INTRODUCTION

The purpose of this report is to describe the Phase I and II archaeological survey of five proposed areas of borrow pit and wetland replacement sites in Kent County, Delaware. Borrow pit and wetland replacement was proposed in these five areas as part of ongoing efforts to mitigate the environmental impact of the construction of Delaware State Route 1, a multilane, limited access road extending 45 miles from I-95 in New Castle County to Dover in Kent County. The location of the proposed State Route 1 alignment and the five proposed borrow pit and wetland replacement areas are shown in Figure 1.

The five proposed borrow pit and wetland replacement areas were surveyed by the University of Delaware Center for Archaeological Research (UDCAR). Fieldwork was conducted from the fall of 1990 to the spring of 1991. The University of Delaware Center for Archaeological Research undertook this survey for the Delaware Department of Transportation (DelDOT) and the Federal Highway Administration (FHWA) for compliance under section 106 of the National Historic Preservation Act of 1966.

The purpose of the survey was to locate and identify cultural resources which may be adversely affected by proposed borrow pit and wetland replacement activities. The five project areas ranged in size from 2.5 to over 300 acres. Each area was defined by legal and physical boundaries. A total of approximately 490 acres was surveyed.

ENVIRONMENTAL SETTING, REGIONAL PREHISTORY, AND REGIONAL HISTORY

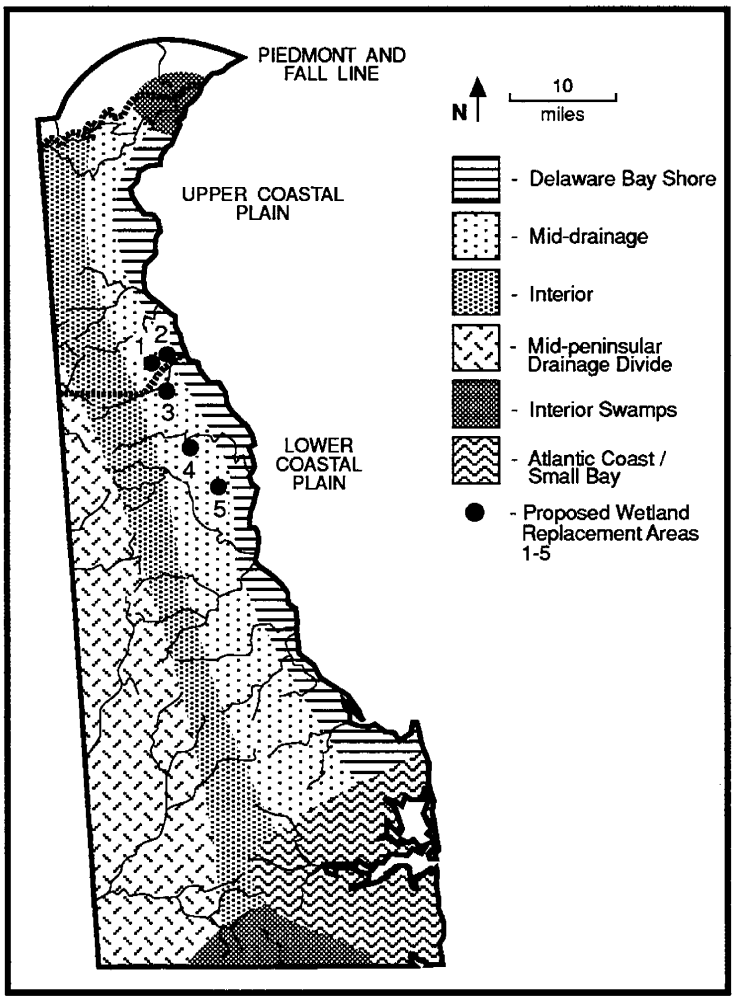
All five proposed borrow pit and wetland replacement areas are located between Smyrna and Dover, Delaware. Areas 1 and 2 are located in the Upper Coastal Plain and Areas 3, 4, and 5 are located in the Lower Coastal Plain (Figure 2). The environmental setting, regional prehistory, and regional history of this area has been fully presented in numerous works (Custer et al. 1984; Custer and Bachman 1986; Custer, Bachman, and Grettler 1987; Bachman, Grettler, and Custer 1988; and Grettler et al. 1991a).

RESEARCH DESIGN

The primary goal of the Phase I survey was the simple location and identification of cultural resources in the proposed State Route 1 right-of-way (ROW). As such, it is difficult to link the Phase I study with an explicit research design. However, the site location data can be used to test predictive models of site locations developed in earlier planning studies of the Route 13 Corridor (State Route 1)

FIGURE 2

Delaware Physiographic Zones



(Custer et al. 1984; Custer, Bachman, and Grettler 1986, 1987). More detailed discussions of the predictive models are also provided in the Phase I/II research plan (Custer, Bachman, and Grettler 1987). A brief discussion of specific site location predictions by time periods is noted below.

During the Paleo-Indian Period (ca. 12,000 B.C. - 6500 B.C.), settlement patterns were focused upon areas with either readily available crypto-crystalline outcrops or poorly drained swamps (Custer, Cavallo, and Stewart 1983). Paleo-Indian sites related to lithic sources are not expected in the study area. However, game-attractive swamps or bogs at ephemeral streams and major drainages are located in the project area and they may be the locations of Paleo-Indian procurement sites. Figure 3 includes potential Paleo-Indian site locations in relation to all five proposed borrow pit and wetland replacement areas.

Archaic Period (ca. 6500 B.C. - 3000 B.C.) settlement patterns in central Delaware are similar to those of the Paleo-Indian Period. Therefore, the potential Paleo-Indian site locations shown in Figure 3 are also potential Archaic Period procurement site locations.

Settlement patterns became more diversified during the Woodland I Period (ca. 3000 B.C. - A.D. 1000). The project areas were near some of the greatest social complexity recorded on the Delmarva Peninsula for this time period. A few large base camps from several cultural complexes are located near the project areas and this kind of site as well as related small base camps, procurement-staging sites, and

procurement sites are also expected in the project areas. Figure 4 shows the projected site location model for mid-drainage wetlands. Woodland I sites are expected throughout the five study areas with procurement sites found adjacent to interior swamps and ephemeral streams and procurement-staging sites found in areas where there are clusters of procurement sites.

Of special interest is the large number of recorded Delmarva Adena Complex sites known from central Delaware. To this time, only Adena mortuary/exchange centers have been located and an understanding of Adena settlement patterns remain elusive. Figure 5 shows a localized site location model for the Delmarva Adena Complex.

Prehistoric settlement during Woodland II times (ca. A.D. 1000 - A.D. 1600) seems to have been less dense, less sedentary, and less intensive than that of the Woodland I Period (Custer 1982; Custer and De Santis 1986:56-58; Stewart, Hummer, and Custer 1986). Procurement sites would be similar to those noted for the Woodland I Period. The project area falls primarily within the northern fringe of the Slaughter Creek Complex (Custer 1984). However, some larger Woodland II sites may be expected, such as the Hughes-Willis site (7K-D-21), which is located near the project area and shown on Figure 3.

The primary goal of the Phase II survey was the identification of site limits and the determination of potential eligibility for inclusion on the National Register of Historic Places of all the archaeological sites identified by the Phase I survey within the proposed right-of-way. Significance was determined according to the archaeological integrity of the site, particularly the presence of intact sub-surface features and artifacts in undisturbed stratigraphic contexts, and the ability of the site to provide data pertinent to current archaeological research questions as provided for under Criterion D of the National Register of Historic Places. The current archaeological research questions used in the determination of significance are discussed in greater detail in Custer, Bachman, and Grettler (1987). Specifically, research on historical archaeological sites within the Proposed State Route 1 Corridor seeks to gather data relevant to current research questions identified in the Management Plan for Delaware's Historical Archaeological Resources by De Cunzo and Catts (1990). De Cunzo and Catts identify four primary research domains—or themes—within current historical archaeological practice that can be addressed through research on sites in Delaware. In turn, further research on these themes will broaden our understanding of more local questions on the history of Delaware and the surrounding Mid-Atlantic region. A summary of each of the four primary research domains identified by De Cunzo and Catts (1990) that were used to guide archaeological research on sites within the project area follows.

The first and most important research domain archaeologically is the reconstruction and interpretation of the domestic economy of individual sites. Such research seeks to identify different domestic social and economic strategies. These concerns reflect the centrality of the family as both a social and economic unit within the American historical experience. The goal is to identify discrete economic and social decisions within individual sites and then to use such data to reconstruct local, regional, and even international consumption and production patterns. These broad patterns provide a context for a number of important current research topics in history and archaeology, including questions related to foodways, architecture and land use, degree of economic self-sufficiency, consumer behavior, and the degree of market participation. Moreover, these patterns change over time, space, and socioeconomic status, and archaeological evidence is particularly well-suited to addressing such questions. Evidence of changing dietary and subsistence patterns and differences between varying social and economic statuses are important in our current understanding of Delaware history.

The second primary research domain concerns manufacturing and trade. Like evidence of domestic occupation, evidence of equipment, raw materials, finished products, and transportation used in all manufacturing processes is particularly well preserved in the archaeological record. Like domestic sites, manufacturing sites in Delaware were critically influenced by transportation conditions and improvements. Also like domestic sites, manufacturing and trade sites provide important evidence of significant social, economic, and technological changes, such as changing uses of space over time, and the defining of activity areas. Evidence of trade and merchant activity, particularly stores and local transportation-related manufacturing/service centers (such as blacksmith and wheelwright shops) are particularly important.

The third primary research domain is the reconstruction and interpretation of the historic landscape. The historic landscape includes both natural and man-made elements. Current research seeks to reconstruct the natural and cultural environment through the identification and analysis of land divisions, spatial utilization patterns, architectural forms, and local geographic setting. Each of these elements can be reconstructed on a number of levels: site-specific, local or inter-site, sub-regional, regional and national. Each of these elements also changes over time, adding a further dimension to current efforts to reconstruct the Delaware landscape.

The final primary research domain is the analysis and identification of social group identity behavior and interaction through historical and archaeological research. Such research seeks to study the social, religious, political, and economic interaction of different groups. The most appropriate study unit for these questions is the local community. Groups have been most often defined by occupation, socioeconomic status, and ethnicity.

In sum, the excavation of various sites along the proposed State Route 1 Corridor have served to greatly enlarge the date base of both prehistoric and historical sites. The collection of comparable data helps to answer the questions that illuminate patterns of change over time in order to better understand diachronic cultural processes. Data from further work in the five proposed areas of borrow pit and wetland replacement areas in Kent County is expected to yield data significant to current research questions in prehistoric and historical archaeology and the history of Delaware and the surrounding Mid-Atlantic region.

FIELD, LAB, AND ARCHIVAL METHODS

Each of the five proposed borrow pit and wetland replacement areas was given a numerical designation. Large project areas were given additional alphabetical designations to distinguish between eastern and western or northern and southern portions. Grids were established and transects were given the designation of a compass co-ordinate, a letter for the transect and the shovel test pits (STPs) were numbered. All archaeological tests were keyed to these numbers. Phase I field methods consisted of the pedestrian survey and selective shovel testing of areas of low, medium, and high site potential. Plowed fields were subjected to controlled surface collections. Woodlots, fallow fields, and areas of poor surface visibility were shovel tested at 20' and 40' intervals. Shovel tests were oriented toward landscape features and were sited along measured grids. All shovel test pits and controlled surface collections were then mapped on detailed 1" to 400' aerial photographs provided by the Delaware Department of Transportation.

The Phase II archaeological field methods included a mixture of shovel test pits and the excavation of 3' X 3' test units within and around areas defined as archaeological sites by the Phase I Survey (Bachman, Grettler, and Custer 1988). Testing was concentrated, but not confined to the limits

of the proposed right-of-way as one of the primary goals of the Phase II survey was to determine site limits.

The standard excavation procedure to determine site limits and gather initial archaeological data was to place shovel test pits at intervals of 20 feet in a grid pattern over the site. The interval was reduced to 10 feet in areas of high artifact density or areas with a high potential for features. The goal of shovel testing was to gather data on artifact distributions, site stratigraphy, and the stratigraphic context of artifacts and features. Special emphasis was placed on the detection of cultural features and the identification of intact, artifact-bearing stratigraphic contexts.

Shovel test pits were laid out along measured transects and grids. All soils excavated were passed through 1/4-inch mesh and all cultural materials recovered were bagged according to the individual test unit and the arbitrary or natural excavation level. Stratigraphic soil data and a record of all cultural materials found were kept for each shovel test on standardized log sheets.

Measured 3' X 3' test units were excavated in areas of high artifact density or atop historical features identified by archaeological testing. All of the test units were excavated to sterile soil unless large historical features were encountered. Small historical features such as post molds were completely excavated while larger features such as wells and cellar holes were sampled. All excavated soil was screened through 1/4-inch mesh and detailed stratigraphic and historical feature records were kept on standardized forms. All subsurface excavations were excavated according to natural soil levels or systematic arbitrary levels. All feature soils were excavated and screened separately. Mean ceramic dates were calculated using mean ceramic date values based on South (1977) and Brown (1982).

Test units were located and described by the coordinates of their southwest corner as determined by the same transit grid as the Phase II shovel test pits. All subsurface tests were mapped on 1/600th scale, one-foot contour field maps (scale: 1 inch equals 50 feet) provided by the Division of Highways. These highly accurate maps were keyed to the centerline surveyors stations and allowed for the accurate placement of finds made during the Phase I and II Surveys.

Prior to a detailed artifact analysis, the standard artifact processing procedures of the Delaware Bureau of Museums were applied to all artifacts recovered from the Phase I and II excavations. All artifacts were cleaned in the lab with plain water, or, in the case of deteriorating bone, shell, or metal,

were damp- or dry-brushed. Bone and shell were then placed in labeled bags. All other artifacts were labeled with the site number and a three digit provenience number. Artifacts were sorted in categories for cataloging based on their material composition. The total artifact count and basic artifact inventory for each site is provided in Appendix I.

Archival research methods included the detailed reconstructions of individual site histories based on deed research and other archival sources. Historical atlases of Kent County showing individual structures, specifically Byles' 1859 and Beers' 1868 atlases, were also used. The goal of deed research was to identify the occupants of a site through time and to reconstruct the local historical landscape. Once deed research was completed, occupants of individual sites were traced through a variety of historical records. Tax assessments, particularly detailed lists made between 1797 and 1828, provided important historical data, including evidence of the relative socioeconomic status of site occupants. Various national censuses, particularly population censuses taken after 1790 and agricultural censuses taken after 1850, provided both site-specific and local data. Local government records, specifically Orphan's Court and probate records, provided critical site-specific information for many sites. Genealogical data from both published and unpublished sources at the Delaware State Archives in Dover were also used.

All site locations were then transferred to cultural resource maps in the possession of the Delaware State Historic Preservation Office in Dover, Delaware. All new sites were assigned Cultural Resource Site (CRS) numbers and CRS forms were completed for each site. Appendix II provides an example on site numbers.

BACKGROUND RESEARCH

In preparation for the archaeological survey of the project area, prior archaeological planning studies (Custer et al. 1984; Custer and Bachman 1986; Custer, Bachman, and Grettler 1986, 1987; Bachman, Grettler, and Custer 1988; Grettler et al. 1991a, 1991b) and the site files of the Bureau of Archaeology and Historic Preservation were consulted to identify known archaeological resources within or adjacent to the project area. Historical maps and atlases noted in the planning studies including Byles' 1859 and Beers' 1868 historical atlases, the 1906 USGS topographic survey map, and Bausman's 1939 Kent County map were also consulted for the locations of former standing structures which have

now become archaeological sites. Current landowners and tenants were queried regarding any observations they may have had about cultural resources on their property. From these sources, several known prehistoric and historical sites were located. A summary of the major historical and prehistoric sites in the vicinity of each of the five proposed borrow pit and wetland replacement areas is presented next.

The nearest significant site to Area 1 along Woodland Beach road is the John Darrach Store site (7K-A-101). The John Darrach Store site is the remains of a store and tenant-occupied dwelling in use from ca. 1770-1830. The site is located north of Area 1 along the south side of Kent Route 6 approximately one half mile east of Smyrna. John Darrach was a wealthy local merchant with extensive local and regional commercial connections. The John Darrach Store site was subjected to data recovery operations by archaeologists from the University of Delaware Center for Archaeological Research in 1989 (De Cunzo et al. 1992).

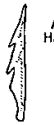
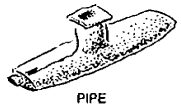
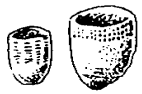
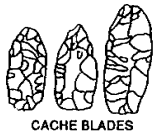
The nearest significant sites to Area 2 along Taylor's Gut are eight nineteenth and early twentieth century agricultural complexes: K-3981 to K-3984, K-3964, K-4000, K-4001, and K-4007. These sites are all extant nineteenth and early twentieth century farms located on adjacent properties. No prehistoric sites are known in the area.

The most significant sites nearest to Area 3 are located along the Leipsic River. This complex of prehistoric sites was nominated for the National Register in 1988 (Bachman, Mellin, and Custer 1989). One of the sites in the Middle Leipsic River Archaeological Complex, 7K-C-194A, was subjected to data recovery operations in 1990. This site is located along the north side of the Leipsic River across from Area 3. Data recovery excavations at 7K-C-194A identified the remains of a large macro-band base camp used during the Woodland I (3000 B.C. to A.D. 1000) and Woodland II (A.D. 1000 - A.D. 1650) periods (Table 1). Intact prehistoric cultural features containing Clyde Farm Complex artifacts from ca. 2000 B.C. were identified and the potential for similarly intact cultural features is high for Area 3.

The most significant sites located nearest to Area 4 east of Dover are 7K-C-365A, the Dover Downs Hill A prehistoric component and 7K-C-365B, the Dover Downs Hill B prehistoric and Loockerman's Range historical components (Bachman, Grettler, and Custer 1988; Riley et al. 1993; Riley, Watson and Custer 1993). Both are located just east of present Kent 88 on the northern end of the

TABLE 1

Prehistoric Cultural Complexes of Delaware

DATE	PERIOD	LOW COASTAL PLAIN	HIGH COASTAL PLAIN	PIEDMONT / FALL LINE
A.D. 1600	WOODLAND II	 TRIANGULAR PROJECTILE POINTS **SLAUGHTER CREEK COMPLEX** Townsend Creek ceramics Triangular projectile points	 CERAMICS **MINGUANNAN COMPLEX** Minguannan ceramics Triangular projectile points	
A.D. 1000		 LARGE TRIANGULAR POINT **LATE CAREY COMPLEX** Mockley / Claggett ceramics Large triangular projectile points	**WEBB COMPLEX** Hell Island ceramics Misc. stemmed points Jack's Reef pentagonal projectile points  ANTLER HARPOON	**DELAWARE PARK COMPLEX** Hell Island ceramics Misc. stemmed projectile points
A.D. 500		**CAREY COMPLEX** Mockley ceramics Rossville stemmed projectile points Fox Creek projectile points  ROSSVILLE LAGOON  JACK'S REEF	**CAREY COMPLEX** Mockley ceramics Rossville stemmed projectile points  PIPE  CACHE BLADES	**CAREY COMPLEX** Mockley ceramics Rossville stemmed projectile points
	WOODLAND I	 CERAMICS	 FOX CREEK	
A.D. 0		 FISHTAIL **WOLFE NECK COMPLEX** Wolfe Neck ceramics Misc. stemmed projectile points	**DELMARVA ADENA COMPLEX** Adena side and corner notched projectile points Misc. stemmed projectile points Coulbourn ceramics  ADENA  CACHE BLADES	**WOLFE NECK COMPLEX** Wolfe Neck ceramics Susquehanna Series ceramics Misc. stemmed projectile points
500 B.C.		 BROADSPEARS **CLYDE FARM COMPLEX** Bare Island / Lackawaxen projectile points Marcey Creek & Dames Quarter ceramics Broadspears Fishtail projectile points Steatite bowls Experimental ceramics	 CERAMICS **BARKER'S LANDING COMPLEX** Bare Island / Lackawaxen projectile points Marcey Creek & Dames Quarter ceramics Broadspears Fishtail projectile points Steatite bowls Experimental ceramics Heavy reliance on argillite	 BROADSPEAR **CLYDE FARM COMPLEX** Bare Island / Lackawaxen projectile points Marcey Creek & Dames Quarter ceramics Selden Island ceramics Broadspears Fishtail projectile points Steatite bowls Experimental ceramics Long broadpoints
3000 B.C.	ARCHAIC	 BARE ISLAND / LACKAWAXEN  LE CROY  ST. ALBANS  KANAWHA	 CARVED STEATITE (SOAPSTONE) BOWL	 GROUND STONE AXE
6500 B.C.				
12000 B.C.	PALEO-INDIAN	 CLOVIS  MID-PALEO  DALTON-HARDAWAY  PALMER  KIRK STEMMED  KIRK CORNER NOTCHED		

Dover Downs Racetrack property. The Hill A component, 7K-C-365A, is located on a 10' high, 300' long sand ridge on the south side of Muddy Branch. The Phase II excavation of the site showed that a variety of cryptocrystalline, quartz and argillite materials were used to fashion bifaces from the Paleo-Indian through Woodland I Periods (Riley et al. 1993). Woodland I ceramics (Wolfe Neck, about 500 B.C. to 0 A.D.) and Woodland II ceramics (Minguannan type, post-dating A.D. 1000) were also found (Table 1). Numerous other chipped stone tools, flakes, fire-cracked rock, cores, and a double-sided stone mortar were found, as well as several deep pit features with flakes, bifaces, and datable wood charcoal. One of these features, Feature 12, produced a stemmed point and a calibrated radiocarbon date of 6381 (6217, 6202, 6183) 6127 B.C. (Stuiver and Becker 1986; Stuiver and Pearson 1986). A second feature, Feature 13, yielded a jasper bifurcated base point and two calibrated dates of 6554 (6449) 6421 and 5193 (4990, 4988, 4945) 4901 B.C. (Stuiver and Becker 1986; Stuiver and Pearson 1986). Further work at this site may produce additional data on these occupations.

The Hill B component, 7K-C-365B, lies about 200 feet southwest of 7K-C-365A and contains an early eighteenth century domestic archaeological component (Loockerman's Range) and a large prehistoric component dating to the Woodland I and Woodland II periods. The Loockerman's Range component takes its name from the estate name of the eighteenth century owner, Nicholas Loockerman, and included domestic refuse and ceramics dating to the second quarter of the eighteenth century. The site is thought to be a tenant site, for Loockerman is known to have divided the 600 acre plantation into six equal parcels and rented them out to individual farmers. The prehistoric component, which was minimally disturbed by the eighteenth century occupation, included about 8000 artifacts, over 99% of which were unmodified waste flakes and cobble cores of quartzite. The lithic material surrounded a small, intact hearth but no other prehistoric soil pit features were associated. The site is clearly a quartzite lithic reduction site, but indications are that little else took place at the site. The source of the cobble quartzite is unknown, but it is probably nearby.

Several other prehistoric sites near Area 4 were located during the 1987 Phase I survey (Bachman, Grettler, and Custer 1988) and Phase II excavations at the sites have been completed and are summarized in Grettler et al. (1991a) and Riley et al. (1993). The early indications are that 7K-C-366 (Davis Beanfield site), 7K-C-364 (Huston Woodlot), 7K-C-367 (Jefferic Fallow Field site), and 7K-C-

368 (Ruyter/Jefferic Woodlot site) are all procurement or procurement/staging sites. They contained limited amounts of ceramic artifacts and no features. The artifacts recovered included low to moderate density debitage (30-100 artifacts per 1m x 1m square), cores, fire-cracked rock and an occasional biface and suggested periodic or occasional reuse rather than continual habitation.

Area 5 was initially pedestrian surveyed in 1987 as part of the Phase I survey of the proposed State Route 1 corridor. Four nearby archaeological sites, three prehistoric, and one historical, were located (Bachman, Grettler, and Custer 1988). The single historical site, 7K-D-115, was determined to be a simple trash deposit of late nineteenth and early twentieth century commercial ceramic sherds. These ceramic sherds were deposited along the north side of Lafferty Lane and the site was not recommended for Phase II testing.

The three prehistoric sites; 7K-C-370, 7K-D-112 and 7K-D-113, were located within the proposed right-of-way outside of Area 5. 7K-C-370 consisted of a small scatter of prehistoric artifacts: a nondiagnostic chert biface fragment, a jasper utilized flake, and two pieces of fire-cracked rock. Site 7K-D-112 consisted of a single argillite cache blade found on a slight rise adjacent to a Fallsington bay/ basin feature. Site 7K-D-113 consisted of a single utilized jasper flake found in a shovel test pit in a woodline along the northeast corner of the field. It was determined that 7K-C-370 did not warrant Phase II testing. Sites 7K-D-112 and 7K-D-113, however, were recommended for Phase II testing (Bachman, Grettler, and Custer 1988).

Sites 7K-D-112 and 7K-D-113 were tested by Phase II operations in 1988. Phase II testing consisted of shovel tests and measured test units. These tests are summarized in Riley et al. (1993). Phase II testing yielded few artifacts and located no intact artifact deposits or cultural features. Neither 7K-D-112 nor 7K-D-113 was determined to be National Register eligible and thus no further work was recommended.

In conclusion, the information gathered from the various sites along the proposed State Route 1 Corridor has served to greatly enlarge the data base of both prehistoric and historical sites in central Delaware. The Phase I and II survey of the five proposed borrow pit and wetland replacement areas offers to further enlarge this data base. This data is especially valuable because 1) little was previously known about the history and prehistory of these parts of Kent County and (2), the area is being rapidly developed for highways and residential and commercial building projects.