CULTURAL RESOURCE SURVEY OF A PROPOSED STORAGE/DISPOSAL AND BORROW AREA ON THE CLINCH RIVER BREEDER REACTOR SITE IN ROANE COUNTY, TENNESSEE

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MANAGEMENT SUMMARY

Between October 28 and December 6, 2002, TRC conducted a cultural resources survey for the Tennessee Valley Authority (TVA) at the Clinch River Breeder Reactor Facility in Roane County, Tennessee. It is proposed as an alternative site for storage and disposal of coal burning by-products produced by the Kingston Steam Plant. There are also plans to bury and cap waste with fill from borrow pits that will be excavated on the property. The study included archaeological, geomorphic, and historic structures investigations.

Three previously unrecorded archaeological sites were discovered during the current project. Two of the sites (40RE547 and 40RE548) are small prehistoric lithic scatters of unknown age. Both are recommended ineligible for listing on the National Register of Historic Places (NRHP). In the opinion of TRC, all archaeological issues associated with these sites have been resolved, and additional investigations will not be required.

The third archaeological site, 40RE549, was also occupied during the prehistoric era. It may actually consist of several spatially distinct occupation zones [Exempted from Disclosure by Statute] Since no diagnostic artifacts were recovered during the investigation, none of the components can be attributed to a specific cultural period or phase. However, the general lack of prehistoric ceramics suggests that the most intensive and extensive occupations may have occurred prior to the Woodland period. Site 40RE549 [Exempted from Disclosure by Statute] appear to represent stratigraphically intact archaeological deposits. Therefore, it has the potential to provide important archaeological information concerning one or more prehistoric periods. Consequently, TRC recommends the site potentially eligible for the NRHP under Criterion D. In the opinion of TRC, Phase II testing will be required at 40RE549 if the property is chosen as the preferred alternative, and if the site cannot be avoided during the construction and operation of the planned facility.

Background research indicated that five previously recorded archaeological sites (40RE121, 40RE122, 40RE156, 40RE157, and 40RE158) are located within the project area as well. Both historic resources (40RE121 and 40RE122) were relocated, but no trace of the prehistoric sites (40RE156, 40RE157, and 40RE158) could be found. All five are recommended ineligible for listing on the NRHP, and it is the opinion of TRC that additional archaeological investigations will not be necessary at these locations.

No historic structures were identified within the area of potential effect (APE) during the field survey, and background research indicated that none were previously listed, or identified as eligible for listing in, the NRHP. Based on these findings, no further architectural/historical analysis is recommended for this project.

ACKNOWLEDGMENTS

TRC would like to thank Eric Howard of TVA for providing logistical support. TRC would also like to thank Sarah Sherwood of the University of Tennessee, for her contributions to this project as the geomorphology subconsultant. TRC also would like to acknowledge James Cummings of David Jones Excavating, Inc., for his skillful operation of the backhoe.

A number of TRC staff members participated in this project under the leadership of William Stanyard. Michael J. Wild was the assistant Field Director. Jason Butler, William Duckworth, Michael Hartley, and Sterling Howard served as Field Technicians. Jeff Holland carried out the historical research, and Ted Karpynec conducted the architectural survey. Tommy Garrow conducted the laboratory analysis, and Larissa Thomas provided the technical review. Vince Macek and William Cody prepared the graphics, and Jessica Wilson edited and produced the report. All of these individuals made significant contributions to this project.

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I. INTRODUCTION

This document presents the results of Phase I archaeological, geomorphic, and historic structures investigations that TRC conducted within the APE of a 188-acre (0.3 square miles) parcel in Roane County, Tennessee (Figure 1). The property is currently part of the Clinch River Breeder Reactor Facility (CRBRF); it is owned and managed by TVA.

The study area is comprised of two tracts. Tract 1 is a proposed alternative site for storing and burying by-products from the coal-fired Kingston Steam Plant. Borrow pits will be excavated in Tract 2; the fill will be used to cap the buried material.

Three previously unrecorded archaeological resources were discovered during the current survey (see Figure 1). Two sites (40RE547 and 40RE548) are small prehistoric lithic scatters of unknown age that are recommended ineligible for the NRHP. No further archaeological studies are recommended at these two sites.

Site 40RE549 also contains prehistoric material. [Exempted from Disclosure by Statute]. The geomorphic evidence indicates that Holocene sediments occur Exempted from Disclosure by Statute in that portion of the project area. Archaeological material was encountered [Exempted from Disclosure by Statute]. Soil below that depth was not screened, so it is unknown if cultural material occurs even deeper in the soil column. Artifact density appears to be very light throughout 40RE549; and no cultural features were encountered. With the exception of one small piece of prehistoric pottery, diagnostic material is absent. The sherd represents an undifferentiated Woodland occupation. Cultural material was found at varying depths, but there is no concrete evidence that stratified cultural horizons occur across large areas. In some cases, artifacts were discovered between 10 and 40 cm below the surface, with no underlying archaeological deposits. In other places, artifacts were not encountered until 180 cm. According to the geomorphic data, it appears that stable, long term surfaces never developed within [Exempted from Disclosure by Statute] sediments that occur at 40RE549. As a result, the prehistoric occupations were probably limited to relatively short-term episodes. Therefore, it is possible—perhaps likely—that several sites occur within the boundary of 40RE549. However, it is impossible to delineate those occupations with standard shovel testing techniques [Exempted from Disclosure by Statute] . Consequently, the entire area has been given a single site designation.

Since intact archaeological deposits are present at 40RE549, TRC recommends the site potentially eligible for the NRHP under Criterion D. If this property is the chosen alternative, TRC suggests that 40RE549 be avoided during the construction, operation, and maintenance of the planned facility. If it cannot be avoided, Phase II testing will be required in order to determine the site's NRHP eligibility status.

The project area also contains five archaeological sites (40RE121, 40RE122, 40RE156, 40RE157, and 40RE158) that were recorded during previous surveys in the project vicinity (Jolley 1982; Schroedl 1972, 1974; Thomas 1973). The two historic sites (40RE121 and 40RE122) were relocated during the current study, while the three prehistoric sites (40RE156, 40RE157, and 40RE158) could not be relocated despite the intensive shovel testing efforts. All

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Figure 1. Project area and site locations.

five sites are recommended ineligible for the NRHP, and no further work is recommended at those locations.

The purpose of the historical/architectural survey was to identify properties within, and surrounding, the 188-acre project area that have been listed in, or are potentially eligible for listing in, the NRHP. The APE was determined to include the project area, plus any areas containing historic resources from which the proposed storage site will be visible.

According to the results of the background research, no previously inventoried properties are located in the immediate vicinity of the project area. In addition, no properties have been listed, or identified as eligible for listing in, the NRHP. Finally, no historic structures were identified during the field survey. Based on these findings, it is the opinion of TRC that this project will have no adverse effect on historically significant architectural resources, and no additional architectural/historical analyses are recommended.

II. ENVIRONMENT

PROJECT AREA SETTING

The project area is located in east-central Tennessee. It is within the southwestern portion of the Ridge and Valley physiographic province, and near the southeastern boundary of the Cumberland Plateau (Fenneman 1938). Local relief ranges from 60 to 152 m (200 to 500 feet).

The area consists of southeastward-dipping sedimentary rocks that create northeast-trending ridges and valleys. They comprise a series of complicated subparallel thrust faults that trend to the northeast and dip to the southeast. Small-scale secondary structural features occur locally throughout the area; they include fractures, folds, and faults (Tucci et al. 1991).

On a more localized scale, the study tract is situated along the southeastern portion of the Chestnut Ridge system, just north of the Copper Creek Fault. Chestnut Ridge is underlain by the Knox Group formations, which were formed during the upper Cambrian and Ordovician Eras (McMaster 1963). The Knox Group can generally be described as a massive, siliceous cherty dolomite that is composed of Copper Ridge Dolomite and Chepultepec Dolomite, as well as the Longview and Newala equivalents (Ketelle and Huff 1984).

The Clinch River is the primary drainage of this portion of the Ridge and Valley; it is currently confined and regulated by Melton Hill Dam. The Clinch River borders the study area to the south, along an outside meander bend of the river. The opposite bank of the river is composed of point bar sequences marking the migration of the river from the base of Hood Ridge (a remnant of Dug Ridge) to the channel it now occupies. That migration has probably occurred since the mid Holocene.

The northern boundary of the proposed disposal area begins at the current Watts Bar Reservation/Department of Energy boundary and trends south-southwest down the narrow valley floor between Chestnut Ridge to the northeast and a remnant of the western extent of Haw Ridge. The interridge valley, currently devoid of any visible surface drainage, probably once served as the drainage way for the unnamed creek that is now confined to a narrow valley to the east.

The 20-foot contour map depicts a relatively level surface on the floor of the valley. In reality, the valley floor is irregular. This suggests that the original topography in that area has been altered by historic disturbances. The causes probably include intensive logging, evidenced in the overgrown logging roads and secondary growth, and clearance related to the large power transmission line that cross-cuts the valley; activities sponsored by the Atomic Energy Commission (AEC) also may have altered the natural landscape (Figures 2 and 3).

The project area is in the original confines of the AEC boundary, and the Oak Ridge Reservation. The Oak Ridge National Laboratory (ORNL) and its main research and production facilities are located north of the project area. Historically, low-level radioactive and other wastes generated

Figure 2. View to the southwest along the electrical transmission line.

Figure 3. View to the west across the northern portion of the valley.

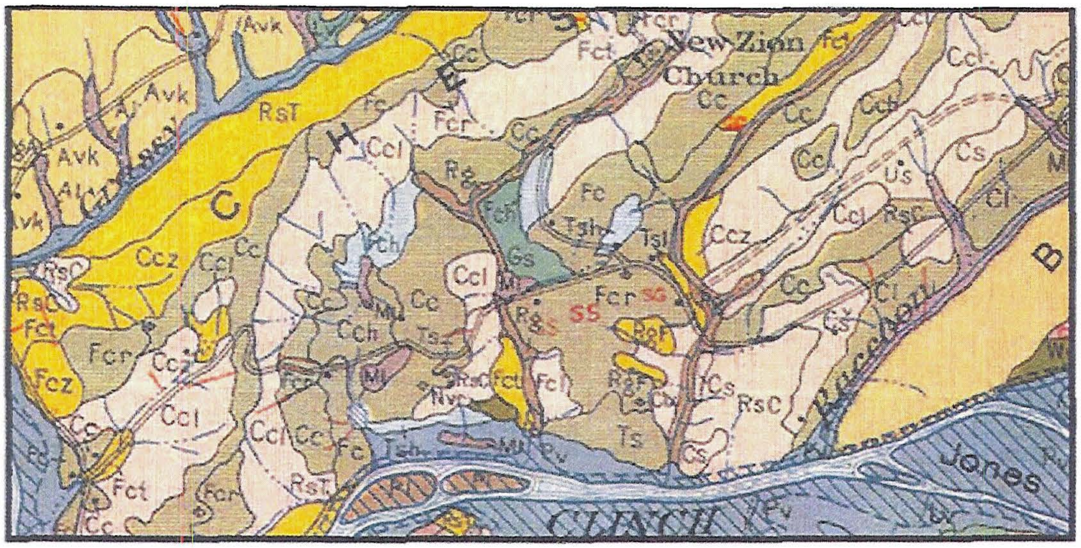
by ORNL were disposed of using shallow-land burial practices (Stowe and Haase 1986; Webster and Bradley 1988). Many of these disposal areas are unmarked and even unknown. A well-known cesium disposal area lies on Jones Island, immediately upstream of the project area (Hoffman et al. n.d.). Marked and unmarked monitoring wells are distributed down the valley, which also indicate previous ground disturbing activities. As is discussed below, an unusual soil and rock matrix was encountered in Backhoe Trench 12—, which is in the center of the valley,—and it may represent recently introduced fill.

Though the Roane County Soil Survey (Swann et al. 1942) is out-of-date relative to landscape alterations and changes in soil taxonomy during the past 60 years, the survey generally characterizes the nature of the soils in the project area (Figure 4). The Clarksville Cherty Silt Loam is the primary series mapped here and is classified as a Typic Paleudult (Swann et al. 1942; USDA/NRCS 2002). These soils are typically ancient clayey residuum from cherty dolomite or cherty limestone adjacent to and on steep slopes. This classification reflects a surficial history controlled by the weathering of the local bedrock and downward migration of colluvium off Chestnut Ridge and the hill to the east. There is no suggestion of alluvial deposits on the floor of the valley, suggesting that if the valley is in part due to a local drainage, the drainage is probably geologically ancient. The Clarksville Paleudult also indicates that the soil's initial formation pre-dates the Holocene [Exempted from Disclosure by Statute

].

The southern boundary of the project area includes a ca. 150 to 245-m (500 to 800-feet) wide by 685-m (2,250-feet) long transect parallel to the Clinch River, on the northern bank. The upper portion of this section includes the low colluvial slopes at the base of the uplands along the western boundary and a hill remnant on the east. The local soils are mapped as Talbott Silty Clay Loam, Pope Very Fine Sandy Loam, and the Melvin Silt Loam Series (Swann et al. 1942; USDA/NRCS 2002). The Pope series is mapped across the majority of project area that is adjacent to the Clinch River. It is classified as a Fluventic Dystrudept, which is a poorly developed floodplain soil typical of alluvium derived from acid sandstone, siltstone, and shale. Bordering the Pope Series, away from the river, is a thin swath of Typic Hapludalf that has been classified Talbott Silty Clay Loam. This residual limestone soil appears to mark the boundary in the interridge valley between the older residual cherty silt loam, and the more coarse alluvial soils of the Pope Series. There is also a change in elevation—visible at the 760-foot contour—that marks the edge of the eroded ridge bases as they slope into the narrow river terrace.

The Melvin Silt Loam Series is mapped as a thin lateral band paralleling the river; it is associated with topographic lows. The Melvin Series is classified as a Fluvaquentic Edoaquept, a young poorly drained soil containing either a sulfuric horizon or associated with sulfidic materials (Hudnall et al. 2000). The horizons below the surface typically contain oxidized and depletion features that usually occur on low areas of the floodplain (Swann et al. 1942; USDA/NRCS 2002). This area, though lacking native wetland vegetation, is probably wet on a periodic (seasonal?) basis, and it may represent the backside of a levee-like feature.



100 m

Series Key

Cc - Clarksville Cherty Silt Loam
Ccl - Clarksville Cherty Silt Loam Hilly Phase
Cch - Clarksville Cherty Silt Loam Smooth Phase
Fct - Fullerton Cherty Silt Loam
Ml - Melvin Silt Loam
Nvr - Nolichucky Very Fine Sandy Loam
Pv - Pope Very Fine Sandy Loam
Rg - Roane Gravely Loam
Tsh/Ts - Talbot Silty Clay Loam

Figure 4. Detail of project vicinity in *Soil Map, Roane County, Tennessee* (Swann et al. 1942).

LITHIC RESOURCE AVAILABILITY

Resource utilization potential in and around the project area is exceptionally high. Lithic materials readily available in the vicinity consist of varying grades (varieties) of Knox chert, hematite, steatite, quartz, quartzite, and limestone (Kimball 1985). The erosion of the dolomite deposits exposed nodules of chert, contained in the Newala formation, which are extremely suitable for tool manufacture. The chert occurs in either tabular form or as small nodules along the stream and riverbanks.

Lithic resources during prehistoric times no doubt were available in the form of large to small river cobbles, nodules, and outcrops from the adjacent uplands. Results of archaeological investigations conducted at numerous outcrops in the region suggest that the preferred method of lithic procurement was by surface extraction, although people occasionally dug into hillsides in order to obtain raw material (Kimball 1985:118).

CLIMATE

The Ridge and Valley province is characterized by abundant rainfall, moderate winters, and warm summers. January is the coldest month, with an average winter temperature of 40.3 degrees F. The warmest month is July, with an average temperature of 77.9 degrees F. The growing season has 192 days, and precipitation is heaviest during the winter and spring. Average rainfall is about 48 inches per year (Springer and Elder 1980:5–8).

FLORA AND FAUNA

The project area lies in the Oak-Chestnut forest region (Braun 1950:231). Oaks, mixed with chestnut prior to the fungus plague of the early twentieth century, occupied the slopes of the nearby mountains, and white oak communities dominated the valley floors. Mixed forest communities are abundant on the ravine slopes and in the coves. Further to the south, the Oak-Chestnut forest grades into oak-pine forests.

The many microenvironments in the Ridge and Valley section provide food resources for a large and diverse group of fauna. Over 480 species of vertebrate animals have been recorded in East Tennessee; only 18 species were introduced to the area after initial contact with Europeans (Bogan et al. 1986). White-tailed deer, bear, and elk represent the largest herbivores in the region and were harvested by the native inhabitants. Before the modern-era wolf, bison, elk, cougar (panther), river otter, and porcupine inhabited the area but have been exterminated from East Tennessee. There are numerous (at least 122) species of fish in area drainages—only seven species of which have been introduced after European contact. Avian species also are numerous with at least 247, and very few of these were introduced by Euroamericans. Reptiles, by comparison, are less numerous, represented by only 39 species, while amphibian species number at least 39 (Bogan et al. 1986).

PALEOENVIRONMENT

Contemporary climatic and environmental data do not apply to the earliest human occupations of the region. During the late Pleistocene and Middle Holocene epochs, the climate was vastly different. It is generally accepted that conditions from about 40,000 years ago were cooler and wetter during the late Pleistocene. Global warming coincided with the gradual melting of the massive glaciers that penetrated the eastern portion of the continent as far south as the Ohio River. Between 15,000 and 11,000 years B.P., sea levels were as much as 200 feet lower than the present, but by 9000 B.P., the glacial meltwaters had brought ocean levels up to near modern-day levels (Anderson et al. 1996).

Delcourt and Delcourt (1985) have produced paleo-vegetational maps illustrating the past 40,000 years. The average winter temperature in the area was considerably cooler in the full glacial period, ca. 23,000–13,000 B.C. At that time, the area was covered by a boreal forest, in which pines and spruce were dominant. The climate warmed and precipitation increased from ca. 13,000 to 8000 B.C. The boreal forests were replaced by dynamic mesic Oak-Hickory forests that provided an abundance of game and plant species utilized by the earliest inhabitants of the region. A dramatic environmental shift, the Altithermal, took place from about 5500–2500 B.C. This was a period of global warming and drier conditions in many regions. Throughout the southeast, plant and animal communities adapted to these altered environmental conditions. There is reason to suspect, however, that precipitation increased in mountainous areas.

Delcourt (1978) indicates that, along the Highland Rim in Middle Tennessee, species-restricted xeric plant species flourished, while wetland plants thrived to the south and east. In response to this drastic alteration of their physical environment, human populations modified their behavior to exploit more fully the new environmental circumstances. Basically modern environments had emerged by the end of the Altithermal (Schuldenrein 1996). The dominant overstory vegetation became dynamic oak-hickory forests. Since ca. 3000 B.C., the climate has cooled slightly and regional rainfall levels possibly have increased, while pines have steadily intermixed with Oak-Hickory species.

III. CULTURAL BACKGROUND

PREHISTORIC OVERVIEW

Nearly continuous aboriginal occupation of the region is likely from at least 12,000 years ago. This chapter provides a general overview of the regional culture history, and draws together some of the available archaeological data to illustrate temporal and social changes. The prehistoric cultural sequence for the Valley and Ridge of eastern Tennessee derives mainly from the extensive work conducted along the Little Tennessee River in conjunction with TVA's Tellico Reservoir project (e.g., Chapman 1977, 1985a, 1985b; Davis 1990; Kimball 1985). This chapter is divided into chronological units that are widely accepted for the cultural sequence in eastern Tennessee: Paleoindian, Archaic, Woodland, Mississippian, and historic settlement.

Paleoindian Period (ca. 10,000–8000 B.C.)

The Paleoindian period represents the earliest human occupation of the southeastern United States. Initial Paleoindian occupation in this region usually is believed to have occurred around 10,000 B.C. and to have continued until about 8000 B.C., although the date for initial occupation of the Americas may be much earlier (e.g., the Monte Verde site in Chile). Paleoindian occupation in the terminal Pleistocene epoch indicates an adaptation to cooler climatic conditions and a different physiographic regime than are found in the following Holocene epoch. Climatically, this period saw the withdrawal of the last ice sheets of the Wisconsin glaciation from the northeastern United States, and, in northeastern Tennessee, the replacement of spruce and pine forests by northern hardwoods. Paleoindian groups likely were organized into small hunting and gathering bands of 25–50 individuals with low reproductive rates. These bands most likely hunted and gathered now-extinct Pleistocene megafauna and flora as a primary subsistence base, although little beyond this is known about Paleoindian everyday life. Recent work by Surovell (2000:493–508) contends that the Paleoindians fertility rates were indeed compatible with a high level of social mobility. If so, it is plausible that a rapid colonization of both North and South America did occur in the relatively short time interval suggested, from 12,000–10,000 B.P. A growing body of data suggests that the "Big Game Hunter" thesis may be somewhat restrictive in its interpretation of Paleoindian material culture, socio-cultural systems, and environmental adaptations (McNutt 1996). Recent archaeological finds at the Coats/Hines Mastodon site (40WM31) indicate that Paleoindian groups did hunt megafauna to some extent in Middle Tennessee (Broster and Breitburg 1995, 1996).

Paleoindian sites most commonly are defined by fluted projectile point forms or by extinct megafauna remains in association with lithic artifacts. The earliest projectile point form defined for the Paleoindian tradition is the Clovis. The Clovis point type was initially defined in New Mexico, where it was found in association with the bones of extinct megafauna. This point form, characterized by basal flakes removed from both faces of the projectile point, often has been found in isolated surface contexts throughout Tennessee. The early occurrence of classic Clovis

points is followed by the appearance of forms classified as Cumberland, Quad, Beaver Lake, and Redstone.

Several intact Paleoindian sites have been investigated in Tennessee (Broster 1989; Broster and Breitburg 1995; Norton and Broster 1993). A survey of Paleoindian sites in the Southeast indicates that discrete, isolatable occupations exist (Williams and Stoltman 1965). One of the earliest loci of Paleoindian activity in the state was in the central Tennessee River valley. This area is demarcated by Beaver Lake, Quad, and Redstone projectile forms in eastern Tennessee (Anderson 1989: Figure 7).

Archaic Period (8000–1000 B.C.)

The Archaic period has been divided into three subperiods: Early (8000–6000 B.C.), Middle (6000–4000 B.C.), and Late (4000–1000 B.C.). Each subdivision has distinctive projectile point styles that serve as temporal markers (Cambron and Hulse 1983; Coe 1964). In the interior southeast, additional artifact classes, such as ground stone artifacts (e.g., Kwas 1981), carved stone vessel fragments, and mortuary items subdivide this period.

The Archaic period is characterized as a hunting and collecting subsistence economy based on the exploitation of modern varieties of plants and animals (Chapman 1977; Coe 1964). Archaic-period social groups were larger and more complex than those in earlier times. This general increase in population density is known as "regional packing." Archaic inhabitants adapted to broad ecological zones, and territorial boundaries, archaeologically recognizable as phases, were established (Anderson and Hanson 1988). Large quantities of fire-cracked rock at numerous sites attest to the intensive exploitation of local food resources. Archaic features include refuse pits used for storage and food preparation. These pits indicate long-term occupancy, as well as a substantial labor investment. Generally, the contents of these types of features reflect a broad-spectrum hunting and gathering subsistence base. Nuts (e.g., walnut, hickory, and acorn) and large faunal species were important in the Archaic dietary regime. Site types or functions include large base camps along the margins of large floodplains and small upland hunting and special-use (extraction) camps that were inhabited for short periods by only a few individuals.

Early Archaic. The Early Archaic seems to reflect a continuation of the Paleoindian hunting and foraging lifestyle but with a shift to modern animal species (especially white-tailed deer). Little is known about their tool kits, and current knowledge is restricted entirely to lithic manifestations of the material culture. Artifacts diagnostic of the Early Archaic period in the Tellico and Watts Bar areas include chipped stone tools with side- and corner-notched hafting elements. These include Dalton, Kirk Corner Notched, Decatur, St. Albans Side Notched, LeCroy Bifurcated, and Kanawha Stemmed types (Kimball 1985).

[Exempted from Disclosure by Statute] Along the [Exempted from Disclosure by Statute] Tennessee River, LeCroy and the Kirk-Palmer cluster are the major diagnostic types (Chapman 1985a). Early Archaic clay hearths also have been investigated at the [Exempted from Disclosure by Statute] site; however, no structural remains have been found (Chapman 1977).

Although mortuary programs are poorly understood for this period, green bone cremations have been discovered [Exempted from Disclosure by Statute] from the LeCroy and Kirk horizons (Chapman 1977). Chapman (1990) indicates that cremations were the dominant burial disposition during most of the Archaic in the Great Valley of eastern Tennessee. Investigations at the Kimberly-Clark site [Exempted from Disclosure by Statute] suggest that the mortuary areas may have been segregated from the remainder of the habitation area.

Middle Archaic. The Middle Archaic can be distinguished from the Early Archaic by a more diverse stone tool kit. Presumably, the population density increased in the Middle Archaic, but small hunting and gathering bands probably still formed the primary social and economic units. Chapman (1985b) argues that indigenous populations actually may have declined during this period in eastern Tennessee, although a shift in settlement patterning or differential site preservation may also be responsible for such a pattern.

Diagnostic bifaces in the Tennessee and Little Tennessee River drainages in East Tennessee include Kirk Stemmed, Stanly Stemmed, Morrow Mountain I and II, Sykes, Halifax Side Notched, and Guilford Lanceolate types (Kimball 1985). Ground stone items (e.g., atlatl weights) became increasingly common in the Middle Archaic (Coe 1964).

Late Archaic. The Late Archaic, the last preceramic period in the region, generally is dated to ca. 4000–1000 B.C. The Late Archaic can be viewed as a time when aboriginal groups lived for long periods in strategic locations and pursued a lifestyle that laid the foundation for more permanent villages in later periods (Wauchope 1966). Existing information suggests that the population density during this period was fairly high, [Exempted from Disclosure by Statute].

According to Kimball (1985), the Savannah River Stemmed (described by Coe 1964), Otarre Stemmed (Keel 1976), and Iddins (Chapman 1981) types are the most common diagnostic hafted bifaces. Excavations at Bacon Bend and Iddins (Chapman 1981) [Exempted from Disclosure by Statute] provide baseline data for this period. During this time, a complex exchange network began to develop that facilitated the movement of exotic trade items (e.g., marine shell, copper) across regional lines. Apparently this exchange was meshed with an increase in social stratification among Late Archaic social groups. Evidence for some type of social stratification is provided by differential mortuary treatments and varying types/quantities of grave goods within social units.

Woodland Period (ca. 1000 B.C.–A.D. 900)

The Woodland tradition in East Tennessee is divided into three periods (Kimball 1985): the Early Woodland (ca. 1000–200 B.C.), Middle Woodland (200 B.C.–A.D. 350), and Late Woodland (A.D. 350–900). The Early Woodland traditionally is marked by the introduction of pottery. Ceramics occur as very distinct series (or traditions) in various parts of the interior riverine southeast in a time-transgressive trend between ca. 2500 and 2000 B.P. The earliest of these include the Wheeler and Alexander series of the upper Tombigbee drainage and Pickwick Lake region, the Kellog-Forsyth series of northern Georgia, the Deptford series of the Piedmont and Atlantic Coastal Plain, and a "mid-latitude fabric and cord-marked" series encompassing most of North Carolina and Tennessee (Smith 1986). The earliest wares appeared sometime prior to this in the estuarine coastal margins of Georgia and South Carolina and spread inland through

stimulus diffusion. Woodland groups also began to construct burial mounds for the interment of the dead. Burial ceremonialism is thought to have begun earlier during the Late Archaic (Chapman 1985a), but it was during the Woodland that the raising of earth mounds as a mortuary device appeared in East Tennessee. Beyond this addition to the artifact inventory, the Early Woodland lifestyle appears to have been quite similar to the Late Archaic.

Projectile forms in this period are variable in morphology and overall craftsmanship. Medium-sized triangular points, pentagonal, side-notched, and stemmed varieties are common in the region for this time period (Chapman 1985b: Figure 6.5). Investigations conducted in the Little Tennessee River valley (Kimball 1985) have isolated diagnostic projectile points for the Woodland tradition, however, distinctive temporally diagnostic projectile points for the Early Woodland (Woodland I) remain unrecognized. For the Middle Woodland (Woodland II) however, temporally sensitive hafted bifaces include the Greeneville, Camp Creek, and Nolichucky forms. Bradley Spike and Connestee Triangular are associated with the Late Woodland (Woodland III) period in this vicinity (Kimball 1985).

Early Woodland. The Early Woodland period is marked by the introduction of pottery into this region, the construction of earthen burial mounds, and intensive horticulture (Watson 1989). This early part of the Woodland period is more of a transitional time between the Archaic and Woodland periods, as seen in the gradual adoption of ceramics and the shift in subsistence and settlement patterns.

During this period there was a distinct increase in the utilization of starchy seed plants as a subsistence resource. Various plants, including goosefoot, maygrass, knotweed, sumpweed, little barley, and sunflower, began to be intensively exploited. Marshelder, goosefoot, cucurbits, and sunflower began to show morphological variations suggesting that the plants had been domesticated. Knotweed, maygrass, and little barley presently are not thought to have been domesticated, but they may have served in some sort of quasi-cultigen capacity, supplementing a more regular dietary regime (Smith 1992:108). The full relationship between Early Woodland horticulturists and their crops in terms of how its effects manifested a robust culture change is not fully understood. TRC recognizes that the effects of formalized horticulture were deeply felt across the interior southeast (Smith 1992).

McCollough and Faulkner (1973) have described the Watts Bar phase, demarcated by distinctive quartz- or sand-tempered, fabric-marked, and cord-marked pottery. The Greenville phase can be identified by the presence of both Watts Bar quartz-tempered and Long Branch limestone-tempered, cord- and fabric-marked ceramics in the artifact assemblages. The final phase identified for the Early Woodland is the Long Branch phase. It can be distinguished by the predominance of limestone-tempered wares.

Middle Woodland. Ceramics associated with this period in East Tennessee consist of sand-tempered Connestee series and limestone-tempered Pickwick Complicated-Stamped, Wright Check-Stamped, Bluff Creek Simple-Stamped, and Candy Creek Cord-Marked types. McCollough and Faulkner (1973) divide this period into two phases. The early Candy Creek phase is associated with limestone-tempered pottery, and the Connestee phase is associated with sand-tempered ceramics. Kimball (1985), however, has declared that statistical analysis of the same material indicates that these assemblages are roughly contemporaneous.

The Middle Woodland can easily be distinguished by the occurrence of exotic non-local trade items associated with the Hopewell Culture. Although centered on the Ohio River Valley, the Hopewell Interaction Sphere (Caldwell 1964; Seeman 1979) reached into eastern Tennessee and beyond. Ceremonial artifacts have been found at Icehouse Bottom and Garden Creek Mound in North Carolina (Chapman 1973; Keel 1976). Walthall (1985) suggests that these apparent ceremonial sites are distinct from smaller, more numerous habitation sites in the region.

Maize (corn) remains have been recovered from sites [Exempted from Disclosure by Statute] (e.g., Icehouse Bottom) and have yielded calibrated radiocarbon dates of A.D. 175 (Chapman and Crites 1987). However, maize is thought to have played only a minor role in prehistoric diets from about A.D. 200 to 800 (Smith 1992:110). Starchy seed plants, exploited during the Early Woodland, continued to be important in the dynamic Middle Woodland horticultural system.

Late Woodland. Investigations at various Late Woodland and Early Mississippian sites in eastern Tennessee have yielded radiocarbon assays suggesting that conical mounds were being constructed from about A.D. 700 to 1200, well into the Mississippian period (Schroedl 1978; Schroedl et al. 1990). A single pit feature from 40LD179 contained both Hamilton and Madison projectile points, as well as Middle Woodland Mulberry Creek Plain ceramics. Charcoal from this feature returned a calibrated date of A.D. 1020 (Ahlman et al. 1999:66). This information suggests that the association of small shell heap middens [Exempted from Disclosure by Statute] may not be strictly contemporaneous with the Hamilton culture groups. Schroedl et al. (1990) stress that there currently are no radiocarbon determinations to place such features accurately in their proper temporal context.

Horticulture apparently played an important role during this period. Wild game and mussels gathered from major waterways supplemented Late Woodland diets. Unfortunately, architectural evidence for the period is absent. The elaborate mortuary ceremonialism seen during earlier periods is no longer present, and perhaps may be oriented on a local rather than regional scale. Primary interments in burial mounds seem to be the common mortuary program. Cole's (1975) analysis of Hamilton-phase mortuary patterning suggests that social stratification was not marked, and that observed differences in burial treatments were related to achieved rather than ascribed status distinctions.

Mississippian Period (A.D. 900–1600)

Perhaps no period of southeastern prehistory has received more research than the Mississippian. From about A.D. 900 until initial European contact in the sixteenth century, Mississippian societies of differing complexity controlled local and regional territories along most of the large rivers in the interior Southeast, including the Little Tennessee. The chronology of the Mississippian period is based on the recognition of phases or cultures defined on temporal, spatial, and technological grounds. In Kimball's (1985) chronology, Mississippian I is synonymous with the Martin Farm culture and falls between A.D. 900 and 1000. The Mississippian II, or Hiwassee Island phase, is defined between A.D. 1000 and 1300. Mississippian III is characterized by the contemporaneous Dallas and Mouse Creek cultures from A.D. 1300 to 1600. Finally, the Mississippian IV, Overhill Cherokee, culture is recognized between A.D. 1600 and 1838.

Research into the Mississippian culture in eastern Tennessee began during the era of dam construction with Webb's (1938) excavations in the Norris Basin of the Clinch River and the work in Chickamauga Lake region (Lewis and Kneberg 1941), as well as Watts Bar Lake along the main channel of the Tennessee. Since then, archaeological investigations in the Tellico Reservoir have dramatically reshaped what is known of local Mississippian material and social culture.

At the risk of oversimplification, the Mississippian cultural pattern in East Tennessee can be summarized in terms of its material and organizational attributes. Settlement patterns of Mississippian communities were focused [Exempted from Disclosure by Statute]. These [Exempted from Disclosure by Statute] had expanses of soil easily tilled with available wood, bone, and stone agricultural implements. Broadly speaking, Mississippian settlement followed a hierarchical pattern, which included nucleated villages (sometimes palisaded, sometimes containing mounds), with outlying villages and isolated farmsteads. [Exempted from Disclosure by Statute]. Other villages and farmsteads were linked to these regional mound ceremonial centers, which were the focus of important religious and social activities. During the Martin Farm phase, [Exempted from Disclosure by Statute], where the richest agricultural soils can be found. During the subsequent Hiwassee Island phase, settlements were situated [Exempted from Disclosure by Statute], possibly because of population increase or concern about flooding. During the Dallas phase, settlement concentrations reverted back [Exempted from Disclosure by Statute] (Davis 1990:241–248).

Architecture within Mississippian settlements was characterized by permanent rectangular structures, with wall posts set vertically into trenches (Chapman 1985b:76). The wall posts were covered with interwoven cane strips or branches and plastered with clay daub. These structures typically measured approximately 5 m on a side and contained a hearth and sleeping benches. At larger villages and ceremonial centers, houses and mounds were arranged around an open central plaza, and towns were encircled by a defensive palisade.

By A.D. 900, ceramic vessels were tempered with crushed and burned mussel shell, a combination of shell and limestone, or limestone alone. The introduction of shell as an aplastic additive ushered in a revolution in the manufacture of ceramic vessels (Morse and Morse 1983). This process allowed for the construction of vessels with stronger, thinner walls that could be fashioned into a variety of never-before-seen shapes (e.g., effigies, shouldered jars, and water bottles). After about A.D. 1000, shell-tempered ceramics were the dominant types in Mississippian assemblages (Schroedl et al. 1990: Figure 69). Mississippian ceramic vessels display a diversity of forms and decorative attributes, but the most common vessels forms were globular jars, often with loop handles from the everted rim to the shoulder (Chapman 1985b:74). Surface treatments or decorations include plain, burnished, cord marked, fabric impressed, and painted.

The focus on maize as a primary food crop had significant impacts on how native societies in eastern Tennessee were organized socially and politically. Relatively egalitarian Woodland groups were transformed into more hierarchical constructs with new emphases on hereditary leadership and emerging managerial organizations (secondary elite). This more complex social organization generally has been referred to as a chiefdom. In a discussion of causal mechanisms

associated with Mississippian development in eastern Tennessee, Schroedl et al. (1990:192) offered the following characterization:

> The introduction of eastern flint corn varieties around A.D. 800 potentially was an important element in overall culture development (Ford 1977, 1981:16). Increased yields could be produced by this plant within the existing horticultural system. By focusing on the selective advantages of this plant, the food supply was improved with no great additional cost in labor. If this became correlated with population peaks over several generations, it is conceivable that a population threshold might have been reached beyond the previous optimal mean. The available Late Woodland sociopolitical and socio-religious organizations were not suitable or capable of managing this situation. Only greater social differentiation with power and access to resources restricted to fewer individuals and groups and more explicitly defined social roles would work. Once in place this system was self-reinforcing until it, too, reached optimal efficiency. This was achieved by the Late Mississippian period.

Maize was supplemented by beans, squash, and a variety of other foods with low archaeological visibility (see Kline and Crites 1979). Domesticated crops were supplemented with wild foods that had contributed to aboriginal diets in the Southeast for millennia, including nuts, berries, persimmons, greens, and roots. Meat sources consisted of deer, turkey, small mammals, and aquatic species.

Increased organizational complexity is marked further by the appearance of substructure platform mounds during the Mississippian. These mounds served as foundations for religious structures and the locations for residences of high-status individuals. However, Woodland-style conical burial mounds were still being erected in the early part of this period, reflecting continuity of local traditions. Status differences derived from achieved as well as ascribed distinctions. One way to achieve elevated status was through success in warfare and the taking of trophies to demonstrate one's warfare prowess (Ezell 1997). Ascribed differences likely corresponded to membership in one of a community's segmented, ranked matrilineages (Chapman 1985b:77). Individual status distinctions were reinforced through differential access to non-subsistence items such as conch shell jewelry, native copper, non-utilitarian chipped stone items, and esoteric knowledge. Status distinctions also were reflected in variation of Mississippian burials, although it is doubtful that professional archaeologists have ever excavated a paramount elite burial in the interior Southeast (Stephen Williams, personal communication 1997). Burials of higher-status individuals usually occurred in conical mound earthworks, while commoners were interred in family cemetery plots near the dwellings.

Lithic assemblages during this period became vastly restricted when viewed against the backdrop of previous cultural periods. This may be explained by the use of more perishable tool mediums (e.g., bone, antler, shell). Triangular point forms including Dallas Excurvate, pentagonal, Madison, and Hamilton are present, as well as hoes chipped from chert and greenstone. Other diagnostic artifact types include ground stone items (chunkey stones), engraved shell items, mica, and galena.

HISTORIC BACKGROUND

This section presents a brief overview of the settlement and social and economic development of Roane County and the project vicinity. The background history provides a context for the interpretation of historic archaeological sites identified during the current survey.

Euroamerican Contact and Settlement

The earliest documented European incursion into the upper drainage of the Tennessee River was the de Soto expedition of 1540. The precise route of de Soto and his men has been the subject of controversy for years. According to DePratter et al. (1985) and Hudson et al. (1984), the de Soto expedition crossed the Appalachians from North Carolina into Tennessee and arrived at the village of Chiaha on Zimmerman's Island in the French Broad River close to Dandridge, Tennessee. Chiaha was located at the northern border of the expansive chiefdom of Coosa, while the central town of the Coosa chiefdom was hypothesized to have been the Little Egypt site at Carters Quarters in northwest Georgia.

At least one other early Spanish expedition, led by Tristan de Luna in 1559–1561, also penetrated the upper Tennessee River in the sixteenth century, visiting many of the same sites as de Soto, including the Coosa site. Although the Spanish rarely ventured this far inland after these expeditions, the effects of the contact were felt throughout the southeast.

Anglo-American expansion into eastern Tennessee began after the Revolutionary War, with settlement concentrated along the fertile valleys of the Tennessee River. Prior to this time the lands of eastern Tennessee belonged to the Cherokee, whose own settlements focused on the Little Tennessee River south of Knoxville. Contact between whites and Cherokees in the Colonial period came primarily through fur traders from the Carolinas and Virginia, and later through the manipulations of war. The British Fort Loudon was established on the Little Tennessee River in 1756 to defend the Carolinas against possible invasion during the French and Indian War. With British victory, white settlers began to move into northeastern Tennessee, purchasing or leasing lands from the Cherokee. British colonial policy officially closed settlement of Tennessee, however, and Anglo-American occupation of this region remained sparse and isolated. During the Revolutionary War, the Cherokee sided with the British, whose defeat gave many land-hungry colonists a basis for assuming that the Cherokee had forfeited their claims to Tennessee.

After the Revolutionary War, the State of North Carolina sought to annex Cherokee lands along its western border, and in 1783 the state enacted the "land grab act," offering for sale all its lands in the Tennessee country at £10 per 100 acres, reserving the land east of the Tennessee River and south of the French Broad and Big Pigeon rivers for the Cherokee (although no formal agreement with the tribe had been made). The land grab act was the impetus for many early settlers arriving in eastern Tennessee (McArthur 1976:1–2).

The pioneers in the Tennessee territory arrived to great confusion, however, as control of the area west of the Appalachians remained uncertain. In 1783, North Carolina had ceded its western territories to the United States government, and then in the following year revoked the cession. The Jefferson Ordinance, passed by Congress in 1784, encouraged the organization of new states

along the western boundary of the former colonies, and the Tennessee settlers, anxious to secure their independence and, more important, to expand their boundaries through the annexation of Cherokee lands, sought to organize themselves as the first state for admission (Rothrock 1946:25). Despite the revoked cession of these lands to the federal government, James Sevier, an aggressive fighter and land speculator, was elected governor of the erstwhile State of Franklin and pursued both territorial expansion and recognized statehood. In 1785, the State of Franklin negotiated the Treaty of Dumplin Creek, which pushed the Cherokee boundary south of the Tennessee River. The United States government, however, refused to recognize the new state or the treaty. The Treaty of Hopewell, negotiated by the federal government, was more generous to the Cherokee and left many of the settlers of Tennessee in Indian territory (Pickel 1981:10; Rothrock 1946:26).

The conflicting claims led to years of violence between the American settlers and the Cherokee. In 1790 North Carolina ratified the federal Constitution and once again ceded its western territorial claims to the United States government, which organized the western lands as the Territory of the United States South of the Ohio River, or Southwest Territory (McArthur 1976:3–5). The capital of the territory was laid out in 1791 and named Knoxville, in honor of Secretary of War James Knox, and William Blount was elected its first governor. The same year, Blount negotiated the Treaty of Holston, which ceded the eastern part of what is now Roane County to the United States. Southwest Point, the later site of Kingston at the mouth of the Clinch River, was just outside this line. However, the line was not surveyed until 1797, creating more confusion between the Cherokee and American settlers (Pickel 1981:10–11).

The militant Lower Cherokee, or Chickamauga band, refused to recognize the Treaty of Holston, and in 1792 declared war on the United States. In response, Governor Blount took it upon himself to assemble a militia force under John Sevier, who took up position at Southwest Point and began construction of a blockhouse there. Secretary of War Knox worried that Blount was overreacting and ordered the force disbanded. This was done, but in 1794, Congress authorized the construction of a fort at Southwest Point. A garrison was posted there through at least 1799, by which time enough civilians had taken up residence in the area to organize a town (Pickel 1981:14–18).

In 1795, a census of the Southwest Territory was taken to determine whether the 60,000 occupants required to vote for statehood were present. The population proved to be 77,262, so in 1796, a convention was held in Knoxville to write a state constitution, and Tennessee was admitted to the Union the same year (Rothrock 1946:35).

Permanent Euroamerican settlement of the project vicinity began after the Treaty of Tellico Blockhouse in 1798, which ceded the land between the Clinch River and Cumberland Mountain to the United States. With the threat of conflict with the Cherokee removed, settlement proceeded rapidly. As these settlements increased, the few remaining Cherokee inhabitants were gradually displaced. Some admixture did occur until their forced removal in 1838 (Hoskins 1979).

Roane County was created in 1801 and included what is now Morgan County. Kingston, at the confluence of the Clinch and Tennessee rivers was designated the Roane County seat and had 600 inhabitants by the mid 1870s. When Roane County's borders were extended across the

Tennessee River in 1819 following the Cherokee cession, Morgan County was created from the northern part of Roane (Killebrew 1974 [1874]:597).

Agricultural and Commercial Development (1801–1933)

Although it bordered on Indian country during the late eighteenth and early nineteenth centuries, the Roane County area was not particularly isolated as a result of being located at the confluence of several rivers and on the road between Knoxville and Nashville, the centers of East and Middle Tennessee respectively. The Walton Road, known as the Kingston Pike from Knoxville to Kingston, was the main east-west route between Knoxville and Nashville. It was completed in 1801. In 1804, money was allocated by the Tennessee legislature for a road south from Kingston to the Georgia road in Cherokee territory. A stagecoach line began regular service between Nashville and the temporary capital of Tennessee located at Washington in what is now Rhea County by 1804. This route passed through Kingston and Roane County (Pickel 1981:34).

Self-sufficient agriculture was the principal pursuit of most nineteenth-century residents of the Clinch River valley. Corn and wheat were the basis of the system; corn was the food base for the family and animals, and wheat was primarily a money crop. Rye, oats, and surplus corn were also sold or bartered. Meat was acquired from hogs and cattle, which in the early years of settlement were allowed to forage freely. Kitchen gardens supplemented the diet with vegetables, and orchards provided fruit. Wild foods were also utilized, including wild game, fruits, and nuts. Clothing, soap, toys, and many other items were produced at home, and the wood lot supplied firewood and building material for houses, outbuildings, fencing, furniture, tools, and wagons. Although much of what was needed was produced on the farm, store-bought items were not uncommon. Surplus products were bartered or sold for iron goods, kitchenware, coffee, salt, shoes, storage containers, and other manufactured goods. These might be purchased on a regular basis from local merchants or from markets in Kingston or Knoxville, where an annual or semiannual trip might be made. As early as 1794, Nathaniel and Samuel Cowan advertised that they would accept "corn, rye, oats, beeswax, flax, old Congress money, and Martin's certificates" for goods at their store in Knoxville (*Knoxville Gazette* 1794). Farmers could also float their goods down the Tennessee River to markets as far away as New Orleans, although the trip was risky and dangerous.

Mills were constructed in convenient locations for grinding corn and wheat into meal. These mills also served as community social centers, where local news was exchanged and business was conducted. Joseph Black was granted permission to construct a mill on Clinch River in 1833, provided he did not obstruct navigation on the waterway, which had its head of navigation at Clinton.

Although agriculture was the chief pursuit of most settlers in eastern Tennessee, the hilly topography and mineral wealth of the hills led to a number of experiments with industry. As early as the 1790s, Mathew English had constructed a primitive iron forge near White's Creek in the southern part of the county, using wood charcoal produced from the timbered hillsides for fuel. An iron furnace was reported for Roane County in the 1820 census, and around 1830, Robert Craven, who had purchased an interest in the old Mathew English furnace, erected Eagle Furnace on White's Creek that produced pig iron for the production of utensils and cookware locally, as well as for trade. Two forges and a furnace are shown in Roane County at the base of

Cumberland Mountain on the Rhea (1832) map of Tennessee (Figure 5). Coal came in to use as a source of power for the forges around 1840, and in that year, a rich vein of coal and iron ore at Rockwood was discovered. By the time of the Civil War, iron production dominated Roane County's industry, with an estimated $100,000 in capital invested in the four furnaces then in operation (Killebrew 1974 [1874]:197; Pickel 1981:35–36).

Prior to the Civil War, tanneries and related industries were a specialty of Roane County. Hats and saddlery were the main products made from the leather processed there. Distillers were also an important early industry, particularly when the costs and risks of transporting large amounts of corn were prohibitive. In 1820, nearly $10,000 in whiskey was produced. The distilling industry had declined by 1840, however, perhaps as a result of improved transportation. A cotton factory was also started in Roane County before the Civil War, employing mostly women and children (Pickel 1981:35–36).

Despite a healthy industrial sector, the number of people employed in manufactures and the contribution of industry to the Roane County economy was nevertheless small when compared with agriculture. As previously noted, corn was the most important crop, with wheat, and other grains also important. Cotton was never a significant crop due to the short growing season, although there were two cotton gins in operation in Kingston prior to the Civil War. Only 200 bales were produced in 1860 compared to the state average of over 3,500 bales. Tobacco was introduced before 1850 and during the 1850s, production of the crop increased more than five-fold. Farm values and improved acreage for all products increased dramatically during the decade prior to the Civil War, reflecting the prosperity of that period in the agriculture of the South. Although no railroads were constructed in Roane County until after the war, the county's river traffic benefited from the improved access to nearby areas of the Tennessee Valley (Kennedy 1990a; Pickel 1981:37–38).

Farmers in the region of East Tennessee did not depend much on slave labor, relying instead on large families, the help of neighbors, and occasional day labor to tend their farms. Slaves were more common in the Tennessee River counties than in the adjacent hill country, however. In 1810, there were 670 slaves in the county, representing 12 percent of the total population. This percentage did not increase significantly up to 1860, when Roane County slaves made up not quite 15 percent of the total (Kennedy 1990b; Pickel 1981:41).

Not as dependent on the plantation economy or slave labor as other areas of the South, many citizens of East Tennessee supported the Union at the outset of the Civil War, although few would have supported emancipation. Many men from the area enlisted in northern units, some of them organized in Kentucky. No major battles were fought in the area, but the importance of controlling the river, railroad, and road transportation networks that passed through the area, led to numerous skirmishes. The East Tennessee and Georgia Railway was completed between Chattanooga and Knoxville through the eastern portion of the county (now in Loudon County) just prior to the Civil War and was an important link in supplying the Union army at Chattanooga during the Tennessee Campaign (Goodspeed Publishing Company 1989 [1887]; Killebrew 1974 [1874]; McInnis and Jamborsky 1986:6, 9).

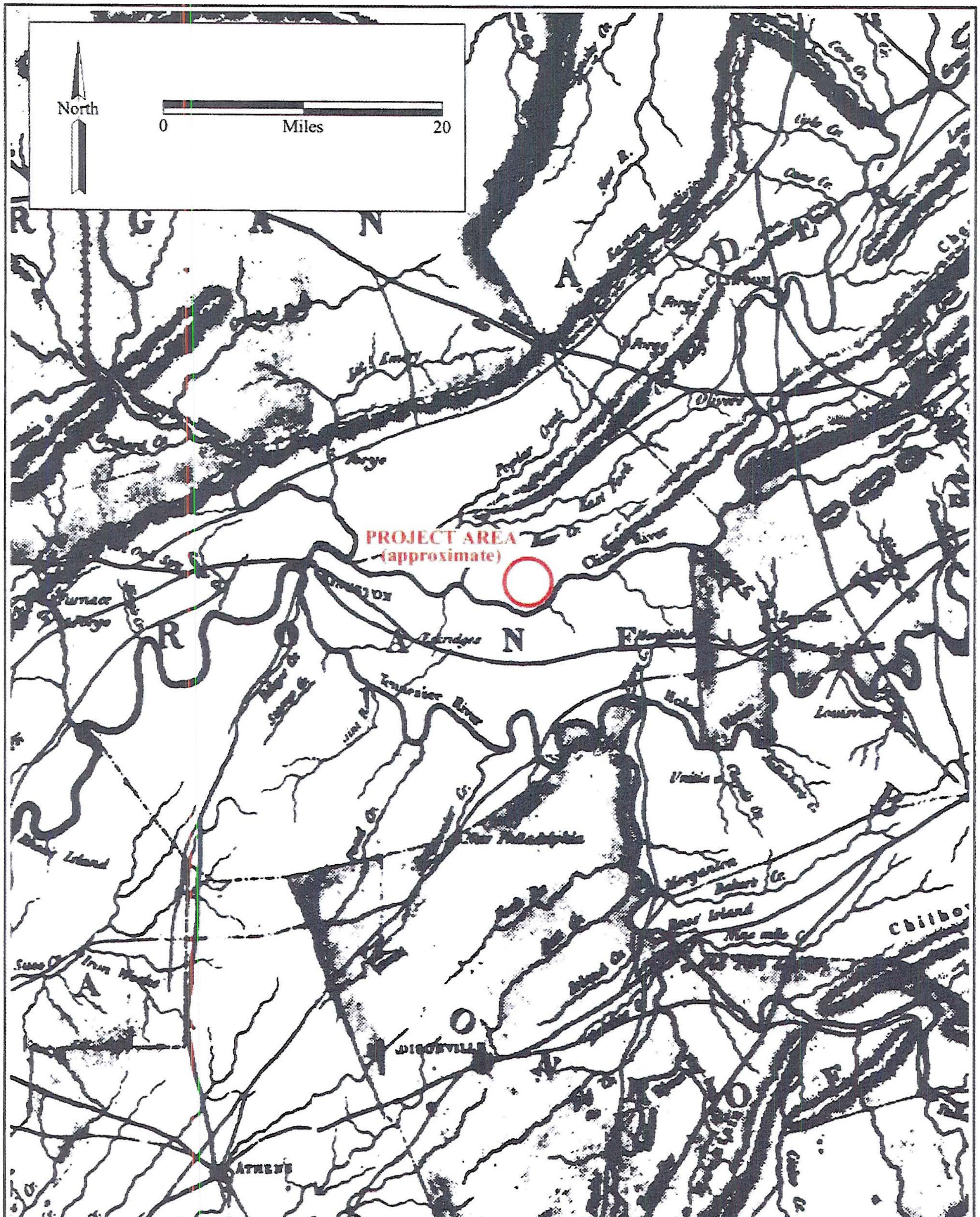


Figure 5. Rhea map of 1832 showing Roane County.

In 1863, General Ambrose Burnside, urged by President Lincoln to come to the relief of Unionists in East Tennessee, moved into Knoxville, driving the Confederates back toward Chattanooga. The retreating Rebels burned the railroad bridge over the Tennessee River at Loudon as they withdrew. By September 1863, Roane County was under Union control, with Col. Robert K. Byrd of Kingston in command of the 1st Tennessee Volunteer Regiment, USA, comprised of many Roane County natives. When Burnside was pulled away from Knoxville to make a raid into Virginia, leaving garrisons at Kingston and Knoxville, Confederate cavalry commander Nathan Bedford Forrest made destructive raids into Roane County to disrupt Burnsides' forces and prevent him from reinforcing Rosencrans at Chickamauga. Confederate forces under General James Longstreet attempted to recapture Knoxville in late 1863, but their siege was unsuccessful. During that campaign, General Joseph Wheeler's Confederate cavalry was sent to Kingston to capture the Union garrison there. Wheeler drove the Union skirmishers back into their main line on the high ground east of the city, but was unable to penetrate the line. He rejoined Longstreet at Knoxville (McInnis and Jamborsky 1986:8–9).

With the war's end, Roane County's economy was in shambles. Raiders from both armies had stripped the countryside of fences, livestock, and crops and many homes and churches were destroyed for firewood. Although the loss of slave labor was not as significant in Roane County as in other areas of the South, the county nevertheless struggled with the loss of labor through death and dismemberment from the war. The loss of capital resulting from the collapse of the Confederacy meant that money was not available to restore farms, replace livestock, and purchase supplies for planting. Because Unionists had been in control of Knoxville and the surrounding region for much of the war, the political and economic influence of Confederate supporters was co-opted by vengeful Reconstructionists. It was not until the late 1860s that life began to return to normal in Roane County (McInnis and Jamborsky 1986:10–15).

The construction of railroads into the hills of East Tennessee after the Civil War offered new opportunities to exploit the area's resources. Mines were opened all along the Cumberland Plateau where rich veins of coal, iron, and other minerals are located. The largest of these in Roane County was the Roane Iron Company, opened by General John T. Wilder, W. O. Rockwood, and others in 1867. The town of Rockwood grew up around the operation and by 1874 included more than 1,000 inhabitants (Killebrew 1974 [1874]:598). The Roane Iron Company constructed the Rockwood & Tennessee River Railway to transport its products 5.5 miles to Rockwood Landing on the Tennessee River for shipment, since the overland and water routes to the East Tennessee, Virginia & Georgia Railroad at Loudon were unreliable. By the mid 1870s, the Cincinnati-Southern Railroad, under construction from the Ohio River to Chattanooga was completed to Rockwood and the bridge over the Emory River became an important landing for the transfer of goods between rail and river routes. In 1879, the Cincinnati-Southern was completed to Chattanooga, passing along the base of the Cumberland escarpment and providing service to a number of coal and iron ventures along its route through Roane County (Williams 1986:37). Figure 6 illustrates the industrial development of the area around Kingston in the mid 1870s.

Not all iron and coal ventures were successful. In 1890, the town of Cardiff was founded amid great land speculation that anticipated a large manufacturing center. Unfortunately, the Cardiff Coal and Iron Company went into receivership only a year later and the nationwide financial

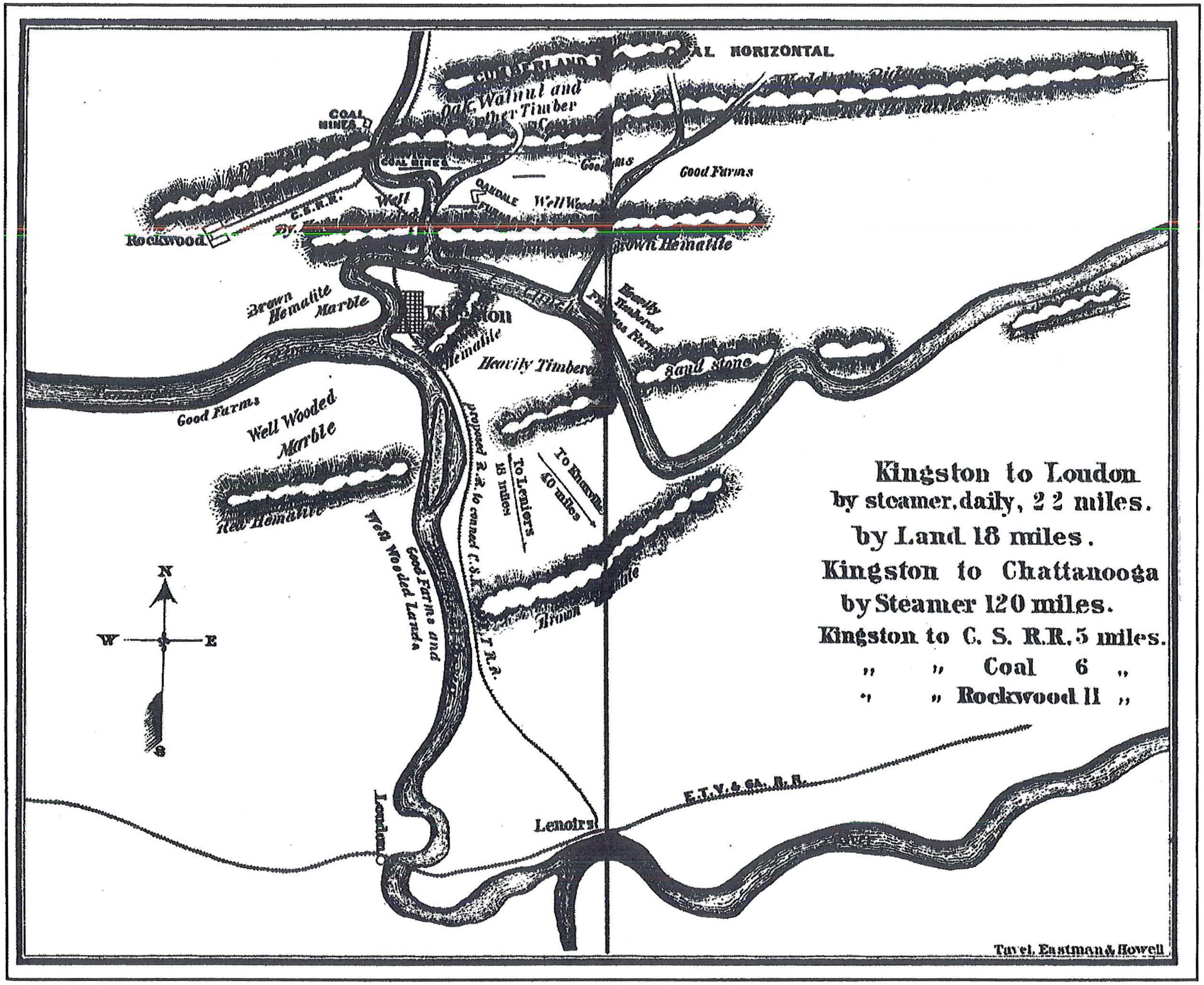


Figure 6. Industrial and transportation facilities in the vicinity of Kingston, ca. 1874 (Tavel, Eastman & Howell 1874, in Killebrew 1974 [1874]:600–601). The proposed railroad through Kingston connecting the Cincinnati-Southern and East Tennessee, Virginia & Georgia railroads was never constructed.

panic of 1893 doomed the enterprise (Galloway 1986:21–24). The effects of the growth of iron and coal industries during the last decade of the twentieth century is evident from the 30 percent increase in the population of Roane County, from 17,417 to 22,738 (U.S. Bureau of the Census 1901).

The town of Harriman, established the same year as Cardiff, proved more durable. Founded by Frederick Gates, an idealistic Chattanooga minister and entrepreneur who believed a successful city could be developed around principles of temperance and industriousness, Harriman prospered and by 1900 supported about 60 businesses. Oliver Springs grew up around the resort established by Richard Oliver before the Civil War, but expanded as a result of nearby coalmines. Besides coal mining, the region's industrial base in the late nineteenth and early twentieth centuries included lumbering and sawmills, stone quarrying, lime kilns, canneries, and wood products.

As railroad connections were expanded in the 1880s and 1890s, the coal and lumber industries also grew. The mines began to employ state convicts to work, much to the disgust of the Welsh, Scottish, and native workers that had been working in the dangerous mines for low pay and were now being forced out. In 1891 the free laborers rallied against the convict system. Joined by fellow workers from Kentucky and around Tennessee, they loaded the prisoners on trains and sent them back to Knoxville. The convicts were sent back several times accompanied by the state militia to keep order. However, continued violence and unrest eventually prompted the legislature to discontinue the convict lease program in 1896 (Hoskins ca. 1987:73–75).

Agriculture remained the principal pursuit of the region after the Civil War, in terms of overall economic impact and number employed. The main crops were corn, wheat, and oats, as they had been before the Civil War. Potatoes were often peddled to mining families. Self-sufficiency continued to be the model for farm operation, with most families supplementing their income with such pursuits as milling, blacksmithing, tanning, stone cutting, teaching, preaching, logging, canning, or sewing. Farms in Roane County appear to have been fairly prosperous. The average number of acres per farm (141 acres) was higher than in the state as a whole (125 acres), and included as many improved acres per farm (50 acres per farm in Roane County compared to 44 acres in Tennessee). Only 58 percent of the county's farmers owned their land, compared to 62 percent in the rest of the state, but this was not uncommon in mountainous counties. Farm size and ownership decreased steadily during the late nineteenth century as it did throughout the South. By 1900, the average farm size in Roane County was 105 acres and the percentage of landowners had slipped to just under 50 percent (U.S. Bureau of the Census 1883, 1902). The 1900 census statistics also highlight the decline in the number of farms, despite a significant population increase, as many local farmers began to work only part-time in the fields, or leave farming altogether for the low but steady pay of the coalmines. However, other farmers benefited from the new markets, selling livestock and produce in the coal towns, rather than shipping to larger towns (Ridenour 1985:71–82).

The first decade of the twentieth century saw a spike in agriculture, with the number of farms and amount of improved acreage in the county increasing. Land ownership rebounded during this period, reaching 68 percent in 1910 and 1920. Cereals, principally corn, but also wheat and oats, accounted for over half of the total value of crops in the county in 1920. Hay and forage crops,

such as grasses and silage represented about a quarter of the value of farm crops. Vegetables, fruits, and nuts were also a significant category of crop. Cotton was not produced at all, and tobacco, which had been an important crop in the late nineteenth century, was negligible (U.S. Bureau of the Census 1925).

Soil depletion, poor management, shrinking farm size, isolation, and the changing character of agriculture in the twentieth century forced many farmers to the edge of poverty in the 1920s. This was a boom period for the coal mines, and many farmers went to work in factories and other laboring jobs in Knoxville, as well. However, the stock market crash in 1929 closed many of the mines and resulted in layoffs in the manufacturing plants. With employment opportunities narrowed, many workers returned to farming the family land, but due to shrinking local markets for farm products, the improvement of living conditions was difficult (Ridenour 1985:95, 101).

TVA and Oak Ridge (1933–Present)

As part of his Depression recovery plan, President Franklin Roosevelt proposed the development of the entire Tennessee Valley region, with dams for power generation and flood control coupled with programs for reforestation, erosion control, and diversification of the industrial base. The Tennessee Valley Authority was created in that year, and its first dam project was Norris Dam in northeastern Anderson County, named for the senator from Nebraska who was instrumental in the passage of the enabling legislation creating the TVA (TVA 1940).

The construction of Norris Dam was seen as a turning point in the history of the region, bringing electricity to rural workers, steady employment, and a new way of life for many of its citizens, who began to leave farming and mining. In 1939 construction was begun on Watts Bar Lake, part of a system of dams and locks on the Tennessee River intended to improve navigation and control flooding. Industry located in the area to take advantage of inexpensive power, and the military needs of World War II led to the construction of Oak Ridge Laboratories in southwest Anderson County in 1941, further fueling growth. The population of Roane County, which had remained steady since the beginning of the twentieth century, began to increase steadily in the 1930s, and saw its largest gains in the 1950s and 1970s. The Kingston Steam Generating Plant, located near the project area, was put into operation in the mid 1950s and is the TVA's fourth largest generating facility (Southern Alliance for Clean Energy ca. 2001; TVA 2002:5). Timbering and light industrial facilities also provide jobs in the area.

Historical Development of the Project Vicinity

The project area is located on the north side of a bend in the Clinch River about 8.5 miles east-northeast of Kingston, which was established at the mouth of the Clinch River in 1799. Secondary sources consulted for the current investigation contained no information on the land use history of the project area, but its location adjacent to the Clinch River and upstream of the county seat would have attracted settlers from an early period. The bottomlands on the south side of the river would have been more desirable for farming; however, the smaller low-lying area in the eastern part of the project tract could have been utilized for farming and grazing. The steep slopes in the western part of the tract were likely utilized for timber and possibly grazing.

The project vicinity was some distance from any major road in the antebellum period (Rhea 1832), with the Kingston Pike and Emory Road passing to the south and north respectively (see Figure 5). By the time of the Civil War (Cowles 1983: Plate 150), a road led from Lenoir's on the Tennessee River to Winter's Gap, following roughly the route of the current State Routes 95 and 327 (Figure 7).

The first detailed map of the project vicinity is the planimetric advance sheets made for the later topographic maps published by TVA and USGS. The advance sheets were surveyed in 1935 and show the location of structures such as houses and barns (TVA 1935a, 1935b). The maps show that a road passed through the middle of the project area, with structures located on this road near the east and west boundaries of the project area (Figure 8). The structure near the east boundary may coincide with the ruins shown on the most recent map of the area (TVA 1989). A post office map from the same period shows several houses in this area as well (Post Office Department ca. 1935). One of these is labeled "McGill," but the map is not detailed enough to locate the buildings precisely in relation to the project area.

A 1939 highway map of Roane County (Tennessee State Highway Department 1939) shows four houses along this road that are in or near the project area (Figure 9). They are all designated as farm units (dwellings with associated outbuildings). The TVA land acquisition maps show that the two historic-period sites within the project area (40RE121 and 40RE122) were farmsteads owned by Mary Grubb and E. M. Freels, respectively. By 1968 (TVA 1968), neither the road nor the houses are shown, although the map notes the ruins that likely represent one of these houses. The unimproved road reappears on the most recent maps (TVA 1989, 1990), but no structures are shown in the project vicinity except the ruins (see Figure 1).

PREVIOUS ARCHAEOLOGICAL INVESTIGATIONS

Nash (1941) conducted the first archaeological survey in the modern era in Watts Bar Reservoir. Intensive archaeological interest in the area did not resume again until the 1970s. F. A. Calabrese (1976) and a team from the University of Tennessee at Chattanooga excavated 40RH6 (Unit 1), located below Watts Bar Dam in Rhea County. Radiocarbon determinations from features at the site indicate a Late Archaic affiliation. The types of ceramics and chipped stone implements recovered from the site are commonly associated with the Woodland period.

A team from the University of Tennessee Anthropology Department conducted excavations of the Leuty and McDonald Site mounds in 1971 (Schroedl 1978). The mound groups consisted of an Early Mississippian mound (40RH6) and five Hamilton (Late Woodland) mounds (40RH7). Eleven radiocarbon dates were derived from the Hamilton mound group, ranging from about A.D. 700–1200.

A series of archaeological investigations were also conducted at the CRBRF (e.g., Fielder 1974; Jolley 1982; Schroedl 1972, 1974a, 1974b, 1975). Some of the surveys, which were not comprehensive, included portions of the current study tract.

Most of the resources discovered during those studies are classified as open habitations with indeterminate cultural affiliations, although Archaic, Woodland, and Mississippian cultural

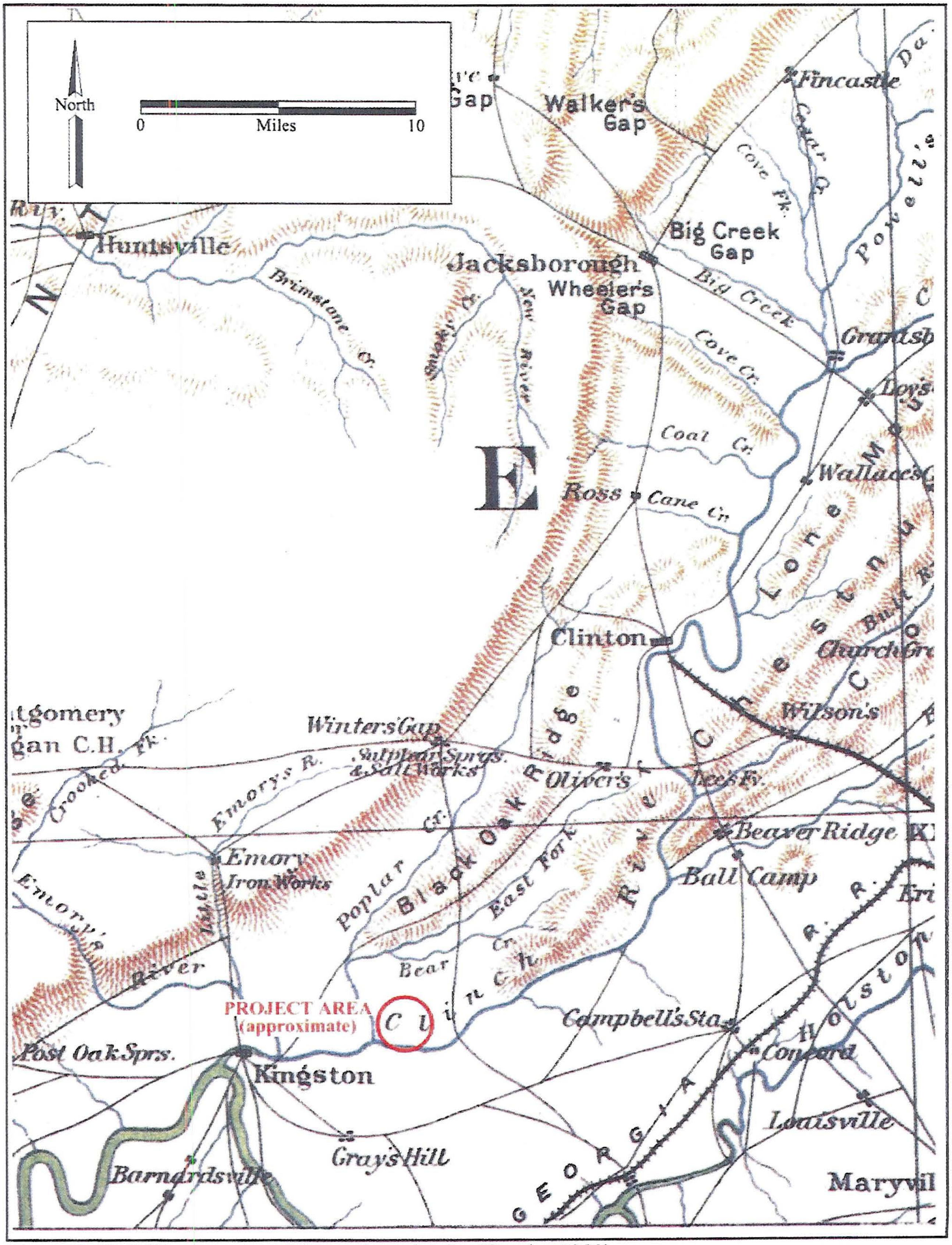


Figure 7. Civil War-era map of the project vicinity (Cowles 1983).

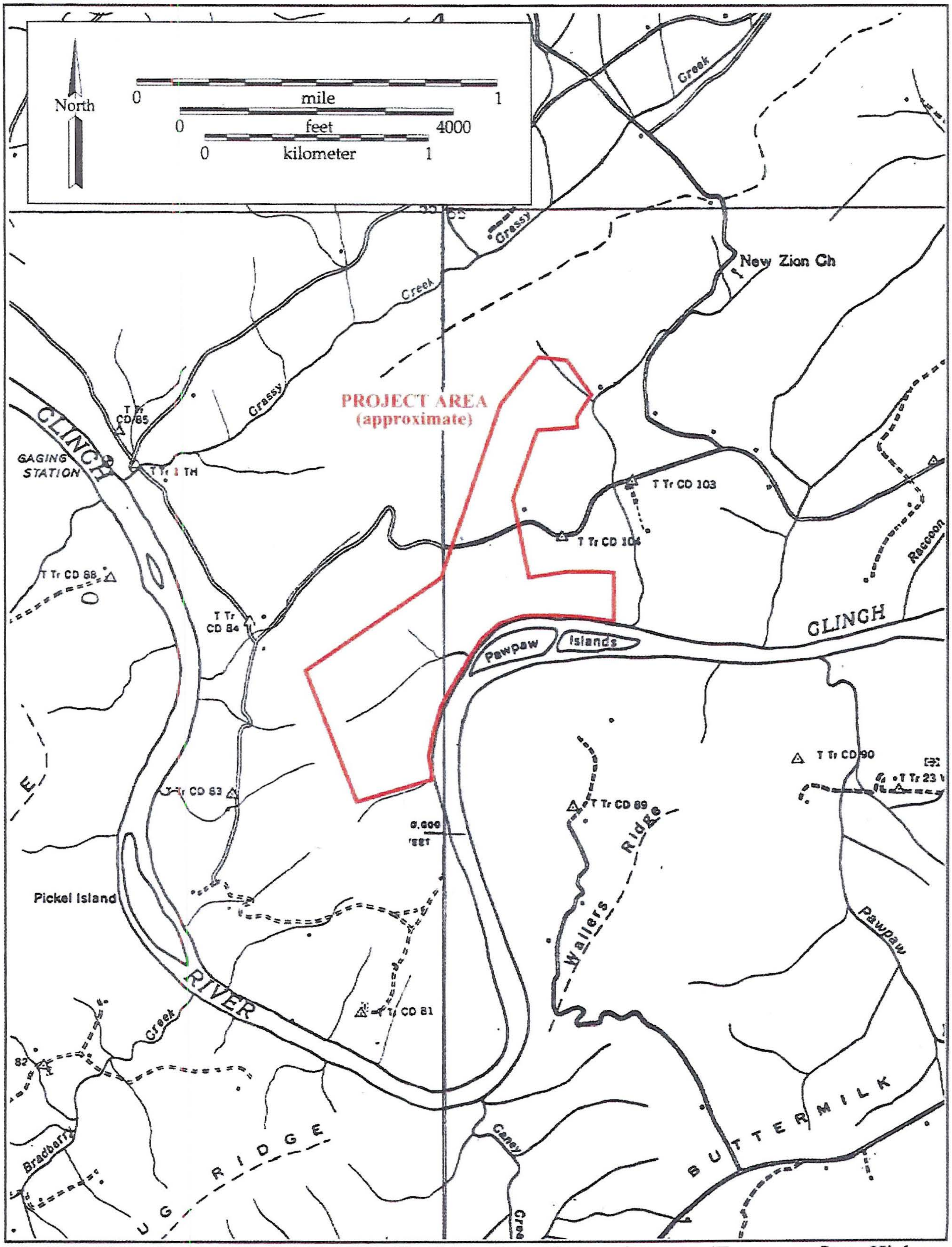


Figure 8. Map of project vicinity in 1935 showing approximate project area (Tennessee State Highway Department 1939).

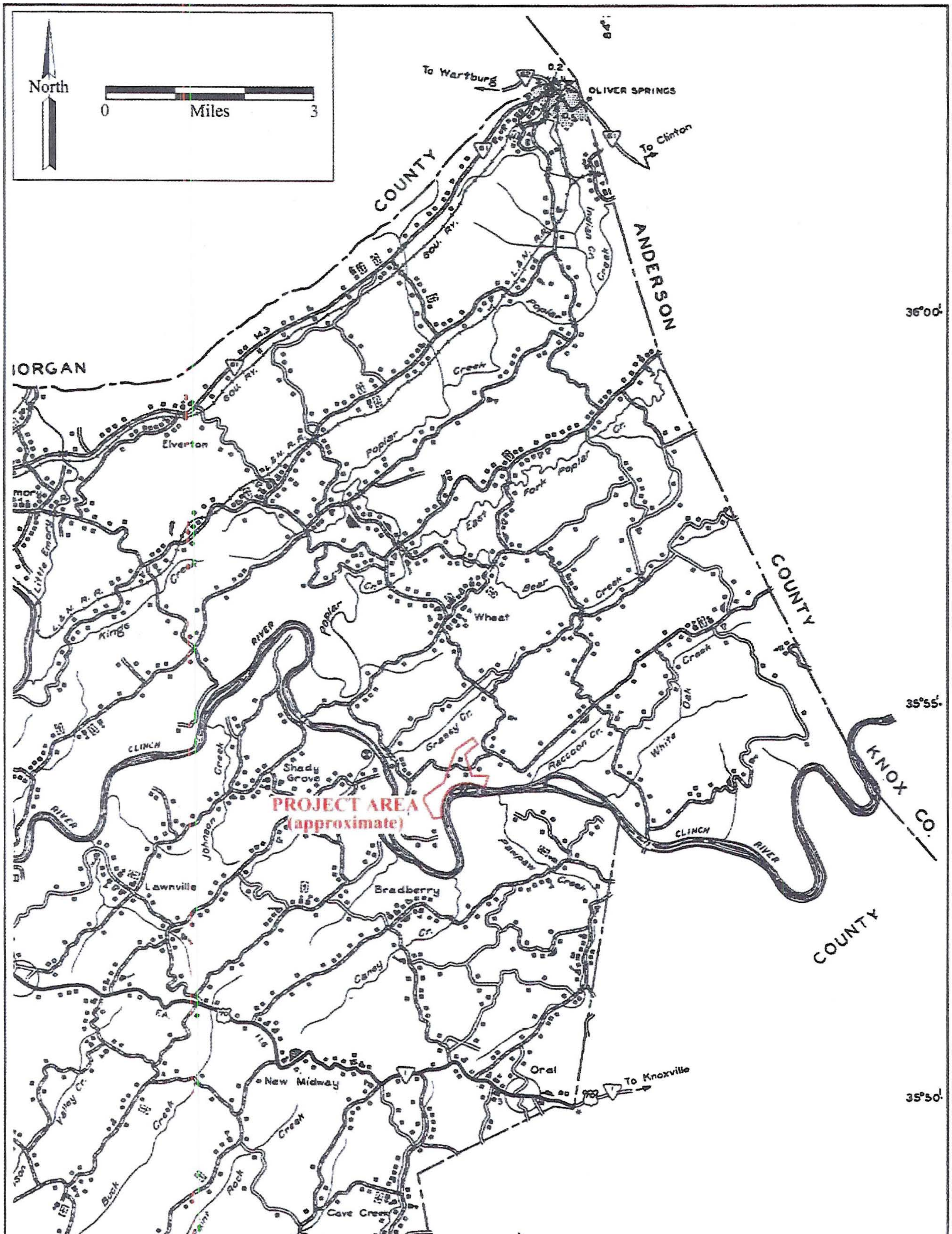


Figure 9. Map of project vicinity in 1939 showing approximate project area (Tennessee State Highway Department 1939).

markers were found at some sites. Archaeological excavations were carried out at three sites in the CRBRF during the early 1970s; one of those sites contains a small conical burial mound (Schroedl 1990). Due to a lack of funding, the technical reports were never completed, but in the late 1980s, additional funding was made available and the project materials were re-analyzed and integrated into the data generated from the Tellico Archaeological Project.

Finally, Fort Southwest Point has undergone extensive archaeological investigation since the early 1970s (Smith 1993). Dating to the late eighteenth and early nineteenth-century, the fort is being rebuilt by the City of Kingston. Construction is being guided by architectural and grounds information that was established during those studies.

PREVIOUSLY RECORDED SITES

A total of 41 previously recorded sites are located within a 2-km radius of the project area (Figure 10; Table 1). As mentioned in Chapter I, five of the sites (40RE121, 40RE122, 40RE156, 40RE157, 40RE158) are located within the current study area

Table 1. Previously Recorded Archaeological Sites within a 2-km Radius of the Project Area.

Site	Cultural Affiliation	Description	NRHP Status	Reference
40RE91	Unknown prehistoric	Lithic scatter	Unknown	Nash 1941
40RE92	Unknown prehistoric	Camp site(shell midden)	Unknown	Nash 1941
40RE93	Unknown prehistoric	Mounds and village	Unknown	Nash 1941
40RE94	Archaic, Woodland	Open habitation	Potentially eligible	Jones 1999
40RE103	Early Archaic	Village	Unknown	Nash 1941
40RE104	Unknown prehistoric	Light lithic scatter	Not eligible	Schroedl 1972
40RE105	Unknown prehistoric	Camp/Village	Not eligible	Schroedl 1972
40RE106	Woodland	Camp/Village	Not eligible	Schroedl 1972; Fielder 1974; Jolley 1982
40RE107	Woodland	Camp/Village	Unknown	Schroedl 1972
40RE108	Woodland; Mississippian	Camp/Village	Potentially eligible	Schroedl 1972
40RE120	Historic	House site	Ineligible	Schroedl 1974b
40RE121	***Historic***	***House site***	***Ineligible***	***Schroedl 1974b***
40RE122	***Historic***	***House site***	***Ineligible***	***Schroedl 1974b***
40RE123	Historic	Log structure	Destroyed	Schroedl 1972
40RE124	Woodland	Mound	Excavated	Schroedl 1974a
40RE125	Archaic; Woodland	Camp/Village	Not eligible	Fielder 1974; Jolley 1982
40RE128	Unknown prehistoric	Camp/Village	Not eligible	Schroedl 1972
40RE129	Historic	Mound	Unknown	Fielder 1974; Schroedl 1974a
40RE138	Paleoindian to Mississippian	Multicomponent habitation	Unknown	Fielder 1974
40RE139	Unknown prehistoric	Lithic scatter	Not Eligible	Fielder 1974
40RE140	Unknown prehistoric	Cave	Unknown	Fielder 1974
40RE151	Unknown prehistoric	Camp/Village	Unknown	Jolley 1982
40RE152	Unknown prehistoric	Camp/Village	Unknown	Jolley 1982
40RE153	Unknown prehistoric	Lithic extraction site	Not eligible	Jolley 1982
40RE154	Unknown prehistoric	Camp/Village	Unknown	Jolley 1982
40RE155	Unknown prehistoric	Lithic scatter	Unknown	Jolley 1982
40RE156	***Unknown prehistoric***	***Lithic extraction site***	***Not eligible***	***Jolley 1982***
40RE157	***Unknown prehistoric***	***Lithic extraction site***	***Not eligible***	***Jolley 1982***
40RE158	***Unknown prehistoric***	***Lithic extraction site***	***Not eligible***	***Jolley 1982***
40RE159	Unknown prehistoric	Lithic extraction site	Unknown	Jolley 1982

Table 1. Previously Recorded Archaeological Sites within a 2-km Radius of the Project Area, continued.

Site	Cultural Affiliation	Description	NRHP Status	Reference
40RE160	Unknown prehistoric	Camp/Village	Unknown	Jolley 1982
40RE161	Unknown prehistoric	Camp/Village	Unknown	Jolley 1982
40RE162	Unknown prehistoric	Camp/Village	Unknown	Jolley 1982
40RE163	Unknown prehistoric	Camp/Village	Unknown	Jolley 1982
40RE164	Unknown prehistoric	Camp/Village	Unknown	Jolley 1982
40RE165	Archaic	Camp/Village	Eligible	Jolley 1982
40RE166	Archaic; Woodland	Camp/Village	Potentially Eligible	Jolley 1982
40RE167	Archaic; Woodland; Mississippian	Camp/Village	Potentially Eligible	Jolley 1982
40RE177	Woodland	Open habitation	Unknown	Cannon 1985
40RE178	Woodland	Open habitation	Unknown	Cannon 1985
40RE507	Archaic; Woodland	Open habitation	Unknown	Jones 1999

*Site in bold italics occur within the current project area.

Exempted from Disclosure by Statute – Withheld Under 10 CFR 2.390(a)(3)

Figure 10. Previously recorded sites within 2 km of the project area.

IV. METHODS

LITERATURE AND RECORDS SEARCH

Prior to conducting investigations, TRC completed a records search at the Tennessee State Historic Preservation Office (TNSHPO) in an effort to identify properties within the project area and its vicinity that have been previously surveyed, listed in the NRHP, or identified as eligible for listing in the NRHP. The Tennessee Division of Archaeology was also visited to collect information on any previously recorded archaeological sites that were recorded in or near the study tract. Historic research was conducted at the Tennessee State Library and Archives in Nashville. Maps, documents, and primary and secondary resources were examined at that facility in order to provide context for any historic-period sites identified in the project area. Finally, the resources of TRC's corporate library in Atlanta were checked for any other relevant information that may be available.

ARCHAEOLOGICAL SURVEY METHODS

The archaeological field survey was accomplished by pedestrian coverage of the entire project tract. Systematic shovel testing was used where appropriate. Shovel testing was not implemented in areas with greater than 25 percent surface visibility, wet or inundated areas, or locations exhibiting a slope greater than 10 percent. In all other areas, shovel tests were excavated at 30-m intervals. Standard shovel tests with a diameter of 30 cm were excavated to sterile subsoil, or 75 cm below the surface. Soils were screened through 0.64-cm (¼-inch) hardware cloth for consistent recovery of any artifacts that might be present. Shovel test descriptions were recorded in field books, and notes include depth, artifact content, soil color, and soil consistency.

When artifacts were found, site boundaries were determined by excavating additional shovel tests at 10-m intervals. This shortened interval was continued until two negative shovel tests were excavated in each cardinal direction, or the boundaries of the project area were encountered. Artifacts were placed in bags labeled with the relevant provenience information.

A sketch map was drawn in the field for each site; it includes shovel test locations, landmarks, and general landform contours. A hand-held Garmin 3 Plus Global Positioning System was used to determine the UTM coordinates for all sites visited during the survey. Each site was photographed with black and white and color slide film.

Backhoe trenches were excavated at 30-m intervals [Exempted from Disclosure by Statute]; additional trenches were placed in various other areas that were selected by the geomorphologist or Principal Investigator. A total of 38 backhoe trenches were excavated. They were 3–5 m in length, and excavated to a maximum depth of 5 m below surface.

The fill was selectively screened through ¼-inch mesh hardware cloth during trench excavations. This was accomplished by creating separate piles with a backhoe; each pile consisted of soil

derived from a 40 cm excavation level. For example, a typical backhoe trench excavation that was 2-m deep required five piles (0–40 cm, 40–80 cm, 80–120 cm, 120–160 cm, and 160–200 cm). Approximately 90 liters of soil from each pile was screened. That volume constitutes the amount of soil that would be screened in four 10 cm levels of a 50 × 50-cm test unit.

A 50 × 50 cm test unit was excavated along the wall of 10 backhoe trenches where cultural material was discovered. This was done when artifacts were found in the screened trench fill, if cultural material was observed in the general fill, or if artifacts were observed in the trench wall. Some trenches that contained artifacts were continuously flooded, and others were excavated to depths beyond 2 m (Figure 11). Test units were not excavated at those locations for safety reasons[1].

Soil from the test units was screened through ¼-inch mesh hardware cloth to ensure uniform artifact recovery. Test units were dug in 10 cm levels within natural strata. The plowzone was screened as a single level; in some cases it was removed by backhoe before excavation began. Information concerning soil conditions, artifact depth, and artifact density was recorded for all test units.

All trench and test unit artifacts were placed in a bag labeled with the proper provenience information. The locations of all trenches and test units were recorded using a hand-held Garmin III Plus Global Positioning System.

GEOMORPHIC FIELD METHODS

Since known and suspected disturbances occur in the center of the valley, the majority of the subsurface geomorphic excavations were focused along the southern limits of the project area where the valley intersects the Clinch River. The possibility that relatively undisturbed colluvial deposits [Exempted from Disclosure by Statute] was also explored; two backhoe trenches (Backhoe Trenches 9 and 10) were used in that endeavor.

Field methods included pedestrian reconnaissance of landforms, examination of [Exempted from Disclosure by Statute] exposures, and the excavation of 20 backhoe trenches using a 36 inch wide smooth bucket (Figure 12). The goal during backhoe trenching was to record soil profiles, and identify any paleosols (buried soils) that might contain archaeological deposits[2].

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[1] In order to enter the deeper trenches while conforming to OSHA regulations—and safely excavate a test unit—it would have been necessary to make the trenches considerably wider. The Principal Investigator determined that intact archaeological deposits might be at risk during that procedure. Therefore, the trenches were not widened, and test units were not conducted at those locations.

[2] Even if the presence of one or more paleosols is detected, it does not necessarily mean that there are buried archaeological deposits. The purpose of the assessment is to identify buried stable surfaces that *might* contain archaeological remains. That is determined by the characteristics of the soil, its age, and its position in relation to the general landscape.

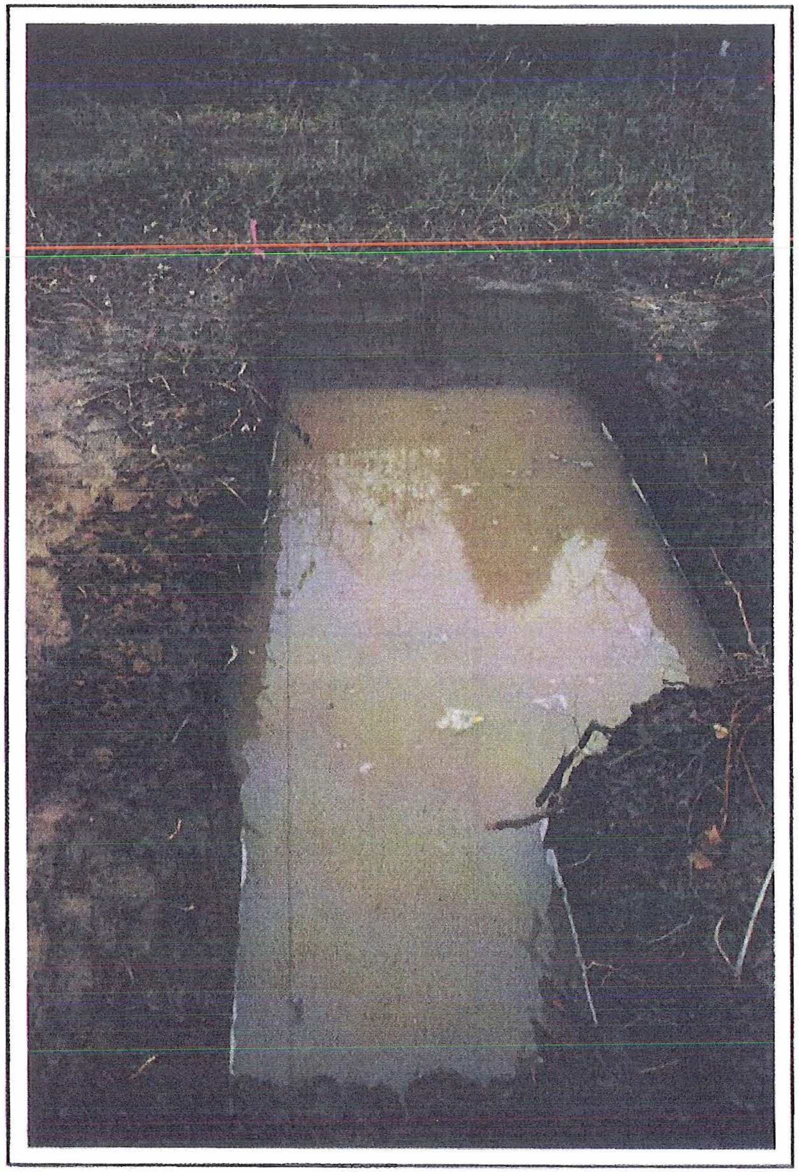

Figure 11. View of flooding in Backhoe Trench 1.

Figure 12. View of backhoe operations in progress.

Each of the trenches was photographed and described using standardized soil descriptions. The descriptions include Munsell color, texture, structure, lower boundary, and pedogenic or cultural features (Soil Survey Division Staff 1993). All measurements were taken from the surface.

ARCHITECTURAL SURVEY METHODS

The architectural/historical inventory of the project's APE was completed in accordance with 36 CFR 800 using guidelines contained in *National Register Bulletin 24: Guidelines for Local Surveys* and provided by the TN-SHPO. Survey information (including field notes, sketch maps, photographs, informant interviews, and Tennessee Historical and Architectural Resource Inventory Forms) was maintained throughout the inventory.

Federal regulations define an APE as "the geographic area or areas within which an undertaking may directly or indirectly cause changes in the character or use of historic properties, if any such properties exist" (36 CFR 800.16[d]). The APE was determined to include the project area and any surrounding areas containing historic resources from which the proposed project would be visible. Viewsheds to and from the proposed project area were terminated where vegetation and/or topography obstructed lines of sight.

LABORATORY METHODS AND CURATION

The artifacts, notes, photographs, maps, and other materials collected in the field were returned to the TRC Atlanta laboratory for processing and analysis. All of the artifacts were cleaned, catalogued, and analyzed. The artifact inventory from the site was entered into a computer database, and is included as Appendix 1 to this report.

The artifacts collected from the site were washed in water with toothbrushes. All ceramics (the one sherd) and lithic tools were individually labeled. All materials were placed in plastic ziplock bags, labeled according to provenience, and stored in acid-free boxes. Analysis included the identification of lithic raw materials used, the identification of tool types, description of ceramics, and the quantification of all artifacts recovered from the sites. After analysis was completed, the artifacts were prepared for curation according to TVA guidelines. They are being curated temporarily at the Atlanta facility of TRC along with field notes, photographs, and other records. These materials will be shipped to TVA for permanent curation upon completion of the project. TVA will be responsible for selecting a permanent curation facility where the materials will be housed.

V. GEOMORPHIC INVESTIGATIONS

During the Phase I field investigation, a total of 38 backhoe trenches (BHT) were excavated, 20 of which are part of the geomorphic study. The descriptions for these trenches are presented in detail in Appendix 2 (Tables 1 through 20). In order to present a coherent discussion, these trenches are divided into two separate areas based on general landscape position. The first area is simply referred to as "uplands" and includes the interridge valley, as well as the foot slope of the round hill along the eastern extent of the project area. The second position is the alluvial terrace, adjacent to the Clinch River (see Figure 1). A detailed description of local and regional physiography, geology, and pedology is presented in Chapter II.

UPLANDS

There are three separate groups of trenches representing the upland position. Trenches BHT 9 and BHT 10 were excavated along the northern extent of the interridge valley. These trenches revealed clayey residual soils buried beneath 120 cm of rocky silty clay loam colluvium (Figures 13 and 14). No evidence of cultural deposits were identified within these buried soils, and in the case of both trenches, there was no buried A horizon (where archaeological deposits might have been present) associated with the paleosol.

BHT 11 and BHT 12 were placed further south, in order to explore a cross-section of the interridge valley (Figures 15 and 16). These trenches produced complex profiles. BHT-11 revealed deep highly oxidized sand and clay deposits (>140 cm) (Figure 16). These soils are completely different from the upper colluvial soil, and they may relate to the ancient fluvial origins of the interridge valley.

In BHT 12, an unexpected intrusive deposit of dense pure gray clay containing clean quartz sand as well as fragmented and complete rounded white quartzite cobbles, was identified at 100 cm (Figure 17). There is no local source for these sediments. An unmarked monitoring well was observed approximately 10 m to the north, but its relationship to the BHT 12 deposits is unknown. They could also be related to the historic occupation of nearby site 40RE122. Finally, they could possibly be related to activities conducted by the AEC (see Chapter II).

In the past, low-level radioactive and other wastes generated by ORNL were disposed of using shallow land burial practices (Stow and Haase 1986). Many of these disposal areas are unmarked, and even unknown. Since no artifacts were observed during the trenching process, and buried A horizons were not detected, the trench excavation was terminated as a safety precaution when the unusual soil and rock matrix was discovered.

Both BHT 11 and BHT 12 contain deeper soils without clearly defined soil horizons, suggesting the absence of a long-term stable surface. This absence, combined with the possibility of an ancient fluvial depositional environment, indicates that these deposits predate the Holocene, and do not contain archaeological deposits.

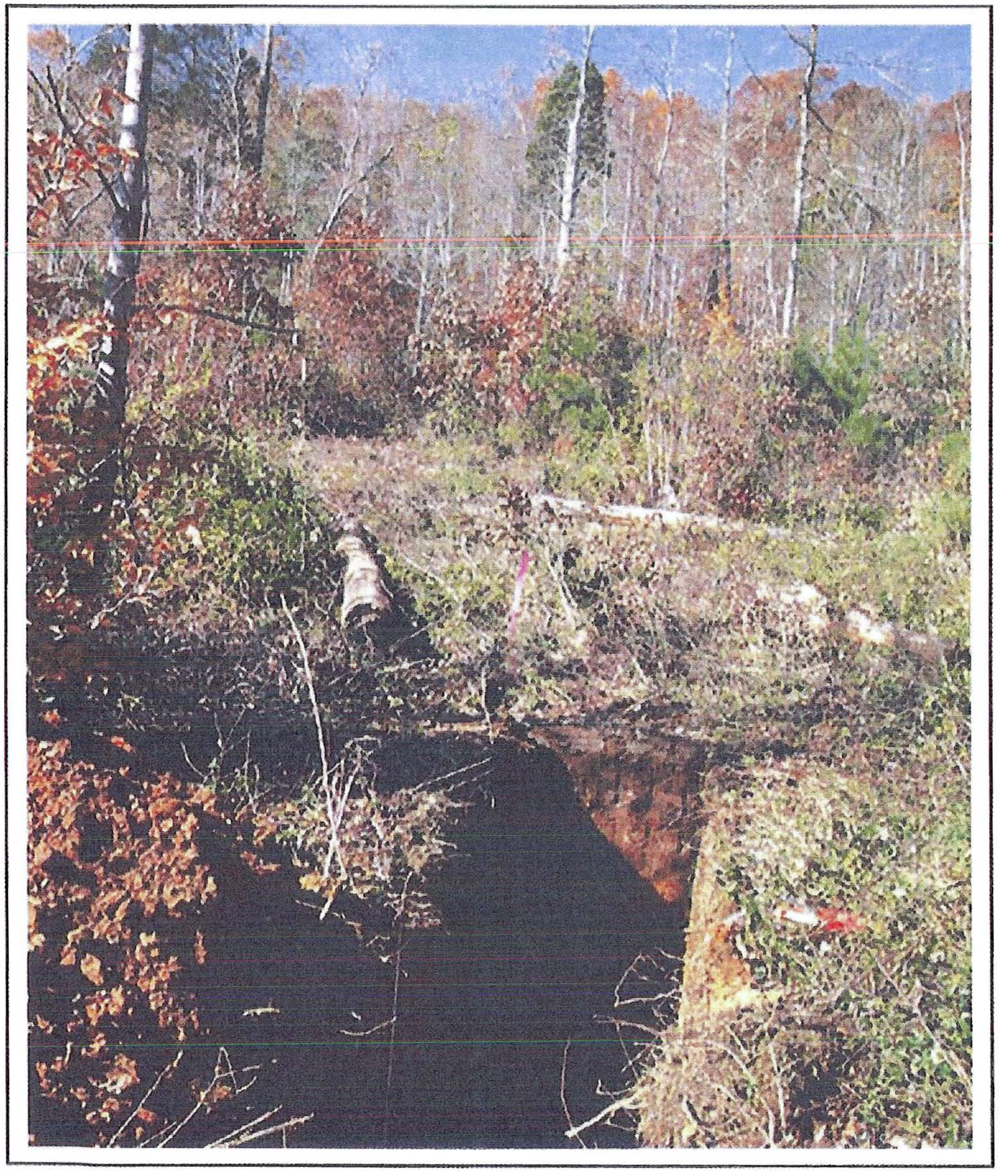

Figure 13. View of setting in the vicinity of Backhoe Trenches 9 and 10, facing north.

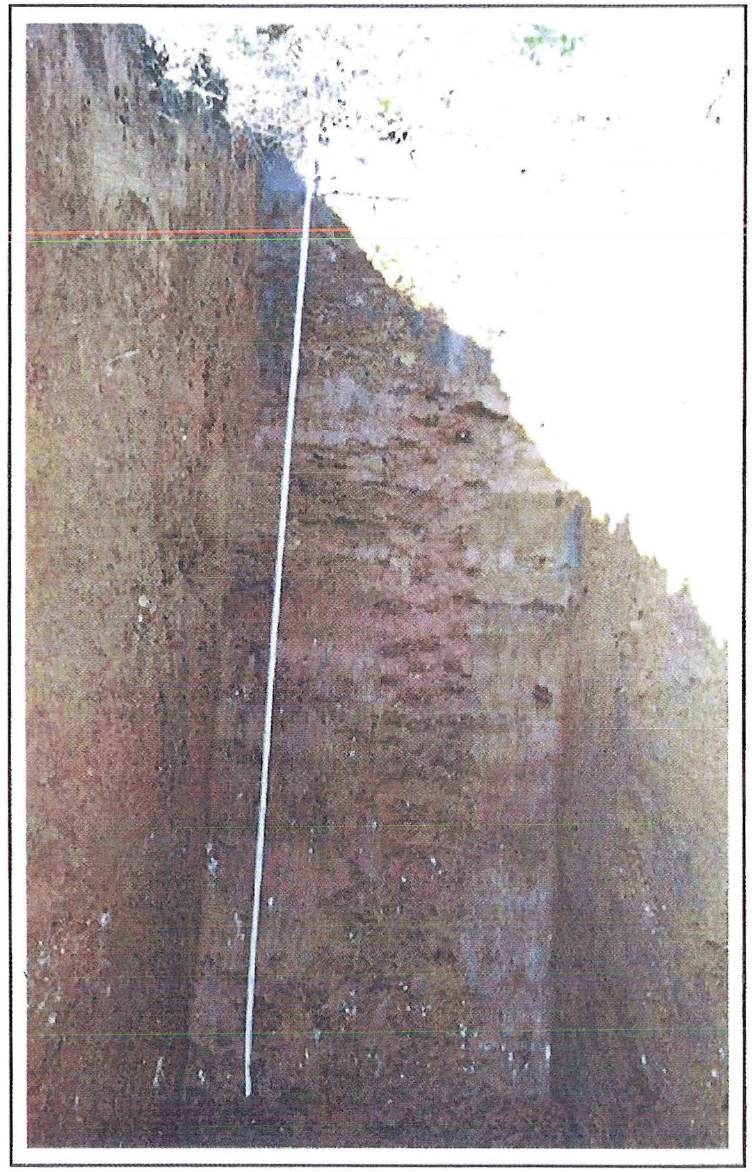

Figure 14. View of Backhoe Trench 9, north profile.

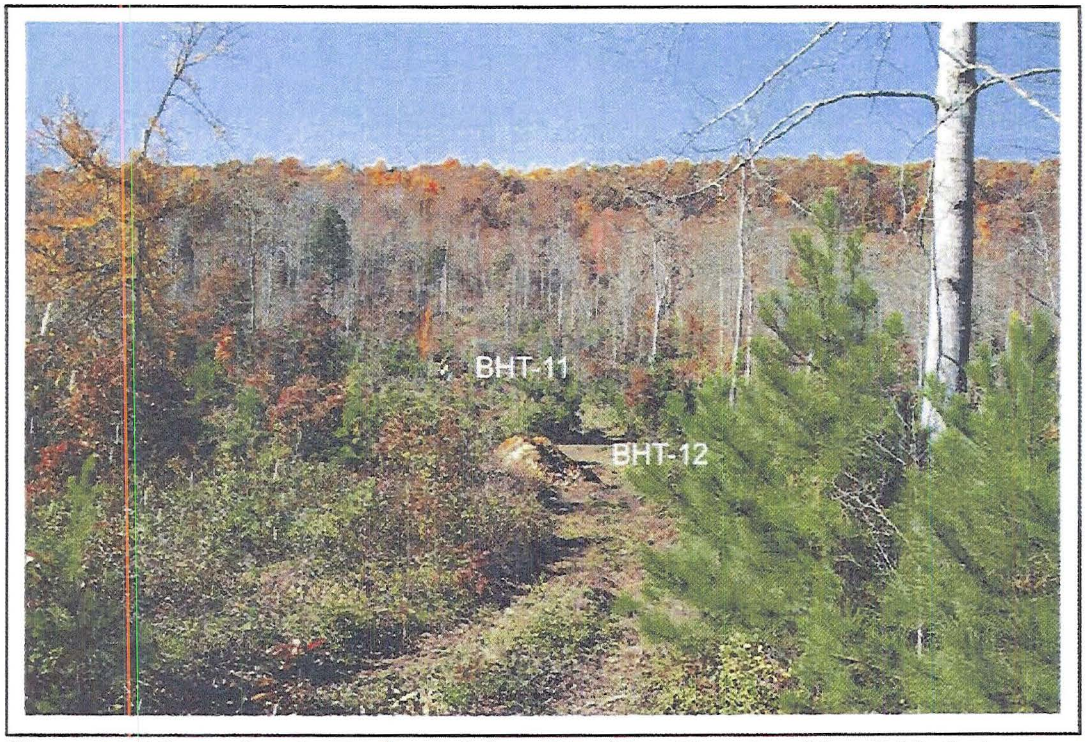

Figure 15. View of setting in the vicinity of Backhoe Trenches 11 and 12, facing west.

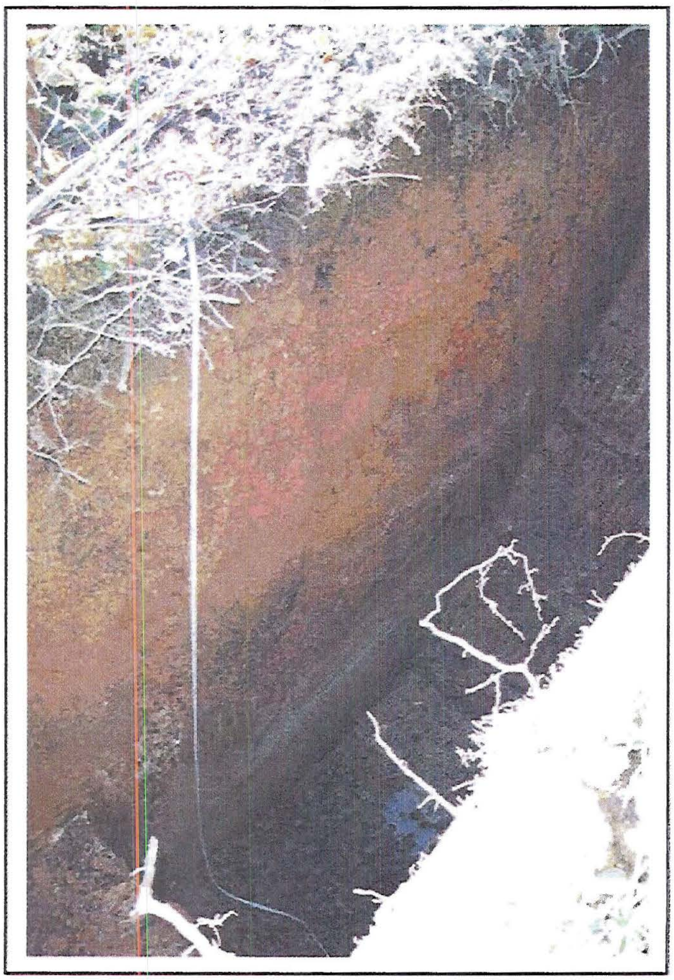
Figure 16. View of Backhoe Trench 11, west wall profile.

Figure 17. View of Backhoe Trench 12, north wall profile.

The final area considered part of the upland landscape occurs in the eastern portion of the study tract. Situated at the foot of the unnamed round hill, it is slightly higher in elevation than the alluvial terrace. Four backhoe trenches (BHTs 5–8), placed perpendicular to the river, were excavated in that area in order to determine its potential for harboring archaeological deposits that have been buried by colluvial processes.

The profiles revealed colluvial soils composed of silty clay loam with subangular weathered rock unconformably overlying a silty clay soil with variable amounts (<5 percent) of subrounded cobbles. There is no clearly defined buried A horizon associated with this buried soil. This paleosol may be associated with a remnant of a Pleistocene terrace that has been eroded and covered with colluvial sediments. No cultural deposits were identified in either of the soils. The upper colluvial profiles may be too active, and while the surface of a Pleistocene terrace is a likely place to identify cultural deposits, the absence of a buried A horizon suggests that if there were artifacts present, they have long since been removed by erosion and perhaps other processes.

TERRACE

Twelve backhoe trenches (BHTs 1–4, 13–18, 22, and 23) were excavated in order to investigate the deposits and soils associated with the terrace environment. The profiles in all these trenches varied to some degree, but all were generally composed of fining upward sequences of Holocene alluvial soils typical of Talbott silty clay loam.

Most (BHT 1, 2, 19, 20, and 22) of the trenches along the eastern edge of the project area contained diffuse deposits of cultural material; artifacts occurred at various depths between 50 and 180 cm (Figure 18). Although no archaeological material was encountered below 180 cm in that area, Bw (cambic) horizons occurred to the maximum depth (5 m) of excavation; older well-developed Bt (argillic) horizons were not identified. This indicates that a significant amount of weathering has not occurred, and that the deposits in general are probably less than or comparable to 5,000 years old (Foss and Segovia 1984; Leigh 1996).

BHT 4 and BHT 23 were placed on the north side of the road, on the slightly lower elevation, or backside of the first terrace (T1). The goal of these excavations was to examine the back of the terrace, away from the river, in what today is a wet area. These profiles did not reveal cultural deposits and in general show prominent redoximorphic features suggesting poor drainage. These conditions are typical of the Melvin silt loam soil series. The absence of native wetland plants and significantly finer sediments, however, indicates that these poor drainage conditions are probably relatively recent in the landscape history, perhaps exacerbated by the rising groundwater associated with the Watts Bar Reservoir. Regardless, they do not appear to be related to a relic backswamp feature, which are known to have attracted prehistoric visitors.

The remaining deep tests were placed along the western half of the project area terrace and include BHTs 13–18 (Figure 19). These profiles revealed sequences similar to those examined in the eastern portion of the project area, with some minor variations.

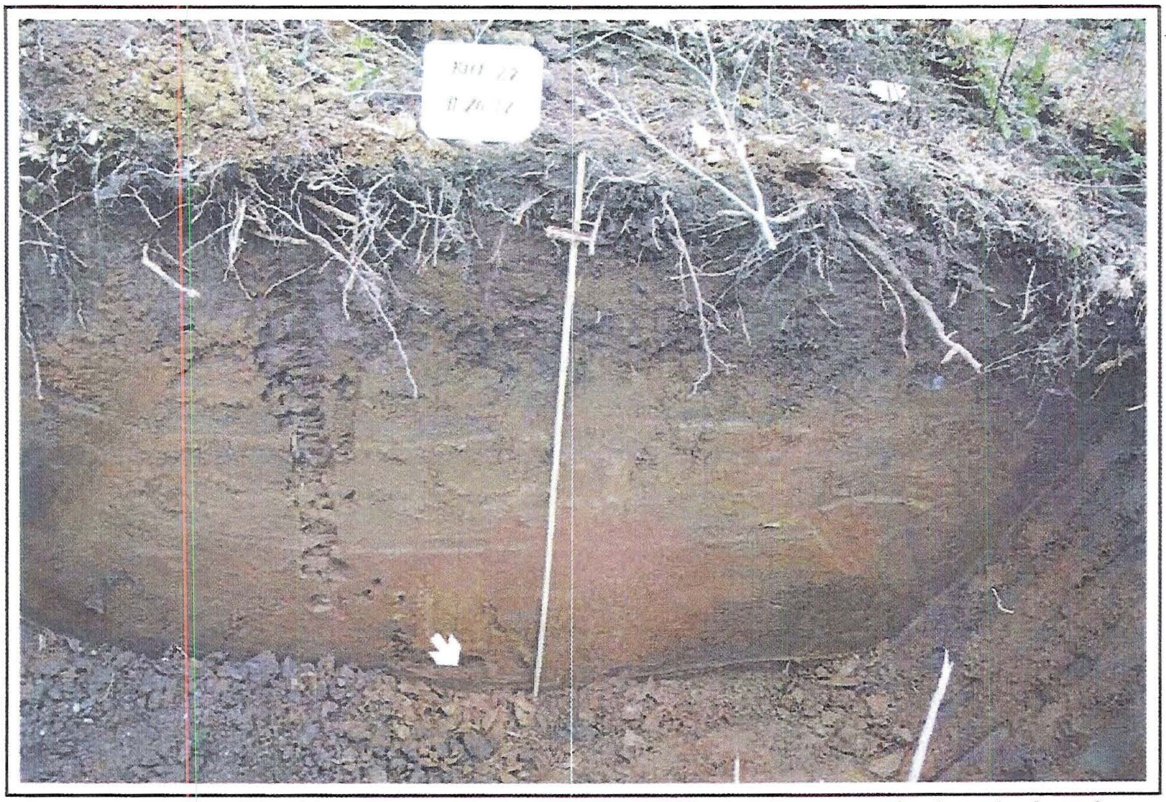

Figure 18. View of Backhoe Trench 22, east wall profile (white arrow depicts the location of a biface that was found *in situ*).

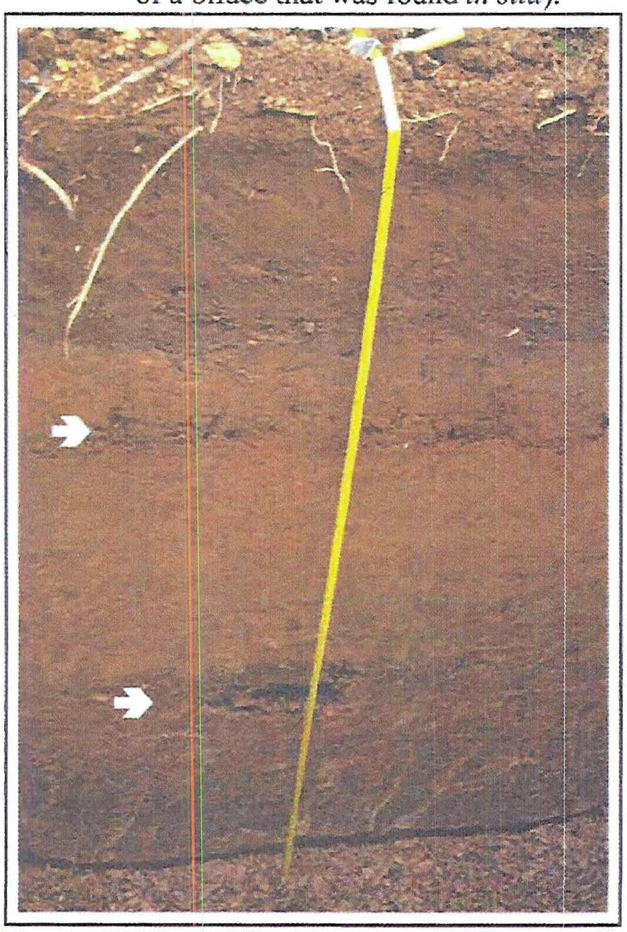

Figure 19. View of Backhoe Trench 18, east wall profile (white arrow depicts the location of localized gravel lenses).

A few of the western terrace trenches contained localized lenses of poorly sorted gravel (see Figure 19). Similar deposits were observed where current drainages were routed beneath the road. This suggests that there has been fluvial input from both the Clinch River and surficial drainages emanating from the interridge valley. This additional sediment source may explain some of the variability among the terrace profiles. In addition, a variable fill zone was observed capping the terrace sequence in the western-most trench profiles (BHTs 17 and 18). In the case of the BHT 17, there appeared to be more than one deposit, and each contained artifacts. A clay loam fill layer with minor amounts of mixed rock was found in that excavation; it is probably derived from colluvial processes, and possibly related to road construction. It is doubtful the artifacts associated with this fill are *in situ*, and therefore are not significant. The deposits they cover, however, may be intact.

In terms of the terrace in general, none of the paleosols discovered in individual trench excavations could be correlated to those found in other trenches. The apparent lack of extensive, long-term surface exposure is probably due to a combination of processes, including a fairly consistent sedimentation rate from the Clinch River, with additional input from the interridge valley.

CONCLUSION

The results from the Phase I geomorphic deep testing revealed separate geomorphic histories for two very generalized landscape positions in the project area, the uplands, and the terrace. The majority of the upland area is within the interridge valley. The upper portion of the valley contains colluvial deposits overlying residual soils with no evidence of archaeological deposits. The floor of the valley is composed of colluvial soils overlying possible ancient fluvial deposits that may relate to the early formation of the valley. Much of the valley floor surface appears to be disturbed and the buried deposits, while interesting from the perspective of the local geomorphology and the formation of the region's interridge valleys, certainly predate the Holocene, and therefore have no archaeological significance.

While no cultural features (pits, hearths, etc) were isolated during deep testing along the first terrace, this technique rarely reveals these kinds of deposits. Backhoe trenching is intended to explore vertical stratigraphic sequences and identify deeply buried soils. That survey technique is not meant to reveal horizontal variability. [Exempted from Disclosure by Statute

]

Finally, there are two caveats offered with these recommendations. The first relates to the possibility of local disposal for radioactive wastes from ORNL, and the potential hazard to archaeologists conducting subsurface investigations. These potentially dangerous deposits could be within the project area, and certainly could be present via groundwater flow paths. It is my recommendation that since the Clinch River is considered a discharge point for groundwater from ORNL, and site 40RE549[ ] Exempted from Disclosure by Statute
any further subsurface work should be monitored by environmental safety personnel.

The second caveat involves the presence of fragipan horizons, or a similar restrictive horizon (see profile descriptions). The irregular polygon-shaped bleached mottles and dense soil in a number of the deeper trenches indicates that a fragipan has formed in some areas (Figure 20). These natural subsurface horizons are known to cause various land-use problems relating to their restriction of water movement and root growth. While they have no archaeological significance, they can affect excavation. These soils, unlike other dense or difficult to excavate soils, will not soften to facilitate excavation when water is applied. Any additional archaeological work involving deeply buried deposits on the terrace should take fragipan formation into consideration, and make an effort to define the depth and extent of these subsurface horizons.

Figure 20. View of fragipan discovered in Backhoe Trench 16, in progress.

VI. ARCHAEOLOGICAL SURVEY RESULTS

A total of 241 shovel tests, 38 backhoe trenches, and 10 test units (50 × 50 cm) were excavated during the archaeological survey. Slightly more than half of the backhoe trenches (*n*= 20) were also investigated by the project geomorphologist (see Chapter V).

PREVIOUSLY RECORDED SITES

Five archaeological sites (40RE121, 40RE122, 40RE156, 40RE157, and 40RE158) within the project area were discovered prior to the current survey. Two resources (40RE121 and 40RE122) are attributable to historic occupations; both were visited during the current project. The three remaining sites (40RE156, 40RE157, and 40RE158) could not be relocated.

40RE121

[Exempted from Disclosure by Statute] It was identified by Schroedl (1972:9–12) as part of the survey for the Clinch River Liquid Metal Fast Breeder Reactor Project. The site was then mapped during an archaeological field school (Thomas 1973). Schroedl (1974b:22) then revisited the site after additional information was obtained about it from TVA's Watts Bar land acquisition map dating to 1940, showing the property as owned by Mary Grubb. From the survey and map data, the site at one time contained features related to a two-story frame house, 4 sheds, 2 barns, a well-house, a smokehouse, and a chicken house. Many of these structures, including the house, were enclosed within a hand-split picket fence. Another fenced enclosure is west of the house, but showed no evidence of features within it. To the south of it, however, was a garbage dump containing twentieth-century garbage and a rectangular depression, which may have been an outhouse pit. Based on the distribution of corner and porch supports and the location of chimney ruins, the house appears to have been L-shaped. As of 1974, one of the three brick chimneys at the house was still standing. In 1972, there were still some hand-hewn sill logs, which apparently served as floor supports for the house.

Observations from the recent visit indicate that 40RE121 has been destroyed (Figure 21). The well has been filled in, while remnants of the cellar and outbuildings are scattered throughout the area. Subsoil occurs at or immediately below the surface. No artifacts were collected.

40RE122

[Exempted from Disclosure by Statute] It was also recorded by Gerald Schroedl in 1972. The site was described as a wood frame house and barn at that time. The 1940 TVA land acquisition map indicates that the last private owner was E. M. Freels.

A collapsed stone and mortar chimney and an old well are all that remain at this location (Figure 22). As is the case at 40RE121, subsoil occurs at or immediately below the surface. No artifacts were collected during the current survey.

Figure 21. View of 40RE121, facing northeast.

Figure 22. View of 40RE122, facing north.

40RE156, 40RE157, and 40RE158

According to the official state site forms, all three of these sites are undifferentiated prehistoric lithic scatters [Exempted from Disclosure by Statute] (Jolley 1982). Although shovel tests were placed throughout the locations depicted on the site forms, TRC was unable to relocate these resources.

Recommendations

All five previously recorded sites have been recommended ineligible for listing on the National Register of Historic Places (NRHP). TRC concurs with those recommendations, and additional archaeological investigations should not be required at these locations.

PREVIOUSLY UNRECORDED SITES

40RE547

Site 40RE547 is on an eroded slope bench [Exempted from Disclosure by Statute] (see Figure 1; Figures 23 and 24). The [Exempted from Disclosure by Statute] surface is visible in some places. Artifacts were discovered within a 30 × 20-m area.

Fifteen shovel tests were placed in the vicinity of 40RE547. A typical shovel test profile exhibits a brown (10YR 4/3) silt loam plow zone that is approximately 20 cm thick. It is underlain by reddish brown (5YR 4/4) silty clay loam subsoil. Three shovel tests contained artifacts, which were encountered in the plow zone. Cultural material was also found on the surface. The assemblage includes two cores and 28 pieces of debitage; all of the material is Ridge and Valley chert.

40RE548

[Exempted from Disclosure by Statute] encompasses an area that is approximately 50 × 30 m (Figures 25 and 26). Site 40RE548 was separated from 40RE549 because of dramatic differences in the soil profiles. [Exempted from Disclosure by Statute].

One backhoe trench (BHT 36) and 16 shovel tests were placed in or near 40RE548. The soil profile from BHT 36 consists of four strata. Stratum I is a 12-cm-thick plow zone comprised of dark yellowish brown (10YR 4/4) silty loam. It is underlain by strong brown (7.5YR 5/6) silty clay subsoil that extends to 32 cm below the surface. Stratum III consists of strong brown (7.5YR 5/8) silty clay subsoil that is heavily mottled with manganese nodules, it extends to a depth of 81 cm below the surface. Stratum IV goes beyond the maximum depth of excavation (100 cm); it is comprised of yellowish red (5YR 5/8) silty clay subsoil.

[ ] Exempted from Disclosure by Statute

Figure 23. Map of 40RE547.

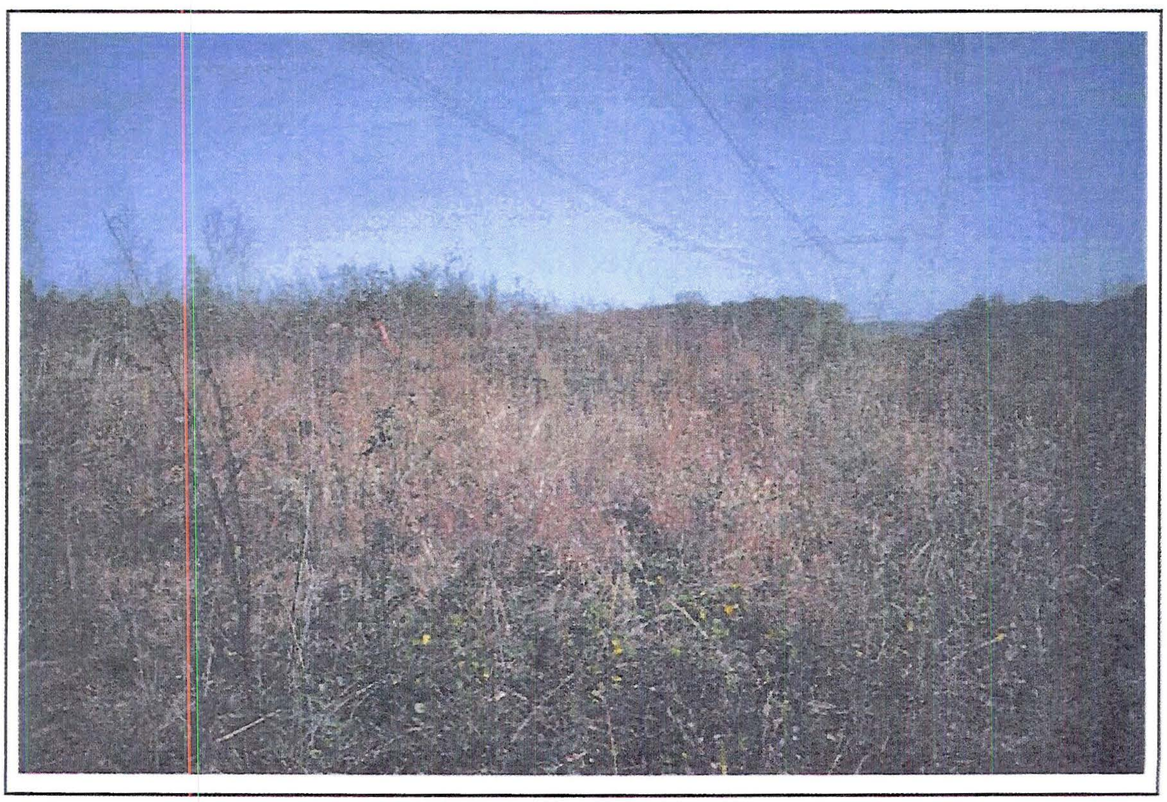

Figure 24. View of 40RE547, facing northeast.

Exempted from Disclosure by Statute – Withheld Under 10 CFR 2.390(a)(3)

Figure 25. Map of 40RE548.

Figure 26. View of 40RE548, facing northwest.

Four shovel tests contained artifacts; no cultural material was discovered in the backhoe trench. The assemblage is limited to one core and seven pieces of debitage that originated from Exempted from Disclosure by Statute. All of the artifacts are Ridge and Valley chert.

40RE549

Site 40RE549 is located[Exempted from Disclosure by Statute](see Figure 1;[Exempted from Disclosure by Statute)] It is approximately 750 × 100 m. The Phase I assemblage includes 111 artifacts, none of which are diagnostic (Table 2).

Table 2. Artifacts Recovered from 40RE549.

Artifact Class	Backhoe Trenches	Test Units	Total
Lithics			
Bifaces	3		3
RUMs	1		1
Nutting Stones	1		1
Broken Cobbles		1	1
Battered Cobbles		2	2
Cores	2		2
Debitage	45	52	97
Manuports	1		1
Fire-cracked rock (FCR)	1	1	2
Ceramics			
Eroded	1		1
Total	**55**	**56**	**111**

Shovel Tests. Although the results of backhoe excavations indicated that archaeological deposits [Exempted from Disclosure by Statute] a systematic shovel-testing program was implemented at 40RE549 in order to determine how the artifacts were distributed within the upper 75 cm of the soil column. None of the 53 shovel tests excavated during this stage of investigations contained cultural material.

Backhoe Trenches. Artifacts were discovered in 16 of the 31 backhoe trenches excavated within the site's boundary (Figure 28); they were encountered [Exempted from Disclosure by Statute] (Tables 3 and 4). The geomorphic evidence indicates that Holocene sediments [Exempted from Disclosure by Statute]. See Chapter V for a discussion of soil conditions at 40RE549[3] [Exempted from Disclosure by Statute]. Detailed descriptions of backhoe trench soil profiles are provided in Appendix 2.

Test Units. Ten test units were excavated during Phase I investigations (Figure 29). They were distributed [Exempted from Disclosure by Statute] in a manner that ensured comprehensive coverage. Six of the 10 test units contained cultural material (see Figure 28; Table 5).

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[3] A cracked cobble was discovered in backfill derived from a depth of approximately 300 cm in BHT 16; it may be a tested cobble, but its cultural origin is in doubt.

[.] Exempted from Disclosure by Statute

Exempted from Disclosure by Statute – Withheld Under 10 CFR 2.390(a)(3)

Figure 28. Map of Site 40RE549, illustrating backhoe trench and test unit locations.

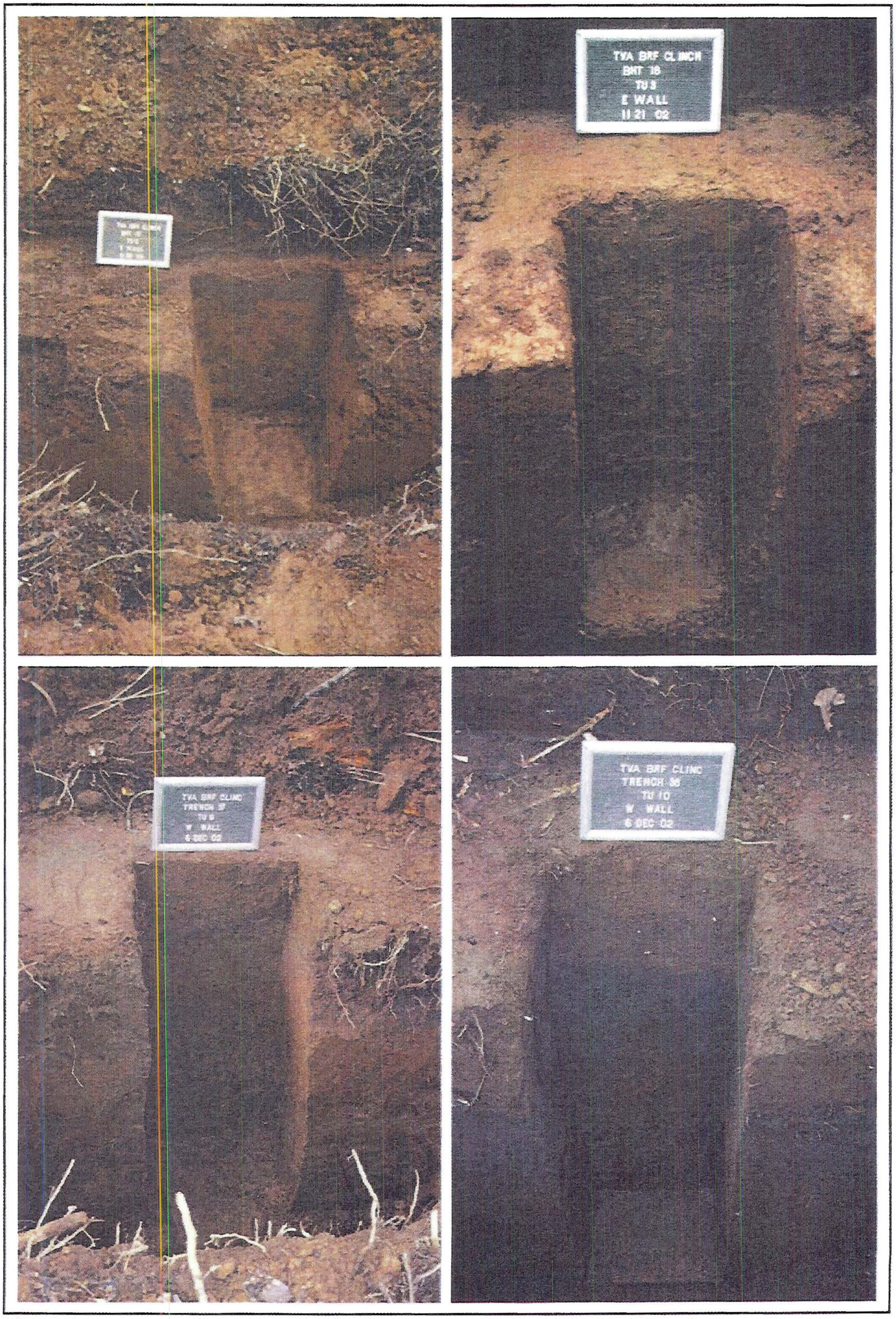

Figure 29. View of test unit soil profiles at 40RE549.

Table 3. Artifacts Recovered during Backhoe Trench Excavations at 40RE549.

	BHT 1	BHT 2	BHT 13	BHT 15	BHT 16	BHT 17	BHT 19	BHT 20	BHT 22	BHT 27	BHT 28	BHT 29	BHT 33	BHT 37	BHT 38
Lithics															
Bifaces	1			1					1						
RUMs						1									
Nutting Stones					1										
Cores			1		1										1
Debitage	3	2	3	12	1	9		2		2	1	2	1	4	2
Manuports							1								
FCR				1											
Ceramics															
Eroded								1							
Total	4	2	4	14	3	10	1	3	1	2	1	2	1	4	3
Grand Total															55

Table 4. Backhoe Trench Artifact Frequency by Depth at 40RE549.

Backhoe Trench	0–40 cm	40–80 cm	80–120 cm	120–160 cm	160–200 cm	300 cm
1					4	
2				2		
13*	10					
15*	9	16				
16			2			1**
17	3	7				
19*		4				
20	2	1				
22					1	
27	1					
28					1	
29				2		
30*	2	6	2			
33					1	
37*	17	6				
38*	8				3	

*Includes test unit artifacts
**The cultural origin of this artifact is in doubt.

Table 5. Artifacts Recovered during Test Unit Excavations at 40RE549.

	Test Unit 1	Test Unit 2	Test Unit 6	Test Unit 8	Test Unit 9	Test Unit 10
Debitage	1	11	6	8	18	8
Broken Cobbles	1					
Battered Cobbles	1				1	
FCR				1		
Total	3	11	6	9	19	8
Grand Total						56

Exempted from Disclosure by Statute - Withheld Under 10 CFR 2.390(a)(3)

[ ] Exempted from Disclosure by Statute

Figure 30. Depth of archaeological deposits by test unit at 40RE549.

Relatively few artifacts were recovered during test unit excavations, and the assemblage is almost exclusively comprised of debitage. Archeological remains were encountered at a variety of depths; two test units contained multiple cultural horizons (Figure 30). However, the artifacts discovered in the upper levels of Test Unit 9 may be secondary deposits that were introduced when fill was placed in that location.

In Test Unit 8, diffuse concentrations of artifacts were encountered in a continuous column that extended from the surface[Exempted from Disclosure by Statute]. Artifacts recovered [Exempted from Disclosure by Statute] in that test unit, as well as those found beyond that depth in Test Units 1, 2, 9, and 10, may have retained their contextual integrity. Material recovered [Exempted from Disclosure by Statute] has probably been subjected to plowing, the effects of clear-cutting, and perhaps other types of mechanical disturbances.

Although widespread, the archaeological deposits at 40RE549 are diffuse, and occur at variety of depths. In addition, only one test unit (TU 10) contained stratigraphically separated cultural horizons. Based on this evidence, it appears that the archaeological record at 40RE549 was primarily created by spatially isolated, relatively short-term prehistoric occupations that occurred at various times throughout the Holocene. Other than a single eroded sherd, which represents an undifferentiated Woodland occupation, no diagnostic artifacts were discovered during Phase I investigations. Therefore, the age of those occupations cannot be determined at this time.

VII. ARCHITECTURAL SURVEY RESULTS

The records search indicated that no previously inventoried properties are located within the immediate vicinity of the project area. In addition, no properties within the area of the reconnaissance level survey have been listed, or identified as eligible for listing in, the NRHP. During the historic architectural assessment for the project APE, no historic structures were identified. Based on the findings of the assessment, no further architectural/historical analysis is recommended for this project.

VIII. SUMMARY AND RECOMMENDATIONS

ARCHAEOLOGICAL AND GEOMORPHIC INVESTIGATIONS

Three previously unrecorded archaeological sites were discovered during the current project. Two of the sites (40RE547 and 40RE548) are small prehistoric lithic scatters of unknown age. All of the material derived from these locations occurred on [Exempted from Disclosure by Statute] . In addition, there is no evidence that stratigraphically intact archeological deposits exist at these locations, or that undisturbed cultural features exist in the subsoil. Since these conditions severely limit their research potential, TRC recommends sites 40RE547 and 40RE548 ineligible for the NRHP. In the opinion of TRC, additional cultural resource investigations will not be required at either location.

The geomorphic evidence indicates that Holocene sediments are [Exempted from Disclosure by Statute] in some areas of 40RE549. No features were encountered, and diagnostic artifacts are absent from the Phase I assemblage. However, cultural material occurs [Exempted from Disclosure by Statute] , and there is evidence that it is stratified in some areas of the site. In any case, there is a strong probability that some of the archaeological deposits have retained their contextual integrity, even if they do not represent stratigraphically separate occupations. Because of these conditions, it is possible that site 40RE549 contains important archaeological information concerning regional prehistory. Therefore, TRC recommends the site potentially eligible for listing on the NRHP under Criterion D. If this property is the chosen alternative, avoidance of 40RE549 during construction, operation, and maintenance of the planned facility is recommended. If the site cannot be avoided, Phase II testing is recommended to determine its NRHP eligibility status.

ARCHITECTURAL RESOURCES

No historic structures were identified within the APE, and none were previously listed, or identified as eligible for listing in, the NRHP. Based on these findings, no further architectural/historical analysis is recommended for this project.

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APPENDIX 1:

ARTIFACT INVENTORY

Exempted from Disclosure by Statute – Withheld Under 10 CFR 2.390(a)(3)

Exempted from Disclosure by Statute – Withheld Under 10 CFR 2.390(a)(3)

Exempted from Disclosure by Statute – Withheld Under 10 CFR 2.390(a)(3)

APPENDIX 2:

SOIL DESCRIPTIONS FROM GEOMORPHIC TRENCHES

Table 2-1. BHT-01 Description.[**.]**

Depth (cm)	Horizon	Field Description
0–22	A/C	10YR 3/3, fine sandy loam, massive to weak granular structure, roots and organic matter, clear smooth boundary
22–37	2Ab	10YR 3/2, sandy loam, granular to massive structure, clear smooth boundary
37–50	2A/C	10YR 3/3, fine sandy loam, weak subangular blocky structure, artifacts include sparse charcoal and fire cracked rock, clear smooth boundary
50–89	3Ab	10YR 4/2, fine sandy clay loam, strong subangular blocky structure, localized silt coatings, few faint mottles, artifacts include sparse charcoal and fire cracked rock, clear smooth boundary
89–110	3Bw	10YR 4/3, fine sandy clay loam, subangular blocky structure, localized silt coatings, redox depletions and concentrations few faint (associated with roots), gradual smooth boundary
110–140	3Bw2	7.5YR 4/4, fine sandy clay loam, weak subangular blocky, gradual smooth boundary
140–210+	3Bw/C	7.5YR 4/6, fine sandy loam, weak subangular blocky structure, redox depletions and concentrations common distinct

Table 2-2. BHT-02 Description.[**.]**

Depth (cm)	Horizon	Field Description
0–25	A/C	10YR 3/2, silt loam, massive to granular structure, roots and organic matter, clear smooth boundary
25–42	2A/C	10YR 4/2, fine sandy loam, granular to massive structure, clear boundary
42–54	3A/C	10YR 3/3, fine sandy loam, weak subangular blocky structure, clear boundary
54–100	4Ab	10YR 4/2, fine sandy clay loam, strong subangular blocky structure, localized silt coatings, few prominent redox features associated with roots, artifacts include 3 chert flakes removed during profile cleaning, gradual wavy boundary
100–170	4Bw	7.5YR 4/4, fine sandy clay loam, moderate subangular blocky, localized clay coatings, bioturbation evident in mixing along upper boundary, redox depletions and concentrations common distinct, gradual wavy boundary
170–220+	4Bw/C	7.5YR 4/6, fine sandy clay, weak subangular blocky structure, redox depletions many prominent (associated with roots), general increase in sand therefore reduction in structure ~200 water rapidly entering trench along cracks and root channels

Table 2-3. BHT-03 Description.[.]Exempted from Disclosure by Statute

Depth (cm)	Horizon	Field Description
0–20	A/C	10YR 3/2, fine sandy loam, massive to granular structure, roots and organic matter, clear smooth boundary
20–40	2A/C	10YR 4/2, fine sandy loam, granular to massive structure, abrupt smooth boundary
40–60	3A/C	10YR 3/3, fine sandy loam, weak subangular blocky structure, clear smooth boundary
60–100	4Ab	10YR 4/2, silty clay loam, weak subangular blocky structure, artifacts identified during profiling - 3 chert flakes, gradual smooth boundary (bioturbation mixing)
100–160	4Bw	7.5YR 4/4, fine sandy clay loam, moderate subangular blocky, localized clay coatings, redox depletions and concentrations common distinct (associated with roots), gradual smooth boundary
170–220	4Bw2	7.5YR 4/6, fine sandy clay, weak subangular blocky structure, redox depletions and concentrations many prominent (associated with roots), gradual smooth boundary
220–375+	4Bw/C	7.5YR4/6, fine sandy loam, redox depletions and concentrations many prominent (associated with roots) stopped excavation at 415 cm – maximum backhoe reach

Table 2-4. BHT-04 Description.[ ]Exempted from Disclosure by Statute

Depth (cm)	Horizon	Field Description
0–20	A/C	10YR 3/1, silt loam, massive to granular structure, roots and organic matter, clear smooth boundary
20–40	2A/B	10YR 3/2, silty clay loam, weak subangular blocky structure, FCR at base of horizon, gradual smooth boundary,
40–100	2Bw	10YR 3/3, silty clay, weak subangular blocky structure, redox depletions and concentrations few distinct (associated with roots), gradual smooth boundary
100–140	2Bw2	7.5YR 4/2, silty clay, blocky structure, redox depletions and concentrations few prominent, gradual smooth boundary
140–210+	2Bw/C	7.5YR 4/2, fine sandy clay loam, blocky structure, redox depletions and concentrations common distinct

Table 2-5. BHT-05 Description.[.] Exempted from Disclosure by Statute

Depth (cm)	Horizon	Field Description
0–20	A	10YR 3/1, silt loam, massive to granular structure, roots and organic matter, clear smooth boundary
20–50	Bw	7.5YR 4/6, silty clay loam, weak subangular blocky structure, clear smooth boundary
50–80	Bw2	7.5YR 5/8, silty clay, 0.5% subrounded cobbles, moderate subangular blocky structure, gradual smooth boundary
80–140	Bw3	10YR 4/6, silty clay, 0.5% subrounded cobbles, blocky structure, redox concentrations few prominent Mn/Fe nodules, localized thin clay coatings, gradual smooth boundary
140–200	Btg	7.5YR 5/4, very fine sandy clay, 0.5% subrounded cobbles, blocky structure, redox depletions and concentrations (distinct prominent Mn/Fe nodules), localized well developed clay coatings, increase in fine sand with depth, gradual smooth boundary
200–250	Btg2/C	7.5YR 5/4, very fine sandy clay, blocky structure, redox depletions and concentrations many prominent, localized well developed clay coatings and Mn coatings on ped faces, increase in fine sand with depth, 0.5% subrounded cobbles, gradual smooth boundary
250–290+	Btg(x?)	7.5YR 5/4, very fine sandy clay, 0.5% subrounded cobbles, blocky structure, redox depletions and concentrations few prominent (increasingly redox with depth), localized well developed clay coatings and Mn coatings on ped faces, increase in fine sand with depth, irregular polygon-shaped bleached mottles suggesting possible fragipan formation

Table 2-6. BHT-06 Description.[.] Exempted from Disclosure by Statute

Depth (cm)	Horizon	Field Description
0–20	O/A	10YR 3/1, silt loam, massive to granular structure, roots and organic matter, abrupt smooth boundary (truncation?)
20–30	Bw1	7.5YR 4/6, silty clay loam, weak subangular blocky structure, clear smooth boundary
30–90	Bw2	7.5YR 5/6, silty clay loam, 0.5% subrounded cobbles, weak subangular blocky structure, few medium redox features, localized thin clay coatings, gradual boundary
90–140	Bt	10YR 5/8, fine sandy clay, 3% subrounded and subangular pebbles, platy structure, redox depletions and concentrations common distinct (7.5YR 5/6 Mn/Fe concentrations), clay coatings, gradual smooth boundary
140–220+	Btg(x?)	7.5YR 5/8, fine sandy clay, 0.5% weathered subrounded cobbles and pebbles platy structure, redox depletions and concentrations many prominent, Fe/Mn concentrations on ped faces, localized clay coatings, irregular polygon-shaped bleached mottles suggesting possible fragipan formation, increase in fine sand with depth

Table 2-7. BHT-07 Description.[ ] Exempted from Disclosure by Statute

Depth (cm)	Horizon	Field Description
0–35	A	7.5YR 2.5/3, silt loam, 5-15% subangular weathered rock, massive to granular structure, roots and organic matter, clear smooth boundary
35–77	Bw	2.5YR 4/6, silty clay loam, loose, 5% subangular weathered rock, weak subangular blocky structure, gradual smooth boundary
77–110	Bt	2.5YR 4/3, clay loam, 5-10% weathered rock, weak subangular blocky structure, gradual smooth boundary
110–152	Bt2	5YR4/6, clay loam, 10-20% weathered rock, clear wavy, weak subangular blocky, clear wavy boundary (disconformity?)
152–161+	2Bt	7.5YR 5/8, silty clay, clay coating, redox depletions, note absence of rock

Table 2-8. BHT-08 Description.[ ] Exempted from Disclosure by Statute

Depth (cm)	Horizon	Field Description
0–20	O/A	10YR 3/1, silt loam, 5-15% weathered rock, massive to granular structure, roots and organic matter, redox concentrations few prominent Fe/Mn nodules, clear smooth boundary
20–45	Bw	5YR 4/6, silty clay loam, 5-15% weathered rock (pebble size), weak subangular blocky structure, redox concentrations – many prominent Fe/Mn nodules, clear smooth boundary
45–78	Bt1	5YR 4/6, silty clay loam, thin clay coatings, weak subangular blocky structure, redox concentrations – few many prominent Fe/Mn nodules, clear smooth boundary
78–110	Bt2	5YR 4/6, silty clay loam, clay coatings, subangular blocky structure, redox concentrations – many prominent Fe/Mn nodules and concentrations, clear smooth boundary (disconformity?)
110–148	2Bw	7.5YR 5/6, silty clay loam, redox concentrations – few distinct Fe/Mn concentrations and nodules, weak subangular structure, clear wavy boundary 140-154 localized lens of subrounded weathered cobbles
148–190+	2Bt	7.5 YR 5/8, silty clay, weak platy structure, thin clay coatings

Table 2-9. BHT-09 Description.[ ] Exempted from Disclosure by Statute

Depth (cm)	Horizon	Field Description
0-25	O/A	10YR 3/1, silt loam, massive to granular structure, roots and organic matter, mixed/disturbed, clear smooth boundary
25-80	Bw	7.5YR 4/6, silty clay loam, 10YR5/4 silt coatings on ped faces, weak subangular blocky structure, redox concentrations – many distinct Fe/Mn concentrations, clear smooth boundary
80-120	Bw2	7.5YR 4/6, silty clay loam, 5% angular weathered pebbles, 10YR5/4 silt coatings on ped faces, redox concentrations – many prominent Fe/Mn nodules and concentrations, weak subangular blocky structure, abrupt wavy boundary (disconformity?)
120-180	2Bt1	5YR 4/6, clay, 20% angular weathered unsorted rock, strong subangular blocky structure, clear smooth boundary
180-250+	2Bt2	5YR 4/6, clay, 30% angular weathered unsorted rock, strong subangular blocky structure, clay coatings

Table 2-10. BHT-10 Description.[ ] Exempted from Disclosure by Statute

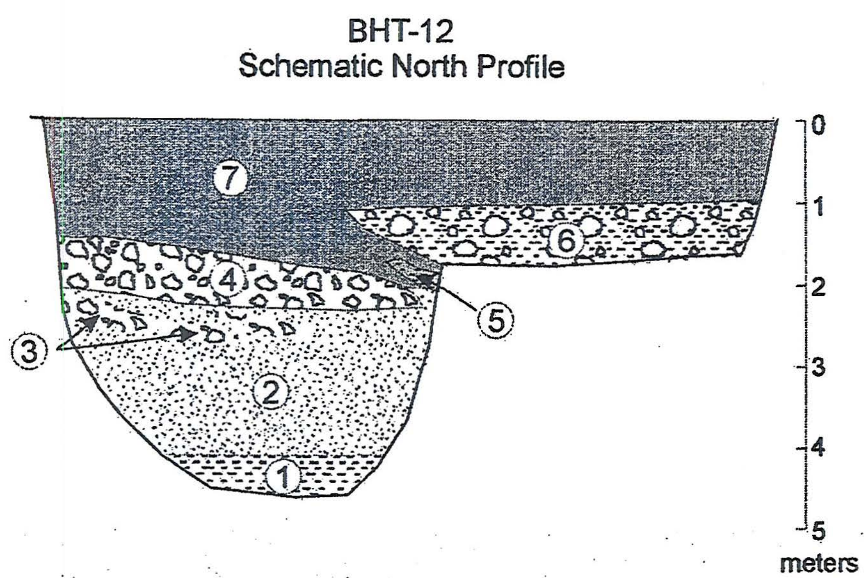
Depth (cm)	Horizon	Field Description
0–20	O/A	10YR 3/1, silt loam, massive to granular structure, roots and organic matter, clear smooth boundary
20–80	A	5YR 3/3, silty clay loam, 5% weathered rock (pebble size), granular to very weak subangular blocky structure, clear wavy boundary
80–120	Bt/C	2.5YR 3/4, clay loam, 10% mixed subangular weathered rock, silt coatings on ped faces, redox concentrations and depletions – few faint, clear wavy boundary
120–130	-	lens of mixed subangular weathered rock, mostly degraded sandstone
120–148	2Bw	7.5YR 5/6, silty clay loam, redox concentrations – few prominent Fe/Mn concentrations, subangular blocky structure, clear wavy boundary
140–154	-	lens of subrounded weathered cobbles, abrupt boundary
140–180+	2Bt	5YR 4/6, clay, 30% angular weathered unsorted rock, subangular blocky structure, clay coatings

Table 2-11. BHT-11 Description.[ ] Exempted from Disclosure by Statute

Depth (cm)	Horizon	Field Description
0–30	A	10YR 3/1, loam, massive to granular structure, roots and organic matter, abrupt smooth boundary
30–80	Bt1	7.5YR 4/6, silty clay loam, 5% weathered mixed angular rock, subangular blocky structure, redox concentrations – few prominent Fe/Mn nodules and concentrations, gradual wavy boundary
80–140	Bt2	7.5YR 4/6, silty clay loam, 5% weathered mixed rock, Mn concretions, clear wavy boundary
140–180	C	5YR 7/1…5YR 5/8 (becomes increasingly oxidized (yellowish red) with depth), clay, abrupt wavy boundary
180–210	2C?	Concentrated fragmented and subangular mixed rock, clear wavy boundary
210–250	3C?	5YR 7/1, sandy clay (clean sand), dense, subrounded white chert cobbles with mixed gravel, localized lens of subrounded weathered cobbles, clear wavy boundary
250–310+	4C?	2.5Y6/8, clay, 50% mixed weathered subangular rock, ~310 water in trench could not excavate further

Table 2-12. BHT-12 Description.[ ]

Note: This trench revealed a very complicated, unique profile. The description that follows is a cursory summary linked to a schematic sketch of the profile. No effort was made to designate horizons.



Strata	Field Description
1	5YR 7/1…5YR 5/8 (becomes increasingly oxidized (yellowish red) with depth), clay, ~5% weathered sandstone gravel
2	7.5YR 4/6, sandy clay, 5% weathered mixed angular rock, few prominent Fe/Mn nodules and concentrations, gradual smooth boundary
3	Localized gravel lenses
4	Concentrated mixed fragmented angular and subangular rock, clear smooth boundary
5	10YR 7/1 dense clay, abrupt smooth boundary
6	10YR 7/1 dense clay with clean sand inclusions, 20-30% unsorted rounded white chert cobbles, abrupt smooth boundaries
7	10YR 3/1, silty clay loam, massive to granular structure, roots, abrupt smooth boundary

Table 2-13. BHT-13 Description.[ ] Exempted from Disclosure by Statute

Depth (cm)	Horizon	Field Description
0–40	A	7.5YR 4/2, silt loam, 0.5% mixed weathered subrounded pebbles, massive to granular structure, roots and organic matter, gradual wavy boundary
40–70	A/B	7.5YR 4/4, silt loam, 5% weathered rock (pebble size), 7.5YR 6/3 silt coatings, weak subangular blocky structure, redox concentrations – few prominent (sand size) Fe/Mn concretions, gradual smooth boundary
70–170	Bw1	7.5YR 4/6, silty clay, 5% mixed subangular weathered rock (pebble size), 7.5YR 6/3 silt coatings on ped faces, redox concentrations and depletions - few faint, clear smooth boundary from 130-170 cm localized lenses of weathered subangular and subrounded chert gravel
170–220+	Bw2	7.5YR 5/4, silty clay, Mn concentrations on ped faces, redox concentrations and depletions - few faint at 220 groundwater (began entering trench at ~120 cm)

Table 2-14. BHT-14 Description.[ ] Exempted from Disclosure by Statute

Depth (cm)	Horizon	Field Description
0–40	O/A	10YR 3/1, silt loam, granular structure, roots and organic matter, clear smooth boundary
40–110	Bw	10YR 4/4, sandy loam, massive to weak subangular blocky structure, abrupt boundary
110–150	2A/C	10YR 3/2, sandy clay loam, strong subangular blocky structure, common charcoal fragments, 3 "possible" chert flakes recovered (cultural zone?), clear wavy boundary
150–200+	2Bw	10YR4/3, silt loam, redox concentrations and depletions (10YR5/3) – many faint, moderate subangular blocky structure, gradual smooth boundary ~ 200 cm groundwater. Continue trench to determine depth of Bw horizons
200–320+	3Bw2 3Bt(?)	Increasing chroma and redox features with depth

Table 2-15. BHT-15 Description.[ ]Exempted from Disclosure by Statute

Depth (cm)	Horizon	Field Description
0–60	A	10YR 3/2, fine silt loam, granular structure, roots and organic matter, 3 gray and white chert flakes recovered at the base of horizon, biface recovered in back dirt, clear irregular boundary
60–110	Bw	10YR 4/6, silty clay loam, moderate subangular blocky structure, few localized thin clay coatings, few coarse sand to pebble size mixed subrounded rock, minor Mn concretions, wavy clear boundary
110–140	2A/C	10YR 4/4, silty clay loam, moderate subangular blocky structure, 3 large rounded cobbles observed– no obvious cultural alteration and no artifacts recovered, abrupt wavy boundary
140–180	3Bt(?)	7.5YR 4/6, silty clay loam, strong subangular blocky structure, thin clay coatings, redox depletions and concentrations – few faint, Fe/Mn coating ped faces, gradual smooth boundary localized lens of subrounded unsorted cobbles at 160 and 180 cm (~5-10 cm thick). Suggestive of small drainage channels – perhaps from upland surges
180–210+	3Bt2(?)	7.5YR 4.5/6, fine sandy clay loam, strong subangular blocky structure, redox depletions and concentrations – common distinct, Fe/Mn coating ped faces. ~ 200 cm groundwater

Table 2-16. BHT-16 Description.[ ] Exempted from Disclosure by Statute

Depth (cm)	Horizon	Field Description
0–20	A/O	10YR 3/2, sandy loam, <0.5% rounded cobbles, granular to massive structure, roots and organic matter, clear irregular boundary
20–55	2Ab	10YR 3/4, sandy loam, <0.5% rounded cobbles, massive to moderate subangular blocky structure, roots, clear wavy boundary
55–85	2Bw	7.5YR 4/4, fine sandy loam, <0.5% rounded cobbles, weak subangular blocky structure, gradual wavy boundary
85–110	2Bw2	7.5YR 3/4, fine sandy clay loam, <0.5% rounded cobbles and chert gravel, weak subangular blocky structure, redox depletions and concentrations – few faint, gradual wavy boundary
110–170	2Bw3 (Bt?)	7.5YR 5/4, silty clay loam, <0.5% rounded cobbles, strong blocky structure, redox depletions and concentrations – common distinct, gradual smooth boundary
170–220	2Btg	7.5YR 5/4, clay loam, <0.5% rounded cobbles, redox depletions (7.5YR 6/2) and concentrations – many prominent, Fe/Mn coatings on ped faces, localized clay coatings, strong subangular blocky structure, gradual smooth boundary
220–500	2Bx/ 2Bt	7.5YR 5/6, silty clay loam, <0.5% rounded cobbles, 1-2% random subrounded chert pebbles, redox depletions and concentrations – common distinct (Fe/Mn concentrations 7.5YR 3/2), irregular polygon-shaped bleached mottles suggesting possible fragipan formation, gradual smooth boundary at ca. 500 cm probably additional horizonation but after ~220 no longer directly accessing profile. Reporting only general description.
500–580+	3Bt/C	7.5YR 5/8, sandy loam, 1-2% unsorted rounded gravel, localized clay coatings, redox depletions and concentrations – many prominent 580 cm maximum reach of the backhoe

Table 2-17. BHT-17 Description[**]** Exempted from Disclosure by Statute

Depth (cm)	Horizon	Field Description
0–30	A	5YR 3/3, clay loam, granular to massive structure, roots, clear irregular boundary
30–40	2A/C	5YR 4/4, clay loam, ~3% mixed rock, massive to weak subangular blocky structure, few lithic artifacts, abrupt smooth boundary
40–53	3A/C	5YR 4/4, fine sandy loam, massive structure, massive to granular structure, few lithic artifacts, gradual wavy boundary
53–75	4Bw	7.5YR 4/6, silty clay loam, weak subangular blocky structure, sparse lithic artifacts, clear smooth boundary
75–108	4Bw2	7.5YR 5/8, silty clay loam, clasts of darker sediment 7.5YR 4/4, moderate blocky structure, redox concentrations – Fe/Mn common distinct, gradual clear boundary
108–160	4Bt	7.5YR 5/8, silty clay loam, 1-2% random subrounded chert pebbles, localized thin clay coatings, redox depletions and concentrations – few prominent depletion mottles, gradual smooth boundary
160–210+	4Bt2	7.5YR 5/8, silty clay loam, 2% random subrounded chert pebbles and cobbles, localized thin clay coatings, increased redox depletions (chroma 2) and concentrations - many prominent

Table 2-18. BHT-18 Description[**]** Exempted from Disclosure by Statute

Depth (cm)	Horizon	Field Description
0–40	A/C	5YR 4/4, clay loam, massive to granular structure, clear wavy boundary
40–50	2A	10YR 3/2, fine silt loam, granular structure, clear irregular boundary
50–118	2Bw	10YR 4/6, silty clay loam, moderate subangular blocky structure, few localized thin clay coatings, few coarse sand to pebble size mixed subrounded rock, clear smooth boundary 68-77 cm localized lens of subrounded unsorted pebbles and cobbles
118–138	2Bw2	7.5YR 3/4, silty clay loam, moderate subangular blocky structure, gradual smooth boundary
118–153	2Bw3	7.5YR 4/4, silty clay loam, moderate subangular blocky structure, gradual smooth boundary 138-153 cm localized lens of subrounded unsorted pebbles and cobbles
153–200+	2Bw(x?)	7.5YR 5/6, silty clay loam, 1-2% random subrounded chert pebbles, redox depletions (chroma 2 associated with root casts) and concentrations (Fe/Mn concentrations 7.5YR 3/2) – common distinct, irregular polygon-shaped bleached mottles suggesting possible fragipan formation

Table 2-19. BHT-22 Description[ ] Exempted from Disclosure by Statute

Depth (cm)	Horizon	Field Description
0–20	O/A	10YR 3/2, sandy clay loam, granular to massive structure, roots, clear wavy boundary
20–45	2A/C	10YR3/3, sandy clay loam, granular to massive structure, clear wavy boundary
45–68	3A/C	7.5YR 3/2, silty clay loam, weak subangular blocky structure, clear smooth boundary
68–91	4Ab	7.5YR 4/2, fine sandy clay loam, weak subangular blocky structure, clear smooth boundary
91–122	4Bw	7.5YR 4/4, fine sandy clay loam, moderate to strong subangular blocky structure, gradual smooth boundary
122–160	4Bw2	7.5YR 4/6, silty clay loam, localized thin clay coatings, redox depletions – few prominent, strong subangular blocky structure, clear smooth boundary
160–190	5Bw	7.5YR 4/3, fine sandy clay loam (slight increase in sand), moderate subangular blocky structure, lithic artifacts*, increased redox features – few prominent depletion mottles, *180 cm gray chert flake tool recovered in profile
190–480+	5Bw-C	*Increasing sand and clay with depth – after 400 cm transitions into 7.5YR 4/5, sandy loam/loamy sand with ~1-2% rounded pebbles, increasingly massive structure, no clearly developed clay coatings, redox concentrations and depletions – many prominent >400 cm irregular polygon-shaped bleached mottles suggesting possible fragipan formation *Could no longer access profile, described only general trends observed in soil removed by backhoe.

Table 2-20. BHT-23 Description[ ] Exempted from Disclosure by Statute

Depth (cm)	Horizon	Field Description
0–20	O/A	10YR 3/2, silty clay loam, granular to massive structure, roots, clear wavy boundary
20–46	2Ab/C	10YR3/3, silty clay loam, granular to massive structure, clear wavy boundary
46–80	3A/B	7.5YR 4/3, silty clay loam, weak subangular blocky structure, redox depletions – few faint, clear smooth boundary
80–120	3Bw	7.5YR 4/4, clay loam, moderate subangular blocky structure, redox depletions – few faint, gradual smooth boundary 120 cm groundwater
120–170	3Bw2	7.5YR 4/4, silty clay loam, redox depletions – common distinct, moderate subangular blocky structure, gradual smooth boundary
170–250	4Bw2	7.5YR 4/6, silty clay loam, localized silt coatings, redox concentrations and depletions (7.5YR 6/2) – many prominent
250+	4Bwx	7.5YR 4/6, clay loam, irregular polygon-shaped bleached mottles suggesting possible fragipan formation

Note – no photo, caved in before trench could be prepared for photo.