Cultural Resources
Appendix A

Rahway River Basin (Fluvial), New Jersey
Flood Risk Management Findings Report

September 2025

New Jersey
Department of
Environmental Protection

U.S. Army Corps of Engineers
New York District

Phase IA Cultural Resource Report and Background Study

Rahway River Basin
Report of Findings
Essex and Union Counties
New Jersey

The U.S. Army Corps of Engineers
New York District
September 2025

Management Summary

The U.S. Army Corps of Engineers, New York District (District) in partnership with the New Jersey Department of Environmental Protection (NJDEP), initiated a feasibility study in 2023 to explore a range of flood risk management (FRM) alternatives. As a potential federal action the Study was subject to Section 106 of the National Historic Preservation Act of 1966, as amended, and its implementing regulations (36 Code of Federal Regulations § 800). In accordance with Section 106 a Phase IA cultural resources investigation was prepared to identify significant cultural resources and historic properties present within the Area of Potential Effect (APE) and to assess the potential for effects to historic properties. District Archaeologist Kailey Loughran conducted the background study under the supervision of Supervisory Archaeologist Carissa Scarpa.

The overall Study Area encompasses several communities in Essex and Union Counties, New Jersey (Figure 1). More than 150 previous cultural resource surveys have been conducted in the Study Area. The Phase IA background study identified more than 5,000 previously recorded aboveground historic properties, 28 recorded historic districts, and 25 archaeological sites within the Study Area.

The proposed measures have the potential to diminish the integrity of districts, properties, and sites located in the APE due to the historical and archaeological significance of the Rahway River Basin. Extensive development is expected to have resulted in disturbances over time and alterations to above ground historic properties which may reduce the impact of proposed measures. Additional archaeological investigations and architectural surveys are required to confirm the presence of historic properties within the project area. Notably, any measures proposed for the Lenape and Nomahegan Parks and the South Mountain Reservation Historic District would require further evaluation of potential adverse effects given the archaeological sensitivity and historic significance.

The feasibility study resulted in a Report of Findings that concluded that the best solution for the Rahway River watershed would be a suite of targeted, local solutions drawing from a multitude of federal and statement programs, therefore none of the Alternatives evaluated in this Phase IA Cultural Resources Report are recommended or planned at this time. Cultural resources investigations of any alternatives developed by USACE through reanalysis in the future will be conducted in accordance with Section 106 of the NHPA. The results of this assessment are presented here for reference and will be coordinated with the NJHPO, federally recognized tribes, and other consulting parties as appropriate for information purposes. Information regarding the locations of archaeological sites has been withheld in accordance with the Freedom of Information Act and National Register Bulletin 29.

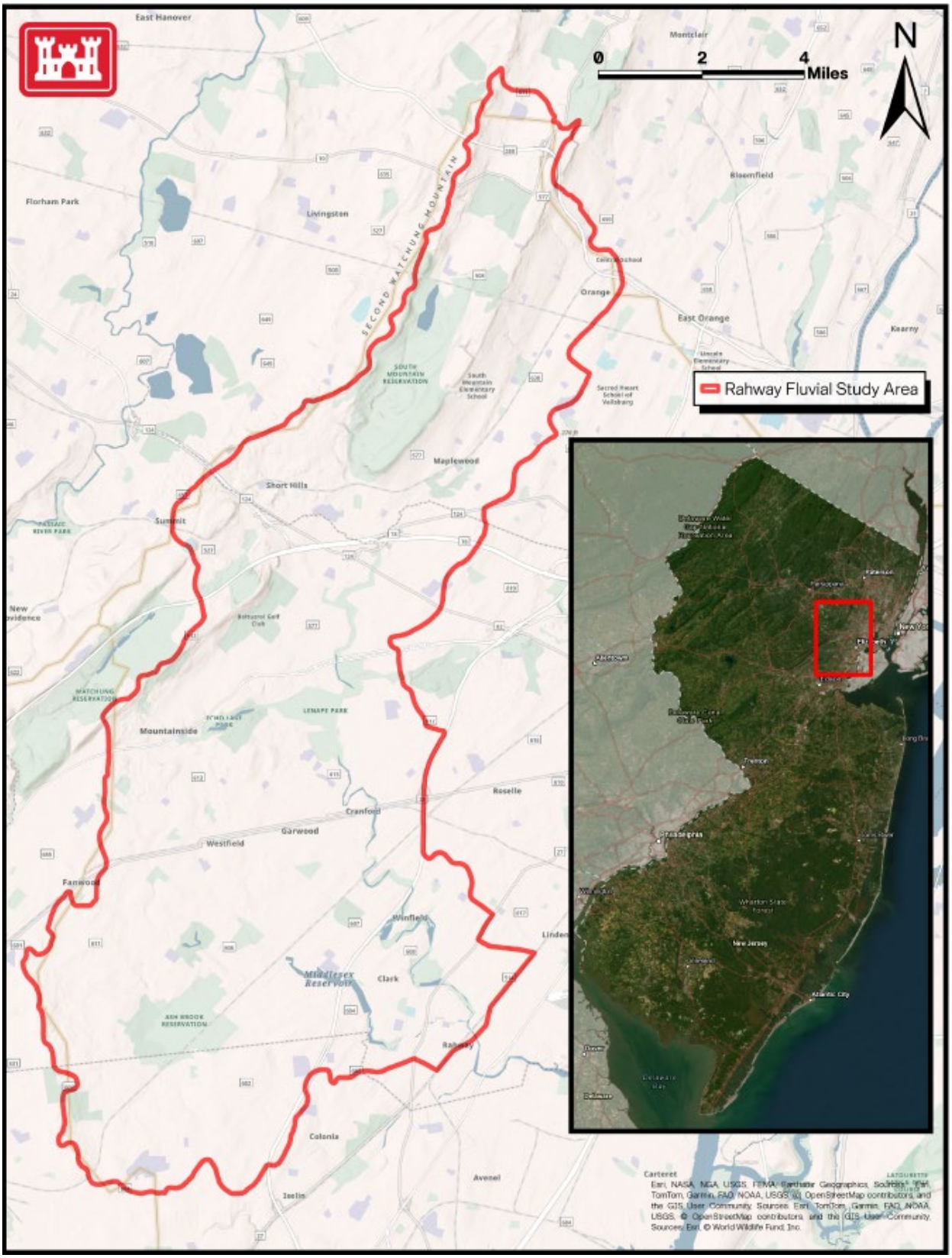

Figure 1: Study Area for the Rahway River Basin Flood Risk Management Feasibility Study

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1. Introduction

1.1 Study Purpose

The U.S. Army Corps of Engineers, New York District (District) Environmental Analysis Branch has conducted a Phase IA cultural resources investigation in support of the preparation of cultural resources sections and appendices for the Rahway River Basin, New Jersey, Flood Risk Management Study (Study). The Study purpose is to reduce flood risk to vulnerable populations and reduce economic and social impacts from riverine flooding in the Rahway River Basin by implementing comprehensive flood risk management (FRM) strategies that will increase resilience and reduce risk from future storms and compounding impacts of sea level change (SLC). Pursuant to Section 106 of the National Historic Preservation Act of 1966, as amended, this Project is subject to Section 106 review in coordination with the New Jersey Historic Preservation Office (NJHPO) for evaluation of potential impacts to cultural resources that may be listed on or eligible for the National Register of Historic Places (NRHP).

This report is organized into the following sections:

- Section 1 – Introduction – presents the Study description, the investigations undertaken, and conformance to regulations and guidelines;
- Section 2 – Environmental Setting – explores the environmental history and current ecological conditions of the Study Area;
- Section 3 – Research Methods – provides an overview of the methods undertaken during the Phase IA investigation and previous cultural resources reports that were consulted;
- Section 4 – Cultural Contexts – describes the socio-cultural developments as they relate to Pre-Contact and historic periods;
- Section 5 – Existing Conditions – presents the data on recorded cultural resources within the Study Area;
- Section 6 – Management Guidance and the Section 106 Process – establishes next steps for managing cultural resources in accordance with Section 106 and potential impacts of the Alternatives;
- Section 7 – Summary and Recommendations – summarizes the Phase IA Investigation findings and presents recommendations for future work;
- Section 8 – References Cited.

One Appendix is included:

- Appendix A.1 – Correspondence

1.2 Study Area

The Feasibility Study looked at a variety of alternatives for flood risk management for the Rahway River Basin Study Area (Study Area) within Essex and Union Counties. The Study Area spans the City of Rahway, Borough of Garwood, Town of Westfield, and Townships of Cranford, Maplewood, Millburn, and Union (Figure 2). The archaeological APE is defined as the area or areas of known or recorded archaeological sites located within the Study Area boundary. The architectural APE is defined as the area or areas of known aboveground historic properties located within the Study Area boundary.

The Rahway River Basin is located in northeastern New Jersey (Figure 1). It lies within the metropolitan area of Greater New York City and occupies approximately 15 percent of Essex County, 35 percent of Union County, and 10 percent of Middlesex County. The basin is 83.3 square miles (53,300 acres) in area and is roughly crescent-shaped. Its greatest width is approximately 10 miles in the east-west direction, from the City of Linden to the City of Plainfield. Its greatest length is approximately 18 miles in a north–south direction, from West Orange to Metuchen.

The Rahway River system consists of the Rahway River and four branches. The West Branch flows south from West Orange through South Mountain Reservation and downtown Millburn. The East Branch also originates in West Orange and Montclair and travels through South Orange and Maplewood. These two branches converge near Route 78 in Springfield to form the mainstem of the Rahway River. The Rahway River flows through the municipalities of Springfield, Union, Cranford, and Clark before traveling through the City of Rahway. The Rahway River receives the waters of Robinson's Branch and the South Branch in the City of Rahway before it enters the city limits of Linden and Carteret. The Rahway River then flows into the Arthur Kill, which connects Newark Bay with the Raritan and Lower Bays of the New York and New Jersey Harbor. The Rahway River Basin is highly developed with both residential and commercial facilities, and most of the land along the river is highly developed with properties and lots built right up to the river's edges.

The Study Area encompasses the Rahway River in Essex and Union Counties and a two-mile segment of Robinson's Branch as it nears the confluence of the Rahway River in the City of Rahway. The Study Area is composed of several regions: 1) the South Mountain Reservation, an Essex County Park, and the Orange Reservoir, owned by the City of Orange; 2) the Township of Cranford portion which includes a three mile segment of the main stem Rahway River from the Union County-owned Nomahegan and Lenape Parks to Lincoln Avenue; and 3) the City of Rahway portion consisting of a two mile segment of the Robinson's Branch from the Middlesex Reservoir to its confluence with the Rahway River.

1.3 Previous Work

Many USACE reports have been produced for the Rahway River Basin. In 1974, USACE constructed a system of levees and pump stations for flood risk management in the City of

Rahway, New Jersey. The project is located along the west bank of the Rahway River and is maintained by the New Jersey Department of Environmental Protection (NJDEP). USACE then conducted a General Reevaluation Report (GRR) in 1985 for the Robinson's Branch and recommended a plan consisting of levees, floodwalls, and channel modifications to provide flood risk management for the 1% annual chance of exceedance event. The study did not advance to construction due to lack of funding.

Several cultural resource studies were conducted as part of the Rahway River Flood Control Project. In 1977, an archaeological and historical survey was conducted in the townships of Cranford and Milburn (Kraft 1977). Panamerican Consultants, Inc. investigated new portions of Cranford and Milburn in 2013 and revisited the 1977 survey, evaluating twentieth-century properties that were not considered eligible in 1977. A detailed discussion of previous cultural resources investigations in the Study Area is provided in Section 3.

In 1998, the Rahway River Study was authorized in a resolution of the Committee on Transportation and Infrastructure of the U.S. House of Representatives. In 1999, the Rahway River Reconnaissance Report (905b) recommended a comprehensive basin wide study to further examine flood risk management and ecosystem restoration measures in the Rahway River Basin. The purpose of the 905(b) Reconnaissance Study was to determine if Federal interest for flood risk management existed in the Rahway River Basin, beyond the geographic scope evaluated for the Robinson's Branch GRR. Based on the recommendation and approval of the Reconnaissance Report, a Feasibility Cost Sharing Agreement (FCSA) was executed in March 2002 with the NJDEP as the non-Federal sponsor.

At the beginning of the feasibility study, an assessment of the entire basin took place for the purpose of identifying all flood risk management problems and opportunities in the Rahway River Basin. The Initial Screening Report (2006) documented this assessment of flood damages and recommended further investigation in the Township of Cranford and the City of Rahway along the Robinson's Branch, two areas within the basin that experienced regular significant flood damages for past storm events (Figure 2). As a result of this initial screening and coordination with the nonfederal sponsor and local stakeholders, the focus of the ongoing study has been on fluvial flooding within Cranford and Rahway.

Two areas analyzed for flood storage were the existing Orange Reservoir in the City of Orange and a proposed dry detention basin in South Mountain Reservation along the West Branch of Rahway River. However, following Tropical Storm Irene in 2011, USACE investigated further into potential flood storage opportunities upstream of Cranford that would benefit not only the Township but other municipalities as well. USACE previously identified and analyzed several alternatives for the Township of Cranford but further revised and developed additional upstream alternatives based on requests from the local stakeholders.

The USACE New York District worked closely with the NJDEP and affected municipalities to develop fourteen (14) alternatives from an array of structural and nonstructural measures which underwent the screening, comparison, and evaluation process. Two alternatives were

recommended for implementation, consisting of modifications to the Orange Reservoir dam, channel improvements in Cranford, and a nonstructural plan within Robinson's Branch. However, further review identified significant concerns regarding the existing Orange Reservoir dam and its operation. Given the significance of life safety concerns, further evaluation of the Rahway River Basin flood risk reduction alternatives was turned over to the USACE New England District Dam Safety Production Center in 2018.

The existing flood risk management and environmental restoration needs were assessed by reviewing prior reports, evaluating flood damage claims filed under the Federal Emergency Management Agency (FEMA) National Flood Insurance Program, site visits, and discussing flooding concerns with local officials. The identified flood problem areas underwent a screening to determine which areas to consider for federal participation. The criteria for federal participation included minimum stream discharges, minimum drainage area sizes, and an assessment of previously constructed flood risk management projects within the basin. A preliminary economic analysis was conducted for the flood risk management measures that passed the screening process to determine which damage areas had the potential for economic justification.

The New England District evaluated an additional five (5) alternatives in order to seek a mutually supported solution as per requests by the municipalities and NJDEP, but none of them were economically justified or acceptable to the local communities. The USACE issued a study termination memo on 10 December 2019 due to the inability to find a feasible alternative. However, Section 336 of the Water Resources Development Act of 2020 (WRDA 2020) directed the USACE to resume the Rahway River Basin Flood Risk Management Feasibility Study and identify an acceptable project alternative. After receiving a Letter of Intent from NJDEP and an approval memo from Congress, the District developed a Feasibility Cost Sharing Agreement (FCSA) for the study in November 2022, which was executed in February 2023.

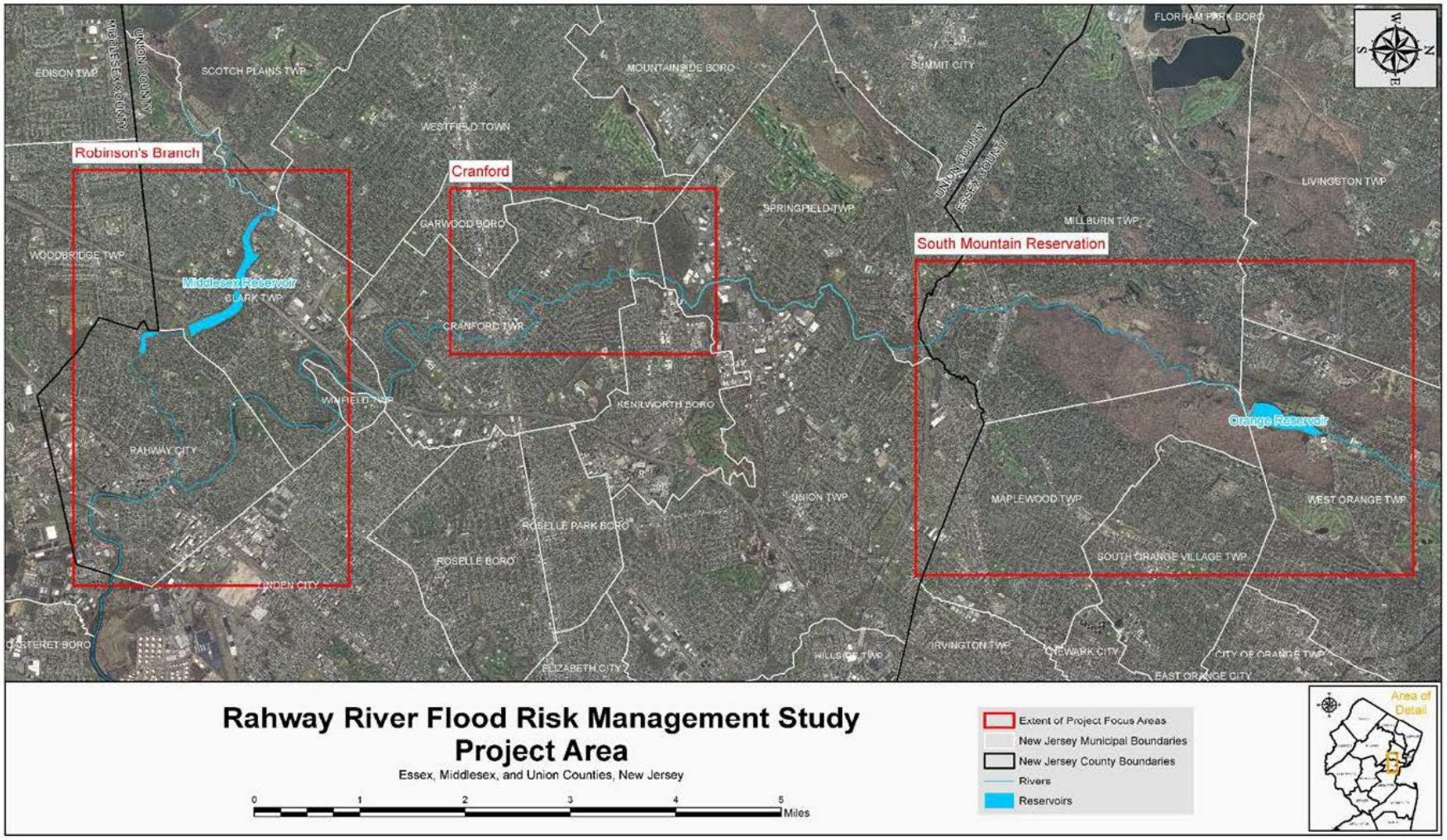

Figure 2: Map of Focus Areas for the Rahway River Flood Risk Management Study

2. Environmental Setting

The Rahway River basin is located in the central northeast portion of New Jersey and drains an area of approximately 83 square miles in Essex, Middlesex, and Union Counties in New Jersey. The river is approximately 24 miles long and flows through the valley between the First and Second Watchung Mountains. Several tributaries feed into the Rahway River, including Nomahegan Brook, Gallows Hill Brook, and Orchard Brook. Most of the Rahway River basin is heavily urbanized. Residential housing developments comprise the largest category of land use in the Study Area. Other categories include recreational, municipal, commercial, and industrial land use. The remaining undeveloped lands in the Study Area consist predominantly of county and municipally owned open space, forested uplands, early successional old fields, and maintained lawns and parkland.

2.1 Physiography

The Study Area is located within the Piedmont Physiographic Province of central northeast New Jersey, which is characterized by flat to gently rolling terrain overlying soft red shale and sandstone bedrock. Geological forces forming this basin have produced an area of high ridges and steep ravines overlooking a flat plain. Volcanic activity during the early Jurassic period (195 to 135 million years ago) resulted in the formation of the First, Second, and Third Watchung Mountains. The Piedmont Province is described as gently rolling plains, 200 to 400 ft above sea level, and includes the crescent-shaped Watchung Mountains ranging between 450 to 900 ft above sea level. The underlying geology is mainly shale with siltstones and sandstones occurring infrequently, with the mountains being composed of basalt flows. Glacial deposits overlie the surface throughout the Piedmont area (Amy S. Greene Environmental Consultants Inc., 2014).

Land use within the sub-basin is predominantly urban and suburban with the sparse remaining open space confined to parkland and a narrow riparian corridor. Intensive land modification activities have impacted the topography and surface conditions of the area surrounding the Rahway River. These activities include development and construction related to the urban and suburban growth of Essex and Union Counties, the building of residential housing and shopping centers, and the revisions and additions of connecting streets, highways, and bridges. Poor local land-use planning has resulted in substantial development in the floodplain, which has degraded water quality, destroyed wildlife habitat, and caused recurrent flooding.

Land use within the northern portion of the Study Area consists predominantly of the South Mountain Reservation, a 2,047-acre park owned by Essex County located in several municipalities including Maplewood Township, West Orange Township, and Millburn Township. The park is bounded by Northfield Avenue to the north, the South Mountain Recreational Complex to the northeast, residential land use on the east and west sides, and urban land use consisting of a mix of residential homes, small businesses, and railroad tracks to the south. Land

use within the park itself is predominantly recreational across wetlands and deciduous forests (Amy S. Greene Environmental Consultants, Inc., 2007).

Land use in the Township of Cranford consists of parks, lands maintained as open space, and predominantly single family homes. Nomahegan and Lenape Parks, owned and operated by Union County, are the two largest parks within the Township of Cranford. Lenape Park lies directly north of Nomahegan Park and is separated from Nomahegan Park by Kenilworth Boulevard. The majority of Lenape Park is forested and mostly used for passive recreation. Lenape Park also serves as a detention basin for flood risk management purposes; the County constructed levees and a dam in 1983 as a means to reduce flooding within the area. A system of levees was also constructed in Nomahegan Park for flood risk management purposes. Land use within the Robinson's Branch portion of the Study Area consists of predominantly residential and business land uses, although several parks, including Kiwanis Park, the Union County Arts Center Park, and Milton Lake Park, are located in Robinson's Branch.

The gradient of the Rahway River is very steep in the South Mountain Reservation portion of the Study Area, where elevations range from 300-650 ft above sea level. The gradient of the Rahway River flattens in the Cranford portion of the Study Area, where it moves through a gently sloping plain east of the Watchung Mountains with an average elevation of 82 ft above sea level. The gradient of the Rahway River then steepens slightly south of the Nomahegan Park (Union County Planning Board, 1974). The Robinson's Branch portion of the Study Area is characterized as relatively flat with elevation ranges from 10 ft to 150 ft above sea level (Rutgers Cooperative Extension, 2005).

2.2 Geography and Soils

Dominant soil types within the South Mountain Reservation include Dunellen sandy loam 3 to 8% slopes, Boonton loam 0 to 15% slopes, and Boonton loam, 15 to 35% slopes, extremely stony. Dominant soils along portions of the Rahway River and Robinson's Branch include Fluvaquents, and Udifluvents, and the Haledon-Urban Land Hasbrouck complex.

The Dunellen soils series consists of very deep, well drained soils formed in stratified materials. Dunellen soils can be found on outwash plains and stream terraces. The underlying bedrock is well-drained, red, soft shale or siltstone (NRCS, 2006). The Boonton soils consists of deep or very deep moderately well and well-drained soils formed in till on uplands. This soil is typically found on gently sloping to very steep uplands and is formed in glacial till composed mostly of red to brown shale, sandstone, basalt, and some granitic gneiss (NRCS, 2011).

Fluvaquents and Udifluvents generally occur on slopes ranging from 0 to 3%. Fluvaquents have parent material consisting of recent alluvium and are commonly found on flood plains and in river valleys. The natural drainage class is somewhat poorly drained, and consequently, frequently floods. Parent material of Udifluvents soil consists of alluvium and

typically found in outwash plains and floodplains. The drainage class is moderately well-drained and frequently floods (NRCS, 2007).

Urban land is classified as land mostly covered by streets, parking lots, buildings, and other structures of urban areas with slopes ranging from 0 to 8%. The Haledon-Urban Land-Hasbrouck complex found throughout the Study Area is generally found on moraines and till plains with parent material consisting of coarse-loamy basal till derived from basalt. The natural drainage class is somewhat poorly-drained. Parent material can also be comprised of fine-loamy eroded and redeposited glacial material over glacial till (NRCS 2008).

Fluvaquents, Udifluvents and the Haledon-Urban Land-Hasbrouck Complex are included on the list of hydric soils for New Jersey developed by the Natural Resources Conservation Service (NRCS). Soils with this classification are those saturated through natural or artificial means sufficiently enough to support the growth and regeneration of hydrophytic vegetation (NRCS 2007).

2.3 Hydrology

Originating in the Watchung Mountains in Essex County, the Rahway River flows south for approximately 24 miles before discharging into the Arthur Kill strait. The Rahway River has four major tributaries: West Branch, East Branch, South Branch and Robinson's Branch. The West and East Branches converge at the Springfield-Union Township line to form the main stem Rahway River. The South Branch and Robinson's Branch join the main stem at the City of Rahway, where it flows until its confluence with the Arthur Kill. The Rahway River Watershed has a drainage area of 83 square miles.

The average channel width of the Rahway River within the South Mountain Reservation is 20ft with an average depth of approximately six inches. The substrate in this segment of the river is typical of a headwater stream; a combination of large rocks, boulders, and cobble. In Cranford, the channel widens to an average width of 35 ft in Lenape Park and then to an average width of 70 ft just below Nomahegan Park. Average depths range from six inches to one foot. The substrate in this segment of the Rahway River is predominantly cobble and gravel with finer silts and clay sediment.

Along with receiving point and non-point discharges related to stormwater runoff, the Rahway River has experienced modifications associated with water supply, recreation, flood risk management, development of infrastructure, and erosion control. The Rahway River is dammed in 11 locations from the northern portion of the Study Area through its confluence with the Arthur Kill. Within South Mountain Reservation, the Rahway River was dammed in three locations to create a series of impoundments. The largest waterbody, the Orange Reservoir, is owned by the City of Orange, and served as the City's water supply until 1999. The Orange Reservoir is currently leased from the City by Essex County and is used for recreational purposes only.

The Orange Reservoir is approximately 0.69 miles long and 0.2 miles wide at its widest point and has a surface area of approximately 62 acres. At its deepest point, the Orange Reservoir is approximately 30 feet deep. The shoreline consists predominantly of a stone retaining wall. The eastern shoreline is embedded within the mountainside forested with mature deciduous trees, giving the shoreline a natural appearance. The western shoreline is lined with ornamental grasses and small shrubs. Approximately 1.5 miles south of the Orange Reservoir, the Rahway River was dammed to create the Campbell's and Diamond Mills Ponds.

In the Township of Cranford, Lenape Park Dam was installed in the Rahway River at Lenape Park for flood risk management. Approximately 3,500 ft of the left riverbank of the Rahway River from Nomahegan Park to Normandie Place was increased in height by the Township of Cranford to create a small levee to provide flood risk management to the residences on the eastern side of the river. South of Nomahegan Park, numerous bridge crossings have been constructed across the Rahway River and the riverbanks have been replaced with concrete, mason rock or timber crib retaining walls in multiple locations. In other locations, riprap has been installed along the riverbanks to prevent erosion. Boat launches along the riverbanks are also located behind several private residences.

The Robinson's Branch originates in the Town of Westfield and flows for approximately 5.5 miles before discharging into the Rahway River. The total drainage area is approximately 22 square miles (Union County Planning Board, 1974). The average width of the stream within the Study Area ranges between 30-40 ft wide with an average depth of one foot. The substrate is predominantly comprised of sand/gravel. Within the vicinity of the Robinson's Branch, the Rahway River Dam is used by United Water to withdraw approximately 4.85 million gallons of water per day from the river to serve approximately 26,500 customers (United Water, 2016).

Land use in the Robinson's Branch is primarily urban, comprising of about 80% of the total land area in the watershed (Rutgers Cooperative Research & Extension, 2005). Like the main stem of the Rahway River, the Robinson's Branch has experienced manmade modifications in the form of dams to create the Clark Reservoir and Milton Lake, the construction of bridge crossings and the installation of retaining walls and riprap to reduce streambank erosion. Within the segment of the Robinson's Branch below New Church Street, development has occurred right up to the top of the stream banks.

2.4 Climate

The climate of the Rahway River basin is characteristic of the Middle Atlantic Seaboard. Marked changes of weather are frequent, particularly during the spring and fall. The winters are moderate in both temperature and snowfall. The summers are moderate, with hot sultry weather in mid-summer and frequent thunderstorms. Rainfall is moderate, and well-distributed throughout the year. The relative humidity is high.

The mean annual precipitation in the Rahway River Watershed is approximately 50.94 inches reported by the 1971-2000 Monthly Normals for the Cranford, New Jersey Station. The

observed highest daily value at this station was 9.76 inches (17 September 1999). The monthly extremes were 13.96 inches in July 1975 and 0.45 inches in November 1976. The distribution of precipitation throughout the years is fairly uniform with the highest amount occurring during the summer months. The mean annual snowfall is 20.00 inches at Cranford, New Jersey as of 2016 (USACE 2016).

2.5 Flora and Fauna

Uplands within the South Mountain Reservation are comprised of a combination of coniferous and deciduous forests. Coniferous forest species include Norway spruce (Picea abies), white pine (Pinus strubus), scotch pine (Pinus sylvestris), hemlock (Tsuga canandensis), and eastern red cedar (Juniperus virginiana). Species observed within the deciduous forest below the Orange Reservoir during field investigations include beech (Fagus grandifolia), hickory (Cary sp.) red maple (Acer rubrum), sugar maple (Acer saccharum) and red oak (Quercus rubra). Understory shrubs observed include honeysuckle (Lonicera sp.), arrowood (Viburnum dentatum), red osier dogwood (cornus stoloniferia) and winged euonymus (Euonymus sp.).

Apart from Lenape and Nomahegan Parks, upland vegetation in the Township of Cranford area primarily consists of maintained lawns, ornamental trees, and shrubs. Common tree species observed in the upland areas are red maple, hickory, cottonwood (Populus deltoids) and tulip tree (Liriodendron tulipfera). Understory shrubs observed include honeysuckle, arrowwood and holly (Ilex sp.). Most of the uplands within the Robinson's Branch portion of the Study Area consists of residential and commercial development. Vegetated uplands are mostly maintained lawns dominated by a variety of common native and nonnative grass species.

Given the lack of development in the South Mountain Reservation, the riparian zone within the South Mountain portion of the Study Area exceeds the regulated riparian zone and consists mainly of deciduous trees such as beech, red oak, and red maple. Aside from Lenape and Nomahegan Parks, the riparian zone within Cranford ranges from 15 to 50 ft due to development. In many locations of both the Cranford and Robinson's Branch portions of the Study Area, the riparian zone has been subject to disturbance which has allowed invasive species such as Japanese knotweed to establish. Within the Robinson's Branch portion of the Study Area, development occurs right up to the streambank, thus limiting the riparian zone to a width ranging from 50 ft to 5 ft with some portions from 25 ft to 10 ft. Development within the last 2,000 ft of the stream prior to its confluence with the Rahway River occurs right up to banks, limiting the width of the riparian zone from 25 ft to 5 ft.

Common tree and shrub species observed within the riparian zone during field investigations include American elm (Ulmus Americana), red maple (Acer rubrum), silver maple (Acer saccharium), sycamore (Platanus occidentalis), arrowwood (Viburnum dentatum), and dogwood (Cornus sp.) Invasive plant species observed throughout the Study Area include Norway maple (Acer platanoides) Japanese knotweed (Fallopia japonica), Japanese hops

(Humulus japonicus), multiflora rose (Rosa multiflora), garlic mustard (Allaria petiolata), and mugwort (Artesemia vulgaris). Japanese knotweed was particularly prevalent along the banks of the Rahway River in Lenape Park and other previously disturbed portions of the riverbanks in Cranford.

The most abundant fish collected by NJDEP at the Lenape Park monitoring station include tessellated darter (Etheostoma olmstedi), white sucker (Catostomus commersoni), spottail shiner (Notropis hudsonius), banded killifish (Fundulus diaphanous), and American eel (Anguilla nostrate). Species collected at the Orange Reservoir include largemouth bass (Micropterus salmoides), bluegill (Lepomis macrochirus), yellow perch (Perca flavescens) and white perch (Morone Americana) (USACE 2016). Other species that have been identified at the Robinson's Branch monitoring station include blacknose dace (Rhinichthys atratulus), golden shiner (Notemigonus crysoleucas), redfin pickerel (Esox americanus), mummichog (Fundulus heteroclitus), and green sunfish (Lepomis cyanellus). Most of the collected species are predominantly tolerant of degraded water quality conditions and are generalist feeders, supporting NJDEP's assessment that the Rahway River has water quality degradation issues (Vile, September 2011). Similarly, the two dominant macro-invertebrate species collected at sampling locations in the Study Area are oligochaete worms (Nais and Limnodrilus) and non-biting midges (Cricotopus and Polypedilium), both of which have a moderate to high tolerance for pollution.

The Study Area lies within the Atlantic Flyway, which is a migration route for over 400 bird species. The 3 large parks within the Study Area – South Mountain Reservation, Lenape Park and Nomahegan Park – likely support the greatest diversity of bird species given the lack of disturbance to these areas as well as the different habitat types within them. Common bird species that have been found throughout the Study Area include mourning dove (Zenaida macroura), American robin (Turdus migratorius), northern mockingbird (Mimus polyglottos), grey catbird (Dumetella carolinensis), American goldfinch (Carduelis tristis), house finch (Carpodacus mexicanus), blue jay (Cyanocitta cristata), American crow (Corvus brachyrhynchos), northern cardinal (Cardinalis cardinalis), European starling (Sturnus vulgaris), mallard duck (Anas platyrhynchos), Canada goose (Branta Canadensis), downy woodpecker (Picoides pubescens), tufted titmouse (Baeolophus bicolor), black capped chickadee (Poecile atricapillus), and house wren (Troglodytes aedon) (USACE 2016).

Mammal species that inhabit the Study Area include raccoon (Procyn lotor), chipmunk (Tamias striatus), red fox (Vulpes vulpes), woodchuck (Marmota monax), white tailed deer (Odocoileus virginianus), muskrat (Ondatra zibethicus), eastern gray squirrel (Sciurus carolinenensis), and opossum (Didelphis marsupialis) (USACE 2016). Black bear (Ursus americanus), coyote (Canis latrans), otter (Lontra Canadensis) and mink (Neovison vison) have also been documented in South Mountain Reservation and Lenape Park (Cranford Environmental Commission 2015).

The reptile and amphibian species that have been observed throughout Lenape Park include northern gray tree frog (Hyla versicolor), bullfrog (Rana catesbeiana), green frog (Rana

clamitans melanota), eastern garter snake (Thamnophis sirtalis sirtalis), eastern box turtle (Terrapene Carolina Carolina), snapping turtle (Chelydra serpentine), northern water snake (Nerodia sipedon), northern brown snake (Storeria dekayi dekayi), eastern painted turtle (Chrysemys picta), and the eastern redback salamander (Plethodon cinereus) (Union County 2005). Given the similar habitat types to Lenape Park, it is expected that the South Mountain Reservation would support similar species. Since the Robinson's Branch portion of the Study Area is more urbanized, reptile and amphibian species that are more adapted to this type of environmental setting and would therefore be more prevalent are the bullfrog, eastern garter snake and snapping turtle (USACE 2016).

Identification of State endangered, threatened, and special concern species occurring within the Study Area is based on review of NJ-Geoweb, the PAL, and from input by interested parties during the NEPA Scoping Period. State endangered species include Northern goshawk (Accipter gentilis), Short-eared owl (Asio flammeus), American bald eagle (Haliaeetus leucocephalus), Indiana bat (Myotis sotoris), and Pied-billed grebe (Podilymbus podiceps). Although not identified as occurring in the Study Area, the bald eagle is listed as state endangered during the breeding season and threatened during the non-breeding season (USACE 2016). Based on coordination with the U.S. Fish and Wildlife Service (USFWS), USACE identified the Federally endangered Indiana bat (Myotis sodalis) and the Federally threatened northern long-eared bat (Myotis septentrionalis) within the Study Area. USACE also noted the potential presence of bog turtle (Clemmys muhlenbergii) within Robinson's Branch.

3. Methods

3.1 Background Research

The Phase IA investigation employed a three-fold research strategy to identify potential impacts to recorded cultural resources within the Study Area. First, a high-level literature review was undertaken to place the Study Area's environmental setting and history of land use into the context of cultural resources. Topics related to environmental settings included soils, regional geomorphology, and native flora and fauna. Pertinent resources regarding precontact and historic period land use include Section 106 survey reports, journal articles, and nineteenth- and twentieth-century historical accounts.

The second step in the research strategy was the collection, organization, and synthesis of cultural resource information obtained from state and federal agency databases. The USACE obtained data for recorded historic properties within the Study Area from the statewide cultural resources GIS dataset provided by the NJHPO in December 2022. Along with the shapefile layers of archaeological sites, historic properties, historic property features, and archaeological and historical districts, the NJHPO GIS dataset contains the National Register of Historic Places (NRHP) eligibility status of known or recorded resources, which are conveyed in Section 5 of this report.

Cultural resource surveys and investigations were undertaken as part of the Feasibility Study in 2016 to identify historic properties in the Study Area, evaluate their eligibility for listing on the National Register, and assess whether the proposed project will impact National Register eligible properties. Details on cultural resources investigations and their findings are presented in the Robinson's Branch and Cranford Phase IA cultural resources investigations completed for the original study (Nolte et. al 2013). These surveys formed the basis of the effects assessment and recommendations for future actions. To evaluate existing conditions of cultural resources and potential impacts associated with the proposed alternative measures, this review of cultural resources data was developed for the Study.

Site forms, spreadsheets, and archaeological site data on file at the New Jersey State Museum (NJSM) and previous USACE cultural resources survey reports on file at the USACE New York District were consulted for this study. Background research also consisted of a desktop review of the NJHPO GIS data layers to evaluate archaeological site locational data and survey report citations. Information provided by the NJHPO indicated approximately 160 previous cultural resource surveys have been conducted within the Study Area since 1977. Several of these surveys consisted of intensive-level architectural surveys, historic structure reports (ex., HAER), and eligibility evaluations for individual properties. The most recent cultural resources and archaeological surveys, conducted throughout the Study Area between 2000 and 2022, are listed in Table 1. Details for previous cultural resource surveys are provided below.

The third step in the research strategy was the evaluation of currently proposed alternative measures to define the Area of Potential Effects (APE). Utilizing the background research carried out for the study area USACE identified known historic properties and archaeologically sensitive areas within the architectural and archaeological APEs for each alternative and made a determination of effects and recommendations for future work. More on that can be found in Chapters 6 and 7 of this report.

Table 1 – Previous Cultural Resource Surveys within the Study Area

Survey Name	**Survey Preparer**	**Publication Year**
Phase IB Cultural Resource Investigation, Northeast Quadrant Storm Water Management Project, Edgewood Road, Glenwood Road, Riverside Drive and Vicinity, Cranford Township, Union County, NJ.	Cultural Resource Consulting Group	2000
Phase IA Cultural Resource Reconnaissance Eastman Street Bridge Cranford Township Union County, NJ.	Cultural Resource Consulting Group	2001
Phase II Cultural Resource Investigation, Eastman Street Bridge, Cranford Township, Union County, NJ.	Cultural Resource Consulting Group	2001
Cultural Resources Survey for Proposed T-Mobile Telecommunications Tower Project Union-22, 2271 US Highway 22 West, Union, Union County, NJ.	Archaeological and Historical Consultants, Inc.	2003

Section 106 Survey, Sprint Site No: NY59XC105 Kenilworth. B&M Finishers, Union County, NJ.	IVI International, Inc.	2004
Phase IA Cultural Resources Investigation, Proposed Valley National Bank, Township of Cranford, Union County, NJ.	Hunter Research, Inc.	2004
Cultural Resources Survey for the AT&T Wireless Services, Inc., Westfield Site #W-112, Union County, NJ.	ARCH^2	2004
Cultural Landscape and Resource Survey, Union County Park System, Union County, NJ.	Cultural Resource Consulting Group	2004
Section 106 Consultation Nextel of New York, Inc. D/B/A Nextel Communications Mountainside Site N. NJ-1908… Borough of Mountainside Union County, NJ.	Richard Grubb & Associates, Inc.	2004
Phase II Historic Architectural Investigation: Springfield Avenue Bridge No. 2003014, Cranford Township, Union County, NJ.	Cultural Resource Consulting Group	2009
Phase IA Historical and Archaeological Survey, Springfield Gardens; Block 3901, Lot 6.01; Springfield Township, Union County, NJ.	Richard Grubb & Associates, Inc.	2009
Phase IB Archaeological Survey, Springfield Gardens; Block 3901, Lot 6.01; Springfield Township, Union County, NJ.	Richard Grubb & Associates, Inc.	2009
Phase 1A Historical and Archaeological Survey Houdaille Quarry… Springfield Township, Union County New Jersey	Richard Grubb & Associates	2011
Phase IB/II Archaeological Survey, North Central Reliability Project, PSE&G Services Corporation; Essex, Morris, Somerset, Union, and Middlesex Counties, NJ	Richard Grubb & Associates	2012
Cultural Resources Investigation, Reconstruction of Bridge No. 0700-053, Glen Avenue over West Branch of the Rahway River, Millburn Township, Essex County, New Jersey	Richard Grubb & Associates	2013
Phase IA Cultural Resources Investigation of the Rahway River Flood Risk Management and Ecosystem Restoration Project, Townships of Cranford, Springfield, Union and Westfield, and Borough of Kenilworth, Union County, New Jersey	Panamerican Consultants, Inc.	2013
Phase IA Archaeological Survey, Rahway River Debris Removal, Cranford Township, Union County, NJ	Richard Grubb & Associates	2013

Intensive-Level Architectural Survey of Selected Properties Within the St. Cloud Neighborhood and the Main Street Corridor in the Township of West Orange, Essex County, NJ. Volume II: Intensive-Level Survey Forms.	Hunter Research, Inc.	2014
Intensive-Level Architectural Survey, College Hill, Township of Maplewood, Essex County, NJ	Connolly & Hickey Historical Architects, LLC	2014
Historic Overview of the Cranford Substation, 225 South Avenue E. (Block 479 Lot 5), Cranford Township, Union County, NJ.	E2 Project Management LLC	2015
Phase IA Archaeological Assessment and Historic Architectural Resources Background Survey and Effects Assessment, TO#14-West Summit Interlacking Environmental Documentation Services, City of Summit, Union County, New Jersey.	Dewberry	2018
Phase IA Historical and Archaeological Survey and Intensive-Level Historic Architectural Survey, Rehabilitation of the Irving Street Bridge over Robinson's Branch of the Rahway River, Union County Bridge Ra-10 (Structure No. 2013010), Rahway, Union C. ,NJ.	Richard Grubb & Associates	2018
Phase IA Historical and Archaeological Survey, New Jersey Army National Guard Armory Facilities, Burlington, Camden, Middlesex, Morris, and Union Counties, New Jersey.	Richard Grubb & Associates	2018
Intensive-level Historic Architectural Survey and Effects Assessment, Droescher's Mill Dam and Hansel's Dam, Rahway River, Cranford, NJ	Hunter Research, Inc.	2019
Phase IA Archaeological Survey, Hamilton Street Bridge (RA-29) Scour Protection, City of Rahway, Union County, New Jersey.	Richard Grubb & Associates	2019
Phase IA Cultural Resources Investigation, Aldene-Warinanco-Liden (AWL) Project, 230kV Overhead Transmission Line, Cranford, Roselle, Linden, and Elizabeth, Union County, New Jersey.	Tetra Tech, Inc.	2019
Phase IA Cultural Resource Reconnaissance: Residences at Crestmont Country Club... West Orange Township, Essex County, New Jersey	P&S Inc.	2019
Upper Gregory Intensive-Level Survey, Volume I: Survey Report, Township of West Orange, Essex County, New Jersey.	Easton Architects	2019

Phase I Archaeological Investigation, 43 to 45 Mount Pleasant Avenue and 49 Mount Pleasant Avenue, West Orange, Essex County, New Jersey.	E2 Project Management, LLC	2019
Phase IB Archaeological Survey, New Jersey Army National Guard Armory Facilities, Hammonton Armory, Somerset Armory, Teaneck Armory, Cape May Armory, Toms River Armory, Woodstown Armory, Hount Holly Armory, Westfield Armory, and Cherry Hill Armory MULT	Richard Grubb & Associates, Inc.	2019
Oak Tree Road Bridge, County Route 604, Structure No. 1253-164 (Conrail) Edison Township	Richard Grubb & Associates	2020
Phase IA Documentary Study and Archaeological Assessment for the Ash Brook Wetland Enhancement Project, Block 15201, Lot 10.01, Scotch Plains Township, Union County, New Jersey.	Chrysalis Archaeological Consultants, Inc.	2020
Stage II Cultural Resources Survey, Well 5 Rehabilitation Project, Millburn Township, Essex County, New Jersey.	Richard Grubb & Associates	2021

3.2 Architectural Study

Aboveground historic properties are defined as buildings, structures, or objects, generally at least 50 years old or older, that are NRHP-listed, NRHP-eligible, or properties that have not yet been evaluated for NRHP eligibility. The review of NJHPO data identified over 5,000 aboveground historic properties recorded within the Study Area. In accordance with 36 CFR 60, a Historic District is a geographically definable area, urban or rural, possessing a significant concentration, linkage, or continuity of sites, buildings, structures, or objects united by past events or aesthetically by plan or physical development. Historic Districts may also comprise individual elements separated geographically but linked by association or history. The review of NJHPO data identified 26 Historic Districts recorded within the Study Area. Further information on historic properties and districts in the Study Area are provided in Section 5.

Union County has spearheaded several cultural resources investigations over the past several decades. In 1991, Union County conducted a Historic American Engineering Record (HAER) evaluation of the Lincoln Avenue/High Street Bridge spanning the Rahway River. The Lincoln bridge is a locally significant example of a typical masonry arch bridge constructed throughout Union County in the early 1870s. The HAER assessment was initiated through a Memorandum of Agreement (MOA) between the Federal Highway Administration and NJHPO as a mitigative measure prior to bridge replacement. In 2003, Union County established a county-wide historic preservation plan to be utilized when making planning and development decisions that could potentially impact historic resources (McTeague 2003). The plan defined historic contexts that could be used to identify patterns of development to which individual properties can be compared and evaluated. This approach established planning recommendations for two categories of historic resources: 1) resources that contribute to

cultural tourism and educational opportunities and 2) resources that create livable communities and illustrate the patterns of development seen today (McTeague 2003, 110).

In 2004, the Union County Parks System conducted a Cultural Landscape and Resource Survey of its park system and individual park units to evaluate its historical significance (Dietrich 2004). The survey evaluated the county's 24 park units and determined that 20 of them are potentially NRHP-eligible as historic districts. The Union County Park System was identified as possessing national significance for its contributions to the broad patterns of development in the areas of community planning, entertainment and recreation, and landscape architecture. That same year, a preservation plan was prepared for the Cranford Canoe Club to assist with the preservation and maintenance of the club building. The club building is the only remaining Canoe Club structure along the Rahway River and represents an early building type and the sole survivor of a bygone era. The evaluation determined the Canoe Club building to be a locally significant historic structure and a contributing resource to the North Cranford Historic District (Stark & Associates 2004).

In 2009, the Township of Cranford conducted a Phase II evaluation of the Springfield Avenue Bridge prior to bridge demolition and replacement. The Springfield Avenue Bridge was built in 1916 and determined a contributing resource to the North Cranford Historic District due to its character-defining features as well as its construction during the district's period of significance (1860-1930). Since the bridge spans the Rahway River and is within the park system boundaries, it was also determined a contributing element to both the Rahway River and the Union County Park System Historic Districts. To minimize visual impacts to the historic districts resulting from the replacement of the Springfield Avenue Bridge, the survey recommended the use of poured concrete that matches the color and texture of the historic concrete and railings that match the historic railings in material and design (Zeoli 2009).

On behalf of the District, Panamerican Consultants, Inc. completed a Phase IA investigation of the Study Area in 2013 in preparation of the original study. This investigation was divided into a Cranford report and a Robinson's Branch report and evaluated the potential impacts of the previously considered alternatives. The reports included discussions of the historical and cultural context of the Study Area, the enumeration of all previously identified cultural resources within it, an assessment of its archaeological sensitivity, and the identification of above-ground cultural resources in the APE that had not been previously identified. The investigation updated the 1977 survey conducted for the same project (Kraft 1977) and evaluated twentieth-century properties that were not considered eligible in 1977. A total of 124 new architectural resources were recorded in Cranford. In Robinson's Branch, the District identified several potentially significant archaeological resources in the townships of Clark and Woodbridge and the City of Rahway. The Phase IA investigation concluded with architectural and archaeological survey recommendations in anticipation of eventual project construction (Nolte et. al 2013).

Recently, cultural resources surveys in the Study Area have centered on historic resources in Cranford. In 2015, Public Service Electric & Gas Company (PSE&G) conducted an

evaluation of the Cranford Substation, formerly the Cranford Trolley Power House, constructed in 1903. The resulting report discussed the historical significance of Cranford's trolley system during the early twentieth century and the present use of the substation building as a main supplier of electrical power to local customers. The PSE&G report was completed in preparation of proposed improvements to the substation building and distributed to the Cranford Historical Society, the New Jersey Historical Society, and the NJHPO (Walsh 2015). In 2019, Hunter Research, Inc. conducted an intensive-level architectural survey for Droescher's Mill Dam and Hansel's Dam, both of which are significant in the planning, development, design, and evolution of Cranford and the Rahway River Parkway. Both dams were recommended as contributing resources to the Rahway River Parkway Historic District and the larger Union County Park System Historic District under Criterion A for landscape architecture and Criterion C for the period of significance of 1921-1964 (Harshbarger 2019).

In 2020, the Cranford Historic Preservation Advisory Board conducted an intensive-level architectural survey of the William Miller Sperry Observatory to evaluate its NRHP eligibility. Constructed in 1967, the observatory represents a rare and distinctive example of mid-twentieth century modernist architecture in Cranford. The building sits on the Cranford Campus of the Union County Community College and played a role in the promotion and popularization of American space exploration during the Cold War period. The Sperry Observatory is significant on the local level as a scientific building constructed during both the Space Race and the community college movement. In addition, the observatory represents an example of the expertise and minimalist style of architect Frederick Elsasser and his attempts to merge mid-century style with the innovation of the Space Age. Features such as flat planes, clean lines, a monochromatic color palette, and minimal ornamentation are defining characteristics of mid-century modern architecture and incorporated into the Sperry Observatory design. These characteristics are visible in the functional rotating dome roofs and the white-gray marble exterior. The Sperry Observatory was determined NRHP-eligible in 2021 (Bulger and Oliver 2020).

USACE has identified over 5,000 recorded historic properties in the Study Area, of which 32 are individually NRHP-listed and approximately 1,100 are contributing to one of 3 NRHP-listed Historic Districts – 1) Maplewood Village Historic District, 2) Montrose Park Historic District, and 3) Wyoming Historic District, all of which are located upstream of Cranford and near the South Mountain Reservation. A total of 45 properties are individually NRHP-eligible, while approximately 1,800 contribute to one of 17 NRHP-eligible Historic Districts. There are 7 properties that represent Local Landmarks. Tables 2 and 4 list the properties and districts as currently recorded in the NJHPO database.

3.3 Archaeological Study

The review of archaeological literature reveals there was at one time evidence of Pre-Contact Period occupation in the Rahway River basin. However, previous surveys suggest the Study Area is no longer archaeologically sensitive for Pre-Contact Period or historic period sites, as several portions of the Study Area have undergone prior disturbance from historic and

recent development. There is the potential to recover Pre-Contact Period resources along the riverbank, this area has also been heavily disturbed. In 1912 and 1913, New Jersey State Archaeologists Max Schrabisch and Leslie Spier conducted archaeological investigations in northern New Jersey to better characterize the distribution of precontact period sites in the region. Most of the reported sites were small camps, village sites, and rock shelter sites identified in the first half of the twentieth century (Schrabisch and Spier 1915). Later investigations suggested that extensive suburban housing and commercial development depleted the Pre-Contact Period resources of the Study Area, but several known historic resources that may be potentially impacted by proposed measures will need to be evaluated.

Since Schrabisch and Spier conducted their investigations in the early twentieth century, USACE and others have undertaken several cultural resource surveys to identify archaeological resources in the Study Area (Panamerican Consultants, Inc. 1997). In 2001, the Township of Cranford conducted a Phase I/II cultural resources investigation of the Eastman Street Bridge in advance of its replacement to evaluate the potential significance of surrounding properties. The bridge was determined to be a contributing resource to the North Cranford Historic District. The survey identified four other historic properties within the APE that are potentially NRHP-eligible. The survey determined that the replacement would adversely affect the North Cranford Historic District and a mitigation plan was developed to reuse the bridge's existing iron railings and implement historically appropriate finishes to the new bridge (CRCG 2001). The survey determined that the replacement of the bridge and its abutments would not disturb any potential archaeological remains and no further archaeological investigations were recommended (Lodato et al. 2001).

In 2003, Cultural Resource Consulting Group (CRCG) conducted a Phase IB cultural resources investigation in advance of construction of storm sewers, headwalls, catch basins, and drainage swales for the Northeast Quadrant Stormwater Management Project in Cranford Township (Bello et al. 2003). Nomahegan Park is an NRHP-eligible historic property in the APE but was previously altered by an extensive flood control project completed by USACE in the 1970s; therefore, no new impacts would impose an adverse effect to the property. Archaeological testing yielded no Pre-Contact Period or historic period cultural materials. The investigation did not identify the presence of archaeological deposits and the project was determined to have no impact on potentially significant archaeological resources. No further investigation was recommended. The same year, Archaeological and Historical Consultants, Inc. completed a Phase I cultural resources survey for portions of Union County in advance of a telecommunications tower construction project. The survey identified no historic properties in the project APE. No archaeological testing was conducted due to the presence of asphalt pavement over the entire project area. Archaeologists determined there to be little potential for intact soils and no archaeological resources were identified (Archaeological and Historical Consultants, Inc. 2003).

In 2004, Hunter Research, Inc. conducted a Phase IA cultural resources investigation in advance of construction of the Valley National Bank in Cranford. The project area was determined to have a low probability of yielding significant Pre-Contact Period resources due to

the extent of ground disturbance associated with historic development of the area. The only historical property identified in the project area, the E.N. Perrine House, is an early twentieth-century residence converted for commercial use that does not retain historic integrity and was determine ineligible for the NRHP. It was determined the project would not affect historic properties and no further work was recommended (Scott and Burrow 2004). That year, Richard Grubb & Associates, Inc. conducted a reconnaissance-level archaeological survey and an intensive-level architectural survey in advance of construction of a Nextel Communications monopole in the Borough of Mountainside. Eighteen historic properties were recorded in the project area but none were determined to maintain historic integrity and are therefore ineligible for the NRHP. The survey determined that the project area was unlikely to yield significant archaeological resources and the proposed monopole will have no effect on cultural resources. No further work was recommended (Andrews et al. 2004).

In the town of Westfield, ARCH^2 completed a historic architectural survey and Phase IA archaeological assessment in advance of construction for a communication tower (Harris et al. 2004). The survey identified the NRHP-eligible Daniel Pierson House within the architectural APE. The archaeological investigation determined that little potential for Pre-Contact Period or historic period resources exist in the APE due to soil degradation and prior disturbance. No additional work was recommended. In the township of Kenilworth, IVI International, Inc. conducted a cultural resources survey in advance of construction for a communication tower (IVI International Inc., 2004). The survey identified several NRHP-eligible historic properties in the APE but will not be adversely impacted by the project. A Phase IA archaeological assessment determined the APE to exhibit a low probability of Pre-Contact Period or historic resources. No further work was recommended.

In 2009, Richard Grubb & Associates, Inc. conducted a Phase IA investigation in advance of construction of a residential development in the Township of Springfield (McEachen et al. 2009). The survey determined that portions of the APE had potential to contain significant prehistoric and historic archaeological resources. A Phase IB archaeological survey was conducted and uncovered several historic artifacts from disturbed contexts. No prehistoric artifacts were recovered. Archaeologists did not identify any potentially significant historic artifact deposits during the pedestrian survey or in the Phase IB STPs and recommended no further work (Cushman 2009). In 2013, Richard Grubb & Associates, Inc. conducted a Phase IA investigation for the proposed removal of debris along an approximately 4-mile stretch along the Rahway River in Cranford Township (Cushman and McEachen 2013). The survey determined that portions of the APE have a high sensitivity for Pre-Contact and historic period archaeological resources. Since no ground disturbance or grading was anticipated in areas of high archaeological sensitivity, no further work was recommended.

In 2016, the District completed a Phase I cultural resources investigation of the Orange Reservoir and Dam in West Orange (Scarpa 2016). This survey evaluated the Orange Reservoir and Dam for its NRHP eligibility, assessed architectural resources, and determined the

archaeological sensitivity of the area. The Orange Reservoir and Dam was determined to be potentially NRHP-eligible. An intensive-level architectural survey has been recommended to complete a determination of eligibility on this property. The survey identified the potential for prehistoric and historic archaeological resources at the Orange Reservoir and Dam and recommended archaeological investigations to determine the presence of significant archaeological deposits. The survey also recommended development of a testing plan to address the potential for deeply buried prehistoric deposits beneath fill and potential deposits relating to the construction of the dam and reservoir and other post construction activities centered on the reservoir (Scarpa 2016).

In 2018, Tetra Tech, Inc. conducted a Phase IA cultural resources investigation in advance of construction upgrades to existing PSE&G transmission facilities throughout Union County (Sexton et al. 2019). Field inspections did not identify any previously unrecorded properties of potential historical significance. The survey determined that the APE occupied an urbanized and industrialized landscape with extensive ground disturbance that did not contain any areas of moderate to high potential for prehistoric or historic period archaeological resources. Consideration of the actual visibility of the existing project led to the conclusion that any changes in structure height will not substantially alter the existing visual environment of the indirect APE. Tetra Tech concluded that no historic property would be adversely affected by the proposed construction and no additional work was recommended.

Certain areas within the APE are believed to be archaeologically sensitive and require an assessment of impacts and an evaluation of the archaeological potential of historic properties. USACE has identified 25 recorded archaeological sites in the Study Area, one of which (Frazee House, Site 28-Un-43) is individually NRHP-listed and another (Smith Farm) which contributes to the NRHP-listed Short Hill Battlefield Historic District. One recorded site (Morris Avenue Rahway River Bridge) is individually NRHP-eligible while another recorded site (NJ First State Mint) contributes to the NRHP-eligible Upper Rahway Historic District. A list of all recorded sites, including the 26 sites that have yet to be evaluated for NRHP eligibility, is provided in Table 3. Due to the sensitive nature of site locational data, the specific locations of archaeological sites are not reproduced here.

3.4 Review of Historic Maps

A sequence of nineteenth- and twentieth-century maps was inspected to establish a baseline for the discussion of the Study Area's archaeological and historic sensitivity. The review of historic maps and aerial photography indicated that much of the Study Area remained undeveloped until the late nineteenth century (Figure 3). Background research indicates the Study Area was sparsely settled until the early twentieth century, with much of the area remaining agricultural lots. The maps shed light on the degree to which the Pre-Contact landscape might have been disturbed by historic and modern development, as well as how

modern development may have altered the types and locations of historic archaeological remains that may be present within the project APE.

Early nineteenth century maps reveal only a handful of structures in or adjacent to the Study Area, including Crane's grist and sawmills, Droescher's Mill (then Vreeland's Mill) (Figure 4a). The 1850 Sidney map illustrates the sparseness of population and overall development in the Rahway River Basin prior to the late nineteenth century, even after the construction of the CNJ Main Line Railroad (Figure 4b). By 1888, Cranford and the surrounding towns started to exhibit increased development in proximity to the railroad, particularly in areas where the railroad converged with the Rahway River, but this expansion remained gradual through the end of the nineteenth century (Figure 5). This growth along the railroad was also evident in the Robinson's Branch at this time (Figure 6).

The early twentieth-century Sanborn Insurance and USGS maps capture the relatively rapid expansion of Cranford during the twentieth century, particularly the large increase in population along the Rahway River in the late nineteenth and early twentieth centuries. The 1922 Sanborn maps show that the portion of the Study Area that now includes Nomahegan Park overlaps with several farmsteads, each consisting of a small complex of buildings (Sanborn Map Company 1922). At this time, the road network of Cranford and Rahway as shown on USGS maps begins to resemble the current grid system seen today (USGS 1905; 1921).

By the mid-twentieth century, much of the remaining farmland gave way to recreation, housing, and commercial development (Figure 7). Nomahegan Park became surrounded by densely settled residential areas, and industrial-scale buildings eventually sprung up around the north and east edges of Lenape Park. Twentieth-century maps also indicate that portions of Nomahegan Park were significantly disturbed during the construction of the park's manmade ponds in the 1920s. However, these disturbances are likely limited to the ponds themselves. With the exceptions of more limited impacts that might be related to the baseball fields and parking lots, none of the maps or aerial photographs shows any large-scale historical or modern construction in the park. Thus, like the area to the south, the historical maps do not show impacts/disturbances in the park that would necessarily undermine the integrity of any historical or prehistoric/pre-Contact archaeological remains that may be present.

The historical maps show relatively little evidence for historical or modern disturbances in Lenape Park. Any potential impacts are primarily limited to flood-control measures along the southern and eastern peripheries of the park, as well as possible disturbances related to large industrial or commercial buildings along its northern edge, south of US 22. Thus, for nearly all of Lenape Park, the maps do not show impacts/disturbances that would undermine the integrity of any historical or prehistoric/pre-Contact archaeological remains that may be present.

Historic topographic maps reviewed included those prepared by the USGS and made available via topoView online: Plainfield, 1888, scale 1:62500; Plainfield, 1893, scale 1:62500; Plainfield, 1905, scale 1:62500, Roselle, 1943, scale 1:124000, and Newark, 1944, scale

1:250000. Historic aerial imagery reviewed included photography made available by the USGS via Earth Explorer online.

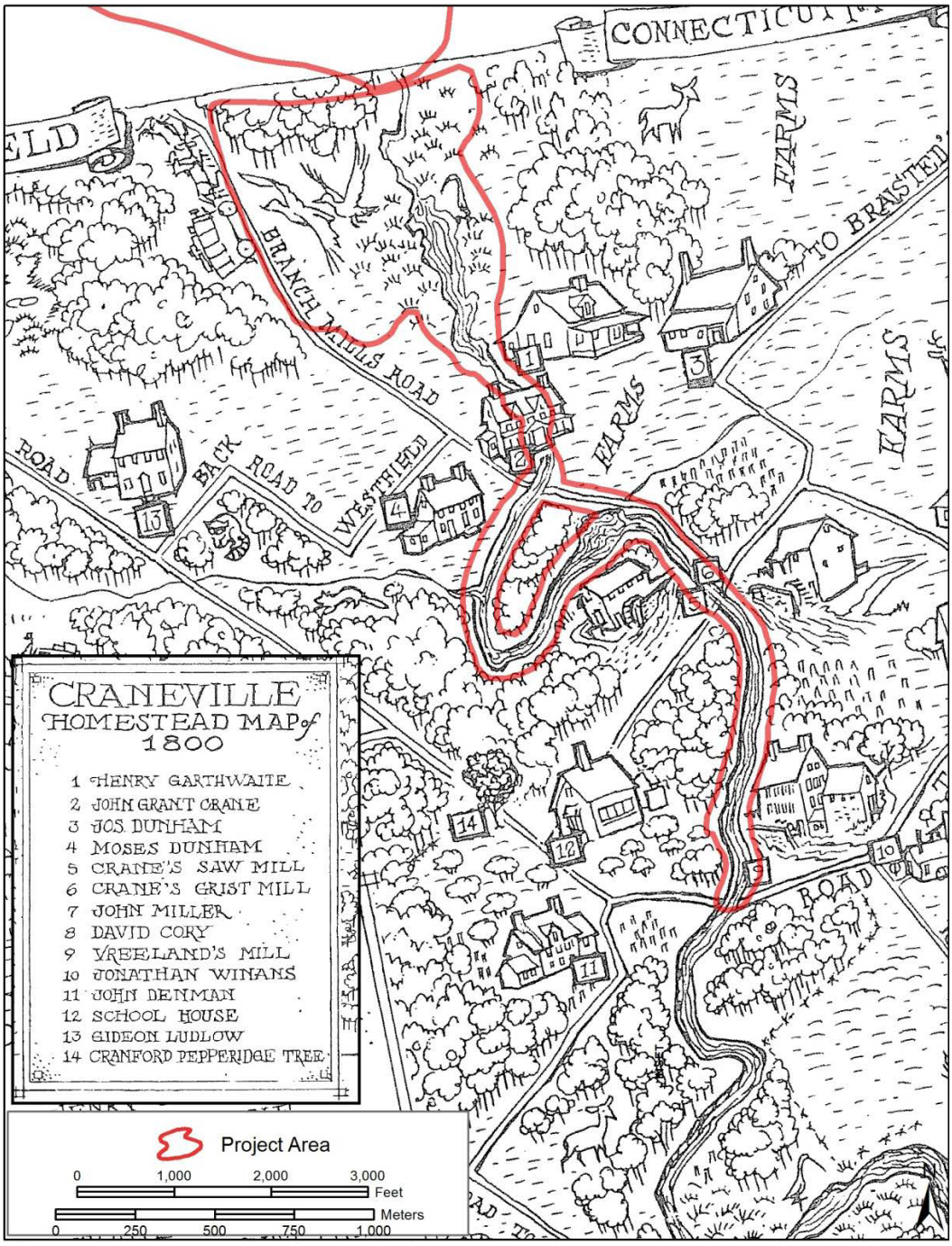

Figure 3: Map of the Study Area overlaid on a schematic settlement map of present-day Cranford, formerly Craneville, in 1800 (Hall 1964). Artistic rendering not drawn to scale.

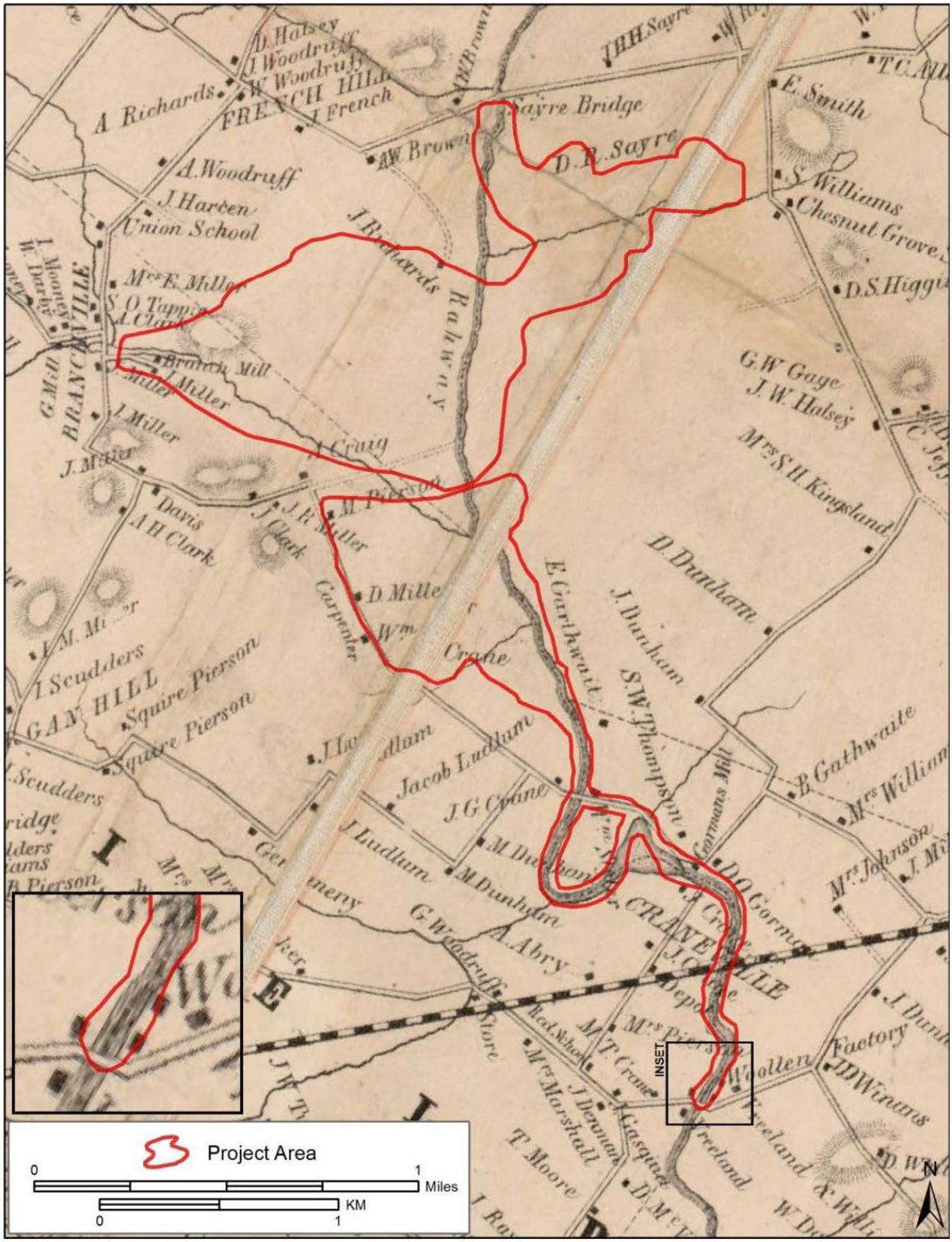

Figure 4a: Map of the Cranford Study Area in 1850 (Sidney 1850).

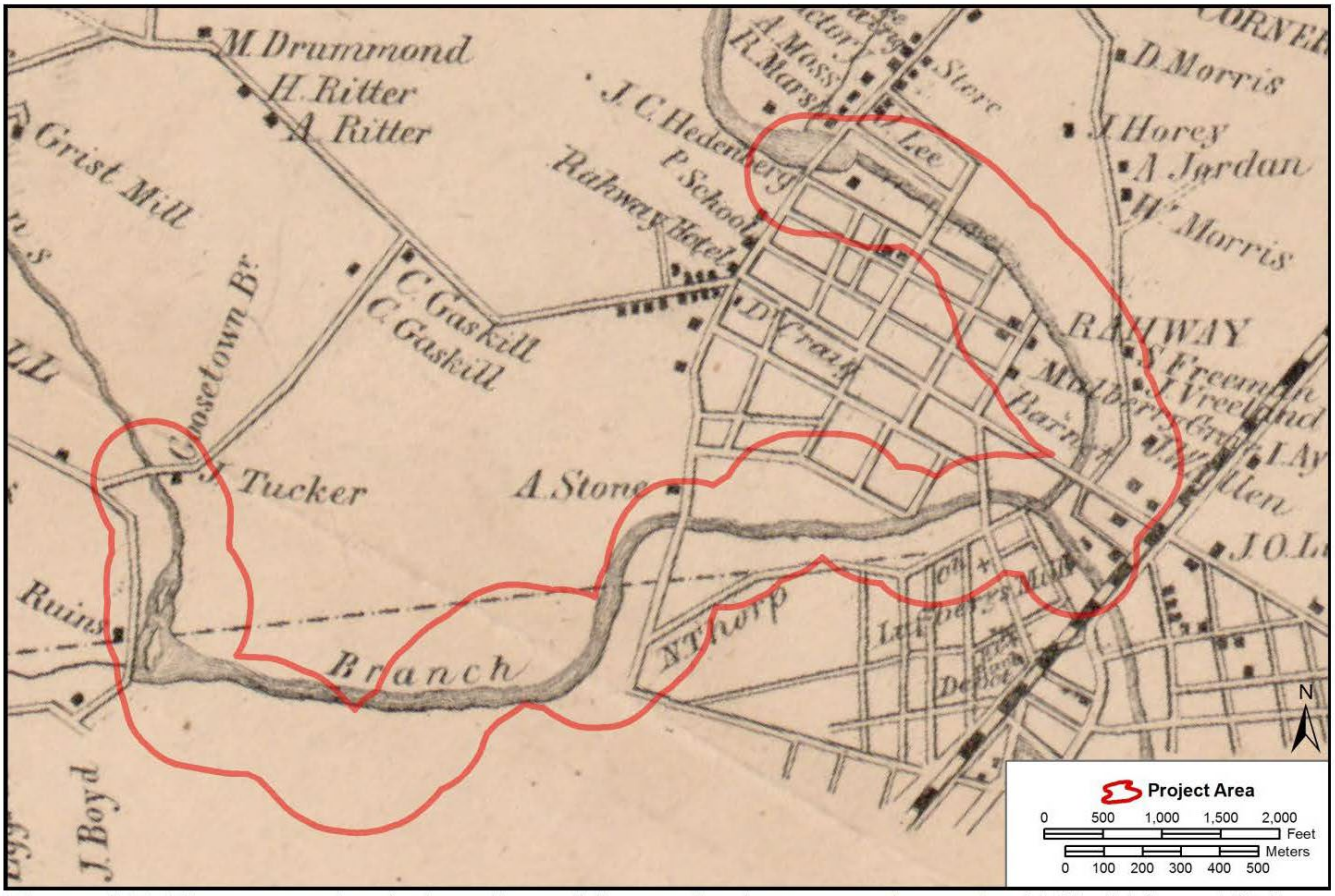

Figure 4b: Map of the Robinson's Branch Study Area in 1850 (Sidney 1850).

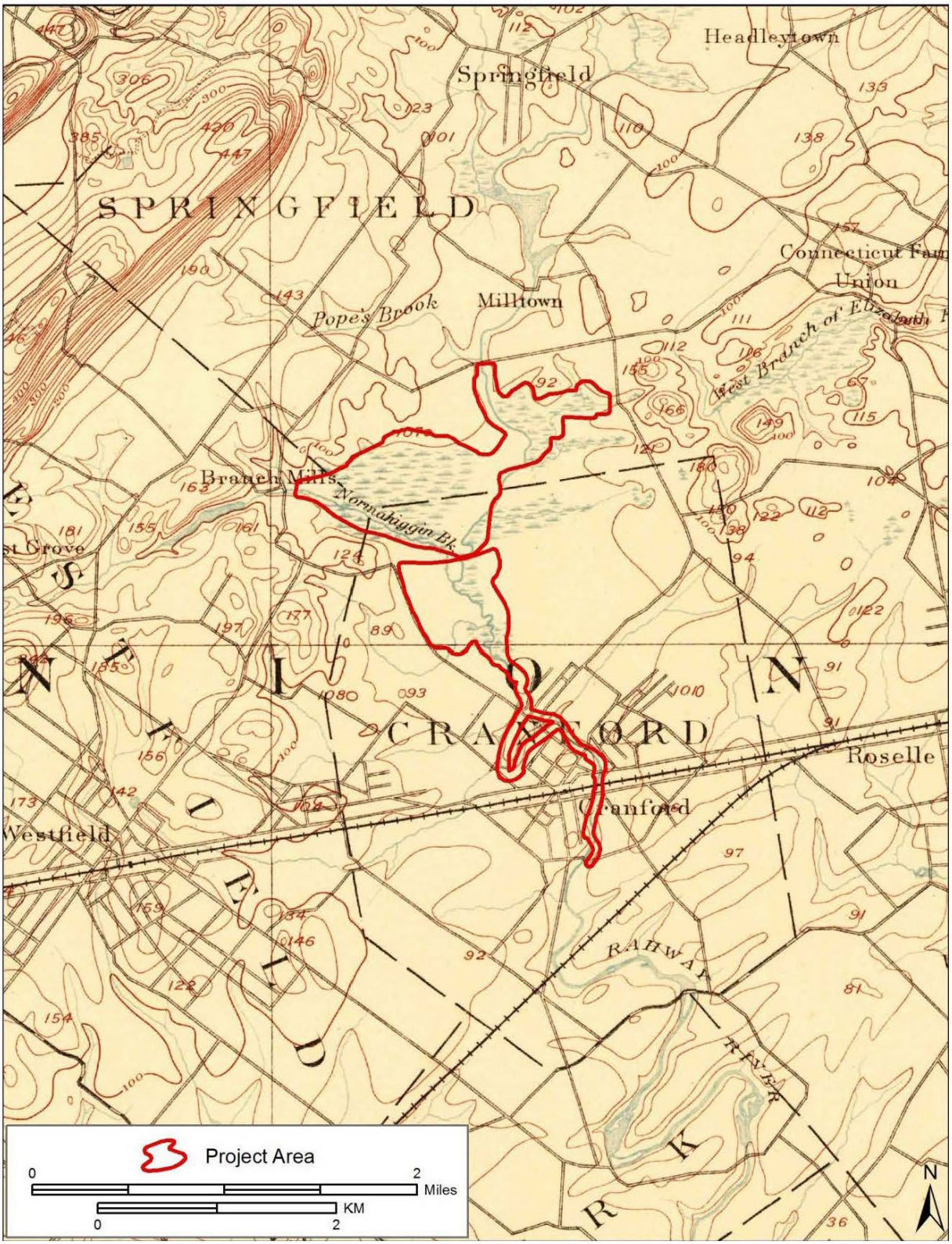

Figure 5: Map of the Study Area in 1888 showing the expansion of Cranford in proximity of the railroad (USGS 1888).

Figure 6: Map of the Robinson's Branch portion of the Study Area in 1874 (Bailey and Hazen 1874). Artistic rendering not drawn to scale.

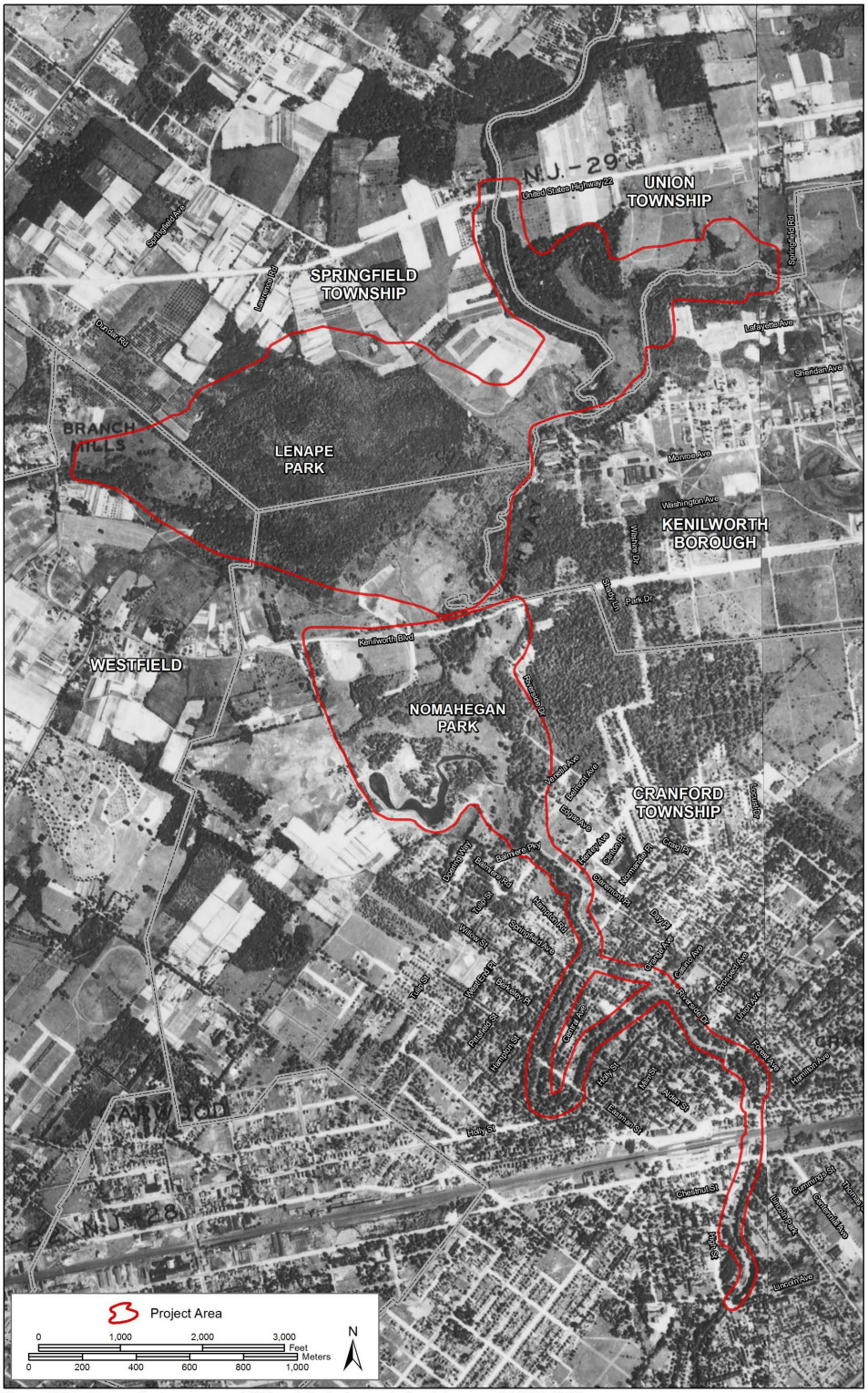

Figure 7: Map of the Project Area overlaid on a 1930 aerial photograph (New Jersey Office of Information Technology 1930).

4. Cultural Contexts

4.1 Prehistoric Context

The prehistory of northeastern North America is marked by three major periods of human occupation spanning approximately 14,000 years. The earliest known period is the Paleo-Indian Period, which lasted from 14,000 to 10,000 years ago (Panamerican Consultants, Inc. 1997). After the receding of the Wisconsin glaciation – the glacial ice of the last glacial period – Paleo-Indian cultures were able to successfully adapt to the tundra or park-tundra environment characteristic of the late Pleistocene era. At the time, Central New Jersey was a mosaic of tundra and forests that provided important habitats for large mammals and other game significant to human subsistence. Pleistocene megafauna roamed the Northeast and included such species as mammoth, mastodon, great beaver, bear, and moose-elk (Marshall 1982:17-18; Funk 1972:11). Radiocarbon dating has identified the remains of Pleistocene megafauna that inhabited Central New Jersey during this time (Funk and Steadman 1994).

During the Paleo-Indian Period, the forests of Central New Jersey were predominantly pine, spruce, and fir but eventually gave way to birch and oak (Marshall 1982). The emergence of oak stands following deglaciation and subsequent increase in resource availability allowed greater human population density toward the end of the period (Funk 1993:43-44). Paleo-Indian cultures were highly mobile, established seasonal camps near freshwater sources, and subsisted by hunting and gathering. Paleo-Indian lithic, or chipped stone, artifacts include fluted points (thin, lanceolate-shaped bifacial implements fluted down the center for hafting), unifacial end and side scrapers, utilized flakes, and waste flakes (Marshall 1982:13). Marshall (1982) attests that several fluted flakes have been found throughout Middlesex and Somerset Counties that were manufactured from jasper and chert. Projectile points that have been identified in Middlesex and Somerset Counties were made predominantly of jasper, grey chert, and black chert (Marshall 1982: 23-24).

Around 10,000 years ago, the Archaic Period developed out of the Paleo-Indian Period, ushering in technological changes during a time of gradual environmental changes (Kraft 1986: 51). The retreating glaciers caused a continuing rise in sea levels, forcing people to move inland. By 8,500 years ago, the world's temperature had warmed sufficiently for a variety of deciduous tree species to become abundant (Funk 1976:209-210; Marshall 1982:21; Kraft and Mounier 1982a:60). Oak, chestnut, beech, and elm trees dominated the landscape, causing animal population to increase in the forests due to the abundance of mast food production (e.g., chestnuts, acorns, etc.). The emergence of oak stands during this period resulted in increased resource availability, causing both animal and human population growth. Archaic groups continued to live in small territorial bands that hunted, fished, and gathered plant foods (Panamerican Consultants, Inc. 1997). Net sinkers, fish remains, and wood working tools used in canoe building found among small encampment sites suggests Archaic subsistence practices revolved around rivers, lakes, and other aquatic environments. People of the Early Archaic subsisted on fish, shellfish, berries, roots, tubers, eggs, nuts, and deer (Kraft 1986:51) and likely

moved when food supplies dwindled. The small encampments close to rivers or ponds that are typical of Early Archaic sites reflect this mobility (Kraft and Mounier 1982a:76).

Aside from occasional technological changes and gradual environmental transformation, life in the Archaic Period continued much the same as it had in the Paleo-Indian Period. People still lived in small territorial bands that hunted, fished, and gathered plant foods, seasonally occupying campsites and later seasonal villages. Except for dogs, Archaic groups had no domestic animals (Kraft 1986:51). The Late Archaic Period began about 6,000 years ago, when subsistence strategies placed greater emphasis on small game, shellfish, nuts, and wild cereal grains, which coincided with an increase in population. People continued to live in small bands and were highly mobile, but likely congregated in large groups for trade and socialization purposes. Tool innovations became increasingly complex and several new variations emerged at this time, namely the Susquehanna broadspear tradition and the Koens-Crispin culture represented by broad-stemmed points, scrapers, atlatl weights, and adzes (Kraft 1986:84).

Archaic people developed woodworking tools using coarse-grained stones and river cobbles as their raw materials. These were commonly available in large sizes and allowed tool makers to reserve high-quality lithic materials for finely flaked tools. A pecking and grinding technique was used to shape axes, adzes, gouges, choppers, and other woodworking or rough stone tools. These heavy woodworking tools may have been used for canoe building. The woodworking tool kit included anvil stones, choppers, netsinkers, and an array of projectile points. Chert, jasper, argillite, shale, and rhyolite were the most commonly used raw materials (Kraft 1986:58).

Towards the end of the Archaic Period, greater emphasis was placed on small game, shellfish, nuts, and wild cereal grains like Chenopodium. This shift in subsistence strategies made higher population densities possible, although the larger population may have made it necessary to exploit these different resources. Whatever the reason, as population increased, camps became larger and more numerous. While principal settlements were located near major rivers, people still lived in bands whose territories were probably well defined. Moving seasonally or when resources dwindled, Late Archaic groups may have congregated occasionally for exchange and socialization (Robbins 1960; Ritchie and Funk 1973).

The introduction of pottery roughly 3,000 years ago marks the beginning of the Woodland Period, improving the efficiency of cooking and food preparation (Curtin 1998). The Woodland period is characterized by seasonally occupied villages and campsites, a hunting and gathering subsistence strategy, and eventually horticulture. Around the same time, several cultures introduced mortuary and ceremonial practices such as cremation, burial cemeteries, burial caches, and medicinal bundles (Williams and Thomas 1982). These cultures include the Meadowood phase, the Adena-Middlesex culture, the Bushkill culture, and the Fox Creek culture (Fischler and French 1991).

During the Late Woodland period (AD 900-1600), the subsistence system shifted emphasis from the gathering of wild foods to the growing of domesticated plants (Fischler and

French 1991: 160). With this switch came settled village life, larger aggregated communities, population growth, enriched religious and ceremonial life, and warfare (Bender and Curtin 1990; Cronon 1983; Handsman 1990). In northern New Jersey, the first major phase of the Late Woodland period is the Pahaquarra, or Owasco phase (AD 1000-1350). Ceramics of this phase were collarless pots with cord-marked bodies and cord-impressed rims (Kraft 1986:120). Houses of this period were most often "[r]ound ended long houses with the doorway on one of the sides" (Kraft and Mounier 1982:146). Deep storage pits are found at the ends. The houses ranged from 18 to 60 ft (5.5 to 18.3 m) long and up to 20 ft (6.1 m) wide. Stone tools such as flake knives, hammer, anvil stones, and Levanna points are typically found on Late Woodland Pahaquarra sites (Kraft and Mounier 1982:148). Besides hunting, gathering, and gardening, Pahaquarra people spent a great deal of time fishing and gathering shellfish, which were then smoked in hearths or dried on stone platforms (Kraft and Mounier 1982b:151; Kauffman and Dent 1982).

Two distinct linguistic groups emerged in New Jersey during the Woodland Period. Proto-Munsee speaking people lived in northern New Jersey, north of the Raritan River, while Proto-Unami speaking people lived south of the Raritan River (Panamerican Consultants, Inc. 1997). These groups are known by differences in ceramics and burial style in addition to their linguistic differences (Kraft 1986:120). Ceramics with well-defined collars and incised linear geometric designs identify the Minisink phase (AD 1350-1650) of the Proto-Munsee people (Kraft 1986:120). Minisink longhouses were virtually the same as those of the Pahaquarra/Owasco culture. Burials are often oriented with the heads to the southwest or west (Kraft and Mounier 1982:157). Unlike earlier Woodland cultures, there were no separate cemeteries and cremation was no longer practiced. People of the Late Woodland buried their dead in bark-lined graves.

Corn horticulture was developed by AD 1020-1060 or earlier, accompanied by sporadic population growth, settled village life, an enriched religious and ceremonial life, and warfare (Cassedy et al. 1993). However, since fortified Late Woodland village sites have not been documented by archaeologists in this region, such large, aggregated communities were most likely not often established by the local Native American groups or their ancestors. It seems likely that the late prehistoric peoples of the Piedmont and Inner Coastal Plain lived in small, unfortified, dispersed farmsteads or hamlets, in similar fashion to many of the New England Indians (Bender and Curtin 1990; Cronon 1984; Handsman 1990; Kraft 1986). A wide variety of implements have been found on these Late Woodland sites, including tools for hunting, butchering, hide preparation, fishing, plant processing, cooking, woodworking, and domestic activities (Kraft and Mounier 1982:154-155). The Study Area lies in east-central New Jersey, which was between the Munsee and Unami. Historical sources report that Unami Lenape inhabited the Rahway basin at the time of Contact (Philhower 1923; Snyder 1969).

4.2 Historic Context

During the 1609 voyage of the Dutch East India Company, led by English explorer Henry Hudson, the Dutch encountered subgroups of Algonquian Delaware, or the Lenape, who at the

time inhabited what would eventually become New Jersey. The Dutch were the first Europeans to settle in the area. Subsequent voyages by Dutch captains served to establish outposts in New Jersey to advance Dutch commercial interests in the region.

The center of Dutch operations in North America was New Netherland, a thin band of sparsely settled territory stretched along the North River which connected New Amsterdam at the lower tip of Manhattan Island with the frontier outpost of Fort Orange, the present City of Albany, New York, and its satellite at Schenectady. From their base in New Netherland, the Dutch prosecuted the prized beaver trade, competing with the English in the Connecticut River valley and the Swedes in the Delaware River valley (Ellis et al. 1967:18-25; Gehring and Starna 1988; Burke 1991:1-18, 123-125).

The 1758 Treaty at Easton affirms the Raritan River as the dividing line between the Munsee and Unami subgroups of the Algonquian. The Munsee and Unami subgroups represent two dialects of the Algonquian language family (Goddard 1978; Williams and Kardas 1982). The Munsee inhabited the New Jersey highlands and the lower Hudson River Valley, while the Unami inhabited the Delaware River Valley and Eastern Pennsylvania.

The relationship between the first Dutch settlers and the local indigenous population was considered peaceful at first, but the increasing Dutch population in the mid-seventeenth century exacerbated tension and sparked violent conflicts over land ownership (Fitch and Glover 1990; Goddard 1978). With the English conquest of New Netherland, the European settler population expanded rapidly throughout the colonies, forcing the Delaware to sell their land and move west. The 1758 treaty came to fruition at conferences held in Easton, Pennsylvania, and Crosswicks, New Jersey, in which the Delaware were mandated to relinquish their claims to all lands in the colony of New Jersey. The Delaware who wished to remain in New Jersey were confined to a reservation on Edgepillock Creek, later known as Indian Mills. All other Delaware resettled farther west, migrating to Pennsylvania and present-day Indiana and Wisconsin (Kraft and Mounier 1982).

The Dutch established several communities along the Delaware and Hudson Rivers in the 1620s and 1630s, but the population of New Netherland remained small (Burke 1991). Problems emerged with other European colonists, most notably the English and the Swedish, who aspired to gain a foothold in the Dutch-dominated beaver trade. The Dutch initially failed to prevent Swedish settlement in the Delaware Valley in the mid-seventeenth century, but New Netherland governor Pieter Stuyvesant succeeded in forcefully dispatching the Swedes from the region in 1654 (Ellis et. al 1967: 20-28).

In 1664, the English abruptly terminated Dutch proprietorship over New Netherland. When forces loyal to James, the Duke of York and Albany, captured the colony during the Second Anglo-Dutch War, New Netherland was renamed New York and the Duke was given control over all land west of the Connecticut River and east of the Delaware River. For the land lying between the Hudson and Delaware Rivers, James awarded to Lord Berkeley and Sir George Carteret, the latter of whom was born on the Isle of Jersey in the English Channel. The

new colony was named in honor of Carteret's birthplace and became New Jersey (Wacker 1982; Kim 1978; Divine et. al 1995).

Philip Carteret arrived in 1665 to become the first governor of New Jersey, at a time when the area was generally undisturbed by European occupation. Although European settlers from present-day Long Island were encouraged to immigrate to New Jersey and establish farms, the area remained occupied by small, scattered, and often isolated farmsteads, with villages of more than a few hundred people remaining rare. Settlement in the Study Area began in the late 1660s when large tracts of land were purchased by Europeans, notably English speculators. Administrative necessities resulted in the division of the Jerseys into municipalities and counties. Counties were formed in 1681 in West Jersey (Burlington and Salem were the original two) and in 1683 in East Jersey (Bergen, Essex, Middlesex, and Monmouth were the original four).

During the late seventeenth century and early eighteenth century, subdivision of the large speculative tracts began as smaller lots were sold to incoming settlers establishing scattered farmsteads. With the advent of active English development of colonial New Jersey, European homesteaders from a variety of backgrounds migrated to New Jersey to clear the land in increasing numbers. New Englanders via Long Island began filtering into eastern New Jersey; Dutch immigrants with their African slaves also left Long Island in the 1680s, establishing settlements in the Raritan valley. However, since the earliest English immigrants came from the Piscataqua River valley in New Hampshire and Newbury, Massachusetts, the area acquired the name Piscataway when townships were being created (Snell 1881; Wacker 1982:199). At first, West Jersey attracted Irish and English Quakers in large numbers. But after William Penn redirected Quaker settlement to his colony of Pennsylvania after 1682, New England and Long Island Puritans and Baptists from England and Virginia entered the area. The first agglomerated settlements grew up around road junctions and river fords. Social, economic, and climatologic conditions favored the development of small subsistence farmsteads rather than large agricultural plantations. Within a local and regional exchange system, farms grew grain and raised livestock for themselves and their neighbors and only later exported their surplus to merchants in either Philadelphia or New York City (Manning 1984:44-45; Wacker 1982:199-205).

European occupation of the Rahway area began in 1664 when English speculators from New England and Long Island purchased large tracts of land from the Unami subgroup of the Lenape, whose main settlement was reported to be on Staten Island. The Dutch referred to the Native American inhabitants of the area as the Raritan (Philhower 1923). The English considered the present location of Cranford to be within the bounds of this purchase, although the Indians may have intended the agreement to apply only to lands south of the Rahway River (Philhower 1923). On 1 December 1664, Governor Nicolls issued a patent to John Baker, John Ogden, John Bayly, and Luke Watson for the Elizabethtown Patent, a substantial tract of land that extended from the mouth of the Raritan River to the mouth of the Passaic River (approximately 17 miles) and 34 miles into the back country, encompassing approximately 500,000 acres, including all of present-day Union County, the present site of the City of Rahway

and the northern branch of the Rahway River, and portions of Essex, Middlesex, Morris, and Somerset counties.

Settlers from Long Island were encouraged to migrate to New Jersey and establish farmsteads within the Elizabethtown grant, but only four families had settled in this area at the time of Philip Carteret's arrival in August 1665 to establish the village of Elizabethtown (present-day Elizabeth). Carteret, Nicolls successor as governor, later bought out Bayly (Pomfret 1964:9- 10). In February 1666, 65 lot owners, nearly all of whom were Puritans originating from Long Island, pledged allegiance to King Charles and the proprietors. About that time, several families obtained a grant from Governor Carteret to settle plantations on the south side of Robinson's Branch of the Rahway River, at what later became the village of Woodridge. By approximately 1680 settlers from both Elizabethtown and Woodridge had occupied land in the Rahway area. One settlement, called Rawack, was developed on the Elizabethtown side of Robinson's Branch, and a second settlement, known as Bridgetown or Lower Rahway, formed on the Woodridge side around present-day Main Street (Kraft 1977; Shipley 1976).

A 1685 map of settlements in the Rahway River Basin lists several land parcels on the western side of the river, suggesting the eastern bank may have been considered less desirable for settlement as a result of its proximity to a large marsh. Many of the landowners were either well-connected to the proprietors in England or part of the proprietor collective themselves. Prior to 1700, Presbyterian families from Connecticut settled the area known as Connecticut Farms in what is now Union Township. Scottish families relocated from Perth Amboy to what is now the Plainfield/Scotch Plains area and Quaker farmers settled along the Rahway River and in Woodbridge and Roselle Park. The Westfield area was surveyed into 180-acre agricultural plots and was originally referred to as the West Fields of Elizabethtown (Clayton 1882; A.G. Lichtenstein & Associates, inc. 1994; Dietrich 2004).

Shortly after the initial settlement of the area, pioneers built several mills using the Rahway River for power. John Marsh built the earliest mill on the south side of the Rahway River just above the present railroad bridge, ca. 1688 (Hills 1778). Jonathan Bishop constructed another early mill along the Rahway in the 1680s along the southern branch of the Rahway River, near the site of the present Hazelwood Avenue bridge (Clayton 1882; Shipley 1976). Marsh later constructed a gristmill on the west side of the river "near lower Main Street" (Clayton 1882). The mill passed through the hands of a series of owners before its final acquisition in the 1820s by Joseph O. Lufbery and John T. Vail, who operated a sawmill on the west side of the river, opposite the old Marsh mill. In 1855, the New Jersey legislature, responding to health hazards caused by stagnant water in the mill ponds, enacted a measure that required the removal of the Rahway River mill dams. The Lufbery mill and other Rahway River mills were subsequently converted to steam operation (Clayton 1882; Shipley 1976).

By the late eighteenth century, the Rahway River served as an early transportation corridor for the shipment of goods and supplies to and from the emerging Rahway community. Several docks, or landings, initially served for the transportation of hay, but soon shipped a diversity of goods. One such dock, located east of Bishop Mill, was known as Bishop's Landing,

and is shown on nineteenth-century maps west of what is now Route 1. Another dock, initially owned by Robert Wright but became known as Edgar's Landing by 1778, is depicted in 1850 near the Lawrence Street bridge (Clayton 1882:245; Shipley 1976:10). In addition to the river, several roads provided transportation during the early settlement of the Study Area. The route connecting Elizabethtown to Woodbridge was referred to as King's Highway, and followed what is now St. George's Avenue (Clayton 1882:243, 245; Dally 1873; Dietrich 2004:19). Newark and Elizabeth, Essex County's two largest villages in the eighteenth century, were linked by the Old York Road (now Route 28), which extended from New York City to Philadelphia. Also on the route were the villages of Westfield, Scotch Plains, and Plainfield (A.G. Lichtenstein & Associates 1994). The Rahway River valley continued to develop during the eighteenth century and by 1770 five well-known travelers' inns operated in Rahway. These were located along the present St. George's Avenue, the main route from Elizabethtown.

At the outbreak of the American Revolution, most Rahway residents supported the rebels, but many of the leading citizens, especially those who lived near Elizabeth, the provincial capital, remained loyal to the British. By December 1776, approximately 500 British troops were headquartered in Rahway (Hall 1964; Shipley 1976). Washington's surprise crossing of the Delaware into New Jersey on Christmas 1776 led to British defeats at the battles of Trenton and Princeton. After these battles, both American and British forces moved back and forth across central New Jersey during the early months of 1777 in what one historian has called "the Forage War" (Fischer 2004:346-356).

Besides several raids and skirmishes occurring in the vicinity of the Rahway River Basin, two significant events reportedly occurred near Rahway. While not major battles, these engagements served to bolster the morale of local militias, which did most of the fighting under the command of Continental Army General William Maxwell (Shipley 1976:46). On January 5, 1777, American forces under Maxwell's command attacked British units at Springfield, northwest of Rahway, killing ten men and taking 40 prisoners. The British retreated toward Rahway, where they engaged the rest of Maxwell's forces. A battle ensued for twelve hours, before the British, suffering nearly 100 casualties, were driven back to Woodbridge. After the battle, the Americans seized a quantity of British supplies, including 1,000 bushels of salt (Cady 1922; Shipley 1976). The site of the battle was near Rahway River Parkway, off St. George's Avenue in the vicinity of Robinson's Branch and the North Branch of the Rahway River (Shipley 1976).

The second action in the Rahway area occurred on February 23, 1777. Maxwell's troops attacked a British force of some 1,500 men under the command of Lieutenant Colonel Charles Mawhood. The British had left Amboy that morning for the joint purpose of foraging and launching a surprise attack on American troops "past Woodbridge, near the present town of Rahway" (Lobdell 1967). On this occasion, the Americans forced the British to withdraw to Amboy with the loss of four dead, 60 wounded, and nine captured. The British units were attacked as they moved along St. George's Avenue. They marched as far as the Robinson's Branch before retreating (Shipley 1976).

After the Revolution, Rahway became the location of the first New Jersey state mint, which was located on the site of a gristmill and sawmill purchased by Christopher Marsh in 1776 and sold to Daniel Marsh the following year. The site was on the east side of St. George's Avenue on the southwest bank of the Rahway River, but the mint closed in less than one year due to the disruptions caused by war and the lack of hard currency after the war subsided (Shipley 1976). By the end of the eighteenth century, numerous communities had grown into townships within Elizabethtown, and included Springfield (1793), Westfield (1794), Rahway (1804), Union (1808), and New Providence (1809) (Clayton 1882:179; Kraft 1977:8-9).

The circuitous Rahway River provided power for several nineteenth-century rural industrial operations. By 1834, approximately 20 mills were operating along the river, processing a variety of products including lumber, grain, wool, cotton, and paper (Dietrich 2004:48). One such sawmill was operated by Benjamin Williams on the west side of the Rahway near Cranford during the Revolutionary War. Williams' heirs converted the sawmill to a fulling mill by 1810, which operated until it burned down in 1821. James Vreeland purchased and rebuilt the mill by 1827 and operated a woolen factory, which remained under his family's ownership until 1893, when it was purchased by Crossman Lyon. Severin R. Droescher bought the mill at auction on July 4, 1902, and during the subsequent decades the machinery, turbines and dam were replaced and rebuilt. The mill changed owners several times since Droescher's death in 1938 and it was listed on the National Register in 1974 (NJDOT 1987).

While roadways and turnpikes did not play a significant role in the development of the area, one of the earliest roads connecting New York and Philadelphia—the Old York Road—passed through Cranford. The route of the Swift Sure Stage Company followed this road and connected the area to the New York ferries (Hall 1964). However, a major stimulus for industrial and commercial development was not turnpikes, but rather the construction of the New Jersey Railroad in the early 1830s. Regular railroad service began for the village of Rahway by 1835, which helped the village become a center of manufacturing and commercial activities in the early nineteenth century, spurring economic growth for Rahway residents. In addition to various mills, brickmaking had become a major enterprise, and a portion of Rahway became known as Bricktown. Early maps show a brickyard north of the river in 1856 (Hughes 1856). Bricks were shipped to New York City and other destinations from Edgar's Landing at Lawrence Street and Hazelwood Avenue and from Shotwell's Landing at Barnett Street. More than 35 carriage factories were established in Rahway around this time (Shipley 1976). Through the nineteenth century, the village center for Rahway remained west of the river, while the area along the eastern bank was largely undeveloped (Gordon 1829).

The Elizabeth & Somerville Railroad was chartered in 1831 as a competitor to the Morris Canal for the transportation of coal from the Lehigh Valley. By 1839, the line was completed to Plainfield, and by 1842 to Somerville. The line was never financially successful and eventually merged with the Somerville & Easton line to form the Central Railroad of New Jersey (CNJ) in 1849. A CNJ station was established at Cranford, then known as "Craneville" in 1865. The CNJ Main Line Corridor linked the anthracite coal mines of Pennsylvania with the harbor and markets of New York City, spurring industrial development along its route (Hall 1994). In

addition to its freight-carrying operations, the CNJ also served as a passenger line, furthering residential growth for communities such as Jersey City, Bayonne, Elizabeth, Plainfield, Bound Brook, and to some extent the area around Cranford. The line helped to spread suburbanization into previously rural east-central New Jersey, as people relocated to these rural areas and commuted to their jobs in urban New York and northeastern New Jersey (Hall 1994; A.G. Lichtenstein & Associates 1994). In 1872, the United New Jersey Railroad was incorporated through the consolidation of the Camden & Amboy Railroad and Transportation Company, the Delaware & Raritan Canal Company, and the New Jersey Railroad and Transportation Company.

The CNJ railroad and the Delaware, Lackawanna, and Western (DL&W) railroad laid the foundation for the suburbanization of the Union and Middlesex Counties during the late nineteenth century and early twentieth century by establishing commuter service, as New York City and eastern New Jersey workers relocated to Central New Jersey (Dietrich 2004:20). Union County was created from the southern portion of Essex County in 1857, with Rahway incorporated as a city the following year. At the time of its incorporation the City of Rahway included parts of two separate townships, Rahway (in Union County) and Woodbridge (in Middlesex County). To resolve this confusion, the state legislature transferred Woodbridge from Middlesex County to Union County, making it part of Rahway Township. The present boundaries were established when a portion of the former Rahway Township was separated to form Linden Township, with the remainder absorbed into the City of Rahway (Honeyman 1923).

In 1860, Cranford was merely a crossroads at a railroad stop in the open country, just northwest of Rahway, and consisted of farmland and a cluster of houses. John Crane was one of the first to purchase land in the area in the early eighteenth century. After building a dam just north of what is now Union Avenue, Crane erected a sawmill and a gristmill. Crane's children constructed homes near the mills and a community known as Crane's Ford, later called Cranford, began to develop. In 1864, developers purchased large farmland tracts and divided them into smaller residential lots. The Township of Cranford was formed in 1871 from sections of Westfield, Rahway, Union, Linden, Springfield, and Clark. The population of the township rose rapidly over the coming decades, as census records indicate there were 2,854 Cranford residents in 1900. The "Oakland" area of Cranford became Garwood in 1902, and the "New Orange" section became Kenilworth in 1907 (Kraft 1977:9). From the late nineteenth century into the early twentieth century, the Rahway River was the center of the area's recreational activities. Residents along the river erected docks and boathouses to access the Rahway and river-themed carnivals and parades continued into the 1920s, with the township adopting the slogan "the Venice of New Jersey," for itself (Maxwell 2006; King 2007).

The Borough of Kenilworth emerged when a group of developers purchased thirty farms around 1880 and began constructing roads, homes, and industry. Originally known as "New Orange," by 1905 the Rahway Valley Railroad connected the community with mass transit and trolley lines. Several of the investors later formed a new organization—Kenilworth Realty Company, which was named in honor of Sir Walter Scott's novel *Kenilworth* (Maxwell 2006). Kenilworth was then incorporated as a borough in 1907. Development of the area grew steadily, but then experienced a boom during World War I when two ammunitions plants

opened along the rail line in 1914, intensifying housing needs and spurring residential construction efforts (King 2007).

The Township of West Orange was formed in 1693 as part of Newark Township but was annexed to form Orange Township in 1806. West Orange was then partitioned from Orange in 1863 with a population of 1,755. By 1936, the population had grown to 29,321. The rapid demographic growth of the late nineteenth and early twentieth centuries is attributed to the attraction of the unspoiled, natural setting of the Watchung Valley and the rugged terrain of the Watchung Mountains. The countryside offered a quiet and peaceful location for businessmen and their families to live that represented both a getaway from the bustle of the city and a sense of community for likeminded, affluent intellectuals (Scarpa 2016).

This population boom led to a need and desire for public utilities and amenities such as rail lines, trolley lines, sewers, and water mains. In 1883, the City of Orange constructed the Orange Reservoir to supply water to residents and businesses. In 1895, the Essex County Parks Commission established the South Mountain Reservation for the purpose of public use and recreation. Although the Orange Reservoir was included as part of the original design concept of the South Mountain Reservation, the reservoir was constructed prior to the design of the park and was never developed as a feature of the park. However, in 1999 use of the reservoir for water supply was discontinued and Essex County leased the property from the City of Orange, adapting the reservoir for recreation (Scarpa 2016).

Development of the park system slowed during the Depression of the 1930s. The federal government helped spur on the development of the parks system through a variety of New Deal programs. These were the Civil Works Administration, the Works Progress Administration (WPA), the Public Works Administration, and the Civilian Conservation Corps (CCC). The WPA and the CCC made additional improvements to the park in the 1930s. Over the last decades of the twentieth century Union County has continued to increase the number of acres within the park system, increasing from 5,200 acres of parkland in 1972 to 5,574.3 acres in 1990 (Nolte et al. 2013).

As a result of the rapid growth of the Study Area, nineteenth-century infrastructure and transportation patterns needed to be upgraded and replaced to fit the increasingly more demanding requirements of the early twentieth century (A.G. Lichtenstein & Associates 1994). Mills had been a fixture along the Rahway River since the eighteenth century, and the City of Rahway used the river to support its ports and facilitate trade. But by 1919 industrial activity had become intensive and the negative impact of this activity had attracted the attention of local engineers (Dietrich 2004:48; Hall 1964). Suggestions for a park comprising land around the Rahway River began emerging during the early post-World War I period as citizens became concerned about the degradation of the river by pollution as a result of increased industrial activity along the river.

In 1921, the Union County Park Commission engaged the Olmsted Brothers Landscape Architects of Brookline, Massachusetts as consultants for the creation of a county-wide system

of public parks. The Olmsted Brothers were the preeminent park planners and designers of the period and were lineal descendants of Frederick Law Olmsted. The Olmsted Brothers firm had planned and designed the Essex County Park System, the first of its kind in the United States. The company conducted a preliminary inspection of potential park sites, made preliminary recommendations, and contributed designs for several individual units (Dietrich 2004). The Union County Park System began acquiring land in 1922 and began construction efforts a year later. By 1930, the park system was managing 17 park units comprising 4,168 acres in Union County.

By 1930 the advent of more widespread automobile use expanded the populations of Plainfield, Union, Cranford, and Westfield, while decreasing the attractiveness of commuter railroads. Road construction became increasingly prioritized over park construction. Furthermore, the Great Depression led to a loss of local funds allocated towards park development and maintenance. After World War II, the park system began losing acreage as the state adapted to the emergence of the automobile as the primary mode of transportation. The park system lost areas in the 1950s for the construction of both the Garden State Parkway and the New Jersey Turnpike. Other losses included periodic flooding, ravages by ice storms, and the remnants of tropical storms. However, the later decades of the twentieth century the park system managed to gain park lands, mostly through private donations. During the 1970s and 1980s, Union County continued to increase the number of acres within the park system, increasing from 5,200 acres of parkland in 1972 to 5,574.3 acres in 1990 (Dietrich 2004).

5. Existing Conditions

5.1 Cultural Resources Inventory

Cultural resources include buildings, structures, objects, districts, pre-contact and historic archaeological sites, locations of important historic events that lack material evidence of those events, and landscapes that convey cultural or traditional importance to social and ethnic groups. Tables listing the recorded historic properties within the Study Area according to the current NJHPO database are presented as follows:

Table 2 – NRHP Listed/Eligible Properties and Local Landmarks in the Study Area
Table 3 – Archaeological Sites in the Study Area
Table 4 – Historic Districts in the Study Area

As of January 2024, NJHPO data indicates that the Study Area includes more than 5,000 recorded historic properties, approximately 3,000 of which have been evaluated for National Register eligibility. Of these properties, 32 are individually NRHP-listed, 45 are individually NRHP-eligible, and 7 are designated Local Landmarks (Table 2). All other evaluated properties contribute to recorded historic districts in the Study Area.

There are 25 recorded archaeological sites in the Study Area (Table 3). Two sites, the Smith Farm Site and the Frazee House Site, are NRHP-listed. Another two sites, the Morris

Avenue Rahway River Bridge Site and the First New Jersey State Mint Site, are NRHP-eligible. The other 21 archaeological sites in the Study Area have not yet been evaluated for NRHP eligibility. Specific site locations and reports are currently unavailable but will need to be consulted once plans are established to determine the level of impact and potential for adverse effects. Due to the sensitive nature of archaeological sites, no locational data is reproduced here.

Figure 8 depicts the locations of historic districts within the Study Area. There are 28 recorded historic districts in the Study Area (Table 4). Three districts, the Maplewood Village Historic District (HD), the Montrose Park HD, and the Wyoming HD are NRHP-listed. Seventeen districts, including the Lower Rahway/Main Street HD, the North Cranford HD, and the South Mountain Reservation, are NRHP-eligible. The other eight districts in the Study Area have yet to be evaluated for NRHP eligibility.

Figure 9 depicts the location of historic properties within the Study Area. No National Historic Landmarks (NHLs) or Locally Designated Historic Districts are located in the Study Area. According to the Automated Wreck and Obstruction Information System (AWOIS), no recorded submerged shipwreck sites are currently located in the Study Area or elsewhere in the Rahway River (NOAA 2024).

The Rahway River Parkway was determined individually eligible for the National Register of Historic Places in 2002. Rahway River Parkway is defined by the Determination of Eligibility (DOE) as a system of parks and open spaces along the banks of the Rahway River bounded to the north by Springfield Avenue in Springfield Township, and to the south by Elizabeth Avenue in the City of Rahway. In 2005 the Union County Parks System Historic District was determined eligible for the NRHP. The Rahway River Parkway is considered a contributing element of the Union County Parks System Historic District. In the Cranford section, the Parkway includes Lenape Park, Nomahegan Park, McConnell Park, Sperry Park, Lincoln Park, Droescher's Mill, Memorial Park, Hampton Park, Girl Scout Park, and Hanson Park. In the Robinson's Branch section, the Parkway includes the Rahway River Park, Bezega Park, Wheatena Park, Veterans Memorial Field, Rahway Kiwanis Park, and Milton Lake Park. In addition to the individual parks, the historic district boundaries include the Parkway corridor that runs continuously along the Rahway River (Figure 8).

In 2013, in compliance with Section 106 responsibilities, cultural resources investigations were carried out for Cranford and Robinson's Branch to identify historic properties and archaeologically sensitive areas (Nolte et. al. 2013a and 2013b). The 2013 surveys did not include the Orange Reservoir or South Mountain Detention Basin, but included a review of previous research, historic maps, and relevant National Register of Historic Places (NRHP) nomination forms and data on file at the New Jersey Historic Preservation Office (NJSHPO), an archaeological sensitivity assessment, and an architectural inventory.

A total of 124 individual architectural resources were recorded within the Study Area in the Townships of Springfield, Union, and Cranford, and the Borough of Kenilworth, Union County, New Jersey, with most resources located in Cranford. Each of the historic resources were photographed and subject to a preliminary assessment. Four National Register-eligible historic districts were located within the Study Area: the North Cranford Historic District, the Central Railroad of New Jersey (CNJ) Main Line Corridor Historic District, the Rahway River Parkway Historic District, and the Union County Park System Historic District (Figure 9). Several of the districts overlap each other and the individually eligible Rahway River Parkway Historic District is contained within the Union County Park System Historic District. An architectural survey was recommended to evaluate several NRHP-eligible properties and to reevaluate historic district boundaries and individual contributing elements for NRHP eligibility.

The archaeological sensitivity assessment conducted as part of the Phase IA investigation consisted of historic map analysis, review of archaeological contexts, evaluation of known archaeological sites, and surface reconnaissance in the Study Area. One pre-contact period archaeological site was located within the Study Area along the Rahway River just south of Nomahegan Park. Two more archaeological sites reportedly exist along the riverbank within the Study Area but the exact location is unclear from the site forms. Much of the Study Area was determined to be sensitive for historic and pre-contact archaeological resources. Shovel testing was recommended for all areas where below-ground impacts are proposed. Deep testing strategies have been recommended for areas where the ground surface was artificially elevated with the understanding that some fill, having been added for the construction of historic homes along the Rahway River, may also contain historic materials (Nolte et. al 2013a).

The Robinson's Branch investigation consisted of a 500-foot buffer surrounding a 2-mile long segment of the Robinson's Branch of the Rahway River and a 1-mile long stretch of the Rahway River in the City of Rahway (Nolte et. al. 2013b). The investigation reviewed previous cultural resource efforts, established a historic and cultural context of the Study Area, and assessed its archaeological sensitivity. Researchers identified several eligible and potentially eligible resources such as the Rahway River Parkway HD, Union County Park System HD, Upper Rahway HD, Lower Rahway HD, Regina HD, and the Pennsylvania Railroad HD. Since several historic districts overlap each other, an architectural survey was recommended to evaluate the historic resources that were identified and to address the historic districts boundaries and individual contributing elements for NRHP eligibility (Nolte et. al 2013b). The map analysis, review of pre-contact and historic contexts of the Study Area, assessment of known nearby archaeological sites, and the results of archaeological surface reconnaissance indicate that, with the exception of certain areas that have been identified as recently disturbed, the Robinson's Branch is an archaeologically sensitive area.

Table 2 – NRHP Listed/Eligible Properties and Local Landmarks in the Study Area

Recorded Property Name	Address	NRHP Status
Briant Park	Bounded by Briant Park Drive, Shunpike Road, County Route 527, Briant Pkwy and County Route 636	Listed
Burial Ground of the Presbyterian Church in the West Fields of Elizabethtown	West side of Mountain Avenue, north of the Driftway, opposite the Presbyterian Church	Listed
Cannonball House (Hutchings Homestead)	126 Morris Avenue	Listed
The Clearing (Reeves Reed Arboretum)	165 Hobart Avenue	Listed
Crane-Phillips House	124 Union Avenue North	Listed
Deacon Hetfield House	Constitution Plaza	Listed
Droescher's Mill	347 Lincoln Avenue East	Listed
First Congregation of the Presbyterian Church of Springfield	201 Morris Avenue, and 11-41 Church Mall	Listed
Gershom and Elizabeth Frazee house	1451 Raritan Road	Listed
Homestead Farm at Oak Ridge	Oak Ridge Golf Club	Listed
John Decamp House	2101 Raritan Road	Listed
Laing House of Plainfield Plantation	1707 Woodland Avenue	Listed
Maplewood Memorial Park	Bounded by Oakland Road, Valley Street, Baker Street and Dunnell Road	Listed
Maplewood Municipal Building	574 Valley Street	Listed
Merchants and Drovers Tavern	1632 St. Georges Avenue	Listed
Miller-Cory House	614 Mountain Avenue	Listed
Mountain Railroad Station	449 Vose Avenue	Listed
Orange Railroad Station	73 Lincoln Avenue	Listed
Oswald Nitschke House	49 South 21st Street	Listed
Pleasant Days (Greenwood Gardens)	274 Old Short Hills Road	Listed
Rahway Theatre	1601 Irving Street	Listed
Sayre Homestead	Sayre Homestead Lane	Listed
Seventeenth Century Clark House	593 Madison Hill Road	Listed
South Orange Fire Department	First Street and Sloan Street	Listed
South Orange Railroad Station	19 Sloan Street	Listed
South Orange Village Hall	101 South Orange Ave	Listed
Stone House by the Stone House Brook	219 South Orange Avenue	Listed
Twin Maples	8 Edgewood Road/214 Springfield Ave	Listed

US Post Office	384 Main Street	Listed
Wallace Chapel AME Zion Church	138-142 Broad Street	Listed
Westfield Fire Headquarters	405 North Avenue West	Listed
William Edgar Reeve house	314 Mountain Avenue	Listed
386 Clarendon Place	386 Clarendon Place	Eligible
Baird Community Center	5 Mead Street	Eligible
Carroll Phillips Bassett House	250 Hobart Avenue	Eligible
Cary Street Bridge	NJ Transit Morristown Line, Milepost 11.81 over Cary Street	Eligible
Central Avenue Bridge	NJ Transit Morristown Line, Milepost 11.98 over Central Avenue	Eligible
Central Railroad of NJ Bridge	Central Railroad of NJ over Rahway River	Eligible
Cranford Masonic Lodge	18-20 North Union Avenue	Eligible
Droescher's Mill Bridge	Lincoln Avenue/High Street over Rahway River	Eligible
Durand-Hedden House	523 Ridgewood Road	Eligible
Eagle Company # 3/ Police Station	59-63 W Main St	Eligible
Echo Lake Park	US Route 22	Eligible
Essex Avenue Bridge	NJ Transit Morristown Line, Milepost 11.38 over Essex Avenue	Eligible
First Methodist Church	NW corner of the intersection of North Avenue & Broad Street	Eligible
First Presbyterian Church of Cranford	11 Springfield Ave	Eligible
First Presbyterian Church and Cemetery	Main Street and Scotland Road	Eligible
Freeman Street Bridge	NJ Transit Morristown Line, Milepost 12.23 over Freeman Street	Eligible
Glebe Street Bridge	NJ Transit Morristown Line, Milepost 11.75 over Glebe Street	Eligible
Highland Avenue Station	Scotland Road and Highland Avenue, Milepost 12.2 NJ Transit Montclair Br.	Eligible
Irving Street Bridge	Irving Street over Robinson Branch of the Rahway River	Eligible
Joyce Street Bridge	NJ Transit Morristown Line, Milepost 11.92 over Joyce Street	Eligible
Lincoln Avenue Bridge	NJ Transit Morristown Line, Milepost 11.51 over Lincoln Avenue	Eligible
Main Street Bridge	NJ Transit Morristown Line, Milepost 17.01 over Main Street	Eligible
Marion Avenue Bridge	Marion Avenue over Tributary of West Branch of the Rahway River	Eligible

Millburn Avenue Bridge	Milburn Avenue over West Branch Rahway River	Eligible
Mitchell Avenue Bridge	NJ Transit Morristown Line, Milepost 12.07 over Mitchell Street	Eligible
Mitchell Street Bridge	Mitchell Street over East Branch of the Rahway River	Eligible
Orange Railway Express Building, Signal Tower, and Freight House	75 Lincoln Avenue	Eligible
Pierson's Mill and "Vaux Hall", the Pierson House	693-697 Valley Street	Eligible
Pleasantdale Farm	757 Eagle Rock Avenue	Eligible
Public Service Electric & Gas West Orange Sub-Station	NJ Route 10 and Prospect Ave.	Eligible
Rahway Library	1670 Irving St	Eligible
Rahway River Park	Roughly bounded by Rahway River and Rahway River tributary, State Hwy 27 and Parkway Drive	Eligible
S.G. Milosy Greenhouses	1325 Terrill Road	Eligible
Sea Captain Brown's House	1391 Raritan Road	Eligible
Shackamaxon Golf and Country Club	100 Tillinghast Turn	Eligible
Short Hills Station	24 Chatham Road	Eligible
Stetson Avenue Bridge	NJ Transit Morristown Line, Milepost 12.13 over Stetson Avenue	Eligible
Union Tower	Amtrak Northeast Corridor Line, Milepost 19.40	Eligible
West Orange Armory	1299 Pleasant Valley Way	Eligible
Westfield Armory	500 Rahway Avenue	Eligible
Westfield Motor Vehicle Inspection Station	410 South Avenue	Eligible
Westfield Railroad Station	North and South Avenues and NJ Transit Raritan Valley Line	Eligible
White Oak Ridge Pumping Station	Millburn Township; Maplewood Township; South Orange Village Township	Eligible
William Miller Sperry Observatory	1033 Springfield Avenue	Eligible
World War I Monument	501 North Street	Eligible
Aaron Brown House	81 Parker Avenue	Local Landmark
Condit House	29 South Valley Road	Local Landmark
Gildersleeves House	57 Jefferson Avenue	Local Landmark
Jonas Ball House	88 Tuscan Road	Local Landmark
Montgomery-Ogden House	22 Jefferson Avenue	Local Landmark
Timothy Ball House	425 Ridgewood Road	Local Landmark
Tompkins House	21 South Valley Road	Local Landmark

Table 3 – Archaeological Sites in the Study Area

Site Number	Recorded Site Name	NRHP Status
28UN0043	Frazee House [Site] (28-Un-43)	Listed
28MI0261	Smith Farm	Listed
28UN0015	Morris Avenue, Rahway River Bridge (Historic Site North)	Eligible
[Unassigned]	NJ First State Mint Site	Eligible
28UN0012	Archaeological Site (28-UN-12)	Undetermined
28UN0007	Cranford Site	Undetermined
28UN0038	Dolbier-Housman House	Undetermined
28UN0037	Dr. Robinson Plantation	Undetermined
28UN0013	Edgar Farm Site	Undetermined
28UN0017	Esposito Site and Farm	Undetermined
28EX0128	General George McClellan Formal Garden & Landscape Historic Site	Undetermined
28UN0004	Grist Mill Site (28-Un-4)	Undetermined
28UN0041	Historic House Site Lot 3	Undetermined
28MI0146	Historic scatter	Undetermined
28UN0051	King's Creek	Undetermined
28UN0032	Merchant and Drovers Tavern	Undetermined
28UN0016	Morris Avenue, Rahway River Bridge (Historic Site South)	Undetermined
[Unassigned]	PCI-Rahway-1	Undetermined
28UN0042	Peace Tavern/Woodruff Historic House Site	Undetermined
28UN0006	Princess' Farm	Undetermined
28UN0040	Rahway City Hall/Municipal Historic Site	Undetermined
28UN0014	Rahway River Park Site	Undetermined
28UN0005	Saw Mill Site (28-Un-5)	Undetermined
28UN0053	Tremley Site	Undetermined
28UN0001	Willow Grove	Undetermined
28UN0002	Willow Grove #2	Undetermined
28UN0003	Willow Grove #3	Undetermined
28UN0009	Willow Grove/Cash Brook Site	Undetermined
28UN0010	Willow Grove/Ashbrook Complex	Undetermined
28UN0011	Willow Grove #4	Undetermined

Table 4 – Historic Districts in the Study Area

Recorded District Name	**NRHP Status**
Maplewood Village HD	Listed
Montrose Park HD	Listed
Wyoming HD	Listed
Central RR of New Jersey Main Line Corridor HD	Eligible
Garden State Parkway HD	Eligible
Inch Lines Linear Multistate HD	Eligible
Lehigh Valley Railroad HD	Eligible
Lower Rahway / Main Street HD	Eligible
Memorial Park HD	Eligible
North Cranford HD	Eligible
Old Main Delaware, Lackawanna, and Western RR HD	Eligible
Pennsylvania RR New York to Philadelphia HD	Eligible
Prospect Street HD	Eligible
Rahway River Parkway HD	Eligible
Regina HD	Eligible
South Mountain Reservation HD	Eligible
South Orange Central Business District	Eligible
South Orange Pumping Station	Eligible
Union County Park System HD	Eligible
Upper Rahway HD	Eligible
Golf Island Neighborhood	Undetermined
Maplewood Residential HD	Undetermined
North Cranford HD [Unevaluated boundary]	Undetermined
Prospect Street HD [Unevaluated boundary]	Undetermined
Ridgewood Road HD	Undetermined
St. Cloud HD	Undetermined
Upper Enclosure/Beaumont Terrace	Undetermined
Valley Street HD	Undetermined

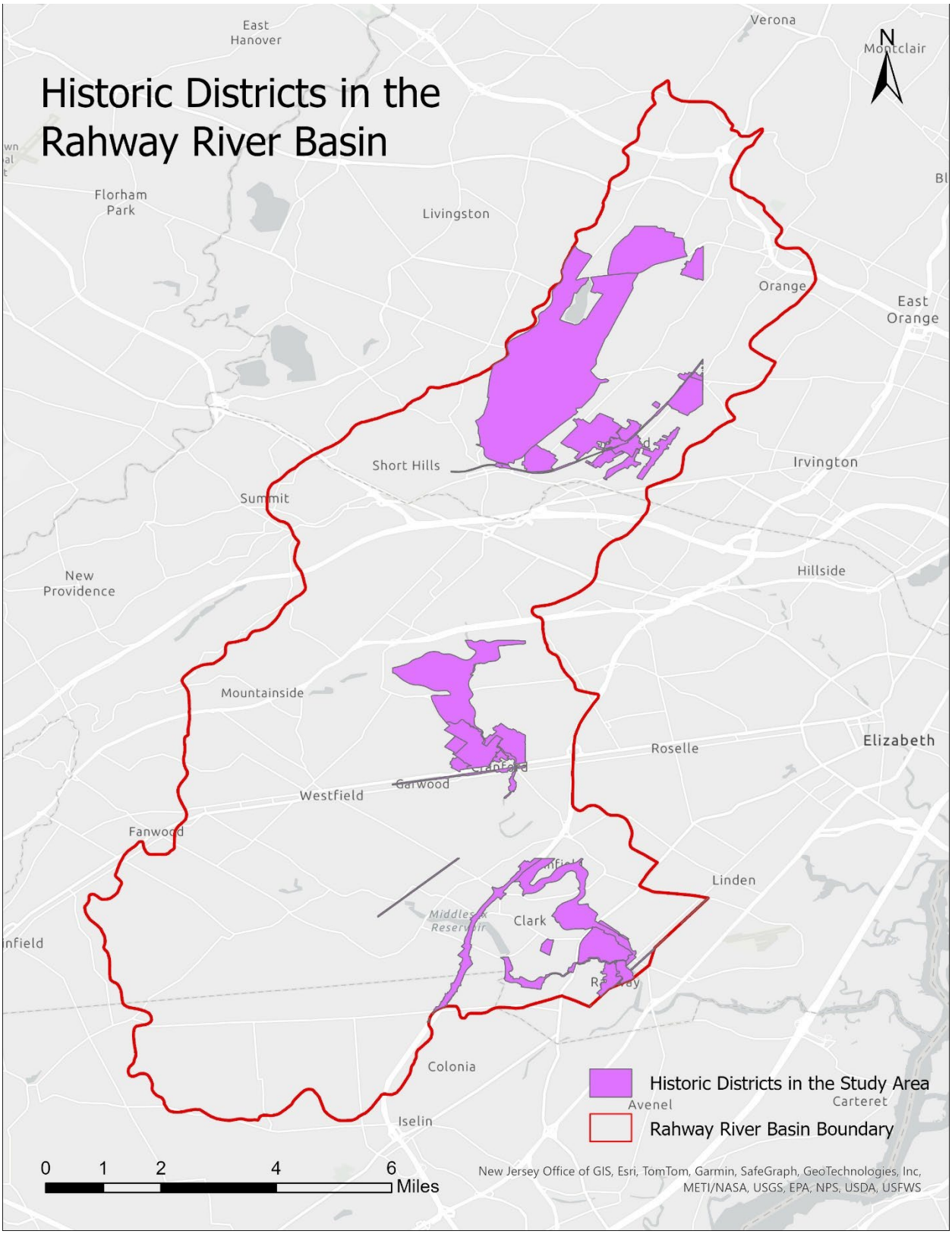

Figure 8: Historic Districts in the Rahway River Basin Study Area

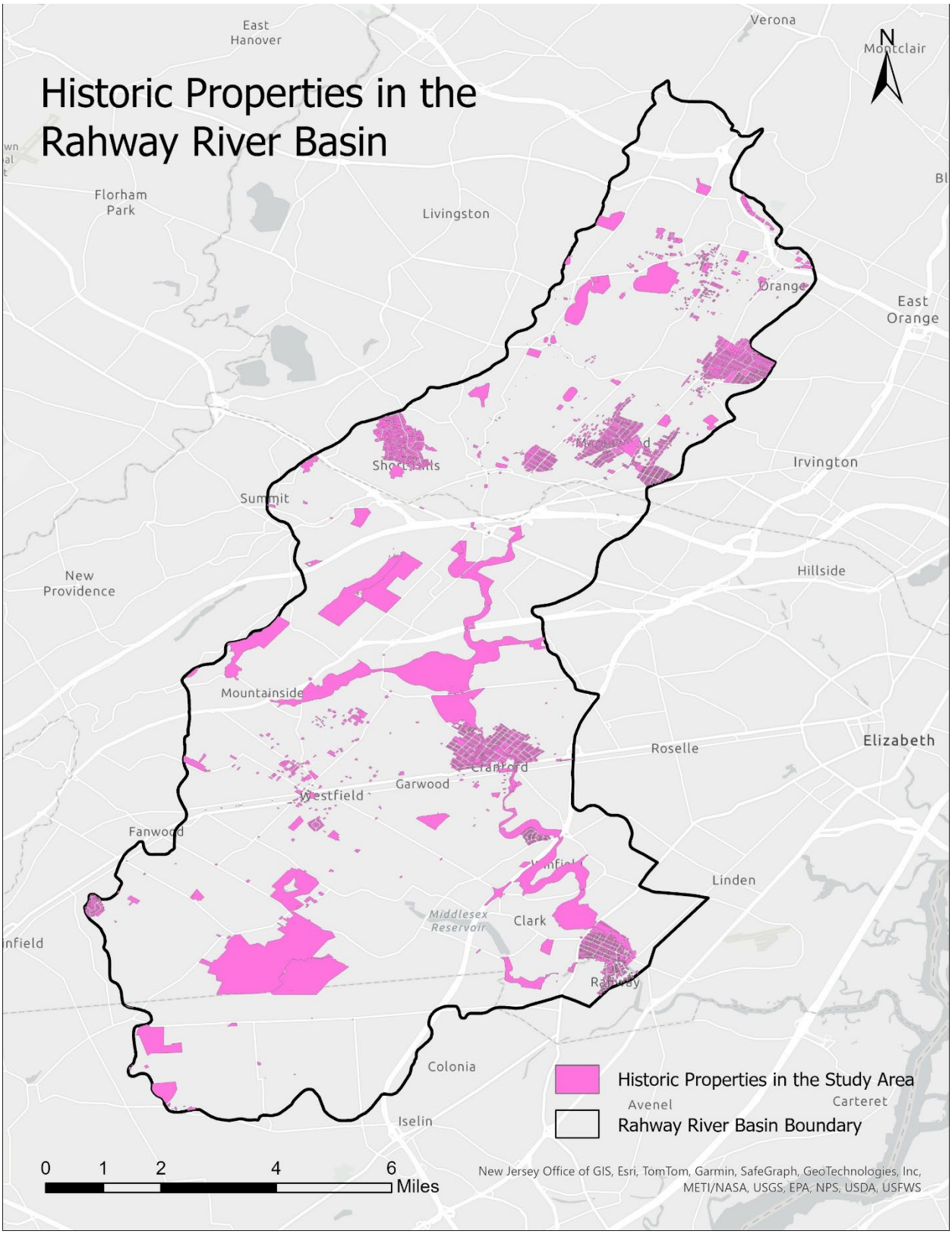

Figure 9: Historic Properties in the Study Area

6. Management Guidance and the Section 106 Effects Determination

The Area of Potential Effect (APE) consists of areas that will be directly affected by the proposed undertaking as well as areas that are visually affected. The District is required to identify historic properties within the APE and determine if the proposed alternatives would potentially adversely impact those properties.

The District carried out consultation with the NJHPO, the Union County Department of Parks and Community Renewal, and the North Cranford Historic Preservation Advisory Board in 2013 upon completion of the Phase IA and Reconnaissance-level cultural resources surveys for the Cranford and Robinson's Branch portions of the Study Area. In 2016, the District consulted again with the NJHPO upon completion of the Orange Reservoir survey report (Scarpa 2016). The District met with the NJHPO in May of 2016 to discuss the NED plan and the need for development of a Programmatic Agreement (PA) to ensure that additional investigations are carried out when the project is authorized and additional funds become available. A meeting was held in June of 2016 with the Cranford Preservation Advisory Board to discuss the NED plan and to receive the Board's input as well as hear any concerns or recommendations relating to the project.

In 2016, the USACE prepared two Programmatic Agreements (PAs) which stipulated the actions the USACE will take regarding cultural resources as the Study proceeds. The PAs would serve as a binding agreement between the USACE, NJHPO, and any other invited signatories or interested consulting parties and would be used to ensure that the USACE satisfies its responsibilities under Section 106 of the NHPA and other applicable laws and regulations. All previous USACE cultural resources studies were coordinated with the NJHPO (Appendix A.1). The two Draft PAs that were prepared in 2016 for the Cranford and Robinson's Branch Study Areas are provided in Appendix A.1. The NJHPO concurred with the direction the USACE would take on future studies as per the draft PAs.

Section 106 consultation was initiated with the Delaware Nation, the Delaware Tribe of Indians, the Shawnee Tribe of Oklahoma, and the Stockbridge Munsee Community in letters dated 18 July 2023. The Shawnee Tribe responded on 30 August 2023 stating the Study Area was outside their tribal area of interest. The Delaware Nation, the Delaware Tribe of Indians, and the Stockbridge Munsee Community have yet to accept our invitation for consultation in accordance with Section 106. Continued coordination will determine whether NJHPO, Consulting Tribal Nations, or other consulting parties have concerns with the findings of this report or concur with the recommendation for further investigations to properly understand any impacts to the cultural resources that exist within the APE. The Cranford Historical Society, Cranford Historic Preservation Advisory Board, the Historic Preservation Commissions for Fanwood, Maplewood, Milburn, West Orange, Westfield, and Woodbridge, and several other potential consulting parties were also contacted by USACE (Appendix A.1).

Should a future study move forward, a new PA would be drafted and provided to the NJHPO, Advisory Council on Historic Preservation (ACHP), the Delaware Tribe of Indians, the Delaware Nation, the Stockbridge Munsee Community, and interested consulting parties for their review and participation.

Cultural resources mitigation includes but is not limited to, background research, consultation, oral history interviews, sample field investigation, field survey, phased archaeological survey, and intensive level architectural survey in selected locations as per the Draft PAs. Cultural resources mitigation estimates include costs to study a site (should one be encountered through mitigation), testing of areas directly impacted by activities required to construct project features (i.e., construction access and staging areas), and, as required, environmental mitigation measures. Should a site be encountered through archaeological survey or investigation, additional study or archaeological mitigation may be needed. These measures have yet to be determined but would be developed in coordination with the NJHPO in accordance with Section 106.

Section 6.1 provides an overview of the alternative plans and measures under consideration.

6.1 Resources within Alternative APEs

As part of the Feasibility Phase for this Study, five flood risk management alternatives were formulated and analyzed as part of this report. Alternatives 1 (No Action) and 5 (Detention Basin and Channel Modifications) were ruled out due to cost and effectiveness, leaving three alternatives (Alternatives 2, 3, and 4) that were analyzed as part of this report. This preliminary assessment was based on the limited availability of conceptual layouts pending engineering and design changes. If one of these alternatives is confirmed as the Tentatively Selected Plan (TSP), the selected alternative would be optimized and the conceptual plans would be modified accordingly.

Alternative 1: No Action
Alternative 2: South Mountain Reservoir Upstream Dry Detention Basin
Alternative 3: Combination Plan
Alternative 4: Nonstructural Plan (acquisition, elevation, floodproofing, relocation)
Alternative 5: Lenape Park Detention Basin & Channel Modifications

Alternative 1: No Action

Under the No Action Alternative, none of the alternatives would be constructed and no changes would occur to existing cultural resources from activities associated with the Proposed Project. As such, there would be no direct impacts to cultural resources from the No Action Alternative. However, continued and increased flooding in the Study Area over time could have indirect, potentially significant adverse impacts on cultural resources by altering historic

architecture, changing the environment around historic properties, and potentially impacting archaeological resources. The No Action Alternative could result in an induced change to the character-defining features of historic resources and could result in substantial alteration of a historic property's viewshed, acoustic environment, or other environmental component, notably affecting an element that contributes to the significance of a historic property.

Under the No Action Alternative, ongoing and increased flooding within the Project Area would continue to impact cultural resources. Overall, the greatest impacts to historic properties would be expected to result from fluvial flooding from the Rahway River and associated tributaries during substantial storm events. Depending on the frequency and severity of these events, impacts to historic properties could be significant, and could include substantial changes to the character-defining features of historic architectural resources (e.g., through flood-related damage, abandonment or neglect, or other adverse changes to historic structures), as well as potentially changes to the environment of historic architectural structures (e.g., more regular inundation of an area, changes in adjacent properties, and the like). Erosion from fluvial flooding could also significantly impact archaeological resources overtime through eroding banks or other flood-related disturbances.

Alternative 2: South Mountain Reservoir Upstream Dry Detention Basin

Alternative 2 draws from two alternatives considered in the 2016 study, which consisted of a dry detention basin in the South Mountain Reservation Area and the relocation of Brookside Drive. The previous alternatives (numbered 5 and 6, in the 2016 study) included a detention basin that was larger than the detention basin being considered in this study, and one of the alternatives (5) also included approximately 15,500 ft of channel modification work. The previous alternatives had BCRs of 0.8 and 1.1 respectively. Despite a BCR above one, the alternative was met with opposition from the public, and another alternative, the Orange Reservoir, had higher net benefits and was selected as the TSP in 2016.

The new Upstream Detention alternative considered in this report was modeled with three variations, two of which had permanent (wet) pools and one of which had a dry detention basin. The wet variations were screened out after early economic modeling showed they would be substantially less effective than the dry variation. Additionally, the wet variations would require additional infrastructure to manage water levels and remove debris and pollutants, and would require permanent conversion of the land, all of which would increase the cost of the alternative as compared to the dry variation. A map of Alternative 2 is provided in Figure 10.

This plan may provide recreational features when not providing flood risk management benefits, as recreational features are a priority for local stakeholders and may be implemented if agreed upon in future stakeholder meetings. Proposed storage locations may be on NJDEP Green Acres encumbered lands and therefore formulation of these conceptual plans should be developed in coordination with Green Acres requirements (Figure 11).

The Upstream Detention alternative would include:

- Designed to the 100-year AEP flood event
- 60-ft high, 300-ft wide earthen dam
- 5’ x 5’ outlet
- Brookside Road realignment (approx. 3,000ft)
- Inundation duration (from WSE 210’ to 210’) is 28 hours. This represents the time it takes for the dam to fill and drain from an empty state. An elevation of 210' indicates that the dam is retaining no water.
- Time from peak stage to drain (from WSE 243’ to 210’) is 23 hours

Preliminary quantities include:

- Embankment fill required: 37,500 cubic yards (cy)
- Spillway area: 122,000 square feet (sq-ft)
- Retaining Walls: 1,900 linear feet (ft)

Based on a review of cultural resource data provided by the NJHPO, the project footprint/APE for Alternative 2 is within the NRHP-eligible South Mountain Reservation and North Cranford Historic Districts. No recorded historic properties are located in the APE for the dam structure. Several recorded historic properties are located in the APE for the detention basin, specifically the South Orange Avenue and Cherry Lane bridges over the Rahway River West Branch, the dam along Brookside Drive just upstream of Campbells Pond, the Tulip Springs Picnic Area, the Orange Reservoir and Dam, and numerous pump stations and footbridges. Additional historic properties are located in the channel modification APE, specifically Nomahegan Park, Lenape Park, Hampton Park, McConnell Park, the Hanson House and Park, and several residential properties (Table 5). No archaeological sites are located in the APE for the dam structure or either impoundment areas, but three archaeological sites – the Cranford, Grist Mill, and Saw Mill Sites – are located in the APE for the channel modifications.

Alternative 2 would overlap with five NRHP-eligible historic districts: the South Mountain Reservation, the Rahway River Parkway, the Union County Park System, the Central New Jersey Main Line Corridor, and the North Cranford Historic Districts. In addition to historic districts, a number of historic properties are located within the APE in Cranford (Table 5). Most of the resources within the APE are eligible for the NRHP as contributing elements to a historic district. The Orange Reservoir and Dam is an individually recorded historic property that has yet to be evaluated for NRHP eligibility. Any potential impacts to the South Mountain Reservation properties, North Cranford Historic District properties, or the Orange Reservoir and Dam will require further evaluation.

None of the archaeological sites in the channel modification APE have yet to be evaluated for NRHP eligibility and therefore will require survey and investigation. Additional portions of the APE are archaeologically sensitive, and furthermore, it is likely that staging for construction will expand to overlap with the South Mountain Reservation Historic District. The

proposed measures and associated features have the potential to result in adverse effects and additional survey will be necessary as the plan is developed. A Programmatic Agreement (PA) is anticipated to outline the activities and tasks that must be carried out to conclude identification of significant resources, determine adverse effects, and mitigate for such effects. If Alternative 2 moves forward in the future, this area would be recommended for further study.

Table 5 – Notable Resources in the Alternative 2 APE

Cultural Resource Name	**Type of Resource**	**Status**
Cranford Site	Archaeological Site	Unevaluated
Grist Mill Site	Archaeological Site	Unevaluated
Saw Mill Site	Archaeological Site	Unevaluated
South Mountain Reservation	Historic District	Eligible
North Cranford	Historic District	Eligible
Rahway River Parkway	Historic District	Eligible
Union County Park System	Historic District	Eligible
Central New Jersey Main Line Corridor	Historic District	Eligible
Droescher's Mill	Historic Property	Listed
Nomahegan Park	Historic Property	Eligible
Lenape Park	Historic Property	Eligible
South Orange Avenue Bridge	Historic Property	Eligible
Cherry Lane Bridge	Historic Property	Eligible
Orange Reservoir and Dam	Historic Property	Eligible
Tulip Springs Picnic Area	Historic Property	Eligible
Hampton Park	Historic Property	Eligible
McConnell Park	Historic Property	Eligible
The Hanson House and Park	Historic Property	Eligible

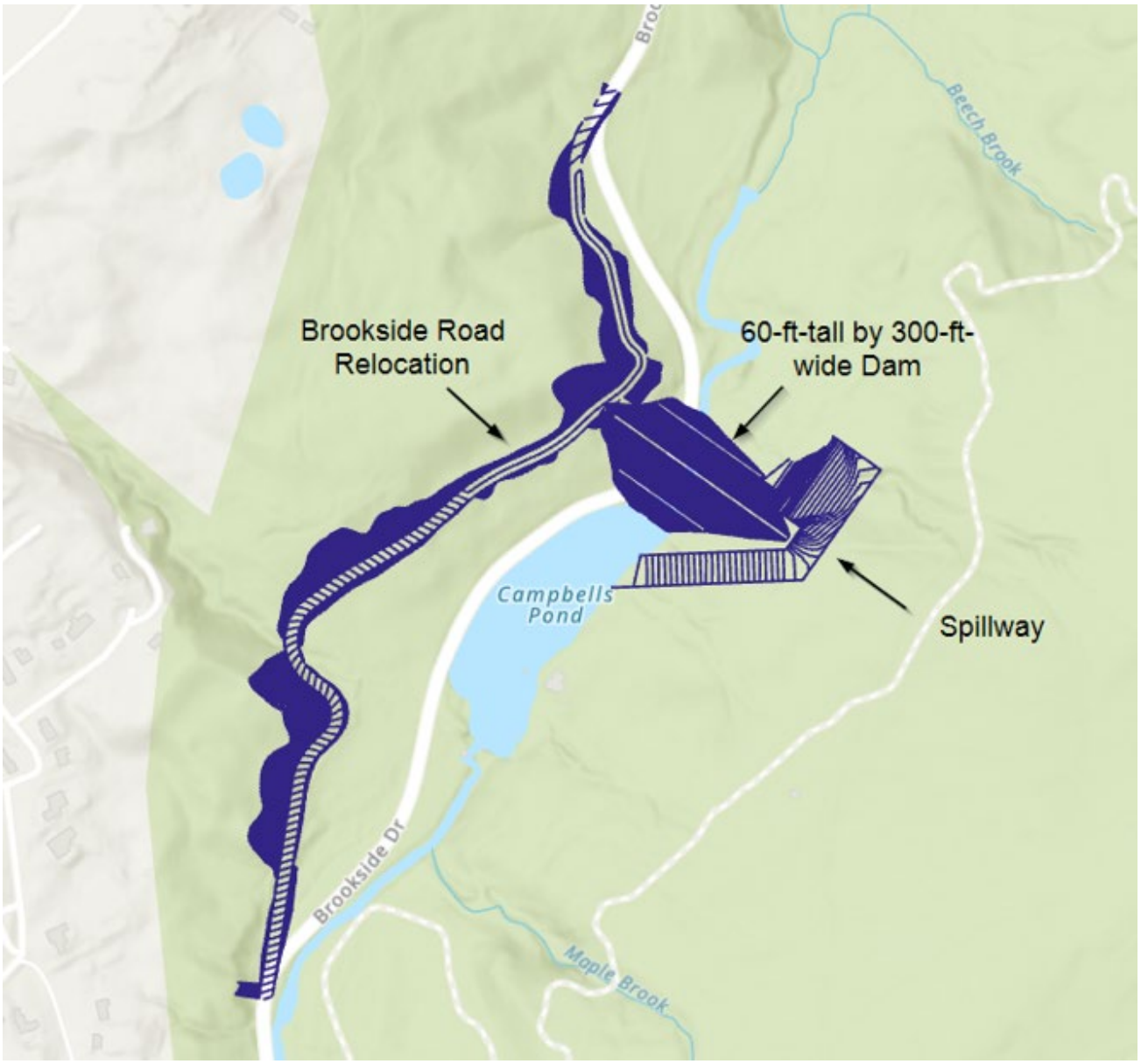

Figure 10: Map of the Alternative 2 Conceptual Plan

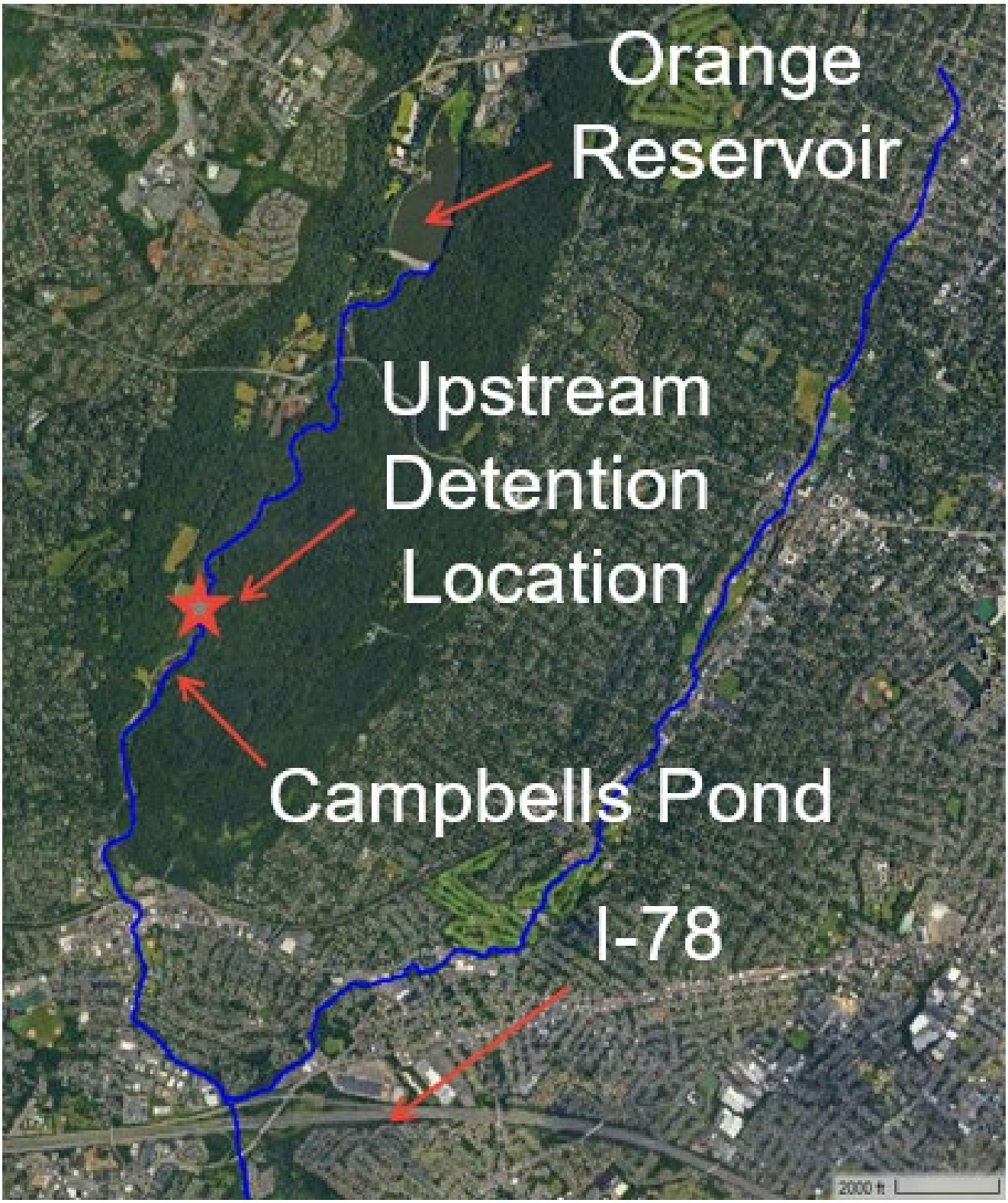

Figure 11: Map of Dry Detention Locations under Alternative 2

Alternative 3: Combination Plan

Alternative 3, the Combination Plan, is a conglomeration of nine FRM measures spread throughout the Rahway River Basin. All nine measures are provided in Figure 12. The purpose of a combination plan is to address vulnerable areas in the study area with a variety of localized structural and nonstructural measures. Alternative 3 was formulated to provide flood risk management in areas that would benefit the most, rather than focusing on an all-encompassing basin-wide solution. Measures consist of channel modification and naturalization, bridge raising, channel deepening, offline storage, levee and floodwall improvements, dam removal and modifications, and the construction of a new pumpstation.

Alternative 3 is ideally suited to be broken up in future study efforts to better serve individual municipalities with more targeted measures. It is important to note, while these measures can be broken out separately in future analysis, and benefits are presented in the proposed municipalities and target areas, they were not modeled independently as part of this current study effort. Therefore, while it can be useful to see how damages are reduced at the proposed site, actual damages reduced may vary based on how the various measures would interact across the basin.

Based on a review of cultural resource data provided by the NJ SHPO, the project footprint/APE for Alternative 3 overlaps with five NRHP-eligible historic districts: the Union County Park System, the Rahway River Parkway, the Central Railroad of New Jersey Main Line Corridor, the Old Main Delaware, Lackawanna and Western Railroad, and the North Cranford Historic Districts. The APE for Alternative 3 also includes several historic properties such as the NRHP-listed Droescher's Mill, the NRHP-eligible Droescher's Mill Park, the NRHP-eligible Millburn Avenue Bridge, and NRHP-eligible Rahway River, Nomahegan, and Lenape Parks. The APE also includes three archaeological sites, Site 28-UN-4 (Grist Mill Site), Site 28-UN-5 (Saw Mill Site), and Site 28-UN-07 (Cranford Site), all of which have not yet been evaluated for NRHP eligibility.

Any potential impacts to the NRHP-eligible Historic Districts or the NRHP-eligible and listed properties will require further evaluation. If Alternative 3 becomes the TSP, archaeological surveys of Sites 28-UN-4, 28-UN-5, and 28-UN-7 will be required to determine any potential impacts to archaeological resources resulting from the proposed measures. A Programmatic Agreement (PA) is anticipated to outline the activities and tasks that must be carried out to conclude identification of significant resources, determine adverse effects, and mitigate for such effects.

Modifications to the Rahway River channel within historic districts, parks, or other features associated with NRHP-eligible historic properties have the potential to result in adverse effects to cultural resources. Several historic bridges over the Rahway River have been recorded – some of which have previously been determined NRHP-eligible – and may need to be evaluated for potential adverse effects resulting from the channelization. Additionally, architectural survey may be required to update the boundaries of the North Cranford Historic

District and to formally assess the NRHP eligibility of many of the contributing structures and elements of the historic district. The APE has been determined sensitive for prehistoric and historic archaeological sites. Surveys, identification, and evaluation of resources will be carried out to inform the determination of adverse effects.

Table 6 – Notable Resources in the Alternative 3 APE

Cultural Resource Name	**Type of Resource**	**Status**
Cranford Site	Archaeological Site	Unevaluated
Grist Mill Site	Archaeological Site	Unevaluated
Saw Mill Site	Archaeological Site	Unevaluated
South Mountain Reservation	Historic District	Eligible
North Cranford	Historic District	Eligible
Rahway River Parkway	Historic District	Eligible
Union County Park System	Historic District	Eligible
Central New Jersey Main Line Corridor	Historic District	Eligible
Droescher's Mill	Historic Property	Listed
Nomahegan Park	Historic Property	Eligible
Lenape Park	Historic Property	Eligible
South Orange Avenue Bridge	Historic Property	Eligible
Cherry Lane Bridge	Historic Property	Eligible
Orange Reservoir and Dam	Historic Property	Eligible
Tulip Springs Picnic Area	Historic Property	Eligible
Hampton Park	Historic Property	Eligible
McConnell Park	Historic Property	Eligible
The Hanson House and Park	Historic Property	Eligible
Cultural Resource Name	Type of Resource	Status

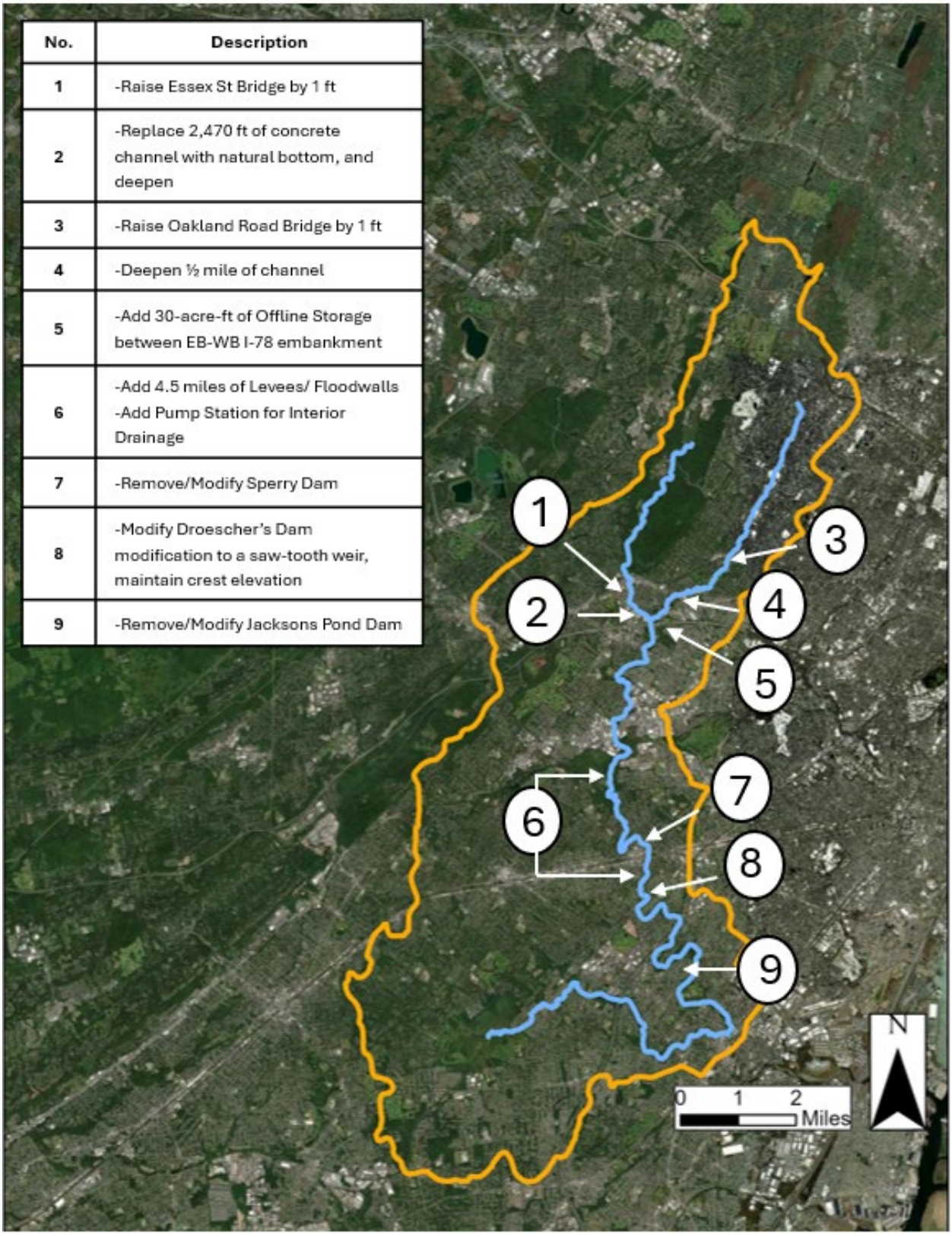

Figure 12: Map of Alternative 3 Conceptual Plan

Alternative 4: Nonstructural Plan

Alternative 4 consists of nonstructural measures such as elevations, wet and dry floodproofing, acquisitions, and relocations for select residential and non-residential structures lying in the floodplain that are considered at risk of damage from flooding. Elevation entails raising the lowest finished floor of vulnerable structures to a height that is above the flood level. In some cases, the structure is lifted in place and foundation walls are extended up to the new level of the lowest floor. Barriers entail surrounding vulnerable properties with structural barriers to protect from floodwater. Barriers usually surround the building(s) and are sometimes used where nonstructural measures are not feasible (barriers are a structural solution). Buyouts involve the purchase and elimination of flood damaged structures, allowing owners to move to places away from flood risk.

Acquisition entails the purchase and permanent removal of vulnerable properties to remove buildings in the floodplain. Floodproofing measures protect the structure and foundation from water damage and can be recommended in combination with elevation. Dry flood proofing measures allow floodwaters to reach the structure but diminish the flood threat by preventing the water from getting inside the structure walls. Dry flood proofing measures considered in this screening make the portion of a building below the flood level watertight by attaching watertight closures to the structure in doorway and window openings. Wet flood proofing measures allow flood water to get inside lower, non-living space areas of the structure via vents and openings in order to reduce the effects of hydrostatic pressure and, in turn, reduce flood-related damages to the structure's foundation.

The cumulative effect of channelization of the Rahway River through historic districts, historic parks, and the backyards of historic properties has the potential to impact historic districts and properties within the APE. Elevation or other flood-proofing measures carried out in the City of Rahway for the Robinson's Branch section would potentially adversely affect not just the structures, but cumulatively impact the historic resources that collectively make up a historic district. As part of the ongoing consultation, mitigation efforts will look to reduce these effects. An architectural survey will be required to determine the NRHP eligibility of each structure selected for nonstructural flood-proofing measures. Archaeological survey may also be required for staging and construction areas.

Several iterations of the Nonstructural plan were formulated and modeled as part of Alternative 4. For each of the model areas, East Branch, Cranford Upstream, and Robinsons Branch, plans were formulated to include structures in the 10-year and 100-year floodplains. Further refinement reduced the number of structures in the 100-year plans to only include structures who see more than 1% (2% for Cranford Upstream) of the depreciated replacement value in damage at the 100-year event. Table 7 provides the structure count for each of the plans.

Table 1: Number of Structures identified in each Nonstructural Iteration

Model Area	10-Year	100-Year and 1% Damage
East Branch	19	51
Cranford Upstream	119	175
Robinson's Branch	23	32

Although the exact locations of nonstructural measures are currently unavailable, it is likely that several proposed measures lie within historic district boundaries or would impact structures that have been determined NRHP-eligible or potentially eligible. The PA outlines the process for additional investigations and the resolution of adverse effects (Appendix A.1). Should the Study move forward, conceptual plans for Alternative 4 would be further developed and optimized accordingly.

Alternative 5 – Lenape Park Detention Basin and Channel Modification

Alternative 5 consists of channel modification at the Rahway River in Cranford Township and modification to Lenape Park Detention Basin (Figure 13). Potential features of this alternative include the replacement, raising, and widening of the existing Lenape Dam spillway structure, modification of the dam embankments, and placement of floodwalls along the existing embankments in the northern area of Lenape Park near Fadem Road in Springfield Township. This alternative was included in the 2016 Draft Feasibility Report and the Non-federal sponsor requested this alternative to be reevaluated in the GRR.

The Lenape dam modifications will include the replacement, raising, and widening of the existing Lenape Dam spillway structure and opening, modification of the dam embankments, widening of the auxiliary spillway, and additional 6 feet of floodwalls to the existing embankments in the northern area of Lenape Park near Fadem Rd. at Springfield Township. This plan also includes approximately 15,500 feet of channel work throughout the extent of the Rahway River in the Township of Cranford, from Kenilworth Blvd, just downstream of Lenape Dam, to a point approximately 1,500 feet downstream of the Lincoln Avenue Bridge. Approximately 1,400 feet of the channel work is expected in Nomahegan Park. There will be approximately 2,000 ft. of new and removed/replaced retaining walls. As part of Alternative 5, the Union Avenue and North Avenue Bridges would be removed and replaced (Figure 14).

Based on a review of cultural resource data provided by the NJHPO, the project footprint/APE for the Lenape Park levee and dam improvements is within the NRHP-eligible South Mountain Reservation Historic District. No recorded historic properties are located in the APE for the dam structure. Additional historic properties are located in the channel modification APE, specifically Nomahegan Park, Lenape Park, Hampton Park, McConnell Park, the Hanson House and Park, and several residential properties (Table 5). No archaeological sites are located in the APE for the dam structure or either impoundment areas, but three archaeological sites – the Cranford, Grist Mill, and Saw Mill Sites – are located in the APE for the channel modifications.

Alternative 2 would overlap with five NRHP-eligible historic districts: the South Mountain Reservation, the Rahway River Parkway, the Union County Park System, the Central New Jersey Main Line Corridor, and the North Cranford Historic Districts. In addition to historic districts, a number of historic properties are located within the APE in Cranford (Table 5). Most of the resources within the APE are eligible for the NRHP as contributing elements to a historic district. Any potential impacts to the South Mountain Reservation properties or the North Cranford Historic District properties would require further evaluation. Both bridges proposed for removal and replacement, the N. Union Avenue and North Avenue Bridges, are contributing properties of the NRHP-eligible Rahway River Parkway Historic District and would therefore require further evaluation.

None of the archaeological sites in the channel modification APE have yet to be evaluated for NRHP eligibility and therefore will require survey and investigation. Additional portions of the APE are archaeologically sensitive, and furthermore, it is likely that staging for construction will expand to overlap with the South Mountain Reservation Historic District. The proposed measures and associated features have the potential to result in adverse effects and additional survey will be necessary as the plan is developed. A Programmatic Agreement (PA) is anticipated to outline the activities and tasks that must be carried out to conclude identification of significant resources, determine adverse effects, and mitigate for such effects. If Alternative 5 moves forward in the future, this area would be recommended for further study.

Table 8 – Notable Resources in the Alternative 5 APE

Cultural Resource Name	**Type of Resource**	**Status**
Cranford Site	Archaeological Site	Unevaluated
Grist Mill Site	Archaeological Site	Unevaluated
Saw Mill Site	Archaeological Site	Unevaluated
South Mountain Reservation	Historic District	Eligible
North Cranford	Historic District	Eligible
Rahway River Parkway	Historic District	Eligible
Union County Park System	Historic District	Eligible
Central New Jersey Main Line Corridor	Historic District	Eligible
Droescher's Mill	Historic Property	Listed
Nomahegan Park	Historic Property	Eligible
Lenape Park	Historic Property	Eligible
North Avenue Bridge	Historic Property	Eligible
N. Union Avenue Bridge	Historic Property	Eligible
Orange Reservoir and Dam	Historic Property	Eligible
Tulip Springs Picnic Area	Historic Property	Eligible
Hampton Park	Historic Property	Eligible
McConnell Park	Historic Property	Eligible
The Hanson House and Park	Historic Property	Eligible

Figure 13: Map of Alternative 5 Conceptual Plan

7. Summary and Recommendations

Background research revealed that numerous previous cultural resources surveys have been conducted within the Study Area, many of which were completed over a period of several years to meet environmental compliance requirements for the Rahway River Basin Flood Risk Management Feasibility Study. A review of available HPO data indicated that 37 archaeological sites and over 5,000 historic properties have been identified within the Study Area.

Historic maps, Google Earth imagery, and recent photographs have illustrated that much of the Study Area has been impacted by prior railroad construction activities and dense urban development. Therefore, further archaeological investigations are not recommended for areas where intensive prior disturbance has taken place. Previous work has indicated that Lenape and Nomahegan Parks, particularly the area within the APE for the levee and dam improvements, exhibit high archaeological sensitivity. Should a plan move forward, further archaeological work is recommended for those areas.

Construction of the proposed alternatives may potentially cause adverse effects to nearby historic districts, historic properties, or archaeological sites along and adjacent to its footprint. Nonstructural measures (elevation and floodproofing) inflicted upon historic properties and structures in historic districts has the potential to have cumulative impacts to the physical structures, districts, and viewsheds. Additionally, archaeological resources may be cumulatively affected. A determination of effect cannot be made at this time, but effects may be avoided, minimized, or mitigated during implementation of a TSP, if one is selected.

Additional evaluation of known historic districts and properties may be required to update their resource inventories and boundaries and confirm current integrity. Treatment plans or mitigation agreements would include, but not be limited to, specialized design guidelines for historic structures to ensure that flood protection measures are consistent with the historic fabric of the buildings, the design of the project elements fit the character of the historic districts, and the scope of data recovery for archaeological sites that cannot be avoided. Treatment plans and agreements for archaeological sites identified within the APE for nonstructural measures should also be included.

It is further recommended that when final design plans are completed, flood proofing and buy out structures be assessed to determine any potential impacts and to determine NRHP eligibility. Flood proofing should have a minimal effect on the historic integrity of structures. The future evaluation should assess the various types of flood proofing methods and evaluate their impact, if any, on historic structures.

If a future project is expected to have an adverse impact on historic properties, additional investigation will be required to determine its impact on cultural resources. A Programmatic Agreement (PA) may be developed to outline the steps that will be taken to

determine adverse effects and the appropriate mitigation measures in consultation with interested parties. Some mitigation measures to be considered include HABS/HAER documentation of historic structures, archaeological data collection, replacing or providing substitute resources, monitoring during construction, and enhancement of historic districts through signage and public outreach.

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