INTRODUCTION

The purpose of this report is to describe the final archaeological investigations at the Hockessin Valley Site (7NC-A-17) in northern New Castle County, Delaware (Figures 1 and 2). Field investigations were carried out over a two week period in July 1987 by the University of Delaware Center for Archaeological Research (UDCAR) for the Delaware Department of Transportation (DelDOT) and the Federal Highway Administration (FHWA) under Section 106 of the National Historic Preservation Act to evaluate the effects of the proposed relocation and reconstruction of Delaware Route 7 on significant, or potentially significant, cultural resources as defined by the National Register of Historic Places (30 CFR 60). The excavations sought to recover important significant archaeological data prior to the proposed relocation of Delaware Route 7. Data recovery excavations were undertaken far in advance of construction due to the imminent construction of the nearby Hockessin Hunt housing development, which impacted the site. This arrangement was accomplished through special consideration and arrangements by FHWA, DelDOT, and UDCAR.

Discussions of the environmental setting, regional prehistory, and previous field investigations are presented below to describe the cultural and natural context of the Hockessin Valley Prehistoric Site (7NC-A-17).

ENVIRONMENTAL SETTING

The Hockessin Valley Prehistoric site (7NC-A-17) is located approximately 1.7 kilometers southwest of the present day town of

Hockessin in the Piedmont Uplands physiographic province of northern New Castle County, Delaware. The summary of the local environmental setting presented below is abstracted from the work of Custer (1984:23-25) and Custer and DeSantis (1986).

The Piedmont Uplands of Delaware represent the northernmost portion of the Delmarva Peninsula and are characterized by a diversified relief dissected by narrow and deep stream valleys with isolated knolls rising above the general upland level (Spoljaric 1967:3). Thornbury (1965:88) notes that within the Piedmont Uplands there are no large tributaries of the older incised river systems, the Susquehanna and the Delaware. Rather,

there are a number of smaller, lower order drainage systems. Some large floodplains can be found along some of the higher order streams such as the White Clay Creek and the Brandywine, Elk, and Northeast Rivers. However, these settings are uncommon. Elevation differences of up to 82 meters (270 feet) can be found between small floodplains of the numerous drainages and the tops of the adjacent knolls, and these elevation differences are sufficient to cause changes in tree community distribution (Braun 1967:192-194). Soils of the Piedmont Uplands can generally be characterized as well-drained with some poorly-drained areas in floodplains and upland flats.

The Hockessin Valley location of 7NC-A-17 is especially interesting because it is an isolated, yet extensive, limestone valley with environments which contrast markedly with the surrounding Piedmont Uplands (Custer and DeSantis 1986). Analysis of pollen data from the Hockessin area (Custer and Griffith 1984) and local edaphic factors allows the reconstruction of changing past environments and these reconstructions for upland and lowland areas are summarized in Table 1. As can be seen from Table 1, the contrast between the rolling upland topography of the Piedmont Uplands and the Hockessin lowlands allows for a wide variety of environments through time. Furthermore, from a regional perspective the nearby Fall Line zone, which is the transition to the Coastal Plain, and the tidal marshes of the lower Christina River (Custer 1982) add to the local environmental diversity.

The specific setting of 7NC-A-17 is at the foot of a slope at the transition between the Piedmont Uplands and the Hockessin

TABLE 1

PAST ENVIRONMENTS OF THE STUDY AREA

Climatic Episode	Uplands	Lowlands
Late Glacial (10,000 B.C. - 8000 B.C.)	Pine/Spruce forest	Deciduous forests with interspersed swamps, and grasslands
Pre-Boreal/Boreal (8,000 B.C. - 6500 B.C.)	Spruce/Pine Forest	Mixed deciduous and coniferous forests
Atlantic (6500 B.C. - 3000 B.C.)	Oak-Hemlock Forest	Oak-Hemlock forest with many swampy areas
Sub-Boreal (3000 B.C. - 1000 B.C.)	Oak-Hickory Forest	Grasslands with interspersed oak-hickory forests and a few poorly-drained areas
Sub-Atlantic (1000 B.C. - Present)	Mixed Mesophytic Forest (Oak-Chestnut)	Interspersed mixed deciduous forest, swampy areas and a few grasslands

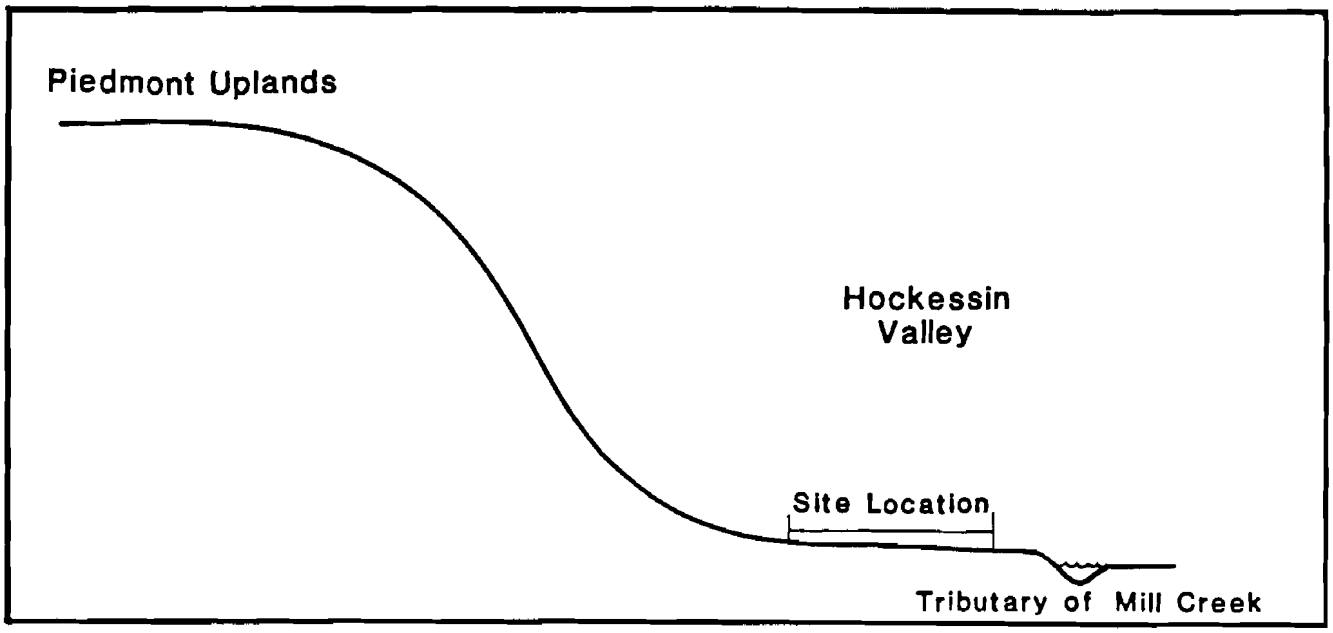
Valley (Figure 3). Across the site, there is a transition from the toe of the long slope leading from the Piedmont Uplands into the floodplain of an unnamed tributary of Mill Creek in the Hockessin Valley proper. From this location, the prehistoric inhabitants of the site would have been able to easily exploit the environments of both the Piedmont Uplands and the Hockessin Valley.

REGIONAL PREHISTORY

The prehistoric archaeological record of northern New Castle County area can be divided into four blocks of time: the Paleo-Indian Period (ca. 12,000 B.C. - 6500 B.C.), the Archaic Period (6500 B.C. - 3000 B.C.), the Woodland I Period (3000 B.C. - A.D. 1000), and the Woodland II Period (A.D. 1000 - A.D. 1650). A

FIGURE 3

Hockessin Valley Site Setting



fifth time period, the Contact Period, may also be considered and includes the time period from A.D. 1650 to A.D. 1750, the approximate date of the final Indian habitation of northern Delaware in anything resembling their pre-European Contact form. Each of these periods is described below and the descriptions are summarized from Custer (1984) and Custer and DeSantis (1986).

Paleo-Indian Period (12,000 B.C. - 6500 B.C.) - The Paleo-Indian Period encompasses the time period of the final disappearance of Pleistocene glacial conditions from Eastern North America and the establishment of more modern Holocene environments. The distinctive feature of the Paleo-Indian Period is an adaptation to the cold, and alternately wet and dry, conditions at the end of the Pleistocene and the beginning of the Holocene. This adaptation was primarily based on hunting and

gathering, with hunting providing a large portion of the diet. Hunted animals may have included now extinct megafauna and moose. A mosaic of deciduous, boreal, and grassland environments would have provided a large number of productive habitats for these game animals throughout northern Delaware, and watering areas, such as the Mill Creek floodplain and the Hockessin Valley swamps in the study area, would have been particularly good hunting settings.

Tool kits of Paleo-Indian groups were oriented toward the procurement and processing of hunted animal resources. A preference for high quality lithic materials has been noted and careful resharpening and maintenance of tools was common. A lifestyle of movement among the game attractive environments has been hypothesized with the social organizations being based upon single and multiple family bands. Throughout the 5500 year time span of the period, the basic settlement structure remained relatively constant with some modifications being seen as Holocene environments appeared at the end of the Paleo-Indian Period.

Numerous Paleo-Indian sites are noted for northern Delaware including hunting and processing sites adjacent to the study area near Hockessin (Custer and DeSantis 1986) and adjacent to the Wilmington Medical Center (Custer, Catts and Bachman 1982), possible quarry sites near Iron Hill (Custer, Ward, and Watson 1986), and isolated point finds.

Archaic Period (6500 B.C. - 3000 B.C.) - The Archaic Period is characterized by a series of adaptations to the newly emerged full Holocene environments. These environments differed from

earlier ones and were dominated by mesic forests of oak and hemlock. A reduction in open grasslands in the face of warm and wet conditions caused the extinction of many of the grazing animals hunted during Paleo-Indian times; however, browsing species such as deer flourished. Sea level rise was also associated with the beginning of the Holocene Period in northern Delaware. The major effect of the sea level rise was to raise the local water table, which helped to create a number of large swamps, such as Churchmans Marsh, which is located approximately 5km south of the study area. Adaptations changed from the hunting focus of the Paleo-Indians to a more generalized foraging pattern in which plant food resources would have played a more important role. Large swamp settings such as Churchmans Marsh supported large base camps as indicated by the remains at the Clyde Farm Site. A number of small procurement sites at favorable hunting and gathering locales are also known in northern Delaware.

Tool kits were more generalized than earlier Paleo-Indian tool kits and showed a wider array of plant processing tools such as grinding stones, mortars, and pestles. A mobile lifestyle was probably common with a wide range of resources and settings utilized on a seasonal basis. A shifting band-level organization which saw the waxing and waning of group size in relation to resource availability is evident.

Woodland I Period (3000 B.C. - A.D. 1000) - The Woodland I Period can be correlated with a dramatic change in local climates and environments that seems to have been a part of events

occurring throughout the Middle Atlantic region. A pronounced warm and dry period set in and lasted from ca. 3000 B.C. to 1000 B.C. Mesic forests were replaced by xeric forests of oak and hickory, and grasslands again became common. Some interior streams dried up, but the overall effect of the environmental changes was an alteration of the environment, not a degradation. Continued sea level rise also made many areas of the Delaware River and Bay shore the sites of large brackish water marshes which were especially high in productivity. The major changes in environment and resource distributions caused a radical shift in adaptations for prehistoric groups. Important areas for settlements included the major river floodplains and estuarine swamp/marsh areas. Large base camps with fairly large numbers of people are evident in many areas of northern New Castle County such as the Delaware Park Site, the Clyde Farm Site, the Crane Hook Site, and the Naamans Creek Site. These sites supported many more people than previous base camp sites and may have been occupied on nearly a year-round basis. The overall tendency was toward a more sedentary lifestyle.

Woodland I tool kits show some minor variations as well as some major additions from previous Archaic tool kits. Plant processing tools became increasingly common and seem to indicate an intensive harvesting of wild plant foods that may have approached the efficiency of horticulture by the end of the Woodland I Period. Chipped stone tools changed little from the preceding Archaic Period; however, more broad-bladed knife-like processing tools became prevalent. Also, the presence of a number of non-local lithic raw materials indicates that trade and

exchange systems with other groups were beginning to develop. The addition of stone, and then ceramic, containers is also seen. These items allowed more efficient cooking of certain types of food and may also have functioned as storage for surplus food resources. Storage pits and house features during this period are also known from the Delaware Park Site and the Clyde Farm Site. Social organizations also seem to have undergone radical changes during this period. With the onset of relatively sedentary lifestyles and intensified food production, which might have produced occasional surpluses, incipient ranked societies may have begun to develop, as indicated by the presence of extensive trade and exchange and some caching of special artifact forms. By the end of the Woodland I Period a relatively sedentary lifestyle existed in northern Delaware.

Woodland II Period (A.D. 1000 - A.D. 1650) - In many areas of the Middle Atlantic, the Woodland II Period is marked by the appearance of agricultural food production systems; however, settlements of the Woodland I Period, especially the large base camps, were also occupied during the Woodland II Period and very few changes in basic lifestyles and artifact assemblages are evident (Stewart, Hummer, and Custer 1986). Intensive plant utilization and hunting remained the major subsistence activities up to European Contact. Similarly, no major changes are seen in social organization for the Woodland II Period of northern Delaware.

Contact Period (A.D. 1650 - A.D. 1750) - The Contact Period is an enigmatic period of the archaeological record of northern

Delaware which began with the arrival of the first substantial numbers of Europeans in Delaware. The time period is enigmatic because few Native American archaeological sites that clearly date to this period have yet been discovered in Delaware, although numerous Contact Period sites are evident in southeastern Pennsylvania. It seems clear that Native American groups of Delaware did not participate in much interaction with Europeans and were under the virtual domination of the Susquehannock Indians of southern Lancaster County, Pennsylvania. The Contact Period ended with the virtual extinction of Native American lifeways in the Middle Atlantic area except for a few remnant groups.

PREVIOUS RESEARCH

The Hockessin Valley Site (7NC-A-17) was discovered during a Phase I/II location/identification survey of the Route 7 North Corridor (Catts, Shaffer, and Custer 1986) when a series of 1m x 1m test units were excavated within the proposed Route 7 right-of-way adjacent to an unnamed tributary of Mill Creek (Figure 4). A total of 11 1m x 1m test units were excavated during intensive Phase II investigations to determine the site's boundaries. The site is triangular in shape (Figure 4), with dimensions of 91.4m x 54.9m x 73.2m. The southern boundary of the site is defined by the extent of artifacts and the foot of a slope which rises steadily to the south with an elevation of approximately 360 ft. The northwestern boundary of the site is defined by an unnamed, spring-fed, tributary of Mill Creek and the eastern edge by the existing Delaware Route 7. Test units

TABLE 2

HOCKESSIN VALLEY SITE PHASE I/II ARTIFACT CATALOG

	Quartz	Quartzite	Chert	Jasper	Chalc-edony	Iron-stone
Flakes (cortex)	50	4	3(1)	4	2	1
Flake tools (cortex)	1					
Core	1					
Total:	52	4	3(1)	4	2	1

were placed in the field on the east side of Route 7 during the Phase I/II survey, however, no cultural remains were found.

Table 2 shows a summary catalogue of the artifact assemblage from the Phase I and II testing at 7NC-A-17 (Catts, Shaffer, and Custer 1986:168). Quartz debitage dominated the assemblage with only a few tools present. Some cryptocrystalline debitage is also present. Based on the site size and artifact assemblage, the site was thought to be either a small base camp or a procurement/staging site.

Geomorphological and pedological analyses were conducted during the Phase I/II study (Pizzuto 1986). Analysis of the soil profiles from 7NC-A-17 indicated that some of the artifacts were found in soils deposited by low energy alluvial sedimentation from the small stream. For the most part, the artifacts seemed to be in undisturbed, in situ contexts. On the basis of the undisturbed artifacts, the site was determined to be eligible for the National Register of Historic Places. The

determination-of-eligibility form for the site is included in Appendix I.

RESEARCH DESIGN AND FIELD METHODS

The main goal of the data recovery research at 7NC-A-17 was to understand the role that the site played in local settlement patterns (Appendix II provides a copy of the original data recovery plan). The present models of Piedmont Upland prehistoric settlement patterns (Custer and Wallace 1982; Custer 1984:105-107) stress an adaptation focused on large habitation sites in major floodplains and in the Hockessin/Kennett Square lowlands. Periodic short-term forays were then made to surrounding upland areas to procure certain types of resources. These forays presumably produced numerous small, scattered archaeological sites in the upland areas away from the major drainages. Because 7NC-A-17 is intermediate in size and is located in a minor stream's floodplain, it does not fit with the existing models. Therefore, its excavation has the potential to refine existing settlement pattern models and this research goal was given a high priority in the Delaware plan for managing prehistoric cultural resources (Custer 1983).

Based on the Phase I/II research, 7NC-A-17 was thought to be a base camp, similar to other major drainage base camps - only smaller, that was inhabited by smaller social groups. The site was possibly identical in function and seasonal occupation to other larger Piedmont Upland base camps, only not as large. It is also possible that 7NC-A-17 was a base camp occupied during different seasons than the larger base camps. For example,

7NC-A-17 may represent a base camp of small social units within a seasonally varied fusion-fission settlement/social organization (see Figure 5 for the settlement system model). Yet another possibility is that 7NC-A-17 is a procurement staging site used by hunting and gathering parties dispatched from base camps. The

staging site was then used as a central point from which individual procurement forays originated. Initial processing of resources may also have taken place (see Figure 6). An archaeological example of such a site is the Hawthorn Site (Custer and Bachman 1984).

Because the major goal of the proposed research at 7NC-A-17 was to understand the role of the site in the regional settlement system, it was important to learn during what time periods and seasons the site was occupied and what kind of activities took place at the site through time. Basic description of chronology and activities at the site are especially important because no similar sites in similar environmental settings have ever been investigated in the Piedmont Uplands region of Delaware, Maryland, or Pennsylvania (Custer and Wallace 1982). Phase I/II excavations at the Hockessin Valley Prehistoric site suggested that it was a small base camp, or a procurement staging site. This preliminary functional identification of the site can be used as a hypothesis to guide the data recovery program. Table 3 lists the identifying characteristics of the varied functional site types identified by excavation of local types, and it is expected that 7NC-A-17 will display the characteristics of either the micro-band base camp or the procurement staging site.

In some ways, the ideal research design described above was complicated by the fact that a large portion of the site came under threat of destruction from an adjacent housing subdivision and all fieldwork had to be completed in two weeks. Major time constraints were placed on the fieldwork and the occurrence of unexpected features at the site also created a need to adapt the research design and field methods while excavations were in progress. However, with the cooperation of Toll Brothers Construction, the developers of the subdivision, and a large field crew, it was possible to excavate a large contiguous block of the site (Figure 7).

TABLE 3

FUNCTIONAL SITE TYPE CHARACTERISTICS

Site Type	Characteristics
macro-band base camp	wide variety of tool types; abundant ceramics; house structures (semi-subterranean); storage pit features; large size (hectare or larger); abundant debitage from tool reduction and manufacture. Examples: 7NC-A-2 (Custer and DeSantis 1985), 7NC-E-6 and 7NC-E-1 (Custer 1982), 36CH3 (Wilkins 1978), 36CH51 (Custer 1985), 18CE29 (Thomas 1982)
micro-band base camp	same characteristics as above, except size is less than .5 hectare. Examples: Green Valley Site Complex (Custer et al. 1981), Morgan Bank Site Complex (Custer, Watson, and DeSantis n.d.)
procurement staging site	small size (less than .5 hectare), limited tool types, limited ceramics, limited debitage, limited tool reduction and manufacture, processing features (hearths and shallow pits), limited house structures (tent ring). Examples: 7NC-E-46 (Custer and Bachman 1984)
procurement site	small size (less than .25 hectare), very small amounts of debitage, almost no evidence of tool manufacture, limited tool reduction, no ceramics, no processing or habitation features. Examples: 7NC-D-114 (Catts, Shaffer, and Custer 1985), Limestone Hills Site Complex (Custer 1980)

It was necessary to open a large block of contiguous excavation units in order to collect data to determine the functions of the site, and spatial variation of activities within the site. These block excavations consisted of 133 1m x 1m squares and focused on the Phase II test units that produced buried artifacts (Figure 7). Placement of excavation units was then determined by the location of subsurface features and their arrangement in a house pattern, which is discussed in more detail below.

Excavation units were initially excavated in four 50cm x 50cm quadrants within each 1m x 1m unit by 5cm arbitrary levels within natural stratigraphic levels. However, careful examination of the soil profiles from these initial units, it became clear that an older buried plowzone existed. Soils overlying the buried plowzone were then removed without screening. The buried plowzone was then excavated as one stratigraphic level. The underlying subsoil was then excavated in four 50cm x 50cm quadrants within each 1m x 1m test unit. This procedure was generally followed for units from N23W7 - N23W18 and north to the N29 line (Figure 7). Also, units along the W10 line from N1 - N22 were excavated in this fashion. Because of the need to explore feature distributions, a low yield of artifacts, and time constraints, units from N17W7 - N17W15 through N23W7 - N23W16, excluding the previously mentioned ones on the W10 line, were excavated in a slightly different manner. The sod layer, fill layer, and the plowzone were excavated as one level but not screened. The subsoil was excavated in quadrant fashion in 10cm arbitrary levels. Units located from N29 - N40 were excavated with the sod and fill layers removed, the plowzone excavated and screened as one 1m x 1m stratigraphic unit, and the subsoil was excavated in one 1m x 1m 10cm arbitrary level.

The interface between the plowzone and the subsoil was carefully troweled to identify prehistoric cultural features and 28 features were identified. All features encountered were mapped and cross-sectioned. The feature fill was saved for flotation and any charcoal found was saved for radiocarbon dating. A majority of the features' test units also had a soil

and rock sample collected from the plowzone and one from the subsoil for use as control samples in blood residue analysis.

Artifact processing and analysis took place at the University of Delaware Center for Archaeological Research (UDCAR). Feature flotation fill was processed at the Island Field Museum. All artifacts were washed, marked, and catalogued using the Island Field Museum's standard accession numbering system. Appendix III contains the total artifact count. Lithic artifacts were analyzed for blood residues using UDCAR protocols (Custer, Ilgenfritz, and Doms 1988) and were sorted by raw material and functional tool categories. The absence or presence of cortex was noted in order to study cobble utilizaton and bifaces were sorted following Callahan's (1979) categories of biface reduction to study stone tool manufacturing activities.