ARCHAEOLOGICAL SURVEYS

FISH PASSAGE AT BRANDYWINE CREEK DAMS 4, 5 AND 6

City of Wilmington, Brandywine and Christiana Hundreds, New Castle County, Delaware
DHCA Project Review No. 2020.06.22.06

PREPARED FOR:

Brandywine Shad 2020
27 Brandywine Falls
Wilmington, Delaware 19806

and

Kleinschmidt
141 Main Street
Pittsfield, Maine 04967

September 2022

RICHARD
GRUBB &
ASSOCIATES

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DHCA Project Review No. 2020.06.22.06

Principal Investigator:

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Prepared by:

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Prepared for:

Brandywine Shad 2020
27 Brandywine Falls
Wilmington, Delaware 19806

and

Kleinschmidt
141 Main Street
Pittsfield, Maine 04967

Date:

September 19, 2022

EXECUTIVE SUMMARY

Richard Grubb & Associates, Inc. (RGA) completed a Phase IA archaeological survey within the Area of Potential Effects (APE) for four discontiguous areas collectively encompassing approximately 16.17 acres (704,365.20 sq. feet). The survey was conducted in advance of the provision of fish passage at Dams 2, 4, 5, and 6 along the Brandywine Creek in the City of Wilmington and in Brandywine and Christiana hundreds, New Castle County, Delaware. Phase IB archaeological testing was conducted at Dams 4 and 6, and the results of a Phase IA and Phase IB archaeological survey at Dam 2 are presented under separate cover (Richard Grubb & Associates, Inc. 2022). In addition, the Center for Historic Architecture and Design completed a Phase II architectural investigation for Dams 2, 3, 4, 5, and 6 under separate cover in April 2022. The project requires a permit from the United States Army Corps of Engineers (USACE), which in turn requires compliance with Section 106 of the National Historic Preservation Act, as amended. According to Section 106, archaeological resources eligible for listing or listed in the National Register of Historic Places (NRHP) must be identified to determine if the project will have an adverse effect on such resources. The Phase IA archaeological survey was conducted to assess the potential for historic and pre-Contact period archaeological resources within the APE and included background research, a pedestrian survey, and an assessment of archaeological sensitivity. The Phase IB archaeological survey of Dams 4 and 6 included subsurface testing and artifact analysis to determine if archaeological resources are present or absent.

After the completion of the initial Phase IA archaeological survey, the proposed undertaking at Dam 2 was combined with the larger undertaking for the development of the Edgemoor Port project. As such, the Phase IA and Phase IB archaeological survey results for Dam 2 are not included in this report and were instead, separately detailed in a report dated September 6, 2022 titled, *Phase IA and IB Archaeological Survey: Fish Passage at Brandywine Creek Dam 2, City of Wilmington, Brandywine and Christiana Hundreds, New Castle County, Delaware*.

The Dam 4 APE falls within the NRHP-listed Bancroft and Sons Cotton Mills Historic District (N03646) (NR: 12/20/1984). Dam 4 was constructed in 1896, is also known as the Kentmere/ Bancroft II Dam, and has been determined individually eligible for the NRHP under Criteria A and C (SHPO Opinion: 5/5/2022). By 1901, a railroad was built within the footprint of the present-day asphalt-paved access path/drive in the APE that will be used for temporary construction access. The railroad was abandoned and removed between 1987 and 1997. Phase IB archaeological testing in areas of assessed moderate to high archaeological sensitivity resulted in the recovery of late nineteenth- through twentieth-century artifacts from secondary contexts of disturbed, possible alluvial, and/ or imported soils. Two shovel test pits (STPs) contained coal/slag deposits that may be related to railroad use or re-deposition of regraded railroad-related soils. Shovel Test Pits D4-3, D4-5, and D4-8 contained coal, ash, and/or slag deposits with other artifacts, some of which date to the twentieth century. Coal was found in many of the STPs excavated, likely the result of disposal or colluvial soil movement during twentieth-century railroad use. No intact rail bedding, sleepers, or rails were identified. No intact structural evidence of a mill race was found. The artifacts recovered are not indicative of an intact archaeological resource. No further archaeological survey is recommended in the upland section of the APE. Archaeological monitoring during the dam's removal is recommended.

The Dam 5 APE is partially encompassed within the northwestern boundary of the NRHP-listed Bancroft and Sons Cotton Mills Historic District (N03646) (NR: 12/20/1984). Dam 5 represents the 1878 Rockford Dam (N03646.048), which is a considered a contributing element to the historic district. This dam, also known as the Rockford/Bancroft I Dam, has been determined individually eligible for the NRHP under Criteria A and C (SHPO Opinion: 5/5/2022). Dam 5 is situated at the location of an earlier, early nineteenth-century dam. The proposed project is not defined at this time but is anticipated to include either just the notching of the dam or the dam's complete removal. Archaeological monitoring of notching or removal of the dam is recommended. Phase IB archaeological testing is also recommended in areas of assessed moderate to high archaeological

sensitivity outside of existing buried utilities. A feasibility study is underway to develop a proposed undertaking for fish passage at Dam 5. Therefore, Phase IB archaeological testing was not completed at Dam 5 at this time.

Dam 6 is an early nineteenth-century dam, known as the Lower Hagley Yard Dam. Phase IB archaeological testing within the Dam 6 APE resulted in the recovery of late nineteenth- through twentieth-century artifacts (n=6) from three STPs with no clear spatial patterning. These artifacts, which include lime green beer bottle glass, window glass, ferrous metal, a bolt, and a spike, are likely the result of secondary deposition and not considered to represent an intact archaeological site. No further archaeological survey is recommended in the upland portion of the APE at Dam 6. Archaeological monitoring of the dam's removal is recommended to record early nineteenth-century dam construction techniques.

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1.0 INTRODUCTION

Richard Grubb & Associates, Inc. (RGA) completed a Phase IA archaeological survey in the Area of Potential Effects (APE) for the provision of fish passage at Brandywine Creek Dams 2, 4, 5, and 6 in the City of Wilmington and in Brandywine and Christiana hundreds, New Castle County, Delaware (Figures 1.1, 1.2, and 1.3a-1.3d). A Phase IB archaeological survey was subsequently conducted in the APE at Dams 4 and 6; the results are presented in this report. Following the completion of the initial Phase IA archaeological survey, Dam 2 was removed from this undertaking and combined with a larger undertaking associated with the Edgemoor Port development project. As a result, the Phase IA and Phase IB archaeological survey results for Dam 2 are not discussed herein and are separately reported in a survey document dated September 6, 2022 and titled, Phase IA and IB Archaeological Survey: Fish Passage at Brandywine Creek Dam 2, City of Wilmington, Brandywine and Christiana Hundreds, New Castle County, Delaware (Richard Grubb & Associates, Inc. 2022). The University of Delaware Center for Historic Architecture and Design (CHAD) completed Phase IA historic architectural reconnaissance reports for the proposed removals of Dams 4 and 6, which were submitted under separate cover (Barni 2021a, 2021b). A subsequent, comprehensive Phase II architectural investigation report for the fish passage at the Lower Brandywine River Dams 2, 3, 4, 5, and 6 was also prepared by CHAD in April 2022 under separate cover (Morrissey, Emmons, and Showell 2022). The fish passage project is being conducted by Kleinschmidt on behalf of Brandywine Shad 2020. The dams require modification to facilitate the movement of shad within the creek course. The design footprint required for Dam 5 has not yet been finalized, and, to account for the area needed for providing fish passage, a larger APE has been created for Dam 5 for the purposes of this survey.

The purpose of the Phase IA archaeological survey was to assess the sensitivity for the APE to contain archaeological resources eligible for or listed in the National Register of Historic Places (NRHP) and to make recommendations for further survey (i.e., Phase IB testing and/or archaeological monitoring), if warranted. The Phase IA work included background research, a pedestrian reconnaissance of the APE, and an archaeological sensitivity assessment. The Phase IB archaeological survey was conducted at Dams 4 and 6 to determine the presence or absence of intact archaeological resources. The Phase IB effort included subsurface testing, artifact analysis, and reporting. A copy of this report will be placed on file at the Delaware Division of Historical and Cultural Affairs (DHCA) in Dover, Delaware.

Richard P. Adamczyk, M.A., RPA, served as Principal Investigator, conducted background research, and authored this report. Background historical research conducted by CHAD was utilized to help understand the historic land use and development of the APE. Archaeological field reconnaissance was conducted by Sean A. McHugh, M.A., RPA. Archaeological testing was supervised by Ted Gold, M.A., RPA, and completed by Mr. Gold, Dawn Cheshaek, Scott Kachelries, Alex Seng, and Gio Palumbo. David Strohmeier, P.S.M., produced the report graphics. Michael J. Gall, M.A., RPA, served as project manager and edited the report. Natalie Maher served as copy editor and formatted the report. Richard C. Grubb provided administrative quality control review. Copies of this report and all field notes, maps, photographs, and project documents are on file at the RGA office in Cranbury, New Jersey. Recovered artifacts will be provided to the Delaware State Museum.

1.1 Regulatory Context

The project requires a permit from the United States Army Corps of Engineers (USACE), which in turn requires compliance with Section 106 of the National Historic Preservation Act, as amended (36 CFR 800). According to Section 106, archaeological resources eligible for listing in the NRHP must be identified to determine if the project will have an adverse effect on such resources.

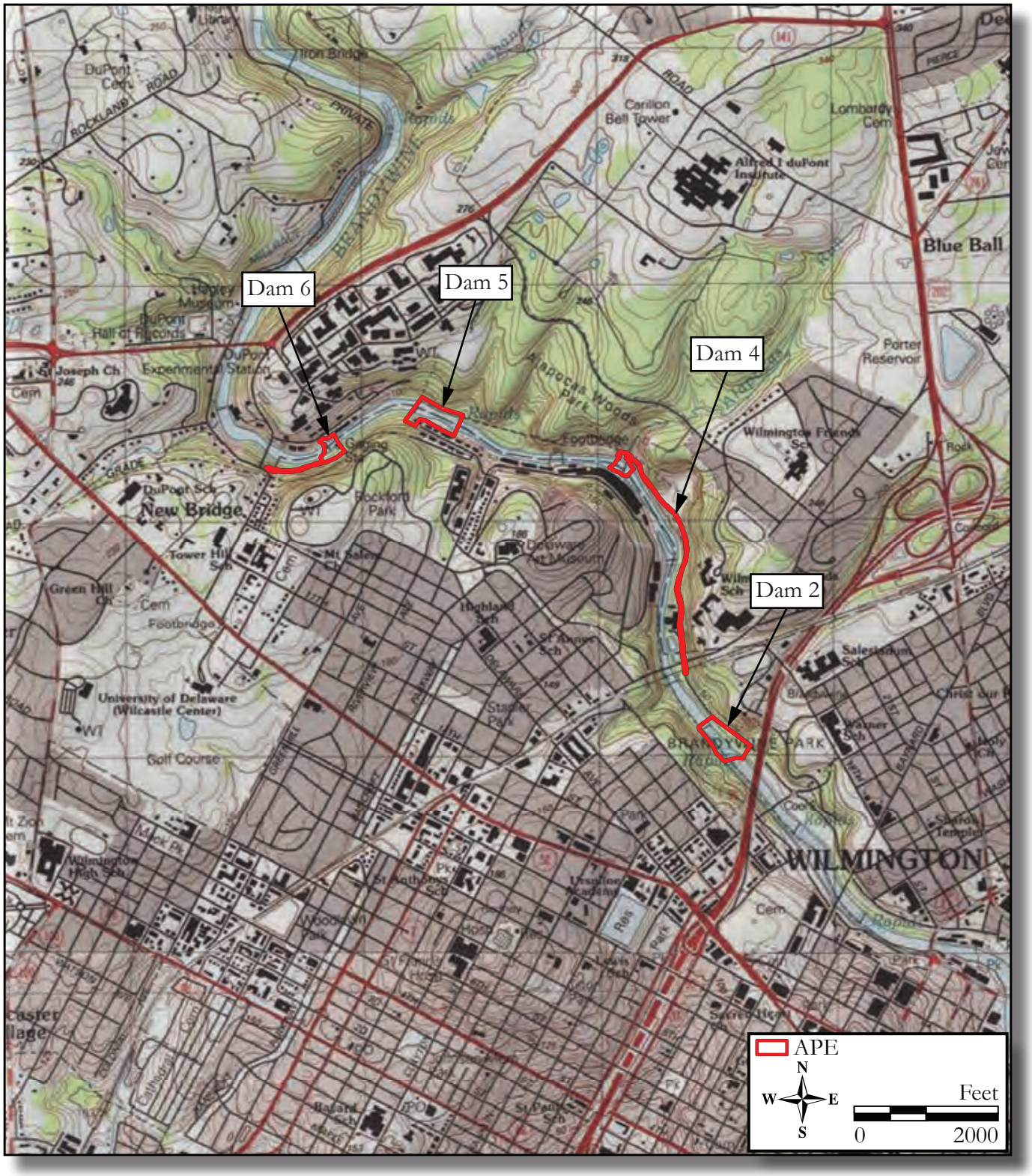

Figure 1.1: U.S.G.S. map
(1997 U.S.G.S. 7.5' Quadrangle: Wilmington North, DE).

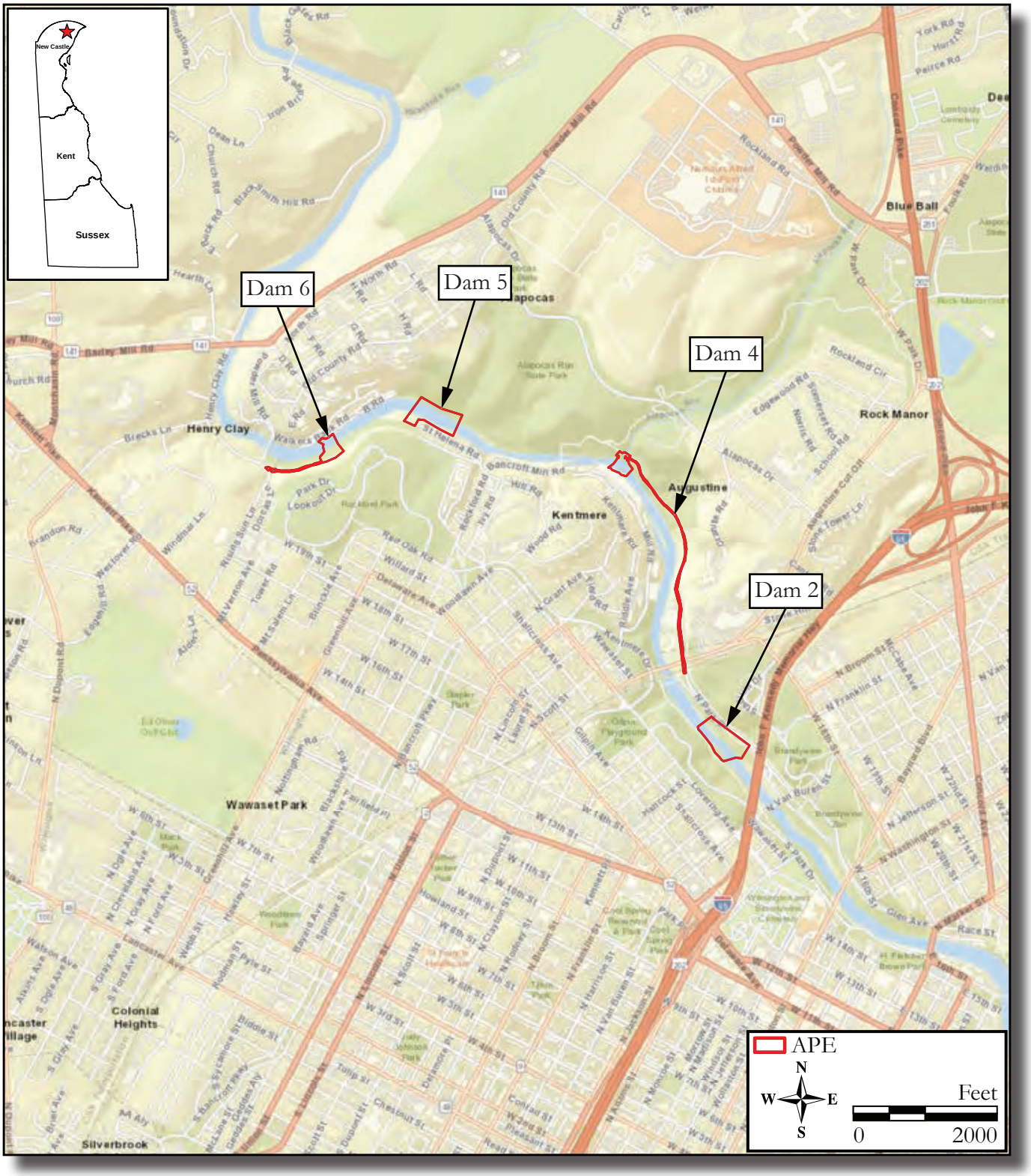

Figure 1.2: Road map
(World Street Map, ESRI 2013).

Figure 1.3a: Aerial photograph of the Dam 2 APE.

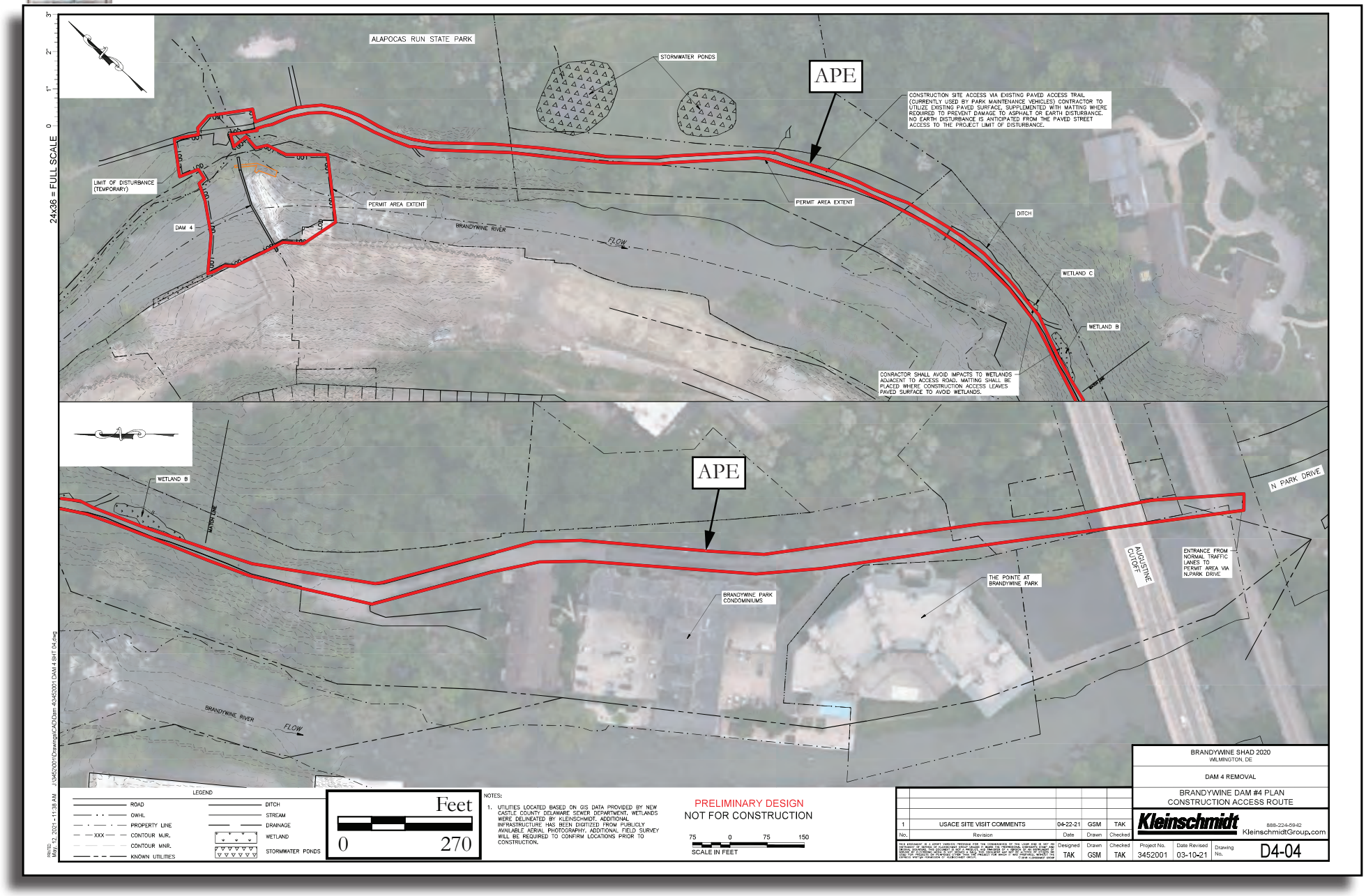

Figure 1.3b: Proposed project plans for Dam 4 removal (from Kleinschmidt 2020b).

Figure 1.3c: Aerial photograph of the Dam 5 APE.

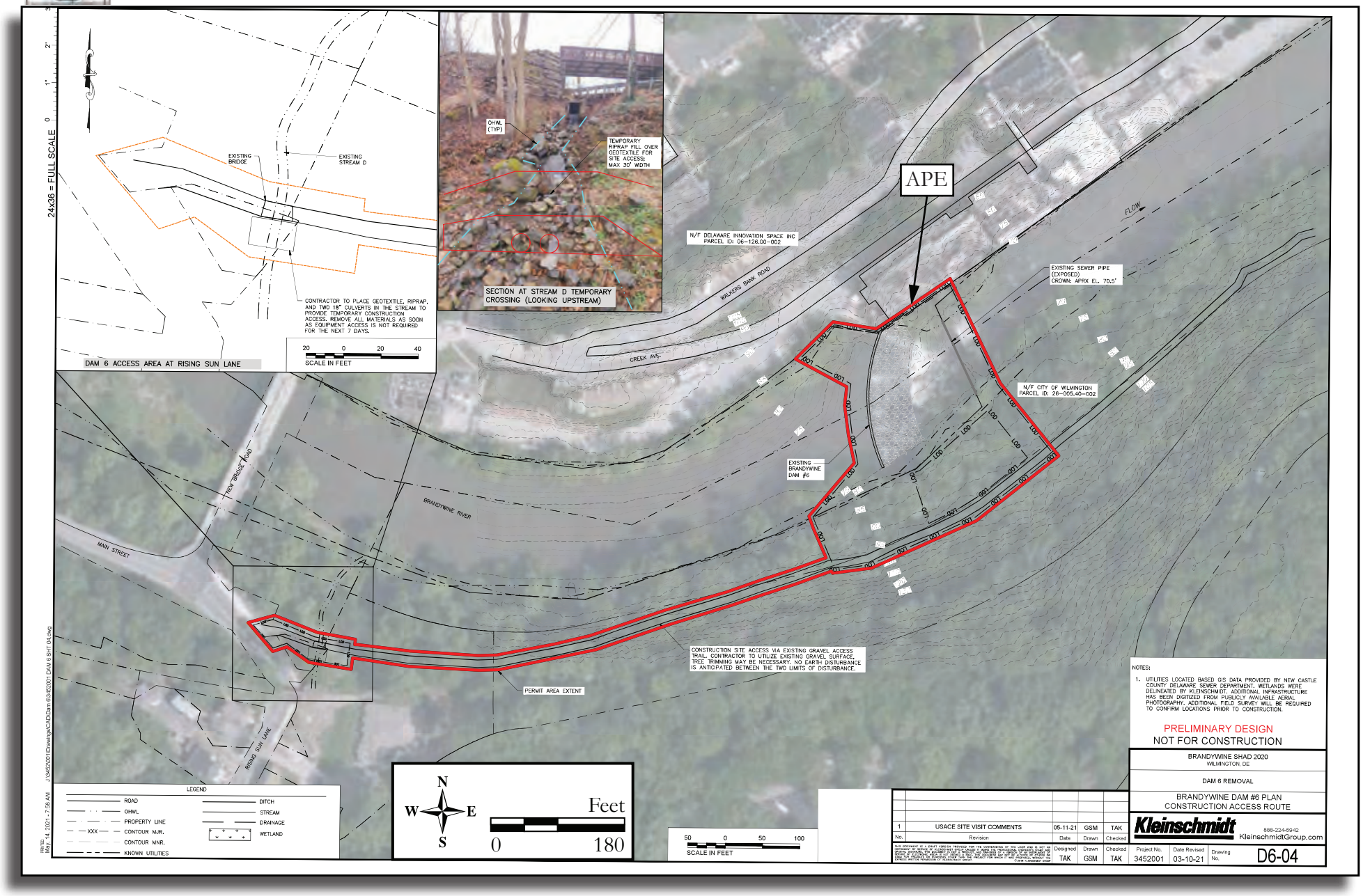

Figure 1.3d: Proposed project plans for Dam 6 removal (from Kleinschmidt 2020c).

Project consultation for Dams 4 and 6 has been initiated by the USACE with the DHCA. In correspondence dated July 20, 2020, the DHCA clarified the consultation process to Brandywine Shad 2020 (Appendix A). RGA's initial work proposal, dated July 28, 2021, was provided to the USACE and DHCA for review and comment (see Appendix A). In correspondence dated August 6, 2021, the DHCA requested a broader archaeological site file research area than the proposed one-half-mile radius and specified that consultation between CHAD and RGA should be conducted during the historic context preparation (see Appendix A). Correspondence dated August 23, 2021, between the USACE and Kleinschmidt determined that a research area for previously identified archaeological resources reaching a one-half-mile radius around each dam was adequate, although the USACE requested that archaeological site background research extend further upstream along the Brandywine Creek's tributaries to ensure that information on sites in similar topographic settings are examined and considered as part of the Phase IA archaeological survey sensitivity assessment (see Appendix A). The USACE specified that the entire Brandywine drainage does not need to be evaluated or researched.

In December 2021, RGA completed and submitted a Phase IA archaeological survey report covering the planned removals or notching of Dams 2, 4, 5, and 6 (Richard Grubb & Associates, Inc. 2021). Following the completion of the Phase IA archaeological survey, the undertaking at Dam 2 was subsequently taken over by the Diamond State Port Corporation as part of the larger Edgemoor undertaking (DCHA Project No. 2018.06.01.01). The Edgemoor undertaking includes the development of the Edgemoor Port and the required mitigation at Dam 2 and Fox Point State Park. In correspondence dated March 31, 2022, the DHCA stated that no archaeological testing is needed at Edgemoor Port and Fox Point State Park. Given that the proposed improvements at Dam 2 will be completed as a separate, independent utility by a different project sponsor (i.e., Diamond State Port Corporation), Dam 2 was removed from the undertaking proposed by Brandywine Shad 2020 and is not discussed further in this report. On May 4, 2020, RGA prepared a Phase IB archaeological survey work plan that was reviewed and approved by the DHCA on May 5 and by the City of Wilmington on May 6 (see Appendix A). This report provides the results of a Phase IA archaeological survey at Dams 4, 5, and 6, and Phase IB archaeological survey results at Dams 4 and 6.

After reviewing the initial Phase IA archaeological survey report for Dams 2, 4, 5, and 6, the Delaware Tribe of Indians of Oklahoma indicated that no known religious or culturally significant sites exist within the APE, concurred with the preliminary report findings, did not object to the proposed project, and requested that if any archaeological materials (artifacts, subsurface features, etc.) are discovered during the construction process that work in the immediate area be halted until an archaeologist can view and asses the finds. They also requested that if human remains are accidentally unearthed during the course of the project that development immediately cease and that the Tribal Nation be informed.

The NRHP Criteria of Adverse Effect was used to assess if the undertaking will have an effect or adverse effect on archaeological resources associated with previously identified historic properties in the APE (Appendix B). This Phase IA and Phase IB report complies with the Secretary of the Interior's Standards and Guidelines for Archaeology and Historic Preservation, and the Archaeological Survey Guidelines of the Delaware DHCA (2015). Richard P. Adamczyk, M.A., RPA, Principal Investigator, meets the Secretary of the Interior's Professional Qualification Standards for Archaeology (36 CFR 61) set forth by the National Park Service (Appendix C).

1.2 Project Description

Brandywine Shad 2020 is an initiative that includes a cross-section of educational organizations, non-profits, governmental agencies, and private citizens that aim to restore the American Shad to the Brandywine River. The methodology for this endeavor includes returning the river to its free-flowing, pre-colonial state through various dam removals, partial removals, or the installation of fish passage structures where dam removal is not feasible (Kleinschmidt 2021a). The project design for fish passage at Dams 4, 5, and 6 is being completed by Kleinschmidt with a USACE permit anticipated to be required for each of these projects.

The proposed APE for Dam 4 encompasses 1.34 acres and a 3,290-foot-long access route, the APE for Dam 5 encompasses 4.65 acres, and the APE for Dam 6 encompasses 2.05 acres and an access route measuring 657 feet long. Demolition of Dams 4 and 6 is the preferred option while the feasibility study at Dam 5 to determine the preferred option is still underway. Where dam removal is required, removal of each dam will consist of the dam's demolition and excavation of the creek bed to natural bedrock or to a specified depth. Where the dam will remain, either a technical fishway (i.e., Denil fish ladder) or nature-like fishway will be installed at the dam, with notches placed in the dam(s) at the site to facilitate upstream passage of American shad. The limits of disturbance also include areas along the creek banks where associated construction activities may take place, such as fence installation, the construction of temporary access bridges, tree clearing, laydown areas, and areas of regrading. Access to Dams 4 and 6 include the utilization of existing gravel and paved (Dam 4 access is paved) access roads, and no ground disturbance is anticipated along these roads. Existing gravel access roads and adjacent areas will be covered in geotextile fabric upon which crushed gravel will be placed to prevent rutting and disturbance to the existing grade if the existing gravel or asphalt surface is not adequate for traversing. Upon project completion the geotextile fabric and crushed gravel will be removed. Installation of geotextile, riprap, and the temporary construction of two approximately 18-inch culverts along an existing bridge will also be necessary to allow access to Dam 6, and these activities are included in the project's limits of disturbance. Project plans for the removal of Dam 4 and Dam 6 are included as Figures 1.3b and 1.3d, respectively. Project plans have not yet been developed for the provision of fish passage at Dam 5. However, RGA was provided with .KMZ files that outlined the draft APE for each of the two dams.

All three dams cross the Brandywine Creek, and the slopes along the creek bank are relatively steep. The Dam 4 APE falls within the NRHP-listed Bancroft and Sons Cotton Mills Historic District (N03646) (NR: 12/20/1984), the 1878 Rockford Dam (N03646.048), and the Brandywine Park and Kentmere Parkway Historic District (see Figure 1.4). The 1878 Rockford Dam (N03646.048), which contributes to the Bancroft and Sons Cotton Mills Historic District, is inaccurately plotted at Dam 5 based on files at the DHCA and actually represents Dam 4. Dam 4, also known as the Kentmere/Bancroft II Dam, was determined individually eligible for the NRHP under Criteria A and C on May 5, 2022 (see Appendix A). The Dam 5 APE is partially encompassed within the northwestern boundary of the NRHP-listed Bancroft and Sons Cotton Mills Historic District (N03646) (NR: 12/20/1984) (see Figure 1.4). Dam 5, also known as the Rockford/Bancroft I Dam, has also recently been determined individually eligible for the NRHP under Criteria A and C (see Appendix A). No historic properties exist within the Dam 6 APE.

1.3 Area of Potential Effects

The APE is defined in 36 CFR 800.16(d) as follows: "the geographic area or areas within which an undertaking may cause changes in the character or use of historic properties, if any such properties exist. The APE is influenced by the scale and nature of an undertaking and may be different for different kinds of effects caused by the undertaking."

The APE includes all locations where a proposed project may result in disturbance of the ground and where the activity may result in changes in land use. Project effects can include physical destruction, demolition, damage, or the alteration of an historic resource. The APE is discontiguous and consists of three separate dam sites, each of which include the locations of dam removal or notching and areas that may be impacted by staging/access on the creek bank within the limits of disturbance. Proposed work in these areas is anticipated to consist of any of the following, as applicable to the specific site: dam demolition and removal, installation of fish passage improvements (e.g., notching of dam(s) or fill in the river), fence installation, the construction of temporary access bridges, tree clearing, staging laydown areas, and regrading (see Figures 1.3a-1.3d). The project design details related to each of the three dams are included in Sections 5.0, 6.0, and 7.0 of this report.

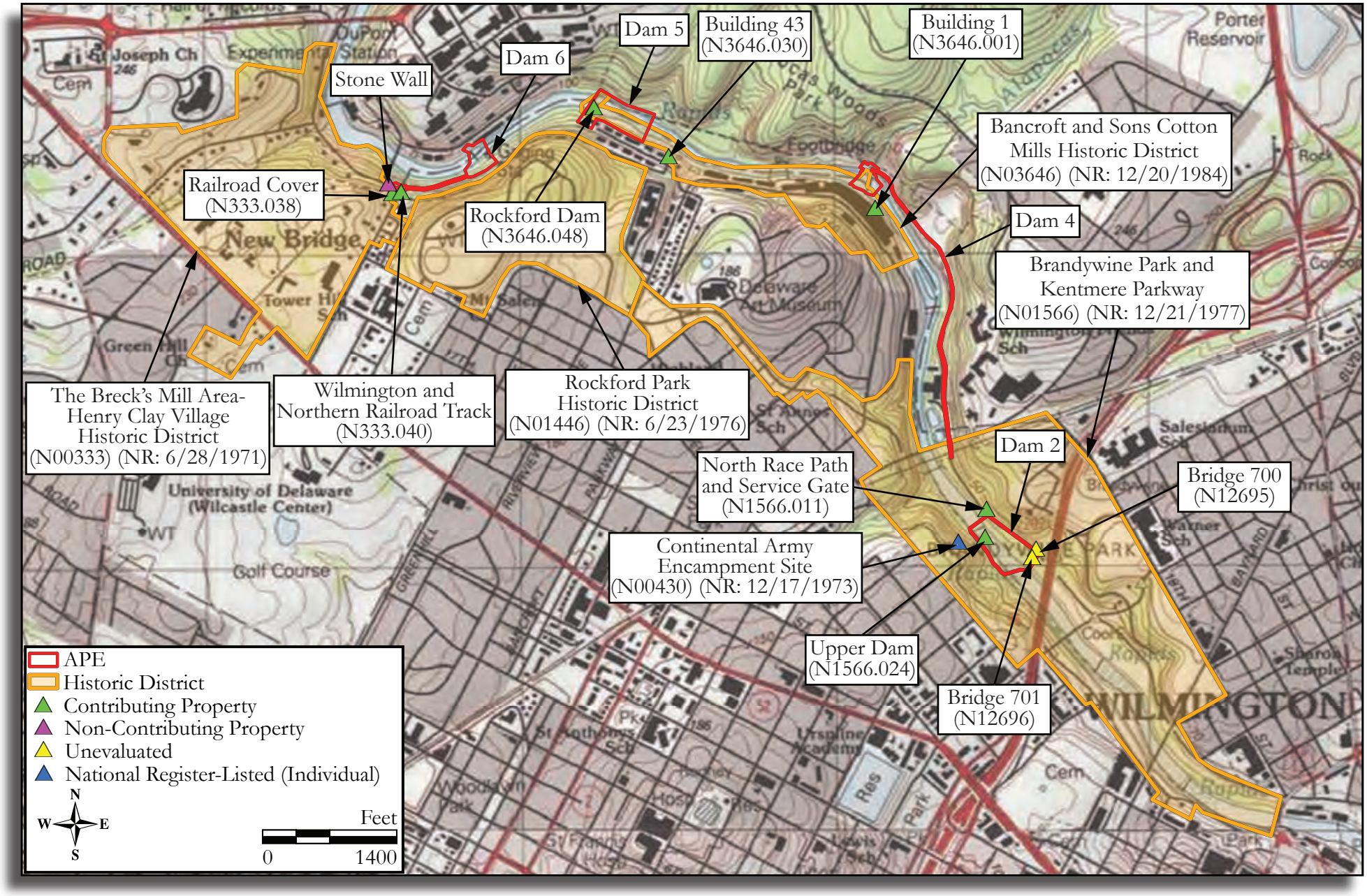

Figure 1.4: U.S.G.S. map showing historic properties within and adjacent to the APE.

2.0 PROJECT APPROACH

The goals of the Phase IA archaeological survey were to assess the sensitivity for the APE to contain archaeological resources eligible for or listed in the NRHP and to make recommendations for any further studies that may be required. A pedestrian reconnaissance survey was also conducted to aid in the archaeological sensitivity assessment of the APE. The goals of the Phase IB archaeological survey were to determine the presence or absence of archaeological resources in the Dam 4 and Dam 6 APEs based on subsurface archaeological testing and to make recommendations for any further studies, as warranted. Determinations of significance or potential significance are based on the NRHP Evaluation Criteria (see Appendix B). Background research was conducted to aid in the archaeological sensitivity assessment and enable interpretation of identified resources within the APE.

2.1 Background Research

Background research identified previously registered archaeological sites and historic properties within the APE and assessed the potential for unidentified archaeological resources within the APE. Research included a search of the Delaware DHCA's Cultural & Historical Resource Information System (CHRIS) database to identify registered archaeological sites within a one-mile radius of the APE, a review of historic resources listed or determined eligible for listing in the NRHP within or adjacent to the APE, and a review of previously completed cultural resources surveys conducted within and adjacent to the APE. Additional background research to author a land-use history of the APE included a review of environmental data, archaeological literature, and pertinent primary and secondary historical sources, including historic maps and atlases, aerial imagery, and local and county histories.

2.2 Fieldwork Methods

Fieldwork included documentation of existing conditions and the plotting of 40 shovel test pits (STPs) in areas of archaeological sensitivity within the APE. Of the 40 STPs plotted (20 STPs each at Dam 4 and Dam 6), 12 STPs were able to be excavated at Dam 4 and 18 STPs were dug at Dam 6. Shovel test pits were plotted at 15-meter intervals within the APE, and, where necessary, at closer intervals or at judgmental locations to supplement coverage. Each STP was assigned the prefix "D4" for those dug at Dam 4 or "D6" for those excavated at Dam 6 and were numbered consecutively (e.g., D4-1, D4-2, etc.). Based on existing conditions observed during fieldwork, including boulder piles, concrete surfaces, a gravel road, and utilities, 10 plotted STPs were not excavated. Shovel test pit locations were plotted using a Trimble Geo 7X sub-meter accurate handheld global positioning system (GPS) unit.

Shovel test pits measured approximately 30 centimeters in diameter and were excavated with round-nosed shovels, reaching approximately one meter below ground surface, to an impasse, or to the top of the water table. All soil characteristics were recorded on standardized field forms, including soil color, texture, and inclusions. Depths below ground surface were measured in centimeters. Individual soil horizons were separately hand excavated and screened through 1/4-inch wire mesh to facilitate artifact recovery. Upon completion, all STPs were backfilled and the ground surface was restored to its original grade. All STP profile information is presented as Appendix D. Photographs of field activities and general site views were taken.

Modern, ubiquitous, and/or non-diagnostic artifacts (e.g., plastic, modern glass, window glass, coal, coal ash, small brick fragments, slag, asphalt, etc.) were observed in a few STPs, noted, and discarded in the field. Discarded material was listed as Not Retained (NR) in the STP log (see Appendix D). Retained historic artifacts recovered during testing are detailed in an artifact catalog. No pre-Contact material was identified. Recovered material was separated by stratum/context and placed in resealable polyethylene bags with a tag containing the appropriate

provenience information. Recovered material was returned to RGA's office laboratory in Cranbury, New Jersey, to be processed and cataloged. Recovered artifacts will be provided to the Delaware State Museum following agency review of this report.

2.3 Laboratory Methods

Artifact processing consisted of cleaning and handwashing non-friable cultural material. Durable artifacts (i.e., ceramic, glass) were washed to remove residual soil and to facilitate identification. Less durable artifacts (i.e., metal and other organic materials) were carefully dry brushed to remove residues prior to identification. Artifacts were placed in archival, four-mil polyethylene zip lock bags.

All artifacts were analyzed and cataloged according to provenience, artifact group, material, artifact type, decorative or surface treatments(s), and period of manufacture (when applicable). All retained artifacts were cataloged, and an effort was made to identify and date all temporally and functionally diagnostic artifacts. The artifact catalog is included as Appendix E.

3.0 ENVIRONMENTAL CONTEXT

This section provides general environmental data for the APE. Site specific environmental data is further presented in Sections 5.0, 6.0 and 7.0 below. The APE at Dams 4, 5, and 6 is located within the Interior Swamps near the boundary of the Piedmont and Fall Line Physiographic Provinces (Grettler et al. 1996) (Figure 3.1). The geology of the APE is composed of Ordovician-age Brandywine Blue Gneiss, a formation that consists of medium to coarse-grained granulites and gneisses composed of plagioclase, quartz, orthopyroxene, clinopyroxene, brown-green hornblende, magnetite, and ilmenite (Ramsey 2005). The APE includes and lies along the banks of the Brandywine Creek. The Brandywine Creek drains into the Christiana River, which flows into the Delaware River. The Delaware River eventually empties into the Delaware Bay and the Atlantic Ocean (see Figure 1.1).

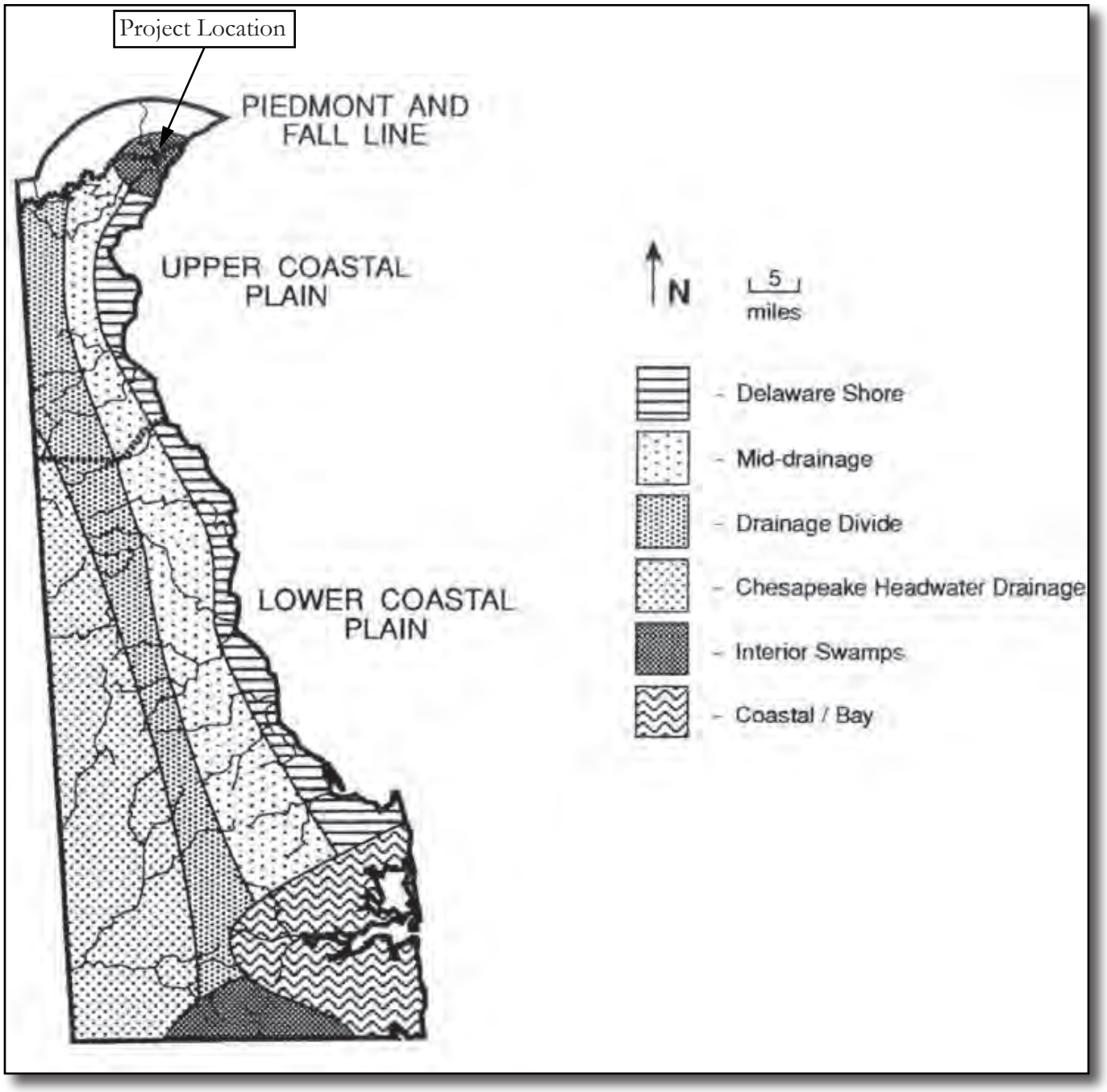

Figure 3.1: Physiographic provinces map
(adapted from Grettler et al. 1996).

4.0 CULTURAL LAND USE CONTEXT

Background research was conducted to provide appropriate cultural contexts for the broader region that encompasses the APE (see Section 2.0). The results of this research are presented below and include contextual information on the pre-Contact Native American and historic post-Contact occupations of Delaware and the Brandywine Creek drainage near Wilmington, and information on archaeological sensitivity in the region. The results of this research are presented in this section. Site-specific background research was also conducted for each dam location and includes site-specific review of historic maps and atlases, aerial photographs that depict each location, documented cultural resources in the vicinity, cultural resources surveys conducted nearby, and an assessment of archaeological sensitivity for each dam APE. Site-specific background research is presented in subsequent sections for each dam (Sections 5.0 through 7.0).

4.1 Pre-Contact Period Context

The prehistory of Delaware is generally divided into the Paleoindian (12,000 to 6500 BC), Archaic (6500 to 3000 BC), Woodland I (3000 BC to AD 1000) and Woodland II (AD 1000 to AD 1650) chronological periods based on a system devised by Custer (see, for example, Custer 1984, 1989). The following discussion briefly summarizes information regarding Delaware pre-Contact archaeology from a variety of sources (Blume et al.1990; Custer 1984, 1989, 1996; Custer and DeSantis 1986; Custer et al. 1986, 1996; Eveleigh et al. 1983; Louis Berger Group 2005; Lowery 2002; Petraglia et al. 1998, Riley et al. 1994; Weslager 1972).

The Paleoindian period extends from 12,000 BC to 6500 BC and is considered the earliest documented human occupation of the Delmarva Region. Subsistence patterns during this time included large game hunting and generalized foraging. People were highly mobile, lived in small groups, and made distinctive fluted projectile or spear points and a variety of other tools favoring high quality jasper or chert obtained from quarry or cobble sources. Later in this period, Kirk and Palmer and other corner-notched and stemmed projectile point types with increased use of other lithic materials such as rhyolite were favored. Paleoindian site settings within the Piedmont are typically associated with upland knolls adjacent to swamps and bogs and poorly drained areas, near the confluences of streams and rivers, limestone sinkholes or valleys, and sources of high-quality lithic materials such as the northern Delaware Chalcedony Complex, outcroppings of quartz in northwestern Delaware, and Iron Hill (Custer 1989, 1996; Custer and DeSantis 1985; Lowery 2002).

Paleoindian and Early Archaic sites in northern Delaware are small procurement sites situated on uplands near swampy or poorly drained areas, floodplains, and springheads. Examples include the Gabor Prehistoric Site 2 (7NC-D131[B]); site 7NC-D-70; and the Mitchell Farm site (7NC-A-2) (Custer 1989: 104; Custer and DeSantis 1985).

The Archaic period (6500 BC to 3000 BC) was a time of adaptation to Holocene environments. Tools used by Archaic people included bifurcated base and stemmed points, groundstone and plant processing tools, and more generalized toolkits. They were hunter-gatherers with increasing intensification of resource use, including shellfish and estuarine resources, forest foods (such as nuts and fruit), and small game. No fish weirs to suggest shad harvesting in the Brandywine Creek have been archaeologically identified during this time period (Lutins 1992). They also made use of a wider variety of lithic materials. Archaeological sites for this period may include both large base camps where many people lived and worked and small camps where specific activities took place or where small groups lived as part of an overall stratified riverine settlement system.

Archaic period sites are found in association with newly emergent freshwater interior swamps and marshes, such as Churchman's Marsh in northern Delaware, upland slopes near streams and bogs, springheads, and knolls near swampy floodplains (Custer and Wallace 1982; Custer 1996:158). In the Piedmont, information about the presence of Archaic period people is limited and includes small procurement sites and find spots of bifurcate points (circa 6000 BC), considered diagnostic of the Archaic period (Custer 1996: 158). Cobble resources and use of a wider variety of lithic sources have been noted during the Archaic period.

The Woodland I period (3000 BC to AD 1000) was a time of dramatic social and technological change. Possibly due to a warmer climate, populations in the area increased. Tools used during this period include broadspear points or knives; narrow-stemmed, fishtail, and other stemmed points; and plant-processing tools. New types of vessels were invented, including soapstone bowls and ceramics. During this time, indications of social change, religious ideas, and possible social ranking can be found on archaeological sites in the Delmarva Peninsula. These include mortuary ceremonialism, extensive trade networks for exotic raw materials, intensive harvesting of wild plant, marine, and game foods, along with the use of a wide variety of environments and settlement of large base camps along major streams. No fish weirs to suggest shad harvesting in the Brandywine Creek have been archaeologically identified during this time period (Lutins 1992).

The Woodland I period is divided into complexes with diagnostic artifacts. During the early part of the Woodland I period, the Clyde Farm Complex (named for the Clyde Farm site [7NC-E-6]) near Churchman's Marsh) is defined by the use of diagnostic early ceramics, steatite vessels, broadspears, and the prevalence of argillite (Custer 1989: 185). Later complexes of the Woodland I period include the Delmarva Adena Complex which is defined by the presence of Adena points, Flint Ridge chert from Ohio, Coulbourn ceramics, grave goods and exotic Adena-related artifacts, including copper, tubular pipes, and shell beads; the Wolfe Neck Complex is defined by the presence of Wolfe Neck/ Susquehanna Series ceramics, argillite, and rhyolite artifacts; and the Delaware Park Complex is defined by the presence of Hell Island ceramics and Jack's Reef points. Large base camp sites were located on the floodplains of major rivers, such as the Conowingo site on the Susquehanna River (Custer 1989: 216), while smaller micro-band sites or procurement sites are found on the slopes of knolls adjacent to low order streams, in headwater settings, near bays/basins, and upland settings (Custer 1989: 216-217; Custer and Wallace 1982). While fish resources were likely important to the diet of Woodland I period inhabitants, no fish weirs to suggest shad harvesting in the Brandywine Creek have been archaeologically identified during this time period (Lutins 1992). The lack of identified weirs may be due to the inability to identify such archaeological resources due to the frequency of water impoundment along the creek resulting from eighteenth-, nineteenth-, and twentieth-century dams.

During the Woodland II period (AD 1000 to circa AD 1650), people were living fairly settled lives, characterized by unfortified hamlets and camps. They made more use of local resources, including cobble cherts and jasper. Their hunting tools included the use of bows and arrows tipped with small, triangular projectile points. The Woodland II people can be linked to the historically known groups collectively referred to as the Lenape. They continued to use wild foods in addition to cultivars such as maize, beans, squash, and others, though this is poorly documented in the northern Delmarva. The northern portion of the Delmarva Peninsula is considered part of the Minguannan Complex, named for diagnostic incised ceramics. Large base camps are noted for portions of the Piedmont, such as the Mitchell Farm site near Hockessin (Custer and DeSantis 1985) and the Webb Site in Chester County (Custer 1989: 312; Custer and Wallace 1982). Smaller procurement sites have been found in the Piedmont on the edges of knolls and adjacent to ephemeral streams.

The Contact period (ca. AD 1650 - AD 1750), is the time of the first European contact with Native Americans in Delaware (Custer 1989; Custer and Wallace 1982). This period is further subdivided by Custer (1989) into the pre-1675 Early Contact Complex and post-1675 Refugee Complex. The Contact period began with the arrival of primarily Dutch and Swedish settlers in the early and mid-seventeenth century. Large numbers of English settlers arrived beginning in the late seventeenth century. Early Native American contact with European explorers and settlers has been documented

for the Chesapeake Bay and the Delaware Bay near Lewes, Delaware. The Upper Chesapeake Bay was visited by Captain John Smith in his second voyage in 1608 and he mapped the area and made notes about his visit (Smith 1608, 1612). Based on ethnographic accounts, Native American groups in the vicinity of the APE included bands who spoke a similar language, called the Southern Unami (Goddard 1978). They were likely to have been somewhat settled in villages at this time, relying on horticulture and continued hunting and gathering for subsistence.

Native American use of the Brandywine was certainly robust, and a large settlement was archaeologically documented along the river near the present-day boundary of Pennsylvania and Delaware. The identified village may have been Queonemysing, which existed in the late seventeenth century, though likely earlier. The name Queonemysing translates as "place where there are long fish" suggesting the village, in part, focused on seasonal fishing (Reed et al. 2019:26). Indeed, the Swedes referred to the Brandywine Creek as Fiskekylen or Fish Creek, suggesting its abundant supply of fish at the time of the Contact period (Reed et al. 2019:26). The archeological data for Native American occupation and settlement sites near the lower portions of the Brandywine are sparse, due in part to the early European colonization and subsequent landscape development as the area in and around present-day Wilmington became increasingly populated. In 1725, the Lenape of the Queonemysing, who were earlier, in 1705, able to retain land one mile on each side of the Brandywine Creek from its mouth to its West Branch, complained of Europeans illegally settling on and selling their land, stating: We are molested and our Lands surveyed out, and settled before we can reap our Corn off and to our great Injury the Brandy-wine Creek is so obstructed with Dams, that the Fish cannot come up to our Habitation" (Reed et al. 2019:28). Clearly, by 1725, the European settlement and landscape modification greatly affected the natural resources earlier used by the Lenape inhabitants during the Contact period.

Dunlap and Weslager (1960) report that seventeenth-century documents highlight Native inhabitants' use of the Brandywine Creek, not only for settlement and a transportation route, but also as part of an annual gathering that focused on fish harvesting and processing, such as shad. The gatherings may have been as extensive as those that resulted in the formation of the Abbott Farm National Historic Landmark along the Delaware River and Crosswicks Creek in New Jersey that date from the Middle to Late Woodland periods. There, archaeology reveals evidence of intensive, annual harvesting, processing, and preserving of sturgeon to provide a longevity of available food stores.

Seasonal villages and fishing along the Brandywine by the Lenape and earlier cultures would likely have resulted in the creation of several fish weirs that, if still extant, may be submerged within areas of impounded water behind extant dams that began to be created during the eighteenth and nineteenth centuries. Members of the Van der Veer family who owned land since the 1660s along the Brandywine, reported a village of 200 to 300 Native Americans who, during the spring months, gathered on the property to establish a seasonal encampment for the purpose of processing, cooking, and preserving fish and turtles gathered from the Brandywine Creek near its confluence with the Christina River during a five to six-week period (Dunlap and Weslager 1960:2). It is unclear if the village of which Van der Veer spoke was that of Queonemysing, near the present-day Pennsylvania and Delaware border or if it was a later village occupied by the same band further downstream. By the 1730s, the Lenape who inhabited the Brandywine drainage area largely relocated to the Susquehanna River and Ohio River (Reed et al. 2019:29).

4.2 General Historic Overview

In accordance with state guidelines, the following historic overview was divided into chronological periods as set forth in the Delaware Comprehensive Historic Preservation Plan (DeCunzo and Catts 1990; Herman et al. 1989). In this section, the previously described APE is referred to as the "project location" due to the imprecision of locating the exact APE boundaries on historic maps of various scales.

Exploration and Frontier Settlement, 1630-1730 ±

The vicinity of the project location was settled in the early seventeenth century with occupations concentrated along the Delaware River. There, European inhabitants relied on hunting, fishing, and trade for subsistence. In 1638, the New Sweden Company built Fort Christina in what is now part of the City of Wilmington to the south, and the Dutch West India Company built Fort Casimir in present-day New Castle (De Cunzo and Catts 1990: 29). After 1680, William Penn made land grants to primarily Quaker and Presbyterian immigrants from England, Wales, and Ireland who began farming the area and established some of the early roads (DeCunzo and Catts 1990; Herman et al. 1989: 1-2). Mills, including saw and grist mills, were established during this period, but they were infrequently erected (Goodwin 1986; Herman et al. 1989:3). In the 1720s, Samuel Kirk purchased an old barley mill and the surrounding lands from the family of Swedish colonist Tymon Stidman. The Stidham family owned the land on the south side of the Brandywine Creek and, there, constructed a barley mill sometime prior to 1687. The lands on the opposite side of the creek were owned by a Dutchman, Jacob Vandever. Samuel Kirk formed the Kirk Company to raise funds to build a new dam and mill.

Intensified and Durable Occupation, 1730-1770 ±

During this period, farmers in the area increased agricultural production for subsistence and for sale in local village markets and markets in Wilmington, Philadelphia, and Baltimore. New and expanded roads enabled farmers to move their crops to local and regional markets. Development in and around Wilmington increased during this period and, prior to the city receiving its charter in 1740, Wilmington was known as Willingtown (Goodwin 1986). The construction of the Brandywine Bridge in 1760 led to development along the north bank of the Brandywine Creek, an area that previously had been relatively undeveloped (Hoffecker 1974: 26). This growth included the excavation of mill races and the establishment of flour mills along the north bank of the creek by Joseph Tatnall who, along with his sons-in-law, Thomas Lea and James Price, bought land from Tobias Vandever in 1770. In addition to mills, Tatnall and others invested in shipping and shipbuilding, which were important commercial activities in the area along with milling and coopering (Goodwin 1986: 70, 75; Hoffecker 1974; Kruse 1970; Kruse and Norton 1976; Scharf 1888).

Early Industrialization, 1770-1830 ±

In 1777, the Continental Army set up an encampment in Wilmington, along Lovering Avenue near Broom Street, before the Battle of Brandywine. After the Continentals lost the battle, the British Army formed an encampment on the lands that currently contain the Wilmington Cemetery (Wangenheim 1777; Goodwin 1986).

By the early nineteenth century, Wilmington's economy became increasingly reliant on the grain milling and grist sale and transportation. In just 100 years, from 1730 to 1830, the population of Wilmington grew from 600 people to over 5,000 (Goodwin 1986). By 1802, Wilmington was well established, and several mills existed along the Brandywine Creek in Brandywine Village (Jones and Moore 1802). Early nineteenth-century population growth, spurred by early industrialization, led to an increased need to supply Wilmington's citizens with an adequate water supply. Prior to 1805, all water was acquired through the use of wells and water redirected from nearby springs. This proved to be inadequate to supply the growing population, and pipes were installed to draw water from the Brandywine Creek. In 1827, a pumping station was established on the south side of Brandywine Creek to draw larger quantities of water and combat the growing water shortage issues (McVarish 2014:18-25).

Industrialization and Early Urbanization, 1830-1880 ±

Between 1830 and 1880, Wilmington's population exploded from just over 6,000 to almost 43,000 (Goodwin 1986) and the city continued to expand across the Brandywine Creek. In addition to milling, four major industries that thrived in Wilmington during this time were shipbuilding, rail car building, carriage making, and tanneries (Goodwin 1986). Another important development was the construction of the Wilmington and Baltimore Railroad to the southeast of Wilmington. During the 1830s, businessmen from Philadelphia, Wilmington, and Baltimore began the process of connecting the three large cities by rail. Each city believed that the creation of the railroad would increase the business and production within their respective city. A company, called the Wilmington and Susquehanna

Railroad, was subsequently formed and granted a charter to lay track in Wilmington. The Wilmington and Susquehanna Railroad later merged with the Philadelphia, Wilmington, and Baltimore Railroad (Hoffecker 1974).

Urbanization and Early Suburbanization, 1880-1940 ±

During the late nineteenth and early twentieth century, the population of Wilmington and surrounding hundreds continued to increase. Polish, Italian, Russian, and Greek immigrants, who clustered together in small communities, each brought new customs to the area (Goodwin 1986). The new immigrant population provided a steady supply of labor to old and new businesses. Wilmington became one of the largest manufacturers of Moroccan leather and railroad cars. Shipbuilding remained an important part of the economy through World War II. However, Wilmington became best known for its chemical companies led by the DuPont Company (Goodwin 1986).

During the 1880s, the population of Wilmington continued to spread northeast. Between 1883 and 1895, the Wilmington Park system was created along the Brandywine Creek and included the present-day Brandywine Park (Goodwin 1986). Originally called Brandywine Glen, the banks of the Brandywine Creek had long been an area used by Wilmington's and neighboring hundred residents as a respite from the crowded city streets (Division of Historical and Cultural Affairs 1979). In 1886, the first land purchases were made, and Samuel Canby was hired to design the park layout. Although Fredrick Law Olmstead, the prominent landscape architect who designed New York City's Central Park, was not hired to help with the design of Brandywine Park, Olmstead was consulted about the project. Many of Olmstead's ideas were incorporated into the park's design and included a curved, landscaped parkway. Roads, paths, and walks were created that blended into the natural park surroundings with primary importance being the preservation of the creek and the mill races (Division of Historical and Cultural Affairs 1979).

Beginning in the 1890s, the mill races that ran parallel to Brandywine Creek delivered water to Wilmington's Waterworks. By the twentieth century, polluted water from Rattlesnake Run that drained into the Brandywine Creek was inadvertently transferred to the waterworks via the former mill races (Chase 1999). This problem was solved in 1902 when a new drainage system was created that collected the runoff and released it into the Brandywine, below the mouth of the mill race (Chase 1999). Polluted ground water was also abated by the construction of new sewer systems between 1895 and 1915, which resulted in the closure and filling the city's privies. Many of the major streets were paved during this period and a new trolley system was constructed in 1912 that connected many parts of the city (Goodwin 1986).

The industrial history of Wilmington and nearby areas was based on a system where the industries were locally owned and laborers resided in nearby dwellings. However, during the early twentieth century, industry shifted to big businesses, such as the DuPont Company, with highly educated workers who lived in and commuted from the nearby suburbs (Goodwin 1986).

Suburbanization and Early Ex-urbanization, 1940-1960 ±

After World War II, the population of Wilmington, as well as its industrial base and nearby areas, began to decline. Service jobs in industries, such as financial services, insurance, corporate management, and research and development, began to increase. During this time, Interstate 95 was constructed, which bisected Wilmington and divided neighborhoods (Goodwin 1986).

4.3 Archaeological Sensitivity

The assessment of archaeological resources sensitivity is based on the potential for archaeological sites to exist in a given area based on the presence of nearby sites, environmental correlates, information from historic mapping, and the sensitivity of that area for intact cultural resources. In areas where no sites are documented, the sensitivity for pre-Contact resources is based primarily on environmental correlates. The sensitivity for historic resources is usually determined through analysis of historic sources and historic cartographic materials.

Pre-Contact Archaeological Sensitivity

Archaeological evidence indicates that the Mid-Peninsular drainage divide zone was occupied from the Paleoindian period to the present (Custer 1984, 1989 1996). The most well-documented period of occupation may have been the Woodland I and II periods, but sites are also known from the Paleoindian and Archaic periods. Available data suggests that the majority of pre-Contact sites consist of procurement sites usually situated in close proximity to water with larger sites found near the confluences of higher order streams especially in zones with multiple resources readily available. Environmental factors that affect pre-Contact site location generally include topography, proximity to water sources, and quality of soil drainage. Pre-Contact sites occur more commonly on well-drained, level terrain in proximity to freshwater sources or wetlands.

Historic Archaeological Sensitivity

Historic archaeological sensitivity, which is based on models of Colonial, Federal, and Early Industrial period land uses, is ranked as high near documented historic occupation and within 300 feet of early transportation routes and as low in areas with little record of historic land development. The presence of standing historic structures indicates a high probability for associated historic archaeological sites. Information obtained from cartographic evidence also contributes to assessments of historic archaeological sensitivity. While early historic maps do not depict historic structures with accuracy, nineteenth-century maps often record details of settlement pattern, ownership, and occupation. The presence of historic roads documented on historic maps also increases the potential for historic sites. From an environmental perspective, the factors contributing to pre-Contact archaeological sensitivity often apply to early historic archaeological sensitivity as well.

5.0 DAM 4

5.1 Environmental Setting

The APE is located at the convergence of Brandywine Creek and Alapocas Run. The topography is generally level, and the elevation of the floodplain terrace adjacent to the creek is approximately 65 feet amsl (see Figure 1.1). Soils mapped within the APE primarily consist of Neshaminy Montalto silt loams, 25 to 45 percent slopes, very stony (NvE). These soils are typically well-drained and are located on hillslopes. Soils classified as the Delanco-Codorus-Hatboro complex, 0 to 8 percent slope, flooded (DcB), are mapped in the southern portion of the APE, along the southernmost portion of the APE's access road where no ground disturbance is proposed. Delanco-Codorus-Hatboro soils are poorly drained and moderately well-drained soils located in stream terraces and floodplains (Natural Resources Conservation Service [NRCS] 2016; Table 5.1; Figure 5.1).

Table 5.1: Soils classified within the Dam 4 APE (based on NRCS 2016).

Name	Soil Horizon Depth (in inches)	Texture and Inclusions	Slope	Drainage	Landform
Neshaminy Montalto silt loams, 25 to 45 percent slopes, very stony (NvE)	A: 0-6 BE: 6-17 Bt1: 17-32 Bt2: 32-59 BC: 59-80	A: Silt loam BE: Silt loam Bt1: Silt loam Bt2: Channery silt loam BC: Very channery loam	25-45%	Well-drained	Hillslopes
Delanco-Codorus-Hatboro complex, 0 to 8 percent slopes, flooded (DcB)	Delanco: Ap: 0-7 E: 7-13 Bt1: 13-19 Bt2: 19-27 BC: 27-39 C: 39-72 Codorus: Ap: 0-9 Bw1: 9-18 Bw2: 18-30 C1: 30-54 C2: 54-65 Hatboro: A: 0-9 Bg1: 9-27 Bg2: 27-44 Cg1: 44-56 Cg2: 56-70 Cg3: 70-78	Delanco: Ap: Silt loam E: Silt loam Bt1: Silty clay loam Bt2: Clay loam BC: Clay loam C: Clay to loam Codorus: Ap: Silt loam Bw1: Silt loam Bw2: Loam C1: Loam C2: Loam Hatboro: A: Silt loam Bg1: Silt loam Bg2: Silt loam Cg1: Sandy clay loam Cg2: Gravelly sandy loam Cg3: Stratified gravelly sandy loam	0-8%	Delanco: Moderately well-drained Codorus: Moderately well-drained Hatboro: Poorly drained	Delanco: Stream terraces Codorus: Floodplains Hatboro: Floodplains

The APE is primarily open with manicured grass park areas, bordered by deciduous trees and heavily vegetated, and consists of deciduous trees and thick underbrush along the creek. North Park Drive is a partially paved and partially gravel road that provides access to the APE.

5.2 Historic Map, Atlas, and Aerial Review

In this section, the previously described "APE" is referred to as the "project location" due to the varied scales used on historic maps and atlases.

Between 1750 and 1751, Thomas Gilpin I constructed a dam, mill race, grist mill, and sawmill in the vicinity of the project location, although the exact location of the mill complex is unknown. The property was passed to Gilpin's nephew, Thomas Gilpin II, after his death in

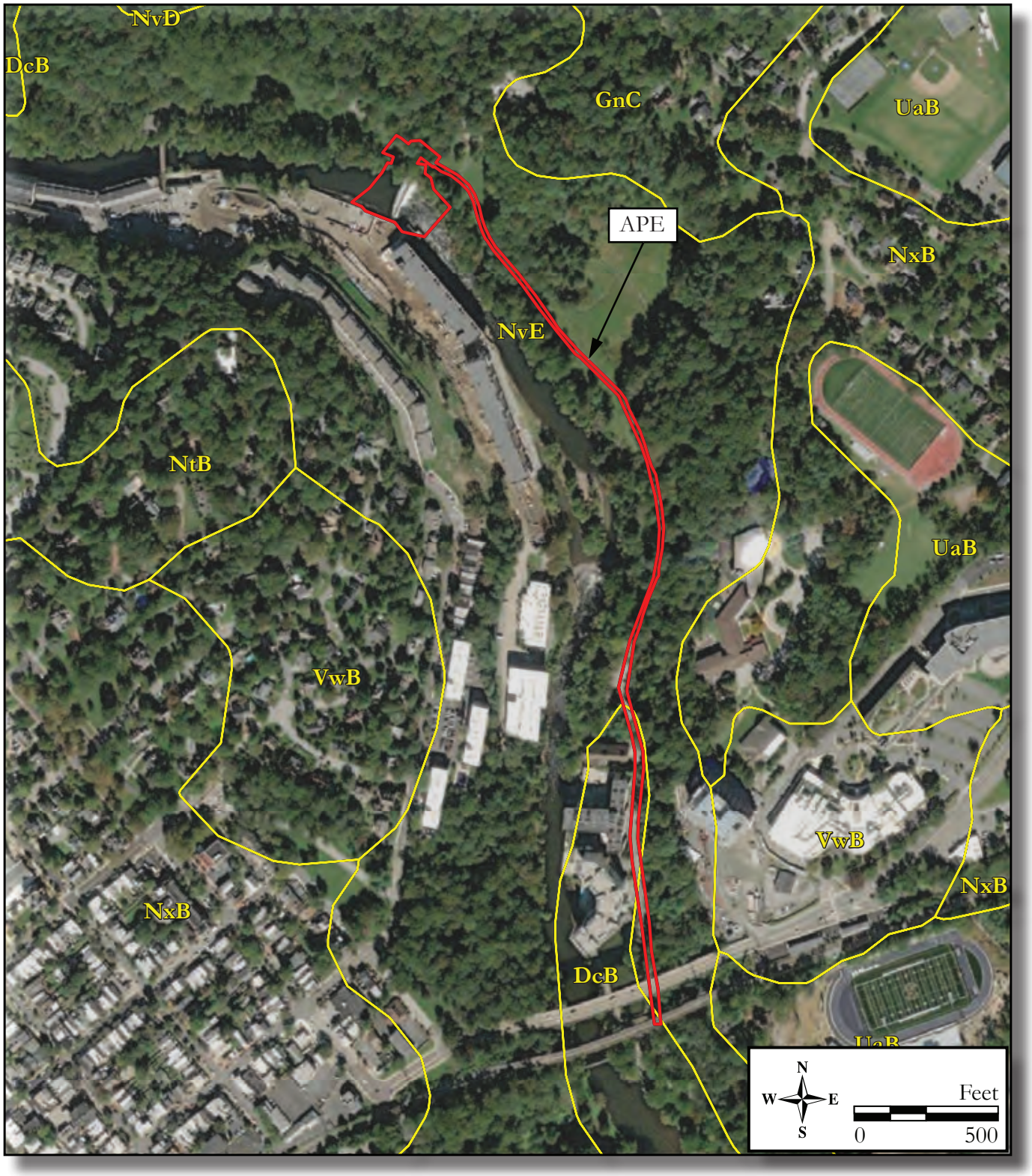

Figure 5.1: Aerial photograph and soils map for Dam 4 APE.

1766. Thomas Gilpin II's father-in-law, Joshua Fisher, constructed a snuff mill in 1766 under the name "Gilpin and Fisher Snuff Mill." The estate was divided between Thomas Gilpin II's sons, Thomas Gilpin III and Joseph Gilpin, when he was exiled to Winchester, Virginia, after being suspected of "disloyal tendencies" during the American Revolution (Barni 2021a).

The snuff mill was converted into a paper mill in 1787, the first in Delaware, and the Gilpin Mills were established in the vicinity of the project location. The mill complex was known by a variety of names (Joshua Gilpin and Company, Thomas Gilpin and Company, Gilpin and Company), although it was locally known as the Brandywine Paper Mill. An 1816 map of Wilmington mill seats depicts an earlier mill dam in the rough location of Dam 4, with a raceway along the southern bank of the creek that appears to have powered four wheels (Fairlamb & Read 1816; see Figure 5.2).

In 1816, Thomas Gilpin III patented the first endless papermaking machine in the United States, which revolutionized the industry and by 1817 the new machinery was installed at the mill. Milling operations at the Brandywine Paper Mill briefly included a woolen mill (1812-1814) and cotton milling was introduced in late 1821. A flood caused major damage to the cotton factory and paper mill in 1822 (Barni 2021a).

An 1822 map of Delaware depicts the project location with a faint indicator of the Brandywine Paper Mill on the south side of the creek (Carey 1822; see Figure 5.3). A large fire damaged the mill in 1825, effectively putting the Gilpins out of business. In 1829, the Brandywine and Christiana Manufacturing Company assumed control of milling operations that included the manufacture of cotton, woollen, paper, flax, and more. The company operated the mill complex until 1845, when it was sold to John B. Newman, who in turn sold it to Henry Lawrence and James Riddle (Barni 2021a). An 1849 map shows that land on the south side of the Brandywine Creek, adjacent and to the south side of the project location, was attributed to the Riddle & Lawrence's Factory (Rea and Price 1849; see Figure 5.4). This complex included several structures, including two indicators for industrial structures along the creek, adjacent and to the south of the project location. James Riddle & Sons constructed a five-story weaving mill in 1850. A map of the Riddle mill complex as it stood in 1866 is depicted on Figure 5.5 (Hexamer 1866), and a map of New Castle County from 1868 illustrates the project location adjacent to the large industrial and residential complex associated with the mills (Beers 1868; see Figures 5.6a and 5.6b). By 1869, the company was renamed Brandywine Cotton Mills. An 1870 photograph shows a mill dam present in the creek next to the complex, which predates the present-day dam (Maybin 1870a; see Figure 5.7). An 1881 map of Delaware depicts the project location adjacent to the "Riddle Son & Co Brandywine Cotton Mills" with no nearby structures shown on the opposite bank (Hopkins 1881; see Figure 5.8). The Brandywine Cotton Mills was operated by the Riddle family until 1895, when it was sold to Joseph Bancroft & Sons (Barni 2021a).

Joseph Bancroft purchased an unused grist mill and machine shop at the site of the former short-lived Rockford Manufacturing Company, on the western bank of the Brandywine Creek and immediately north of the Gilpin's paper mill (Barni 2021a; Boatman 1957:80). Bancroft consolidated property purchased from William Young (owner of Rockford Manufacturing Company) and a portion of the Brandywine Mill Seat Company. After taking control of the property in 1831, Bancroft replaced the dam, enlarged the raceway, and improved the waterwheel, establishing the Rockford Bleaching & Dye Works as his first mill. A January 1839 flood destroyed the boiler house and mill dam, which were rebuilt. The Bancroft Mills added finishing, bleaching, and calendering to its operations around 1859. In 1866, the firm was retitled Joseph Bancroft & Sons when he named his children, William and Samuel Jr., as co-partners. One of the mills partially burned in 1870. In 1896, the mill dam was rebuilt by the Bancroft company, and Dam 4 (the Kentmere/Bancroft II Dam) was constructed near the location of a prior dam (Barni 2021a). The earlier dam is visible on Hopkins' 1881 map (see Figure 5.8). An 1892 map illustrates Bancroft's mill complex (Figure 5.9). In 1889 the firm was renamed Joseph Bancroft & Sons Company, and in 1895, the Brandywine Cotton Mills (the James Riddle Cotton Mill and Gilpin Paper Mill) were purchased and added to the Bancroft empire. By 1930, the company was the largest cotton dyeing and finishing company in the world, and by the mid-twentieth century, they were the last remaining textile industry still located on the Brandywine (Barni 2021a).

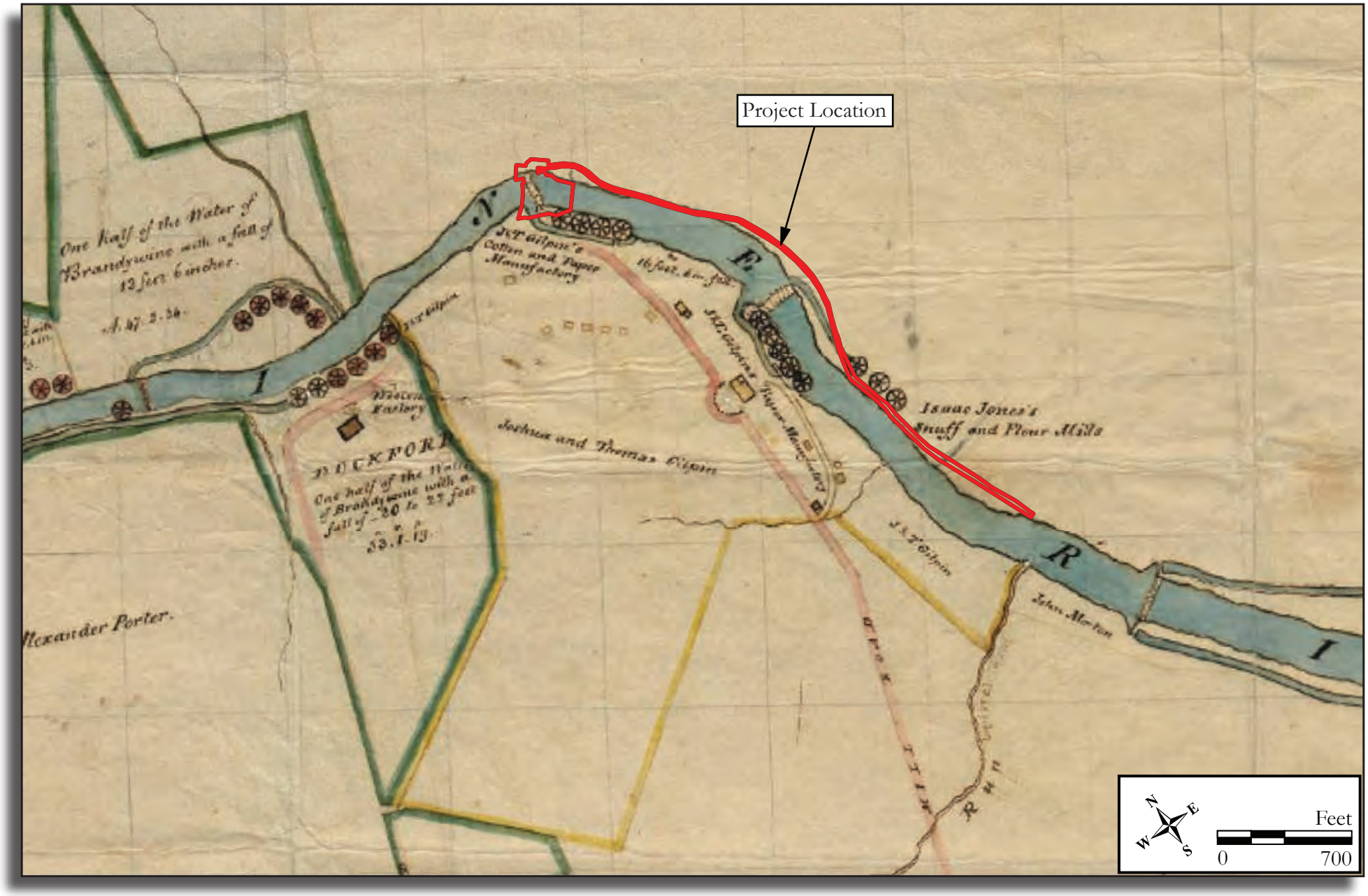

Figure 5.2: 1816 Fairlamb & Read, *Mill Seats on the Brandywine River.*

Figure 5.3: 1822 M. Carey, *Delaware, from the best of Authorities.*

Figure 5.4: 1849 S. Rea and J. Price, *Map of New Castle County, Delaware.*

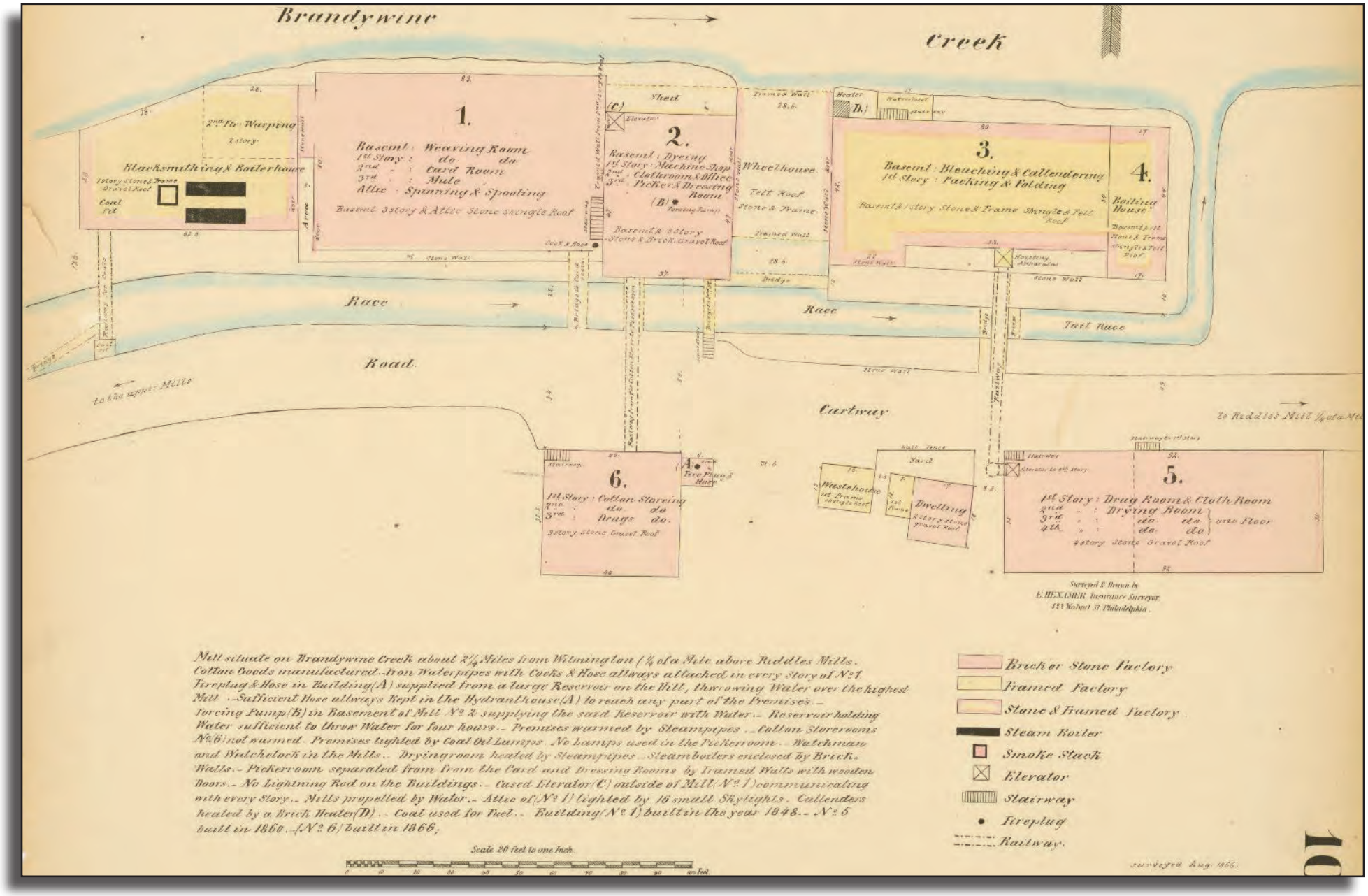

Figure 5.5: 1866 Hexamer General Survey, *James Riddle & Sons Cotton Mills.*

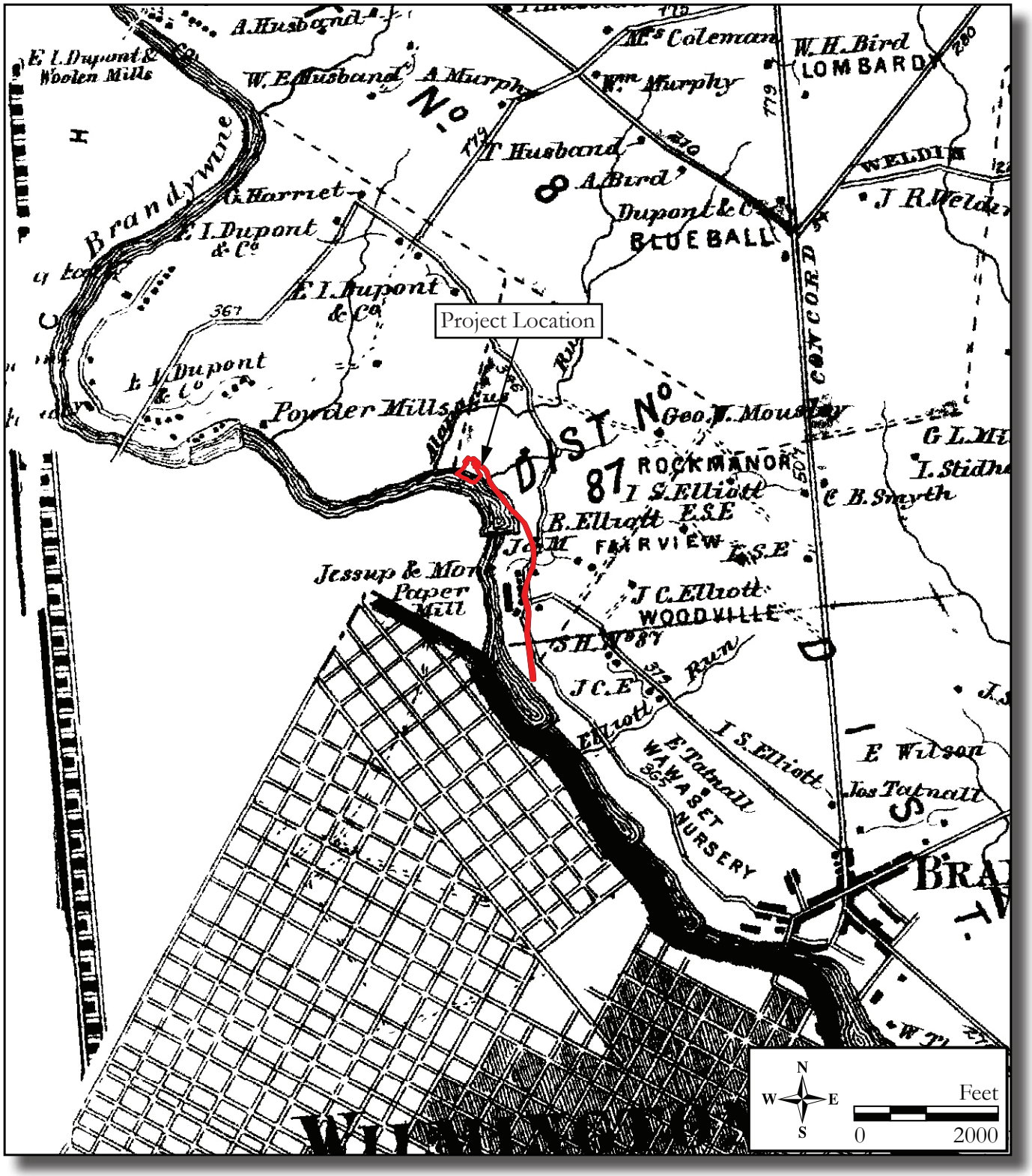

Figure 5.6a: 1868 D.G. Beers, *Brandywine, New Castle Co Del.*

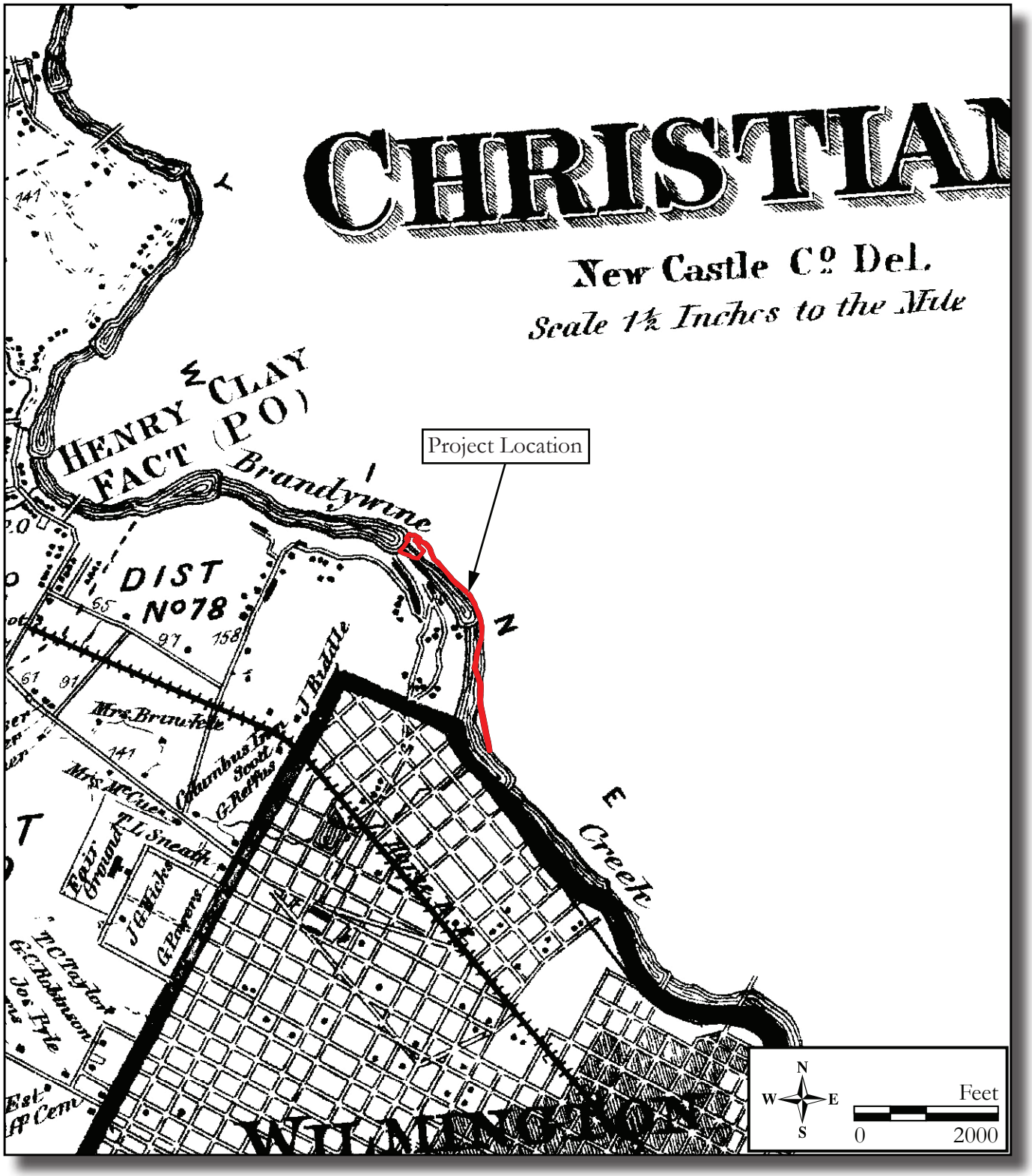

Figure 5.6b: 1868 D.G. Beers, *Christiana, New Castle Co Del.*

Figure 5.7: Bancroft Dam on Brandywine Creek in 1870
(Maybin 1870a).

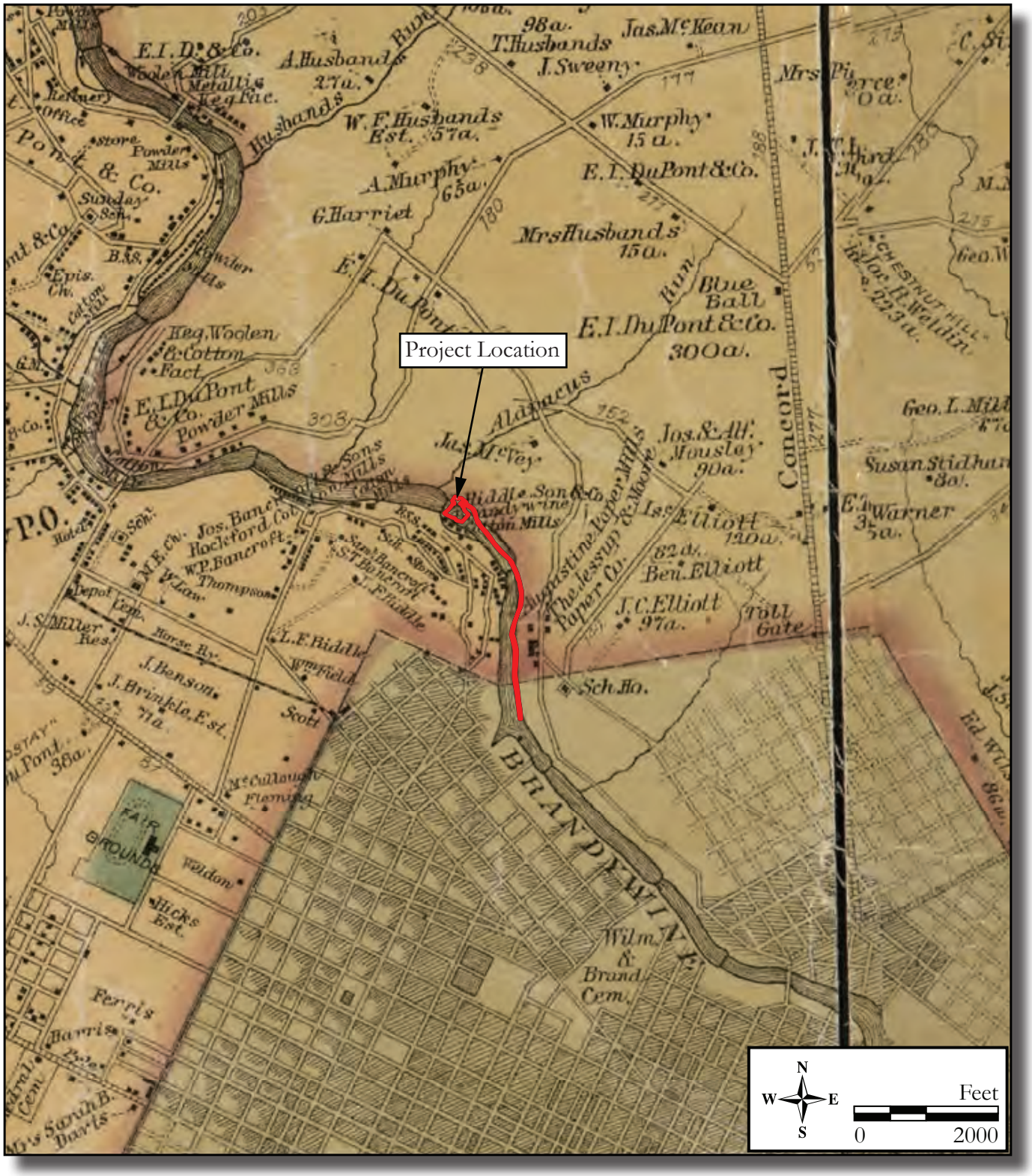

Figure 5.8: 1881 G.M. Hopkins & Co., *Map of New Castle County, Delaware.*

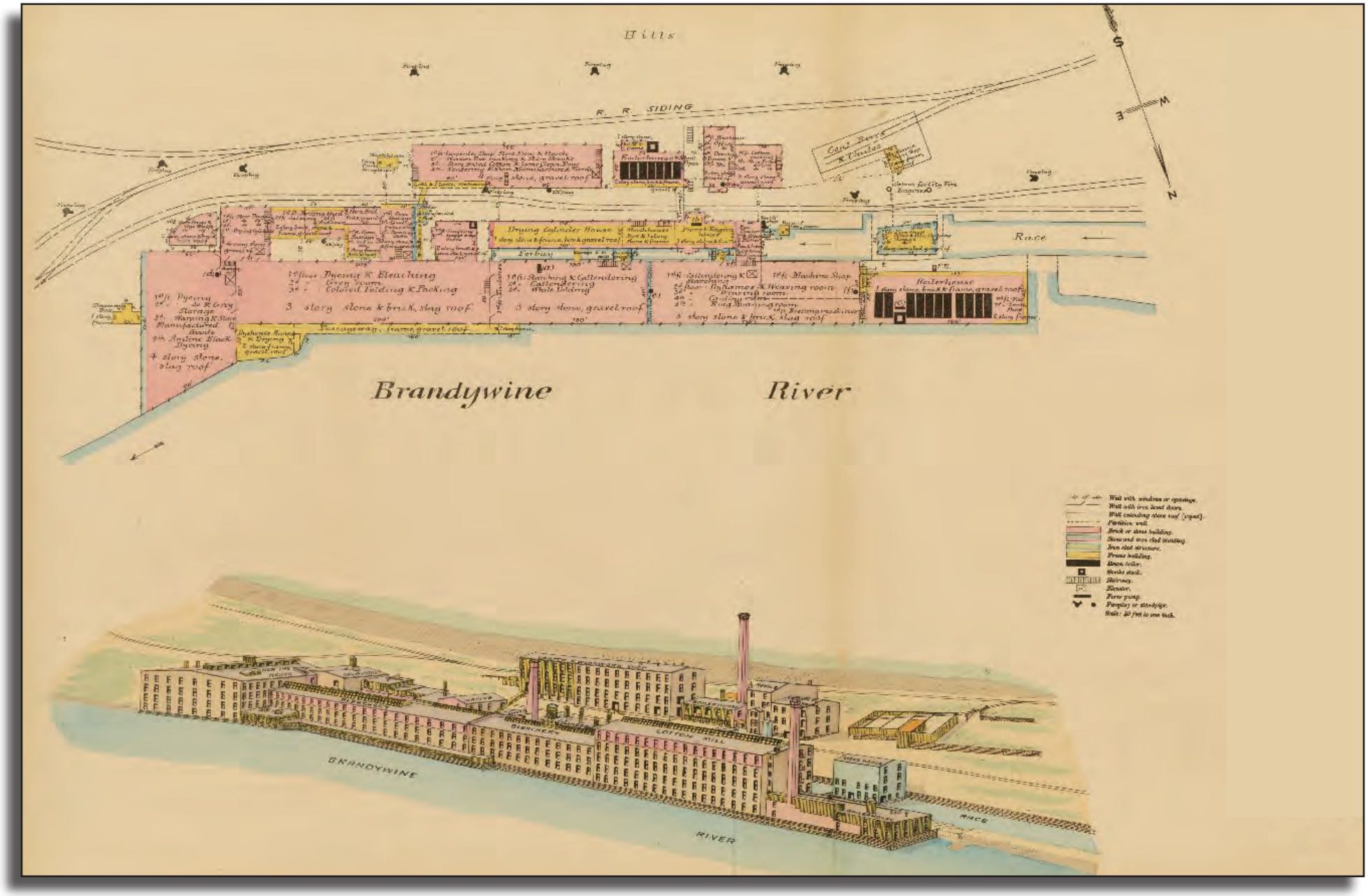

Figure 5.9: 1892 Hexamer General Survey, *Joseph Bancroft and Sons Co.*

Examination of early to late twentieth-century U.S.G.S. maps reveals that a railroad was constructed on the north and east bank of the creek by 1901, likely as a feeder line for a nearby quarry (see Figure 5.10; U.S.G.S. 1901). A 1912 photograph of the project location depicts the Kentmere portion of Bancroft Mills; Dam 4; and railroad tracks related to quarrying by Locke & Company, Brandywine Granite Company, and others during the late nineteenth and early twentieth centuries (see Figure 5.11). The railroad remained extant for much of the twentieth century and was removed between 1987 and 1997 (U.S.G.S. 1987, 1997). By 1997, the former location of the railroad was converted into an asphalt-paved access path.

The Bancroft complex is visible adjacent and to the south of the project location in 1912 and 1937 aerial photographs, which also depicts the long access road to the project location from Park Drive and a mill complex-related building on the north bank, connected by a structure that crossed over the creek. This structure was adjacent and to the south of the present-day access road, outside of the project location limits of disturbance. The project location on the northern bank of the creek appears mostly wooded on the 1937 aerial photograph (NETR 1937). Very little discernible change in the area is demonstrated in historic aerial photography from the rest of the twentieth century and into the twenty-first (NETR 1950; 1953; 1954; 1965; 1970; 1981; 1982; 1992; 2002; 2006; 2007; 2009; 2010; 2011; 2012; 2013; 2015; 2017). The Joseph Bancroft & Sons Company ceased operations at the site in 1961, and the mills changed hands several times during the mid- to late twentieth century. Textile operations ceased in 2003. Portions of the Bancroft Mills were redeveloped into condominiums in 2015, and as of March 2021, several new condominiums and housing developments have replaced the historic mill buildings adjacent to the mill dam (Barni 2021a). Between 2017 and 2018, the structure that crossed over the creek from the mill-complex was demolished (NETR 2017; 2018).

5.3 Summary of Previous Research

Registered Archaeological Sites

No registered archaeological sites are present within or adjacent to the APE. Several registered archaeological sites are mapped on the Delaware-CHRIS within a roughly one-mile radius of the APE. All mapped archaeological sites are greater than 3,117 feet from the APE. The majority of registered sites are related to the nineteenth and twentieth-century residential and industrial development of Wilmington. Three pre-Contact site components were identified within the search radius, at the Alapocas Run Site (7NC-B-013), Augustine Cutoff Site (7NC-B-049), and the Ronald McDonald House Site (7NC-B-054) (Table 5.2). The Alapocas Run Site yielded a Bare Island type projectile point, which broadly dates from the Middle Archaic to the Middle Woodland period (Custer 2001:25), and Archaic and Woodland period components were identified at the Ronald McDonald House Site. These pre-Contact sites were all located on subtle uplands situated near wetlands and/or tributaries.

Cultural Resources Surveys

A Phase IA reconnaissance-level historic architecture survey was conducted by CHAD for the proposed project's effects on the 1895 Dam 4 (Barni 2021a). The survey concluded that the APE encompasses two above-ground resources: the Kentmere/Bancroft II Dam (Dam 4) and a circa-1970 fish ladder. The dam is within the Bancroft and Sons Cotton Mills Historic District (N03646) (NR: 12/20/1984), and due to the fact that a significant portion of the structures in this historic district have been demolished, an intensive-level survey was recommended for the dam. The fish ladder was considered unlikely to be eligible for listing on the NRHP, but because it is going to be demolished, a full set of CHRIS forms was recommended to document the resource. The Phase II architectural investigation conducted by CHAD recommended Dam 4, the Kentmere Dam, as eligible for listing in the NRHP under Criteria A and C (Morrissey, Emmons, and Stowell 2022).

The northern portion of the APE falls within the survey boundaries of the Brandywine Valley Scenic River and Highway Study (New Castle County Department of Planning 1987). The survey resulted in an inventory of historic sites in the Brandywine River Valley. The survey did not identify any historic resources within the APE.

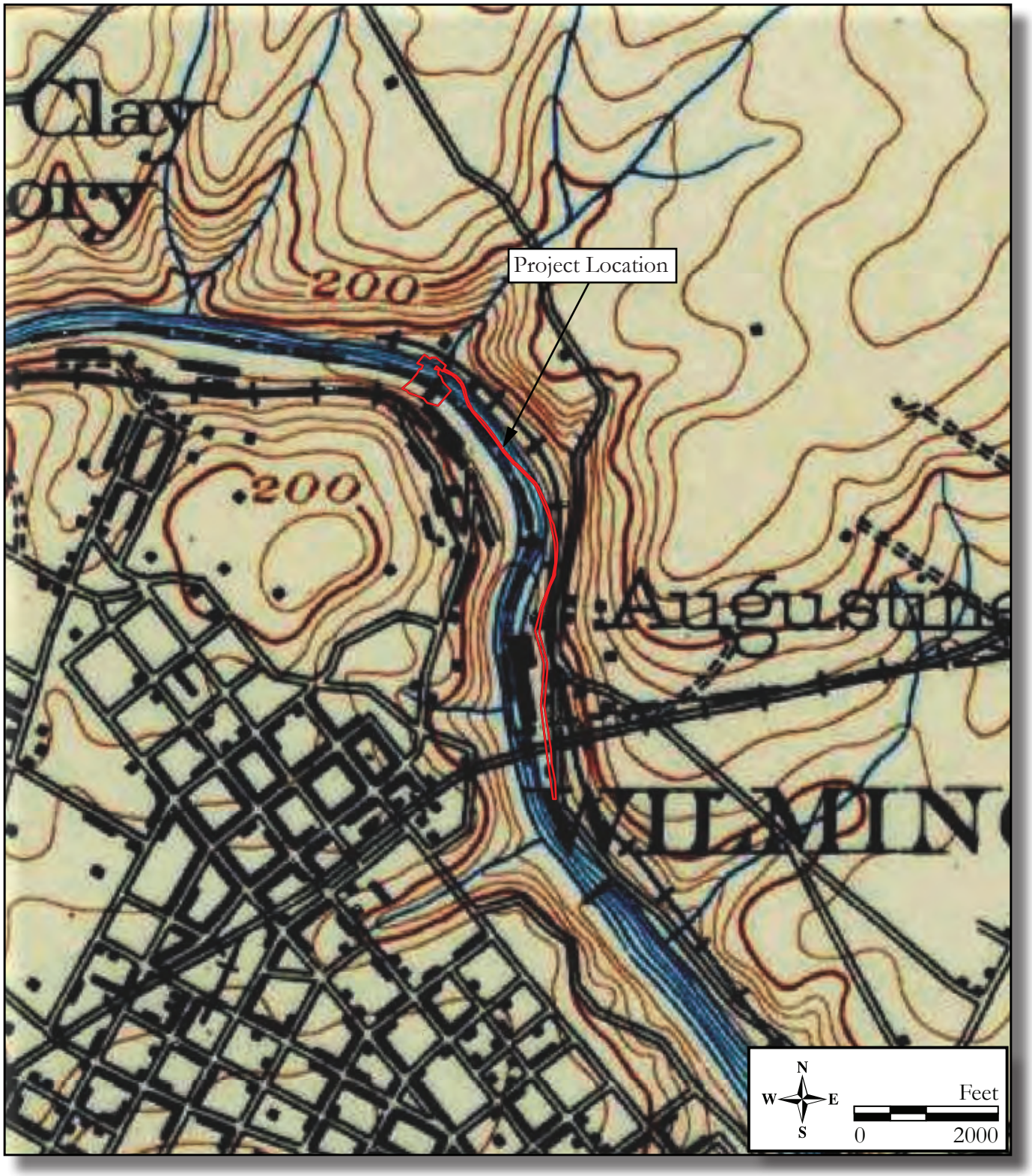

Figure 5.10: 1901 U.S.G.S. 15' Quadrangle: West Chester, PA-DEL.

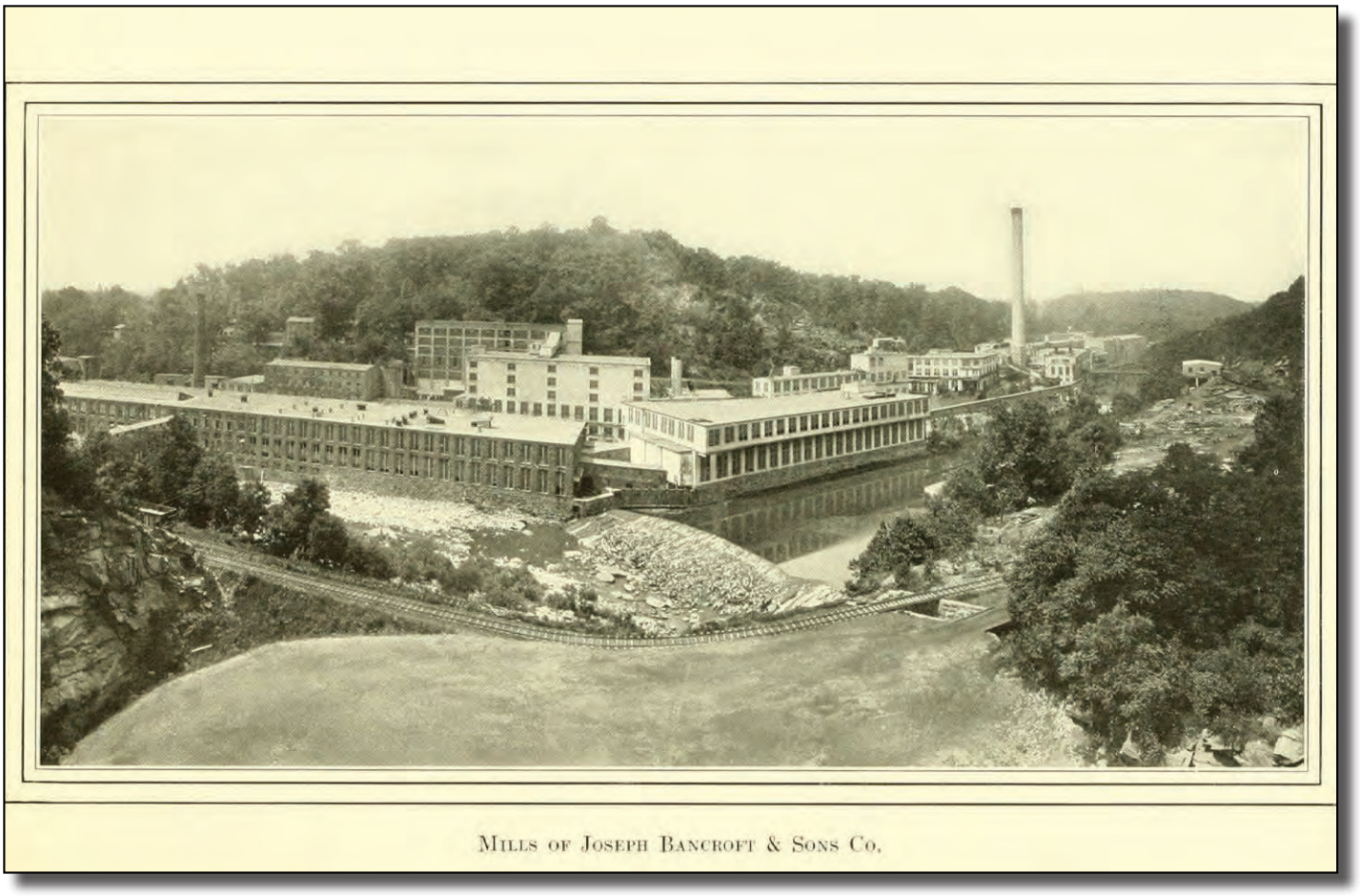

Figure 5.11: Mills of Joseph Bancroft and Sons Co. (MacElree 1912).

Table 5.2: Registered archaeological sites within a one-mile radius of the Dam 4 APE.

CRS #	Site #	Site Name	Distance from the Project Area in Feet	Distance to Water Source in Feet	Time Period	Site Type
N542	7NC-B-022	Blue Ball Tavern	4,987	Alapocas Run/ 787	Historic: 18th through 20th century	Former tavern, demolished
N4048	7NC-B-050	Du Pont Dairy	4,757	Alapocas Run/ 755	Historic: built 1930s	Brick dairy barn and small milk house
N13717	7NC-B-049	Augustine Cutoff Site	4,446	Alapocas Run/ 1,493	Pre-Contact and Historic	Quartz biface; open cistern and a surrounding scatter of rubble and domestic artifacts
N13776	7NC-B-051	Bottle Dump Site	3,215	Brandywine Creek/1,148	Historic: ca. 1900	Trash dump associated with nearby historic houses
N4313	7NC-B-067	Elliot Archaeological Site	4,101	Alapocas Run/ 2,526	Historic: late 18th/ early 19th to 20th century	Farmstead
N6929	7NC-B-068	Smyth Archaeological Site	4,724	Alapocas Run/ 2,772	Historic: late 18th/ early 19th to 20th century	Domestic residence
N10939	7NC-B-010	Smithy Site	5,118	Alapocas Run/ 1,017	Historic: 19th and 20th centuries	Surface concentration of historic artifacts
N10941	7NC-B-013	Alapocas Run Site	4,921	Alapocas Run/ 115	Pre-Contact	Lithic scatter, Bare Island style projectile point included
N494	7NC-B-016	Bird, A. House (Beers)	4,659	Alapocas Run/ 492	Historic: built ca. 1860-1870	Farmhouse
N13785	7NC-B-054	Ronald McDonald House Site	5,069	Alapocas Run/ 1,312	Pre-Contact: Archaic and Woodland	Lithic scatter
N544	7NC-B-041	Murphy, George, House	5,135	Husbands Run/ 2,264	Historic: built ca. 1840	Farmhouse

CRS= Cultural Resources Survey

An archaeological investigation was conducted adjacent and to the north of the APE for the proposed dualization of Route 141 (Thunderbird Archeological Associates 1989). The survey resulted in the identification of 23 archaeological sites and the recommendation that nine sites should be investigated further. The potentially significant sites included the remains of nineteenth-century textile worker housing, mill worker housing, and a small farm. No sites were identified within the current APE.

An archaeological management plan for the City of Wilmington determined that the APE may be located in an area where Paleoindian, Archaic, and Woodland period Native Americans may have lived. The APE falls outside the main areas of early historic period settlement between 1630 and 1730, as well as just outside the 1830 core limits of the city (Goodwin 1986).

National and State Register Files

In the NRHP files and on the Delaware CHRIS database, Dam 4 is erroneously called the Rockford Dam (N03646.048). The Rockford Dam is actually situated at the location of Dam 5, was initially constructed in 1878, and is considered a contributing element of the NRHP-listed Bancroft and Sons Cotton Mills Historic District (N03646) (NR: 12/20/1984) that encompasses the APE (see Figure

1.4). CHAD has contacted the DHCA about this discrepancy, and, as of the drafting of this report, is awaiting a reply. The Bancroft Mills is a collection of industrial buildings along the southern bank of the Brandywine Creek related to textile milling. Dam 4, known as the Kentmere Dam/Bancroft II Dam, was constructed in 1896 by the Joseph Bancroft & Sons Company and is individually eligible for the NRHP under Criteria A and C for its significance at the local level (see Appendix A). Under Criterion A, it is significant for its association with the industrial development along the Brandywine, specifically the textiles industry. Bancroft & Sons Company became the word's largest textile finishing company by the early twentieth century and introduced various innovative processes and synthetic materials to the market. Under Criterion C, Dam 4 is significant for its vernacular construction of a descending ramp, bowed, stone apron dam, which was later augmented in circa 1940 by a straight stone and concrete dam. In addition to the aforementioned historic district, the southern tip of the APE is located within the NRHP-listed Brandywine Park and Kentmere Parkway Historic District (NR: 7/23/1981).

5.4 Field Reconnaissance

Archaeological reconnaissance was performed by Sean McHugh on October 22, 2021 (Plates 5.1-5.7; Figure 5.12). The APE is accessed by an existing 3,290-foot-long paved/gravel road that runs primarily through gently sloped, wooded areas with a cleared roadside (see Plate 5.1). The northern portion of the APE, situated away from the creek, consists of a cleared, manicured grass lawn (see Plate 5.2). Areas adjacent to the Brandywine Creek consist of dense overgrowth and rocky slopes (see Plates 5.3 and 5.4). Dam 4, known as the Kentmere Dam/ Bancroft II Dam, is located in the center of the APE and is the main focus of the proposed disturbances (see Plate 5.5). A large stone retaining wall is located adjacent to the dam on the northern bank, through which Alapocas Run empties into the Brandywine Creek (see Plate 5.6). A bridge over the structure carries the access road over the tributary. A series of concrete and metal structures and walkways associated with the Rockford Dam lie along the Brandywine Creek's northern bank (see Plate 5.7). A concrete encased sewer line is situated along the north bank of the creek and a concrete technical fishway (abandoned) is located adjacent to the north side of the dam (Figure 5.12; see Plate 5.3).

5.5 Assessment of Archaeological Sensitivity

The northern bank of the Brandywine Creek within the project location primarily consists of level terrain adjacent to the river. Based on the regional model of pre-Contact site location in similar settings, undisturbed areas on the northern bank of the creek within the APE outside of the existing concrete technical fishway and below grade sewer line are assessed with a high sensitivity for pre-Contact archaeological resources (see Figure 5.12).

The upland portion of the APE is adjacent to Dam 4, which is a contributing element of the NHRP-listed Bancroft and Sons Cotton Mills Historic District that encompasses the APE. Due to the presence of nearby historic resources, the northern bank of the creek outside of the existing concrete technical fishway and below grade sewer line is assessed with a high sensitivity for historic archaeological resources (see Figure 5.12). Further, given the potential for earlier dam remains upstream of Dam 4 and the age of Dam 4, the dam and upstream portion of the creek have a high sensitivity for significant submerged dam remains. Dam 4 also may have the potential to provide information about dam construction methods employed during the 1870s.

5.6 Subsurface Testing Results

Archaeological testing was completed by field director Ted Gold and field archaeologists Dawn Cheshaek, Scott Kachelries, Alex Seng, and Gio Palumbo on May 25-27, 2022 (see Figure 5.12). The survey effort included the excavation of 12 STPs at 15-meter and closer intervals in unpaved

portions of the APE (see Figure 5.12; Appendix D). Originally, 16 STPs were plotted within the APE at 15-meter intervals, four STPs were excavated at 7.5-meter intervals around STP D4-8 to further investigate identified artifact deposits, and eight STPs were not excavated due to boulder piles along the creek's banks or paved concrete surfaces.

The stratigraphy identified in STPs primarily consisted of disturbed soils and imported fills. No STPs included a natural soil profile at grade, and one STP (D4-1) identified a potential buried A-horizon beneath 32.5 centimeters of secondary contexts. The possible buried A-horizon yielded no artifacts. Two STPs demonstrated a truncated subsoil and no buried topsoil (STPs D4-8N and D4-8S). No artifacts were found in the truncated subsoil. All other STPs had modern fill deposits to the base of the STP that appears to be associated with twentieth-century landscaping, infilling, and re-deposited soils associated with a circa-1901-to-1987 railroad line (see Plate 5.8). A total of 65 artifacts was retained (see Appendix E). The fill layers encountered primarily yielded coal and coal ash, likely the result of re-deposition of railroad-related fill soils (see Appendices D and E). Other railroad-related hardware found consists of three railroad spikes. Whiteware, yellowware, redware, stoneware drain pipe, vessel and window glass, rubber, wire nails, early to late twentieth-century bottle glass, and miscellaneous metal were also recovered (see Appendix E). No intact rail bedding, sleepers, or gauges were identified during testing. The re-deposited soils and artifacts are not indicative of an intact archaeological site. No pre-Contact Native American or early historic artifacts were recovered, and no intact cultural features were identified in the upland portion of the APE.

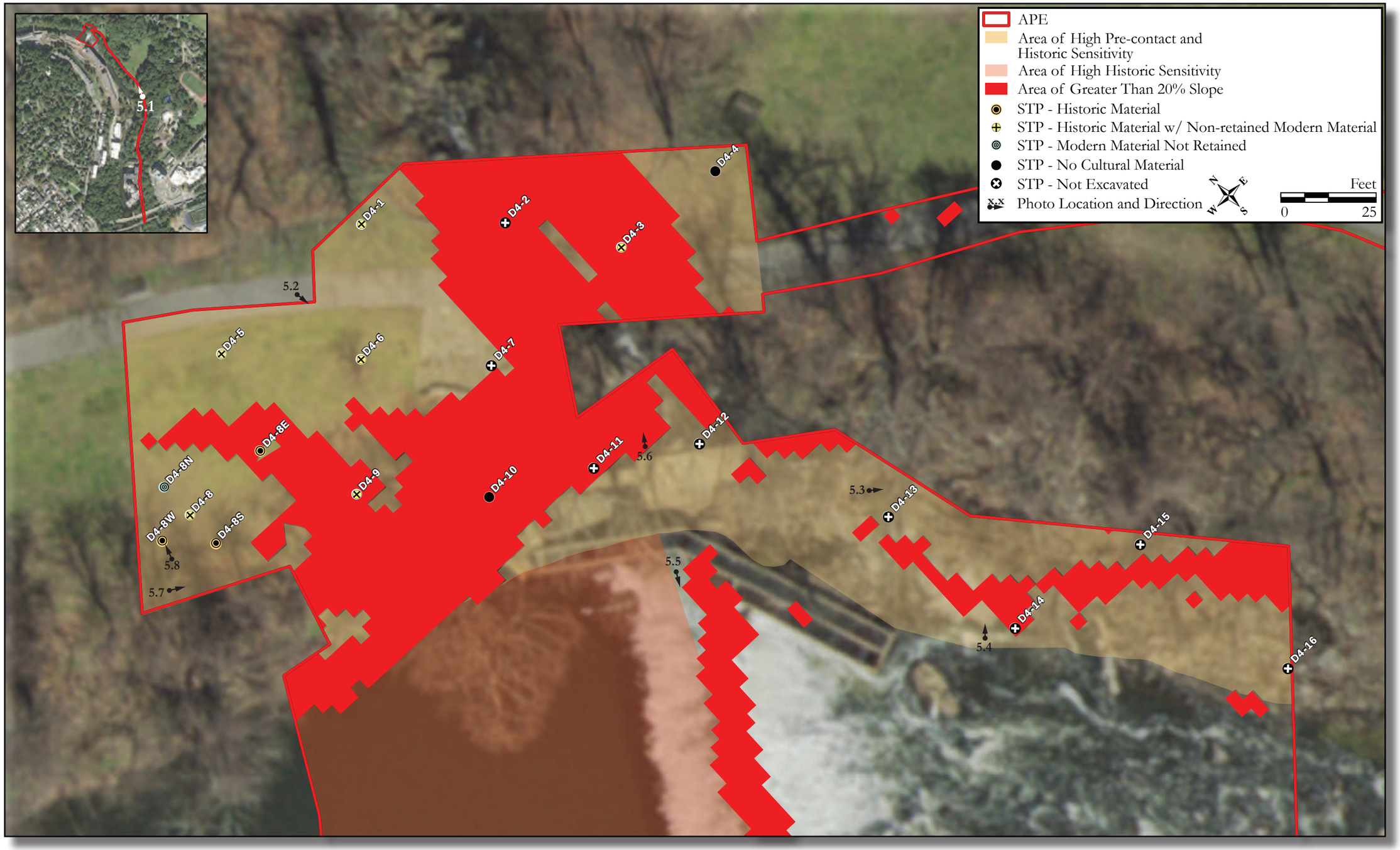

Figure 5.12: Aerial photograph of the Dam 4 APE showing photograph locations, areas of archaeological sensitivity, and STP locations and results.

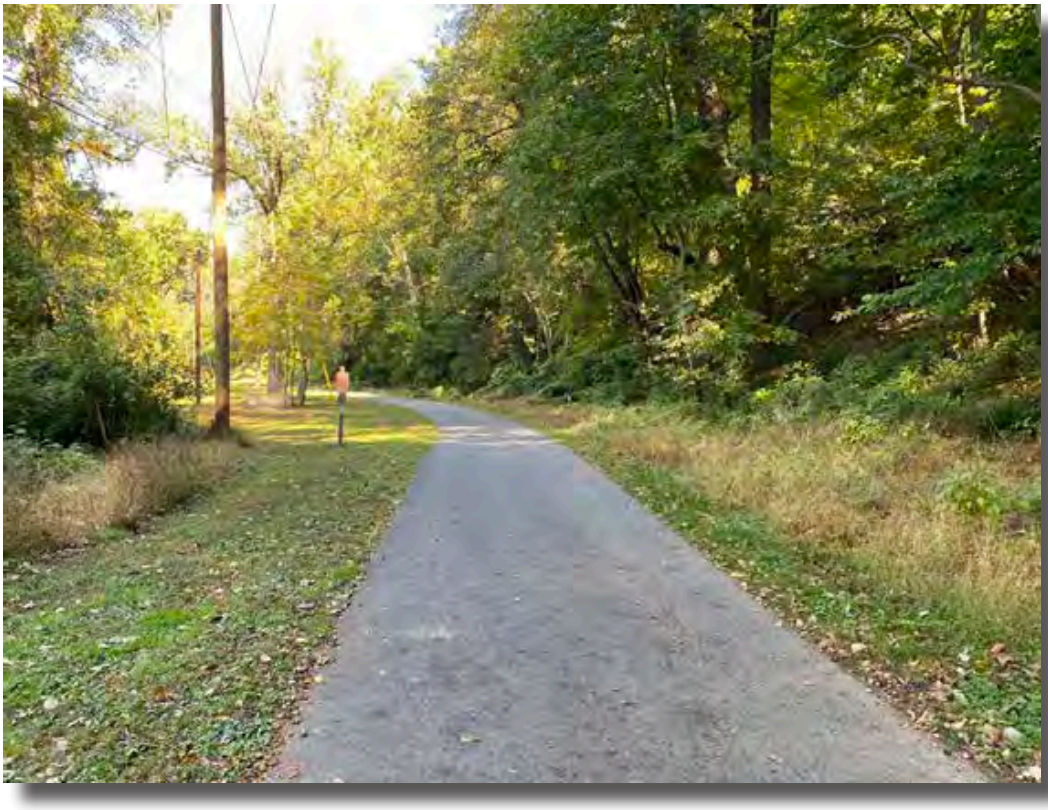

Plate 5.1: Overview of paved access road to Dam 4 APE.

Photo view: North

Photographer: Sean McHugh

Date: October 22, 2021

Plate 5.2: Overview of manicured grass lawn on northern bank of the Brandywine Creek.

Photo view: South

Photographer: Sean McHugh

Date: October 22, 2021

Plate 5.3: Overview of rocky slopes and the concrete-encased sewer line and manhole on the north bank of the creek.

Photo view: Southeast

Photographer: Sean McHugh

Date: October 22, 2021

Plate 5.4: Overview of dense vegetation, concrete sewer line manhole, and a rocky slope on the north bank of the creek.

Photo view: Northeast

Photographer: Sean McHugh

Date: October 22, 2021

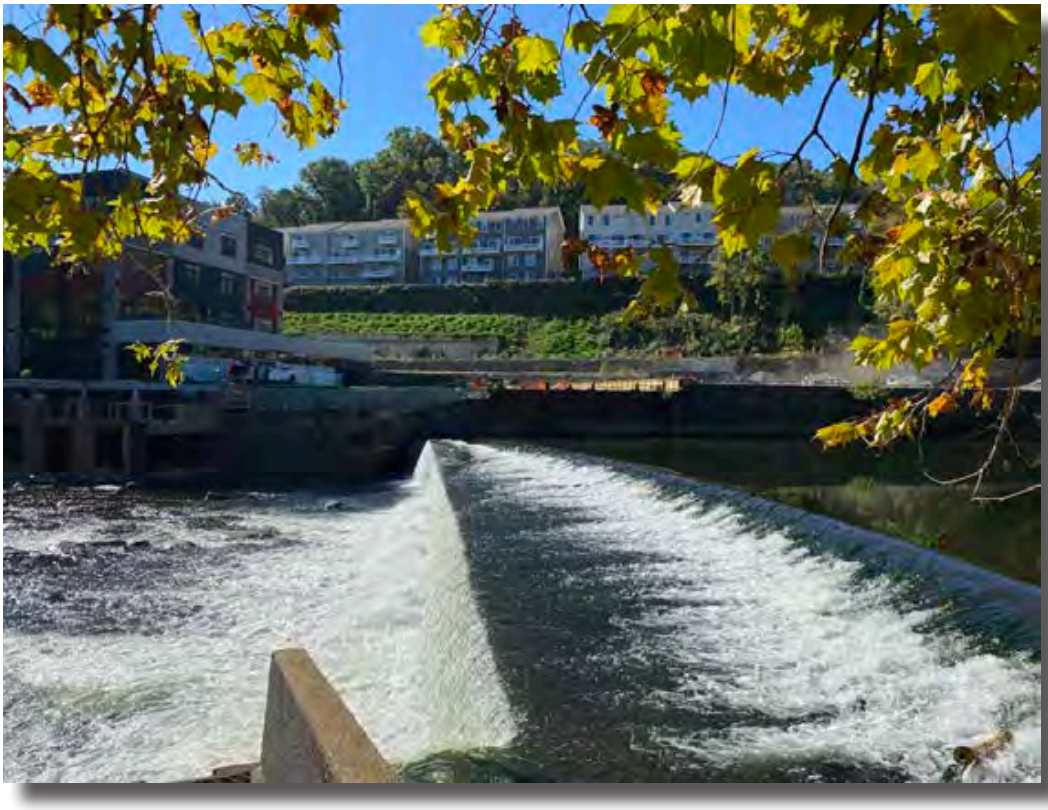

Plate 5.5: Overview of Dam 4.

Photo view: Southwest

Photographer: Sean McHugh

Date: October 22, 2021

Plate 5.6: Overview of stone structure at the mouth of Alapocas Run.

Photo view: North

Photographer: Sean McHugh

Date: October 22, 2021

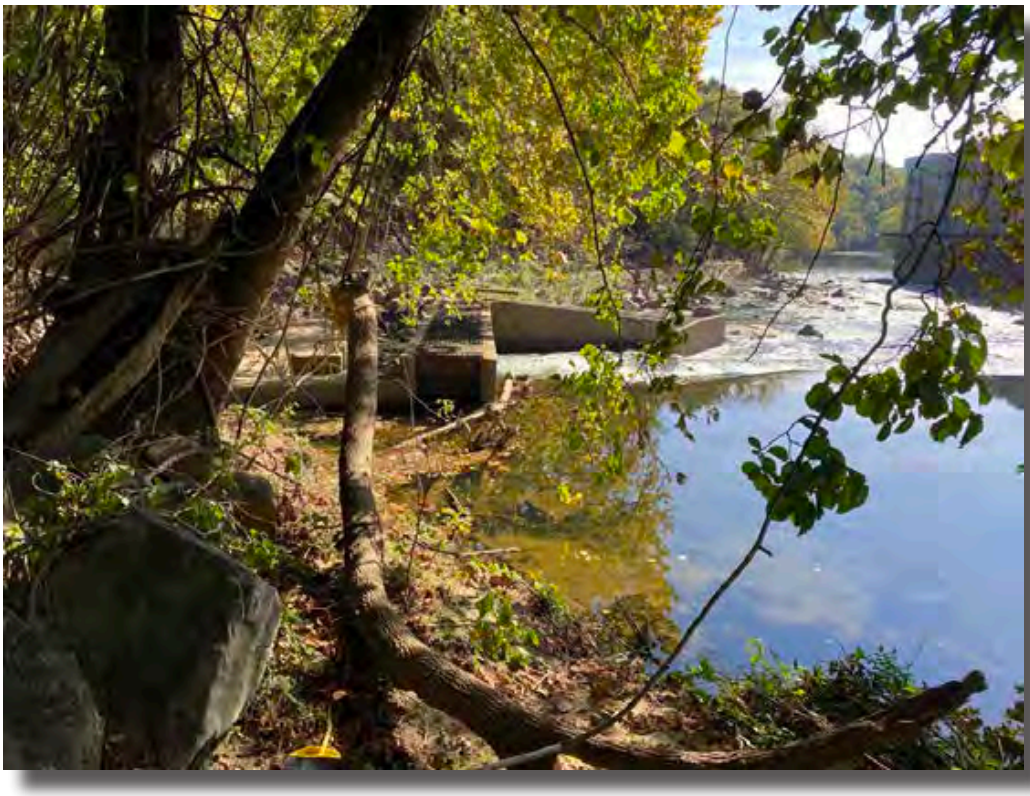

Plate 5.7: Overview of an abandoned concrete technical fishway and a concrete encased sewer line on the north side of Dam 4.

Photo view: Southeast

Photographer: Sean McHugh

Date: October 22, 2021

Plate 5.8: View of STP D4-8W soil profile.

Photo view: North

Photographer: Ted Gold

Date: May 26, 2022

6.0 DAM 5

6.1 Environmental Setting

The topography is relatively level on the banks of the Brandywine Creek in the APE (see Figure 1.1). Soils mapped within the APE consist of Neshaminy Montalto silt loams, 25 to 45 percent slopes, very stony (NvE). These soils are typically well-drained and are located on hillslopes (Natural Resources Conservation Service [NRCS] 2016; Table 6.1; Figure 6.1).

Table 6.1: Soils classified within the Dam 5 APE (based on NRCS 2016).

Name	Soil Horizon Depth (in inches)	Texture and Inclusions	Slope	Drainage	Landform
Neshaminy Montalto silt loams, 25 to 45 percent slopes, very stony (NvE)	A: 0-6 BE: 6-17 Bt1: 17-32 Bt2: 32-59 BC: 59-80	A: Silt loam BE: Silt loam Bt1: Silt loam Bt2: Channery silt loam BC: Very channery loam	25-45%	Well-drained	Hillslopes

The APE is somewhat densely vegetated and consists of deciduous trees and thick, woody underbrush on the northern bank. The southern bank consists of manicured grass.

6.2 Historic Map, Atlas, and Aerial Review

In this section, the previously described "APE" is referred to as the "project location" due to the varied scales used on historic maps and atlases.

An 1816 map of mill seats in Wilmington shows that there may have been a dam in the project location at this time, and four mills are depicted in the vicinity of the project location on the north side of the creek, as well as a raceway on the south side of the creek (Fairlamb & Read 1816; Figure 6.2). An 1822 map of Delaware does not depict any major milling or industrial enterprises in the vicinity of the project location, although the state overview map likely did not mark evidence of smaller milling operations (Carey 1822; Figure 6.3). On a map from 1849, the project location is depicted near a presently filled tributary that once emptied into the Brandywine Creek from the north (Rea and Price 1849; Figure 6.4). The earlier mills depicted on the 1816 map are not depicted on the 1849 map. A small raceway is also shown on the south side of the creek, which passes through an apparent mill just outside of the project location to the southeast. The 1868 atlas illustrates the DuPont powder mills in or adjacent to the north side of the project location (Beers 1868; Figure 6.5a). By 1868, development had also started to the south of the project location, along present-day Brandywine Falls Road (Figure 6.5b). These structures are attributed to the Joseph Bancroft & Sons Rockford Cotton Mills on an 1881 map of the county (Hopkins 1881; Figure 6.6). In 1878, the Bancroft company rebuilt a dam that had earlier existed and was later owned, operated, or utilized by the Rockford Cotton Mills. The dam is referred to as the Rockford/Bancroft I Dam. Beyond the dam, no other structures are depicted within the project location on the 1881 map.

Very little change is shown on twentieth-century aerial photography of the project location. A 1932 photograph depicts the dam and norther creek bank at that time (Figure 6.7). From 1937 to 2018, the project location consisted of Dam 5 in the Brandywine Creek with wooded areas along its banks, as well as a large raceway diverted by the dam and flowing eastward along the creek's southern bank. The raceway conveyed water to power the Bancroft Mills complex to the southeast. A row of buildings and circular tanks were situated outside of the project location on the south side of the mill raceway in the 1930s and early 1970s (NETR 1937, 1950,

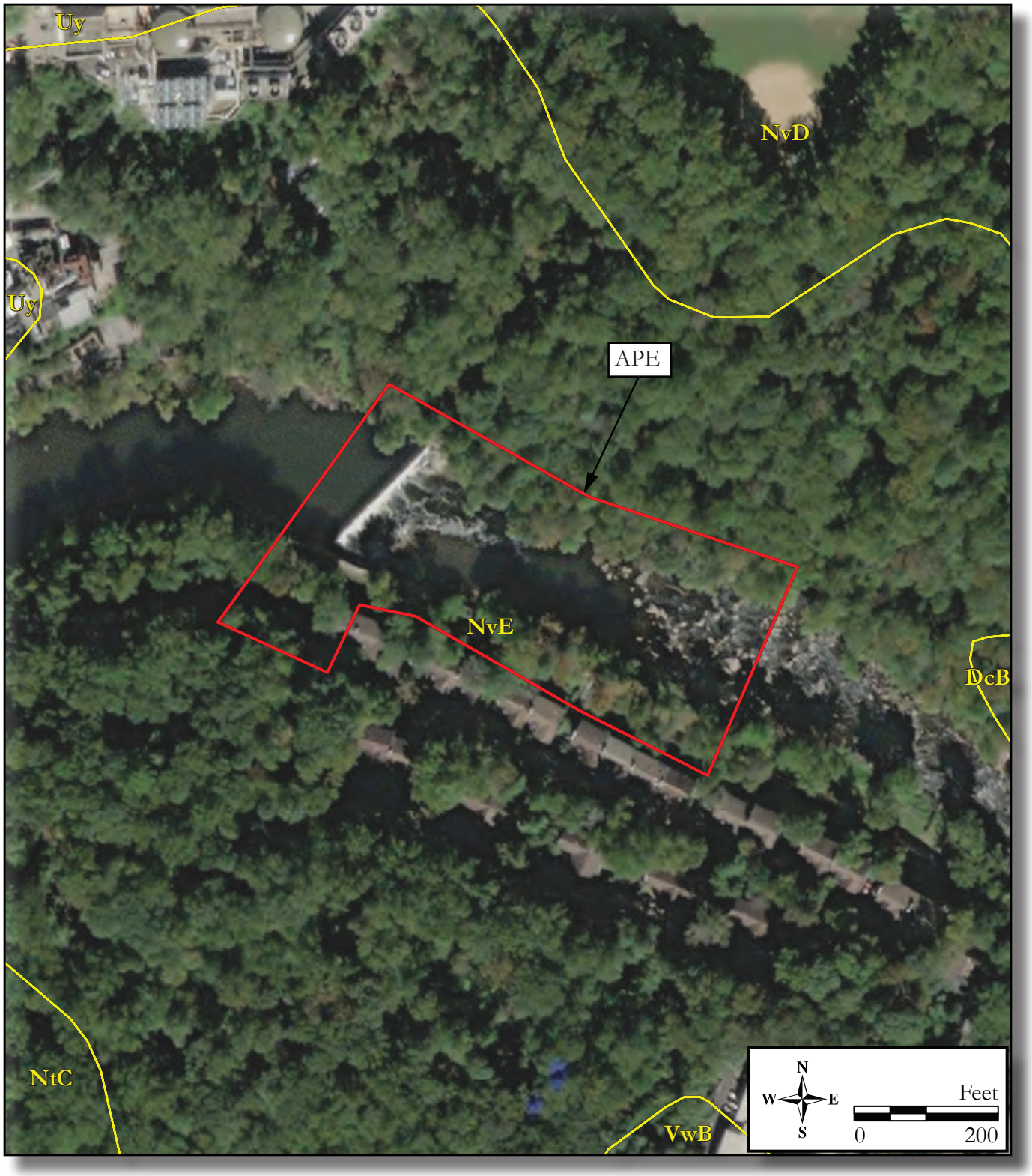

Figure 6.1: Aerial photograph and soils map for Dam 5 APE.

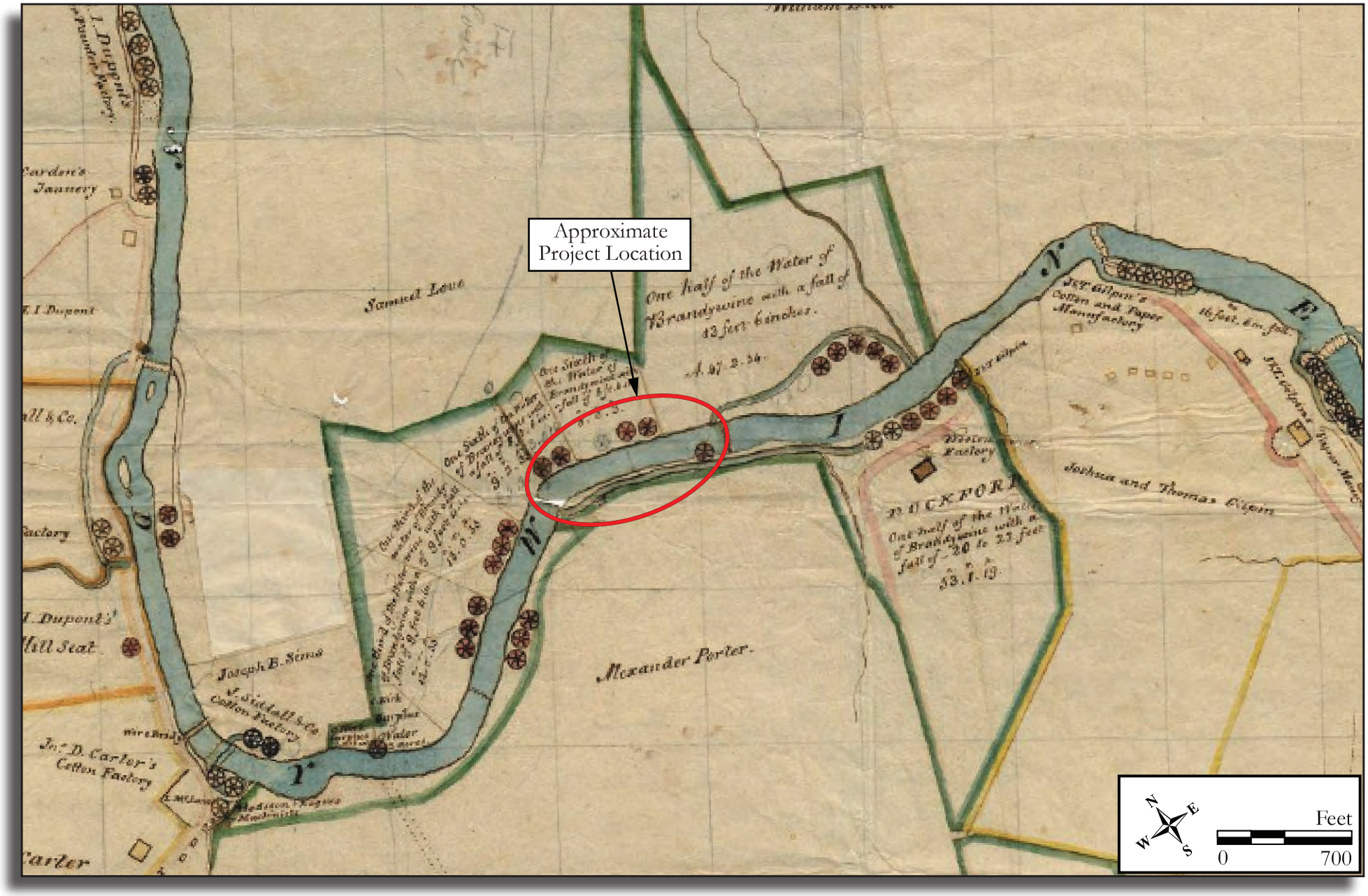

Figure 6.2: 1816 Fairlamb & Read, *Mill Seats on the Brandywine River.*

Figure 6.3: 1822 M. Carey, *Delaware, from the best of Authorities*.

Figure 6.4: 1849 S. Rea and J. Price, *Map of New Castle County, Delaware.*

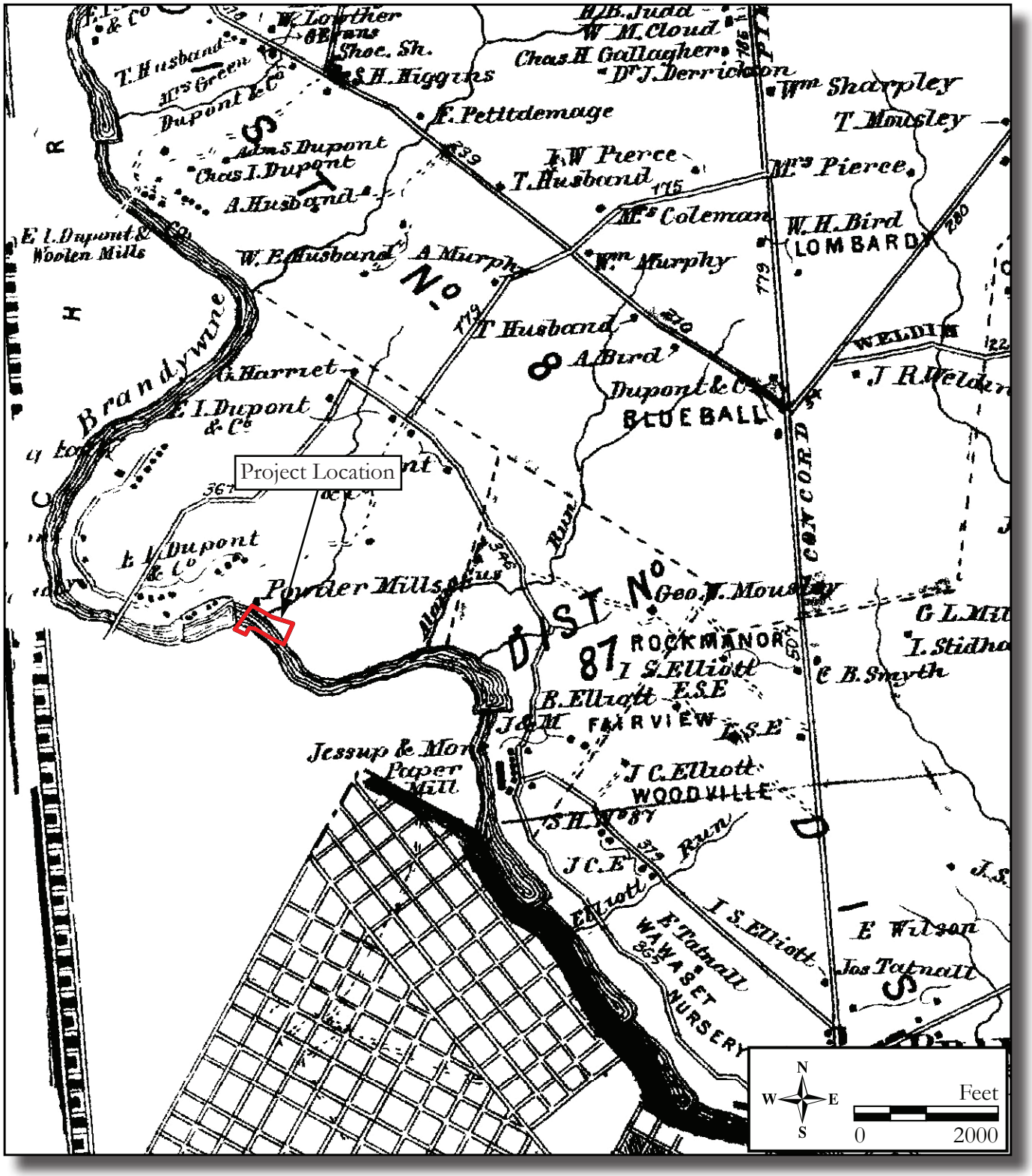

Figure 6.5a: 1868 D.G. Beers, *Brandywine, New Castle Co Del.*

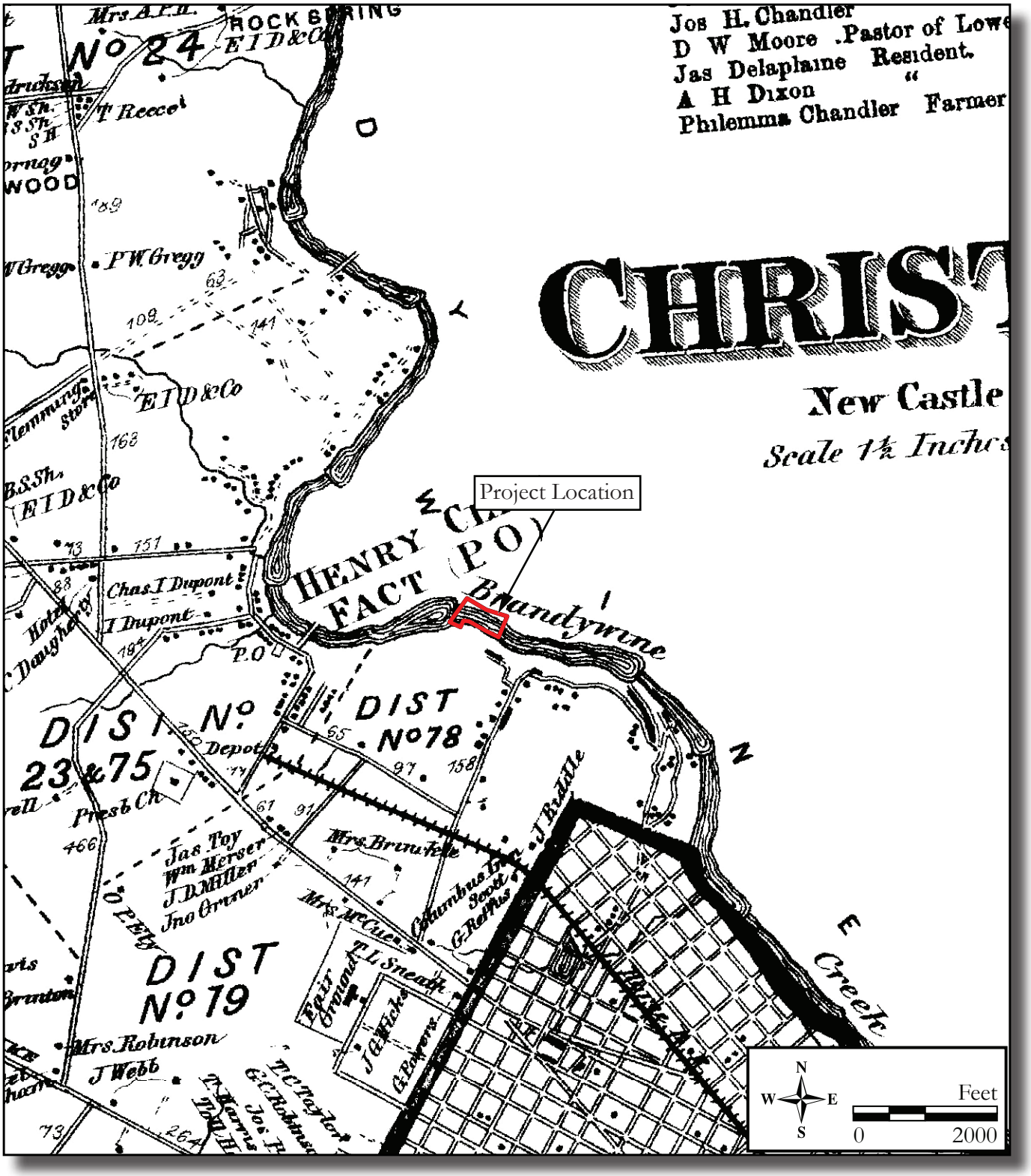

Figure 6.5b: 1868 D.G. Beers, *Christiana, New Castle Co Del.*

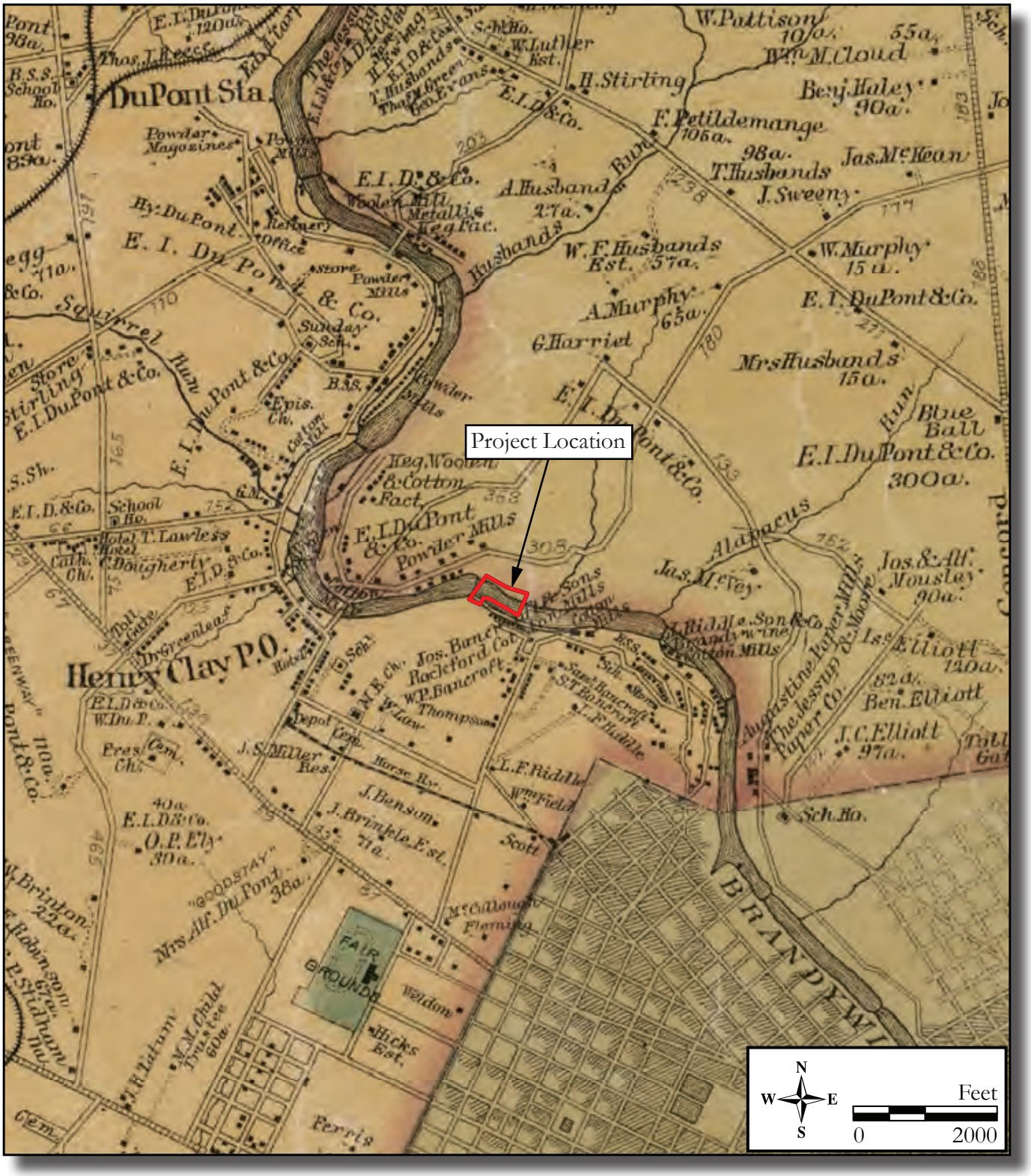

Figure 6.6: 1881 G.M. Hopkins & Co., *Map of New Castle County, Delaware.*

Figure 6.7: Dam 5 in 1932
(Zebley 1932).

1953, 1954, 1965, 1970). By 1981, dwellings were erected along the south side of the raceway starting at the raceway's upstream convergence with the creek (NETR 1981; 1982; 1992; 2002; 2006; 2007; 3009; 2010; 2011; 2012; 2013; 2015; 2017; 2018).

6.3 Summary of Previous Research

Registered Archaeological Sites
No registered archaeological sites are present within or adjacent to the APE, or within a roughly one-mile radius of the APE or proximate to associated tributaries.

Cultural Resources Surveys
The portion of the APE on the southern bank of the Brandywine Creek falls within the survey area for a historic firehouse survey in Wilmington (Archibald and Ralph 1992). No historic firehouses were identified within the current APE. The northern portion of the current APE falls within the study area for the Brandywine Valley Scenic River and Highway Study (New Castle County Department of Planning 1987), which did not identify any historic resources within the APE. In 2021 and 2022, the Center for Historic Architecture and Design (CHAD) completed a Phase II architectural investigation of Dam 5 and recommended the dam eligible for listing in the NRHP under Criteria A and C with significance at the local level (Morrissey et al. 2022) (see Appendix A). Dam 5 was constructed in 1878 by the Joseph Bancroft & Sons Company, which by the early twentieth century had become one of the world's largest textile finishers and introduced various innovative processes and synthetic materials to the market. The dam is significant under Criterion A for its association with industrial development along the Brandywine and textile manufacturing. It is also significant under Criterion C for its vernacular construction of an ascending ramp, straight, timber-braced stone dam.

National and State Register Files
Dam 5 is depicted in the NRHP nomination form and on the Delaware CHRIS database as within the northwestern boundary of the Bancroft and Sons Cotton Mills Historic District (N03646) (NR: 12/20/1984) (see Figure 1.4). The Bancroft Mills is a collection of industrial buildings along the southern bank of the Brandywine Creek related to textile milling. The Rockford Dam (N03646.048), also known as the Bancroft I Dam, was constructed in 1878 of blue granite, similar to some of the stone used in the mill complex buildings and is considered integral to the waterpower history of the mill. The dam was used after steam was first introduced as an industrial power source. The dam and associated headrace contributed to the long-term interpretation of the property (Schooler 1984). Dam 5 is actually the location of the Rockford Dam (N03646.048), which is erroneously plotted on the Delaware CHRIS at the location of Dam 4. CHAD has contacted the DHCA about this discrepancy, and, as of the drafting of this report, is awaiting a reply. The Rockford Dam (N03646.048) is a contributing element to the Bancroft and Sons Cotton Mills Historic District (N03646) (NR: 12/20/1984), and has recently been determined individually eligible for the NRHP under Criteria A and C as mentioned above (see Appendix A).

6.4 Field Reconnaissance

Senior Archaeologist, Sean McHugh conducted the archaeological reconnaissance survey on October 22, 2021 (Plates 6.1-6.9; Figure 6.8). The northern portion of APE for the Dam 5 removal is generally very sloped and rocky, and the area is covered in young deciduous trees (see Plates 6.1 and 6.2). It is unclear if the rock debris represents flood-destroyed mills that formerly stood along the north bank in the early to mid-nineteenth century (see Figure 6.2 and 65a). No evidence of intact foundations was observed along the north bank of the creek. The dam itself is accompanied by a sluice gate and adjacent stone retaining wall situated just upstream from the dam, which draws water into a raceway that runs along the creek's southern bank (see Plates 6.3 through 6.7). The datestone on the sluice reads "1878." The raceway directs water to the Bancroft and Sons Cotton Mills complex. A smaller sluice is situated along the raceway, near the buildings associated with the adjacent mill complex (see Plate 6.8)

6.5 Assessment of Archaeological Sensitivity

Models for pre-Contact archaeological site location in the region suggest that level terrain adjacent to major watercourses are highly sensitive for pre-Contact resources, therefore, level and undisturbed terrain within the APE on the southern banks of the creek outside the former mill race are assessed with a high sensitivity for pre-Contact archaeological resources (see Figure 6.8). The north bank is excessively sloped and lacks sensitivity for pre-Contact period archaeological resources. No evidence of rock shelters or platforms was observed in this area of the APE.

Although the northern bank of the Brandywine Creek within the APE is relatively sloped and rocky, this area is also the approximate mapped location of four former mill wheels on an 1816 map (see Figure 6.2). Another mill wheel is depicted on the southern bank near the APE. The southern portion of the APE is also adjacent to the Bancroft Mills complex and an extant mill race passes through this area. Due to the presence of mapped and extant historic resources and the APE's location within and adjacent to the Bancroft and Sons Cotton Mills Historic District, the northern and southern portions of the APE are assessed with a high sensitivity for historic archaeological resources (see Figure 6.8). In addition, the location of Dam 5 and the upstream area of Dam 5 also have an assessed high sensitivity for archaeological remains associated with the current dam and any former dams that existed since the early nineteenth century within the APE. Phase IB archaeological survey at Dam 5 will be conducted once the design for proposed undertaking at the dam has progressed and the limits of disturbance have been refined.

Figure 6.8: Aerial photograph of the Dam 5 APE showing photograph locations and areas of archaeological sensitivity.

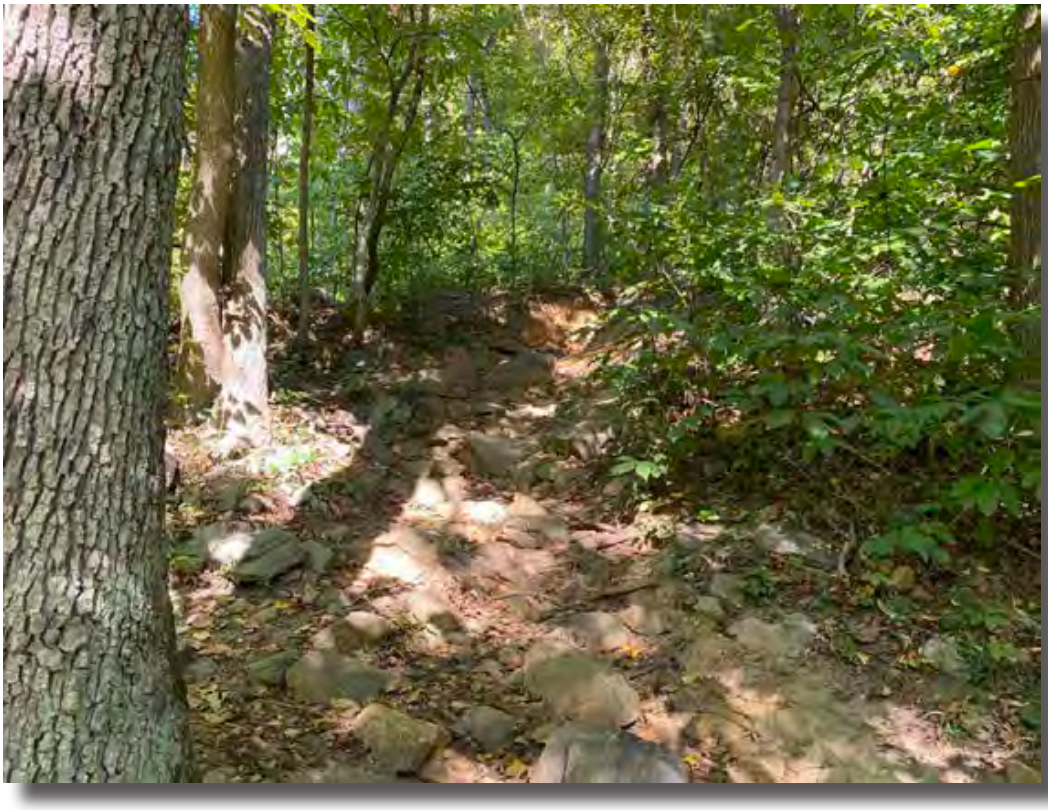

Plate 6.1: Overview of rocky slopes on the northern creek bank in the Dam 5 project site.

Photo view: Northeast

Photographer: Sean McHugh

Date: October 22, 2021

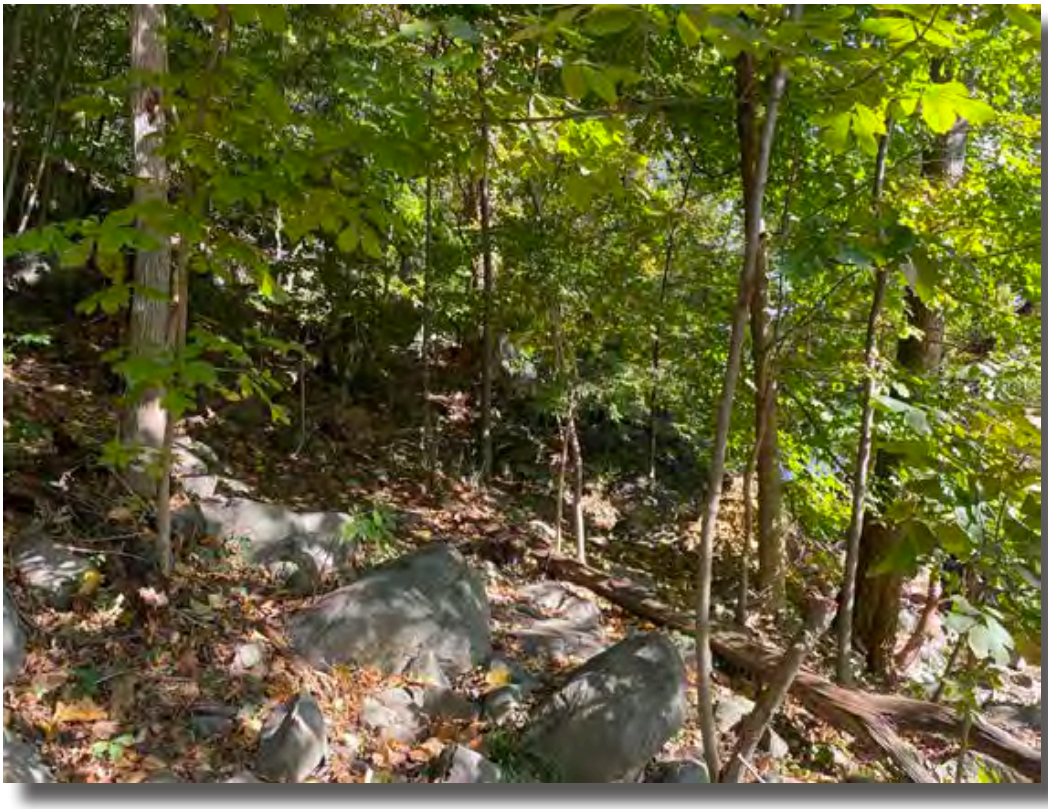

Plate 6.2: Overview of rocky slopes and young deciduous trees on the northern bank of the creek.

Photo view: East

Photographer: Sean McHugh

Date: October 22, 2021

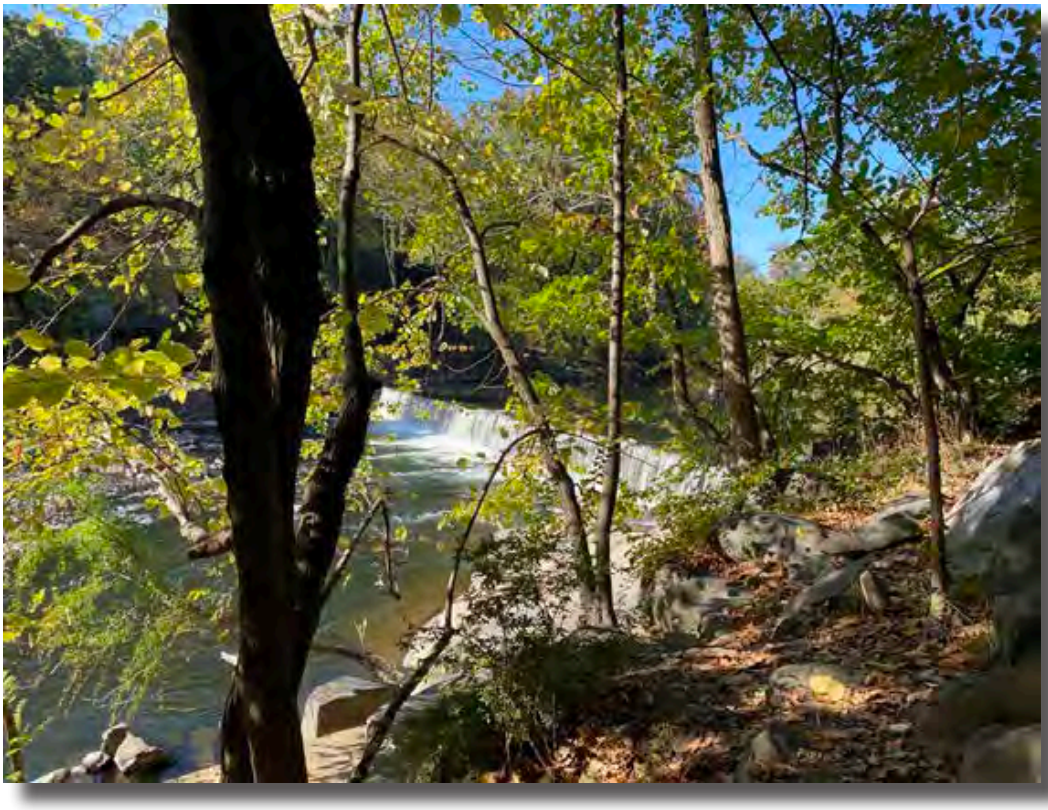

Plate 6.3: Overview of Dam 5 and the northern bank of the creek showing a possible concrete-encased sewer line at the edge of the creek in the lower left corner of the image.

Photo view: Southwest

Photographer: Sean McHugh

Date: October 22, 2021

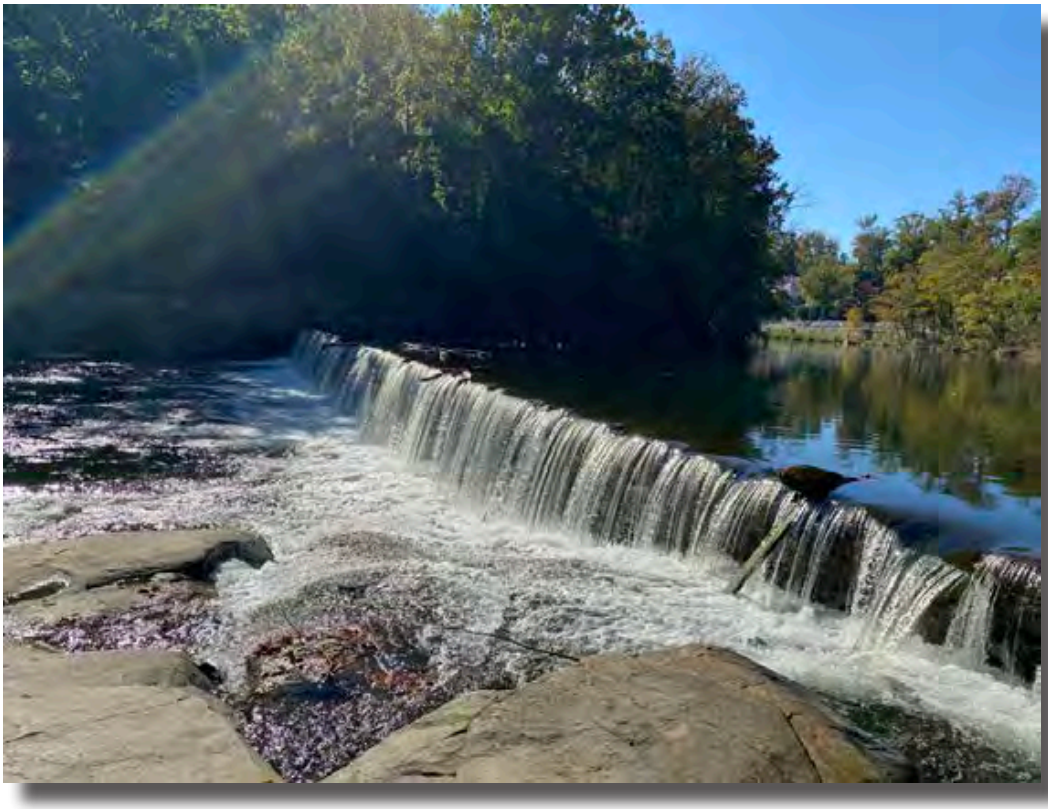

Plate 6.4: Overview of Dam 5.

Photo view: Southwest

Photographer: Sean McHugh

Date: October 22, 2021

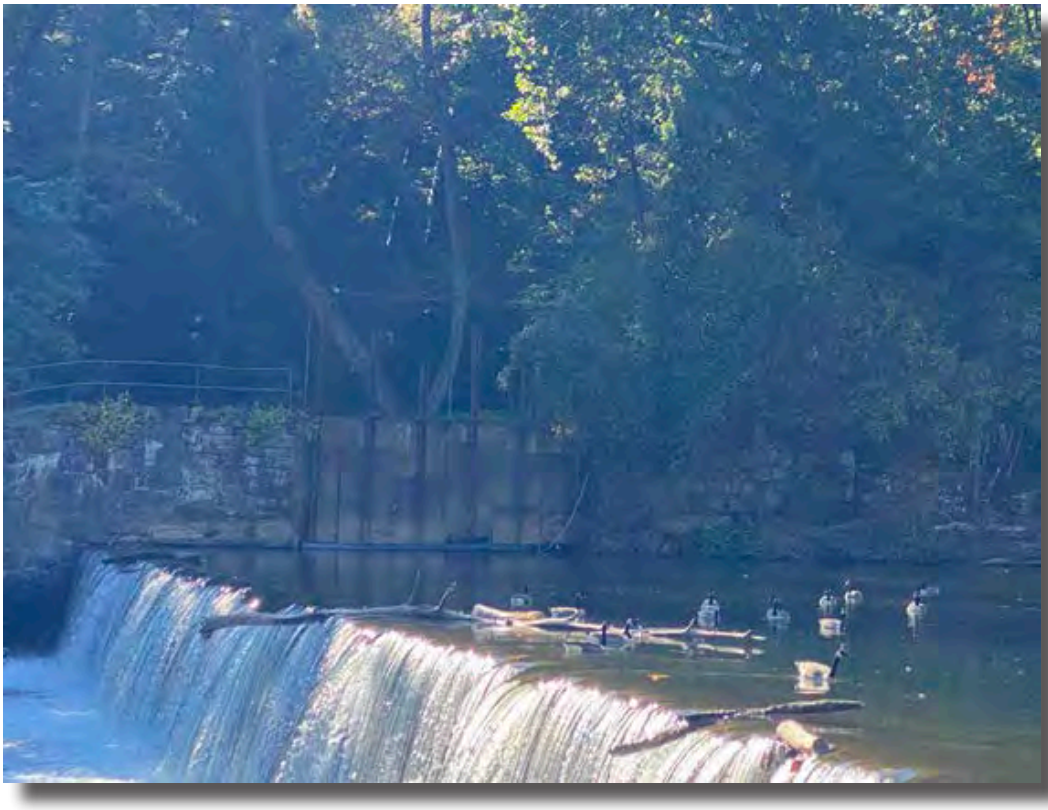

Plate 6.5: Overview of the sluice gate situated along the southern bank of the Brandywine Creek, just upstream from Dam 5.

Photo view: Southwest

Photographer: Sean McHugh

Date: October 22, 2021

Plate 6.6: Overview of the sluice gate mechanism on the southern bank of the creek.

Photo view: East

Photographer: Sean McHugh

Date: October 22, 2021

Plate 6.7: Overview of the millrace fed by the Brandywine Creek with a flow controlled by the sluice gate upstream from Dam 5.

Photo view: East

Photographer: Sean McHugh

Date: October 22, 2021

Plate 6.8: Overview of a smaller sluice gate along the millrace, further controlling the water flow to the former Bancroft and Sons Cotton Mills complex.

Photo view: South

Photographer: Sean McHugh

Date: October 22, 2021

7.0 DAM 6

7.1 Environmental Setting

In addition to the prevailing Brandywine Blue Gneiss of the region, small portions of the Dam 6 APE are underlain by Ordovician-age Rockford Park Gneiss (Ramsey 2005). The APE topography is relatively level (see Figure 1.1). Soils mapped within the APE consist of Neshaminy Montalto silt loams, 25 to 45 percent slopes, very stony (NvE). These soils are typically well-drained and are located on hillslopes (Natural Resources Conservation Service [NRCS] 2016; Table 7.1; Figure 7.1).

Table 7.1: Soils classified within the Dam 6 APE (based on NRCS 2016).

Name	Soil Horizon Depth (in inches)	Texture and Inclusions	Slope	Drainage	Landform
Neshaminy Montalto silt loams, 25 to 45 percent slopes, very stony (NvE)	A: 0-6 BE: 6-17 Bt1: 17-32 Bt2: 32-59 BC: 59-80	A: Silt loam BE: Silt loam Bt1: Silt loam Bt2: Channery silt loam BC: Very channery loam	25-45%	Well-drained	Hillslopes

The APE is sparsely vegetated with deciduous trees and short, herbaceous underbrush near the creek banks. Dirt and gravel walkways pass through the area.

7.2 Historic Map, Atlas, and Aerial Review

In this section, the previously described "APE" is referred to as the "project location" due to the varied scales used on historic maps and atlases.

The project location was likely owned by Job Harvey during the mid- to late eighteenth century, who operated a grist mill along the western bank of the Brandywine Creek in the vicinity of the Rockford mill site (Barni 2021b). A dam is shown within the project location on an 1816 map of mill seats in Wilmington and is situated upstream of several mills that existed on both sides of the creek (Fairlamb & Read 1816; Figure 7.2). The text displayed on the parcel adjacent to the dam reads: "One third of the Water/ of Brandywine with a fall of 9 feet 4 in./ a. r. p./ 13.0.33." The dam depicted on the 1816 map (not extant) was of an unknown construction style. It appears to have powered six waterwheels on the north bank and three waterwheels on the south bank. During this time, Caleb Kirk owned the land and water rights in the area, who also operated Rockland Mills further upstream with his brothers. Kirk entered into a partnership with James Jeffries, E.I. du Pont de Nemours, John Warner, William Warner, and John Torbet to form the Brandywine Mill Seat Company. The area marked in a green outline on the map depicts the property owned by the company. Although it disbanded in 1825, the Brandywine Mill Seat Company allowed for the collective purchase of land and water rights to diffuse the cost of milling operations and allow for the construction and repair of dams that supplied multiple mills of different ownership (Barni 2021b). On an 1822 map of Delaware, the project location is shown near the mill complex along that portion of the creek (Carey 1822; Figure 7.3).

In 1830, E.I. du Pont de Nemours purchased the mill seat from Kirk, and the Lower Hagley Yard became part of the DuPont Company of black powder manufacturers (founded in 1802). In 1839, flooding of the Brandywine destroyed the stone dam embankments and part of the dam, while also forcing open the headgates and sweeping away the entire race bank. The dam

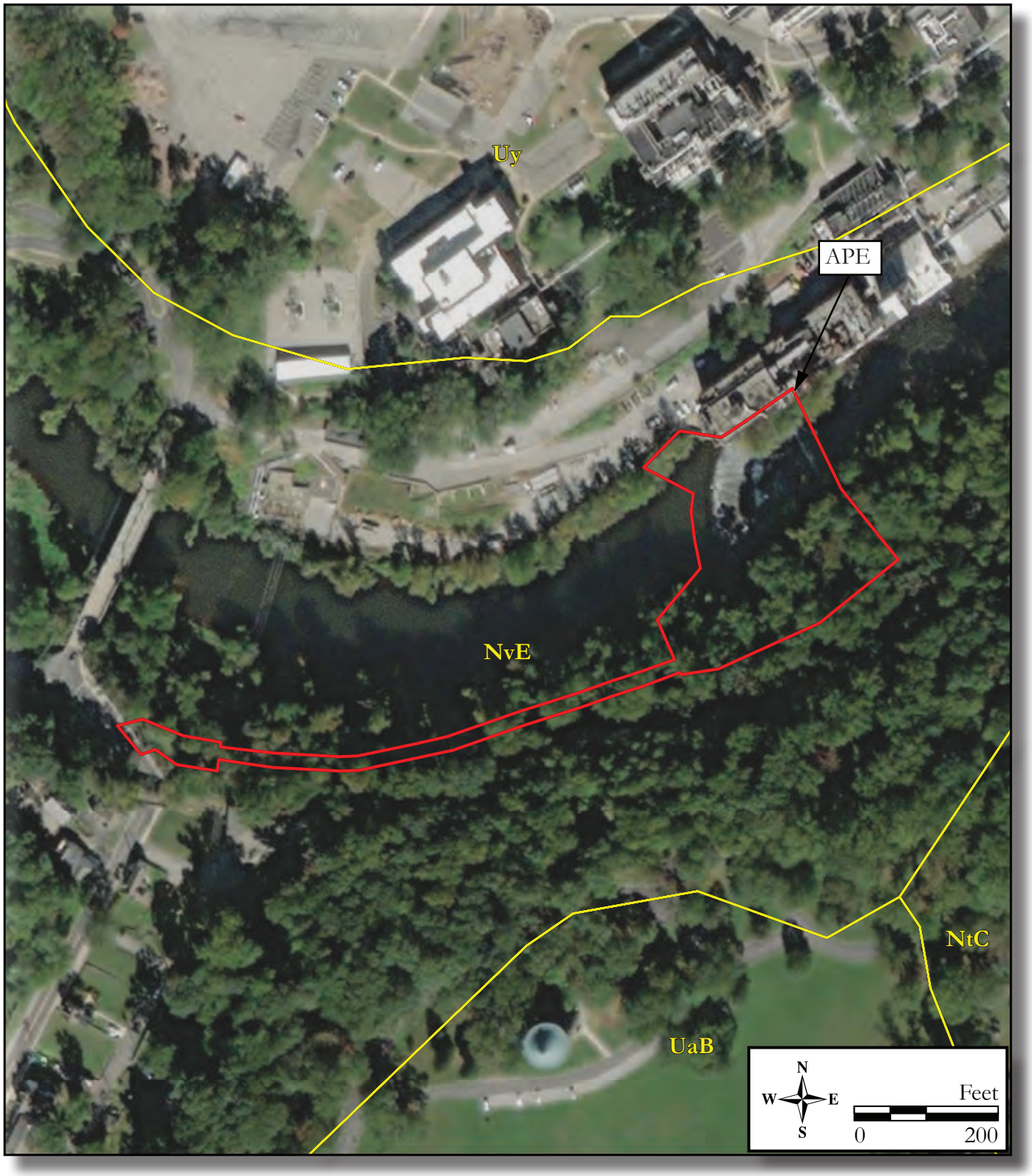

Figure 7.1: Aerial photograph and soils map for Dam 6 APE.

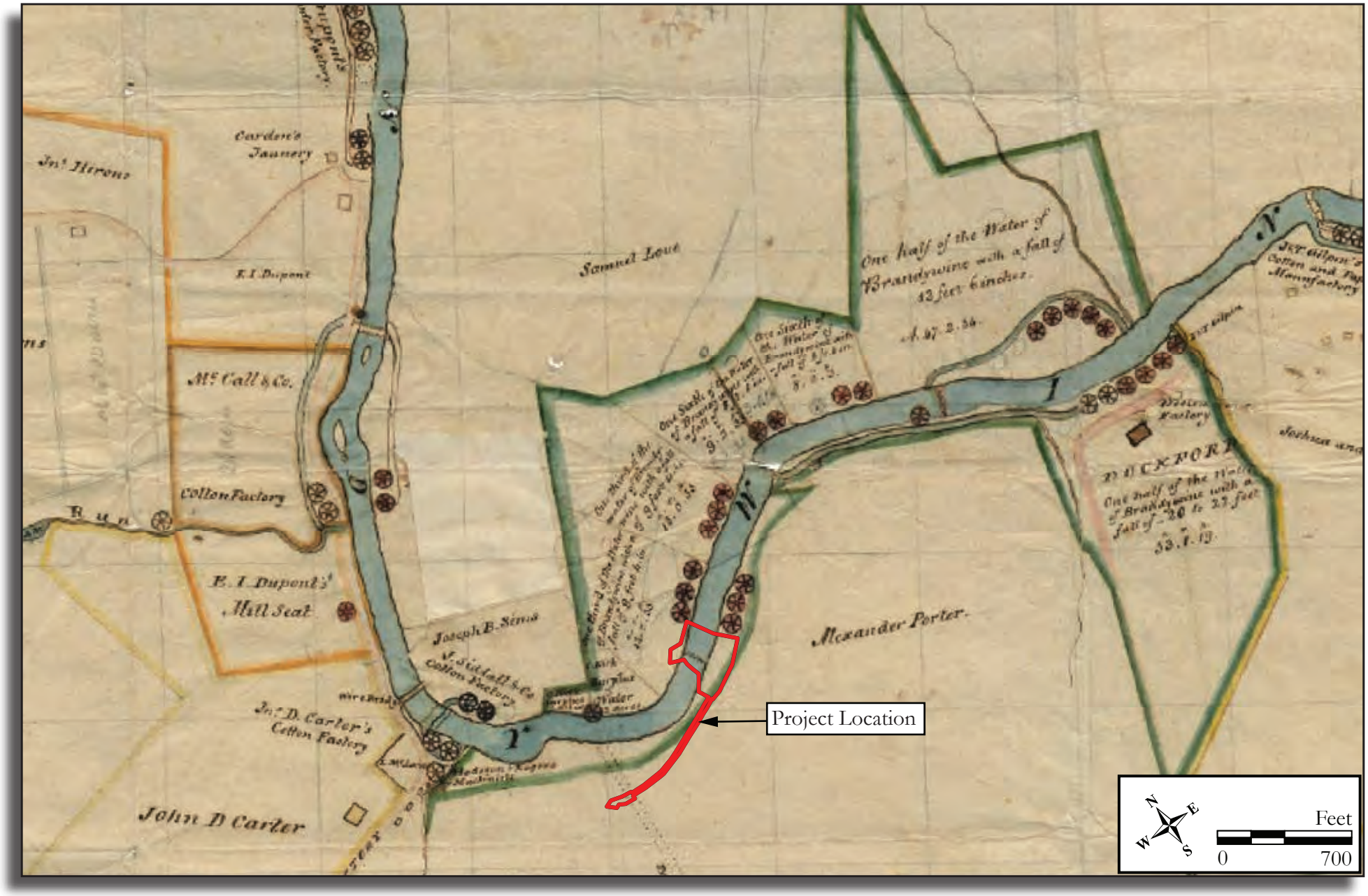

Figure 7.2: 1816 Fairlamb & Read, *Mill Seats on the Brandywine River.*

Figure 7.3: 1822 M. Carey, *Delaware, from the best of Authorities*.

was rebuilt following the flood, and it is likely that the rebuilt dam is the same dam that is extant within the project location (Dam 6). It is estimated that the Lower Hagley Yard produced more than half of the total black powder manufactured by DuPont and allowed the company to supply over 40 percent of the ammunition used by the Union Army during the Civil War (Barni 2021b).

An 1849 map of the county shows the eastern portion of the project location situated across the creek from the industrial buildings of the DuPont Company's Lower Hagley Yard (Rea and Price 1849; Figure 7.4). The western side of the project location is situated next to present-day Rising Sun Lane, which was extant by this period. Little change is shown on an 1868 atlas, which depicts the DuPont power mills on the northern bank and slightly increased development along Rising Sun Lane to the west (Beers 1868; Figures 7.5a and 7.5b). A photograph of the dam was taken in 1870, which shows a building associated with the Lower Hagley Yard on the northern bank (Anonymous 1870; Figure 7.6). The picture depicts a railroad between the armoring/stone retaining wall and the building that stood in 1870. The creek appears to be lined by stone armoring and the dam was arch shaped, similar to its present-day form. A separate photograph from the same year was taken looking at the dam from downstream, with more DuPont buildings visible among the trees in the background (Maybin 1870b; Figure 7.7).

The 1881 county map shows the Lower Hagley Yard is part of the E.I. DuPont & Co. Powder Mills, with present-day Creek Road added through the complex (Hopkins 1881; Figure 7.8). A photograph of the Lower Hagley Yard Dam (Dam 6) was taken in 1896, which shows the building adjacent to the dam on the northern bank had a gabled dormer addition constructed since it was photographed in 1870 and the stone armoring was in a greater state of disrepair (Anonymous 1896; Figure 7.9; Anonymous 1870; see Figure 7.6). A map of the Lower Powder Yard from 1902 depicts the project location in relation to the Lower Hagley Yard Dam, the DuPont complex adjacent and to the north, and Rising Sun Lane adjacent and to the west (E.I. du Pont de Nemours & Company 1903; Figure 7.10). The Wilmington and Northern Railroad – Kentmere Branch passed to the south of the project location. In 1903, the DuPont Company constructed an Experimental Station to facilitate their new commercial endeavor of researching and developing chemicals. Due to a diminished demand for black powder, the powder mills ceased operation entirely in 1921, and it is unlikely that the Lower Hagley Yard mill dam has been used since (Barni 2021b).

Little change is visible within the project location in twentieth- and twenty-first-century aerial photography (NETR 1937; 195; 1953; 1954; 1965; 1970; 1981; 1982; 1992; 2002; 2006; 2007; 2009; 2010; 2011; 2012; 2013; 2015; 2017; 2018). The project location is primarily wooded, situated just north of Rockford Park. The industrial Lower Hagley Yard north of the project location did not see any major additions or alterations, and residential development to the west of the project location remained the same.

7.3 Summary of Previous Research

Registered Archaeological Sites
No registered archaeological sites are present within or adjacent to the APE, or within a roughly one-mile radius of the APE or along nearby tributaries.

Cultural Resources Surveys
A Phase IA reconnaissance-level historic architecture survey was conducted by CHAD for the proposed project's effects on Dam 6, the Lower Hagley Yard Dam (Barni 2021b). The survey concluded that the APE included three previously unidentified above-ground resources: the Lower Hagley Yard Dam, a bridge, and a culvert. Due to the dam's age (constructed in 1836 with major repairs in 1839 and 1880) and the fact that it is going to be partially removed, an intensive-level historic architectural survey was recommended. Because the bridge and culvert will not be altered, a reconnaissance-level survey was recommended for each. The Phase II architectural investigation by CHAD recommended the Lower Hagley Yard Dam as eligible for listing in the NRHP under Criteria A and C (Morrissey, Emmons, and Showell 2022).

Figure 7.4: 1849 S. Rea and J. Price, *Map of New Castle County, Delaware.*

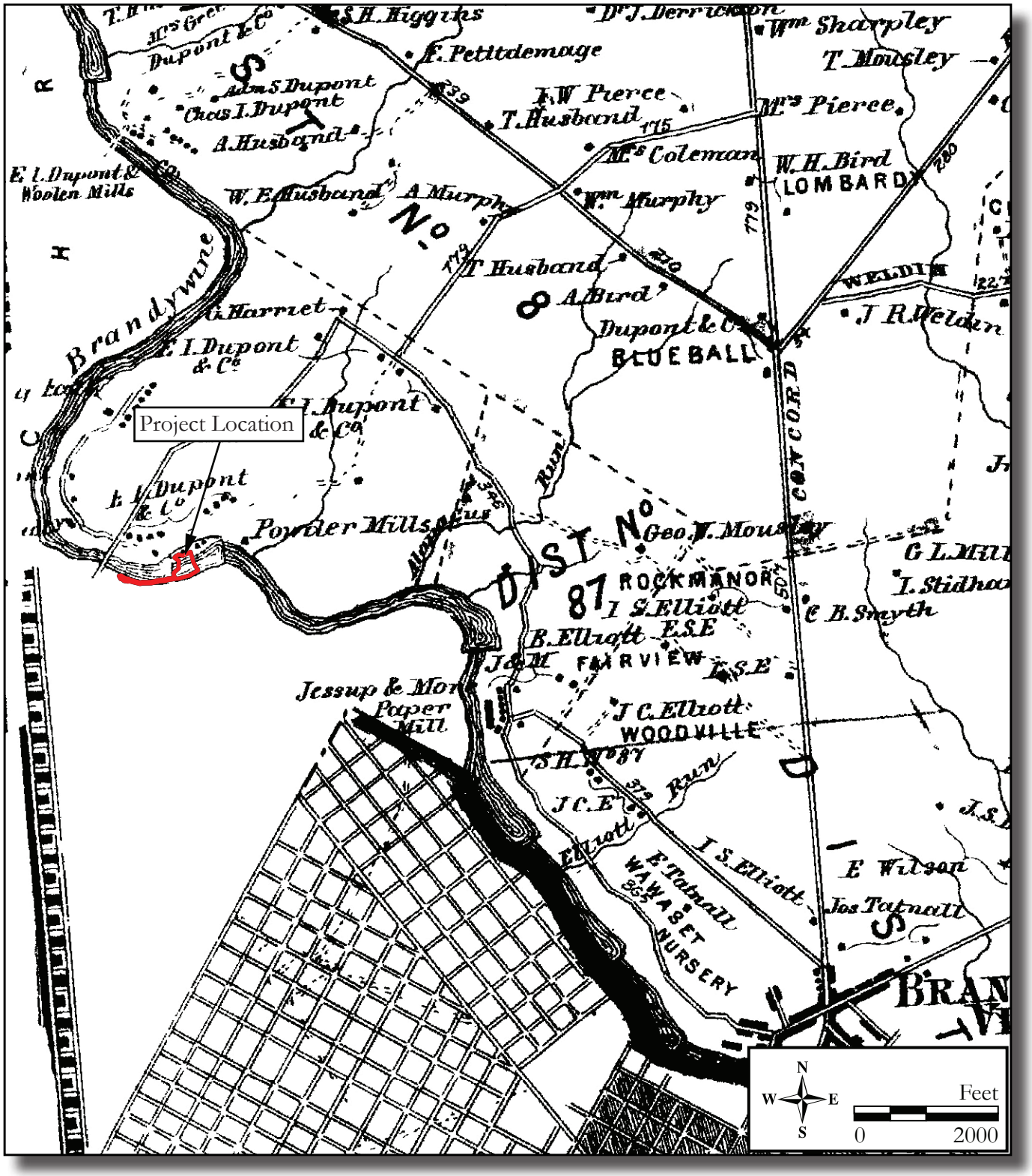

Figure 7.5a: 1868 D.G. Beers, *Brandywine, New Castle Co Del.*

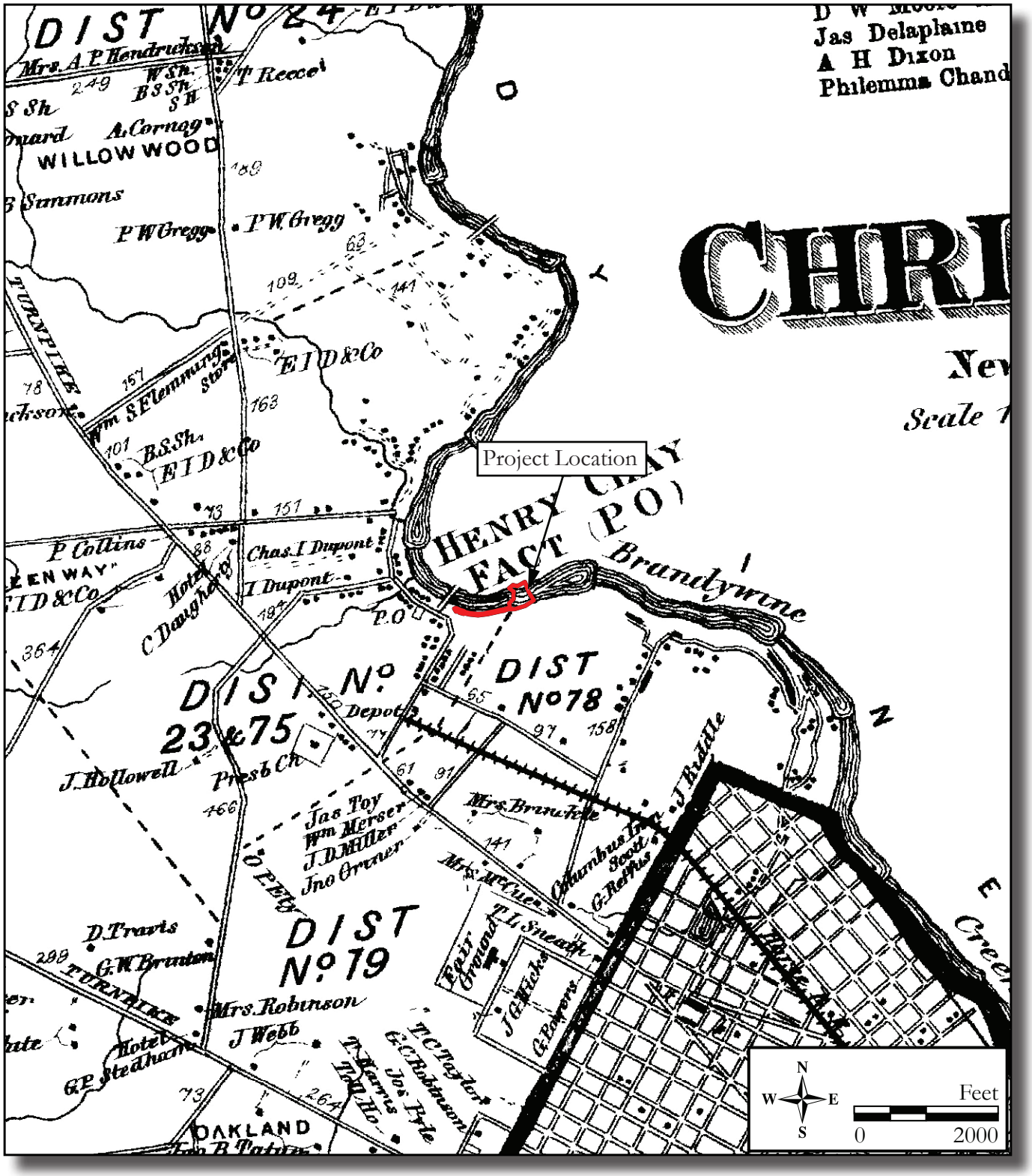

Figure 7.5b: 1868 D.G. Beers, *Christiana, New Castle Co Del.*

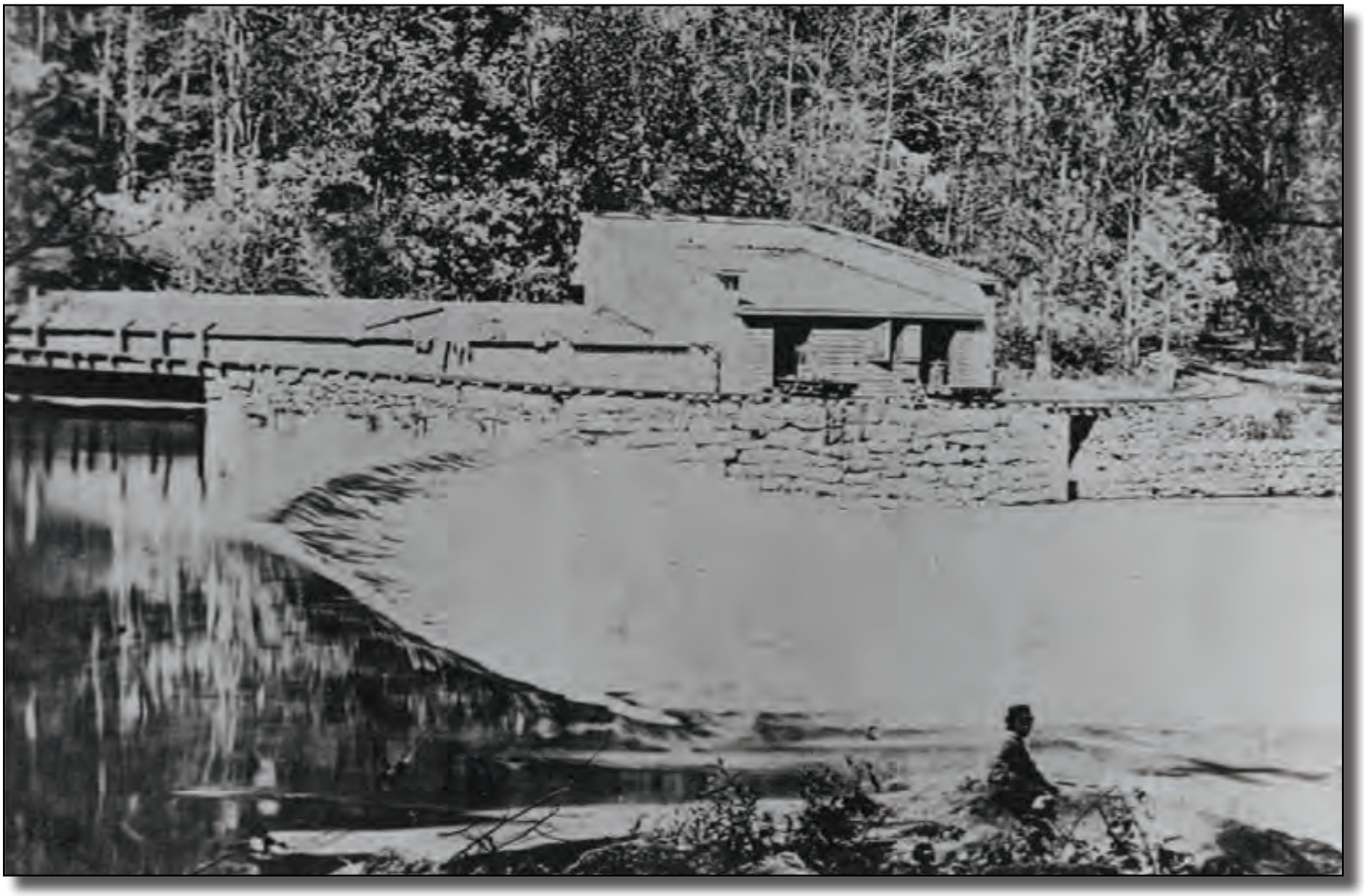

Figure 7.6: Glaze mill, Lower Yard (with view of Dam 6) in 1870 (Anonymous 1870).

Figure 7.7: Dam, Lower Hagley Yard in 1870
(Maybin 1870b).

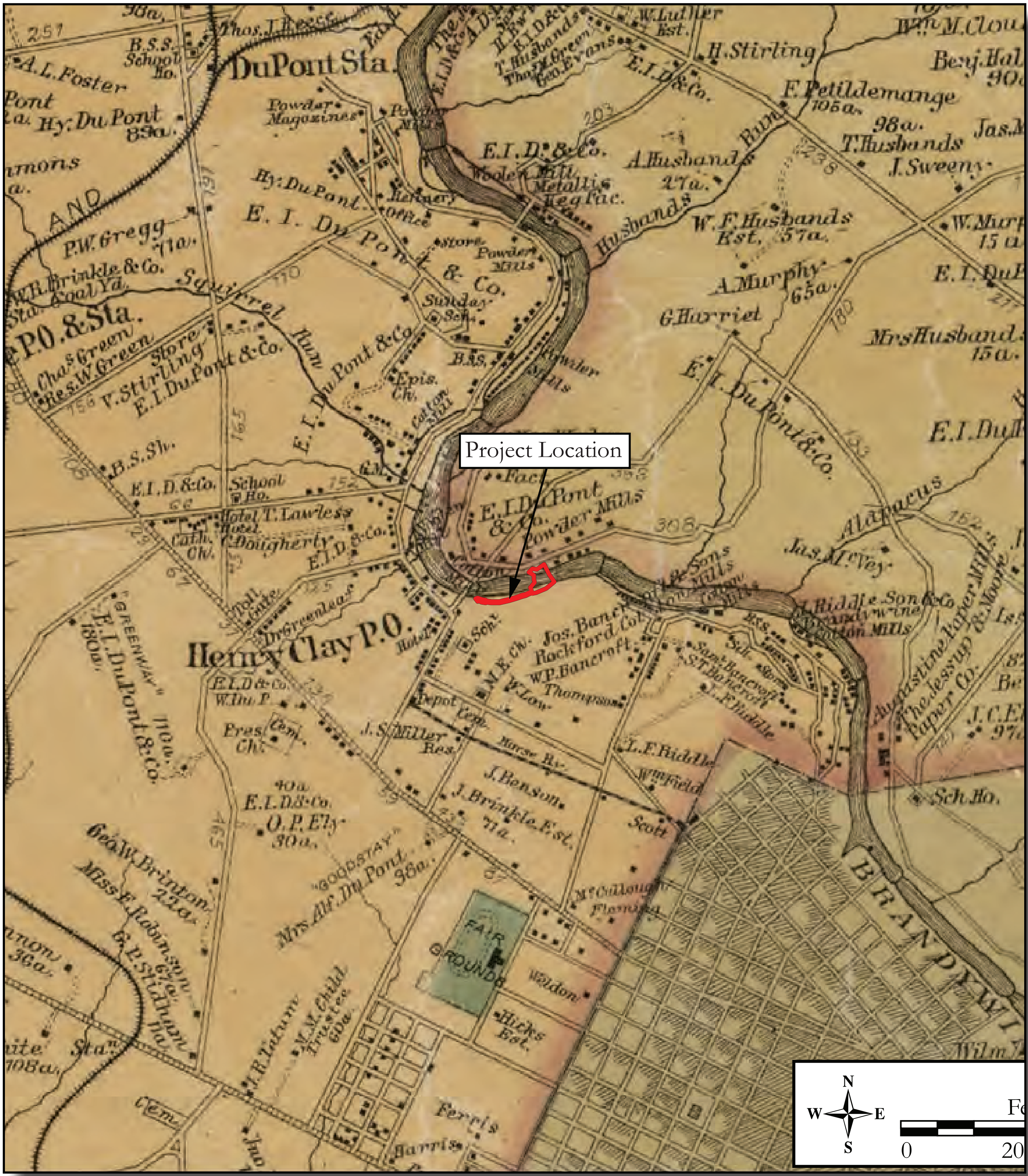

Figure 7.8: 1881 G.M. Hopkins & Co., *Map of New Castle County, Delaware.*

Figure 7.9: Dust mill, rolling mills, Lower Hagley Yard (with view of Dam 6) in 1896 (Anonymous 1896).

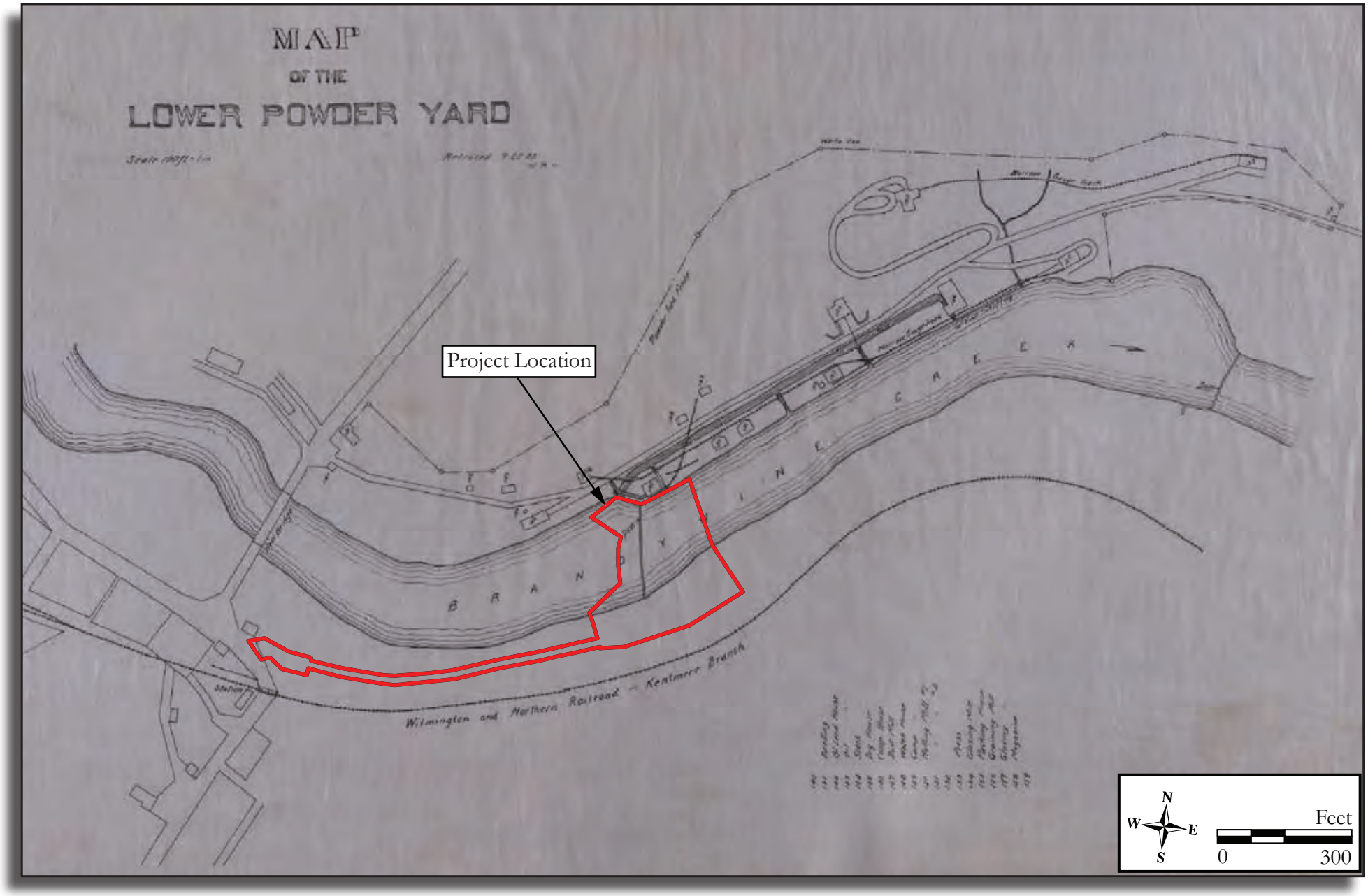

Figure 7.10: 1903 E.I. du Pont de Nemours & Company, *Map of the Lower Powder Yard.*

Portions of the APE fall within the boundaries of the Brandywine Valley Scenic River and Highway Study (New Castle County Department of Planning 1987) and the Thunderbird archaeological survey for Route 141 improvements (Thunderbird Archeological Associates 1989). Neither survey identified any historic or archaeological resources within the current APE and neither assessed archaeological sensitivity within the APE.

An evaluation of cultural resources in the Bancroft Parkway Area was conducted in 1983 (Baron 1983). The large study area included portions of the current APE and primarily focused on the historic resources associated with the Bancroft Mills and Henry Clay Village historic communities. No resources were evaluated within the current APE and no archaeological sensitivity was completed.

National and State Register Files
The Rockford Park Historic District (N012446) (NR: 6/23/1976) is adjacent and to the south of the APE (see Figure 1.4). The historic district has a period of significance from 1800-1899 and from 1900 to the mid-twentieth century in the areas of Landscape Architecture and Social/Humanitarian history. The park represents the first effort made by an individual citizen to create a Wilmington-area park. The citizen, William P. Bancroft, donated the land for the park in 1899 and became known as the father of the Wilmington Park System.

The Breck's Mill Area-Henry Clay Village Historic District (N00333) (NR: 6/28/1971), is adjacent and to the west of the APE (see Figure 1.4). The district's period of significance includes the nineteenth century in the areas of Architecture and Industry. The Breck's Mill area is considered an excellent example of an early nineteenth-century industrial village. Increased industrial development in 1813, followed the embargo of British trade after the War of 1812. The area historically developed around the 1813 Breck's Mill, which is situated upstream from the APE adjacent to Brandywine Creek Dam 7. Breck's Mill was built in the location of an earlier, eighteenth-century mill and was originally used for cotton production. Mill owner and workers' houses were built in a compact development surrounding the industrial complex. Contributing properties located adjacent to the APE include a track of the Wilmington and Northern Railroad (N00333.039) and an associated railroad cover (N00333.038). A stone wall (N00333.040) is also adjacent to the APE within the boundaries of the historic district but not considered a contributing property. These three structures are located on the west side of Rising Sun Lane, opposite the APE.

7.4 Field Reconnaissance

Senior Archaeologist, Sean McHugh, conducted the site visit on October 22, 2021 (Plates 7.1-7.9; Figure 7.11). The APE is accessed by crossing a metal grate and stone bridge to a gravel access road (see Plates 7.1-7.4). A stone wall is situated along the access road (see Plate 7.2). The portion of the APE along the southern bank of the Brandywine Creek, adjacent to Dam 6, is sparsely vegetated with deciduous trees, light underbrush, and rocky ground (see Plates 7.5-7.7). A small, U.S.G.S. gauging station abandoned in 2006 is situated along the southern bank near the eastern edge of the APE (see Plate 7.8). Dam 6 is situated adjacent to a large industrial building just outside the APE that is associated with the DuPont Company powder mills (see Plate 7.9). Existing utilities are visible on both banks of the creek (see Figures 1.3d, 7.11; see Plates 7.8 and 7.9).

7.5 Assessment of Archaeological Sensitivity

Due to the documented regional model of pre-Contact site location in similar settings along major waterways, level and undisturbed areas of the APE, specifically adjacent to the creek on the southern bank, are assessed with a high sensitivity for pre-Contact archaeological resources. Areas in the footprint of existing underground utilities have been disturbed and lack pre-Contact period sensitivity. The westernmost portion of the APE is a rocky slope that requires a bridge to span the terrain (see Plate 7.1) and is therefore not considered archaeologically sensitive (see Figure 7.11).

The southern bank of the creek within the APE is situated adjacent to the Lower Hagley Yard dam and on the opposite side of the creek from the DuPont Powder Mills complex. A U.S.G.S. gauging station abandoned in 2006 was identified in this area (see Plate 7.8). Although the powder mills complex was on the opposite side of the creek, the potential for dam-related infrastructure or earlier milling-related sites is present on the southern bank. For that reason, the area is assessed with moderate sensitivity for historic archaeological resources. A stone retaining wall is present in the western portion of the APE. This area has a high sensitivity for historic archaeological resources. Further, the location of Dam 6 has a high sensitivity for significant archaeological resources associated with the dam itself and may have the potential to yield information about early nineteenth-century dam construction techniques.

7.6 Subsurface Testing Results

Archaeological testing was completed by field director Ted Gold and field archaeologists Dawn Cheshaek, Scott Kachelries, Alex Seng, and Gio Palumbo on May 25-27, 2022 (see Plate 7.10; Figure 7.11). The survey effort included the excavation of 18 STPs at 15-meter intervals in unpaved portions of the APE (see Figure 7.11, see Appendix D). Originally, 20 STPs were plotted within the APE, and two STPs were not excavated due to a gravel road and buried communication utility.

Seven STPs contained a natural soil profile at grade (STPs D6-3, D6-5, D6-7, D6-10, D6-11, D6-13, and D6-14; see Figure 7.11), none of which yielded any artifacts. Two STPs consisted of a shallow topsoil, overlying boulders (STPs D6-8 and D6-9). Six STPs demonstrated a truncated subsoil and no buried topsoil (STPs D6-4, D6-12, D6-17, D6-18, D6-19, and D6-20). No artifacts were found in the truncated subsoil. Three STPs had modern fill to the base of the STP (STPs D6-6, D6-15, and D6-16). Fill layers in the Dam 6 APE appear to be associated with twentieth-century landscape modification, gravel road and parking area construction, and utility installation. A total of six artifacts was recovered from the STPs, consisting of twentieth-century beverage bottle glass, window glass, and metal fasteners (see Appendix E). Items that were noted and not retained include plastic, Styrofoam, concrete, small brick fragments, and slag.

In sum, no pre-Contact Native American or early historic artifacts were recovered, and no cultural features were identified in the upland portion of the APE. The low quantity of modern artifacts recovered from possibly intact, natural soils is not considered representative of an archaeological site.

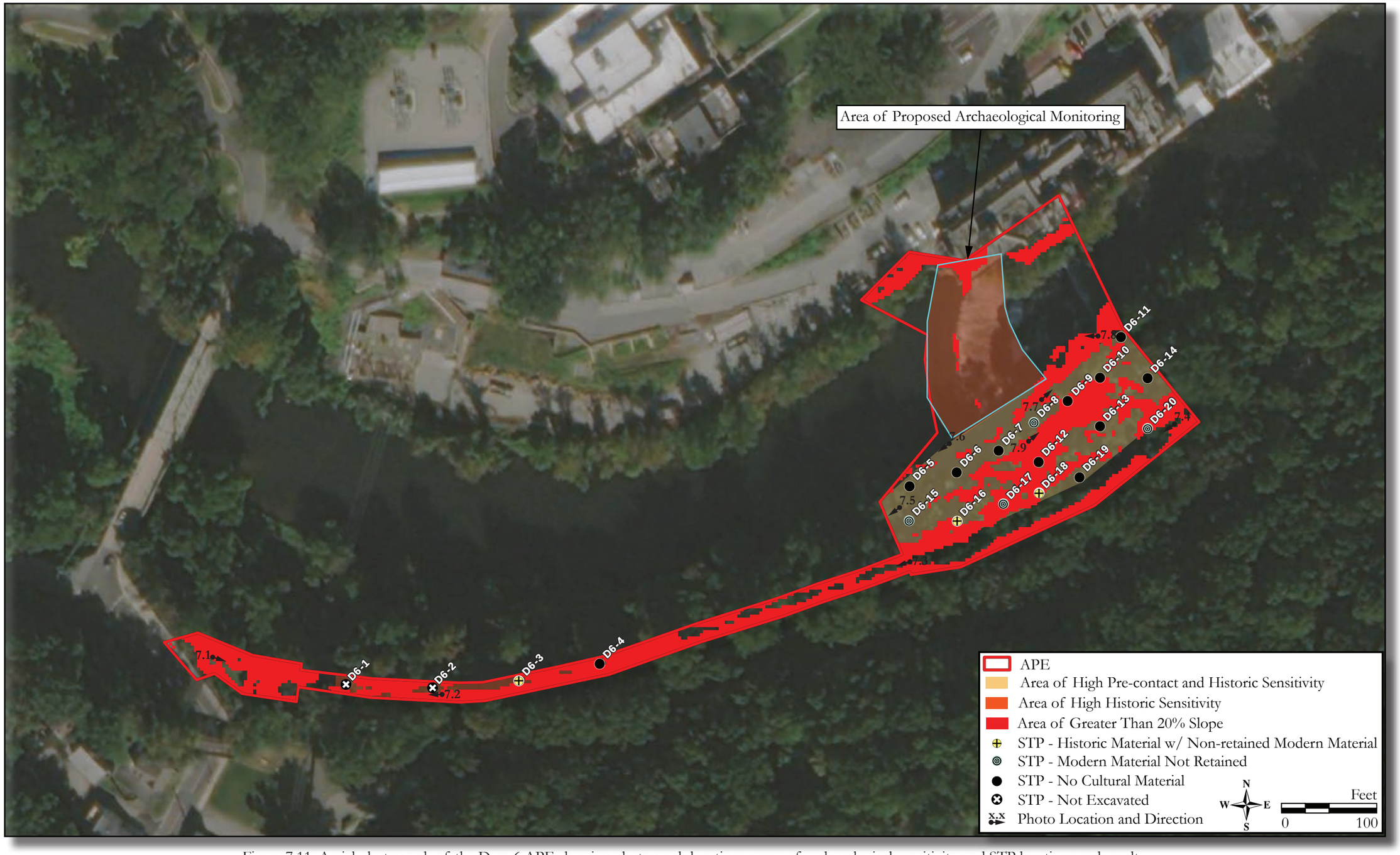

Figure 7.11: Aerial photograph of the Dam 6 APE showing photograph locations, areas of archaeological sensitivity, and STP locations and results.

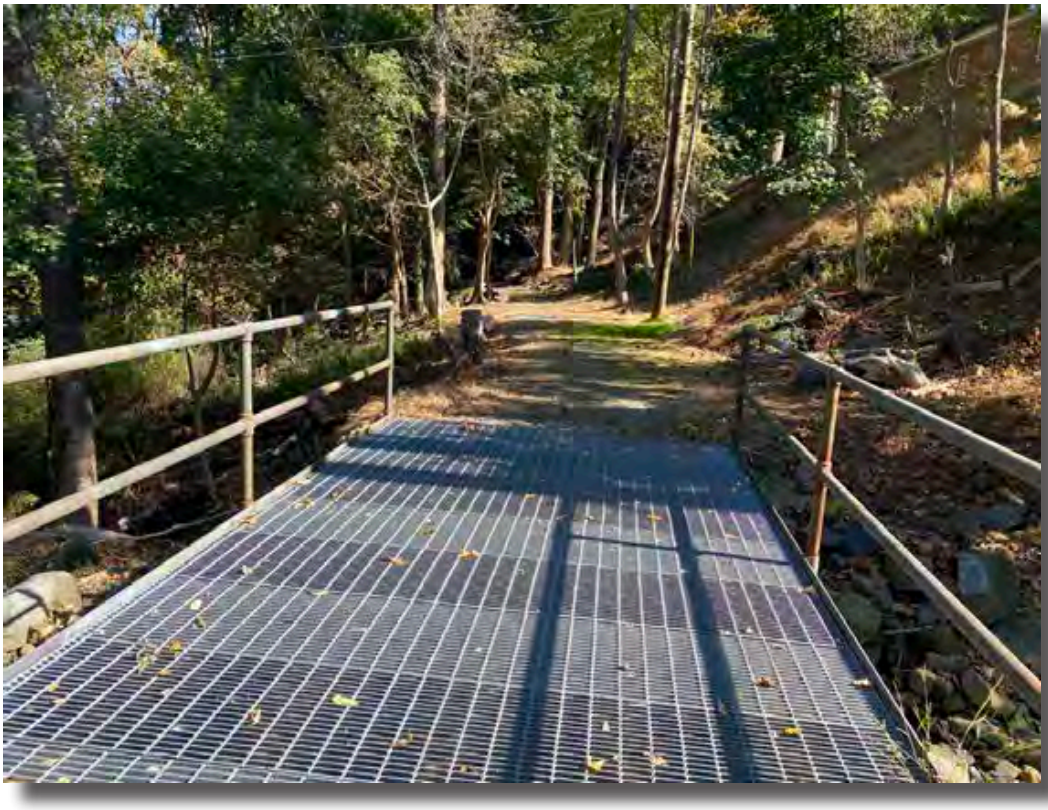

Plate 7.1: Overview of a metal grate bridge leading to gravel access road for the Dam 6 APE.

Photo view: East

Photographer: Sean McHugh

Date: October 22, 2021

Plate 7.2: Overview of gravel access road.

Photo view: West

Photographer: Sean McHugh

Date: October 22, 2021

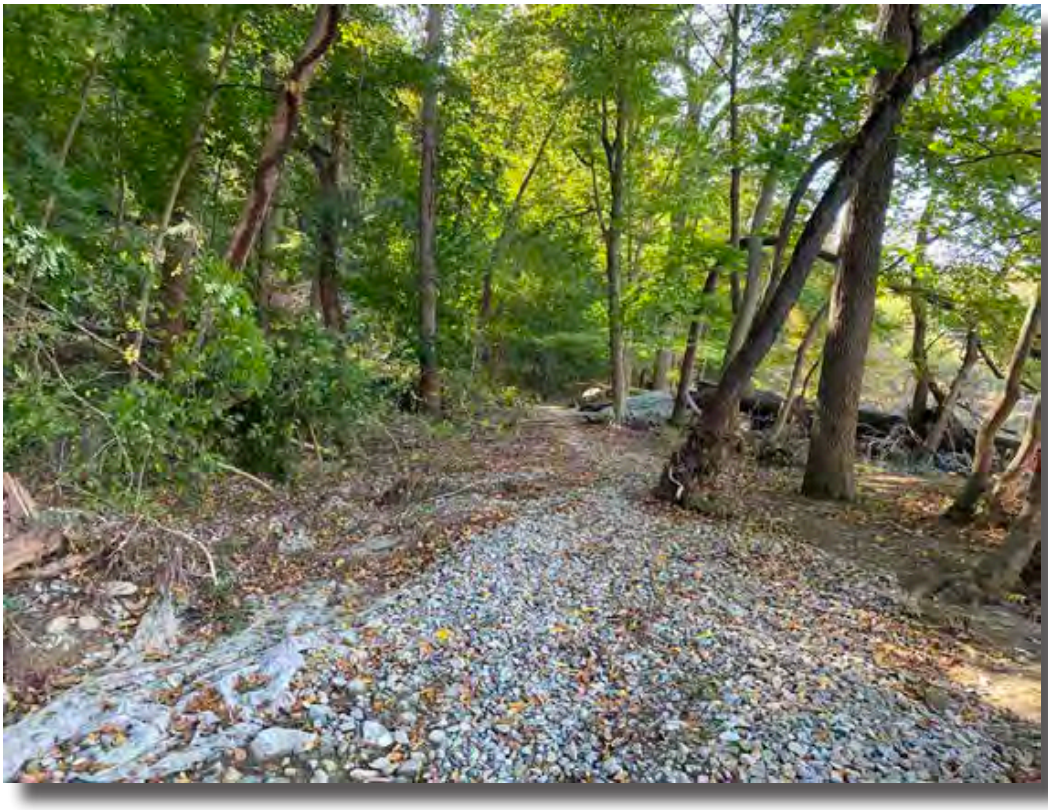

Plate 7.3: Overview of gravel access road at the entrance to the APE.

Photo view: West

Photographer: Sean McHugh

Date: October 22, 2021

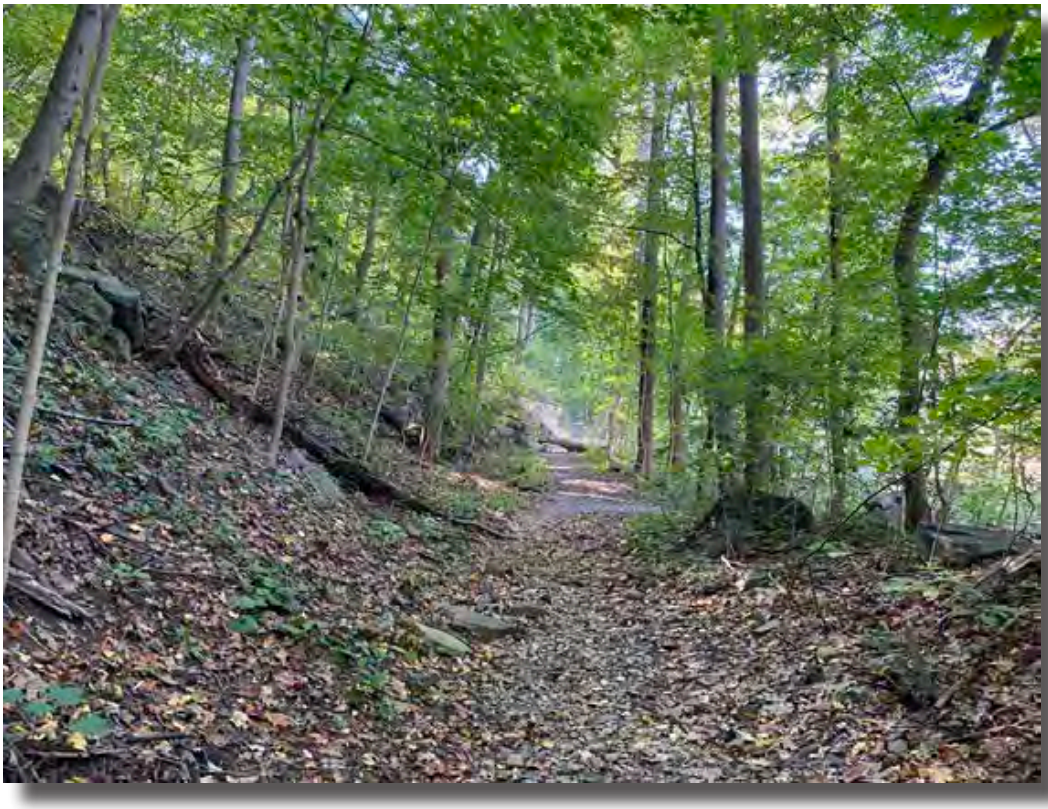

Plate 7.4: Overview of gravel access road within the APE.

Photo view: Southwest

Photographer: Sean McHugh

Date: October 22, 2021

Plate 7.5: Overview of Dam 6 removal APE along the southern bank of the creek, showing sparse vegetation and rocky ground.

Photo view: West

Photographer: Sean McHugh

Date: October 22, 2021

Plate 7.6: Overview of northern creek bank.

Note, gravel area marks the location of a buried sewer line.

Photo view: West

Photographer: Sean McHugh

Date: October 22, 2021

Plate 7.7: Overview of the southern bank within the APE.

Photo view: West

Photographer: Sean McHugh

Date: October 22, 2021

Plate 7.8: Overview of a U.S.G.S. gauging station abandoned in 2006 on the southern bank of the creek.

Note, a concrete encased sewer line is visible crossing the creek in the lower right corner of the image.

Photo view: West

Photographer: Sean McHugh

Date: October 22, 2021

Plate 7.9: Overview of Dam 6 and brick industrial buildings in the background.

Note, an existing sewer line is visible in the image background at the base of the retaining wall adjacent to the creek below the brick building.

Photo view: North

Photographer: Sean McHugh

Date: October 22, 2021

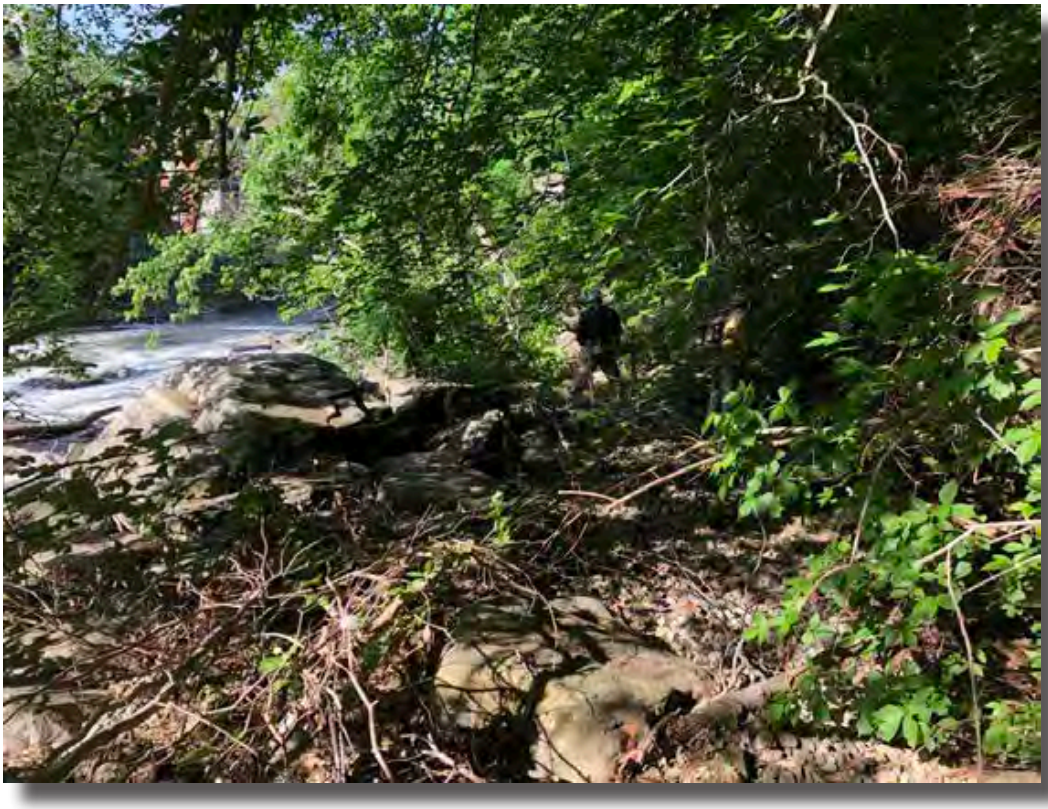

Plate 7.10: Overview of work in progress, STP excavation by field archaeologist Gio Palumbo.

Photo view: Northeast

Photographer: Ted Gold

Date: May 25, 2022

8.0 CONCLUSIONS AND RECOMMENDATIONS

Richard Grubb & Associates, Inc. (RGA) completed a Phase IA archaeological survey within the Area of Potential Effects (APE) for the proposed provision of fish passage at Dams 4, 5, and 6 along the Brandywine Creek in the City of Wilmington, and Brandywine and Christiana hundreds, in New Castle County, Delaware. The Phase IA archaeological survey was conducted pursuant to Section 106 of the National Historic Preservation Act, as amended, and included background research, pedestrian reconnaissance, and an archaeological sensitivity assessment.

Dam 4

The Dam 4 APE falls within the NRHP-listed Bancroft and Sons Cotton Mills Historic District (N03646) (NR: 12/20/1984) and the southern tip of the temporary access road is within the Brandywine Park and Kentmere Parkway Historic District (NR: 7/23/1981). Dam 4 is known as the Kentmere/Bancroft II Dam and dates to 1896, with an abandoned concrete technical fishway built between 1937 and 1950. A pre-1896 dam existed proximate to the location of Dam 4 based on historic maps. The 2022 report by the Center for Historic Architecture and Design (CHAD) concluded that Dam 4 meets the criteria for historical significance at the local level and retains sufficient integrity to be listed in the NRHP under Criteria A and C (Morrissey, Emmons, and Showell 2022). Archaeological monitoring during dam removal is recommended to record the construction design associated with this structure.

The northern bank of the Brandywine Creek within the APE was assessed with a high sensitivity for pre-Contact and historic archaeological resources. Phase IB archaeological testing in the area assessed with high archaeological sensitivity was conducted to determine if archaeological resources exist that could be affected by the proposed undertaking. Testing resulted in the recovery of late nineteenth- through twentieth-century artifacts from secondary contexts of disturbed, possible alluvial, and/or imported soils. Two shovel test pits (STPs) contained coal/slag deposits that may be related to railroad use or re-deposition of regraded railroad-related soils. Shovel Test Pits D4-3, D4-5, and D4-8 contained coal, ash, and/or slag deposits with other artifacts, some of which date to the twentieth century. Coal was found in many of the STPs excavated, likely the result of disposal or colluvial soil movement during twentieth-century railroad use. No intact rail bedding, sleepers, or rails were identified. No intact structural evidence of a mill race was found. The artifacts recovered are not indicative of an intact archaeological resource. No further archaeological survey is recommended in the upland section of the APE. Archaeological monitoring during the dam's removal is recommended.

Dam 5

The Dam 5 APE is partially encompassed within the northwestern boundary of the NRHP-listed Bancroft and Sons Cotton Mills Historic District (N03646) (NR: 12/20/1984) and is the location of the 1878 Rockford Dam (N03646.048) (i.e., Dam 5), which is considered a contributing element to the historic district. Dam 5 is also situated at the location of an earlier early nineteenth-century dam. Dam 5, also known as the Rockford/Bancroft I Dam, is individually eligible for this NRHP under Criteria A and C. The proposed project is not defined at this time but is anticipated to include either just notching of the dam or the dam's complete removal. Archaeological monitoring of notching or removal of the dam is recommended. Modification to Dam 5 will have an adverse effect on this historic property. The southern and northern banks of the Brandywine Creek within the APE is assessed with a high sensitivity for historic archaeological resources due to four map-documented mills that stood in or adjacent to the APE in 1816 along the north bank of the creek and an extant mill race. Archaeological monitoring of the dam's modification is recommended to document dam construction techniques. Further, a Phase IB archaeological survey is recommended within the areas assessed with high sensitivity outside of existing buried utility locations to determine if archaeological resources are present that could be affected by the proposed undertaking.

Dam 6

The Dam 6 APE includes the Lower Hagley Yard Dam associated with the nineteenth through early twentieth-century DuPont Company of black powder manufacturers. The 2022 report by CHAD concluded that Dam 6, the Lower Hagley Yard Dam, meets the criteria for historical significance at the local level and retains sufficient integrity to be listed in the NRHP (Morrissey, Emmons, and Showell 2022). The southern bank of the Brandywine Creek within the APE was assessed with a high sensitivity for pre-Contact archaeological resources due to its environmental setting and a moderate sensitivity for historic archaeological resources due to its proximity to the DuPont complex and its location adjacent to the historic dam. A stone retaining wall is present in the western portion of the APE, and the area of the retaining wall has an assessed high sensitivity for historic archaeological resources. Phase IB archaeological testing was conducted in the upland area assessed with moderate to high archaeological sensitivity to determine if archaeological resources exist that could be affected by the proposed undertaking. Archaeological fieldwork resulted in the recovery of a low number of late nineteenth- through twentieth-century artifacts with no clear spatial patterning. These artifacts are likely the result of secondary deposition and not considered to represent an intact archaeological site. No further archaeological survey is recommended in the upland portion of the APE. Due to the map-documented presence of a dam at the location of Dam 6 in the early nineteenth century, archaeological monitoring of the removal of Dam 6 is recommended to record dam construction techniques.

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APPENDIX A: PROJECT DOCUMENTS

HCA
DELAWARE HISTORICAL & CULTURAL AFFAIRS

Delaware Division of Historical & Cultural Affairs
21 The Green, Dover, Delaware 19901
Tel. (302) 736-7400 | Fax. (302) 739-5660
history.delaware.gov

July 20, 2020

H. Hunter Lott, III, Director
Brandywine Shad 2020
307 A Street
Wilmington, DE 19801

Subject: **Section 106 Consultation, Removal of Brandywine Dams 3, 4, & 6, Brandywine and Christiana Hundreds, New Castle County**
Project Review No. 2020.06.22.06

Dear Mr. Lott:

Thank you for initiating consultation for the above-referenced project with this Office. This is the first of four steps in the Section 106 review process, which is defined in regulations 36 CFR Part 800. The information provided is a good start, but there are several aspects of the scope of the project and potential effects on historic properties that need to be addressed.

You have identified the US Army Corps of Engineers (USACOE) as the lead federal agency for the undertaking. As such, the USACOE would be responsible for fulfilling the requirements of Section 106 and to ensure that an agency official with jurisdiction over the undertaking takes responsibility for compliance. However, it is not clear from the information provided thus far that the USACOE confirmed that it will serve in this role, or if it will delegate legal responsibility for compliance to a State, local, or tribal government official. Are there other federal agencies that are involved in the undertaking?

We appreciate the project description and identification of some properties that may be affected by the undertaking, but the Section 106 process needs a complete description and depiction of the Area of Potential Effects (APE) to ensure proper consideration is given to potential effects. The APE is "…the geographic area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties." (36 CFR 800.16(d)). For this project it should include all adjacent properties on both sides of the Brandywine and any that have the undertaking within their viewshed. We will work with you and the agency official or delegate to establish the APE. Once the APE is established, the identification of historic properties (36 CFR 800.4), the second step in the process, can be accomplished. This would include properties previously identified and evaluated noted in the materials you provided, but may also require further work to determine if there are other properties in the APE with the potential for listing in the National Register. The assessment of adverse effects (36 CFR 800.5), the third step, will determine the need for mitigation for impacts to historic properties. If so, during the final step of the process, the appropriate mitigation measures for resolving adverse effects are defined. Consultation among the federal agencies, your organization, our office and any other consulting parties is key to ensuring that the process is carried out as effectively as possible.

It is up to the lead federal agency to determine the consulting parties for the consultation. If it is the USACOE, they will have the responsibility to make a reasonable and good faith effort to consult with federally recognized Indian tribes that that might attach religious or cultural significance to historic properties in the APE and invite them to be consulting parties. In addition to the entities you identify by way of letter copy, we suggest Preservation Delaware, Inc., the Lenape Indian Tribe of Delaware, the Archaeological Society of Delaware, the Friends of Wilmington Parks, and any other local organizations and groups proximal to the project. The USACOE is also responsible for a plan to involve the public to ensure appropriate opportunity for input.

We look forward to additional information for the undertaking and continued consultation. Please feel free to contact me if you have any questions at (302) 736-7406 or john.w.martin@delaware.gov.

Sincerely,

John W. Martin, RPA
Cultural Preservation Specialist

c: Gwen Davis, Deputy SHPO
Nicole Minnichbach, USACOE (electronic)
Kelly Williams, Department of Public Works, City of Wilmington (electronic)
Debra C. Martin, Department of Planning and Development, City of Wilmington (electronic)
John McCarthy, DNREC (electronic)

HCA
DELAWARE HISTORICAL & CULTURAL AFFAIRS

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history.delaware.gov

August 6, 2021

Mr. Tyler Kreider
Kleinschmidt Group
[letter submitted via email]

RE: Brandywine Dams 4 & 6 – Phase IA architectural reports and Brandywine Dams 2, 4 & 6 – Phase IA archaeological proposal (DE SHPO project review no. 2020.06.22.06)

Thank you for providing us with the opportunity to comment on the Phase IA architectural background research reports prepared by the University of Delaware Center for Historic Architecture and Design (CHAD), and the Phase IA archaeological background research proposal prepared by Richard Grubb Associates (RGA) for the Brandywine Dams projects. We have reviewed these documents and would like to offer the following comments.

While we have a number of comments on the CHAD reports (see attachment), they were helpful in determining the level of effort needed for the next steps in the Section 106 process. We agree that both Dam 4 and Dam 6 should be individually evaluated for their eligibility for listing in the National Register of Historic Places. For Dam 4, additional information on the existing fish ladder, including its date of construction and who built it, should be included in the background historical research.

For Dam 6, the bridge and culvert on the access road must be included in the evaluation. The CHAD report states that these structures will not be "altered as a result of this project." However, project plans are not yet complete, and we recall from the field meeting earlier this year that some form of reinforcement may be needed to allow equipment to pass over the bridge in particular. Additionally, the Section 106 review process requires consideration of resources that *may* be affected, which would include inadvertent damage that may occur during the course of the project. Similarly, we are concerned about the proximity of buildings/structures to the north side of the dam, which are not described in the report. Although the U.S. Army Corps of Engineers' permit area abuts but does not include them, it would be prudent to at least identify the age and nature of these buildings/structures for consideration as planning and consultation for the project continues.

Addressing our comments (and those of other consulting parties) on the reports may be done as stand alone, final reports if the applicant so wishes. However, changes could also be incorporated into the Phase II evaluation. As has been discussed before, it would be more efficient and meaningful if the dams along on the Brandywine were considered more holistically. As illustrated in the Phase IA draft reports, currently there is a lack of consideration of the relationship among the resources, and thereby aspects of their potential significance may be missed. For both the architectural and archaeological surveys, we strongly recommend a coordinated approach, taking into consideration that these three structures are part of a larger system with shared historic contexts.

RGA's proposal for archaeological Phase IA survey covers the proposed projects at Dams 4 and 6, but also for Dam 2. Consultation for the project being considered for Dam 2 has not yet been initiated. We recommend that the applicant rectify this as soon as possible. The proposal offers a fairly standard approach for background research and assessment of the potential for sites to be present. However, the area for research of known sites

should be much broader. Using the center of each dam as a point of reference for a half-mile radius study area will not likely yield sufficient information on the types of sites that may be present in the project areas. At a minimum, research should include adjacent areas the length of the APE; better would be to look at sites that occur in similar environments along the Brandywine drainage. We have a few other minor comments on the proposal as well (see attached).

Thank you for consideration of these comments. Please let us know if you have any questions, or would like to discuss further. We look forward to continuing consultation on these projects.

Sincerely,

Gwenyth A. Davis

Gwenyth A. Davis, Archaeologist
Deputy State Historic Preservation Officer

Attachment

ec: Dave Caplan, Philadelphia District, U.S. Army Corps of Engineers
Nicole Minnichbach, Philadelphia District, U.S. Army Corps of Engineers
H. Hunter Lott, III, Director, Brandywine Shad 2020
Jim Shanahan, Brandywine Shad 2020
Gerald Kauffman, Director, University of Delaware Water Resources Center
Catherine Morrissey, Assoc. Dir., University of Delaware Center for Historic Architecture and Design
Debra Martin, Preservation Planner, City of Wilmington
Elizabeth Hatch, Preservation Planner, New Castle County
Melody Abbott, Archaeologist, DNREC

Letter to T. Kreider
Brandywine Dams – Attachment
August 6, 2021

DE SHPO Technical Comments on Reports & Proposal

Phase IA Architectural Survey Reports (CHAD)

General/Common to Dam 4 and Dam 6 reports:

- The title pages refer to the work as Phase I Identification, but Phase IA Reconnaissance is the more appropriate term for the level of survey performed.
- Page numbers are needed
- Number, and integrate photos and figures in the body of the report. Ensure figures have north arrows, and that figures and aerial photos identify the location of the project areas.
- Please correct regulatory citations:
    - The implementing regulation for Section 106 of the National Historic Preservation Act is **36 CFR 800**.
    - It is not clear to what "(ACHP 1966)" refers. While the Act was first passed by Congress in 1966, it has been amended several times. The Advisory Council on Historic Preservation issues the 36 CFR 800 regulations, which were last amended in 2004. See www.achp.gov.
    - The definition of APE given in the Dam 4 report is attributable to the Section 106 regulations, specifically 36 CFR 800.16(d). Re: statement made in the Dam 6 report, please note that the APE does not necessarily equal the permit area defined by the Corps' regulations.
    - Ask the Corps for the proper name of the law to which Appendix C applies.
- Historic Background & Context: Inclusion of the generic context for "prehistoric" sites in Delaware may not be needed for these reports, given the nature of the study. If it is to be retained, note that the context is missing discussion of the Contact period. Discussion of what the contexts (prehistoric and historic) indicate about the types of archaeological sites that may be anticipated in the project areas would also be needed, with additional sources consulted and cited.
- The identified resources, and the APEs as a whole, should be described in much more detail. How are the dams damaged?
- Potential additional sources of info: 1820 Heald Map? DelDOT reports, perhaps background for SR141/Tyler McConnell Bridge project, and Rockland area projects (e.g. https://deldot.gov/environmental/archaeology/papermakers/index.shtml)

Dam 4

- Introduction: The term "documentation" inappropriate here; the purpose of a Phase I is to identify resources that may require further evaluation to determine National Register eligibility. In referencing the locations of the abutments, please use cardinal directions (not left/right).
- Concur that individual evaluation of the dam is needed; however additional information about the fish ladder is needed (date of construction? who built it? are there plans?)

Dam 6:

- Historic Background & Context: Check names of nominations (Eleutherian Mills NHL; Brandywine Powder Mills National Register Historic District). Typo in dates of remarks attributed to Lamont DuPont in 1936 – discussing 1939 event?
- There is only brief description of the dam in its current state, and no description of the bridge or culvert. What are the structures(?) that appear to be shown in the aerial in the eastern part of the APE? In the 2021photo, what are buildings on the right side of the image - part of the Experimental Station? (see above comments and cover letter)
- Map clearly showing where the identified resources are, relationship to each other, would be helpful.
- Concur that individual evaluation of the dam is needed, but the bridge and culvert should be evaluated as well (see cover letter comments)

RGA proposal

- To clarify, consultation with HCA/SHPO has been initiated for Dams 4 and 6, but not 2. The applicant should initiate consultation ASAP.
- Fairly standard approach. Disagree with using center of dam as the point of reference for background research. Look at the area adjacent to the whole APE, and preferably the Brandywine drainage.
- Proposal should include coordinating research w/CHAD so as not to miss info/duplicate efforts.
- SHPO will accommodate RGA's researchers, whether in-person or remote.
- The proposal should allow for edits to address all consulting parties' comments on the draft report, including federal, state and local agencies, Tribes, and others.
- SHPO currently requires one hard copy and one digital copy of final reports.

RICHARD GRUBB & ASSOCIATES
Historic Architecture • Archaeology • Historical Research
259 Prospect Plains Road | Building D | Cranbury, New Jersey 08512 | 609-655-0692 | www.rgaincorporated.com

May 4, 2022

Nicole Minnichbach
Cultural Resource Specialist and Tribal Liaison
CENAP-PLE
Philadelphia District
United States Army Corps of Engineers
100 Penn Square East
Philadelphia, Pennsylvania, 19107

Re: Scope of Work, Phase IB Archaeological Survey, Proposed Removal of Brandywine Creek Dams 4 and 6, City of Wilmington, Brandywine and Christiana Hundreds, New Castle County, Delaware (DHCA Project Review No. 2020.06.22.06)

Dear Ms. Minnichbach:

Richard Grubb & Associates, Inc. (RGA) is pleased to submit this Scope of Work (SOW) to you for review associated with a proposed Phase IB archaeological survey within the Area of Potential Effects (APE) associated with the proposed removal of Brandywine Creek Dam 4 in the City of Wilmington and Brandywine Hundred and with the proposed removal of Brandywine Creek Dam 6 in the City of Wilmington and Brandywine and Christiana Hundreds, New Castle County. The project requires a permit from the United States Army Corps of Engineers (ACOE) and, as such, necessitates compliance with Section 106 of the National Historic Preservation Act of 1966, as amended. Dams 4 and 6 are situated within Brandywine Creek State Park and Dam 4 is located within the National Register of Historic Places-listed Bancroft and Sons Cotton Mills Historic District (NR: 12/20/1984). Dam 6 contains an early nineteenth-century dam.

RGA completed a Phase IA archaeological survey for the referenced dams in December 2021 and recommended Phase IB archaeological survey in areas of assessed moderate to high archaeological sensitivity, as well as archaeological monitoring during dam removal. The Delaware Division of Historical and Cultural Affairs (DHCA) concurred with the results and recommendations presented in the Phase IA archaeological survey. The purpose of the Phase IB archaeological survey is to determine if previously unidentified archaeological sites are present or absent within the limits of disturbance (LOD) for the proposed undertaking and to make appropriate recommendations for further survey (i.e., Phase II archaeological survey) or no further survey, as warranted. The survey for Dams 4 and 6 will be presented in a Phase IA and Phase IB archaeological survey report that includes the survey results for both dams, that meets the Secretary of the Interior's *Standards and Guidelines for Archaeology and Historic Preservation* (1983), and complies with the archaeological survey and reporting guidelines of the DHCA. The project archaeologist will meet the Secretary of the Interior's *Professional Qualifications Standards* for Archaeology (36 CFR Part 61). RGA is seeking concurrence on this scope of work from your office, the DHCA, and the City of Wilmington prior to fieldwork commencement.

The following tasks will be completed for the Phase IB archaeological survey at Dams 4 and 6:

- Coordination with the Delaware Division of State Parks archaeologist Melody Abbott regarding the Phase IB archaeological survey fieldwork schedule.

- Completion of a One-Call utility mark out request.

- Subsurface testing within the portions of the proposed LOD that were previously assessed with a moderate to high pre-Contact and historic archaeological sensitivity and/or historic archaeological sensitivity. Subsurface testing will include the excavation of 16 STPs dug at 15-meter intervals at Dam 4 and 23 STPs at 15-meter intervals at Dam 6. If necessary, up to eight (8) additional STPs will be dug at each dam at 7.5-meter or closer intervals to further investigate identified archaeological deposits. These STPs will either be divided into four (4) bracket STPs to surround up to two (2) positive STPs with intact archaeological deposits or, should a cluster of positive tests with intact archaeological deposits be identified, the eight (8) bracket tests will be distributed to better define site boundaries. No STPs will be excavated in asphalt, gravel, or concrete paved surfaces, in rock covered surfaces, at existing utilities, or in areas of standing water. The STPs will measure roughly 30 centimeters in diameter and will be excavated up to approximately one meter below ground surface, to the top of the C-horizon, to the top of the water table, or to an impasse, whichever is encountered first. Should deep historic fills be identified, a hand auger will be employed to attempt to reach depths greater than one meter unless an impasse is encountered. Excavated soils will be screened through ¼-inch wire mesh screen to facilitate the recovery of artifacts. Recovered artifacts will be separated by stratum and will be placed in resealable polyethylene bags with an accompanying tag that lists the appropriate provenience information. Exposed soil profiles will be recorded on standardized forms. An STP log will be created and will be appended to the technical report. Upon excavation completion, all STPs will be backfilled. The location of all STPs will be plotted on survey base maps. RGA will not enter into the Brandywine Creek. A proposed testing map is enclosed for each dam. Fieldwork is anticipated to take up to one day at each dam.

- RGA will contact DHCA Cultural Preservation Specialist Sarah Carr via phone during fieldwork to discuss the preliminary findings.

- Washing, analysis, and curation of recovered artifacts. An artifact catalog will be appended to the technical report. All recovered artifacts will be provided to the DHCA's Center for Material Culture. Artifacts recovered will be curated to meet the Center's standards.

- Graphics production, including a map showing the locations of each STP, presence of artifacts in STPs, and identified archaeological site boundaries, if any sites are identified.

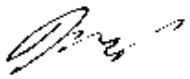
- Assessment of integrity of archaeological sites, if present.

- Preparation of CRS01, CRS04, and CRS09 survey forms, if necessary.

- Preparation of a Phase IA/Phase IB report for Dams 4 and 6 that will include management recommendations.

Please contact Michael Gall at 609-655-0692, ext. 318 (mgall@rgaincorporated.com) if you have any questions.

Very truly yours,



Michael J. Gall, M.A., RPA
Principal Senior Archaeologist

Enclosures

Cc : Sarah Carr, DHCA
Gwen Davis, DHCA
Debra Campagnari Martin, Historic Preservation Planner, City of Wilmington
James B. Shanahan, Brandywine Shad 2020
Tyler Kreider, Kleinschmidt
Gene Bailey, Diamond State Port Corporation
Melody Abbott, Delaware State Parks

Attachment: Proposed Shovel Test Pit Maps

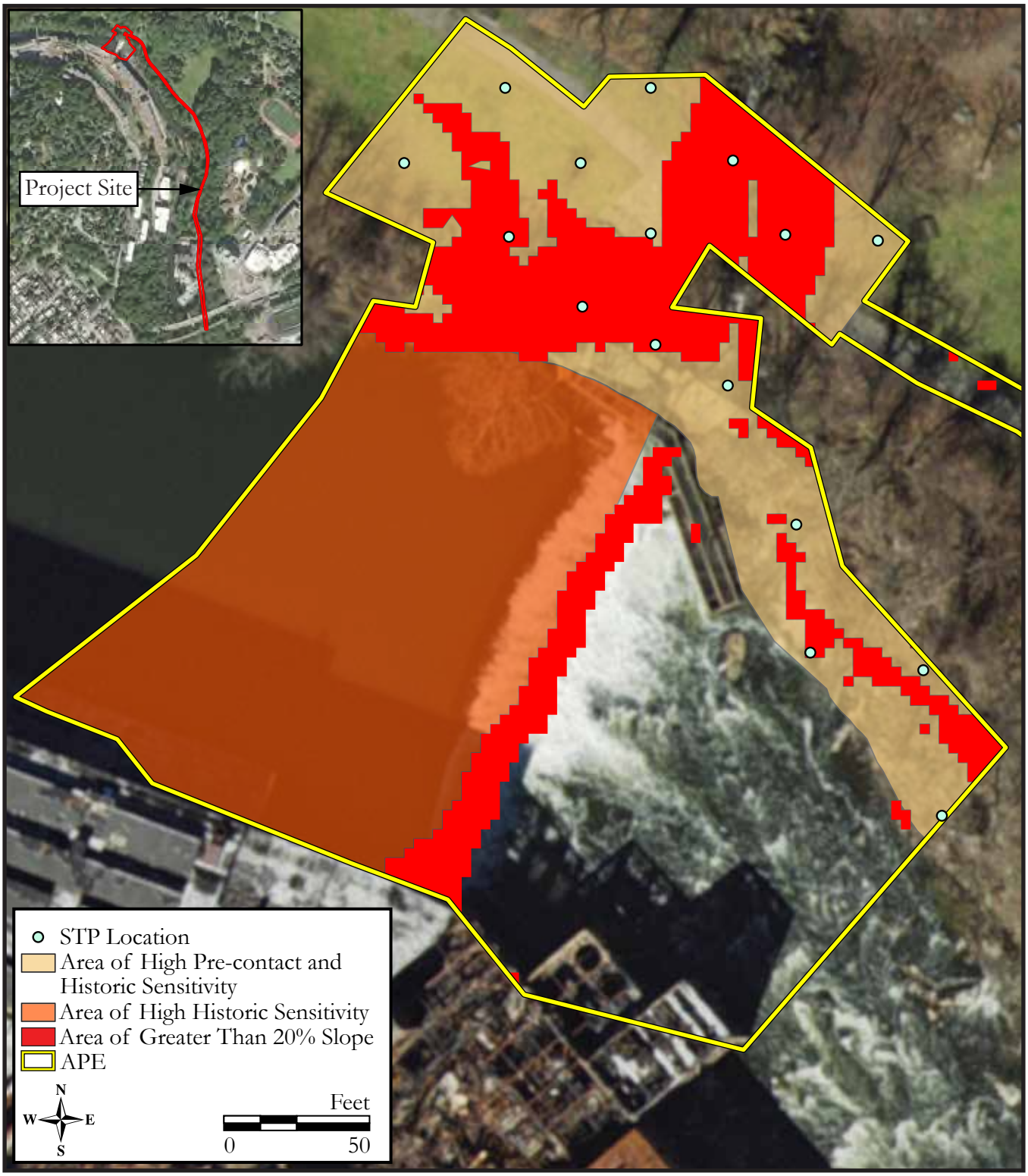


Figure 1: Aerial showing the APE for Dam 4, areas of 20 percent or greater slope, areas of assessed archaeological sensitivity, and proposed shovel test pit locations.

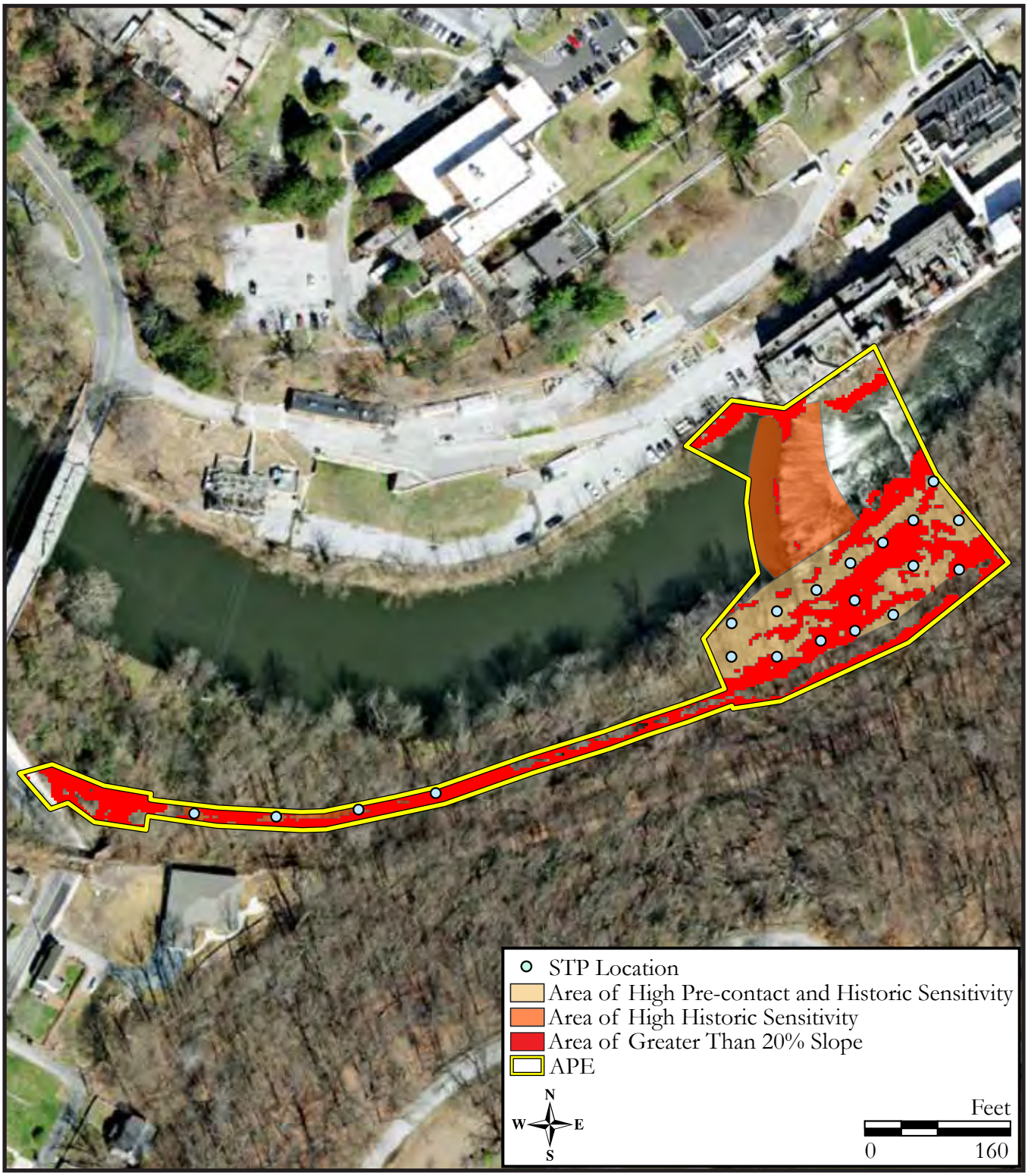


Figure 2: Aerial showing the APE for Dam 6, areas of 20 percent or greater slope, areas of assessed archaeological sensitivity, and proposed shovel test pit locations.

From:	Carr, Sarah (DOS)
To:	Tyler Kreider; Davis, Gwen (DOS); Minnichbach, Nicole C CIV USARMY CENAP (USA); Debbie Martin; Abbott, Melody (DNREC)
Cc:	Caplan, David J CIV USARMY CENAP (USA); Michael Gall; Hunter Lott; Gerald Kauffman; Jim Shanahan; Rick Stuckey; Schaible, Todd A CIV USARMY CENAP (USA); Scott Ault; McGonigle, Thomas; Gene Bailey
Subject:	RE: Brandywine River: Dam 4 and Dam 6 Phase 1B Archaeological Scope for review
Date:	Thursday, May 5, 2022 2:24:11 PM

Good afternoon,

Thank you for providing a revised scope of work for Phase IB archaeological survey. DE SHPO finds the revised scope sufficient. Please keep us informed as work begins.

Sarah Carr
she/her
Cultural Preservation Specialist - Archaeologist
29 N. State St| Dover, DE 19901
tel (302) 736-7431
Historical and Cultural Affairs

From: Tyler Kreider <Tyler.Kreider@KleinschmidtGroup.com>
Sent: Wednesday, May 4, 2022 11:53 AM
To: Carr, Sarah (DOS) <Sarah.Carr@delaware.gov>; Davis, Gwen (DOS) <Gwen.Davis@delaware.gov>; Minnichbach, Nicole C CIV USARMY CENAP (USA) <Nicole.C.Minnichbach@usace.army.mil>; Debbie Martin <DMARTIN@wilmingtonde.gov>; Abbott, Melody (DNREC) <Melody.Abbott@delaware.gov>
Cc: Caplan, David J CIV USARMY CENAP (USA) <David.J.Caplan@usace.army.mil>; Michael Gall <mgall@rgaincorporated.com>; Hunter Lott <hunterlott@aol.com>; Gerald Kauffman <jerryk@udel.edu>; Jim Shanahan <jim1960superfine@gmail.com>; Rick Stuckey <rick.stuckey@gmail.com>; Schaible, Todd A CIV USARMY CENAP (USA) <Todd.A.Schaible@usace.army.mil>; Scott Ault <Scott.Ault@KleinschmidtGroup.com>; McGonigle, Thomas <Thomas.McGonigle@btlaw.com>; Gene Bailey <gbailey@port.state.de.us>
Subject: RE: Brandywine River: Dam 4 and Dam 6 Phase 1B Archaeological Scope for review

Nikki, Gwen, Sarah, and Debbie,

Based on your input below, we are proposing the attached scope of work for Dams 4 and 6 that includes additional STPs around any positive holes to define a tentative limit on a site boundary. While the proposed scope of work does put an upper limit on the additional STPs at a positive STP, this is primarily for purposes of estimating costs for this work. RGA and our team recognize the need

to perform adequate STPs to assess the integrity of a site and will work with Sarah as work progresses to inform characterization of any positive STPs.

Please indicate if this revised scope is acceptable by the end of the week (if feasible), and if so, we will plan to implement it as soon as field conditions and staff availability allow.

Regards,

Tyler Kreider
Kleinschmidt
Office: 717.983.4066
\\kleinschmidtusa.com\Condor\Jobs\3452\001\Docs\Permitting\SHPO\Brandywine Dams 4 & 6 Proposed Phase IB Scope rvsd 4-25-2022.pdf

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From: Tyler Kreider <Tyler.Kreider@KleinschmidtGroup.com>
Sent: Tuesday, April 26, 2022 8:16 AM
To: Carr, Sarah (DOS) <Sarah.Carr@delaware.gov>; Davis, Gwen (DOS) <Gwen.Davis@delaware.gov>; Minnichbach, Nicole C CIV USARMY CENAP (USA) <Nicole.C.Minnichbach@usace.army.mil>; Debbie Martin <DMARTIN@wilmingtonde.gov>; Abbott, Melody (DNREC) <Melody.Abbott@delaware.gov>
Cc: Caplan, David J CIV USARMY CENAP (USA) <David.J.Caplan@usace.army.mil>; Michael Gall <mgall@rgaincorporated.com>; Hunter Lott <hunterlott@aol.com>; Gerald Kauffman <jerryk@udel.edu>; Jim Shanahan <jim1960superfine@gmail.com>; Rick Stuckey <rick.stuckey@gmail.com>; Schaible, Todd A CIV USARMY CENAP (USA) <Todd.A.Schaible@usace.army.mil>; Scott Ault <Scott.Ault@KleinschmidtGroup.com>; McGonigle, Thomas <Thomas.McGonigle@btlaw.com>; Gene Bailey <gbailey@port.state.de.us>
Subject: RE: Brandywine River: Dam 4 and Dam 6 Phase 1B Archaeological Scope for review

Sarah,
Thank you for comments on behalf of DHCA.

Nikki and Debbie,
Should we expect any comments from your organization or look to revise the Phase 1B scope based on the below comments?

Tyler Kreider
Kleinschmidt
Office: 717.983.4066

From: Carr, Sarah (DOS) <Sarah.Carr@delaware.gov>
Sent: Friday, April 22, 2022 3:25 PM
To: Davis, Gwen (DOS) <Gwen.Davis@delaware.gov>; Tyler Kreider <Tyler.Kreider@KleinschmidtGroup.com>; Minnichbach, Nicole C CIV USARMY CENAP (USA) <Nicole.C.Minnichbach@usace.army.mil>; Debbie Martin <DMARTIN@wilmingtonde.gov>; Abbott,

Melody (DNREC) <Melody.Abbott@delaware.gov>
Cc: Caplan, David J CIV USARMY CENAP (USA) <David.J.Caplan@usace.army.mil>; Michael Gall <mgall@rgaincorporated.com>; Hunter Lott <hunterlott@aol.com>; Gerald Kauffman <jerryk@udel.edu>; Jim Shanahan <jim1960superfine@gmail.com>; Rick Stuckey <rick.stuckey@gmail.com>; Schaible, Todd A CIV USARMY CENAP (USA) <Todd.A.Schaible@usace.army.mil>; Scott Ault <Scott.Ault@KleinschmidtGroup.com>; McGonigle, Thomas <Thomas.McGonigle@btlaw.com>; Gene Bailey <gbailey@port.state.de.us>
Subject: RE: Brandywine River: Dam 4 and Dam 6 Phase 1B Archaeological Scope for review

Hi Tyler,

Below are our comments on the proposed scope of work for Phase IB archaeological survey for Dams 4 and 6. We are finishing our review of CHAD's revised Phase II Architectural Survey and will respond early next week.

- Division of State Parks' archaeologist should be contacted as a consulting party, along with the Corps, DHCA, and the City's preservation planner, etc. Per Delaware Code 7Del.C.§5313(a)(1), a permit for archaeological work on State lands is not needed for activities which are already subject to federal laws or regulations relating to archaeological resources (i.e., Section 106 of the NHPA). Please note that if a permit *were* required, it would be under the purview of DHCA, not DNREC.
- Please clarify "up to 4 additional STPs." Will radials be excavated for *each* positive STP (positive with intact deposits, obviously disregarding disturbed fill)? Or will a maximum of four additional STPs be excavated per location?
- The number of additional judgmental tests should be increased to allow testing in areas of greater than 20% slope if warranted and feasible, to ensure appropriate testing coverage of the APE.
- Although the University of Delaware is a qualified repository for artifacts recovered from State land, in this case it is most appropriate that artifacts and all related documentation should be curated at DCHA's Center for Material Culture. Please see curation standards here. If there are any questions regarding curation, please contact the Curator of Archaeology, Paul Nasca.
- While an assessment of potential integrity of a site may be possible at the Phase IB level of archaeological survey, it is unlikely that significance can be appropriately addressed. Please see the survey guidelines. Generally speaking, our Office does not provide concurrence with an assessment of potential significance for a Phase IB archaeological survey, as the primary goal is to identify if sites exist.
- If a site is identified, required survey forms would include CRS01, CRS04, and CRS09.
- As mentioned, please remain in contact while completing the Phase IB survey, so we are able to appropriately address if a potential site is found, or discuss alternative testing measures, including auger testing at the bottom of STPs, if there are fill deposits. This will assist in expediting the review process as time is of the essence.

Do not hesitate to reach out with any questions.

Sarah Carr
she/her
Cultural Preservation Specialist - Archaeologist
29 N. State St| Dover, DE 19901
tel (302) 736-7431
Historical and Cultural Affairs

From: Davis, Gwen (DOS) <Gwen.Davis@delaware.gov>
Sent: Monday, April 18, 2022 4:13 PM
To: Tyler Kreider <Tyler.Kreider@KleinschmidtGroup.com>; Carr, Sarah (DOS) <Sarah.Carr@delaware.gov>; Minnichbach, Nicole C CIV USARMY CENAP (USA) <Nicole.C.Minnichbach@usace.army.mil>; Debbie Martin <DMARTIN@wilmingtonde.gov>; Abbott, Melody (DNREC) <Melody.Abbott@delaware.gov>
Cc: Caplan, David J CIV USARMY CENAP (USA) <David.J.Caplan@usace.army.mil>; Michael Gall <mgall@rgaincorporated.com>; Hunter Lott <hunterlott@aol.com>; Gerald Kauffman <jerryk@udel.edu>; Jim Shanahan <jim1960superfine@gmail.com>; Rick Stuckey <rick.stuckey@gmail.com>; Schaible, Todd A CIV USARMY CENAP (USA) <Todd.A.Schaible@usace.army.mil>; Scott Ault <Scott.Ault@KleinschmidtGroup.com>; McGonigle, Thomas <Thomas.McGonigle@btlaw.com>; Gene Bailey <gbailey@port.state.de.us>
Subject: RE: Brandywine River: Dam 4 and Dam 6 Phase 1B Archaeological Scope for review

Tyler,
Thanks for sending proposed scope of work for Phase IB archaeological survey for Dams 4 and 6. We will review and get back to you as soon as possible. Thank you.
-- Gwen

Gwenyth A. Davis
Deputy State Historic Preservation Officer
Delaware Division of Historical and Cultural Affairs
New Address: 29 North State St., Dover, DE 19901
tel (302) 736-7410 gwen.davis@delaware.gov
website: https://history.delaware.gov/

From: Tyler Kreider <Tyler.Kreider@KleinschmidtGroup.com>
Sent: Monday, April 18, 2022 12:15 PM
To: Carr, Sarah (DOS) <Sarah.Carr@delaware.gov>; Minnichbach, Nicole C CIV USARMY CENAP (USA) <Nicole.C.Minnichbach@usace.army.mil>; Davis, Gwen (DOS) <Gwen.Davis@delaware.gov>; Debbie Martin <DMARTIN@wilmingtonde.gov>; Abbott, Melody (DNREC) <Melody.Abbott@delaware.gov>

Cc: Caplan, David J CIV USARMY CENAP (USA) <David.J.Caplan@usace.army.mil>; Michael Gall <mgall@rgaincorporated.com>; Hunter Lott <hunterlott@aol.com>; Gerald Kauffman <jerryk@udel.edu>; Jim Shanahan <jim1960superfine@gmail.com>; Rick Stuckey <rick.stuckey@gmail.com>; Schaible, Todd A CIV USARMY CENAP (USA) <Todd.A.Schaible@usace.army.mil>; Scott Ault <Scott.Ault@KleinschmidtGroup.com>; McGonigle, Thomas <Thomas.McGonigle@btlaw.com>; Gene Bailey <gbailey@port.state.de.us>
Subject: Brandywine River: Dam 4 and Dam 6 Phase 1B Archaeological Scope for review

Nikki, Gwen, Sarah, Debbie, and Melody,
Please see the attached for the Phase 1B Archaeology scope proposed for further investigations at Dams 4 and 6 on the Brandywine, as requested during earlier consultation. Please review as quickly as feasible to allow us to commence the field work as soon as we can this spring. I'm requesting any comments on this scope of work by COB April 25, but given the tight timeline, please advise if you need more time to review.

Nikki and Debbie,
We have added Melody to the review, as she is involved with these investigations for DE Parks.

Regards,

Tyler Kreider
Kleinschmidt
Office: 717.983.4066
\\kleinschmidtusa.com\Condor\Jobs\3452\001\Docs\Permitting\SHPO\Brandywine Dams 4 & 6 Phase IB Proposed Scope - Rvsd 4-14-2022.pdf

---

From: Tyler Kreider <Tyler.Kreider@KleinschmidtGroup.com>
Sent: Wednesday, April 13, 2022 2:36 PM
To: Carr, Sarah (DOS) <Sarah.Carr@delaware.gov>; Minnichbach, Nicole C CIV USARMY CENAP (USA) <Nicole.C.Minnichbach@usace.army.mil>; Davis, Gwen (DOS) <Gwen.Davis@delaware.gov>; Debbie Martin <DMARTIN@wilmingtonde.gov>
Cc: Caplan, David J CIV USARMY CENAP (USA) <David.J.Caplan@usace.army.mil>; Catherine Morrissey <cmorriss@udel.edu>; Michael Gall <mgall@rgaincorporated.com>; Hunter Lott <hunterlott@aol.com>; Gerald Kauffman <jerryk@udel.edu>; Jim Shanahan <jim1960superfine@gmail.com>; Rick Stuckey <rick.stuckey@gmail.com>; Schaible, Todd A CIV USARMY CENAP (USA) <Todd.A.Schaible@usace.army.mil>; Scott Ault <Scott.Ault@KleinschmidtGroup.com>
Subject: RE: Brandywine River: Dam 4 and Dam 6 Submission of Phase II Architectural and Phase IA Archaeological Reports

Nikki, Gwen, Sarah, and Debbie,

On behalf of Brandywine Shad 2020, I'm providing the revised Phase II Architectural Report (by CHAD) for your review, as updated based on our discussions earlier this year, and the DHCA's 1/21/22 comment letter, as well as input from the City (on January 22, 2022) and USACE.

At this time Brandywine Shad 2020 would like to propose that we move ahead with consultation assuming the site has archaeological sensitivity and that the revised Phase II Architectural report (attached, same report as submitted by DSPC for Dam 2) and initial Phase 1A Archaeological report, be used to guide that discussion. Brandywine Shad 2020 is planning to submit a revised Phase 1A archaeological report (with your comments addressed) with results from the Phase 1B archaeological investigations that are planned for this spring. Given the timing, we are asking to assume the site has archaeological sensitivity as identified in the Phase 1A report and start consultation acknowledging that those areas of archaeological sensitivity will need to be protected (at a minimum) during construction, unless cleared by results of the Phase 1B investigations. Kleinschmidt is working with RGA to develop a Phase 1B scope for your review prior to initiating that work and hopes to submit it in the next few weeks.

Please confirm receipt of this Phase II report and advise as to what you recommend for a next step in this consultation.

Thank you,

Tyler Kreider
Kleinschmidt
Office: 717.983.4066
"J:\3452\001\Docs\Permitting\SHPO\Site Reports\CHAD 2022 Phase II Architectural Investigations for Lower Brandywine Dams_2022 April.pdf"

From: Carr, Sarah (DOS) <Sarah.Carr@delaware.gov>
Sent: Friday, January 21, 2022 4:14 PM
To: Tyler Kreider <Tyler.Kreider@KleinschmidtGroup.com>; Minnichbach, Nicole C CIV USARMY CENAP (USA) <Nicole.C.Minnichbach@usace.army.mil>; Davis, Gwen (DOS) <Gwen.Davis@delaware.gov>; Debbie Martin <DMARTIN@wilmingtonde.gov>
Cc: Caplan, David J CIV USARMY CENAP (USA) <David.J.Caplan@usace.army.mil>; Catherine Morrissey <cmorriss@udel.edu>; Michael Gall <mgall@rgaincorporated.com>; Hunter Lott <hunterlott@aol.com>; Gerald Kauffman <jerryk@udel.edu>; Jim Shanahan <jim1960superfine@gmail.com>; Schaible, Todd A CIV USARMY CENAP (USA) <Todd.A.Schaible@usace.army.mil>
Subject: RE: Brandywine River: Dam 4 and Dam 6 Submission of Phase II Architectural and Phase IA Archaeological Reports

Good afternoon,

Please see attached for our response the Phase IA archaeological report and the Phase II architectural report for the proposed undertaking at the Brandywine Dams. Do not hesitate to reach out if you have any questions or concerns.

Sarah Carr
she/her
Cultural Preservation Specialist - Archaeologist

21 The Green| Dover, DE 19901
tel (302) 736-7431
Historical and Cultural Affairs

From: Tyler Kreider <Tyler.Kreider@KleinschmidtGroup.com>
Sent: Thursday, January 20, 2022 11:45 AM
To: Carr, Sarah (DOS) <Sarah.Carr@delaware.gov>; Minnichbach, Nicole C CIV USARMY CENAP (USA) <Nicole.C.Minnichbach@usace.army.mil>; Davis, Gwen (DOS) <Gwen.Davis@delaware.gov>; Debbie Martin <DMARTIN@wilmingtonde.gov>
Cc: Caplan, David J CIV USARMY CENAP (USA) <David.J.Caplan@usace.army.mil>; Catherine Morrissey <cmorriss@udel.edu>; Michael Gall <mgall@rgaincorporated.com>; Hunter Lott <hunterlott@aol.com>; Gerald Kauffman <jerryk@udel.edu>; Jim Shanahan <jim1960superfine@gmail.com>
Subject: RE: Brandywine River: Dam 4 and Dam 6 Submission of Phase II Architectural and Phase IA Archaeological Reports

Nikki, Debbie, Sarah, and Gwen,

Just checking in on this review as we approach 30 days after the submission, as we would like to hold a meeting (virtual or in person) to discuss these reports and review site conditions at Dams 4 & 6 to inform our next steps as the next step in this consultation, although any written comments you may want to share before that meeting would be helpful as well.

Regards,

Tyler Kreider
Kleinschmidt
Office: 717.983.4066

From: Carr, Sarah (DOS) <Sarah.Carr@delaware.gov>
Sent: Tuesday, December 28, 2021 7:57 AM
To: Tyler Kreider <Tyler.Kreider@KleinschmidtGroup.com>; Minnichbach, Nicole C CIV USARMY CENAP (USA) <Nicole.C.Minnichbach@usace.army.mil>; Davis, Gwen (DOS) <Gwen.Davis@delaware.gov>; Debbie Martin <DMARTIN@wilmingtonde.gov>
Cc: Caplan, David J CIV USARMY CENAP (USA) <David.J.Caplan@usace.army.mil>; Catherine Morrissey <cmorriss@udel.edu>; Michael Gall <mgall@rgaincorporated.com>; Hunter Lott <hunterlott@aol.com>; Gerald Kauffman <jerryk@udel.edu>; Jim Shanahan <jim1960superfine@gmail.com>

Subject: RE: Brandywine River: Dam 4 and Dam 6 Submission of Phase II Architectural and Phase IA Archaeological Reports

Good morning,

Thank you for sending this over. We will review and respond with any questions or comments as soon as possible.

Sarah Carr
she/her
Cultural Preservation Specialist - Archaeologist
21 The Green| Dover, DE 19901
tel (302) 736-7431
Historical and Cultural Affairs

From: Tyler Kreider <Tyler.Kreider@KleinschmidtGroup.com>
Sent: Thursday, December 23, 2021 10:59 AM
To: Minnichbach, Nicole C CIV USARMY CENAP (USA) <Nicole.C.Minnichbach@usace.army.mil>; Davis, Gwen (DOS) <Gwen.Davis@delaware.gov>; Carr, Sarah (DOS) <Sarah.Carr@delaware.gov>; Debbie Martin <DMARTIN@wilmingtonde.gov>
Cc: Caplan, David J CIV USARMY CENAP (USA) <David.J.Caplan@usace.army.mil>; Catherine Morrissey <cmorriss@udel.edu>; Michael Gall <mgall@rgaincorporated.com>; Hunter Lott <hunterlott@aol.com>; Gerald Kauffman <jerryk@udel.edu>; Jim Shanahan <jim1960superfine@gmail.com>
Subject: Brandywine River: Dam 4 and Dam 6 Submission of Phase II Architectural and Phase IA Archaeological Reports

Nikki, Gwen, Sarah, and Debbie,
On behalf of Brandywine Shad 2020, please find the cover letter for the submission of the Lower Brandywine River Phase 1A Archaeological and Phase II Architectural Reports attached, including a hyperlink to Kleinschmdit's Sharefile site to download the reports given the file sizes. Please advise if you have any issues downloading the reports or questions on this submission.

We wish you all a wonderful holiday and look forward to working with you on this project in the new year!

Tyler Kreider, P.E. (PA, NY, NJ, DE)
Senior Ecological Engineer
Kleinschmidt

Office: 717.983.4066
Follow us on LinkedIn
We provide practical **solutions** *for renewable energy, water and environmental projects!*

From:	Debbie Martin
To:	Tyler Kreider; Minnichbach, Nicole C CIV USARMY CENAP (USA); Carr, Sarah (DOS); Davis, Gwen (DOS); Abbott, Melody (DNREC)
Cc:	Schaible, Todd A CIV USARMY CENAP (USA); Hoernemann, Todd A CIV USARMY CENAP (USA); Sarlo, Genevieve T CIV USARMY CENAP (USA); McGonigle, Thomas; Gene Bailey; Brian Devine; Rebecca Harris; Scott Ault; Michael Gall
Subject:	Re: Brandywine Dam 2 - Phase 1B Archaeological Scope for review
Date:	Friday, May 6, 2022 8:58:51 AM

Tyler: I'm good with both revised scopes.
Debbie

Debra Campagnari Martin| Historic Preservation Planner
City of Wilmington, Department of Planning
Louis L. Redding City/County Building
800 North French Street
Wilmington, DE 19801
302-576-3107
302-571-4119 (fax)
dmartin@wilmingtonde.gov

From: Tyler Kreider <Tyler.Kreider@KleinschmidtGroup.com>
Sent: Wednesday, May 4, 2022 12:41 PM
To: Minnichbach, Nicole C CIV USARMY CENAP (USA) <Nicole.C.Minnichbach@usace.army.mil>; Debbie Martin <DMARTIN@wilmingtonde.gov>; Carr, Sarah (DOS) <Sarah.Carr@delaware.gov>; Davis, Gwen (DOS) <Gwen.Davis@delaware.gov>; Abbott, Melody (DNREC) <Melody.Abbott@delaware.gov>
Cc: Schaible, Todd A CIV USARMY CENAP (USA) <Todd.A.Schaible@usace.army.mil>; Hoernemann, Todd A CIV USARMY CENAP (USA) <Todd.A.Hoernemann@usace.army.mil>; Sarlo, Genevieve T CIV USARMY CENAP (USA) <Genevieve.T.Sarlo@usace.army.mil>; McGonigle, Thomas <Thomas.McGonigle@btlaw.com>; Gene Bailey <gbailey@port.state.de.us>; Brian Devine <bdevine@verdantas.com>; Rebecca Harris <rharris@verdantas.com>; Scott Ault <Scott.Ault@KleinschmidtGroup.com>; Michael Gall <mgall@rgaincorporated.com>
Subject: [EXTERNAL] RE: Brandywine Dam 2 - Phase 1B Archaeological Scope for review

Nikki,
Yes, this is a revised SOW that reflects changes made based on your/Sarah's comments on the earlier submission. If you prefer, we can revise the revised SOW document to have today's date. Please advise and if requested, we can turn around the updated SOW/date today.

Thank you,

Tyler Kreider
Kleinschmidt [kleinschmidtgroup.com]
Office: 717.983.4066

From: Minnichbach, Nicole C CIV USARMY CENAP (USA) <Nicole.C.Minnichbach@usace.army.mil>
Sent: Wednesday, May 4, 2022 12:26 PM
To: Tyler Kreider <Tyler.Kreider@KleinschmidtGroup.com>; Debbie Martin <DMARTIN@wilmingtonde.gov>; Carr, Sarah (DOS) <Sarah.Carr@delaware.gov>; Davis, Gwen (DOS) <Gwen.Davis@delaware.gov>; Abbott, Melody (DNREC) <Melody.Abbott@delaware.gov>
Cc: Schaible, Todd A CIV USARMY CENAP (USA) <Todd.A.Schaible@usace.army.mil>; Hoernemann, Todd A CIV USARMY CENAP (USA) <Todd.A.Hoernemann@usace.army.mil>; Sarlo, Genevieve T CIV USARMY CENAP (USA) <Genevieve.T.Sarlo@usace.army.mil>; McGonigle, Thomas <Thomas.McGonigle@btlaw.com>; Gene Bailey <gbailey@port.state.de.us>; Brian Devine <bdevine@verdantas.com>; Rebecca Harris <rharris@verdantas.com>; Scott Ault <Scott.Ault@KleinschmidtGroup.com>; Michael Gall <mgall@rgaincorporated.com>
Subject: RE: Brandywine Dam 2 - Phase 1B Archaeological Scope for review

If this is a revised SOW for the Phase IB that includes radials and the other aspects discussed by myself and Sarah – then I approve of the scope if Sarah is satisfied.

However – this is a revised SOW therefore the date of submission should also be updated to reflect today's date.

Thank you,

Nicole Cooper Minnichbach
Cultural Resource Specialist and Tribal Liaison
CENAP-PLE
100 Penn Square East
Philadelphia, PA 19107
(O) 215-656-6556
(M) 215-834-1065

From: Tyler Kreider <Tyler.Kreider@KleinschmidtGroup.com>
Sent: Wednesday, May 4, 2022 11:52 AM
To: Minnichbach, Nicole C CIV USARMY CENAP (USA) <Nicole.C.Minnichbach@usace.army.mil>; Debbie Martin <DMARTIN@wilmingtonde.gov>; Carr, Sarah (DOS) <Sarah.Carr@delaware.gov>; Davis, Gwen (DOS) <Gwen.Davis@delaware.gov>; Abbott, Melody (DNREC) <Melody.Abbott@delaware.gov>
Cc: Schaible, Todd A CIV USARMY CENAP (USA) <Todd.A.Schaible@usace.army.mil>; Hoernemann, Todd A CIV USARMY CENAP (USA) <Todd.A.Hoernemann@usace.army.mil>; Sarlo, Genevieve T CIV USARMY CENAP (USA) <Genevieve.T.Sarlo@usace.army.mil>; McGonigle, Thomas <Thomas.McGonigle@btlaw.com>; Gene Bailey <gbailey@port.state.de.us>; Brian Devine

<bdevine@verdantas.com>; Rebecca Harris <rharris@verdantas.com>; Scott Ault <Scott.Ault@KleinschmidtGroup.com>; Michael Gall <mgall@rgaincorporated.com>
Subject: [URL Verdict: Neutral][Non-DoD Source] RE: Brandywine Dam 2 - Phase 1B Archaeological Scope for review

Nikki, Gwen, Sarah, and Debbie,

Based on your input, we are proposing the attached scope of work for Dam 2 that includes additional STPs around any positive holes to define a tentative limit on a site boundary. While the proposed scope of work does put an upper limit on the additional STPs at a positive STP, this is primarily for purposes of estimating costs for this work. RGA and our team recognize the need to perform adequate STPs to assess the integrity of a site and will work with Sarah as work progresses to inform characterization of any positive STPs.

Please indicate if this revised scope is acceptable by the end of the week (if feasible), and if so, we will plan to implement it as soon as field conditions and staff availability allow.

Regards,

Tyler Kreider
Kleinschmidt
Office: 717.983.4066
\\kleinschmidtusa.com\Condor\Jobs\5023\001\Docs\Permitting\SHPO\Brandywine Dam 2 Proposed Phase IB Scope rvsd 4-25-2022.pdf

---

From: Tyler Kreider <Tyler.Kreider@KleinschmidtGroup.com>
Sent: Tuesday, April 26, 2022 9:31 AM
To: Minnichbach, Nicole C CIV USARMY CENAP (USA) <Nicole.C.Minnichbach@usace.army.mil>; Debbie Martin <DMARTIN@wilmingtonde.gov>; Carr, Sarah (DOS) <Sarah.Carr@delaware.gov>; Davis, Gwen (DOS) <Gwen.Davis@delaware.gov>; Abbott, Melody (DNREC) <Melody.Abbott@delaware.gov>
Cc: Schaible, Todd A CIV USARMY CENAP (USA) <Todd.A.Schaible@usace.army.mil>; Hoernemann, Todd A CIV USARMY CENAP (USA) <Todd.A.Hoernemann@usace.army.mil>; Sarlo, Genevieve T CIV USARMY CENAP (USA) <Genevieve.T.Sarlo@usace.army.mil>; McGonigle, Thomas <Thomas.McGonigle@btlaw.com>; Gene Bailey <gbailey@port.state.de.us>; Brian Devine <bdevine@verdantas.com>; Rebecca Harris <rharris@verdantas.com>; Scott Ault <Scott.Ault@KleinschmidtGroup.com>; Michael Gall <mgall@rgaincorporated.com>
Subject: RE: Brandywine Dam 2 - Phase 1B Archaeological Scope for review

Thank you all for your comments – we will update the scope and re-share shortly.

Regards,

Tyler Kreider
Kleinschmidt

Office: 717.983.4066

From: Minnichbach, Nicole C CIV USARMY CENAP (USA) <Nicole.C.Minnichbach@usace.army.mil>
Sent: Tuesday, April 26, 2022 8:57 AM
To: Debbie Martin <DMARTIN@wilmingtonde.gov>; Tyler Kreider <Tyler.Kreider@KleinschmidtGroup.com>; Carr, Sarah (DOS) <Sarah.Carr@delaware.gov>; Davis, Gwen (DOS) <Gwen.Davis@delaware.gov>; Abbott, Melody (DNREC) <Melody.Abbott@delaware.gov>
Cc: Schaible, Todd A CIV USARMY CENAP (USA) <Todd.A.Schaible@usace.army.mil>; Hoernemann, Todd A CIV USARMY CENAP (USA) <Todd.A.Hoernemann@usace.army.mil>; Sarlo, Genevieve T CIV USARMY CENAP (USA) <Genevieve.T.Sarlo@usace.army.mil>; McGonigle, Thomas <Thomas.McGonigle@btlaw.com>; Gene Bailey <gbailey@port.state.de.us>; Brian Devine <bdevine@verdantas.com>; Rebecca Harris <rharris@verdantas.com>; Scott Ault <Scott.Ault@KleinschmidtGroup.com>; Michael Gall <mgall@rgaincorporated.com>
Subject: RE: Brandywine Dam 2 - Phase 1B Archaeological Scope for review

I agree with the DESHPO comments, and further agree that radials should be implemented on each positive STP in order to get a tentative limit on the site boundary.

And please keep us informed as fieldwork progresses so we can make real time decisions.

Thank you

Nicole Cooper Minnichbach
Cultural Resource Specialist and Tribal Liaison
CENAP-PLE
100 Penn Square East
Philadelphia, PA 19107
(O) 215-656-6556
(M) 215-834-1065

From: Debbie Martin <DMARTIN@wilmingtonde.gov>
Sent: Tuesday, April 26, 2022 8:40 AM
To: Tyler Kreider <Tyler.Kreider@KleinschmidtGroup.com>; Carr, Sarah (DOS) <Sarah.Carr@delaware.gov>; Davis, Gwen (DOS) <Gwen.Davis@delaware.gov>; Minnichbach, Nicole C CIV USARMY CENAP (USA) <Nicole.C.Minnichbach@usace.army.mil>; Abbott, Melody (DNREC) <Melody.Abbott@delaware.gov>
Cc: Schaible, Todd A CIV USARMY CENAP (USA) <Todd.A.Schaible@usace.army.mil>; Hoernemann,

Todd A CIV USARMY CENAP (USA) <Todd.A.Hoernemann@usace.army.mil>; Sarlo, Genevieve T CIV USARMY CENAP (USA) <Genevieve.T.Sarlo@usace.army.mil>; McGonigle, Thomas <Thomas.McGonigle@btlaw.com>; Gene Bailey <gbailey@port.state.de.us>; Brian Devine <bdevine@verdantas.com>; Rebecca Harris <rharris@verdantas.com>; Scott Ault <Scott.Ault@KleinschmidtGroup.com>; Michael Gall <mgall@rgaincorporated.com>
Subject: [URL Verdict: Neutral][Non-DoD Source] Re: Brandywine Dam 2 - Phase 1B Archaeological Scope for review

Tyler: I agree with the comments from SHPO and the adjustment of testing for the area formerly referred to as disturbed.
Thank you.
Debbie

Debra Campagnari Martin| Historic Preservation Planner
City of Wilmington, Department of Planning
Louis L. Redding City/County Building
800 North French Street
Wilmington, DE 19801
302-576-3107
302-571-4119 (fax)
dmartin@wilmingtonde.gov

From: Tyler Kreider <Tyler.Kreider@KleinschmidtGroup.com>
Sent: Tuesday, April 26, 2022 8:17 AM
To: Carr, Sarah (DOS) <Sarah.Carr@delaware.gov>; Davis, Gwen (DOS) <Gwen.Davis@delaware.gov>; Minnichbach, Nicole C CIV USARMY CENAP (USA) <Nicole.C.Minnichbach@usace.army.mil>; Debbie Martin <DMARTIN@wilmingtonde.gov>; Abbott, Melody (DNREC) <Melody.Abbott@delaware.gov>
Cc: Schaible, Todd A CIV USARMY CENAP (USA) <Todd.A.Schaible@usace.army.mil>; Hoernemann, Todd A CIV USARMY CENAP (USA) <Todd.A.Hoernemann@usace.army.mil>; Sarlo, Genevieve T CIV USARMY CENAP (USA) <Genevieve.T.Sarlo@usace.army.mil>; McGonigle, Thomas <Thomas.McGonigle@btlaw.com>; Gene Bailey <gbailey@port.state.de.us>; Brian Devine <bdevine@verdantas.com>; Rebecca Harris <rharris@verdantas.com>; Scott Ault <Scott.Ault@KleinschmidtGroup.com>; Michael Gall <mgall@rgaincorporated.com>
Subject: [EXTERNAL] RE: Brandywine Dam 2 - Phase 1B Archaeological Scope for review

Sarah,
Thank you for comments on behalf of DHCA.

Nikki,
Per your 4/18/22 email, you found the scope of work appropriate, and we note that you ask that RGA/DSPC keep you informed as investigations occur, if a site or feature is found.

Debbie,
Should we expect any comments from you or look to revise the Phase 1B scope based on the below comments from DHCA?

Thank you,

Tyler Kreider
Kleinschmidt [kleinschmidtgroup.com]
Office: 717.983.4066

From: Carr, Sarah (DOS) <Sarah.Carr@delaware.gov>
Sent: Friday, April 22, 2022 3:24 PM
To: Davis, Gwen (DOS) <Gwen.Davis@delaware.gov>; Tyler Kreider <Tyler.Kreider@KleinschmidtGroup.com>; Minnichbach, Nicole C CIV USARMY CENAP (USA) <Nicole.C.Minnichbach@usace.army.mil>; Debbie Martin <DMARTIN@wilmingtonde.gov>; Abbott, Melody (DNREC) <Melody.Abbott@delaware.gov>
Cc: Schaible, Todd A CIV USARMY CENAP (USA) <Todd.A.Schaible@usace.army.mil>; Hoernemann, Todd A CIV USARMY CENAP (USA) <Todd.A.Hoernemann@usace.army.mil>; Sarlo, Genevieve T CIV USARMY CENAP (USA) <Genevieve.T.Sarlo@usace.army.mil>; McGonigle, Thomas <Thomas.McGonigle@btlaw.com>; Gene Bailey <gbailey@port.state.de.us>; Brian Devine <bdevine@verdantas.com>; Rebecca Harris <rharris@verdantas.com>; Scott Ault <Scott.Ault@KleinschmidtGroup.com>; Michael Gall <mgall@rgaincorporated.com>
Subject: RE: Brandywine Dam 2 - Phase 1B Archaeological Scope for review

Hi Tyler,

Below are our comments on the proposed scope of work for Phase IB archaeological survey for Dam 2. We are finishing our review of CHAD's revised Phase II Architectural Survey and will respond early next week.

- Page 2: Division of State Parks' archaeologist should be contacted as a consulting party, along with the Corps, DHCA, and the City's preservation planner, etc. Per Delaware Code 7Del.C.§5313(a)(1), a permit for archaeological work on State lands is not needed for activities which are already subject to federal laws or regulations relating to archaeological resources (i.e., Section 106 of the NHPA). Please note that if a permit *were* required, it would be under the purview of DHCA, not DNREC.
- Please clarify "up to 4 additional STPs." Will radials be excavated for *each* positive STP (positive with intact deposits, obviously disregarding disturbed fill)? Or will a maximum of four additional STPs be excavated per location?
- The number of additional judgmental tests should be increased to allow testing in areas of greater than 20% slope if warranted and feasible, to ensure appropriate testing coverage of the APE.
- Although the University of Delaware is a qualified repository for artifacts recovered from State

land, in this case it is most appropriate that artifacts and all related documentation should be curated at DCHA's Center for Material Culture. Please see curation standards here. If there are any questions regarding curation, please contact the Curator of Archaeology, Paul Nasca.

- While an assessment of potential integrity of a site may be possible at the Phase IB level of archaeological survey, it is unlikely that significance can be appropriately addressed. Please see the survey guidelines. Generally speaking, our Office does not provide concurrence with an assessment of potential significance for a Phase IB archaeological survey, as the primary goal is to identify if sites exist.
- If a site is identified, required survey forms would include CRS01, CRS04, and CRS09, to be submitted through DHCA's GIS mapping portal, CHRIS.
- As Nikki mentioned, please remain in contact while completing the Phase IB survey, so we are able to appropriately address if a potential site is found, or discuss alternative testing measures, including auger testing at the bottom of STPs, if there are fill deposits.

Do not hesitate to reach out with any questions.

Sarah Carr
she/her
Cultural Preservation Specialist - Archaeologist
29 N. State St| Dover, DE 19901
tel (302) 736-7431

[history.delaware.gov]

From: Davis, Gwen (DOS) <Gwen.Davis@delaware.gov>
Sent: Monday, April 18, 2022 4:13 PM
To: Tyler Kreider <Tyler.Kreider@KleinschmidtGroup.com>; Minnichbach, Nicole C CIV USARMY CENAP (USA) <Nicole.C.Minnichbach@usace.army.mil>; Carr, Sarah (DOS) <Sarah.Carr@delaware.gov>; Debbie Martin <DMARTIN@wilmingtonde.gov>; Abbott, Melody (DNREC) <Melody.Abbott@delaware.gov>
Cc: Schaible, Todd A CIV USARMY CENAP (USA) <Todd.A.Schaible@usace.army.mil>; Hoernemann, Todd A CIV USARMY CENAP (USA) <Todd.A.Hoernemann@usace.army.mil>; Sarlo, Genevieve T CIV USARMY CENAP (USA) <Genevieve.T.Sarlo@usace.army.mil>; McGonigle, Thomas <Thomas.McGonigle@btlaw.com>; Gene Bailey <gbailey@port.state.de.us>; Brian Devine <bdevine@verdantas.com>; Rebecca Harris <rharris@verdantas.com>; Scott Ault <Scott.Ault@KleinschmidtGroup.com>; Michael Gall <mgall@rgaincorporated.com>
Subject: RE: Brandywine Dam 2 - Phase 1B Archaeological Scope for review

Tyler,
Thanks for sending proposed scope of work for Phase IB archaeological survey for Dam 2. We will review and get back to you as soon as possible. Thank you.
-- Gwen

Gwenyth A. Davis
Deputy State Historic Preservation Officer
Delaware Division of Historical and Cultural Affairs
New Address: 29 North State St., Dover, DE 19901
tel (302) 736-7410 gwen.davis@delaware.gov
website: https://history.delaware.gov/
[history.delaware.gov]

From: Tyler Kreider <Tyler.Kreider@KleinschmidtGroup.com>
Sent: Monday, April 18, 2022 12:09 PM
To: Minnichbach, Nicole C CIV USARMY CENAP (USA) <Nicole.C.Minnichbach@usace.army.mil>; Davis, Gwen (DOS) <Gwen.Davis@delaware.gov>; Carr, Sarah (DOS) <Sarah.Carr@delaware.gov>; Debbie Martin <DMARTIN@wilmingtonde.gov>; Abbott, Melody (DNREC) <Melody.Abbott@delaware.gov>
Cc: Schaible, Todd A CIV USARMY CENAP (USA) <Todd.A.Schaible@usace.army.mil>; Hoernemann, Todd A CIV USARMY CENAP (USA) <Todd.A.Hoernemann@usace.army.mil>; Sarlo, Genevieve T CIV USARMY CENAP (USA) <Genevieve.T.Sarlo@usace.army.mil>; McGonigle, Thomas <Thomas.McGonigle@btlaw.com>; Gene Bailey <gbailey@port.state.de.us>; Brian Devine <bdevine@verdantas.com>; Rebecca Harris <rharris@verdantas.com>; Scott Ault <Scott.Ault@KleinschmidtGroup.com>; Michael Gall <mgall@rgaincorporated.com>
Subject: Brandywine Dam 2 - Phase 1B Archaeological Scope for review

Nikki, Gwen, Sarah, Debbie, and Melody,
Please see the attached for the Phase 1B Archaeology scope that DSPC is proposing for further investigations at Dam 2, as requested during earlier consultation. Please review as quickly as feasible to allow us to commence the field work as soon as we can this spring. I'm requesting any comments on this scope of work by COB April 25, but given the tight timeline, please advise if you need more time to review.

Nikki and Debbie,
We have added Melody to the review, as she is involved with these investigations for DE Parks.

Regards,

Tyler Kreider
Kleinschmidt [gcc02.safelinks.protection.outlook.com]
Office: 717.983.4066
"J:\5023\001\Docs\Permitting\SHPO\Brandywine Dam 2 Phase IB Proposed Scope - Rvsd 4-14-2022.pdf"

From: Tyler Kreider <Tyler.Kreider@KleinschmidtGroup.com>

Sent: Wednesday, April 13, 2022 2:31 PM
To: Minnichbach, Nicole C CIV USARMY CENAP (USA) <Nicole.C.Minnichbach@usace.army.mil>; Davis, Gwen (DOS) <Gwen.Davis@delaware.gov>; Carr, Sarah (DOS) <Sarah.Carr@delaware.gov>; Debbie Martin <DMARTIN@wilmingtonde.gov>; Schaible, Todd A CIV USARMY CENAP (USA) <Todd.A.Schaible@usace.army.mil>
Cc: Hoernemann, Todd A CIV USARMY CENAP (USA) <Todd.A.Hoernemann@usace.army.mil>; Sarlo, Genevieve T CIV USARMY CENAP (USA) <Genevieve.T.Sarlo@usace.army.mil>; McGonigle, Thomas <Thomas.McGonigle@btlaw.com>; Gene Bailey <gbailey@port.state.de.us>; Brian Devine <bdevine@verdantas.com>; Rebecca Harris <rharris@verdantas.com>; Scott Ault <Scott.Ault@KleinschmidtGroup.com>; Michael Gall <mgall@rgaincorporated.com>; Catherine Morrissey <cmorriss@udel.edu>
Subject: Brandywine Dam 2 - Submission of Revised Phase II Architectural Report and Permit Sketch

Nikki, Gwen, Sarah, and Debbie,
On behalf of DSPC, I'm providing the revised Phase II Architectural Report (by CHAD) for your review, as updated based on our discussions earlier this year, and the DHCA's 2/21/22 comment letter, as well as input from the City (2/22/22) and USACE (3/4/22).

As discussed on the April 7, 2022 call, DSPC proposed that we move ahead with consultation assuming the Dam 2 site has archaeological sensitivity and that the revised Phase II Architectural report (attached) and initial Phase 1A Archaeological report, be used to guide that consultation (along with the forthcoming alternatives analysis). DSPC is planning to submit a revised Dam 2 Phase 1A archaeological report (with your comments addressed) with results from the Dam 2 Phase 1B archaeological investigations that are planned for later this spring. As stated on the call, given the timing, we are asking to assume the site has archaeological sensitivity as identified in the Phase 1A report and start consultation acknowledging that those areas of archaeological sensitivity will need to be protected (at a minimum) during construction, unless cleared by results of the Phase 1B investigations. Kleinschmidt/DSPC is working with RGA to develop a Phase 1B scope for your review prior to initiating that work (hopeful to share in next week or so).

As discussed on the call on April 7, 2022, we will plan to capture the requested updates to the Phase 1A Archaeological Report in the report for Phase 1B work later this spring.

We appreciate USACE starting the outreach to the consulting parties and are providing the attached updated sketch that has the same LOD as shared in the permit drawings; but clarifies impacts and protection areas as requested on our April 7, 2022 call. I believe this will help with consultation and clarify those items discussed on that call. We are working on the form provided by USACE and an alternatives analysis and will provide those as they are available.

Please confirm receipt of these documents due to file size.

Thank you,

Tyler Kreider, P.E. (PA, NY, NJ, DE, GA)
Senior Ecological Engineer

Kleinschmidt [gcc02.safelinks.protection.outlook.com]
Office: 717.983.4066
Follow us on LinkedIn [gcc02.safelinks.protection.outlook.com]
We provide practical **solutions** *for renewable energy, water and environmental projects!*
"J:\5023\001\Docs\Permitting\SHPO\CHAD 2022 Phase II Architectural Investigations for Lower Brandywine Dams_2022 April.pdf"
"J:\5023\001\Drawings\Sent\20220413 Brandywine NLF - LOD figure-SK-1 - Revised 20220412.pdf"

WILMINGTON 311

Please use the 311 system for all City of Wilmington information or non-emergency service requests.
To reach Wilmington311, dial '311' if you are calling on your cell phone from inside the city limits,
or 302-576-2620 if calling from either outside the city or from a landline.

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HCA
DELAWARE HISTORICAL & CULTURAL AFFAIRS

Delaware Division of Historical & Cultural Affairs
29 N. State St., Dover, Delaware 19901
Tel. (302) 736-7400 | Fax. (302) 739-5660
history.delaware.gov

May 5, 2022

Tyler Kreider
Kleinschmidt
400 Historic Drive
P.O. Box 278
Strasburg, PA 17579

Subject: **Edgemoor Port: Brandywine Dam 2 Submission of Revised Phase II Architectural Report**
SHPO Project Review # 2018.06.01.01

Dear Mr. Krieder,

This Office is in receipt of the revised report *Phase II Architectural Investigations for the Fish Passage at the Lower Brandywine River Dams, 2, 3, 4, 5, and 6*. The Phase II architectural evaluation report was prepared by the University of Delaware Center for Historic Architecture and Design (CHAD) for both the proposed undertaking at Edgemoor Port and associated mitigation at Brandywine Dam 2, as well as the separate proposed undertakings on behalf of Brandywine Shad 2020. As these are separate and distinct undertakings, a separate letter will be sent from our Office to Brandywine Shad 2020. We appreciate the consideration of our comments from January 22, 2022 and the revisions made to the report. We find this report meets the standards of this Office.

The architectural evaluation report did an excellent job providing detailed background regarding different types of dams and the history of dams as it relates to industrialization on the Brandywine River. CHAD's report recommended Dam 2 and Dam 5 to be eligible for the inclusion in the National Register of Historic Places (NRHP) as individual resources outside of their respective historic districts. CHAD also recommended Dams 3, 4, and 6 to be eligible for inclusion in the NRHP. CHAD has drawn appropriate boundaries around each eligible resource. While not evaluated as such for this undertaking, the report finds the Lower Brandywine Dams have the potential to be considered eligible to listing as a historic district. We concur with these conclusions.

Four additional properties were identified and evaluated for the proposed undertakings at the Brandywine Dams. The bridge and stone wall culvert, the platform bridge, and the stone wall culvert were recommended not eligible for inclusion in the NRHP as they do not meet the criteria outlined by the 1996 *Historic Bridge Criteria for Determining Significance* (A.G. Lichtenstein and Associates, Inc). The United States Geological Survey Water Monitoring Station Gage House was also recommended not eligible as it does not represent the significance of water studies, is not associated with significant people, nor does it represent significant and distinguishable characteristics. This Office concurs with these recommendations.

DuPont Experimental Station buildings 241, 269, 256, and 236 were identified but not evaluated as part of this undertaking. The four buildings are part of a 150-acre campus composed of approximately 50 buildings. CHAD recommends that to fully evaluate eligibility, the entire DuPont Experimental Station should be evaluated. Such

evaluation is outside the scope for the proposed undertaking. This Office concurs buildings 241, 269, 256, and 236 would need to be evaluated with the entire DuPont Experimental Station.

We thank CHAD for their thorough revisions on the Phase II architectural evaluation report and consideration of our feedback. We look forward to continuing consultation with the U.S. Army Corps of Engineers regarding the proposed undertaking at Edgemoor and the associated mitigation at Fox Point and Brandywine Dam 2. We welcome the opportunity to further discuss the ongoing cultural resource investigations with USACE and the invited consulting parties. If you have any questions I can be reached at (302) 736-7431 or sarah.carr@delaware.gov.

Sincerely,

Sarah Carr
Cultural Preservation Specialist

c: Gwen Davis, Deputy SHPO
David Caplan, USACE
Todd Schaible, USACE
Genevieve Sarlo, USACE
Eugene Bailey, Diamond State Port Corporation
Rebecca Harris, Verdantas
Michael Gall, RGA
Melody Abbott, DNREC
Debra Martin, City of Wilmington
Nicole Minnichbach, USACE
Todd Hoernemann, USACE
Thomas McGonigle, Barnes & Thornburg LLP
Brian Devine, Verdantas
Scott Ault, Kleinschmidt
Catherine Morrissey, CHAD

APPENDIX B: NATIONAL REGISTER OF HISTORIC PLACES CRITERIA OF ADVERSE EFFECT

1. National Register of Historic Places Criteria
2. Criteria of Adverse Effect

1. National Register of Historic Places Criteria

Significant historic properties include districts, structures, objects, or sites that are at least 50 years of age and meet at least one National Register criterion. Criteria used in the evaluation process are specified in the Code of Federal Regulations, Title 36, Part 60, National Register of Historic Places (36 CFR 60.4). To be eligible for inclusion in the National Register of Historic Places, a historic property(s) must possess:

> the quality of significance in American History, architecture, archaeology, engineering, and culture [that] is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association and:

a) that are associated with events that have made a significant contribution to the broad patterns of our history, or

b) that are associated with the lives of persons significant in our past, or

c) that embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components lack individual distinction, or

d) that have yielded, or may be likely to yield, information important in prehistory or history (36 CFR 60.4).

There are several criteria considerations. Ordinarily, cemeteries, birthplaces, or graves of historical figures, properties owned by religious institutions or used for religious purposes, structures that have been moved from their original locations, reconstructed historic buildings, properties primarily commemorative in nature, and properties that have achieved significance within the past 50 years shall not be considered eligible for the National Register of Historic Places. However, such properties will qualify if they are integral parts of districts that do meet the criteria or if they fall within the following categories:

a) a religious property deriving primary significance from architectural or artistic distinction or historical importance, or

b) a building or structure removed from its original location but which is significant primarily for architectural value, or which is the surviving structure most importantly associated with a historic person or event, or

c) a birthplace or grave of a historical figure of outstanding importance if there is no other appropriate site or building directly associated with his/her productive life, or

d) a cemetery which derives its primary significance from graves of persons of transcendent importance, from age, from distinctive design features, or from association with historic events, or

e) a reconstructed building when accurately executed in a suitable environment and presented in a dignified manner as part of a restoration master plan, and when no other building or structure with the same association has survived, or

f) a property primarily commemorative in intent if design, age, tradition, or symbolic value has invested it with its own historic significance, or

g) a property achieving significance within the past 50 years if it is of exceptional importance. (36 CFR 60.4)

When conducting National Register evaluations, the physical characteristics and historic significance of the overall property are examined. While a property in its entirety may be considered eligible based on Criteria A, B, C, and/or D, specific data is also required for individual components therein based on date, function, history, and physical characteristics, and other information. Resources that do not relate in a significant way to the overall property may contribute if they independently meet the National Register criteria.

A contributing building, site, structure, or object adds to the historic architectural qualities, historic associations, or archeological values for which a property is significant because a) it was present during the period of significance, and possesses historic integrity reflecting its character at that time or is capable of yielding important information about the period, or b) it independently meets the National Register criteria. A non-contributing building, site, structure, or object does not add to the historic architectural qualities, historic associations, or archeological values for which a property is significant because a) it was not present during the period of significance, b) due to alterations, disturbances, additions, or other changes, it no longer possesses historic integrity reflecting its character at that time or is incapable of yielding important information about the period, or c) it does not independently meet the National Register criteria.

Archaeological sites are frequently eligible for inclusion on the National Register under Criterion D. The application of Criterion D to archaeological sites is based on a researcher's assessment of a particular site's significance and whether a particular site is likely to yield important information for the reconstruction of past lifeways (Glassow 1977; Talmage and Chesler 1977; Raab and Klinger 1977; Moratto and Kelly 1978; Raab 1981; Tainter and Lucas 1983; Shott 1987).

Raab and Klinger (1977) have argued that significance should be measured in terms of a site's potential to provide information on specific research issues that are carefully formulated based on prior research studies. Glassow (1977) and Tainter and Lucas (1983) have argued that significance should be judged on the theory neutral dimensions of variety, quantity, clarity, integrity, and environmental context. An archaeological site is evaluated as significant when it possesses the potential to address important research issues and the integrity to convey this significance.

The empirical dimensions of a site, including the presence of sufficient data sets to address significant research issues, must be considered to determine integrity. Only sites possessing both the potential to address specific research questions coupled with integrity are considered significant (King 1998:77; Little 1997:179-180; Little et al. 2000; National Park Service 1995:44-46).

2. Criteria of Adverse Effect

Whenever a historic property may be affected by a proposed undertaking, Federal agency officials must assess whether the project constitutes an adverse effect on the historic property by applying the criteria of adverse effect. According to the Advisory Council on Historic Preservation, the criteria of adverse effect (36 CFR 800.5), is as follows:

> (1) An adverse effect is found when an undertaking may alter, directly or indirectly, any of the characteristics of a historic property that would qualify it for inclusion in the National Register, in a manner that would diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or association. Consideration shall be given to all qualifying characteristics of a historic property, including those that may have been identified subsequent to the original evaluation for the property's

eligibility for the National Register. Adverse effects may include reasonably foreseeable effects caused by the undertaking that may occur later in time, be farther removed in distance or cumulative.

(2) Adverse effects on historic properties include, but are not limited to (36 CFR 800.5(a)(2)):

i) Physical destruction of or damage to all or part of the property;

ii) Alteration of a property, including restoration, rehabilitation, repair, maintenance, stabilization, hazardous material remediation and provision of handicapped access, that is not consistent with the Secretary's Standards for the Treatment of Historic Properties (36 CFR part 68) and applicable guidelines;

iii) Removal of the property from its historic location;

iv) Change of the character of the property's use or of physical features within the property's setting that contribute to its historic significance;

v) Introduction of visual, atmospheric or audible elements that diminish the integrity of the property's significant historic features;

vi) Neglect of a property which causes its deterioration, except where such neglect and deterioration are recognized qualities of a property of religious and cultural significance to an Indian tribe or Native Hawaiian organization; and

vii) Transfer, lease, or sale of property out of Federal ownership or control without adequate and legally enforceable restrictions or conditions to ensure long-term preservation of the property's historic significance.

A finding of adverse effect or no adverse effect could occur based on the extent of alteration to a historic property, and the proposed treatment measures to mitigate the effects of a proposed undertaking. According to 36 CFR 800.5(3)(b):

> The agency official, in consultation with the SHPO/THPO, may propose a finding of no adverse effect when the undertaking's effects do not meet the criteria of § 800.5(a)(1) or the undertaking is modified or conditions are imposed, such as the subsequent review of plans for rehabilitation by the SHPO/THPO to ensure consistency with the Secretary's Standards for the Treatment of Historic Properties (36 CFR part 68) and applicable guidelines, to avoid adverse effects.

Sources

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1978 Optimizing Strategies for Evaluating Archaeological Significance. In Advances in Archaeological Method and Theory, M. B. Schiffer, ed., Academic Press, New York, New York.

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1983 Epistemology of the Significance Concept. American Antiquity 48(4):707-719.

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1977 The Importance of Small, Surface, and Disturbed Sites as Sources of Significant Archaeological Data. United States Park Service, Department of the Interior, Washington D.C.

APPENDIX C: QUALIFICATIONS OF THE PRINCIPAL INVESTIGATOR

CULTURAL RESOURCE CONSULTANTS

RICHARD P. ADAMCZYK
PRINCIPAL INVESTIGATOR, ARCHAEOLOGIST (36 CFR 61)

YEARS OF EXPERIENCE:
With this firm:
2017-Present
With other firms: 0

EDUCATION:
MA 2019
Monmouth University
Anthropology

BA 2018
Monmouth University
Anthropology and History

PROFESSIONAL TRAINING:
Remote Pilot Certificate with a Small UAS Rating (FAA 14 CFR 107.12), February 2020

40-hour Hazardous Waste Operations and Emergency Response (OSHA 29 CFR 1910.120), July 2019

PROFESSIONAL REGISTRATION:
Register of Professional Archaeologists

PROFESSIONAL SOCIETIES:
Archaeological Society of New Jersey (2nd Vice President)

Middle Atlantic Archaeological Conference

Nautical Archaeology Society

Professional Experience Summary:

Richard Adamczyk has experience conducting all phases of archaeological investigations and monitoring projects in New Jersey, Pennsylvania, New York, North Carolina, West Virginia, and the Caribbean (Jamaica and St. Eustatius). He specializes in the pre-Contact period and has an interest in maritime archaeology. Mr. Adamczyk has worked on cultural resource surveys prepared in accordance with Section 106 of the National Historic Preservation Act and other municipal and state cultural resource regulations, and his educational and professional background meet the Secretary of the Interior's Professional Qualification Standards for Archaeology [36 CFR 61]. Mr. Adamczyk also serves as the Curator of the Alan Ewing Carman Museum of Prehistory in Cumberland County, New Jersey.

Representative Project Experience:

Chester Pump Station, Wet Weather Treatment System, City of Chester, Delaware County, PA (Sponsor: DELCORA) Principal Investigator for a Phase IA archaeological survey for the proposed installation of a new wet weather treatment system at the Chester Pump Station, located near the mouth of Chester Creek at the Delaware River. The survey included a geomorphological assessment. The project area was determined to be historically situated on tidal wetlands with evidence of extensive ground disturbance and was assessed with low sensitivity for pre-Contact and historic archaeological resources. The project was performed pursuant to Section 106 of the National Historic Preservation Act, as amended, and in compliance with the Pennsylvania History Code.

Mount Holly Relief Fire Station, Block 86, Lot 4 Terminal Phase II, Township of Mount Holly, Burlington County, NJ (Sponsor: New Jersey Historic Trust) Principal Investigator and Field Director for a Terminal Phase II evaluation and mitigation for the Block 86, Lot 4 Site (28-Bu-927). The site falls partially within the proposed footprint of an addition to the Mount Holly Relief Fire Station, a contributing element to the Mount Holly Historic District (NR: 2/20/1973; NJR: 8/7/1972). The site represents the location of a former fulling/cotton mill and associated millrace constructed before 1730. The investigation identified four historic features, including the former millrace and a creosote-impregnated wooden water pipe. The millrace and water pipe associated with site 28-Bu-927 were recommended to collectively represent a contributing element to the Mount Holly Historic District. No further archaeological survey was recommended, and the NJHPO concurred.

Calpine Deepwater, Block 301, Lot 13 Phase II, Pennsville Township, Salem County, NJ (Sponsor: Deepwater Investment Group, LLC) Field Director for the Phase II evaluation of five pre-Contact period Native American sites (28-Sa-224 through 228) within the Salem River drainage in advance of a proposed warehouse development. Fieldwork consisted of the excavation of 30, 50-centimeter square shovel test pits and 22, three-foot square excavation units within the five sites. Recovered artifacts included debitage (n=22), fire-cracked rock/thermally altered rock (n=11), and sherds of Early Woodland-period ceramic (n=4). The research potential of the five sites was evaluated as part of the larger pre-Contact landscape. The sites were not recommended eligible for the National Register of Historic Places, and no further archaeological survey was recommended.

APPENDIX D: SHOVEL TEST PIT LOG

APPENDIX D: SHOVEL TEST PIT LOG

STP	Depth*	Level	Stratum	Munsell Color	Soil Type	Comments/Artifacts
D4-01	0-7.5	1	Fill 1	10YR 4/2	Sand w/ Roots & 50% Rocks	HM
	7.5-25	2	Fill 2	10YR 2/1	Sandy Silt Loam w/ Roots & 50% Rocks	HM; NR: Sewer pipe fragment
	25-32.5	3	Fill 3	7.5YR 5/8	Sandy Silt Loam w/ Roots & 70% Rocks	NCM
	32.5-100	4	Ab	10YR 4/3	Loamy Sand w/ Roots & 70% Rocks	NCM
D4-02	Not excavated due to rock/spillway					
D4-03	0-48	1	Fill 1	10YR 3/2	Silt Loam	Approximately 50% Coal Ash and Slag HM; NR: Coal ash slag, 10 industrial porcelain tile, 1 asbestos tile
	48-74	2	Fill 2	7.5YR 5/6	Silty Clay Loam w/ 20% Rocks	NCM Stopped by rock
D4-04	0-5	1	Fill 1	10YR 4/4	Silt w/ Roots & 50% Rocks	NCM
	5-12.5	2	Fill 2	10YR 7/8	Coarse Sand w/ Roots & 50% Rocks	NCM
	12.5-15	3	Fill 3	10YR 3/3	Sandy Silt Loam w/ Roots & 70% Rocks	NCM
	15-100	4	Fill 4	10YR 2/2	Silty Clay Loam w/ Roots & 75% Rocks	NCM
D4-05	0-15	1	Fill 1	10YR 5/3	Silt Loam	NR: Landscape staple
	15-34	2	Fill 2	10YR 2/2	Coal & Slag	HM; NR: 100s coal, 50 window glass,10 clear bottle glass, 20 asbestos shingle, 1 large concrete fragment, RR rail plate with spike.
	34-66	3	Fill 3	7.5YR 5/8	Silty Clay Loam w/ 25% Rocks	NCM Stopped by rock
D4-07	Not excavated due to paving stone surface					
D4-06	0-10	1	Fill 1	10YR 3/3	Sandy Clay Loam w/ Roots & 75% Pebbles & Cobbles	HM; NR: Coal
	10-25	2	Fill 2	10YR 6/4 m/w 7.5YR 5/8	Sandy Clay Loam w/ 80% Rocks	HM; NR: Coal
	25-82	3	Fill 3	10YR 2/2 m/w 7.5YR 5/8	Sandy Clay w/ 80% Rocks	HM; NR: Coal
D4-08	0-40	1	Fill 1	10YR 4/3	Sandy Silt Loam w/ Roots & 50% Rocks	Rock, brick, coal, and mortar debris throughout HM; NR: Coal, brick
	40-100	2	Fill 2	10YR 3/1	Sandy Silt Loam w/ Coal Ash	HM; NR: Coal, brick
D4-08E	0-8	1	Fill 1	10YR 5/3	Silt Loam	NCM
	8-100	2	Fill 2	10YR 3/2	Silt w/ 60% Pebbles & Gravels	HM
D4-08N	0-10	1	Fill 1	10YR 4/4	Sandy Silt Loam w/ 50% Rocks	NCM
	10-17.5	2	Fill 2	10YR 2/1	Coarse Sand w/ 60% Rocks	NR: Brick
	17.5-35	3	Fill 3	10YR 4/6	Sandy Loam w/ 60% Rocks	NCM
	35-77.5	4	B	10YR 5/8	Loamy Sand w/ 80% Rocks	NCM Stopped by rock deposit at base of STP and interior wall
D4-08S	0-12.5	1	Fill 1	10YR 4/4	Loam w/ Roots & 40% Rocks	NCM
	12.5-20.5	2	Fill 2	10YR 6/6	Sandy Loam w/ Roots & 40% Rocks	HM
	20.5-27.5	3	Fill 3	5YR 5/8	Sandy Loam w/ 50% Rocks	NCM
	27.5-100	4	B	10YR 2/2	Loamy Sand w/ 50% Rocks	NCM

STP	Depth*	Level	Stratum	Munsell Color	Soil Type	Comments/Artifacts
D4-08W	0-16	1	Fill 1	10YR 3/2	Silt Loam w/ 30% Rocks	NCM
	16-37	2	Fill 2	5YR 4/6 m/w 10YR 4/4	Silt Loam w/ 50% Rocks	HM
	37-52	3	Fill 3	10YR 3/2	Sand w/ 50% Rocks	NCM
						Stopped by rock
D4-09	0-29	1	Fill 1	10YR 6/2	Sand	HM
	29-59	2	Fill 2	10YR 4/2 m/w 10YR 4/4	Sand	NR: Plastic netting
						Stopped by log/rock
						Offset 20' southeast due to boulder pile
D4-10	0-50	1	Fill 1	10YR 4/3	Silt Loam w/ Roots	NCM
						Stopped by water
D4-11	Not excavated due to rock/dam					
D4-12	Not excavated due to rock/dam					
D4-13	Not excavated due to rock/dam					
D4-14	Not excavated due to rock/dam					
D4-15	Not excavated due to rock/dam					
D4-16	Not excavated due to rock/dam					
D6-01	Not excavated due to gravel road/communication line					
D6-02	Not excavated due to gravel road/communication line					
D6-03	0-34.5	1	Ap	10YR 2/2	Loam w/ Roots & 40% Rocks	HM; NR: Modern glass green, window glass?
	34.5-70	2	B	5YR 5/8	Sandy Clay Loam w/ Roots & 70% Rocks	NCM
						Stopped by large rock/boulder cluster at base of STP
D6-04	0-10	1	Fill 1	10YR 3/2	Sandy Silt Loam w/ Roots	NCM
	10-36	2	B1	10YR 6/6	Silt Loam w/ 40% Rocks	NCM
	36-59	3	B2	5YR 4/6	Silty Clay Loam w/ 60% Rocks	NCM
						Stopped by rock
D6-05	0-70	1	A	10YR 4/3	Sandy Silt Loam w/ Roots & 40% Rocks	NCM
						Stopped by massive root complex at bottom of excavation
D6-06	0-10	1	Fill 1	10YR 2/2	Silt Loam w/ 50% Rocks	NCM
						Stopped by boulder impasse
D6-07	0-13	1	A	10YR 4/3	Silt Loam w/ 30% Rocks	NCM
	13-25	2	B	10YR 5/6	Silty Clay Loam w/ 50% Rocks	NCM
						Stopped by rock
						Offset 10' south

STP	Depth*	Level	Stratum	Munsell Color	Soil Type	Comments/Artifacts
D6-08	0-15	1	A	10YR 5/2	Silt Loam w/ 30% Rocks	NR: 3 large sewer line tile frags and large brick/mortar rounded chunk on surface
						Stopped by rock
						Offset 10' south due to underground communication line
D6-09	0-20	1	A	10YR 5/2	Silt Loam	Falls within boulder field; NCM
						Stopped by boulder
D6-10	0-32.5	1	Ap	10YR 2/2	Loamy Sand w/ Roots & 50% Rocks	NCM
	32.5-60	2	B1	10YR 3/3	Loamy Sand w/ Roots & 60% Rocks	NCM
	60-100	3	B2	10YR 4/6	Sandy Clay Loam w/ Roots & 70% Rocks	NCM
D6-11	0-30	1	Ap	10YR 2/2	Coarse Sand w/ Roots & 60% Rocks	NCM
	30-52.5	2	B	10YR 3/3	Sandy Loam w/ Roots & 75% Rocks	NCM
						Stopped by large rock/boulder cluster at base of STP
D6-12	0-21	1	Fill 1	10YR 4/3	Silt Loam w/ Roots & 60% Rocks	NCM
	21-64	2	B	10YR 6/6	Sandy Silt Loam w/ Roots & 60% Rocks	NCM
						Stopped by rock
D6-13	0-32.5	1	Ap	10YR 2/2	Sandy Loam w/ Roots & 30% Rocks	NCM
	32.5-100	2	B	10YR 3/3	Loamy Sand w/ Roots & 50% Rocks	NCM
D6-14	0-30	1	Ap	10YR 2/2	Sandy Loam w/ Roots & 70% Rocks	NCM
	30-45	2	B	10YR 3/3	Loamy Sand w/ Roots & 80% Rocks	NCM
						Stopped by large rock/boulder cluster at base and surrounding STP
D6-15	0-36	1	Fill 1	10YR 4/3	Silt Loam w/ Roots & 30% Rocks	NR: 4 plastic, 1 Styrofoam
						Stopped by rock
D6-16	0-53	1	Fill 1	10YR 4/3	Silt Loam w/ Roots & 60% Rocks	HM; NR: 3 plastic
						Stopped by rock
						Offset 15' west due to gravel pile
D6-17	0-49	1	Fill 1	10YR 4/3	Silt Loam w/ Roots & 60% Rocks	NR: 1 bottle glass
	49-56	2	B	10YR 6/6	Sandy Silt Loam w/ Roots & 60% Rocks	NCM
						Stopped by rock
D6-18	0-13	1	Fill 1	10YR 3/3	Silt Loam w/ Roots & 60% Rocks	HM
	13-22	2	Fill 2	10YR 2/2	Slag	NR: Slag
	22-45	3	B	10YR 6/6	Sandy Silt Loam w/ Roots & 60% Cobbles	NCM
						Stopped by rock
D6-19	0-55	1	Fill 1	10YR 3/3	Silt Loam w/ Roots & 60% Rocks	NCM
	55-76	2	B	10YR 6/6	Sandy Silt Loam w/ Roots & 60% Cobbles	NCM
						Stopped by rock

STP	Depth*	Level	Stratum	Munsell Color	Soil Type	Comments/Artifacts
D6-20	0-17	1	Fill 1	10YR 3/3	Silt Loam w/ Roots & 60% Rocks	NR: 1 vessel glass
	17-31	2	Fill 2	10YR 2/2	Slag	NR: Slag
	31-51	3	B	10YR 6/6	Sandy Silt Loam w/ Roots & 60% Cobbles	NCM

Key:

* Depth in centimeters below ground surface

HM = Historic Cultural Material (see Appendix E)

NR = Not Retained

NCM = No Cultural Material

w/ = With

m/w = Mottled With

APPENDIX E: ARTIFACT CATALOG

APPENDIX E: ARTIFACT CATALOG

Bag #	Context	Level	Depth*	Stratum	Ct.	Group	Artifact Material	Artifact Class	Artifact Type	Description	Measurements/ Dates	Wt. (g)
1	D4-01	1	000-007.5	Fill 1	1	DOM	Ceramic	Whiteware	Indeterminate Form	Body sherd, undecorated interior and exterior	1820-present (Miller et al. 2000:13)	
1	D4-01	1	000-007.5	Fill 1	1	DOM	Ceramic	Porcelaneous	Indeterminate Form	Body sherd, undecorated interior and exterior, possible "Hotel China"	1896-present (Miller et al. 2000:10)	
2	D4-01	2	007.5-025	Fill 2	1	HRDW	Ferrous Metal	Fastener	Spike	Whole, corroded	5.9" L.	
3	D4-03	1	000-048	Fill 1	1	ARCH	Composite	Building Material	Wall/Floor Tile	White fragments, (1) glazed		
4	D4-05	2	015-034	Fill 2	1	ARCH	Ferrous Metal	Nail	Cut or Wrought Nail	Shaft fragment	Pre-1893 (Nelson 1968; Wells 1998:92)	
4	D4-05	2	015-034	Fill 2	1	DRAIN	Ceramic	Stoneware	Drainage Pipe	Brown glazed fragment		122.6
4	D4-05	2	015-034	Fill 2	1	DOM	Ceramic	Redware	Indeterminate Form	Rim sherd, unglazed interior and exterior		
4	D4-05	2	015-034	Fill 2	1	DOM	Glass	Vessel	Indeterminate Vessel	Pale pink-tinted body fragment, embossed with possible clover or flower		
4	D4-05	2	015-034	Fill 2	1	DOM	Glass	Vessel	Indeterminate Vessel	Aqua-tinted body fragment		
4	D4-05	2	015-034	Fill 2	1	DRAIN	Synthetic	Rubber	Hose	Fragment	2.53" L.	
5	D4-06	1	000-010	Fill 1	1	ARCH	Glass	Flat	Window	Pale aqua-tinted fragments		
5	D4-06	1	000-010	Fill 1	3	DOM	Glass	Vessel	Indeterminate Vessel	Colorless body fragments		
5	D4-06	1	000-010	Fill 1	2	DOM	Glass	Vessel	Indeterminate Vessel	Green body fragments		
5	D4-06	1	000-010	Fill 1	1	DOM	Glass	Vessel	Beer/Liquor Bottle	Lime green body fragment, machine-manufactured, embossed "…LITER…"	Early 20th century-present (Lindsey 2022)	
6	D4-06	2	010-025	Fill 2	2	MISC	Ferrous Metal	Miscellaneous Metal	Indeterminate Metal Item	Rectangular fragments, heavily corroded, possible hardware		
6	D4-06	2	010-025	Fill 2	3	ARCH	Glass	Flat	Window	Pale aqua-tinted fragments		
6	D4-06	2	010-025	Fill 2	2	DOM	Glass	Vessel	Indeterminate Vessel	Colorless body fragments		
6	D4-06	2	010-025	Fill 2	1	DOM	Glass	Vessel	Beer/Liquor Bottle	Amber body fragment, machine-manufactured	Early 20th century-present (Lindsey 2022)	
7	D4-06	3	025-082	Fill 3	1	DOM	Ceramic	Porcelaneous	Indeterminate Form	Body sherd, undecorated interior and exterior		
8	D4-08	1	000-040	Fill 1	1	HRDW	Ferrous Metal	Fastener	Spike	Whole, corroded	3.5" L.	
8	D4-08	1	000-040	Fill 1	1	ARCH	Glass	Flat	Window	Pale aqua-tinted fragment		
8	D4-08	1	000-040	Fill 1	1	DOM	Glass	Vessel	Indeterminate Vessel	Colorless body fragment		
8	D4-08	1	000-040	Fill 1	1	MISC	Ferrous Metal	Miscellaneous Metal	Possible File	Triangular shaft fragment, heavily corroded	7.8" L.	
9	D4-08	2	040-100	Fill 2	1	MISC	Ferrous Metal	Miscellaneous Metal	Strap	Rectangular, curved fragments, heavily corroded		
9	D4-08	2	040-100	Fill 2	1	ARCH	Red Clay	Fired Clay	Brick	Red fragment		107.1
9	D4-08	2	040-100	Fill 2	5	DOM	Glass	Vessel	Indeterminate Vessel	Colorless body fragments		
9	D4-08	2	040-100	Fill 2	1	DOM	Ceramic	Whiteware	Indeterminate Form	Body sherd, undecorated interior and exterior	1820-present (Miller et al. 2000:13)	
9	D4-08	2	040-100	Fill 2	1	DOM	Glass	Vessel	Indeterminate Vessel	Milk glass curved fragment, indeterminate manufacture method	1870-Mid-20th century (Lindsey 2020b)	
9	D4-08	2	040-100	Fill 2	1	DOM	Ceramic	Yellowware	Indeterminate Form	Body sherd, undecorated interior and exterior	1830-1940 (Miller et al. 2000:12)	

Bag #	Context	Level	Depth*	Stratum	Ct.	Group	Artifact Material	Artifact Class	Artifact Type	Description	Measurements/ Dates	Wt. (g)
9	D4-08	2	040-100	Fill 2	1	HRDW	Ferrous Metal	Miscellaneous Hardware	Cap	Cylindrical end cap with 1.5" square attachment cut-out in the center, thin-bodied, possible machine part	3.5" diameter	
9	D4-08	2	040-100	Fill 2	1	ELEC	Porcelaneous	Miscellaneous Electrical	Knob	Whole cylindrical knob, glazed white on indented pole otherwise unglazed, stamped model or maker's mark "(in a T-shape) 395/A"	0.03" L., 0.04" diameter	
9	D4-08	2	040-100	Fill 2	1	MISC	Porcelaneous	Miscellaneous Ceramic	Possible Wall/Floor Tile	White beveled fragment, unglazed		
9	D4-08	2	040-100	Fill 2	1	DOM	Glass	Vessel	Tableware	Colorless flared lip fragment, machine-manufactured, remnant neon green (post-depositional?) paint on exterior	Approx. 5.0" lip diameter	
9	D4-08	2	040-100	Fill 2	1	DOM	Glass	Vessel	Indeterminate Vessel	Dark amber lip or base fragment, machine-manufactured, possible electrical component	Approx. 2.0" diameter	
10	D4-08E	2	008-100	Fill 2	1	ARCH	Red Clay	Fired Clay	Brick	Red fragment		170.4
10	D4-08E	2	008-100	Fill 2	1	DOM	Ceramic	Whiteware	Indeterminate Form	Body sherd, undecorated interior and exterior	1820-present (Miller et al. 2000:13)	
10	D4-08E	2	008-100	Fill 2	1	FUEL	Coal Ash	Coal Ash	Coal Ash	Fragment		12.8
10	D4-08E	2	008-100	Fill 2	1	DOM	Glass	Vessel	Beer/Liquor Bottle	Amber body fragment, machine-manufactured	Early 20th century-present (Lindsey 2022)	
10	D4-08E	2	008-100	Fill 2	1	DOM	Glass	Vessel	Beer/Liquor Bottle	Lime green body fragment, machine-manufactured	Early 20th century-present (Lindsey 2022)	
10	D4-08E	2	008-100	Fill 2	1	DOM	Glass	Vessel	Bottle	Pale aqua-tinted neck and body fragment		
10	D4-08E	2	008-100	Fill 2	1	ARCH	Ferrous Metal	Nail	Wire Nail	Whole, 8d, corroded	2.5" L. 1879-present (Wells 1998:92)	
10	D4-08E	2	008-100	Fill 2	3	FUEL	Slag	Slag	Slag	Fragments		53.2
10	D4-08E	2	008-100	Fill 2	2	ARCH	Ferrous Metal	Nail	Wire Nail	Shaft fragments	1879-present (Wells 1998:92)	
11	D4-08S	1	012.5-020.5	Fill 2	1	HRDW	Ferrous Metal	Miscellaneous Hardware	Bracket	L-shaped bracket with (7) gimlet-pointed Philips-head screws attached, corroded	12.0" L., 3.0" W. 1846-present (Miller et al. 2000:14)	
11	D4-08S	1	012.5-020.5	Fill 2	2	ARCH	Ferrous Metal	Nail	Wire Nail	Whole, 20d, corroded	4.0" L. 1879-present (Wells 1998:92)	
12	D4-08W	2	016-037	Fill 2	1	ARCH	Ferrous Metal	Nail	Wire Nail	Whole, 10d, corroded	3.0" L. 1879-present (Wells 1998:92)	
12	D4-08W	2	016-037	Fill 2	1	DOM	Glass	Vessel	Indeterminate Vessel	Colorless body fragment		
12	D4-08W	2	016-037	Fill 2	1	DOM	Glass	Vessel	Liquor Bottle	Colorless lip/neck, mouth-blown, tooled straight brandy/wine finish	1890s-1920 (Lindsey 2020a)	
13	D4-09	1	000-029	Fill 1	1	DOM	Ceramic	Whiteware	Hollowware	Rim sherd, undecorated interior and exterior	1820-present (Miller et al. 2000:13)	

Bag #	Context	Level	Depth*	Stratum	Ct.	Group	Artifact Material	Artifact Class	Artifact Type	Description	Measurements/ Dates	Wt. (g)
14	D6-03	1	000-034.5	Ap	2	DOM	Glass	Vessel	Beer/Liquor Bottle	Lime green body fragment, machine-manufactured	Early 20th century-present (Lindsey 2022)	
14	D6-03	1	000-034.5	Ap	1	ARCH	Glass	Flat	Window	Pale aqua-tinted fragment		
14	D6-03	1	000-034.5	Ap	1	MISC	Ferrous Metal	Miscellaneous Metal	Possible Machine Part	L-shaped cast or wrought iron fragment with circular cut out on one surface, corroded	8.4" L.	
15	D6-16	1	000-053	Fill 1	1	HRDW	Ferrous Metal	Fastener	Bolt	Head and shaft fragment, heavily corroded	2.9" L.	
16	D6-18	1	000-013	Fill 1	1	HRDW	Ferrous Metal	Fastener	Spike	Whole, corroded	5.9" L.	
Total Phase IB Artifacts:					***70***							

Key:

* in centimeters below ground surface

ARCH = architectur
DOM = domestic
DRAIN = drainage
ELEC = electrical
FUEL = fuel
HRDW = hardware
MISC = miscellaneous
L = length
g = grams

APPENDIX E: ARTIFACT CATALOG REFERENCES

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APPENDIX F: ANNOTATED BIBLIOGRAPHY

Author:	Richard P. Adamczyk, M.A., RPA
Title:	Archaeological Surveys, Fish Passage at Brandywine Creek Dams 4, 5 and 6, City of Wilmington, Brandywine and Christiana Hundreds, New Castle County, Delaware
Date:	September 2022
RGA Database Title:	Brandywine Dams Removal
RGA Project No:	2022-095DE
State:	Delaware
County:	New Castle
Municipalities:	City of Wilmington
U.S.G.S. Quad:	Wilmington North, DE
Drainage Basin:	Brandywine Creek, Christiana River, Delaware River, Atlantic Ocean
Regulation:	Section 106 of the National Historic Preservation Act, as amended
Project Type:	Government
Project Sponsor:	Brandwine Shad 2020
Client:	Kleinschmidt
Level of Survey:	Phase IA and IB Archaeological Survey
Cultural Resources:	Brandywine Park and Kentmere Parkway Historic District (NR: 7/23/1981), Bancroft and Sons Cotton Mills Historic District (NR: 12/20/1984), Upper Dam, Northern Mill Race, Kentmere/Bancroft II Dam (SHPO Opinion: 5/5/2022), and Rockford/Bancroft I Dam (SHPO Opinion: 5/5/2022)