IV. RESEARCH DESIGN

A. RESEARCH CONTEXT

The kinds of research questions that may be addressed during a particular cultural resource management project depend on the project's scope and the quality of information available from previous investigations. The scope of work for this study focuses on the location and evaluation of prehistoric and historic archaeological sites; therefore it is best suited to the study of settlement patterns, i.e., the distribution of sites across the landscape. The present study has been preceded by a number of archaeological investigations in the SR 1 corridor, primarily reconnaissance and survey-level studies, but there have been relatively few site evaluation or site excavation projects. As a result, while there is much information available for developing general predictions regarding site location, individual site types have not been well defined.

The overall context for federally funded or permitted archaeological research is provided by the Secretary of the Interior's Standards and Guidelines for Archaeology and Historic Preservation (48 FR 44716-44742). The Secretary of the Interior's Standards were designed as a tool to organize information in such a way as to provide a basis for decisions concerning the identification, evaluation, and treatment of cultural resources. The process begins with the creation of historic contexts that define the conceptual framework for a set of resources or property types that share a thematic or topical unity as well as relatively well-defined geographic and temporal limits.

After the framework has been established by the definition of historic contexts, cultural resource management issues may be grouped into the three broad areas of (1) identification, (2) evaluation, and (3) protection or treatment. The primary issues related to identification include establishing what kinds of resources (property types) are associated with each context and determining the geographic distribution, relative frequency, and current condition of these property types. Within the context of a single project or undertaking, identification issues focus on developing an inventory of resources or properties within an area of potential effects. Typically, this is accomplished at the level of the Phase I archaeological survey.

Issues related to evaluation are those that can establish whether or not a particular resource or property possesses significance relative to the criteria of eligibility for inclusion in the NRHP. To apply these evaluation criteria, it is necessary to establish what historical associations best embody the values inherent in the historic contexts and define information needs or research topics that represent important knowledge about each context. Archaeological properties that are significant with respect to a particular historic context must also possess an appropriate level of physical integrity, at a level that would provide significant information relative to the property's prehistoric or historic context. These issues related to assessing integrity and information potential are typically accomplished at the level of a Phase II archaeological study.

The third major decision area in the cultural resource management process pertains to protection or other appropriate treatment of historic properties. Issues that relate to treatment or protection are relevant only to those properties that have been determined to be historically significant (i.e., eligible for inclusion in the NRHP). Questions that need to be addressed in order to determine appropriate treatment strategies include an assessment of what uses enhance the significant aspects of various resource types, what land uses are incompatible with preservation, and how many representatives of each property type are available. For archaeological properties, treatment strategies may include preservation in place, avoidance of adverse effects, or data recovery.

In Delaware, the archaeological resource management plan is carried out according to the Secretary of the Interior's Standards, with contexts defined by geographic, temporal, and thematic criteria. Existing management plans for prehistoric resources (Custer 1986, 1994; Custer and De Santis 1986) provide an excellent basis for assessing the overall archaeological sensitivity of the project area and for the development of explicit predictions regarding the occurrence of prehistoric sites. The state and regional management plans provide settlement pattern models for the various periods of the state's prehistory. The state plan describes expected site types for each period, together with their locational characteristics, which enables identification of predicted zones of archaeological sensitivity or predictions regarding the occurrence of specific site types in a particular project area. These existing management plans, together with a predictive model developed by UDCAR for the SR 1 corridor (Custer et al. 1984), provide the basis for predicting the likelihood for various prehistoric site types to occur in the project area. In addition to providing a basis for predicting the occurrence of prehistoric archaeological resources within the project area, the various management plans also provide specific guidance for decisions regarding the significance of identified archaeological resources, which are issues directly related to archaeological resource evaluation. The prehistoric resource management plans (Custer 1986, 1994; Custer and De Santis 1986) provide specific information pertaining to Research Sensitivity Zones, Significance Probability, Data Quality, Numbers of Known Sites, Composite Sensitivity Zone rankings, and Research Priorities, all of which may be considered in the evaluation of specific sites.

In Delaware, the first definitions of contexts for the historic period were based on a simple grid with axes for time period, region, and site type (Ames et al. 1989; Herman et al. 1989). Delaware history was divided into five time periods: 1630-1730, 1730-1770, 1770-1830, 1830-1880, and 1880-1940+, which correspond roughly to important stages in the history of the state (Ames et al. 1989; Herman et al. 1989). Five geographic regions were identified: Piedmont, Upper Peninsula (which encompasses the study area), Lower Peninsula/Cypress Swamp, Coastal, and Urban (Wilmington). Eighteen historic themes were identified, 10 of which are economic (such as agriculture and manufacturing) and eight of which are cultural (such as settlement patterns, religion, and major families). This grid approach provides a convenient way to classify sites, but the gridded historic contexts were not well developed. A management plan for the state's historic archaeological resources is also available (De Cunzo and Catts 1990), and this document provides a discussion of historic preservation themes in terms of more encompassing research domains such as Domestic Economy; Manufacturing and Trade; Landscape; and Social Group Identity, Behavior, and Interaction (De Cunzo and Catts 1990). These issues provide the

general contexts which crosscut specific properties that are assignable to specific temporal and geographic units defined for historic preservation planning in Delaware. Attempts have now been made to develop detailed individual contexts, including research questions, for the most common types of sites. The most relevant documents pertaining to rural historic archaeological resources, such as are expected to occur in the SR 1 project area, are *Historic Context: The Archaeology of Agriculture and Rural Life, New Castle and Kent Counties, Delaware, 1830-1940* (De Cunzo and Garcia 1992), *"Neither a Desert nor a Paradise": Historic Context for the Archaeology of Agriculture and Rural Life in Sussex County, 1770-1940* (De Cunzo and Garcia 1993), and the *Dwellings of the Rural Elite in Central Delaware* thematic National Register Nomination (Herman et al. 1992)

B. PHASE I (SITE IDENTIFICATION) RESEARCH OBJECTIVES

For both prehistoric and historic resources, the Phase I research design focused on issues of site distribution across the landscape, i.e., settlement pattern models. LBA's Phase I survey design was based on a predictive model developed by UDCAR for the SR 1 corridor (Custer et al. 1984). The prehistoric portion of the UDCAR model was based on environmental data from LANDSAT satellite photographs. Pixel values from the satellite photos were equated with potentially significant environmental variables, and the resulting values were fed into a gridded database. The environmental categories chosen for inclusion in the model were: high-order streams, moderate-order streams, low-order streams, high-salinity marshes, brackish and low-salinity marshes, very poorly drained soils, well-drained soils, and moderately drained soils. A logistical regression program was then developed to test the impact of proximity to all these environments on the likelihood of finding archaeological sites. The regression was trained using the results of existing archaeological surveys. As might be expected, the resulting model predicts that most prehistoric sites will be located near water, on well-drained or moderately drained soils. Another important factor was the location of bay/basin features ("whale wallows"). Many of these depressions are now dry, but they were once important watering holes, and several archaeological sites have been found in association with them. Although the report in which the model is described (Custer et al. 1984) includes discussion of sites and settlement patterns from different time periods, the maps of probability zones used in planning this survey did not make such distinctions.

The model used by LBA for the survey of the SR 1 corridor from Scott Run to Pine Tree Corners treated all undisturbed areas identified by the UDCAR model as having high or moderate probability as high-potential areas. In addition, detailed topographic information obtained during the initial reconnaissance of the project area was used to define additional high-potential areas. A substantial additional survey area was defined along the northern bank of Drawyer Creek, including the Eisenbrey Wetland Mitigation Area; this area was treated as high potential by LBA, although most of it was designated low potential by the UDCAR model. Other, smaller high-potential areas were identified near ravine heads along the southern bank of Drawyer Creek, west of Odessa, and south of Odessa adjacent to ravines that drain into Whitby Branch, a marshy tributary of the Appoquinimink River. Thus, during the survey of these segments, LBA treated all areas identified by the UDCAR model as having high or moderate probability as high-potential

survey areas, and the only changes were to add additional high-potential areas in locations that seemed promising based on the initial reconnaissance.

Because experience with the UDCAR model during the surveys in the SR 1 corridor indicated that it was not a good predictor of prehistoric site locations, a different model was employed during the surveys of the Lynch and Osborne wetlands. In the form recorded on the maps kept at the DESHPO in Dover, the UDCAR model designates well-drained, level areas near both the Appoquinimink River and Drawyer Creek as low potential, including at least part of Sites 7NC-F-13, 7NC-F-24, 7NC-G-138, 7NC-G-139, and 7NC-J-208, five of the nine prehistoric sites discovered by LBA during the Drawyer Creek to Pine Tree Corners survey. On the other hand, the UDCAR model designates some large areas of upland terrain more than 200 meters from water as having high and moderate potential for sites. LBA surveyed these areas as high-potential areas but discovered no prehistoric sites. Within the Osborne wetland, the areas of high, moderate, and low potential appear randomly distributed with respect to the existing wetlands; some areas of high ground near the current stream are considered low potential, while large areas of higher ground more than 200 meters from wetlands are considered high potential.

For the survey of the Lynch and Osborne wetlands, therefore, the UDCAR model was abandoned, and replaced with a more conventional one based on slope, drainage, and distance to water. Within the Osborne wetland, areas of high ground within 150 meters of wetlands were considered to have high potential because the wetlands have been channelized by the digging of deep ditches and were probably substantially larger in prehistoric times. In the Lynch wetland, where there has been less drainage, all currently dry areas within 150 meters of current wetlands were considered to have high potential.

The UDCAR model for the location of historic sites is impressionistic rather than mathematical, and therefore needs further refinement. Detailed maps of the project area are available for the period after 1849, and those maps have been used to predict the locations of sites from that period. For the period before 1849, other techniques must be used. Research by Charles Fithian (1994) and others indicates that early colonial sites in Delaware are usually associated with waterways or early roads. Louise Heite's (1972) research on the early settlement of the Appoquinimink area supports this model. High-probability areas for the location of sites from the 1660 to 1849 period are therefore defined for the current survey as those areas within 150 meters of open water or 120 meters of a road dating to the period. The old roads in the project corridor are U.S. Route 13 south of Fieldsboro and north of Odessa, and SR 299. The locations of two colonial sites south of Odessa (De Cunzo 1993) suggest that such sites are particularly likely where ravines give access from dry bluff locations down to open water.

C. EXPECTATIONS FOR SITE OCCURRENCE

Specific expectations for the occurrence of prehistoric sites were derived from the state management plans and the predictive model developed by UDCAR for the SR 1 corridor. General predictions regarding prehistoric site distribution were derived from the location of the study area within the Upper Coastal Plain physiographic zone, Mid-drainage management unit,

and Appoquinimink River drainage basin. The overall probability for Paleoindian sites in the study area is low. Quarries, quarry reduction stations, quarry-related base camps, base camps, and base camp maintenance stations are all considered to have a low probability for occurrence in the Mid-drainage management unit. Paleoindian hunting sites are considered to have a low to moderate probability for occurrence in the Mid-drainage management unit. All defined types of Archaic sites (macroband base camps, microband base camps, and procurement sites) are considered to have a medium probability for occurrence in the Mid-drainage management unit. All defined types of Woodland I sites (macroband base camps, microband base camps, procurement sites, minor mortuary/exchange sites, and major mortuary/exchange sites) are considered to have a moderate probability for occurrence in the Mid-drainage management unit. For the Woodland II period, macroband base camps and microband base camps have a medium probability for occurrence in the Mid-drainage management unit, while Woodland II procurement sites have a high probability for occurrence in the Mid-drainage management unit. Contact period sites are considered to have a low probability for occurrence in the Mid-drainage management unit (Custer and DeSantis 1986).

More specific predictions regarding the distribution of prehistoric sites within the project area were developed on the basis of the UDCAR predictive model for the SR 1 corridor (Custer et al. 1984) and from general analyses based on landform, slope, and surface water. Small procurement sites dating to the Woodland I and Woodland II periods were expected adjacent to Augustine Creek and the numerous smaller streams and large ravines. Data from the UDCAR surveys indicated that procurement sites dating to the Archaic, Woodland I, or Woodland II periods could also be expected around Pine Tree Corners and in the Osborne and Lynch wetland replacement areas, where the project area includes bay/basin ponds and other poorly drained wetlands. The northern and southern banks of the Appoquinimink River were thought to be high-potential locations for procurement sites or base camps dating to the Woodland I or Woodland II periods. Indeed, prehistoric sites of unknown temporal affiliation and type were already recorded on the northern bank, and Gardner and Stewart's (1978) research indicated that larger sites (possibly macroband base camps of the Woodland I and Woodland II periods) could be expected on the southern bank. On the southern bank of Drawyer Creek, the project corridor crosses the area of Woodland II settlement defined by the 1984 UDCAR planning survey (Custer and Bachman 1986a), and sites dating to the late Woodland I or Woodland II periods were also expected.

General predictions of the occurrence of historic archaeological sites within the project area may be derived from the state management plans and the project-specific background research. It is expected that the study area would conform to the general patterns defined for the Upper Peninsula geographic zone (De Cunzo and Catts 1990). Sites from the Exploration and Settlement period (1630-1730) are expected to have a low probability for occurrence in the Upper Peninsula, as population levels were very low and settlement was mainly concentrated around tidal rivers and creeks. One area of seventeenth-century settlement has been identified in the project area vicinity, focused on the Appoquinimink River/Cantwell's Bridge area. Site types associated with this period that might be expected in the study area would include English farmsteads with possible associated slave sites, industrial sites (mills and brickyards), landings, shipwrecks, taverns, churches, and Native American interaction sites; all of these have a low

probability of occurrence in the study area. In the project area, farm sites from the pre-1730 period were considered to be potentially present around Odessa, on the Appoquinimink River, and on Drawyer Creek. Properties associated with the Intensified and Durable Occupation period (1730-1770) are also expected to be infrequent in the study area, based on the low population level of this period. Site types associated with this period include farmsteads, domestic sites located along transportation routes, industries, shipwrecks, inns, churches, courthouses, and communities; all of these have a low probability of occurrence in the study area, but given the enormous population growth of this period, these sites should be more common than those of the Exploration and Settlement period. Sites of this period would be most likely around Odessa, on the Appoquinimink River, and on Drawyer Creek.

Agricultural production expanded during the early part of the Early Industrialization period (1770-1830), then declined. Sites associated with this period should be more common than those of earlier periods, and a broad range of agricultural sites would be anticipated: large estates, middling farms, tenant sites, and slave sites. A range of domestic sites is also associated with this period, including those associated with craft, industrial, and mercantile workers. Other property types associated with this period include various industries (mills, tanneries, and distilleries), transportation-related sites, inns, taverns, churches, courthouses, and communities. Among the various property types associated with this period, agricultural sites would be the most common in the project area. Farmsteads or house sites from this period were considered likely to be located in the same places as those of the earlier periods, as well as along the older roads.

The agricultural expansion that characterized the Industrialization and Early Urbanization period (1830-1880) allowed a great rebuilding in New Castle County, and many farmhouses survive from this period. Many of the economic trends of this period continued into the Urbanization and Early Suburbanization period (1880-1940). Properties associated with these periods should be relatively common in the project area, especially those related to agriculture.

Beginning in the late nineteenth century, excellent map evidence is available for all parts of the project area. Maps show several farms and dwellings that may have been located in the project corridor. The maps also show that the corridor crosses the small crossroads town at Fieldsboro, where houses and stores were present from the early nineteenth century to the present. One standing historic house is present in the corridor, a nineteenth-century house on SR 299, known as Locust Grove. No historic sites were expected in either the Lynch or Osborne wetland replacement areas, based on cartographic evidence.

D. PHASE I SURVEY METHODOLOGY

The overall strategy for the Phase I survey was to stratify the project area into probability zones and concentrate the field effort in areas where archaeological sites were most likely to occur. In order to efficiently use the resources available for an archaeological survey, it is imperative to employ a research design rigorously based on a predictive site-location model. A carefully constructed model, when it is based on sufficient data about known site locations, identifies those areas most likely to contain sites, and efforts can be focused on these sensitive areas. In order

to prevent the survey from being a closed, self-fulfilling circle, in which only high-probability areas are surveyed and, therefore, all sites are found in high-probability areas, a sample of low-probability areas must also be surveyed as a test of the predictive model.

Before the archaeological fieldwork was carried out, the high-potential portions of the project areas were all mapped onto project design plans provided by DelDOT, and a sample of low-potential areas was also selected and mapped. To facilitate recordkeeping, the actual survey areas were then numbered. In the SR 1 corridor from Drawyer Creek to Pine Tree Corners, the areas were numbered 1 to 28 in the order that they were tested. In the SR 1 corridor from Scott Run to Drawyer Creek, the areas were numbered 1 to 9 from north to south. The Osborne wetland was divided into 18 areas, the Lynch wetland into five. Shovel tests were numbered sequentially within each survey area; for example, Shovel Test Pit 4-11 was the eleventh shovel test pit excavated in Area 4. The locations of all the shovel test pits were recorded on the design plans. Although only portions of the project area were subject to shovel testing, the entire project corridor was walked over to search for obvious signs of sites and high-potential microenvironments not visible on the project plans.

Field conditions varied significantly throughout the survey areas, and the Phase I fieldwork reported herein was actually carried out in four episodes between November 1994 and December 1995. The majority of the SR 1 project corridor, as well as the Osborne wetland, consisted of active agricultural fields. Near McDonough, the project corridor crossed housing developments in the early stages of construction. In those places, the corridor had been thoroughly disturbed by grading and excavation for roads, ponds, utilities, and house lots. At Biddles Corner and Fieldsboro, the corridor included areas of commercial development, and it crossed residential areas west and south of Odessa. South of Scott Run, north and south of Drawyer Creek, and south of Odessa, the corridor crossed wooded areas. The Lynch wetland consisted of old agricultural fields that had been abandoned for about five years and were growing up in a mix of brambles and small trees.

There were also significant seasonal variations in the ground cover which may have had an effect on the survey results. The Drawyer Creek to Pine Tree Corners segment was tested during a six-week period from November 1994 to January 1995, and the Scott Run to Drawyer Creek segment was surveyed in April 1995. The Osborne wetland was surveyed in June 1995, while the Lynch wetland and some additional storm water management ponds and other small areas were tested in September, October, and December, 1995. The Scott Run to Drawyer Creek segment and the Osborne wetland were tested in the spring; at that time, portions of these areas had been recently plowed.

The field survey methodology was varied in response to varying field conditions, in an attempt to reduce the effects of varying ground cover. Areas which had excellent surface visibility were surveyed by surface inspection on transects 2 meters apart. All other survey areas were shovel tested at 20-meter intervals. If an isolated artifact was recovered from a shovel test, four additional shovel test pits were excavated around that shovel test at 10-meter intervals. Within sites where there were several positive shovel tests, additional shovel test pits were dug as needed

to further define the site. Shovel tests measured approximately 50 centimeters in diameter and were excavated by natural soil strata. Most shovel test pits were excavated 10 centimeters into the subplowzone soil, to a depth of approximately 40 centimeters. However, in locations along streams and in low-lying areas, where more deeply buried cultural material might have been present, selected shovel test pits were excavated to a depth of 1 meter. All soil from the shovel tests was screened through 1/4-inch hardware cloth for systematic recovery of artifacts. Schematic soil profiles, including soil texture and Munsell soil color notations, were recorded for each shovel test on a standardized form. Each shovel test was backfilled upon completion. Shovel tests and surface finds were recorded either on 1":50' plans provided by DelDOT or on 1":100' maps prepared by the archaeologists from 1":400' DelDOT aerial photographs. Black-and-white photography was used to record sites and general field conditions throughout the study area. Sites were subject to preliminary evaluation, focused on a delineation of their boundaries in relation to the proposed right-of-way. Site survey forms were completed for each site and submitted to the Delaware State Historic Preservation Office for assignment of site numbers.

E. PHASE II (SITE EVALUATION) RESEARCH OBJECTIVES

The primary cultural resource management objective of a Phase II archaeological investigation is to determine whether a site is eligible for the NRHP. Archaeological sites usually qualify for National Register eligibility under Criterion D. Criterion D states that sites that have yielded, or are likely to yield, information important to history or prehistory may be eligible for inclusion in the NRHP (36 CFR 60.6). In addition, properties that are eligible for the NRHP must also possess integrity. Archaeological resource evaluation studies must therefore carefully determine the integrity of cultural deposits, evaluate the stratigraphy (or archaeological context) of sites, obtain a sample of the artifacts, estimate the age range of the deposits, obtain information pertinent to site function and structure (i.e., property type), and establish the boundaries of sites. In projects involving historic archaeological resources, site-specific documentary research is generally required to evaluate the site's historical associations.

Delaware's archaeological resource management plans and historic contexts (especially Ames et al. 1989; Custer 1986, 1994; De Cunzo and Catts 1990; De Cunzo and Garcia 1992) provide the basis for establishing the information needs by which individual properties may be evaluated as to whether they have the capacity to contain significant information. Aside from information potential and physical integrity, it is also important to consider how many representatives of a specific property type are available. The integrity criteria may vary by individual property types; certain property types that are abundant, such as nineteenth-century farmsteads, should require a very high level of integrity to qualify for the NRHP, while lower levels of integrity may be acceptable for property types for which there are few or no examples, such as Paleoindian base camps. The evaluation of a site's physical integrity is generally a site-specific issue which requires evaluation of site formation processes such as plowing, deflation, and erosion. In general, archaeological integrity may be expressed by the presence of intact features, the presence of artifact deposits in well-preserved pedological contexts, or the preservation of a whole property. Conversely, low levels of integrity may be expressed by the absence of features (in a

property type that would have been expected to possess features), the manifestation of postdepositional disturbances to the cultural deposits, or the preservation of only a fraction of the resource.

Evaluation of site significance was also carried out with reference to information needs. Delaware's archaeological resource management plans provide some discussions of the information needs associated with various historic contexts. These information needs were supplemented or amplified by reference to research domains that are widely used in prehistoric and historic archaeology. For prehistoric resources, these research domains include chronology, subsistence, settlement systems, intrasite patterning, technology, and environmental adaptation. For historic resources, these research domains include landscape, material culture studies/ consumer behavior, culture history, and rural vernacular architecture.

F. PHASE II SITE INVESTIGATION METHODOLOGY

1. Background Research

Historical research was conducted to provide the context necessary for interpreting and evaluating the five historic period sites that received Phase II investigation. This endeavor included both general research on the economic and social history of New Castle County and site-specific research on the histories of the individual properties. A chain of title was prepared for each property, using the current owner, tax information in the New Castle County Tax Assessment Office, and the will, probate, and Orphans' Court records kept on microfilm at the New Castle County Chancery Office. U.S. census records for the sites were consulted on microfilm at the Morris Library of the University of Delaware. The marriage catalogue, the tax assessment records of St. Georges and Appoquinimink hundreds, and road returns were consulted at the Delaware State Archives. Genealogical and background material was consulted at the Delaware Historical Society in Wilmington, the Dover Public Library, the Wilmington Public Library, and the Odessa Public Library.

Background research was also conducted on the prehistory of the region, in order to provide a context for evaluating the prehistoric sites. This research included library studies at the University of Delaware and the Library of Congress, inspection of site files at the Delaware State Historic Preservation Office, and visits to the collections of the Island Field Museum and the University of Delaware Center for Archaeological Research.

2. Field Methods

The field evaluations of the 17 sites were carried out by the excavation of 1x1-meter test units and shovel test pits, surface inspection, and, on two sites, the use of a backhoe to dig test trenches and remove plowzone. The evaluation of each site began with the creation of a grid to locate shovel tests and test units. This grid was prepared using a surveyor's transit and tapes and was mapped onto 1"=50' plans provided by DelDOT. In each case this grid approximated as closely as possible the Phase I shovel testing grid. The Phase I shovel testing consisted of regular testing

at 20-meter intervals and some additional shovel test pits at 10-meter intervals. On sites where it was felt that further information about artifact distribution on the site was required, the 10-meter shovel testing grid was completed, filling in all the gaps left during the Phase I testing. Information from the Phase I and Phase II shovel testing was used to determine the placement of test units. On most sites, test units were placed judgmentally, with at least one in each area of high artifact density or interesting stratigraphy identified by the shovel testing, and further units in the most interesting areas.

One-by-one meter test units were excavated by natural soil strata; subplowzone strata were further subdivided into arbitrary 10-centimeter levels. Shovel tests measured approximately 50 centimeters in diameter and were excavated by natural soil strata. Shovel test pits were excavated at least 10 centimeters into the subplowzone soil, in most places to a depth of approximately 40 centimeters. All soil from the test units and shovel tests was dry screened through 1/4-inch hardware cloth to recover cultural artifacts. The excavation of the test units was recorded in several ways. A standardized form that recorded soil texture, Munsell color notation, and artifact count was prepared for each stratum and level excavated. An additional form was prepared for each test unit, summarizing the findings in the unit. A detailed stratigraphic profile was also drawn of most units. Shovel tests were recorded on a form that included schematic soil profiles, soil texture, Munsell soil color notation, and artifact counts. Each unit and shovel test pit was identified by both a grid address, such as North 500/East 500, and a numerical designation. Excavations were backfilled upon completion. Black-and-white and color slide photography was used to record sites, general field conditions, soil profiles, and features.

Geomorphological investigations were completed at selected prehistoric sites for the purpose of interpreting soil profiles and examining geomorphic features for evidence of buried surface levels, deposit ages, and site environmental conditions. Observations were made of site landscapes and soil profiles, and detailed soil profile descriptions were compiled in accordance with standard (USDA) techniques and nomenclature for the field description of soils. The geomorphological studies were performed by a consultant and were especially useful for assessing site integrity.

G. LABORATORY METHODOLOGY

The artifact collections were processed for eventual storage and curation by the Delaware State Museum. The collections were assigned accession numbers according to the system utilized by the Delaware State Museum. In addition to the accession numbers, unique catalog numbers indicating field provenience within the sites and survey areas were assigned. The overall laboratory treatment of the collection included (1) basic processing—cleaning and packaging in appropriate containers, (2) cataloging and analysis according to LBA's in-house analytical system, and (3) preparation of the collection for permanent curation, according to the standards of the Delaware State Museum.

Historic artifacts were cataloged according to standard typologies (e.g., Noel Hume 1970; South 1977), using the class, type, and variety approach (for example, class=glass, type=bottle, variety=case). The entire collection was first sorted according to major classes—ceramics, curved

glass, pipes, and small finds. The small finds class is a residual or catch-all category that includes a broad variety of items, including artifacts assignable to South's (1977) Architectural, Furnishings, Arms, Personal, Clothing, and Activities Groups. Cataloging of the ceramics and glass was carried only to the level of individual sherds, rather than vessels, and no crossmends or Minimum Number of Vessel determinations were made. Some of the attributes—date ranges, for example—were automatically entered by the computer for commonly encountered artifact types. Data processing speed and storage were enhanced by the use of alphabetic and numeric codes for the various attributes, but more lengthy "translations" can be generated as well, particularly for printing catalog sheets. For example, the code "CRW 10" translates to "Ceramic, whiteware, shell-edged blue," with an automatically entered date range of 1820 to 1900.

Dating of deposits was accomplished primarily by the Terminus Post Quem (TPQ) technique, using the beginning date of manufacture for artifacts with a known temporal range. Mean Ceramic Dates (MCD) were also computed for sites with a substantial number of datable ceramics. The MCD dating technique theoretically provides a date that corresponds to a site's median occupation date (South 1977), and is a useful tool for comparison of assemblages between sites or of different deposits within sites.

The cataloging of prehistoric lithic artifacts was also carried out according to a technomorphological analytical approach; that is, artifacts are grouped into classes and then further divided into types based upon key morphological attributes, which are linked to or indicative of particular stone-tool production or reduction strategies. However, a function(s) can be assigned to each artifact class and type. Data derived from experimental and ethnoarchaeological research are relied upon in the identification and interpretation of artifact classes and types. The works of Callahan (1979), Clark (1986), Crabtree (1972), Flenniken (1981), Gould (1980), and Parry (1987) are drawn upon most heavily. Ceramics were classified according to temper and surface treatment or decoration, and assigned to a defined ware type if possible. After completion of the artifact cataloging and data entry, a series of standard computer reports were generated, including general catalog listings as well as more specialized summaries for particular tool types, raw materials, and debitage.