Draft Integrated Interim Response Feasibility Report and Environmental Assessment for Actionable Elements

NEW YORK-NEW JERSEY HARBOR AND TRIBUTARIES COASTAL STORM RISK MANAGEMENT FEASIBILITY STUDY

APPENDIX A-1
EAST RISER
CULTURAL RESOURCES

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EXECUTIVE SUMMARY

This discussion compliments the main report of which this document is an Appendix to, comprising of an Integrated Interim Response Feasibility Report (FR) and Environmental Assessment (EA). The Purpose and Need for the action, including the Interim Response Action, and the Alternative details for each Actionable Element site are discussed in more depth in the Environmental Impact Statement (EIS) and Feasibility Study, which was prepared by the New Jersey Department of Community Affairs (NJDCA), Sandy Recovery Division in 2018 (NJDCAEIS). The affected cultural resources and cultural resource consequences and benefits detailed here, are presented in the main text in summary format. The details included herein are presented in their entirety within the NJDCAEIS, as a more condensed version than what has been detailed here, to simplify the discussion of the main text and provide additional detail where needed specific to each particular Actionable Element (AE) EA Appendix. This Sub-Appendix focuses primarily on the Existing Conditions of the AE site, and the Cultural Resource Effects (both adverse and beneficial) of the AE Alternatives, including the No Action Alternative. Therefore, this Sub-Appendix deviates from the Harlem River and Oakwood Beach Sub-Appendices in format and sub-sections due to the existing content as provided by the Phase IA report provided by NJDCAEIS.

This Sub-Appendix is organized according to the existing EIS' Phase IA background study which identified several previously recorded aboveground historic properties, historic districts, and archaeological sites within one mile of the Study Area.

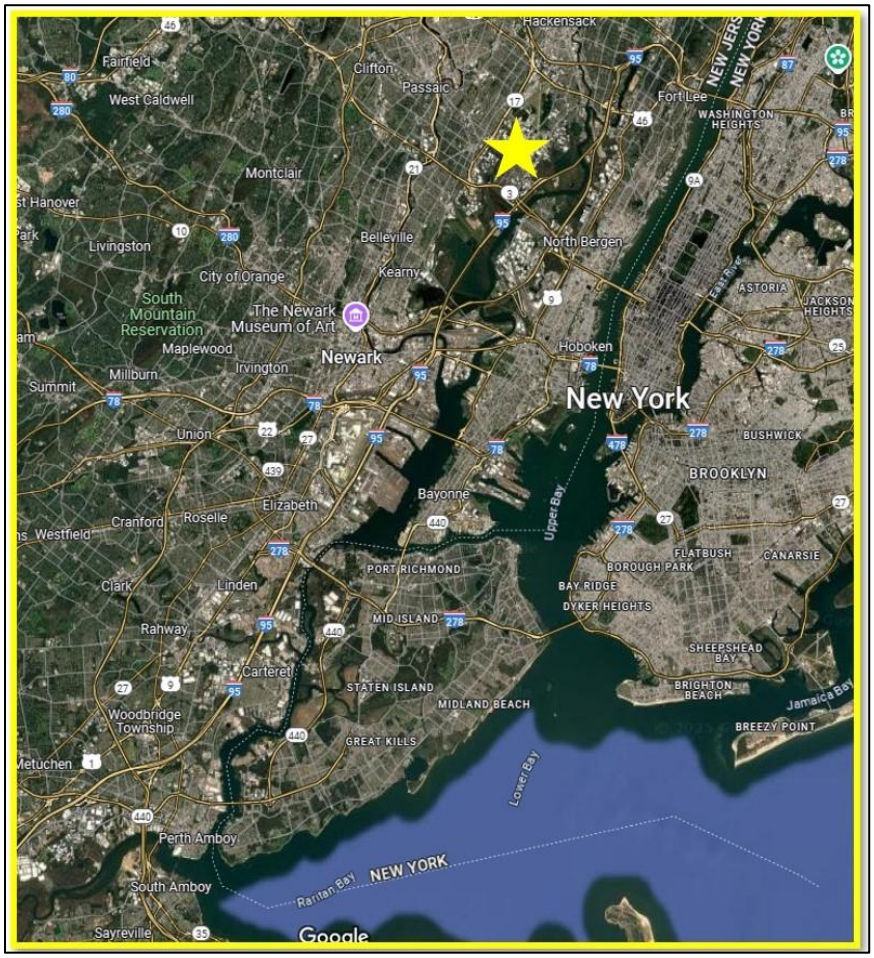

Figure 1. East Riser Actionable Element Site, Bergen County, New Jersey.

The Actionable Element documented in this sub-appendix is referred to as East Riser, located in the New Jersey Meadowlands, which falls within the Hackensack/Passaic Planning Region of the Comprehensive Plan,

discussed in the Draft Integrated FR/Tier 1 (Programmatic) EIS. This Actionable Element serves as an interim action of the Comprehensive Plan. The East Riser project initially completed National Environmental Policy (NEPA) analyses under a grant with the Federal Emergency Management Agency (FEMA) of which is a Cooperating Agency on this Study, from the Rebuild by Design Meadowlands project. This project has already been issued a Finding of No Significant Impact (FONSI) and obtained several permits to construct, as presented in the Main Appendix. As such, in the integration of this project into the NYNJHAT Study, the 2019 East Riser EA has been incorporated herein by reference, noted in *italicize* font throughout this document, supplemented by validating text where needed to confirm, and/or address USACE policy, and any other details to be noted between the issuance of the original FONSI and preparation of this report.

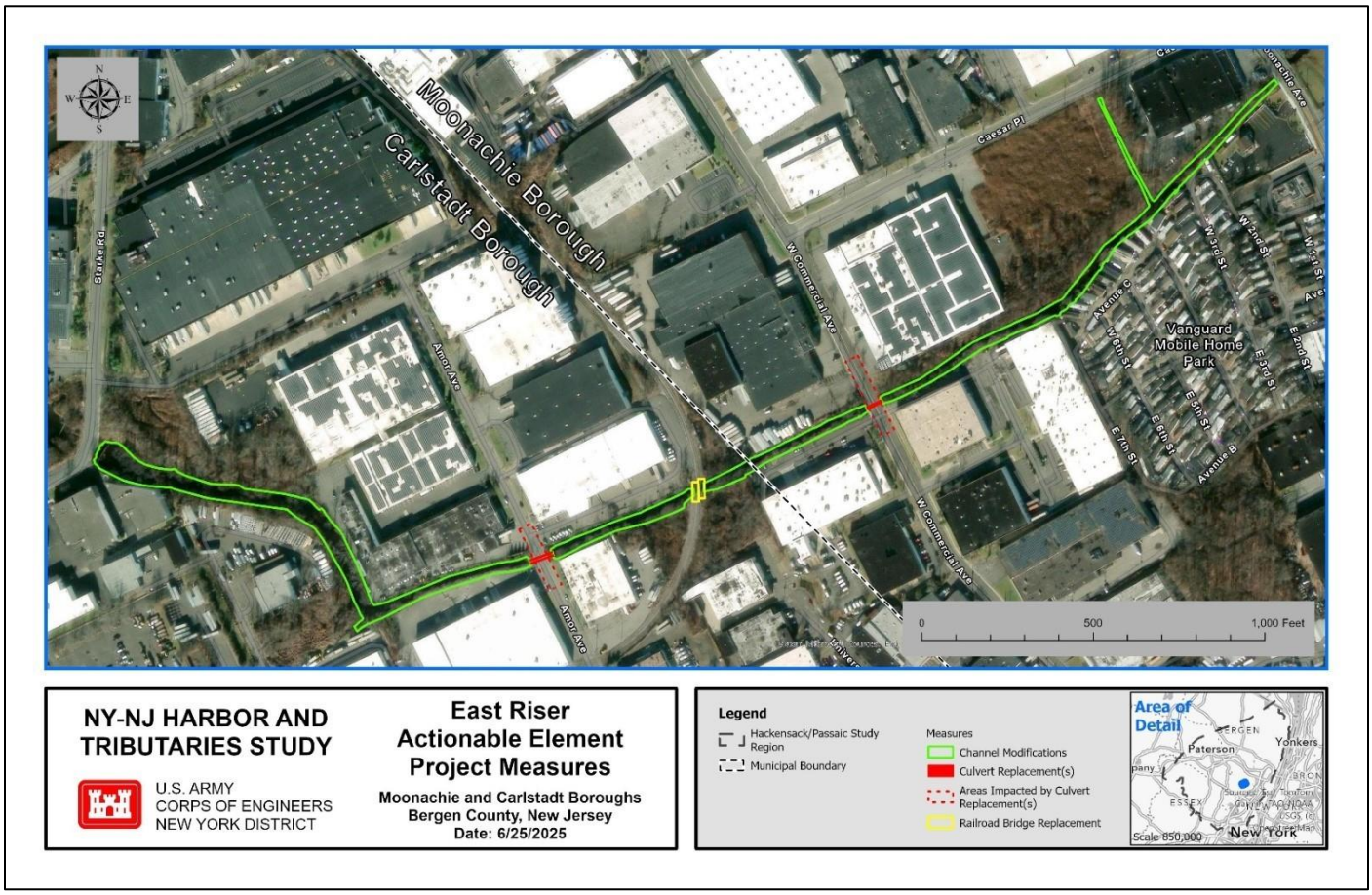

Figure 2. East Riser Actionable Element

1 FEDERAL AND STATE CULTURAL RESOURCE COMPLIANCE

Federal and state laws require the USACE to consider effects on cultural resources. The Council on Environmental Quality's regulations implementing the National Environmental Policy Act (NEPA), as amended, require that Federal agencies consider the "unique characteristics of the geographic area such as proximity to historic or cultural resources, park lands, prime farmlands, wetlands, wild and scenic rivers, or ecologically critical areas" and "the degree to which the [proposed] action may adversely affect districts, sites, highways, structures, or objects listed in or eligible for listing in the National Register of Historic Places or may cause loss or destruction of significant scientific, cultural, or historical resources" (40 CFR §1508.27(b)(3), (8)).

The USACE must also consider the effects of its undertaking on historic properties as defined in 54 U.S.C. §300308 of the National Historic Preservation Act (NHPA). The NHPA (54 U.S.C.§300101 et. seq.) distinguishes historic properties as any prehistoric or historic district, sites, building, structure, artifacts, or object included on, or eligible for inclusion on, the National Register of Historic Places (NRHP). Other Federal laws and regulations also protecting these resources include the Archaeological and Historic Preservation Act of 1974 (54 U.S.C. §§312501- 312508), and the Archaeological Resources Protection Act of 1979 (16 U.S.C. §§470aa-470mm). These Federal laws, specifically Section 106 and Section 110 of the NHPA, require Federal agencies to consider the effects of their actions on cultural resources and historic properties, including districts, sites, buildings, structures, and objects included or eligible for inclusion in the NRHP.

Section 106 of the National Historic Preservation Act (NHPA) (54 U.S.C. § 306108) and its implementing regulations (36 CFR Part 800) requires an assessment of the potential impact of an undertaking on historic properties that are within the proposed project's area of potential effects (APE). The NHPA defines the APE defined as the geographic area or areas "within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist" (36 CFR 800.16(d)). Additionally, Section 110(f) of the NHPA (54 U.S.C. § 306107) requires USACE to minimize harm to all National Historic Landmarks (NHL) within the Area of Potential Effects (APE) to the maximum extent possible.

For the NYNJHAT AE study, the APE for cultural resources extends beyond the study area to encompass the following: 1) areas where structural measures are implemented (to include construction, demolition, vibration, and auditory effects); 2) where non-structural measures are applied to historic properties, and 3) where structural or non-structural measures has the potential to affect the viewshed of historic properties. An effect is an alteration to the characteristics of a historic property qualifying it for inclusion in or eligibility for the NRHP (36 CFR 800.16(i)). Examples of effects include visual intrusions, alterations of setting, noise, vibrations, viewsheds, and physical impacts. Indirect effects to historic properties are those caused by the undertaking that are later in time or farther removed in distance but are still reasonably foreseeable. Applicable state laws include the New Jersey Register of Historic Places Act, (Laws of 1970, Chapter 268) and New Jersey Public Law 2004, Chapter 1**.**

Federal agencies are required under Section 106 of the National Historic Preservation Act to "consider the effects of their undertakings on historic properties" and consider alternatives "to avoid, minimize or mitigate the undertaking's adverse effects on historic properties" [(36 CFR 800.1(a-c)] in consultation with the State Historic Preservation Officer (SHPO) and appropriate federally recognized Indian Tribes (Tribal Historic Preservation Officers -THPO) [(36 CFR 800.2(c)].

2 NJDCAEIS

In July 2016, the New Jersey Department of Community Affairs (NJDCA), Sandy Recovery Division, initiated consultation with the New Jersey Historic Preservation Office (NJHPO) for the RBD Meadowlands Flood Protection Project on behalf of the U.S. Department of Housing and Urban Development (HUD). Subsequently, NJDEP conducted a Phase IA Archaeological Survey (Walker et al. 2018) and a Historic Structures Survey (Everett 2018) to identify historic properties that could potentially be affected by the proposed alternatives. The NJDEP subsequently provided NJHPO with the draft Phase 1A Archaeological Survey Report and the draft Historic Structures Survey Report for review in January 2018.

In a letter dated 19 March 2018, the NJHPO provided Section 106 concurrence with the APEs and requested additional information (Appendix A). The Phase IA Archaeological Survey and Historic Structures Survey reports were revised and resubmitted in May 2018, and the NJHPO concurred with the findings in June 2018 (Appendix A). Both reports are included in this Sub-Appendix. The 2018 APE included all land that may be affected during proposed construction-related activities at that time. The project footprint illustration on the plans represents that APE. The archaeological APE was defined as the area or areas of known or recorded archaeological sites located within the Study Area boundary. The architectural APE was defined as the area or areas of known aboveground historic properties located within the Phase IA boundary. This approach captured all potentially relevant archaeological or architectural resources in the event of slight changes in design footprints.

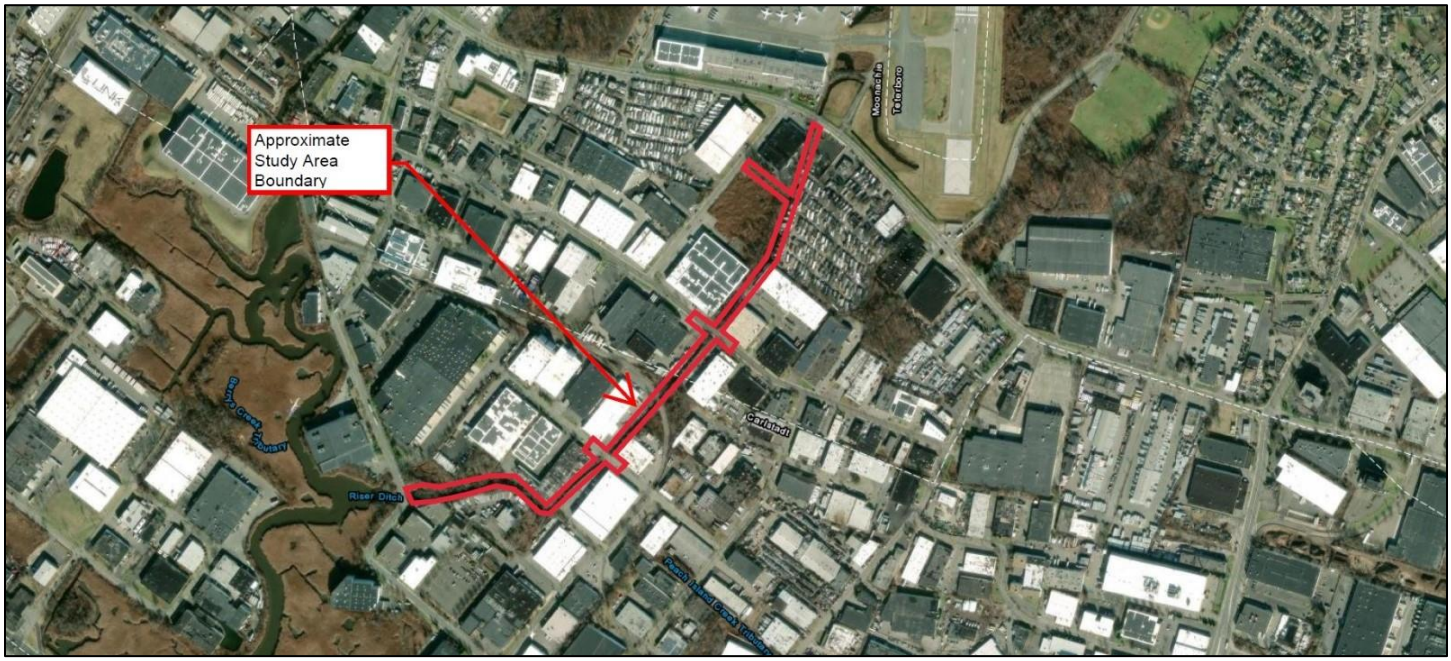

Figure 3. Phase IA Study Area.

One historic resource, the ca. 1960 Rail Bridge over the ERD, was deemed ineligible for listing in the State and National Registers of Historic Places (SRHP/NRHP), and the APE was assessed as having low archaeological sensitivity for pre-contact Native American and historic archaeological sites. In email correspondence dated December 3, 2018, the NJHPO approved NJDEP's proposed phased assessment of effects of the Project, in accordance with 800.5(a)(3), owing to difficulties in gaining access to Caesar Place Park, which abuts the ERD, and Avanti Park, where Phase IB archaeological surveys were recommended (Walker et al. 2018). Improvements within these properties are not included as part of the Project and no Phase IB survey have yet

to be conducted for Caesar Place Park or Avanti Park. In June of 2018, NJHPO concurred with the NJDEP's determination that the ERD and pump station APE has low archaeological sensitivity.

An Environmental Impact Statement (EIS) and Feasibility Study for the RBD Meadowlands Project was completed in 2018, establishing the NJDEP's decision to select the Alternative 3 Build Plan for implementation of the Proposed Project in compliance with the National Environmental Policy Act (NEPA). The Alternative 3 Build Plan, channel modifications, culvert replacements, and a railroad bridge replacement along the East Riser Ditch, was also determined to be the Environmentally Preferred Alternative. As part of the Section 106 process, a Programmatic Agreement (PA) was executed among the NJHPO, FEMA, HUD, New Jersey Office of Emergency Management, and the Advisory Council on Historic Preservation (ACHP) in 2018.

3 METHODOLOGY

The focus of this Draft EA study is to present a preliminary assessment of Direct Areas of Potential Effects (APEs) and the Indirect Areas of Potential Effects/ Visual Impact Areas for the project's alternatives. The APE includes the geographic area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist. The APE is influenced by the scale and nature of an undertaking and may be different for different kinds of effects caused by the undertaking", 36 CFR 800.16(d). For the NYNJHAT Project, the District shall consider potential direct, indirect, and cumulative effects to historic properties and all aspects of integrity, including their associated settings as applicable.

This study uses the broad term 'cultural resources' to apply to places, archaeological sites, buildings, structures, objects, cultural practices, or collections of these physical and nonphysical manifestations that have significance to humans. Definitions of cultural resources and other terms are summarized in a glossary.

3.1 DIRECT AREA OF POTENTIAL EFFECTS

The Study's Direct Area of Potential Effects (APE) is defined in relation to the perimeters of the NJDCAEIS. The Study Area is located in northeastern New Jersey and lies within the metropolitan area of Greater New York City, specifically the Hackensack River and Passaic River watersheds in Bergen County, New Jersey. The Project is located in the Meadowlands District in the Boroughs of Carlstadt and Moonachie and includes approximately 4,150 feet of the East Riser Ditch (ERD) channel, commencing at Moonachie Avenue and extending downstream to the tide gate located at the ERD's confluence with the tidally influenced Berry's Creek. The area impacted by flooding from the ERD is primarily commercial and industrial. At the end of the channel, on the southern side of Moonachie Avenue, there are two residential mobile home parks, one on each side of the channel. The channel improvements will begin upstream at the south face of Moonachie Avenue Bridge over the East Riser Ditch and traverse downstream in a southerly direction approximately 4,150-ft ending at the new East Riser Ditch Pump Station located in Carlstadt just north of Starke Road.

The APE includes all land that may be affected during proposed construction-related activities. The project footprint illustration on the plans represents the APE. 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. This approach captures all potentially relevant archaeological or architectural resources in the event of slight changes in design footprints.

In general, an undertaking has an effect on an historic property when the undertaking may alter characteristics of the property. Section 106 of the National Historic Preservation Act and 36 CFR 800.5 provide a useful definition of adverse effects, as well as helpful examples:

(1) **Criteria of adverse effect.** An adverse effect is found when an undertaking may alter, directly or indirectly, any of the characteristics of a historic property that qualify the property for inclusion in the National Register in a manner that would diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or association. Consideration shall be given to all qualifying characteristics of a historic property, including those that may have been identified subsequent to the original evaluation of the property's eligibility for the National Register. Adverse effects may include reasonably foreseeable effects caused by the undertaking that may occur later in time, be farther removed in distance or be cumulative.

(2) **Examples of adverse effects**. Adverse effects on historic properties include, but are not limited to:

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

(ii) Alteration of a property, including restoration, rehabilitation, repair, maintenance, stabilization, hazardous material remediation and provision of handicapped access, that is not consistent with the Secretary's Standards for the Treatment of Historic Properties (36 CFR 68) and applicable guidelines;
(iii) Removal of the property from its historic location;
(iv) Change of the character of the property's use or of physical features within the property's setting that contribute to its historic significance;
Introduction of visual, atmospheric or audible elements that diminish the integrity of the property's significant historic features;
(v) Neglect of a property which causes its deterioration, except where such neglect and deterioration are recognized qualities of a property of religious and cultural significance to an Indian tribe or Native Hawaiian organization; and
(vi) Transfer, lease, or sale of property out of Federal ownership or control without adequate and legally enforceable restrictions or conditions to ensure long-term reservation of the property's historic significance [36 CFR 800.5].

3.2 INDIRECT AREA OF POTENTIAL EFFECTS/ VISUAL IMPACT AREA

This study provides preliminary identification of known cultural resources that could be visually affected by the AEs. Visual analysis is part of the NEPA and Section 106 analyses and includes a broad look at the potential impacts to historic properties. By definition, a visual effect occurs whenever a proposed undertaking will be visible from an historic property. The mere existence of a visual effect does not automatically imply that the effect is adverse. An *adverse* visual effect occurs only when the addition of a new element to a landscape is found to diminish those aspects of a property's significance and integrity, such as its historic setting, which make it eligible for the State and National Registers of Historic Places (S/NRHPs).

Adverse visual effects are generally of two types, aesthetic or obstructive. An adverse aesthetic effect transpires when an undertaking's visual effect has a negative impact upon the perceived beauty or artistic values of an historic structure or landscape, thereby diminishing the appreciation, experience, or understanding of the resource. Common examples of adverse aesthetic impacts include the diminution or elimination of open space, or the introduction of a visual element that is incompatible, out of scale, in great contrast, or out of character with the historic resource or its associated setting. An adverse obstructive effect occurs when the proposed undertaking blocks any part of an historic property or eliminates scenic views historically visible from the property.

In keeping with USACE guidance, the APE for visual impacts on historic properties for the AEs cultural resource study is defined as those areas within one mile of proposed features which are within the potential viewshed (based on topography) of each Alternative. The New York State Department of Environmental Conservation (NYSDEC) defines *Visual Impact* as:

> *…when the mitigating effects of perspective do not reduce the visibility of an object to insignificant levels. Beauty plays no role in this concept. A visual impact may also be considered in the context of contrast. For instance, all other things being equal, a blue object seen against an orange background has greater visual impact than a blue object seen against the same colored blue background. Again, beauty plays no role in this concept* [NYSDEC 2000:10-11].

The analysis takes into consideration the resource's geographical distance and the effect of topography on whether the Project is visible from historic resources.

3.3 RESEARCH METHODS

This study is intended to provide a baseline of cultural and historic information that will inform preliminary planning decisions regarding cultural resources and is a coordinated effort between the NJDCAEIS and the current EA assessments.

The NJDCAEIS 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. 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.

The third step in the research strategy was the evaluation of currently proposed alternative measures to identify potential impacts to previously identified cultural resources and anticipate the development of mitigation plans as necessary. Cultural resource surveys and investigations were undertaken in 2016 and 2017 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 EIS Phase IA cultural resources investigations completed for the original study (NJDEP 2018). These surveys formed the basis of impacts 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 this Supplemental EA.

As a component of this EA, the AE study conducted background research to identify known cultural resources and previous cultural resources surveys located within the architectural and archaeological APEs. 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 several previous cultural resource surveys have been conducted within the Study Area, many of which consisted of intensive-level architectural surveys, historic structure reports (ex., HAER), and eligibility evaluations for individual properties. Details for previous cultural resource surveys are provided in the following sections.

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4 ENVIRONMENTAL SETTING

The Project Area is primarily located within the limits of the New Jersey Hackensack Meadowlands District (NJHMD) boundary, which is located in Hudson and Bergen Counties in northeastern New Jersey and contains more than 16,000 acres (NJDEP 2018). When European settlers first arrived in the Meadowlands via the Hackensack River, they encountered a predominantly freshwater tidal river system with forested swamps and bogs, including extensive stands (approximately 6,000 to 10,000 acres) of Atlantic white cedar forest, and freshwater and brackish marshes in its lower reaches (USFWS 2007). By the eighteenth century, however, landowners were draining and filling wetlands in the Meadowlands to create farmland and control mosquito populations.

Large portions of the Meadowlands District have been filled for industrial, commercial, residential uses, and the creation of landfills (Kiviat and MacDonald 2004). Railroad construction across portions of the Meadowlands District in the nineteenth century introduced extensive ditching, diking, and filling of wetlands, resulting in the fragmentation of tidal drainage basins. Major roadways were constructed across the Meadowlands District at an increasing rate throughout the twentieth century. Following implementation of the New Jersey General Health Act in 1904, extensive marsh-ditching and draining activities began. By 1924, the Bergen County Mosquito Commission is reported to have created approximately 1,000,000 feet of drainage ditches through salt marshes and over 500,000 feet of upland ditches. By 1945, the vast majority of salt marshes along the Hackensack River had been ditched and diked (USFWS 2007).

5 PHYSIOGRAPHY

The geology of New Jersey is commonly divided into four regions, known as Physiographic Provinces, whose boundaries separate distinctive rock formations, rock structures, and landforms. The four geologic regions of New Jersey consist of (from north to south): Valley and Ridge Province, Highlands Province, Piedmont Lowlands Province, and the Coastal Plain Province (New Jersey Geological Survey 1999). The Meadowlands District is located within the Piedmont Lowlands Province in northeastern New Jersey in the Hackensack Valley, a subdivision of the greater Newark Rift Basin. The Newark Basin was formed during the initial stages of the rifting of the Pangaea supercontinent and the consequent opening of the Atlantic Ocean during the late Triassic Period. Rifting at the surface caused large crustal blocks to drop downward, forming basins throughout eastern North America. Regionally, erosion of older rocks from the Paleozoic and Precambrian ages (approximately 260 million years and older) at higher elevations led to the deposition of continental sediments into the newly formed Newark Basin. These sediments subsequently formed consolidated rocks such as red siltstones, sandstones, and conglomerates (New Jersey Geological Survey 1999).

The Piedmont Physiographic Province of New Jersey is characterized mainly by slightly folded and faulted sedimentary and igneous rocks of Triassic and Jurassic age (Dalton 2003). The bedrock underlying the Meadowlands District is part of the Passaic Formation, which is composed of sedimentary rocks such as reddish-brown to purple and gray shales and sandstones that were deposited within fluvial and lacustrine environments. Erosion of older rocks from the Paleozoic and Precambrian ages formed sediments and created consolidated rocks that include red siltstones, sandstones, and conglomerates (NJDEP 2016). Sedimentary rocks in the Passaic Formation comprise the bedrock that underlies the Meadowlands District at a depth of approximately 100 feet (NJDEP 1959). However, during the deposition of the Passaic Formation sediments, periods of volcanic activity led to the development of less prevalent igneous formations. The subsequent differential weathering of the siltstone and mudstone of the Passaic Formation, in contrast to the weathering resistant igneous ridges to the east and west, formed a flood valley trending northeast and dipping 15 to 20 degrees to the northwest (USACE 1995). Late Triassic- and early Jurassic aged (230 to 190 million years old) sedimentary rocks underlie the lowlands while the ridges and uplands are underlain by Jurassic-aged igneous rocks (Dalton 2003).

As depicted in the Bedrock Geologic Map of Northern New Jersey, by the U.S. Geological Survey and New Jersey Geological Survey, the bedrock within the Study Area consists of siliciclastic sedimentary rocks of Lower Jurassic and Upper Triassic age, mapped as Sandy Mudstone (JTrpms) and Sandstone (JTrps), both units of the Passaic Formation. Sandy Mudstone (JTrpms) is reddish-brown to brownish-red, massive, silty to sandy mudstone and siltstone, which are bioturbated, ripple cross-laminated and interbedded with lenticular sandstone. Sandstone (JTrps) is interbedded grayish-red to brownish-red, medium- to fine-grained, medium- to thickbedded sandstone and brownish- to purplish-red coarse-grained siltstone; this unit is planar to ripple crosslaminated, fissile, locally calcareous, containing desiccation cracks and root casts (Drake et al., 1996).

6 GEOGRAPHY AND SOILS

The Study Area is within a broad lowland between the Palisades Ridge to the east and the First Watchung Mountain in the west, formerly inundated by glacial Lake Hackensack (Wolfe 1977:244). During the Pleistocene Epoch (approximately 2.6 million to 12,000 years ago), the Earth underwent a series of ice ages; the last of these, the Wisconsin Glaciation, lasted from approximately 85,000 to 11,000 years ago. This glaciation affected the Hackensack River Valley, covering the valley and surrounding area with an approximately 4,000-foot-thick ice sheet that extended south of the Meadowlands District (Stone et al. 2002). As the glacier advanced, it eroded soil and rock and carried it southward. The eroded material (a mixture of clay, silt, sand, gravel, cobbles, and boulders), called glacial drift, was deposited on the land as the ice sheet advanced southward.

Glacial drift deposited under the advancing ice was compacted by the weight of the ice and formed deposits called glacial till. As the glacier retreated, some of the glacial drift deposits formed ridges called moraines that acted as dams blocking natural drainages. One such moraine was responsible for the formation of Lake Hackensack, which formed between the Palisades Sill and Watchung Mountains. The water from the melting ice sheet carried particles of sand, silt, and clay to Lake Hackensack, where they formed thin, alternating layers called varves on the lake bottom (USACE 2002). As global temperature rose, vast amounts of glacial meltwater emptied into the world's oceans and the subsequent global rise in mean sea level led to the erosion of the moraine dam that formed the southern boundary of Lake Hackensack. As the moraine eroded, the lake eventually drained, leaving behind discontinuous layers of silt and fine sand on the former lake bottom (NJSEA 2007). As the ice sheets continued to melt and recede northward, the Earth's crust (which was compressed from the weight of the ice sheet) rebounded back to its pre-glacial elevation. In spite of the crustal rebound, the rising sea level flooded the Hackensack Valley and deposited organic-rich layers of peat and mineral soils that formed marshlands (USACE 2002).

Soil forms from an existing parent material at the land surface and its composition is related to various factors such as geology, topography, surrounding vegetation, and climate. In the Study Area, the Natural Resources Conservation Service (NRCS) Bergen County Soil Survey characterizes the soils in the Meadowlands District as Udorthents (UdoB, UdouB, UdwB and Ud); Urban Land (UR); SulfaquentsSulfihemists (TrkAv), also known as Tidal Marsh soils; and a small percentage of accessory soils (DuuB, Duuc, PrnAt, RkrB, and RkrC) (Goodman 1995, USDA NRCS 2025). The Study Area is largely composed of urban soil types, which are characterized by disturbed and natural soil materials that are covered by pavement, concrete, buildings, and other structures.

The bedrock in the Meadowlands is overlain by thick Quaternary deposits, composed of lake-bottom sediments and minor estuarine, alluvial and till deposits. Due to the recent urbanization of the area, the natural soils and sediments are capped by artificial fill consisting of artificially emplaced sand, gravel, silt, clay, and rock, as well as manufactured materials such as bricks, concrete, wood, plastic, glass, refuse, stones, boulders, cinders, ash, trash, and various miscellaneous materials deposited for residential, commercial, and industrial development. This layer ranges from approximately 2.5 to 15 feet in thickness (NJSEA 2007). These materials are found discontinuously throughout the region, in varying thicknesses and evenly mixed in some instances.

The terrain of the Study Area consists largely of a gently undulating topography that slopes gradually from the New Jersey Highlands down to the Coastal Plain (USACE 1995). The Study Area is nestled in a valley with typical elevations between 1 and 6 feet above mean sea level. The accelerated urbanization and industrialization of the region during recent times has seen portions of the southern section of the Meadowlands District reach elevations up to 10 feet (NAVD 88) as a result of former landfill operations and creation of man-made land for regional networks of highways and rail (Goodman 1995). The areas immediately surrounding the valley are characterized by much greater variations in elevation. Adjacent areas to the east and west of the Meadowlands reach elevations of approximately 250 feet (MERI 2014).

7 HYDROLOGY

The Study Area lies in the Hackensack-Passaic Watershed, an urbanized watershed that is impacted by residential, commercial, and industrial development. Within this watershed, the Meadowlands District includes a portion of one of the largest tidal wetland complexes within the Hudson-Raritan Estuary, encompassing approximately 5,800 acres of estuarine wetlands (USFWS 2007). According to the USFWS National Wetland Inventory (USFWS 2022b) maps, there are 5.35 acres of wetlands in or immediately adjacent to the Study Area. Major open waters and wetland types within the Study Area include estuarine shallow and deep water; estuarine emergent wetlands (e.g., saline or salt marsh, brackish marsh); riverine waters; pond/lakes; freshwater emergent wetlands; and freshwater forested/shrub wetlands, as shown in the USFWS National Wetlands Inventory (NWI) map and the NJDEP Wetlands map. Major tributaries that flow to the Hackensack River from the Study Area include Losen Slote, Moonachie Creek, Bashes Creek, Peach Island Creek, West Riser Ditch, East Riser Ditch, DePeyster Creek, and Berry's Creek. Draining the central and west sides of the Study Area are the West Riser Ditch, East Riser Ditch, Peach Island Creek, and other tributaries that flow to Berry's Creek and Berry's Creek Canal, conveying drainage to the Hackensack River.

Much of the development along tributaries to the Hackensack River has increased the number of pollutants entering waterways. Additional vehicle traffic, combined with the increase in paved surfaces, result in increased runoff of contaminates such as motor oil, sediments, and salts during winter months. The ERD is a 4.2-mile-long tributary that originates from springs in an area of historical wetlands and terminates at Berry's Creek. The portion of the ERD tributary within the Study Area receives significant urban runoff from surrounding roads and parking lots, and contamination from heavy metals (including mercury) has been recorded (Hobble et al. 2015). Berry's Creek is listed as impaired by the New Jersey 2020 303(d) List and requires a Total Maximum Daily Load (TMDL) restoration plan to be developed by the state; although, no plan has yet been developed to protect or restore water quality. Berry's Creek does not currently support the water quality goals for aquatic life (impaired by cadmium, copper, and lead) or fish consumption (impaired by arsenic, benzo[a]pyrene, heptachlor epoxide, and the following substances in fish tissue: chlordane, DDT, dieldrin, mercury, and PCBS) (NJDEP 2020b).

The hydrology of the Study Area, as well as the entire Meadowlands District, is characterized by extensive man-made changes to tidally influenced drainages, as evident by the historic construction of dikes, tide gates, dams, berms, and roadways, and the subsequent failure of water control structures along the Hackensack River (Kiviat and MacDonald 2004). The Oradell Dam, constructed in 1922, along with water supply withdrawals from the Oradell Reservoir, curtail freshwater inputs into the lower Hackensack River, increasing tidal effects and facilitating the movement of saline waters further upriver. As many as 30 flood control structures, including tide gates and culverts, are located along the Hackensack River and its tributaries in the vicinity of the Study Area. Remnants of former or non-functioning tide gates are visible in several other tributaries (e.g., Mill Creek, Penhorn Creek) (USFWS 2007). A distinctive physical feature of tidal wetlands within the Meadowlands District is the lack of typical tidal creek drainage patterns due to man-made ditching and draining. Over time, landowners have filled and developed many ditched wetland areas, diminishing flood storage capacity and shoreline stabilization functions (Kiviat and MacDonald 2002).

Direct wetland loss from draining, filling, diking, shoreline hardening, and development has historically been the greatest threat to wetland resources of the Meadowlands District. Tiner et al. (2005) estimated the overall rate of wetland loss between 1890 and 1950 at approximately 100 acres per year. Most of the losses during that 60-year period were due to filling activities; however, nearly 1,400 acres of wetlands were converted to open water habitats when a series of dikes near Sawmill Creek were damaged and/or breached during a severe storm event in 1950. Wetland loss rates in the Meadowlands District doubled from the mid-1950s to the mid-1960s, and continued to increase during the 1960s. However, wetland loss rates declined during the years following implementation of the Federal CWA, which regulates development projects in wetlands and other waters. From the mid-1980s through the mid-1990s, the rate of wetland losses declined substantially. Wetland losses in the Meadowlands District since the mid-1990s have been primarily due to direct loss or encroachment of small parcels (USFWS 2007). Today, wetlands throughout the Meadowlands District and specifically within the Study

Area experience degradation/loss as a result of habitat fragmentation associated with transportation infrastructure (road, rail, and aviation), eutrophication (excess nutrient loading), and the effects of invasive species. Several sewage treatment plants located along the Hackensack River cumulatively discharge approximately 100 million gallons of treated wastewater each day and, historically, nitrogen loadings have been estimated to occur at a rate of approximately 13 tons per day (NJSEA 1975, USFWS 2006).

Field investigations were completed in 2016 and 2017 to characterize wetland habitats throughout the Study Area for the RBDM EIS. As evaluated under the Stream Visual Assessment Protocol, the ERD received a poor rating and is deemed to be low quality due to the significant urban runoff from surrounding roads and parking lots (NJDEP 2018). In addition, the limited riparian area surrounding the ERD lacks vegetative diversity, and significant silt deposits on the banks and in the channel indicate erosion and active downcutting of the upstream embankments (NJDEP 2018). A 0.4-acre freshwater emergent wetland, not mapped on the NWI, was identified adjacent to the ERD, just east of Grand Street. A large estuarine and marine complex, with wetlands (48.41 acres) and deep water habitat (12.76 acres) is located west of Grand Street and receives hydrological input from the ERD. Field investigations indicated that this is a habitat of moderate ecological value because it is largely dominated by a monoculture of common reed. Given its proximity to Berry's Creek, which has been reported to be contaminated with heavy metals (including mercury) and runoff from adjacent developments, there is potential that this habitat may also contain contaminated sediments (NJDEP 2018).

The wetlands within the Study Area are located in an area of commercial and industrial use and are considered habitats of moderate ecological value owing to anthropogenic perturbation and the presence of invasive and nuisance species (NJDEP 2018). Invasive plants are an important concern in the Meadowlands District, where common reed (an invasive plant species) dominates thousands of acres (Kiviat and MacDonald 2004). Invasive plants are often effective colonizers in disturbed habitats, out-competing native vegetation under stressed conditions. Within the Study Area, residential and industrial development and transportation infrastructure increase habitat fragmentation, loss, and stress, thereby worsening this threat. While common reed is native to New Jersey, it became much more abundant in the Meadowlands District during the 1900s due to the proliferation of a more aggressive European genotype in North America (Saltonstall 2002). Human activity has accelerated the spread of this new common reed genotype by increasing the abundance of disturbed wetland soils and lowering salinity (Bart and Hartman 2002, 2003).

8 CLIMATE

Annual rainfall in the Study Area averages approximately 47 inches and annual snowfall averages 40 to 50 inches. During the warm season, thunderstorms are responsible for most of the rainfall, with cyclones and frontal passages being less frequent. Thunderstorms spawned in Pennsylvania and New York often move into the Study Area, where they usually reach maximum development in the evening (ONJSC 2014). However, flooding in the Study Area can occur during any season of the year. The worst storms have occurred in late summer or early fall when tropical disturbances (hurricanes) are most prevalent, but the Study Area is also subject to impacts from coastal storms, often characterized as “nor'easters,” which are most frequent between October and April. These storms track over the coastal plain or up to several hundred miles offshore, bringing strong winds and heavy rains. Typically, at least one significant coastal storm occurs each winter; some years’ experience as many as five to ten such storms. In some years, they contribute a significant amount to the precipitation totals of the region (ONJSC 2014).

Historically, stormwater management has been a significant challenge in the Study Area and the entirety of the Meadowlands District, as the District and the Study Area are less than 10 feet in elevation (NAVD 88) (Rutgers University 2007). This lack of elevation puts a strain on the ability of the municipalities to drain stormwater. Smaller tributaries, including East and West Riser Ditches, Losen Slote, and Berry’s Creek, drain the Study Area to the Hackensack River, which has a drainage area of approximately 202 square miles (USFWS 1997). Each of the Study Area’s communities has their own stormwater drainage systems, consisting of pipes, swales, and outfalls, that empty into these tributaries. Upstream of the wetland areas of the Study Area, the drainage subbasins consist of mostly dense residential and urban development, interspersed with commercial and industrial properties. This land use results in a large percentage of impervious surfaces and high stormwater runoff.

Drainage infrastructure is typically powered by gravity, and is slower if the slopes of the infrastructure are shallow (Guo et al. 2014). The extensive development of the Study Area, in conjunction with the significant changes made to the natural hydrology of the Study Area, has made much of the landscape impervious and severely limited its ability to absorb and store stormwater and discharge it over time. Consequently, most rainfall becomes surface runoff and is thrust into the drainage infrastructure immediately. These issues are further compounded when the Hackensack River has a particularly high tide, such as a spring high tide, because the river is the ultimate destination for the stormwater. The river must be at a lower elevation than the drains in order for drainage to occur (Rutgers University 2007).

9 FLORA AND FAUNA

The Study Area is urbanized and primarily composed of hard infrastructure associated with the surrounding commercial and industrial uses. Based on a survey of vegetation communities conducted for the RBDM EIS (NJDEP 2018), forested, shrubland, and herbaceous vegetation communities are present in the Study Area. A narrow corridor of riparian vegetation exists along the ERD. Species found in the riparian community include blackgum (Nyssa sylvatica), eastern cottonwood (Populus deltoides), black cherry (Prunus serotina), pin oak (Quercus palustris), crack willow (Salix fragilis), sweet pepperbush (Clethra alnifolia), arrowwood (Viburnum dentatum), and poison ivy (Toxicodendron radicans).

Patches of shrubland community are also present along the ERD and consist of woody shrubs and herbaceous vegetation. Representative species in this community include Amur honeysuckle (Lonicera maackii), arrowwood, eastern baccharis (Baccharis halimifolia), blackberry (Rubus allegheniensis), white snakeroot (Ageratina altissima), Indian hemp (Apocynum cannabinum), late flowering thoroughwort (Eupatorium serotinum), bull thistle (Cirsium vulgare), seaside goldenrod (Solidago semervirens), Japanese knotweed (Fallopia japonica), Virginia creeper (Parthenocissus quinquefolia), poison ivy, and common reed (Phragmites australis). Herbaceous vegetation communities are found in commercial areas and along roads, vacant lots, and other disturbed areas. Species in this community include grasses (Poa sp.), spotted sandmat (Chamaesyce maculate), ground ivy (Glechoma hederacea), bird's-foot trefoil (Lotus corniculatus), and English plantain (Plantago lanceolata).

Terrestrial habitats are present along the ERD and include riparian forest, shrublands, and herbaceous habitats (NJDEP 2018). Terrestrial wildlife present in the project area include many species of migratory birds that use the ERD and associated riparian and shrubland habitats. Mammals present in the Study Area include species common to suburban and disturbed environments, including eastern gray squirrel (Sciurus carolinensis), eastern cottontail rabbit (Sylvilagus floridanus), raccoon (Procyon lotor), red fox (Vulpes vulpes), and Virginia opossum (Didelphis virginiana). In addition, little brown bat (Myotis lucifugus) was observed in the Study Area during biological surveys conducted in 2016 and 2017 (NJDEP 2018).

Berry's Creek supports a large complex of marshes and other aquatic habitats; however, the ERD is channelized with steep banks and the substrates are silt and mud. The water in the channel is typically approximately 1-foot deep with occasional small pools associated with culverts and a large pool of unknown depth at the tide gate at the south end. As a result, the ERD provides limited aquatic habitat and no aquatic vegetation was observed in the ERD during the biological surveys (NJDEP 2018). Wildlife associated with the limited aquatic habitat provided by the ERD include common amphibians and reptiles such as the American bullfrog (Lithobates catesbeianus), American toad (Anaxyrus americanus), gray treefrog (Hyla versicolor), green frog (Lithobates clamitans melanota), and Atlantic Coast leopard frog (Lithobates sphenocephalus). Reptiles include painted turtle (Chrysemys picta), red-eared slider (Trachemys scripta elegans), common snapping turtle (Chelydra serpentine), and garter snake (Thamnophis sirtalis). Fish present in the ERD are limited to those species tolerant of disturbances from flooding, sedimentation, and lack of natural vegetated cover, such as western mosquitofish (Gambusia affinis). The tide gate located at the confluence of the ERD and Berry's Creek also limits fish access to the ERD.

Critical habitat has not been designated for any species in the Study Area. According to the RBDM EIS (NJDEP 2018), coordination with NMFS confirmed that no listed species under their jurisdiction are present in the Hackensack River or its tributaries. No federally listed species were observed during biological surveys in the Study Area (NJDEP 2018). However, a number of state-listed threatened and endangered species have the potential to occur in the Study Area (NJDEP 2018). Because of the urbanized nature of the Study Area, and the channelized and disturbed nature of the ERD, habitat for state-listed, threatened, and endangered species is limited to the narrow riparian forest and shrublands located along the ERD. During biological surveys conducted for the RBDM EIS, several state-listed bird species were observed, including American kestrel (Falco sparverius), bald eagle (Haliaeetus leucocephalus), blackcrowned night-heron (Nycticorax nycticorax), northern

harrier (Circus cyaneus), osprey (Pandion haliaetus), black skimmer (Rynchops niger), peregrine falcon (Falco peregrinus), pied-billed grebe (Podilymbus podiceps), and Savannah sparrow (Passerculus sandwichensis) (NJDEP 2018).

Many species of migratory birds use the Study Area for foraging, roosting, and nesting. Habitat for migratory birds in the Study Area is primarily associated with the narrow riparian corridor and shrublands located along the ERD. However, migratory birds can utilize any vegetation, including trees located in commercial lots and along roadways, for foraging and nesting. Based on avian surveys conducted in 2016 and 2017 (NJDEP 2018), bird species commonly found in the Study Area include Canada goose (Branta canadensis), double-crested cormorant (Phalacrocorax auritus), ring-billed gull (Larus delawarensis), mallard (Anas platyrhynchos), American robin (Turdus migratorius), and red-winged blackbird (Agelaius phoeniceus). Raptor species observed during surveys included northern harrier, red-tailed hawk (Buteo jamaicensis), and American kestrel.

10 CULTURAL BACKGROUND OF THE EAST RISER AE, NEW JERSEY: FROM NATIVE AMERICAN INHABITANTS TO THE PRESENT

The historic cultural background narrative for the AE includes broad trends in sub-regional developments for historic time periods, specific to each of the three AEs. The historic background identifies information on specific topics of New York history and is presented below.

A 2014 report for Hudson-Raritan Estuary Comprehensive Plan (Harris et al. 2014) compiled cultural resources background information to serve as an appendix to the Feasibility Study and Programmatic Environmental Impact Statement for the Hudson-Raritan Estuary Ecosystem Restoration Program. The report provided a detailed cultural/historical overview for eight regions in northeastern New Jersey, New York City, and the lower Hudson River Valley. These areas are very similar geographically to planning regions presented in this study. The present study includes the Mid-Hudson and Upper Hudson Regions, which were not included in 2014, and combines the Arthur Kill and Lower Bay regions, which were separate in 2014. Please refer to that study for additional detailed information on the regions.

The 2022 Tier I Environmental Impact Statement and Cultural Resource Assessment: New York-New Jersey Harbor and Tributaries Study completed an initial investigation of the comprehensive study area to provide information about cultural resources that will contribute to the USACE's decision-making process in selecting a build alternative for the New York-New Jersey Harbor and Tributaries flood risk management system. To do so, the investigation included two parts: an historical review of the study area to provide contextual information for the cultural resources it contains; and preliminary assessments of the potential direct and indirect (i.e., visual) effects of each of the build alternatives on cultural resources. The historic context covered the USACE-defined study area, while the effects assessments are limited to areas near the planned build alternatives.

Each planning region's historic background was presented as its own project area and covered the period between initial European contact with Native American inhabitants of New Jersey and New York to the present time. There was some overlap in the historic contexts of the planning regions due to the proximity of the regions.

10.1.1 Early history and Native American inhabitants (Pre-1625)

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).

Paleo-Indian Period: 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).

Little is known about the prehistory of the Hackensack River drainage due to a general lack of systematic survey and testing programs. The record now suggests that the prehistoric period Meadowlands may have been a dynamic landscape within the context of formerly dry freshwater and estuary land forms (Grossman 1992). Such an environment could have been a rich area that Native American populations utilized to procure resources. The Native American archaeology in the Newark Basin, which contains the Meadowlands, provides insight into settlement patterns (URS Corporation 2001).

Regional patterns indicate that in the Piedmont, Paleoindian sites were settled away from high-order drainages and have been characterized as small hunting stations (Custer and Wallace 1982). Settlement patterns likely encompassed large regions of the Hackensack Basin and surrounding areas. Paleoindian subsistence strategy in this forest and mixed woodland environment may have centered on the hunting of game, as indicated in the recovery of fluted projectile points. On the other hand, evidence from some sites, like Shawnee-Minisink on the Upper Delaware River, suggest that Paleoindian groups were collecting seeds, plums, and blackberries, as well as exploiting local fish resources (Gingerich 2013). The location of known Paleoindian sites in New Jersey suggests a preference for high, well-drained ground near streams or wetlands and offering vantage points for observing game (Stewart and Rankin 2017). Sites have also been located in rockshelters, near lithic source areas, and on lower river terraces. It is probable that many Paleoindian sites were situated on what is now the continental shelf (Marshall 1982).

Archaic Period: 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).

Woodland Period: 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).

10.1.2 Early European Exploration and Settlement

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 pursued 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).

10.1.3 Colonial Settlement and Development

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).

The earliest European settlement in Bergen County between the Hackensack and Passaic Rivers (south of the present-day City of Hackensack) was limited to fast land above the marshes. In 1641, this settlement consisted of a Dutch trading post on the west bank of the Hackensack River, located at the modern site of the Borough of Little Ferry. A ferry crossing of the Hackensack River was established there in 1659 to permit access to the more extensive development east of the river, and it remained in operation until 1826. In addition to regular service, the ferry aided George Washington's troops in their escape from Fort Lee after the British invasion of New Jersey. Despite violent conflict with Native American populations, the first land patent on the west side of the Hackensack River was issued to Captain William Sanford in 1668 upon his purchase of 15,000 acres from the East Jersey Proprietors. This parcel encompassed the southern peninsula at the confluence of the Hackensack and Passaic Rivers, south of the Study Area. The land to the north was granted to John Berry of Barbados, who was given the tract in 1669 by then-governor Philip Carteret. Berry's tract, which he called New Barbadoes, encompassed all land between the Hackensack and Saddle Rivers for a distance of 6 miles north of Sanford's land (Harvey 1900) and included the present-day Borough of Teterboro (NJDOT 1987, Hunter Research, Inc. 2006). At the end of the seventeenth century, Thomas Outwater and others purchased the island of Moonachie, or Berry's Island, and built a dwelling there in 1718 (Bergen County Office of Cultural and Historic Affairs 1980 - 1981, Matthews 1993).

10.1.4 Industrialization and Urbanization

Transport of people, goods, and salt hay across the marshes and uplands was facilitated by the construction of a few roads; among the earliest was the Pollifly Road built in the late seventeenth century (present-day Bergen County Route 55), a north-south corridor that ran along the western upland bordering the marshes (Clayton and Nelson 1882). Plank roads constructed of Atlantic white cedar made transportation of people and goods possible across the marshes, and in 1759, John Schuyler built the first of these plank roads between Barbadoes Neck and his copper mine on the Passaic River (Hunter Research, Inc. 2006).

By the mid-eighteenth century, Bergen County became divided along cultural lines. Throughout the countryside, people continued speaking Dutch, attending the Dutch Reformed Church, retaining Dutch names, and favoring Dutch clothing designs. Conversely, people in the Hackensack Valley, though mindful of their Dutch roots, had adopted the customs of British America. The divisions in Bergen County became more apparent during the

American Revolution, when strong ties to either British or American interests had militarized the citizenry. The Patriots and Loyalists of Bergen County created militias to fight against each other (Leiby 1962:9, 13). Throughout the war, neither the British nor American armies were able to successfully occupy Bergen County for more than a short period of time (Leiby 1962:103, 251).

Bergen County's prosperity was largely due to its abundance of natural resources. Early settlers found that the Meadowlands were an ideal spot for gathering fish, oysters, fowl, and small mammals for food and trade. The Meadowlands continued as a major food source until the late-nineteenth century, when it was discovered that the industrial buildup in the area had polluted the Meadowlands to the point that consumption was dangerous (Marshall 2012). Despite its condition, the Meadowlands continued to serve as a significant economic driver for Bergen County and surrounding municipalities. Another valuable resource in the area was the harvesting of salt hay, ideal for "feeding and bedding livestock" (Marshall 2012). At the time of early settlement, the Meadowlands were largely composed of salt marsh and cedar swamps, so settlers later developed a localized system of drainage to reduce salinity and create freshwater meadows, thereby converting the marsh into valuable farmland and providing the perfect conditions for producing salt hay (Sebold 1992; Hunter Research, Inc. 2006:4–9).

In the nineteenth century, farming, particularly in Bergen County, had developed into the backbone of New Jersey's economy (Lurie and Veit 2012:105). Bergen County was so renowned for its proficiency in producing garden vegetables that it became the primary supplier of vegetables to the New York market by 1840 (Van Valen 1900:31). Commerce was made possible through the development of transportation routes such as the "wagon road," built in 1660 to connect Bergen County to Communipaw, or the King's Highway, constructed in 1764 to connect Bergen County to the Dutch Church on Staten Island. Alternatively, ferries were a common means of transport across the Hackensack River and were used as a commercial thoroughfare as early as the seventeenth century (Hackensack Keeper 2016). In 1804, the Bergen Turnpike Company built the Hackensack Turnpike from Hackensack to Hoboken. The New York and Paterson Turnpike (present-day State Route 120), which crossed the marsh between Berry's Creek and the island of Moonachie, was surveyed and built between 1816 and 1820 (Van Valen 1900). These early corridors connected the widely distributed villages established on the higher, drier ground surrounding and within the marshes. However, the main transportation improvements in the Meadowlands District were aimed at connecting the interior of New Jersey to the Hudson River waterfront and New York City (Hunter Research, Inc. 2006).

Along the Pollifly Road, from south to north, were the present-day Boroughs of Carlstadt and Moonachie. Dividing the marshes between the Hackensack River and Pollifly Road was Washington Avenue, which ran through the island of Moonachie (Clayton and Nelson 1882). German political refugees established the Borough of Carlstadt in the 1840s, when the German Democratic Land Association organized mass immigration to the US and purchased 140 acres in Lodi Township for their members (Van Valen 1900). Residential and commercial development of Carlstadt was rapid, and by the 1850s the village was well known for German singing societies, beer gardens, and the teaching of German and English in schools (Lurie and Mappen 2004). The first church in the area was the German Presbyterian Church of Carlstadt, built in 1869 (Van Valen 1900). By the early twentieth century, the Borough of Carlstadt had several manufacturing industries in operation, producing ladies' shoes, watch cases, and onyx and marble church pulpits (Van Valen 1900). According to local legend, the name "Moonachie" was taken from Monaghie, a famous Indian Chief (Wesrervelt 1923). The Borough of Moonachie was an abundant agriculture center; its principal role was feeding the Continental Army during the American Revolution (Borough of Moonachie 2016).

Prior to the 1860s, sparse residential and commercial settlement flanked the four streets (Liberty Street, Washington Avenue, Riverside Avenue, and Bergen Pike) of Little Ferry. However, discovery of large, high quality clay beds in the banks of the Hackensack River during the late 1860s brought profitable and large-scale industry to the borough. During the 1870s, brick-making became a major industry in the Borough of Little Ferry, which, with its clay beds and proximity to the Hackensack River's transportation options, was well positioned to exploit the brick demands of nearby expanding urban centers. Cole and Showers established the area's first

brickyards in 1872, although this enterprise was not successful, and the business quickly passed first into the hands of John Thume and then to the Mehrhof family in 1877.

By the mid-nineteenth century, railroads replaced the Hackensack River as the primary transportation route in Bergen County, allowing faster access to large markets such as New York City (Lurie and Mappen 646 2004:71). The first railroads through Bergen County were constructed in the 1830s—the New Jersey Railroad from Newark and the Paterson & Hudson River Railroad from East Rutherford (Van Valen 1900:87). Both connected to the Paulus Hook ferry terminal on the Hudson River (Hunter Research, Inc. 2006). In 1852, the New York & Erie Railroad leased the Paterson & Hudson River Railroad, and subsequently established it as its main line (County of Bergen 2016). In addition to trade, the railroad facilitated the rapid growth of Bergen County's population, which historically had seen only moderate increases since the start of European colonization. These transportation routes provided the small villages around the Meadowlands District an opportunity for industrial growth and the late nineteenth century saw the subdivision of the all-encompassing Lodi Township into the smaller, independent villages of Carlstadt (1894), Little Ferry (1894), Moonachie (1910), Teterboro (1917), and South Hackensack (1935).

10.1.5 Immigration and Economic Expansion

Bergen County's population began to surge in the late-nineteenth and early-twentieth centuries due to the widespread development of railroad lines that created easier access between metropolitan areas (Eugene 1953:209). The increase, coupled with school-funding issues, caused the legislature to pass a bill in 1894 that simplified the procedure and requirements for incorporating new boroughs, with the intention of more efficiently providing governmental services. Once the subdividing ceased in 1924, Bergen County was left with seventy-five boroughs, three cities, and nine townships (Cunningham 1994:86; Lurie and Mappen 2004:72). In 1920, only 24 people resided in the Borough of Teterboro, which was part of a land-development firm headed by Walter Teter (Wesrervelt 1923). The initial 540 acres that made up Teterboro were removed from the Borough of Little Ferry, Borough of Hasbrouck Heights, and the Township of South Hackensack. At the time, the Borough of Teterboro was home to the Wittemann-Lewis Aircraft Company, which produced airplanes, while South Hackensack was predominantly farmland until the 1940s (Wesrervelt 1923). By the late twentieth century, industrial growth around the Teterboro Airport and the Hackensack River began altering the township's landscape (Lurie and Mappen 2004). Today, the Teterboro Airport is the most recognizable feature in the Borough of Teterboro. The Borough of Teterboro is also home to the Aviation Hall of Fame and Museum of New Jersey (founded in 1972) and the Aeronautical Education Center (Lurie and Mappen 2004).

10.1.6 Post-War Changes and Suburban Development

The population increased again during the post–World War II era, largely due to the construction of the George Washington Bridge, which in 1932 connected Bergen County to Manhattan via highway. The population of "once-bucolic Bergen County" exploded from 78,441 in 1900 to 911,000 in 1976, with many of the county's new residents commuting to jobs in New York. After World War II, agriculture was largely abandoned in favor of industry, and traditional farms and marshlands were removed in order to create space for high rises and industrial centers (Lurie and Mappen 2004). As shopping malls and housing developments were constructed to accommodate the growing population in the late 1960s, the open spaces of the Meadowlands were increasingly seen as a development opportunity where, in 1972, construction began on a new stadium for the New York Giants football team (Cunningham 1994).

10.2 REVIEW OF HISTORIC MAPS

A sequence of eighteenth-, 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 throughout the eighteenth century (Figure 4). Eighteenth-century settlement was concentrated in the vicinity of Little Ferry, near the Bergen

Turnpike, where the Hackensack River facilitated access to land. Nineteenth-century development near the APE was scattered along roadways and more concentrated in Little Ferry than other nearby communities. Background research indicates that eighteenth- and nineteenth-century settlement in Little Ferry was concentrated along the Hackensack River and along historic roads such as Redneck Avenue, Washington Avenue/Moonachie Road/Liberty Street (Route 503), and other older roadways.

Historical alignments of roadways throughout the Study Area have changed very little during the past two centuries, with streets generally added rather than reconfigured. Liberty Street (Route 503) is a segment of one of the earliest historical roadways in the vicinity and appears on an 1849 map (Figure 5). Development along the roadway began slowly, with few structures concentrated at crossroads and scattered along its length. This continued into the latter half of the nineteenth century, as late-nineteenth century maps depict few structures adjacent to the roadway within the vicinity of APE (Figure 6). The Paterson Plank Road near the southern portion of the APE was a major east/west route across the Hackensack River in the nineteenth century, while Liberty Street (Route 503) was the north/south route in the APE.

By 1861, a railroad was constructed west of the APE (Figure 7). The boom of Little Ferry's industry contributed to development along the northern section of Liberty Street during the final decades of the nineteenth century and into the twentieth. Most of the remaining agricultural parcels were converted to industrial use by the second half of the twentieth century; however, some small, isolated pockets of undeveloped land remained. By 1888, Little Ferry, Carlstadt, and Woodridge started to exhibit increased development in proximity to the railroad, particularly in areas where the railroad converged with the Hackensack River, but this expansion remained gradual through the end of the nineteenth century (Figure 8). The immediate area surrounding East Riser Ditch was sparsely settled until the early twentieth century, as much of the area remained wetlands.

By 1903, additional development and new neighborhoods were established near the APE (Figure 9). Industry concentrated along the Passaic and Hudson Rivers and near Teterboro Airport, which opened in 1919. The harvesting of salt hay fell into decline with the emergence of industrialization. Brickworks continued to operate along the Hackensack River into the twentieth century, but by the 1930s, former clay pits from brick works filled with water. In the second half of the twentieth century, construction of roads and commercial buildings was extensive in the APE. The construction of the New Jersey Turnpike, Route 46, Interstate 80, and other roadways led to increased development near the APE (Figure 10). Mid twentieth-century maps capture the relatively rapid expansion of urban development and industrialization throughout Moonachie, Little Ferry, and Carlstadt (Figures 11 and 13).

Marshlands restricted early historical development of the APE. Historic topographic maps illustrate that the late nineteenth- and early twentieth-century configuration of the ERD was very similar to the present day (Figure 7 and Figure 8). Interpretations of historic maps and aerial photographs concluded that the southern extent was subjected to modifications during the twentieth century, with the smoothing of near-confluence undulations and the creation of an abrupt 90-degree angle to direct water to the west and away from areas of industrial construction during the 1970s. The westernmost section of the ERD was straightened by 1987 and drained west–southwest through the newly built tide gate into Berry's Creek (Walker et al. 2018:3-6). Over time, much of the remaining wetlands gave way to residential and commercial development, and the road network as shown on USGS maps begins to resemble the current grid system seen today (Figure 10 and Figure 11). East Riser Ditch became surrounded by densely settled residential areas and industrial properties, particularly along Moonachie Avenue.

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 APE. Since nineteenth-century maps reveal only a handful of structures located along roadways along the upper and lower boundaries of the Study Area, there is low sensitivity for historic archaeological resources in the APE. Historic road fabric was likely adversely impacted by subsequent road-paving activity and is of questionable archaeological value, if compromised.

Review of historic maps with specific attention paid to the locations of historic structures in relation to proposed footprints did not identify areas of concern, as the limited APEs of proposed subsurface impacts avoid or are restricted to the curb edge of the historic frontage. These assessments of very low archaeological sensitivity for roadway and immediate roadside work apply not only to the roads in the northern portion of APE but also the central and southern portions of the APE.

The intensive level of development suggests significant disturbance in the APE during the construction of large commercial parking lots and industrial buildings in the mid-twentieth century. While there is little evidence for historical archaeological deposits due to the lack of historical settlement in the area, it is possible that these impacts may have undermined the integrity of any pre-Contact period archaeological remains that may be present. In summary, the review of historic maps and previous research indicate that most of the APE has a low sensitivity for archaeological resources. Prior earthmoving activities are comprehensive throughout the APE. Two locations (the proposed Avanti Park and Caesar Place Park) in the APE are considered to have high sensitivity for archaeological resources and are further defined in Section 6. Historic topographic maps reviewed included those prepared by the USGS and made available via topoView online: Paterson, 1888, scale 1:62500; Paterson, 1903, scale 1:62500; Weehawken, 1935, scale 1:24000, Weehawken, 1947, scale 1:125000, and Weehawken, 1967, scale 1:250000. Historic aerial imagery reviewed included photography made available by the USGS via Earth Explorer online.

Figure 4. 1781 map showing the approximate location of the Study Area (Hills 1781).

Figure 5. 1849 map showing the approximate location of the Study Area (Sidney 1849).

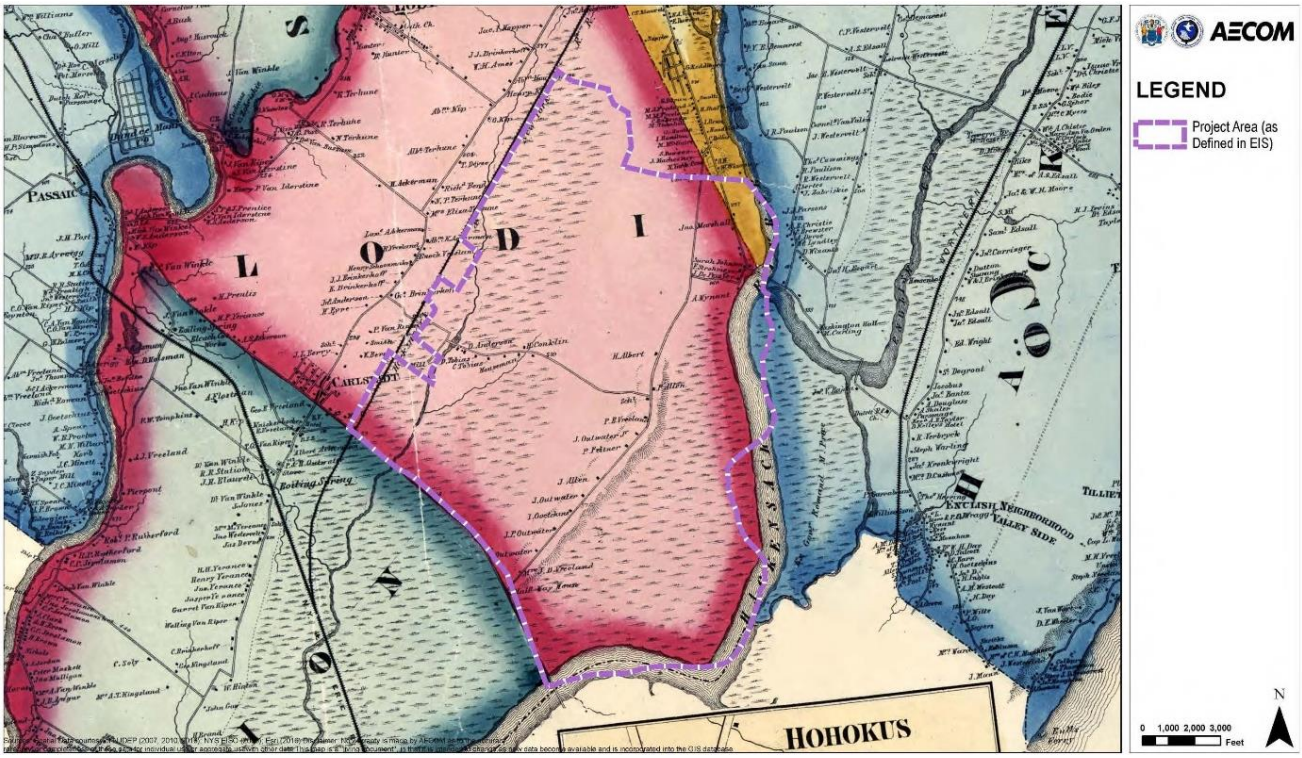

Figure 6.1861 map showing the approximate location of the Study Area (Hopkins 1861).

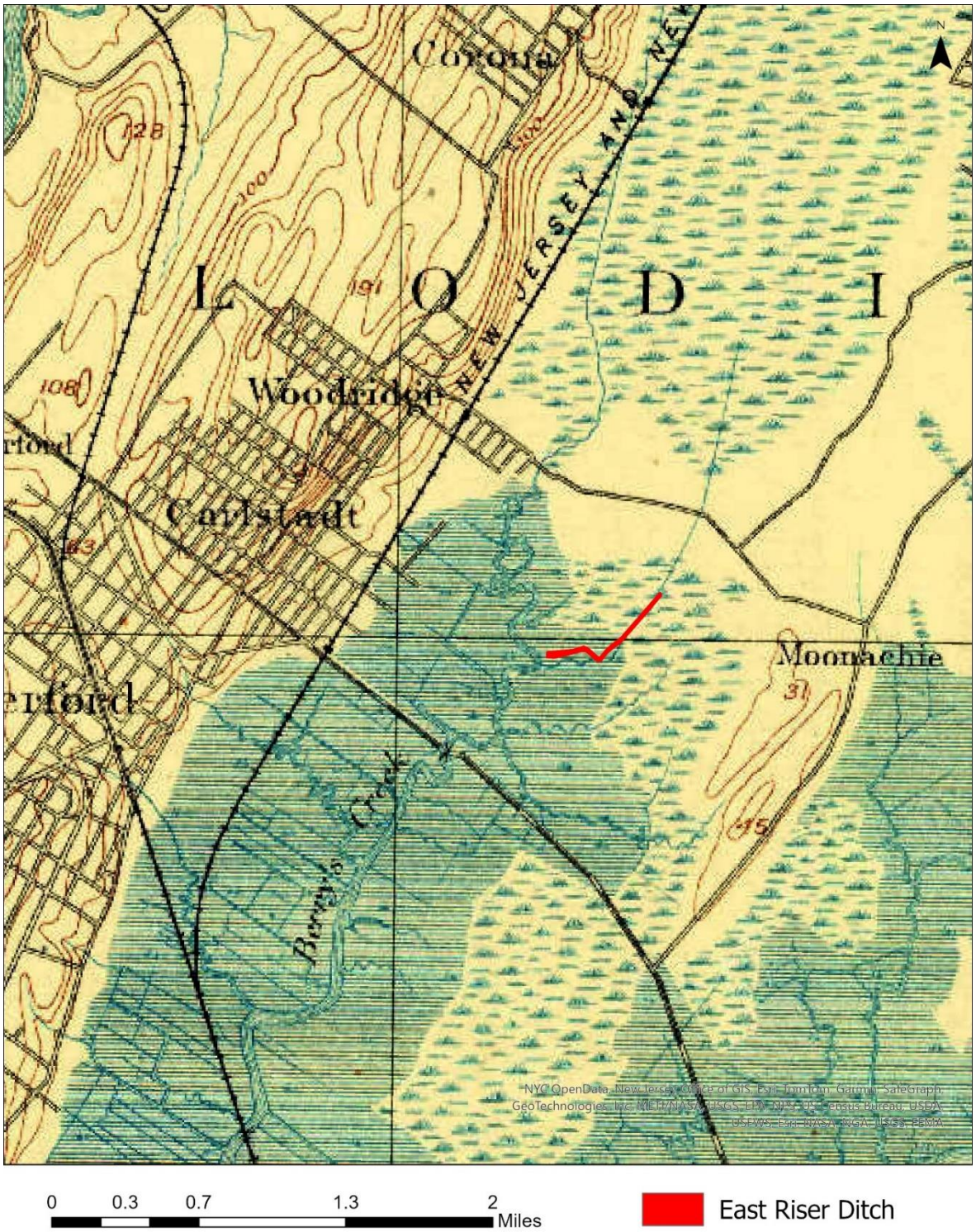

Figure 7. 1888 map of the East Riser Ditch (ERD) Area of Potential Effect (APE) (USGS 1888).

Figure 8. 1903 map of the East Riser Ditch (ERD) Area of Potential Effect (APE) (USGS 1903).

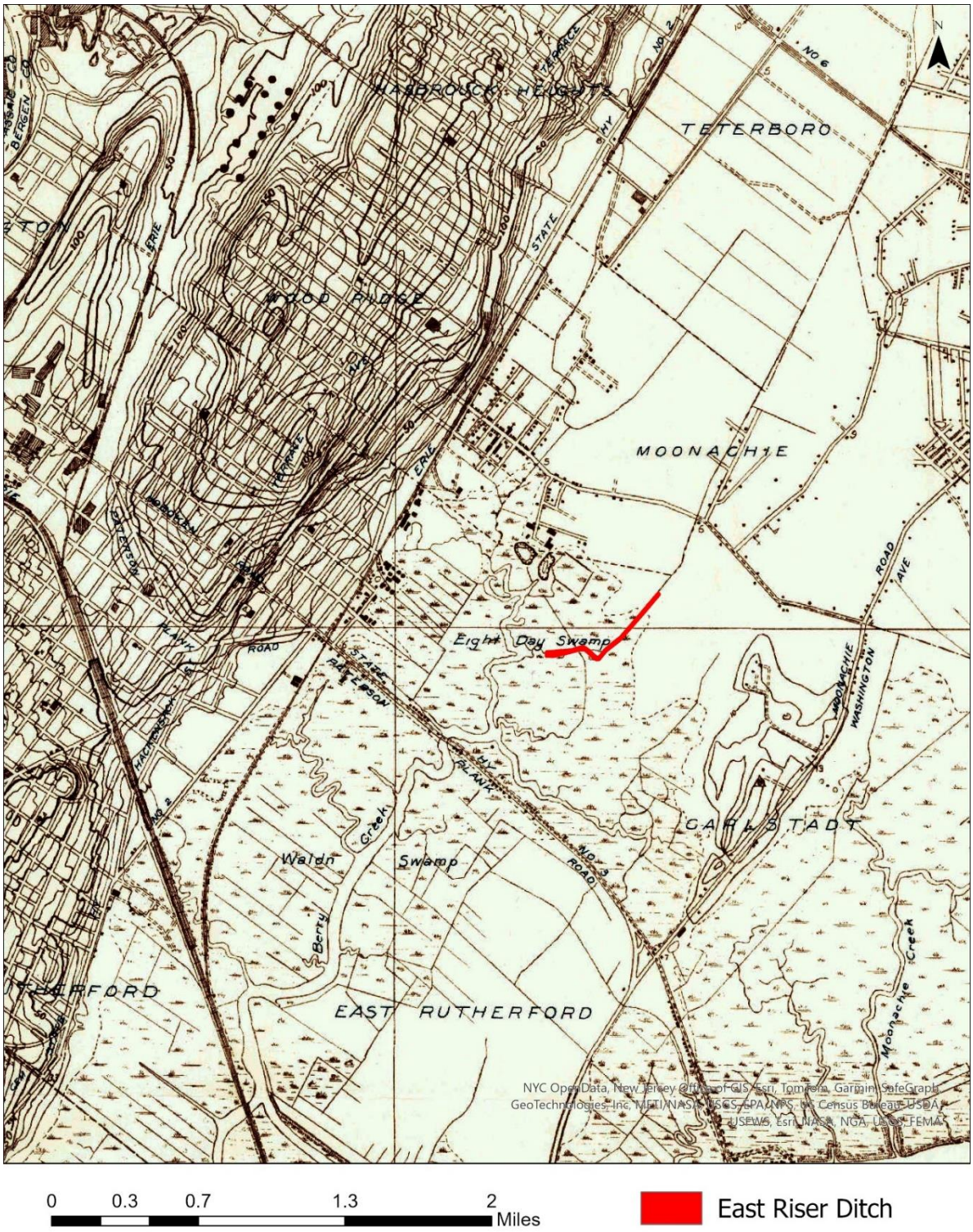

Figure 9. 1935 map of the East Riser Ditch (ERD) Area of Potential Effect (APE) (USGS 1935).

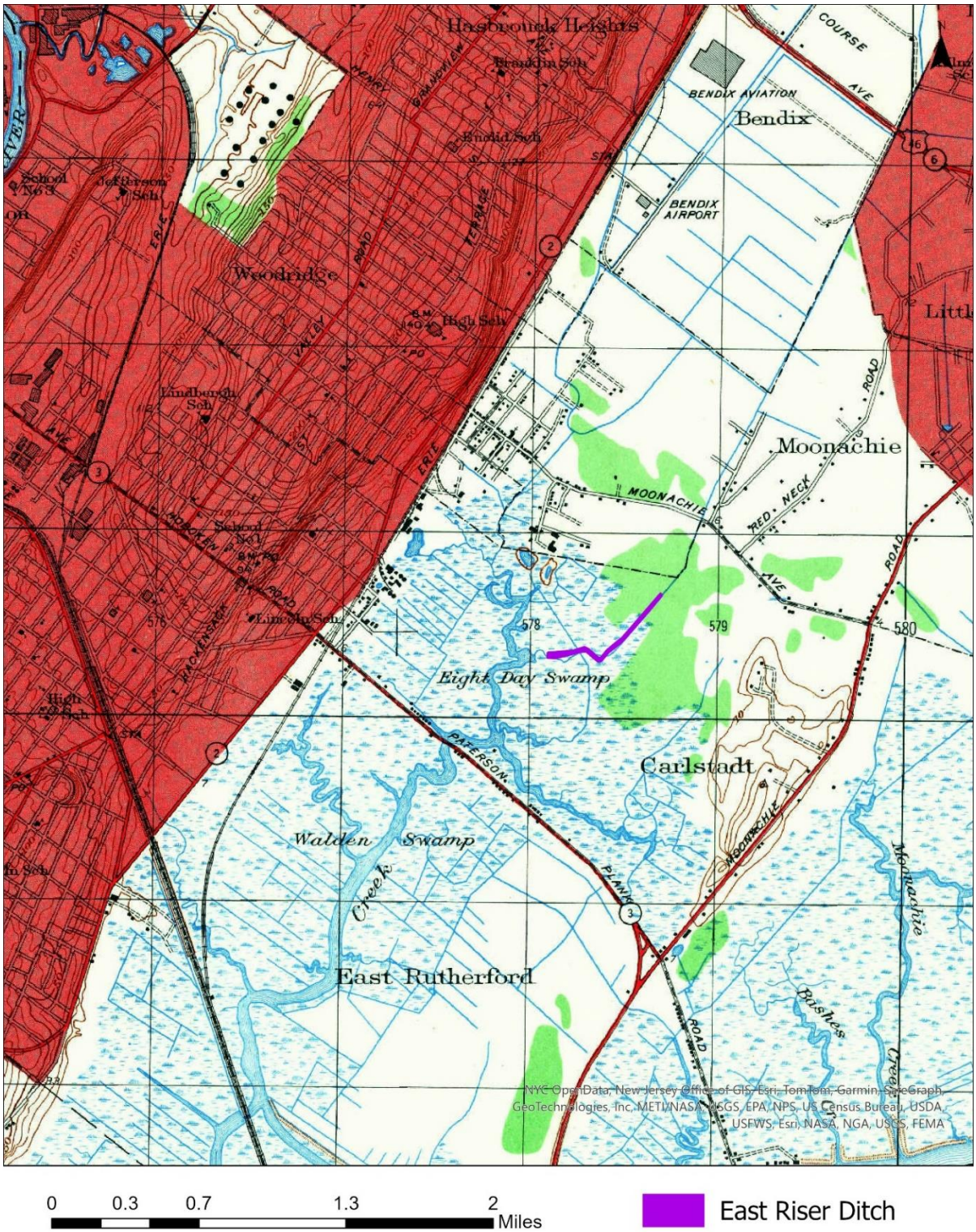

Figure 10. 1947 map of the East Riser Ditch (ERD) Area of Potential Effect (APE) (USGS 1947).

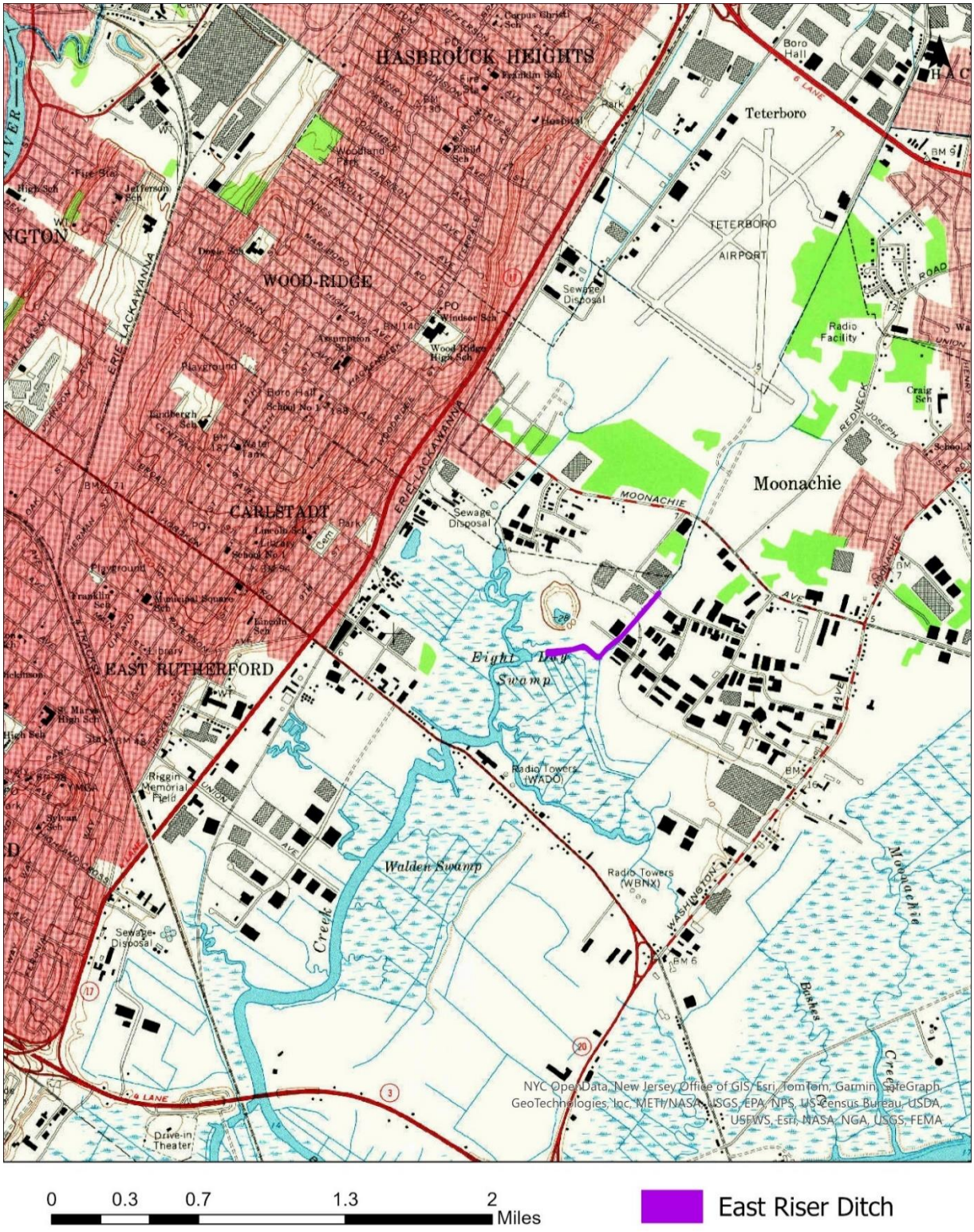

Figure 11. 1967 map of the East Riser Ditch (ERD) Area of Potential Effect (APE) (USGS 1967).

11 EXISTING CONDITIONS AND CULTURAL RESOURCE EFFECTS

As presented in the Environmental Appendix, Cultural Resource Categories within the Study Area have been reviewed to determine if there is a potential for the Alternatives to effect, either adversely or beneficially, Resource Categories starting with an initial screening to identify *if* there is a potential for adverse effects (Yes – Y; or No – N) by the measures of each Alternative, followed by an assessment of the magnitude of those identified potential adverse effects, rated on a scale of 0 (No Adverse Effects) to minus 5 (–5, Significant Adverse Effects), by Alternative. Each Cultural Resource includes a summary discussion of the anticipated and reasonably foreseeable effects of each Alternative, additionally reflected by qualitative magnitude of effect ratings. Based on comments received following release of the Draft Report, the qualitative rating system and criteria has been revised and expanded upon in the following manner:

- Adverse effects rating criteria ranges from 0 to –5, with negative markers added to emphasize the anticipated qualitative negative effect.
- Beneficial effects rating criteria was established and presented herein, following a similar structure as the adverse effects rating criteria, except the beneficial effects ranging from 0 to +5, including a positive marker to emphasize the anticipated qualitative beneficial effect.
- The No Action was assessed in the same manner as the Alternative Actions, with qualitative rating scores accompanying each description.
- Cultural Resource Impacts require a more refined framework tailored to cultural resources is essential to adequately assess both adverse and beneficial effects, guide meaningful mitigation, and ensure compliance with federal preservation mandates. This approach enables more precise evaluations and protects cultural heritage in ways that environmental scoring systems alone cannot achieve.

Cultural resources are vulnerable to the impacts of storm surges, flooding, and sea-level rise. These types of exposures can diminish the physical and historic integrity of archaeological sites, historic buildings, and cultural landscapes through physical damage or destruction. Integrity is essential for historic properties to retain their designations as National Historic Landmarks, State / National Register listed or eligible resources, NYC Landmarks, and / or NPS parks or site units, examples of all of which are present throughout the study area.

11.1 CULTURAL RESOURCE LIST AND POTENTIAL TO EFFECT DETERMINATION

This table represents the overview of the Resources identified in the September 2022 Draft Report as potentially occurring within the Study Area to determine if the Comprehensive Plan would affect. These same resources were again reviewed for the Harlem River AE Site and assessed in the same manner as summarized below. The difference between the September 2022 Draft Report assessment and this one is that this one includes the negative and positive markers to establish the presence/absence of adverse and/or beneficial effects. A deviation from this process, is the exclusion of the New York Bight Ecological Model (NYBEM) Developed by the U.S. Army Corps of Engineers, Engineering Research and Development Center, as it is not applicable to these AE sites but rather the larger Comprehensive Plan as a whole.

11.2 CULTURAL RESOURCE QUALITATIVE RATING METHODOLOGY AND SCORING PROCESS

A rating methodology was developed, adopted, and enhanced from the September 2022 Draft Integrated Report and Tier 1 EIS to qualitatively assess as well as the current Draft EA Qualitative Rating Methodology to compare the adverse impacts of each resource within the Study Area. While environmental impact frameworks provide a broad lens for evaluating project effects, cultural resources require a more nuanced and specialized approach due to their historical, archaeological, and intangible values. Environmental models often emphasize biophysical metrics such as land use, hydrology, or emissions, which can overlook the complex regulatory, contextual, and community-based significance of cultural resources. Under Section 106 of the National Historic Preservation Act, federal undertakings must consider not only physical alterations but also visual, auditory, and contextual impacts

to historic properties and archaeological sites. Therefore, a more refined framework tailored to cultural resources is essential to adequately assess both adverse and beneficial effects, guide meaningful mitigation, and ensure compliance with federal preservation mandates. This approach enables more precise evaluations and protects cultural heritage in ways that environmental scoring systems alone cannot achieve.
Cultural Resources Impact Evaluation Framework

Resource Categories:

- Above-Ground: Historic structures, viewsheds, cultural landscapes
- Below-Ground: Archaeological sites (terrestrial and submerged)
- Project Phases Considered: Construction, Operation & Maintenance
- Impact Types: Adverse (Negative) Effects, Beneficial Effects

Evaluation Factors:

- Impact Magnitude (Intensity/Extent)
- Geographic Scope (Local/Regional)
- Temporal Scope (Short-/Long-Term)
- Regulatory Thresholds (e.g., NEPA, NRHP eligibility, Section 106 compliance
- Mitigation Potential (Avoidance, Minimization, Treatment, Enhancement)

Table 1. Adverse Effects Rating Table (With Mitigation Evaluation Built In)

Impact Rating	Score	Description	Example	Mitigation Category
High	-5	Permanent destruction of resource; exceeds regulatory thresholds; mitigation **insufficient** to reduce impact to an acceptable level.	Demolition of an NRHP-listed building without documentation or alternatives.	**No effective mitigation possible**; total loss of integrity/significance.
Mod–High	-4	Significant adverse effect; mitigation **necessary and substantial**, but cannot eliminate loss of integrity.	Cut through historic landscape with unavoidable impacts.	**Partial mitigation** (e.g., detailed documentation, interpretive signage, data recovery).
Moderate	-3	Impact is localized and within thresholds; mitigation **can fully address** resource loss or damage.	Archaeological site disturbed by utilities, but full data recovery is planned.	**Effective mitigation** (e.g., redesign, excavation, relocation, HABS/HAER documentation).
Low–Mod	-2	Minor adverse impact; mitigation **simple and sufficient** to avoid significance loss.	Short-term construction next to historic structure with vibration monitoring.	**Standard BMPs** or buffer zones.
Low	-1	Temporary, negligible effects; no mitigation required.	Minor access near site boundary.	**No mitigation necessary**.
No Impact	0	No effect on cultural resources.	Boring in fully disturbed, tested area.	Not applicable.

Table 2. Beneficial Effects Rating Table (With Enhancement Evaluation)

Benefit Rating	Score	Description	Example	Mitigation Enhancement Category
High	+5	Regionally significant enhancement of a cultural resource or site; measurable, long-term improvement; promotes public engagement.	Adaptive reuse of a historic building as public space with interpretation.	**Preservation + Public Benefit** (e.g., funding, easements, partnerships).
Mod–High	+4	Strong enhancement locally or regionally; mitigation or restoration improves condition or setting.	Viewshed restoration at a historic site through invasive species removal.	**Restoration + Setting Rehabilitation**.
Moderate	+3	Measurable benefit to one or more cultural resources; increased protection or documentation.	Phase III recovery with public education materials produced.	**Public interpretation, research access, stewardship agreements**.
Low–Mod	+2	Some improvement beyond existing condition; resource protected or documented more completely.	HABS documentation of vulnerable site.	**Archival mitigation + limited outreach**.
Low	+1	Minor benefit, such as improved access, visibility, or documentation.	Signage for nearby unmarked historic feature.	**Minimal enhancement**.
No Impact	0	No beneficial effect beyond current condition.	Routine maintenance in non-sensitive areas.	Not applicable.

Both rating methodologies analyses and qualitative scoring informed the effects assessments and the EQ account for Plan Selection and identifying the environmentally preferred alternative for each Actionable Element site. Scores for adverse impacts were rated for each resource on a scale of 0 to –5, with 0 being no impact to the resource, and –5 being significant impacts to the resource that would be considered not
Example explanation:

Table 3. Cultural Resources Impact Summary Table

Resource Qualitative Rating	Adverse Effects		Beneficial Effects		NO ACTION TOTAL SCORE	TSP TOTAL SCORE
	No Action	TSP	No Action	TSP		
Construction/Footprint						
Historic Structures	-1	-1	0	0	0	-1
Viewshed / Historic Setting	-1	0	0	1	-1	0
Terrestrial Archaeological Resources	-1	-1	0	0	-1	-1
Submerged Archaeological Resources	0	0	0	0	0	0
O&M Assumptions						
Historic Structures	0	0	0	1	0	1
Viewshed / Historic Setting	0	0	0	1	0	1
Terrestrial Archaeological Resources	0	0	0	0	0	0
Submerged Archaeological Resources	0	0	0	0	0	0
Mitigation (if applicable, otherwise 0)	0	0	0	0	0	0
Subtotal Resource Score with mitigation						
ACTION TOTAL SCORE (calculated, additive, with mitigation)					**-3**	**1**

11.3 EXISTING CONDITIONS

Cultural resources are vulnerable to the impacts of storm surges, flooding, and sea-level rise. These types of exposures can diminish the physical and historic integrity of archaeological sites, historic buildings, and cultural landscapes through physical damage or destruction. Integrity is essential for historic properties to retain their designations as National Historic Landmarks, State / National Register listed or eligible resources, and / or NPS parks or site units, examples of all of which are present throughout the study area.

Based on an examination of historic sites maps and NJHPO data, USACE has identified five (5) recorded historic properties in the Study Area, one of which, the Gethsemane Cemetery, is NRHP and SRHP listed. The Gethsemane Cemetery is a mid-nineteenth century African American burial ground located on Liberty Street just north of US Route 46 in the Borough of Little Ferry. In 1860, this 1-acre site was set aside for Hackensack's African American population. Burial and health records document that it was mainly a family cemetery for the local African American population, but it also served as a potter's field. Approximately 28 gravestones exist, and a ground-penetrating radar survey conducted in 1990 suggested the presence of 238 burials (Geismar 1993). The cemetery was NRHP and SRHP listed in 1994.

Four other historic resources have been previously inventoried within the Study Area, including the US Route 46 Bascule Bridge, which has been determined eligible for individual listing on the NRHP. The US Route 46 Bascule Bridge in the Borough of Little Ferry was designed in 1934 by John Waddell and Shortridge Hardesty, who were known for their innovative bridge designs. The span is one of only two double-leaf bascule spans constructed in the 1930s in Bergen County (KFS 1997).

The other three historic properties in the Study Area – the Outwater Cemetery, the Moonachie Streetscape, and 69 Bruno Street in the Borough of Moonachie – have yet to be evaluated for NRHP or SRHP eligibility. One recorded historic district, the Vanguard Associates Mobile Home Park, also known as the Rogers Trailer Park, has been identified in the Study Area. The district has not yet been evaluated for NRHP or SRHP eligibility. The district and the five historic properties are provided in Table 2.

The eighteenth-century Outwater Cemetery is located in the Borough of Carlstadt, on Washington Avenue. It was inventoried as part of the Washington Avenue widening project in the late 1980s and was found to be ineligible for the NRHP (NJDOT 1987). Attempts to relocate the cemetery in 2003 were unsuccessful, and researchers hypothesized that it was partially or completely destroyed during the widening of Washington Avenue (Kodlick 2003).

The Moonachie Streetscape is a 17-property historic residential streetscape along Moonachie Road that forms the gateway to the Borough of Moonachie at its border with Little Ferry. This historic streetscape was first identified in the 1980-1981 Bergen County Historic Sites Survey as part of an eight-block area bounded by Albert Street, Joseph Street, Moonachie Road, and the Little Ferry Border and later in the reduced two-block Moonachie Road/Ramella Avenue area identified in the 2005 update (Trevisan 2005; Niederer 1981). The streetscape area is comprised of modest, one-and-a-half and two-story, end gable, brick and frame structures constructed during the first quarter of the twentieth century. Their roof form, raised basements, consistent setbacks

and regular rhythm of one-story front porches lend a cohesive feeling to the northeastern-most end of Moonachie Road.

The dwelling at 69 Bruno Street was individually identified in the 2005 update of the Bergen County Historic Sites Survey (Trevisan 2005). The one-and-a-half story, end-gable, brick dwelling at 69 Bruno Street was constructed circa 1911 in the Washington Park neighborhood of the Borough of Moonachie. With its unpainted red brick walls and tan brick accents, it stands on a corner lot among largely circa 1980 split-level frame dwellings as a distinctive and easily recognizable remnant of an earlier era of development.

NJDEP (2018) identified two additional cultural resources in the Study Area that have not yet been formally recorded with the NJHPO. The first, recognized by the American Institute of Aeronautics and Astronautics, is the Bendix Aviation Factory Complex at Teterboro Airport as a national historic site in the aerospace industry (NJDCHA 2005). The second resource is Maple Grove Cemetery, originally called New York Cemetery of the Dutch Reform Church of New York, which is located along the northern portion of the Project Area. In 2003, over 4,000 remains were removed from a historic potter's field in Secaucus, New Jersey, and brought to Maple Grove Park Cemetery to be honored and remembered (Louis Berger Group 2005).

11.3.1 Aboveground Resources

World Heritage Sites. There are no United Nations Educational, Scientific and Cultural Organization (UNESCO) World Heritage Sites within the study area.

Traditional Cultural Properties. A Traditional Cultural Property (TCP) is "one that is eligible for inclusion in the National Register because of its association with cultural practices or beliefs of a living community that (a) are rooted in the community's history, and (b) are important in maintaining the continuing cultural identity of the community" (Parker and King 1998:1). Currently, there is no comprehensive list of such properties within the study area.

The Stockbridge Munsee Tribe recognizes Papscanee Island, located on the Hudson River just two miles south of Albany, outside of the study area, as a traditional cultural property of religious and cultural importance. The New York State Office of Parks, Recreation and Historic Preservation has, based on these criteria, determined the site eligible for inclusion in the National Register of Historic Places.

If other TCPs exist in the region, they may be linked to Native American Nations or ethnic groups from more recent waves of migration, including those from Europe, Asia, Africa, South America, Australia, and other parts of North America.

Ethnographic Resources. In NPS parlance, ethnographic resources are "sites, structures, objects, landscapes, and natural resources or features of traditional importance to a contemporary cultural group through associations three generations or more in length" (Rockman et al. 2016:19). Currently, these resources have not been quantified for the study area. If they are present, they may be connected to Native American Nations, as well as ethnic groups from more recently arrived populations from Europe, Asia, Africa, South America, Australia, and other regions of North America.

Cultural Landscapes. A cultural landscape is "a geographic area, including both cultural and natural resources and the wildlife or domestic animals therein, associated with a historic event, activity, or person, or exhibiting other cultural or aesthetic values" (NPS 2021). The National Park Service defines four types of cultural landscapes, which are not mutually exclusive: Historic Designed Landscapes; Historic Sites; Historic Vernacular Landscapes; and Ethnographic Landscapes. At present, cultural landscapes are not well-quantified for the study area.

Museum Collections. The AE Study Area does not contain any of the 145 museum collections associated with the rich and varied cultural history of New York and New Jersey, the United States, and other collections from around the world.

11.3.2 Archaeological and Submerged Resources

Submerged Cultural Resources. The submerged cultural resources portion of the Direct APE is defined as the depth and breadth of the geographic areas potentially affected by any bottom-disturbing activities. The marine/riverine Direct APE also includes maritime/riverine cultural resources landward of the shoreline (i.e., onshore) and resources offshore of the AEs and tributaries

Potential For Encountering Submerged Native American Sites. Preceramic-period sites in the Northeast are typically located on high ground along major river terraces, often near confluences, offering views of expansive land areas. During this time, river systems were larger, longer, and more dynamic, shaped by glacial meltwater that moved glacial outwash boulders, cobbles, and pebbles, materials that could serve as lithic resources. As sea levels rose, river mouths were submerged, creating bays, estuaries, and salt marshes that expanded over the retreating coastal plain. These environments would have been attractive to early human settlers for habitation or resource exploitation. Such areas, especially lee and back-bay settings, may also help preserve archaeological sites, as estuarine sedimentation can protect older or contemporaneous deposits from erosion caused by rising sea levels (Panamerican 2020:17).

Potential Native American Archaeological Sites. For Native American archaeological sites, areas of interest include the margins of streams, lakes, ponds, and estuarine environments. Channel facies are typically identified as concave-shaped reflectors, while potential reflectors might include deltaic features (wedge-shaped deposits), characterized by alternating layers with varying reflective properties and indicative slope (Panamerican Consultants 2020:18). The potential for Native American Archaeological sites is considered low.

Geomorphology and Submerged Prehistoric Resources. The potential for submerged prehistoric resources within the study area is closely tied to the geomorphology of river and harbor bottoms, shaped by post-Pleistocene sea-level changes and subsequent marine processes. The configuration of the seafloor reflects various processes, including multiple glacial advances, isostatic rebound (uplift), marine incursion, and modern seafloor processes. Data gathered from cores, seismic remote sensing, and sediment studies help reconstruct the geological history of the region, providing insights into the areas most likely to contain preserved prehistoric sites (Panamerican 2020:3)

Archaeological Site and Shipwreck Inventory. Studies of shipwrecks in the New York/New Jersey Harbor area have revealed that numerous vessels have been lost in the region since the early

seventeenth century. The waters surrounding New York have served as a major route for ships spanning every era in U.S. history, making it home to a wide array of shipwreck sites, many of which remain undocumented and unidentified.

Estimates of the number of shipwrecks in the region vary, ranging from hundreds to thousands. The coastlines of Long Island and New Jersey form a natural "funnel" that directs maritime traffic into New York Harbor, leading to a higher concentration of shipwrecks than anywhere else along the East Coast of the United States, possibly with the exception of Cape Hatteras on the Carolina Outer Banks [Sheard 1998:8].

Numerous accounts have been written about the hazards faced by ships navigating the approach to New York New Jersey Harbor. These vessels were often lost due to adverse weather conditions, lack of navigational aids, marine accidents, or grounding near the surf zone. In many cases, ships could not be salvaged, resulting in the degradation of their hulls. According to Rattray (1973:50), the southern shore of Long Island is notorious for shifting sandbars that extend along the entire length of the island. These dangerous features, along with other factors, made the approach to New York New Jersey Harbor, and the harbor itself, a prime location for shipwrecks and maritime disasters (Panamerican Consultants 2020:35). Much like other submerged cultural resources, the potential for shipwrecks in this portion of the Meadowlands is considered low.

National Register Listed and Eligible Resources. According to the NJHPO's LUCY data, an additional 31 historic resources have been recorded within a 1-mile radius of the Study Area, including one archaeological site, four historic districts, and 27 individual properties (Table 1). Table 1 lists each resource as currently recorded in the NJHPO database. Figure 11 depicts the location of cultural resources within the Study Area. Due to the sensitive nature of site locational data, the specific locations of archaeological sites are not reproduced here.

National Historic Landmarks (NHLs). National Historic Landmarks are historic properties that illustrate the heritage of the United States. There are currently more than 2,600 NHLs designated which represents an outstanding aspect of American history and culture (NPS 2022a). There are many types of NHLs which include historic buildings, sites, structures, objects, and districts. There are no identified NHLs within the study area.

New Jersey Women's Heritage Trail. The Study Area does not include sites in the New Jersey Women's Heritage Trail. The Trail uses historic places to communicate the collective story of women, both famous and private, who contributed to the agricultural, industrial, labor, and domestic history of the state (NJ SHPO 2005; 2020b). One example in the Study Area is Women's Federation Memorial in Palisades Interstate Park, Bergen County. The New Jersey Federation of Women's Clubs played a key role in saving the Palisades. The Trail also recognizes women associated with the history of National Historic Landmarks and national Park sites such as at Sandy Hook, Gateway, NRA and Ellis Island.

11.4 ENVIRONMENTAL CONSEQUENCES EAST RISER, NEW JERSEY STUDY AREA

The Direct APE for this alternative consists of the physical footprint of individual measures and a 300 meters (328 feet) buffer around the AE. The NJDCAEIS Area of Potential Effect (APE) also consisted 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 project will potentially adversely impact those properties. The AE, formerly known as the Alternative 3 Build Plan, currently consists of channel modifications, culvert replacements, and a railroad bridge replacement. The AE was designed to address coastal storm flooding from tidal events and stormwater flooding from fluvial events by increasing conveyance and channel capacity. Based on the review of cultural resource data provided by the NJHPO, one historic property, the rail bridge over the East Riser Ditch, is located in the APE for the AE. One archaeological site, the Outwater Cemetery, is within the 1-mile radius of the APE for the AE. One historic district, the Vanguard Associates Mobile Home Park, is within the 300-meter radius of the APE for the AE.

The archaeological site (outside the APE)', and historic district have yet to be evaluated for NRHP eligibility and therefore may require additional survey and investigation. 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.

Most of the direct APE has been impacted by prior earth-moving activities associated with the construction of buildings, roads, and other development unrelated to the proposed project. No known archaeological resources are located within the direct APE. However, areas with a high potential to contain prehistoric and historic period archaeological resources (i.e., high archaeological sensitivity areas) were identified for portions of the Study Area based on background research, historic maps, aerial photographs, and a site visit. The five areas of high archaeological sensitivity include the Fluvial Park, K-Town Park, DePeyster Creek Park, the Bergen County Utilities Authority (BCUA), and Berry's Creek Archaeological Sensitivity Areas. A summary of each archaeological sensitivity area is provided in Appendix A.

This Section provides the results of a preliminary review of cultural resources data available in the NJ HPO databases, as well as the NOAA ENC database Preservation Commission's internet accessible geographic information system, for proposed measures for the AE. To protect archaeological sites, in compliance with Federal and State laws, their locations and names are not provided in this EA report. The features for the AE involve the construction of structures that have a potential to affect directly historic properties and cultural resources in both terrestrial and submerged environments. The proposed alternative is in an area that would be considered to have a moderate probability for terrestrial and submerged cultural resources to occur. At the most general level, Native American archaeological sites are most likely to be located near water; by definition, submerged resources are in water and early non-Native American settlements clustered near water, particularly in the time before plumbing and sanitary sewer systems. For further discussion and analysis of project features please see the East Riser Appendix A-3.

Table 4. Previously Recorded Historic Properties and Districts in the Study Area

Resource Type	Name	NRHP/SRHP Status
Historic District	Vanguard Associates Mobile Home Park	Unevaluated
Historic Property	Gethsemane Cemetery	Listed
Historic Property	2962 US Route 46 Bascule Bridge	Eligible
Historic Property	Outwater Cemetery	Unevaluated
Historic Property	Moonachie Streetscape	Unevaluated
Historic Property	69 Bruno Street	Unevaluated

According to NJSM and NJHPO site files, no archaeological sites have been identified in the Study Area. One archaeological site, the Outwater Cemetery site, has been identified within the 1-mile radius of the Study Area. The site was first identified in 1987, and a ground penetrating radar (GPR) survey in 2015 determined that the site has a low archaeological sensitivity for intact burials, possibly due to previous disturbance. The site has not yet been evaluated for NRHP or SRHP eligibility.

Native American artifacts were found north of the Study Area in the 1960s near I-80, which do not appear to have been registered as an archaeological site with NJSM (Ensign 1971). A dugout canoe was found in marshland along the Hackensack River (Cross 1941). Archaeological deposits associated within pearl shell button manufacturing activities have been observed in the Borough of Little Ferry (Erik Kiviat, personal communication, September 19, 2016). Mr. Kiviat indicated that button debris was observed in 2006 within the Study Area. The pearl button industry in the Borough of Little Ferry began around 1890 (Aggarwal 2012, Lurie and Mappen 2004).

An additional 31 historic resources have been recorded within a 1-mile radius of the Study Area, including one archaeological site, four historic districts, and 27 individual properties (Table 2). Table 2 lists each resource as currently recorded in the NJHPO database. Figure 11 depicts the location of cultural resources within the Study Area. Due to the sensitive nature of site locational data, the specific locations of archaeological sites are not reproduced here.

Table 2: Archaeological Sites, Historic Districts, and Properties within 1-Mile of the Study Area

Resource Type	Name	NRHP/SRHP Status
Archaeological Site	The Outwater Cemetery Site	Unevaluated
Historic District	Bergen County Line Historic District	Eligible
Historic District	Erie Railroad Main Line Historic District	Eligible
Historic District	Little Ferry Shops - Railroad Turntable Historic District	Eligible
Historic District	Rutherford Downtown Historic District	Eligible
Historic Property	Bergen County Court House	Listed
Historic Property	Brinkerhoff House	Listed
Historic Property	Casper Westervelt House	Listed
Historic Property	Doremus House	Listed
Historic Property	Dutch Reformed Church of the English Neighborhood	Listed
Historic Property	Dutch Reformed Church and Green in Hackensack	Listed
Historic Property	Fridolin Arnault House (also Arnault-Bianchi House)	Listed
Historic Property	John Hopper House	Listed
Historic Property	Kip Homestead	Listed
Historic Property	U.S.S. Ling (SS2977)	Listed
Historic Property	Paulison-Christie House	Listed
Historic Property	Richard Outwater House	Listed
Historic Property	Rutherford Railroad Station	Listed
Historic Property	William Carlos Williams House	Listed
Historic Property	Baker-Post House	Eligible

Historic Property	Court Street Bridge (Str #020004A)	Eligible
Historic Property	Franklin School	Eligible
Historic Property	James A. Brinkerhoff House	Eligible
Historic Property	New York, Susquehanna and Western Railroad Bridge	Eligible
Historic Property	NYS & W Railroad Tunnel and Cut	Eligible
Historic Property	Overpeck Creek Drawbridge	Eligible
Historic Property	Apartment House	Unevaluated
Historic Property	Bogota Boro Hall	Unevaluated
Historic Property	East Rutherford Municipal Building	Unevaluated

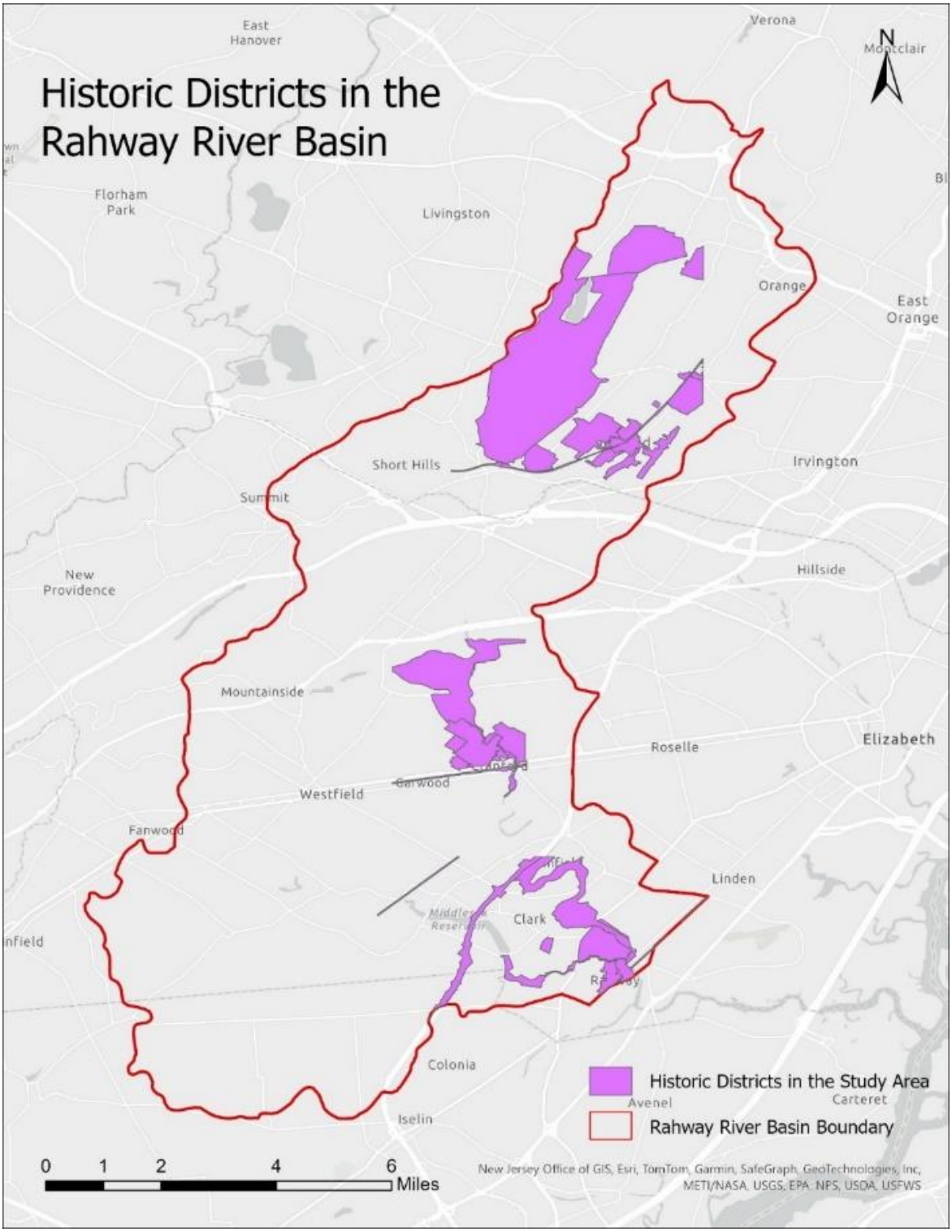

Figure 12. Cultural Resources in the East Riser Ditch Study Area

11.4.1 Cultural Resource Surveys in the 1000-meter Direct APE

Architectural Surveys

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 several aboveground historic properties recorded within one-mile of 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 one recorded historic district, the Vanguard Associates Mobile Home Park, within the Study Area. Further information on historic properties and districts in the Study Area are provided in Section 5. Mapped locations of historic resources are depicted in Appendix B.

A historic architectural survey was completed in 2017 to determine the presence or absence of historic properties within the APE that are listed in or eligible for listing in the SRHP and NRHP (Everett 2018). In addition, intensive surveys were conducted and all newly identified historic architectural resources over 45 years of age were evaluated for eligibility under the SRHP and NRHP criteria. One historic resource within the ERD direct APE over 45 years of age was identified: the ca. 1960 Rail Bridge over ERD owned by Conrail (Everett 2018). This structure is a deck girder bridge that carries two sets of rail tracks over the man-made ERD in Carlstadt.

According to the architectural survey (Everett 2018), the Rail Bridge over the ERD ('the Rail Bridge'), located off Amor Avenue in Carlstadt Borough, was constructed during the period of industrialization in the 1950s and 1960s. The Rail Bridge does not meet the NRHP criteria for significance and does not appear to exhibit any distinguishing aspects of bridge design or significant engineering (Everett 2018). As a result, the Rail Bridge was deemed ineligible for listing in the SRHP and NRHP, and the NJHPO concurred on June 28, 2018 (Appendix A). No other architectural resources were identified within the direct or indirect APE for the TSP.

Archaeological Surveys

An examination of NJHPO data identified 23 cultural resource management related documents on file that contain some level of archaeological or historic aboveground research undertaken within the Study Area. Most of the studies were done in support of transportation-related projects. The density of sites and aboveground resources cannot be determined because survey acreage was not consistently reported, but some of these projects covered large areas that extended well beyond the current Study Area. The studies included sensitivity analyses (Phase IA), identification-level archaeological surveys (Phase I), and evaluation-level archaeological investigations (Phase II). In some cases, Phase IA and Phase I investigations included the documentation and evaluation of historic aboveground resources. Several large cultural resource studies conducted in the Project Area suggested sensitivity for both prehistoric and historic period archaeological resources. However, subsequent testing uncovered no evidence of prehistoric or historic activities and no further work was recommended (Richard Grubb & Associates, Inc. 1989, Matthews 1993, Boylan 1978).

In the late 1970s, a Phase I archaeological survey was conducted along the proposed (but never built) extension of Redneck Road, which was to extend between Moonachie Avenue and U.S. Route 46. The proposed route diverged from the current alignment of Redneck Road at Union Street and followed the eastern property boundary of the Study Area to Fred Wehran Drive, then along Fred Wehran Drive northward to U.S. Route 46. The study included excavation of 18 1-meter-square units, several of which were distributed along the western edge of the current Redneck Road. None of these test pits fall within the current APE, although Pit 6 was situated less than 100 feet north of a proposed bioswale location. The Pit 6 soil profile is characterized as "black soil" and excavation was terminated at the water table 30 centimeters below the ground surface. In general, the typical profile of the units along Moonachie Road consisted of "black soil" to a depth of between 22 and 60 centimeters, at which point standing water prevented further excavation. In the two units where there were other soils beneath the "black soil," one had "yellow sand" and one had "brown clay," possibly suggesting that the peat deposits in this area are not very deep. No cultural materials were recovered from any of the units (Boylan 1978).

A Phase IA cultural resource survey for an expansion of the Little Ferry Water Pollution Control Facility was conducted near the mouth of DePeyster Creek (Gimigliano et al. 1979). The survey concluded that the proposed expansion of the waste treatment facility would most likely not yield any cultural remains based on available evidence. The property was assessed as a perpetually low-lying, marshy area, and visual inspection of the ground surface identified Hackensack River dredge spoils and New Jersey Turnpike construction material. It was recommended, however, that an archaeological monitor be present when soil borings were conducted to examine soil profiles to a depth where glacial clays were encountered. The purpose of the monitoring would be to identify anomalous features—such as sand spits—that prehistoric occupants of the region may have exploited, if such features existed, or to verify the conclusion that the area has always been submerged (Gimigliano et al. 1979). It is not known if these soil borings were conducted. Additional work adjacent near the Hackensack River included a Phase IA/IB archaeological survey for the Overpeck Valley Relief Sewer Project (Scharfenberger and Vincent 2006). No significant cultural material was found within the 121 excavated shovel test pits, which revealed the widespread presence of historic disturbance and fill episodes.

In the 1980s, a Phase IA archaeological survey for a sewage treatment plant on the south side of Moonachie Avenue included historical research and field reconnaissance; based on this information, archaeologists concluded that the area was sensitive for both prehistoric and historic-period archaeological resources (Boylan 1982). Subsequent Phase IB testing uncovered no evidence of pre-modern cultural activities, and no further work was recommended (Richard Grubb & Associates, Inc. 1989). The eighteenth-century Outwater Cemetery, located on Washington Avenue in the borough of Carlstadt, was inventoried as part of the Washington Avenue widening project and was found to be ineligible for the National Register of Historic Places (NJDOT 1987). Proposals to relocate the cemetery in 2003 were unsuccessful, and researchers hypothesized that it was partially or completely destroyed during the widening of Washington Avenue (Kodlick 2003). The APE is located approximately 2,000 feet south of the Outwater Cemetery. The historic Gethsemane Cemetery is located immediately northwest of the APE and has been the subject of several professional surveys, including ground-penetrating radar and pedestrian surveys in conjunction with intensive-level documentary research (Geismar 1992, 1993).

Smaller cultural resource studies conducted across the Meadowlands have characterized the Study Area as having low sensitivity for the possible presence of archaeological resources and yielded no cultural materials, while identifying large areas of subsurface disturbance (Eldridge

2001, Lenik and Gibbs 1997, URS 2012, URS 2013, Veit and Walezak 1997). In 1997, John Milner Associates, Inc. conducted a Phase I survey in the Borough of Little Ferry in anticipation of proposed improvements to the Route 46 Little Ferry Circle and adjacent roadways—encompassing some of the proposed bioswale and trenchbox locations in the APE. Veit and Walezak (1997) excavated four shovel test pits within the Little Ferry Circle and identified deep (+50 centimeter) fill packages containing modern trash. However, past studies have identified the possible presence of three historic tide gates associated with the drainage and dike systems constructed to drain the Meadowlands within the Study Area. A Phase I archaeological survey, conducted by Richard Grubb and Associates in 2011 for a wetland mitigation bank in the Borough of Carlstadt, encountered the presence of wooden and earthwork features associated with the historic drainage and dike systems (Wieczorek and Tvaryanas 2011). These features are most likely associated with early-twentieth century-efforts to control mosquito populations in New Jersey. Due to evidence of recent modification and repair, no further work was recommended.

The U.S. Army Corps of Engineers studied the former Meadowlands in the vicinity of Moonachie Road and to the south of the current Study Area for a flood-control project in the Hackensack River Basin, specifically in the Berry's Creek area (Matthews 1993). The study noted that the area was sensitive for both prehistoric and contact-period archaeological resources and delineated areas that should be tested based on a previous determination that formerly dry land along the streambanks in the Hackensack Meadowlands are potentially archaeological sensitive (Grossman 1992). One of these areas is adjacent to the proposed Avanti Park APE in the current Study. While shovel-testing results were not available for review, no archaeological site is defined in the vicinity. Subsequent Phase IA investigation of a proposed Valley National Bank location at 119 Moonachie Road (Burrow 2003), located north of the Avanti Park APE and within 200 feet of the proposed St. Joseph Street APE, determined a low potential for significant archaeological resources in the area.

The 2005 Phase IA evaluation of proposed improvements to portions of the Paterson Plank Road by RBA Group (Tucher and Porter 2005) assessed the roadway near Berry Creek south of the APE. Background research and a pedestrian reconnaissance of the project area determined that despite an elevated potential for Native American and historic archaeological resources, additional archaeological investigation was unnecessary based upon the likely impacts and disturbances incurred to the project area during roadway construction and improvements.

Hunter Research, Inc. (2006) reviewed paleoenvironmental and cultural resource studies relevant to archaeological sensitivity in the Meadowlands District. They found that while there is little disagreement about the high subsistence value of the marshland environment for prehistoric populations in terms of plant and animal resources, the way in which those resources were exploited is much less certain. It remains unknown whether groups used the Meadowlands to procure resources for base camps in the uplands or whether the camps were in the Meadowlands themselves. As Hunter Research, Inc. (2006) notes, the Meadowlands are not a static environment and small changes in climate and sea level would have affected what areas were habitable at different points in time. In terms of historic-period sensitivity, Hunter Research, Inc. (2006) cites palynological studies that indicate agricultural use of the Meadowlands as early as the second quarter of the seventeenth century. The major economic emphasis in the Meadowlands toward the end of the seventeenth century was the exploitation of salt hay, and Meadowland drainage projects aimed at improving their economic value began in the early nineteenth century. For the most part, settlement was limited to dry ground; however, Hunter

Research, Inc. (2006) cautions that changes in water levels may indicate current wet areas may not have been the same throughout the historic period.

A Phase IA archaeological survey was completed in 2017 and 2018 for the Rebuild by Design (RBD) Meadowlands Flood Protection Project, located in the Boroughs of Little Ferry, Moonachie, Carlstadt, and the Township of South Hackensack, Bergen County, New Jersey, to assess the potential for pre-contact period Native American or historic-period archaeological sites within the APE. The survey included background research, visual inspections, consultation with interested parties and federally recognized tribes, and an archaeological sensitivity assessment. Research included a review of known archaeological sites within a 1-mile radius of the APE, prior cultural resource survey reports within or in proximity to the APE, review of historic maps and aerial photographs, and review of environmental background information to develop cultural and environmental contexts for the assessment. No previously recorded archaeological sites were identified within or adjacent to the APE and a limited amount of prior archaeological testing has been conducted near the APE.

Fieldwork was conducted in October of 2017 and included a visual inspection, observations of existing conditions, and photographs of the APE. The portions of the APE in public roads, parks, and other accessible areas were visited, while other portions were not accessible due to fences, gates, and other private property restrictions. Historic maps and aerial photographs, combined with the field visit, indicate that most of the APE has been impacted during the construction of roadways or other earthmoving activities. Many proposed project elements are located in paved roadways and parking lots. An archaeological sensitivity assessment was developed for prehistoric and historic-period resources based on the background research, regional archaeological data, and review of historic maps. Historic aerial photographs and other publicly available satellite imagery provided information about the extent of prior ground disturbance, grading and historic development, and past land-use practices throughout the APE.

The results of the Phase IA archaeological survey identified the APEs for both Caesar Place Park and Avanti Park as having a high sensitivity for Native American archaeological resources. These two areas have been subjected to limited prior earthmoving activities. The remainder of the APE has a low sensitivity for archaeological resources. The field visit confirmed the extensive grading and earthmoving activities throughout most of the APE. The investigation determined the APE for the ERD pump station to be disturbed due to channelization of the drainage and construction of an adjacent warehouse complex during the second half of the twentieth century (Walker et al. 2018). The only artifacts observed during the field visit were brick fragments from late-nineteenth- to early-twentieth-century brickworks in Little Ferry. The bricks were located in the APE for the proposed improvements to Willow Lake Park; however, this portion of the APE was a former clay pit that was infilled in the 1970s. The bricks were present in the fill and this location is not archaeologically sensitive. No other artifacts, features, or archaeological resources were observed during the field visit. It is recommended that a Phase IB archaeological survey be completed in the two areas of high sensitivity for the proposed Caesar Place Park and Avanti Park. No further archaeological survey is recommended in the remainder of the APE.

According to NJSM and NJHPO site files, no archaeological sites have been identified in the Study Area. One archaeological site, the Outwater Cemetery site, has been identified within the 1-mile radius of the Study Area. Native American artifacts were found over 1.5 miles northwest of the APE in the 1960s near Interstate 80, and do not appear to have been registered as an archaeological site with the New Jersey State Museum (Ensign 1971). Archaeological sites have

been found in the City of Hackensack north of the APE and farther up the Hackensack River (Lenik 1989). A dugout canoe was found in marshland along the Hackensack River (Cross 1941). Archaeological deposits associated with pearl shell button manufacturing activities have been observed in the Borough of Little Ferry (Erik Kiviat, personal communication, September 19, 2016). Mr. Kiviat indicated that button debris was observed in 2006 in the vicinity of the APE. The pearl button industry in Little Ferry began around 1890 (Lurie and Mappen 2004). Maple Grove Cemetery, originally called New York Cemetery of the Dutch Reform Church of New York, is located in the City of Hackensack. The cemetery is located approximately 800 feet west of the APE. In 2003, over 4,000 remains were removed from a historic potter's field in Secaucus, New Jersey, and brought to Maple Grove Park Cemetery to be honored and remembered (Louis Berger Group 2005).

In summary, several previous archaeological surveys have been conducted near and within the APE. However, only a limited number of archaeological resources are known in the general region. Given the extent of twentieth-century development and background research, the amount of the APE with a high sensitivity for prehistoric and historic archaeological resources is anticipated to be limited.

11.4.1.1 No Action

Adverse Effects

The No Action or No-Build Alternative was assessed in relation to the project's purpose and need. Under this scenario, no measures would be implemented to address future flood risks, which are anticipated to worsen due to relative sea level rise. As a result, this alternative would leave existing aesthetic, visual, historical, and cultural resources vulnerable to damage. Cultural resources within the study area face the risk of deterioration or destruction from coastal flooding and sea-level rise.

Cultural resources throughout the Meadowlands are increasingly threatened by environmental changes. The impact of recent extreme weather events underscores this vulnerability. For instance, Hurricane Sandy in 2012 significantly affected the New York–New Jersey Harbor region and caused widespread damage across 26 states. Overall, the greatest impacts to historic properties would be expected to result from coastal storm surges and fluvial flooding from the Hackensack River, Berry's Creek, and associated ditches 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 coastal storm surge, fluvial flooding, and RSLC could also significantly impact archaeological resources overtime through erosion or other flood-related disturbances.

Numerous early Euro-American settlements in New Jersey were historically established along waterfronts, both coastal and inland. Similarly, Native American archaeological sites in the Meadowlands are commonly located near low-elevation water sources—coastlines, estuaries, and rivers—placing them at heightened risk. Historic buildings, landmarks, and archaeological

sites across New Jersey face growing threats from flooding, tidal erosion, and intensified storm activity as climate-related impacts escalate.

Beneficial Effects

No beneficial effects of no action are anticipated, as the area would continue to be vulnerable to coastal flood risk and damages. Therefore, this effects category is representative as no impact, with a corresponding Impact Score of 0.

The no action is anticipated to continue to have cultural resources vulnerable to coastal flood risk and damages. Coastal storm damages would contribute to continued loss of habitat and food species based on repeated flooding and wind from storms and RSCL. Coastal erosion may contribute to alterations not consistent with pre-existing conditions pre-storm. Although the no action would continue on the existing condition trajectory, frequency of storms may increase over time, as may RSLC.

11.4.1.2 East Riser AE

This AE includes approximately 4,150 feet of the East Riser Ditch (ERD) channel, commencing at Moonachie Avenue and extending downstream to the tide gate located at the ERD's confluence with the tidally influenced Berry's Creek. The area impacted by flooding from the ERD is primarily commercial and industrial. At the end of the channel, on the southern side of Moonachie Avenue, there are two residential mobile home parks—one on each side of the channel. The channel improvements will begin upstream at the south face of Moonachie Avenue Bridge over the East Riser Ditch and traverse downstream in a southerly direction approximately 4,150-ft ending at the new East Riser Ditch Pump Station located in Carlstadt just north of Starke Road.

Adverse Effects

The construction activities associated with the East Riser Alternative—including channel modifications, culvert replacements, and the replacement of a railroad bridge, are expected to result in low adverse effects on cultural resources. The Area of Potential Effect (APE) is primarily confined to existing roadways, paved surfaces, and previously disturbed corridors such as road shoulders and graded embankments, which significantly limits the likelihood of encountering intact archaeological deposits. Based on background research, historic maps, and aerial photographs, both prehistoric and historic archaeological sensitivity within the APE is low. The most sensitive areas are those near map-documented buildings, which may warrant monitoring during construction. Additionally, one historic district (the Vanguard Associates Mobile Home Park) is located within 300 meters of the APE, but is not directly affected. Therefore, while potential impacts are limited, minor adverse effects could result from construction near previously undocumented or poorly mapped cultural features.

Beneficial Effects

Despite its low overall sensitivity, the East Riser Alternative presents opportunities for beneficial effects on cultural resource management. The project footprint's location in previously disturbed areas provides a high potential for avoiding significant archaeological resources through informed design and targeted monitoring. If implemented, cultural resource protection measures (such as archaeological monitoring near map-documented buildings or pre-construction survey in less-disturbed sections) would support compliance with Section 106 of the National Historic

Preservation Act (NHPA), enhancing preservation planning without major changes to the project. These activities contribute to long-term cultural resource stewardship and help document areas with little prior survey coverage, and work occurs within already disturbed corridors with minimal changes to the surrounding setting and character. Additionally, no long-term or operational effects on cultural resources are anticipated following construction, ensuring continued preservation of nearby historic properties such as the Vanguard Associates Mobile Home Park.

11.5 Cultural Resources Within Visual Impact Area (Indirect Effects)

The measures included in the study will enhance existing viewscapes, depending on location and scale. Construction of nature based measures may positively affect scenic byways, improve existing residential views, and/or increase access to historic coastal sites (USACE 2019). Aesthetic valuation, a judgement of value based on appearance of an object and emotional responses, of the public is ongoing and will be updated as stakeholder input is aggregated, but was not used to determine the preliminary impact rating.

Aerial photographs, LiDAR and field observations were analyzed for each alternative of visual effect, that will later be considered in determining the build alternative. This includes project visibility and viewsheds from neighbors and travelers as well the influence of topography, vegetation, and structures. An inventory of existing landscape character, viewers and visual quality is the baseline for this documentation. Characterization of visual quality of landscape compositions based on intrinsic characteristics of natural, and existing roadway features; stakeholder values, public interest, real estate and scenic designations may be altered by the implementation of the proposed structural measures but will greatly manage the impact from coastal storms. Generally, implementing the alternatives could provide direct benefits by reducing the severity of damage to coastal sites and residences.

In support of the aesthetic viewshed analysis, USACE undertook a preliminary identification of known cultural resources that could be visually affected by the project in accordance with the New Jersey Historic Preservation Office's (2004) Guidelines for the Preparation of Cultural Resource Management Archaeological Reports; New York Archeological Council's (NYAC) Standards for Cultural Resources Investigations and the Curation of Archeological Collections in New York State; New York State Office of Parks, Recreation, and Historic Preservation's (2005) State, Historic Preservation Office Phase I Archaeological Report Format Requirements; and the Secretary of the Interior's Standards and Guidelines for Archaeological Documentation (48FR4473437), and the USACE NYNJHATS OSE Report (2022). Visual analysis, as a component of the NEPA and Section 106 analyses, includes a broad look at the potential impacts to historic properties. By definition, a visual effect occurs whenever a proposed undertaking will be visible from an historic property. The mere existence of a visual effect does not automatically imply that the effect is adverse.

Background research for the project included a review of existing cultural resource reports, management plans, archaeological site files, historic maps, and nominations to the National Register of Historic Places (NRHP). The analysis takes into consideration the resource's geographical distance and the effect of topography on whether the Alternative is visible from historic resources. A visibility analysis that takes the built environment and vegetation into account are beyond the scope of the Study. Additional discussion and evaluation of the visual impacts from each Alternative is available in the following Sections.

Measures proposed for the AE will not involve the construction of structures that have a potential to indirectly affect historic properties, there are no historic properties impacted by the Action Alternative, and will not alter the visible environment (i.e., setting) of those resources. For this study, the visual impact study area (Indirect APE) includes those places within one mile (1.6 km) of proposed measures for the alternative that are in the potential viewshed (based on topography). This Visual Impact Area, or Zone of Visual Influence (ZVI), primarily encompasses parts of the New Jersey Hackensack Meadowlands District.

Additional visual assessment was not required for the Action Alternative because the proposed undertaking, consisting of channel modifications, culvert replacements, and a railroad bridge replacement, does not introduce visual changes that would result in an adverse effect under Section 106 criteria. An adverse visual effect occurs only when a new element introduced to the landscape diminishes those aspects of a property's significance and integrity, such as its historic setting, which contribute to its eligibility for listing in the State or National Registers of Historic Places (S/NRHPs). These effects can be aesthetic, where visual character is negatively altered, or obstructive, where important views are blocked or eliminated.

The ERD improvements are located within a highly developed and predominantly industrial and commercial landscape, where visual integrity is already substantially altered by existing infrastructure and land use. The nature of the proposed work, channel improvements and infrastructure replacements—is visually consistent with the utilitarian character of the surrounding environment. These interventions do not introduce elements that are incompatible in scale, design, or material with the setting, nor do they obstruct any known scenic views or diminish the appreciation or understanding of eligible historic properties.

Given the limited visual sensitivity of the project area and the compatibility of the improvements with the existing setting, the undertaking does not meet the threshold for adverse visual effects. Therefore, no additional visual impact analysis was warranted.

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US Army Corps
of Engineers®
New York District

NEW YORK-NEW JERSEY HARBOR AND TRIBUTARIES

COASTAL STORM RISK MANAGEMENT PROJECT

AE Programmatic Agreement

July 2025

PROGRAMMATIC AGREEMENT
AMONG
THE U.S. ARMY CORPS OF ENGINEERS, NEW YORK DISTRICT,
THE NEW YORK STATE HISTORIC PRESERVATION OFFICE,
THE NEW JERSEY STATE HISTORIC PRESERVATION OFFICE AND
THE NATIONAL PARK SERVICE

REGARDING THE NEW YORK – NEW JERSEY HARBOR AND TRIBUTARIES
COASTAL STORM RISK MANAGEMENT PROJECT

ACTIONABLE ELEMENTS
EAST RISER, HARLEM RIVER, and OAKWOOD BEACH

WHEREAS, the US Army Corps of Engineers, New York District (District) is proposing to undertake early, Actionable Elements which are near-term recommendations for potential construction authorization, associated with comprehensive measures to manage coastal storm risk and minimize impact throughout the New York Metropolitan Area, including the most densely populated city in the United States, and the six most populated cities in New Jersey. The shorelines of some of the New York New Jersey Harbor and Tributaries Coastal Storm Risk (NYNJHAT) study area are characterized by low elevation areas, developed with residential and commercial infrastructure and are subject to tidal flooding during storms. The NYNJHAT Actionable Elements consist of three distinct areas: East Riser, Meadowlands, NJ, Harlem River, Manhattan, NY and Oakwood Beach, Staten Island, NY (Project); and

WHEREAS, the comprehensive NYNJHAT study effort was authorized by the River and Harbor Act of 14 July 1960, and subsequently modified in accordance with Section 31 of the Water Resources Development Act of 1974 and Sections 103, 502 and 934 of the Water Resources Development Act of 1986 (P.L. 99-662), and Public Law 113-2; and

WHEREAS, in January 2015, USACE completed the North Atlantic Coast Comprehensive Study (NACCS), which identified high-risk areas on the Atlantic Coast for warranting further investigation of flood risk management solutions, and the NYNJHAT focus area was one of the focus areas identified to investigate coastal flood risk within the New York-New Jersey Harbor region; and

WHEREAS, the National Environmental Policy Act (NEPA) of 1969 requires federal agencies, including the District, to consider the potential environmental impacts of their proposed actions and any reasonable alternatives before undertaking a major federal action, as defined by 40 CFR 1508.18, therefore the District initially drafted an integrated Feasibility Report and Environmental Impact Statement (FR/EIS) which will be conducted in two stages or tiers; Tiering, which is defined in 40 CFR 1508.28, is a means of making the environmental review process more efficient by allowing parties to “eliminate repetitive discussions of the same issues and to focus on the actual issues suitable for decision at each level of environmental review” (40 CFR 1502.20) with Tier 1 as a broad-level review, and Tier 2 consisting of subsequent specific detailed reviews; and

WHEREAS**,** the draft FR/EIS presented the formal Tentatively Selected Plan, which consisted of: integrated shoreline based measures (SBMs) along with the Arthur Kill, Kill Van Kull, Jamaica

Bay, Newtown Creek, Gowanus Canal, and Flushing Creek storm surge barriers. The required SBMs include managing risk reduction for the New Jersey Upper Bay and Hudson River shoreline from Liberty State Park to Hoboken, New York City West Side shoreline from Brooklyn Bridge to Pier 78, East Harlem shoreline from Carl Schurz Park to Washington Heights, the Red Hook shoreline and the Long Island City-Astoria shoreline from Astoria Park to Ed Koch Queensboro Bridge. To mitigate the residual flood risk, residual risk features (RRFs) are proposed along the shorelines of the Upper Bay, the Arthur Kill region, Jamaica Bay, and the Hackensack and Passaic Rivers. Induced flooding is expected to occur in portions of the East River and Harlem River and on the flood side of the Jamaica Bay storm surge as a result of the presence of the above stated storm surge barriers, thus, induced flooding features (IFFs) are suggested to be placed in these regions. A schematic concept for the TSP and the referenced reaches is shown in Appendix A.

WHEREAS, following development of the TSP Milestone and release of the draft FR/EIS, the District was directed develop a **Draft Interim Response Actionable Elements Integrated Feasibility Report and Environmental Assessment** focusing on investigating coastal storm risk management measures in the study area consistent with the study authority, which may be put forward to Congress for consideration in a Water Resources Development Act (WRDA). Such opportunities include the investigation of Actionable Elements, as well as a framework for a comprehensive regional plan (Comprehensive Plan Framework), which will highlight the types of measures that could be funded to meet the NYNJHAT study's planning objectives.

WHEREAS, the Actionable Elements, heretofore referred to as the Project focus on addressing coastal storm risk through a combination of measures in three distinct areas; East Riser, Meadowlands, NJ (channel, culvert, and bridge modifications), Harlem River, Manhattan, NY (floodwall or seawall) and Oakwood Beach, Staten Island, NY (nature-based solutions); and

WHEREAS**,** the District has determined that the Project constitutes an undertaking, as defined in 36 C.F.R. § 800.16(y), and therefore, is subject to Section 106 of the National Historic Preservation Act of 1966 (NHPA), 54 U.S.C. § 306108; and

WHEREAS**,** the District is the Lead Federal Agency for compliance with Section 106 of the NHPA for this Project pursuant to 36 C.F.R. § 800.2(a)(2); and

WHEREAS, Cooperating Agencies include the U.S. Environmental Protection Agency, U.S. Fish and Wildlife Service, U.S. Coast Guard, National Oceanic and Atmospheric Administration National Marine Fisheries Service, and the National Park Service(NPS), while the Federal Emergency Management Agency is a Participating Agency; and

WHEREAS, the non-federal sponsors are the New Jersey Department of Environmental Protection (NJDEP) and New York State Department of Environmental Conservation (NYSDEC), in partnership with the New York City Office of Recovery and Resiliency (NYCORR); and

WHEREAS, the Project minimizes exacerbating riverine/fluvial flooding, covered under the Flood Risk Management (FRM) mission of USACE, and includes measures to alleviate any induced flooding with measures like levees, floodwalls, and non-structural (TBD) and natural and nature-based features (TBD) which are also included in the Project; and

WHEREAS, the District has determined that the Project's APE includes the area of construction, non-structural measures, and indirect impacts on the viewshed during the feasibility level analysis of the Project (see depiction in **Attachment A** to this Agreement); the APE considers the following impacts: 1) construction effects, to include demolition, vibration, and auditory effects, will be considered within a coordinated buffer of either side of proposed measures, the living shoreline, and other constructed features (e.g. pump stations and surge gates); 2) effects of non-structural measures will be considered at each location; potential visual impacts will be considered from the perspective of cultural resources within the APE consisting of 3) the exterior viewshed (historic properties that view an Actionable Element, and 4) the interior viewshed (historic properties located with a view of an Actionable Element); and

WHEREAS**,** numerous archaeological and/or architectural resource surveys have been conducted within the APE and background research conducted through New York's and New Jersey's online cultural resources information system (CRIS and LUCY), the New York City Landmark Preservation Commission mapper, and the National Park Service's (NPS) National Register Database, documented the presence of approximately 26 previously identified historic properties within 100 meters of the Project, while the preliminary viewshed analysis documented approximately 2,050 previously identified historic properties within 1 mile of the Project where Project structures will potentially be visible, detailed in **Attachment B** to this Agreement; and

WHEREAS**,** the District has determined that the undertaking may have an adverse effect on historic properties which are listed or eligible for listing in the National Register of Historic Places (NRHP), which the agency is required to take into account pursuant to Section 106 of the NHPA; and

WHEREAS, schedule and budgetary constraints, including Section 1001 of the Water Resources Reform and Development Act (WRRDA) of 2014 (Public Law 113-121) (limiting duration and cost of Corps of Engineers final feasibility reports), limit the detailed engineering design of the Project features during the feasibility phase such that the District cannot conduct all of the necessary surveys to fully identify and evaluate historic and cultural resources, fully determine adverse effects of the Project on historic properties, or fully avoid, minimize or mitigate those adverse effects, prior to completing the appropriate NEPA documentation for the feasibility phase; and

WHEREAS**,** because implementation of the Preconstruction, Engineering and Design (PED) phase (where detailed engineering design will occur) is contingent on either authorization by Congress or the Secretary of the Army's determination that the Project is justified, appropriation of funds by Congress, and execution of a Design Agreement (DA) between the NJDEP and NYSDEC, in partnership with NYCORR, the District may implement PED in phases to the extent that design and/or construction authority is phased and funds are appropriated, so that efforts to identify and evaluate historic properties, determine effects from Project features, identify appropriate avoidance, minimization or mitigation, and conduct related consultation may occur over a period of multiple years as the design for each Project construction phase and/or feature is finalized; and

WHEREAS, the District recognizes that significant historic districts and properties in and around the Project area are an integral part of the community's life and character; and preservation of this irreplaceable heritage is in the public interest. The knowledge and identification of New York and New Jersey's historic resources, together with the goal of preserving the integrity of these resources, will improve the planning and execution of the Project. The District commits to

considering the avoidance and minimization of adverse effects to historic properties in its design of the Project; and

WHEREAS, the District has determined that as Project features are further designed during the PED phase of the Project, the APEs may be further refined, cultural resources surveys to be conducted may identify additional historic properties within the APEs, and effects on historic properties may be further identified; and

WHEREAS, the District intends to comply with Sections 106 and 110(f) of the NHPA for the undertaking, and while it has complied to the extent practicable in an effort to avoid, minimize, or mitigate adverse effects on historic properties and minimize harm to Historic Properties during the feasibility phase of the Project, recognizes that there are potential effects on historic properties which cannot be fully determined prior to approval of this complex undertaking; and

WHEREAS, the District intends to ensure compliance for all NYNJHATS phases and features with Sections 106 and 110(f) of the NHPA for the undertaking through the execution and implementation of this Programmatic Agreement (PA), and future PAs for other elements associated with the Comprehensive Plan, pursuant to 36 C.F.R. § 800.14(b)(3); and

WHEREAS, in accordance with 36 C.F.R. § 800.6(a)(1) and § 800.10(a), the District has notified the Advisory Council on Historic Preservation (ACHP) of its intension to develop this Agreement, and the ACHP has chosen to participate/ declined to participate and will remain a Consulting Party, in the consultation pursuant to 36 C.F.R. § 800.6(a)(1)(iii); and

WHEREAS, the New York State Historic Preservation Office (NYSHPO), has concurred in the use of a Programmatic Agreement and in being a Signatory to this Agreement; and

WHEREAS, the New Jersey Historic Preservation Office (NJHPO), has concurred in the use of a Programmatic Agreement and in being a Signatory to this Agreement; and

WHEREAS, the New Jersey Department of Environmental Protection (NJDEP) and New York State Department of Environmental Conservation (NYSDEC), in partnership with the New York City Office of Recovery and Resiliency (NYCORR) are the non-Federal sponsors for this project, and the District has invited them to sign this Agreement as an Invited Signatory and they have chosen to participate/ declined to participate and will remain a Consulting Party; and

WHEREAS, any measure to be constructed within NPS Land or land managed by the NPS, mutual acceptability between the Department of Interior and the Department of Army is required pursuant to the Gateway National Recreation Area (GATE) enabling legislation (P.L. 92-592, 1972); and

WHEREAS, the District has invited the NPS to sign this Agreement as a Signatory, in accordance to P.L. 92-592, 1972, 36 C.F.R. § 800.10(c), as a mutually acceptable plan between NPS Interior Region 1 Office, and the District requires concurrence between both parties, support of Project objectives, minimization of impacts to NPS cultural, natural and recreational resources, and mitigation for all unavoidable impacts to NPS resources, and the NPS has elected to participate; and

WHEREAS, in accordance with 36 C.F.R. § 800.6(c)(3), the District is consulting with the, the Delaware Nation, the Stockbridge Munsee, the Delaware Tribe of Indians, regarding the effects

of the undertaking on historic properties, and has invited these Tribes to sign this Agreement as Invited Signatories or Concurring Parties;

WHEREAS, in accordance with 36 C.F.R. § 800.6(c)(3), the Delaware Nation has responded and elected to participate as a Concurring Party in this Agreement; and

WHEREAS, in accordance with 36 C.F.R. § 800.6(c)(3), the Stockbridge Munsee has responded and elected to participate as a Concurring Party in this Agreement; and

WHEREAS, the District has consulted with the NYC Landmarks Preservation Commission (LPC) regarding the effects of the undertaking on historic properties and the District has invited them to sign this Agreement as a Signatory and they have elected to participate; and

WHEREAS, the District has consulted with local, county and state historical societies regarding the effects of the undertaking on historic properties and has invited them to each sign this Agreement as a Concurring Party and they have/ have not elected to participate each as a Concurring Party; and

WHEREAS, the District has consulted and will continue to consult with the NYSHPO, NJHPO, the Delaware Nation, the Stockbridge Munsee, the Delaware Tribe of Indians (federally-recognized tribes), the NPS, and municipal and county historic societies, and other appropriate Consulting Parties to define and implement process for taking into consideration the effects of the Project on historic properties; and

WHEREAS, the NYSHPO, NJHPO, NPS, ACHP, in partnership with NJDEP and NYSDEC, NYCORR, Interested Tribes, the LPC, and other interested parties are hereinafter collectively referred to as Consulting Parties; and

WHEREAS, the District has, and will continue to, consult with the NJSHPO, the NYSHPO and LCP in regard to portions of the APE within their relevant areas of responsibility and jurisdiction: and

WHEREAS, in accordance with 36 C.F.R. § 800.2(d) the District is soliciting public comment on the Project through the release of the draft Feasibility Report/Environmental Assessment (EA) for a period of 30 days, and through a series of in person and virtual informational meetings with stakeholders to share information about the project and to discuss the District's ongoing efforts to evaluate the project's potential to affect cultural resources; and

NOW, THEREFORE, the District, New York SHPO, New Jersey HPO, and NPS (hereinafter collectively referred to as Signatories) agree that the Undertaking shall be implemented in accordance with the following stipulations in order to take into account the effects of the Project on cultural resources and undertake appropriate planning and actions with regard to resources and associated with GATE.

STIPULATIONS

I. IDENTIFICATION AND EVALUATION

The District shall ensure that the following measures are carried out:

A. The New York District shall carry out cultural resources surveys for Project features that are advanced past feasibility phase to identify significant cultural resources within the APE. Survey methodology shall be tailored to the unique environment of the restoration site to identify resources and will consider previous survey results and consultation comments when designing the surveys. Consultation shall be carried out with the appropriate SHPOs depending on whether the site or site(s) are within the States of New York or New Jersey. If a survey is addressing multiple sites located within both states, both the NYSHPO and the NJSHPO shall be consulted.

1. The District shall consult with the NPS and the LPC in regards to only portions of the APE within their respective areas of responsibility and the District shall require their coordination and concurrence on any proposed identification and evaluation efforts, and any steps to avoid, minimize or mitigate those effects for actions proposed within their respective land or areas of responsibility and any eligibility determinations, see Stipulation VII.B.d.

2. The NPS must be consulted on each proposed cultural resource survey/evaluation on NPS managed land, and the necessary permits (Special Use Permit, Archaeological Resources Protection Act, etc.) must be obtained prior to initiating any work.

B. Prior to the initiation of construction-related activities which may affect historic properties, the District, in consultation with the relevant SHPO(s), NPS, LPC and other interested parties as appropriate, shall identify and evaluate:

1. Archaeological Sites

a. The District shall ensure that archaeological surveys within the uninvestigated portions of the APE are conducted in a manner consistent with the Secretary of the Interior's Standards and Guidelines for Archeology and Historic Preservation (48 FR 44720-23) and guidelines set forth by the SHPOs including the New Jersey Historic Preservation Office Requirements for Archaeological Survey Reports - Standards for Report Sufficiency (N.J.A.C. 7:4-8.5), New Jersey Historic Preservation Office Requirements for Phase I Archaeological Survey at N.J.A.C. 7:4-8.4, the New York Archaeological Council's Standards for Cultural Resource Investigations and the Curation of Archaeological Collections in New York State (1994, adopted by NYSHPO in 1995), the NYSHPO's 2005 Phase I Archaeological Format Requirements, and take into account the National Park Service publication The Archaeological Survey: Methods and Uses (1978) and the statewide historic contexts developed by the SHPOs.

b. The scopes of work and survey reports shall be submitted to the appropriate SHPO(s), and other Consulting Parties, as appropriate, for review and comment.

2. Traditional Cultural Properties.

a. The District shall ensure that future surveys within the uninvestigated portions of the APE include procedures to identify traditional cultural properties (TCPs) and to consult with the Delaware Nation, the Stockbridge Munsee, and the Delaware Tribe of Indians,

(federally-recognized tribes) and other affected parties in accordance with the guidelines provided by National Park Service Bulletin 38, Guidelines for Evaluating and Documenting Traditional Cultural Properties and the U.S. Army Corps of Engineers Tribal Consultation Policy (2013).

b. In the event that the Delaware Nation, the Stockbridge Munsee, and the Delaware Tribe of Indians, (federally-recognized tribes), or another affected group contacts the District regarding its recognition of a traditional cultural property, located within the APE, the District shall notify the appropriate SHPO, THPO and the ACHP to initiate discussions to consider whether the property is a traditional cultural property that meets the Criteria.

c. The identification of TCPs and Archaeological Sites on NPS managed land will require concurrence with Native Nations and will require further consultation. In case of disagreement regarding potential resolution of adverse effects, see Stipulation II.

3. Buildings and Structures

a. The District shall ensure that surveys are conducted for buildings and structures in the APE in a manner consistent with the Secretary of the Interior's Standards and Guidelines for Archeology and Historic Preservation (48 FR 44720-23), and in New Jersey, the New Jersey Historic Preservation Office's l999 *Guidelines for Architectural Survey*, and take into account the statewide historic contexts developed by the SHPO(s). The Scope of Work and survey report will be consistent with the guidelines set forth by the SHPOs and shall be submitted to the appropriate SHPO(s), the ACHP, and other Consulting Parties for review.

b. The District, in consultation with the appropriate SHPO(s), the ACHP, and other Consulting Parties, shall identify and evaluate buildings and structures that are located adjacent to listed or eligible NRHP historic districts to determine whether such properties should be considered as part of the historic district or an expanded district.

4. Historic Landscapes and View Sheds

a. The District shall consult with the appropriate SHPO(s) and other Consulting Parties, including local historical societies, to identify and evaluate historic landscapes and viewsheds located within the APE. The District shall consult National Park Service Bulletins 18, How to Evaluate and Nominate Designed Historic Landscapes, and 30 Guidelines for Evaluating and Documenting Rural Historic Landscapes, National Park Service Preservation Brief 36, Protecting Cultural Landscapes, and other publications and materials made available by the SHPO(s), like the New Jersey Historic Preservation Office's l999 *Guidelines for Architectural Survey,* to assist in defining the criteria that should be applied to such properties.

b. The objective in conducting the surveys is to identity NRHP-listed or eligible historic landscapes and affected viewsheds within the project area that may be adversely affected by the Project, and to determine whether they meet the NRHP criteria set forth

in 36 CFR Part 60.4.

C. The District shall ensure that qualified professionals meeting the National Park Service professional qualifications for the appropriate discipline [National Park Service Professional Qualification Standards, Secretary of the Interior's Standards and Guidelines for Archaeology and Historic Preservation (48 FR 44738-39)] are used to complete all identification and evaluation plans related to this undertaking, to include geomorphological, palynological, and archaeological surveys and testing, and documentation.

D. The District, the SHPO(s), and all other Consulting Parties shall consider the views of the public and interested parties, including local historic preservation groups, in completing its identification and evaluation responsibilities.

E. The District shall maintain records of all decisions it makes related to the NRHP eligibility of properties.

F. Application of Criteria:

1. The District, in consultation with the appropriate SHPO, and other Consulting Parties, shall evaluate historic properties using the Criteria established for the NRHP [36 CFR 800.4(c)(1)]:

a. If the District, the SHPO(s), and the other Consulting Parties agree that the Criteria apply or do not apply, in evaluating the NRHP eligibility of a property, the property shall be treated accordingly for purposes of this PA.

b. If the District, the SHPO(s), and other Consulting Parties disagree regarding NRHP eligibility, prior to the start of any project-related work at the site or in the vicinity of the property, the District shall obtain a formal Determination of Eligibility (DOE) from the Keeper of the National Register (Keeper), National Park Service, whose determination shall be final.

2. The District shall ensure that the identification and evaluation of historic properties that may be affected by each phase of the Undertaking is completed prior to the initiation of any formal action by the District including rehabilitation, relocation, demolition, etc.

3. Any changes to the project design that may have the potential to affect historic properties or extends beyond the current APE will be submitted to the Consulting Parties for review and comment.

4. If a property is determined to be eligible for the National Register, the District will consult with the NJSHPO, NYSHPO, NPS, LPC, and the appropriate Consulting Parties to resolve the adverse effects in accordance with Stipulation II below.

II. RESOLUTION OF ADVERSE EFFECTS

A. If the District, in consultation with the appropriate SHPO(s), and other Consulting Parties, as appropriate, determines that the Project will have an adverse effect on historic properties, the District shall consult with the appropriate Consulting Parties and signatories, pursuant to 36 CFR Part 800.6, to determine how best to resolve adverse effects and document the proposed resolution.

B. The District shall invite the ACHP to participate in consultation when:

1. The District and SHPO determine that an agreement or treatment plan cannot be reached;

2. A National Historic Landmark is involved;

3. Human remains have been identified; or

4. There is widespread public interest in a historic property or properties.

C. Once there is agreement on how adverse effects will be resolved, the District will develop treatment plans that will identify the activities to be implemented to resolve adverse effects. The SHPO(s) and the appropriate signatories and other Consulting Parties, if identified, will be provided with copies of each treatment plan for review and comment. The District shall revise plans to address comments and recommendations provided by the Consulting Parties. The District shall ensure that treatment plans are implemented by the District or its representative(s).

1. Treatment plans will include a description of the historic property, the adverse effect to the historic property, and the treatment to mitigate the adverse effect to the historic property.

2. Draft treatment plans will be reviewed by the signatories and the applicable invited signatories. The signatories will have 30 calendar days to review the draft treatment plan and provide comments to the District.

3. The District will resolve all comments received. Once all comments have been agreed upon, a final treatment plan will be sent for signature to the signatories and applicable invited signatories.

II. PUBLIC INVOLVEMENT AND OUTREACH

A. The District shall inform the public of the existence of this PA and the District's plan for meeting the stipulations of the PA. Copies of this agreement and relevant documentation prepared pursuant to the terms of this PA shall be made available for public inspection via the District's website. Information regarding the specific locations of terrestrial and submerged archaeological sites, including potential wreck areas, will be withheld in accordance with the Freedom of Information Act and National Register Bulletin No. 29, if it appears that this information could jeopardize archaeological sites. Any comments

received from the public related to the activities identified by this PA shall be taken into account by the District.

B. The District shall develop publicly accessible information about the cultural resources and historic properties investigations for the Undertaking in the form of brief publication(s), exhibit(s), or website.

III. CURATION

A. Any collection resulting from the investigations undertaken as part of the agreement are the property of the landowner at the time the collection was made. The District does not retain ownership of any collection removed from land(s) it does not own.

B. The District shall ensure that all collections resulting from the identification and evaluation of surveys, data recovery operations, or other investigations pursuant to this PA are maintained in accordance with 36 CFR Part 79 until the collection is turned over to the landowner or other entity. Minimally, the District will ensure that analysis is complete and the final report(s) are produced and accepted by the New York and NJHPO before the collection is provided to the landowner.

C. The District shall be responsible for consulting with landowners regarding the curation of collections resulting from archaeological surveys, data recovery operations, or other studies and activities pursuant to this agreement. The District shall coordinate the return of collections to non-federal landowners. If landowners wish to donate the collection, the District, in coordination with the New York SHPO and NJHPO, determine an appropriate entity to take control of the collection.

D. The District shall be responsible for the preparation of federally-owned collections and the associated records and non-federal collections donated for curation in accordance with the standards of the curation facility.

IV. UNANTICIPATED DISCOVERY

A. The following language shall be included in construction plans and specifications:

"When a previously identified cultural resource, including but not limited to archaeological sites, shipwrecks and the remains of ships and/or boats, standing structures, and properties of traditional religious and cultural significance to the the Delaware Nation, the Stockbridge Munsee, and the Delaware Tribe of Indians (federally-recognized tribes) are discovered during the execution of the Project, the individual(s) who made the discovery shall immediately secure the vicinity and make a reasonable effort to avoid or minimize harm to the resource, and notify the Project's Contracting Officer's Representative (COR) and the District. All activities shall cease within a minimum of 50 feet from the inadvertent discovery (50-foot radius 'no work' buffer) until authorized by the District and the Project COR.

B. If previously unidentified and unanticipated properties are discovered during Project activities, the District shall cease all work in the vicinity of the discovery until it can be evaluated in accordance with 36 CFR Part 800.13 "Post Review Discoveries". Upon notification of an unanticipated discovery, the District shall implement any additional

reasonable measures to avoid or minimize effects to the resource. Any previously unidentified cultural resource will be treated as though it is eligible for the NRHP until such other determination may be made.

C. The District shall immediately notify the NYSHPO, NJHPO, LPC and NPS for unanticipated discoveries within their respective boundaries, as well as the Delaware Nation, the Stockbridge Munsee, and the Delaware Tribe of Indians (federally-recognized tribes), within 48 hours of the finding and request consultation to determination the nature of the find, the National Register eligibility and the assessment and resolution adverse effects, if identified.

1. Pursuant to [16 U.S.C. 470cc (a)], the unanticipated discovery of a cultural resource on land managed by the NPS will also require the immediate notification of the GATE Superintendent and the COR, who will coordinate with the NPS and other Consulting Parties in order to facilitate a timely resolution in tandem to the requirements outlined Stipulation IV.

D. If it is determined the unanticipated discovery is not eligible for the National Register, in consultation and concurrence with the Consulting Parties, then the suspension of work in the area of the discovery will end.

E. If it is determined that the cultural resource is eligible for the National Register, then the suspension of work will continue, and the District, in consultation with the NYSHPO, NJHPO, LPC and NPS for unanticipated discoveries within their respective boundaries, as well as the Delaware Nation, the Stockbridge Munsee, and the Delaware Tribe of Indians (federally-recognized tribes), will determine the actions to avoid, minimize, or mitigate adverse effects to the historic property and will ensure that the appropriate actions are carried out.

F. If there is a disagreement on the appropriate course of action to address an unanticipated discovery or effects to an unanticipated discovery, then the District shall initiate the dispute resolution process set forth in Stipulation XII below.

G. Inadvertent discovery under section 3 (d) of NAGPRA and the treatment of human remains is governed by Stipulation V.

V. DISCOVERY OF HUMAN REMAINS/FUNERARY OBJECTS

A. If any human remains and/or grave-associated artifacts are encountered during any of the investigations federal lands, including but not limited to land managed by the NPS, the District shall follow the Native American Graves Protection and Repatriation Act (PL 101-601) and its implementing regulations. All other project features not located on federal land will follow the NYSHPO Human Remains Discovery Protocol (2018; see Appendix D) and, as appropriate, develop a treatment plan for human remains that is responsive to the ACHP's Policy Statement on Human Remains" (September 27, 1988), and , US Army Corps of Engineers, Policy Guidance Letter No. 57 (1998) Indian Sovereignty and Government-to-Government Relations with Indian Tribes.

B. In the event that human remains as burials, fragmentary remains, or any associated funerary objects, sacred objects, and objects of cultural patrimony are encountered, the

following actions should be taken:

"In the event that human remains as burials or fragmentary remains are found, the following actions should be taken:

1. The Contractor will stop work in the general area of the discovery immediately and report the discovery to the Contracting Officer/Contracting Officer Representative (KO/COR), who will call the appropriate New York or New Jersey Police Department at 911 and the NY Office of the Chief Medical Examiner and direct the call to the Forensic Anthropology Unit or the NJ **Office of the Chief State Medical Examiner.**
2. The KO/COR will inform the District Archaeologist who, as appropriate, will call the New York Landmarks Preservation Commission, the New York State Historic Preservation Office, the New Jersey State Historic Preservation Office and the relevant federally-recognized Tribes as appropriate.
3. If, upon inspection by the appropriate legal authorities, the remains are determined to be a criminal matter and not archaeological, the District will ensure that appropriate legal and contractual requirements are followed.
4. If the remains are determined to be archaeological, the relevant State Archaeologist has jurisdiction to determine the appropriate treatment and options for the remains following additional coordination with the Consulting Parties.
5. At all times, the Contractor will treat human remains with the utmost dignity and respect.
6. The Contractor will secure and protect the general area of the discovery (not less than fifty feet in all directions from the location of the discovery) from damage, vandalism, and disturbance until released by the KO/COR.
7. The Contractor will leave human remains and/or associated artifacts in place and not disturb them. The Contractor will not collect skeletal remains or materials associated with the remains. Any displaced remains or those found after excavation will be turned over to the KO/COR immediately.
8. The Contractor will not conduct any activities in the vicinity of the site until these steps have been completed and the site has been released by the KO/COR.
9. The Contractor will continue to protect and secure the area until the site is released by the KO/COR.
10. The District will coordinate with all Consulting Parties, and other Interest Parties or descendent communities to develop a treatment or avoidance plan consistent with Stipulation IV"

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C. The following language, in accordance with [43 CFR 10.2 (g)(4)], shall be included in the construction plans and specifications for Project features located on land managed by the NPS:

"In the event that human remains as burials, fragmentary remains, or any associated funerary objects, sacred objects, and objects of cultural patrimony are encountered, the following actions should be taken:

1. The Contractor will stop work in the general area of the discovery immediately and report the discovery to the Contracting Officer/Contracting Officer Representative (KO/COR), who will notify the GATE Superintendent who will then notify the appropriate

authorities once jurisdiction is situationally established after the Stop Work order is made.

2. The KO/COR and Superintendent will inform the District archaeologist who, as appropriate, will notify the New York Landmarks Preservation Commission, the New York State Historic Preservation Office, the New Jersey State Historic Preservation Office and the relevant federally-recognized Tribes.
3. If, upon inspection by the appropriate legal authorities, the remains are determined to be a criminal matter and not archaeological, the District will ensure that appropriate legal and contractual requirements are followed.
4. If the remains are determined to be archaeological, the GATE Superintendent has jurisdiction to determine the appropriate treatment and options for the remains following additional coordination with the Consulting Parties.
5. At all times, the Contractor will treat human remains with the utmost dignity and respect.
6. The Contractor will secure and protect the general area of the discovery (not less than fifty feet in all directions from the location of the discovery) from damage, vandalism, and disturbance until released by the KO/COR.
7. When human remains/funerary objects are encountered, all activity that might disturb the remains shall not resume until authorized by the GATE Superintendent, District Archaeologist, and the relevant federally-recognized Tribes.
8. The Contractor will leave human remains and/or associated artifacts in place and not disturb them. The Contractor will not collect skeletal remains or materials associated with the remains. Any displaced remains or those found after excavation will be turned over to the KO/COR immediately.
9. The Contractor will not conduct any activities in the vicinity of the site until these steps have been completed and the site has been released by the KO/COR.
10. The Contractor will continue to protect and secure the area until the site is released by the KO/COR.
11. The Corps will coordinate with all Consulting Parties, Interested Tribe(s), and other Interest Parties or descendent communities to develop a treatment or avoidance plan consistent with Stipulation IV"

VI. PROFESSIONAL QUALIFICATIONS AND STANDARDS

A. The District shall ensure that qualified professionals meeting the National Park Service professional qualifications for the appropriate discipline [National Park Service Professional Qualification Standards, Secretary of the Interior's Standards and Guidelines for Archaeology and Historic Preservation (48 FR 44738-39)] are used to complete all identification and evaluation plans related to this undertaking, to include remote sensing surveys, underwater investigations, historic structure inventory and documentation.

B. All historic structures surveys carried out pursuant to this PA will be undertaken in accordance with the standards and guidelines of the NYSHPO, NJHPO, the LPC and the Secretary of the Interior's *Standards for the Treatment of Historic Properties* (36 CFR Part 68) which takes into account the statewide historic contexts developed by the NJHPO and NY SHPO. The survey will be conducted following consultation with the NJHPO, NY SHPO, LPC and relevant historic and preservation groups and will be consistent with the appropriate guidelines for architectural surveys as identified by the

Consulting Parties.

C. All archaeological investigations carried out pursuant to this PA will be undertaken in accordance with the New York State Archaeological ACHP's Standards for Cultural Resource Investigations and the Curation of Archaeological Collections in New York State (1994) and Cultural Resources Standards Handbook (2000), the NYSHPO Archaeological Report Format Requirements (2005), and the Secretary of the Interior's *Standards for the Treatment of Historic Properties* (36 CFR Part 68), and the New Jersey Historic Preservation Office Guidelines for Phase I Archaeological Investigations: Identification of Archaeological Resources (N.J.A.C. 7:4-8.4), the New Jersey Historic Preservation Office Requirements for Archaeological Reports – Standards for Report Sufficiency (N.J.A.C. 7:4-8.5)

D. For submerged portions of the APE, the archaeological survey should be designed with input from a qualified marine archaeologist and specialists in other fields as appropriate (e.g., geology and geomorphology), in a manner that is capable of identifying the precontact and historic period site types that are present offshore New Jersey and New York. The Report and analyses presented therein should be prepared by a qualified marine archaeologist and specialists in other fields as appropriate (e.g., geology, geomorphology). A qualified marine archaeologist must meet the Secretary of the Interior's Professional Qualification Standards (48 F.R. 44738-44739) and have experience in conducting high-resolution geophysical surveys of submerged environments and processing and interpreting the resulting data for archaeological potential.

VII. ADMINISTRATIVE TERMS

A. REPORTING

1. The District shall provide a summary report to the Consulting Parties by February 1st of each year detailing work undertaken pursuant to this PA in the preceding calendar year (Appendix E). This report will include any scheduling changes, problems encountered, project work completed, PA activities completed, and any objections and/or disputes received by the District in its efforts to carry out the terms of this PA. Copies of the summary report with be posted in the District project website.

2. Following authorization and appropriation, the District shall coordinate a meeting or equivalent with the signatories to be held annually on a mutually agreed upon date to evaluate the effectiveness of this PA and discuss activities carried out pursuant to this PA during the preceding year and activities scheduled for the upcoming year.

B. COORDINATION, CONSULTATION, AND REVIEW PERIODS

1. The District will consult with the NJSHPO, the NYSHPO, the NPS, the LPC and all other relevant Consulting Parties in regard to portions of the APE within their relevant areas of responsibility and jurisdiction unless otherwise formally requested by the Consulting Party.

2. National Park Service Land:

a. For all activities involving properties and/or investigations within the bounds of land held by the National Park Service, the District will obtain the required National Park Service permits to complete investigations.

b. The District will provide the draft and final reports pertaining to the investigations within the respective boundaries bounds of National Park Service Land, the NYSHPO, NJHPO, NPS, the Delaware Nation, the Stockbridge Munsee, and the Delaware Tribe of Indians (federally-recognized tribes), for review.

c. Coordination and consultation on eligibility determinations, the need for additional investigations within National Park Service Land based on results of completed investigations will include, where relevant, the NYSHPO, NJHPO, NPS, the Delaware Nation, the Stockbridge Munsee, and the Delaware Tribe of Indians (federally-recognized tribes).

d. All elements of the Project within the boundaries of, or impacting cultural resources of the NPS must be mutually acceptable to the Department of the Interior and the Department of the Army (P.L. 92-592, 1972):

   "The authority of the Secretary of the Army to undertake or contribute to water resource developments, including shore erosion control, beach protection, and navigation improvements (including the deepening of the shipping channel from the Atlantic Ocean to the New York harbor) on land and/or waters within the recreation area shall be exercised in accordance with plans which are mutually acceptable to the Secretary of the Interior and the Secretary of the Army and which are consistent with both the purpose of this sub chapter and the purpose of existing statutes dealing with water and related land resource development."

   The NPS 's authority to conserve and manage park resources is derived from the Organic Act of 1916, which states that "the fundamental purpose of the said parks .. .is to conserve the scenery and the natural and historic objects and the wild life therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations." The NPS has discretion to allow impacts on park resources and values when necessary and appropriate to fulfill the purposes of a park (NPS 2006 sec. 1.4.3). However, as mandated by the Organic Act, the NPS cannot allow an adverse impact that would constitute impairment of the affected resources and values (NPS 2006 sec 1.4.3). An action constitutes an impairment when its impacts "harm the integrity of Park resources or values, including the opportunities that otherwise would be present for the enjoyment of those resources or values" (NPS 2006 sec 1.4.5). To determine impairment, the NPS must evaluate "the particular resources and values that would be affected; the severity, duration, and timing of the impact; the direct and indirect effects of the impact; and the cumulative effects of the impact in question and other impacts" (NPS 2006 sec 1.4.5). The NPS cannot legally take or authorize an action that will result in impairment. Therefore, the District will continue to coordinate with and provide sufficient information to the NPS, upon which the NPS can make a written determination that the Districts actions authorized by the NPS will not lead to an impairment of park resources and values (NPS 2006 sec 1.4. 7).

3. Borrow Areas

a. All draft and final reports pertaining to investigations of Project borrow areas will be provided to the New York SHPO, NJHPO, the LPC NPS, and the Interested Tribes for review.

b. Coordination and consultation on eligibility determinations, the need for additional investigations for targets and anomalies will include the New York SHPO, NJHPO, NPS, and Interested Tribes.

4. Nearshore Sand Placement, Coastal Process Features, Measures for Residential and Non-Residential Structures, and Ringwalls:

a. All draft and final reports pertaining to investigations of the nearshore, the coastal process features, the measures for residential and non-residential structure Areas of Potential Effect outside of National Park Service Land will be provided to the New York SHPO, NJHPO, the LPC, NPS, Interested Tribes, the relevant municipality(ies) and local historical society(ies) or historic preservation group(s) for review (see Appendix E).

b. Coordination and consultation on eligibility determinations, the need for additional investigations, etc., resulting from the reviews completed in Stipulation XI.B.3.a above will include the New York SHPO, NJHPO, the LPC, Interested Tribes, the relevant municipality, its local historical society or historic preservation group(s) (see Appendix E), and the landowner(s).

5. Unless otherwise stated, all review periods will be 30 calendar days from the date of receipt by the Consulting Party and any comments resulting from those reviews must be submitted to the District in writing (via electronic or regular mail).

6. With the submission of final reports, the District will respond to comments, identifying how comments were/were not taken into account as part of report revisions or recommendation for additional action.

7. If a response is not received by the end of the review period, the District will assume concurrence with the subject determination, evaluation, plan, report or other document submitted.

8. Activities On New York City Lands:

a. For those portions of the Undertaking which take place on New York City (NYC) owned property, the District will fully engage the LPC in all consultations and secure LPC concurrence for all decisions related to identification, evaluation, effect determinations, and treatment of adverse effects. The District will submit all documentation and determination findings for properties on NYC land to the LPC for review and concurrence prior to submission to NYSHPO or ACHP. If the District, and NYSHPO cannot come to agreement on any such matters, the provisions of Stipulations V or XII will apply, as most appropriate.

XII. DISPUTE RESOLUTION

A. Should any Signatory object in writing to the District at any time to any actions proposed or the manner in which the terms of this PA are implemented, the District and the signatories shall attempt to resolve any disagreement arising from implementation of this PA.

B. If there is a determination that the disagreement cannot be resolved, the District shall forward all documentation relevant to the dispute to the ACHP and request the ACHP's recommendations or request the comments of the ACHP in accordance with 36 CFR Part 800.7(c).

C. The ACHP shall provide the District with its advice on the resolution of the objection within thirty (30) days of receiving adequate documentation. Any ACHP recommendations or comments provided in response will be considered in accordance with 36 CFR Part 800.7(c), with reference only to the subject of the dispute. The District shall respond to ACHP recommendations or comments indicating how the District has taken the ACHP's recommendations or comments into account and complied with the ACHP's recommendations or comments prior to proceeding with the Undertaking activities that are the subject to dispute. Responsibility to carry out all other actions under this PA that are not the subject of the dispute will remain unchanged.

D. If the ACHP does not provide its advice regarding the dispute within the thirty (30) calendar day time period, the District may make a final decision on the dispute and proceed accordingly. Prior to reaching such a final decision, the District shall prepare a written response that takes into account any timely comments regarding the dispute from the signatories to the PA, and provide them and the ACHP with a copy of such written response.

XIII. WITHDRAWAL AND TERMINATION

A. Any signatory may withdraw its participation in this PA by providing thirty (30) days advance written notification to all other signatories. In the event of withdrawal, any signatory to this PA may terminate it by providing 30 calendar days, written notice to the signatories. In the event of withdrawal, this PA will remain in effect for the remaining signatories.

B. This agreement may be terminated in accordance with 36 CFR Part 800, provided that the signatories consult during the period prior to termination to seek agreement on amendments or other actions that would avoid termination. Any signatory requesting termination of this PA will provide thirty (30) days advance written notification to all other signatories.

C. In the event of termination, the District will comply with 36 CFR 800.4 through 800.6 with regard to individual undertakings covered by this Agreement.

XIV. DURATION AND SUNSET CLAUSE

A. This PA shall take effect upon execution by the District, the New York SHPO, NJHPO, NPS with the date of the final signature.

B. This PA will continue in full force and effect until the construction of the Undertaking is complete and all terms of this PA are met, unless the Undertaking is terminated or authorization is rescinded or a period of five years from execution of the PA has passed, at which time the agreement may be extended as written provided all signatories concur.

XV. AMENDMENT

A. This PA may be amended upon agreement in writing by all Signatories. Within thirty (30) days of a written request to the District, the District will facilitate consultation between the signatories regarding the proposed amendment.

B. Any amendments will be in writing and will be in effect on the date the amended PA is filed with the ACHP.

XVI. ANTI-DEFICIENCY ACT

All requirements set forth in this PA requiring expenditure of funds by the District are expressly subject to the availability of appropriations and the requirements of the Anti-Deficiency Act (31 U.S.C. 1341). No obligation undertaken by the District under the terms of this PA shall require or be interpreted to require a commitment to extend funds not appropriated for a particular purpose. If the District cannot perform any obligation set forth in this PA because of unavailability of funds that obligation must be renegotiated among the District and the signatories as necessary.

PROGRAMMATIC AGREEMENT
AMONG
THE U.S. ARMY CORPS OF ENGINEERS, NEW YORK DISTRICT,
THE NEW YORK STATE HISTORIC PRESERVATION OFFICE,
THE NEW JERSEY STATE HISTORIC PRESERVATION OFFICE AND
THE NATIONAL PARK SERVICE

REGARDING THE NEW YORK – NEW JERSEY HARBOR AND TRIBUTARIES
COASTAL STORM RISK MANAGEMENT PROJECT

ACTIONABLE ELEMENTS
EAST RISER, HARLEM RIVER, and OAKWOOD BEACH

Execution and implementation of this PA evidences that the District has satisfied its Section 106 responsibilities 36 CFR 800.6(b)(1)(iv) for all individual undertakings of the Project, and has afforded the New York , NJHPO, NPS and the ACHP an opportunity to comment on the undertaking and its effects on historic properties.

_____ _____

Matthew W. Luzzatto
Colonel, U.S. Army
New York District
Army Corps of Engineers

Date

PROGRAMMATIC AGREEMENT
AMONG
THE U.S. ARMY CORPS OF ENGINEERS, NEW YORK DISTRICT,
THE NEW YORK STATE HISTORIC PRESERVATION OFFICE,
THE NEW JERSEY STATE HISTORIC PRESERVATION OFFICE AND
THE NATIONAL PARK SERVICE

REGARDING THE NEW YORK – NEW JERSEY HARBOR AND TRIBUTARIES
COASTAL STORM RISK MANAGEMENT PROJECT

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_____ _____

Jennifer T. Nersesian Date
Superintendent
Gateway National Recreation Area

PROGRAMMATIC AGREEMENT
AMONG
THE U.S. ARMY CORPS OF ENGINEERS, NEW YORK DISTRICT,
THE NEW YORK STATE HISTORIC PRESERVATION OFFICE,
THE NEW JERSEY STATE HISTORIC PRESERVATION OFFICE AND
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_____ _____

Katherine J. Marcopul, PhD Date
Deputy State Historic Preservation Officer
New Jersey State Historic Preservation Office

PROGRAMMATIC AGREEMENT
AMONG
THE U.S. ARMY CORPS OF ENGINEERS, NEW YORK DISTRICT,
THE NEW YORK STATE HISTORIC PRESERVATION OFFICE,
THE NEW JERSEY STATE HISTORIC PRESERVATION OFFICE AND
THE NATIONAL PARK SERVICE

REGARDING THE NEW YORK – NEW JERSEY HARBOR AND TRIBUTARIES
COASTAL STORM RISK MANAGEMENT PROJECT

ACTIONABLE ELEMENTS
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_____ _____

R. Daniel Mackay Date
Deputy Commissioner for Historic Preservation/Deputy SHPO
New York State Historic Preservation Office

PROGRAMMATIC AGREEMENT - APPENDIX A

REGARDING THE NEW YORK – NEW JERSEY HARBOR AND TRIBUTARIES
COASTAL STORM RISK MANAGEMENT PROJECT

ACTIONABLE ELEMENTS
EAST RISER, HARLEM RIVER, and OAKWOOD BEACH
STUDY MAPS

NY-NJ HARBOR AND TRIBUTARIES STUDY

U.S. ARMY
CORPS OF ENGINEERS
NEW YORK DISTRICT

East Riser Actionable Element Project Measures

Moonachie and Carlstadt Boroughs
Bergen County, New Jersey
Date: 6/25/2025

Legend

- Hackensack/Passaic Study Region
- Municipal Boundary

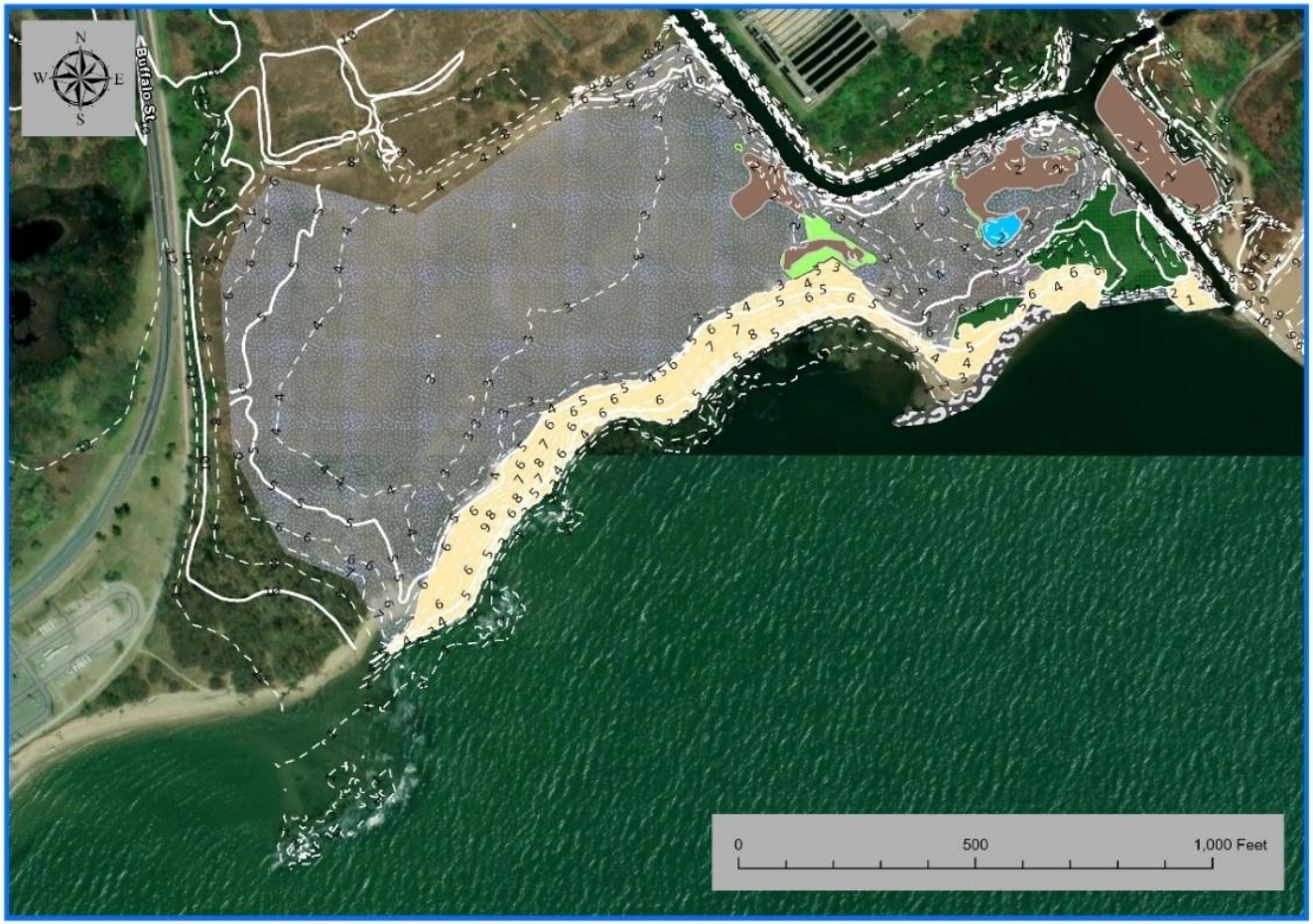
Measures

- Channel Modifications
- Culvert Replacement(s)
- Areas Impacted by Culvert Replacement(s)
- Railroad Bridge Replacement


Harlem River
Actionable Element
LANDWARD Alignment
Harlem River Dr
Harlem River Dr S
Amtrak Railroad
P.S. 046 Arthur Tappan
Holcombe Rucker Park Comfort Station
Macombs Dam
Colonel Charles Young Triangle
Harlem Lane Playground
Frederick Johnson Playground
Harlem-148 St
0 250 500 750 Feet


Harlem River
Actionable Element
SEAWARD Alignment
Harlem River Dr
Harlem River Dr S
Amtrak Railroad
P.S. 046 Arthur Tappan
Holcombe Rucker Park Comfort Station
Macombs Dam
Colonel Charles Young Triangle
Harlem Lane Playground
Frederick Johnson Playground
Harlem-148 St
0 250 500 750 Feet


Area of Detail
ROCKLAND
Ossining
White
Scarsdal
Yonkers
BRONX
NEW YORK
Queens
New York
Brooklyn
Jamaica
Scale 1:500,000
Legend
Lower Hudson/East River Study Region
Reduced Risk with Harlem River Actionable Element
Measures
Combi Wall
Deployable Flood Barrier - Vehicle Gate
Large Floodwall
Large Floodwall - Under Roadway
Tunnel Span
NY-NJ HARBOR AND TRIBUTARIES STUDY
Harlem River Actionable Element Alignment Comparison
Future With Project Reduced Risk (1% AEP w/ Intermediate Sea Level Rise in 2095)
Date: 6/20/2025
U.S. ARMY CORPS OF ENGINEERS NEW YORK DISTRICT



NY-NJ HARBOR AND TRIBUTARIES STUDY

Oakwood Beach Actionable Element

Existing Conditions

Staten Island, New York

Date: 6/26/2025

U.S. ARMY
CORPS OF ENGINEERS
NEW YORK DISTRICT

Legend

Existing Contours
- 5ft Interval Contours
- 1ft Interval Contours

Existing Environmental Zones
- Existing Rip Rap
- Phragmites Zone
- Mud Flat Zone
- Spartina Zone
- Salt Panne Zone
- Maritime Shrub Land Zone
- Dune Beach Zone

PROGRAMMATIC AGREEMENT - APPENDIX B

THE NEW YORK – NEW JERSEY HARBOR AND TRIBUTARIES
COASTAL STORM RISK MANAGEMENT ACTIONABLE ELEMENTS
EAST RISER, HARLEM RIVER, and OAKWOOD BEACH

CULTURAL APPENDIX