Susquehanna River, opposite the project area is drained primarily by Wapwallopen, Little Wapwallopen and Nescopeck Creeks, and their tributaries, which empty directly into the river.

Soils

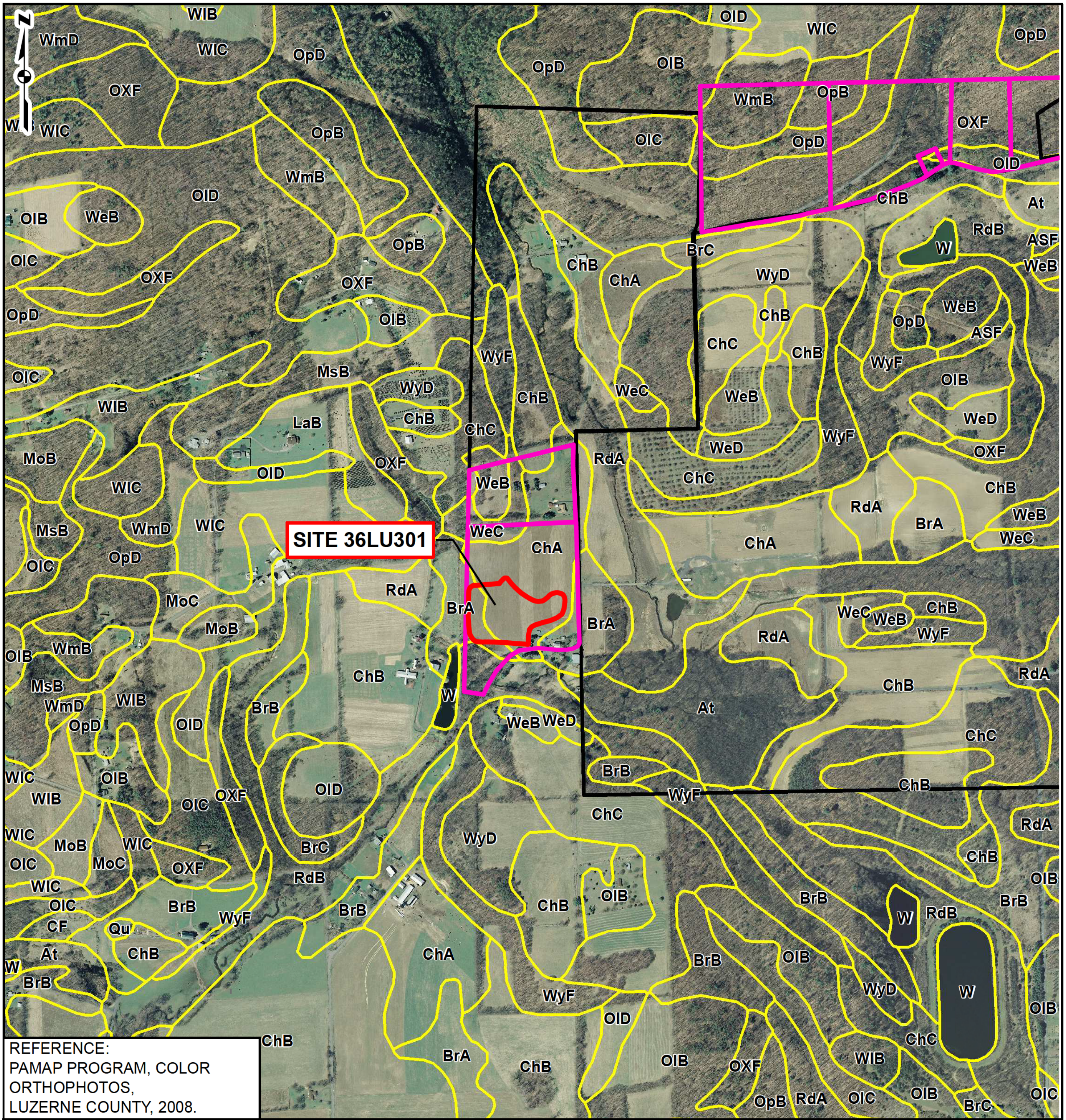
The site vicinity is mapped as the Chenango-Pope-Wyoming soil association (Bush 1981). This soil association is characterized by relatively level to sloping glacial outwash terraces, moderate to very steep hillsides, and relatively level floodplains. Uplands in the general site vicinity (north and west of U.S. Route 11) consist of glacial till and glacial outwash soils (Bush 1981). Glacial till soils, which weathered from sandstone, shale, siltstone and conglomerates, occur on the highest uplands to the north of the site, and on the highest elevation knobs and hillsides to its north and east. Site 36LU301and the majority of surrounding upland settings consist of glacial outwash soils, which formed in thick sediments derived from melting glacial ice. These broad, gently sloping areas represent the highest outwash terraces of the Susquehanna River and are Late Illinoian to Wisconsin in age. The wetlands that have developed on these terraces are also formed in glacial outwash. The site area itself is mapped predominantly as Chenango gravelly loam (ChA), with an area of Braceville gravelly loam (BrA) along its western edge (Figure 6). Soil types in the surrounding localities of glacial outwash include Chenango gravelly loam (ChA, ChB, ChC) and Braceville gravelly loam (BrA, BrB, BrC), as well as Atherton silt loam (At), Rexford loam (RdA, RdB) and Wyoming gravelly loam (WyD, WyF) (see Figure 6). Chenango gravely loam is found across large areas of cultivated fields, such as Site 36LU301; smaller areas of open fields are mapped with Braceville gravelly loam. In the surrounding area, Atherton silt loam and Rexford loam are associated with poorly drained localities while Wyoming gravelly loam occurs on steep hillsides.

Due to its upland setting Site 36LU301 has no potential for deeply buried cultural resources. Cultural resources in this locality are anticipated to be associated with the modern ground surface. Ground surface disturbances in the site area result from prior cultivation and an historic farmstead occupation (along the southern edge).

Prehistoric Toolstone Resources

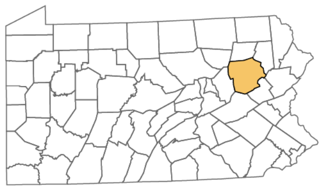
The geologic landscape of the Central West Branch subbasin provided Native Americans with not only livable terraces and highly productive soils, but also with a variety of lithic raw materials for stone tool production, including numerous cherts, jaspers, and quartzites. Among the most widely known lithic raw materials include Bald Eagle jasper, Shriver chert, Onondaga chert, oolitic chert, and Nittany chert (MacDonald 2006). Several other lithic raw materials, including rhyolite (from south-central Pennsylvania), steatite (from the Upper Potomac River), and Flint Ridge chert (from eastern Ohio), were transported into the region within the toolkits of Native Americans and mark the boundaries of trading systems and settlement patterns.

Two varieties of chert that could be attributed to specific geologic sources were deposited as artifacts at the Bell Bend sites (Figure 7). These include Shriver/Helderberg chert and Onondaga chert. Shriver/Helderberg chert is found in outcrops of the Helderberg formation, which extends in a northeast/southwest trending band following the ridgelines, from West Virginia and Virginia, into northeast Pennsylvania. This raw materially is locally available and was the most common material identified during GAI’s previous Phase Ib and Phase II investigations of prehistoric sites in the BBNPP project area. Onondaga chert outcrops in New York and also occurs as secondary deposits of cobbles that are transported throughout the river systems from New York and southward. Cobbles of Onondaga chert are available locally from stream beds.



REFERENCE:
PAMAP PROGRAM, COLOR ORTHOPHOTOS, LUZERNE COUNTY, 2008.

PROJECT LOCATION



LUZERNE COUNTY, PENNSYLVANIA

LEGEND

- PHASE II SITE BOUNDARY
- SECOND SUPPLEMENTAL PHASE Ib PROJECT AREA
- PREVIOUS PHASE Ib PROJECT AREA
- SOIL BOUNDARY

0 500 1,000 2,000 Feet

FIGURE 6
PROJECT AREA SOILS

gai consultants

BELL BEND NUCLEAR POWER PLANT
PPL BELL BEND, LLC

DRAWN BY: AJW
CHECKED: BAM

DATE: 12/09/2011
APPROVED: BAM

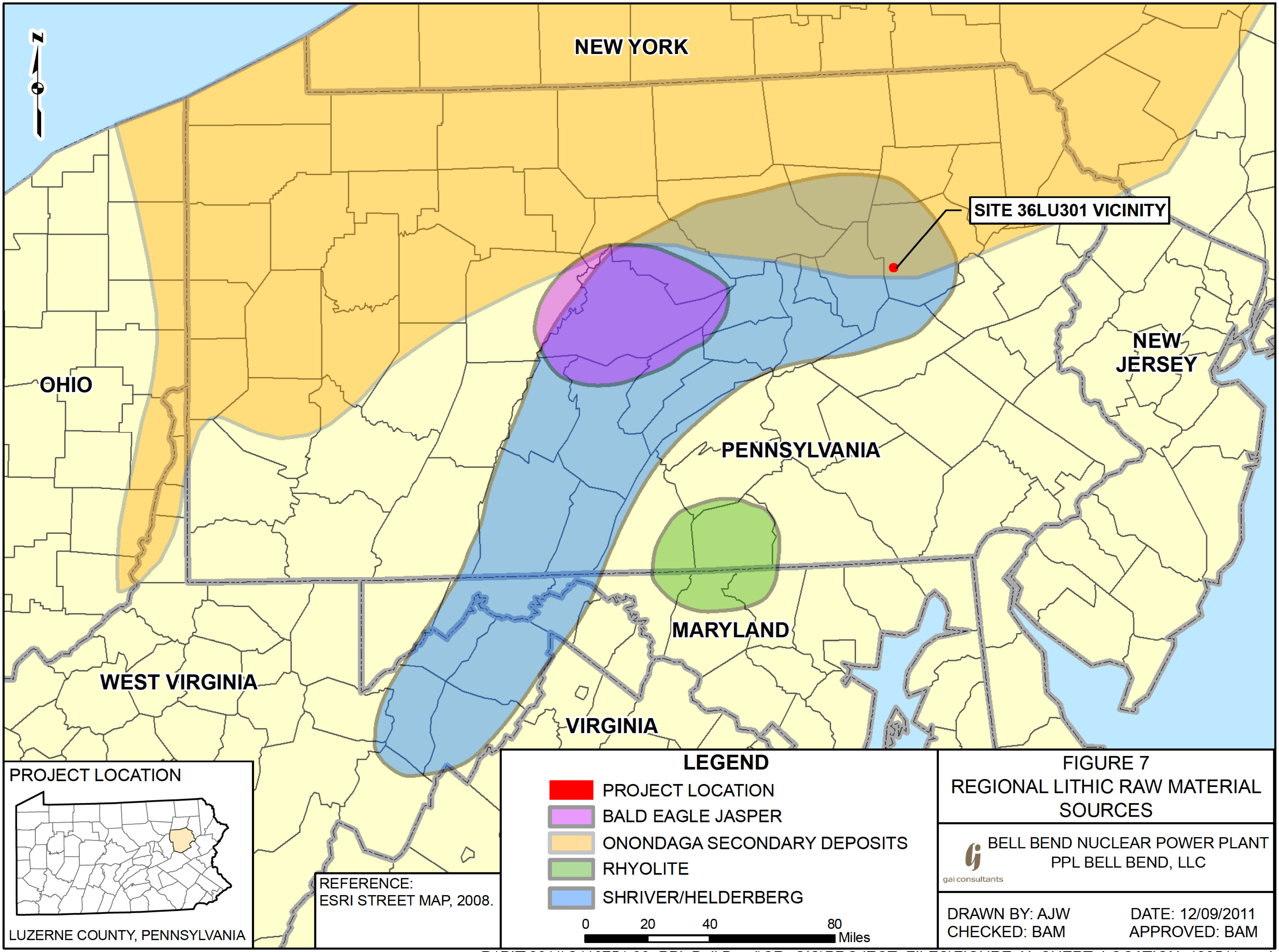


FIGURE 7
REGIONAL LITHIC RAW MATERIAL SOURCES

P:\PIT\2011\C110751.00_PPL Bell Bend\CR_GIS\PROJECT_FILES\FIGURE_X_CHERT_LOCATION_120511.mxd

In addition, calcareous clay shale (claystone) occurs on-site as a surface outcrop exposed in the cultivated field within the north-central portion of the site. The rock outcrop has undoubtedly been impacted by plowing and fractured pieces of claystone are ubiquitous across the ground surface in the vicinity of the outcrop. This raw material fractures naturally in a thin platy fashion, resulting in fragments with flake-like characteristics but with edges that are friable and easily broken. Over 200 specimens of claystone were initially collected during Phase II testing, however, following laboratory processing and analysis, all but six of these (exhibiting clear flake morphology) were concluded to be non-cultural and were discarded. As no tools made from claystone were recovered from the site, the use of this raw material as a prehistoric toolstone cannot be conclusively confirmed.

Several other cherts were used in toolstone production but they could not be identified with a specific sourced material type. These unsourced cherts were described primarily by color and include black and dark gray cherts.

In addition to the various cherts, other unsourced toolstone materials found in the prehistoric artifact assemblage include metamorphic rock and sandstone, typically used for cobble tools and/or fire-cracked rock (FCR). Phase II testing (plowzone stripping) exposed a gravel bar, representing a former stream channel, extending in a southwest/northeast band through the northwest quadrant of the site. A portion of a second gravel bar was also documented in the southern portion of the site. Sandstone cobbles found in these stream deposits may have been one source of this raw material; cobbles were also available in glacial till and outwash deposits in the surrounding uplands.

Within the Site 36LU301 Phase Ib and Phase II flaked stone assemblage, Shriver/Helderberg chert was the most common raw material type, followed by Onondaga chert. Sandstone and metamorphic rock were used predominantly for fire-cracked rock and cobble tools. The remaining raw material types occurred in lower frequencies.

Modern and Past Climates

The modern, local climate within the project area is classified as humid continental, with some modifications due to proximity to the Great Lakes and to the Atlantic Ocean (Rossi 1999, Trewartha 1967). An even greater influence is provided by the Ridge and Valley physiography, which has many of the characteristics of a mountain-type climate. These characteristics include localized uplift of moisture-laden air masses producing increased precipitation on the windward side of ridges, and drier conditions on the lee side.

In Luzerne County, Canadian air masses collide with warm airflow originating in the Gulf of Mexico, creating ample precipitation for the region. Summers are typically warm with average temperatures ranging between 80° and 85° Fahrenheit (26° to 29° Celsius). The cold and cloudy winters accumulate approximately 15 inches (38 centimeters) of snowfall in the lower elevations and up to 70 inches (177 centimeters) in higher elevation. In winter, the daytime temperature ranges from 30° to 35° Fahrenheit (1.1° to 1.6° Celsius). Spring and fall are characterized by swift weather pattern changes with fluctuating periods of freeze and thaw during both seasons. The area has a mean annual precipitation of 40.1 inches (102 centimeters). The growing season in Luzerne County averages 120-150 days (USDA, SCS 1981).

Pennsylvania has experienced three main climatic changes over the last 12,000 years (Carr 1998a, Guilday et al. 1964, Guilday et al. 1977, Stingelin 1965). First, at the late Pleistocene/early Holocene transition (circa 11,000 B.P.), a warmer and moister climate (although cooler than present) caused the northward movement of most plant communities and glacial retreat. Glacial deposits were present throughout the area, as glaciers reached as far south as Picture Rocks, in nearby Lycoming County (USDA, SCS 1986). Between 10,000 and 6000 B.P., climates became warmer and drier with the onset of the Hypsithermal/Altithermal. In the project vicinity, this change likely resulted in the establishment of the modern Mixed Mesophytic forest, including oak, hickory, and chestnut. Finally, after 3000 B.P., human modification of the landscape via fire and agriculture increasingly affected the ecological mosaic, leading to an increase in oak forests along with grasses and sedges (Joyce 1988, Watts 1979).

Paleoenvironment

The project area falls within a basswood-beech-oak-hemlock Mixed Mesophytic forest region (Braun 1950) that became entrenched during the Holocene. Prehistoric faunal assemblages in the Appalachians revealed a rich and diverse fauna for forager exploitation. The white-tailed deer was the most commonly exploited mammal. Other species hunted by prehistoric populations were black bear, bobcat, river otter, raccoon, squirrel, beaver, woodchuck, fox, and rodents. Prehistoric Native Americans also exploited avian and aquatic resources. Except for the extinction of certain large animals (elk, wolf, and cougar) and increases in other species populations, such as white-tailed deer, turkey, and woodchuck, the faunal composition of the area is little changed from early historic times (Shelford 1963).

With easy access to resources in a variety of upland and riverine settings, prehistoric inhabitants extensively utilized this region, which generally has a high potential for prehistoric archaeological sites. However, the pattern of previously recorded sites in the vicinity suggests that there was a preference for the larger drainage valleys along Susquehanna River. Few sites have been recorded in uplands settings similar to that of Site 36LU301.

Chapter 3. Culture History

The purpose of this chapter is to provide a general context for the Phase II investigations of prehistoric Site 36LU301. Both the Native American and Euro-American culture history sections focus on Pennsylvania's Susquehanna Valley region.

Native American Prehistory

Paleoindian (15,000 to 10,000 B.P.)

Humans first entered North America during the Paleoindian period, which dates to before 10,000 B.P. Radiocarbon dates recorded at Meadowcroft Rockshelter in western Pennsylvania have conservatively placed the earliest date of site occupation to approximately14,500 B.P. (Adovasio et al. 1999); occupation of the Shawnee-Minisink Site in eastern Pennsylvania has been placed between 10,000 and 11,000 years ago (McNett 1985). Although the exact date of human entry into the New World remains obscure, it is generally agreed that the arrival was from Asia via Beringia (the area including modern day Northeastern Siberia, the Bering Straits, and Alaska), exposed during Pleistocene glaciations (Neusius and Gross 2007). The paleoclimate to which these populations were adapted was much wetter and cooler than the climate of today. Glaciers covered large portions of North America, terminating in northern Pennsylvania.

Paleoindian populations are viewed as having subsisted as relatively mobile bands of hunters and foragers. They have traditionally been viewed as primarily dependent on the hunting of Pleistocene megafauna such as mastodon, sloth, and giant beaver. Recent evaluations of the evidence for this type of subsistence base have suggested a more generalized hunting and foraging economy where Paleoindians exploited small game and wild plants (e.g., Meltzer 1988). Investigations of the Paleoindian levels at the Shawnee-Minisink Site, in eastern Pennsylvania, suggest that procurement and processing of seeds, berries, and fish reflect seasonally based procurement activities in this locality (McNett 1985; Dent 2002). In this light, more generalized subsistence strategies focusing on a variety of locally available species may have been the best available adaptation.

The majority of Paleoindian sites are interpreted as small, short-term campsites where activities included animal butchering and hide processing, as well as working of wood, bone and antler. Artifact scatters with fluted stone spear points and flake tools used for cutting and scraping mark these sites. The projectile points for this period include forms such as Clovis, Cumberland, and the unfluted Lanceolate Plano cluster (Justice 1987). Dalton cluster points are typical of the Late Paleoindian and some appear to be a technological transition into Early Archaic forms (Justice 1987). Paleoindian tool kits include polyhedral blade cores for producing expedient flake tools, as well as endscrapers, sidescrapers, and gravers. Bipolar reduction techniques may have been employed to allow for exploitation of a wider range of raw materials (Tankersley 1996: 31).

In the glaciated portions of northern Pennsylvania, Paleoindian points and sites typically occur on lowland terraces of small tributaries. Lantz (1984) observed that many Paleoindian sites also occur on glacial features such as glacial kames, terraces, and moraines near springs, wetlands, creeks, and rivers. These areas are considered to be game-attractive settings (Tankersley 1996: 28). In unglaciated regions, Paleoindians sites are located at "more diverse elevations with few areas of concentration" (Lantz 1984).

Researchers suggest that sources of cryptocrystalline raw material were important focus of these groups (Lantz 1984; Tankersley 1996). Studies conducted in the Blue Ridge area of

Virginia (Gardner 1977) indicate that these lithic sources were a primary focus of Paleoindian groups. However, more recent examinations of sites across Virginia (Barber 2003) caution that this is only one of probably multiple factors weighing on the Paleoindian selection process for settlement location. Quarry-related sites in the Ridge and Valley province may occur in association with primary outcrops of these materials, or with cobble beds yielding chert, jasper, and other cryptocrystallines.

Many sites dating to the Paleoindian period have been recorded in the Susquehanna River Valley. However, in Pennsylvania, as in other areas, the majority of these sites are represented by isolated finds, limiting the evidence for subsistence activities of these populations. Prior to GAI's investigations of the Bell Bend project area, only one previously recorded Paleoindian site, consisting of an isolated Paleoindian projectile point, had been documented in Luzerne County. GAI's field investigations of the Bell Bend project area produced two Paleoindian points from prehistoric Site 36LU288, situated on a low terrace/floodplain west of the North Branch Susquehanna River (Munford et al. 2010). In addition, one Paleoindian point was recovered from a disturbed context within an historic period farmstead site (Site 36LU286), located approximately 259 meters (850 feet) east of Site 36LU301, in a similar upland setting above Walker Run. No Paleoindian diagnostic artifacts were recovered from Site 36LU301.

Early Archaic (10,000-8000 B.P.)

The beginning of the Archaic period in eastern North America is generally associated with the onset of the Holocene, which directly followed the end of Pleistocene glaciation. The warmer, drier climate that resulted from the retreat of the Pleistocene glacial ice led to the replacement of a subarctic regime with more heterogeneous flora and fauna (Caldwell 1958). Gradual cultural change occurred as groups began to schedule their activities and specialize in methods of seasonal resource extraction in response to the existence of a more diversified resource base.

Although archaeological research on the Early Archaic period in the region has been limited, it is likely that patterns characterizing the Northeast in general were also typical of central and western Pennsylvania (George 1985). Many archaeologists believe the Early Archaic represents a continuation of the basic Paleoindian subsistence/settlement pattern. This notion is supported by a number of studies in the Mid-Atlantic region that indicate a continuity of lifeways at Paleoindian/Early Archaic sites in Delaware (Custer 1988), the Shenandoah Valley (Gardner 1980), and the Great Valley in Pennsylvania and Maryland (Stewart 1980). Groups remained highly mobile, and Carr (1998b:49, 60) and Stewart and Katzer (1989) suggest that the region sustained a significant population increase during the early Holocene. Territories became somewhat more limited as the spread of deciduous forests led to a greater dispersal of game species (Carbone 1974).

Technologically, the shift in projectile points from the earlier fluted forms to notched and serrated varieties may represent a change from a thrusting to a throwing technique that suggest changes in the hafting of these projectiles to dart or spear shafts. This shift in the design of hunting weaponry may reflect a change in prey species from Pleistocene to Holocene fauna. Projectile point forms typical of this period in the Susquehanna Valley include Palmer, Kessel, Charleston, and Kirk, corner-notched and stemmed points (Custer 1996; Justice 1987). Non-diagnostic tools on Early Archaic sites can include bifaces, and utilized and retouched flakes. Early Archaic sites also witness the first evidence of ground stone technology. Examples include flaked and ground celts and axes along with abraders. Early Archaic trends in lithic raw material use show a continued preference for high quality materials, such as jaspers and cherts, and the introduction of rhyolite to the tool assemblages (Carr 1998a). Often these materials are considered non-local to the sites and may indicate a wider range of settlement and/or procurement rounds (Carr 1998b).

Within the limits of the two watersheds in the site vicinity, only six sites with Early Archaic components have been identified. Three of these sites were located on low floodplain or terrace settings near the current study (PHMC/BHP 2010).

GAI's 2008 Phase Ib survey of the Bell Bend project area documented two Early Archaic Isolated Finds (IF 2 and IF 15), consisting of individual diagnostic projectile points, in the upland flats east of Site 36LU301 (Munford et al., 2010). One Kirk corner notched point was recovered from a cultivated field approximately 0.9 kilometers (0.5 miles) to the east, while one Palmer point was found in a cultivated field along the east edge of North Market Street, immediately opposite the site.

Middle Archaic (8000-5000 B.P.)

Like the Early Archaic period, the Middle Archaic is poorly understood in the Ridge and Valley (George 1985; Carr 1998a). Based on an understanding of this period in adjacent regions, however, researchers assume that population densities continued to increase because of the wider availability of food resources. Carr (1998a) notes a "significant increase in population" during the Middle Archaic in the Susquehanna region. A shift occurred toward more logistically organized subsistence/settlement patterns. In the American Midwest, there is evidence to suggest a decline in residential mobility for Middle Archaic populations, at least on a seasonal basis (Brown and Vierra 1983).

Bifurcate point production is the major technological change between the Early and Middle Archaic periods in the Ridge and Valley of Eastern Pennsylvania. Point forms indicative of the Middle Archaic period include Neville/Stanly and LeCroy, with fewer examples of MacCorkle, St. Albans, and Kanawha stemmed points in central Pennsylvania (Kuhn 1985). Rare examples of Morrow Mountain and Guilford type bifaces are found in the region (Cowin 1991:46). The processing of plant foods also grew in importance, and seems to be reflected in the tool assemblage by the introduction of various grinding and pitted stones (Graybill 1995:37). More local lithic resources were exploited and there seems to be an emphasis on more expedient tool production (e.g., bipolar reduction of cobbles) rather than curated tools such as bifaces of select high quality materials (Carr 1998a:88; Custer 1996:151; Graybill 1995:37).

Middle Archaic sites have been identified in a wider variety of settings than the previous Paleoindian and Early Archaic period sites. Cowin (1991:48) characterizes the Middle Archaic settlement system as consisting of base camps positioned on Holocene-age river terraces, smaller resource procurement stations for seasonal plant and animal exploitation in upland settings, and lithic reduction stations near bedrock outcrops of stone exploited for tool manufacture. Custer (1996:154-155) suggests that the base camps are located in areas where multiple resources are readily accessible, not just river terraces, and that procurement sites are positioned to focus exploitation on a single resource. He has revised his previous scenario, which included macro-band and micro-band base camps, and now sees evidence that the larger sites (previously termed "macro-band") are simply a result of more frequent use rather than use by larger groups.

Previous research in Central Susquehanna Watersheds B and D has identified ten sites with Middle Archaic components. Of these sites, three are situated in the vicinity of Site 36LU301 in floodplain or terrace settings (PHMC/BHP 2010).

One Early/Middle Archaic MacCorkle-like point was recovered from the surface of Site 36LU301 during GAI's Second Supplemental Phase Ib survey.

GAI's 2008 Phase Ib survey of the Bell Bend project area recovered two isolated diagnostic Early/Middle Archaic points (one MacCorkle-like point and one Kanawha point), recorded as IFs 3 and 5, from the surface of a cultivated field on an upland flat approximately 0.9 kilometers (0.5 miles) east of the current site (Munford et al., 2010).

In addition, Phase II investigations of Site 36LU301 identified two prehistoric thermal features (hearths) that have been radiocarbon dated to the Middle Archaic period. Radiocarbon analysis of samples from Feature 150 produced a date of 5120+/-40 B.P. (Beta-309435) while Feature 171 samples yielded a date of 7150+/-40 B.P. (Beta-309438).

Late Archaic (5000-3000 B.P.)

The Late Archaic period witnessed major environmental changes, which seem to coincide with cultural changes, including continued population growth, a greater shift to logistically-oriented subsistence/settlement patterns, and the establishment of exchange networks. The appearance of more diverse artifact forms also marks this period. In other areas of eastern North America, the Late Archaic period yields the first evidence of fiber-tempered pottery (Reid 1984; Skibo et al. 1989), burial mounds (Charles and Buikstra 1983), and the use of domesticated plants (Ford 1985; Smith 1987).

Change toward a more logistical settlement pattern is paralleled by an increase in the number and types of sites, at least as seen in the region around Southeastern Pennsylvania (Custer 1983, 1988). Custer (1983) suggests that large base camp sites are found on well-drained land near large drainages or wetlands, while small procurement and extraction stations are found in upland areas.

Within central and eastern Pennsylvania, diagnostic artifacts of the Late Archaic period include Laurentian point types (Kinsey 1972:403-408; Ritchie 1965), such as Otter Creek, Vosburg, and Brewerton, as well as narrow-stemmed Piedmont point types (Kinsey 1972:418-417), including Poplar Island, Lackawaxen, Normanskill, and Lamoka. Subsequent Terminal Archaic projectiles include the Susquehanna and Perkiomen Broadspear, as well as Orient Fishtail points. Custer (1983) suggests that broad blade projectile points found in the neighboring regions may also represent knives. There is also an increase in the use of non-projectile point flaked stone technologies, including expedient flake tool and non-lithic tool types.

Non-diagnostic flaked stone artifacts at Late Archaic sites are dominated by unfinished bifaces and bifacial tools, expedient flake scrapers, drills, perforators, and utilized flakes. Additionally, the variety of groundstone implements in Late Archaic artifact assemblages increases, consisting of adzes, celts, gouges, and axes. The appearance of steatite vessels characterizes the latter part of the Late Archaic. As exchange networks increase in complexity during the Late Archaic, the importance of artifacts of rhyolite, argillite and steatite increased (Custer 1988; Dent 1995:202; Kent et al. 1971; Stewart 1987).

Within the nearby watersheds, Late Archaic components have been identified at 52 previously recorded sites. Of these 52, 13 sites occur near Site 36LU301, all in floodplain or terrace settings (PHMC/BHP 2010).

GAI's 2008 Phase Ib survey of the Bell Bend project area recovered one diagnostic Middle to Late Archaic Piney Island point (IF 4), in a cultivated field on an upland flat 0.9 kilometers (0.5 miles) east of Site 36LU3U01 (Munford et al, 2010). In addition, one Late Archaic Brewerton eared-notched point (IF 11) was found in a cultivated field bordering the east edge of North Market Street, opposite (northeast of) the site.

Phase Ib and Phase II testing of Site 36LU301 yielded no diagnostic Late Archaic artifacts or features.

Early Woodland (3000-2100 B.P.)

The Woodland period is better known in Pennsylvania than the preceding cultural periods. The major diagnostic traits traditionally cited for the Woodland period include burial ceremonialism, an increased reliance on horticulture, and extensive use of fired clay ceramics. Although the subsistence base was primarily composed of resources collected by the traditional patterns of hunting and gathering that persisted from the Archaic period, horticulture gradually assumed greater importance. This led to a subtle change in settlement patterns toward a more sedentary lifeway. Settlements focused on the most predictable resources and the areas with highest productivity. Semi-sedentary, very large base camps are situated in the floodplains of major drainages.

The emergence of the Adena cultural complex in the central Ohio Valley influenced groups as far east as New York and New Jersey and directly involved populations within the Susquehanna River watershed (Raber 1985). Beginning in the latter portion of the Early Woodland, Native Americans of the Adena and Meadowood cultures built burial mounds and other ceremonial facilities along the Ohio River and mid-Atlantic coast (Adena), as well as along the upper portion of the Susquehanna Valley in New York (Meadowood) (MacDonald 2006).

Early Woodland sites in the greater Susquehanna Valley, including the Memorial Park Site on the West Branch in Lock Haven, reveal evidence of early domestication of squash, chenopod, maygrass, sumpweed, and sunflower (Hart 1995a). Ethnobotanical remains from various Early Woodland sites suggest that, while domesticates were introduced, they were dominated by the use of widely available wild plant foods (Adovasio and Johnson 1981; Ballweber 1989; Ritchie 1980).

Ceramics generally function as cultural markers during the Woodland period. The general trend of Early Woodland pottery in central Pennsylvania and the greater Susquehanna River Valley was toward the production of coarse, crushed rock-tempered, and thick-walled conoidal vessels with cordmarked surface treatment. Marcey Creek, Juniata Thick, and Vinette I wares are characteristic of this region (Custer 1996). Stylistic changes are observable in these wares as Early Woodland potters replaced steatite temper with various forms of grit or crushed rock, including quartz, chert, and other minerals, and flat-bottomed vessels were replaced by conoidal-shaped ones (Custer 1996; MacDonald 2006).

Diagnostic lithic artifacts for the Early Woodland period in the greater Susquehanna Valley region include Cresap stemmed, Adena stemmed, Meadowood points (Ritchie 1980:181), and Robbins stemmed points (Justice 1987). Non-diagnostic stone tool assemblages include drills, perforators, scrapers, and utilized flakes. Additional artifacts associated with the Adena are tubular open-end and blocked-end pipes, copper beads and bracelets, cut mica, and groundstone gorgets and celts. Domestic (both Adena and non-Adena) sites typically yield groundstone tools, such as mortars, pestles, metates, manos, and pitted cobbles, while mortuary sites may contain ground slate objects, such as pendants, gorgets, and effigy pipes, as well as jewelry, projectile points, and blade/biface caches produced from exotic lithic raw materials (MacDonald 2006).

Previous investigations have recorded 31 sites with Early Woodland components in the Central Susquehanna Watersheds B and D (PHMC/BHP 2010). However, only nine recorded sites containing Early Woodland components are located in the vicinity of Site 36LU301. As with the earlier time periods all of these sites were found in floodplain or low terrace settings.

The current study recovered one diagnostic Early Woodland specimen, a Cresap-like point, from Site 36LU301. In addition, based on the results of radiocarbon analysis two prehistoric thermal features (hearths) identified at the site were dated to the Early Woodland period. Feature 153 produced a radiocarbon date of 2780+/-40 B.P. (Beta-309436) and Feature 154 yielded a date of 2760+/-30 B.P. (Beta-309437).

Middle Woodland (2100 B.P.–A.D. 900)

The Middle Woodland period demonstrates a continuation of developments associated with the Late Archaic and Early Woodland periods. The Middle Woodland is characterized by further elaboration in burial ceremonialism, widespread interregional exchange, the increased importance of indigenous cultigens, and perhaps the first use of maize. After the end of Adena-related ceremonialism circa A.D. 250, the Hopewell complex flourished in Ohio and brought cultures in central and western Pennsylvania directly and/or indirectly into its exchange network (Kent et al. 1971). The seasonal hunting and gathering pattern continued, but with a greater emphasis on fishing. Settlement patterns are similar to those described for the Early Woodland. Settlements focused on the most predictable resources and the areas with highest productivity. Semi-sedentary, very large base camps are situated in the floodplains of major drainages.

The diagnostic ceramic types of this period are thick, but more finely grit-tempered wares that exhibit surface finishes of net-marking or cord-marking (e.g., Point Peninsula and Owasco). Associated projectile point forms are a mix of stemmed and notched varieties, including Fox Creek, and Jack's Reef types.

Twenty previously-recorded sites with Middle Woodland components occur in the Central Susquehanna Watersheds B and D. Only four of these previously identified sites are situated near the current study area (PHMC/BHP 2010), all in lowland settings.

Phase Ib and II investigations of Site 36LU301 produced no diagnostic Middle Woodland artifacts or features.

Late Woodland (A.D. 900–1600)

The Late Woodland period in the Upper Susquehanna drainage is characterized by increasing cultural variability and an increase in the use of agriculture to supplement gathered wild food supplies. Although wild food resources remained a major part of the diet during the Late Woodland, data regarding subsistence indicates that maize, domesticated *Chenopodium*, as well as tobacco and sunflower used in the in the Susquehanna basin (Hart 1995b). Wild foods include hickory, chestnut, hazelnut, walnut, butternut, black walnut, acorn, wild rice, and a variety of mammals, fish, and birds. In consort with the change in subsistence pattern, village nucleation and increasing populations marked settlement patterns. There is evidence of large, circular, fortified multi-seasonal villages in floodplain settings. Social organization became more complex during the Late Woodland, and led to the emergence of tribal societies. The presence of palisaded villages suggests that intergroup relations were characterized by violence and competition, as well as intertribal alliances. Treatment of the dead changes, with ossuary burials identified during the Late Woodland.

The Late Woodland period seems to have experienced a more rapid population growth than the preceding periods. The population increase also corresponds with an increasing use of the

Susquehanna drainage and vicinity. Sixty-five sites yielding Late Woodland components were identified within the Central Susquehanna Watersheds B and D. Of the previously identified sites, ten sites near the current study area yielded Late Woodland components (PHMC/BHP 2010).

The Late Woodland in this region can be divided into three sub-phases: Clemson Island (A.D. 750/900-1250), Stewart (A.D. 1250-1350), and McFate-Quiggle (A.D. 1350-1550/1600) (Graybill 1995). Clemson Island occupations show evidence that houses and large storage features were built, suggesting a fairly sedentary, agricultural community (Hart 1995b). Clemson Island pottery shows an increase in finely-made cordmarkings and punctations on vessel exteriors, an increase in decorated lips, and an increase in finely-crushed quartz, chert, or other grit temper. Some evidence of shell temper is observed in later Clemson Island pottery collections (MacDonald 2006). Ground stone tools increase in quantity due to the need for plant-processing equipment (Graybill 1995). Clemson Island stone tool assemblages consist of expedient tools for daily tasks and a decrease in biface production. Projectile points consist mainly of Levanna and Madison triangles and some Jack's Reef corner-notched. Shenks Ferry sites typically yield only triangle points, which generally decrease in size over time (MacDonald 2006).

The Stewart Phase is believed to have developed locally out of the preceding Clemson Island complex. There is strong evidence for interaction with the down river Shenks Ferry populations and the Owasco-Iroquoian populations to the north (Graybill 1995). The Stewart Phase pottery is dominated low-collared forms of rock-tempered Shenks Ferry Incised and Shenks Ferry Cordmarked. Diagnostic projectiles points continue to be varieties of Levanna and Madison triangles.

The McFate-Quiggle Phase shows a continued focus on large fortified villages in the valleys of major drainages. Their ceramics are characterized by high-collared, shell-tempered varieties that exhibit distinctive incised line patterns (Graybill 1995). Again, diagnostic projectile points are primarily varieties of Madison triangular forms.

No Late Woodland diagnostic artifacts were recovered during Phase Ib and Phase II investigations of Site 36LU301.

Protohistoric/Contact (A.D. 1600−1750)

In the Susquehanna River Valley south of the site vicinity, the Susquehanna River divides into its North and West Branches. The region is known for its rich soils, particularly near the mouths of principal tributaries, and former heavy timber coverage. Its mountains were originally a barrier to travel and settlement was initially slow; yet the timber and iron ore extracted from the mountains provided a source for industrial prosperity and growth.

The Andastes or Susquehannocks were known to have occupied the Susquehanna Valley as early as the year 1620. They are believed to have migrated southward from populations living in what is now New York State. Initial occupations appear to be represented by dispersed hamlets in the upper Susquehanna Valley, but later habitation established a series of fortified villages along the Lower Susquehanna River Valley (Custer 1996). Archaeological and ethnohistorical evidence indicates that this new group of people in the Susquehanna Valley brought with them a social organization that was different from the preceding populations. One sign of this is the introduction of Iroquois-style longhouses in the villages. The Susquehannocks became the dominate group in the central Mid-Atlantic region, and a vast array of trade goods has been found at sites during this period. The Susquehannocks occupied the Susquehanna Valley into the middle of the seventeenth century. By the beginning of the eighteenth century, they had already been removed as the dominate power in the region, and the native populations throughout the Mid-Atlantic were fragmented and dispersed due to increasing European settlement and control.

Initially, after the demise of the Susquehannocks, many different Indian groups migrated to Eastern Pennsylvania due to the more tolerant treatment by William Penn (Custer 1996). However, increasing pressure made those settlements unsustainable, and many groups began to form alliances with the Iroquois Nation, which seemed to have a strong influence on the region. During the last quarter of the seventeenth century and the first half of the eighteenth century, members of the Algonquin (Lenapi and Shawnee), Iroquois (Haudenosaunee), and Siouan (Tutelow and Catawa) tribes lived near the fork of the Susquehanna River. The Algonquins and Siouans, after being conquered by the Haudenosaunee, were absorbed into the Six Nations alliance of tribes. The Oneida Chief Shikellamy, a leader among the Six Nations, established his seat of power near what is now Milton. In 1741, he moved his headquarters to Shamokin, a Lenapi village in Northumberland County at the fork of the Susquehanna. From that location it was possible to travel up the North Branch to Lake Otsego, a short distance from Onondaga, New York, the center of government for the Six Nations. Additionally, the West Branch of the Susquehanna provided access to the upper Ohio Valley, and the Chesapeake Bay could be reached simply by traveling downstream along the main stem of the Susquehanna River. Nevertheless, most of the inhabitants of Shamokin moved westward to the Ohio lands following the death of Shikellamy in 1748 (Godcharles 1944:229-232).

Of the previously recorded archaeological sites in the general vicinity of the current study area just one site contained a Protohistoric/Contact era component (PHMC/BHP 2010). That site, located on the east side of the North Branch Susquehanna River, was identified as a cemetery.

Phase Ib and Phase II investigations of Site 36LU301 produced no diagnostic artifacts or cultural features dating to the Protohistoric/Contact period.

Euroamerican History

The study area is located in Salem Township in western Luzerne County, east of the city of Berwick. The Susquehanna River flows east and south of the study area and forms the southern boundary of Salem Township. This region is predominately rural and agrarian in nature with Wapwallopen, and Beach Haven being the principal areas. While the study area was historically agricultural in nature, it was also impacted by mining of the large anthracite coal field in the Wyoming Valley to the north.

Euroamerican Settlement (1750−1840)

Although William Penn was granted the Charter of Pennsylvania containing the present boundaries of Pennsylvania in 1681, the region remained largely unsettled by English colonists until the latter half of the eighteenth century (Archambault 1924:277). In the 1730s, Conrad Weiser, a noted Pennsylvanian German, travelled throughout the area that would become Luzerne County and noted the presence of Shawnee villages along the banks of the Susquehanna River (Pearce 1866:32). In approximately 1754, hostilities between Britain and France erupted into the Seven Years’ War or the French and Indian War. Most of the Shawnee and Lenape who were living in the Susquehanna River drainage allied themselves with the French during the conflict (Pearce 1866:40). After the Treaty of Paris in 1763, hostilities with the French ended. Delaware Chief Teedyuscung and other Native American leaders entered into council, and made peace with the English and settlement of the

Pennsylvania frontier was open to American colonists (Pearce 1866:40-51). Shortly after the arrival of the settlers, Chief Teedyuscun perished in a suspicious fire, which triggered more hostilities of the Native American populations, and attacks were led against settlers throughout the western frontiers of Pennsylvania.

Settlement of the region progressed slowly during the 1770s. In 1774, the region that includes Luzerne, Wyoming, Susquehanna, Bradford, and a portion of Wayne Counties had a population of 1,922 (Pearce 1866:178). In a town meeting held in Wilkes-Barre on August 1, 1775, settlers resolved to join the American colonists in their fight against Britain. Hasty forts were constructed throughout the region (Pearce 1866:121).

In 1786, Luzerne County (encompassing present day Lackawanna, Wyoming, Susquehanna, and Bradford Counties) was created from part of Northumberland County. The county was named in honor Chevalier Caesar Anne de la Luzerne, who served as the French minister to the United States from 1779 to 1783.

In 1780, Sebastian Seybert settled at the mouth of Seybert's Creek a mile west of Beach Haven and operated a gristmill and sawmill, as well as a distillery and clothiery (Bradsby 1893:643-644). In 1788, Mr. Walker constructed a gristmill on a small creek emptying into the Susquehanna a short distance upstream from Beach Haven. Prior to the construction of these mills, settlers in Salem Township shipped their grain via rafts up the Susquehanna to a mill located in Nanticoke.

The early settlers cleared their land, constructed houses, and raised a variety of crops and livestock for personal consumption. These farmers typically relied on storing less perishable items such as wheat, whisky, and salted pork (PHMC/BHP 2005b:15). Extra farm produce was traded locally for other needed goods and services. Their houses and barns were small, one-story, one or two room log structures. By 1840, new buildings (consisting of the two-story, "four-over-four" houses and banked barns) were built in the region (PHMC/BHP 2005b:159-165).

Agricultural development and settlement increased within the region, helped by improved transportation infrastructure, which made it easier to transport goods to more distant markets. The Lehigh-Nescopeck Highway was completed in 1790 to ease the burden of this travel, and allow a more efficient influx of goods in and out of the region. The decade between 1790 and 1800 witnessed a rapid increase in settlement largely due to transportation improvements. The population of Luzerne County rose from 2,000 to almost 13,000 during this decade.

After 1807, construction on the Susquehanna and Tioga Turnpike Road began in Berwick and proceeded north until it reached Elmira, New York in 1825. A ferry was opened to connect Nescopeck with Berwick and Beach Haven to the east. A bridge constructed across the Susquehanna River in 1816 connected Nescopeck to Berwick and also connected the Susquehanna and Lehigh Turnpike to the Tioga and Susquehanna Turnpike, providing easier access to other communities (Bradsby 1893: 612). A stage coach stop was established at Berwick to handle transportation needs of those passing through the area (Nescopeck Centennial Committee 1996: 34). These early roadways contributed to the economic growth and development of the area and, with a short connection from Lehigh to Philadelphia, the route provided the shortest distance from Philadelphia to Elmira, New York.

Construction of the North Branch Canal began in Berwick in 1828. The initial section of the canal extended 55 miles from Northumberland, at the fork of the North and West Branch of the Susquehanna River, to Nanticoke Falls, and was completed in 1831. The canal's primary purpose was to transport the anthracite coal extracted in the Wyoming Valley to the main

Pennsylvania canal system for transportation to other markets (Shank 1991:51). The canal spurred a general economic boom by providing an efficient means of transporting goods in and out of the region.

Economic Development (1840−1900)

Farmers within the study area most likely relied on the North Branch Canal and the Susquehanna and Tioga Turnpike for the transportation of their goods to market until railroad lines were constructed in the area. In 1846 the completion of the Lehigh and Susquehanna Railroad, which connected the anthracite fields of the Wyoming Valley to the Lehigh River, proved to be a quicker and more efficient means of transportation. By 1856, the Lackawanna and Bloomsburg Railroad connected Scranton to Northumberland. Construction of this line began in 1854 and, by 1858, had reached Berwick. While the railroads became the preferred means of transportation for coal, agricultural products, and other supplies, the North Branch of the Pennsylvania Canal continued to be used in a limited capacity.

Following the Civil War, the Pennsylvania Railroad constructed a series of short routes in the region that connected to other anthracite-hauling routes to the northeast. The line that traversed through this area, also known as the North and West Branch Railroad, operated between Catawissa and the rich anthracite region of Wilkes-Barre. In 1873, the Delaware, Lackawanna, and Western Railroad took over the rails of the Lackawanna and Bloomsburg railroad, and added this spur to their larger system (Berwick Bicentennial Committee 1976:4). The Delaware, Lackawanna, and Western Railroad had earlier become the first anthracite region railroad that ran trains directly from the anthracite fields of the Wyoming Valley to New York Harbor. Many of the railroad corporations began purchasing coal land holdings after the Civil War, and by the turn of the nineteenth century railroads controlled 96 percent of the anthracite fields (Duncan and Sams 2002:18). By the 1880s, the more efficient railroad systems in the area had made the North Branch of the Pennsylvania Canal obsolete as a major transportation route.

The local region was located outside of the anthracite fields so farming continued in the rural areas within Luzerne County. The county witnessed a steady increase in the production of corn, sweet potatoes, and honey and beeswax in the latter half of the nineteenth century. Corn production rose from 290,122 bushels in 1849 to 478,648 bushels in 1879. Farmers of Luzerne County continued to grow oats, potatoes, wheat, rye, and buckwheat crops but not to the same extent as corn.

During the same period, the number of working oxen, other cattle, and sheep in Luzerne County steadily decreased. The number of working oxen in the county fell from 2,347 in 1850 to 358. The number of cattle and sheep also declined during the same period while dairy production and butter seemed to fluctuate.

The overall decline in agricultural production in Luzerne County was most likely due to the growing anthracite industry in the region attracting farmers from the fields to the mines or mining towns. In the late 1800s, many county residents became employed in the coal mines, as well as in other burgeoning industry related jobs. There were fewer families making a living farming; however, the project area was still largely rural and farmed in the late nineteenth to mid twentieth century. Local farmers continued to practice a diversified mix of production and sold their produce to markets in mining communities using transportation routes established earlier (PHMC/BHP 2005b:152).

As shown in Figure 8, in 1873 the general site vicinity consisted of scattered residences and farmsteads located in proximity to roads, railroads and waterways (Beers 1873). A residence identified as “S. Hill” is depicted inside the sharp bend in North Market Street in the location of the current Michaels farmstead and another residence is shown to the northeast, opposite North Market Street, in the location of Site 36LU286 (the Kisner Farmstead), investigated during GAI’s previous Phase II study of the Bell Bend project area. No structures are mapped in the field to the north of the current Michaels Farmstead.

The economic development and population within the study area continued to grow. By 1892, Beach Haven contained a post office, railroad station, two hotels, two general stores, two groceries, a brick yard, a blacksmith, and a shoemaker. The village boasted 300 residents (Bradsby 1893:647).

Economic Development in the Twentieth Century

At the end of the nineteenth century, labor unrest and union activity grew among Luzerne County’s miners. Tension over poor working conditions and pay escalated in the county, and eventually culminated in the Lattimer Massacre in September of 1897; during this tragedy, a Sheriff posse opened fire on miners killing 16 and wounding 38. Then, in 1902, 140,000 United Mine Workers went on strike that was finally settled with President Theodore Roosevelt’s assistance. After the strike, production of anthracite coal increased dramatically. By 1914, 181,000 people were employed in northeastern Pennsylvania’s anthracite mines.

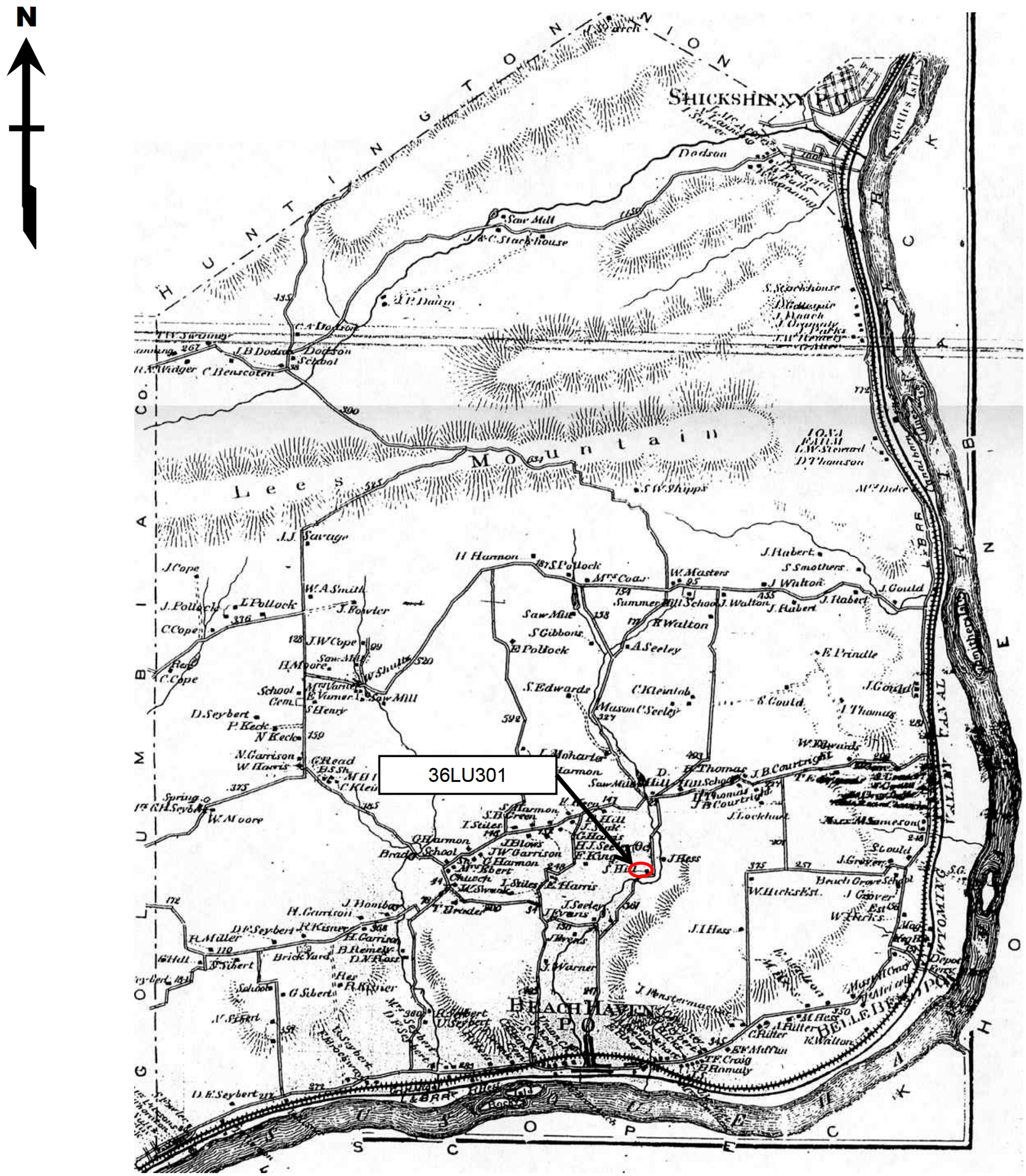
Anthracite coal was commonly used in industrial production, such as steel mills, rather than home use. Two world wars created heavy demand for anthracite coal. The industrial demands created by World War I spurred a boom in anthracite production in 1917, with a national output of 99.7 million tons. After the war, production rapidly declined (Luzerne County 2006). The industrial needs of World War II created another demand for anthracite coal, and in 1944 63.7 million tons of anthracite coal was used. However, after the war, the use and mining of anthracite coal again sharply declined.

On January 22, 1959, tragedy struck the anthracite mining community. The Knox Mine Disaster occurred near the small town of Port Griffith, between Scranton and Wilkes-Barre. The company’s mines under the Susquehanna River collapsed, sending 10.37 billion gallons of water into mines. Other mines were shut down as mining companies feared that a similar accident might occur at their mines. This tragedy essentially ended the underground anthracite mining in the area, costing the county 7,500 jobs (Luzerne County 2006).

Hurricane Agnes struck the region in 1972. The storm dropped 18 inches of rain on an already saturated Luzerne County. The Susquehanna River rose 40.9 feet in some areas, and as the flood subsided 25,000 homes had been nearly destroyed and six people had lost their lives. The total cost of the estimated damage was set at $1 billion (Luzerne County 2006).

In 1975, Pennsylvania Power and Light Company purchased property for the Susquehanna electric steam plant. The construction of the nuclear power plant resulted in the relocation of families within the current APE. Most of these families relocated to nearby Berwick in Columbia County (Berwick Bicentennial Committee 1976:6).

The area in the immediate vicinity of Site 36LU301 remained largely agricultural through the twentieth century. Aerial photography of the area from 1939 (Figure 9) shows the Michaels Farmstead (residence and outbuildings) and indicates the presence of large cultivated fields to the north of the farmstead in the area of the Site 36LU301. No structures are depicted within the cultivated field. Aerial photographs dating to 1959 and 1969 show no changes in land use within the site area.



REFERENCE:
BEERS, 1873. PUBLISHED BY
A. POMEROY, PHILADELPHIA.

LEGEND

SITE LOCATION

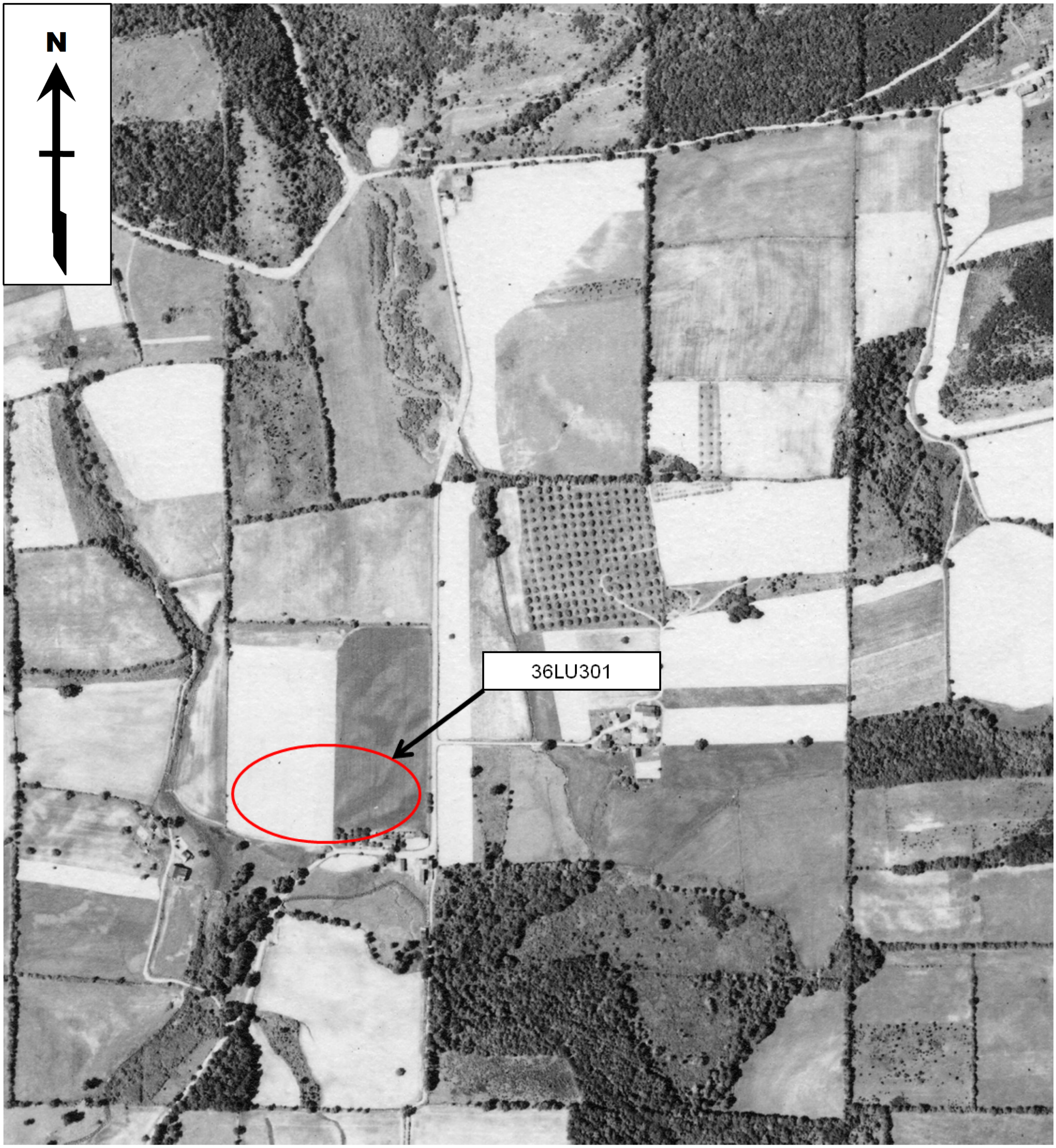
FIGURE 8
SITE 36LU301 VICINITY IN 1873

gai consultants

BELL BEND NUCLEAR POWER PLANT
PPL BELL BEND, LLC

DRWN: BAM
CHECKED: LAF

DATE: 11/02/2011
APPROVED: BAM



REFERENCE:
AERIAL PHOTO, 1939.

LEGEND

○ SITE LOCATION

FIGURE 9
SITE 36LU301 VICINITY IN 1939

gai consultants

BELL BEND NUCLEAR POWER PLANT
PPL BELL BEND, LLC

DRWN: BAM
CHECKED: LAF
DATE: 11/02/2011
APPROVED: BAM

Chapter 4. Phase Ib Summary

Phase Ib Methods and Results

Site 36LU301 was identified in May 2010, during GAI's Second Supplemental Phase Ib survey of the Bell Bend project area (Munford 2010). The site was encountered in the southern portion of a large cultivated field (Lot 41, Section 1) and the adjacent farmyard (Lot 41, Section 2) at the western edge of the study area (see Figure 4). Field investigations included pedestrian ground survey and judgmental shovel testing in the cultivated field and systematic shovel testing in the farmyard. Because cultural resources in this upland setting were anticipated to be near surface in nature, shovel tests were excavated to a maximum depth of 50 cm below ground surface. GAI conducted pedestrian survey of the field along transects spaced at 5-meter (16-foot) intervals (Photograph 3). Observed surface artifacts were marked with pin flags. Due to the dispersed nature of the artifact scatter, surface artifacts were plotted on a site map and recorded individually, rather than being collected within a surface collection block (as proposed in the scope of work). Twelve judgmental shovel tests were excavated in dispersed localities within the field to document stratigraphy and the depth of cultural deposits, with four of these (STPs 3, 10, 11, and 12) occurring within the site boundary (see Figure 4). All four of these shovel tests were negative. The farmyard south of the field was subject to systematic shovel testing along transects spaced at 15-meter (49-foot) intervals (see Figure 4). Of the 21 systematic shovel tests excavated in the farmyard, only one STP (STP A2) produced a prehistoric artifact; one additional STP (STP E1) contained an historic specimen.

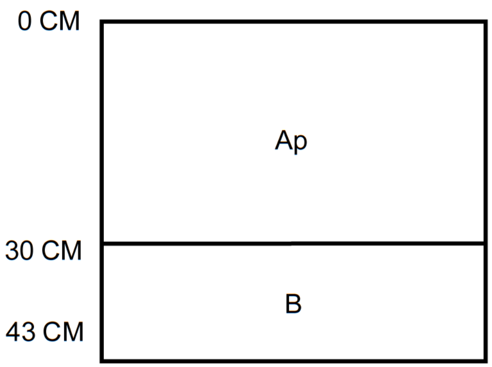
Photograph 3. Site 36LU301: Pedestrian Ground Survey of Cultivated Field (Lot 41, Section 1), Facing South

Phase Ib investigations yielded a dispersed low-density surface scatter of 14 prehistoric lithics, as well as a scatter of 21 historic specimens, across the southern end of the field. Systematic shovel testing within the farmyard yielded one additional prehistoric artifact from a single positive STP (STP A-2, A horizon), located at the northwestern edge of the yard (see Figure 4). Radial shovel tests excavated around this initial findspot produced no additional artifacts. Based on the results of Phase Ib survey, the site had dimensions of 80 x 200 meters (262x656 feet).

Shovel testing revealed an Ap-B soil horizon sequence within the cultivated field (Lot 41, Section 1). As described for STP 10 the profile consisted of a 30-cm-thick dark yellowish-brown silt loam plowzone above a brownish-yellow silty clay B horizon (Figure 10). Shovel testing in the farmyard (Lot 41, Section 2) exposed an A-B soil horizon sequence. The profile of STP A-2 included a 30-cm-thick brown silt loam A horizon and a yellowish-brown clay loam B horizon (see Figure 10).

SITE 36LU301

STP J-10

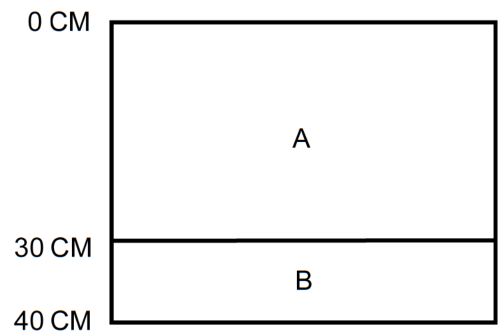


BASE OF EXCAVATION

Ap – DARK YELLOWISH BROWN (10YR 4/4) SILT LOAM

B – YELLOWISH BROWN (10YR 5/6) SILTY CLAY

STP A-2



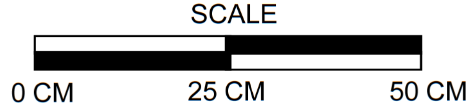
BASE OF EXCAVATION

A –BROWN (10YR 4/3) SILT LOAM

B – YELLOWISH BROWN (10YR 5/6) CLAY LOAM

FIGURE 10
SITE 36LU301: REPRESENTATIVE PHASE Ib STP PROFILES
(STPs J-10 AND A-2)

SCALE



1 INCH = 25 CM

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DRWN: LMD
CHECKED: BAM

DATE: 12/9/2011
APPROVED:BAM

All but one of the prehistoric artifacts were found on the surface of the cultivated field; the single prehistoric lithic recovered during shovel testing occurred in an A horizon. No cultural features were identified.

Phase Ib Artifact Analysis

Phase Ib investigations of Site 36LU301 yielded 14 prehistoric lithic artifacts and 21 historic artifacts. The prehistoric lithic artifacts consisted of 5 bifaces, 7 debitage and 2 cobble tools (hammerstones/pecking stones). The very high tool to debitage ratio exhibited by the assemblage (1:1) suggested that lithic reduction activities were not the primary activity at the site. Lithic analysis identified four raw material types in the assemblage, including locally-available Onondaga chert and Shriver/Helderberg chert, as well as argillite and sandstone (Table 1). Sandstone was used exclusively for the two cobble tools. Among the flaked stone assemblage, Shriver/Helderberg chert was the most common raw material, accounting for six artifacts, including three of the five bifaces.

Table 1. Site 36LU301: Phase Ib, Crosstabulation of Artifact Type by Lithic Raw Material

Lithic Raw Material	Biface	Cobble Tool	Debitage	Total	%
Argillite	1		3	4	28.6%
Onondaga chert	1		1	2	14.3%
Sandstone		2		2	14.3%
Shriver/Helderberg chert	3		3	6	42.9%
TOTAL	**5**	**2**	**7**	**14**	**100.0%**

An analysis of cortical surfaces indicated that Shriver/Helderberg artifacts included one specimen with block cortex and one specimen with cobble cortex. This suggests both primary and secondary sources for this raw material. One argillite debitage also retained cortex, which was indeterminate as to type.

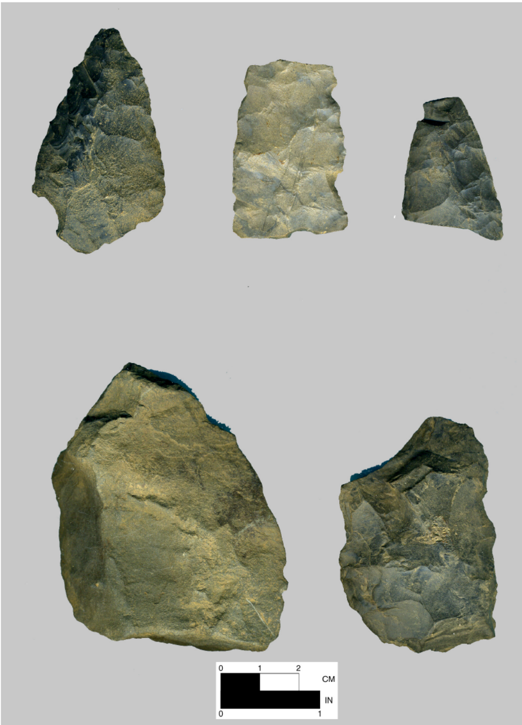
The sample of five bifaces included two projectile points, one late-stage biface, one middle-stage biface and one early stage specimen (Table 2, Photograph 4). Both projectile points (FS 2 and 18) are made from Shriver/Helderberg chert. FS 2 represents a possible Early/Middle Archaic MacCorkle-like specimen; due to a broken basal lobe, this point cannot be conclusively identified as to type. FS 10 is an untyped medial fragment of a projectile point. This broken specimen exhibits a diagonal snap at its proximal end and a possible impact snap with a hinge fracture at its distal end.

Table 2. Site 36LU301: Phase Ib, Summary of Lithic Tools

FS#	Soil Horizon	Wt (g)	Lithic Raw Material	Artifact Type	Cortex	Condition	L (mm)	W (mm)	Th (mm)	Comments*
2	surface	16.21	Shriver/Helderberg	Projectile Point	Absent	broken	58.4	35.5	7.9	Possible EA/MA MacCorkle-like
10	surface	7.31	Shriver/Helderberg	Projectile Point	Absent	medial		25	7.8	Untyped
18	surface	10.56	Onondaga	Late-Stage Biface	Absent	medial		29.3	6	
4	surface	37.2	Shriver/Helderberg	Middle-Stage Biface	Absent	broken		42.2	13.4	
8	surface	117.14	Argillite	Early-Stage Biface	Absent	broken		60.3	19.7	Utilized
6	surface	670.13	Sandstone	Hammerstone		whole	89.5	83	67.7	Utilized
7	surface	617.29	Sandstone	Hammerstone		whole	85.7	84.8	61.3	Utilized

*EA=Early Archaic; MA=Middle Archaic

The remaining three bifaces (one early-stage biface, one middle-stage biface and one late-stage biface) are non-diagnostic tool fragments made from Shriver/Helderberg chert, Onondaga chert and argillite. The single early-stage biface (FS 8) exhibits usewear along one flaked margin, suggesting that after being broken early in the manufacturing process it was used for various cutting or scraping tasks.



Photograph 4. Site 36LU301: Phase Ib Bifaces

Top—Possible Early/Middle Archaic MacCorkle-like Projectile Point (FS 2), Late Stage Biface (FS 18), Untyped Projectile Point (FS 10);

Bottom—Early Stage Biface (FS 8), Middle Stage Biface (FS 4)

The two cobble tools (FS 6 and FS 7) are both hammerstones/pecking stones made from sandstone cobbles (see Table 2, Photograph 5). These cobble tools were both recovered from the northwest corner of the site, approximately 40 meters (131 feet) apart. Such tools could have been used for a variety of percussive tasks, such as flaked stone tool manufacture, initial shaping of ground stone tools, or food processing.

Photograph 5. Site 36LU301: Hammerstones (FS 6 and FS 7)

Flake type analysis of the debitage sample identified two biface reduction flakes, two decortication flakes and three flake fragments. Although results may be skewed by the small sample size, based on this flake type distribution, prehistoric occupants likely conducted limited early and late stage lithic reduction at Site 36LU301.

A low-density dispersed scatter of 21 historic artifacts was also recovered within the boundaries of prehistoric Site 36LU301; additional historic artifacts were found in the field outside the site boundaries. The sample of 21 historic artifacts consists predominantly of kitchen-related specimens (86 percent) with a low frequency of architectural debris and activities-related artifacts (Table 3). These artifacts include 14 historic ceramics (9 redware, 4 whiteware and 1 ironstone), 4 bottle/container glass fragments, 1 brick, 1 window glass and 1 toy car. The assemblage includes eight temporally diagnostic specimens (olive bottle glass, plain whiteware, spongeware whiteware, and plain ironstone). Of these, only one spongeware whiteware sherd (1830-1871) dates to the mid- to late-nineteenth century; date ranges for the remaining temporally diagnostic artifacts extend to the present.

No structural remains were identified within the site boundary during fieldwork and historic map review revealed no structures within area of the cultivated field, north of the Michaels Farm. Based on Phase Ib results, this sample of historic artifacts was concluded to represent field scatter associated with cultivation of this property; they do not constitute an historic period archaeological site.

Table 3 Site 36LU301: Phase Ib Historic Artifact Pattern Analysis

Class	Sub-Class	Ware Type/Object	Total	%
Activities	**Toys**	**Car**	**1**	**4.76%**
Architecture	Brick, Block	brick fragment	1	4.76%
	Window Glass	window glass	1	4.76%
		Architecture Total	**2**	**9.52%**
Kitchen	Bottles/Jars	wine bottle	3	14.29%
		container glass	1	4.76%
	Ceramics	ironstone, plain	1	4.76%
		redware	9	42.85%
		whiteware, plain	3	14.29%
		whiteware, spongeware	1	4.76%
		Kitchen Total	**18**	**85.71%**
		TOTAL	**21**	**100.00%**

Based on the results of Phase Ib investigations, GAI concluded that Site 36LU301 had a potential to yield diagnostic prehistoric artifacts and cultural features that could contribute important information on the prehistoric use of this upland setting. GAI recommended that Site 36LU301 was potentially eligible for listing in the NRHP and recommended either site avoidance by proposed construction or Phase II testing to evaluate its NRHP eligibility. PHMC-BHP reviewed these results as presented in GAI's Second Supplemental Phase Ib Addendum Report (Munford 2010) and concurred with the recommendations in a May 20, 2011 review letter (see Appendix A).

Chapter 5. Phase II Research Design

Because site avoidance through project design was not feasible, PPL requested that GAI conduct a Phase II National Register Site Evaluation of Site 36LU301 to evaluate its eligibility for listing in the NRHP. Specific objectives of the study included the following:

(1) Determine the horizontal and vertical limits of the site in the APE;

(2) Interpret the site's cultural affiliations, functions and significance;

(3) Evaluate site integrity;

(4) Conclusively determine the site's eligibility for listing on the NRHP;

(5) Define the need for further archaeological work.

The *National Register Bulletin No. 15-How to Apply the National Register of Criteria for Evaluation* (NPS 1997) provides standards that a site must meet to be considered eligible to the NRHP. The researcher must first be able to establish an historic context for the site, relating it to a specific cultural group or particular time period, and secondly, document that the site retains integrity.

To establish the historic context of a site, archaeologists must determine the period of occupation or cultural affiliation, typically accomplished via analysis of diagnostic artifacts (e.g., projectile points, bottle glass manufacturing method, ceramic type and decoration method), or by the identification of features which may provide a means to date the site occupation (e.g., large sample of diagnostic historic period artifacts or radiocarbon dating of charcoal from prehistoric hearths). For historic sites, context can be established by means of historic map research and chain-of-title and deed research. If the age of a site cannot be established, the site cannot be placed within a broad historic context and likely will not be eligible to the NRHP.

If the site provides data regarding its period of occupation, it must also be shown to be significant under one of the four National Register Criteria: A) association with historic events; B) association with historic individuals; C) distinctive design/construction; or D) information potential. Archaeological sites generally cannot be linked to historic events (Criterion A) or historic individuals (Criterion B), nor can they be evaluated based on their distinctive design/construction (Criterion C). Thus, most historic and prehistoric sites are evaluated for NRHP eligibility under Criterion D, the potential to contribute important information on the prehistory or history of the region. Site 36LU301 was evaluated for its NRHP eligibility under Criterion D.

An archaeological site must also retain integrity to qualify as NRHP-eligible. For archaeological sites, integrity is a quality that typically reflects whether or not the site's physical components have been disturbed since their original deposition. If the disturbance has been substantial, resulting in a significant loss of integrity, the site is likely to be not eligible to the NRHP. However, if a site was not disturbed, or only minimally disturbed to the extent that the disturbance has not affected the qualities that render it NRHP eligible, then the site can still be considered eligible to the National Register.

Chapter 6. Phase II Methods

Field Methods

At the request of PPL, GAI performed a Phase II National Register site evaluation of Site 36LU301. Phase II investigations were conducted in accordance with GAI's Phase II Scope of Work (May 13, 2011) as approved by the PHMC-BHP (May 26, 2011) (see Appendix A). The study included field excavations and laboratory analysis. Phase II fieldwork was conducted between June 24 and July 27, 2011.

Prior to the start of Phase II investigations, the previously cultivated field within the site area was plowed and disked and was rain washed in order to provide good ground surface visibility. Following site preparation, GAI surveyors established a grid across the site using a total station [electric theodolite (transit) with integrated electronic distance meter]. The grid was referenced in space using GPS points (to sub meter accuracy). The survey grid covered an area measuring 140x220 meters (459x722 feet) (see Figure 3). A site datum was established and designated with arbitrary north and east coordinates. Stakes were placed at 20-meter (65.6-foot) intervals along north/south and east/west baselines at the edges of the site and throughout the portion of the site in the cultivated field. Ground surface elevations were recorded at these stakes. Subsequent excavations were designated by their coordinates within this grid system.

Phase II fieldwork included controlled surface collection (CSC) followed by judgmental and close-interval shovel testing, test unit excavation, plowzone stripping (mechanical trenches), and feature sampling. Due to the need for mechanical plowzone stripping, the Luzerne Conservation District required preparation and implementation of an Erosion and Sedimentation Control (E&S) Plan for the site (Appendix G). In accordance with this plan, GAI installed silt fencing along the southern and western edges of the cultivated field before the start of plowzone stripping and removed this fencing following the completion of fieldwork.

Surface Collection

Phase II fieldwork began with a controlled surface collection (CSC) of the plowed and disked field. The site was gridded into 5x5-meter (16.4x16.4 foot) surface collection blocks (see Figure 3). GAI archaeologists examined the ground surface within each block and observed artifacts were collected, bagged, and provenienced according to the southwest corner grid coordinates of the collection block. A total of 1,009 surface collection blocks were examined during the CSC, for a total of 25,225 square meters (271,520 square feet). Surface collection results were plotted on a site map, documented on standard GAI Surface Collection Forms, and used to guide the placement of subsequent shovel tests and test units.

Shovel Testing

GAI excavated 84 shovel test pits (STPs) within the site area during the Phase II study. Based, in part, on the results of the surface collection, 64 judgmental shovel test pits (STPs) were excavated in select localities within the cultivated field to further investigate areas of surface artifact recovery, document soil stratigraphy, and assess the presence of subplowzone cultural deposits (see Figure 3). Radial shovel tests were excavated at 5-meter (16-foot) intervals around initial positive findspots in an area outside of the recent plowing and disking at the northern edge of the site, where surface visibility was poor.

Close-interval (5-meter/16-foot) shovel testing was conducted in a small portion of the farmyard south of the field from which prehistoric artifacts were recovered during Phase Ib shovel testing. Twenty STPs were excavated in this lawn area (also used as a field access road) bounded by North Market Street to the south, the field to the north and west, and a line of evergreen trees to the east (see Figure 3).

Shovel tests measured 50x50-cm (1.6x1.6-feet) and were hand-excavated by natural stratigraphy to a depth of approximately 40 to 50 cm (1.3 to 1.6 feet) below ground surface. Shovel test results were recorded on standard GAI Shovel Test Forms. STPs were backfilled upon completion.

Test Unit Excavation

GAI excavated ten 1x1-meter (3.3x3.3-foot) test units (TUs 1-10) in select areas of the site to sample areas of relatively higher artifact density or possible activity areas, to assess the presence of cultural features, and to evaluate the vertical extent of cultural deposits. Test units were hand-excavated in 10-cm (0.3-foot) levels within natural strata, to a depth of at least 10 cm (0.3 feet) into the subsoil and 10 cm (0.3 feet) below the deepest recovered artifact. Nine of the test units (TUs 1-8 and 10) were excavated in the northwest quadrant of the site and one (TU 9) was placed in the southwest quadrant (see Figure 3). Test units were backfilled upon completion.

TU 1 (N592 E418) and TU 5 (N585 E416) were excavated in the location of two contiguous positive surface collections blocks (yielding one flake and one FCR), in the western portion of the site's northwest quadrant. TU 2 (N603 E426), TU 4 (N608 E426), and TU 7 (N598 E423) were located in the central portion of the northwest quadrant, in the vicinity of positive STP J29, which produced one flake. TU 6 (N602 E444) sampled two contiguous positive surface collection blocks (yielding one flake each), in the western portion of the northwest quadrant. TU 3 (N612 E445), TU 8 (N610 E443), and TU 10 (N617 E445) were located north of TU 6, between positive STPs J29 (*n*=1 flake) and J32 (*n*=2 flakes).

TU 9 (N540 E445) was positioned in the site's lower density southwest quadrant, in the vicinity of a positive surface collection block which produced one FCR.

Plowzone Stripping

Following the completion of hand excavations, GAI conducted mechanical stripping of the plowzone to investigate the presence of cultural features at the top of the subsoil. Seven trenches (Trenches 1-7) were excavated using a rubber-tired backhoe and/or a trackhoe, both with flat-bladed buckets. Due to the near absence of recovered artifacts from the site's eastern portion, these parallel, north/south-oriented trenches were all located in the western half of the site. The trenches measured 2-meters (6.6-feet) wide and varied in length from 95 to 130 meters (312 to 427 feet). Under the guidance of a GAI archaeologist, within each trench the plowzone was removed in increments, to expose the top of the B horizon. Excavated soils were deposited in piles along one side of each trench. GAI archaeologists then hand shovel-scraped the floor of the trench to expose soil anomalies or artifact concentrations representing possible cultural features. Each trench was mapped and photographed. Identified features were documented and sampled (as described below).

Trenches were mechanically backfilled upon completion of investigations. GAI excavated 1,600 square meters (17,222 square feet) during plowzone stripping, representing approximately 7.9 percent of the total site (measuring 20,175 square meters/217,162 square feet).

The trenches extended northward from the south edge of the cultivated field through the site area. Six of the parallel trenches (Trenches 1-6) were placed at 10-meter (33-foot) intervals between E405 and E455; Trench 7 was positioned 25 meters further east at E480. Trenches 1 through 5 extended from between the N505 and N530 gridlines to approximately the northern edge of the site, ending at the N630 to N640 gridlines. Trenches 1 and 2 measured 110 meters (361 feet) in length while Trenches 3, 4 and 5 were 130 meters (427 feet) long. Trenches 6 and 7 (95 meters/312 feet in length) were both terminated at N600 in order to avoid the rock outcrop (claystone) located in the north-central portion of the site.

Feature Sampling

GAI's initial Phase II Scope of Work assumed investigation of up to five prehistoric features. Following the identification of a large number of possible cultural features during initial plowzone stripping, GAI notified Mr. Brad Wise (PPL) of these unanticipated discoveries. At the request of PPL, GAI consulted with Steve McDougal (PHMC-BHP) to develop an appropriate approach for investigation of these features. In a July 12, 2011 phone conference, Mr. McDougal recommended investigation of a 25 percent sample of various feature types exposed during plowzone stripping. In accordance with PHMC-BHP's recommendations, and subsequent to PPL's approval of supplemental Phase II work, feature sampling was conducted at Site 36LU301.

GAI identified 211 possible cultural features on the surface of the plowzone stripped trenches. [One additional feature (non-cultural Feature 1) was previously exposed and excavated in TU 6 and was not included in sampling process.] GAI grouped these 211 possible cultural features into categories based on initial plan view observations of feature size and morphology. Seven feature categories were defined: small circular/oval stains (Type A); medium circular/oval stains (Type B); large circular stains (Type C); large oval/elongate stains (Type D); oxidized stains (Type OX); irregular stains (Type I); and large, likely historic/modern stains (Type H). Clearly non-cultural anomalies (e.g., obvious root disturbances) and recent agricultural-related anomalies (e.g., multiple, overlapping lines of small circular to rectangular stains) were excluded from investigation. GAI investigated a 25 percent sample of features in each of the seven categories. During Phase II fieldwork, GAI investigated 54 possible cultural features exposed during plowzone stripping, plus one additional feature (Feature 1) identified during test unit excavation, for a total of 55 features.

All 212 possible cultural features were troweled clean, plotted on project maps, photographed, and recorded on a Feature Log. Each sampled feature was bisected along its long axis and the first half of the feature was removed in 10-cm (0.3-foot) arbitrary levels within natural stratigraphy, if present. The feature fill was screened through 0.6-cm (0.25-in) wire mesh and recovered artifacts were bagged according to their provenience. The feature profile was recorded with a measured drawing and photographs. If the results of the bisection confirmed that the feature was non-cultural, investigations were terminated at this stage. If the feature was concluded to be potentially cultural the second half of the feature was excavated as above and flotation samples were collected from the feature fill. The base of the excavated feature was photographed. Sampled features were documented with standardized GAI Feature forms.

Analytical Methods

This section reviews the methods employed during analysis of prehistoric and historic artifacts recovered during GAI's investigations of Site 36LU301. Brief overviews of analytical methods are presented for prehistoric lithics, historic/modern artifacts, and flotation/ethnobotanical remains. Detailed descriptions of prehistoric lithic analysis and historic artifact analysis are provided in Appendices H and I.

Laboratory Processing

Cultural materials collected during field investigations were transported to GAI's Archaeological Laboratory in Homestead, Pennsylvania, for processing and analysis. These materials were processed in accordance with the *Curation Guidelines* of the Pennsylvania Historical and Museum Commission (2005a). Following completion of this project and approval of technical reporting, project materials will be donated to the PHMC-BHP for permanent curation at the State Museum of Pennsylvania.

The initial processing stage consisted of checking artifact bags against the field-generated Field Specimen Log to confirm that all collected materials were present. Artifacts were temporarily placed in numerical order according to Field Specimen Number (FS#), providing a basis for processing, analysis, and curation. Artifacts were then cleaned, generally with water and a soft brush. Metal artifacts and perishable items were cleaned by dry-brushing. Non-cultural materials (i.e., pebbles) included in the artifact samples were recorded and discarded during this stage of processing or in later stages, as they were recognized. Cultural materials were placed on artifact-drying racks to air dry.

When dry, the artifacts within each provenience were sorted into basic artifact classes (i.e., lithics, glass, ceramic) and were re-bagged accordingly in clean, perforated, 4-mil polyethylene bags. Bags were labeled with provenience information using a permanent ink marker. An acid-free paper tag with complete provenience information was also placed inside each artifact bag.

Specimens large enough in size were then labeled with the site number and the appropriate field specimen number (FS#). Labels were written in permanent ink and coated with PVA. After washing and labeling, artifacts were subject to the appropriate laboratory analysis.

Methods of Prehistoric Lithic Analysis

The analytical approach for stone tools and debris employed here can be described as techno-morphological; that is, lithic artifact classes and types were based on key morphological attributes, which are linked to or indicative of particular stone tool production (reduction) strategies (see Appendix H).

Following initial artifact processing, GAI's Lithic Analyst divided lithic artifacts from each provenience into general classes (i.e., debitage, bifaces, fire-cracked rock) and then subdivided them into specific artifact types (i.e., early-stage biface, late-stage biface, projectile point) for that particular class. Artifacts were then examined and appropriate attributes were recorded. The surfaces and edges of artifacts were examined with the unaided eye and with a 10x hand lens, where appropriate, to discern evidence of retouch and/or utilization.

Lithic raw material type was recorded for all artifacts. These lithic raw material types were defined on the basis of macroscopic characteristics, including color, texture, hardness, and inclusions (Luedtke 1992). Where possible using conservative standards and based on the above macroscopic criteria, lithic raw material types were attributed to known geological sources based on published sources (e.g., Stewart 1984) and by reference to GAI's lithic reference collection.

All lithic tools were examined at a detailed analysis level that recorded temporal/stylistic, functional, and technological variables as well as lithic raw material type. These variables included artifact class, artifact type, condition of specimen, presence/type of cortex, weight, and metric dimensions (when complete). Further artifact-specific observations (e.g., heat damage, refit, unique characteristics) were noted where appropriate. Diagnostic projectile points, important in assessing the age of prehistoric components represented at the sites, were identified though a comparison with standard typologies established for Pennsylvania and the eastern United States (Custer 2001; Fogelman 1988; Dent 1995; Justice 1987; Broyles 1971; Ritchie 1961). Additional variables of point type and temporal affiliation were recorded for diagnostic points.

Lithic debitage was classified using a typology designed to detect differences in lithic reduction practices and early vs. late-stage reduction (e.g., decortication flake, bipolar reduction flake, early reduction flake, biface thinning flake). Other attributes recorded for debitage included raw material, presence and type of cortex (as indicators of primary or secondary geologic source), weight and size grade.

Information recorded during lithic analysis was entered on analysis sheets as a series of codes, unique to each variable. The codes were then entered into Access, a relational database. For the purposes of data analysis and manipulation, this database was subsequently converted to the Excel computer program for data manipulation and table generation.

Methods of Historic/Modern Artifact Analysis

Historic/modern artifacts recovered during Phase II investigations were subjected to identification and analysis using GAI's Historic Coding scheme (see Appendix I). This multivariate classification system codes for significant attributes of various artifact classes. Artifact analysis was focused on the creation of an inventory of artifact classes and types to examine issues of chronology and function for each site containing historic/modern components. A variety of analytical techniques was employed to synthesize artifact data including standard classification typologies developed by South (1977).

Once washed, artifacts were sorted into major material classes including ceramics, glass, and metal. The materials were then subjected to a preliminary analysis, which included a basic description of artifacts by material class, functional group, and relevant attributes. Included among the recorded attributes, where applicable, are type, beginning and end dates of production, form, motif/decoration, color, manufacturing technique, functional group, base, finish, embossment, maker's mark/manufacturer, material, bore diameter, and pattern class and subclass (South 1977:95-96). Artifact dating was based on the identification of maker's marks, diagnostic-manufacturing methods, such as bottle mold seams, bottle pontil marks, ceramic bodies and glazes, and known dates of production.

Coded data, using unique codes for each artifact description, were entered into the Access database. This database was subsequently converted into the Excel computer program for purposes of data manipulation and table generation.

Historic ceramic analysis focused on identifying ware and type categories, decorative attributes, and maker's marks, in order to interpret site chronology. Whenever possible, each provenience was assigned dates based on a Mean Ceramic Dates (MCD) and Terminus Post Quem (TPQ) date. Attributes recorded during the ceramic analysis include count, ware, type, form, motif, colors, percent complete, and functional group for each artifact or group of artifacts. Maker's marks were described in detail and dated, when possible.

Glass artifacts, much like ceramics, were tabulated according to major groups (e.g., bottle glass, window glass, lamp glass, tableware, tumblers) and then separated into functional categories whenever possible. Dating information was based on the identification of diagnostic technological attributes (e.g., mold seams and evidence of snap-case manufacture) in addition to identifiable bottle embossments. Attributes recorded for glass artifacts include manufacturing technique, decoration, finish type, base type, color, and functional group. The beginning and end dates for datable attributes were determined. As with ceramics sample, maker's marks and embossments were described and dated, when possible.

Other historic/modern artifact classes include architectural debris (e.g., bricks, nails, window glass, etc.), clothing (type and materials identified when possible) and miscellaneous small finds. Where appropriate, attributes such as character, wear, decoration, and material were recorded for these artifacts.

Methods of Flotation Processing

Soil flotation samples were collected from feature fill during excavation in order to recover small specimens that would normally pass through 6-mm (0.25-inch) hardware cloth.

Select flotation samples of feature fill were processed at GAI's Archaeological Laboratory using an *R. J. Dausman Flot-Tech* flotation machine. The Dausman flotation machine is a self-contained, multi-modal system that uses a closed-loop water recirculation system. It allows the user to manually adjust water circulation and flow rates to assist in the separation of light and heavy fractions of flotation samples. This method produces clean, sediment-free, light and heavy fraction feature fill samples. Once processed, the materials were allowed to air dry before being re-bagged according to heavy or light fraction type into clean, 4-mil polyethylene bags. As with artifact processing, these bags were clearly labeled with provenience information using a permanent ink marker and an acid-free tag with complete provenience information placed inside each bag.

Following flotation processing, GAI technicians examined heavy fractions of each sample to collect cultural materials. To insure standardization during flotation sample "picking," each heavy fraction sample was examined for 20 minutes to separate out other cultural materials. Cultural materials identified in the samples were subjected to historic or prehistoric analysis as described above.

Chapter 7. Phase II Results

Phase II testing at Site 36LU301 consisted of controlled surface collection of 1,009 5x5-meter (16.4x16.4-foot) blocks, the excavation of 84 shovel tests and 10 test units, mechanical plowzone stripping (1,600 square meters/17,222 square feet), and sampling of 55 features. This work produced 49 prehistoric artifacts and 143 historic specimens (Tables 4 and 5). In addition, investigation of 55 features (a 25 percent sample of the 212 possible features identified) documented ten cultural features (five prehistoric thermal features, two prehistoric/historic postmolds, one historic trash pit and two historic features of indeterminate function) and 45 non-cultural anomalies.

The meager prehistoric lithic assemblage consisted of 2 bifaces, 24 debitage and 23 pieces of FCR (Table 6). These artifacts included a single diagnostic specimen—an Early Woodland Cresap-like projectile point. The prehistoric lithics occurred in an extremely low density, widely dispersed scatter, across the approximately 5.0-acre (2.0-hectare) site, with approximately 90 percent found in the site's western half. These artifacts were recovered overwhelmingly (83.7 percent, *n*=41) from plow disturbed contexts (surface and Ap horizon) (see Table 6). Seven lithics were recovered from feature fill (including three from prehistoric features, and four from non-cultural or historic features), while a single artifact was found on the plowzone-stripped B horizon surface in Trench 3.

The sample of 143 Phase II historic artifacts consisted largely of ceramics, glass and faunal remains. Approximately two thirds of these artifacts were recovered from the feature fill in a single historic trash pit (Feature 77). The remaining historic artifacts were found in plow disturbed contexts, primarily in a low density scatter across the southeast and eastern portion of the site.

Table 4. Site 36LU301 Phase II: Stratigraphic Distribution of Prehistoric Artifacts by Testing Method

Soil Horizon	Surface Collection	STP	TU	Plowzone Stripping	Feature Sampling	Total	%
Surface	20	--	--	--	--	20	40.8%
Ap	--	7	14	--	--	21	42.9%
B		--	--	1	--	1	2.0%
Feature Fill	--	--	--	--	7	7	14.3%
Total	**20**	**7**	**14**	**--**	**7**	**49**	**100.0%**
%	40.8%	14.3%	28.6%	2.0%	14.3%	100.0%	

Table 5. Site 36LU301 Phase II: Stratigraphic Distribution of Historic Artifacts by Testing Method

Soil Horizon	Surface Collection	STP	TU	Plowzone Stripping	Feature Sampling	Total	%
Surface	17	--	2	--	--	19	13.29%
Ap	--	28	1	--	--	29	20.28%
Feature Fill	--	--	--	--	93	93	65.03%
Disturbed	--	--	--	2	--	2	1.40%
Total	**17**	**28**	**3**	**2**	**93**	**143**	**100.0%**
%	11.89%	19.58%	2.10%	1.40%	65.03%	100.0%	

Table 6. Site 36LU301 Phase II: Stratigraphic Distribution of Prehistoric Artifacts by Artifact Class

Soil Horizon	Biface	Debitage	Fire-Cracked Rock	Total	%
Surface	2	11	7	20	40.8%
Ap	0	6	15	21	42.9%
B	0	1	0	1	2.0%
Feature Fill	0	6	1	7	14.3%
TOTAL	**2**	**24**	**23**	**49**	100.00%

Soils and Geomorphology

As discussed above (Site Setting) Site 36LU301 is located in a glaciated upland flat above Walker Run. The site area is mapped primarily as Chenango gravelly loam (ChA), with an area of Braceville gravelly loam (BrA) along its western edge. Topography across the site is relatively level, with gentle rise of approximately 3 meters (10 feet) towards the northwest. Elevations range from a low of 656 feet at its southern edge to 666 at the northwest corner.

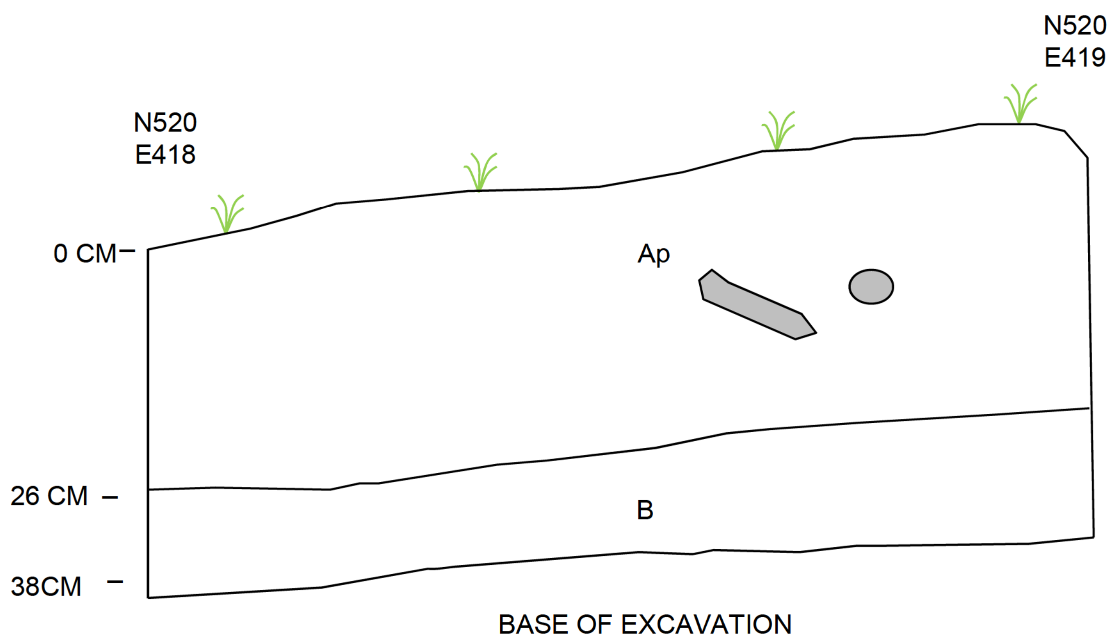
Cobbles, gravels, and channers are common throughout the site area, both on the surface and in the exposed soil profile. An outcrop of claystone is located in the north-central portion of the site and platy fragments of this material occur throughout the site, especially in the western portion in proximity to the outcrop. Phase II plowzone stripping revealed portions of two gravel bars within the site, representing former braided stream channels (see Figure 3). One gravel bar was located in the higher-elevation, northwest quadrant of the site; as defined in Trenches 1 through 5, this gravel bar had a northeast/southwest orientation and widened toward the northeast, expanding from less than 5 meters (16.4 feet) wide in Trench 1 to over 25 meters (82 feet) wide in Trench 5. A portion of a second gravel bar, measuring 25 meters (82 feet) in width, was observed in the southern portion of the site in Trench 7; this gravel bar was not encountered in the trenches directly to its east. However, the southern ends of Trenches 2 and 3, excavated further to the west, both contained a relatively high percentage of cobbles, possibly representing the edges or upper contact of such a gravel bar.

The area of Site 36LU301 has been plowed and Phase II excavations exposed a simple Ap-B horizon across the site. [The only exception to this soil profile occurred in shovel tests at the western edge of the farmyard, which revealed disturbed soils associated with a drainage ditch and use as a field access road.] Typical stratigraphic profiles at the site, exemplified by the profiles of TU 1, 9 and 10 are provided in Figures 11, 12 and 13.

TU 1, located in the site's northwest quadrant, exposed an Ap-B soil horizon sequence including an approximately 30-cm (11.8-in) thick dark grayish-brown silt loam Ap horizon with only 10 percent cobbles and gravels, above a yellowish-brown sandy silt loam B horizon (see Figure 11, Photograph 6). TUs 5, 6 and 7 revealed soil profiles similar to that of TU 1 (i.e., containing a low percentage of cobbles and gravels).

Photograph 6. Site 36LU301: TU 1 West Wall Profile, Facing West

36LU301
TEST UNIT 1
WEST WALL PROFILE



Ap – DARK GRAYISH BROWN (10YR 4/2) SILT LOAM WITH 10 % COBBLES AND GRAVEL

B –YELLOWISH BROWN (10YR 5/4) SANDY SILT LOAM

LEGEND

– GROUND SURFACE

– ROCK

SCALE

0 CM 20 CM 40 CM

FIGURE 11
SITE 36LU301: TEST UNIT 1
WEST WALL PROFILE

gai consultants

BELL BEND NUCLEAR POWER PLANT
PPL BELL BEND, LLC.

DRAWN: LMD DATE: 12/09/11
CHECKED: APPROVED: BAM