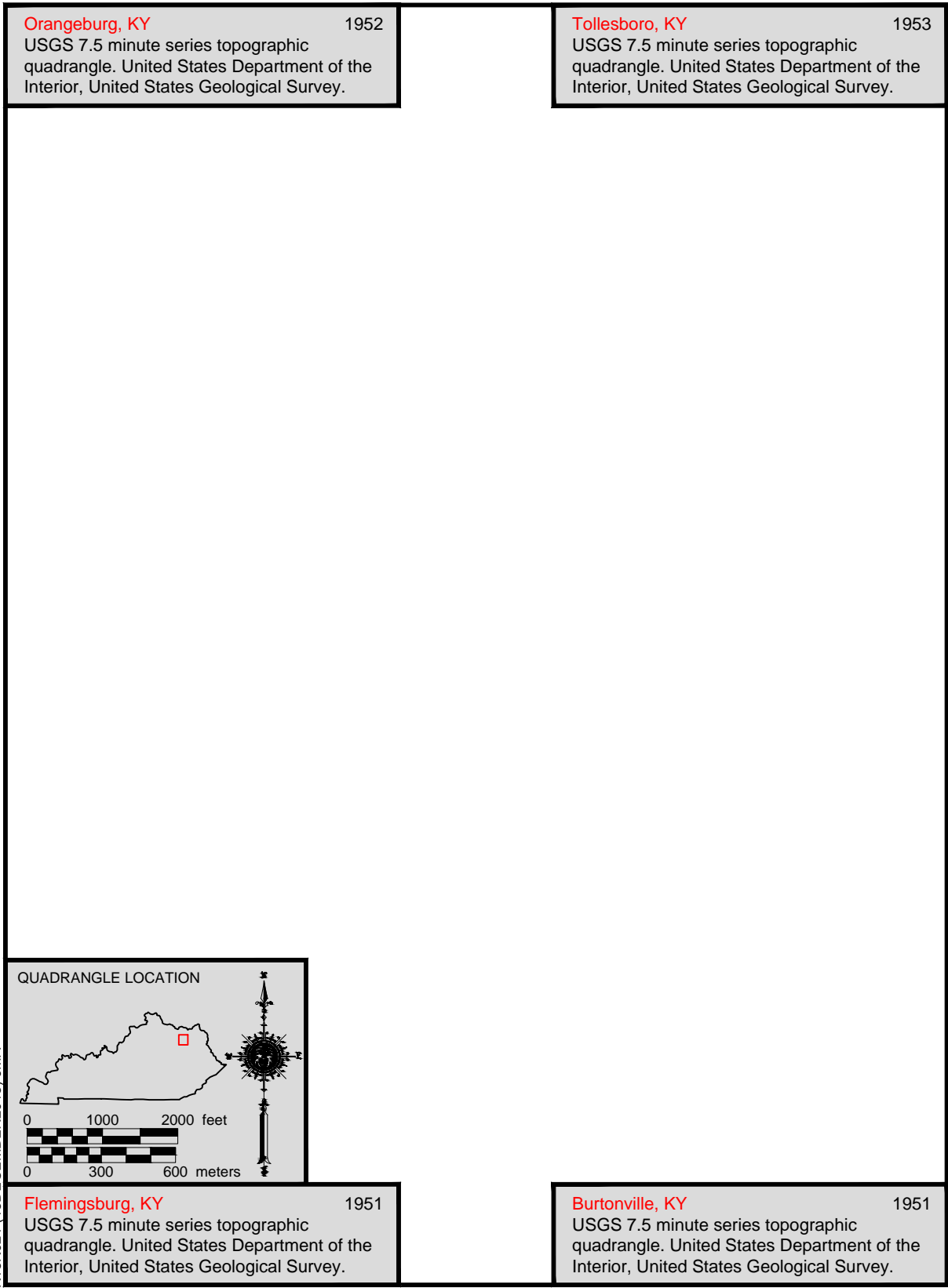


Figure 3.1. 1950s topographic quadrangle mosaic showing map structures adjacent to the project area.

Engineering Map of Proposed KY 57 1934

Realignment
Kentucky Transportation Cabinet
Frankfort, Kentucky.

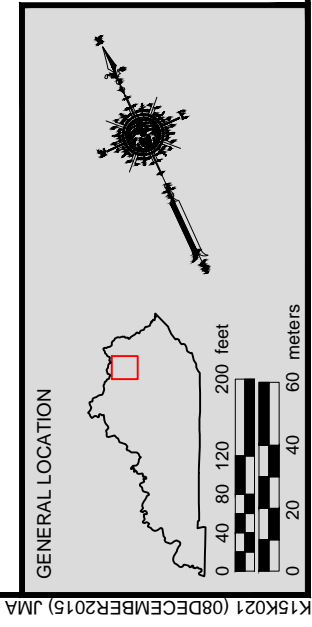


Figure 3.2. Location of cemetery on 1934 highway plan.

mounds and earthen mounds, were to be expected. The presence of historic farmsteads/residences would be expected, but at a much lower frequency. Given the presence of the cemetery depicted on the 1934 highway map, a cemetery is expected.

Cultural Overview

Early Human Occupation

There is an increasing amount of evidence documented over the last two decades suggesting that humans arrived in North America before what has traditionally been thought of as the first migration of peoples into the Americas. Archaeologists thought that humans first entered the Americas while following Pleistocene megafauna or other animal species over the Bering Land Bridge that once joined Siberia and Alaska no earlier than about 11,500 years ago. It was thought that after arrival, these migrants—referred to as the Clovis people—quickly spread across North and South America.

Evidence for a pre-Clovis migration is becoming stronger as additional data are collected. Furthermore, multiple entry points or routes have been suggested. Not only did entry into North America occur across a land bridge, but it may also have happened via northern coastal waterways leading to the western (Waguespack 2007), and possibly the eastern (Lowery et al. 2010), seaboards. According to Maggard and Stackelbeck (2008:110) “these discoveries have seriously challenged the Clovis-first model and force us to reconsider the timing of colonization and the processes that were involved in the initial settlement of the New World.”

Paleoindian Period (before 8000 B.C.)

The Paleoindian cultural tradition in the northeastern United States has been recognized as part of the Clovis culture, a widespread, homogeneous New World culture typified by a distinctive lithic assemblage. The most distinctive members of this assemblage are lanceolate shaped, often fluted, hafted bifaces

(Maggard and Stackelbeck 2008). The presence of other artifact types in these

Paleoindian assemblages, such as chert knives, scrapers, unifacial tools, and blades, is consistent across the eastern United States. These types of artifacts have been recovered from Clovis sites such as Holcombe Beach in Michigan (Fitting et al. 1966), Debert in Nova Scotia (MacDonald 1968), Martens in Missouri (Martens et al. 2004; Morrow 1998, 2000), and Topper in South Carolina (Goodyear and Steffy 2003).

Clovis components are not well represented in Kentucky, but they have been identified at sites such as Adams, Adams Mastodon, Big Bone Lick, Clay’s Ferry Crevice, and Parrish (Tankersley 1996). The artifacts in the Clovis toolkit represent predominantly hunting, butchering, and hide-working activities. Bone tools (e.g., awls, needles, flakers, and possibly shaft straighteners) and ornaments are assumed to have been used but have not been recovered because of unfavorable environmental conditions (Griffin 1978:226).

Post-Pleistocene adaptive strategies were geared for coping with a harsh, but rapidly changing, environment. In general, Paleoindian sites are reflective of areas where small groups of people, perhaps no more than 50 individuals (Tankersley 1996:21), would perform specific tasks of short duration. This type of site casts a very low archaeological profile across the landscape. It has been argued that the earliest subsistence strategies in the eastern United States were not typified by a focus on the harvest of megafauna, but rather by a balanced hunting economy based on the exploitation of migratory game—especially caribou—and supplemented by foraged food (Fitting et al. 1966:103–104; Gingerich 2011; Ritchie and Funk 1973:336; Tankersley 1996:22; Walker et al. 2001).

Archaic Period (8000–1000 B.C.)

As Griffin (1978:226) states, “a purely arbitrary division is made between the earlier fluted point hunter and their direct descendants,” yet typological comparisons of artifact assemblages begin to take on distinctly regional

characteristics with time. The Archaic period is customarily divided into three subperiods: Early (8000–6000 B.C.), Middle (6000–3500 B.C.), and Late (3500–1000 B.C.) (Jefferies 2008). By the Early Archaic, the last glaciers had retreated and the arctic-like boreal forest was developing into the eastern deciduous forest. By the Middle Archaic subperiod, the environment was much as it is today. This subperiod is marked by the introduction of groundstone tools, some of which have been interpreted as plant processing implements. At the beginning of the Late Archaic subperiod, the modern deciduous climax forest covered the entire eastern United States. In response to the changing environment and concurrent changes in plant and animal communities, Archaic period peoples developed a more diversified subsistence strategy that included a shift to exploitation of riverine ecosystems and, perhaps, the beginnings of a planned seasonal round exploitation strategy (Winters 1967:32).

The typical artifact assemblage representative of the Archaic period is composed of corner- and side-notched, or stemmed, hafted bifaces, increasing in both quantity and stylistic variation through time but accompanied by a decrease in quality of individual workmanship. Corner- and side-notched forms appear earlier in the sequence, whereas stemmed bifaces appear later (Jefferies 2008).

Judging from the greater frequency with which Late Archaic sites appear among sites that are recognized in the prehistoric record, a population increase may be postulated. Moreover, evidence of longer, more intensive site occupation suggests, in some cases, the possibility of extended habitation in parts of the state (Jefferies 2008).

Woodland Period (1000 B.C.–A.D. 900)

Griffin (1978:231) notes that during the Late Archaic subperiod there was “considerable evidence for the long distance movement of goods.” The interregional movement of goods provided a structure for the transmission of information as well. During this period of interregional dynamism, there was a trend

towards a more sedentary lifestyle with increasingly elaborate burial ceremonialism and, possibly, stratified social organization. These trends, along with the appearance of fired ceramic vessels, mark the transition between Archaic and Woodland peoples (Griffin 1978).

The Woodland period, like the preceding Archaic period, is divided into three subperiods: Early Woodland (1000–200 B.C.), Middle Woodland (200 B.C.–A.D. 400), and Late Woodland (A.D. 400–900) (Applegate 2008). Overall, the Woodland period witnessed a continuation and elaboration of cultural practices that began during the Late Archaic subperiod. Woodland peoples became increasingly dependent on the cultivation of plant foods, which allowed for a more sedentary lifestyle. Except for the latter part of the Late Woodland subperiod, subsistence practices remained similar to the Archaic subsistence patterns, which is to say a combination of hunting, plant food gathering, and fishing in a seasonal round exploitation pattern. It is within the Woodland period that highly visible site types, such as mounds and enclosures, were constructed (Applegate 2008).

Late Prehistoric Period (A.D. 900–1650)

In addition to an increase in cultural integration and cultural complexity, the Late Prehistoric period witnessed a rapidly growing dependence upon horticulture in the subsistence activities of native populations. Cultural materials are assigned to the Late Prehistoric period by the presence of seemingly diagnostic artifacts, such as mixed limestone and shell or purely shell tempered pottery and triangular projectile points. Temporal assignment based on the presence of triangular points can be misleading since they first appeared during the Late Woodland period. The Late Prehistoric period in this region of Kentucky is referred to as Fort Ancient (Henderson 2008).

During the Fort Ancient period, there was an increased reliance on agriculture, an increase in sedentism, and an increase in the complexity of sociopolitical organization. Subsistence practices focused on the cultivation of corn and

beans. This was supplemented with hunting, fishing, and wild plant collecting. Many Fort Ancient villages were circular or elliptical and “exhibit distinct activity areas that encircle a central plaza: domestic/habitation, storage/trash disposal, and mortuary” (Henderson 2008:745). Some, but not all, of these circular villages were surrounded by a palisade.

Cultures with a somewhat similar level of development included Pisgah in the Appalachian Summit, Mississippian in the middle Mississippi River area, and the Plaquemine culture of the lower Mississippi River area. A Late Woodland level of society continued in the Midwest, the Great Lakes, the Northeast, and the piedmont and coastal areas of the Middle Atlantic until European contact (Geier 1992:279–280). The Fort Ancient period is dated between approximately A.D. 900 and 1650.

History of Lewis County

In 1776, the Virginia General Assembly had created Kentucky County from its western lands. The newly created Kentucky County had approximately the same boundaries as the state of Kentucky does today. This county in 1780 was divided into three separate counties (Fayette, Lincoln, and Jefferson), which would collectively become the District of Kentucky in 1783 (Hammon 1992:495). Then, in 1792, the Kentucky District would dissipate in favor of the Commonwealth of Kentucky, and the counties that comprised the district would eventually be divided and subdivided into the 120 counties that presently make up Kentucky.

Lewis County is located in the foothills section of the Appalachian Mountains cultural landscape. Located in the northeastern part of the state, Lewis County is bordered by the Ohio River to the north, Greenup and Carter Counties to the east, Rowan County to the south, and Mason and Fleming Counties to the west. Formed in 1806 out of a portion of Mason County, Lewis County is the forty-eighth Kentucky county in order of formation. The county was named for Meriwether Lewis who along with William Clark led the Corps of Discovery to the Pacific Northwest between 1803 and 1806, in what would popularly become

known as the Lewis and Clark Expedition. Vanceburg is the county seat (Kleber 1992:548).

An Englishman named John Powling was the first white man to carve out a settlement in what is today Lewis County. He constructed a few crude cabins at Esculapia Springs. Powling eventually moved to Maysville (Limestone). John McDaniel and Jesse Melson then settled in the area where Melson cleared 4 acres and built a cabin. While he scratched out a settlement, McDaniel started a salt furnace along Salt Lick Creek in the late 1780s. Isaac Hulbert also started manufacturing salt along the same creek soon after McDaniel started his operation (Hook 1943; Ragan 1977: 24).

William Wilson soon settled in the area, and he had several sons who built cabins along Salt Lick Creek. In 1794, John Waugh settled on a tract of land along Cabin Creek and constructed a large log house near the creek. Soon, he started operating his house as a tavern, providing shelter, food, and drink for travelers in the region. That same year, Turner Davis settled a large tract of land on Quick’s Run, a tributary of Martin’s Fork (Hook 1943).

The first Lewis County court house was constructed in the western portion of the county at Poplar Flat in 1806. In 1810 the county court moved to Clarksburg, which was on Salt Lick Creek closer to the Ohio River. The continued success of salt manufacturing and increased trade on the river better suited Clarksburg as the county seat. Kinniconnick Creek, upstream from Salt Lick Creek and Clarksburg, also developed into an early manufacturing and trading center. Several grist mills and saw mills were constructed along the creek (Kleber 1992:918; Ragan 1977:28).

Lewis County’s river trade was enhanced after 1811 when the steamboat started to govern the movement of goods on the Ohio River. By 1820, the mouth of Cabin Creek had developed into an important steamboat landing. Boats unloaded tons of dry goods and equipment at the creek mouth, then it was hauled overland to interior trading towns to the south. The mouth of Salt Lick Creek was also a popular landing. Vanceburg developed as a result of the trading and economic activity, and on January 24, 1827,

it was incorporated by the Kentucky General Assembly (Hook 1943; Kleber 1992:918; Ragan 1977:28).

The county continued to develop steadily throughout the first half of the nineteenth century. Its development is reflected in the county's steady population growth throughout the antebellum period. In 1810, just four years following its creation, Lewis County was home to 2,357 residents, and by 1820, the population increased to 3,973 residents. Over the next decade, the county's population increased 31.6 percent to 5,229 inhabitants. In 1840, the population reached 6,306 residents, and by 1850 it reached 7,202 residents. On the eve of the Civil War, Lewis County had 8,361 inhabitants.

The number of slaves in Lewis County was consistent with the number of slaves in other mountain counties. In 1840, there were 406 slaves in the county making up only 6.4 percent of the total population. In 1850, the number of slaves dropped to 322, which was 4.4 percent of the total population. Over the next decade, the number of slaves continued to decline, and by 1860, there were 322 slaves and 17 free blacks, making up 3 percent of the total population (Collins 1882:261; Lucas 1992:xx)

During the Civil War Lewis County remained intensely loyal to the Union. No battles were fought in the county, but it lost 107 men, all Federal soldiers, during the war. The county remained a Republican stronghold in Kentucky politics after the war, and in 1884, residents financed the construction of a memorial to the county's losses during the war. It was the only Union monument erected in the state of Kentucky (Kleber 1992:549).

River trade continued to be an important part of the Lewis County economy after the Civil War, but the timber industry fueled much of the county's growth. In 1870 the population stood at 9,115, but over the next decade it increased 44.3 percent to 13,154 people in 1880. The growth was generated by the increasing timber trade. The population reached 14,803 by 1890, then it increased another 20.7 percent over the next decade to reach 17,868 in 1900. The county ended the nineteenth century with the

largest population it ever achieved in the nearly two centuries of its existence.

Timber continued to be an important facet of the county's population throughout the twentieth century. Over 70 percent of the county was covered in timber during the century; therefore, it afforded ready access to high quality timber and transportation. In 1957 the U.S. Shoe Corporation opened a plant in Vanceburg, and a decade later it expanded its operation there. Lewis County was among the state's leaders in mining Clay. Over 11,000 tons of the resource was mined in the county. The completion of the AA Highway, which provides all of northeastern Kentucky with a link to Ashland and the Cincinnati metropolitan area, spurred further development in the county during the 1990s (Kleber 1992:549, 981; Vertical File, Kentucky Historical Society).

Agriculture played an important role throughout Lewis County's history, but statistics for the nineteenth century production of crops and livestock are scarce. In 1882 there were 980 farms in the county averaging 166 acres per farm, but by 1992 the number of farms dropped to 909 while the average size of farms increased to 175.6 acres. In 1997, farmers produced 336,700 bushels of corn, 59,500 bushels of soybeans, and 38,400 bushels of wheat. The three production categories ranked fifty-third and fifty-ninth in Kentucky, placing the county near the median for grain crops. They raised 5.8 million pounds of burley tobacco, which ranked thirty-fifth in the state and third in the fifth agricultural district. The county's dairy farms produced 13.7 million pounds of milk, which was thirty-fifth in the state and 3rd in the district. The county's overall farm production in 1997 totaled over \$16 million, which was seventy-second in Kentucky (Kentucky Agricultural Statistics Service 1998: 34, 70, 127).

After the start of the twentieth century Lewis County's population started a general decline from its nineteenth century levels. In 1910 the population slipped to 16,887, and it continued to drop until it reached 14,315 in 1930. It rebounded throughout the following decade until it reached 15,686 by 1940. By

1950, however, the number dropped to 13,520, and by 1970 it had dropped to 12,355 people. In 1980 the population had increased to 14,545, but it dropped again to 13,029 in 1990.

Chapter 4. Methods

This chapter describes the methods used during the survey. Site-specific field methods are discussed in further detail in the Results chapter of this report. Laboratory methods specific to the individual analyses are also discussed in the Materials Recovered chapter of this report.

Field Methods

The field investigation consisted of an intensive archaeological survey for the proposed KY 57 bridge replacement and approaches at the Fleming-Lewis County Line in northeastern Kentucky. The project area measured approximately 1.7 km (1.0 mi) in length and approximately 9.8 ha (24.3 acres) in area (including the existing portion of KY 57). Landowner permission was obtained prior to the survey of each parcel.

Prior to the survey, CRA was provided with mapping of the project area. This mapping depicted the project boundary, contours, and other natural, cultural, and topographic features. A Magellan MobileMapper 6 handheld GPS unit was used to record pertinent archaeological data. The location of the project area was also determined by its relative position to the existing road and property lines. The project area was also examined based on aerial photographs and satellite imagery.

The entire project was subjected to an intensive pedestrian survey supplemented by screened shovel testing (see Figure 1.3). All undisturbed, relatively flat terrain possessing poor surface visibility within the project area was shovel tested. These included the various pastures and portions of manicured lawns. All slopes greater than 15 percent also were subjected to intensive pedestrian survey. These latter areas included segments of the proposed ROW. Areas of disturbances, including land grading and underground utility corridors, were also pedestrian surveyed.

Shovel testing was conducted in all areas with low surface visibility and less than 15

percent slopes. Shovel tests were excavated at 20 m intervals with spacing of transects set at 20 m. In all cases, shovel tests measured not less than 35 cm in diameter and extended well into the subsoil. Shovel tests were excavated in levels. The topsoil/plow zone was removed as one level. After the topsoil was removed, 10 cm (4 in) arbitrary levels within natural horizons were excavated. All fill removed from the tests was screened through .64 cm (.25 inch) mesh hardware cloth, and the sidewalls and bottoms were examined for cultural material and features. All artifacts recovered from shovel tests were bagged by test number and level.

Limited bucket augering was conducted within the North Fork floodplain. The bucket augers were excavated in order to sample the near-surface sediments to determine the possibility of buried archaeological deposits (Stafford 1995, 2004). For the purposes of the current investigations, bucket augering was not employed as a site discovery method. The main goal was to determine the depositional characteristics of the sediments in the area, in order to determine the potential for buried archaeological materials. The examination of buried deposits for archaeological sites is best conducted with a deep testing program consisting of close interval (5–10 m) systematic bucket augering, systematic backhoe trenching, or both. Subsurface investigation of complex depositional environments should be done in consultation with a geomorphologist or geoarchaeologist. Such investigation was beyond the scope of the current project.

A hand-operated bucket auger with a 4-inch (10.2 cm) opening was used to excavate two individual auger tests in the northern portion of the project area (Figure 1.3). Sediments were removed in approximately 10 cm levels. All soil was screened through .25-inch mesh hardware cloth. The general soil characteristics (texture, Munsell colors, etc.) were recorded by individual level. Two bucket augers were excavated during the current investigations.

Only one of the bucket augers recovered cultural materials.

When a site was identified, the GPS unit was used to record the location of the site datum, positive shovel tests, and other pertinent archaeological data. At each archaeological site, a datum for mapping was established at the location of a positive shovel test. The site specific methods can be referenced in the Results chapter of this report. The collection of cultural materials varied from each site, dependent upon local conditions. GPS data was collected and a site sketch map was created depicting the location of all shovel tests, project boundaries, site boundaries, and other cultural or topographic features.

Geophysics

Russell S. Quick, PhD, RPA

The survey area was divided into two 30-x-50 m (98-x-164 ft) grids (Figure 4.1) encompassing .30 ha (.75 acres). The corners of these grids were marked with non-magnetic pin flags during the survey. These flags were replaced with gutter spikes following the survey to facilitate future relocation of the grids. Both radar and magnetometry were utilized for investigation of the survey area.

Duplexed Geoscan Research FM-256 fluxgate gradiometers were utilized for the magnetic survey of the project area (Figure 4.2). Data were collected in survey transects spaced .5 m apart at a density of 8 readings of nT per linear m. This protocol gave a density of 24 magnetic readings per square meter or 6,400 per 20 m survey block. Data were processed using a combination of Geoscan Research Geoplot, Golden Software Surfer, ESRI ArcGIS, and Snuffler, a freeware processing program.

A GSSI SIR-3000 GPR coupled with a 400 MHz center frequency antenna and survey cart was utilized for the radar survey of the project area (Figure 4.3). Accepted geophysical methods were followed (i.e., 1 m transect spacing with 33–64 readings per linear m) (Conyers and Goodman 1997:57–75; Gaffney and Gater 2003:77–101). The results of the survey were post-processed and graphical plots of the data

were produced utilizing RADAN 6, GPR Slice, and ArcGIS.

A GPR antenna sends radio waves into the ground to measure differences in the physical and chemical (and therefore electrical) properties of an area. Unlike other geophysical survey methods, GPR has the ability to convert the two-way travel time of a radio wave to a buried target and back to the receiver into a distance, thus giving an approximate depth-to-target. The depth provided in survey figures is a relative depth and is probably not an accurate representation of actual depth to targets. No soil tests were conducted to determine the dielectric permittivity of the soil.

Magnetometry

Magnetometers were originally developed to search for the metallic signatures of submerged submarines. They were later adapted for oil exploration and soil studies (Wynn 1986:245). Tabbagh states that “magnetic properties play a very important part in archaeological prospecting,” (Tabbagh et al. 2000:394) but this avenue of exploration is still rarely tapped, in spite of its advantages. There are several varieties of geophysical prospection equipment that rely on the principle of measuring minute variations in the earth’s magnetic field and are hence called by the generic term “magnetometer.”

All magnetometers rely on the principle of measuring the remanent magnetism of subsurface archaeological features. In order to use a magnetometer, there must “be a clear contrast in magnetic susceptibility between subsoil or bedrock and topsoil, so that silted archaeological features are readily detectable” (Clark 1990:87, 92). Magnetometry can find not only fired kilns and ferrous objects but also soil features, such as ditches and pits (Schmidt 2002:7). Alternatively, the features being targeted must have a contrasting magnetic signature from the background matrix. This is dictated by the principle of remanent magnetism.

Remanent magnetism is tied to variations in the location of the magnetic North Pole. The earth’s magnetic pole is not stationary; it wanders around as the earth spins on its axis.

Figure 4.1. Plan view of project area showing geophysical survey blocks.



Figure 4.2. Duplexed Geoscan Research FM256 gradiometers.



Figure 4.3. The GSSI SIR-3000 GPR and survey cart.

When certain substances, like clays that contain iron particles, are heated above the Curie point, their ferrous particles realign to magnetic north and are then “frozen” in place when the substance cools. This process is known as thermoremanence (Clark 1990:64). The clay “donut” hearths of Southeastern Woodland period sites are excellent examples of this process in relation to an archaeological feature. Artifacts that have significant and distinctive remanent magnetism are bricks, kilns, and pottery. The principle of remanent magnetism is often employed to take magnetic dates by comparing the orientation of a sample taken from a hearth or kiln to a chart of the pole’s meanderings over the centuries. For the purposes of magnetometry, however, it is not necessary to take a sample back to the lab to have its magnetic properties analyzed. It is enough that the magnetic properties of the hearth contrast with those of the unheated soils around them. The principle applies equally well to pits filled with ceramics, prehistoric burials, or unmarked historic burials with no coffins—even though their magnetic signatures are all different from each other, they are also different from the surrounding undisturbed soil matrix.

Magnetometers also measure the magnetic susceptibility of materials. Magnetic susceptibility is a more general effect, literally “susceptible to being magnetized.” Iron objects that are not, in themselves, permanent magnets, possess magnetic susceptibility (i.e., they are susceptible to being magnetized), as do certain types of igneous rocks. Humic soil, for example in the A horizon of a typical profile, possesses magnetic susceptibility in proportion to the weathering and decomposition that has been involved in its formation. Buried A soil horizons are distinctive in contrast to the horizons above and below that lack magnetic susceptibility for this reason. Of interest to archaeology, remanent magnetism is produced by soil processes involved with a combination of burning and decomposition, often called the burning and rotting factor. A magnetometer survey records the magnetic effects of remanent magnetism and magnetic susceptibility measured in nanoTeslas (nT). Areas of elevated magnetic susceptibility (approximately 2–10 nT) can indicate general

areas of midden. Concentrated, tightly bounded magnetic susceptibility anomalies (approximately 2–20 nT) can indicate the location of pits and other features filled with concentrated midden and the products of either burning or organic decomposition.

Concerns for Magnetometer Surveys

Near-surface readings of nT can be wildly distorted by the presence of small bits of modern metal (Ambos and Larson 2002:34). These can range from small objects, for example agricultural machine parts, to much larger items. Despite their size, all can create significant distortions of the local magnetic field with their individual magnetic susceptibility. For this reason, it is generally difficult to use magnetometers in the survey of urban properties, beyond using them to identify areas of magnetic disturbance created by iron objects, large and small. Readings are also disturbed by surface modification processes. For example, plowing and disking redistribute and concentrate remanent magnetism generally associated with the topsoil, as can the excavation and refilling of test pits, trenches, and other sorts of archaeological explorations. At times this redistribution of magnetic materials may mask in situ archaeological features. Also, car motors, electrical power lines, and metal sewer pipes confuse magnetometer readings. Magnetometers are omni-directional—they receive data from all directions, so above-surface variations in the magnetic field caused by a passing car or, in extreme cases, by diesel-electric trains operating 16 km from a survey site (Clark 1990:67) are recorded just like the subsurface ones caused by archaeological features.

Magnetometry is limited in some soils, particularly those that contain high levels of magnetite or those that have been “gleyed,” or so saturated with water that their iron particles have been converted to a reduced state (Waters 1996:48). In gleyed soils, magnetic susceptibility is decreased because of the iron shifting from a ferric to a ferrous state (Clark 1990:114). Butler points out that “in the shallow subsurface, the only objects which will typically produce localized magnetic anomalies will be cultural features and artifacts” such as bits of

iron, fired clay, and rocks (Butler et al. 1994:461).

Differential Magnetometers and the Fluxgate Gradiometer

The main problem with magnetometry is the nature of the magnetic field itself. Much of the field is generated from within the earth (95 percent), but electromagnetic radiation from the sun and other sources causes fluctuations from 5 to 50 nT in the primary field (Clark 1990:67). To counter this, it is often necessary to use another magnetometer set up as a base station to record this “diurnal variation.” The two readings can then be subtracted, leaving only the variations recorded by the magnetometer used for conducting the survey (Clark 1990:67; Chavez et al. 2001:1268). This technique can increase a magnetometer’s resolution to below .1 nT. Another way to control diurnal variation of the earth’s magnetic field is to use two magnetometers aligned with each other on the same staff with a typical vertical separation of 1–2 m (Clark 1990:68). This configuration is known as a gradiometer because it measures the slight differences, or gradients, measured by the two magnetometers (Breiner 1965:188).

One of the most often employed instruments for archaeological survey is the fluxgate magnetometer. This is surprising because it was once considered nearly useless for archaeological survey. The sensors are directionally responsive, meaning that if a single sensor unit is employed, any tilting of the mechanism changes the magnetic field and presents itself as an anomaly (Clark 1990:69). As a result, fluxgate sensors are typically paired to create a gradiometer (Clark 1990:70). Fluxgate gradiometers have to be constructed carefully, with one sensor being rigidly mounted in a tube (typically PVC or aluminum), while the second is mounted so that its axis can be aligned to the first through the use of non-ferrous screws, thereby decreasing interference. A properly aligned system provides (near) continuous data across a site because its charge/read time is only 1/1000 of a second and it has a resolution of .1 nT, making it ideal for archaeological survey (Clark 1990:70). As a result of the speed and resolution of the fluxgate

gradiometer, magnetometer surveys are now used more often than electrical resistivity (Wynn 1986:248), and high resolution magnetometry surveys of large areas are now possible (Schmidt 2002:7). Clark even suggests that the fluxgate gradiometer “as an adjunct to standard fieldwalking techniques is much to be recommended” (Clark 1990:89).

GPR

GPR is one of several geophysical technologies “borrowed” for archaeological use. It was first employed in 1929 to map the thickness of a glacier (Olhoeft 1996:1) and was later used to search for tunnels, bunkers, and unexploded ordinance (UXO), and for the reconnaissance of building sites (Wynn 1986:251). In principle, GPR is similar to seismic sounding. Rather than using a hammer or other device to introduce physical shock waves into the ground, GPR introduces high frequency radio (radar) waves that are affected by objects and soil horizons within the ground that alter the speed of the radar pulse. The computer control unit of the GPR is capable of converting the time elapsed between the emission of the radar pulse and the reception of reflected pulses off of different subsurface discontinuities into a measurement of depth (Appel et al. 1997:220; Chamberlain 2000:958; Dabas et al. 1999:510; Heimmer 1992:37).

GPR has been used to map “soil layers, depth of bedrock, cavities, voids, rock fractures, ice thicknesses...buried stream channels, burial sites, buried structures, detection of metallic objects and other related anthropogenic features” (Heimner 1992:38). Newer computerized versions of the GPR, such as the SIR-3000 system owned by CRA, have the ability to record the radar traces and present them in both two and three dimensions. They also allow the operator to filter out much of the background noise and random scatter that occurs during a survey. GPR has become “an extremely useful archaeological investigative method, where subsurface conditions permit its usage...[GPR’s] relatively shallow investigative depth, high resolution, sensitivity to soil disturbances, and...ease of data acquisition overshadow its relatively high cost” (Heimner 1992:43).

GPR is most effective in an archaeological setting when looking for highly reflective “hard” targets, such as buried structures, middens, and pits or trenches with a fill that has different electrical properties than the surrounding undisturbed soil (Conyers and Goodman 1997:27). It was first employed on an archaeological site by Vickers and Dolphin in Chaco Canyon in 1974 (Vickers and Dolphin 1975:6; Wynn 1986:251). The Vickers and Dolphin team had remarkable success mapping subsurface archaeological features, such as buried kivas. More recently, surveys conducted at the Cahokia Mounds State Historic Park in southern Illinois utilizing a 400 MHz center frequency antenna documented a large subsurface anomaly, possibly a platform mound, in the northeastern plaza adjacent to Monk’s Mound. The northern limit of the initial palisade surrounding the central plaza may also have been discovered during this survey (Keeley et al. 2001). CRA has successfully utilized GPR to locate unmarked burials and to map subsurface features and foundations at various sites and cemeteries throughout the Midwest (Quick 2010; Quick and Clay 2009).

GPR is an active geophysical method that injects a relatively low frequency electromagnetic signal, generally from 80 MHz to 1000 MHz, into the ground and measures the reflected waves (Heimmer 1992:37; Wynn 1986:252). As the signals travel through the ground, they encounter materials of varying electrical impedances or properties. The signals can be either reflected or attenuated—dissipated or weakened—by these subsurface interfaces, hence the name of the GSSI radar owned by CRA: the Subsurface Interface Radar System, or SIR-2. The radar signals “give reflections from conductivity contrasts caused by metallic objects or disturbed soil horizons” (Wynn 1986:252), such as archaeological features, which “often affect water saturation in the subsurface [and] may be excellent radar targets” (Heimmer 1992:42). The greater the contrast between the electrical and magnetic properties of two sedimentary layers, the stronger the reflection (Conyers and Goodman 1997:27). Air-filled voids and layers of saturated sediment also make strong reflectors (Chamberlain 2000:958). The

reflected signals “can be compared with the original input signal. Observation of the two way travel time allows a calculation of subsurface velocities” (Heimmer 1992:113, 37; Nishimura and Goodman 2000:102; Olhoeft 1996:2).

Therefore, unlike other geophysical prospecting methods, these GPR time-depth slices allow for direct measurements of depth based on the velocity of the radar waves through the medium, provided the relative dielectric permittivity (RDP) of the soil is known (Schmidt 2002:6). Heimmer notes that the uninitiated will often “view the profile as a geologic cross section. Realization that this is not the fact is a first step in understanding the data set. The features observed are changes in electrical properties” that may or may not coincide with local geology (Heimmer 1992:42).

One of the most important choices regarding the use of ground penetrating radar for archaeological geophysics is the center frequency. The choice of frequency determines both the depth of penetration of the signals and the ability of the radar to resolve features (Chamberlain 2000:958; Heimmer 1992:39; Wynn 1986:252). The “subsurface resolution [is] dependent on antenna frequency [and] ranges from centimeters to several meters” (Heimmer 1992:41). In order to be successful, the wavelength has to be short enough to resolve subsurface interfaces (Conyers and Goodman 1997:47). Lower frequency radars, from 80 to 200 MHz, are not very effective for archaeological use because although their depth of penetration can be tens of meters, their resolution is fairly low (Heimmer 1992:39; Sternberg and McGill 1995:209; Wynn 1986:252). Radar tests in Arizona found that “low-frequency [100 MHz] GPR records seldom showed any features of interest” even when the radar was towed above known subsurface structures (Sternberg and McGill 1995:218). The wavelength was simply too long to resolve the features of interest (e.g., adobe walls). However, tests with a higher frequency 500 MHz GPR were able to resolve the same features. This was because although the depth of penetration with a 500 MHz GPR is more than five times less than that of a 100 MHz GPR, its shorter wavelength

means that the resolution is over five times better (Heimmer 1992:39; Sternberg and McGill 1995:218–219; Wynn 1986:252). Experiments show that antennae of “300 MHz or higher provide excellent resolution, but limit the depth of investigation to 5 m or less” (Chamberlain 2000:958), which is sufficient for most archaeological sites. Very high frequency GPRs, in the 900–1000 MHz range, have only limited application in archaeological surveys because although their resolution is excellent, their depth of penetration is too shallow. The frequency choice is a compromise between depth of investigation and resolution (Chamberlain 2000:959). GPRs with a center frequency between 270 and 600 MHz seem best suited for archaeological surveys because they provide good depth (1–5 m) and acceptable resolution (Conyers and Goodman 1997:40–45).

Two other factors that affect the ability of GPR to resolve subsurface features are the beam width and subsurface “clutter.” As the radar signal propagates through the ground, “signal loss or dissipation increases with depth. Random noise also increases with depth, often obscuring reflectors of interest” (Heimmer 1992:40), especially in previously disturbed urban soils. The disturbances caused by rocky soils and high concentrations of magnetite “underlying a site frequently exceeds the anthropogenic anomalies by an order of magnitude or more,” but this kind of high frequency noise can sometimes be filtered out during post-processing (Wynn 1986:254).

The beam width also effects resolution, because the “radar beam is not collimated and reflections are obtained from a broad cone below [and slightly in front of] each recording station” (Chamberlain 2000:958). Therefore, the size of hyperbolic reflections caused by “point” targets, such as buried pipes or walls (when crossed perpendicular to the direction of travel), depends on their size (width and thickness), depth, the velocity of the radar waves, and the wavelength of the GPR (Butler et al. 1994:455). For these reasons, antenna orientation is important because narrow features may be missed by transects perpendicular to them but not by transects running parallel to them (Olhoft 1996:1). The 400 MHz antenna owned by CRA

has a nominal depth of penetration of 2–5 m (6–16 ft) and can resolve features around 14 cm (6 in) across at a depth of 1 m (3 ft), which provides enough depth and resolution for shallow archaeological sites, but not for very deeply buried sites.

Analysis

The gradiometer data were downloaded to a laptop computer in the field using Geoscan Research Geoplot. The same program was subsequently used to process the data to remove survey errors, emphasize the results for interpretation, and smooth the results. Processing generally involved the procedures known as clipping and value replacement, zero-mean traverse, destagger, despiking, interpolation, and low pass filtering. Report graphics were prepared in Geoplot and/or Surfer. These were subsequently integrated into report mapping in ArcGIS.

The processed magnetic data were examined in plan view in order to find anomalies consistent with features such as trenches or graves. Typically, such features are indicated by high amplitude (i.e., all strong positive or all strong negative) signals or dipoles (i.e., strong positive directly adjacent to strong negative), all positive or all negative “smudges,” or a combination of the two (Figure 4.4).

The GPR data were processed utilizing GSSI’s RADAN 6.6 and GPR Slice 7. Filters applied included vertical IIR low pass (800 MHz) and high pass (100 MHz), vertical boxcar low pass (195 MHz) and vertical boxcar high pass (590 MHz), a horizontal background removal (199–299 scans), a horizontal boxcar stack of three traces to smooth the data, and a range gain adjustment. The processed data were transferred into GPR Slice and down-sampled to a consistent 1,001 scans per transect. Presentation graphics were produced using RADAN 6.6, GPR Slice 7, and ArcGIS.

The processed GPR data were viewed in both 2-d (vertical cross-section) and 3-d (horizontal time-slice) in order to find anomalies consistent with features such as pits or graves. Typically, such features are indicated by parabolic signals on radargraphs (Figure 4.5).

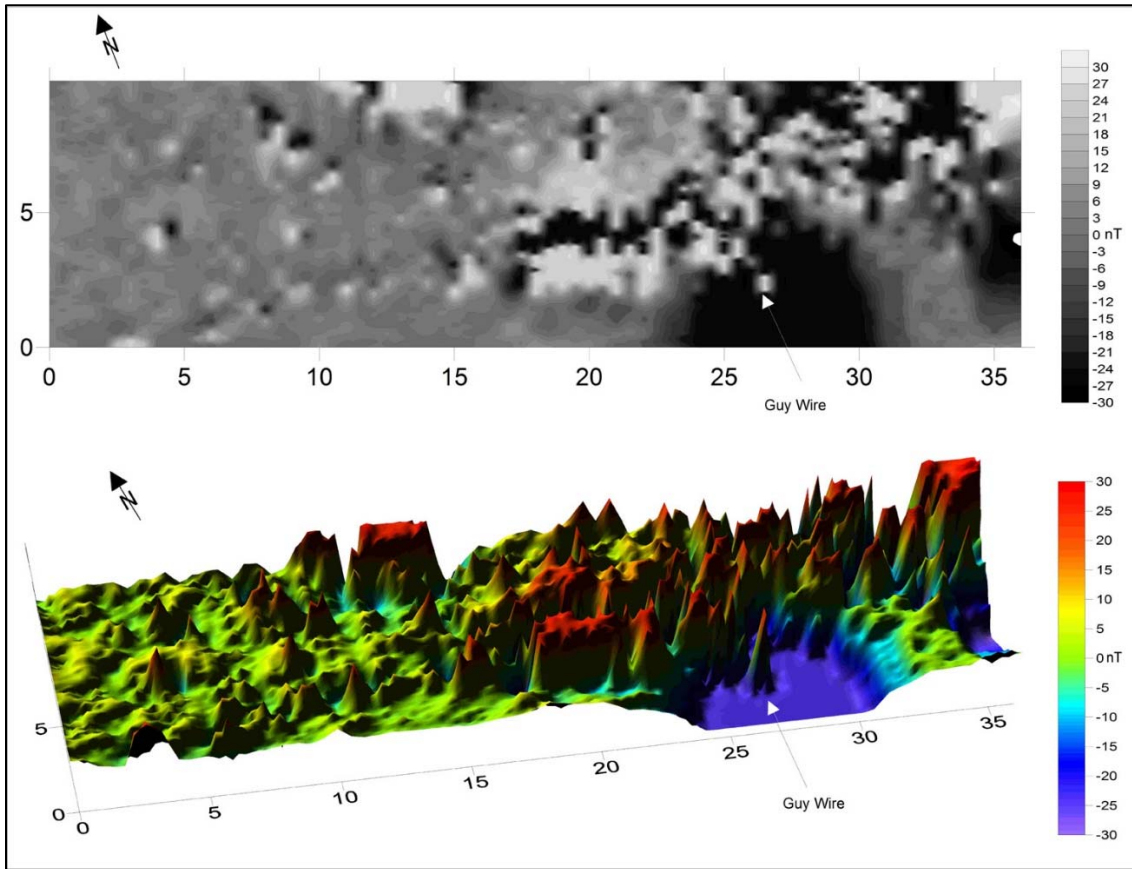


Figure 4.4. Magnetic plot showing burials in a cemetery near Princess, Kentucky.

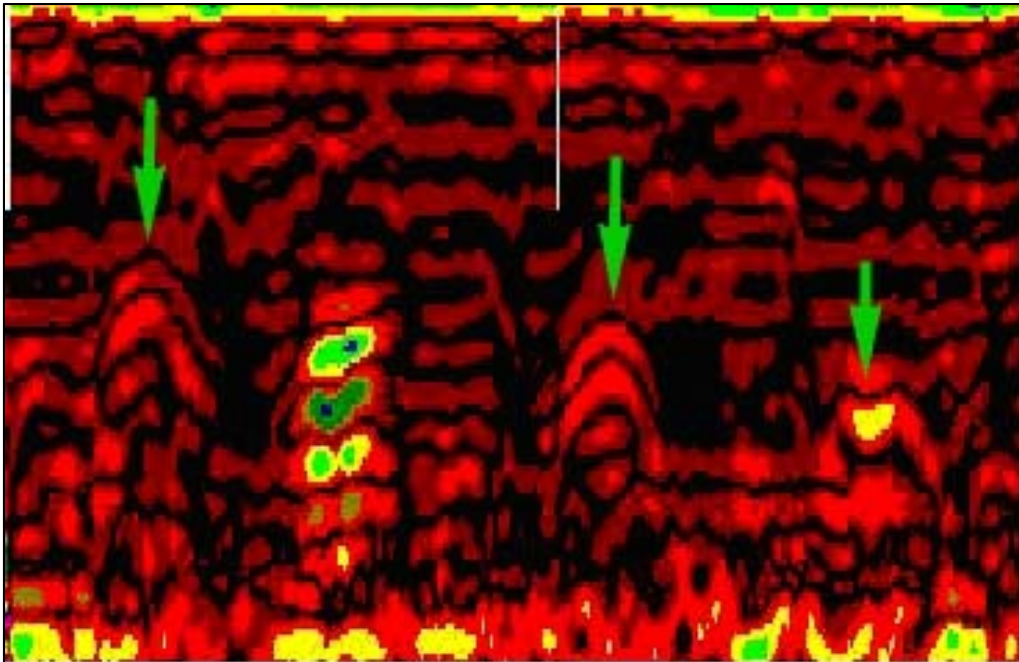


Figure 4.5. GPR plot showing burials in a cemetery near Elburn, Illinois.

Laboratory Methods

All cultural material recovered from the project was transported to CRA for processing and analysis. Initial processing of the recovered artifacts involved washing all artifacts, sorting the artifacts into the major material classes (i.e., prehistoric) for further analysis, and assigning catalog numbers. Catalog numbers consisted of the site number and a unique number for each provenience lot or diagnostic specimen. Non-diagnostic material, such as flake debris, was cataloged by provenience lot.

The methods, specifics, and results of subsequent analysis are discussed in each of the specific analysis sections of this report. All cultural materials, field notes, records, and site photographs will be curated at the University of Kentucky in Lexington, Kentucky.

Chapter 5. Materials Recovered

The current archaeological investigations recovered cultural materials from three previously undocumented prehistoric archaeological sites: 15Lw218, 15Lw219, and 15F1146 and one isolated find (IF2). All of the recovered artifacts were prehistoric in nature. No historic materials were identified during the current investigations. Site 15Lw219, however, was a historic cemetery.

The purpose of the following analysis was to provide an inventory of the recovered materials and an assessment of the likely temporal, spatial, and behavioral factors involved in the formation of the lithic assemblage. Analysis of the recovered lithic artifacts included flake debris analysis and technological analysis of the modified implements. The assemblages recovered from each of these archaeological resources will be described and analyzed in the following sections. Appendices A and B will provide detailed information concerning lithic assemblages. Appendix A provides the lithic codes employed during the current analysis. Appendix B provides for the summary of the flake debris and cores/modified implements.

Laboratory Methods

Lithic materials recovered from each of the sites were processed in three steps prior to analysis. The first step was to sort material into several general artifact categories (i.e., flake debris, cores, and modified implements). The second step consisted of recording attributes of these artifacts into a computer-coding format. The final step was to enter all artifact codes into a Microsoft Access® database, where data could later be manipulated.

A paradigmatic classification system (Dunnell 1971:70–76) was used to code lithic artifacts for analysis. In this form of classification, dimensions, or mutually exclusive features, are recorded for each artifact. Within each dimension are several possible attribute states. Artifact classes can then be formed by the intersection of these attribute states (Dunnell 1971:73). The scale of investigation and the

determination of the classes examined are guided by the questions being asked of the data. This form of analysis is preferred over typological formats for the following reasons:

- 1) Lithic reduction is a dynamic process; therefore, forcing lithic material into static “types” is counter productive to actually understanding prehistoric lithic technologies.
- 2) No a priori assumptions are necessary concerning the meaning of classes, as is common in typological formats.
- 3) Mutually exclusive classes are formed.
- 4) Analysis is possible at various levels of detail.
- 5) Classification does not obscure artifact variability (i.e., functional, stylistic, technological, and morphological) to the extent that typologies do.
- 6) Classification allows several different analytical techniques to be used to support or reject hypotheses generated of the data.

A total of 73 lithic artifacts weighing 119.7 g were recovered from the 3 archaeological sites and 1 isolated find investigated during the current survey. The vast majority of the assemblage was identified as nondiagnostic flake debris; however, a single multidirectional core was recovered at 15Lw218.

Table 5.1 summarizes the lithic artifact assemblage. The following analysis will describe and discuss these artifacts and place them into a broader project-wide context.

Table 5.1. Summary of Lithic Artifacts by Site.

	Flakes*	Cores	TOTAL
15Lw218	51 (53.4 g)	1 (25.6 g)	52 (106 g)
15F1146	16 (11.1 g)		16 (11.1 g)
15Lw219	4 (1.8 g)		4 (1.8 g)
IF2	1 (0.8 g)		1 (0.8 g)
TOTAL	72 (67.1 g)	1 (25.6 g)	73 (119.7 g)

Raw Materials

Raw material type was determined based on parent geological formation when possible. An

Indeterminate category was used for flakes that could not be assigned confidently to a parent geological formation. Determination of raw material type was made using published descriptions and by comparisons with a sample collection of locally occurring chert housed at CRA. Flakes smaller than .25 inch were counted and weighed, and no additional attributes were recorded. Raw material type was not assessed for these flakes, as they often exhibit no diagnostic characteristics that can be used to confidently identify a raw material type. In addition, .25 inch screens were used in the field; therefore, flake debris smaller than .25 inch is probably underrepresented in the lithic sample.

The examination of raw materials used in flaked stone manufacture is important for several reasons. As Binford (1979:260) notes, variability in the proportions of raw material at a site is a function of the scale of the habitat exploited from that location. It is recognized, however, that the proportions of raw materials recovered from a site likely represent only the minimal extent of a group's annual range (Ingbar 1994). The distribution and quality of raw materials are important factors that condition their use (Andrefsky 1994). A number of raw materials may be sufficient for flaked stone tool production; however, "certain materials may be chosen over others because of differences in mechanical efficiency at hand" (Beck and Jones 1990:284). Similarly, Terry et al. (2009) found that raw material type tended to significantly vary with regard to different tool forms during the Upper Paleolithic in the Transbaikal region of Siberia. Based on their experiments, Terry et al. (2009) determined that lithic raw material types can be important for different functions and need to be considered in scenarios of technological organization.

The region surrounding the project area is considered chert-rich, given the presence of numerous chert-bearing formations in relatively close proximity to the project area. Based on the geologic composition of the surrounding region (Morris 1965; Peck 1967, 1969; Schilling and Peck 1967), at least five individual geologic formations have been mapped as containing chert resources. Both primary and secondary geologic formations were identified. Only two

primary formations were identified, consisting of the Bisher Limestone and the Lower Crab Orchard and Brassfield Formations. The remaining formations consisted of secondary sources, including: high level fluvial deposits, alluvium, and tributary stream alluvium. Of these formations, the Brassfield Formation was the most widespread. As previously stated, samples of this latter raw material were collected within the project area, confirming the presence of this particular raw material as a local resource. Description of this raw material was presented in Chapter 2.

Flake Debris Analysis

Flake debris is defined here as lithic waste that exhibits evidence of intentional removal from a parent piece but no evidence of further modification. Flake debris is a useful indicator of prehistoric activities because it is ubiquitous on most sites, exhibits evidence of the stage of manufacture during which it was produced, and unlike modified implements, was usually deposited where it was generated. The flake debris analysis provides information concerning prehistoric lithic technology and, in conjunction with other analyses, aids in determining site use.

The analysis of flake debris involved the recording of several attributes, including flake size, weight, raw material type, presence of cortex, and probable stage of lithic reduction during which the flake was produced. Reduction stage follows Magne's (1985) definitions and was determined by the number of facets on the platform or the number of flake scars on the dorsal surface. Early stage reduction is defined as core reduction, middle stage as the first half of tool production, and late stage as the second half of tool production and subsequent maintenance. For flakes that retain platforms, zero to one facet on the platform indicates early stage, two facets indicate middle stage, and three or more facets indicate late stage. Biface thinning is a specialized form of late stage reduction. A biface thinning flake is defined as a flake with a lipped platform having three or more facets. For non-platform bearing flakes, dorsal flake scars were counted instead of platform facets; zero to one dorsal flake scars indicate early stage, two scars middle stage, and

three or more flake scars late stage. Stage of reduction was not determined for blocky debris or flakes smaller than .25 inch.

For the flake debris analysis presented here, a series of attribute dimensions were recorded for each flake larger than .25 inch: size-grade, weight, portion, platform configuration, cortex cover, cortex type, reduction stage, raw material, and thermal alteration. Several attribute states were possible within each dimension. In addition, flakes were assigned to a reduction stage based on the work of Magne (1985; Magne and Pokotylo 1981).

Size-grade was determined by passing flakes through a series of nested wire screens of the following sizes: 2.54 cm (1 in), 1.9 cm (.75 in), 1.27 cm (.5 in), .64 cm (.25 in), to .37 cm (.125 in). Standard geologic sieves were used for all size grading. All flakes were hand manipulated through the screen. If a flake could fit through the mesh in any direction, it was included with the size below. All flakes larger than .25 inch were examined for the above attributes. Flakes smaller than .25 inch were not subjected to detailed analysis because of the difficulty of determining material type and reduction stage for such small flakes. Also, screens with .25 inch mesh were used in the field, so flakes smaller than .25 would be underrepresented in the lithic sample. Therefore, these small flakes were examined to confirm that they were actual flakes then counted and weighed only.

Flakes larger than .25 inch were assigned to four reduction stages based on the presence of certain attributes. Magne (1985; also see Magne and Pokotylo 1981), building on the work of Collins (1975), used discriminant function analyses to determine the best variable for separating flakes produced by experimental reduction into four stages. In Magne's (1985) scheme, early stage reduction is viewed as all core reduction, middle stage reduction is viewed as the first part of the manufacture of tools, and late stage reduction is viewed as the completion and maintenance of tools. Biface thinning is considered a special form of late stage reduction. For platform bearing flakes, platform facet count was determined to be the best single attribute. Dorsal scar count was determined to be the best

single attribute for non-platform bearing flakes. Magne (1985:120) determined that for platform bearing flakes, zero to one facets indicated early stage, two facets middle stage, and three or more facets late stage. In addition, flakes with lipped platforms and three or more facets were the result of biface thinning. For non-platform bearing flakes, zero to one scar indicated early stage reduction, two scars middle stage, and three or more scars late stage.

Results of Analysis

The current investigations recovered a total of 72 flakes weighing approximately 119.7 g (see Table 5.1). This total included 50 flakes larger than .25 inch (63.6 g) and 20 flakes smaller than .25 inch (2.5 g). Of the flakes larger than .25 inch, 3 pieces of blocky debris (6.4 g) were identified. Two pieces of thermal shatter (1.0 g) were also recovered.

Materials smaller than .25 inch in size were counted and weighed with no further attributes recorded. These items, however, were examined for the presence of tool fragments, none of which were found in any of the assemblages. None of the recovered lithic materials were subjected to micro-wear analysis.

Based on the various assemblages, it appears that the prehistoric peoples almost exclusively exploited a single lithic raw material resource (Brassfield chert). Of the 50 flakes larger than .25 inch, 48 (93.0 percent) were made from this locally available raw material. The 2 remaining flakes were made from Oolitic Newman (3.4 g) and Indeterminate (4.7 g) cherts. The high percentage of this raw material likely reflects unfettered access to this raw material resource.

Brassfield chert was available within the immediate area of the current survey. Bedrock underlying portions of the project area have been identified as belonging to the chert-bearing lower portion of the Crab Orchard Formation and Brassfield Formation. As previously stated, samples of Brassfield were collected within the project area.

Of the 50 flakes larger than .25 inch, 47 flakes could be assigned to an established reduction stage (i.e., Magne 1985). All reduction

stages were represented within the various assemblages. In terms of reduction stages, roughly equal percentages of these stages were represented in the combined lithic assemblage. Middle stage flakes (n = 17; 36.2 percent) was only slightly more commonly represented than those flakes classified as either late (n = 16; 34.0 percent) or early (n = 14; 29.8 percent) stages. Discussed below, only the Site 15Lw218 flake assemblage could be examined in this manner, given its relatively large sample size.

Cores

Cores (class 106) are defined as nodules or blocks of cherts that have negative flake scars (previous flake removals) across at least one face. Core tools (class 206) are cores that show evidence of use other than a source of flakes. For cores and core tools, flaking orientation is the main attribute recorded. Flaking that was in one direction from a single margin is classified as unidirectional (106-2 or 206-2). Bi-directional flaking is described as flake removals from two directions, but not bifacial (106-7 or 206-7). Multi-directional cores (106-6 or 206-6) have random flake removals from several directions. Cores of this type have also been referred to as amorphous core by other analysts (e.g., Faulkner and McCollough 1973:80; Johnson 1986). Flake removals that form a bifacial margin are termed bifacial (106-3 or 206-3). The edge angles on these specimens are typically greater than 60 degrees. Cores that were conical in shape with flake removals in one direction (106-5 or 206-5) are termed unidirectional subconical (i.e., blade core). Bipolar cores (106-4 or 206-4) are those that exhibit evidence of bipolar reduction techniques. Such cores often exhibit evidence of force being applied from two opposing faces and crushing along the striking platform. Indeterminate orientation is reserved for fragmented cores (106-1 or 206-1) where the flaking orientation was not determinable.

In addition to the primary attribute of flaking orientation, a secondary attribute was also recorded. This was used to differentiate between cores (.3), core fragments (.2) and tested cobbles (.1). Simply defined, cores have in excess of three flake removals, while tested cobbles exhibit three or less flake removals.

Core fragments are portions of cores that have been truncated.

The current investigations identified a single core. This specimen, recovered at Site 15Lw218, was a multiple directional core (Artifact k15k21-01). It was recovered at the site in the upper portion of the solum (0–22 cm [0–9 in] bgs) in STP T1. This specimen was manufactured from low quality local Brassfield chert. It exhibits flake scars originating from multiple platforms. It exhibits several small portions of patinated/water-worn cortical surfaces. The presence of the water-worn cortex suggests that at some of the artifacts arriving at 15Lw218 were likely procured from alluvial settings.

Results of Analysis

The current investigations at Sites 15Lw218 and 15Lw219 and IF1 resulted in the recovery of 73 lithic artifacts weighing approximately 119.7 g. The flake debris assemblage included 50 flakes larger than .25 inch (63.6 g) and 20 flakes smaller than .25 inch (2.5 g). Of the flakes larger than .25 inch, 3 pieces of blocky debris (6.4 g) were identified. Two pieces of thermal shatter (1.0 g) were also recovered. A single multidirectional core was recovered at 15Lw218. None of the recovered artifacts was considered temporally sensitive. No modified implements or fire cracked rock (FCR) were recovered at any of the archaeological resources.

Site 15Lw218

Investigations at Site 15Lw218 recovered a modest-sized lithic assemblage totaling 52 lithic artifacts weighing approximately 106 g. The artifact assemblage consisted predominantly of flake debris. This artifact class account for approximately 96.2 percent (n = 50) of the total assemblage. The flake debris assemblage consisted of 35 flakes larger than .25 inch (51.1 g) and 15 flakes smaller than .25 inch (2.0 g). One piece of thermal shatter was also recovered from the site. Of the flakes larger than .25 inch, 1 was classified as blocky debris (4.7 g). A single core (52.6 g) was identified in the assemblage, having been manufactured from Brassfield chert. No modified implements were recovered at the site.

In terms of raw materials, the vast majority of the flakes larger than .25 inch (n = 33; 94.3 percent) were made from Brassfield chert (43.0 g). Only 2 non-Brassfield flakes were identified in the assemblage. These included single examples of Oolitic Newman (3.4 g) and Indeterminate (4.7 g).

The flakes larger than .25 inch were examined based on reduction stages. Only Brassfield chert flakes were examined in this manner given the larger sample size. All of the reduction stages were represented in the assemblage, indicating that a variety of lithic-related activities had been conducted on-site. These activities included core reduction, as well as initial tool production and tool maintenance episodes. Based on a chi-square goodness of fit test, there appears to be significant differences among the various reduction stages ($\chi^2 = 8.7788$; $p = 0.0241$; $df = 2$). Early stage flakes were under represented; while middle stage flakes were over represented in the assemblage. No significant differences were seen in the late stage flake sample. In other words, the various lithic activities being conducted at 15Lw218 appears to have been focused on initial tool production activities. Core reduction does not appear to have played a significant role at the site. The late stage flakes identified in the assemblage indicate that some tool maintenance had also been conducted.

The flake debris was then examined for the presence of cortex. Of the 33 flakes larger than .25 inch, approximately one-third (n = 12) exhibit some form of cortical surface. Eleven flakes possess water-worn cortex, while only a single example exhibits a patinated surface. This data suggests that a portion of the raw material that was arriving on-site was procured from secondary deposits, particularly gravel bars, or other alluvial sources.

While no modified implements were recovered at the site, a single core was identified. This specimen was a multidirectional example manufactured from a water-worn cobble of Brassfield chert (52.6 g). This example lacked diagnostic features and could not be assigned to a temporal and/or cultural span.

The small sample size of the flake debris assemblage prevents a detailed description of the various activities conducted by the former prehistoric inhabitants of the site. The flake assemblage indicated that Brassfield chert was heavily exploited, having been used in a variety of lithic-related activities on-site. These tasks included core reduction, tool production, and tool maintenance activities. The small sized assemblage indicates that the occupation was ephemeral, or of a specialized nature. The single piece of thermal shatter indicates that thermal activities, such as those involved with hearths or other thermal features had likely taken place. The lack of additional thermally damaged artifacts, including FCR, indicates that these activities were not likely intensive. The lack of temporally sensitive artifacts impedes an estimation of the temporal affiliation of the occupations. Little else can be said of this small lithic assemblage.

Site 15F1146

Investigations at 15F1146 recovered a small-sized lithic assemblage consisting of 16 nondiagnostic lithic artifacts weighing approximately 11.1 g. The flake assemblage consisted of 12 flakes larger than .25 inch (10.1 g) and 3 flakes smaller than .25 inch (.3 g). The assemblage also included 1 piece of thermal shatter (.7 g). No cores or modified implements were recovered at the site during the current investigations.

All of the flakes were manufactured from the locally available Brassfield chert. No other raw material was identified in the assemblage.

In terms of reduction stages, of the 12 flakes larger than .25 inch, 10 could be placed into an established reduction stage: early (n = 4), middle (n = 3), and late (n = 3). Two pieces of blocky debris were also identified in the assemblage. The small size of the flake debris assemblage was too small to adequately examine the flakes in a meaningful manner. The flake assemblage was likely produced by a variety of lithic reduction activities.

The sparse lithic assemblage indicates that the occupations were the result of short-term or specialized occupations. Chert selection

indicates that locally available Brassfield chert was the preferred raw material. The presence of the thermal shatter appears to indicate that thermal activities had likely been conducted on-site. As no temporally sensitive artifacts were identified, little can be said of the temporal and/or cultural affiliation of the prehistoric occupations at the site. Little more can be inferred from this sparse assemblage.

15Lw219

The artifact assemblage recovered from 15Lw219 consisted of 4 nondiagnostic flakes (1.8 g). All four of the flakes were recovered from the upper portion of the solum within 25 cm (10 in) of the ground surface. Two of the flakes were smaller than .25 inch (.2 g); while the other 2 flakes were manufactured from Brassfield chert (1.6 g). Both of the flakes were late stage examples.

As none of the flakes were considered diagnostic, little can be said of the temporal and/or cultural affiliation of the prehistoric component. Beyond the fact that at least a single lithic reduction episode involving the use of Brassfield chert had been conducted, little else can be inferred of these four flakes.

IF2

IF2 consisted of a single late stage flake made from Brassfield chert (.8 g). Flake was recovered in a bucket auger (BA2) from the upper portion of the solum (17–30 cm bgs). Radial shovel tests were all negative for cultural materials.

The lack of temporally sensitive artifacts precludes the identification of the temporal and/or cultural affiliation of this prehistoric component. Beyond the fact that at least a single lithic reduction episode involving the use of Brassfield chert had been conducted, little else can be inferred of this single artifact.

Summary

The current investigations identified three archaeological sites along with a single isolated find that contained prehistoric artifacts. No

historic materials were recovered at these locations.

Based on the lithic assemblages, each of the three sites represented very low to low density lithic scatters. The majority of the materials recovered consisted of flake debris, although one core was recovered at Site 15Lw218. No modified implements or FCR were recovered at any of the archaeological resources. The relatively low density of materials at the sites and the low diversity of artifact classes recovered suggest that the occupations were of limited duration, and few activities were conducted on-site. Since there was a lack of temporally sensitive, or otherwise diagnostic lithic artifacts, it is impossible to ascertain the temporal and/or cultural assignment of any of the sites.

Chapter 6. Results

The current investigations identified a total of three previously undocumented prehistoric archaeological sites (15Lw218, 15Lw219, and 15F1146) and one prehistoric isolated find (IF2). Sites 15Lw218 and 15F1146 consisted of sparse subsurface scatters of prehistoric artifacts; while 15Lw219 consisted of a multicomponent mid-nineteenth century historic cemetery containing several nondiagnostic prehistoric flakes. The current investigations also included a geophysical survey of the cemetery.

The following sections will describe and discuss each of the archaeological resources, including the general setting, depositional context, and interpretation. The locations of these resources are presented in Figures 1.2 and 1.3.

15Lw218

Elevation: 235 m (770 ft) AMSL

Component(s): Indeterminate prehistoric

Site type(s): Prehistoric open habitation without mounds

Size: 1,335 sq m (14,370 sq ft)

Distance to nearest water: 70 m (230 ft)

Direction to nearest water: Southeast (North Fork of the Licking River)

Type and extent of previous disturbance: erosion and agriculture, extent unknown

Topography: Terrace

Vegetation: Various pasture grass

Ground surface visibility: Poor due to various grasses (less than 5 percent)

Aspect: Approximately 5 percent; south-southeast

Recommended NRHP status: Not assessed

Site Description

Site 15Lw218 consisted of a linear subsurface scatter of prehistoric artifacts. The site was situated on a terrace position overlooking the North Fork of the Licking River in southern Lewis County, Kentucky (Figures 1.2 and 1.3). The site was located approximately 65 m (213 ft) north-northwest of the existing KY 57 bridge over the North Fork. Within the project area, the site was located in Parcel 4. The site was situated at an elevation of approximately 235 m (770 ft) AMSL.

Disturbances to the site included historic and modern agricultural activities. No evidence of recent agricultural activities was noted; however, the landform appears to be used for hay or forage crop harvesting. At the time of the current survey, the field where the site is located was covered by various pasture grasses (Figure 6.1). Due to its position on the slope, erosion and possible deposition of upslope sediments would also be a factor in site preservation.

The site was initially identified during shovel testing along a 20 m (66 ft) grid following the fence line that borders the eastern edge of the site. The site boundaries were established by negative shovel tests to the west and north. The southern edge was defined by steep slopes and the presence of a gravel driveway at the base of the slope. The eastern edge of the site was defined by the fence line that parallels KY 57. Beyond the fence, the land surface was graded towards KY 57. Given the broad landform, it is possible that the site may extend beyond the eastern edge of KY 57.

Within the project area, the site measured approximately 80 m (262 ft) southwest to northeast and approximately 22 m (72 ft) northwest to southeast. The site area is estimated to be approximately 1,335 sq m (14,370 sq ft). Ground surface visibility was zero percent due to various pasture grasses present along the landform. No artifacts were collected from the ground surface.

Investigation Methods

Shovel testing was conducted along transects parallel to the fence line/KY 57. A total of 21 screened shovel tests were hand excavated within and adjacent to the site (Figure 6.2). Of the 21 shovel tests, 7 (33 percent) had cultural materials. All of the artifacts were recovered from the upper portions of the solum. No artifacts were identified below the plow zone. All sediment from each of the shovel tests was visually inspected for cultural materials and screened through .25 inch hardware mesh.



Figure 6.1. Overview of Site 15Lw218 showing vegetation. KY 57 is situated along the left side of the picture. Photo facing south-southwest.

Data pertaining to the site location was recorded and marked on appropriate maps. A site datum was established and its UTM coordinates were recorded using a MobileMapper 6 handheld GPS unit. A site sketch map was drawn, showing the placement of the shovel test positions in relation to topographic positions and the project area boundary. As previously stated, the site boundaries were determined by negative shovel tests to the west and north, by slope to the south, and by KY 57 to the east. It is possible that the site may extend further to the east beyond KY 57 and the currently delineated project boundary.

Depositional Context

The site is located on topography that has been mapped as belonging to the Otwell silt loam (2 to 6 percent slopes) (Jacobs and Jones 2004; Soil Survey Staff 2015). Shovel testing at the site revealed relatively consistent two

horizon soil profiles throughout the site (Figures 6.2 and 6.3). A typical shovel test revealed a plow zone consisting of a dark yellowish brown (10YR 4/4) silty clay loam possessing fine weak to moderate angular blocky structure. Many fine grass roots were identified in the upper 7 cm (3 in) of the sediments. The lower boundary was identified at depths ranging between 30 and 47 cm (12 and 19 in) bgs. This boundary was typically abrupt and smooth, suggesting the results of historic/modern agricultural activities. The subsoil generally consisted of a yellowish brown/brownish yellow (10YR 5.5/6) clay loam possessing medium moderate angular blocky structure.

No evidence of intact, subsurface cultural features, midden, or other cultural deposits were identified during the current investigations. The prehistoric artifacts were only noted in the uppermost soil horizon.

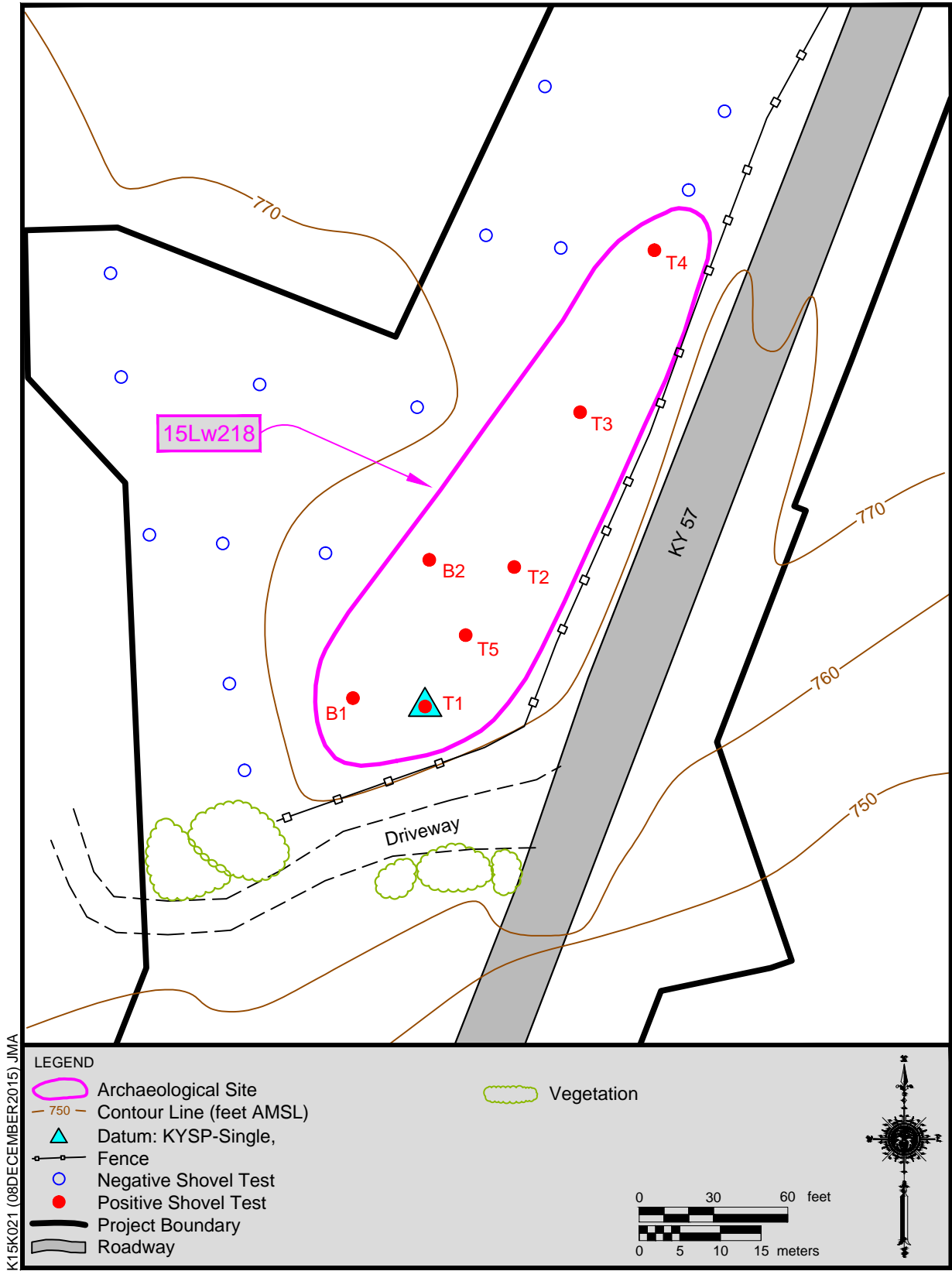


Figure 6.2. Schematic plan map of Site 15Lw218.

Modern artifacts were only noted in one shovel test (STP T3; 0–40 cm [0–16 in] bgs). A single artifact, a piece of off-white colored plastic sheeting, was identified in the upper horizon at a depth between 20 and 31 cm (8 and 12 in) bgs. As noted during the excavation of the shovel test, this piece of plastic was recovered deeper in the profile than several of the prehistoric flakes in the same shovel test.

The presence of plastic suggests that at least some portions of the site have been disturbed. While the current investigations could not identify the exact origins of these disturbances, it is clear that some degree of vertical mixing had occurred on-site. The plastic was incorporated into the upper horizon during historic/modern times, such as what might be expected if the landform was previously plowed.

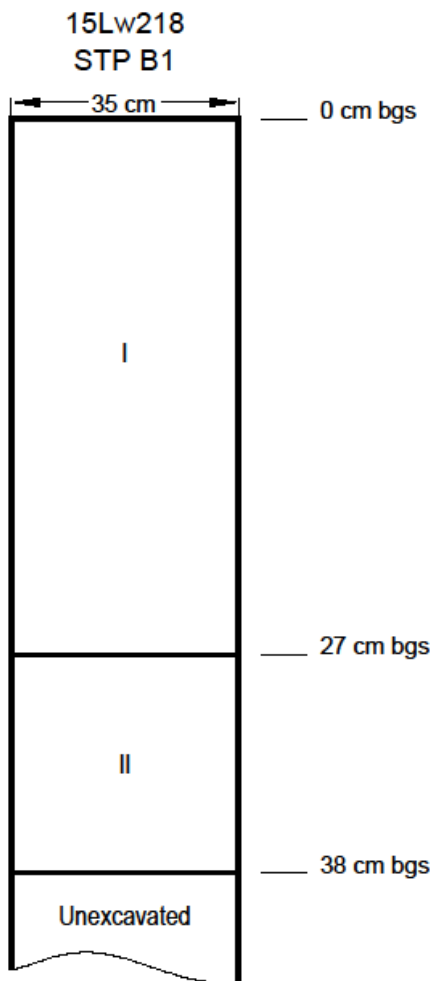


Figure 6.3. Representative soil profile from Site 15Lw218, STP B1 (0–38 cm bgs).

Artifact Assemblage

The investigations recovered a modest-sized lithic assemblage totaling 52 artifacts (106 g) (Table 6.1). The assemblage was composed predominantly of flakes: 35 flakes larger than .25 inch (51.1 g) and 15 flakes smaller than .25 inch (2.0 g). One piece of thermal shatter (.3 g) was also recovered at the site. In addition to the flake debris, 1 multidirectional core (52.6 g) was also recovered. This specimen was manufactured from a water-worn cobble of Brassfield chert. No modified implements, or additional cores, were recovered.

All of the artifacts were recovered from the uppermost horizon, which is considered to have been agriculturally disturbed (i.e., plow zone). While several artifacts were identified at deeper depths, most were recovered at depths shallower than 40 cm (16 in) bgs. A few shovel tests (T1 and T4) recovered cultural materials at slightly deeper depths ranging between 22 to 47 cm (9 to 19 in) bgs in STP T1 to 40 to 60 cm (16 to 24 in) in STP T4. It should also be noted that these deeper deposits were still classified as the uppermost horizon (Zone I).

Based on the landform, it appears that erosion transported sediments downslope and were deposited along the southern and southeastern portions of the site along the fence line. The deeper recovery of the artifacts (totaling 14 flakes) in STPs T1 and T4 reflect natural processes related to erosion and deposition of sediments as a result of historic/modern agricultural practices, rather than to older, intact sediments. Thus, like the other artifacts recovered at the site, these deeper artifacts were collected from disturbed sediments.

In terms of the raw material composition of the lithic assemblage, the vast majority of the artifacts were manufactured from locally available Brassfield chert. The only definitive non-Brassfield materials consisted of single flakes of Oolitic Newman (3.4 g) and Indeterminate (4.7 g). The cortical surfaces of the assemblage indicate that most of the materials were likely procured from secondary deposits, such as stream beds and other alluvial deposits.

Table 6.1. Summary of Artifacts Recovered from Site 15Lw218.

Unit#	Zone	Depth	Count	Wt (g)	Item Type	Raw Material	Comment
STP B1	I	0-13 cm bgs	2	4.5	Flakes	Brassfield	Late
STP B2	I	0-15 cm bgs	1	3.3	Flakes	Brassfield	Early
STP B2	I	0-15 cm bgs	1	2.6	Flakes	Brassfield	Middle
STP B2	I	0-15 cm bgs	1	6	Flakes	Brassfield	Late
STP T1	I	0-22 cm bgs	5	0.8	Flakes	<.25 inch	--
STP T1	I	0-22 cm bgs	1	0.2	Flakes	Brassfield	Middle
STP T1	I	0-22 cm bgs	1	4.7	Flakes	Indeterminate	Blocky
STP T1	I	22-47 cm bgs	3	0.3	Flakes	<1/4 inch	--
STP T1	I	22-47 cm bgs	3	2.5	Flakes	Brassfield	Early
STP T1	I	22-47 cm bgs	3	3.5	Flakes	Brassfield	Middle
STP T1	I	22-47 cm bgs	2	0.8	Flakes	Brassfield	Late
STP T1	I	22-47 cm bgs	1	3.4	Flakes	Oolitic Newman	Middle
STP T1	I	0-22 cm bgs	1	52.6	Core	Brassfield	Multidirectional Core
STP T2	I	0-30 cm bgs	3	0.2	Flakes	<.25 inch	--
STP T2	I	0-30 cm bgs	1	0.3	Flakes	Brassfield	Early
STP T2	I	0-30 cm bgs	2	1.2	Flakes	Brassfield	Middle
STP T3	I	0-40 cm bgs	1	0.1	Flakes	<.25 inch	--
STP T3	I	0-40 cm bgs	3	7.8	Flakes	Brassfield	Early
STP T3	I	0-40 cm bgs	2	4	Flakes	Brassfield	Middle
STP T3	I	0-40 cm bgs	3	2.9	Flakes	Brassfield	Late
STP T4	I	0-30 cm bgs	1	0.1	Flakes	<.25 inch	--
STP T4	I	0-30 cm bgs	1	0.8	Flakes	Brassfield	Late
STP T4	I	40-60 cm bgs	1	0.2	Flakes	Brassfield	Middle
STP T4	I	40-60 cm bgs	1	0.4	Flakes	Brassfield	Late
STP T5	I	0-25 cm bgs	2	0.5	Flakes	<.25 inch	--
STP T5	I	0-25 cm bgs	1	0.3	Flakes	Brassfield	Early
STP T5	I	0-25 cm bgs	3	1.4	Flakes	Brassfield	Middle
STP T5	I	0-25 cm bgs	1	0.3	Flakes	Brassfield	Late
STP T5	I	0-25 cm bgs	1	0.3	Flakes	Thermal Shatter	--

The Brassfield chert flakes larger than .25 inch (n = 34) were analyzed using stage analysis. The results of the analysis indicated that this raw material was utilized in a variety of reduction activities, including core reduction, initial tool production, and some maintenance activities. The results also indicated that most of the activities were likely focused around initial tool production. The presence of the core further supports that at least some core reduction had been conducted on-site.

The small sample size of the flake debris assemblage prevents a detailed description of the various activities conducted by the former prehistoric inhabitants of the site. The assemblage clearly indicates that Brassfield chert was the preferred raw material of choice by the site inhabitants. The small sized assemblage indicates that the occupation was ephemeral, or of a specialized nature. The single piece of thermal shatter indicates that thermal features were present on-site. The lack of additional thermally altered (or damaged) artifacts, including FCR, indicates that these activities did not likely play a substantial role at

the site. The lack of temporally sensitive artifacts precludes an accurate determination of the temporal and/or cultural affiliation of the occupations.

Features

No cultural features were observed during the current investigations of Site 15Lw218. No FCR, charcoal, or burned soil was observed at the site that would indicate the presence of prehistoric features within the site boundaries.

Summary and National Register Evaluation

Site 15Lw218 was a prehistoric open habitation site of indeterminate age, consisting solely of nondiagnostic prehistoric lithic artifacts. The artifact assemblage was restricted to the upper portions of the solum within the plow zone horizon. No evidence of intact features, middens, or other cultural deposits were identified during the investigations. The site appears to have limited research value due to the sparse, nondiagnostic artifact assemblage.

It is unlikely that the portion of Site 15Lw218 within the current project area would produce information beyond that recorded during the survey. As such, the portion of Site 15Lw218 within the current project area is not considered to have the potential to provide information about local or regional history, and, therefore, is recommended not eligible for listing in the NRHP (Criterion D). Therefore, no further work is recommended for the portion of Site 15Lw218 within the current project area.

As previously mentioned, the site may continue to the east beyond KY 57. The area east of KY 57 has not been assessed during the current investigations. If the project boundary changes to include this eastern area, then further work will be required to determine the extent and archaeological integrity of the site in that location.

Project Impacts

This site is situated within the proposed ROW immediately west of KY 57 and north of the existing bridge. The site is located in the southern portion of Parcel 4. Additional archaeological work would not likely produce significant information beyond what has been collected. As noted above, the portion of the site within the project area is recommended as not eligible for listing in the NRHP and no further work will be needed for the investigated portion of the site. For this reason, the investigated portion of the site will not be impacted.

15F1146

Elevation: 260 m (853 ft) AMSL

Component(s): Indeterminate prehistoric

Site type(s): Prehistoric open habitation without mounds

Size: 635 sq m (6,835 sq ft)

Distance to nearest water: 230 m (755 ft)

Direction to nearest water: Southeast (North Fork of the Licking River)

Type and extent of previous disturbance: erosion and agriculture, extent unknown

Topography: Dissected uplands: ridgespur

Vegetation: Various pasture grass, manicured grass

Ground surface visibility: Poor due to various grasses (less than 5 percent)

Aspect: Less than 5 percent; east

Recommended NRHP status: Not eligible

Site Description

Site 15F1146 consisted of a triangular-shaped subsurface scatter of prehistoric artifacts. The site was situated along a ridgespur overlooking the North Fork of the Licking River in northern Fleming County, Kentucky (see Figures 1.2 and 1.3). The site was located approximately 30 m (98 ft) southeast of the intersection of Perkins lane and KY 57. Within the project area, the site was located in the south portion of Parcel 4 within an eastern trending cutout. The site was situated at an elevation of approximately 260 m (853 ft) AMSL.

Disturbances to the site included a variety of activities. These include the construction of a gravel driveway and the installation of the wooden fence (Figure 6.4). Although situated outside of the currently defined site boundary, additional disturbances may have included the construction of the corn crib and the concrete pad that are located along the southern edge of the driveway. Given the ridgespur location of the site, erosion did not likely play a significant role at the site.

The site was initially identified during shovel testing within the bump out. The shovel testing deviated from a 20 m grid given the small size of the bump out and the location of the driveway and other impenetrable features. The site boundaries were established by negative shovel tests to the south, by KY 57 to the west, and the project boundaries to the north and east. As the landform continues in those directions, it is likely that the site continues in those directions. Within the project area, the site measured approximately 29 m (95 ft) north to south and approximately 36 m (118 ft) west to east. The site area, within the project boundary, was estimated to be approximately 635 sq m (6,835 sq ft).



Figure 6.4. Overview of Site 15FI146 showing vegetation and the northern fenceline. Photo facing west.

Ground surface visibility was zero due to the presence of the pasture and manicured grassy areas. The portion of the site located along either side of the gravel driveway inside the fence was covered in manicured grass; while those areas to the north and south of the fence line was situated in a pasture. The gravel driveway also obscured portions of the landform. No artifacts were noted on the ground surface within the cutout.

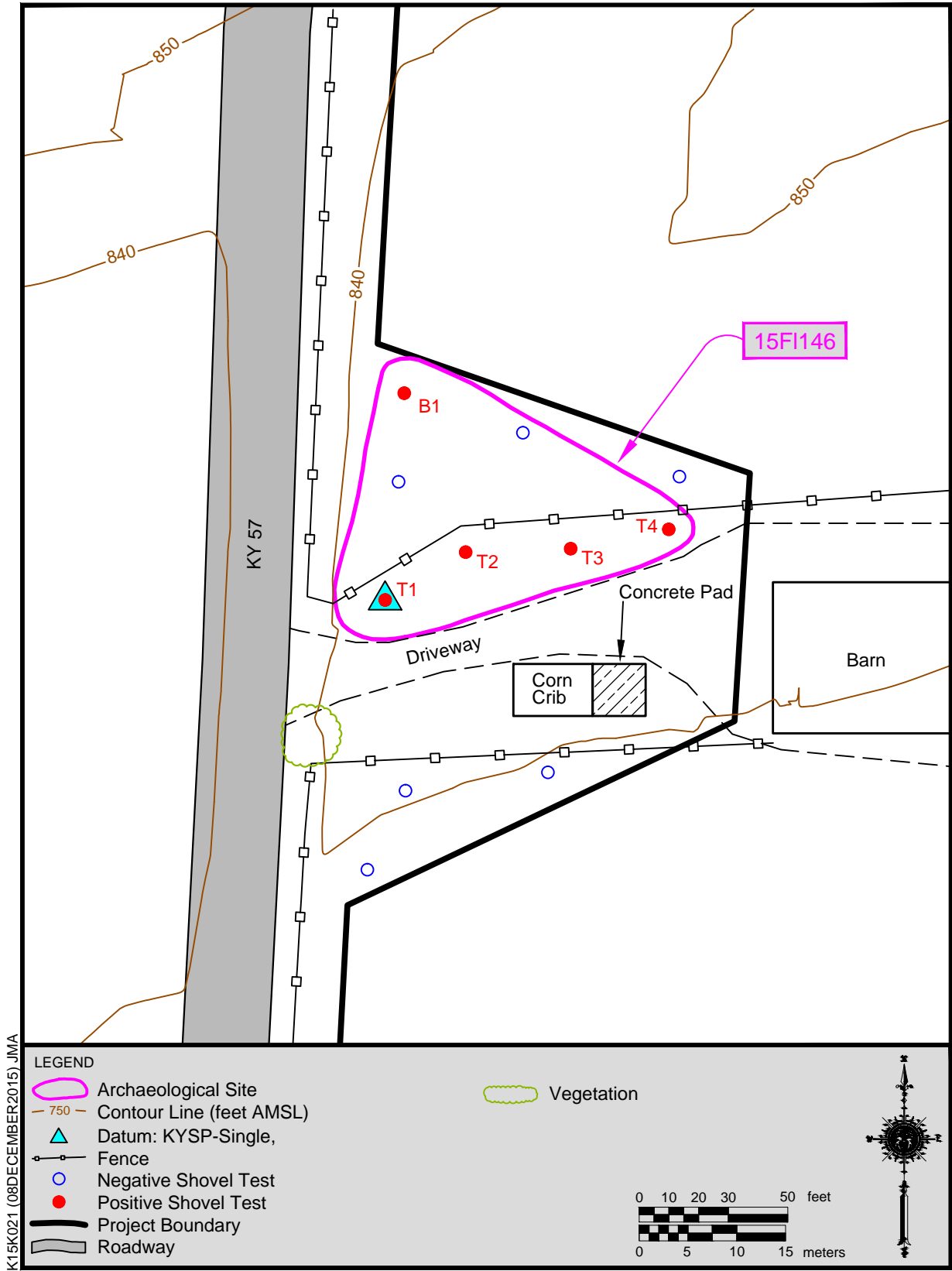
Investigation Methods

Shovel testing was conducted along portions of the landform within the cutout that were not covered in impenetrable surfaces (see Figures 6.4 and 6.5). A total of 12 screened shovel tests were hand excavated within and adjacent to the site. Of the 12 shovel tests, 4 (33.3 percent) recovered cultural materials. All of the artifacts were recovered from the upper portion of the solum. No artifacts were identified in the subsoil deposits at the site. All sediment from each of the shovel tests was visually inspected for cultural materials and screened through .25 inch hardware mesh.

Data pertaining to the site location was recorded and marked on appropriate maps. A site datum was established and its UTM coordinates were recorded using a MobileMapper 6 handheld GPS unit. A site sketch map was drawn, showing the placement of the shovel test positions in relation to topographic positions and the project area boundary. The site boundaries were established by negative shovel tests to the south, by KY 57 to the west, and the project boundaries to the north and east. It is likely that site extends to the north and east along the landform outside of the currently delineated project area.

Depositional Context

The site is located on topography that has been mapped as belonging to the Beasley silt loam (2 to 6 percent slopes) (Jacobs 1993; Soil Survey Staff 2015). Shovel testing at the site revealed fairly consistent two horizon soil profiles (Figure 6.6).



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Figure 6.5. Schematic plan map of Site 15FI146.

A typical shovel test consisted of a dark yellowish brown (10YR 3/4) clay loam possessing moderate to strong angular blocky structure plow zone. This uppermost horizon contained many fine grass roots in the upper 8 cm of the sediments. The lower boundary of the plow zone ranged between 24 and 32 cm bgs and was classified as clear and smooth. The subsoil generally consisted of a strong brown (7.5YR 4/6) clay loam possessing strong moderate angular blocky structure. Shovel tests terminated at depths between 34 and 42 cm bgs. Artifacts were confined to the plow zone with none being recovered from the subsoil. No evidence of intact, subsurface cultural features, midden, or other cultural deposits were identified during the current investigations.

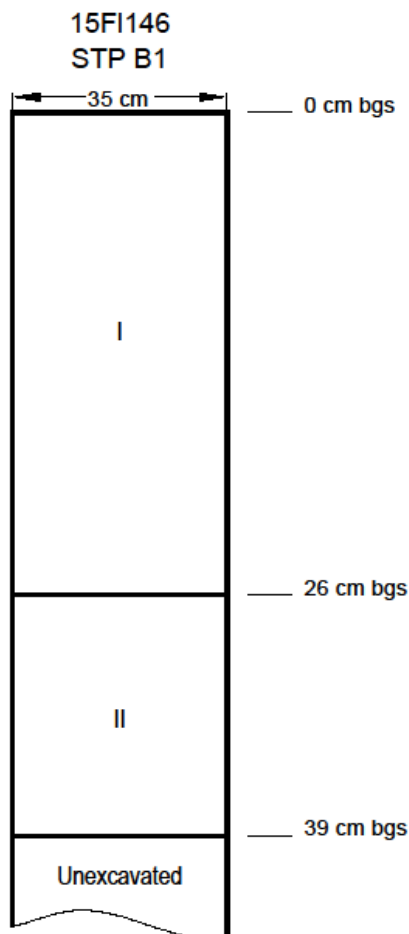


Figure 6.6. Representative soil profile from Site 15FI146 STP B1 (0-39 cm bgs).

Artifact Assemblage

The current investigations recovered a sparse artifact assemblage consisting solely of nondiagnostic flake debris (Table 6.2). As previously discussed, this assemblage was only recovered from the upper portion of the solum in the agriculturally disturbed contexts at depths ranging between 15 and 32 cm bgs. None of the artifacts were recovered from intact contexts.

The assemblage consisted of 16 nondiagnostic flakes weighing approximately 11.1 g and included 12 flakes larger than .25 inch (10.1 g) and 3 flakes smaller than .25 inch (.3 g). The assemblage also included 1 piece of thermal shatter weighing .7 g. No cores or modified implements were recovered.

All of the artifacts were recovered from shovel tests north of the gravel driveway leading to the barn. Based on the spacing the positive shovel tests, it is likely that the site extends beyond the project boundaries to the north.

All of the flakes larger than .25 inch were manufactured from the locally available Brassfield chert. No additional materials were identified in the assemblage.

Little can be stated concerning the technological composition of the flake debris assemblage due to the small sample size. Suffice it to say, the assemblage was likely the result of multiple reduction activities, given the presence of flakes assigned to multiple reduction stages.

The lithic assemblage was likely the result of short-terms or specialized occupations. The presence of a single piece of thermal shatter indicates that various thermal features, such as hearths, were present at the site. The small number of thermally altered (or damaged) materials suggests that these activities were not a primary focus of the occupations. The inhabitants focused on the procurement and utilization of a single local resource for various lithic activities that likely involved core reduction and tool manufacture. Since no temporally sensitive, or otherwise diagnostic, artifacts were recovered, little can be said of the temporal and/or cultural affiliation of the occupations.

Table 6.2. Summary of Artifacts Recovered from Site 15F1146.

Unit#	Zone	Depth	Count	Wt (g)	Item Type	Raw Material	Comment
STP B1	I	0-15 cm bgs	2	1	Flakes	Brassfield	Late
STP T1	I	0-16 cm bgs	1	1.9	Flakes	Brassfield	Early
STP T1	I	0-16 cm bgs	1	0.3	Flakes	Brassfield	Middle
STP T2	I	0-20 cm bgs	1	0.3	Flakes	Brassfield	Late
STP T3	I	0-32 cm bgs	2	1.7	Flakes	Brassfield	Blocky
STP T3	I	0-32 cm bgs	2	2.5	Flakes	Brassfield	Early
STP T3	I	0-32 cm bgs	2	2	Flakes	Brassfield	Middle
STP T4	I	0-20 cm bgs	3	0.3	Flakes	<25 inch	--
STP T4	I	0-20 cm bgs	1	0.4	Flakes	Brassfield	Early
STP T4	I	0-20 cm bgs	1	0.7	Flakes	Thermal Shatter	--

Features

No cultural features were observed during the current investigations of Site 15F1146. No FCR, charcoal, or burned soil was observed at the site that would indicate the presence of prehistoric features within the site boundaries.

Summary and National Register Evaluation

Site 15F1146 was a prehistoric open habitation of indeterminate age consisting solely of nondiagnostic flake debris. The artifact assemblage was restricted to the upper portion of the solum, with artifacts being confined to the plow zone. No evidence of intact subsurface, features, midden, or other cultural deposits were identified during the current archaeological investigations. The site appears to have limited research value due to the sparse, nondiagnostic artifact assemblage.

It is unlikely that the portion of Site 15F1146 within the current project area would produce information beyond that recorded during the survey. As such, the portion of Site 15F1146 within the project area is not considered to have the potential to provide information about local or regional history, and, therefore, is recommended not eligible for listing in the NRHP (Criterion D). Therefore, no further work is recommended for the portion of Site 15F1146 within the current project area.

As previously mentioned, the site likely continues outside of the current project boundary to the north and east. The area outside of the project footprint has not been assessed. If the project boundary changes to include this latter area, then further work will be required to

determine the extent and archaeological integrity of the site in that location.

Project Impacts

This site is located within the proposed ROW within a cutout along the eastern side of KY 57. The bump out is located in the southern portion of Parcel 4 and is situated immediately west of an existing barn. Additional archaeological work would not likely produce significant information beyond what has been collected. As noted above, the portion of the site within the project area is recommended as not eligible for listing in the NRHP and no further work will be needed for the investigated portion of the site.

15Lw219

Elevation: 256 m (840 ft) AMSL

Component(s): Indeterminate prehistoric, mid-nineteenth century

Site type(s): Historic cemetery; open habitation without mounds

Size: 820 sq m (8,826 sq ft)

Distance to nearest water: 160 m (525 ft)

Direction to nearest water: Southeast (North Fork of the Licking River)

Type and extent of previous disturbance: erosion and agriculture, extent unknown

Topography: Dissected uplands: ridgespur

Vegetation: Various pasture grass

Ground surface visibility: Poor due to various grasses (less than 5 percent)

Aspect: Less than 5 percent; southeast

Recommended NRHP status: Historic cemetery—NRHP status not assessed; prehistoric component—not eligible

Site Description

Site 15Lw219 was a multicomponent site consisting of a historic cemetery dating to the middle to late nineteenth century that contained four nondiagnostic prehistoric flakes recovered from a single shovel test. The site is situated on a southeastern trending ridgespur overlooking the North Fork of the Licking River in southern Lewis County, Kentucky (see Figures 1.2 and 1.3). The site was located approximately 800 m (2,625 ft) north-northeast of the intersection of Perkins Lane and KY 57. Within the project area, the site is situated along the western edge of KY 57 in Parcel 4 at an elevation of approximately 256 m (840 ft) AMSL.

Disturbances to the site included historic and modern agricultural activities. No evidence of recent agricultural activities was noted; however, the landform appears to be used for hay or forage crop harvesting as well as cattle grazing. At the time of the current survey, the field where the site is located was covered by various pasture grasses (Figure 6.7). Due to its position along the upper portion of the

ridgespur, erosion of the upper sediments would also be a factor in site preservation.

The site was initially identified by the presence of a marked cemetery on a 1934 KYTC plan map of the proposed, realignment of KY 57. The cemetery was marked on the map as an open-ended (to the northwest) parcel situated along the western edge of the proposed KY 57 road bed.

No grave markers were noted at the cemetery location during the survey. Additionally, there was no surface indication of the presence of the former cemetery, such as depressions or particular varieties of vegetation (such as yucca) that might be associated with a cemetery. Several grave markers, however, were known from an adjacent property on the eastern side of the road, approximately 75 m (246 ft) to the south-southeast of the cemetery location. The grave markers were located in the northern portion of Parcel 7 along the corner of an existing wooden fence line. See Appendix C for documentation of located grave markers.

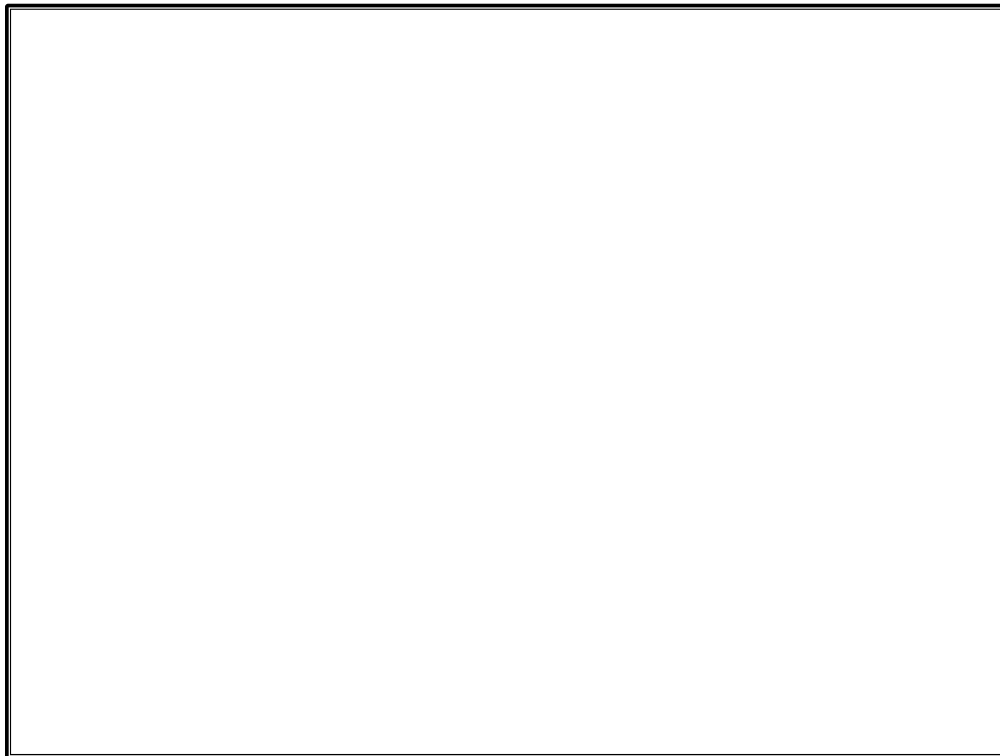


Figure 6.7. Overview of Site 15Lw219 showing landscape and vegetation. Photo facing south.

While there is no definitive proof that the grave markers are directly associated with the cemetery, it is presumed that the markers are related to the cemetery given their close proximity. An adjacent landowner stated that he was told several years ago that the headstones belonged to the unmarked cemetery located across the street. At least seven grave markers (or portions of grave markers) were present on the ground surface; several more may be present, having been partially or completely buried.

Of the seven markers, only five exhibited any written information. The remaining markers were either partially buried, or were upside down and partially buried, preventing the recording of information. Names identified on the headstones consisted of Mary Power (d. 1852), Joseph Power (d. 1837), Charles Power (no death date present on fragment), Nancy Arnold (d. 1890), and Unknown name (not present on fragment) (d. 1854).

The site area was estimated to be approximately 820 sq m (8,826 sq ft) based on the spatial extent of the cemetery within the project area as depicted on the 1934 highway map.

Ground surface visibility was zero due to the presence of the pasture grasses. The gravel driveway also obscured portions of the landform. No evidence of the formed graves was noted on the ground surface.

Investigation Methods

Prior to the commencement of the archaeological survey, a geophysical survey of the landform was undertaken. Both the geophysical and archaeological survey methods are described in this section.

Results of The Geophysical Survey

Russell S. Quick, PhD, RPA

This section presents the results from the geophysical survey. A number of subsurface trench (i.e., possible grave) features were identified during the geophysical survey. There were also some interesting circular non-grave features in the magnetic data that were probably geologic in origin. The figures on the following pages present some of these anomalies in various plan and profile views (Figures 6.8–6.13). Grid corner

coordinates are approximate; however, the actual corners of the magnetic (larger) survey area were marked with gutter spikes so that they can be relocated in the future.

Magnetics

Survey equipment: Duplexed Geoscan Research FM-256 gradiometers
Maximum Size: 50 m (164 ft) east–west, 60 m (197 ft) north–south
Surveyed Area: .30 ha (.75 acres)
Transect spacing: .5 m (1.6 ft)
Transect orientation: north–south
Survey origin: southwest
Southwest: N 4.0
Northeast: N 4.6
Visible disturbance: utility pole, guy wires, fence on east edge of survey area
Topography: rolling upland
Vegetation: pasture grass and weeds
Aspect: on a ridgetop (slightly northwest, slightly southeast)

The project area was approximately 50 m east–west by 60 m north–south. This area was divided into two 30-x-50 m survey blocks (see Figure G1). The first transect of each magnetic block began in the southwest corner and proceeded south–north. Transects were then conducted in a meandering fashion until the northeast corner of each survey block was reached. Transects were spaced at .5 m and 8 readings of nT were recorded per linear m. This resulted in the recording of 24 readings per sq m.

The only major source of disturbance visible in the project area was a utility pole and its attendant metal guy wires. These items “blanked out” a roughly circular area within approximately 7 m (22 ft) of them.

The magnetic data showed that there were several probable trench (i.e., grave) anomalies within the survey area (Figures 6.8 and 6.9). The majority of these were located within the southern portion of the survey area. They are, therefore, located within the mapped location of the cemetery on the 1934 highway plan. The magnetic data suggested that the minimum count of “probable” graves is 1. The maximum count of “probable” graves is approximately 19.

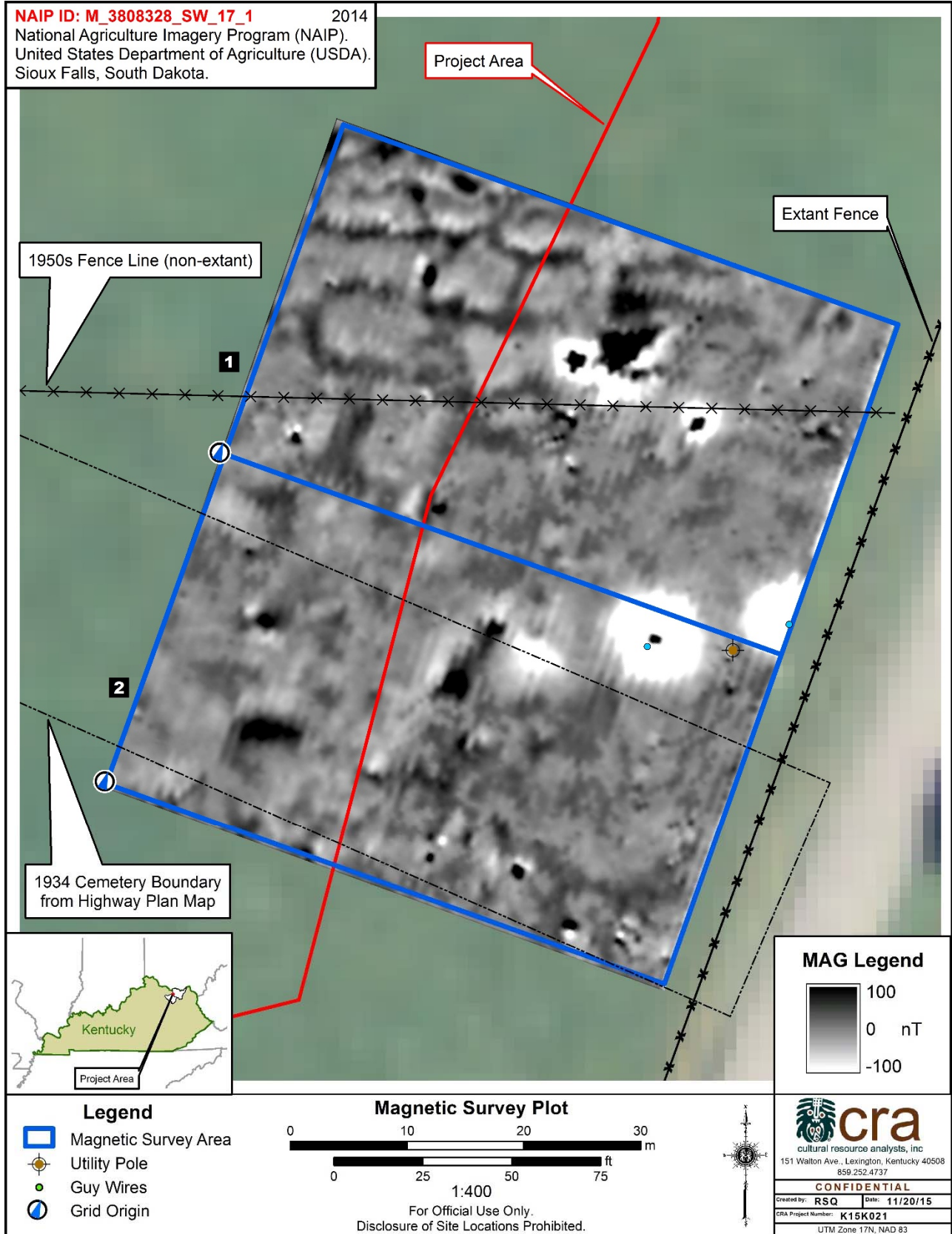


Figure 6.8. Overview of survey area showing magnetic survey results.

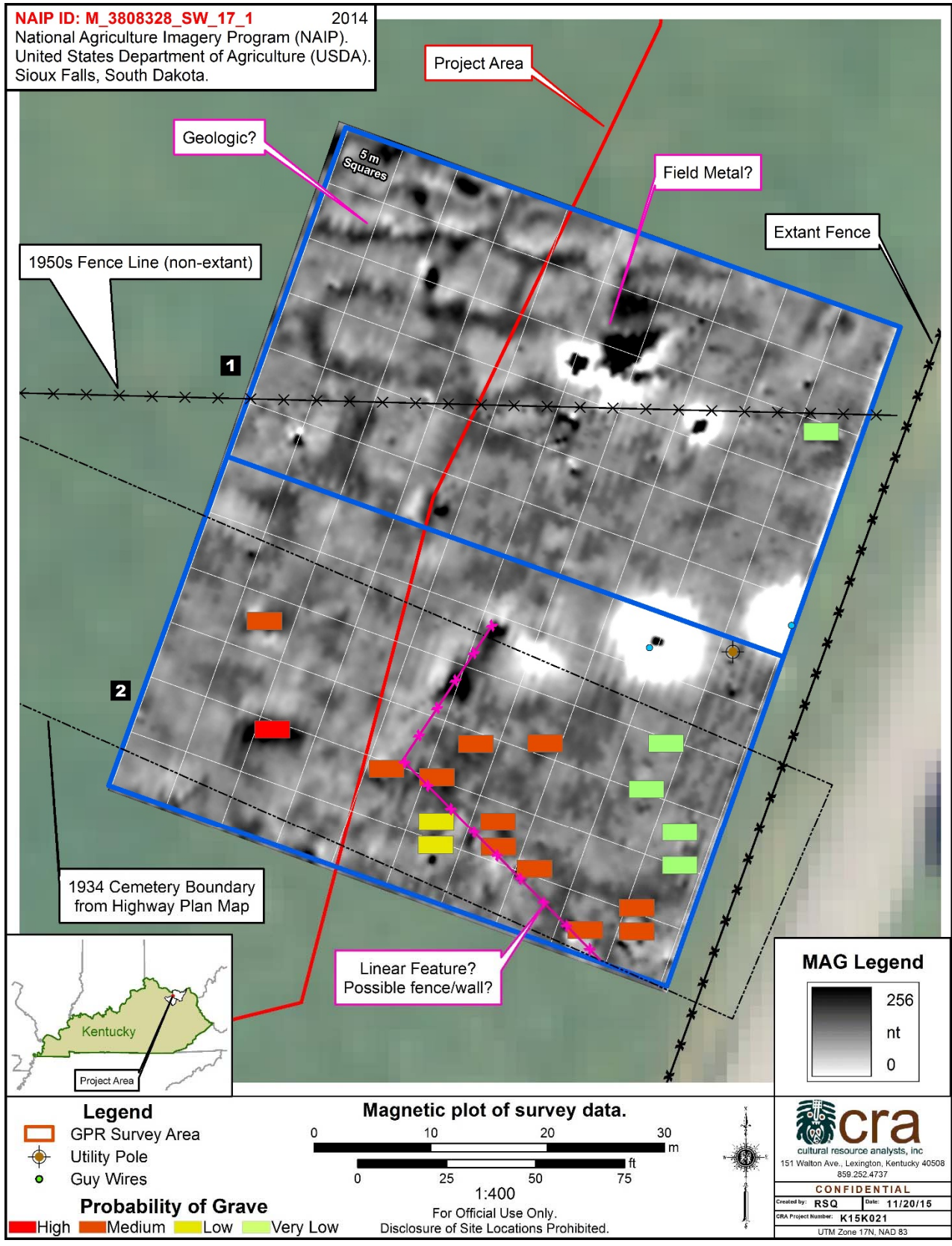


Figure 6.9. Interpretation of magnetic survey.

GPR

Survey equipment: GSSI SIR-3000 with 400 MHz antenna and survey cart

Maximum Size: 42 m (138 ft) east–west, 60 m (197 ft) north–south

Surveyed Area: .25 ha (.62 acres)

Transect spacing: .5 m (1.6 ft)

Transect orientation: north–south

Survey origin: northeast

Southwest: N 4.8

Northeast: N 4.6

The GPR survey area encompassed .25 ha. The survey area was approximately 42 m east–west by 60 m north–south, and was broken into two 30-x-42 m grids (see Figure 4.1). The first transect of each GPR block began in the northeast corner and proceeded north–south. Transects were then conducted in a meandering fashion until the southwest corner of each survey block was reached. Transects were spaced at .5 m and 25 radar traces were recorded per linear m. This resulted in the recording of between 75 readings per sq m.

The only major source of above ground disturbance within the project area was the utility pole and its attendant guy wires, which had little effect on the GPR. As noted in the environmental chapter of this report, however, there appear to be actual physical or structural irregularities that make the soils less than optimal for GPR survey. Note that in Profile A (Figure 6.10, top), the strata recorded by the GPR are somewhat blocky and choppy; whereas, the strata in Profiles B and C (Figure 6.10, middle and bottom) are fairly straight and sinuous. As noted in the Methods section, these strata are not necessarily directly correlated to the local geologic horizons, but are instead changes in the electrical properties of the soil (Heimmer 1992:42). The variable electrochemical properties of the soils may explain why the NRCS rated the utility of GPR in the survey area as “very low” (Soil Survey Staff 2006). The soils certainly seem to have adversely affected the GPR survey.

The GPR data were processed to produce time-slices at various depths within the ground (see Appendix D). As with the magnetic survey, the GPR data indicated that there were targets

consistent with trenches (i.e., graves) within the survey area (Figures 6.11 and 6.12); however, the GPR was apparently less successful than the magnetometer, probably due to the soil irregularities discussed above.

The majority of the anomalies localized were located within the southeastern portion of the survey area. They are, therefore, located within the mapped location of the cemetery on the 1934 highway plan. It is nearly impossible to get a count of graves based on the GPR data—there are far too many anomalies for them all to be graves. The minimum count of “probable” graves is 1. The maximum number of total graves localized by the GPR is approximately 16. Of these, 7 coincide with potential graves observed on the magnetic plots.

Conclusions

In general, both geophysical methods suffered from environmental factors that adversely affected some portion of each survey. Portions of the magnetic survey were blanked out by the magnetic field from two steel guy wires in the east center of the survey area. Field metal (e.g., tractor or fence parts) and the local geology produced interesting, although irrelevant, results in the western half of Grid 1.

As noted above, the GPR suffered from the variable properties of the soils in the area. These affects were not localized to any portion of the survey area but occurred throughout the entire survey, hence the amount of “static” in the results depicted in Figures 6.11 and 6.12.

Both survey methods appear to agree that the southern half of Grid 2, from the eastern edge of the block to around the 42 m (138 ft) mark, is the area most likely to contain graves (Figure 6.13, oval). This is consistent with the location of the cemetery depicted on the 1934 highway plan. The area around grid coordinates 25E 10N, as measured from the southwest corner of the magnetic survey area shows the highest concentration of grave-like features (Figure 6.13, cross). The most obvious grave-like anomaly, the rectangular feature at grid coordinates 12E 9N, seems large for a grave at 1.5-x-4.0 m (4.9-x-13.1 ft), but the unusual size may be an artifact of the way magnetic data are

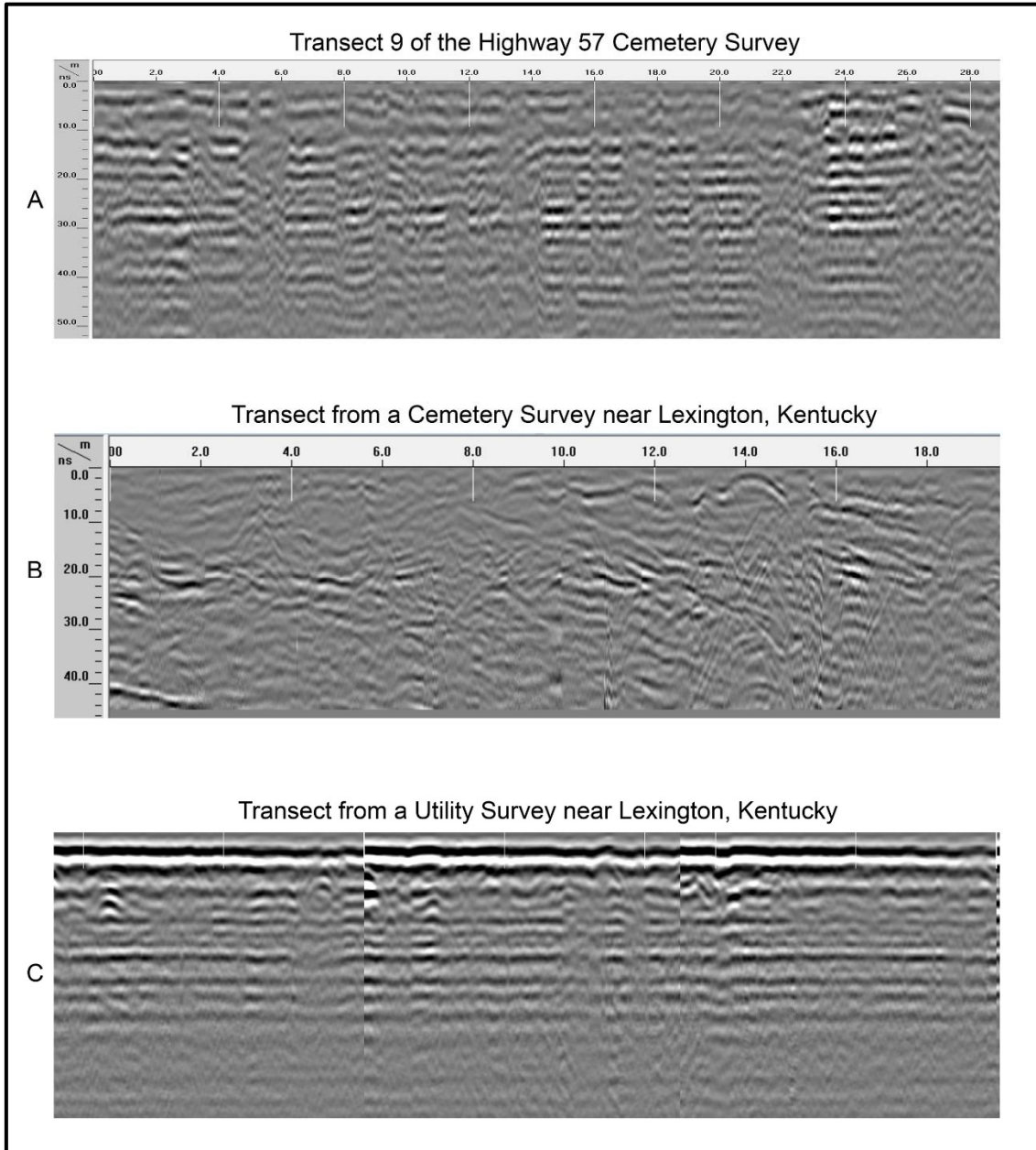


Figure 6.10. GPR profiles showing irregularity of soils.

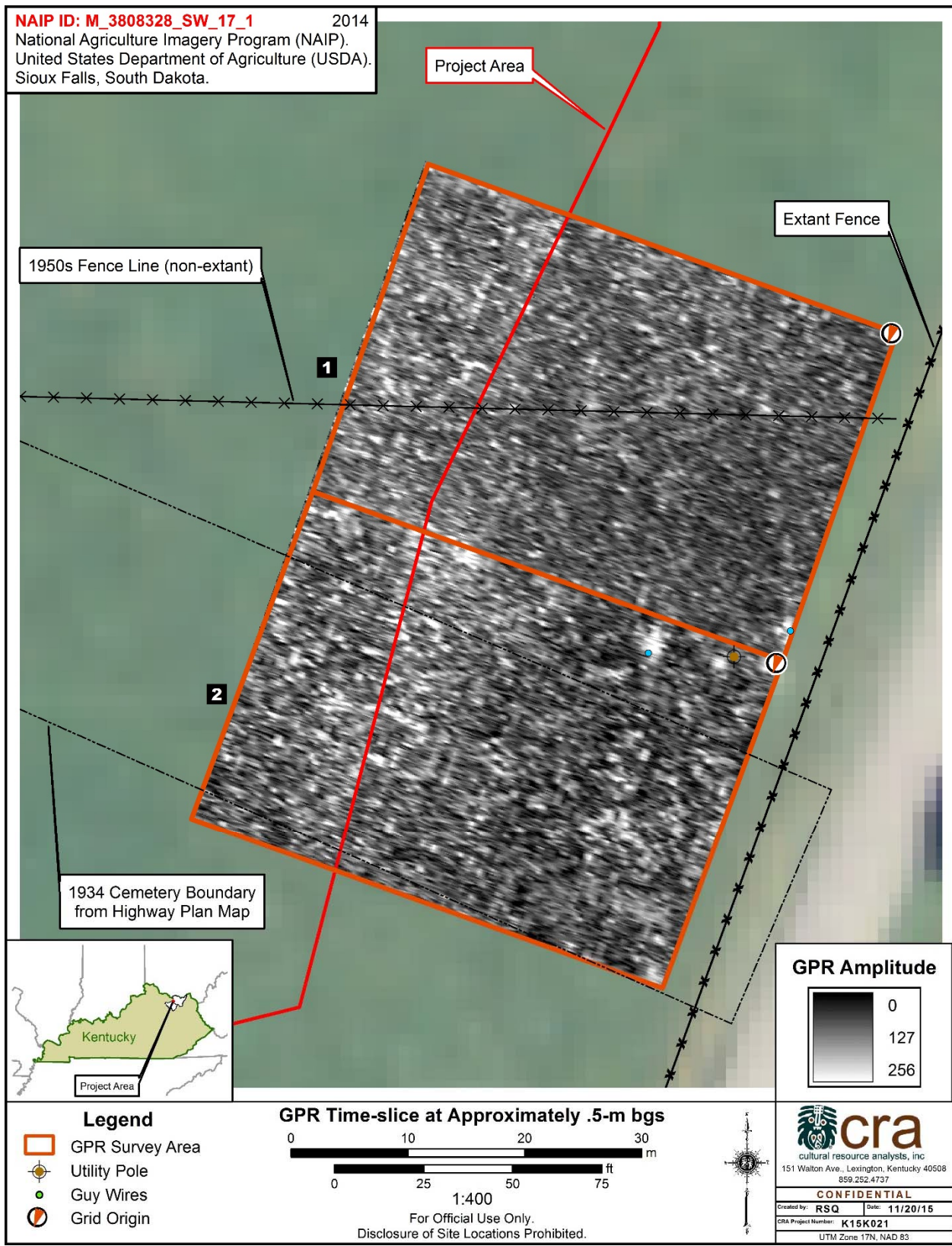


Figure 6.11. Overview of survey area showing time-slice of GPR survey results.

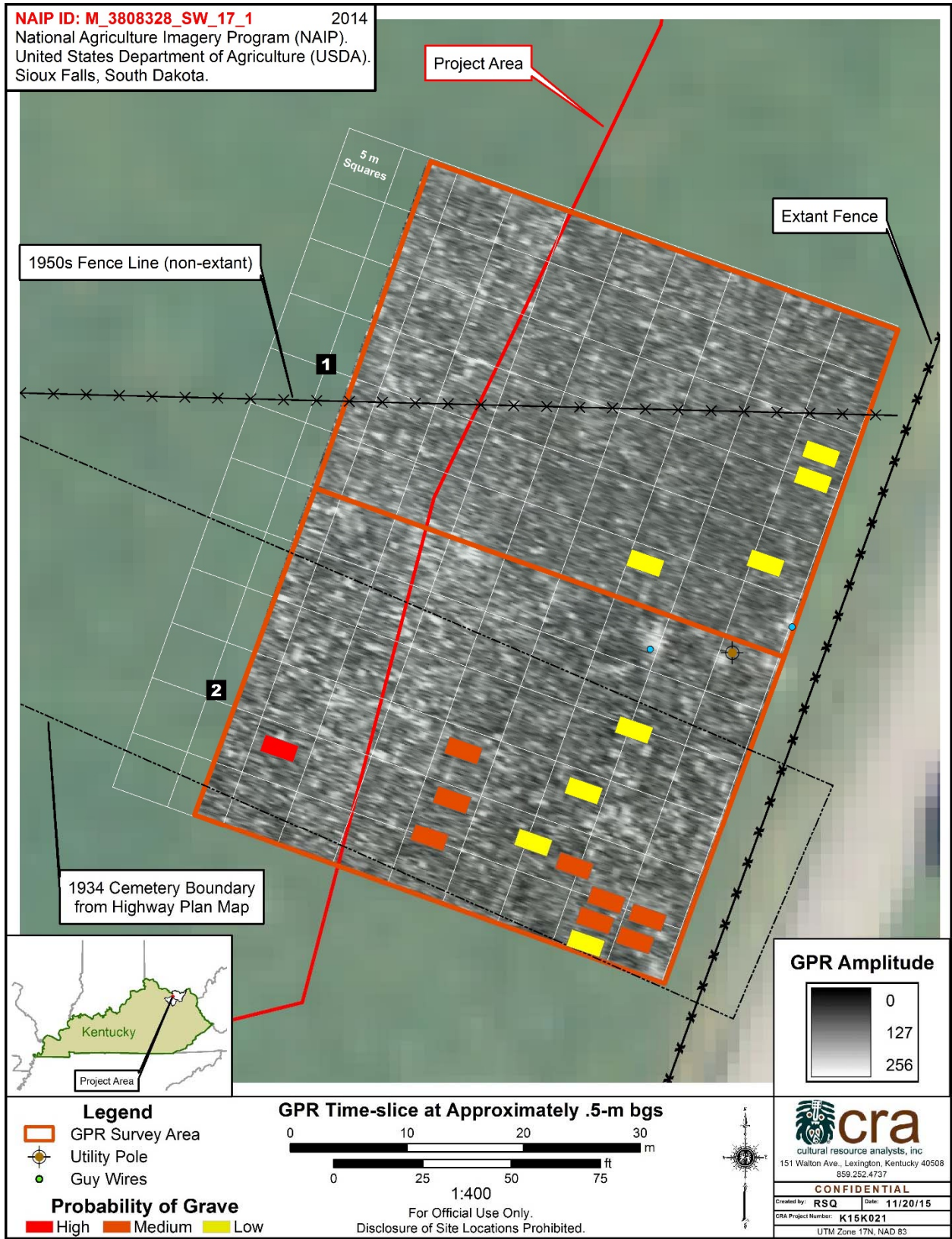


Figure 6.12. Interpretation of GPR survey.

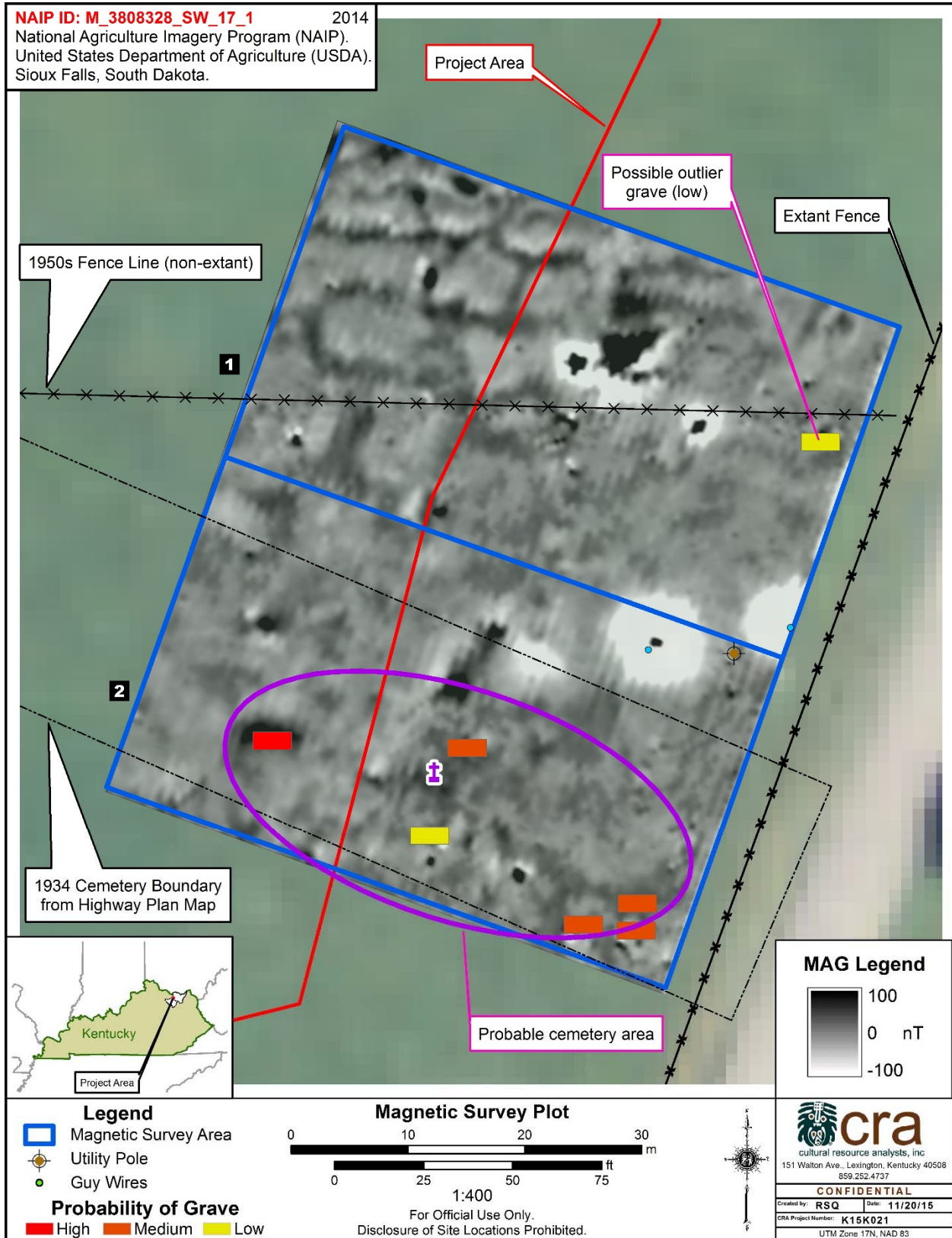


Figure 6.13. Probable cemetery location based on geophysical surveys.

recorded in the field and then displayed by the software rather than its true size. The anomaly is oriented almost perfectly east–west on its long axis, as would be expected of an historic, Euro-American Christian burial consistent with the grave markers found close to the site. Unfortunately, once a cemetery has been abandoned and put into agricultural use, it is impossible to tell a farmer’s random trench-like feature from an actual burial. Ground truthing a few of the anomalies may be the only way to determine whether or not they are graves.

Results of the Archaeological Survey

The archaeological survey at the site consisted of shovel testing of the landform along transects parallel to the fence line that bordered the western edge of the KY 57 ROW (Figure 6.14). A total of 9 screened shovel tests were hand excavated within and adjacent to the site. Of the 9, only one (11.1 percent) recovered cultural materials. All four of the flakes were recovered from the upper portion of the solum from a single shovel test near the summit of the ridgespur. No artifacts were identified in the subsoil deposits at the site. All sediment from each of the shovel tests was visually inspected for cultural materials and screened through .25 inch hardware mesh.

Data pertaining to the site location and various topographic and modern cultural features (i.e., such as fence lines), was recorded and marked on appropriate maps. A site datum was established and its UTM coordinates were recorded using a MobileMapper 6 handheld GPS unit. A site sketch map was drawn, showing the placement of the geophysical survey along with the shovel tests in relation to the topographic positions and the project area boundary. The site boundary was established by the georeferenced location of the cemetery boundary on the 1934 highway plan map.

Depositional Context

The site is located on topography that has been mapped as belonging to the Beasley silt loam (2 to 6 percent slopes) (Jacobs 1993; Soil Survey Staff 2015). Shovel testing at the site revealed fairly consistent two horizon soil profiles (Figure 6.15).

A typical shovel test at the site revealed a two horizon soil profile. The uppermost horizon consisted of a dark yellowish brown (10YR 4/4) silty clay loam possessing weak moderate angular blocky structure. The lower boundary of the topsoil was identified at approximately 31 cm (12 in) bgs and was classified as clear and smooth. The subsoil consisted of a yellowish red (5YR 4/6) silty clay loam possessing moderate medium subangular blocky structure. Typical shovel tests terminated at depths between 35 and 41 cm (14 and 16 in) bgs. The only artifacts recovered were collected from STP T1 and were confined to the topsoil; none were recovered from the subsoil. No evidence of intact, subsurface cultural features, midden, or other cultural deposits were identified during the current investigations. No archaeological evidence of the grave shafts were noted during the current investigations.

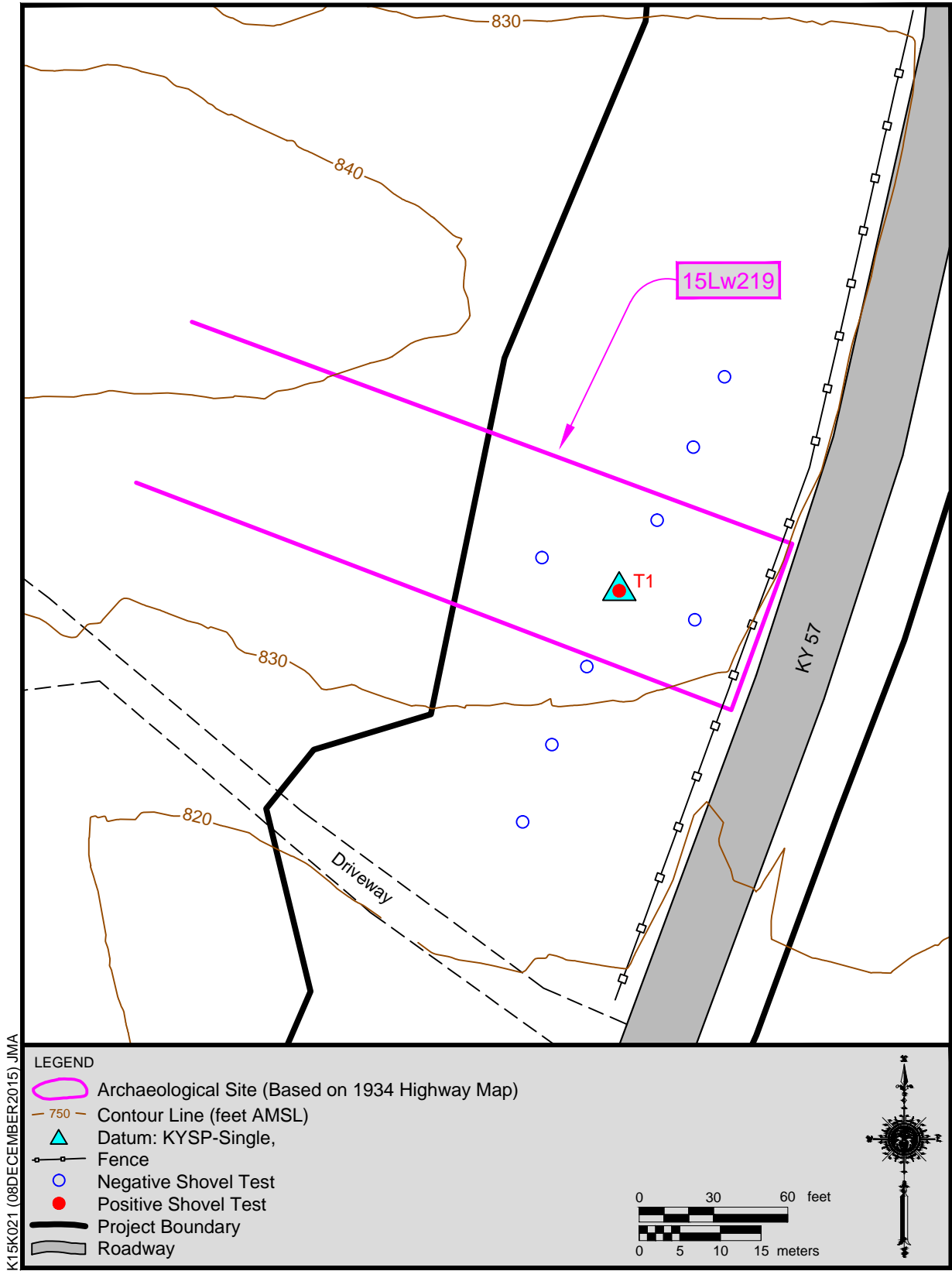
Artifact Assemblage

The artifact assemblage recovered at the site consisted solely of nondiagnostic prehistoric lithic artifacts. A total of 4 flakes (1.8 g) were collected at the site during the current investigations. All of the flakes were recovered from STP T1 from the upper portion of the solum within 25 cm (10 in) bgs. Two of the flakes were smaller than .25 inch (.2 g); while the other 2 flakes were manufactured from Brassfield chert (1.6 g). Both of the flakes were late stage examples.

Little can be said of the current lithic assemblage. None of the artifacts were considered temporally sensitive, thus the flakes cannot be assigned to a temporal and/or cultural span. Beyond the fact that at least a single lithic reduction episode involving the use of Brassfield chert had been conducted, little else can be inferred of these four flakes.

Features

The archaeological survey of the site did not identify the presence of features. No FCR, charcoal, or burned soil was observed at the site that would indicate the presence of prehistoric features within the site boundaries.



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Figure 6.14 Schematic plan map of Site 15Lw219.

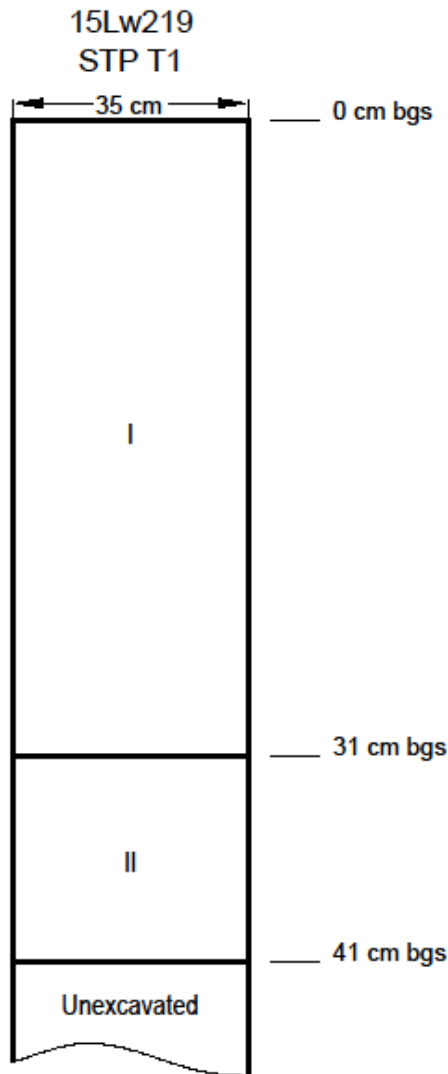


Figure 6.15. Representative soil profile from Site 15Lw219 STP T1 (0-41 cm bgs).

The geophysical survey of the site, however, identified several possible subsurface features consistent with trenches (i.e., possible graves). As the survey results noted, at least 1 probable grave was identified. It appears as a strong response on both the radar and magnetic surveys. This anomaly lies just west (outside) of the proposed right-of-way.

The magnetometry survey identified a maximum number of 19 graves; while the GPR data suggested a total of 16 possible graves. Seven of the GPR anomalies correspond to the 19 potential graves observed during the magnetometry survey. Most of these anomalies

lie within the boundary of the cemetery as shown on the 1934 map (see Figure 3.1).

Archival Data

James Heideman

The earliest deed available with regard to the ownership of the property containing Site 15Lw219 dates to June 13, 1882 (Table 6.3). At that time, a more or less 19.4 ha (48.0 acres) property was sold under the order of Master Commissioner J.C. Cole to Emma H. Arnold and her heirs for the consideration of the premises outlined in the deed record (Lewis County Clerk's Office [LCCO] Deed Book [DB] 1:455, Vanceburg, Kentucky). The sale of the property was first brought to the Lewis County Circuit Court's 1881 June term in the action of Thomas C. Wilson (Administrator) for Eleanor Arnold (deceased) against Felix J.W. Arnold, Sarah Arnold, Charles P. Arnold, Lucy F. Arnold, Mary B. Arnold, Nannie Arnold, Nancy Powers, Sarah Truitt, Margaret Truitt Pertis, J.W. Arnold, Joseph William H. Arnold, Harry C. Arnold, George C. Arnold, and Rebecca Arnold. This resulted in J.C. Cole selling the property to J. J. Walker for \$481.00 on September 19, 1881, with the direction that once the sale was approved J.J. Walker was to sell the property to Emma H. Arnold (LCCO DB 1:455).

Eleanor Arnold was born circa 1800 and the first available census data for her is from 1850 at which time she was living in the household of her presumed 86 year old mother, Nancy Arnold, in District 2 of Lewis County (USBC 1850). In 1850, the household of Nancy Arnold also included her presumed daughters, Margaret Arnold and Nancy Power, as well as Nancy's supposed children, James O., Mary C., Margaret A., and Thomas (USBC 1850). By 1860, Nelly (Eleanor) Arnold was the head of a household that included her presumed sister, Margaret, as well as Nancy A. Power and Sarah Power, who were themselves sisters (USBC 1860). Nancy A. and Sarah Power were the children of Charles and Mary Power, both of whom had died by 1860. It is unknown what the children's relation was to Eleanor Arnold and/or Margaret Arnold. By 1870, Eleanor Arnold was living in the household of Peter J. Arnold and his wife, Sarah

Table 6.3. Ownership History for Site 15Lw219.

Date	Owner	Acreage	Amount
1888 – Present	Norma White	132.5 +	\$1.00 and other good and valuable considerations
1962 – 1988	Harry D. and Norma White; Willard and Lou Anna White	132.5 +	\$1.00 and other good and valuable considerations
1929 – 1962	Arthur E. and Lorena Arnold	48 +/-	\$1.00 and the exchange of real estate and other valuable considerations
1929	Arthur E. Arnold, Paul Arnold, Pearl Arnold, Katharyn Arnold, Myrtle (Arnold) Savage, and Alma (Arnold) Cox	48 +/-	Inheritance
1920 – 1929	George C. Arnold	48 +/-	Inheritance
1882 – 1920	Emma H. Arnold	48	Premises outlined in deed record
1881 – 1882	J.J. Walker	48	\$481
c. 1860 – 1881	Eleanor Arnold	Unknown	Unknown
?	Nancy Arnold and husband	Unknown	Unknown

(USBC 1870). Included in their household at that time were their eight children, Charles P., Henry, Lucy A., George C., Nancy P., William, Peter, and Mary, as well as the 67 year old Margaret Arnold (USBC 1870). Eleanor died around the age of 80 years old on an unknown date at some time prior to June 1881. This supposition is based on information provided in deed records.

Emma H. Wallingford was born July 3, 1853, to James T. and Eveline Wallingford, presumably in Mason County, Kentucky (Ancestry.com 2007). By 1860, she was living in her parent's household in Mason County along with her five siblings, Fannie, Henry, Anna E., Oscar, and Ida (USBC 1860). The only change to James T. and Eveline Wallingford's household by 1870 was the addition of three more children, Sarah, Susan, and William (USBC 1870). Emma H. Wallingford married George C. Arnold in 1879, and by 1880 the two were living in Tollesboro, Lewis County (USBC 1880). By 1900, George C. and Emma H. Arnold were still living in Tollesboro, but their household also included their seven children, Myrtle, Pearl, Alma, Arthur, Katharyn, Ira, and Paul (USBC 1900). The family was living in Burtonville, Lewis County, in 1910, and the only change noted to the household was the absence of Myrtle (USBC 1910). By 1920, the household of George C. and Emma H. Arnold included their three children, Pearl, Katharyn, and Paul, as well as Paul's wife, Callie, and their nine month old daughter Kathern C. (USBC 1920). Death records indicate that Emma H. Arnold died October 3, 1920, in Lewis County (Ancestry.com 2007).

Following Emma's death the property in her possession appears to have been passed onto her widowed husband, George C. Arnold. Once George died February 25, 1929, the property was inherited by his surviving children. In April, 1929, the more or less 48 acre property containing Site 15Lw219 was sold to Arthur E. Arnold, George and Emma's son, by the other heirs to the property for \$1.00 and the exchange of real estate and other valuable considerations (LCCO DB 56:249). The other heirs involved in that transaction include: Paul Arnold and his wife, Callie, Pearl Arnold, Katharyn Arnold,

Myrtle (Arnold) Savage and her husband, W.C., and Alma (Arnold) Cox and her husband, Russ.

Census data shows that in 1920, Arthur E. Arnold was living in Flemingsburg, Fleming County, Kentucky, working as a teacher in a household that included his wife, Lorena, and their one year old daughter, Jean D. (USBC 1920). By 1930, Arthur E. Arnold had become the principal of a high school and was living in Newport, Campbell County, Kentucky, with his wife, Lorena, and their daughter, Jean D. (USBC 1930). No census data was located for Arthur E. Arnold beyond 1930,

The next land conveyance involving the property containing Site 15Lw219 occurred on September 4, 1962. At that time, Arthur E. Arnold and his wife, Lorena, sold a property containing five tracts of land totaling more than 53.6 ha (132.5 acres) to Harry D. White and his wife, Norma, and Willard White and his wife, Lou Anna, for \$1.00 and other good and valuable considerations (LCCO DB 98:307). The final land conveyance involving the property occurred December 22, 1988, when Willard and Lou Anna White sold their half interest in the more than 132.5 acre property to Norma White for \$1.00 and other good and valuable considerations (LCCO DB 153:404). It seems that by the time that transaction occurred, Harry D. White had died. No census data was available for the members of the White family mentioned above, but it seems probable that Harry D. White and Willard White were siblings.

Based on the available archival data, the property containing Site 15Lw219 was in the ownership of members of the Arnold family from at least the late nineteenth century until it was sold to Willard and Lou Anna White in 1962. It is likely that Eleanor Arnold's supposed mother, Nancy Arnold was the owner of the property during much of the mid-twentieth century. Though Nancy's husband is unknown, it seems likely that he was the owner of the property from at least the early-to-mid-nineteenth century. Census data suggests that Nancy Arnold died at some time between 1850 and 1860 and that Eleanor owned the property following Nancy's death until her own death

circa 1881. Though the property was owned briefly from 1881–1882 by J. J. Walker, his ownership only seems to be due to court orders as a means to manage the property in the wake of Eleanor’s death.

After J. J. Walker briefly held the property, it was conveyed to Emma H. Arnold in 1882. She went on to own the property until her death in 1920, at which time the property was passed to her husband, George C. Arnold. The property then appears to have been owned by George until his death in 1929. The surviving children of George C. and Emma H. Arnold then inherited the property. Shortly after their father’s death, the surviving heirs were involved in a transaction that resulted in Arthur E. Arnold becoming the owner of the property containing Site 15Lw219 from 1929–1962.

The property is known to contain a historic cemetery in the location of Site 15Lw219 based on a 1934 KYTC map associated with the construction of a new stretch of KY 57. The map depicts a cemetery in the same general vicinity of the site. Although no archaeological evidence for the cemetery was noted on the ground surface in the location of the site, the geophysical survey identified several probable graves at the site location. In addition, several headstones thought to be associated with the cemetery were located on an adjacent property approximately 75 m (246 ft) to the south-southeast of the mapped location of the cemetery. Only five of the grave markers were noted to display written information. The names identified on the grave markers include: Mary Power (d. October 8, 1852), Joseph Power (d. July 5, 1837), Charles Power (no death date available), Nancy Arnold (d. August 30, 1890), and an unknown name (d. June 16, 1854).

Only minimal census data was available for the individuals for which headstones were located. No census data was located for Joseph Power or Nancy Arnold. From their headstones

it can be deduced that Joseph Power was born circa 1799, and Nancy Arnold was born February 15, 1806. It is also known that Nancy Arnold was the wife of Peter Arnold. Census data from 1850 indicates that Mary Power was the wife of Charles Power, and the two were living in District 2 of Lewis County with their children, Nancy A. and Sarah (USBC 1850). Based on the headstone for Mary Power she died October 8, 1852, at the age of 44, and census data suggests that Charles Power had himself died by 1860. As previously mentioned, in 1860, Nancy A. and Sarah Power, the children of Charles and Mary Power, were living in the household of Nelly (Eleanor) Arnold (USBC 1860).

Although the exact relationship between the Arnold and Power families is unknown, census data suggests that at least several members from the families had intermarried. The presence of headstones from members of both families being found in association with each other supports the close relationship between the two families.

Summary and National Register Evaluation

Site 15Lw219, situated along the western side of KY 57, was a multicomponent historic cemetery dating to the middle portion of the nineteenth century. The temporal assignment was made on the dates depicted on several discarded headstones situated along the eastern side of the road approximately 75 m (246 ft) south-southeast of the cemetery. A minor indeterminate prehistoric component was also identified at the site, consisting of four flakes recovered from a single shovel test.

The geophysical survey identified 1 probable grave and as many as 19 possible graves within the survey area. As with all historic cemeteries, an absolute count of interments is made almost impossible by overlapping grave shafts and the potential for subadult graves that may not be excavated to the same sizes and depths of adult interments. These smaller graves are not always detectable through geophysical methods. As noted, the unusual nature of the soils in the survey area, particularly the wavy clay subsoil boundary, may have

masked real anomalies or created false ones. The subsurface features are consistent with graves; however, their integrity and precise nature cannot be determined solely on the basis of the geophysical survey. The anomalies should be ground truthed by monitored mechanical stripping several months prior to the commencement of the proposed project in order to allow time for the grave relocation process.

The minor prehistoric component consisted of four flakes recovered from a single shovel test. All of the flakes were recovered from the upper portion of the solum and were collected from disturbed sediments. The prehistoric portion of the site is considered not eligible for listing in the NRHP and no further work is recommended.

The presence of the cemetery was not identified during the archival research. The available deed research dates back to the 1860s with property owned by Eleanor Arnold. The 1934 KY 57 map, however, identified a cemetery situated along the western edge of the road north of a private driveway and south of a spring and small drainage. Currently, it is unclear why the cemetery was not listed on any of the available deeds, or was discussed in any of the archival documents.

As previously mentioned, the cemetery likely continues outside of the current project boundary to the west-northwest. The area outside of the project footprint has not been assessed. If the project boundary changes to include this latter area, then further work will be required to determine the extent and archaeological integrity of the cemetery in that location.

Project Impacts

This site is partially located within the proposed ROW between Station 277+00 and 278+00. It is situated along the western side of KY 57 immediately north of a privately owned driveway. As noted above, the portion of the cemetery within the project area has not been assessed for NRHP eligibility; while the prehistoric component is recommended not eligible for listing in the NRHP. The proposed road construction would have an effect upon this

cultural resource. Avoidance of the site is recommended, given the presence of graves within the site. If the cemetery cannot be avoided, then the cemetery should be subjected to archaeological excavation and grave relocation. The prehistoric component is recommended not eligible for listing in the NRHP.

IF2

UTM Coordinate: NAD 83, Zone 17 N
4,264,956m ; E 271,181 m

Elevation: 232 m (760 ft) AMSL

Component(s): Indeterminate prehistoric

Site type(s): Isolated Find

Distance to nearest water: 30 m (98 ft)

Direction to nearest water: Northwest (North Fork of the Licking River)

Type and extent of previous disturbance:
Indeterminate; disturbance extent unknown

Topography: Floodplain

Vegetation: Various weedy deciduous underbrush

Ground surface visibility: Poor due to various vegetation

Aspect: Less than 5 percent; north

Recommended NRHP status: Not eligible

Description: This isolated find consists of a flake made from Brassfield chert (.8 g). The complete flake was recovered from Bucket Auger 2 in the floodplain of the North Fork of the Licking River (Figure 1.3) in the southern portion of Parcel 4. The isolated find is located approximately 24 m (79 ft) due west of KY 57. The nondiagnostic flake was recovered from the bucket auger at a depth between 17 and 30 cm (7 and 12 in) of the modern ground surface.

Beyond the shovel tests conducted on a 20 m grid across the floodplain, an additional 6 shovel tests were excavated in each of the cardinal directions. No additional artifacts were identified.

Bucket Augering

Limited bucket augering of the project area was conducted in conjunction with the current investigations. To more fully document the potential for buried archaeological resources within the current project area, two bucket augers were excavated along the west side of KY 57 and on the southern bank of the North Fork of the Licking River (Figure 1.3). The bucket augers were placed in the wooded section to document the potential for buried archaeological resources within this segment of the river. Both bucket augers were terminated within the upper portion of the water table. Given variations in the horizons from the official soil series descriptions, only numerical horizon designations were made (Figure 6.16).

Neither of the excavated bucket augers revealed the presence of buried cultural components. In addition, no evidence for buried A horizons were noted in the bucket augers. Both bucket augers were composed of silty and clay-rich alluvial sediments.

Given the overall similarity of the bucket augers, only one auger will be described. This bucket auger (BA2) recovered a flake in the second horizon at a depth between 17 and 30 cm (7 and 12 in) bgs and was designated as IF2.

The uppermost horizon consisted of a very dark greyish brown (10YR 3/2) silty clay loam possessing weak fine to medium angular blocky structure. A moderate amount of roots was noted in the upper 10 cm (4 in) bgs. The lower boundary of the horizon was identified at 15 cm (6 in) bgs. The second horizon consisted of a dark brown (10YR 3/3) silty clay loam containing a slightly higher clay content than the uppermost horizon. The sediments possessed weak, fine to medium angular blocky structure. The lower boundary was identified at a depth of approximately 50 cm (20 in) bgs. The third horizon was identified to a depth of approximately 82 cm (32 in) bgs, consisting of a dark yellowish brown (10YR 4/4.5) silt loam. These sediments possessed weak fine angular blocky structure. The fourth horizon consisted of a yellowish brown (10YR 5/6) silt loam possessing weak medium angular blocky

structure. The lower boundary of this horizon was identified at approximately 110 cm (43 in) bgs.

At a depth of approximately 110 cm, redoximorphic features (i.e., redox features) became prominent, indicating the increasing influence of water in the alluvial sediments. The fifth horizon was similar to the overlying horizon; however, redox features were noted. A few fine iron/manganese (i.e., Fe/Mn) nodules and fine to medium Fe depletions (10YR 5/2) were noted. These redox features increased in size and frequency with depth. The lower boundary of this horizon was identified at approximately 195 cm (6.4 ft) bgs. The lowermost horizon had a variegated soil patterning reflecting anaerobic conditions of the sediments. This horizon consisted of a yellowish brown (10YR 5/6) silt loam (moderate medium angular blocky structure). The redox features consisted of approximately 40 percent brown Fe depletions (10YR 5/3) and less than 20 percent faint dark yellowish brown Fe/Mn masses (10YR 4/4). Common Fe/Mn nodules were also present in this horizon. The water table was reached at this depth.

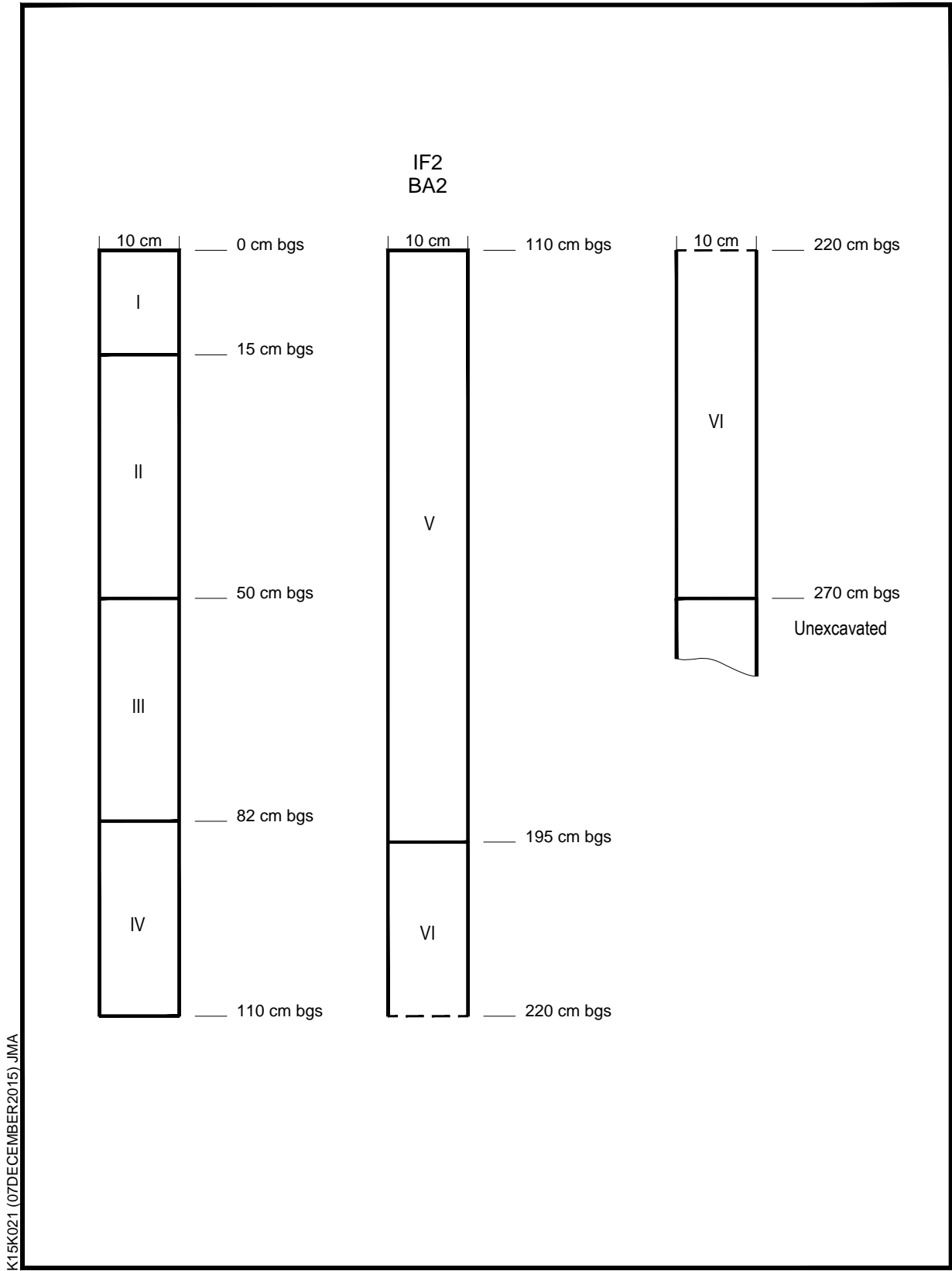


Figure 6.16. Bucket Auger BA2 profile, 0–270 cm bgs.

Chapter 7. Conclusions and Recommendations

CRA personnel completed an archaeological survey for the proposed rebuilding of the KY 57 Bridge over the North Fork of the Licking River at the Fleming and Lewis County line. The project area measured approximately 9.8 ha (24.3 acres) in size and was surveyed in its entirety. The OSA site file search did not identify previously known archaeological sites or previous archaeological surveys within a 2-km radius of the project area.

The project area was investigated through the use of systematic shovel testing supplemented by pedestrian survey, geophysical survey techniques, and limited bucket augering. The survey resulted in the identification of three previously unrecorded archaeological sites (Sites 15Lw218, 15Lw219, and 15F1146) as well as a single prehistoric isolated find (IF2). A geophysical survey using both ground penetrating radar and magnetometry was conducted at Site 15Lw219 prior to the archaeological investigation due to the presence of a possible historic cemetery. The magnetometry survey identified a maximum number of 19 graves; while the GPR data suggested a total of 16 possible graves. Seven of the GPR anomalies correspond to the 19 potential graves observed during the magnetometry survey. The integrity and precise nature of the subsurface features within the field cannot be determined on the basis of the geophysical survey alone; therefore, the anomalies should be ground truthed by unit excavation or monitored mechanical stripping.

Of the three newly identified archaeological sites, two of the sites (15Lw218 and 15F1146) fail to meet the criteria for listing in the NRHP. Both sites contained a low density of cultural materials and the research potential of each was exhausted at this level of investigations. Neither site contained temporally sensitive, or otherwise diagnostic, artifacts. The remaining site, 15Lw219, was a multicomponent cemetery dating to the mid-nineteenth century. This site contained a minor prehistoric component consisting of four flakes collected from a single shovel test. The prehistoric component at this

latter site is recommended not eligible or listing the NRHP. The NRHP eligibility of the 15Lw219 historic component could not be assessed during the current investigations. The cemetery appears to extend to the northwest outside of the currently delineated project area. Avoidance of Site 15Lw219 is recommended, given the presence of multiple graves. If the site cannot be avoided, then the cemetery should be subjected to archaeological excavation and relocation. The prehistoric component is recommended not eligible for listing in the NRHP.

Note that a principal investigator or field archaeologist cannot grant clearance to a project. Although the decision to grant or withhold clearance is based, at least in part, on the recommendations made by the field investigator, clearance may be obtained only through an administrative decision made by the lead federal agency in consultation with the State Historic Preservation Office (Kentucky Heritage Council).

If any previously unrecorded archaeological materials are encountered during construction activities, the KHC should be notified immediately at (502) 564-6662. If human skeletal material is discovered, construction activities should cease, and the KHC, the local coroner, and the local law enforcement agency must be notified, as described in KRS 72.020.

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Appendix A. Lithic Codes

Flake Debris Analysis Codes

- 1) Size Grade:
 - 1: .125 inch
 - 2: .25 inch
 - 3: .5 inch
 - 4: .75 inch
 - 5: 1.0 inch
- 2) Count
- 3) Weight (to nearest 0.1 gram)
- 4) Portion
 - 0: < .25 inch
 - 1: Complete
 - 2: PRB
 - 3: Fragment
 - 4: Blocky
 - 5: Thermal Shatter
- 5) Platform
 - 0: Not present
 - 1: Lipped
 - 2: Cortical
 - 3: Non lipped, non cortical
 - 4: Broken
- 6) Stage (based on platform facet count and dorsal flake scar count)
 - 0: Blocky
 - 1: Early
 - 2: Middle
 - 3: Late
 - 4: Biface thinning
- 7) Thermal Alteration
 - 0: No evidence
 - 1: Color change (possible alteration)
 - 2: Partial dull, partial gloss
 - 3: Gloss both faces
 - 4: Crenulations, crazing, potlids
 - 5: Differential thermal damage
 - 8: Indeterminate
 - 9: Not applicable
- 8) Cortex Cover
 - 0: None
 - 1: Dorsal only
 - 2: Platform only
 - 3: Dorsal and platform
- 9) Cortex Type
 - 0: None present
 - 1: Matrix/residual
 - 2: Waterworn cobble
 - 3: Patination
 - 9: Indeterminate
- 8) Raw Material:
 - 000: <.25 inch
 - 025: Brassfield
 - 110: Indeterminate
 - 111a: Oolitic Newman

Morphological and Technological Attributes (Modified Implements and Cores)

Dimension 1: Material Class

- 1: Unmodified lithic
- 2: Modified lithic

Dimension 2: Lithic Class

- 01: debitage
- 02: fire cracked rock
- 03: ground and pecked stone
- 04: biface
- 05: cobble tool
- 06: cores
- 07: micro-tool
- 08: uniface
- 09: unmodified cobble

Dimension 3: Technological / Morphological Class for Flaked Stone

Classes 201, 207, 208	Class 204	Class 106 and 206
0: no retouch	1: hard hammer .1: biface	1: indeterminate .1: Tested Cobble
1: unifacial only	2: hard/soft hammer .2: hafted biface	2: unidirectional .2: Core Fragment
2: some bifacial	3: soft hammer .3: drill	3: bifacial .3: Core
3: bifacial	4: soft hammer/retouch .4: drill/hafted biface	4: bipolar
4: alternate unifacial	5: retouch .5: scraper/hafted biface	5: unidirectional subconical
	6: indeterminate .6: boring/hafted biface	6: multidirectional
		7: bidirectional

Dimension 3: Technological/Morphological Class for Ground / Pecked Stone and Cobble Tools (classes 203 and 205)

Manufacture Technique		Modification		
D3a Primary	D3b Secondary	D3c Form	D3d Use wear	D3e Location
0: None	0: None	00: None	0: None observed	0: No obvious modification
1: Use only	1: Use only	01: V-pit	1: Grinding	1: One face
2: Ground	2: Ground	02: U-pit	2: Polish	2: Both faces
3: Pecked	3: Pecked	03: U and V pits	3: Striations only	3: One end
4: Flaked	4: Flaked	04: Other / Indet. pits	4: Battering	4: Both ends
5: Carved	5: Carved	05: Basin	5: Crushing	5: One edge
6: Drilled	6: Drilled	06: Notched	8: Other	6: Multiple edges
7: Grooved	7: Grooved	07: Drilled	9: Indeterminate	7: Edge and end
8: Incised	8: Incised	11: Grooved		8: Other
		12: Incised		9: Indeterminate
		18: Other		
		19: Indeterminate		

Dimension 4: (Raw Material)

Same codes as Flake Debris

Dimension 5: (Thermal Alteration)

- 0: no evidence
- 1: color change (possible alt)
- 2: partial dull, partial gloss
- 3: gloss both faces
- 4: crenulations, crazing, potlids
- 5: differential thermal damage
- 8: indeterminate
- 9: not applicable

Dimension 6: (Cortex Type)

- 0: none present
- 1: matrix/residual
- 2: water worn cobble
- 3: patination

Dimension 7: (Cortex Presence)

Classes 201, 207 and 208	Class 204	Classes 106 and 206
1: none present	1: none present	1: none present
2: < 50% dorsal cortex	2: cortex on one face	2: present
3: > 50% dorsal cortex	3: cortex on two faces	
4: 100% dorsal cortex	4: cortex on base only	
5: platform only cortex	5: cortex on base and face	

Dimension 8: (Classes 201, 207 and 208)

Flake debris codes for portion, platform, stage

Dimension 8: (Type of Wear, classes 106, 206)

- 0: None
- 1: Battering

Dimension 8: (Portion, class 204)

- 01: Indeterminate fragment
- 02: complete
- 03: proximal
- 04: distal
- 05: medial
- 06: lateral
- 07: facial
- 08: basal fragment
- 09: tip missing
- 10: partial stem and base missing

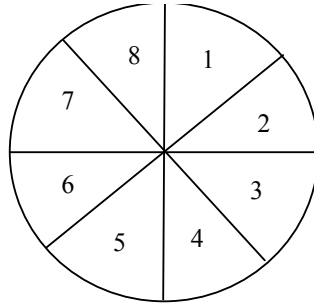
Dimensions 8 and 9: Function for Ground Stone and Cobble Tools (classes 203 and 205)

D8 General Function	D9 Specific Function	
00: None obvious (manuport)	A1: Nutting Stone	E1: Notched (hoe)
01: Processing platform	A2: Anvil	E2: Unnotched (hoe)
02: Hand stone	A3: Metate	F1: Bowl
03: Tool fabricator	A4: Mortar	F2: Pipe
04: Hafted woodworking tool	A5: Grinding slab (misc)	F3: Griddle stone
05: Hoe / Pick	A6: Multifunction	G1: Gorget
06: Vessel	B1: Mano	G2: Bead
07: Ornament / Decorative	B2: Pestle	G3: Pendant
08: Gaming stone	B3: Pulverizer	H1: Ball
09: Weight	C1: Hammerstone	H2: Chunky stone
10: Pigment stone	C2: Whetstone	I1: Net sinker
11: Blade	C3: Abrader	I2: Plummets
18: Other	C4: Smoothing stone	I3: Bannerstone
19: Indeterminate	C5: Shaft smoother	J1: Hematite
	C6: Saw	K1: Ground projectile
	D1: Celt	K2: Knife / ulu
	D2: Grooved axe (¾)	Q1: Indeterminate ground
	D3: Full	Q2: Indeterminate incised
	D4: Adz	Q3: Indeterminate carved

Dimension 9: (Location of retouch: *Classes 201, 207, 208*)

0: indeterminate

- All numbers corresponding to an eight polar coordinate grid (Odell 1977) of retouched area are recorded. Dorsal face up, proximal end facing, distal end away from analyst.



Dimension 9 (Type of Wear, class 206)

0: none
1: Crushing
2: Battering

Dimension 9: Failure Type (class 204)

01: none	08: thermal	15: longitudinal reverse
02: hinge	09: impact	16: bipolarized
03: incipient fracture	10: transverse hinge	17: radial break
04: edge collapse	11: lateral hinge	18: burinated
05: lateral snap	12: haft snap	
06: perverse	13: post-depositional	
07: outré passé	14: indeterminate	

Dimension 10: Haft Modification (class 204)

1: indeterminate	5: basal cortex
2: none	6: basal burination
3: haft present, no mod.	7: basal beveling
4: basal grinding	8: basal burination/grinding

Dimension 11: Blade Modification (class 204)

01: indeterminate	07: serrated/alternate bevel
02: none (bi-convex)	08: alternate unifacial retouch
03: serrated	09: unifacial retouch
04: alternate bevel	10: bifacial retouch
05: one edge beveled	11: reworked/serrated
06: unifacial bevel	12: unifacial bevel/serrated

Dimension 12: Basal Shape (class 204)

- 1: incurvate
- 2: excurvate
- 3: straight
- 4: bifurcate
- 5: indeterminate

Dimension 13: Haft Element (class 204)

- 1: side notched
- 2: corner notched
- 3: straight stem
- 4: contracting stem
- 5: expanding stem
- 6: no definable haft (lanceolate)
- 7: fluted
- 8: no haft element
- 9: Indeterminate

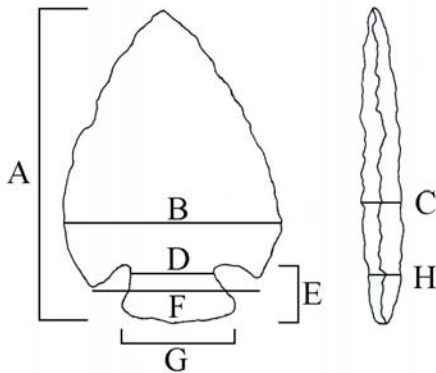
Dimension 14: Blank Type (all classes)

- 1: indeterminate
- 2: core
- 3: flake
- 4: tabular block
- 5: river gravel

Dimension 15: Edge Angle (Classes 201, 204, 207, and 201) to nearest degree

Metric Measurements: (Use Length, blade width and thickness for all classes, rest for class 204-4.2, 204-3.2 only)

- A: Maximum length
- B: Maximum blade width
- C: Maximum blade thickness
- D: Maximum shoulder width
- E: Maximum stem length
- F: Maximum neck width
- G: Maximum basal width



Tradition Cluster Association:

Groundstone Tool Codes

Dimension 1: (Material Class)

- 1: Unmodified lithic
- 2: Modified lithic

Dimension 2: (Lithic Class)

- | | |
|-----------------------------|-----------------|
| 01: flake debris | 05: cobble tool |
| 02: fire cracked rock | 06: cores |
| 03: ground and pecked stone | 07: microtool |
| 04: biface | 08: uniface |

Dimension 3: (Modification)

- | | |
|---------------------|---------------------|
| 0: Unmodified | 9: drilled |
| 1: Pitted, V-Shaped | 10: ground cobble |
| 2: Pitted, U-Shaped | 11: Pecked/Ground |
| 3: Battered | 12: Gorget Fragment |
| 4: Ground | 13: carved |
| 5: Notched | 14: Pecked |
| 6: Flaked | 15: Pitted/Battered |
| 7: Flaked/Notched | |
| 8: pigment source | |

Dimension 4: (Raw Material)

- 070: Quartz
- 071: Quartzite
- 080: Hematite
- 095: Sandstone

Dimension 5: (Location of Modification)

- 0: no modification
- 1: 1 face
- 2: both faces
- 3: 1 end
- 4: both ends
- 5: 1 edge
- 6: more than one edge

Dimension 6: (Number of Pits or Notches, classes 203-1, 203-2, 203-5)

Dimension 7: (Burning)

- 0: not burnt
- 1: Burnt

Dimension 8: (Complete)

- 0: No
- 1: yes

Appendix B. Lithic Materials Recovered

Table B-1. Flake Debris.

Bag	Site	Unit #	Level	Depth	Feature	Component	Count	Wt(g)	Size	Portion	Platform	Stage	Therm Alt	Cortex Type	Cortex Cover	Material
1	15Lw218	STP T1		0-22 cm bgs			5	0.8	1	0	-	-	-	-	-	0
1	15Lw218	STP T1		0-22 cm bgs			1	0.2	2	3	0	2	0	0	0	25
1	15Lw218	STP T1		0-22 cm bgs			1	4.7	3	4	0	0	0	2	1	110
2	15Lw218	STP T1		22-47 cm bgs			3	0.3	1	0	-	-	-	-	-	0
2	15Lw218	STP T1		22-47 cm bgs			2	1.8	2	1	3	1	0	0	0	25
2	15Lw218	STP T1		22-47 cm bgs			1	0.3	2	1	3	2	0	0	0	25
2	15Lw218	STP T1		22-47 cm bgs			1	0.2	2	1	3	3	1	2	1	25
2	15Lw218	STP T1		22-47 cm bgs			1	0.7	2	2	3	1	0	2	1	25
2	15Lw218	STP T1		22-47 cm bgs			1	0.6	2	2	3	3	0	0	0	25
2	15Lw218	STP T1		22-47 cm bgs			1	0.1	2	3	0	2	0	0	0	25
2	15Lw218	STP T1		22-47 cm bgs			1	3.1	3	3	0	2	0	2	1	25
2	15Lw218	STP T1		22-47 cm bgs			1	3.4	3	3	0	2	0	2	1	111a
3	15Lw218	STP T2		0-30 cm bgs			3	0.2	1	0	-	-	-	-	-	0
3	15Lw218	STP T2		0-30 cm bgs			1	0.2	2	2	3	2	0	0	0	25
3	15Lw218	STP T2		0-30 cm bgs			1	0.3	2	3	0	1	0	0	0	25
3	15Lw218	STP T2		0-30 cm bgs			1	1	2	3	0	2	1	0	0	25
4	15Lw218	STP T3		0-40 cm bgs			1	0.1	1	0	-	-	-	-	-	0
4	15Lw218	STP T3		0-40 cm bgs			1	2.6	2	2	3	2	0	2	1	25
4	15Lw218	STP T3		0-40 cm bgs			1	0.2	2	3	0	1	0	2	1	25
4	15Lw218	STP T3		0-40 cm bgs			1	1.4	2	3	0	2	0	0	0	25
4	15Lw218	STP T3		0-40 cm bgs			2	0.5	2	3	0	3	0	0	0	25
4	15Lw218	STP T3		0-40 cm bgs			1	3.9	3	1	2	1	0	2	3	25
4	15Lw218	STP T3		0-40 cm bgs			1	3.7	3	3	0	1	1	0	0	25
4	15Lw218	STP T3		0-40 cm bgs			1	2.4	3	3	0	3	0	0	0	25
5	15Lw218	STP T4		0-30 cm bgs			1	0.1	1	0	-	-	-	-	-	0
5	15Lw218	STP T4		0-30 cm bgs			1	0.8	3	1	3	3	0	0	0	25
6	15Lw218	STP T4		40-60 cm bgs			1	0.2	2	3	0	2	0	0	0	25
6	15Lw218	STP T4		40-60 cm bgs			1	0.4	2	3	0	3	0	0	0	25
7	15Lw218	STP T5		0-25 cm bgs			2	0.5	1	0	-	-	-	-	-	0
7	15Lw218	STP T5		0-25 cm bgs			1	0.3	2	1	2	1	0	2	2	25
7	15Lw218	STP T5		0-25 cm bgs			1	0.3	2	1	3	2	1	0	0	25
7	15Lw218	STP T5		0-25 cm bgs			1	0.9	2	2	3	2	0	0	0	25
7	15Lw218	STP T5		0-25 cm bgs			1	0.3	2	2	3	3	0	0	0	25
7	15Lw218	STP T5		0-25 cm bgs			1	0.2	2	3	0	2	0	0	0	25
7	15Lw218	STP T5		0-25 cm bgs			1	0.3	2	3	0	2	0	0	0	25
8	15Lw218	STP B1		0-13 cm bgs			1	0.3	2	5	-	-	4	-	-	090t
8	15Lw218	STP B1		0-13 cm bgs			1	2.1	3	1	3	3	0	0	0	25
8	15Lw218	STP B1		0-13 cm bgs			1	2.4	3	2	3	3	0	3	1	25
9	15Lw218	STP B2		0-15 cm bgs			1	3.3	3	2	3	1	0	0	0	25
9	15Lw218	STP B2		0-15 cm bgs			1	2.6	3	3	0	2	0	2	1	25
9	15Lw218	STP B2		0-15 cm bgs			1	6	4	3	0	3	5	2	1	25
10	15F146	STP T1		0-16 cm bgs			1	1.9	2	3	0	1	0	1	1	25
10	15F146	STP T1		0-16 cm bgs			1	0.3	2	3	0	2	0	0	0	25
11	15F146	STP T2		0-20 cm bgs			1	0.3	2	2	3	3	0	0	0	25
12	15F146	STP T3		0-32 cm bgs			1	1.3	2	1	3	1	0	0	0	25
12	15F146	STP T3		0-32 cm bgs			1	1.2	2	1	3	1	0	2	1	25
12	15F146	STP T3		0-32 cm bgs			1	1.8	2	2	3	2	0	3	1	25
12	15F146	STP T3		0-32 cm bgs			1	0.2	2	3	0	2	0	0	0	25

Bag	Site	Unit #	Level	Depth	Feature	Component	Count	Wt(g)	Size	Portion	Platform	Stage	Therm Alt	Cortex Type	Cortex Cover	Material
12	15F1146	STP T3		0-32 cm bgs			1	1.3	2	4	0	0	0	0	0	25
12	15F1146	STP T3		0-32 cm bgs			1	0.4	2	4	0	0	2	2	1	25
13	15F1146	STP T4		0-20 cm bgs			3	0.3	1	0	-	-	-	-	-	0
13	15F1146	STP T4		0-20 cm bgs			1	0.4	2	3	0	1	0	1	1	25
13	15F1146	STP T4		0-20 cm bgs			1	0.7	2	5	-	-	4	-	-	090t
14	15F1146	STP B1		0-15 cm bgs			1	0.3	2	2	3	3	0	0	0	25
14	15F1146	STP B1		0-15 cm bgs			1	0.7	2	3	0	3	0	0	0	25
15	15LW219	STP T1		0-25 cm bgs			2	0.2	1	0	-	-	-	-	-	0
15	15LW219	STP T1		0-25 cm bgs			1	0.3	2	2	3	3	0	0	0	25
15	15LW219	STP T1		0-25 cm bgs			1	1.3	3	1	3	3	0	0	0	25
16	IF 2	2-Aug		17-30 cm bgs			1	0.8	2	1	3	1	0	0	0	25

Table B-2. Modified Implements and Cores.

Art #	Bag	Site	Unit #	Level	Depth	Feature	Component	Count	Weight	D2 Class	D3 Tech	D4 Material	D5 Therm Alt	D6 CortexI	D7 CortexII	D8	D9	D10 Haft Mod	D11 Blade Mod	D12 Basal Shape	D13 Haft Shape	D14 Blank	D15 Edge Angle	Length	Blade	Thick	Shoulder	Stem	Neck	Base	Cluster
k15k21-01	1	15Lw218	STP T1		0-22 cm bgs			1	52.6	6		25	0	2		0								45.09	46.53	33.09					-

Appendix C. Kentucky Grave Marker Forms

Kentucky Grave Marker Documentation Form

Cemetery Unmarked County: Lewis Site No.: 15Lw219

Burial 1 Name: Mary Power

DOB not listed DOD 1852 Material: limestone

Inscription: Mary Power

Died Oct. 8, 1852

Aged 44 yrs 3 mo 8 days

Comments: _____

Photos: Roll 1 Frame 22 Roll _____ Frame _____

Sketch Marker



Burial 2 Name: Joseph Power

DOB not listed DOD 1837 Material: limestone

Inscription: Joseph Power

Died July 5, 1837

Aged 38 yrs ???

Comments: _____

Photos: Roll 1 Frame 23 Roll _____ Frame _____

Sketch Marker



Burial 3 Name: Nancy Arnold

DOB not listed DOD 1860 Material: limestone

Inscription: Nancy Arnold

Consort of

Peter Arnold

Died Aug 30, 1890

Aged 84 yrs 6 mon 15 days

Photos: Roll 1 Frame 24 Roll _____ Frame _____

Sketch Marker



Burial 4 Name: Charles Power
DOB not listed DOD not listed Material: limestone
Inscription: Charles Power

Comments: Fragmentary – lacking all information other than name
Likely belongs to headstone listed below

Photos: Roll 1 Frame 25 Roll Frame

Sketch Marker



Burial 5 Name: Not listed
DOB DOD 1854 Material: limestone
Inscription: June 16, 1854
In the 17th year
Of his age

Comments: Fragmentary – lacking name
Likely belongs to the headstone listed above

Photos: Roll Frame Roll Frame

Sketch Marker



Appendix D. GPR Time Slices

