Geoarchaeological Monitoring Report

NYC Department of Design and Construction
NYC Borough Based Jail System: Manhattan

Prepared for
New York City Department of Design and Construction
New York City Landmarks Preservation Commission

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Prepared for:

NYC Department of Design and Construction (DDC)
NYC Landmarks Preservation Commission (LPC)

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1. Abstract

AECOM-Hill JV completed geoarchaeological monitoring of geotechnical soil borings and utility test pits at the Manhattan site at 124-125 White Street (Block 198, Lot 1; part of Block 167, Lot 1) for the New York City (NYC) Borough Based Jail Program (Project) Area of Potential Effect (APE). The fieldwork effort followed the methodology that was outlined in the work plan that was approved by the NYC Landmarks Preservation Commission (LPC) in March 2021. The APE corresponds to the area of archaeological sensitivity established within AKRF Inc.'s 2018 supplemental Phase IA report for this property. Archaeological monitoring of test pits and soil borings was completed between April and June 2021.

The test pits were excavated to identify the location of the Consolidated Edison, Inc. (Con Edison or ConEd) electric transmission line (Oil-O-Static) and were extended to a maximum of 5 feet below the existing grade. The fill deposits encountered date to the twentieth century. Several utilities were observed in the test pits along with cement slabs. A brick lining for a utility was observed in the base of one test pit along with a wooden utility conduit. Isolated bricks and twentieth-century material such as plastic were observed in the test pit fill levels. The test pits were not planned to extend deep enough to fully test for potential archaeological resources as the original intent was limited to the Oil-O-Static investigation.

Archaeologists documented stratigraphic profiles of 2 environmental borings and 7 geotechnical borings. The environmental borings extended from 20 to 25 feet below grade while the geotechnical borings extended to bedrock (approximately 90 to 110 feet deep). The borings demonstrated a profile composed of fill ranging from around 16 to 33 feet deep, getting deeper as the borings moved westwards. Deeper peat sediments were encountered near Centre Street in 5 borings. In the remaining borings, the profile did not contain peat and consisted of C horizons and glacial sediments below the overlying fill deposits. The stratigraphy in the 2021 borings was similar to prior soil borings recorded in the APE and noted in AKRF Inc's 2018 Phase IA report.

2. Introduction

AECOM-Hill JV (AHJV) completed geoarchaeological monitoring of geotechnical soil borings, which were advanced by its subconsultant TRC, and utility trenches (test pits), which were completed by Consolidated Edison, Inc. (Con Edison or ConEd) for the Manhattan site located at 124-125 White Street (Block 198, Lot 1; part of Block 167, Lot 1) as part of the NYC Borough Based Jail Program (Project) (Figure 1). Block 198 is located north of White Street. The geoarchaeological work was conducted within the Area of Potential Effect (APE) along White Street between the existing North and South Towers of the extant detention facility. Baxter Street is located on the eastern side end of the APE and Centre Street at the western edge of the APE. The APE corresponds to the area of archaeological sensitivity established within AKRF Inc.'s supplemental Phase IA report for this property and encompasses approximately 17,776 square feet or 0.41 acres (AKRF 2018). Geoarchaeological review of both the test pits and borings was conducted to gather information regarding the stratigraphy and historical disturbance depth, and to identify strata with archaeological preservation potential within the Project APE to inform whether additional archaeological testing is warranted.

The research AKRF completed in 2018 indicates that there is no archaeological potential within the footprint of the North Tower on Block 198 (north of White Street), where cellar excavation has impacted the likelihood for preservation. There is low potential for precontact archaeological resources within the southwestern portion of the block (currently sidewalk and plaza) (Figure 2) as well as within the street bed of White Street. The Project APE encompasses these locations. Any precontact resources would be at a depth between 20-40 feet below ground surface (bgs), which correlates to peat and bog deposits identified in prior geotechnical borings. These deposits relate to the freshwater Collect Pond, which was once located southwest of the Project APE, and to the surrounding marshes. While marshland would not typically have been utilized as a dwelling area, these freshwater resources were a significant source of water and food for indigenous populations. AKRF determined a low to moderate sensitivity for historic resources within the same southwestern portion of the block and White Street. Historic resources may be found within the historic fill levels as well as the original ground surface.

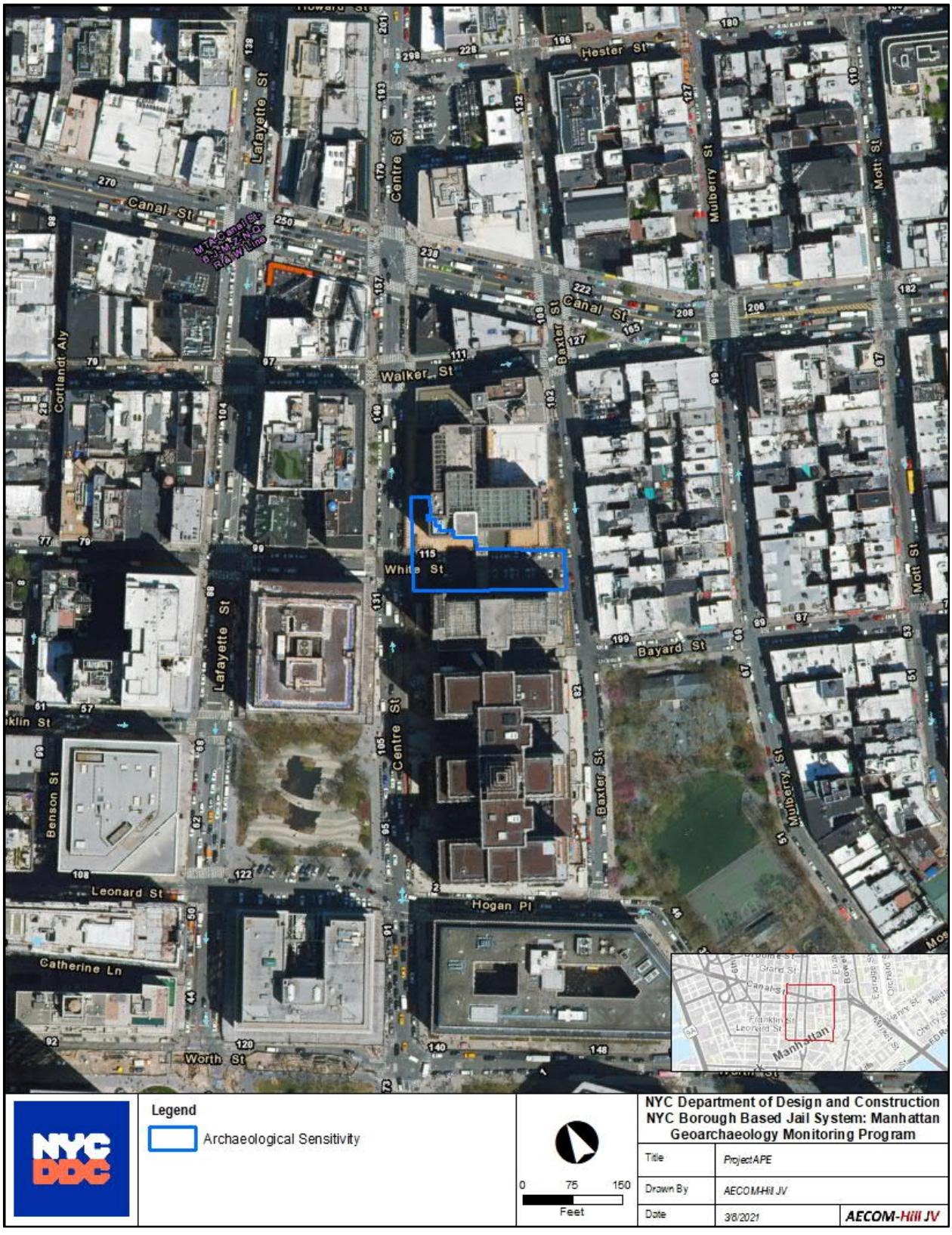

Figure 1. APE Map

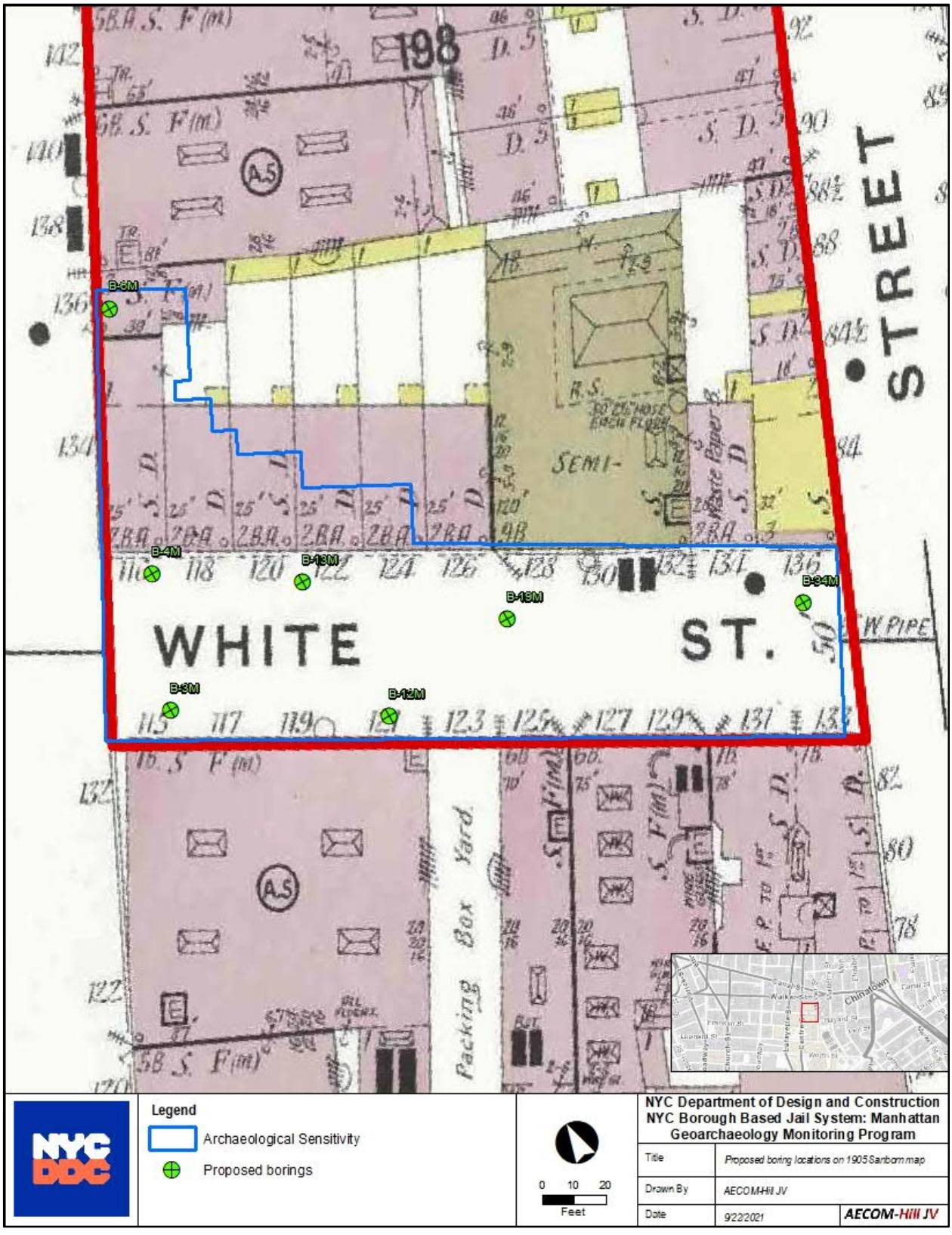

Figure 2: APE on the 1905 Sanborn Insurance map (base map from 2018 AKRF report), showing boring locations

3. Methodology

The geoarchaeological review was conducted by Jesse Walker, Liz LaVigne, and Joel Dworsky, who all meet or exceed the Secretary of Interior Qualifications for Archaeology. Work was completed according to the approved Geoarchaeological Monitoring Plan (Appendix A).

Con Edison Utility Trenches (Test Pits)

Archaeologists documented the stratigraphy and conditions in 8 test pits, which were excavated by Con Edison personnel using jack hammers and hand tools. Photographs, profile drawings, and field notes were completed for each test pit. Twentieth-century fills were documented for the depth of each test pit; therefore, the sediment was not screened for artifacts. Observations of brick, gravel, wood, and any diagnostic material were recorded in field notes.

TRC Environmental and Geotechnical Borings

The geotechnical and environmental boring drilling efforts were both completed by TRC and managed by AHJV. The upper 5 feet of all borings were hand excavated to avoid hitting existing utilities. The environmental borings were advanced to 20 to 25 feet below grade using a geoprobe machine with continuous samples collected in five-foot increments using plastic sleeves. The geotechnical borings were advanced by a geotechnical drill with split spoon samples collected in two-foot segments. Continuous samples from the geotechnical borings were collected and documented to a depth of approximately 30 to 40 feet or at which point the sampling frequency changed to every 5 feet (e.g. 30-32, 35-37, 40-42 etc. in feet bgs). The continuous sampling was extended in any borings that had not encountered glacial sediments within 40 feet of grade to not miss any potentially preserved peat or ground surface.

Each soil sample was trowel scraped to expose a clean profile and was examined on site by an Archaeologist. The profiles were documented using standard soil description nomenclature (Birkeland 1984:353–360; Soil Survey Staff 1993:117–135). The recovery of sediment in the environmental and geotechnical boring samples varied. Soils were compacted and partial recoveries were commonplace in the spoon/sleeve samples. Estimates of the thickness of the strata were made based on the amounts recovered and sediment characteristics among samples. Characteristics recorded included soil horizon designation, Munsell color, texture, consistence, mottles (including redoximorphic features), and the presence of organics/roots, shells and artifacts. The sediment profiles were photographed, and one geotechnical boring (B6M) depicted in the monitoring plan was not advanced because of conflicts with the existing underground MTA subway facilities.

4. Results

Test Pit Monitoring

The test pits were excavated to identify the location of ConEd's Oil-O-Static Electrical Transmission Line along White Street (Figure 3). Table 1 summarizes observations from the test pits. The top of each test pit typically measured 10 feet long by 5 feet wide. The pavers were first carefully removed, exposing a cement and crushed stone subbase. In several of the test pits, re-enforced concrete cement was jackhammered to excavate deeper. Below the crushed stone, modern utilities were encountered in recent earthen fill deposits (Photograph 1- Photograph 10). The depth of the test pits was limited to the top of the existing transmission line, which was typically exposed at approximately 4.5 to 5 feet below grade.

In Test Pit 1, the top of a linear brick feature was observed that is likely a utility duct bank (Photograph 3). Historic maps do not depict buildings in the area of Test Pit 1, so this feature is not interpreted as a wall. A wooden utility conduit was observed approximately 2.5 feet below ground surface in Test Pit 2. The wooden utility conduit is older than the other utilities encountered in the APE, but it is not interpreted to be of cultural significance. No significant archaeological deposits were encountered in any of the test pits;

however, potential still exists for significant historic archaeological deposits within fill deposits in portions of the APE set back from White Street where buildings and yard areas were located.

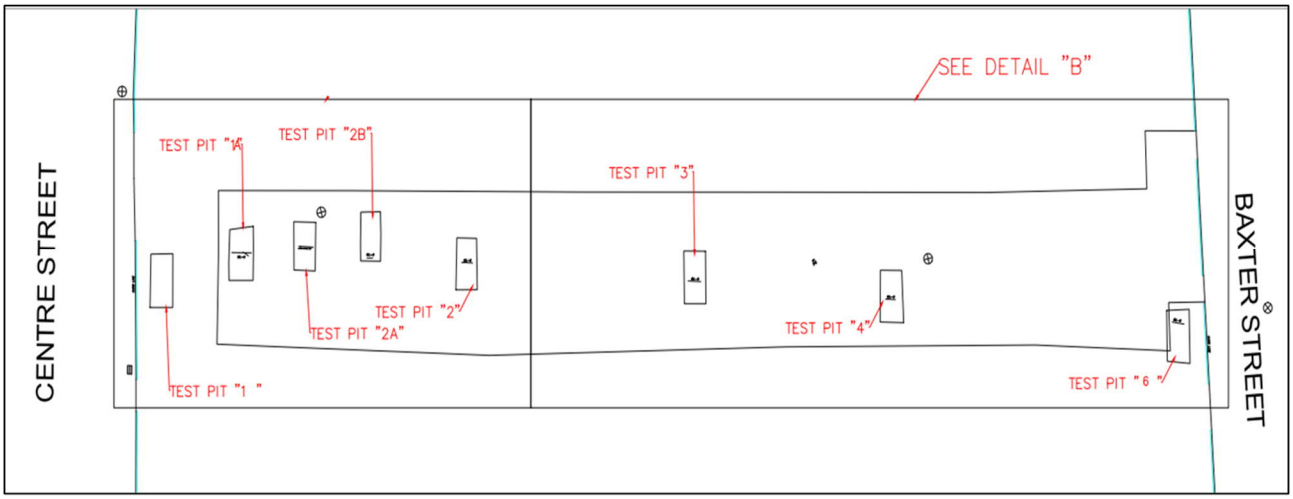

Figure 3: Test Pit Location Map

Table 1. Summary of Test Pits

Test Pit	Base of Excavation	Observations
1	4.0 to 4.6 feet	Brick duct bank utility; 3 other modern utilities; water at base of test pit; two fill deposits (10YR 5/6 sandy loam and 10RY 3/1 coarse sandy loam with gravel and brick fragments
1A	4.75ft	Oil-O-Static Electrical Transmission Line; one fill deposits (10YR 4/6 loamy sand)
2	4.3 ft	Oil-O-Static Electrical Transmission Line; wooden conduit; two fill deposits (10YR 3/2 loam and 10YR 4/2 loam)
2A	2.2 ft	Cement surface encountered across base of test pit; two metal pipe utilities encountered
2B	4.7.5ft	Oil-O-Static Electrical Transmission Line; one other modern utility; plastic noted; two fill deposits (10YR 4/2 loam and 7.5 YR 4/3 sandy loam)
3	3.9 ft	Oil-O-Static Electrical Transmission Line; Isolated wood fragment; three fill deposits (10YR 4/2 loam with gravel, 10YR 4/6 loam with gravel, 10 YR 4/2 loam with gravel)
4	4.ft	Oil-O-Static Electrical Transmission Line; four additional modern utilities; two fill deposits (7.5YR 4/3 sandy loam with brick rubble and 7.5YR 4/2 sandy loam)
6	4.0-4.5	Oil-O-Static Electrical Transmission Line; two additional modern utilities encountered; one fill deposit (10YR 5/6 sandy loam with gravel)

Photograph 1. Central Portion of White Street with Test Pit 2 in Foreground and Baxter Street in Background

Photograph 2. Tests Pits 2A and 1 with Centre Street in Background

Photograph 3. Test Pit 1 by Centre Street

Photograph 4. Test Pit 1A

Photograph 5. Test Pit 2

Photograph 6. Test Pit 2A

Photograph 7. West Profile of Test Pit 2B

Photograph 8. Test Pit 3

Photograph 9. Test Pit 4

Photograph 10. Test Pit 6

Environmental and Geotechnical Boring Monitoring

Archaeologists documented the soil profiles in 2 environmental soil borings and 7 geotechnical borings (Figure 4). Appendix B includes the boring logs. The environmental borings were designated SB2 and SB10 and extended 25 feet below grade. SB2 contained several fill deposits. A coal-rich fill layer was encountered from approximately 23 to 24 feet below grade in SB2, which may relate to historic period occupation. SB10 contained peat at 20 feet; this peat layer was not as thick as peat encountered in other geotechnical borings farther to the west and it was encountered at a shallower depth. SB10 was in the eastern portion of APE near Baxter while the other peat deposits were encountered closer to Centre Street. The nearby geotechnical boring B27M did not contain any peat, so it is unclear if the peat identified in SB10 represented an intact stratum or a deposit that had been historically modified.

The advancement of geotechnical borings B3M, B4M, B12M, B13M, B19M, B27M, and B34M were monitored (Photograph 11) over several weekends. The fill deposits in these borings were found to be 16 to 33 feet thick, with deeper fill typically towards the western end of the APE. In Boring B27M, an iron bolt was recovered at 21 feet below grade. The fill contained brick, cement, angular gravel, and was composed of various sediment types. Peat deposits were encountered in B3M, B4M, B13M, and B19M, and SB2, in the western half of the APE, closer to Centre Street (Photograph 12). The Collect Pond was located southwest of APE and was historically infilled. It is assumed that the peat in the borings correlated to the margins of this waterbody. A large wooden timber was encountered at around 30 feet in B13M and maybe an historic piling (Photograph 13); timber was also noted in B12M. The timber was found at a similar depth to peat deposits in other borings. No Native American artifacts were found in the peat or below the peat deposit.

Below the peat deposits, silt and clay was recorded. These finer sediments, often laminated, are interpreted as low energy alluvial sediments, deposited at the base of a water body. Perhaps Collect Pond once occupied a much larger footprint than it did historically. These waterbody sediments thinned moving eastward within the APE, with none recorded in B27. Gravels and coarse sand found deep below the alluvial sediments are interpreted as glacial or glacio-fluvial. The sediment below the peat likely predates Native American occupation. Buried A horizons or B horizons that would have a potential for Native American archaeological deposits were not observed.

The profiles of the soil borings completed in 2021 are similar to those documented in earlier soil borings (AKRF 2018). Fill deposits indicated the depth of prior disturbance varied across the APE; however, the fill was typically found to be deeper moving westward. Surprisingly, disturbance close to the existing North and South Tower buildings is not as comprehensively deep as anticipated, with peat deposits encountered within less than 20 feet from the walls of these buildings in certain places. The soil borings provided important information about the stratigraphy and the extent of deep impacts from building construction and other historic development. The former landform (wetland/water body margins) appears to have been capped by deep historic fill across a large part of the APE.

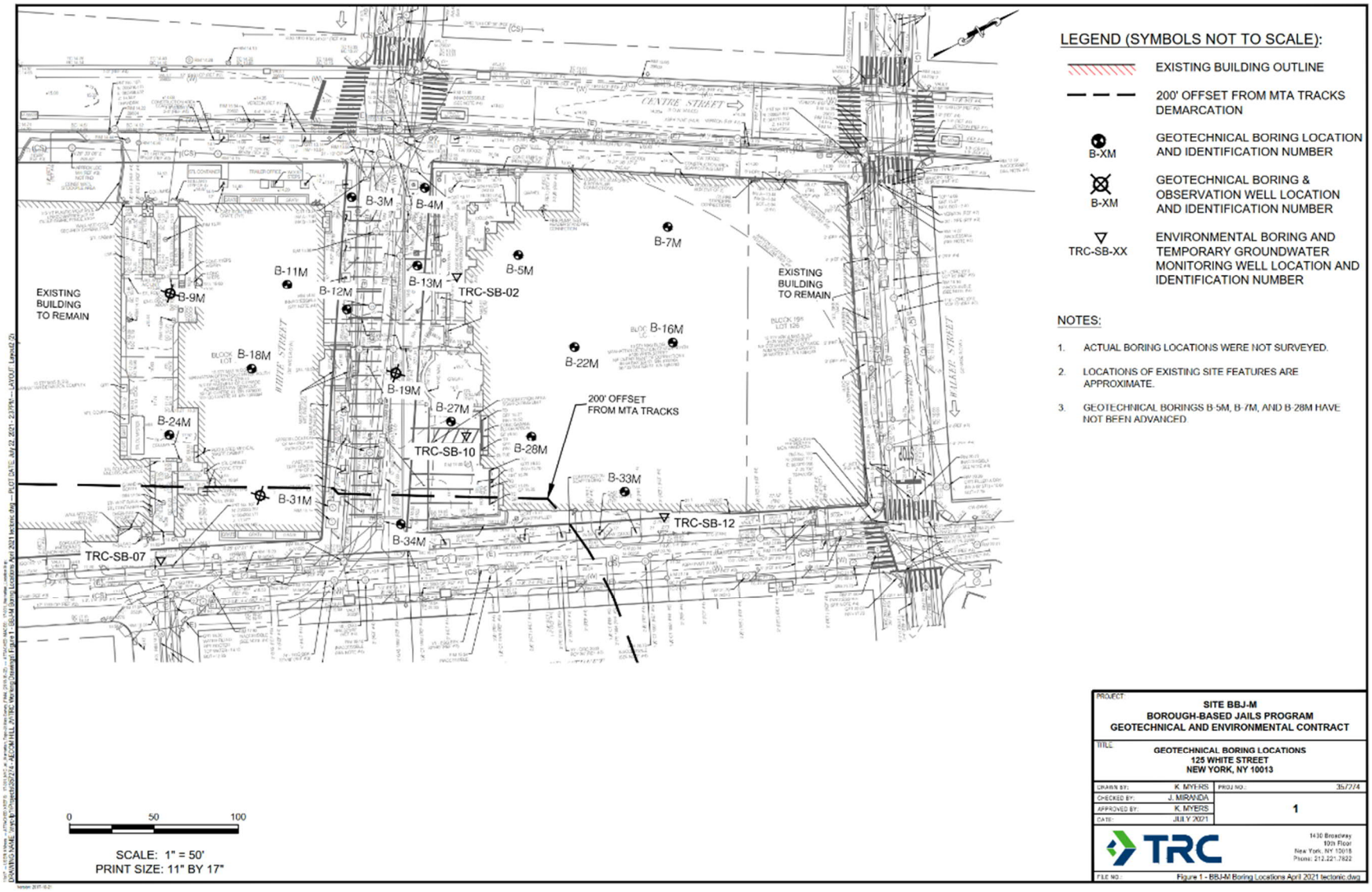

Figure 4. Soil Boring Location Map

Photograph 11. Drilling of B4M

Photograph 12. Peat in B3M from 30 to 32 Feet

Photograph 13. Wood Timber Fragment Recovered from B12M

5. Conclusions

In 2021, AECOM-Hill JV completed geoarchaeological monitoring of soil borings and test pits at the Manhattan site at 124-125 White Street (Block 198, Lot 1; part of Block 167, Lot 1) for the NYC Borough Based Jail Program Manhattan (Project) Area of Potential Effect (APE). The proposed impacts will extend to approximately 40 feet below the existing grade within the APE.

Eight test pits were monitored during ConEd's excavation efforts to identify their Oil-O-Static electrical transmission line. The test pits were shallow and encountered twentieth century fill. Therefore, the test pits provided limited information about stratigraphy. No historical features or structural elements were recorded in any of the test pits.

The environmental borings and geotechnical borings extended through the fill deposits into natural underlying sediments. Multiple fill layers were encountered that reflect the historic development overtime. The 2021 profiles were similar to the stratigraphy from prior soil borings advanced in the APE. Fill deposits ranged from 16 to 33 feet thick. Peat deposits were encountered in several locations, primarily in the western portion of the APE. The presence of peat suggests that intact natural strata are present in portions of the APE, deeply buried by the fill. However, no upland soils (i.e., buried Ab or B horizons) were documented in the borings. These soil borings monitored in 2021 and prior soil borings provide insight into the stratigraphy in the APE; however, given the small size of the borings the potential to recover artifacts was limited.

The sensitivity of Native American and historic period archaeological resources was further examined using the following sources: the 2018 Phase IA archaeological survey report, 2021 borings, paleo-environmental reconstruction of the APE and surroundings, regional Native American settlement patterns/predictive models, and prior archaeological investigations conducted in lower Manhattan and the surrounding area.

Native American Sensitivity

Understanding the pre-1620s paleo-environment in the APE and Native American settlement patterns/predictive models is necessary to assess the Native American archaeological sensitivity in the APE. Collect Pond encompassed between approximately 7.5 to 16 acres based on the georeferencing of several eighteenth and nineteenth century maps. The pond size likely changed over time due to historic infilling. Also, variability in cartography may have affected depiction of the pond size. The portion of Collect Pond within the APE is limited to approximately 1% to 2%. The edge of Collect Pond and the poorly drained wetlands extended into the western portion of the APE near Centre Street. Based on the recovery of peat from the 2021 soil borings, approximately 6,900 square feet (0.1585 acres) of the APE was located in Collect Pond or associated wetlands. The Phase IA report discussed key points about Collect Pond, environmental changes, historic development, and Native American archaeological sensitivity (AKRF, Inc. 2018).

The geoarchaeological investigation at Foley Square also provides paleo-environmental reconstruction of Collect Pond and the surrounding area (Schuldenrein 2003: Figures 11A and 11B). The Foley Square project was located approximately 1000 feet southwest of the APE. In the APE, the silty clay loam and silt clay deposits (i.e., waterbody sediment) from the soil borings below the peat likely represent a sub-tidal estuarine complex that overlaid late glacial sediments, based on comparisons to the Foley Square geoarchaeological investigation (Schuldenrein 2003). The data from the Foley Square investigation indicates the waterbody sediment in the APE could date to the Middle-Late Holocene and that the APE was situated in sub-tidal or below water setting throughout the Holocene and subsequently the freshwater marsh (i.e., Collect Pond) was established around the time of Dutch settlement (Schuldenrein 2003). There are several factors influencing the potential sensitivity for Native American archaeological resources in the APE such as geomorphology, soils/sediments, proximity to water, landform type, proximity to known Native American sites, and historic landscape modifications. The paleo-environmental data indicates the APE was underwater throughout the Holocene, which dramatically reduces the potential for Native American archaeological remains. No shellfish fragments were observed in the soil borings and the conditions may not have supported shellfish in the past. Native American shell middens have been found in the New York City region near brackish water settings (Cantwell and Wall 2001). The Dutch in the seventeenth century mention that a shell midden was present in lower Manhattan possibly near Collect Pond; however, archaeological evidence for this has not been found (Cantwell and Wall 2001:54). The lack of shell in the soil borings indicates that Native American shell middens are unlikely in the APE. Regional data indicates Native American sites are typically situated on well drained landforms close to wetlands and water (Baugher-Perlin et. al. 1982; Lenik 1992; Stewart 2019).

The Foley Square geoarchaeological investigation characterizes the paleo-environmental and changes overtime around Collect Pond. Higher nearby landforms such as the kames, historically called Catimuts Hill and Kalkhoek Promontory, would have been ideal Native American site settings along with other higher landforms. In contrast, the APE was in an aquatic setting with little potential for Native American archaeological sensitivity. Collect Pond and the Holocene estuarine complex at the APE would have supported a wide variety of plant (reeds, tubers) and animal (turtle, freshwater shellfish, snakes, fish, etc.) habitats that would have been exploited by Native Americans.

At the Old Place Neck site on Staten Island, Native American archaeological deposits contained evidence of carbonized macrobotanical nutshells, carbonized raspberry seeds, starch grains (arrowhead tuber) phytoliths (grasses), and blood protein (eel, bear), highlighting the variety of plants and animals exploited (PAL 2012). Varieties of plant/animal resources would have been available at Collect Pond and attracted Native Americans for food and other purposes (i.e., medicinal, religious, and utilitarian) to this location, but Native Americans would have been at the pond for only short periods to obtain plant/animals to bring back to sites located on dry land. The Holocene changes in water salinity related to sea level would have altered plant and animal species at the pond.

Prior archaeology investigations near Collect Pond and the APE have not extensively sampled deeper deposits at the base of the historic fill deposits; therefore, the existing archaeological data is not a reliable

indicator for the presence/absence of Native American archaeological deposits near the pond. Four sites (i.e., 60 Wall Street, Barclay's Bank, A. Heerman's Warehouse, and Stadt Huys) in lower Manhattan recovered Native American artifacts in mixed contexts with historic archaeological remains. These four sites are each situated over 4,200 feet from the APE primarily near the East River (Lenik 1992). Since buried well drained soils (i.e., Ab or B horizons) were not observed in the soil borings in the APE, this also corroborates the assessment that the APE has a low sensitivity for Native American archaeological resources. The comprehensive impacts from historic construction, utilities, and grading since Dutch settlement have significantly altered/destroyed any former ground surface, which would have been utilized for Native American occupation. In the AKRF, Inc. Phase IA report (2018: 15), the APE was considered to have low sensitivity for Native American resources. Based on the 2021 soil boring data that the APE is located in a sub-tidal and below water environment, AECOM-Hill JV also considers the Native American archaeological sensitivity low. Potential types of Native American archaeological resources in the APE would be fishing weir/traps, digging sticks, canoes, or isolated tools. Fish weirs made from stone or wood have been found in Boston and other places in the Northeast, but they are uncommon in buried archaeological contexts (Lutin 1992). Finding isolated digging sticks, tools, or canoes would also be a rare discovery, as would a canoe that could also be from post-Contact European times.

Historic Period Sensitivity

AKRF, Inc. (2018: 15) assessed the APE to have low to moderate sensitivity for historic period archaeological resources. Historic deposits associated with nineteenth century buildings in the southwest corner of Block 198 at the historic addresses of 116/118 White Street are within the APE and this portion of the APE could contain foundation remains, yard deposits, and shaft features. Other foundation remains may exist in the APE; however, historic maps indicate that White Street was established in the early nineteenth century and buildings were constructed along the street and not in the roadbed. Undisturbed portions of White Street could contain significant fill deposits or other historic period archaeological resources. Prior archaeological work in Manhattan has demonstrated that analysis of historic fill deposits can provide significant information about nineteenth century lifeways (GRA 2016). The fill deposits from approximately five to 10 feet below the current grade are anticipated to date to the twentieth century and have limited archaeological sensitivity. Deeper historic fills are more likely to have a higher archaeological sensitivity.

In addition to the sensitivity of the fill, archaeological sensitivity exists for the late eighteenth century ropewalk mapped across the APE. The wooden timber found in B12M could potentially represent the remains of piers, cribbing, a building support, a wooden utility related to the ropewalk, or a natural object. The timber was found near the subterrain tunnel connecting the North and South Towers. The timber could be related to the tunnel or twentieth century construction; thus, further investigation of this portion of the APE is warranted. Based on the 2021 boring data and prior Phase IA, AECOM-Hill JV considered the APE to have a low to moderate sensitivity for historic period archaeological resources.

6. Recommendations

AECOM-Hill JV considers the APE have to a low sensitivity for Native American archaeological resources and a low to moderate sensitivity for historic period archaeological resources. Based on archaeological sensitivity, further additional archaeological investigation is recommended. The recommended approaches for additional archaeological investigation will follow LPC guidelines and be developed in consultation with LPC. An unanticipated discovery plan must be reviewed and approved by LPC prior to facility construction.

Phase IB archaeological testing throughout the area of archaeological sensitivity will be conducted with the assistance of heavy equipment and extend down to approximately 15 feet below grade, which is the approximate reach of heavy equipment. The work will consist of several trenches in White Street and former lots at 116/118 White Street located near the corner of White and Centre Streets. This Phase IB

testing will begin during site validation and enabling work of the new facility, which will be after the dismantling of the existing buildings and decommissioning of utilities. Due to the proximity of the existing subway tunnel and Oil-O-Static Electrical Transmission Line, Phase IB testing may be limited near Centre Street and White Street. The depth of the Phase IB testing may also be limited by the depth of ground water. A Phase IB archaeological work plan must be reviewed and approved by LPC prior starting this fieldwork.

Separate from the Phase IB archaeological testing, archaeological monitoring is recommended below approximately 15 feet. Archaeological monitoring during construction will be necessary due to the depth of the proposed impacts, thickness of fill, depth of peat deposits, and ground water table. The monitoring will be conducted during excavation of the project area. Temporary construction work stoppages may be required during the monitoring to investigate archaeological deposits. The monitoring will further explore for timbers near Soil Boring B13M and other portions of the APE. The monitoring will examine the peat deposits and fill deposits below approximately 15 feet down to below the peat and fill to identify archaeological features, archaeological deposits, and artifact concentrations. The peat deposits will be inspected for possible Native American remains and historic period remains. The stratigraphy of the fill deposits will be recorded during the soil removal process. Samples of temporally diagnostic artifacts should be collected to date the fill and reconstruct the sequence of infilling similar to the Riverside Project on the Upper West Side of Manhattan (GRA 2016). Monitoring will seek to determine if archaeological deposits associated with the ropewalk exist in the APE. LPC must approve the archaeological monitoring plan prior to start of construction-related excavations.

Further Phase II/III archaeological investigations may also be needed based on the results of the Phase IB investigation and archaeological monitoring. All plans and reports must follow LPC's Guidelines for Archaeological Work in New York City.

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Appendix A Workplan and Approval

Geoarchaeological Monitoring Work Plan

NYC Department of Design and Construction
NYC Borough Based Jail System: Manhattan

Prepared for
New York City Department of Design and Construction
Landmarks Preservation Commission

Elisabeth A. LaVigne, MA, RPA

March 16, 2021
March 30, 2021 – Revised

FINAL DRAFT

Prepared for:

New York Department of Design and Construction (DDC)
Landmarks Preservation Commission (LPC)

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Appendix: Resume

1. Introduction and Project Background

The purpose of this proposed Geoarchaeological Monitoring Program (GMP) is to identify the presence or absence of intact or truncated buried surfaces with the potential for archaeological resource preservation within the New York City Borough Based Jail System Manhattan (Project) area of potential effect (APE) (Figure 1). The Project is being undertaken to establish a new facility that will house individuals who are in the City's correctional custody. The Manhattan site at 124-125 White Street (Block 198, Lot 1; part of Block 167, Lot 1) is one of four proposed facility locations. The Project APE corresponds to the area of archaeological sensitivity established within AKRF Inc.'s supplemental Phase IA report for this property (AKRF 2018).

The research that AKRF completed in 2018 indicates that there is no archaeological potential within the footprint of the modern North Tower on Block 198 (north of White Street) where cellar excavation has impacted the likelihood for preservation. There is low potential for Precontact archaeological resources within the southwestern portion of the block (currently sidewalk and plaza) as well as within the street bed of White Street. The Project APE encompasses these locations. Any Precontact resources would be at a depth between 20-40 feet below ground surface (bgs), which correlates to peat and bog deposits identified in prior geotechnical borings. These deposits relate to the freshwater Collect Pond, which was once located southwest of the Project APE, and surrounding marshes. While marshland would not typically been utilized as a dwelling area, these freshwater resources were a significant source of water, food, and other resources for indigenous populations. AKRF determined there to be low to moderate sensitivity for historic resources within the same southwestern portion of the block and White Street. Historic resources may be found within the historic fill levels as well as the original ground surface.

As part of the project planning and design phase, utility trenches and additional geotechnical borings will be excavated within the Project APE by Con Edison and TRC (AECOM-Hill JV's geotechnical consultant), respectively. The GMP will include monitoring both the trenching and borings in order to gather information regarding the stratigraphy and disturbance depth and to identify strata with archaeological preservation potential within the Project APE. The goal of this monitoring effort is to utilize already proposed ground disturbance by Con Edison and TRC to gather information that can inform whether or not additional archaeological testing is warranted.

2. Geoarchaeological Monitoring Program

Guidelines and Qualifications

The following GMP is consistent with the Landmarks Preservation Commission's (LPC) *Guidelines for Archaeological Work in New York City* (LPC 2018) and the *Standards for Cultural Resource Investigations and the Curation of Archaeological Collections in New York State* (NYAC 1994). The GMP will be overseen by Elisabeth LaVigne, AECOM's Senior Geoarchaeologist who is a registered archaeologist with the Register of Professional Archaeologists (RPA) and exceeds the Secretary of the Interior's professional qualifications standards (36 CFR 61). Other RPA-registered archaeologists working under the supervision of Ms. LaVigne may also monitor~~ing~~ soil borings and trench activities.

Monitoring Strategy and Recordation

The GMP will be limited to the Project APE, which includes White Street in between Baxter Street and Centre Street as well as a portion of sidewalk and plaza along the southwest sides of the currently standing North Tower. Monitoring will include both trenches and geotechnical borings.

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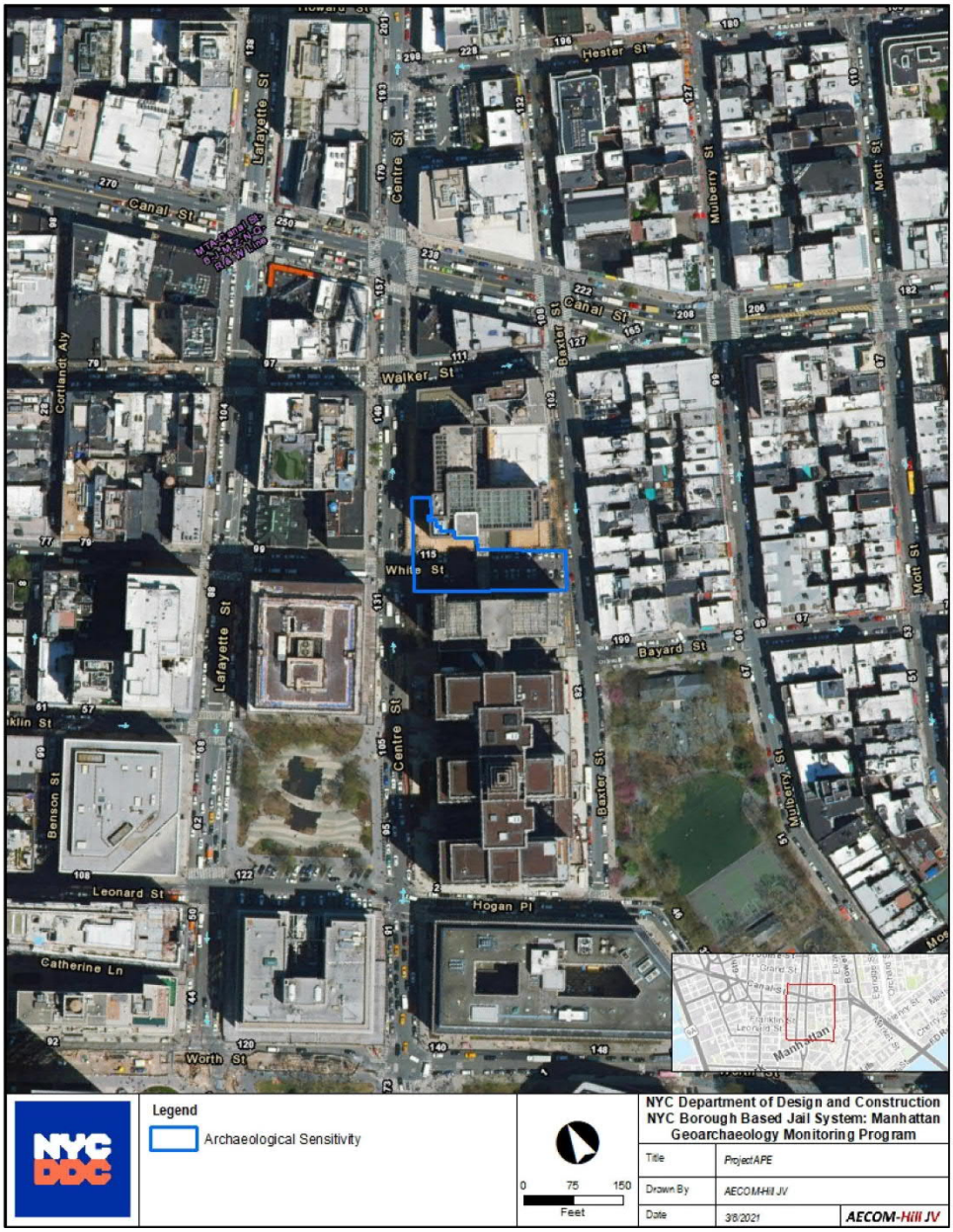

Figure 1: Project APE.

Con Edison Utility Trenches

Five utility trenches will be excavated by Con Edison within White Street to a maximum depth of five feet. The test pits will measure approximately 15 feet in length and 5 feet in width. The trenches will be oriented north/south and spaced approximately 50 feet apart as shown in Figure 2. According to the Phase IA background research (AKRF 2018), AECOM-Hill JV does not anticipate historic features or walls will be in the street bed of White Street within the first 5 feet of fill. However, an archaeologist will be on call to review exposed trench profiles.

The trenches are anticipated to be excavated within existing utility trenches, but there is always the potential for exposure of distinct stratigraphy outside of the Con Edison trenches. The ConEd Chief Construction Inspector will monitor the trench work, photo document exposed profiles, and provide to AECOM-Hill JV's Senior Geoarchaeologist to review prior to trench closing. If anything of note is determined (i.e. archaeological features, walls, or preserved soils), an archaeologist will be sent out to complete documentation. An archaeologist will also be onsite frequently to do a full documentation of exposed profiles regardless of whether sensitive strata or features are encountered. The trenches are anticipated to be completed within two weeks.

Full documentation will include photos and-profile drawings with depths, Munsell color, and texture descriptions. Screening for artifacts will be limited to any soil identified as an intact or truncated buried surface. Any diagnostic artifacts visually noted during the examination of the sediment from historic fill layers will also be noted.

TRC Geotechnical Borings

The primary purpose of the geotechnical borings is to provide data about subsurface conductions for foundation design and construction. AECOM-Hill JV provided to TRC all available drawings showing subsurface structures and utilities to prepare the boring plan. As the geotechnical investigation program is not intended to satisfy the requirements for obtaining New York City Department of Building (NYC DOB) permits and approvals for construction of the proposed new facilities, a hybrid boring frequency was selected. One boring per 2,000 sq. ft. within the center core (60,000 sq. ft.) and one boring per 4,000 sq. ft. outside center core. The boring selection has been developed via several reiterations of a frequency grid and a final reduced boring selection has been determined by DDC/AECOM-Hill JV/TRC. This led to a final selection of borings as shown in the Figure 3.

Borings will be advanced at the general locations depicted on Figure 3 by locating with a portable global positioning system (GPS) device. If any boring location is required to be relocated, the alternate location will be documented with the portable GPS device. Prior to mobilization, TRC's drilling subcontractor will submit a ticket for a One Call/811 mark-out. Additionally, a buried utility survey will be performed to confirm proposed boring locations are clear of subsurface utilities and structures. TRC's drilling subcontractor will pre-clear each boring location by means of vacuum excavator and/or soft digging techniques to a minimum depth of six (6) feet bgs prior to advancing borings. If deemed necessary, borings will be relocated within 5 ft and reattempted.

Seven geotechnical borings will be excavated by TRC within the Project APE (Figure 3). If obstructions due to field conditions are still encountered after attempted relocations, borings might be aborted, reducing the total number of borings. The borings are anticipated to extend to a depth of 100 feet or to five feet into competent bedrock, whichever is shallower. Continuous samples will be collected and documented to a depth of 20 feet at which point the sampling frequency will change to every 5 feet (e.g. 20-22, 25-27, 30-32, etc. in feet bgs). If glacial sediments have not been encountered within the first 22 feet, then the continuous sampling will be extended in order to not miss any potentially preserved peat or ground surface that has been observed in previous borings up to a depth of 40 feet bgs in order to assess whether or not peat or intact ground surface is preserved at each location.

Each 2-foot split spoon sample will be examined on site by an archaeologist and the sediment profile trowel scraped in order to expose a clean profile. The profiles will be documented on boring forms using standard soil description nomenclature (Birkeland 1984:353–360; Soil Survey Staff 1993:117–135). Characteristics recorded on these forms include soil horizon designation, Munsell color, texture, consistence, mottles (including redoximorphic features), and the presence of organics/roots, shells, and artifacts. The sediment profiles will be photographed.

OPRHP guidance (NYAC 1994) recommends that traditional archaeological tests be placed at a maximum of 50-foot (15-meter) intervals. LPC recommends that "for most sites in New York City a much narrower interval, such as 15 feet (3 meters) should be used" (LPC 2018: 41). The monitored geotechnical borings measure an average of 60-feet (18-meters) apart. While the geotechnical borings will be at a wider spacing than required for archaeological testing, the

goal of the geotechnical boring monitoring will be to determine whether buried soils, truncated soils, peat, or wetland sediments with the potential to contain archaeological resources are preserved below the historic fill levels. Screening for artifacts will be limited to any soil identified as an intact or truncated buried surface. Any diagnostic artifacts visually noted during the examination of the sediment from historic fill layers will also be documented.

3. Reporting

The GMP report will be completed within 30 business days after completion of the trench and boring monitoring. The report will summarize the results of the monitoring, the recovered data, and recommendations for additional testing, if any; a log of the strata encountered in the trenches and borings, along with graphic representation of the stratigraphy, will be included in the report. The report will follow the standards set forth in OPRHP's *Phase I Archaeological Report Format Requirements* (2005) and the LPC's guidelines. AECOM-Hill JV anticipates adjusting the next phase of proposed archaeological testing to adhere to LPC's recommendations based on their review of the GMP report.

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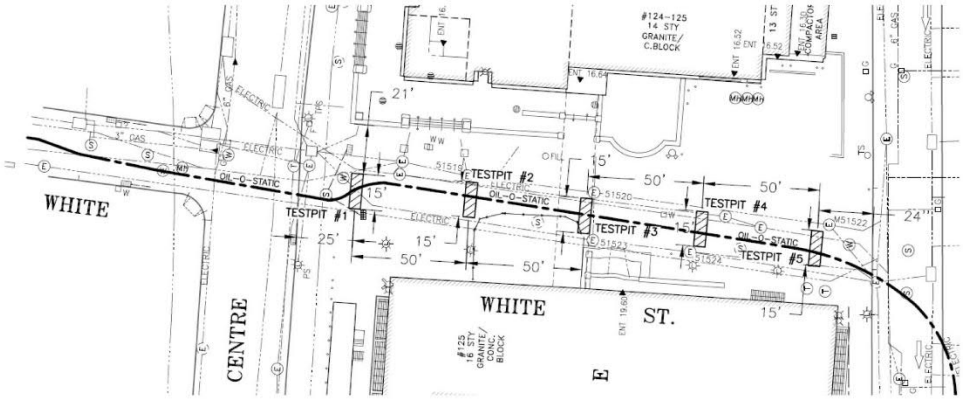

Figure 2: Proposed test pit locations.

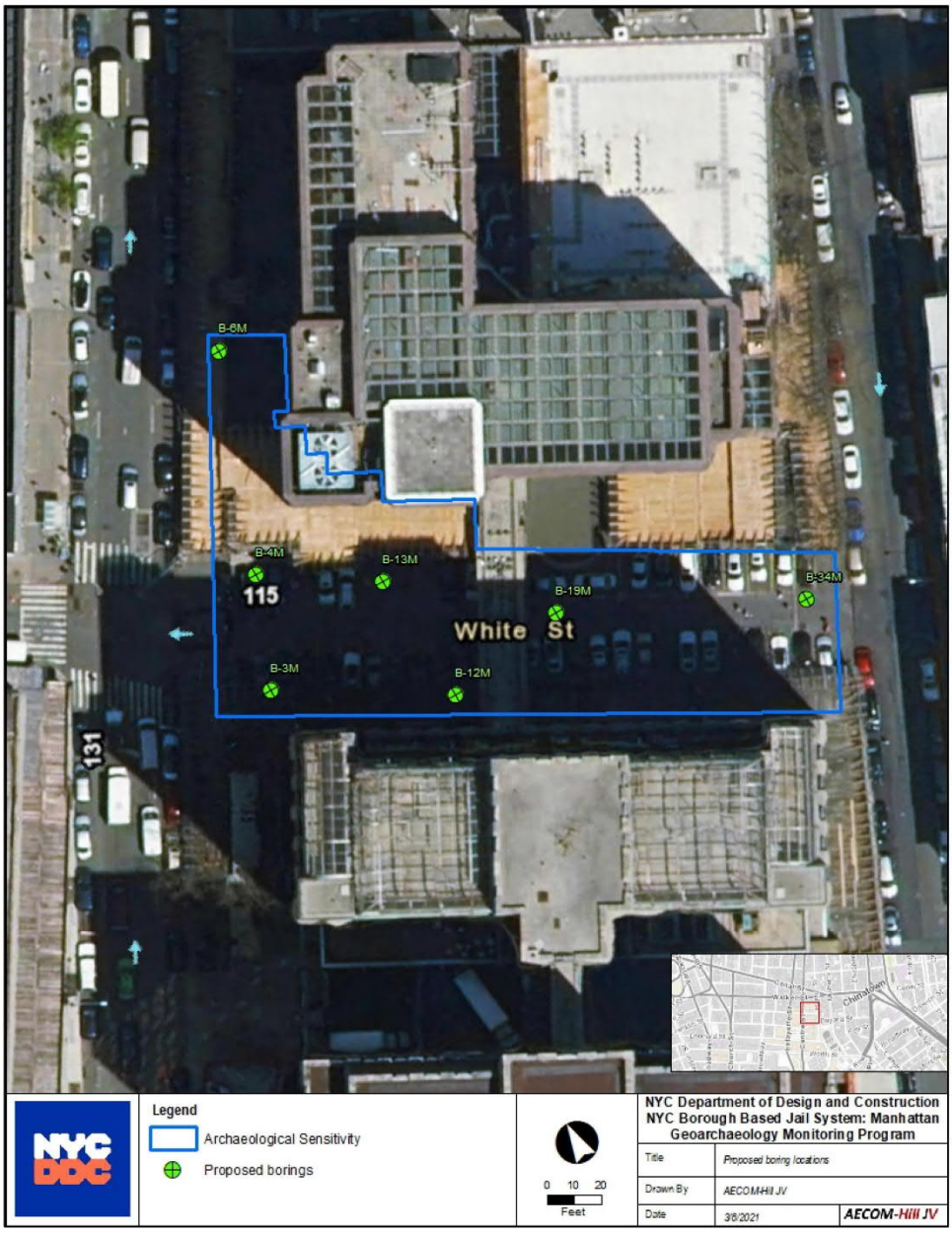

Figure 3: Proposed Geoprobe testing locations.

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ARCHAEOLOGY REVIEW

Project number: 18DOC001Y (DEPT. OF CORRECTION)
Project: BOROUGH BASED NYC JAIL SYSTEM
Date Received: 3/31/2021

Comments: as indicated below. Properties that are individually LPC designated or in LPC historic districts require permits from the LPC Preservation department. Properties that are S/NR listed or S/NR eligible require consultation with SHPO if there are State or Federal permits or funding required as part of the action.

This document only contains Archaeological review findings. If your request also requires Architecture review, the findings from that review will come in a separate document.

Comments: The LPC is in receipt of the revised, "Geoarchaeological Monitoring Work Plan, NYC Borough Based Jail System: Manhattan," prepared by AECOM and dated March 30, 2021. The requested changes were made. Please alert LPC when work begins.

3/31/2021

SIGNATURE DATE
Amanda Sutphin, Director of Archaeology

File Name: 33498_FSO_ALS_03312021.docx

Appendix B Core Log

Bore ID	Cm	Ft	Munsell	Soil Texture	Horizon	Description
B3M	0-30	0-1	NA	NA	fill	cement
B3M	30-91	1-3	10YR 5/3	sandy loam	fill	brick and cement fill
B3M	91-137	3-4.5	7.5YR 3/2	sand	fill	brick and cement fill
B3M	137-152	4.5-5	5YR4/3	sand	fill	brick and cement fill
B3M	152-168	5-5.5	5YR4/3	sand and gravel	fill	fill
B3M	168-213	5.5-7				no recovery
B3M	213-274	7-9				no recovery
B3M	274-290	9-9.5	5YR 3/2	sand	fill	fill
B3M	290-335	9.5-11				no recovery
B3M	335-351	11-11.5	10YR 3/2	sand	fill	fill with brick
B3M	351-396	11.5-13				no recovery
B3M	396-411	13-13.5	10YR 3/2	sand	fill	fill with brick
B3M	411-457	13.5-15				no recovery
B3M	457-480	15-15.75	7.5YR 3/1	sandy loam	fill	fill
B3M	480-488	15.75-16	10YR 2/1	sand	fill	fill
B3M	488-518	16-17				no recovery
B3M	518-543	17-17.8	10YR 2/1	sand	fill	fill with trace of brick and cement
B3M	543-579	17.8-19				no recovery
B3M	579-610	19-20	10YR 2/1	clay	fill	fill
B3M	610-640	20-21	7.5YR 4/4	sand	fill	fill with brick fragments
B3M	640-671	21-22	7.5YR 4/4	sand	fill	fill
B3M	671-701	22-23				no recovery
B3M	701-716	23-23.5	10YR 2/1	silt clay loam	fill	fill
B3M	716-762	23.5-25	7.5YR 4/4	coarse sand and gravel	fill	fill
B3M	762-777	25-25.5	7.5YR 4/4	coarse sand and gravel	fill	fill
B3M	777-823	25.5-27				no recovery
B3M	823-914	27-30				no recovery
B3M	914-924	30-30.33	10YR 3/3	Peat	2C1	wetland
B3M	924-975	30.33-32				no recovery
B3M	975-981	32-32.2	10YR 3/3	Peat	2C1	wetland
B3M	981-1036	32.2-34				no recovery
B3M	1036-1097	34-36				no recovery
B3M	1097-1122	36-36.8	10YR 3/3	Peat	2C1	wetland

Bore ID	Cm	Ft	Munsell	Soil Texture	Horizon	Description
B3M	1122-1158	36.8-38				no recovery
B3M	1158-1180	38-38.7	10YR 3/3	Peat	2C1	wetland
B3M	1180-1219	38.7-40				no recovery
B3M	1219-1280	40-42	10YR 2/1	Peat	2C2	wetland
B3M	1280-1305	42-42.8	10YR 2/1	silt loam	3C1	wetland (organics)
B3M	1305-1372	42.8-45				no recovery
B3M	1372-1433	45-47	10YR 2/1 and 10YR 3/2	silty clay	3C2	wetland (organics)
B3M	1433-1478	47-48.5	10YR 3/2	silty clay	3C3	wetland/water body edge (mica, isolated organics, banding)
B3M	1478-1494	48.5-49				no recovery
B3M	1494-1585	49-52				no recovery
B3M	1585-1646	52-54	5Y 3/1	clay	3C4	water body
B3M	1646-1676	54-55				no recovery
B3M	1676-1737	55-57	5Y 3/1	silty clay	3C4	water body
B3M	1737-1789	57-58.7	5Y 3/1	silty clay	3C4	water body
B3M	1789-1798	58.7-59	10R 4/2	medium to coarse sand	4C1	glacial/glaciofluvial
B3M	1798-1981	59-65				no recovery
B3M	1981-2003	65-65.7	5YR 2/1	medium sand	4C2	glacial/glaciofluvial
B3M	2003-2134	65.7-70				no recovery
B3M	2134-2286	70-75				no recovery
B3M	2286-2301	75-75.5	5YR 4/4	angular gravels	4C3	glacial/glaciofluvial
B3M	2301-2438	75.5-80				no recovery
B3M	2438-2454	80-80.5	5YR 4/4	coarse sand	4C4	glacial/glaciofluvial

Bore ID	Cm	Ft	Munsell	Soil Texture	Horizon	Description
B4M	671-762	22-25				inwash
B4M	762-778	25-25.5	5YR 3/3	fine to coarse sand and gravel	fill	fill
B4M	778-823	25.5-27				no recovery
B4M	823-843	27-27.7	5YR 3/4	fine to med sand and gravel	fill	fill
B4M	843-914	27.7-30				no recovery
B4M	914-924	30-30.3	5YR 3/1	organic-possible peat fragments	fill	fill
B4M	924-938	30.3-30.8	5YR 3/3	fine to coarse sand	fill	fill
B4M	938-946	30.8-31	10YR 3/3	med to coarse sand and gravel	fill	fill
B4M	946-954	31-31.3	2.5YR 6/4 m/w 5YR 3/3	med to coarse sand and gravel	fill	fill
B4M	954-975	31.3-32				no recovery
B4M	975-1005	32-33		NA	fill	fill: wood or timber
B4M	1005-1010	33-33.1	5YR 3/3	fine to med sand and gravel	fill	fill
B4M	1010-1067	33.1-35				no recovery
B4M	1067-1103	35-36.2	Peat 5YR3/2 to 5YR3/4	peat	2C1	wetland: lots of wood inclusions, feels spongy
B4M	1103-1128	36.2-37				no recovery
B4M	1128-1189	37-39	5YR 3/4	peat w/ fine silt	2C2	wetland: very waterlogged
B4M	1189-1216	39-39.9	5YR 2.5/1	silt	2C3	wetland/water body edge: no organics
B4M	1189-1250	39-41	5YR 3/4	peat w/ wood fragments	2C4	wetland/water body edge: lots of wood inclusions and organics
B4M	1250-1260	41-41.3	5YR 3/2	silt	2C5	wetland/water body edge
B4M	1260-1286	41.3-42.2	2.5YR 2.5/1	silt	3C1	water body
B4M	1286-1311	42.2-43				no recovery

Bore ID	Cm	Ft	Munsell	Soil Texture	Horizon	Description
B4M	1311-1351	43-44.3	5Y 3/2	silty clay loam	3C2	water body
B4M	1351-1372	44.3-45	5Y 2.5/1	silty clay loam	3C3	water body, compact
B4M	1372-1433	45-47	Gley 1 4/N	silty clay	3C4	water body
B4M	1433-1494	47-49	Gley 1 4/N to Gley 2 4/BG	silty clay	3C4	water body
B4M	1494-1555	49-51	2.5YR 3/2	silty clay loam	3C5	water body
B4M	1554-1615	51-53	2.5YR 3/2	silty clay	3C5	water body: very loose and wet, possible organics
B4M	1615-1635	53-53.6	2.5YR 4/2	silty clay	3C6	water body
B4M	1635-1676	53.6-55				no recovery
B4M	1676-1737	55-57	2.5YR 3/2 to 3/1	loamy fine to coarse sand	4C1	glacial/glaciofluvial
B4M	1737-1829	57-60				no recovery
B4M	1829-1846	60-60.6	5YR 4/6	med to coarse sand	4C2	glacial/glaciofluvial
B4M	1846-1859	60.6-61	2.5YR 4/2	med to coarse sand	4C3	glacial/glaciofluvial
B4M	1859-1890	61-62	2.5YR 4/2	silty clay	4C4	glacial/glaciofluvial
B4M	1890-1981	62-65				no recovery
B4M	1981-2021	65-66.3	2.5YR 4/2	med to coarse sand	4C5	glacial/glaciofluvial
B4M	2021-2042	66.3-67				no recovery
B4M	2042-2103	67-69				no recovery
B4M	2134-2184	70-71.7	5YR 4/6	gravel and coarse sand	4C6	glacial/glaciofluvial
B4M	2184-2195	71.7-72	2.5YR 4/2	coarse sand	4C7	glacial/glaciofluvial
B12M	914-975	30-32			1C	timber
B12M	975-1067	32-35				no recovery
B12M	1067-1128	35-37			1C	timber
B12M	1219-1222	40-40.1			1C	timber

Bore ID	Cm	Ft	Munsell	Soil Texture	Horizon	Description
B12M	1222-1280	40.1-42	7.5YR 3/1	clay	2C1	water body, some organics
B12M	1341-1356	44-44.5	7.5YR 4/1	clay	2C1	water body, sand lenses
B12M	1356-1402	44.5-46				no recovery
B12M	1402-1463	46-48				no recovery
B12M	1463-1478	48-48.5	7.5YR 3/1	clay	2C1	water body
B12M	1478-1494	48.5-49	2.5YR 2.5/1	silty clay	2C2	water body
B12M	1494-1524	49-50				no recovery
B12M	1524-1570	50-51.5	2.YR 3/1	silty clay	2C2	water body
B12M	1570-1676	51.5-55				no recovery
B12M	1676-1722	55-56.5	10YR 4/3	coarse sand and gravel	3C1	glacial/glaciofluvial
B12M	1722-1829	56.5-60				no recovery
B12M	1829-1850	60-60.7	2.5YR 3/3	coarse sand and gravel	3C2	glacial/glaciofluvial
B12M	1850-1981	60.7-65				no recovery
B12M	1981-1987	65-65.2	5YR 3/3	coarse sand and gravel	3C3	glacial/glaciofluvial
B12M	1987-2134	65.2-70				no recovery
B12M	2134-2143	70-70.3	10YR 3/2	coarse sand and gravel	3C4	glacial/glaciofluvial
B12M	2143-2286	70.3-75				no recovery
B12M	2286-2307	75-75.7	10YR 3/2	coarse sand and gravel	3C4	glacial/glaciofluvial
B13M	0-122	0-4	2.5YR 2.5/3	sand	fill	fill
B13M	122-137	4-4.5	NA	NA	fill	fill: rock
B13M	137-152	4.5-5	10YR 4/6	sandy loam	fill	fill with cement, brick
B13M	152-183	5-6				no recovery
B13M	183-198	6-6.5	10YR 3/3	loamy sand	fill	fill with brick
B13M	198-244	6.5-8				no recovery
B13M	244-265	8-8.7	10YR 3/4	coarse sand and gravel	fill	fill with brick
B13M	265-305	8.7-10				no recovery

Bore ID	Cm	Ft	Munsell	Soil Texture	Horizon	Description
B13M	305-314	10-10.3	10YR 3/3	loamy sand and gravel	fill	fill
B13M	314-366	10.3-12				no recovery
B13M	366-375	12-12.3	NA	NA	fill	fill, brick and cement
B13M	375-384	12.3-12.6	NA	NA	fill	fill: burnt wood
B13M	384-396	12.6-13	10YR 3/4	sandy loam	fill	fill
B13M	396-427	13-14				no recovery
B13M	427-436	14-14.3	10YR 3/4	sandy loam	fill	fill
B13M	436-442	14.3-14.5	10YR 3/1	sandy loam	fill	fill with wood
B13M	442-488	14.5-16				no recovery
B13M	488-527	16-17.3	5Y 3/1 mix with 2.5R 2.5/1	coarse sand	fill	fill
B13M	527-610	17.3-20				no recovery
B13M	610-619	20-20.3	7.5YR 3/4	loamy sand	fill	fill
B13M	622-631	20.4-20.7	10YR 2/1	clay	fill	fill
B13M	631-640	20.7-21	5YR 3/3	sandy loam and gravel	fill	fill
B13M	640-762	21-25				no recovery
B13M	762-783	25-25.7	5YR 3/2	med to coarse sand and gravel	fill	fill
B13M	783-823	25.7-27				no recovery
B13M	823-847	27-27.8	5YR 3/2	med to coarse sand and gravel	fill	fill
B13M	847-914	27.8-30				no recovery
B13M	914-939	30-30.8	10YR 3/2	sandy loam and gravel	fill	fill
B13M	939-1067	30.8-35				no recovery
B13M	1067-1099	35-36.1	2.5Y 2.5/1	peat	1C1	wetland
B13M	1099-1128	36.1-37				no recovery
B13M	1128-1219	37-40				no recovery
B13M	1219-1232	40-40.4	7.5 YR 3/2	silty loam	1C2	wetland, roots present
B13M	1232-1280	40.4-42				no recovery
B13M	1280-1371	42-45				no recovery
B13M	1372-1389	45-45.6	2.5 Y 5/1	silty clay loam	2C1	water body

Bore ID	Cm	Ft	Munsell	Soil Texture	Horizon	Description
B13M	1389-1418	45.6-46.5	2.5 Y 5/1	silty clay loam	2C1	water body
B13M	1418-1427	46.5-46.8	2.5Y 4/1	silty clay loam	2C2	water body
B13M	1427-1433	46.8-47				no recovery
B13M	1433-1524	47-50				no recovery
B13M	1524-1585	50-52	2.5Y 4/1	silty clay loam	2C2	water body
B13M	1585-1676	52-55				no recovery
B13M	1676-1716	55-56.3				no recovery
B13M	1716-1737	56.3-57	7.5YR 5/1	silt	2C3	water body
B13M	1737-1828	57-60				no recovery
B13M	1829-1869	60-61.3	5YR 4/2	loamy sand	3C1	glacial/glaciofluvial
B13M	1869-1890	61.3-62				no recovery
B13M	1890-1943	62-63.7	5YR 4/2	loamy sand	3C1	glacial/glaciofluvial
B13M	1943-1981	63.7-65				no recovery
B13M	1981-2011	65-66	7.5YR 4/6	loamy sand	3C2	glacial/glaciofluvial
B19M	0-61	0-2		loose sediment	fill	fill
B19M	61-104	2-3.4	10YR 3/3	sandy loam	fill	fill with brick fragments
B19M	104-122	3.4-4				no recovery
B19M	122-141	4-4.6	7.5YR 6/2	sandy loam and gravel	fill	fill with brick fragments
B19M	141-183	4.6-6				no recovery
B19M	183-188	6-6.2	7.5YR 6/2	sandy loam and gravel	fill	fill with brick fragments
B19M	188-192	6.2-6.3	2.5Y 2.5/1		fill	asphalt
B19M	192-196	6.3-6.4	10YR 4/3	sandy loam and gravel	fill	fill
B19M	196-203	6.4-6.7	10YR 6/2	sandy loam and gravel	fill	fill
B19M	203-244	6.7-8				no recovery
B19M	244-251	8-8.2	10YR 4/3	loamy sand	fill	fill

Bore ID	Cm	Ft	Munsell	Soil Texture	Horizon	Description
B19M	251-278	8.2-9.1	10YR 4/4	sandy loam and gravel	fill	fill with brick fragments
B19M	278-305	9.1-10				no recovery
B19M	305-330	10-10.8	7.5YR 4/2	sandy loam and gravel	fill	fill with brick fragments
B19M	330-366	10.8-12				no recovery
B19M	366-427	12-14				no recovery
B19M	427-445	14-14.6	7.5YR 3/4	sandy clay loam	fill	fill
B19M	445-488	14.6-16				no recovery
B19M	488-500	16-16.4	5YR 3/3	sandy clay loam	fill	fill
B19M	500-536	16.4-17.6	5YR 3/3	sandy clay loam and gravel	fill	fill with brick fragments
B19M	536-549	17.6-18				no recovery
B19M	549-574	18-18.8	5YR 3/3	sandy clay loam	fill	fill
B19M	574-587	18.8-19.3	5YR 3/3	sandy clay loam	fill	fill with brick fragments
B19M	587-610	19.3-20				no recovery
B19M	610-624	20-20.5	7.5YR 3/2	loamy fine sand and gravel	fill	fill with brick fragments
B19M	624-671	20.5-22				no recovery
B19M	671-684	22-22.4	2.5YR 5/2	sandy loam and gravel	fill	fill
B19M	684-693	22.4-22.7	10YR 2/1	peat	1C	wetland
B19M	693-732	22.7-24				no recovery
B19M	732-793	24-26				no recovery
B19M	792-796	26-26.1				inwash
B19M	796-839	26.1-27.5	10YR 4/4	coarse sand	2C1	glacial/glaciofluvial
B19M	839-853	27.5-28				no recovery
B19M	853-890	28-29.2	10YR 4/3	sandy loam	2C2	glacial/glaciofluvial
B19M	890-914	29.2-30	10YR 3/3	loamy sand	2C3	glacial/glaciofluvial
B19M	914-932	30-30.6	10YR 3/3	loamy sand	2C3	glacial/glaciofluvial
B19M	932-935	30.6-30.7	10YR 3/6	sandy loam	2C4	glacial/glaciofluvial
B19M	935-959	30.7-31.5	10YR 4/2	sandy loam	2C5	glacial/glaciofluvial
B19M	959-975	31.5-32				no recovery
B19M	975-1066	32-35				no recovery
B19M	1067-1106	35-36.3	7.5YR 3/2	loamy fine sand	2C6	glacial/glaciofluvial
B19M	1106-1122	36.3-36.8	7.5YR 3/2	sandy clay loam	2C7	glacial/glaciofluvial

Bore ID	Cm	Ft	Munsell	Soil Texture	Horizon	Description
B19M	1122-1128	36.8-37				no recovery
B19M	1128-1219	37-40				no recovery
B19M	1219-1272	40-41.7	7.5YR 3/2	sandy clay loam	2C7	glacial/glaciofluvial
B19M	1272-1280	41.7-42				no recovery
B19M	1280-1371	42-45				no recovery
B19M	1372-1433	45-47	7.5YR 3/3	sandy clay	2C8	glacial/glaciofluvial
B19M	1433-1524	47-50				no recovery
B19M	1524-1536	50-50.4	7.5YR 4/1	sandy loam and gravel	2C9	glacial/glaciofluvial
B19M	1536-1541	50.4-50.6	7.5YR 5/8	sandy loam and gravel	2C9	glacial/glaciofluvial
B19M	1541-1556	50.6-51	7.5YR 4/6	sandy loam and gravel	2C9	glacial/glaciofluvial
B19M	1556-1585	51-52				no recovery
B19M	1585-1829	52-60				no recovery
B19M	1829-1848	60-60.6	7.5YR 4/6	sandy loam and gravel	2C9	glacial/glaciofluvial
B34M	0-9	0-0.3			fill	pavement
B34M	9-24	0.3-0.8			fill	concrete
B34M	24-30	0.8-1			fill	gravel
B34M	30-76	1-2.5	10YR 4/4	loamy sand and gravel	fill	fill
B34M	76-183	2.5-6	10YR 3/6	loamy sand and gravel	fill	fill, plastic
B34M	183-192	6-6.3	10YR 6/2	sand and gravel	fill	fill with concrete and asphalt
B34M	192-244	6.3-8				no recovery
B34M	244-253	8-8.3	10YR 6/2	sand and gravel	fill	fill with concrete and asphalt
B34M	253-305	8.3-10				no recovery
B34M	305-326	10-10.7	10YR 4/6	coarse sand and gravel	fill	fill with brick
B34M	326-366	10.7-12				no recovery
B34M	366-375	12-12.3	10YR 4/6	coarse sand and gravel	fill	fill with brick
B34M	375-427	12.3-14				no recovery

Bore ID	Cm	Ft	Munsell	Soil Texture	Horizon	Description
B34M	427-457	14-15	10YR 3/4	sand and gravel	fill	fill with brick
B34M	457-488	15-16				no recovery
B34M	488-518	16-17	10YR 3/3	coarse sand and gravel	fill	fill with brick
B34M	518-549	17-18	10YR 3/4	silt clay	1C	water body
B34M	549-572	18-18.75	10YR 3/4 w/ mottles (10% gley 1, 5G6/2), with 5% gravels	silt clay	1C	water body
B34M	572-587	18.75-19.25	10YR 3/2	silt clay	1C	water body
B34M	587-610	19.25-20				no recovery
B34M	610-671	20-22				no recovery
B34M	671-680	22-22.3	10YR 3/4	sandy clay loam and gravel	2C1	glacial/glaciofluvial
B34M	680-692	22.3-22.7	gley 1 5G3/2	coarse sand and gravel	2C2	glacial/glaciofluvial
B34M	692-701	22.7-23	7.5 YR 3/4 with 50% gravel	sandy loam	2C3	glacial/glaciofluvial
B34M	701-732	23-24				no recovery
B34M	762-792	25-26	5YR 3/4	loamy sand	2C4	glacial/glaciofluvial
B34M	792-914	26-30				no recovery
B34M	914-945	30-31	5YR 3/4	loamy sand	2C4	glacial/glaciofluvial
B34M	945-1067	31-35				no recovery
B34M	1067-1070	35-35.1				no recovery
B34M	1070-1219	35.1-40				no recovery
B34M	1219-1250	40-41	5YR 3/4	loamy sand	2C4	glacial/glaciofluvial
B34M	1250-1372	41-45				no recovery
B34M	1372-1387	45-45.5	5YR3/3	sandy loam	2C5	glacial/glaciofluvial
B34M	1387-1402	45.5-46	5YR 2.5/1	sandy loam	2C6	glacial/glaciofluvial
B34M	1402-1524	46-50				no recovery
B34M	1524-1545	50-50.7	7.5 YR 3/4	sand and gravel	2C7	glacial/glaciofluvial

Bore ID	Cm	Ft	Munsell	Soil Texture	Horizon	Description
B34M	1545-1676	50.7-55				no recovery
B34M	1676-1682	55-55.2	10YR 3/3	gravel and coarse sand	2C8	glacial/glaciofluvial
B34M	1682-1829	55.2-60				no recovery
B34M	1829-1829	60-60		Boulder Encountered, end of observation	R	bedrock
B27M	0-24	0-0.8			fill	concrete
B27M	24-61	0.8-2			fill	gravel fill
B27M	61-152	2-5	10YR 7/8	gravel	fill	gravel fill
B27M	152-183	5-6		gravel	fill	gravel fill
B27M	183-213	6-7				no recovery
B27M	213-244	7-8		gravel	fill	gravel fill
B27M	244-274	8-9				no recovery
B27M	274-305	9-10	10YR 2/1 and 10YR 4/2	loam with brick and organics	fill	fill
B27M	305-335	10-11				no recovery
B27M	335-366	11-12	5YR 4/3	sandy loam	fill	fill
B27M	366-396	12-13				no recovery
B27M	396-411	13-13.5	2.5YR 3/3	sand and gravel	fill	fill
B27M	411-457	13.5-15				no recovery
B27M	457-463	15-15.2	10YR 2/2	silty clay loam	fill	fill
B27M	463-518	15.2-17				no recovery
B27M	518-524	17-17.2	10YR 2/2	silty clay	fill	fill
B27M	524-579	17.2-19				no recovery
B27M	579-640	19-21	2.5YR 4/4	loamy coarse sand and gravel	fill	fill, bolt identified
B27M	640-646	21-21.2	2.5YR 4/4	loamy coarse sand and gravel	fill	fill
B27M	646-762	21.2-25				no recovery
B27M	762-808	25-26.5	10YR 4/4	sand and gravel	C1	glacial/glaciofluvial
B27M	808-914	26.5-30				no recovery
B27M	914-960	30-31.5	10YR 3/2	sand	C2	glacial/glaciofluvial
B27M	960-1067	31.5-35				no recovery

Bore ID	Cm	Ft	Munsell	Soil Texture	Horizon	Description
B27M	1067-1119	35-36.7	10YR 3/2	sand	C2	glacial/glaciofluvial
B27M	1119-1219	36.7-40				no recovery
B27M	1219-1250	40-41	10YR 4/1	sandy loam	C3	glacial/glaciofluvial
B27M	1250-1372	41-45				no recovery
B27M	1372-1417	45-46.5	10YR 3/3 and 10YR 4/6	loam and gravel	C4	glacial/glaciofluvial
B27M	1417-1524	46.5-50				no recovery
B27M	1524-1539	50-50.5	5Y 4/4	coarse sandy loam and gravel	C5	glacial/glaciofluvial
B27M	1539-1676	50.5-55				no recovery
B27M	1676-1692	55-55.5	10YR 4/3	coarse sand and gravel	C6	glacial/glaciofluvial
SB2	0-24	0-0.8		cement		
SB2	24-152	0.8-5	10YR 4/3	loam	fill	fill with brick
SB2	152-305	5-10	10YR 4/3	loam	fill	fill with brick and wood fragments
SB2	305-457	10-15				no recovery
SB2	457-701	15-23	10YR 4/4	fine sand	fill	fill
SB2	701-732	23-24	10YR 5/1	loam	fill	fill with 60% coal
SB2	732-762	24-25	10YR 5/1	loam and gravel	fill	fill
SB 10 (near B27M)	0-152	0-5			fill	paver, cement gravel
SB 10 (near B27M)	152-305	5-10	2.5Y 5/1	sand and gravel	fill	fill with brick
SB 10 (near B27M)	305-457	10-15				no recovery
SB 10 (near B27M)	457-518	15-17	10YR 3/3	silty clay loam	fill	fill
SB 10 (near B27M)	518-610	17-20				

Bore ID	Cm	Ft	Munsell	Soil Texture	Horizon	Description
SB 10 (near B27M)	610-671	20-22		peat	C1	wetland; below peat is 10YR 4/4 matches C1 horizon in B27M,

Appendix C Resumes

Elisabeth LaVigne, RPA
Senior Geoarchaeologist and Geospatial Data Manager

Education
M.A in Geoarchaeology, Boston University, 2009
B.A. in Archaeology, Wheaton College, 2004

Training
Amtrak and CSX Safety training, 2018
HAZWOPER 40-Hour Certification, 2011, updated
10-Hour Construction Industry Training, 2015
8-Hour OSHA Training for Supervisors, 2001
NPS American Battlefield Protection Program workshop, 2016
Section 106 Review Process workshop, 2011

Years of experience
10 years in CRM

Years with AECOM
5

Professional memberships
Archaeological Society of New Jersey, Council for Northeast Historical Archaeology, Society for Historical Archaeology, Geological Society of America, Register of Professional Archaeologists

Professional history

Elisabeth LaVigne has been working in cultural resources management in North American archaeology for the past ten years, primarily in New England and the Mid-Atlantic. Prior to that, her experience ranged outside of the U.S., working in Italy, Israel, and Belize. She specializes in archaeological applications of micro- and macro-geomorphology, geophysical remote sensing technology, and geospatial technology. Ms. LaVigne has archaeological experience with both pre- and post-contact sites at all levels of survey. Ms. LaVigne joined AECOM five years ago and has been managing the Geoarchaeological and Geospatial team, broadening the team's technological capabilities, and supporting archaeological surveys with supplemental geophysical and geomorphological investigations. Her geoarchaeological experience has included geomorphological assessments of glacial landscapes, floodplains, wetlands, intertidal zones, and urban areas. As the Geospatial team manager, Ms. LaVigne is also responsible for deliverable geospatial data quality and accuracy for both archaeological and architectural history surveys. She has served on projects for SHPO's, DOT's, NPS, the United States Army Corps of Engineers, large utility companies, and various other state, county, municipal, and private parties. She is a Registered Professional Archaeologist, meeting the Secretary of the Interior's Professional Qualifications Standards for Archaeologists.

Selected project experience

Section 56 Replacement Saugus River Crossing, Massachusetts Water Resources Authority, Revere, MA

Date: 2020-Present. **Role:** Senior Geoarchaeologist. As part of the design and engineering process, a geoarchaeological survey has been completed to assess archaeological sensitivity for both terrestrial and underwater portions of the project. This has included monitoring test pits, geotechnical borings, and vibracores.

Shipyard Infrastructure Optimization Program (SIOP): Cultural Resources Studies at Norfolk Naval Shipyard, VA; Pearl Harbor Naval Shipyard and Intermediate Maintenance Facility, HI, Portsmouth Naval Shipyard, ME, and Puget Sound Naval Shipyard and Intermediate Maintenance Facility/Naval Base Kitsap Bremerton, WA

Date: 2019-Present. **Role:** Cultural Resource Geospatial Lead. As part of the SIOP program, AECOM is developing installation-wide mapping of all previous cultural resource studies, resource locations, and landscape features. Environmental data, both historical and modern, are being utilized to develop archaeological sensitivity modeling for future planning purposes.

PA Turnpike NE Extension Project Data Recovery for Sites 36BU445 and 36BU449, Quakertown, PA

Date: 2019-present **Role**: Senior Geoarchaeologist. As part of this Phase III survey a geomorphological survey was conducted at both sites prior to archaeological excavation. The hand-auger survey mapped the lateral extent of preserved buried soils and assist in the interpretation of stratigraphy of the archaeological investigation.

MTA Forsyth Emergency Vent Plant Geoarchaeological Survey, New York City, NY

Date: 2019 **Role**: Senior Geoarchaeologist. Previous research in this project area identified the potential for buried soils preserved at a depth of 10-12 feet below ground surface. A Geoprobe survey was conducted in order to verify this potential. Eleven borings were excavated and recorded. Unfortunately, no soils were found to be preserved; anthropogenic was found up to eighteen feet below ground surface lying atop glacial sediments.

I-84 Hartford Geoarchaeological Survey, ConnDOT, Hartford, CT

Date: 2018-2019 **Role**: Senior Geoarchaeologist. The I-84 Hartford Geoarchaeological Survey was conducted on behalf of the Connecticut Department of Transportation. This effort involved the testing of seventeen parcels and a portion of the Amtrak ROW utilizing a Geoprobe bore rig. The Geoprobes were pre-plotted in GIS prior to the survey, placed based on the results of the Phase IA survey in order to examine the integrity of the subsurface stratigraphy. Of the fifty-three geoprobes, thirteen contained surfaces with archaeological potential, ranging from 16-200cm below ground surface.

NYSEG Granville Geomorphological Survey, New York State Electric and Gas Corporation, Granville, NY

Date: 2018 **Role**: Senior Geoarchaeologist. A geomorphological survey was conducted by AECOM through the use of a hand auger to determine the presence or absence of buried surfaces within the floodplain of the Mettawee River that could have potential for archaeological site preservation. The investigation found that the floodplain was covered in fill on the western side, with pockets of the former A horizon preserved. Modern disturbance had removed the potential for deeply buried horizons on the northern side.

Phase I, II, and III Archaeological Investigations of the I-95/Girard Ave. Improvements PennDOT Project, Philadelphia, PA

Date: 2016-present **Role**: Senior Geoarchaeologist. AECOM is conducting a long-term, multi-phase archaeological survey along three miles of I-95. As part of the overall Phase I, II, and III investigations, tasks have included geomorphological investigations, geospatial data collection and processing, and collaborating with other teams to develop a geospatial database incorporating historic research and lab data. Ultimately a synthesis of all the geomorphological investigations will yield a broader understanding of Philadelphia's landscape and topography prior to urbanization. This archaeological project has yielded a wealth of information about 17th-20th century inhabitants of Philadelphia.

PennEast Natural Gas Pipeline Project, PA and NJ

Date: 2016-present **Role**: Senior Geoarchaeologist and Geospatial Lead. Responsibilities have included training field technicians in the identification of soil horizons and important geomorphological events, such as loess and colluvial deposition. Additional geomorphological assessments where known loess and alluvial deposits occur have been conducted on properties within the pipeline alignment in order to

identify any deeply buried landscape surfaces. Responsibilities as the geospatial lead in include the management and quality control of geospatial data for both archaeological and architectural history surveys in both states.

Geomorphological Review of the LaGuardia Geoprobe® Soil Borings, NYC Airports, New York, NY

Date: 2016 **Role**: Senior Geoarchaeologist. As part of the reconfiguration of Delta Air Lines Terminals at LaGuardia Airport, a geomorphological investigation was conducted following the initial Phase IA survey. Four Geoprobe borings were extracted and screened for artifacts, examined for paleosols, and scanned for volatile organic emissions. No evidence of cultural resources was found during the geomorphological survey; rather, the area has been historically down cut and then infilled, destroying the original landform.

Jesse Walker, MA
Senior Archaeologist/Project Manager

Education
MA, Anthropology, Temple University, 2003
BA, Anthropology, State University of New York at New Paltz, 1997

Years of experience
18

Years with AECOM
6

Training
OSHA 29 CFR 1910.120 HAZWOPER 40-Hour Certification Course
OSHA 10-Hour Construction Safety and Health
Supervisor Training In Accountability and Recognition Techniques Training, Safety Services 2018
Section 106 Essentials Course, Advisory Coucil on Historic Preservation (Philadelphia, PA), 2016
NJHPO: CRM Essentials (Trenton, NJ), 2007

Professional Affiliations
Eastern States Archaeological Federation, Society for Pennsylvania Archaeology, Archaeological Society of New Jersey, Middle Atlantic Archaeological Conference, New York State Archaeological Association, Register of Professional Archaeologists

Professional history

Mr. Walker has over 15 years of experience in archaeological investigations and Section 106 of the National Historic Preservation Act in the Middle Atlantic and Northeastern United States. Jesse possesses a strong background in archaeological field and laboratory methods along with extensive training and experience in lithic, shell, and ceramic analysis and geomorphology. His primary specialization is the study of Native American groups through archaeology. He has directed field surveys, analyzed artifacts, and written technical reports for projects in Delaware, Vermont, New York, New Jersey, Maryland, and Pennsylvania. His current responsibilities include project management, coordinating fieldwork, managing laboratory analysis, and technical report preparation. Mr. Walker is the author or co-author of more than 100 technical reports, two peer-reviewed publications and has presented at various archaeological conferences. Mr. Walker serves on the executive board of the Archaeological Society of New Jersey.

Selected project experience

Scudders Falls Bridge Replacement Project, Delaware River Joint Toll Bridge Commission, Mercer County, NJ:

Date: 2017-present **Role:** Principal Investigator. Archaeological monitoring was conducted for the Scudders Falls Bridge Replacement Project located along the Delaware River in Ewing Township. The archaeological monitoring was conducted to comply with Programmatic Agreement. An archaeological monitoring plan was approved by the NJHPO. Archaeological Monitoring was conducted to identify remains of Trenton Water Power Canal. Archaeological monitoring for proposed impact to the Delaware and Raritan Canal will also be conducted.

Rebuild By Design Meadowlands Project, New Jersey, Division of Property Management & Construction, Bergen County, NJ:

Date: 2016-2018. **Role:** Principal Investigator. Mr. Walker prepared Phase IA archaeological survey report for a federally funding flood control project in several municipalities. Screenings for project alternatives were conducted. The Phase IA archaeological identified most of the project area as having a low archaeological sensitivity. Limited Phase IB archaeological testing was recommended. The New Jersey Historic Preservation Office concurred with the recommends. Mr. Walker prepared the cultural resources portion of

the draft Environmental Impact Statement. Consultation with Native American Tribes, historic organizations and other interested parties was conducted.

Smart Pig and Facility Modifications, 14-Inch PGW Plant "A" Lateral Launcher/Receiver Facility Installation, Williams/ Transcontinental Gas Pipe Line Company, LLC, Gloucester City, Camden County, New Jersey

Date: 2017. **Role:** Principal Investigator. A Phase IB workplan and unanticipated discovery plan was prepared and approved by the New Jersey Historic Preservation Office. The project area was located in an existing paved roadway and extensive coordination was conducted to complete the Phase IB archaeological survey. No archaeological resources were identified.

Marine Academy of Science and Technology (MAST), MAST Fiber Optic Cable Installation, Altice Business, Monmouth County:

Date: 2018. **Role:** Principal Investigator/Project Manager. Archaeological monitoring was completed for the installation of fiber optic cable at the Marine Academy of Science and Technology (MAST) located at Sandy Hook Unit of National Gateway Recreation Area. An Archaeological Resources Protection Act (ARPA) permit was obtained from the National Park Service to complete archaeological monitoring. No significant archaeological resources were identified. The artifacts were curated to comply with Interior Collections Management System and submitted to the National Park Service.

Phase I Archaeological Survey, Lippincott Hill, Naval Weapons Station Earle, Colts Neck, NJ

Date: 2016-2017. **Role:** Principal Investigator/Project Manager. Directed the survey and prepared the report. Prepared work plan that was approved by the New Jersey Historic Preservation Office. The project delineated the horizontal boundaries of a prehistoric site within an approximately 100-acre portion of the military installation.

Phase I Archaeological Survey, New York Bay Expansion Project, Williams/ Transcontinental Gas Pipe Line Company, LLC, New Jersey

Date: 2016-2017. **Role:** Principal Investigator/Project Manager. Directed the survey and prepared the report. Prepared work plan that was approved by the New Jersey Historic Preservation Office. The project delineated the horizontal boundaries of a prehistoric site within an approximately 100-acre portion of the military installation.

Delaware & Raritan Canal Dredging, Kingston Station (1862+00) and Amwell Road (2418+00), New Jersey Water Supply Authority, Somerset County, NJ

Date: 2014 to Present **Role:** Principal investigator/Project Manager. Providing cultural resources services since 2014 for the dredging project along a 10-mile section of the Delaware & Raritan Canal. Phase IB archaeological investigations were completed which identified two historic sites within the Delaware & Raritan Canal Historic District. An Application for Project Authorization to comply with New Jersey Register of Historic Places Act was prepared and approved by the New Jersey Historic Preservation Office. Archaeological monitoring plans, avoidance and protection plans, and other services were completed for the project. Archaeological monitoring is on-going in the canal and construction areas during dredging operations. The archaeological monitoring identified industrial deposits associated with the Excelsior Terra-Cotta Works/Atlantic Terra-Cotta Company site (28So122). AECOM is consulting frequently with the New Jersey Historic Preservation Office and archaeological reviewer at Municipal Finance and Construction Element of the New Jersey Department of Environmental Protection.

Phase I/II Archaeological Survey, Southern Reliability Link Project, New Jersey Natural Gas, Burlington, Monmouth, and Ocean Counties, NJ

Date: 2014-2017. **Role:** Principal Investigator. Directed and wrote the reports for the archaeological survey for the 27-mile long natural gas transmission pipeline project. Several historic archaeological sites were identified. Consultation with federally recognized Native Americans tribes was conducted as part of the Environmental Assessment. Archaeological avoidance/protection plans and archaeological monitoring plans were developed. Geoarchaeological investigations were conducted on sand dune landforms which involved deep archaeological testing. The survey was completed to comply with New Jersey Department of Environmental Protection-Historic Preservation Office regulations, Section 106 of the NHPA, and the New Jersey Pinelands Commission Regulations.

Cultural Resources Investigation, Route 45 Bridge Over Woodbury Creek, Woodbury City, New Jersey Department of Transportation, Gloucester County, NJ

Date: 2017 to Present **Role:** Principal Investigator. Phase I/II archaeological survey conducted for bridge replacement project. A late nineteenth century glass house was identified and determined eligible for listing on the National Register of Historic Places.

Phase I/II Archaeological Investigation, Cedar Substation, Atlantic City Electric, Stafford Township, Ocean County, NJ

Date: 2014. **Role:** Co-Principal Investigator. Led and authored a report for an Atlantic City Electric substation expansion project. Prehistoric and historic archaeological resources were identified. The archaeological resources were determined to not be eligible for listing on the National Register of Historic Places.

Archaeological Assessment, PSEG Fossil LLC Linden Generating Station, PSEG, Union County, NJ

Date: 2014. **Role:** Principal Investigator. Led and authored an archaeological assessment conducted for the Demolition of Retired Facilities at Linden Generation Station. A consultation letter was prepared for the proposed project which determined there was a low potential for significant archaeological resources and recommended no further archaeological survey. The New Jersey State Historic Preservation Office (NJ HPO) concurred with the recommendations.

Phase I/II/III Deepwater Reterminations Project, Atlantic City Electric, Salem County, NJ

Date: 2015 - 2018. **Role:** Principal Investigator. Directed the archaeological surveys and wrote for the transmission line project. An historic period site (28Sa216) and Native American site (28Sa117) were investigated during the Phase I archaeological survey. The Phase II/III archaeological survey was completed at 28Sa117. The Phase III data recovery documented new significant information about Native American culture in the Salem River watershed.

Deepwater to Salem Transmission Line, Atlantic City Electric, Salem County, NJ

Date: 2015. **Role:** Co-Principal Investigator. Served as a project lead for a Phase I Archaeological Survey for a 69kV transmission line project. One prehistoric site was identified.

Joel Dworsky, MA
Senior Archaeologist

Education
MA, Anthropology, Archaeology, College of William and Mary, 2010
BA, Archaeology, Antrhopology, Millersville, 2005

Years of experience
14

Years with AECOM
8

Training
OSHA 29 CFR 1910.120 HAZWOPER 40-Hour Certification Course
OSHA 10-Hour Construction Safety and Health
Section 106 Essentials Course, Advisory Coucil on Historic Preservation (Philadelphia, PA), 2016

Professional Affiliations
Council for Northeast Historical Archaeology; Philadelphia Archaeological Forum

Professional history

Mr. Dworsky joined AECOM in 2012 and has 16 years of experience in archaeology and cultural resources management. He has participated in the excavation of sites throughout New England, the Mid-Atlantic, and Bermuda. As an archaeological principal investigator at AECOM, his responsibilities include overseeing fieldwork, client consultation, and report preparation. Mr. Dworsky also works as a GIS specialist wherein he conducts a variety of spatial analyses (predictive modeling, cut/fill, landscape reconstruction, as-built road analysis, GIS palimpsest analysis) as well as collecting and preparing GPS data, and managing GIS databases. Mr. Dworsky is responsible for ensuring the accurate integration of field and laboratory data into a cohesive and comprehensive GIS database to facilitate spatial analysis. Mr. Dworsky's experience encompasses pre-contact, historic, and industrial archaeology.

Selected project experience

I-84 Hartford - Archaeologist, GIS Analyst, Author – Conducted a cultural resource assessment of the archaeological rescores which was utilized as part of an alternatives analysis. Conducted and As-built road analysis, GIS palimpsest analysis, Cut/Fill analysis in order to derive an archaeological sensitivity and archaeological potential designation for properties within the proposed APE. Made recommendations about the need for future cultural resources work associated with the undertaking.

New Haven Downtown Crossing – Principal Investigator, Archaeologist, GIS Analyst, Primary Author – Phase IB archaeological survey and archaeological monitoring for the realignment and expansion of Rte-34 in downtown New Haven Connecticut performed on behalf of the Connecticut DOT and the City of New Haven.

New Haven CATEX – Principal Investigator, Archaeologist, GIS Analyst, Primary Author - Archaeological assessment of a proposed realignment and expansion of I-34 in downtown New Haven Connecticut performed on behalf of the Connecticut DOT. Drafted report containing archaeological and historical background and archaeological sensitivity assessments, GIS palimpsest analysis, as well as recommendations about the need for future cultural resource work.

East Side Access – Archaeological Monitor, Principal Investigator – Conducted open cut archaeological monitoring for several sections of the East Side Access project Sunnyside Yard Rail Complex, Yard A on behalf of the MTA and LIRR.

U.S. Coastguard Station Shinnecock - Principal Investigator, Archaeologist, GIS Analyst, Author – Phase IA/B archaeological survey for the proposed construction of a new facility at U.S. Coastguard Station Shinnecock. Field Survey, GIS Palimpsest analysis, Background Research, Archaeological Monitoring and Report Preparation.

Rockaway Delivery Lateral Project – (Drill head rescue monitoring) - Archaeological Monitor, Author – Conducted open cut archaeological monitoring for several sections of the Rockaway Lateral pipeline in Far Rockaway on behalf of the Transcontinental Gas Pipeline Company, LLC, a Williams Company. Supervised excavations in proximity to a WWI airfield (now Jacob Riis Park golf course) that was to be impacted during an HDD drill head recovery operation.

Jacob Riis Park - Archaeological Monitor, Principal Investigator – Monitored the excavation of trenches and isolated pits within the park where HDD pits were needed to replace gas lines. The trenches and pits largely occurred in areas of fill or areas of disturbance resulting from Hurricane Sandy. The work was conducted on behalf of the National Grid and performed under the jurisdiction of the National Park Service (NPS), under ARPA permit 2015.GATE.01 archaeological monitoring was required concurrent with the excavation.

Kensico Dam Shoreline Stabilization Project – Principal Investigator, Archaeologist, GIS Analyst – Phase IA investigations of the shoreline of the Kensico Dam reservoir in Mount Pleasant Township, Westchester County, New York on behalf of the New York Department of Environmental Protection (NYDEP). Digitally reconstructed the topography of the flooded section of the Bronx River Valley prior to the flooding for the creation of the dam and used that data to construct a precontact sensitivity model for the greater project area. Conducted a GIS palimpsest analysis to identify areas of historic sensitivity.

Capitol Corridor Rail Transit Study – Principal Investigator, Archaeologist, GIS Analyst, and Primary Author - Tier 1 NEPA study of a rail transportation corridor for and proposed commuter rail station locations performed on behalf of the NHDOT and MASS DOT. Drafted report containing archaeological and historical background, GIS palimpsest analysis, and archaeological sensitivity assessments for a roughly 70-mile project corridor as well as recommendations about the need for future cultural resource work.

General Electric Hudson River Project, Fort Edward, New York (Terrestrial) - Archaeologist and GIS specialist – Conducted a Phase IB survey of the Hudson River in the advance of dredging by General Electric to remediate PCB contamination of river sediment. In addition to the Phase I work, a Phase II study was conducted at Fort Miller, a French and Indian War era fort, located near Lock 5 on the Hudson River. This Phase II investigation revealed the remains of the builder's trench and posts that comprised two palisade walls, as well as several pit features that contained military artifacts, burnt timbers, and period ceramics. This site is of importance because it was a small provisioning fort for the larger forts upstream and no fort of its kind from this period has been studied.

General Electric Hudson River Project, Fort Edward, New York (Maritime) – Maritime Archaeologist and GIS specialist – Assisted with the underwater survey and documentation of submerged resources within the Hudson River including a wrecked canal boat, lumber chains, chain anchors, piers. Conducted video documentation, measurement, and geolocation of resources.

Constitution Pipeline Project, Williams Companies, INC, New York and Pennsylvania (Field Archaeologist, GIS Specialist, Principal Data Manager, contributing author) - Phase I survey of a more than 200 mile stretch of northern PA and central NY. The survey uncovered many prehistoric and historic sites many of which are awaiting Phase II investigation. Designed and help to implement a shovel testing strategy for the Phase 1 testing of the pipeline ROW that comprised the project APE. Managed and updated the GIS with data coming in from the field and generated new route recommendations based on that data.