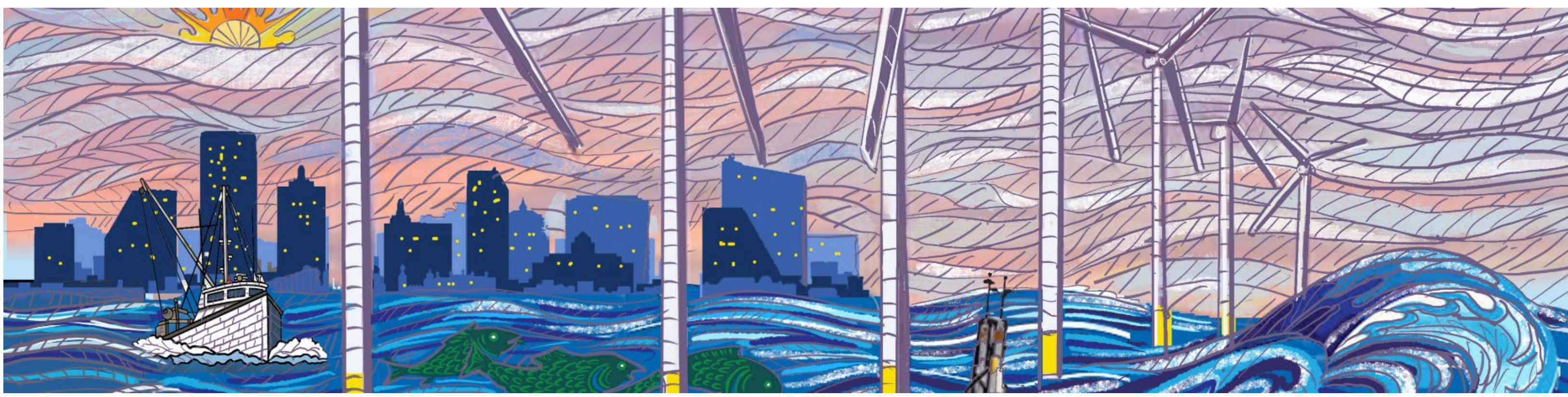

Appendix II-P1

Terrestrial Archaeology Resources Assessment (TARA) - Onshore Interconnection Facilities

Redacted Version - Confidential and/or Privileged Information Removed

May 2024

Note: At the time of the initial development of this report, development of a substation and/or converter station at the Brook Road Site in Howell Township, New Jersey was considered. The Brook Road site is now expected to be prepared and developed as part of the State of New Jersey Board of Public Utility (BPU) State Agreement Approach 1.0 (SAA)1 to support the delivery of offshore wind energy onshore. In collaboration with the regional gird operator PJM Interconnection (PJM), NJBPU conducted a study that examined whether an integrated suite of open access transmission facilities designated to support the delivery of offshore wind energy onshore could best facilitate meeting New Jersey's expanded offshore wind goals. Under the SAA 1.0 Award all permitting for site preparation activities, including construction activities to provide a "fit for purpose" site, for an associated substation and/or converter station will be the responsibility of the BPU's SAA-awardee at the Brook Road Site. Therefore, impacts associated with site preparation have not been considered as part of the Project Design Envelope (PDE) of the Project. Discussion of the site has been retained as part of the study area in this report to demonstrate the completeness of Atlantic Shores' multi-year development efforts.

[1] New Jersey Board of Public Utilities Selects Offshore Wind Transmission Project Proposed by Mid-Atlantic Offshore Development and Jersey Central Power & Light Company in First in Nation State Agreement Approach Solicitation

Terrestrial Archaeological Resources Assessment

Atlantic Shores South Offshore Wind Project – Onshore Interconnection Facilities

Monmouth and Atlantic County, New Jersey

Confidential - Not for Public Distribution – Contains Archaeological Site Information

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Initial submission February 2021, updates December 2021, August 2022, February 2023, November 2023, December 2023 and May 2024

MANAGEMENT SUMMARY

Involved State/Federal Agencies:	Bureau of Ocean Energy Management New Jersey Department of Environmental Protection New Jersey Historic Preservation Office
Phase of Survey:	Phase IA Archaeological Survey Phase IB Archaeological Survey
Location Information:	Boroughs of Manasquan and Borough of Sea Girt, Township of Howell and Township of Wall, Monmouth County, New Jersey. City of Atlantic City and City of Pleasantville, Egg Harbor Township, Atlantic County, New Jersey.
Preliminary Area of Potential Effects:	The Cardiff and Larrabee Physical Effects PAPEs include the export cable landfall sites, the onshore interconnection cable routes, and the proposed onshore substation and/or converter station sites.
USGS 7.5-Minute Quadrangles:	*Asbury Park, NJ, Farmingdale, NJ, Lakewood, NJ, Point Pleasant, NJ, Atlantic City, NJ, Oceanville, NJ, Pleasantville, NJ.*
Terrestrial Archaeological Resources Assessment Overview:	The TARA shows that one previously identified archaeological site is mapped within the PAPE.
Report Authors:	Joseph Kwiatek, Amanda Filmyer, MA, RPA, Daniel Seib, MA, Dan Forrest, ABD, Patrick Heaton, RPA, Douglas Pippin, PhD, RPA
Date of Report:	Initial submission February 2021, updates December 2021, August 2022, February 2023, and December 2023

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1.0 INTRODUCTION

1.1 Purpose of the Investigation

On behalf of Atlantic Shores Offshore Wind, LLC (Atlantic Shores), a 50/50 joint venture between EDF-RE Offshore Development, LLC, a wholly owned subsidiary of EDF Renewables, Inc. (EDF Renewables) and Shell New Energies US LLC (Shell), Environmental Design & Research, Landscape Architecture, Engineering, & Environmental Services, D.P.C. (EDR) has prepared this Terrestrial Archaeological Resources Assessment (TARA) for the proposed onshore interconnection facilities located in the Boroughs of Manasquan and Borough of Sea Girt, Township of Howell and Township of Wall, Monmouth County, New Jersey and the City of Atlantic City and City of Pleasantville, Egg Harbor Township, Atlantic County, New Jersey (Figure 1). The information and results included in the TARA are intended to assist the New Jersey Department of Environmental Protection (NJDEP), New Jersey State Historic Preservation Office (NJHPO), the Bureau of Ocean and Energy Management (BOEM), and other relevant New Jersey State and/or Federal agencies and consulting partners in their review of the proposed onshore interconnection facilities under Section 7:4 of the New Jersey Administrative Code (NJAC), the State of New Jersey Executive Order #215, and/or Section 106 of the National Historic Preservation Act (NHPA), as applicable. This TARA was completed in support of the Atlantic Shores Construction and Operations Plan (COP; EDR, 2021a) for Atlantic Shores' proposal to develop two offshore wind energy generation projects (the Projects) within BOEM Lease Area OCS-A 0499 (the Lease Area).

The purpose of this TARA is to inventory and characterize previously identified archaeological resources within the Preliminary Area of Potential Effects for Physical Effects to Above Ground Historic Properties and Terrestrial Archaeological Resources (PAPE; as described in Section 1.4) and evaluate the potential for unidentified terrestrial archaeological resources to be present within the PAPE. As summarized in Section 4.2, additional phased Phase IB archaeological field survey has been recommended within portions of the PAPE depicted as "Potential Phase IB Survey Areas" in Figures 14, 21, 31, and 38.

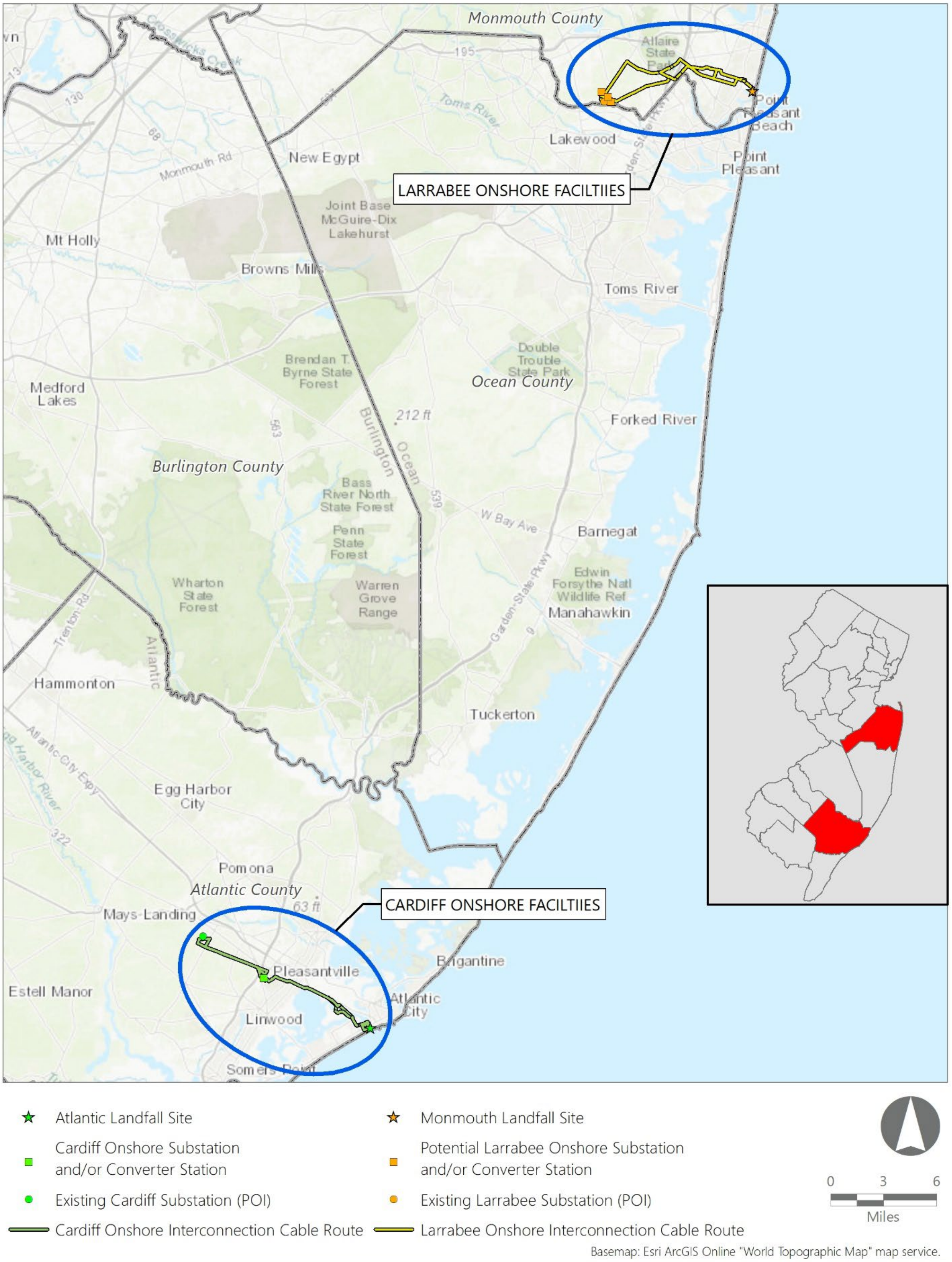
The Phase IB archaeological field survey effort for proposed substation locations, landfalls, and associated onshore cable routes is ongoing. BOEM has determined, in accordance with Section 106 regulations (36 CFR § 800.4 (b)(2), that a Phased Identification approach is appropriate for the survey, reporting, and consultation related to this outstanding archaeological investigation while property access permissions are acquired to conduct the remaining Phase IB archaeological investigations. The current Phased Identification schedule is included in the Projects' Phased Identification Plan: Terrestrial Archaeological Resources (BOEM, 2023: Attachment 21).

The results of all Phase IB field surveys completed as of August 2023 have been incorporated into this TARA report, which will be submitted to BOEM and the Consulting Parties prior to the Projects' Record of Decision (ROD). The TARA was prepared by professional archaeologists who satisfy the qualifications criteria provided in the Secretary of the Interior's Standards for archaeology and historic preservation (Title 36 Code of Federal Regulations Part 61, Appendix A), as appropriate. The TARA was prepared in accordance with applicable requirements and guidance provided in NJAC 7:4-8.4 and 7:4-8.5, *Requirements for Phase I Archaeological Survey* and *Requirements for Archaeological Survey Reports* (NJAC, 2015), further expanded and clarified by the New Jersey Historic Preservation Office (NJHPO 2000; 2008). The results of any Phase IB field survey conducted hereafter will be included in a subsequent revision or in an addendum to this TARA report. Atlantic Shores anticipates that some Phase IB archaeological survey may be conducted following the Project's ROD and the execution of the Memorandum of Agreement (MOA), but all survey results and relevant data will be submitted to BOEM and relevant consulting parties for review prior to the start of construction activities in unsurveyed areas.

Subsequent to the initial filing of the COP, Atlantic Shores has revised the proposed onshore project design, which is detailed further in Volume I of the COP. This TARA addresses the refinements in engineering and design to the proposed onshore interconnection facilities since the initial COP filing and serves as a combined update to the two separate Phase IA archaeological survey reports for the Cardiff and Larrabee Onshore Interconnection Cable Routes and Facilities previously submitted.

This TARA is included as Appendix II-P1 of the Projects' COP. A Historic Resources Effects Assessment (HREA) to identify and document aboveground historic properties with potential visibility of the proposed onshore interconnection facilities has been provided under separate cover and is included as Appendix II-N1 of the Projects' COP. A TARA to inventory and characterize previously identified archaeological resources within the PAPE for a proposed Operations and Management

Figure 1. Regional Project Location



Basemap: Esri ArcGIS Online "World Topographic Map" map service.

Facility (O&M Facility) has been provided under separate cover and included as Appendix II-P2 of the COP.

1.2 Description of Onshore Facilities

Atlantic Shores is developing two offshore wind energy generation projects within the Lease Area, located on the Outer Continental Shelf (OCS) within the New Jersey Wind Energy Area. Atlantic Shores proposes to construct, operate, and decommission the offshore wind energy generation facilities, offshore export cables, onshore interconnection cables, and onshore substations and/or converter stations. The Projects will include up to 200 wind turbine generators, up to 10 offshore substations, and up to eight cables installed within two offshore, export cable corridors (ECCs). Those cables will deliver energy from the offshore generation facilities to proposed landfall sites located in either Monmouth County (the Monmouth Landfall Site) and/or Atlantic County (the Atlantic Landfall Site), New Jersey. From the landfall sites, onshore cables will follow onshore interconnection cable routes (onshore routes) proposed within existing roadway, utility rights-of-way (ROWs), and/or along bicycle paths to existing Points of Interconnection (POIs) for connection to the electrical grid. Along the onshore routes, onshore substations and/or converter stations are also proposed. The following descriptions summarize each of these Onshore Facilities:

- The **landfall sites (Monmouth and Atlantic)** will include the excavation of a horizontal directional drilling (HDD) exit pit and installation of onshore transition vaults, within which the offshore export cables will be split into separate onshore cables. The transition vaults within the export cable HDD exit pits measure approximately 14.8 feet (ft.) (4.5 meters [m]) deep with 2.0-ft. (0.6-m) thick walls, resulting in a maximum vertical depth of disturbance of 16.8 ft. (5.12 m) at the landfall location (further details relating to specific landfall sites provided in Section 1.3). Engineering for the HDD trajectories at each landfall site is currently underway. Final design of the landfall site HDDs will be provided as part of each individual Project's Facility Design Report (FDR) and Fabrication and Installation Report (FIR) and will be available for public review as part of the Project's state level permit filings. At both sites, the HDDs will either be initiated or exit landward of the beach to avoid impacts to the beach.
- The **onshore routes (Larrabee and Cardiff)** are comprised of a 20-ft. (6.0-m)-wide corridor within which the underground, onshore routes will be installed within concrete duct banks.

Installation of the onshore routes will typically be accomplished via open trenching to a depth of up to 11.5 ft. (3.5 m), which is the maximum vertical effect along most of the onshore route corridor. Examples of typical duct bank configurations and installations from the Project's constructability reports are included as Figure 2 through Figure 5 (Power, 2021a, 2021b). Some specialty trenchless techniques (i.e., HDD, pipe jacking, and/or jack-and-bore) that avoid surface disturbance will be used to avoid impacts to busy roadways, wetlands, waterbodies, or existing developments or features and could result in disturbance up to 30 ft. (9.0 m) below ground surface. Atlantic Shores has proposed that the onshore routes be buried primarily along existing roadways, utility ROWs, and/or along improved bike paths. The selection of a buried cable (as opposed to an overhead transmission line) avoids potential visual impacts (including visual impacts to historic properties). In addition, siting the onshore routes within previously disturbed roadways, utility ROWs, and/or along improved bicycle paths which were formerly railroad grades avoids potential impacts to adjacent undisturbed soils and avoids or minimizes the risk of potentially encountering intact, archaeological deposits, because the depth of likely disturbance during construction/installation of that infrastructure equals or exceeds the depth to subsoil for most of the onshore routes.

- The **onshore substations and/or converter stations (Lanes Pond Road Site, Brook Road Site, Randolph Road Site, and the Fire Road Site)** are facilities where transmission voltage will be stepped up/stepped down or converted in preparation for interconnection to the electrical grid at either of the existing POIs. Construction activities resulting in ground disturbance at the onshore substation and/or converter station locations may include land and tree clearing, grading, fencing, trenching and excavation, landscaping/planting, and installation of equipment foundations. The maximum vertical effect of these activities is anticipated to be approximately 60 ft. (18.3 m) in depth. Note that Atlantic Shores is not undertaking construction activities for the Brook Road Site, since it will be developed separately by the awardee of the New Jersey Board of Public Utilities (NJBPU) State Agreement Approach (SAA).

Figure 2. Typical Single Trench Configuration Duct Bank Profile (6 ft. total depth)

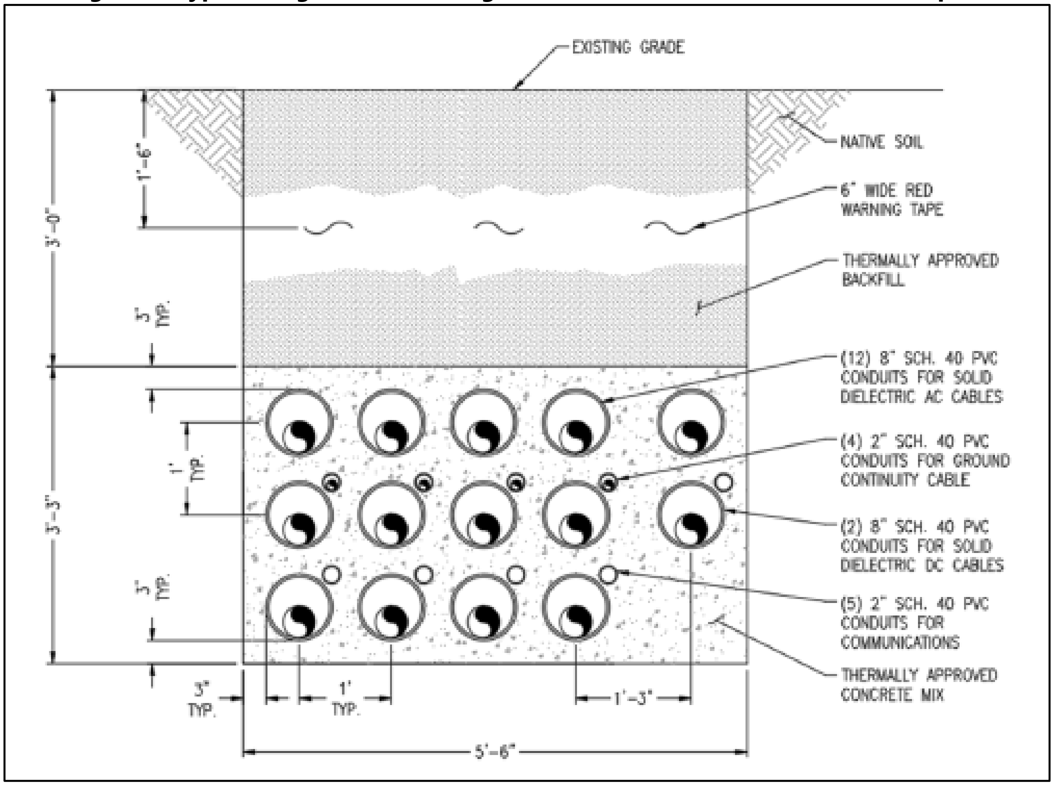


Figure 3. Typical Single Trench Configuration Duct Bank Profile (9 ft. total depth)

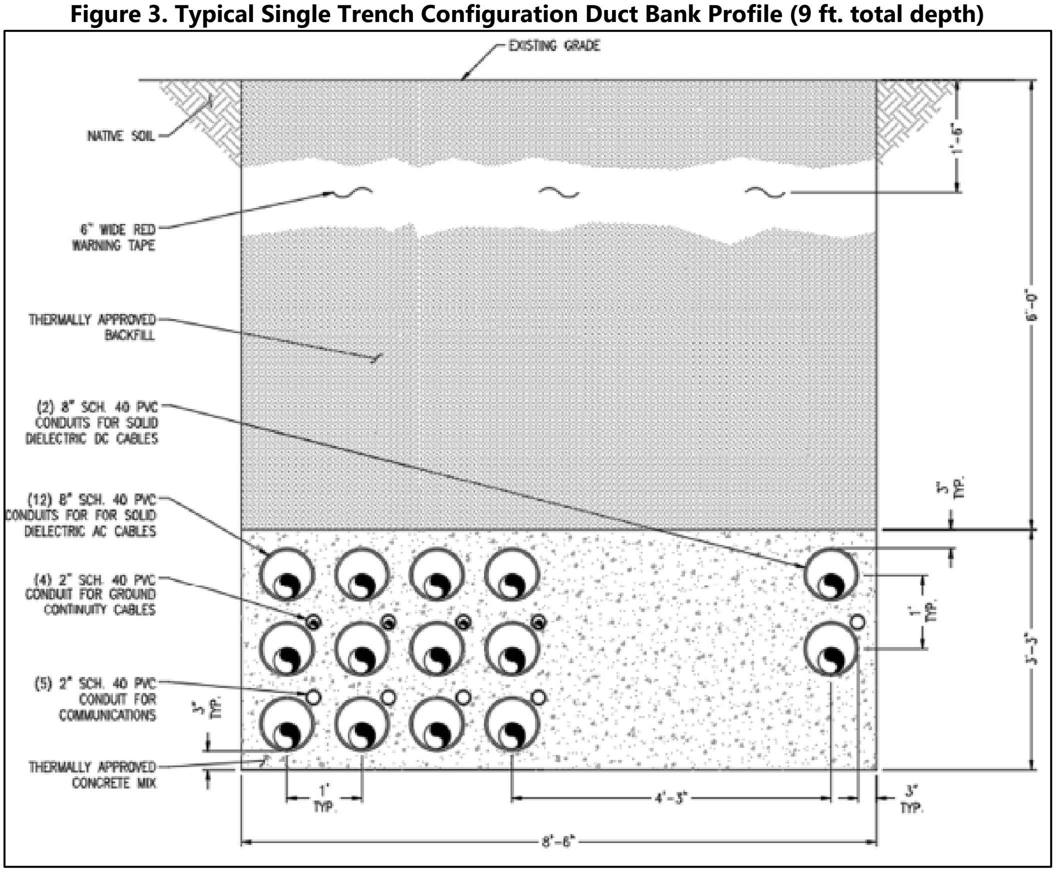
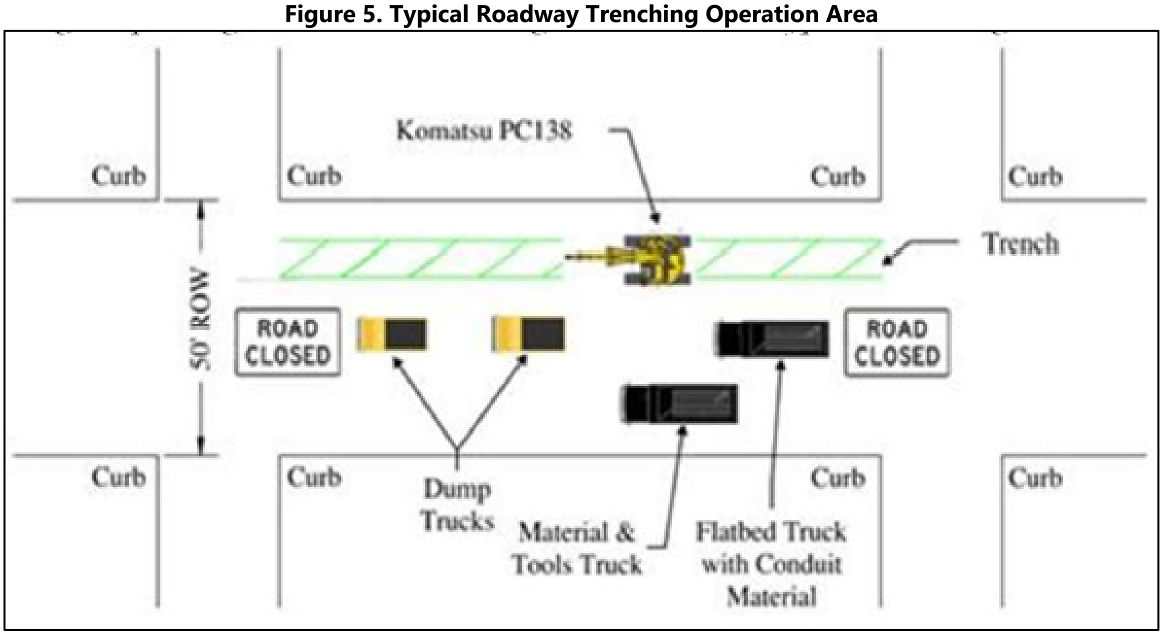


Figure 4. Representative photograph of onshore cable installation (Ramkumar and Hillar, 2022)

Figure 5. Typical Roadway Trenching Operation Area



1.3 Description of Onshore Facility Sites

Atlantic Shores is considering multiple options for onshore transmission, including multiple sites and locations for the Projects' Onshore Facilities. The following descriptions summarize each potential Facility Site:

- The **Monmouth Landfall Site** is made up of two landfall options (collectively 8.32 acres [3.37 hectares]) on the of the grounds of the New Jersey Army National Guard Training Center, immediately west of the Atlantic Ocean shoreline (Figure 6):
  - The first landfall option is a previously disturbed area in the southeast corner of the National Guard Training Center.
  - The second landfall option is a partially disturbed area on the eastern side of the National Guard Training Center, north of the first landfall option.

  Collectively, both landfall options are hereafter included when referencing the proposed Monmouth Landfall Site. Archaeological assessment of the Monmouth Landfall Site is included in Section 2.2.

- The **Larrabee Onshore Interconnection Cable Route (Larrabee Onshore Route)** is an approximately 12-mile (mi.) (19.5-kilometer [km]) underground transmission route that uses existing linear corridors to connect the Monmouth Landfall Site to a planned onshore substation and/or converter station and the existing Larrabee Substation POI (Figure 6). From the Monmouth Landfall Site, the Larrabee Onshore Route exits the northeastern corner of the lot and extends north to Sea Girt Avenue. The route then continues west along Sea Girt Avenue for approximately 0.6 mi. (1.0 km) through suburban residential areas to the intersection of Sea Girt Avenue, Washington Boulevard, and Camp Drive, where it may split into three, if needed, due to limited space within the ROW. The Larrabee Onshore Route will then cross underneath the existing New Jersey Transit Railroad via trenchless jack-and-bore installation (Figure 16, Sheet 1). From this point, the route runs along both Sea Girt Avenue and heads west on Crescent Place for approximately 0.3 mi. (0.6 km) until 8th Avenue, where the two routes again converge into a single route. The Larrabee Onshore Route then continues along Sea Girt Avenue for approximately 0.21 mi. (0.34 km) before splitting into two or more route options:
  - The main routing option continues to follow Sea Girt Avenue for an additional 0.89 mi. (1.46 km), turns north on Bailey's Corner Road, and turns west on Tiltons Corner Road,

until it intersects with the Wall Township Bike Path. The main route option follows Wall Township Bike Path south for approximately 0.5 mi. (0.9 km) to the Edgar Felix Memorial Bikeway (built within former railroad ROW). The route then follows the Edgar Felix Memorial Bikeway for approximately 1.43 mi. (2.3 km) to Ramshorn Drive. The route then continues northwest along Ramshorn Drive for 0.05 mi. (0.08 km) until the intersection with Lakewood Allenwood Road, turning west onto Lakewood Allenwood Road. The route continues west, then southwest on Lakewood Allenwood Road for 0.58 mi. (0.93 km) to a planned HDD entrance pit within the ball fields at Robert L Brice Memorial Park for crossing of the Manasquan River. The planned HDD route continues to the southwest for approximately 0.6 mi. (0.97 km) before reaching the HDD exit pit in re-forested sand and gravel pits north of Squankum Allenwood Road (Figure 16, Sheets 4-5). The main route option continues northwest along Squankum Allenwood Road for approximately 0.91 mi. (1.46 km) to the intersection with Easy Street (crossing underneath the Garden State Parkway via trenchless jack-and-bore; Figure 16, Sheet 4), continuing for approximately 2.07 mi. (3.33 km) to Lakewood Farmingdale Road (County Route 547). From this point, the route travels south along Lakewood Farmingdale Road (County Route 547) approximately 2.5 mi. (4.1 km) to the Larrabee Substation POI. Archaeological assessment of the Larrabee Onshore Route is included in Section 2.3.8.

- Another routing option begins at the intersection of Sea Girt Avenue and North Main Street. Instead of continuing on Sea Girt Avenue, the Larrabee Onshore Route may turn to the south and follow North Main Street for approximately 0.39 mi. (0.63 km) southwest to the intersection with the Edgar Felix Memorial Bikeway. The route then follows the Edgar Felix Memorial Bikeway for approximately 1.2 mi. (1.93 km) to the intersection of the Wall Township Bike Path and the Edgar Felix Memorial Bikeway. From this point the routing option converges with the main route option continuing along the Edgar Felix Memorial Bikeway.
- Another routing option begins at the intersection of Tiltons Corner Road and the Wall Township Bike Path, where instead of turning south onto the Bike Path the Larrabee Onshore Route may continue west on Tiltons Corner Road/Atlantic Avenue for approximately 1.51 mi. (2.43 km) to the intersection of Atlantic Avenue and Ramshorn

Drive. From this point, the alternate routing option converges with the main route option on Lakewood Allenwood Road.

- Another routing option begins at the intersection of Squankum Allenwood Road and Lakewood Allenwood Road, where instead of continuing northwest the route turns south/southwest onto Lakewood Allenwood Road, continuing approximately 3.41 mi. (5.49 km) to an intersection with Brook Road and Oak Glen Road. Here the routing option turns northwest onto Oak Glen Road and continues west for approximately 0.61 mi. (0.98 km) to the Larrabee Substation POI.
- Another routing option begins at the intersection of Edgar Felix Memorial Bikeway and Ramshorn Drive, where instead of turning onto Ramshorn Drive the Larrabee Onshore Route may continue on the Edgar Felix Memorial Bikeway for an additional 0.80 mi. (1.28 km) to the intersection with Hospital Road (crossing underneath the Garden State Parkway via trenchless jack-and-bore; (Figure 16, Sheet 4). From that point the routing option would turn southwest and continue along Hospital Road/Easy Street for approximately 1.38 mi. (2.22 km) until it converges with the main route option on Easy Street past the intersection with Squankum Allenwood Road.

Additional routing options branch off the main Larrabee Onshore Route to provide connection options to the three potential parcels for the proposed Larrabee Onshore Substation and/or Converter Station (see below).

- One routing options begins at the intersection of and Lakewood Farmingdale Road and Miller Road, traveling northwest up Miller Road for approximately 0.18 mi. (0.29 km) to the Lanes Pond Road potential Larrabee Substation and/or Converter Station Sites, discussed below. Access to the Lanes Pond Road Site may also come via a routing option which begins at the intersection of Lakewood Farmingdale Road and Alexander Avenue near the existing Larrabee POI. This routing option travels west on Alexander Avenue for approximately 0.02 mi. (0.04 km) before turning north on Lanes Pond Road and continuing approximately 0.36 mi. (0.59 km).
- Another option begins at the intersection of Lakewood Farmingdale Road and Randolph Road, where the route may branch off the main Larrabee Onshore Route and travel east on Randolph Road for approximately 0.5 mi. (0.91 km) to provide access to the Randolph Road Site for the potential Larrabee Substation and/or Converter Station.

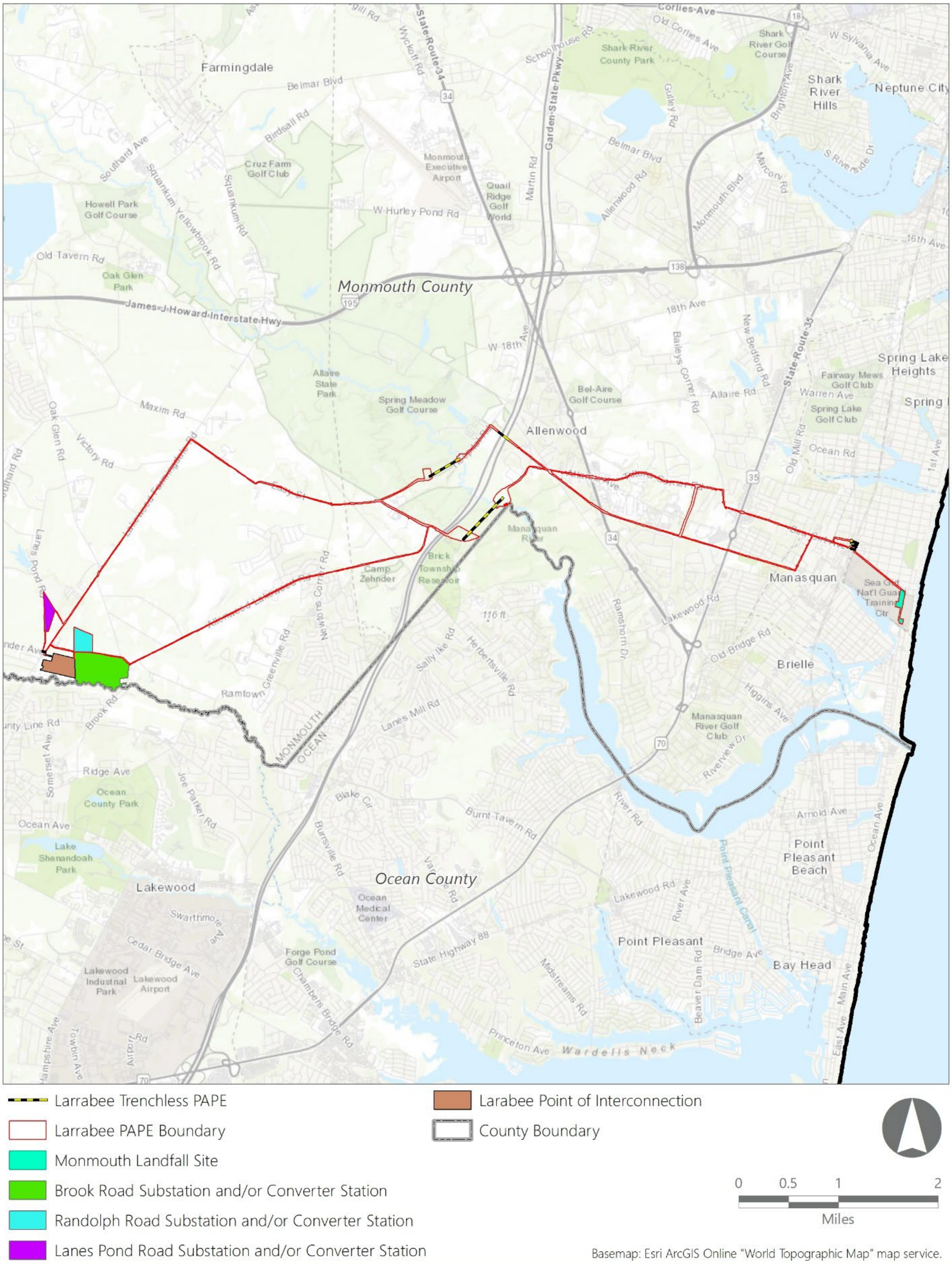
In order to pursue a conservative estimate of potential effects while Project plans are in development, all routing options for proposed Larrabee Onshore Route are included in the Project Design Envelope (PDE, see Section 1.4) and archaeological assessment (Section 2.3.8).

- Atlantic Shores has identified three potential locations for the proposed **Larrabee Onshore Substation and/or Converter Station** in the vicinity of the Larrabee Onshore Route.[1] Archaeological assessment of these locations is included in Section 2.4.
  - The **Lanes Pond Road Site** (former Parcel Area 7) is an approximately 16.3-acre (6.6-hectare [ha]) parcel consisting of agricultural fields and wooded areas south of the intersection of Miller Road and Lanes Pond Road in Howell Township.
  - The **Brook Road Site[2]** (former Parcel Area 8) is an approximately 99.4-acre (40.2-ha) combination of two parcels consisting primarily of forested uplands and some wetlands between Randolph Road and the Metedeconk River in Howell Township.
  - The **Randolph Road Site** is an approximately 24.6-acre (9.97-ha) combination of three parcels consisting of a steel fabrication facility with associated laydown yard, offices, and parking, as well as forested wetlands surrounding Dicks Brook. The location is north of Randolph Road to the northeast of the existing Larrabee POI in Howell Township.

[1] Atlantic Shores previously submitted a memorandum to BOEM in August 2022 with information on eight potential locations (Parcel Areas) for the proposed Larrabee Onshore Substation and/or Converter Station. Design decisions since the transmittal of that memorandum have resulted in the removal of six of the previously identified locations (Parcel Areas 1 through 6), and the addition of one location (Randolph Road Site). The designations of the two retained locations (Parcel Areas 7 and 8) have been updated to the Lanes Pond Road and Brook Road Site (See footnote 2 for an updated status on the Brook Road Site).

[2] Note that the Brook Road Site (formerly Parcel Area 8) is now proposed to be developed separately under the New Jersey Board of Public Utilities (NJBPU) State Agreement Approach (SAA). Although no specific actions or effects are proposed by Atlantic Shores at this location, research and analysis of the Brook Road Site has been retained in the TARA, as the project may utilize future facilities at the site.

Figure 6. Proposed Larrabee Onshore Interconnection Cable Route and Associated Facility Sites



- The **Atlantic Landfall Site**[3] is collectively 2.90 acres (1.17 ha) and islocated on a paved public parking lot at the southeastern terminus of S. California Avenue adjacent to the Atlantic City Boardwalk, and along the block of S Iowa Avenue between Pacific Avenue and the Atlantic City Boardwalk. An archaeological assessment of the Atlantic Landfall Site is included in Section 3.2.6.

- The **Cardiff Onshore Interconnection Cable Route (Cardiff Onshore Route)** is an approximately 12-14-mi. (19-23-km) underground transmission route that largely uses existing linear infrastructure corridors to connect the Atlantic Landfall Site to the proposed onshore substation and/or converter station at the Fire Road Site and existing Cardiff Substation POI (Figure 7).

  From the Atlantic Landfall Site, the PDE includes three routes and two routing options[4] to extend the onshore routes inland to a common point at the southeast corner of Pete Pallitto Field, a park/ballfield which is located at the intersection of N. Sovereign Ave and Fairmont Avenue in Atlantic City. From the California Avenue Landfall:

  - A route would follow California Avenue to Fairmont Avenue, turning west on Fairmont Avenue heading towards the ballfield.
  - A route would follow Pacific Avenue west to Sovereign Avenue, where the route would turn to the north and follow Sovereign Avenue towards the ball field.
  - A route would follow Pacific Avenue to Iowa Avenue, where the route would turn north and run to Arctic Avenue. At Arctic Avenue, the route would turn west continuing to N. Montpelier Avenue, where the route turns north to Fairmont Avenue and follows Fairmont Avenue west to the park/ballfield. Alternatively, the route would continue along Arctic Avenue, turning west onto Sovereign Avenue, towards the ball field.

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[3] Although the December 2021 version of this TARA included multiple options for the Atlantic Landfall Site within the PDE, the S. California Avenue location has since been selected. Atlantic Shores submitted a memorandum to BOEM in November 2023 adding a short portion within the S. Iowa Avenue ROW to the Landfall PAPE to maintain technical feasibility for landing the export cables in Atlantic City after Atlantic Shores received information from NJDEP regarding a stormwater outfall pipe near the parking lot landfall location.

[4] Atlantic Shores submitted a memorandum to BOEM in November 2023 summarizing minor additions to the Cardiff Onshore Interconnection Cable Route PDE based on recent stakeholder input, individual landowner discussions, and advanced engineering design. These revisions are not major divergences from the routes currently included in the COP and analyzed in the DEIS and are not expected to result in significant changes to the magnitude or nature of impacts or mitigations.

- Rather than turning west onto Arctic Avenue, another routing option continues north along Iowa Avenue to Fairmont Avenue, where it rejoins the California Avenue to Fairmont Avenue route.
- Another routing option would continue along Iowa Avenue and turn north onto Atlantic Avenue. The route would follow Atlantic Avenue, where it would turn west onto Sovereign Avenue, towards the ballfield.

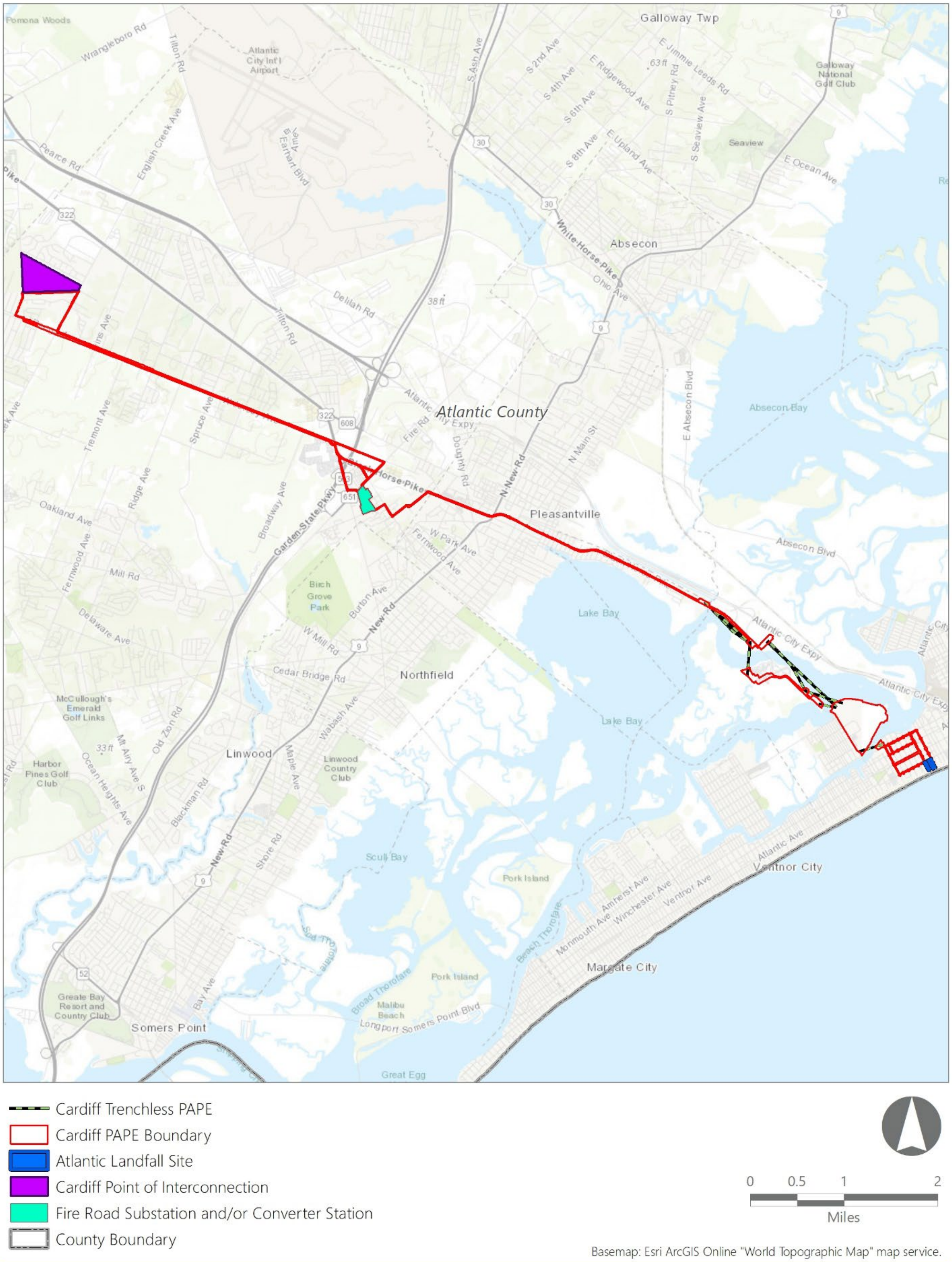
From the convergence point at Pete Pallitto Field, the Cardiff Onshore Route continues northwest. HDD is expected to be used to cross the waterway (Inside Thoroughfare) to Bader Airfield (Figure 33, Sheet 1). The Cardiff Onshore Route then continues along U.S. Route 40 for approximately 0.4 mi. (0.64 km) to a planned HDD entry pit on Bader Airfield before splitting into two or more routing options:

- One routing option begins where HDD is expected to be used to cross the Great Thorofares to the mainland within a graveled and paved lot northeast of U.S. Route 40 and west of a marina (Figure 33, Sheet 2). From here, the Cardiff Onshore Route enters the U.S. Route 40 corridor an continues northwest for approximately 3.97 mi. (6.39 km) to Delancy Avenue, turning southwest onto Delancy Avenue and traveling approximately 0.46 mi. (0.74 km) to the intersection of Old Egg Harbor Road. From this point the route turns to the northwest to follow Old Egg Harbor Road to Hingston Avenue, turning southwest and continuing approximately 0.15 mi. (0.24 km) before entering the southern side of the potential substation/converter station site at the Fire Road Site. The route exits the northern corner of the Fire Road Site on Fire Road and continues approximately 0.35 mi. (0.56 km) northwest before converging with a railroad ROW that contains an existing 69-kilovolt (kV) Atlantic City Electric (ACE) transmission line. The route continues northwest along this corridor to just west of the Garden State Parkway (crossing underneath the Garden State Parkway via trenchless jack-and-bore) near the Shore Mall. At this point the railroad ROW transitions to the Atlantic County Bikeway (built within former railroad ROW) and the route follows this ROW for approximately 3.8 mi. (6.1 km) to English Creek Avenue. Alternatively, another routing option follows West Jersey Avenue for this distance. From here, the route turns northeast onto English Creek Avenue and continues approximately 0.5 mi. (0.8 km) before converging with an existing ACE 230 kV transmission line ROW. The route travels 0.38 mi. (0.6 km) west along the ACE ROW before reaching the existing Cardiff Substation POI.

    - Another alternative within this routing option begins at a second HDD entry pit option located approximately 0.08 mi. (0.13 km) east of the primary pit option in Bader Airfield, crossing Beach Thorofare to a paved parking of a (now demolished) commercial structure to the east of U.S. Route 40. From this parking lot, the HDD route crosses under the Great Thorofare to the mainland within a graveled and paved lot northeast of U.S. Route 40 and west of a marina (Figure 33, Sheet 2). From here, the routing option converges with the main routing option within the U.S. Route 40 ROW described above.

- An alternate routing option begins at the HDD entry pit in the northwest corner of Bader Airfield, where instead of crossing under Great Thorofares the alternate routing option may cross Beach Thorofare to a razed industrial lot on the southeastern portion of Great Island to the east of U.S. Route 40. From this point the alternate routing option continues northwest along U.S. Route 40 for approximately

Figure 7. Proposed Cardiff Onshore Route and Associated Facility Sites



0.37 mi.(0.60 km) before turning west onto an exit ramp leading to the Atlantic City Highschool. The alternate routing option continues west through the school's paved parking lot before turning north to a potential HDD entry pit in the school's ballfields. From this point the routing option crosses under the Great Thoroughfare via HDD for approximately 0.36 mi. (0.58 km) to an HDD exit pit within a razed commercial lot on the mainland west of U.S. Route 40 (Figure 33, Sheet 2). From here, the routing option converges with the main routing option within the U.S. Route 40 ROW.

  - Two alternatives within this routing option extends the planned HDD past the razed commercial lot, turning to the northwest and paralleling the U.S. Route 40 ROW for approximately 1.1 mi. (0.67 km) before reaching a planned HDD exit pit within a roadside lot used for vehicle and road maintenance storage and the existing 69 kV ACE transmission line and railroad ROW. The routing option continues northwest along this ACE/railroad ROW for approximately 1.51 mi. (2.44 km) before converging with the main routing option at the intersection of the ACE/railroad ROW and Palermo Avenue.

- Another routing option exits the northern corner of the Fire Road Site on Fire Road and continues approximately 0.2 mi. (0.3 km) before turning northwest onto U.S. Route 40. The routing option continues along U.S. Route 40 for 0.6 mi. (0.88 km) before crossing through the parking lot of Shore Mall and converging with the previously described routing option at the beginning of the Atlantic County Bikeway.
- Another routing option begins at the intersection of Fire Road and Old Egg Harbor Road, where instead of continuing along Fire Road the route turns northwest onto Old Egg Harbor Road and follows it until reaching U.S. Route 40. The routing options continues northwest along U.S. Route 40 before converging with the previously described routing option at the beginning of the Atlantic County Bikeway East.
- Another routing option exits the northwest corner of the Fire Road Site, crossing Fire Road, and continuing west along a paved commercial parking lot before intersecting Tilton Road. The routing option turns to the north and follows Tilton Road before converging with U.S. Route 40 and previously described routing options.
- Another routing option begins at the intersection of the Atlantic County Bikeway and Spruce Avenue (CR 684), where instead of following the Atlantic County Bikeway, the

route turns northwest onto Reega Avenue and continues for approximately 1.58 mi. (2.54 km) until reaching Roberta Avenue, turning to the northeast and following Roberta Avenue for approximately 0.26 mi. (0.42 km). until reaching the existing ACE 230 kV transmission line ROW. The routing option then travels east to the Cardiff Substation POI.

  - Another routing option begins at the intersection of the Atlantic County Bikeway and English Creek Avenue, where instead of following English Creek Avenue, this routing option continues northwest for approximately 0.21 mi. (0.34 km) along the Atlantic County Bikeway and West Jersey Avenue. From this point, the routing option then converges with Reega Avenue and continues along the alternate route described above

In order to pursue a conservative estimate of potential effects while Project plans are in development, all of the proposed Cardiff Onshore Route within the streets of Atlantic City and all routing options are included in the Project Design Envelope (PDE, see Section 1.4) and archaeological assessment (see Section 3.3.8). Collectively, any or all of the routing options are hereafter included when referencing the proposed Cardiff Onshore Route.

- The **Fire Road Site** at approximately 3038 Fire Road, is situated on approximately 19.71 acres (7.98 ha) of currently wooded and overgrown lots in Egg Harbor Township (Figure 7). An archaeological assessment of this proposed substation and/or converter station location is included in Section 3.4.7.

1.4 Description of Preliminary Area of Potential Effects (PAPE)

To facilitate BOEM's Section 106 review, Atlantic Shores prepared the *Preliminary Area of Potential Effects (PAPE) Memorandum* to describe and illustrate the Preliminary Area of Potential Effects (or PAPE) for the Projects (EDR, 2021b)[5]. As defined in that *Memorandum*, the PAPE included all locations under consideration where construction or operation of the proposed Projects has the potential to affect

[5] The *Preliminary Area of Potential Effects (PAPE) Memorandum* (EDR, 2021b) includes a description of "Preferred" and "Alternative" substation locations for both the Larrabee and Cardiff Onshore Facilities within the PAPE, while the December 2021 version of this TARA narrowed the onshore substation/converter station locations under consideration to the Randolph Road Mulching Site and Vacant Commercial Center Site. Design decisions since these initial filings have eliminated those substation locations from consideration and identified the Fire Road Site as the proposed onshore substation/converter station location in the Cardiff Physical Effects PAPE.

historic properties. The information used to define the PAPE therein was summarized from and references the PDE described in Volume I of the COP (EDR, 2021a). According to BOEM (2020), "A PDE approach is a permitting approach that allows a project proponent the option to submit a reasonable range of design parameters within its permit application, allows a permitting agency to then analyze the maximum impacts that could occur from the range of design parameters, and may result in the approval of a project that is constructed within that range." The PDE approach allows Atlantic Shores design flexibility and an ability to respond to advancements in industry technologies and techniques.

To support the assessment of potential physical effects to historic properties and terrestrial archaeological resources within the PDE, Atlantic Shores established a PAPE for physical effects to historic properties and terrestrial archaeological resources which incorporates the maximum breadth and depth of all areas of onshore ground disturbing activity, or other construction activities that could result in demolition or alteration of existing buildings or other built features.

The Projects overall PAPE for physical effects consists of three distinct PAPEs; two PAPEs for the Project's proposed Onshore Interconnection Cable Routes and associated Onshore Facilities and one PAPE for the O&M Facility.[6] The Cardiff and Larrabee Physical Effects PAPEs include the export cable landfall sites, the onshore transmission cable routes, the proposed onshore substation and/or converter station sites, and the POIs.[7] For the landfall sites, the proposed onshore substation and/or converter station sites, and the POIs, the PAPE was established as the boundaries of those facilities and/or the parcels on which those facilities are planned to be sited. For the onshore transmission cable routes, the PAPE was generally established using the width of the existing roadway, bike path, and railroad ROWs that the cable routes followed combined with the boundaries of parcels containing planned HDD entry or exit pits. As such, the width of the PAPE along the Larrabee and Cardiff Onshore Routes is overly conservative when considering the actual 20-foot (6-meter)-wide footprint of potential ground disturbance associated with open trenching during installation of the onshore cables (described in Section 1.2; see Figure 2-Figure 5).

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[6] A TARA for the O&M Facility was prepared under separate cover as Appendix II-P2 of the Projects COP.

[7] The existing substation POIs are by definition included in the PAPEs; however, they are owned by Jersey Central Power and Light (JCP&L) and Atlantic City Electric (ACE), who will be responsible for the design and construction of the required upgrades at these locations. This TARA does not include an assessment of either POI as no specific actions or effects are proposed by Atlantic Shores at these existing facilities at this time.

The PAPEs are individually described in Sections 2.0 and 3.0 based on the current PDE and are anticipated to be refined as design of the Projects progresses. The breadth and depth of physical effects for the Onshore Interconnection Facilities are tabulated in Table 1.

Table 1. Summary of PAPEs for Physical Effects

Project Component	Maximum Horizontal Effect	Maximum Vertical Effect
Larrabee Facilities	**237.17 ac. (96.24 ha)**	
Landfall Sites		
Monmouth Landfall Site	8.32 ac. (3.37 ha)	16.8 ft. (5.12 m)
Onshore Substations and/or Converter Station Site/s		
Lanes Pond Road Site	16.27 ac. (6.84 ha)	60 ft. (18.3 m)
Randolph Road Site	24.64 ac. (9.97 ha)	60 ft. (18.3 m)
Brook Road Site[a]	99.37 ac. (40.21 ha)	60 ft. (18.3m)
Larrabee Onshore Interconnection Cable Route Options[b]		
Larrabee Onshore Route	187.94 ac. (76.06 ha) 20 ft. (6 m) width of Open Trenching	Open Trenching 11.5 ft. (3.5 m) Specialty Installation 30 ft. (9 m)
Cardiff Facilities	**342.15 ac. (138.46 ha)**	
Landfall Sites		
Atlantic Landfall Site	2.90 ac. (1.17 ha)	16.8 ft. (5.12 m)
Onshore Substation and/or Converter Station Site/s		
Fire Road Site	19.71 ac. (7.98 ha)	60 ft. (18.3 m)
Cardiff Onshore Interconnection Cable Route Options[b]		
Cardiff Onshore Route	319.56 ac. (129.31 ha) 20 ft. (6 m) width of Open Trenching:	Open Trenching 11.5 ft. (3.5 m) Specialty Installation 30 ft. (9 m)

a. Note that since the Brook Road Site is proposed to be developed separately under the New Jersey Board of Public Utilities (NJBPU) State Agreement Approach (SAA), it has been removed from the Larrabee Physical Effects PAPE and its listed acreage is not included in the maximum horizontal effects total. Although no specific actions or effects are proposed by Atlantic Shores at this location, discussion of the Brook Road Site has been retained as part of the study area in the TARA since the project may utilize future facilities on the site.

b. Trenchless portions of the PAPE, including planned HDD and/or jack-and-bore locations, are included as part of the Onshore Routes. The maximum vertical effect of these installations is described as “Specialty Installation” in this table.

The final Area of Potential Effects (APE) will be formally determined by BOEM in consultation with the NJHPO as part of the Section 106 consultation process. The process for identifying and evaluating effects on historic properties resulting from the construction and operation of the Project will involve consultation with BOEM and the NJHPO, Native American Tribes/Nations, and other consulting parties with a demonstrated interest in the historic properties (e.g., historic preservation organizations).

1.5 Methods of Investigation

Areas where there is a higher relative potential for humans to have occupied the landscape (and therefore, where archaeological sites are more likely to be present) are typically assessed based on the following:

- the presence of/proximity to previously recorded archaeological sites
- environmental variables, such as topography, setting, soil, and proximity to water sources
- the locations of map-documented structures (MDS) or other features depicted/described on historical maps, historical sources, and/or oral history.

The primary assumption behind the assessment of archaeological sensitivity is that pre-industrial populations located their settlements in areas that maximized their access to key subsistence resources (e.g., water, fish, game, wild plant foods, and domesticated plants). Therefore, major habitation sites are often located on flat terrain, along major streams and rivers, in proximity to wetlands, and on well-drained soils. A review of historical maps and aerial imagery for identifying MDS is an effective method for assessing archaeological sensitivity for sites dating from the seventeenth century and later. Overall, historical maps and aerial imagery highlight that the probability of encountering historic-period archaeological resources increases at the locations of former buildings, along roadways, and intersections between roadways.

To inventory and characterize previously identified archaeological resources and evaluate the potential for unidentified terrestrial archaeological resources to be present within the PAPE, EDR conducted the following research:

- Archaeological reconnaissance of the Facility Sites to assess and document existing conditions
- Local and regional histories review
- Review of the NJHPO's Look Up Cultural Resources Yourself (LUCY) website
- Review of archaeological site forms within a 0.5-mile (0.8-kilometer) buffer of the PAPE

- Review of digitally available previous cultural resources surveys encompassing or intersecting portions of the PAPE[8]
- Historical map review
- Topographic survey
- Lidar and hillshade analysis
- Mapping of buried utilities
- Review of as-built road drawings
- Present and past aerial photography review
- Soils assessment, including soil boring data.

Lists of the specific sources examined during background research of the Larrabee and Cardiff Physical Effects PAPEs are included in Sections 2.1.1 and 3.1.1.

To document existing conditions within the PAPE, EDR archaeologists conducted field reconnaissance which included walking or driving adjacent to or across the proposed locations of the landfall sites, onshore routes, and onshore substations and/or converter stations to record existing conditions, which were documented by photographs, field notes, and global navigation satellite system (GNSS)-collected data. The primary goal of the reconnaissance was to identify those areas where visible prior ground disturbance (e.g., engineered/artificial landforms, grading, cut and fill, and/or buried utility markers) was evident.

EDR utilized the LUCY website maintained by the NJHPO to determine whether previously identified cultural resources were located within or adjacent to the PAPE (NJHPO, 2021). Information found therein includes properties and sites listed on and eligible for the State and National Registers of Historic Places (S/NRHP), as well as historic districts, historic resources and sites not listed on or evaluated for listing on the S/NRHP. The NJHPO also maintains a mapped grid of archaeologically sensitive areas. In addition to a review of the information available through LUCY, EDR also examined cultural resources reports from an in-house reference library, those available through online repositories, and through correspondence with other firms.

[8] Due to the Covid-19 pandemic, the NJHPO suspended in-person research visits, and review of previous cultural resource survey reports was limited to those that were available digitally or through correspondence with report authors.

For its background and site file research, EDR noted all previously recorded cultural resources mapped within a 0.5-mi. (0.8-km) buffer of the PAPE. EDR conducted archaeological site file research through correspondence with the New Jersey State Museum (NJSM) in Trenton, New Jersey and the Pinelands Commission in New Lisbon, New Jersey. EDR also reviewed historical maps to ascertain past land uses and determine whether MDS were depicted within or adjacent (i.e., within 200 ft.) to the PAPE in order to assess potential historic-period archaeological sensitivity.

Historical aerial imagery dating from 1995 to 2020, available through Google Earth (Google, 2022), was utilized to assess the recent conditions and land uses within the PAPE. Additional historical aerial imagery from LUCY and other online sources was also inspected (NJDEP, 2021; Historic Aerials, 2022) to determine prior land use. Natural Resources Conservation Service (NRCS) soil data was also assessed to provide supplementary insight into the PAPE's geomorphic setting and any potential anthropogenic disturbance (NRCS, 2021).

Informed by a synthesis of the research summarized above, the PAPE was categorized into "Disturbed" and "Potentially Undisturbed" areas (see Figures 14, 21, 31, and 38). This categorization informed EDR's assessment of the archaeological sensitivity of the proposed Onshore Interconnection Facilities Sites as well as EDR's identification of areas where additional archaeological field investigations is recommended (i.e., Phase IB shovel testing) in a manner consistent with the NJHPO's *Guidelines for Phase I Archaeological Investigations: Identification of Archaeological Resources* (hereafter, NJHPO's *Guidelines*; NJHPO, 2019). NJHPO's *Guidelines* state:

> There are a number of special conditions that can lead to excluding all or part of an APE from field investigation. For example, it may be possible to eliminate part or all of the APE from further investigation if it can be demonstrated that recent disturbance has rendered it unlikely that any potentially significant archaeological sites have survived. However, in order to do this, it is necessary to document the severity and extent (horizontal and vertical boundaries) of the disturbance and to assess the degree to which this disturbance would compromise the significance of any sites that may have been present. Documentation may take the form of test excavation unit profile drawings, written or graphic records of past land use (e.g., maps showing a sand quarry), or photographs and written descriptions showing how current conditions differ from the historic configuration of the landscape.
>
> Each situation should be assessed individually to determine whether the cultural resource potential is in fact limited by any special condition. For example, steep slopes are unlikely to hold many types of prehistoric sites,

> but may contain rockshelter or quarry sites. While inundated lands are not apt to contain most types of sites, they may contain the remains of historic period shipwrecks or sawmills. Sites that are inundated today may have been fast land prior to recent sea level rise, or may have become inundated as the result of increased runoff, changes in routing of storm water, or construction of impasses to drainage such as dams or railroad or road alignments.
>
> In sum, it is important to assess the range of site types that could be present, as well as changes in site conditions through time, in assessing the need to survey a particular area. It is advisable to discuss any special conditions with the HPO and other relevant agencies in advance of fieldwork so that a strategy for surveying or excluding special condition areas can be agreed upon.

In a July 25, 2022 meeting with Atlantic Shores and EDR, NJHPO staff indicated to Atlantic Shores that they do not typically require testing within roadways when the impacts are confined to the roadway. NJHPO indicated it would recommend testing for HDD pits that are located outside of the roadway and asked for justifications of any areas beyond roadways assessed as disturbed. Atlantic Shores also inquired about its review of the portions of the PAPE immediately adjacent to the roadways, and if testing the roadside margin was required. The NJHPO stated that if construction was confined to the highway/roadway, testing the roadside is not required but providing supporting data for that exclusion would be good practice.

A review of previously conducted cultural resource surveys in New Jersey uncovered the use of an archaeological sensitivity model which assigned "no sensitivity" for prehistoric archaeological resources to areas that contain poorly drained soils (e.g., Louis Berger, 2014, 2015). In a November 9, 2022 meeting with Atlantic Shores and EDR, BOEM indicated that it found this approach insufficient, and that the agency would require more investigation of landforms which may only be seasonally inundated. In compliance with this guidance, EDR has classified mapped wetlands and poorly drained soils as Low sensitivity areas which will be subjected to pedestrian survey (and judgmental shovel test survey if deemed appropriate based on observed field conditions). A review of elevation and lidar data (see Figures 14, 21, 31, and 38) was also conducted to potentially identify any elevated micro landforms within the wetland areas which would be included in judgmental shovel test survey.

Following discussion with NJHPO and BOEM staff, the "Disturbed", "Potentially Undisturbed", and "Paved" areas within the PAPE were further subdivided to correspond to the archaeological sensitivity categories described in NJHPO's *Guidelines (*NJHPO, 2019). These categories are outlined as follows:

- Excluded from field survey consideration – Disturbed areas. Slopes greater than 15%. Areas of previous subsurface archaeological testing/survey.
- Low sensitivity – Mapped wetlands and poorly drained soils. Potentially undisturbed areas adjacent to paved roadways (within which the onshore cables are actually sited) where depth to culturally sterile subsoil is less than approximately 2.0 ft. These areas will be pedestrian surveyed (and may be subject to limited judgmental shovel test survey if deemed appropriate based on observed field conditions).
- Medium sensitivity, included in "Potential Phase IB Survey Areas" for shovel testing – Potentially undisturbed areas outside of road and railroad/bike path ROWs, mapped wetlands, and poorly drained soils. Potentially undisturbed areas adjacent to paved roadways and bike paths (within which the onshore cables are actually sited) where depth to culturally sterile subsoil is greater than approximately 2.0 ft. These areas will be subject to systematic shovel test survey.
- Medium-High sensitivity, included in "Potential Phase IB Survey Areas" for shovel testing – Potentially undisturbed areas within approximately 500 ft. of surface freshwater and/or 1,000 ft. of previously identified archaeological sites. These areas will be subject to systematic shovel test survey. Potentially undisturbed areas which are completely paved within 1,000 ft. of previously identified archaeological sites are recommended for archaeological monitoring.

In compliance with The NJHPO's *Guidelines* and in consideration of discussions with NJHPO and BOEM staff, the "Potential Phase IB Survey Areas" depicted on Figures 14, 21, 31, and 38 illustrate those portions of the PAPE for the proposed Onshore Facilities for which Phase IB shovel testing is recommended. Figures 14, 21, 31, and 38 also include soil mapping, lidar based topographic analysis, and geotechnical boring locations to document soil conditions and recent disturbance; as well as historical mapping and buffers of waterways and archaeological site locations which informed archaeological sensitivity determinations.

In those portions of the proposed onshore routes with Medium to Medium-High sensitivity that overlap with paved roadways or bike paths not suitable for subsurface archaeological testing (i.e., shovel testing), then shovel test pits (STPs) would be excavated within the public ROW on the road shoulder or bike path margins adjacent to the paved areas, as a proxy for what may be beneath the paved areas. This testing strategy is based on methodologies utilized when evaluating the onshore facilities for similar offshore wind projects reviewed by BOEM (EDR, 2020, 2022; see Section 4.2).

All Phase IB shovel testing and associated reporting will be submitted to BOEM and Consulting Parties prior to the Projects' ROD. The archaeological sensitivity assessment for each of the Onshore Facilities are included in Sections 2.2 through 2.3 and Sections 3.2 through 3.4. As of August 2023, Phase IB survey has been completed for the majority of the Cardiff Facilities and a portion of the Larrabee Facilities The results of all Phase IB shovel testing completed to date are presented in Sections 2.3.9, 3.3.9, and 3.4.7. The results of any Phase IB survey conducted hereafter will be presented in an addendum to this TARA. The methods used in Phase IB investigation are discussed in Section 1.5.1

1.5.1 Phase IB Survey Methodology

Atlantic Shores followed the general survey methodology described herein for the Phase IB archaeological survey efforts presented in the TARA. This methodology will also be utilized for the remaining Phase IB survey efforts.

Prior to initiating the archaeological fieldwork, New Jersey One Call (811) is contacted to request a utility mark-out. The utility mark-out enables the archaeologists to avoid excavation in the area of existing utilities and helped identify additional previously disturbed areas where no archaeological work is necessary.

The archaeological survey consists of hand excavation of STPs in a 50 × 50-foot (ft.) (15 × 15-meter [m]) grid or transects in areas identified as "Potentially Undisturbed." In Medium to Medium-High sensitivity areas of proposed ground disturbance that overlap with paved roadways or bike paths not suitable for subsurface archaeological testing (i.e., shovel testing), STPs would be excavated within the public ROW on the road shoulder or bike path margins adjacent to the paved areas, as a proxy for what may be beneath the paved areas. This testing strategy is based on methodologies utilized when evaluating the onshore facilities for similar offshore wind projects evaluated by BOEM (EDR, 2020 and 2022). Note that excavation does not occur in areas consisting of wetlands, inundated terrain, or slopes in excess of 15 to 20%, as these areas are not required to be tested under NJHPO's *Guidelines* (NJHPO, 2019).

STPs measure approximately 18 to 20 inches (in.) (45 to 50 centimeters [cm]) in diameter and are excavated to a depth of at least 4.0 in. (10 cm) into a sterile subsoil stratum or to the practical limits of hand excavation (typically 3 to 4 ft. [0.9 to 1.2 m] below the ground surface). No machinery or heavy equipment was used during excavation. The locations of all STPs are recorded with sub-meter accurate GNSS equipment and noted on field maps. Stratigraphic profiles, including depth, soil color, and texture, for all shovel tests will be recorded digitally on standardized field record forms.

All soils excavated from STPs are screened through 0.25-in. (0.6-cm) mesh hardware cloth over tarps (to avoid leaving soil piles) to allow for the identification of artifacts. The presence of clearly modern materials, such as plastic fragments, modern bottle glass fragments, or twentieth-century architectural materials in shovel tests are noted on field forms, but these materials are not collected for subsequent analysis. All STPs are backfilled immediately upon completion and restored to match pre-existing conditions.

If artifacts or other archaeological materials (e.g., lithic artifacts/stone tools, projectile points, pottery sherds, indications of a former building) are recovered from STPs, then additional STPs at closer intervals may be excavated to determine if an archaeological site is present. If artifacts are recovered from an isolated shovel test, then up to eight additional radial STPs will be excavated at 16- and 33-ft. (5- and 10-m) intervals around the original STP to determine whether the artifacts represent an isolated find or may indicate the presence of a more substantial archaeological site. If any archaeological finds are observed, these will be collected and returned to the archaeologists' laboratory facility where they will be washed, rebagged in labeled, clean, 4-mil archival quality plastic bags and inventoried in accordance with the *Requirements for Phase I Archaeological Survey* and Requirements for Archaeological Survey Reports (NJHPO, 2008).

Results of any subsequent Phase IB archaeological survey, as well as tabulated field record forms and a complete inventory of all potential archaeological finds, will be included in a subsequent revision or in an addendum to this TARA report. The revision or addendum will be provided to appropriate federal, state, and/or local agencies and interested parties and marked "Confidential – Not for Public Disclosure – Contains Archaeological Site Information" if it contains locational information for archaeological resources that may be placed at risk by disclosure. The report will be prepared in accordance with applicable portions of the NJHPO's *Guidelines for Preparing Cultural Resources Management*

Archaeological Reports Submitted to the Historic Preservation Office (NJHPO, 2000). Atlantic Shores anticipates that some Phase IB archaeological survey may be conducted following the Project's ROD and the execution of the MOA, but all survey results and relevant data will be submitted to BOEM and relevant consulting parties for review prior to the start of construction activities in unsurveyed areas.

1.6 Organization of the Report

This TARA was prepared in accordance with applicable requirements and guidance provided in NJAC § 7:4-8.4 and § 7:4-8.5, *Requirements for Phase I Archaeological Survey* and *Requirements for Archaeological Survey Reports* (NJAC, 2015), further expanded and clarified by the New Jersey Historic Preservation Office (NJHPO, 2000, 2008). This TARA includes an *Introduction* (Section 1.0) followed by an assessment of the *Larrabee Physical Effects PAPE* (Section 2.0), an assessment of the *Cardiff Physical Effects PAPE* (Section 3.0), *Summary and Conclusions* (Section 4.0), *References* (Section 5.0), as well as Attachments.

2.0 LARRABEE PHYSICAL EFFECTS PAPE

The Larrabee Physical Effects PAPE (Larrabee PAPE) describes onshore Project components that have the potential to result in physical effects to above ground historic properties and/or require ground disturbance that has the potential to impact terrestrial archaeological resources. The Larrabee PAPE includes the export cable Monmouth Landfall Site, Larrabee Onshore Route, and three options for the Larrabee Onshore Substation and/or Converter Station (Figure 6; Table 2).[9] As described in Section 1.4, the PAPE along the Larrabee Onshore Route is overly conservative when considering the actual 20 foot- (6 meter)-wide footprint of potential ground disturbance associated with open trenching during installation of the onshore cables (Section 1.2, Figure 2-Figure 5).

Table 2. Summary of Larrabee Physical Effects PAPE

Project Component	Maximum Horizontal Effect	Maximum Vertical Effect
Larrabee Physical Effects PAPE	**237.17 ac. (96.24 ha)**	
Landfall Sites		
Monmouth Landfall Site	8.32 ac. (3.37 ha)	16.8 ft. (5.12 m)
Onshore Substation and/or Converter Station Site/s		
Lanes Pond Road Site	16.27 ac. (6.84 ha)	60 ft. (18.3 m)
Randolph Road Site	24.64 ac. (9.97)	60 ft. (18.3 m)
Brook Road Site[a]	99.37 ac. (40.21)	60 ft. (18.3 m)
Larrabee Onshore Interconnection Cable Route Options[b]		
Larrabee Onshore Interconnection Cable Route	187.94 ac. (76.06 ha) 20 ft. (6 m) width of Open Trenching	Open Trenching 11.5 ft. (3.5 m) Specialty Installation 30 ft. (9 m)

a. Note that since the Brook Road Site is proposed to be developed separately under the NJBPU SAA, it has been removed from the Larrabee Physical Effects PAPE and its listed acreage is not included in the maximum horizontal effects total. Although no specific actions or effects are proposed by Atlantic Shores at this location, discussion of the Brook Road Site has been retained as part of the study area in the TARA since the project may utilize future facilities on the site.

b. Trenchless portions of the PAPE, including planned HDD and/or jack-and-bore locations, are included as part of the Onshore Routes. The maximum vertical effect of these installations is described as "Specialty Installation" in this table.

A general environmental background and historic context of the Larrabee PAPE is included in Section 2.1. Site specific information on the historical development and extent of prior disturbance for each Onshore Facility Site within the Larrabee PAPE is subsequently described in Sections 2.2 and 2.3.

[9] The *Preliminary Area of Potential Effects (PAPE) Memorandum*, which was submitted to BOEM as Appendix I-A of the COP, included substation locations referred to as "Preferred" and "Alternate" (EDR, 2021b). Design decisions since the initial COP filing have resulted in the removal of the "Preferred" and "Alternate" sites, with the Lanes Pond Road and Randolph Road Sites now proposed.

2.1 LARRABEE PAPE GENERAL BACKGROUND AND RESEARCH

2.1.1 Research Sources

EDR reviewed the following primary and secondary sources to assess the potential for previously unidentified cultural resources within the Larrabee PAPE. Digital collections, online databases, archives, and repositories consulted included the following:

- NJHPO online cultural resources database (LUCY)
- New Jersey State Museum (NJSM) archaeological site files
- Library of Congress digital collections
- Historic American Building Survey /Historic American Engineering Record digital collections
- New Jersey Historical Society digital collections
- Monmouth County Historical Association online resources
- David Rumsey Map Collection database
- NRHP nominations as provided by the NPS
- New Jersey State Library Genealogy and Local History collection
- New Jersey State Archives online catalog
- JSTOR online journal database.

In addition, local and regional histories and resources were consulted, including the following:

- *History of Monmouth County, New Jersey* by Franklin Ellis (1885)
- *History of Monmouth and Ocean Counties* by Edwin Salter (1890)
- Staff at the Howell Heritage and Historical Society (2020).

Historical mapping, aerial imagery, and community management documents consulted included the following:

- 1828 *A Map of the State of New Jersey: With Part of the Adjoining States* by T. Gordon (Figure 18)
- 1860 *Topographical Map of the State of New Jersey* by G.M. Hopkins (Figure 12)
- 1873 *Atlas of Monmouth Co., New Jersey* by F.W. Beers
- 1878 "The State of New Jersey," in *Historical and Biographical Atlas of the New Jerse*y Coast by G.W. Howell (Figure 19)

- 1889 *Atlas of Monmouth County*, "Howell Township," by Chester Wolverton
- 1888 USGS 1:62,500-scale Topographical Map, *Asbury Park, N.J.* Quadrangle (Figure 13)
- 1901 USGS 1:62,500-scale Topographical Map, *Asbury Park, N.J.* Quadrangle
- 1947 USGS 1:24,000-scale Topographical Map, *Point Pleasant, N.J.* Quadrangle
- 1954 USGS 1:24,000-scale Topographical Map, *Asbury Park, N.J.* Quadrangle (Figure 20)
- 1953 USGS 1:24,000-scale Topographical Map, *Point Pleasant, N.J.* Quadrangle (Figure 20)
- 1954 USGS 1:24,000-scale Topographical Map, *Lakewood, N.J.* Quadrangle (Figure 20)
- 1954 USGS 1:24,000-scale Topographical Map, *Farmingdale, N.J.* Quadrangle (Figure 20)
- 1890 and 1905 Sanborn Fire Insurance Maps for Sea Girt, New Jersey
- 1889, 1890, 1905, and 1921 Sanborn Fire Insurance Maps for Manasquan, New Jersey
- 1930 Sanborn Fire Insurance Maps for Wall Township, New Jersey
- Historical cartography available online by Rutgers University
- Google Earth aerial imagery
- Historic Aerials imagery
- 2016 Monmouth County Master Plan by Monmouth County Division of Planning
- 2018 Borough of Sea Girt Master Plan Reexamination Report
- 1999 Wall Township Master Plan
- 1994 Howell Township Master Plan.

2.1.2 Environmental Setting

Sea levels along the east coast of North America reached their late Pleistocene nadir during the Last Glacial Maximum, between approximately 26,500 and 20,000 years ago. Deglaciation began in the Northern hemisphere approximately 20,000 years ago and in Antarctica at approximately 14,500 years ago. Although physically distant, the timing of deglaciation in Antarctica is relevant to the Larrabee PAPE along coastal New Jersey because it introduced a large volume of water into the oceans which drastically increased the rate of global sea level rise between approximately 14,500 years ago and 10,000 years ago (Clark et al., 2009). The significantly lower sea levels during glaciation meant that large expanses of the eastern North American continental shelf were exposed, providing habitat for plants and animals, as well humans. In the words of Stanford and Bradley (2012: 91): "during the last ice age the western Atlantic shelf was a vast and environmentally rich plain stretching from the Grand Banks off Newfoundland to Florida and around the Gulf of Mexico." Lower sea levels during the late

Pleistocene epoch and extending into the early Holocene, the outer coastal plain of New Jersey extended the coastal plain to the east by 60 to 80 mi. (97 to 129 km) (Stanzeski, 2005: 58).

In eastern North America, rising sea levels gradually inundated the coastal plain between approximately 20,000 and 10,000 years ago (with the rate of sea level rise increasing between approximately 14,500 and 10,000 years ago), temporarily creating a biotically rich estuarine environment which was also eventually inundated (Stanford and Bradley, 2012: 111). Sea levels along the east coast of North America have continued to rise throughout the last 10,000 years, although at much reduced rates compared to the period between approximately 20,000 and 10,000 years ago.

The Larrabee PAPE is located on the Atlantic Ocean shoreline and near inland areas of New Jersey within the broad, low relief Outer Coastal Plain physiographic province (Figure 8). The Outer Coastal Plain formed from rising and falling sea levels over the Cenozoic Era (66 million years to the present) and has remained relatively stable in recent geological history. The bedrock and older sediments of the Outer Coastal Plain are derived from marine and littoral sediments as well as riverine and alluvial deposits originating from the eroding Appalachian Mountains to the west. More recent deposits consist of outwash plains formed during the Pleistocene Epoch and accelerating with the retreat of the Laurentide Ice sheet approximately 12,000 years ago (National Park Service, 2018; Newell et al., 1998).

The deeper underlying unit below the Outer Coastal Plain is made up of unconsolidated sediments that mainly consist of gravels, sands, and clays that gradually decrease in depth with increasing distance from the coastline, before merging into the Inner Coastal Plain province that precedes the Piedmont further inland. The farthest southern advance of glacial ice during the Pleistocene Epoch terminated north of the Outer Coastal Plain in northern New Jersey and did not significantly alter the composition or relief of the Outer Coastal Plain. However, Pleistocene glaciation created significantly lower sea levels than at present due to the massive amount of seawater absorbed into ice sheets in the northern hemisphere. Sea levels were as much as 394 ft. (120 m) lower than the present day in various settings in North America during the Pleistocene (Gornitz, 2007). As ice sheets melted during the terminal Pleistocene and early to middle Holocene (between approximately 20,000 and 4,000 years ago), global sea levels rose and submerged large areas of once habitable land, including land east of the present New Jersey shoreline. Global sea levels stabilized at current levels approximately 4,000 years ago, but seaward coastal conditions and estuaries continued to evolve as they do at the present time.

The Larrabee Onshore Route ranges from 6.6 ft. (2.0 m) in elevation above mean sea level at the Monmouth Landfall Site in the Borough of Sea Girt to a high of approximately 100 ft. (30 m) in Wall Township. The Manasquan River is the principal drainage intersected by the Onshore Route, draining its central portions, with Judas Creek draining the eastern portion of the Onshore Route and the Metedeconk River draining the western terminus. Several named streams also intersected by the Onshore Route drain into the two rivers and include from east to west: Tarklin Brook, Haystack Brook, and Dicks Brook.

Figure 8. Proposed Larrabee Onshore Interconnection Cable Route and Facilities – Topographic Conditions

2.1.3 Historic Context

The earliest people to occupy the coastal plain of New Jersey likely focused their subsistence along the plains and estuaries now submerged under the Atlantic Ocean (Stanzeski, 2005). Therefore, due to rising sea levels, many of the earliest archaeological sites in the region are now underwater. Similar to other coastal regions of eastern North America, few archaeological sites representing the Pre-Clovis, Paleoindian, and Early Archaic Periods (i.e., spanning between approximately 13,000 and 8,500 years ago) have been identified along coastal New Jersey (Shrabisch, 1915, 1917; Skinner and Shrabisch, 1913; Stanzeski 1996, 1998). However, undisturbed Pre-Clovis (i.e., pre-13,000-year-old) archaeological sites in the region would likely be located on the now-submerged continental shelf east of the present New Jersey shoreline (Stanford and Bradley, 2012). It is also possible early sites dating to the Paleoindian and Early Archaic periods, if they exist on modern-day terrestrial coast of New Jersey, have been overlooked in previous investigations because they often consist of relatively small, low density lithic scatters lacking diagnostic bifaces and dateable carbon-bearing features. This is reflective of the fact that the earliest human groups who occupied the landscape were highly mobile, existed in relatively low population densities, and did not use ceramic technologies (Ritchie and Funk, 1973).

The following cultural context summarizes the Native American and Euro-American settlement of coastal New Jersey as they relate to cultural resources which may be present in the vicinity of the PAPE. A summary of Native American cultural periods that are typically recognized by archaeologists can be found in Table 3.

The Middle and Late Archaic Periods (8,500 to 3,000 years ago) on the coastal plain of New Jersey is characterized by higher mobility, which was likely patterned by seasonal subsistence strategies. Population density increased at a greater rate during these periods than during previous periods and settlement was characterized by small seasonally occupied settlements located in riverine, lacustrine, and coastal environments.

This settlement pattern took advantage of the wide variety of natural resources, including marine resources that were available across coastal settings after sea levels stabilized to near present levels (Chesler, 1982). Diagnostic artifacts and features that indicate a Middle Archaic period occupation include Stanly Stemmed and Neville projectile point types with shallow basal notching, while Late

Table 3. Native American Cultural Periods for Coastal New Jersey

Time Period	Environment	Settlement Pattern & Subsistence Strategy	Artifact Assemblage	Comments
Paleo-Indian Period (Prior to 10,000 BP)	Non-forested plains, Pleistocene megafauna present along the coast, low sea level causes coastline to be miles out to sea from its current location.	Mobile hunting and gathering.	Fluted points.	Sites along coastlines now inundated under the Atlantic Ocean surface. Low population density. Sites are extremely rare. Very few sites dating to the Paleoindian Period are known from New Jersey.
Early Archaic Period (10,000-8,000 BP)	Warmer and wetter conditions relative to previous period, sea level begins to rise.	Mobile hunting and gathering (but somewhat decreased mobility)	Bifurcate Points.	Sites along coastlines now inundated under the Atlantic Ocean surface. Low population density. Sites are extremely rare. Very few sites dating to the Early Archaic Period are known from New Jersey.
Middle Archaic Period (8,000-6,000 BP)	Continuation of warm and wet conditions, sea level rises, and coast stabilizes near current extent. Pine and oak dominated forests give way to mixed deciduous forests.	Mobile hunting and gathering. Seasonal exploitation of resources. Initial exploitation of marine resources at the end of this period.	Poplar Island complex; Stanly Stemmed and Neville projectile points, notched atlatl weights, biface knives, drills, side scrapers, hammerstones, and choppers.	Small seasonal sites utilizing a majority of terrestrial fauna for subsistence. Marine shellfish were utilized but not deposit in great number due to high mobility.
Late Archaic Period (6,000-3,500 BP)	Continuation of warm and wet conditions	Somewhat high residential mobility, likely on a seasonal basis. Exploitation of marine resources (not widely represented).	Susquehanna point types, cremation burials in shallow pits, diversifying stone toolkit.	Larger population sizes than the previous period, small seasonal settlements seasonally located on upland landforms and sandy plateaus.
Transitional Period (4,000-3,000 BP)	Cooling trend. Mixed deciduous forests persist.	Somewhat high residential mobility, likely on a seasonal basis. Small scale exploitation of marine resources.	Orient Culture influences. Small shell middens. Cemeteries. Orient fishtail projectile points. Steatite vessels.	Shellfish exploitation in seasonal camps leaving middens. Cemeteries for burials.

Time Period	Environment	Settlement Pattern & Subsistence Strategy	Artifact Assemblage	Comments
Early Woodland Period (3,000-2,300 BP)	Cooler temperatures persist. Mixed deciduous forests persist.	Terrestrial foraging coupled with intensive exploitation of marine resources.	Cadwalader Complex. Large shell middens/rings. Introduction of ceramics.	Increased sedentism leads to larger communities developing leaving more material trace.
Middle Woodland Period (2,300-1,000 BP)	Warming and drying trend (Medieval Climatic Anomaly). Mixed deciduous forests persist.	Terrestrial foraging coupled with intensive exploitation of marine resources, introduction of agriculture.	Meadowood Culture. Lithic toolkits including quartz and quartzite projectile points. Shell tempered and stamped undecorated ceramics.	Large communities exploiting all resources available. Introduction of agriculture.
Late Woodland Period (1,000-400 BP)	Warm and dry conditions persist. Mixed deciduous forests persist.	Sedentary villages supported by agriculture, seasonal camps targeting large and small game, plants, riverine, and marine resource.	Wide variety of projectile point types, high frequency of triangular projectile points including quartz and quartzite. Increasing use of decorated ceramics.	Large communities exploiting all resources available including agriculture, relationships with surrounding populations cause consistent trade.
Post-1600 (400 BP)	Cooler and wetter conditions (Little Ice Age). Mixed deciduous forests persist.	Sedentary villages supported by agriculture, seasonal camps targeting large and small game, plants, riverine, and marine resource.	Similar technology to Late Woodland Period, with increasing presence of European trade goods.	Relationships with the English and Dutch reveal a mixture of material culture, large manufacture of wampum to facilitate political interests.

Archaic bifaces and tool kits are marked by non-local sources of lithic materials, such as rhyolite and porphyry (Chesler, 1982; Custer, 2001). Late Archaic projectile points have been further characterized by Small Stemmed and the later Susquehanna point traditions in southern New Jersey. The stabilizing oak-chestnut-hickory forests of the eastern Atlantic seaboard began to support larger populations of mediums sized game like deer and turkey that in turn led to higher human populations. Sites dating from the Late Archaic further suggest that higher population density led to greater exploitation of niche ecosystems, smaller game, and more attention paid to nuts and wild cereal grains for food (Chesler, 1982). Decreasing mobility coupled with the funerary practice of cremation points to increasing attention to semi-permanent settlements and territoriality (Spier, 1915; Veit and Bello, 2001).

The later portion of the Late Archaic period is referred to as the Transitional Archaic/Terminal Archaic period (Stewart et al., 2015). Trends observed during this Transitional Period include further development of extensive trade networks (Grossman-Bailey, 2001; Stewart et al., 2015). The Transitional Period is defined by somewhat high residential mobility, likely on a seasonal basis to pursue small scale exploitation of marine resources, especially shellfish, during optimum harvest seasons and while shifting to terrestrial, upland resources during other seasons. Coastal camp sites dating to the Transitional Period often contain shell middens, such as the Tuckerton Shell Mound in Burlington County, New Jersey. The period is characterized by material culture that includes small shell middens, formal cemeteries, and distinctive Orient fishtail stemmed projectile points which were often made of locally procured quartzite and occasionally quartz. An important technological change from the Late Archaic Period was the appearance of soapstone vessels that preceded ceramic cultures (Braun, 1974; Ritchie and Funk, 1973; Stewart et al., 2015).

The Early Woodland Period (3,000 to 2,000 years ago) is characterized by a foraging tradition combined with an intensive exploitation of marine resources and the introduction of ceramic technology. Increased sedentism during this period caused large communities to converge on more permanent settlements. These large, semi-permanent settlements left a more distinct material culture trace, and as a result are more archaeologically expressed than the smaller campsites dating to earlier periods. Material culture dating to this period in the Outer Coastal plain is most often included in the Cadwalader Complex which includes the first appearance early ceramic technology with flat-bottomed vessels, large shell middens/shell rings, and broad side-notched projectile points. Early woodland ceramics tend to be coarser and more unrefined in construction, tempered with steatite and quartz, and are rarely extensively decorated (Tuck, 1978).

The Middle Woodland Period (2,000 to 1,000 years ago) is distinguished from earlier periods by increased evidence of foraging and intensive exploitation of marine resources, but also the first appearance of horticulture throughout the Middle Atlantic region and the Atlantic coast. Horticultural economies allowed larger communities to remain sedentary for much of the year, utilizing more resources available around these settlements but with groups rarely exceeding 50 persons. Material culture traditions that are well expressed during the Middle Woodland Period in New Jersey include the Meadowood Culture, which consists of lithic toolkits including various styles of quartz lobate, stemmed, and side-notched projectile points, as well as shell tempered undecorated ceramics, followed by the Fox Creek Culture that placed heavier preference on fishing than upland game (ASNJ, 2013).

During the Late Woodland Period (1,000 to 400 years ago), groups along the coast of New Jersey occupied large villages and engaged in intensive marine and riverine resource exploitation, and terrestrial hunting. Archaeological evidence, including exotic trade goods, indicates complex relationships with both surrounding and more distant cultures which facilitated trade as well as the spread of technologies and cultural practices including ceremonial use of tobacco (Chesler, 1982; Veit and Bello, 2004). Usage of decorated ceramics increased dramatically, which has been useful to archaeologists in defining distinct cultural traditions, or phases, tied to different areas of the Middle Atlantic region. These phases include a wide variety of projectile point types and a high frequency of triangular projectile points made of local quartz and quartzite, plus exotic traded materials such as rhyolite and chalcedony. Large shell rings, middens, and decorated ceramics (e.g., Overpeck Incised, Bowmans Brook Incised, and Riggins Fabric-Impressed) are also all prevalent during this period (Chesler, 1982). Late Woodland Period settlement and subsistence patterns are discussed in additional detail below in the context of observations by European traders and settlers following the period of contact beginning in the sixteenth century and accelerated in seventeenth century. Resource use changed from Paleo-Indian to Late Woodland times, and though the inhabitants of the Outer Coastal Plain remained hunter-gatherers, their use of local food and lithic resources increased (Grossman-Bailey, 2001).

In the period of contact between Native Americans and Europeans in the sixteenth and seventeenth centuries, the Lenni Lenape inhabited present day coastal areas and the interior of New Jersey. The Unalachtigo Lenape, or the "people who live near the ocean," lived across central and southern New Jersey (Ellis, 1885). However, sixteenth and seventeenth century-dated Native American archaeological sites for the coastal and near upland regions are difficult to clearly discern in the archaeological record and are further poorly characterized due to loss of sites from later periods of development and regular erosion of shorelines and stream and riverbanks.

Dutch, Finnish, and Swedish colonists were the first Europeans to establish trading and settlements in what is now New Jersey, along the coast from present-day Cape May to Trenton and into the Delaware River valley. The Finnish and Swedish colonies, however, did not receive enough support from their respective home countries, and suffered from a lack of population and financial resources. In 1655, Peter Stuyvesant sent a fleet of Dutch ships to raid the Finnish and Swedish settlements, resulting in the Dutch absorbing the region into the New Netherlands colony (Salter, 1890). However, the New Netherlands colonies soon came under English control in 1664 following the Dutch defeat in the Second Anglo-Dutch War (Snyder 1969). For the following century, settlers from the Netherlands, French Huguenot refugees, and increasingly, settlers from England and Scotland, colonized coastal areas between the Hudson and Delaware Rivers under English crown charter and protection. Colonial settlements at this time also included a significant number of enslaved Africans involved in agricultural labor. Until 1702, colonial New Jersey was organized into two separate provinces, East Jersey and West Jersey, when the provinces were combined into a single province that largely assumed the present-day boundaries of the state of New Jersey. During the American War for Independence, several engagements between British and Continental forces took place in New Jersey and the city of Princeton served as the seat of the United States government for a brief period in 1783 (Salter, 1890).

English colonial officials formed Monmouth County in 1683 in the East Jersey province. English Quakers formed a significant share of early Euro-American settlers in the county, while bands of Lenni Lenape continued to dwell in the region and maintained trading relationships with Europeans (Ellis, 1885; Salter, 1890). Colonizing Euro-Americans largely concentrated economic development of the region on clearing pitch pine timber for lumber and producing tar and turpentine for the maritime industry and subsequently developed cleared areas for agricultural and livestock grazing land in favorable soil conditions (Parsons, 1928). The Euro-American population of Monmouth County remained relatively low compared to more intensively developed areas in the Hudson and Delaware River valleys but steadily grew into the nineteenth century with a focus on agriculture and light industry, such as grist and saw milling on suitable streams and rivers.

In what is now Howell and Wall Townships, iron production was an important aspect of the early nineteenth century economy. In 1822, James P. Allaire organized the Howell Works to produce pig iron for his prosperous Allaire Iron Works in New York City (Boyer, 1931; Wilson, 1974). Purchasing the existing Monmouth Furnace from Benjamin B. Howell, Allaire developed a largely self-supported industrial community around the furnace that remained prosperous through the 1830s. The furnace consumed bog ore raised from surrounding swamps and charcoal rendered from stands of nearby pitch pine. However, the long-term economic downturn following the Panic of 1837 and competition from larger and cheaper ironmakers in northern New Jersey led to abandonment of the furnace and surrounding community by the late 1840s (Boyer, 1931; Wilson, 1974). Remaining as a largely vacant village until the mid-twentieth century, New Jersey purchased and developed the property into Allaire State Park beginning in 1957. The area encompassing 27 previously recorded archaeological sites associated with the Howell Works is located to the north of the Larrabee Onshore Route beyond the 0.5-mile (0.8-kilometer) buffer (visible on Figure 16 in Section 2.3.3).

Apart from the growth of public roadways that connected farms and communities, two early railroads were important to the continued prosperity of southern Monmouth County into the twentieth century. The Raritan and Delaware Bay Railroad Company (later the New Jersey Southern Railroad) completed its north-south line from Port Monmouth on Raritan Bay to Lakewood by 1860, passing through Howell Township (Cunningham, 1997; visible on Figure 18 in Section 2.3.5). Today the single-track line remains in use but for infrequent freight service and has been determined as eligible for listing in the NRHP as the "New Jersey Southern Railroad Historic District." The other major railroads in the region of the Larrabee PAPE, the Farmingdale and Squan Village Railroad and the active NJ Transit Railroad, are discussed in greater detail in Section 2.3.6.

While Wall and Howell Townships remained largely agricultural into the twentieth century, rail connections with larger urban areas and later improved roadways for automobiles in the twentieth century led to the growth of seaside communities in Monmouth County that were increasingly not connected with local farming or industry (Parsons, 1928). The New Jersey state legislature formed Manasquan as a separate borough from Wall Township in 1887 and later formed Sea Girt as its own borough in 1917 as an influx of part-time and full-time residents came to live in the area due its seaside and beach amenities (Snyder, 1969). The current 165-acre (67-ha) New Jersey National Guard training facility in Sea Girt began as an annual encampment ground when the New Jersey state legislature leased the initial property (locally known as the "Stockton Farm") in 1885, later purchasing it for state militia training at the time of the Spanish-American War in 1898 (Parsons, 1928).

2.2 MONMOUTH LANDFALL SITE

2.2.1 Existing Conditions

Existing conditions within and adjacent to the Monmouth Landfall Site were observed and photographed during an archaeological reconnaissance completed by EDR personnel on September 22, 2020. Recent aerial imagery of the Monmouth Landfall Site is included as Figure 9 and photographic documentation is provided below. The Monmouth Landfall Site is currently occupied by a manicured grass lawn on the grounds of the New Jersey Army National Guard Training Center. Recent aerial photography depicts the southern portion of the landfall site in use as a parking lot and storage area for wooden lifeguard stands and benches (Figure 9; Photograph 1 and Photograph 2). The site is located immediately to the west of grass and scrub brush covered elevated sand dunes which separate it from the beach along the Atlantic Ocean coastline. The site is bounded to the south and west by paved roadways. Man-made sand berms and a collection of modern structures are located in the grass lawn to the north and east.

Photograph 1. A view of the south side of the Monmouth Landfall Site, encompassing a grass and sand parking lot area. Taken from a path through the sand dunes, leading to the beach along the Atlantic Ocean coastline. View to the west.

Figure 9. Monmouth Landfall Site Overview

Photograph 2. Training field of the New Jersey Army National Guard Training Center, with the Monmouth Landfall Site adjacent to shoreline. View to the south.

2.2.2 Soils

EDR reviewed Environmental Systems Research Institute (ESRI) and Natural Resources Conservation Service (NRCS) electronic data for information relating to the soils within the Larrabee PAPE (NRCS, 2021). Per NRCS soil data, two distinct soil units are present within the proposed Monmouth Landfall Site, representing the primarily loamy sand to sand composition of soils in the vicinity:

- Urban Land – Brockatonorton complex (USBROA), 0-2% slopes, occasionally flooded. This soil type is part derived from sandy eolian and/or sandy marine deposits on dunes and dune fields. Its classification as urban land denotes probable human alteration/disturbance of the area.

- Downer – Urban Land complex (DouB), 0-5% slopes, well drained. This soil type is derived from loamy fluviomarine deposits on the coastal plain. Its classification as an urban land complex denotes potential human alteration/disturbance of the area.

Mapping of the surficial geology of the Monmouth Landfall Site indicates that sediments in the area are part of the Cape May Formation, dating to the middle and late Pleistocene. Due to erosion from waves and sea level change, beach and dune deposits like those in the Monmouth Landfall Site are rarely preserved in the subsurface (Stanford et al., 2018).

In addition, mapping of a previous Phase IB STP survey conducted across the northern portion of the PAPE for the Monmouth Landfall Site indicates that the majority of the area was found to be previously disturbed (Siegel and Baldwin, 2005; further discussed in Sections 2.2.3 and 2.2.4 and illustrated in Figure 11).

2.2.3 Previously Identified Archaeological Sites

One previously recorded archaeological resource (28-Mo-283) [redacted] Two other archaeological sites (28-Mo-019 and 28-Mo-407) [redacted] All three sites are presented in Table 4 and Figure 10 and further described below.

Table 4. Previously Identified Archaeological Sites [redacted] of the Monmouth Landfall Site

Site Number	Site Name	Distance and Direction from PAPE	NRHP Eligibility	Time Period/s	Cultural Affiliation
28-Mo-283	[NO NAME RECORDED]	[redacted]	Undetermined	Native American, Late Woodland	Native American
28-Mo-019	Manasquan	[redacted]	Undetermined	Native American, unspecified	Native American
28-Mo-407	Shearman-Mount-Stockton Farmstead	[redacted]	Eligible	Mid-eighteenth to mid-nineteenth century	Euro-American

- Unnamed Site (28-Mo-283) [redacted] Information on 28-Mo-283 is scarce. The NJSM site form lists 28-Mo-283 as prehistoric and a place where [redacted] Reports from archaeological investigations [redacted] (e.g., Kraft, 1976; Siegel et. al 2004; Siegel and Baldwin, 2005; HDR, 2014, 2015) state that 28-Mo-283 is a Late Woodland site that was first identified in 1976 by members of Seton Hall University. Phase IB archaeological survey conducted across [redacted]

[redacted] in 2004 and 2005 excavated 1,268 STPs in an attempt to reconfirm the boundaries of 28-Mo-283. The site was not relocated during this survey, and [redacted] (Siegel and Baldwin, 2005).

- The Shearman-Mount-Stockton Farmstead (28-Mo-407) is a 1.58 acre, mid-eighteenth to mid-nineteenth century Euro-American archaeological site [redacted] The site was first identified in 2005 [redacted] The Phase II evaluation [redacted], interpreted to be the remains of a farmstead, with possible evidence of a domestic structure and detached kitchen, attributable to the Thomas Shearman family, Joseph Mount, and/or Commodore Robert Stockton (HDR, 2014 and 2015). The site was recommended as S/NRHP-eligible by the reporting archaeologists and NJHPO.

- The Manasquan site (28-Mo-019) [redacted]. The NJSM site form for 28-Mo-020 includes mapping depicting 28-Mo-019 [redacted]

Figure 10. Previously Identified Archaeological Sites within [redacted] of the Monmouth Landfall Site
Confidential – Not for Public Distribution

[redacted]

2.2.4 Previous Cultural Resource Surveys

A review of LUCY, archaeology site forms, and available online resources identified the following previously conducted cultural resource survey with associated cultural resources adjacent to or intersecting the Monmouth Landfall Site.

- The 1976 report titled *Stage 2 Archaeological Investigation of the Proposed Laurel Avenue and Cedar Lane Sewage Pumping Station Areas* by Seton Hall University was the first to document site 28-Mo-283 during testing, [redacted] (Kraft, 1976).

- The 2004 report titled *Archaeological Investigations for the New Jersey Army National Guard Phase I Archaeological Surveys: Sea Girt and Morristown Armories; Phase IA Sensitivity Assessments: Fort Dix, Picatinny, Lawrenceville, Vineland, and West Orange Installations* by John Milner Associates, Inc. (JMA) excavated 51 STPs across [redacted]. A total of 84 artifacts were recovered from 29 positive STPs, along with modern refuse which was discarded in the field.

- The 2005 report titled *Archaeological Investigations for the New Jersey Army National Guard Phase IB Archaeological Surveys: West Orange Armory and* [redacted] by JMA expanded upon the 2004 survey and encompassed [redacted] including the area on which the Monmouth Landfall Site is located (Siegel and Baldwin, 2005). Approximately 1,217 STPs were excavated, resulting in two prehistoric isolated finds and 369 historic artifacts distributed relatively evenly across the project area. Maps illustrating the extent of the 2005 Phase IB survey (Figure 11; Siegel and Baldwin, 2005: Figure 14) demonstrate that approximately 95 STPs were excavated within the proposed Monmouth Landfall PAPE. No STPs excavated in the PAPE uncovered any prehistoric cultural material and 14 of the total 95 STPs contained twentieth century historic artifacts associated with general field scatter. The survey results revealed that the area on which the Monmouth Landfall Site is sited primarily consisted of disturbed soil. The few areas within the PAPE that were intact terrain (i.e., the dark gray areas depicted in Figure 11) uncovered no cultural material. The majority of identified intact terrain was approximately 0.4 mi. west of the Monmouth Landfall Site, in the western portion of the National Guard Training Center fields.

As a result of this survey, NJHPO recommended that no further survey was needed in the eastern portion of the JMA survey area. However, a Phase II evaluation was recommended in the western extent of the National Guard Training Center fields where large concentrations of historic artifacts were uncovered within intact soils.

- The 2014 report titled *Phase I Archaeological Survey of the Proposed Museum Site, New Jersey Army National Guard,* [redacted]*, Monmouth County, New Jersey* by HDR details the excavation of STPs and test units within an approximately 2.7-acre APE conducted to address regulatory requirements in advance of the construction of a proposed museum at the location (HDR, 2014). Fieldwork conducted in October 2013 included excavation of 49 STPs and one 0.5-m by 0.5-m test unit. A total of 358 Euro-American artifacts and 86 objects classified as "modern items" were recovered. Artifacts were noted as recovered from mixed soils and fill layers. The concentration of artifacts was interpreted as a push pile associated with 1971 demolition of the Governor's Cottage and/or construction of a parking roundabout and road. HDR recommended the site as not eligible for the S/NRHP due to lack of integrity and recommended no further work.

- The 2015 report titled *Phase II Archaeological Investigation of Site 28-Mo-407 at the* [redacted]*, Monmouth County, New Jersey* by HDR details the excavation of 725 STPs and seven 1.0-m by 1.0-m test units within the approximate five acre portion of intact land identified in the 2005 JMA survey area [redacted] (Siegel and Baldwin, 2005). The investigations established the boundary of a 1.03-acre archaeological site (28-Mo-407; Section 2.2.3) which contained 3,475 artifacts primarily dating from the mid eighteenth to mid nineteenth century. HDR recommended the site as S/NRHP eligible under Criterion D. NJHPO concurred with this opinion via letter dated November 15, 2013, while also requesting the inclusion of an area referred to as "Concentration D" to the boundaries of 28-Mo-407, additional artifact analysis, mapping, and data. In response to NJHPO comments, the survey report was updated in February 2015 to include the additional analysis and expand the boundaries of the site to 1.58 acres to include Concentration D (HDR, 2015).

Figure 11. Map illustrating the locations of STPs excavated during the 2005 Phase IB survey of [redacted] in relation to the Monmouth Landfall Site PAPE (Siegel and Baldwin, 2005: Figure 14; HDR, 2015: Figure 3-10).

[redacted]

2.2.5 Historical Map and Photography Review

A review of historical maps and aerial photography depicting the area in and around the Monmouth Landfall Site revealed the following:

- The 1860 *Topographical Map of the State of New Jersey* by G.M. Hopkins (Figure 12) depicts the Monmouth Landfall Site as undeveloped land northeast of a small body of water (Stockton Lake), between the Sea Girt and Manasquan Inlets. The nearest population center is Squan Village (present day Manasquan) to the west. The nearest MDS is located south of the landfall site, south of Stockton Lake.

- The 1888 USGS 1:62,500-scale Topographical Map, *Asbury Park, N.J.* Quadrangle depicts an unimproved road running north to south in or near the landfall site, and the L.S. (Life Saving) Station Squan Beach approximately 0.34 mi. to the south (USGS, 1888; Figure 13). Research indicates the L.S. station was located there since 1856 "to serve as a first responder for those in trouble in the treacherous waters along the state's oceanfront" (SBLSSPC, 2021). By 1947, USGS mapping depicts the New Jersey National Guard Facility and improved roadways in the area (USGS, 1947).

- Between 1947 and 1989, USGS mapping and aerial photography show changing road routes, sand push piles/berms, retaining walls, and equipment storage in the area (USGS, 1947; Historic Aerials, 2020). By 1995, aerial photography depicts the landfall site in a state and configuration similar to present day.

In brief, the historical map review demonstrates that the proposed Monmouth Landfall Site was an undeveloped beachside location with unimproved roads or trails until construction of the New Jersey National Guard Facility by 1947. From 1947 to present the proposed Monmouth Landfall Site has been subjected to multiple periods of extensive earthmoving, grading, and light development.

Figure 12. 1860 *Topographical Map of the State of New Jersey* by G.M. Hopkins

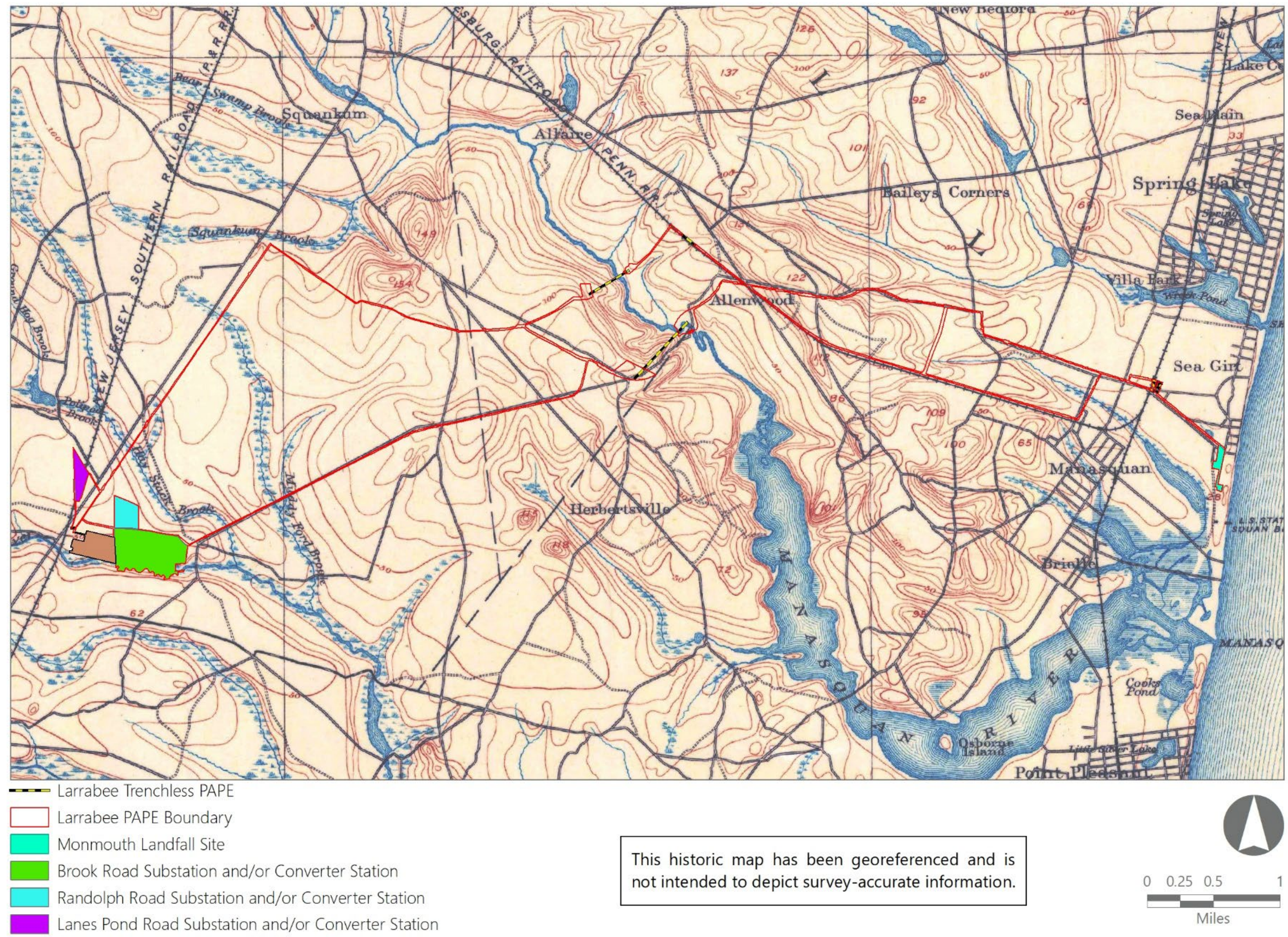
Larrabee Trenchless PAPE
Larrabee PAPE Boundary
Monmouth Landfall Site
Brook Road Substation and/or Converter Station
Randolph Road Substation and/or Converter Station
Lanes Pond Road Substation and/or Converter Station
Larabee Point of Interconnection

This historic map has been georeferenced and is not intended to depict survey-accurate information.

0 0.5 1 2
Miles

Basemap: 1860 G.M. Hopkins *Topographical Map of the State of New Jersey*

Figure 13. 1888 USGS 1:62,500-scale Topographical Map, *Asbury Park, N.J*



Basemap: 1888 USGS 1:62,500-scale topographical map, *Asbury Park, NJ.*

2.2.6 Archaeological Sensitivity Assessment

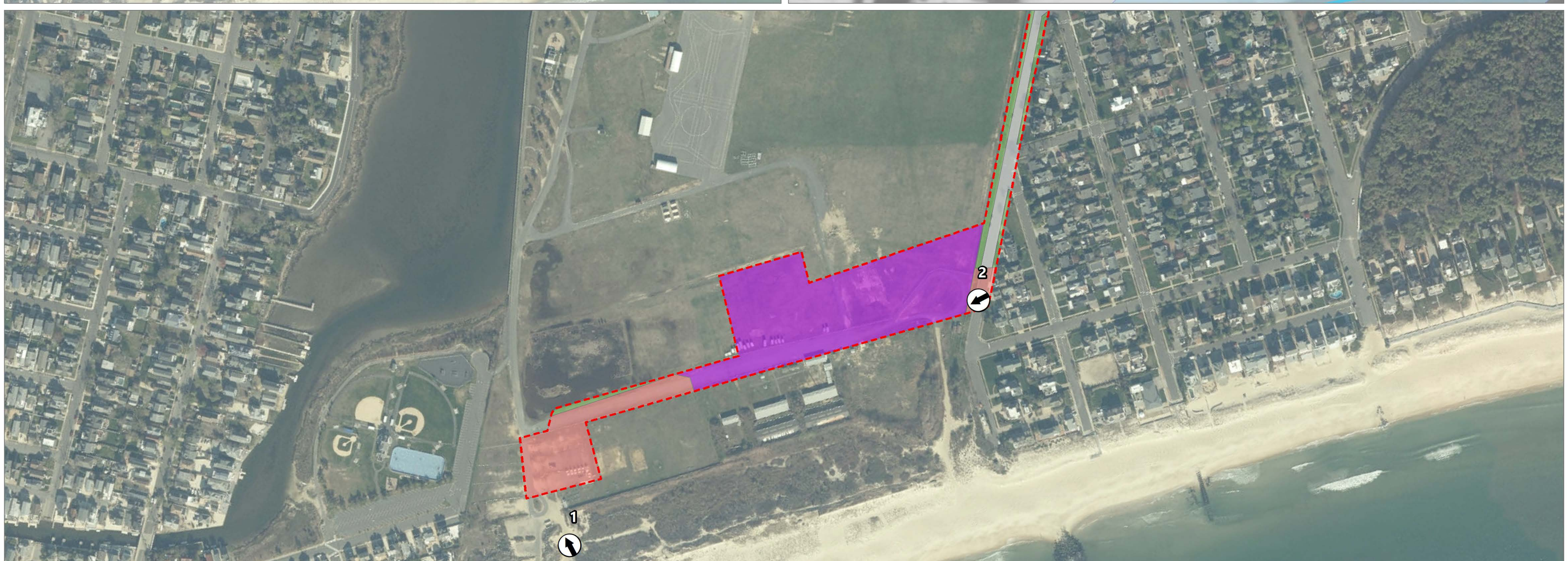
Since one previously identified Native American archaeological site (28-Mo-283) is [redacted], another was identified [redacted] and due to proximity to the Atlantic Coast, the landfall site would be considered to have a moderate to high sensitivity for the presence of Native American archaeological resources in the absence of historic-period and modern ground disturbance. However, due to the extent of prior ground disturbance observed during previous Phase IB survey of the area (Section 2.2.4), indicated by soil data, and illustrated in historical mapping, aerial photography, and mapping from previous cultural resource surveys there is a very low likelihood for intact Native American archaeological resources to be located within the Monmouth Landfall Site. Similarly, the recorded disturbance to the area throughout the latter half of the twentieth century indicates a low likelihood for intact historic-period archaeological resources, since the multiple episodes of construction and grading would have significantly disturbed, if not destroyed, any archaeological sites that predated such disturbance.

The portions of the Monmouth Landfall Site mapped as Urban Land – Brockatonorton complex have been categorized as "Disturbed" in EDR's Archaeological Reconnaissance and Desktop Assessment (see Figure 14) and are recommended as excluded from field survey consideration. Phase IB archaeological survey conducted across [redacted] by LMA in 2005 did not identify any new archeological sites and was unsuccessful in relocating archaeological site 28-Mo-283. Although the survey did uncover two prehistoric isolated finds, neither of the objects were found within [redacted] nor could they be definitively linked to 28-Mo-283. Furthermore, surveying archaeologists determined that most of the terrain, [redacted], was not intact (Figure 11). This determination was echoed by NJHPO, who did not recommend additional investigations in the area (HDR, 2015; Section 2.2.4). As such, the portion of the Monmouth Landfall Site PAPE that overlaps the JMA Phase IB survey has been categorized as "Previously Surveyed" in Figure 14 and will be excluded from field survey consideration.

NJHPO's G*uidelines* (see Section 1.5) advise that it may be possible to eliminate part or all of the APE from further investigation if it can be demonstrated that recent disturbance has rendered it unlikely that any potentially significant archaeological sites have survived (NJHPO, 2019). As such, no further archaeological investigation is anticipated to be necessary in the areas of the Monmouth Landfall Site identified as "Disturbed" in Figure 14 and they have been excluded from field survey consideration.

As such, no further archaeological investigation is recommended within the Monmouth Landfall Site as it has been categorized as both "Previously Disturbed" and "Previously surveyed" and therefore excluded from field survey consideration. Previous ground disturbance is evident, significant, and well-documented throughout the Monmouth Landfall Site. Furthermore, previous cultural resources surveys found no trace of archaeological site 28-Mo-283 [redacted]. As such, it highly unlikely that the development will have any negative impact on any previously recorded archaeological sites.

Figure 14. Monmouth Landfall Site - Archaeological Reconnaissance and Desktop Assessment Results



Atlantic Shores South Offshore Wind Project – Onshore Interconnection Facilities

Monmouth and Atlantic County, NJ

Terrestrial Archaeological Resources Assessment

Top Left Map - Soils and Topography

- Larrabee PAPE Boundary
- 2ft Contour
- Historic Fill

Soil Condition

- Disturbed
- Intact Soils – Subsoil depth approx. 1.0-2.0 ft

Elevation

Higher

Lower

Top Right Map - 1930 Aerial & Mapped Resources

- Larrabee PAPE Boundary
- Waterway
- 500' Waterway Buffer

Bottom Map - Archaeological Sensitivity Results

- Larrabee PAPE Boundary
- Photograph Location
- Phase 1B Survey Area

Archaeological Sensitivity

- Excluded from Field Survey Consideration
- Previously Surveyed
- Low Sensitivity
- Medium Sensitivity
- Roadway/Paved

0 100 200 400

Feet

Prepared October 5, 2023

Basemap: NJ Office of Information Technology and Office of GIS "NJ 2020 Natural Color Imagery" & "New Jersey Black White 1940" Map Service

EDR

2.3 LARRABEE ONSHORE ROUTE

2.3.1 Existing Conditions

Existing conditions within and adjacent to the Larrabee Onshore Route were observed and photographed during archaeological reconnaissance completed by EDR personnel on September 22, 2020, December 3, 2020, September 14, 2021, and June 13, 2022. The reconnaissance included observation of the proposed Larrabee Onshore Route which was detailed in Section 1.3. An overview of the Larrabee Onshore Route is included as Figure 15, while more detailed aerial imagery is included in Figure 16. Photographs of the existing conditions within the Larrabee Onshore Route are provided below.

From the Monmouth Landfall Site and transition vault on the Atlantic shoreline in the Borough of Sea Girt, the Larrabee Onshore Route uses existing linear infrastructure and roadway corridors to connect the Monmouth Landfall Site to the proposed onshore substation and/or converter station at the Randolph Road Mulching Site and the existing Larrabee POI. Examples of roadways through residential neighborhoods in the Boroughs of Sea Girt and Manasquan, before passing into Wall Township, are included below (Photograph 3, Photograph 4, and Photograph 5).

Figure 15. Larrabee Onshore Interconnection Cable Route Overview

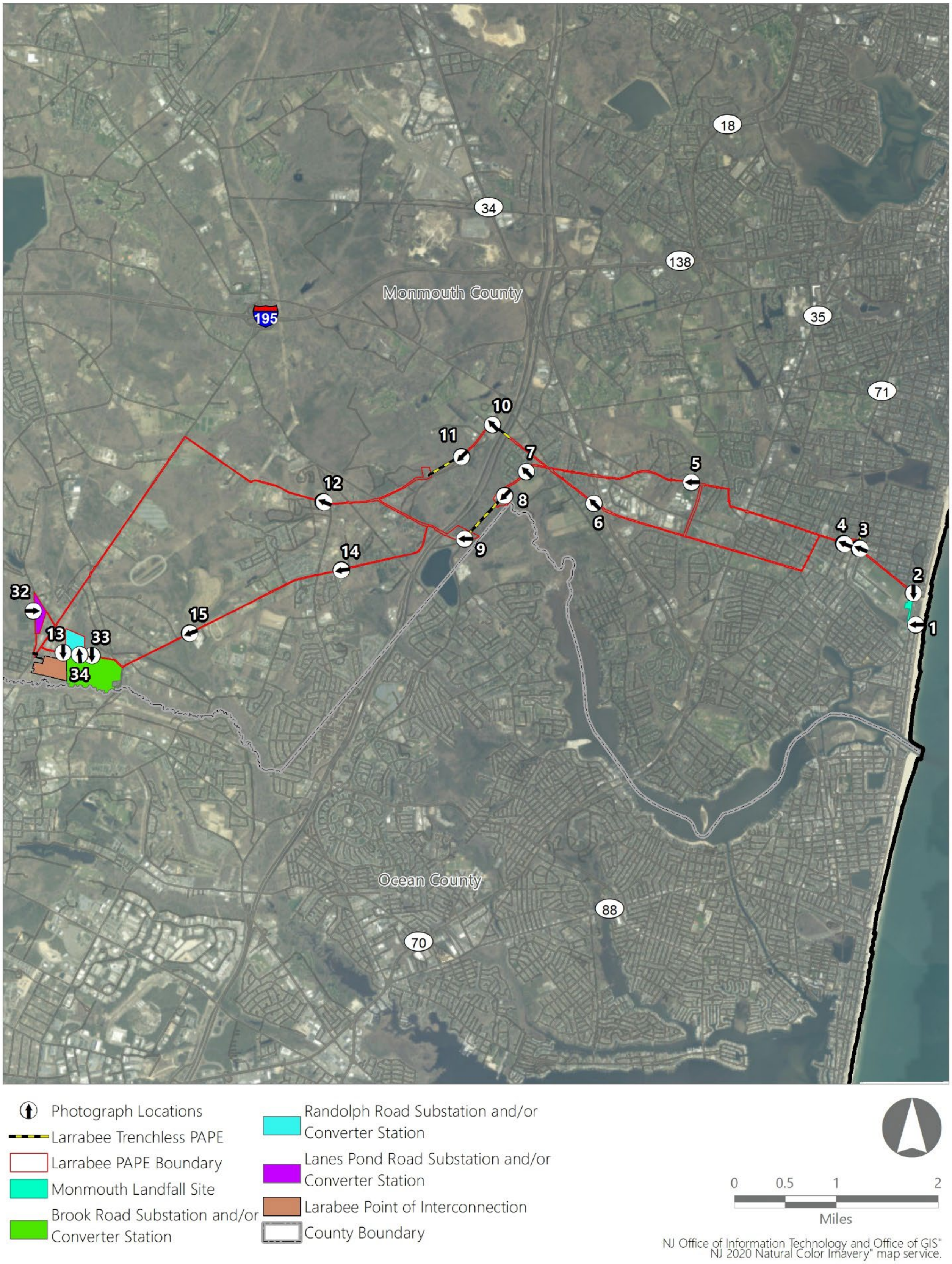


Figure 16. Larrabee Onshore Interconnection Cable – Existing Conditions and Photograph Locations

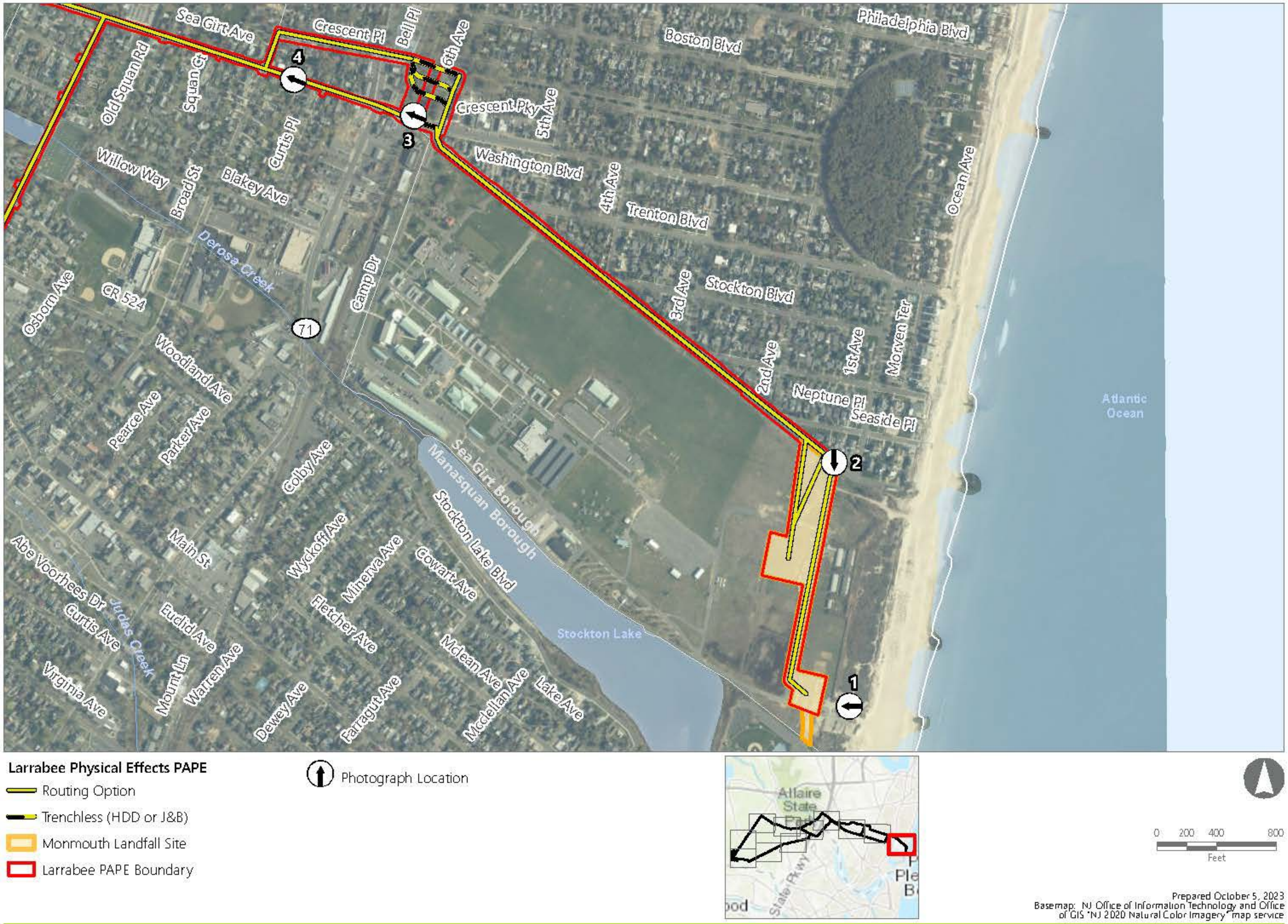
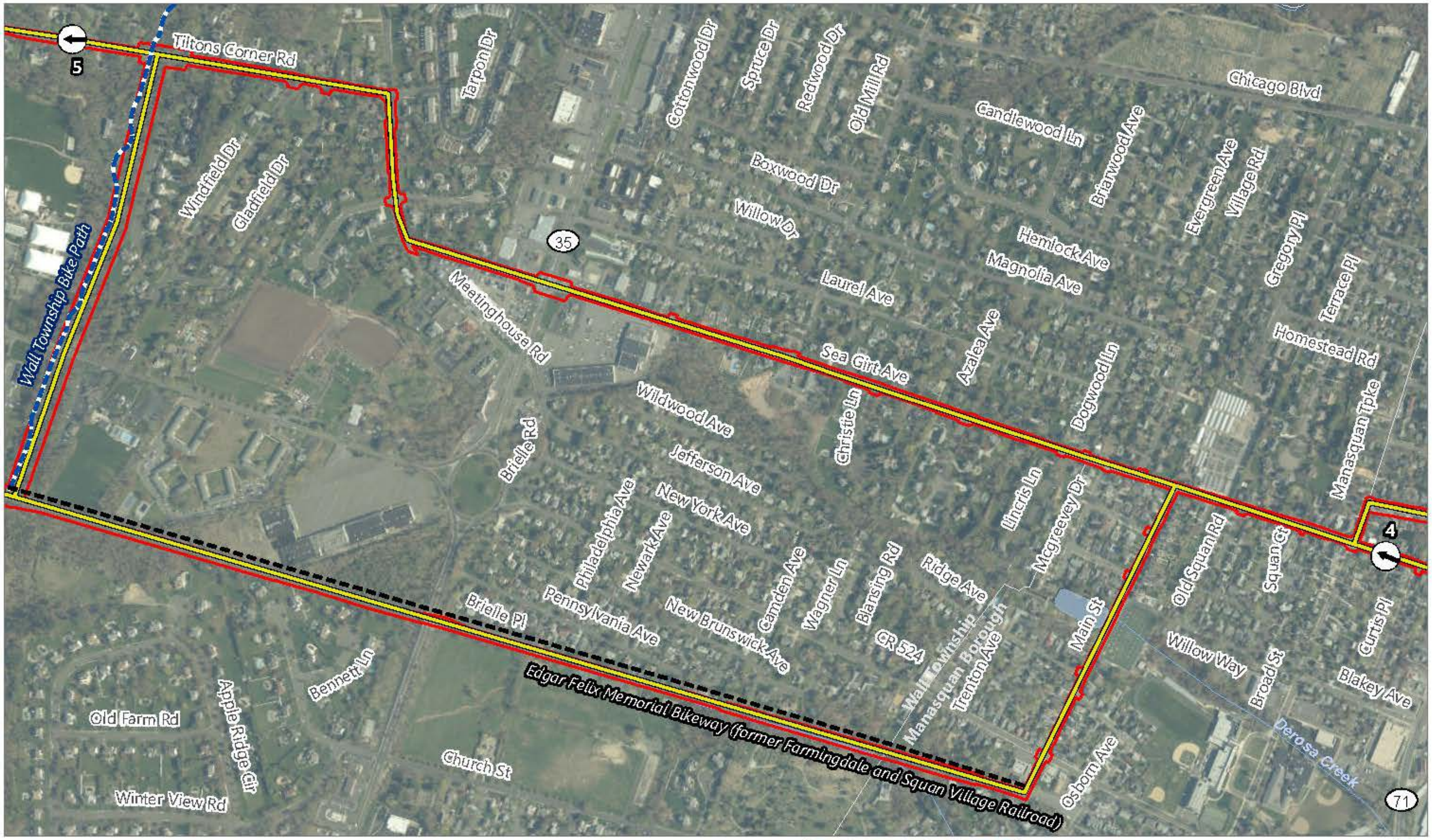


Figure 16, Sheet 2



Larrabee Physical Effects PAPE

- Routing Option
- Larrabee PAPE Boundary
- Photograph Location
- Edgar Felix Memorial Bikeway (former Farmingdale and Squan Village Railroad)
- Wall Township Bike Path

0 200 400 800
Feet

Prepared October 5, 2023
Basemap: NJ Office of Information Technology and Office of GIS "NJ 2020 Natural Color Imagery" map service

Figure 16, Sheet 3

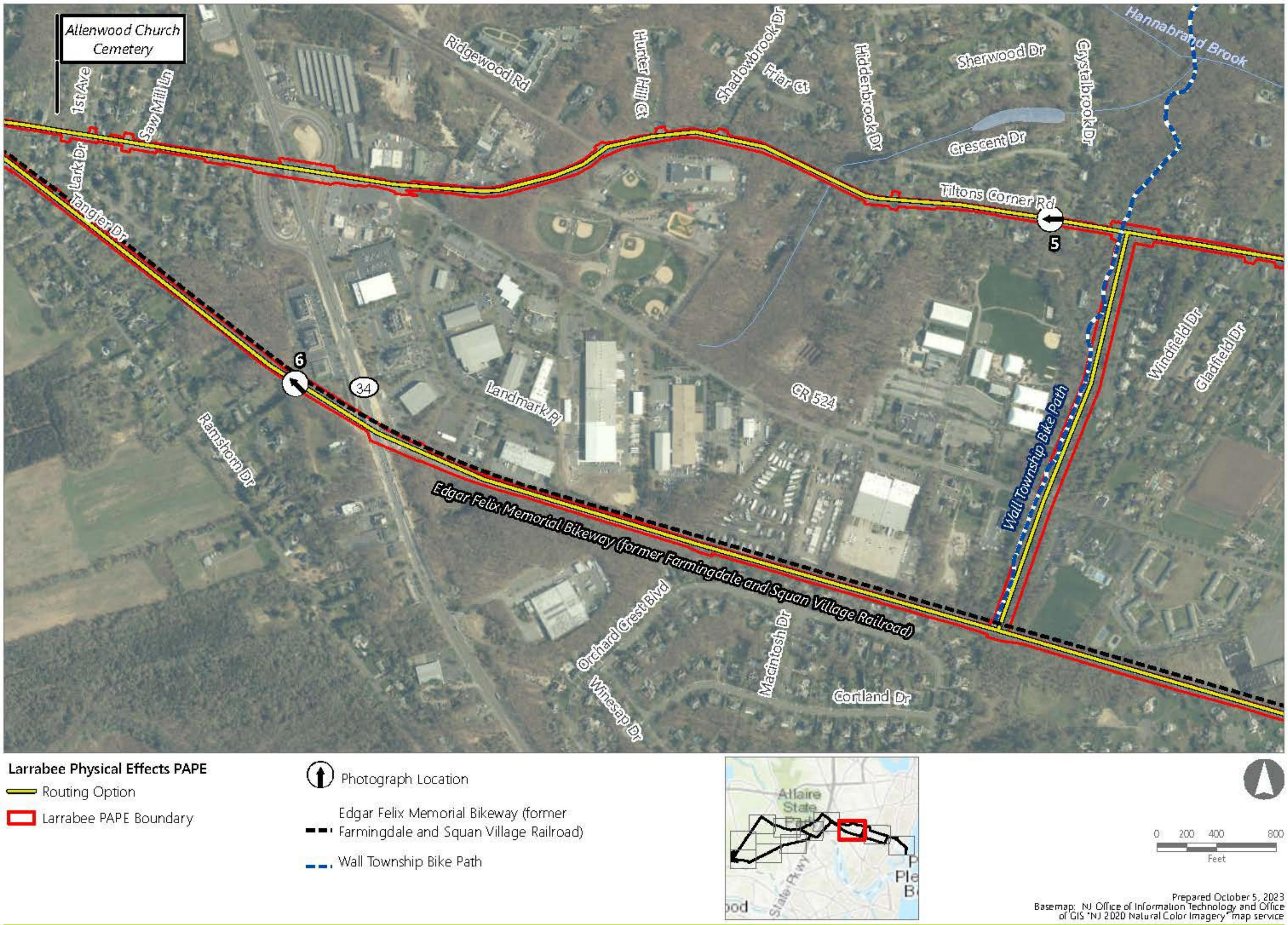


Figure 16, Sheet 4

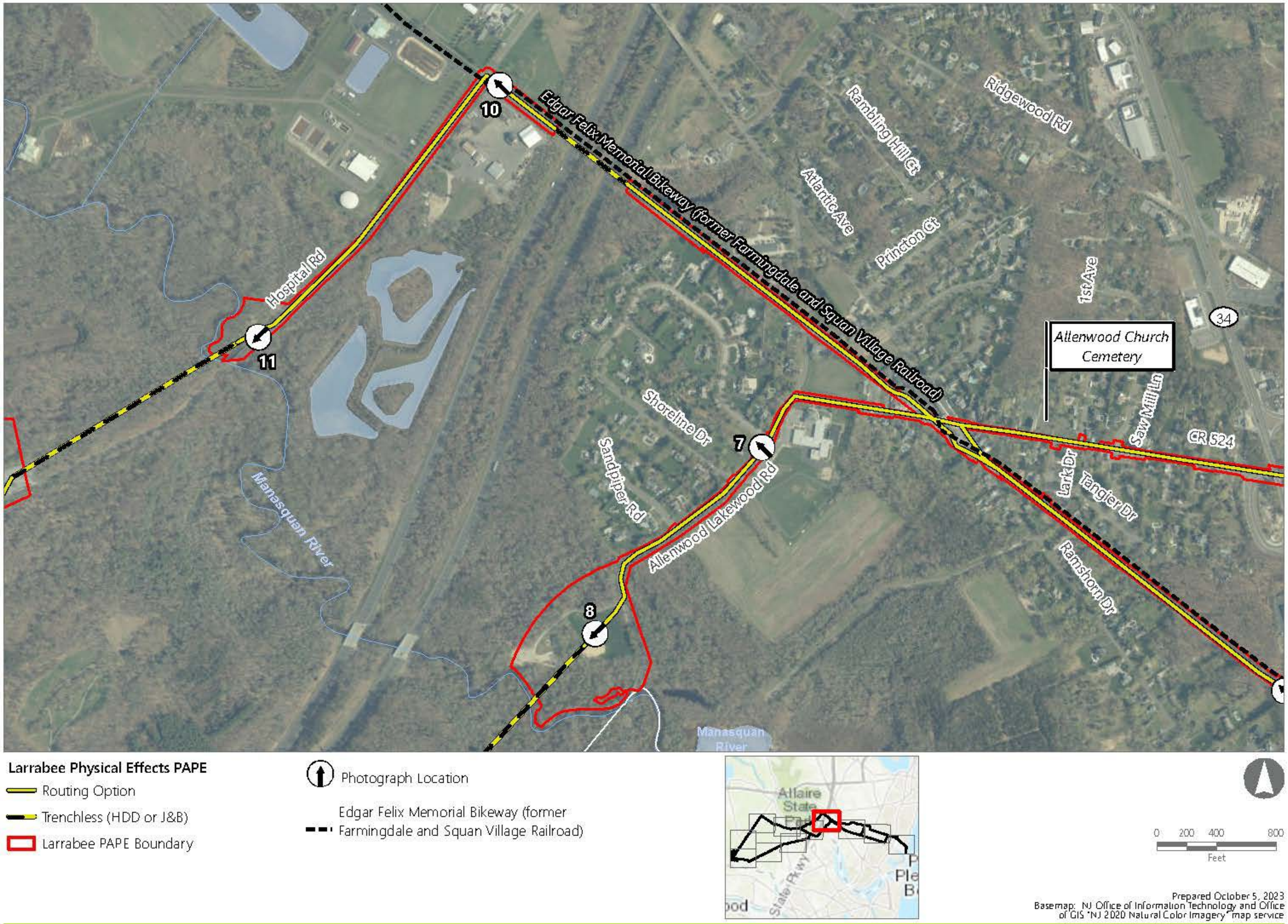


Figure 16, Sheet 5

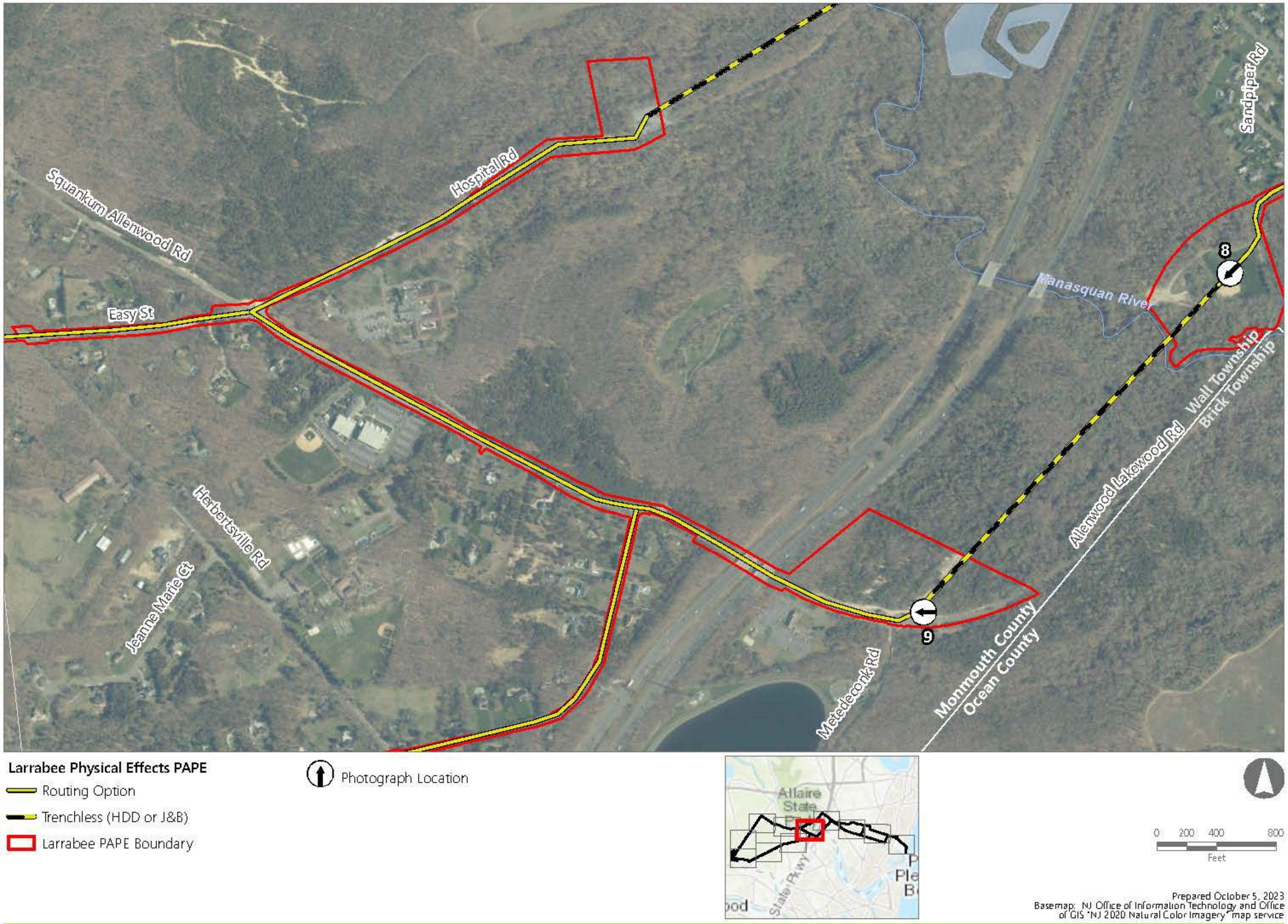


Figure 16, Sheet 6

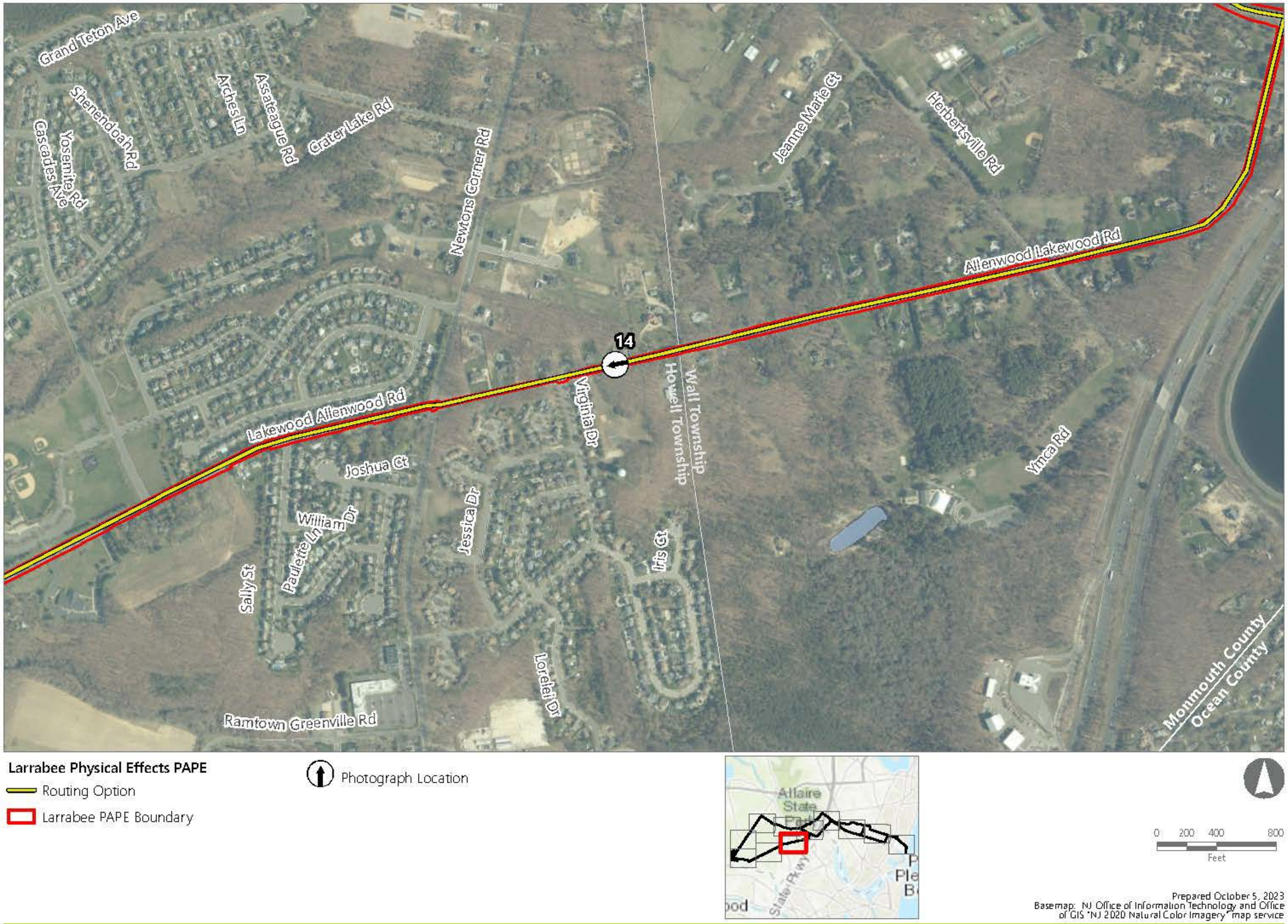


Figure 16, Sheet 7

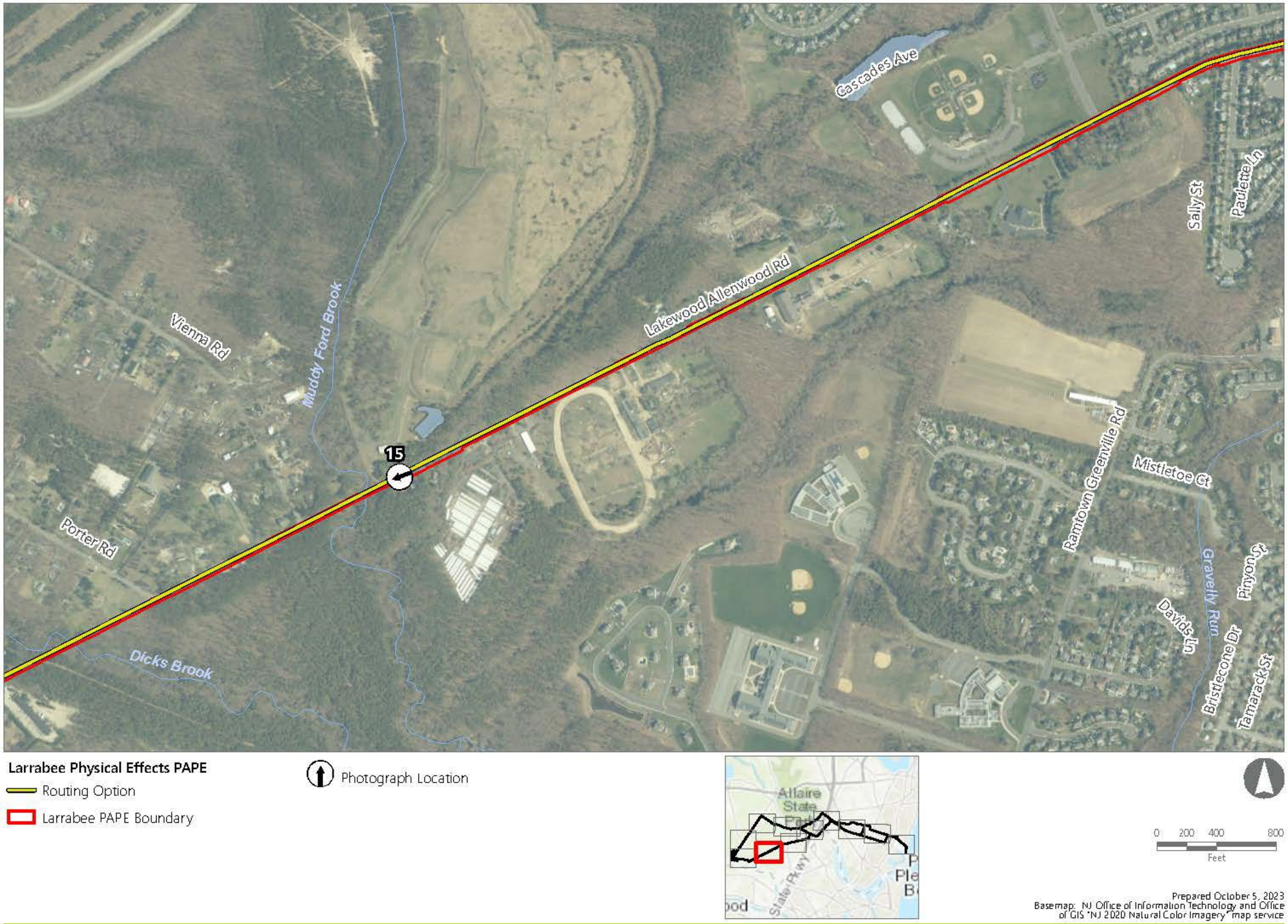


Figure 16, Sheet 8

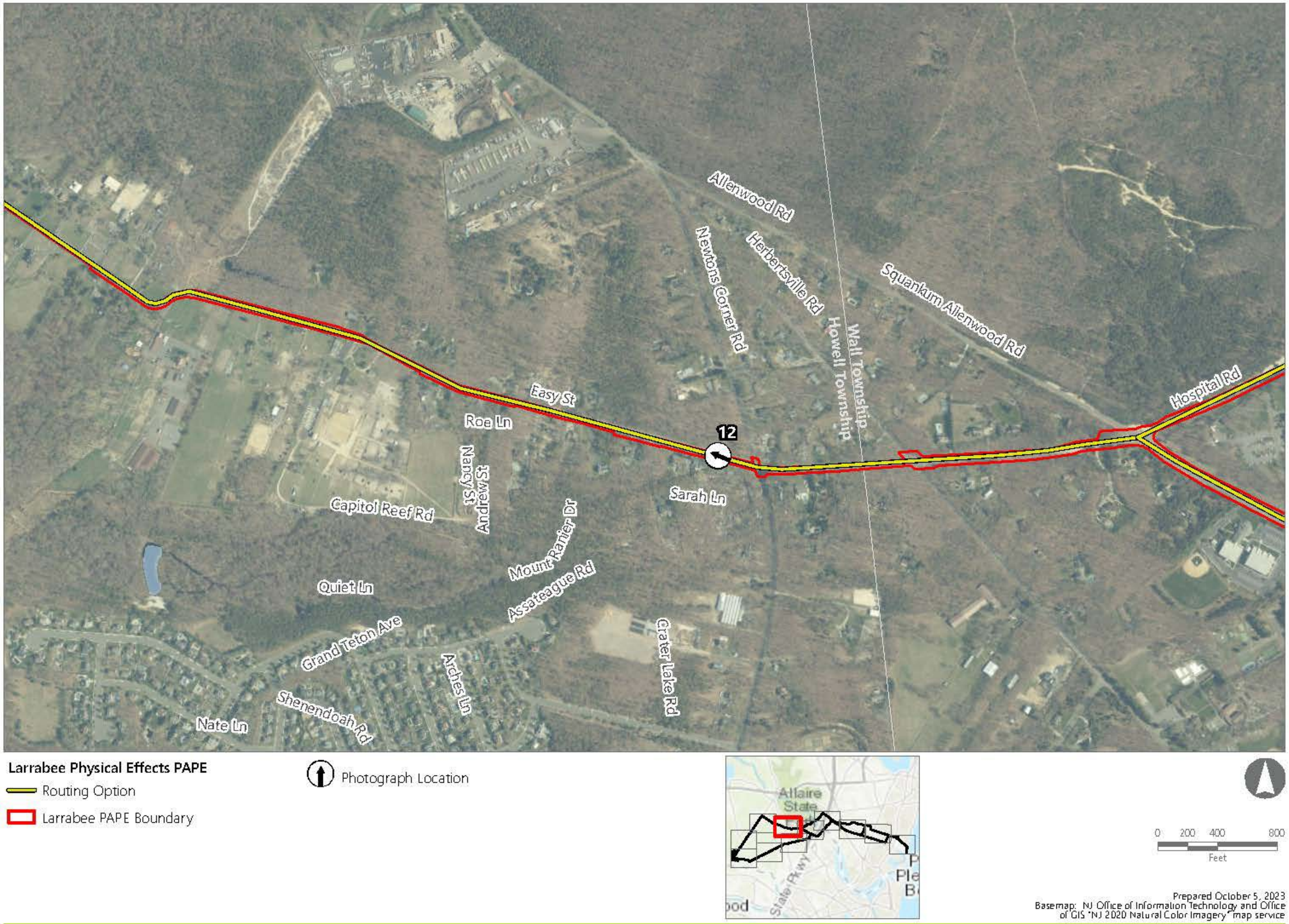


Figure 16, Sheet 9

Figure 16, Sheet 10

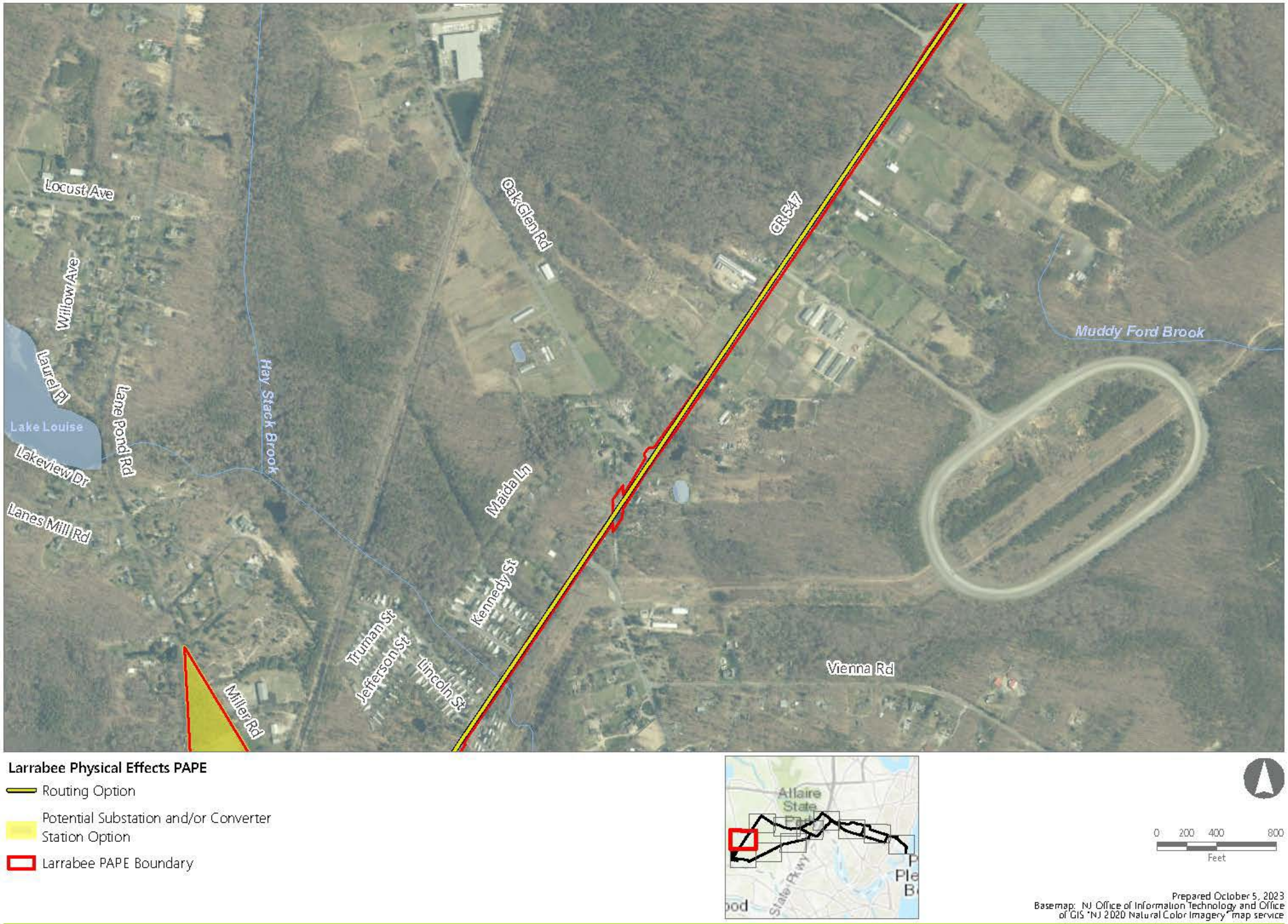
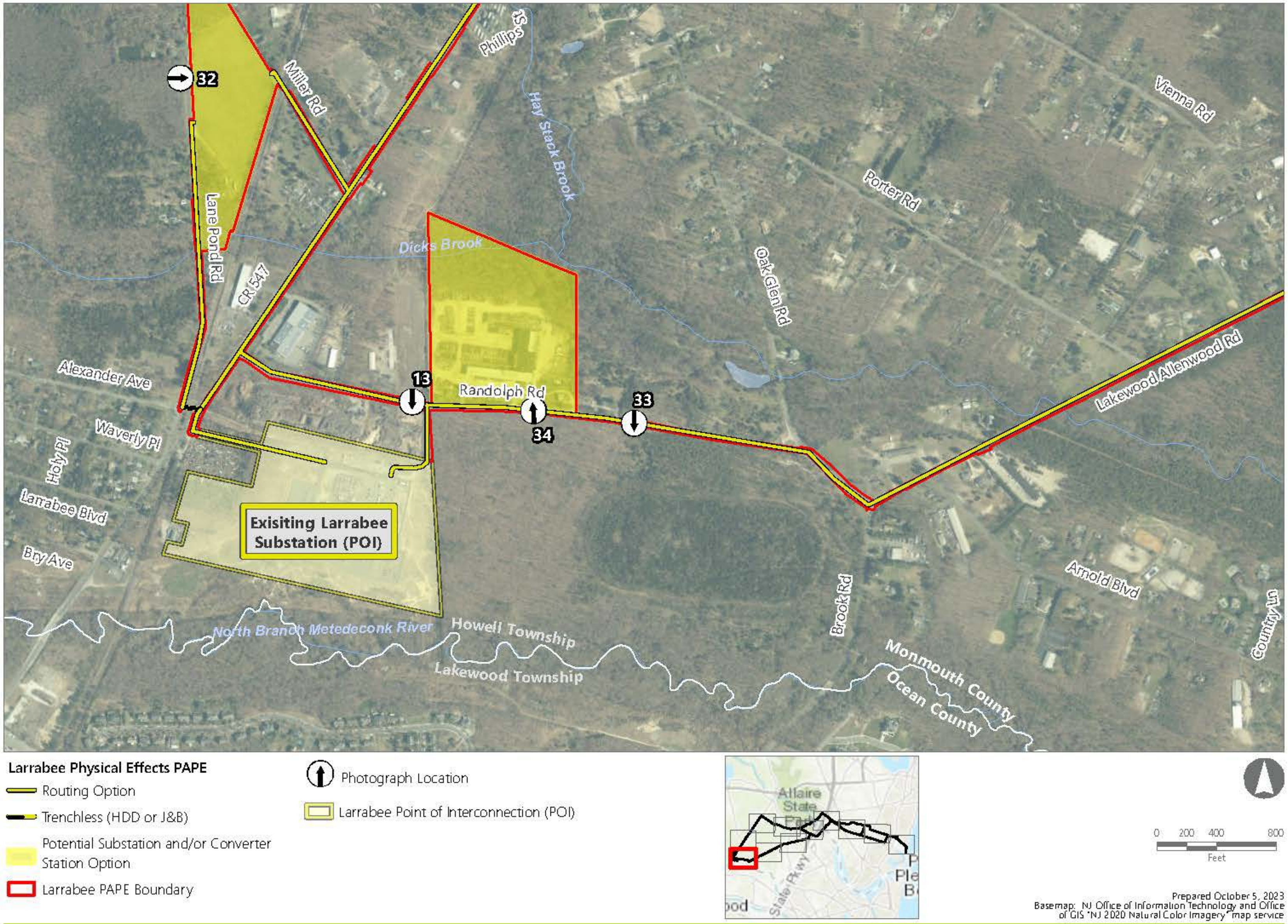


Figure 16, Sheet 11



Photograph 3. Area of Larrabee Onshore Route along Sea Girt Avenue (NJ Route 71) within a commercial area of the Borough of Manasquan. View to the west-northwest.

Photograph 4. Area of the Larrabee Onshore Route along Sea Girt Avenue (NJ Route 71) within a residential area of the Borough of Manasquan. View to the west-northwest.

Photograph 5. Area of the Larrabee Onshore Route along Tilton's Corner Road in Wall Township, from the intersection of Crystal Brook Drive. View to the west.

Photograph 6. Area of Larrabee Onshore Route along Edgar Felix Memorial Bikeway, west of NJ Route 34. Note the overhead transmission line. View to the northwest.

The Larrabee Onshore Route also runs within the Wall Township Bike Path and the Edgar Felix Memorial Bikeway (i.e., former right-of-way of the Freehold and Jamesburg Agricultural Railroad) and follows the Bikeway for approximately 2.6 mi. (Photograph 6). The Bike Path and Bikeway are cleared and paved corridors slightly elevated from the surrounding landscape. An overhead high-voltage power transmission line is also collocated with the Bikeway. The Bikeway passes through a mix of idle wooded areas, residential areas, and light commercial developments and passes over N.J. State Route 34 and the Garden State Parkway. HDD will be used to pass underneath the Garden State Parkway everywhere the Larrabee Onshore Route crosses that highway ROW, avoiding any potential project impacts in those areas (Figure 16, Sheet 4).

The main routing option exits the Bikeway and turns to the west near the intersection of Lakewood Allenwood Road. The route continues west, then southwest on Lakewood Allenwood Road (Photograph 7) to a planned HDD crossing of the Manasquan River within the ball fields at Robert L. Brice Memorial Park (Photograph 8; Figure 16, Sheets 4-5). The planned HDD exits in re-forested sand and gravel pits north of Squankum Allenwood Road (Figure 16, Sheet 5).

One of the routing options continues northwest along the Edgar Felix Memorial Bikeway before returning to active paved roadways at the intersection of the Edgar Felix Memorial Bikeway and Hospital Road (Photograph 10), following Hospital Road to the south and west along the southern side of Allaire State Park, crossing the Manasquan River via a planned HDD (Photograph 11; Figure 16, Sheets 4-5). The routing option continues within paved roadways to the west, through wooded areas before rejoining the main routing option along Easy Street.

Photograph 7. Area of Larrabee Onshore Route along Lakewood-Allenwood Road, from south of the intersection with Shoreline Drive. View to the east of North.

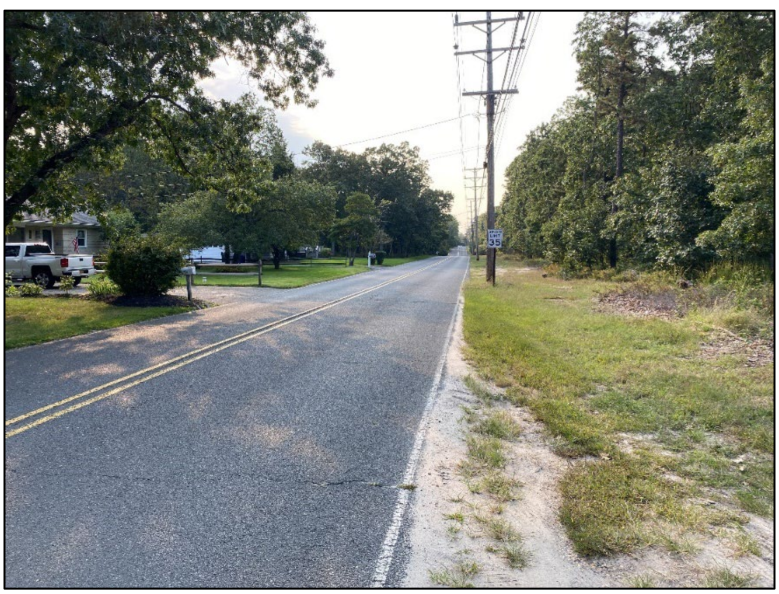
Photograph 8. View of HDD entrance pit area in Robert L. Brice Memorial Park for crossing the Manasquan River. View to the southwest.

Photograph 9. View of HDD pit exit area along Lakewood-Allenwood Road, with heavy surface disturbance and soil push piles on mapped sand and gravel pits. View to the west.

Photograph 10. Area of the Larrabee Onshore Route along Edgar Felix Memorial Bikeway at intersection of Hospital Road. View to the northwest.

Photograph 11. Area of the Larrabee Onshore Route along Hospital Road northeast of the Manasquan River crossing. View to the southwest.

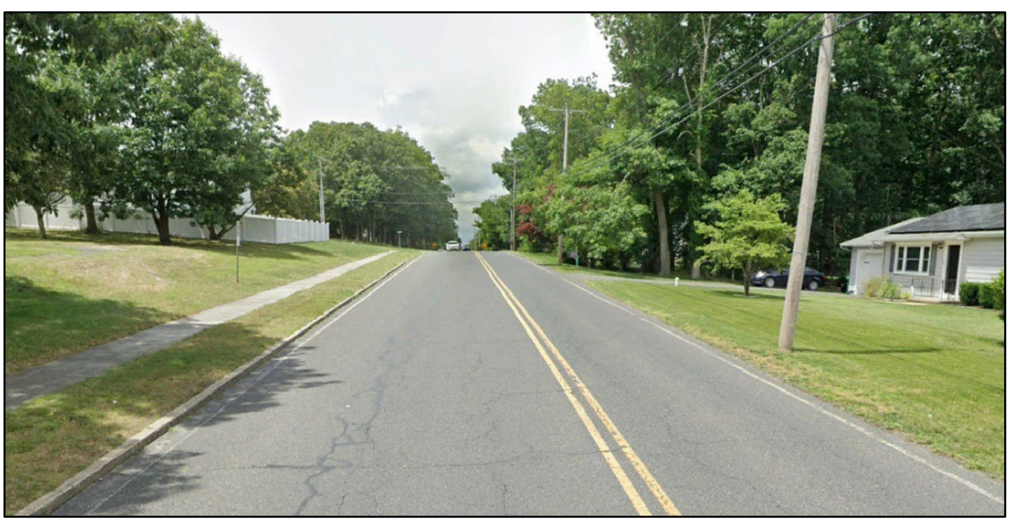
The Larrabee Onshore Route continues west on Easy Street (Photograph 12) through mixed wooded and residential areas before reaching County Route 547 (Lakewood-Farmingdale Road) and turning to the southwest toward the Larrabee POI in Howell Township (Photograph 13).



Photograph 12. Area of the Larrabee Onshore Route along Easy Street in a mixed wooded and residential area. View to the west-northwest.

Photograph 13. Large push piles, bulk material storage, and pervasive ground disturbance on a parcel just north of the existing Larrabee POI. Note transmission towers leading to existing facility. View to the south.

Another option begins at the intersection of Squankum Allenwood Road and Lakewood Allenwood Road, heading south/southwest along Lakewood Allenwood Road through mixed wooded and residential areas, toward the Larrabee Substation POI (Photograph 14 and Photograph 15).



Photograph 14. Overview of a mixed residential area of the Larrabee Onshore Route option along Lakewood Allenwood Road. View to the southwest.

Photograph 15. Overview of a wooded area of the Larrabee Onshore Route option along Lakewood Allenwood Road. View to the southwest.

2.3.2 Soils

Per NRCS soil data, eleven distinct soil units are present within the Larrabee Onshore Route, representing the primarily sandy loam composition of soils in the vicinity:

- Klej loamy sands – Derived from sandy fluviomarine sediments that are highly siliceous. Found in broad upland depressions and flats on coastal plain landscapes. Very deep and somewhat poorly drained.
- Downer sandy loams – Derived from loamy fluviomarine deposits. Found on broad interfluve, hills, and ridges in the Northern Atlantic Coastal Plain. Very deep and well drained.
- Downer Urban Land Complex – Same general characteristics as the Downer sandy loams (described above). Its classification as urban land denotes human alteration/disturbance of the area.
- Sassafras sandy loams – Derived from loamy fluviomarine deposits. Found on terraces and flats in the coastal plain and uplands. Very deep and well drained.
- Evesboro series sands – Derived from sandy marine and eolian deposits. Found on coastal plain upland. Very deep and somewhat poorly drained.

- Lakewood series sands – Derived from sandy marine sediments. Found on marine terraces. Rapidly permeable and excessively drained.
- Klej loamy sands – Derived from sandy fluviomarine deposits. Found on broad upland depressions and flats in the coastal plain. Very deep and somewhat poorly drained.
- Lakehurst series sands – Derived from sandy coastal plain sediments. Found on broad flats bordering streams and depressions within the coastal plain. Very deep and moderately well drained.
- Atsion sand – Derived from sandy marine sediments. Found on flats and depressions in the coastal plain. Very deep and poorly drained.
- Pits, sand and gravel – Disturbed areas that have been excavated for sand and/or gravel.
- Udorthents – Disturbed areas that have been cut or filled greater than or equal to 2.0 ft. (0.6 m).

In addition to the NRCS soil units, limited areas of artificial/historic fill were also identified along portions of the Larrabee Onshore Route according to NJDEP online mapping (NJDEP, 2018). A description of these fill areas included in the mapping of the surficial geology of the Larrabee Onshore Route indicates that these areas in road and railroad embankments include mixed soils and construction debris as much as 20 ft. (6.1 m) thick (Stanford et al., 2018). Areas of cutting and filling were also identified through review of lidar and hillshade data.

Depth to culturally sterile subsoil is approximately 1.0 to 2.0 ft. (0.3 to 0.6 m) for most of the Larrabee Onshore Route. As noted previously, Atlantic Shores has elected to site the buried onshore cables within existing, previously disturbed road, bike path, and railroad ROWs, where disturbance during construction and installation of the existing infrastructure likely exceeded the depth of potential archaeological deposits. This siting strategy avoids or significantly reduces potential impacts to adjacent undisturbed soils and avoids or minimizes the risk of potentially encountering undisturbed archaeological deposits throughout most of the Larrabee Onshore Route. Some specialty trenchless techniques (i.e., HDD, pipe jacking, and/or jack-and-bore) that avoid surface disturbance will be used to avoid impacts to busy roadways, wetlands, waterbodies, or existing developments or features at existing developments (see Figure 16 and Figure 21).

Areas of Evesboro series sands with intact eolian sediments have the potential to contain archaeological deposits buried deeper in the soil profile. The portions of the Larrabee Onshore Route that fall within mapped Evesboro soils have been characterized as "Potentially Undisturbed" to account for the potentially increased depth of Holocene deposits (see Section 2.3.8), even in areas where surface ground disturbance was observed or identified in other research sources.

Most of the areas of mapped Udorthents, Pits, Urban Land, and historic fill have been characterized as "Disturbed" and the potential for intact archaeological deposits in these areas is considered low. Though partially indicated as an area of historic fill, out of an abundance of caution the majority of the Larrabee Onshore Route routing option's HDD crossing of the Manasquan River in Robert L. Brice Memorial Park has been characterized as "Potentially Undisturbed" due to the increased archaeological sensitivity of the areas in close proximity to the Manasquan River (see Section 2.3.8).

2.3.3 Previously Identified Archaeological Sites

No previously recorded archaeological resources are located within the Larrabee Onshore Route. The ten archaeological sites located within [redacted] of the Larrabee Onshore Route are summarized in Table 5 and depicted on Figure 17[10].

- Unnamed Site (28-Mo-023) [redacted] The site was identified in an agricultural field and the only finds listed are "Arrowheads – some unfinished". The site is currently occupied by residential lots and the Calvary Presbyterian Church.

- The Kessler Farm Site (28-Mo-057) [redacted] The site

10 [redacted]

Figure 17. Previously Identified Archaeological Sites [redacted] of the Larrabee Onshore Route
Confidential – Not for Public Distribution

[redacted]

Table 5. Previously Identified Archaeological Sites [redacted] of the Larrabee Onshore Route

Site Number	Site Name	Distance and Direction from PAPE	NRHP Eligibility	Time Period/s	Cultural Affiliation
28-Mo-023	[NO NAME RECORDED]	[redacted]	Undetermined	Native American, unspecified	Native American
28-Mo-024	[NO NAME RECORDED]	[redacted]	Undetermined	Native American, unspecified	Native American
28-Mo-057	Kessler Farm	[redacted]	Undetermined	Early Archaic; Post-1500	Native American, Euro-American
28-Mo-141	Cottage Historic Site	[redacted]	Eligible	Eighteenth through Twentieth Centuries	Euro-American
28-Mo-142	Cottage Prehistoric Site	[redacted]	Eligible	Native American, unspecified	Native American
28-Mo-143	Prehistoric Site on [redacted]	[redacted]	Eligible	Native American, unspecified	Native American
28-Mo-144	Prehistoric Site on [redacted]	[redacted]	Eligible	Archaic	Native American
28-Mo-236	Route 18 Corridor	[redacted]	Undetermined	Unspecified	Euro-American
28-Mo-283	[NO NAME RECORDED]	[redacted]	Undetermined	Native American, Late Woodland	Native American
28-Mo-407	Shearman-Mount-Stockton Farmstead	[redacted]	Eligible	Mid-eighteenth to mid-nineteenth century	Euro-American

was identified in agricultural fields [redacted] A large assemblage of Native American lithic artifacts was recovered during multiple surveys/collections, including projectile points, drills, knives, hammerstones, cores, axes, scrapers, choppers, teshoas, pestles, steatite bowls and fragments, and other flake tools. Material types included shale, argillite, flint, chert, jasper, quartz, chalcedony, and possibly obsidian. Historic-period artifacts were also recovered including gun flints, pipe fragments, pottery, and assorted metal objects. The site has been disturbed by [redacted]

- The Cottage Historic Site (28-Mo-141) [redacted] The site is located on a small bluff [redacted] At the time of recording a historic farm structure had recently been removed by mechanical scraping, though a small "cottage" which was likely a late out-structure associated with [redacted] Information included in the NJSM Site Registration Form indicates that an infilled cellar is also located in the scraped area. Artifacts recovered from the site include household and structural items dating from the eighteenth through twentieth century.

- The Cottage Prehistoric Site (28-Mo-142) [redacted] The site is located in the same area as the Cottage Historic Site (28-Mo-141), on a small bluff [redacted] Artifacts recovered from the site include flint and quartz flakes, a basalt flake tool, and a chert scraper.

- The Prehistoric Site [redacted] (28-Mo-143) [redacted] The site is located on a small bluff [redacted] Information from the NJSM site form says a surface find and shovel tests determined the extent of the site, but no diagnostic artifacts were recovered. It is also noted that the site is likely a part of nearby site 28-Mo-144 though they were recorded separately.

- The Prehistoric Site [redacted] (28-Mo-144) [redacted] The site is located on top of a bluff [redacted] Information from the NJSM site form says surface finds and shovel tests demonstrated a prehistoric occupation, and that diagnostic artifacts indicated an Archaic component.

- [redacted] (28-Mo-236) [redacted]. Information from the obtained archaeological site form is sparse, only listing the site as historic. [redacted]

- Unnamed Site (28-Mo-283) is depicted on NJSM mapping [redacted] Information on 28-Mo-283 is scarce. The NJSM site form lists 28-Mo-283 as prehistoric and a place where [redacted] Reports from archaeological investigations [redacted] (e.g., Kraft, 1976; Siegel et al., 2004; Siegel and Baldwin, 2005; HDR, 2014, 2015) state that 28-Mo-283 is a Late Woodland site that was first identified in 1976 by members of Seton Hall University. Phase IB archaeological survey conducted [redacted] in 2004 and 2005 excavated 1,268 STPs in an attempt to reconfirm the boundaries of 28-Mo-283. The site was not relocated during this survey, and [redacted] (Siegel and Baldwin, 2005).

- The Shearman-Mount-Stockton Farmstead (28-Mo-407) is a 1.58 acre, mid-eighteenth to mid-nineteenth century Euro-American archaeological site [redacted] The Phase II evaluation of the site [redacted], interpreted to be the remains of a farmstead, with possible evidence of a domestic structure and detached kitchen, attributable to the Thomas Shearman family, Joseph Mount, and/or Commodore Robert Stockton (HDR, 2014 and 2015). The site was recommended as S/NRHP-eligible by the reporting archaeologists and NJHPO.

The six Native American sites and one multicomponent site contain low to higher density deposits of lithic debitage with diagnostic lithic tools, indicating occupation of the landscape at both a transient, short-term, and intensive scale. These sites are generally [redacted]

2.3.4 Previous Cultural Resource Surveys

A review of LUCY, archaeology site forms, and available online resources identified the following previously conducted cultural resource surveys with associated cultural resources encompassing or intersecting portions of the Larrabee Onshore Route:

- The 1980 Phase II archaeological survey titled *A Report on the Phase I Cultural Resource Survey* of the Proposed Alternate 5 Sanitary Sewer System in the Southeast Section of Wall Township, Monmouth County, New Jersey by Archaeological Survey Consultants identified the Blansingburg School Historic District (ASC, 1980). NJHPO concurred with the determination that the resource was NRHP eligible on July 3, 1980. The proposed Larrabee Onshore Route runs within Sea Girt Avenue between buildings and properties contributing to this historic district.

- A 1981 report titled *Phase I Cultural Resource Survey,* [redacted]*, Wall Township, Monmouth County, NJ* by Kardas & Larrabee was responsible for the identification of sites 28-Mo-141 through 144, discussed in Section 2.3.3 (Kardas and Larrabee, 1981).

- The 2000 combined architectural and archaeology report titled *Technical Memorandum No. 18, Cultural Resources Investigation, Garden State Parkway Widening, Interchanges 30-80, Ocean, Burlington, and Atlantic Counties, New Jersey* by Richard Grubb & Associates, Inc. (RGA) identified the Garden State Parkway Historic District (RGA, 2000). In October 2001, NJHPO concurred with the determination that the resource was NRHP eligible under Criteria A and C, with a period of significance from 1945 to 1957. The PAPE for the proposed Larrabee Onshore Route passes underneath the Garden State Parkway. Atlantic Shores will use specialty trenchless techniques (i.e., HDD, pipe jacking, and/or jack-and-bore) that avoid surface disturbance to avoid impacts to this area (Figure 16, Sheet 4). Since the Garden State Parkway Historic District will be completely avoided and is located outside of (above) the PAPE, the Projects will have no effects on this resource.

- The proposed Larrabee Onshore Route runs within a portion of the Edgar Felix Memorial Bikeway. The 2012 architecture intensive survey titled *NJ Route 34/Edgar Felix Memorial Bikeway Bridge Replacement Project, Wall Township, Monmouth County, NJ* by the RBA Group identified a segment of the Edgar Felix Memorial Bikeway as part of the former Farmingdale and Squan Railroad (RBA, 2012). The research and fieldwork for that intensive-level historic architectural survey concluded that the Farmingdale and Squan Railroad was ineligible for listing on the NRHP. A NJHPO decision letter dated to August 16, 2021 concurred with the results of the survey, stating "No Historic Properties Affected" within the APE for the bridge replacement (NJHPO, 2012). Additional discussion of the Edgar Felix Memorial Bikeway (and the Farmingdale and Squan Railroad) is included in Section 2.3.6.

- The 2016 combined architectural and archaeology report titled *Phase I A Archaeological Survey and Historic Architectural Resources Background Survey (HARBS)/ Effects Assessment Report. NJ Transit North Jersey Coast Line Raritan River Draw Bridge Replacement Project, City of Perth Amboy and City of South Amboy, Middlesex County, NJ* by RGA identified the New York and Long Branch Railroad Historic District (RGA, 2004). NJHPO determined in August 2004 that the New York and Long Branch Railroad Historic District was NRHP eligible, with a period of significance beginning in 1872 and ending in 1954. This railroad district is currently occupied by the active New Jersey Transit Railroad commuter line. The PAPE for the proposed Larrabee Onshore Route crosses underneath the active New Jersey Transit Railroad near the intersection of Sea Girt Avenue, Camp Drive, and Washington Boulevard (see Figure 16, Sheet 1). Atlantic Shores will use specialty trenchless techniques (i.e., HDD, pipe jacking, and/or jack-and-bore) that avoid surface disturbance to avoid impacts to this area. Since the New York and Long Branch Railroad Historic District will be completely avoided, the Projects will have no effects on this resource.

2.3.5 Historical Map and Photography Review

A review of historical maps and aerial photography depicting the area in and around the Larrabee Onshore Route revealed that the area underwent slow, gradual development throughout the nineteenth century before undergoing rapid suburbanization in the twentieth century with the advent of automobile transportation. Some insights gained from the review include:

- As previously described in Section 2.1.3, and illustrated on historical maps, the surrounding area was settled by Europeans in the mid-seventeenth century as a part of the East Jersey province. Documented settlements of that period, however, are sparse. By the early nineteenth century local road networks are well established throughout Monmouth County, as seen in the 1828 T. F. Gordon *A Map of the State of New Jersey* (Figure 18; Gordon, 1828). No major settlements or MDS are depicted in the Gordon map in the immediate vicinity of the Larrabee Onshore Route but notably mill sites are depicted on tributaries to the Manasquan River. The largest nearby settlement of this period, Freehold, is visible to the northwest of the Larrabee Onshore Route, and a series of roads traversed the area adjoining Freehold and areas south of Manasquan River.

- The Larrabee Onshore Route witnessed further development from the mid to late nineteenth century. The 1860 *Topographical Map of the State of New Jersey* by G. M. Hopkins depicts much of the same roadway network depicted in the 1828 Gordon map but includes several MDS along the mapped roadways, as well as the New Jersey Southern Railroad west of the Larrabee Onshore Route. The Howell Works is also depicted north of the Larrabee Onshore Route between tributaries north of the Manasquan River (Figure 12; Hopkins, 1860).

- The 1873 *Atlas of Monmouth Co., New Jersey* by F. W. Beers depicts marginally greater development in the Onshore Cable Route vicinity relative to the 1860 Hopkins map, with the most significant growth concentrated in and around Squan Village (today the Borough of Manasquan) and closer to Farmingdale, south of the Larrabee POI (Beers, 1873). Present-day county and local municipal roadways that intersect and parallel the Larrabee Onshore Route largely conform to the roadways depicted in the 1873 Beers Monmouth County atlas, with several residences and churches depicted along many of these roadways.
- These roadways are depicted again in 1878 *The State of New Jersey* by G. W. Howell and are mapped with higher accuracy (Figure 19; Howell, 1878). Of note, this map also depicts the major railroads within and adjacent to the Larrabee Onshore Route, including the New Jersey Southern Railroad, the Freehold and Jamesburg Agricultural Railroad, and the Farmingdale and Squan Railroad. A portion of the Larrabee Onshore Route runs within the former Farmingdale and Squan right-of-way (now the Edgar Felix Memorial Bikeway). Additional discussion of this railroad is included in Section 2.3.6.

- Sanborn Fire Insurance Maps and historical aerial photography encompassing the adjoining Boroughs of Sea Girt and Manasquan dating from 1890 to the 1950s demonstrate in detail the steady growth of residential neighborhoods and business places in both communities within the APE (Sanborn, 1889, 1890, 1905, 1921). Residential and commercial development is most concentrated along Sea Girt Avenue and progressively expanded from the shore towards N.J. State Route 35 to the west. In the northern and western portions of the APE, the construction of the Garden State Parkway in the mid-1950s and the later construction of I-195 in the late 1970s were the most significant development projects in Wall and Howell Townships in the mid- to late twentieth century.

- The 1953 and 1954 USGS topographic quadrangles depict the increased urbanization of the area and roadways (including the Garden State Parkway and Hospital Road) are largely similar to present day. The Larrabee Onshore Route can be clearly seen following Sea Girt Avenue, the Edgar Felix Memorial Bikeway, Tiltons Corner Road/Atlantic Avenue, Lakewood Allenwood Road, Hospital Road/Easy Street, and County Route 547 (Figure 20; USGS, 1953, 1954).

In brief, the historical map review demonstrates that MDS are mapped in the immediate vicinity of the proposed Larrabee Onshore Route, with most mapped along existing roadways and at intersections that were largely established by the mid-nineteenth century. Most of the MDS are concentrated in the eastern portion of the Larrabee Onshore Route along Sea Girt Avenue. Of note, historical maps illustrated that a portion of the proposed Larrabee Onshore Route runs within the former ROW of the Farmingdale and Squan Railroad (further discussed in Section 2.3.6).

Figure 18. 1828 T. F. Gordon *A Map of the State of New Jersey*

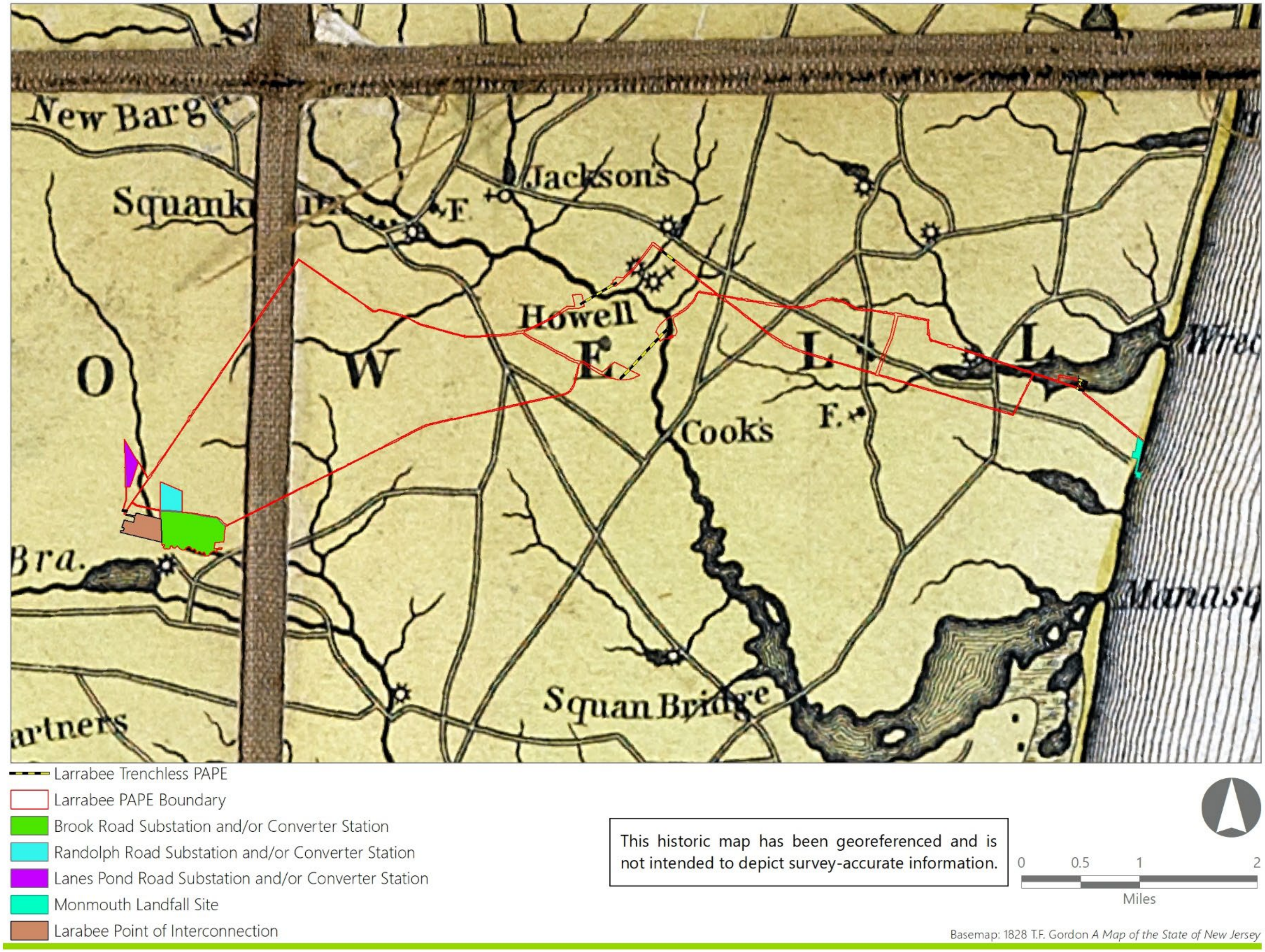


Figure 19. 1878 *The State of New Jersey* by G.W. Howell

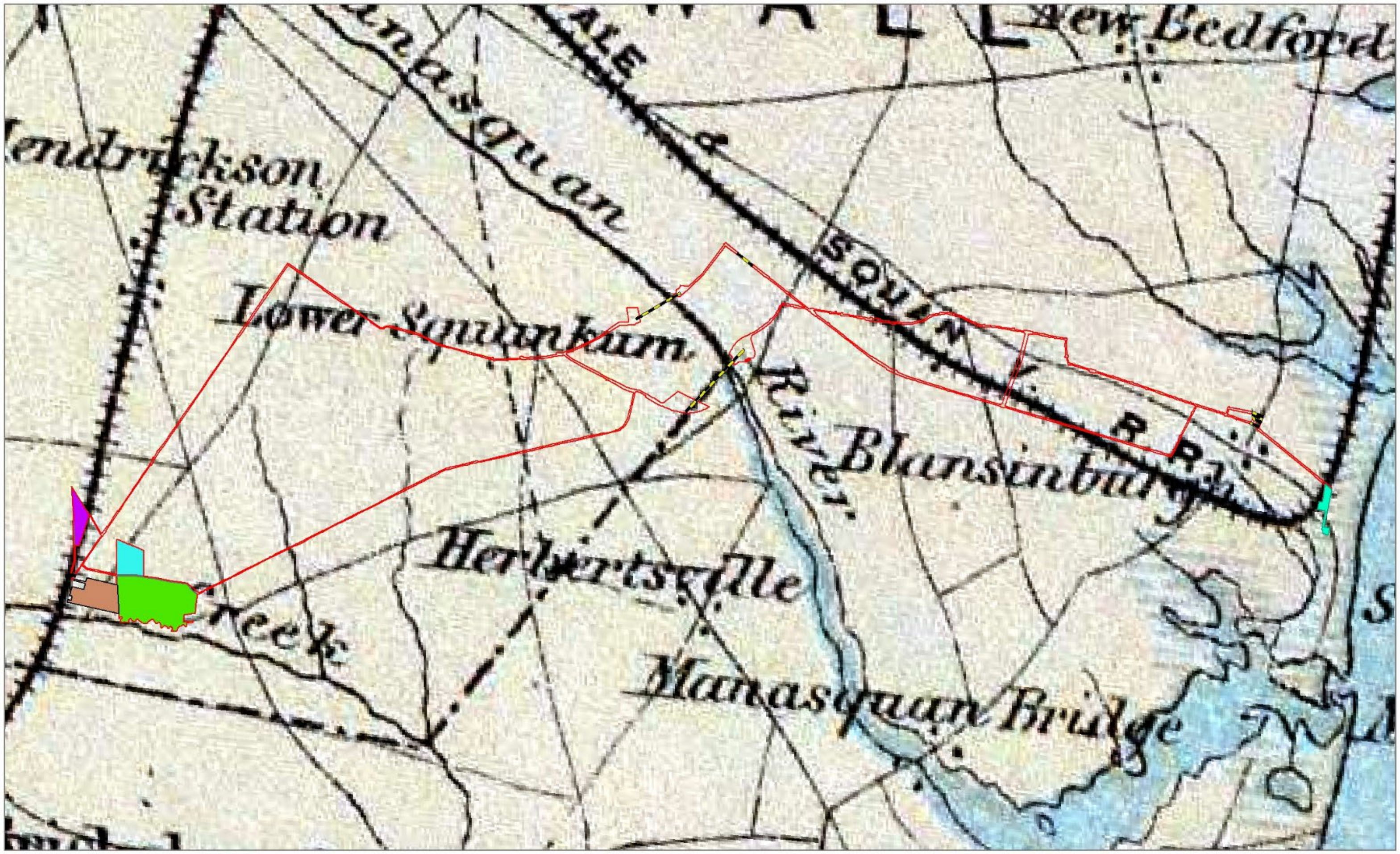
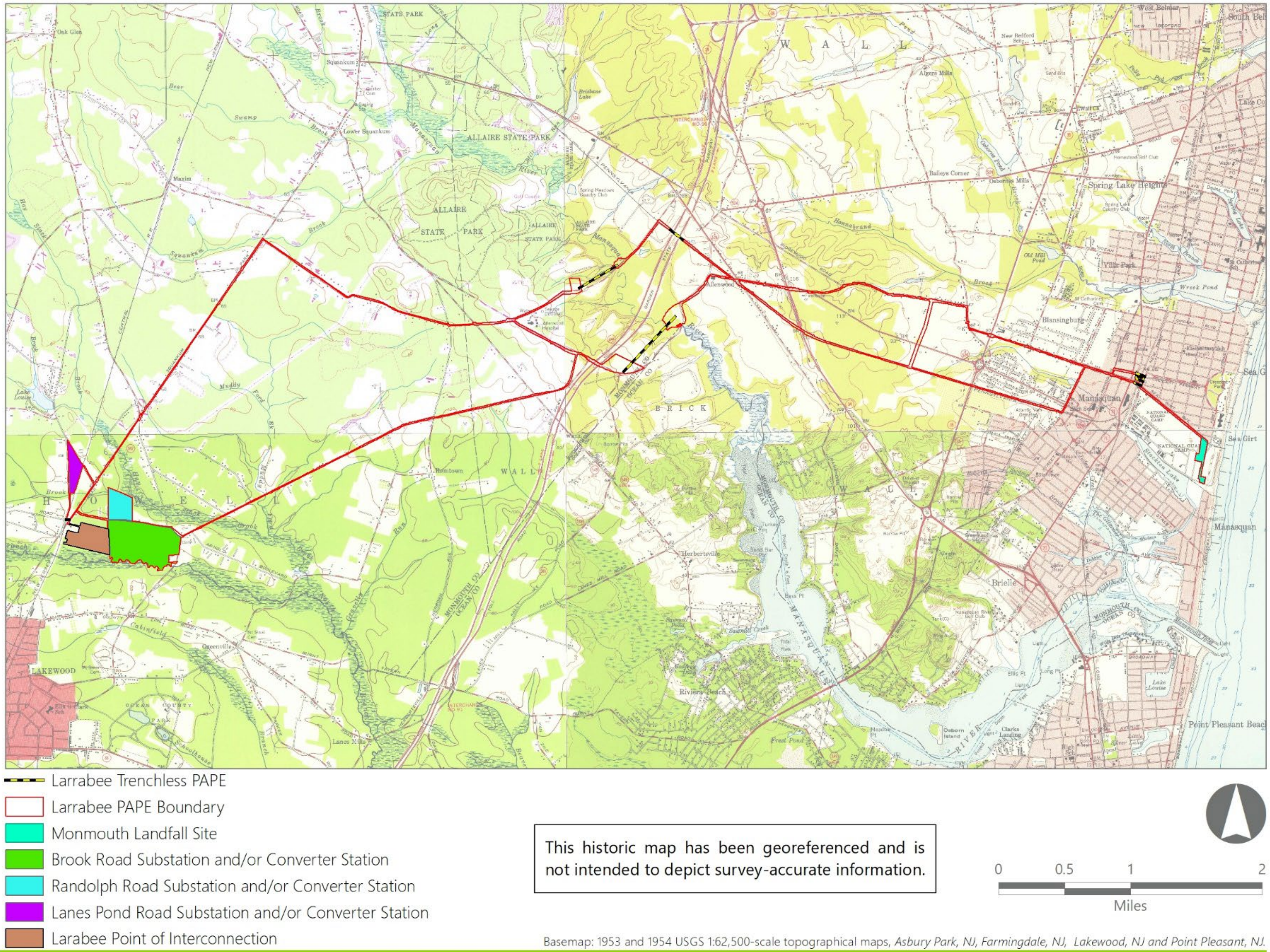


Figure 20. 1953 and 1954 USGS 1:62,500-scale topographical maps, *Asbury Park, NJ, Farmingdale, NJ, Lakewood, NJ and Point Pleasant, NJ*



2.3.6 Railroads

As stated in Section 2.3.4, the proposed Larrabee Onshore Route PAPE passes underneath the New York and Long Branch Railroad Historic District (now the active New Jersey Transit Railroad) near the intersection of Sea Girt Avenue, Camp Drive, and Washington Boulevard (see Figure 16, Sheet 1). Atlantic Shores will use specialty trenchless techniques (i.e., HDD, pipe jacking, and/or jack-and-bore) that avoid surface disturbance to avoid impacts to this area. Since the New York and Long Branch Railroad Historic District will be completely avoided and is located outside of (above) the PAPE, the Projects will have no effects on this linear historic property.

A portion of the proposed Larrabee Onshore Route is collocated with the Edgar Felix Memorial Bikeway, progressing northwest along the asphalt-paved bikeway for approximately 3.43 mi. (5.52 km) (Figure 16, Sheets 2-4). The bikeway itself is set within the former railroad corridor of the Farmingdale and Squan Railroad.

Construction of the Farmingdale and Squan Village Railroad began in the 1860s, creating a rail connection between the vicinity of Allaire Village and local farms with other regional railroads to the west and coast to the east (Cunningham, 1997; Figure 19). In 1879, the Farmingdale and Squan Village Railroad was consolidated into the Freehold and Jamesburg Agricultural Railroad, a consolidated line that remained in operation until 1932 that carried farm produce and seafood to local and regional markets. As previously stated, in recent years, much of the former railbed of the Freehold and Jamesburg Agricultural Railroad has been adapted into the Edgar Felix Bikeway, which opened in 1971 as the first cycling trail created in the state of New Jersey (APP, 1971).

A review of LUCY indicated that a segment of the Edgar Felix Memorial Bikeway was identified during a 2012 survey for the replacement of the Route 34 bridge over the Bikeway (NJHPO, 2012; Figure 16, Sheet 3). According to a press release about the project, the original Route 34 bridge was built in 1935 (NJDOT, 2019). If the resource identified in LUCY indicates the Route 34 bridge (as opposed to a segment of the Bikeway), it has since been replaced by a modern concrete bridge and there should be no further concern over potential effects, as the proposed Larrabee Onshore Route will travel beneath the bridge along the Bikeway. If the identified resource in LUCY does concern a segment of the Edgar Felix Memorial Bikeway (within the former Farmingdale and Squan Railroad corridor), there should also be no further concern over potential effects, as the previously conducted intensive-level architectural survey concluded that the former railroad was ineligible for listing on the NRHP (RBA, 2012). As previously discussed in Section 2.3.4, a corresponding opinion letter from the NJHPO concurred "No Historic Properties Affected" within the APE for that project (NJHPO, 2012).

Based on the loss of integrity from conversion to the paved/graveled Edgar Felix Memorial Bikeway, and the assessment of the segment from the RBA survey, the section of the former Farmingdale and Squan Historic Railroad within the Larrabee Onshore Route PAPE does not appear eligible for NRHP listing.

2.3.7 Cemeteries

New Jersey State Law (NJSL) prohibits the unlawful disturbance, movement, or concealment of human remains (NJSA, 2C:22-1(a)(1)). As such, construction and installation activities associated with the Projects will avoid all cemeteries and burials regardless of S/NRHP status or previous disturbance.

One of the Larrabee Onshore Route's routing options passes by the Allenwood Church Cemetery located at 3108 Atlantic Avenue, Allenwood, New Jersey (Figure 16, Sheets 3-4). The Allenwood Church, finished in in 1859 and rebuilt in 1895, was determined not S/NRHP eligible by NJHPO according to the LUCY database (Napoliton, 1999; NJHPO, 2021). According to cemetery records the oldest burial was John J. Guifford who died 17 June 1851, predating the completion of the original church building. The most recent burial is listed as 2018 (Find a Grave, 2021). The southernmost grave monuments are located approximately 50 ft. (15 m) north of the road ROW, slightly north of the front façade of the church. As such, it is not anticipated that there is any potential for burials associated with the Allenwood Church Cemetery to be located (or to have once been located) within the Atlantic Avenue ROW, and no remote sensing survey is recommended. In addition, the Project's Monitoring Plan and Post Review Discoveries Plan (MPRDP) (see Section 4.2.1) will be in effect for all construction and installation activities, providing guidance and instructions to all contractors on how to proceed in the event (however unlikely) of encountering unanticipated cultural resources during work in this area. The MPRDP will include appropriate "Stop Work" procedures if potential grave shafts or burials are observed.

2.3.8 Archaeological Sensitivity Assessment

The archaeological sensitivity of the Larrabee Onshore Route was assessed via archaeological reconnaissance and a review of soil mapping, lidar data, topographic data, archaeological site records, historical mapping, modern and historical aerial imagery, and utility data. The results of this archaeological reconnaissance and desktop assessment can be found in Figure 21, where the PAPE has been classified into "Disturbed" (Excluded from field survey consideration), "Potentially Undisturbed" (Low, Medium, and Medium/High), and "Paved" areas.

As noted in Section 2.3.3 above, there are no previously recorded archaeological sites found within the Larrabee Onshore Route. However, there are ten previously identified archaeological sites located [redacted] of the Larrabee Onshore Route, including six Native American sites, one multicomponent site (Kessler Farm), and three historic-period sites (see Table 5 and Figure 17).

All previously identified sites with Native American components mapped in the vicinity of the Larrabee Onshore Route were identified within [redacted]. This suggests a higher likelihood for sites to be situated near permanent sources of freshwater, [redacted], like other regions in the Middle Atlantic. Portions of the APE within the Boroughs of Sea Girt and Manasquan, however, have a reduced likelihood for intact Native American archaeological resources due to the active nature of the surface geology in this coastal setting, which is prone to erosion and tidal inundation, and more recently, significant modern commercial and residential development.

MDS locations near the Larrabee Onshore Route are generally clustered in residential neighborhoods in the Boroughs of Sea Girt and Manasquan and separate single-family home sites in Wall and Howell Townships. With the growth of residential neighborhoods in the Boroughs of Sea Girt and Manasquan and separate single-family home sites in Wall and Howell Townships, historic-period archaeological sites most likely to be encountered within the Larrabee Onshore Route would be associated with early to mid-twentieth century residences and commercial buildings.

Due to the presence of previously identified archaeological sites and MDS locations near the Larrabee Onshore Route, it should be considered to have a moderate sensitivity for the presence of both Native American and historic-period archaeological resources, if not for prior ground disturbance. In areas outside of mapped soil disturbance, or in areas of potentially intact alluvial or eolian soils deposits, the potential for intact archaeological resources (below surface disturbances) increases. However, since Atlantic Shores has elected to site the buried onshore cables within existing, previously disturbed road, bike path, and railroad ROWs, where disturbance during grading, construction, and installation of the existing infrastructure likely exceeded the approximately 1.0 to 2.0 ft. (0.3 to 0.6 m) depth to subsoil, there is a very low likelihood for intact archaeological resources to be located within most portions of the Larrabee Onshore Route.

As noted in Section 1.5, NJHPO's Guidelines advise that there are a number of special conditions that can lead to excluding all or part of an APE from field investigation, if it can be demonstrated (with sufficient documentation) that recent disturbance has rendered it unlikely that any potentially significant archaeological sites have survived (NJHPO, 2019).

As such, no further archaeological investigation is recommended in the areas of the Larrabee Onshore Route identified as "Disturbed" in Figure 21. Previous ground disturbance is evident and significant throughout the Larrabee Onshore Route, largely originating from the construction and expansion of roadways and railroad ROWs along which the Larrabee Onshore Route is collocated with for most of its layout. Grading and construction of these roadways and railroads would likely have significantly disturbed, if not destroyed, any near-surface archaeological sites that predated construction. Other sources of disturbance include residential and commercial development (especially along Sea Girt Avenue and its intersection with N.J. State Route 34), mapped historical filling of land, and the trenching of buried utilities that are collocated with existing roadways.

Additionally, since a previous intensive-level architectural survey by the RBA Group determined that the former Farmingdale and Squan Railroad (now the Edgar Felix Memorial Bikeway) is ineligible for the NRHP (RBA, 2012), and a subsequent NJHPO opinion letter concurred with that survey (NJHPO, 2012), no further archaeological investigation is anticipated to be necessary within the portion of the Larrabee Onshore Route sited in the Edgar Felix Memorial Bikeway, outside of those areas within mapped eolian soil deposits which have the potential to contain intact deposits below the depth of railroad disturbance.

Pedestrian survey (with judgmental shovel testing if deemed appropriate based on observed field conditions) is recommended in any Low sensitivity, "Potentially Undisturbed" areas adjacent to paved roadways (within which the onshore cables are actually sited) where depth to culturally sterile subsoil is less than approximately 2.0 ft. as well as in any wetlands or areas of steep slope.

Targeted archaeological shovel testing is recommended within 26.35 of the 187.94 total acres (approximately 14%) of the Larrabee Onshore Route portion of the PAPE as indicated by the Medium and/or Medium-High sensitivity "Potential Phase IB Survey Areas" in Figure 21. This includes the following areas of the PAPE categorized as "Potentially Undisturbed" and located outside of existing roadways and railroad ROWs, as well as areas adjacent to paved ROWs:

- Unpaved public ROW north and south of Sea Girt Avenue between 3rd Avenue and Sea Girt Plaza [redacted] (Figure 21, Sheets 1-2);
- Unpaved public ROW on the south side of Sea Girt Avenue between Old Mill Road and Begonia Avenue within 500 ft. of surface fresh water (Figure 21, Sheet 4);
- "Potentially Undisturbed" areas of the Wall Township Bike Path adjacent to the paved path (Figure 21, Sheets 5, 11-12);
- Portions of the Edgar Felix Memorial Bikeway between Main Street and NJ State Route 35 overpass within 500 ft. of fresh surface water (Figure 21, Sheet 9);
- Portions of the Edgar Felix Memorial Bikeway near its intersection with the Wall Township Bike Path within mapped eolian soil deposits [redacted] (Figure 21, Sheets 10-12);
- Unpaved public ROW north and south of Tiltons Corner Road between Hidden Brook Drive and White Boulevard within mapped eolian soil deposits (Figure 21, Sheets 6-7);
- Unpaved Public ROW on the eastern portion of North Main Street between Ridge Avenue and James Place within 500 ft. of surface fresh water (Figure 21, Sheet 8)

- Portions of the Edgar Felix Memorial Bikeway between Ramshorn Drive and Hospital Road within mapped eolian soil deposits [redacted] (Figure 21, Sheets 15 & 30);
- Unpaved public ROW adjacent to portions of Lakewood Allenwood Road between Atlantic Avenue and Shoreline Drive within 500 ft. of surface fresh water (Figure 21, Sheet 16);
- "Potentially Undisturbed" portions of Robert L. Brice Memorial Park planned to contain an HDD entry pit within 500 ft. of surface fresh water (Figure 21 Sheets 16-17);
- Unpaved public ROW adjacent to portions of Lakewood Allenwood Road east of the intersection with Metedeconk Road within mapped eolian soil deposits (Figure 21, Sheets 18-19);
- "Potentially Undisturbed" portions of the parcel north of the intersection of Lakewood Allenwood Road and Metedeconk Road planned to contain an HDD exit pit (Figure 21, Sheets 18-19);
- Unpaved public ROW adjacent to Hospital Road south of the intersection with the Edgar Felix Memorial Bikeway within 500 ft. of surface fresh water (Figure 21, Sheets 30-31);
- "Potentially Undisturbed" and non-inundated portions of an area northwest of Hospital Road on the north side of the Manasquan River planned to contain an HDD entry pit within 500 ft. of surface fresh water (Figure 21, Sheet 31);
- "Potentially Undisturbed" area surrounding a parking lot on Hospital Road south of the Manasquan River planned to contain an HDD exit pit and partially within 500 ft. of surface fresh water (Figure 21, Sheets 31-32);
- Unpaved public ROW adjacent to portions of Easy Street and Lakewood Farmingdale Road within mapped eolian soil deposits and/or within 500 ft. of surface fresh water (Figure 21, Sheets 36-38);

- Unpaved public ROW adjacent to portions Lakewood Farmingdale Road near the intersection of Oak Glen Road and between Randolph Road and Miller Road within mapped eolian soil deposits (Figure 21, Sheets 40-41, 43-44);
- Unpaved public ROW adjacent to portions of Lakewood Allenwood Road between Herbertsville Road and Virginia Drive within mapped eolian soil deposits (Figure 21, Sheet 22);
- Unpaved public ROW adjacent to portions of Lakewood Allenwood Road between Cascades Avenue and Arnold Boulevard within mapped eolian soil deposits (Figure 21, Sheets 25-27); and
- Unpaved public ROW adjacent to portions of Lanes Pond Road north of the intersection of Alexander Avenue within mapped eolian soil deposits (Figure 21, Sheet44).

As listed above, some Medium to Medium-High sensitivity areas of the Larrabee Onshore Route are sited within paved roadways or bike paths. Since the paved roadways or bike paths are not suitable for subsurface archaeological testing (i.e., shovel testing), it is recommended that STPs be excavated within the public ROW on the road shoulder or bike path margins adjacent to the paved areas, as a proxy for what may be beneath the paved areas. This strategy is based on survey methodology used for the onshore facilities of similar offshore wind projects reviewed by BOEM (EDR, 2020 and 2022).

In addition, the Project's Monitoring Plan and Post Review Discoveries Plan (MPRDP) will be in effect for all construction and installation activities, providing guidance and instructions to all contractors on how to proceed in the event (however unlikely) of encountering unanticipated cultural material and/or features during work along the Larrabee Onshore Route. Out of an abundance of caution, archaeological monitoring of construction and installation is recommended in paved portions of the Larrabee Onshore Route with Medium-High Sensitivity located within 1,000 ft. of previously recorded archaeological sites. The exact locations recommended for monitoring in the Larrabee Onshore Route PAPE are detailed in Section 4.2.1.

Any routing options removed from Project consideration prior to conducting the recommended Phase IB archaeological field survey for the Project will result in the omission of any corresponding Potential Phase IB Survey Areas from the field effort. Section 2.3.9, describes the results of the Phase IB archaeological survey of the Larrabee Onshore Route. Further information on the design and methodology of the Phase IB investigation is included in Section 1.5.1

Figure 21. Larrabee Onshore Interconnection Cable - Archaeological Reconnaissance and Desktop Assessment Results

Atlantic Shores South Offshore Wind Project – Onshore Interconnection Facilities

Monmouth and Atlantic County, NJ

Terrestrial Archaeological Resources Assessment

Top Map - Soil and Topography

- Larrabee PAPE Boundary
- 2ft Contour

Soil Condition

- Intact Soils – Subsoil depth approx. 1.0-2.0 ft

Value

- High : 40.6205
- Low : 0

Middle Map - 1930 Aerial & Mapped Resources

- Larrabee PAPE Boundary
- Historic Districts of New Jersey

Bottom Map - Archaeological Sensitivity Results

- Larrabee PAPE Boundary
- Trenchless PAPE
- Phase 1B Survey Area

Archaeological Sensitivity

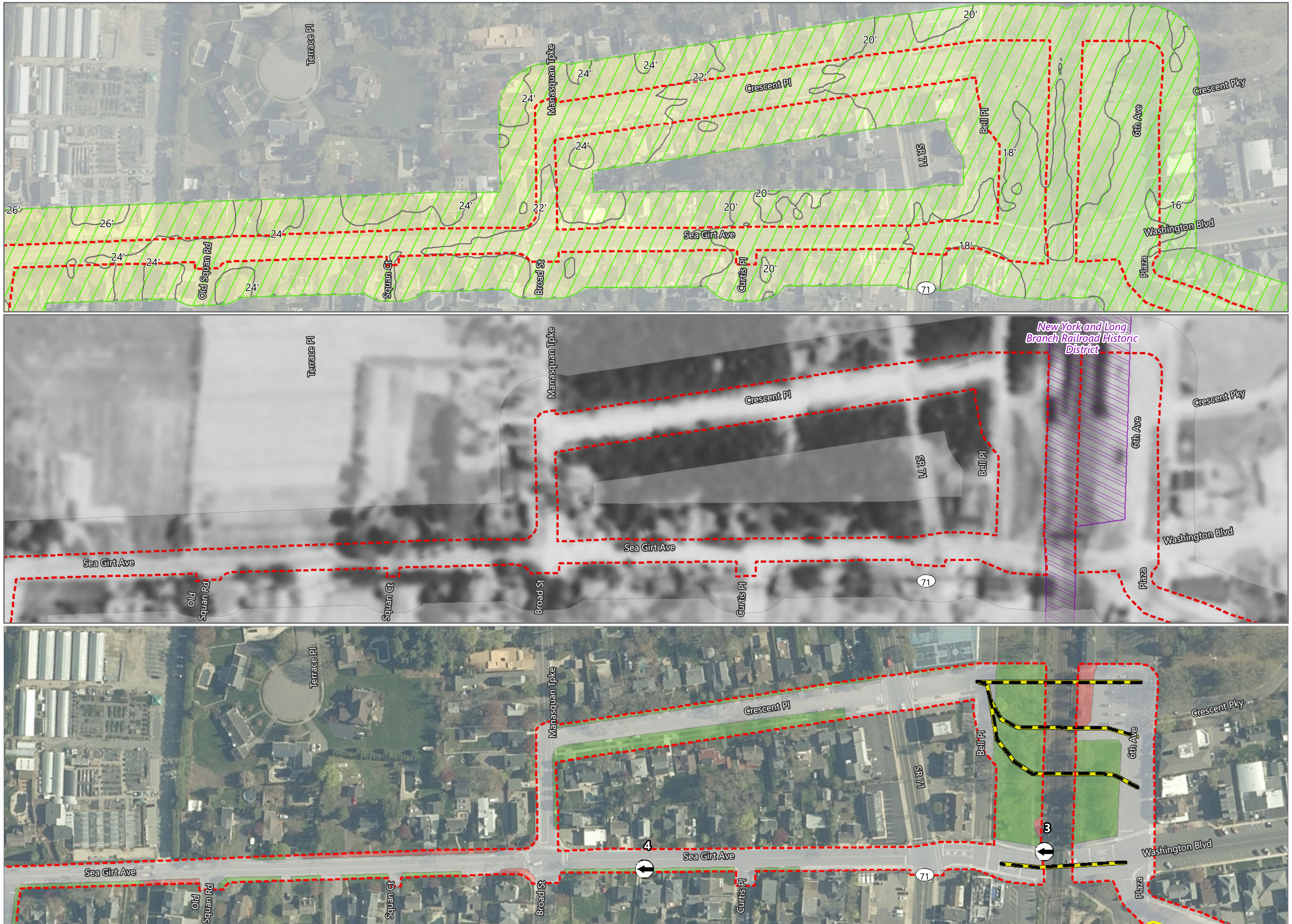
- Low Sensitivity
- Medium-High Sensitivity
- Roadway/Paved

0 50 100 200
Feet

Prepared October 31, 2023
Basemap: NJ Office of Information Technology and Office of GIS "NJ 2020 Natural Color Imagery" & "New Jersey Black White 1930" Map Service

EDR

Figure 21. Larrabee Onshore Interconnection Cable - Archaeological Reconnaissance and Desktop Assessment Results



Atlantic Shores South Offshore Wind Project – Onshore Interconnection Facilities

Monmouth and Atlantic County, NJ

Terrestrial Archaeological Resources Assessment

Top Map - Soil and Topography

- Larrabee PAPE Boundary
- 2ft Contour

Soil Condition

- Intact Soils – Subsoil depth approx. 1.0-2.0 ft

Value

- High : 40.6205
- Low : 0

Middle Map - 1930 Aerial & Mapped Resources

- Larrabee PAPE Boundary
- Historic Districts of New Jersey

Bottom Map - Archaeological Sensitivity Results

- Larrabee PAPE Boundary
- Trenchless PAPE
- Photograph Location
- Phase 1B Survey Area

Archaeological Sensitivity

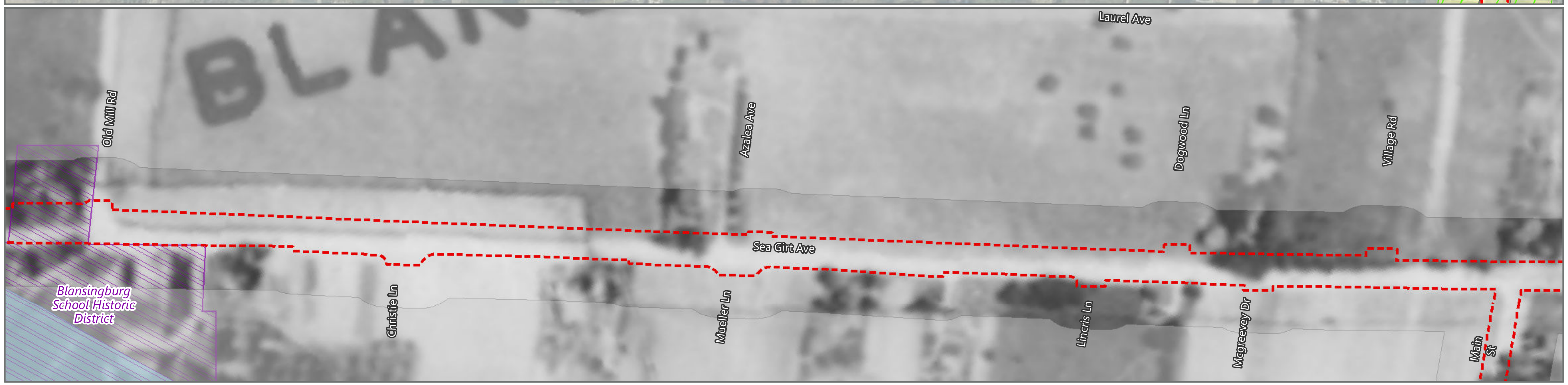
- Excluded from Field Survey Consideration
- Low Sensitivity
- Medium-High Sensitivity
- Roadway/Paved

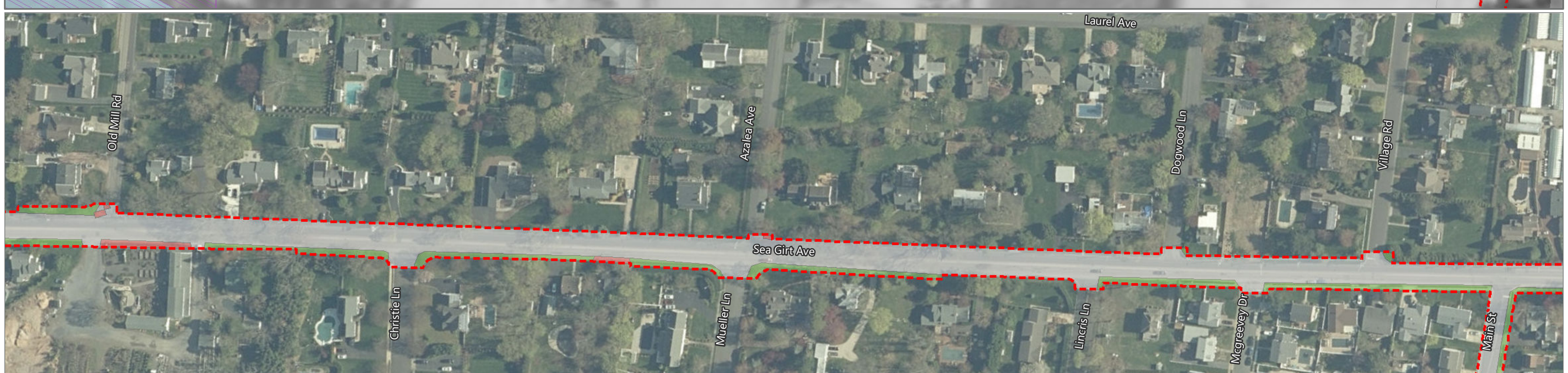
0 50 100 200
Feet

Prepared October 31, 2023
Basemap: NJ Office of Information Technology and Office of GIS "NJ 2020 Natural Color Imagery" & "New Jersey Black White 1930" Map Service

EDR

Figure 21. Larrabee Onshore Interconnection Cable - Archaeological Reconnaissance and Desktop Assessment Results





Atlantic Shores South Offshore Wind Project – Onshore Interconnection Facilities

Monmouth and Atlantic County, NJ

Terrestrial Archaeological Resources Assessment

Top Map - Soil and Topography

- Larrabee PAPE Boundary
- 2ft Contour

Soil Condition

- Intact Soils – Subsoil depth approx. 1.0-2.0 ft

Value

- High : 40.6205
- Low : 0

Middle Map - 1930 Aerial & Mapped Resources

- Larrabee PAPE Boundary
- Historic Districts of New Jersey
- 500' Waterway Buffer

Bottom Map - Archaeological Sensitivity Results

- Larrabee PAPE Boundary

Archaeological Sensitivity

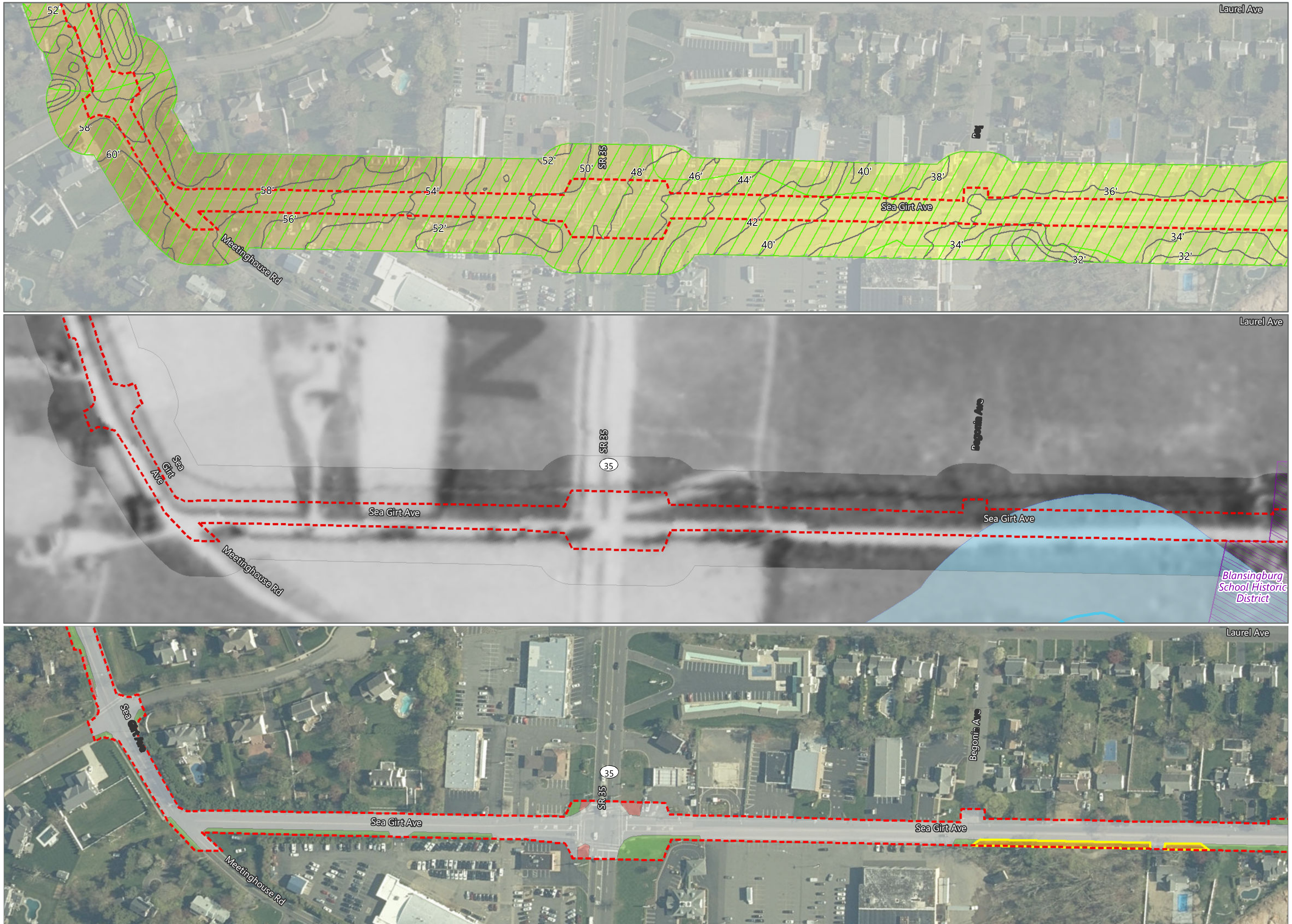
- Excluded from Field Survey Consideration
- Low Sensitivity
- Roadway/Paved

0 50 100 200
Feet

Prepared October 31, 2023
Basemap: NJ Office of Information Technology and Office of GIS "NJ 2020 Natural Color Imagery" & "New Jersey Black White 1930" Map Service

EDR

Figure 21. Larrabee Onshore Interconnection Cable - Archaeological Reconnaissance and Desktop Assessment Results



Atlantic Shores South Offshore Wind Project – Onshore Interconnection Facilities

Monmouth and Atlantic County, NJ

Terrestrial Archaeological Resources Assessment

Top Map - Soil and Topography

- Larrabee PAPE Boundary
- 2ft Contour

Soil Condition

- Intact Soils – Subsoil depth approx. 1.0-2.0 ft

Value

- High : 40.6205
- Low : 0

Middle Map - 1930 Aerial & Mapped Resources

- Larrabee PAPE Boundary
- Waterway
- Historic Districts of New Jersey
- 500' Waterway Buffer

Bottom Map - Archaeological Sensitivity Results

- Larrabee PAPE Boundary
- Phase 1B Survey Area

Archaeological Sensitivity

- Excluded from Field Survey Consideration
- Low Sensitivity
- Medium-High Sensitivity
- Roadway/Paved

0 50 100 200

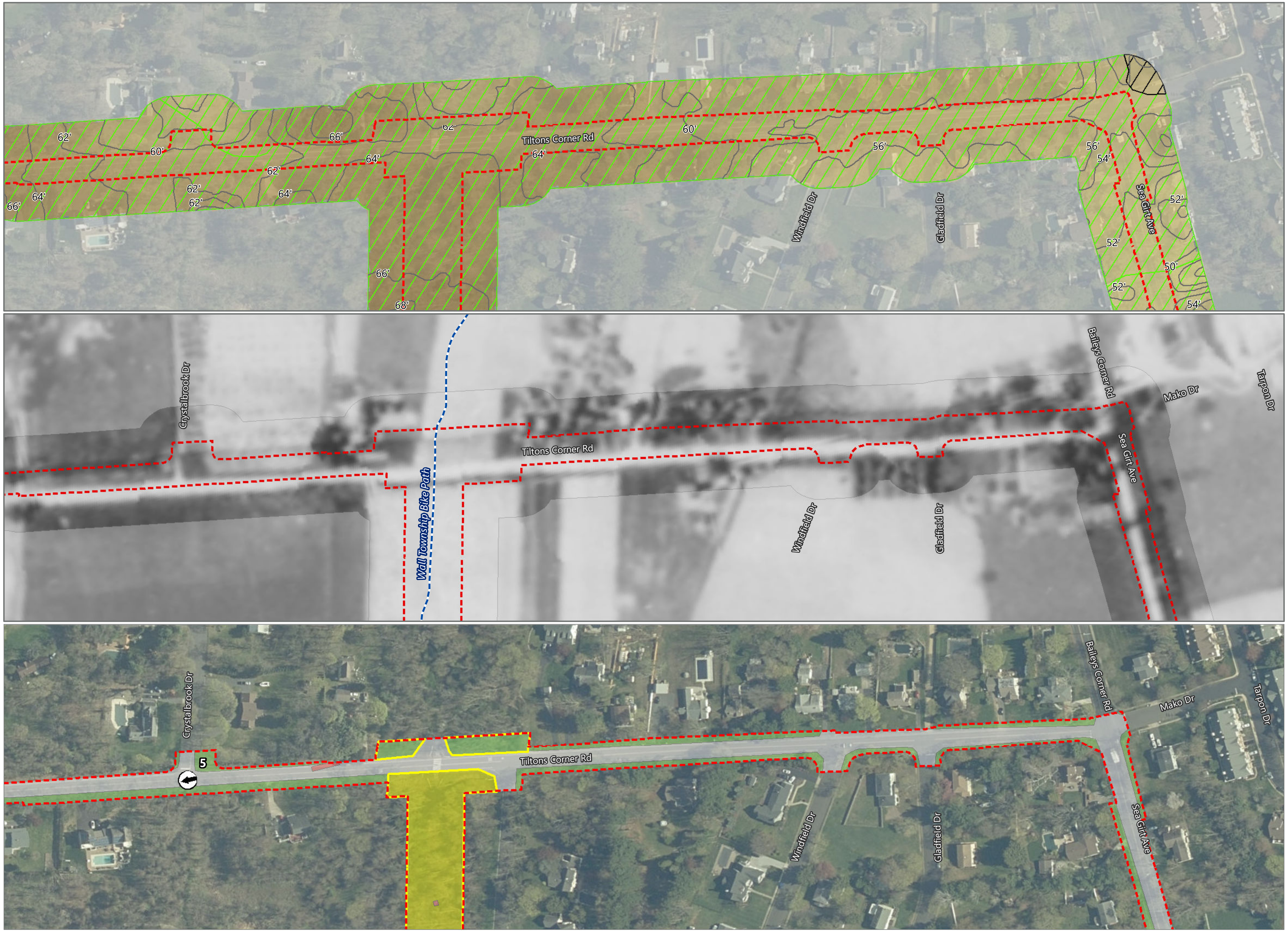
Feet

Prepared October 31, 2023

Basemap: NJ Office of Information Technology and Office of GIS "NJ 2020 Natural Color Imagery" & "New Jersey Black White 1930" Map Service

EDR

Figure 21. Larrabee Onshore Interconnection Cable - Archaeological Reconnaissance and Desktop Assessment Results



Atlantic Shores South Offshore Wind Project – Onshore Interconnection Facilities

Monmouth and Atlantic County, NJ

Terrestrial Archaeological Resources Assessment

Top Map - Soil and Topography

- Larrabee PAPE Boundary
- 2ft Contour

Soil Condition

- Disturbed
- Intact Soils – Subsoil depth approx. 1.0-2.0 ft

Value

- High : 40.6205
- Low : 0

Middle Map - 1930 Aerial & Mapped Resources

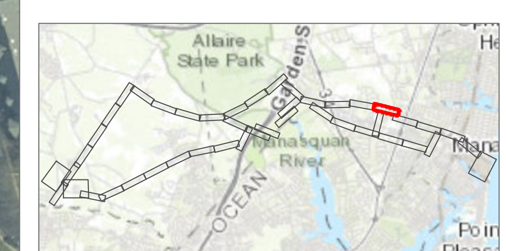
- Larrabee PAPE Boundary
- Wall Township Bike Path

Bottom Map - Archaeological Sensitivity Results

- Larrabee PAPE Boundary
- Photograph Location
- Phase 1B Survey Area

Archaeological Sensitivity

- Excluded from Field Survey Consideration
- Low Sensitivity
- Medium Sensitivity
- Roadway/Paved

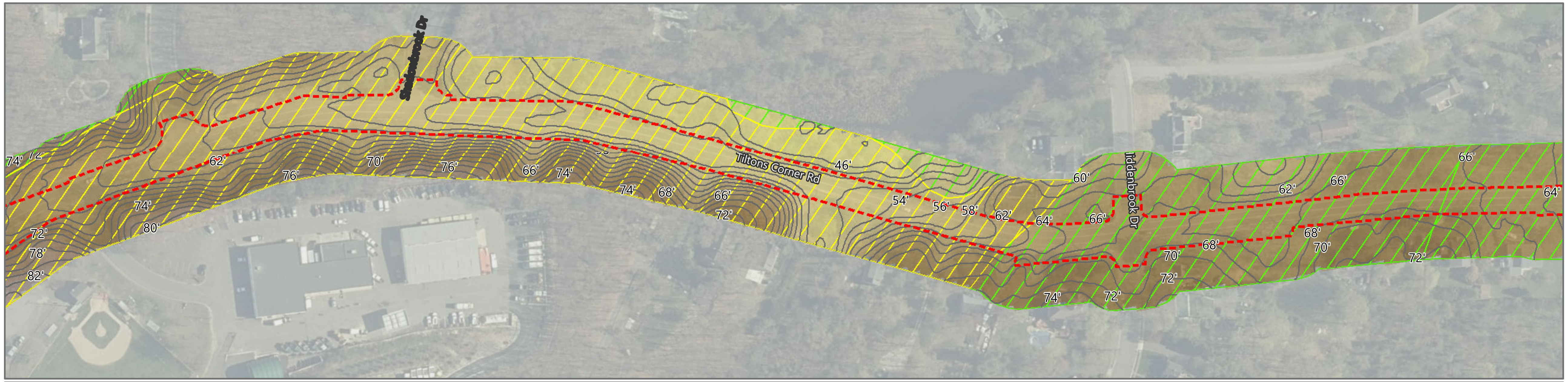


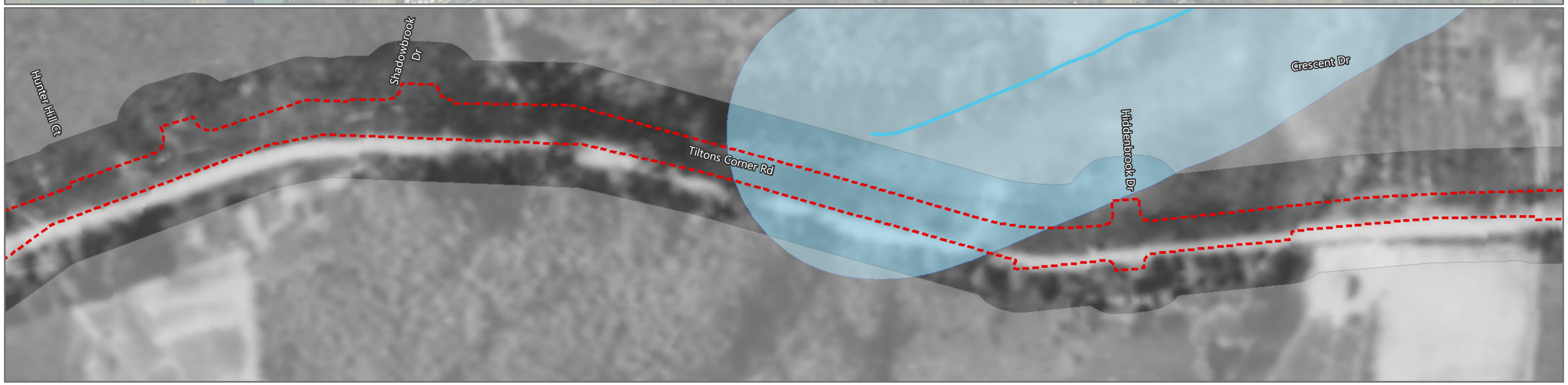
0 50 100 200
Feet

Prepared October 31, 2023
Basemap: NJ Office of Information Technology and Office of GIS "NJ 2020 Natural Color Imagery" & "New Jersey Black White 1930" Map Service

EDR

Figure 21. Larrabee Onshore Interconnection Cable - Archaeological Reconnaissance and Desktop Assessment Results





Atlantic Shores South Offshore Wind Project – Onshore Interconnection Facilities

Monmouth and Atlantic County, NJ

Terrestrial Archaeological Resources Assessment

Top Map - Soil and Topography

- Larrabee PAPE Boundary
- 2ft Contour

Soil Condition

- Intact Soils – Subsoil depth approx. 1.0-2.0 ft
- Intact Soils – Subsoil depth approx. > 2.0 ft

Value

- High : 40.6205
- Low : 0

Middle Map - 1930 Aerial & Mapped Resources

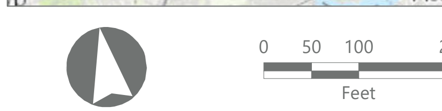
- Larrabee PAPE Boundary
- Waterway
- 500' Waterway Buffer

Bottom Map - Archaeological Sensitivity Results

- Larrabee PAPE Boundary
- Phase 1B Survey Area

Archaeological Sensitivity

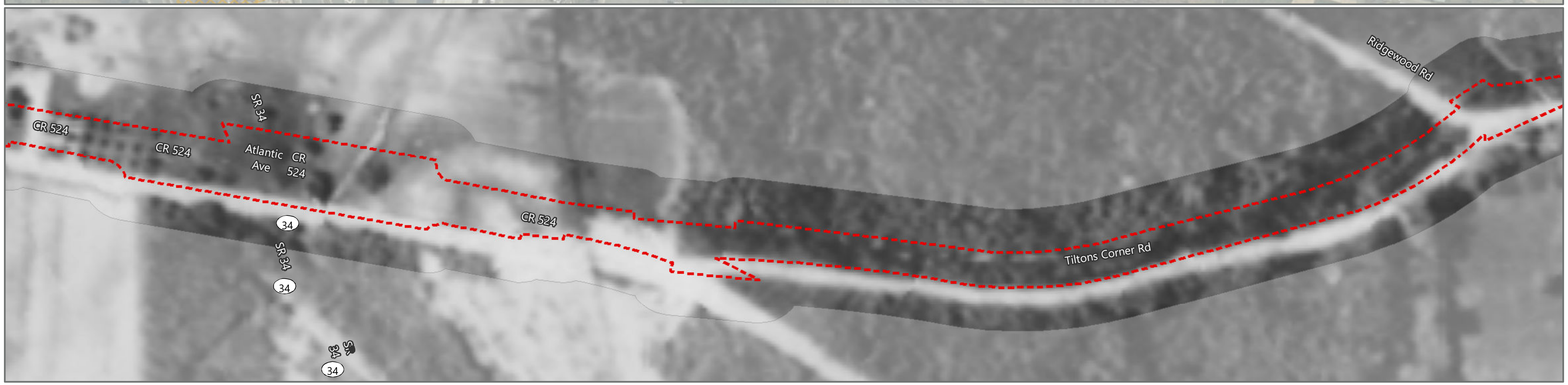
- Excluded from Field Survey Consideration
- Low Sensitivity
- Medium Sensitivity
- Medium-High Sensitivity
- Roadway/Paved

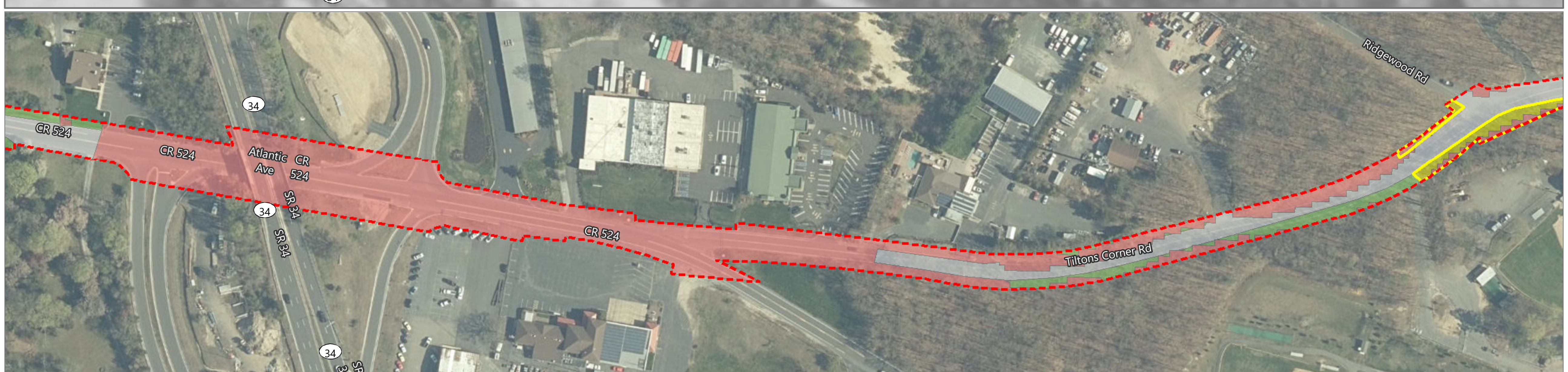


Prepared October 31, 2023
Basemap: NJ Office of Information Technology and Office of GIS "NJ 2020 Natural Color Imagery" & "New Jersey Black White 1930" Map Service

EDR

Figure 21. Larrabee Onshore Interconnection Cable - Archaeological Reconnaissance and Desktop Assessment Results





Atlantic Shores South Offshore Wind Project – Onshore Interconnection Facilities

Monmouth and Atlantic County, NJ

Terrestrial Archaeological Resources Assessment

Top Map - Soil and Topography

- Larrabee PAPE Boundary
- 2ft Contour
- Historic Fill

Soil Condition

- Disturbed
- Intact Soils – Subsoil depth approx. 1.0-2.0 ft
- Intact Soils – Subsoil depth approx. > 2.0 ft

Value

High : 40.6205

Low : 0

Middle Map - 1930 Aerial & Mapped Resources

- Larrabee PAPE Boundary

Bottom Map - Archaeological Sensitivity Results

- Larrabee PAPE Boundary
- Phase 1B Survey Area

Archaeological Sensitivity

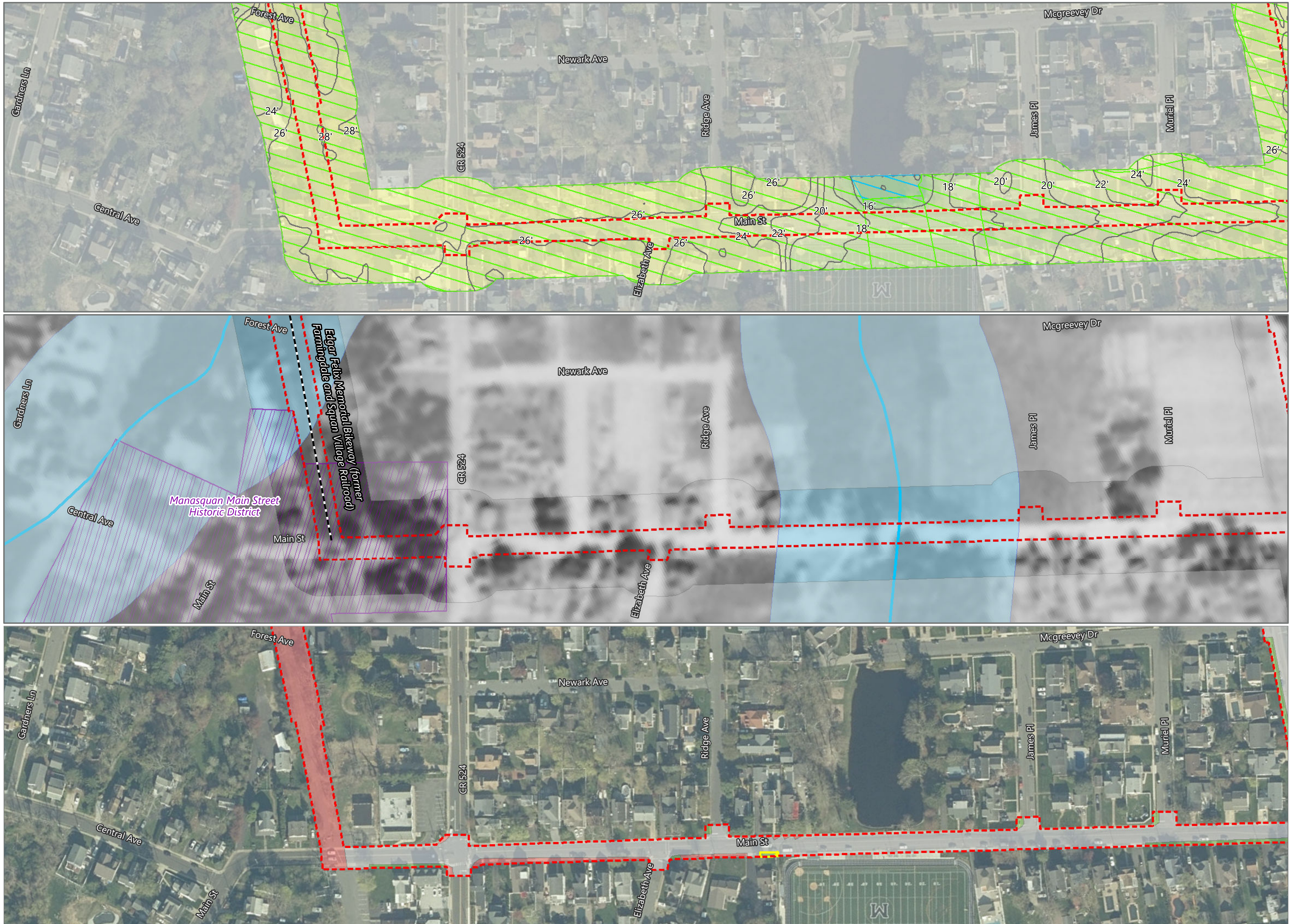
- Excluded from Field Survey Consideration
- Low Sensitivity
- Medium Sensitivity
- Roadway/Paved

0 50 100 200
Feet

Prepared October 31, 2023
Basemap: NJ Office of Information Technology and Office of GIS "NJ 2020 Natural Color Imagery" & "New Jersey Black White 1930" Map Service

EDR

Figure 21. Larrabee Onshore Interconnection Cable - Archaeological Reconnaissance and Desktop Assessment Results



Atlantic Shores South Offshore Wind Project – Onshore Interconnection Facilities

Monmouth and Atlantic County, NJ

Terrestrial Archaeological Resources Assessment

Top Map - Soil and Topography

- Larrabee PAPE Boundary
- 2ft Contour

Soil Condition

- Intact Soils – Subsoil depth approx. 1.0-2.0 ft
- Water

Value

- High : 40.6205
- Low : 0

Middle Map - 1930 Aerial & Mapped Resources

- Larrabee PAPE Boundary
- Edgar Felix Memorial Bikeway (former Farmingdale and Squan Village Railroad)
- Waterway
- Historic Districts of New Jersey
- 500' Waterway Buffer

Bottom Map - Archaeological Sensitivity Results

- Larrabee PAPE Boundary
- Phase 1B Survey Area

Archaeological Sensitivity

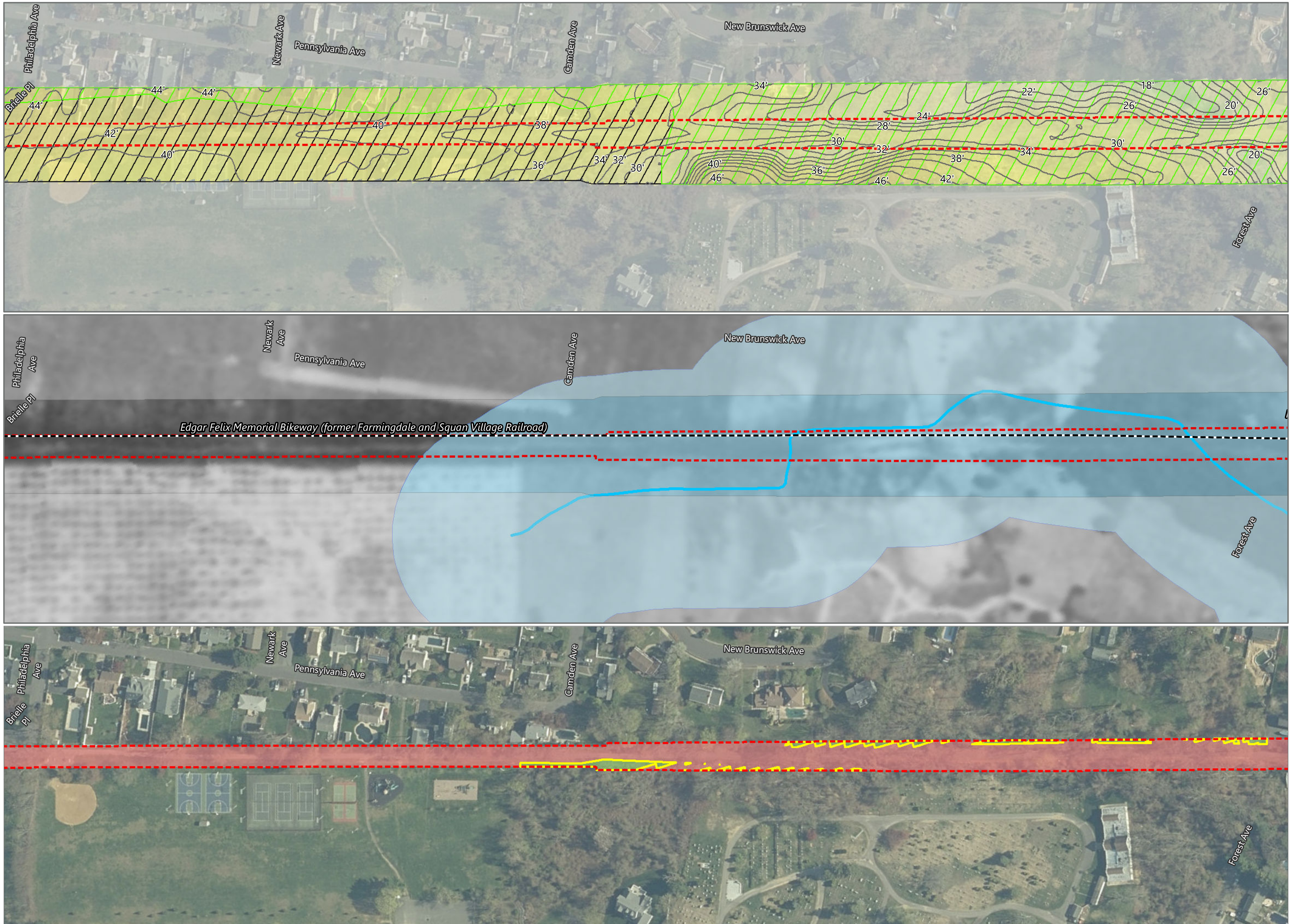
- Excluded from Field Survey Consideration
- Low Sensitivity
- Medium-High Sensitivity
- Roadway/Paved

0 50 100 200
Feet

Prepared October 31, 2023
Basemap: NJ Office of Information Technology and Office of GIS "NJ 2020 Natural Color Imagery" & "New Jersey Black White 1930" Map Service

EDR

Figure 21. Larrabee Onshore Interconnection Cable - Archaeological Reconnaissance and Desktop Assessment Results



Atlantic Shores South Offshore Wind Project – Onshore Interconnection Facilities

Monmouth and Atlantic County, NJ

Terrestrial Archaeological Resources Assessment

Top Map - Soil and Topography

- Larrabee PAPE Boundary
- 2ft Contour

Soil Condition

- Disturbed
- Intact Soils – Subsoil depth approx. 1.0-2.0 ft

Value

High : 40.6205

Low : 0

Middle Map - 1930 Aerial & Mapped Resources

- Larrabee PAPE Boundary
- Edgar Felix Memorial Bikeway (former Farmingdale and Squan Village Railroad)
- Waterway
- 500' Waterway Buffer

Bottom Map - Archaeological Sensitivity Results

- Larrabee PAPE Boundary
- Phase 1B Survey Area

Archaeological Sensitivity

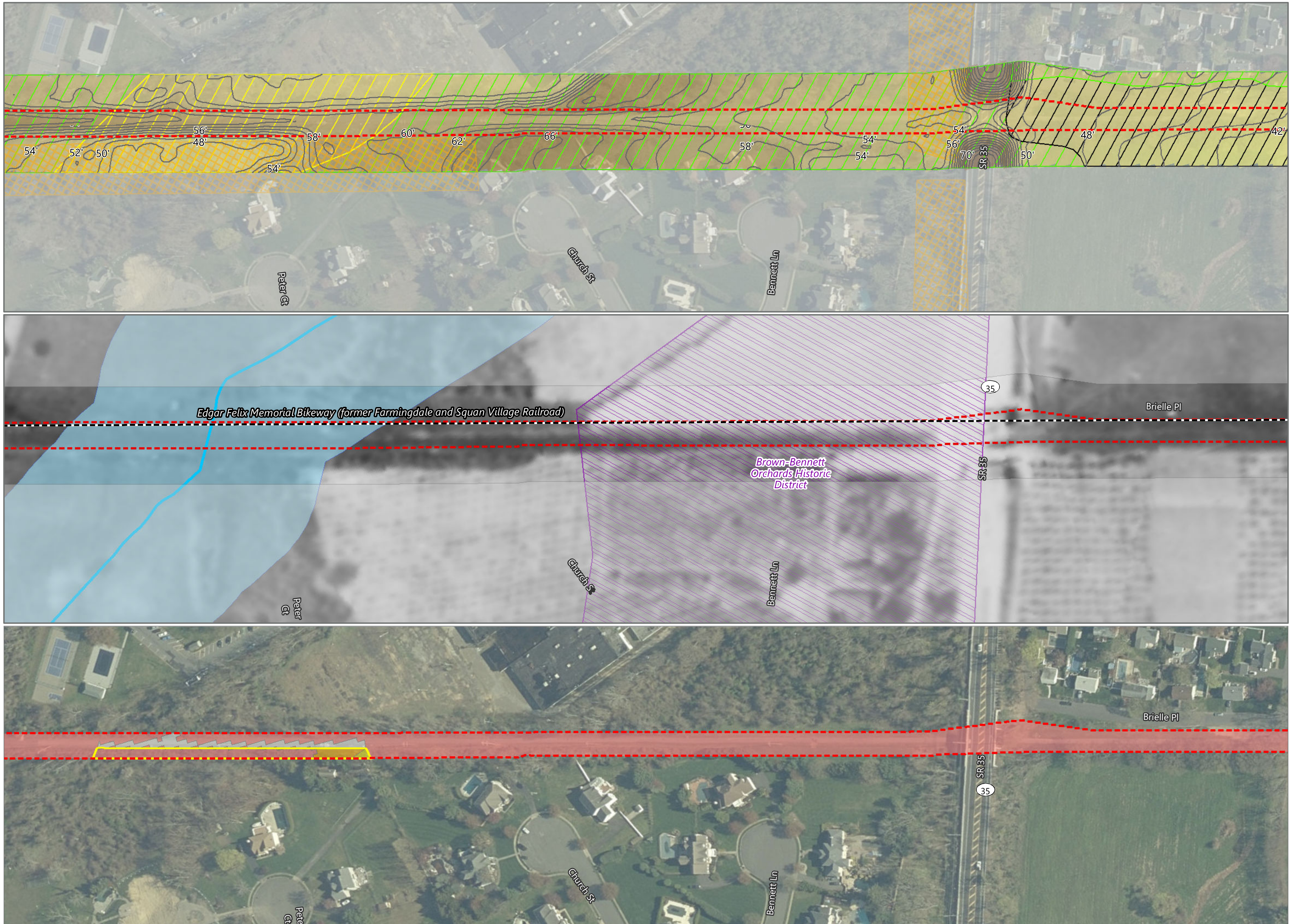
- Excluded from Field Survey Consideration
- Low Sensitivity
- Roadway/Paved

0 50 100 200 Feet

Prepared October 31, 2023
Basemap: NJ Office of Information Technology and Office of GIS "NJ 2020 Natural Color Imagery" & "New Jersey Black White 1930" Map Service

EDR

Figure 21. Larrabee Onshore Interconnection Cable - Archaeological Reconnaissance and Desktop Assessment Results



Atlantic Shores South Offshore Wind Project – Onshore Interconnection Facilities

Monmouth and Atlantic County, NJ

Terrestrial Archaeological Resources Assessment

Top Map - Soil and Topography

- Larrabee PAPE Boundary
- 2ft Contour
- Historic Fill

Soil Condition

- Disturbed
- Intact Soils – Subsoil depth approx. 1.0-2.0 ft
- Intact Soils – Subsoil depth approx. > 2.0 ft

Value

High : 40.6205

Low : 0

Middle Map - 1930 Aerial & Mapped Resources

- Larrabee PAPE Boundary
- Edgar Felix Memorial Bikeway (former Farmingdale and Squan Village Railroad)
- Waterway
- Historic Districts of New Jersey
- 500' Waterway Buffer

Bottom Map - Archaeological Sensitivity Results

- Larrabee PAPE Boundary
- Phase 1B Survey Area

Archaeological Sensitivity

- Excluded from Field Survey Consideration
- Medium Sensitivity
- Medium-High Sensitivity
- Roadway/Paved

0 50 100 200

Feet

Prepared October 31, 2023

Basemap: NJ Office of Information Technology and Office of GIS "NJ 2020 Natural Color Imagery" & "New Jersey Black White 1930" Map Service

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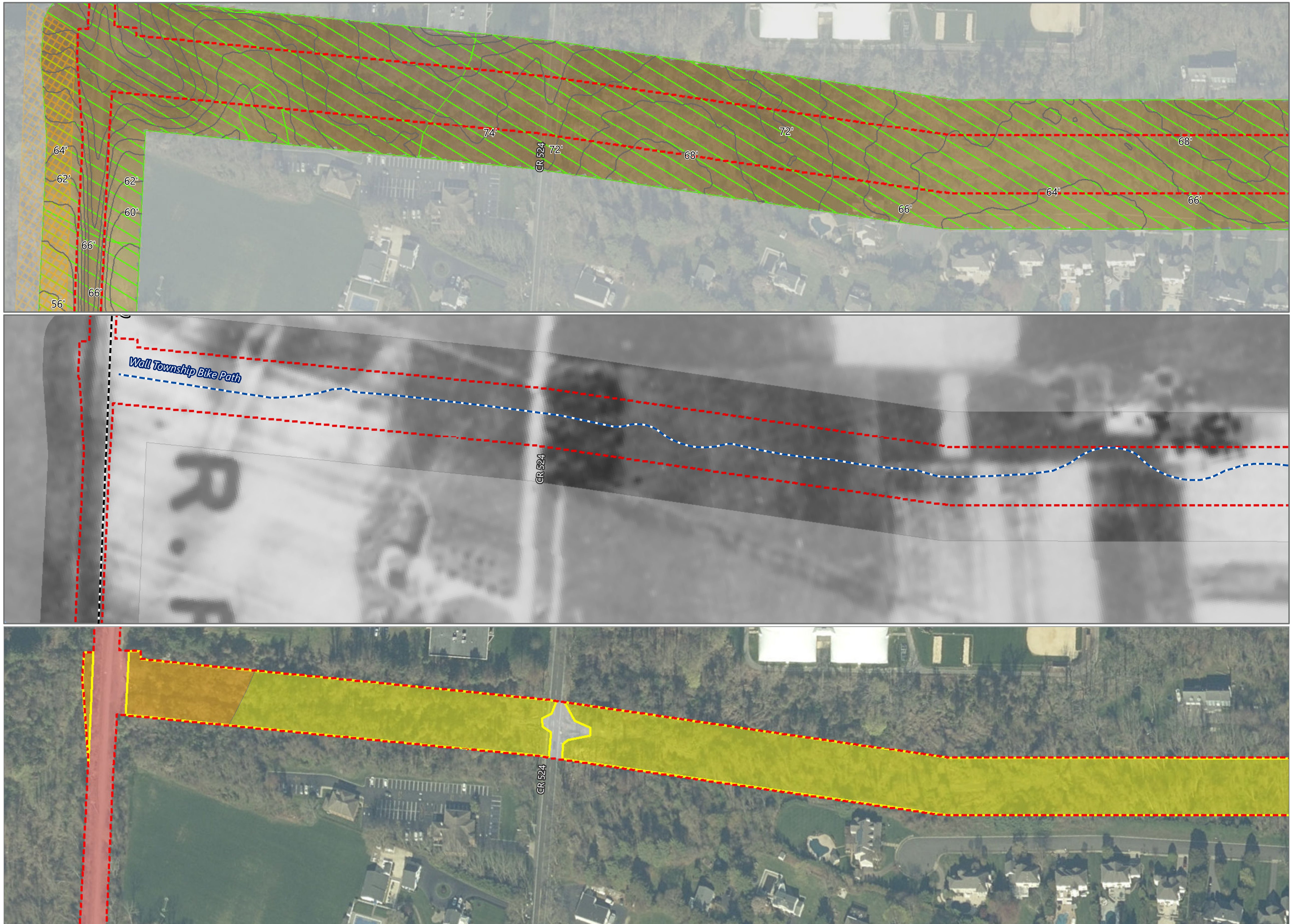

Atlantic Shores South Offshore Wind Project – Onshore Interconnection Facilities

Monmouth and Atlantic County, NJ

Terrestrial Archaeological Resources Assessment

Top Map - Soil and Topography

- Larrabee PAPE Boundary
- 2ft Contour
- Historic Fill

Soil Condition

- Intact Soils – Subsoil depth approx. 1.0-2.0 ft

Value

- High : 40.6205
- Low : 0

Middle Map - 1930 Aerial & Mapped Resources

- Larrabee PAPE Boundary
- Edgar Felix Memorial Bikeway (former Farmingdale and Squan Village Railroad)
- Wall Township Bike Path
- 500' Waterway Buffer

Bottom Map - Archaeological Sensitivity Results

- Larrabee PAPE Boundary
- Phase 1B Survey Area

Archaeological Sensitivity

- Excluded from Field Survey Consideration
- Medium Sensitivity
- Medium-High Sensitivity
- Roadway/Paved Medium-High Sensitivity
- Roadway/Paved

0 50 100 200
Feet

Prepared October 31, 2023
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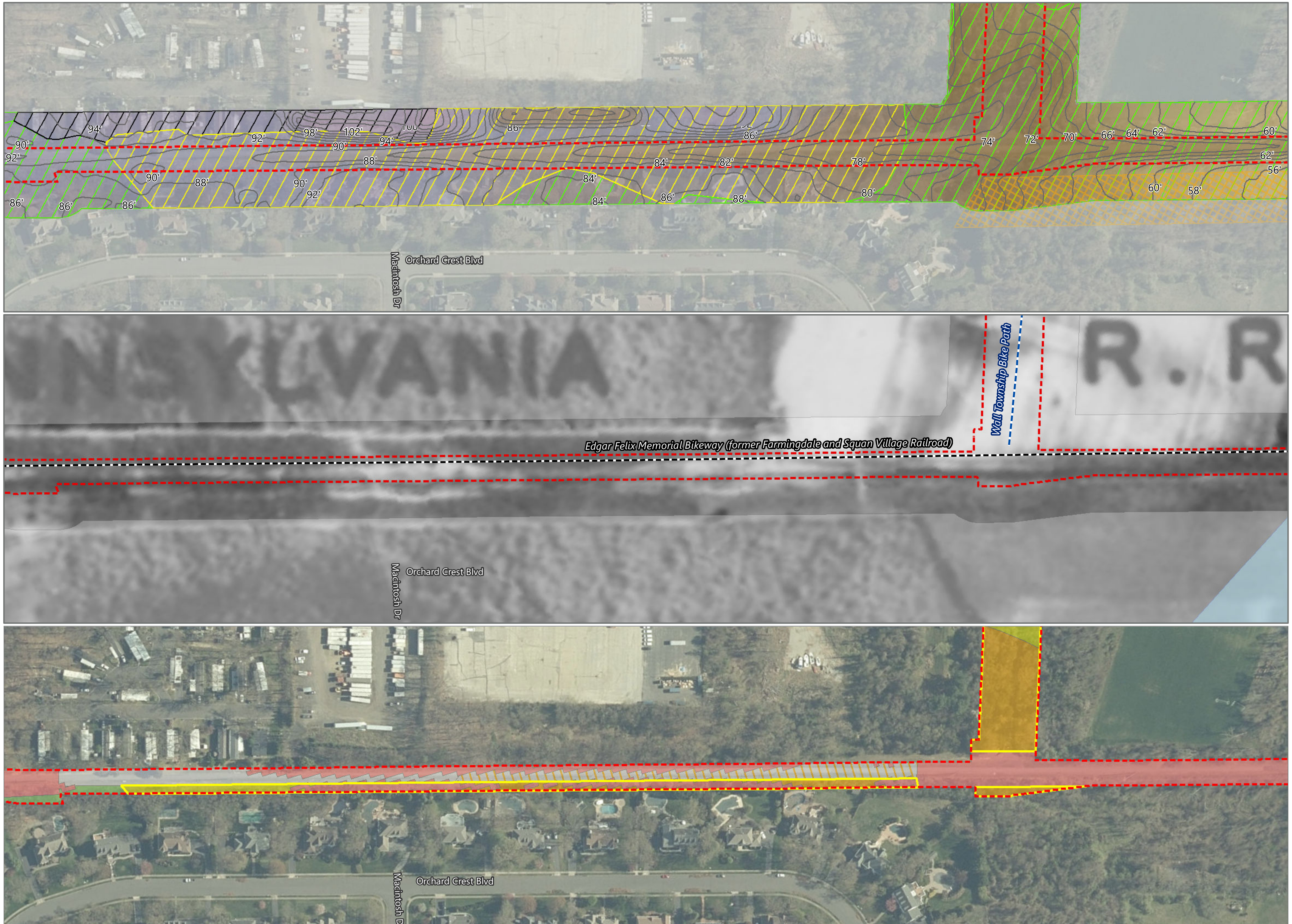

Atlantic Shores South Offshore Wind Project – Onshore Interconnection Facilities

Monmouth and Atlantic County, NJ

Terrestrial Archaeological Resources Assessment

Top Map - Soil and Topography

- Larrabee PAPE Boundary
- 2ft Contour
- Historic Fill

Soil Condition

- Disturbed
- Intact Soils – Subsoil depth approx. 1.0-2.0 ft
- Intact Soils – Subsoil depth approx. > 2.0 ft

Value

High : 40.6205

Low : 0

Middle Map - 1930 Aerial & Mapped Resources

- Larrabee PAPE Boundary
- Edgar Felix Memorial Bikeway (former Farmingdale and Squan Village Railroad)
- Wall Township Bike Path
- 500' Waterway Buffer

Bottom Map - Archaeological Sensitivity Results

- Larrabee PAPE Boundary
- Phase 1B Survey Area

Archaeological Sensitivity

- Excluded from Field Survey Consideration
- Low Sensitivity
- Medium Sensitivity
- Medium-High Sensitivity
- Roadway/Paved Medium-High Sensitivity
- Roadway/Paved

0 50 100 200
Feet

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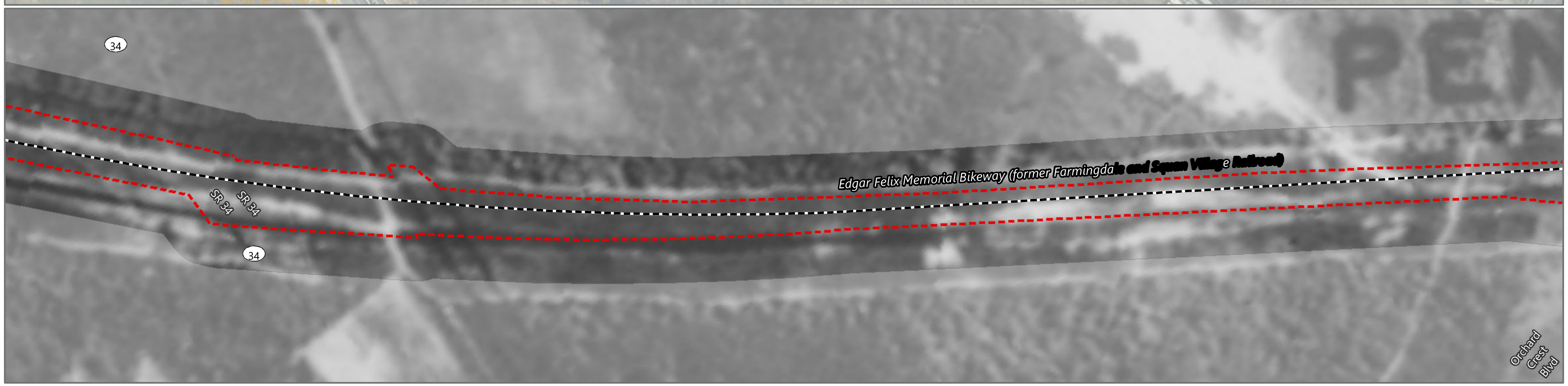

Atlantic Shores South Offshore Wind Project – Onshore Interconnection Facilities

Monmouth and Atlantic County, NJ

Terrestrial Archaeological Resources Assessment

Top Map - Soil and Topography
- Larrabee PAPE Boundary
- 2ft Contour
- Historic Fill

Soil Condition
- Disturbed
- Intact Soils – Subsoil depth approx. 1.0-2.0 ft
- Intact Soils – Subsoil depth approx. > 2.0 ft

Value
- High : 40.6205
- Low : 0

Middle Map - 1930 Aerial & Mapped Resources
- Larrabee PAPE Boundary
- Edgar Felix Memorial Bikeway (former Farmingdale and Squan Village Railroad)

Bottom Map - Archaeological Sensitivity Results
- Larrabee PAPE Boundary

Archaeological Sensitivity
- Excluded from Field Survey Consideration
- Low Sensitivity
- Roadway/Paved

0 50 100 200
Feet

Prepared October 31, 2023
Basemap: NJ Office of Information Technology and Office of GIS "NJ 2020 Natural Color Imagery" & "New Jersey Black White 1930" Map Service

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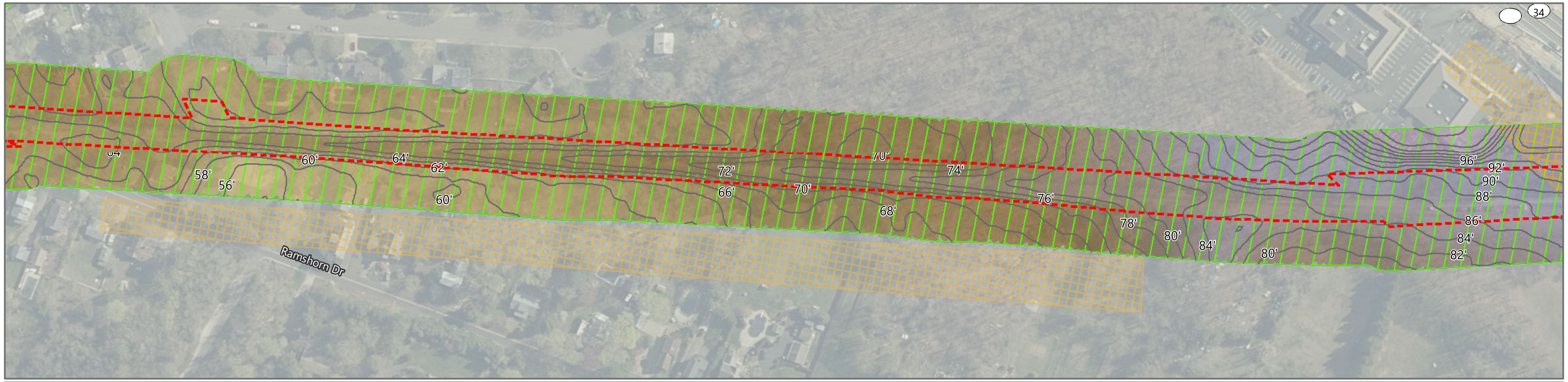

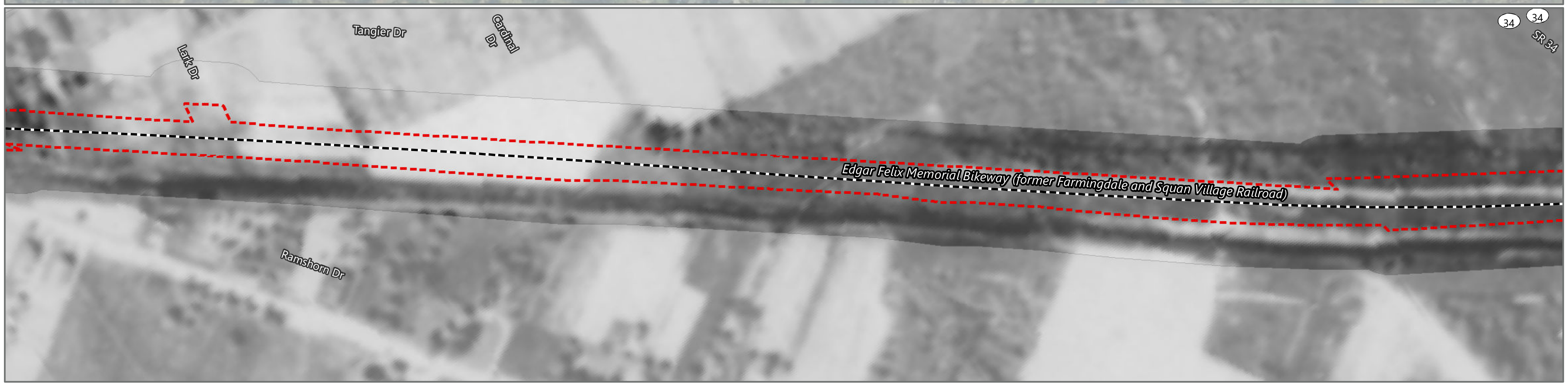

Atlantic Shores South Offshore Wind Project – Onshore Interconnection Facilities

Monmouth and Atlantic County, NJ

Terrestrial Archaeological Resources Assessment

Top Map - Soil and Topography

- Larrabee PAPE Boundary
- 2ft Contour
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- Larrabee PAPE Boundary
- Edgar Felix Memorial Bikeway (former Farmingdale and Squan Village Railroad)

Bottom Map - Archaeological Sensitivity Results

- Larrabee PAPE Boundary
- Photograph Location

Archaeological Sensitivity

- Excluded from Field Survey Consideration
- Low Sensitivity
- Roadway/Paved

0 50 100 200
Feet

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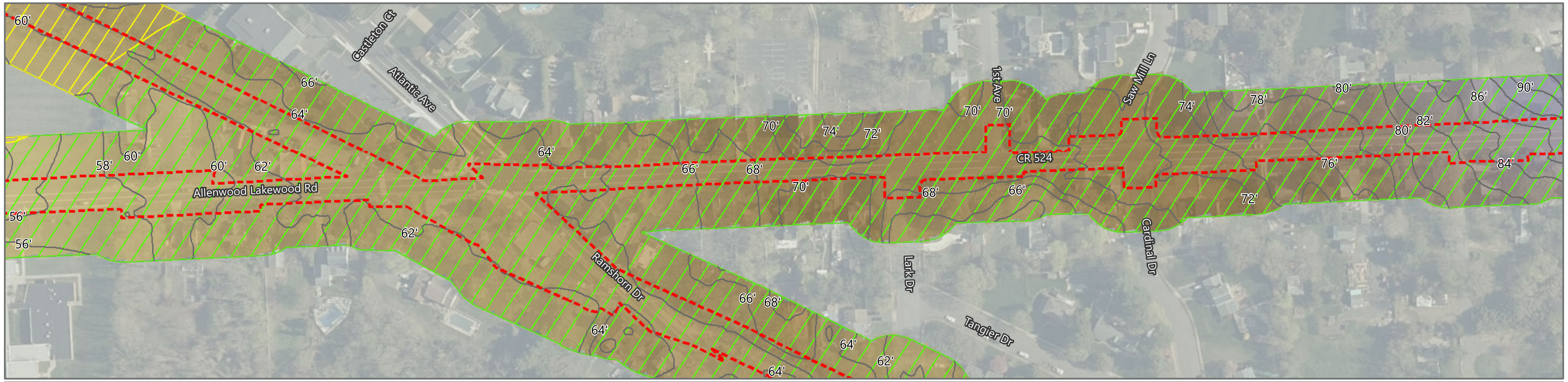

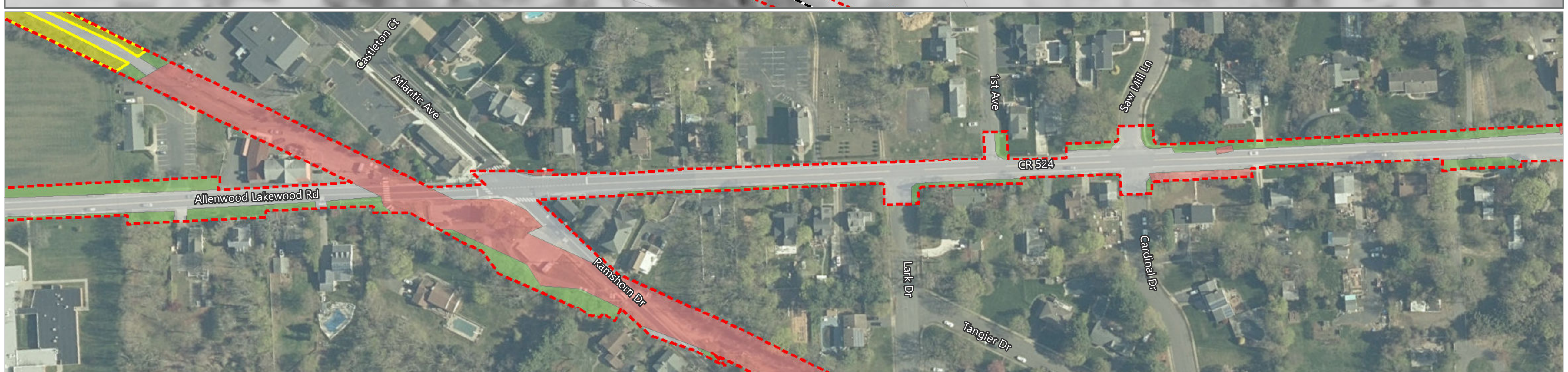

Atlantic Shores South Offshore Wind Project – Onshore Interconnection Facilities

Monmouth and Atlantic County, NJ

Terrestrial Archaeological Resources Assessment

Top Map - Soil and Topography

- Larrabee PAPE Boundary
- 2ft Contour

Soil Condition

- Intact Soils – Subsoil depth approx. 1.0-2.0 ft
- Intact Soils – Subsoil depth approx. > 2.0 ft

Value

High : 40.6205

Low : 0

Middle Map - 1930 Aerial & Mapped Resources

- Larrabee PAPE Boundary
- Edgar Felix Memorial Bikeway (former Farmingdale and Squan Village Railroad)

Bottom Map - Archaeological Sensitivity Results

- Larrabee PAPE Boundary
- Phase 1B Survey Area

Archaeological Sensitivity

- Excluded from Field Survey Consideration
- Low Sensitivity
- Medium Sensitivity
- Roadway/Paved

0 50 100 200

Feet

Prepared October 31, 2023

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EDR

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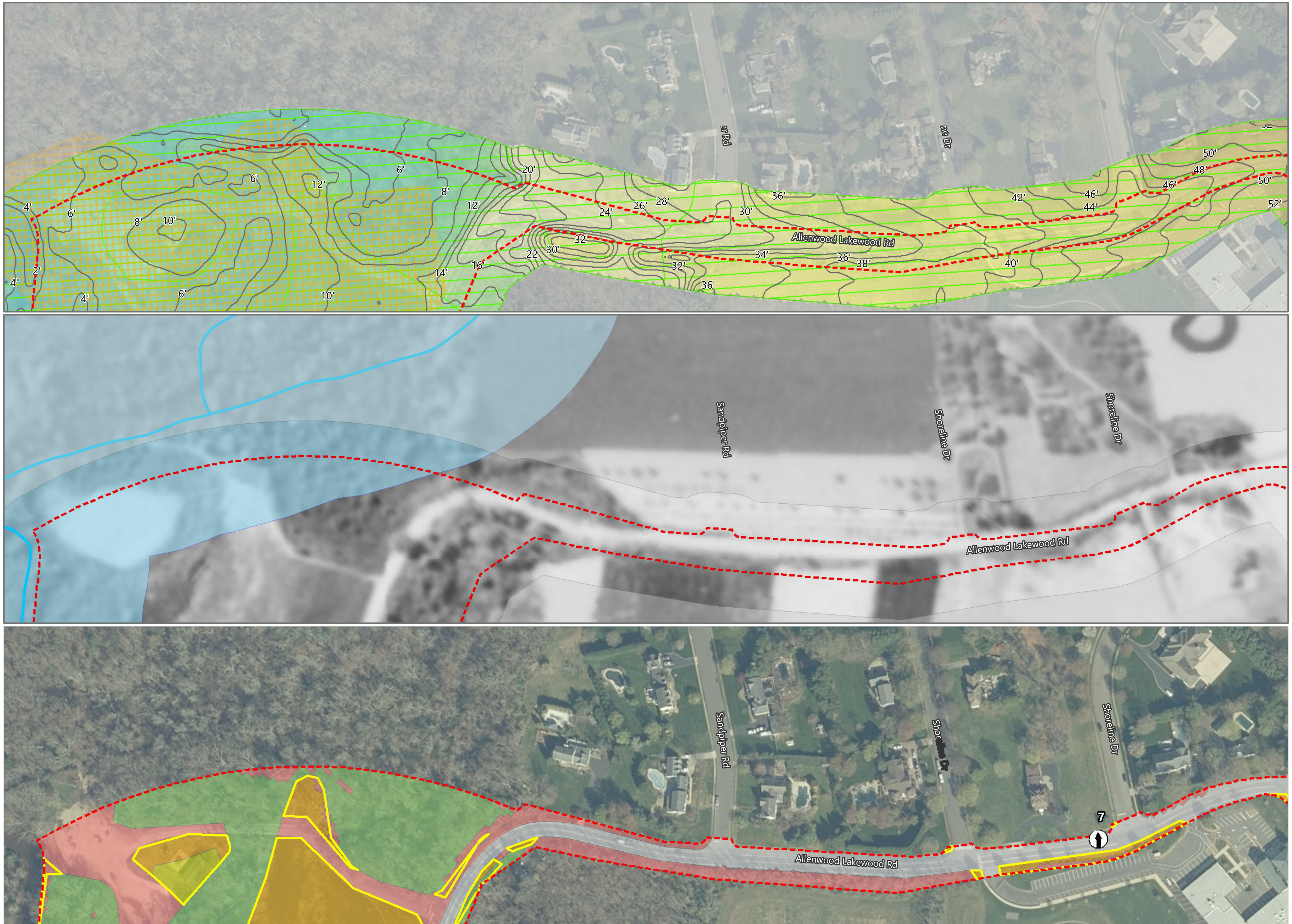


Atlantic Shores South Offshore Wind Project – Onshore Interconnection Facilities

Monmouth and Atlantic County, NJ

Terrestrial Archaeological Resources Assessment

Top Map - Soil and Topography

- Larrabee PAPE Boundary
- 2ft Contour
- Historic Fill

Soil Condition

- Intact Soils – Subsoil depth approx. 1.0-2.0 ft

Value

- High : 40.6205
- Low : 0

Middle Map - 1930 Aerial & Mapped Resources

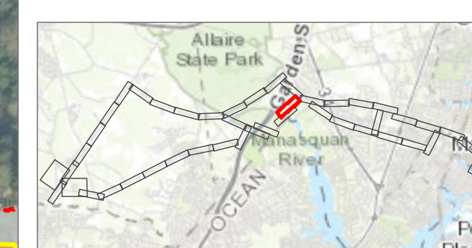
- Larrabee PAPE Boundary
- Waterway
- 500' Waterway Buffer

Bottom Map - Archaeological Sensitivity Results

- Larrabee PAPE Boundary
- Photograph Location
- Phase 1B Survey Area

Archaeological Sensitivity

- Excluded from Field Survey Consideration
- Low Sensitivity
- Medium Sensitivity
- Medium-High Sensitivity
- Roadway/Paved



0 50 100 200
Feet

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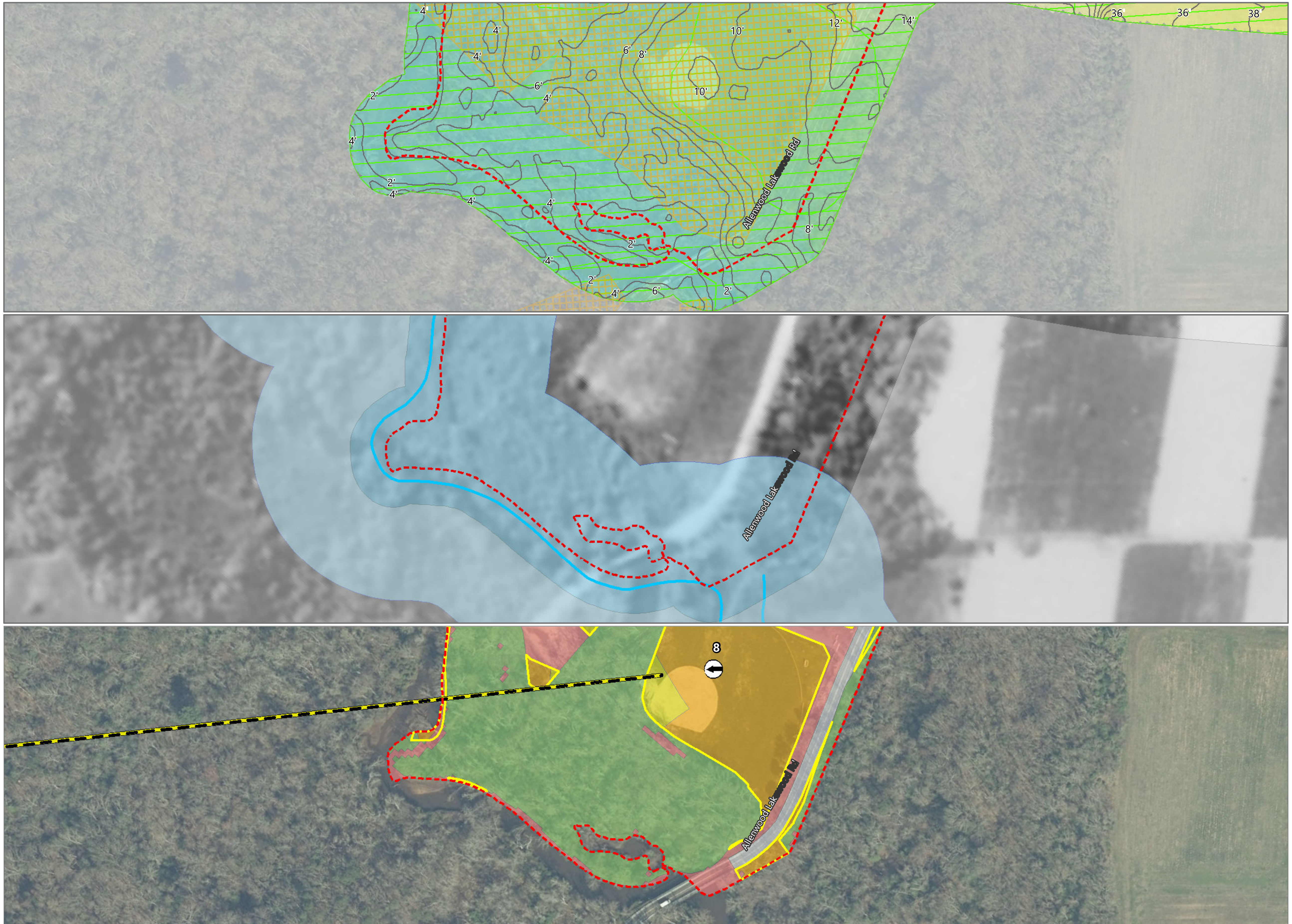


Atlantic Shores South Offshore Wind Project – Onshore Interconnection Facilities

Monmouth and Atlantic County, NJ

Terrestrial Archaeological Resources Assessment

Top Map - Soil and Topography

- Larrabee PAPE Boundary
- 2ft Contour
- Historic Fill

Soil Condition

- Intact Soils – Subsoil depth approx. 1.0-2.0 ft

Value

High : 40.6205

Low : 0

Middle Map - 1930 Aerial & Mapped Resources

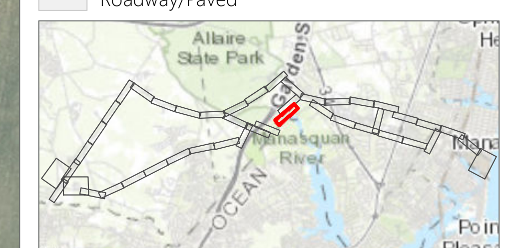
- Larrabee PAPE Boundary
- Waterway
- 500' Waterway Buffer

Bottom Map - Archaeological Sensitivity Results

- Larrabee PAPE Boundary
- Trenchless PAPE
- Photograph Location
- Phase 1B Survey Area

Archaeological Sensitivity

- Excluded from Field Survey Consideration
- Low Sensitivity
- Medium Sensitivity
- Medium-High Sensitivity
- Roadway/Paved



0 50 100 200

Feet

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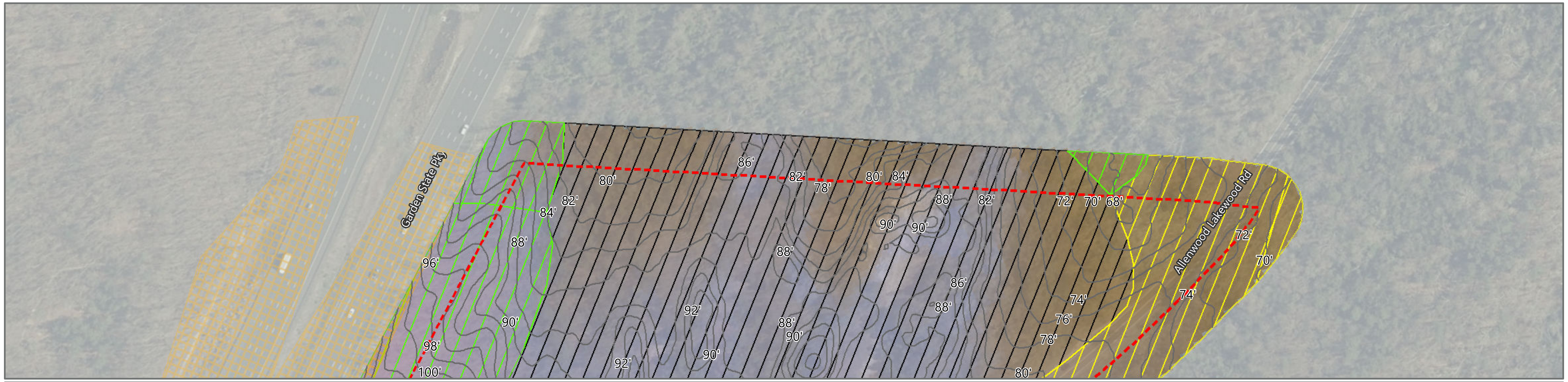

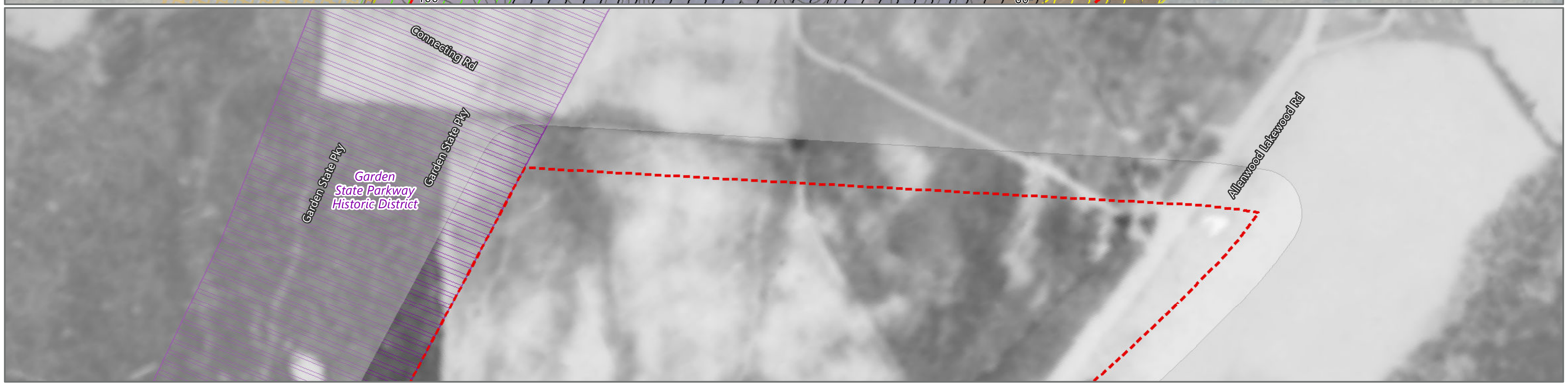

Atlantic Shores South Offshore Wind Project – Onshore Interconnection Facilities

Monmouth and Atlantic County, NJ

Terrestrial Archaeological Resources Assessment

Top Map - Soil and Topography

- Larrabee PAPE Boundary
- 2ft Contour
- Historic Fill

Soil Condition

- Disturbed
- Intact Soils – Subsoil depth approx. 1.0-2.0 ft
- Intact Soils – Subsoil depth approx. > 2.0 ft

Value

High : 40.6205

Low : 0

Middle Map - 1930 Aerial & Mapped Resources

- Larrabee PAPE Boundary
- Historic Districts of New Jersey

Bottom Map - Archaeological Sensitivity Results

- Larrabee PAPE Boundary
- Trenchless PAPE
- Phase 1B Survey Area

Archaeological Sensitivity

- Excluded from Field Survey Consideration
- Medium Sensitivity
- Roadway/Paved

0 50 100 200

Feet

Prepared October 31, 2023

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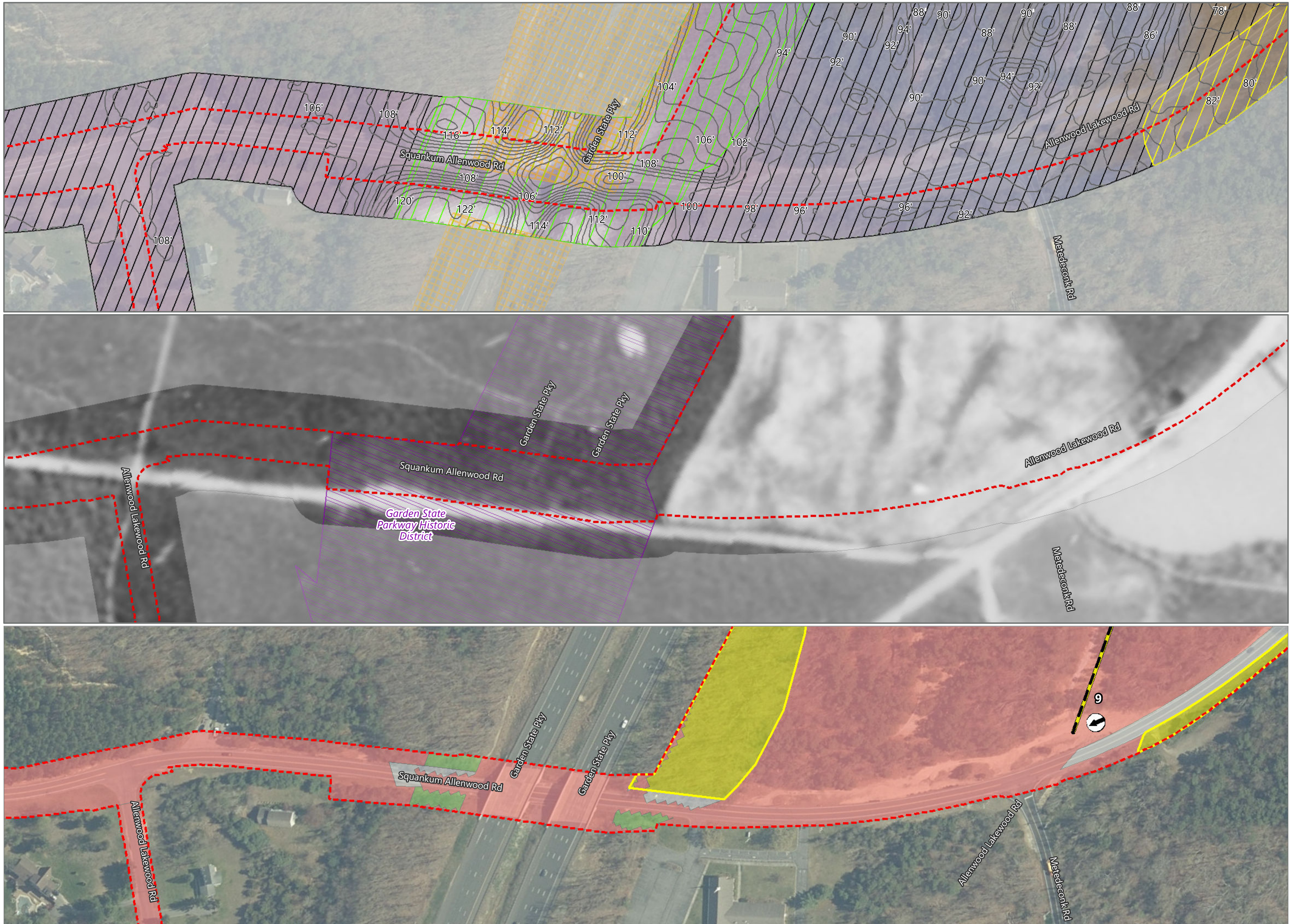

Atlantic Shores South Offshore Wind Project – Onshore Interconnection Facilities

Monmouth and Atlantic County, NJ

Terrestrial Archaeological Resources Assessment

Top Map - Soil and Topography

- Larrabee PAPE Boundary
- 2ft Contour
- Historic Fill

Soil Condition

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- Intact Soils – Subsoil depth approx. 1.0-2.0 ft
- Intact Soils – Subsoil depth approx. > 2.0 ft

Value

High : 40.6205

Low : 0

Middle Map - 1930 Aerial & Mapped Resources

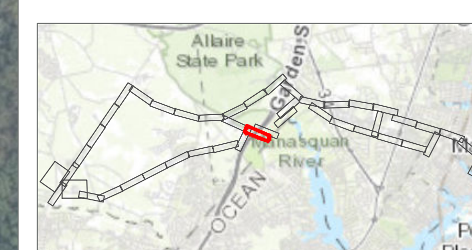
- Larrabee PAPE Boundary
- Historic Districts of New Jersey

Bottom Map - Archaeological Sensitivity Results

- Larrabee PAPE Boundary
- Trenchless PAPE
- Photograph Location
- Phase 1B Survey Area

Archaeological Sensitivity

- Excluded from Field Survey Consideration
- Low Sensitivity
- Medium Sensitivity
- Roadway/Paved



0 50 100 200
Feet

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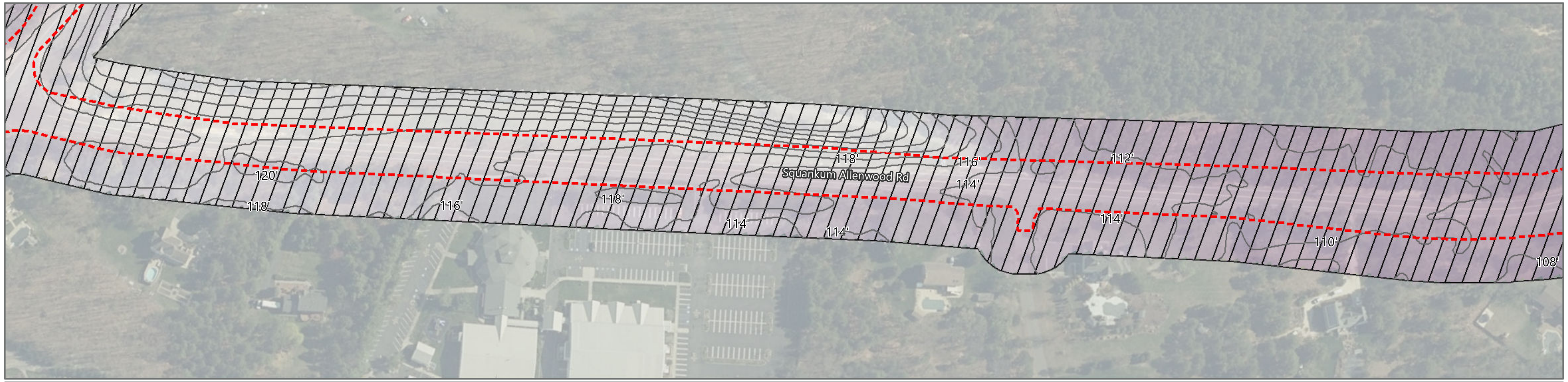
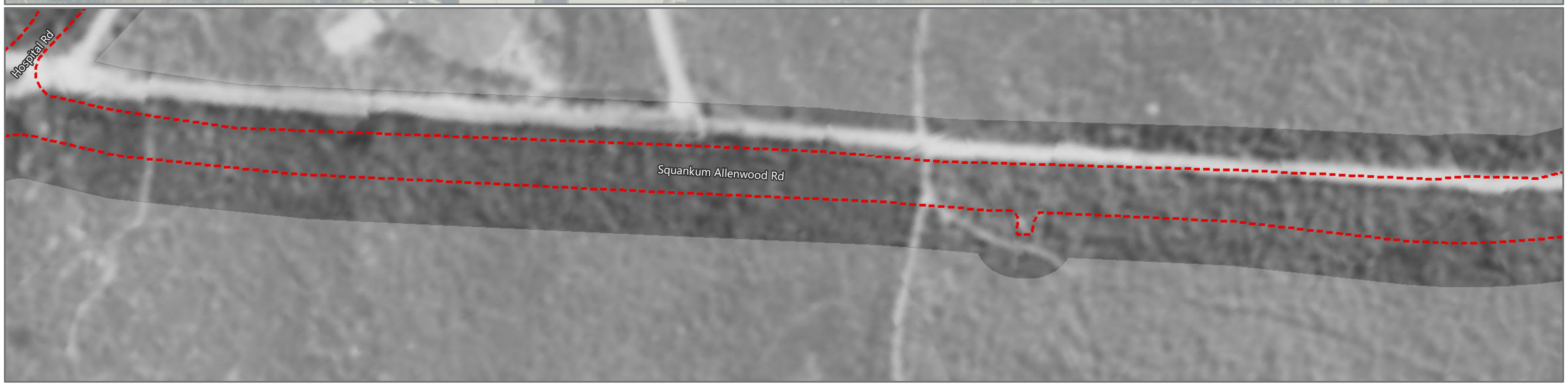




Atlantic Shores South Offshore Wind Project – Onshore Interconnection Facilities

Monmouth and Atlantic County, NJ

Terrestrial Archaeological Resources Assessment

Top Map - Soil and Topography

Larrabee PAPE Boundary

2ft Contour

Soil Condition

Disturbed

Value

High : 40.6205

Low : 0

Middle Map - 1930 Aerial & Mapped Resources

Larrabee PAPE Boundary

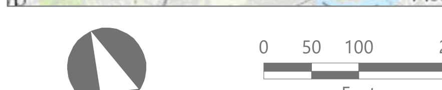
Bottom Map - Archaeological Sensitivity Results

Larrabee PAPE Boundary

Archaeological Sensitivity

Excluded from Field Survey Consideration

Roadway/Paved



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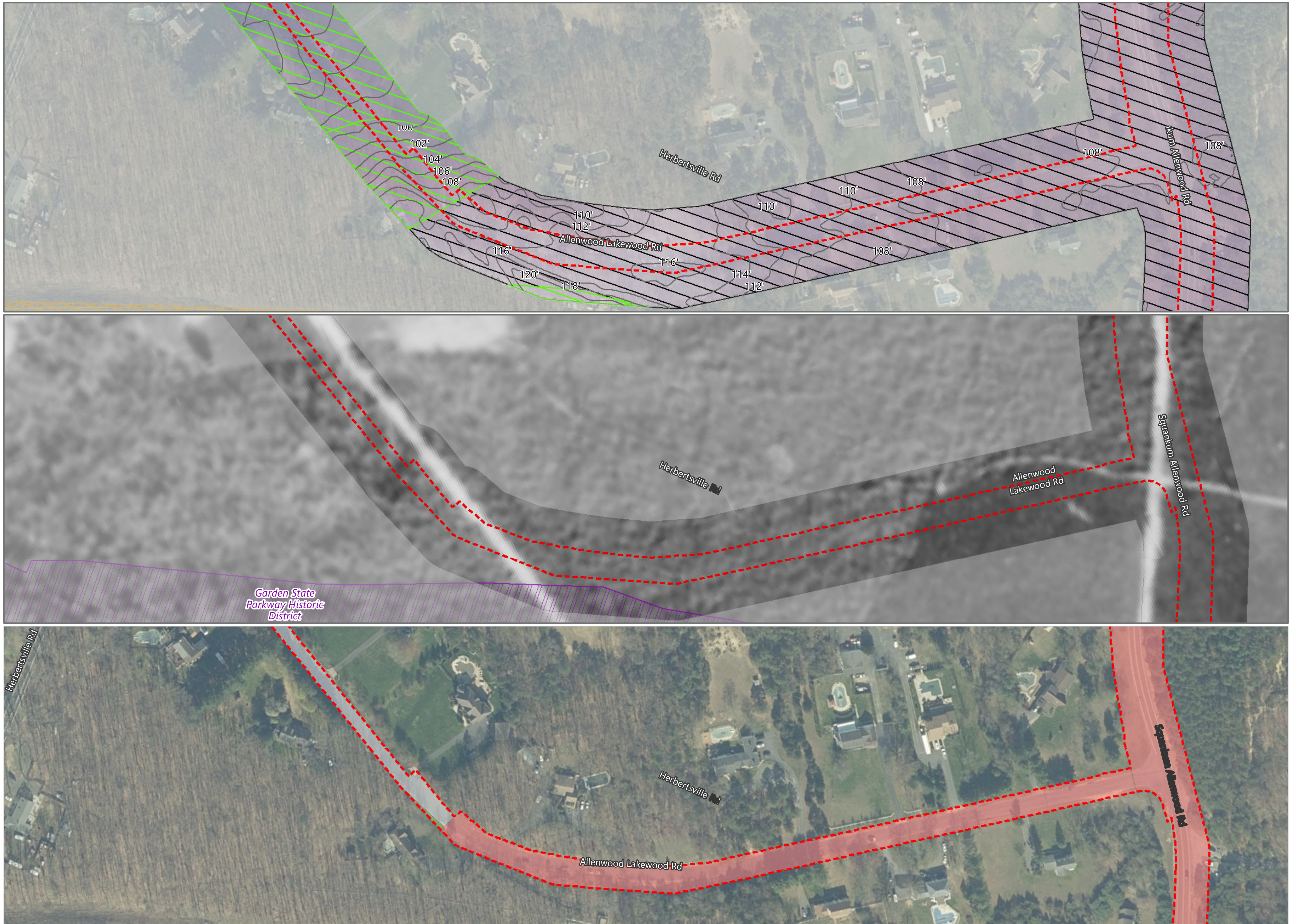

Atlantic Shores South Offshore Wind Project – Onshore Interconnection Facilities

Monmouth and Atlantic County, NJ

Terrestrial Archaeological Resources Assessment

Top Map - Soil and Topography

- Larrabee PAPE Boundary
- 2ft Contour
- Historic Fill

Soil Condition

- Disturbed
- Intact Soils – Subsoil depth approx. 1.0-2.0 ft

Value

High : 40.6205

Low : 0

Middle Map - 1930 Aerial & Mapped Resources

- Larrabee PAPE Boundary
- Historic Districts of New Jersey

Bottom Map - Archaeological Sensitivity Results

- Larrabee PAPE Boundary

Archaeological Sensitivity

- Excluded from Field Survey Consideration
- Low Sensitivity
- Roadway/Paved

0 50 100 200

Feet

Prepared October 31, 2023

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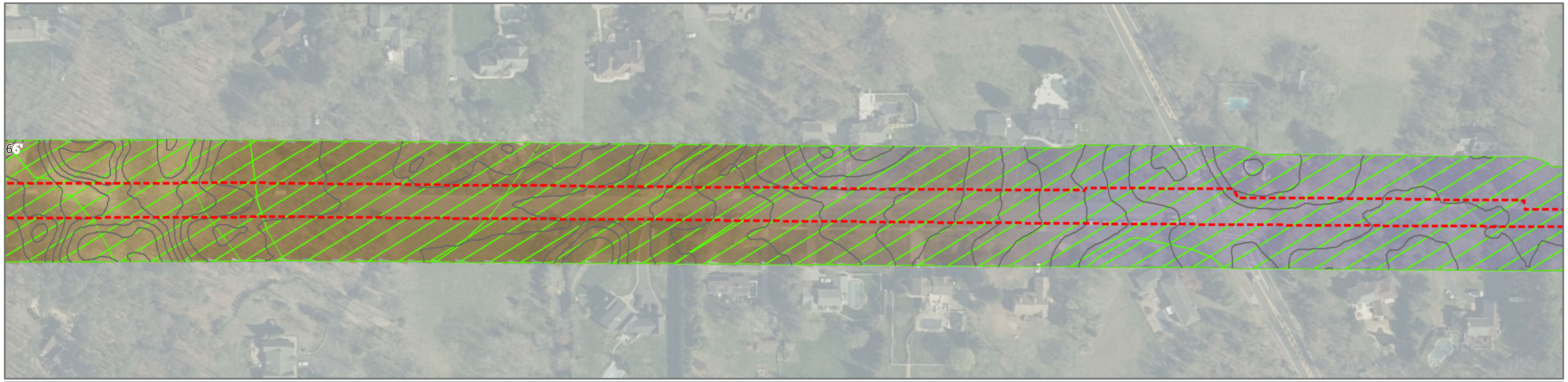

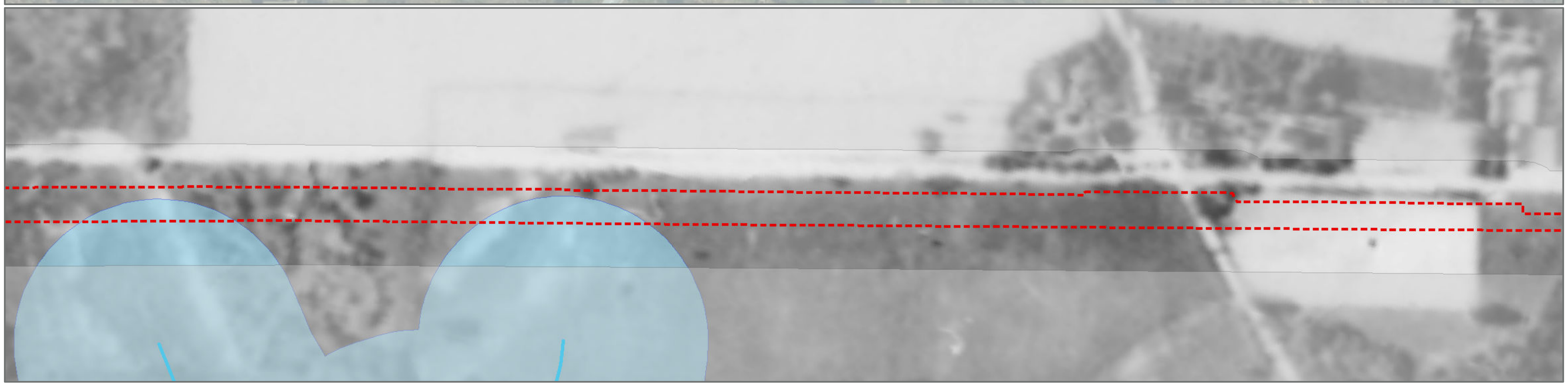

Atlantic Shores South Offshore Wind Project – Onshore Interconnection Facilities

Monmouth and Atlantic County, NJ

Terrestrial Archaeological Resources Assessment

Top Map - Soil and Topography

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Value

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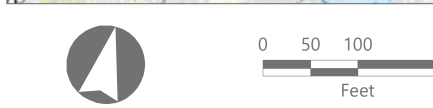
- Waterway
- 500' Waterway Buffer

Bottom Map - Archaeological Sensitivity Results

- Larrabee PAPE Boundary
- Phase 1B Survey Area

Archaeological Sensitivity

- Excluded from Field Survey Consideration
- Low Sensitivity
- Medium-High Sensitivity
- Roadway/Paved



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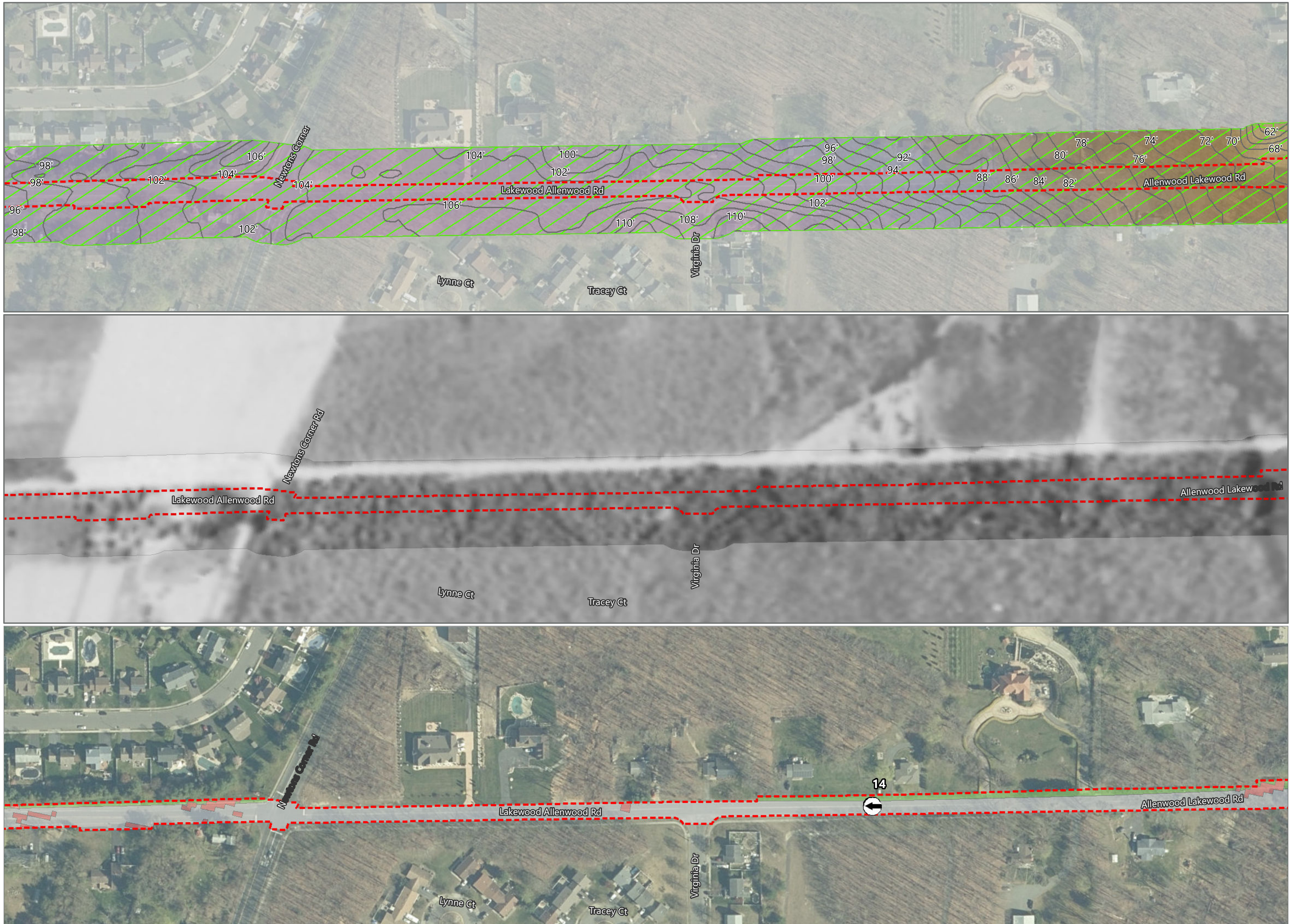

Atlantic Shores South Offshore Wind Project – Onshore Interconnection Facilities

Monmouth and Atlantic County, NJ

Terrestrial Archaeological Resources Assessment

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- Larrabee PAPE Boundary

Bottom Map - Archaeological Sensitivity Results

- Larrabee PAPE Boundary
- Photograph Location

Archaeological Sensitivity

- Excluded from Field Survey Consideration
- Low Sensitivity
- Roadway/Paved

0 50 100 200
Feet

Prepared October 31, 2023
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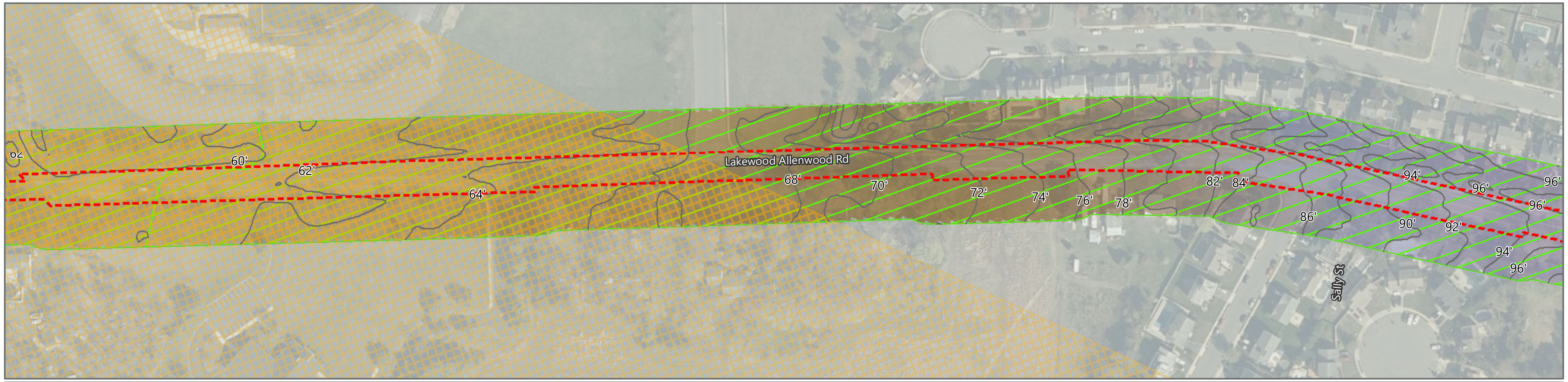

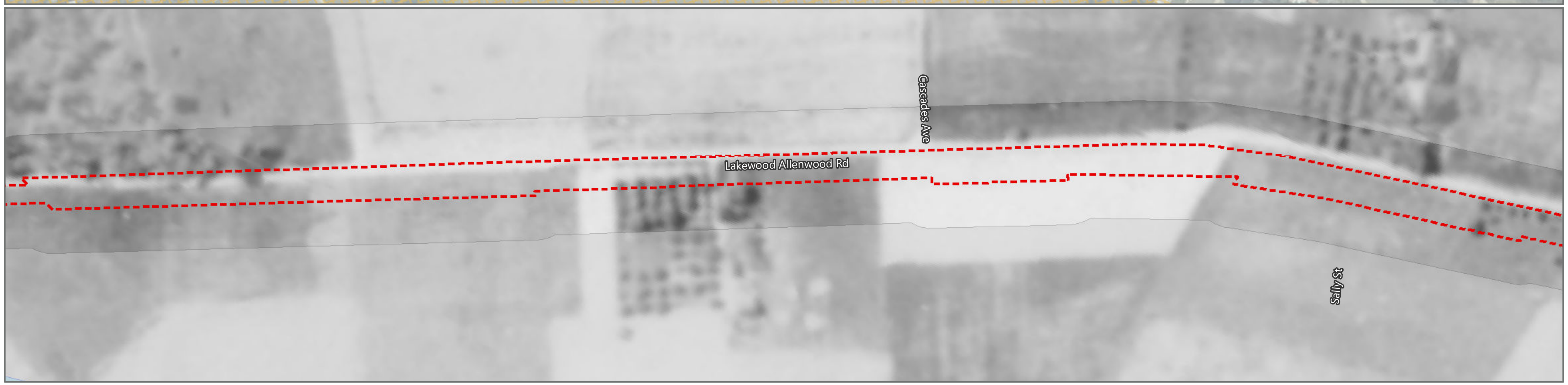

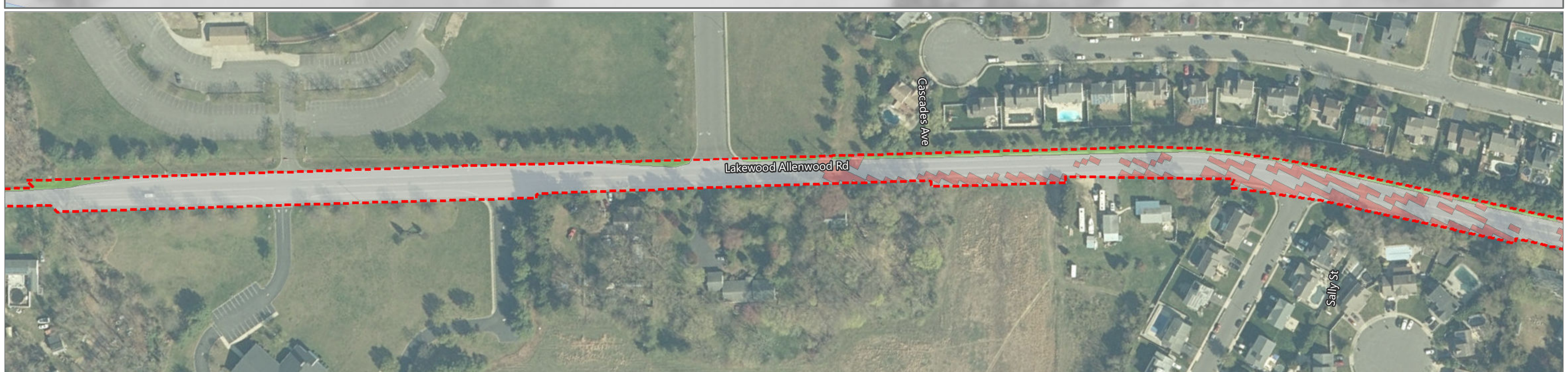

Atlantic Shores South Offshore Wind Project – Onshore Interconnection Facilities

Monmouth and Atlantic County, NJ

Terrestrial Archaeological Resources Assessment

Top Map - Soil and Topography

- Larrabee PAPE Boundary
- 2ft Contour
- Historic Fill

Soil Condition

- Intact Soils – Subsoil depth approx. 1.0-2.0 ft

Value

- High : 40.6205
- Low : 0

Middle Map - 1930 Aerial & Mapped Resources

- Larrabee PAPE Boundary
- 500' Waterway Buffer

Bottom Map - Archaeological Sensitivity Results

- Larrabee PAPE Boundary

Archaeological Sensitivity

- Excluded from Field Survey Consideration
- Low Sensitivity
- Roadway/Paved

0 50 100 200
Feet

Prepared October 31, 2023
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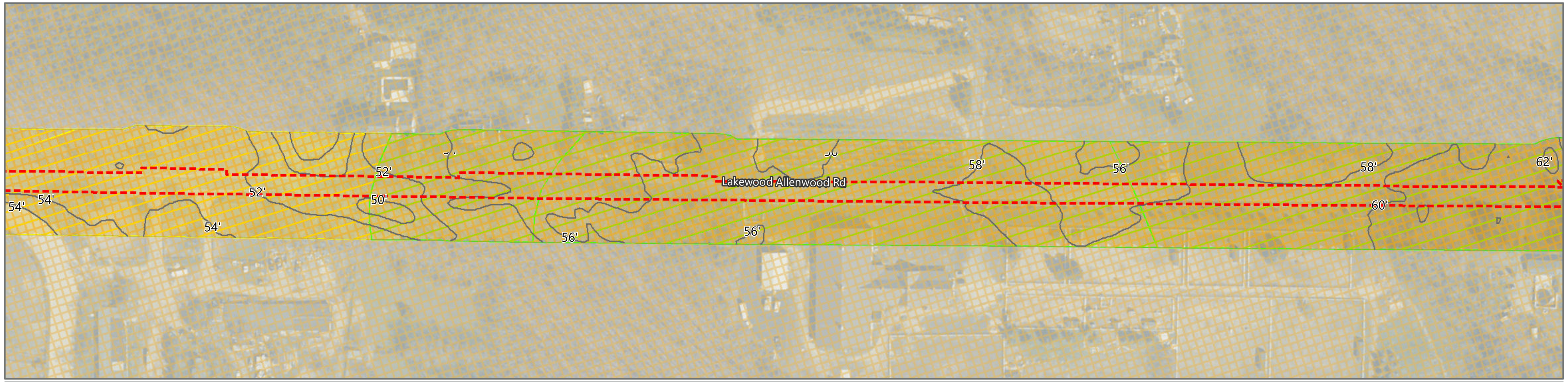


Atlantic Shores South Offshore Wind Project – Onshore Interconnection Facilities

Monmouth and Atlantic County, NJ

Terrestrial Archaeological Resources Assessment

Top Map - Soil and Topography

- Larrabee PAPE Boundary
- 2ft Contour
- Historic Fill

Soil Condition

- Intact Soils – Subsoil depth approx. 1.0-2.0 ft
- Intact Soils – Subsoil depth approx. > 2.0 ft

Value

- High : 40.6205
- Low : 0

Middle Map - 1930 Aerial & Mapped Resources

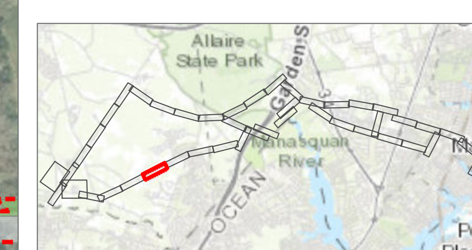
- Larrabee PAPE Boundary
- 500' Waterway Buffer

Bottom Map - Archaeological Sensitivity Results

- Larrabee PAPE Boundary
- Phase 1B Survey Area

Archaeological Sensitivity

- Excluded from Field Survey Consideration
- Low Sensitivity
- Medium Sensitivity
- Roadway/Paved

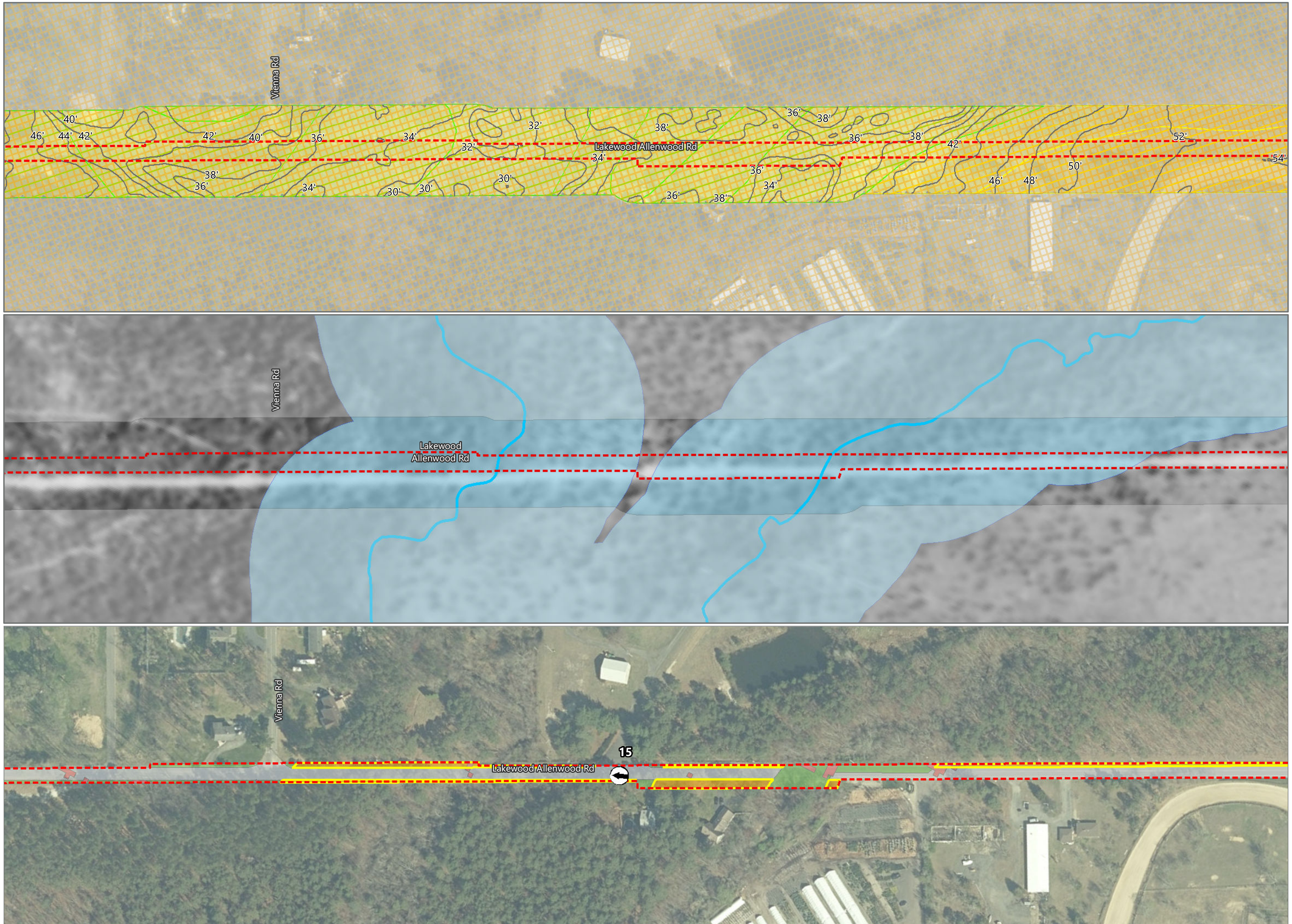


0 50 100 200
Feet

Prepared October 31, 2023
Basemap: NJ Office of Information Technology and Office of GIS "NJ 2020 Natural Color Imagery" & "New Jersey Black White 1930" Map Service

EDR

Figure 21. Larrabee Onshore Interconnection Cable - Archaeological Reconnaissance and Desktop Assessment Results



Atlantic Shores South Offshore Wind Project – Onshore Interconnection Facilities

Monmouth and Atlantic County, NJ

Terrestrial Archaeological Resources Assessment

Top Map - Soil and Topography

- Larrabee PAPE Boundary
- 2ft Contour
- Historic Fill

Soil Condition

- Intact Soils – Subsoil depth approx. 1.0-2.0 ft
- Intact Soils – Subsoil depth approx. > 2.0 ft

Value

- High : 40.6205
- Low : 0

Middle Map - 1930 Aerial & Mapped Resources

- Larrabee PAPE Boundary
- Waterway
- 500' Waterway Buffer

Bottom Map - Archaeological Sensitivity Results

- Larrabee PAPE Boundary
- Photograph Location
- Phase 1B Survey Area

Archaeological Sensitivity

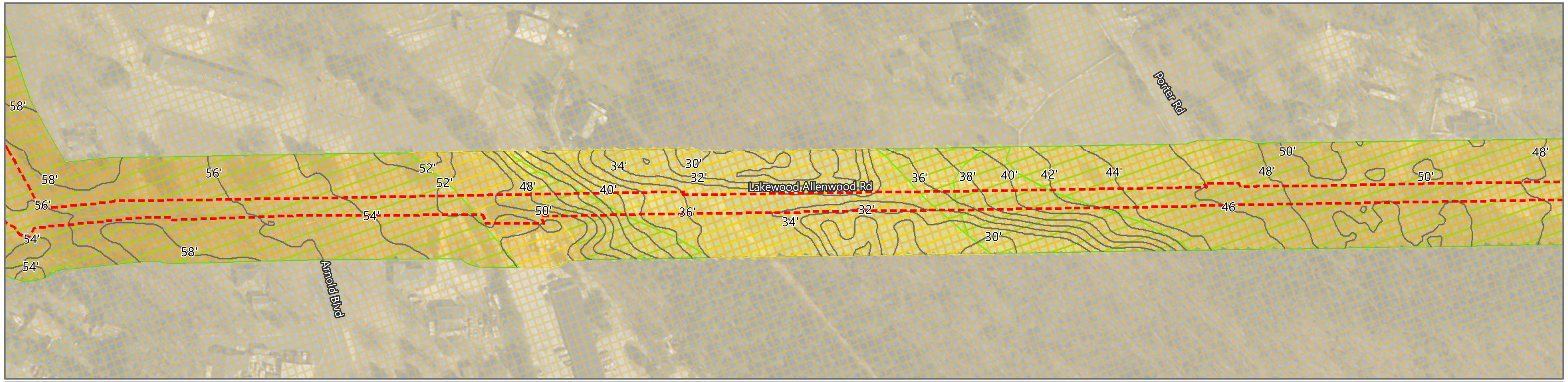
- Excluded from Field Survey Consideration
- Low Sensitivity
- Medium Sensitivity
- Medium-High Sensitivity
- Roadway/Paved

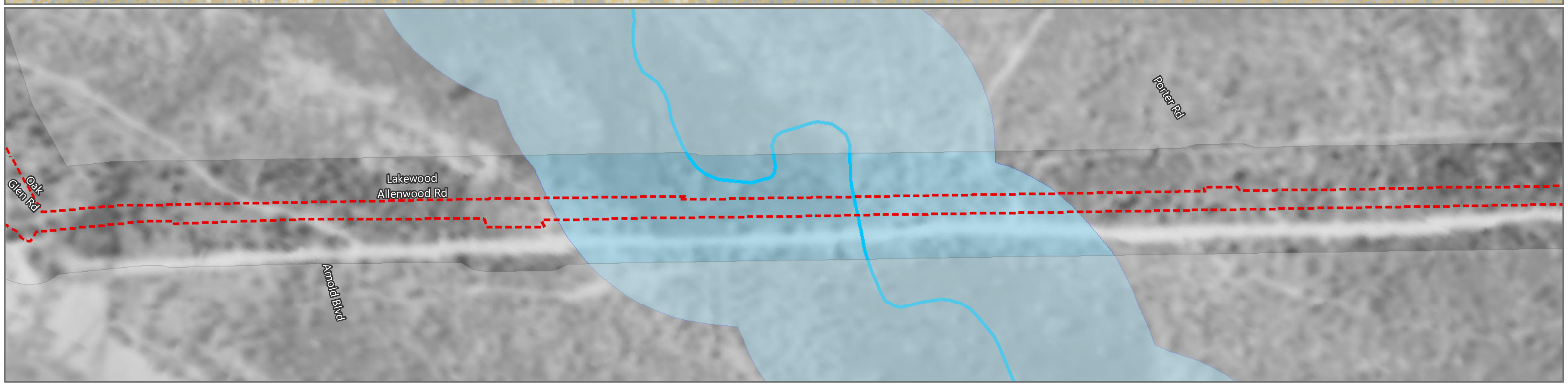
0 50 100 200
Feet

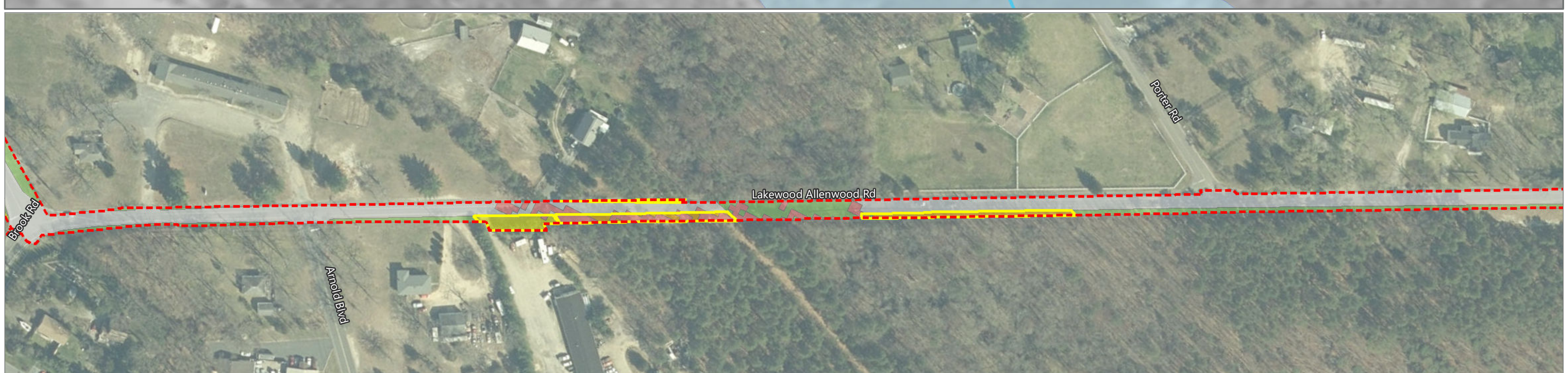
Prepared October 31, 2023
Basemap: NJ Office of Information Technology and Office of GIS "NJ 2020 Natural Color Imagery" & "New Jersey Black White 1930" Map Service

EDR

Figure 21. Larrabee Onshore Interconnection Cable - Archaeological Reconnaissance and Desktop Assessment Results







Atlantic Shores South Offshore Wind Project – Onshore Interconnection Facilities

Monmouth and Atlantic County, NJ

Terrestrial Archaeological Resources Assessment

Top Map - Soil and Topography
- Larrabee PAPE Boundary
- 2ft Contour
- Historic Fill

Soil Condition
- Intact Soils – Subsoil depth approx. 1.0-2.0 ft
- Intact Soils – Subsoil depth approx. > 2.0 ft

Value
- High : 40.6205
- Low : 0

Middle Map - 1930 Aerial & Mapped Resources
- Larrabee PAPE Boundary
- Waterway
- 500' Waterway Buffer

Bottom Map - Archaeological Sensitivity Results
- Larrabee PAPE Boundary
- Phase 1B Survey Area

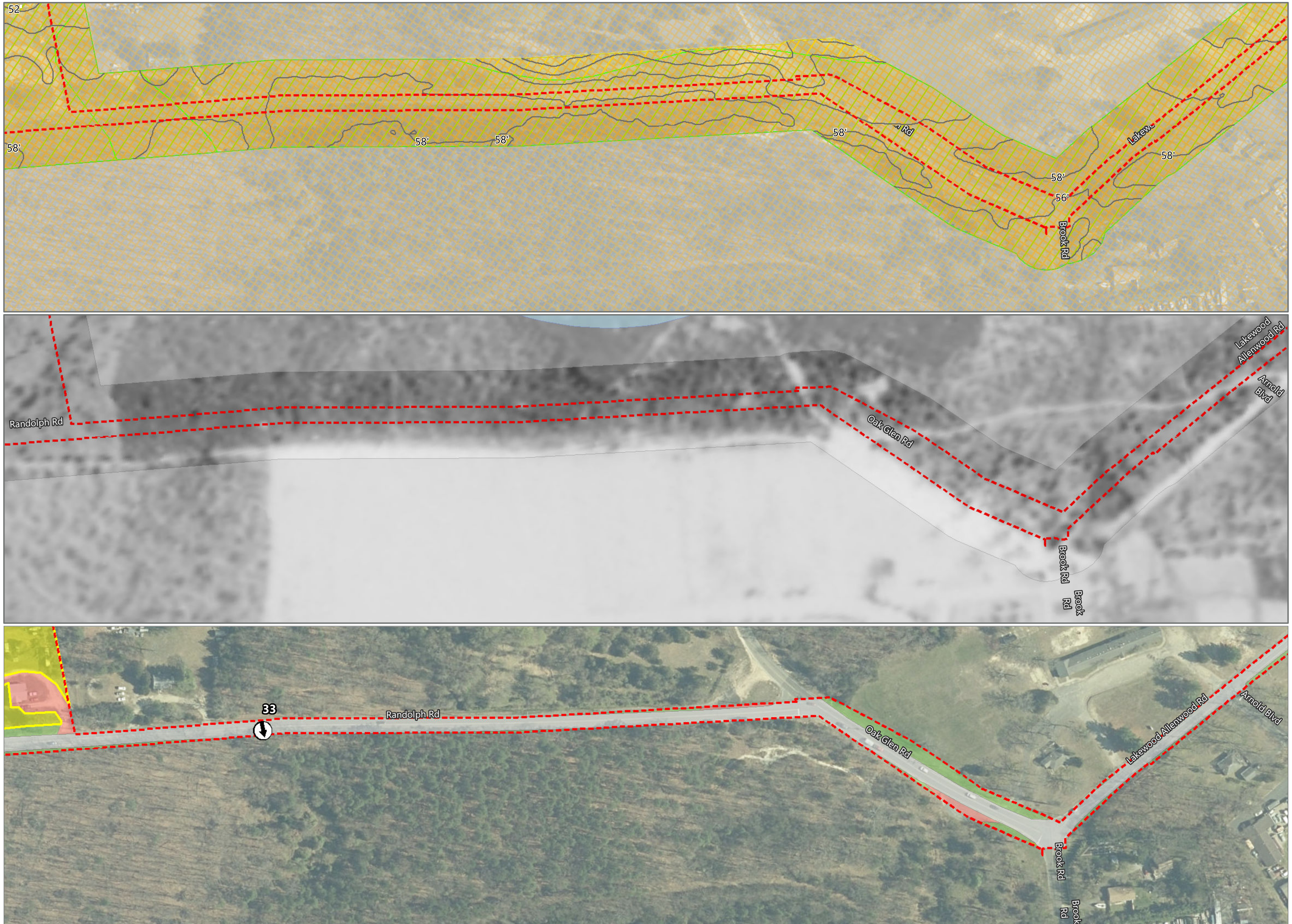
Archaeological Sensitivity
- Excluded from Field Survey Consideration
- Low Sensitivity
- Medium Sensitivity
- Medium-High Sensitivity
- Roadway/Paved

0 50 100 200
Feet

Prepared October 31, 2023
Basemap: NJ Office of Information Technology and Office of GIS "NJ 2020 Natural Color Imagery" & "New Jersey Black White 1930" Map Service

EDR

Figure 21. Larrabee Onshore Interconnection Cable - Archaeological Reconnaissance and Desktop Assessment Results



Atlantic Shores South Offshore Wind Project – Onshore Interconnection Facilities

Monmouth and Atlantic County, NJ

Terrestrial Archaeological Resources Assessment

Top Map - Soil and Topography

- Larrabee PAPE Boundary
- 2ft Contour
- Historic Fill

Soil Condition

- Intact Soils – Subsoil depth approx. 1.0-2.0 ft
- Intact Soils – Subsoil depth approx. > 2.0 ft

Value

High : 40.6205

Low : 0

Middle Map - 1930 Aerial & Mapped Resources

- Larrabee PAPE Boundary
- 500' Waterway Buffer

Bottom Map - Archaeological Sensitivity Results

- Larrabee PAPE Boundary
- Photograph Location
- Phase 1B Survey Area

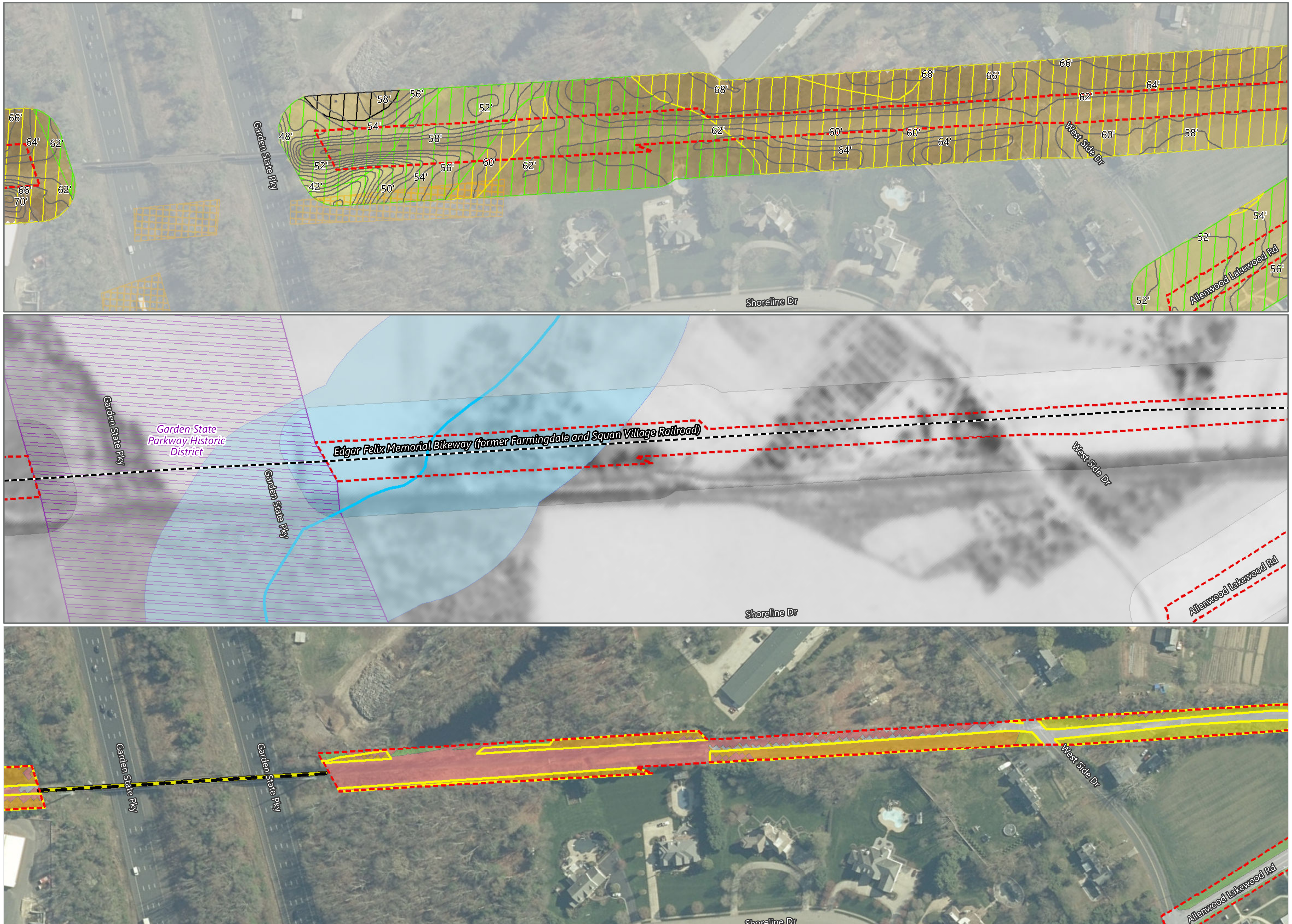
Archaeological Sensitivity

- Excluded from Field Survey Consideration
- Low Sensitivity
- Medium Sensitivity
- Roadway/Paved

0 50 100 200
Feet

Prepared October 31, 2023
Basemap: NJ Office of Information Technology and Office of GIS "NJ 2020 Natural Color Imagery" & "New Jersey Black White 1930" Map Service

EDR



Atlantic Shores South Offshore Wind Project – Onshore Interconnection Facilities

Monmouth and Atlantic County, NJ

Terrestrial Archaeological Resources Assessment

Top Map - Soil and Topography

- Larrabee PAPE Boundary
- 2ft Contour
- Historic Fill

Soil Condition

- Disturbed
- Intact Soils – Subsoil depth approx. 1.0-2.0 ft
- Intact Soils – Subsoil depth approx. > 2.0 ft

Value

- High : 40.6205
- Low : 0

Middle Map - 1930 Aerial & Mapped Resources

- Larrabee PAPE Boundary
- Edgar Felix Memorial Bikeway (former Farmingdale and Squan Village Railroad)
- Waterway
- Historic Districts of New Jersey
- 500' Waterway Buffer

Bottom Map - Archaeological Sensitivity Results

- Larrabee PAPE Boundary
- Trenchless PAPE
- Phase 1B Survey Area

Archaeological Sensitivity

- Excluded from Field Survey Consideration
- Low Sensitivity
- Medium Sensitivity
- Medium-High Sensitivity
- Roadway/Paved Medium-High Sensitivity
- Roadway/Paved

0 50 100 200
Feet

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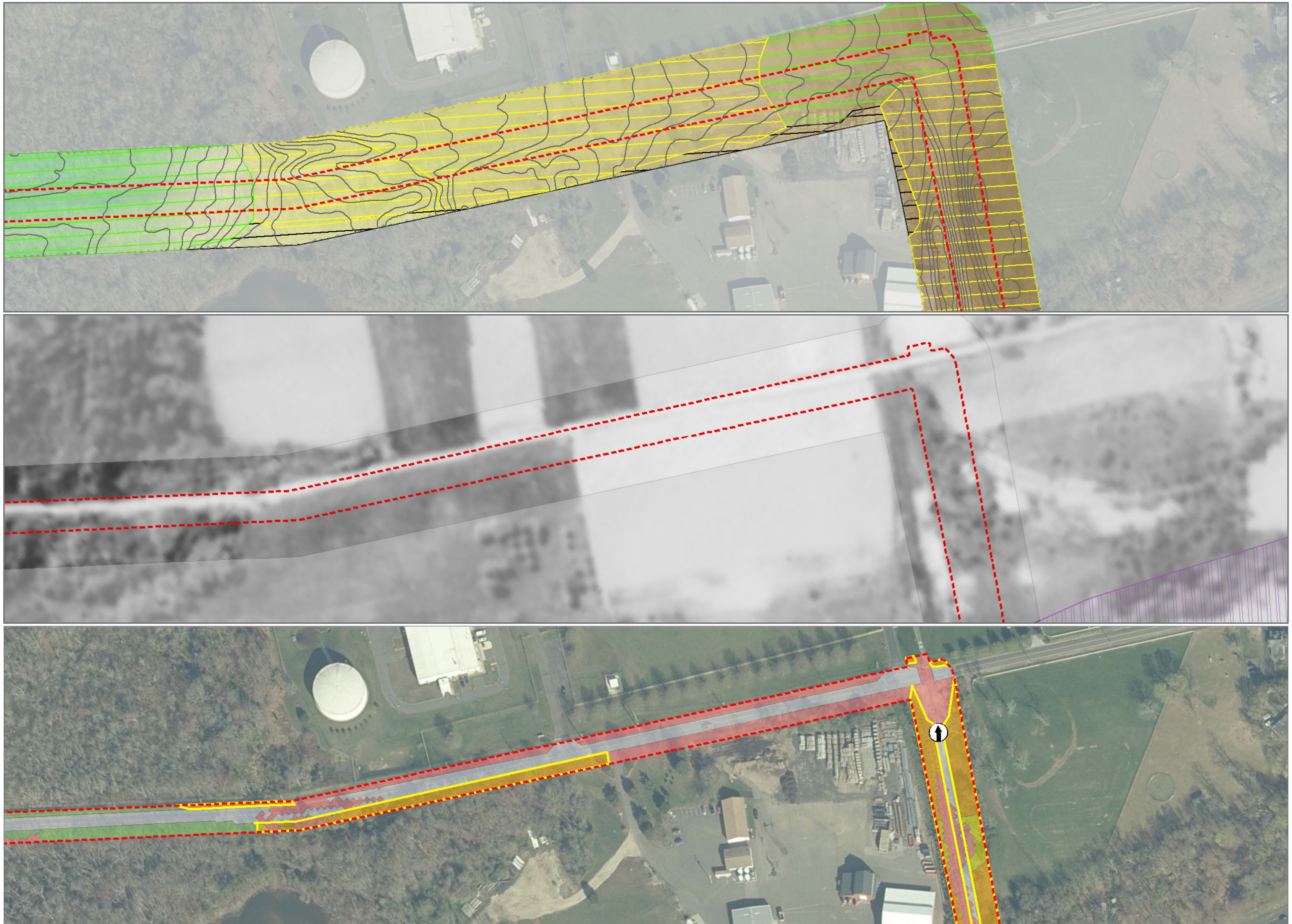
EDR



Atlantic Shores South Offshore Wind Project – Onshore Interconnection Facilities

Monmouth and Atlantic County, NJ

Terrestrial Archaeological Resources Assessment

Top Map - Soil and Topography

- Larrabee PAPE Boundary
- 2ft Contour

Soil Condition

- Disturbed
- Intact Soils – Subsoil depth approx. 1.0-2.0 ft
- Intact Soils – Subsoil depth approx. > 2.0 ft

Value

- High : 40.6205
- Low : 0

Middle Map - 1930 Aerial & Mapped Resources

- Larrabee PAPE Boundary
- Edgar Felix Memorial Bikeway (former Farmingdale and Squan Village Railroad)
- Historic Districts of New Jersey

Bottom Map - Archaeological Sensitivity Results

- Larrabee PAPE Boundary
- Photograph Location
- Phase 1B Survey Area

Archaeological Sensitivity

- Excluded from Field Survey Consideration
- Low Sensitivity
- Medium Sensitivity
- Medium-High Sensitivity
- Roadway/Paved

0 50 100 200
Feet

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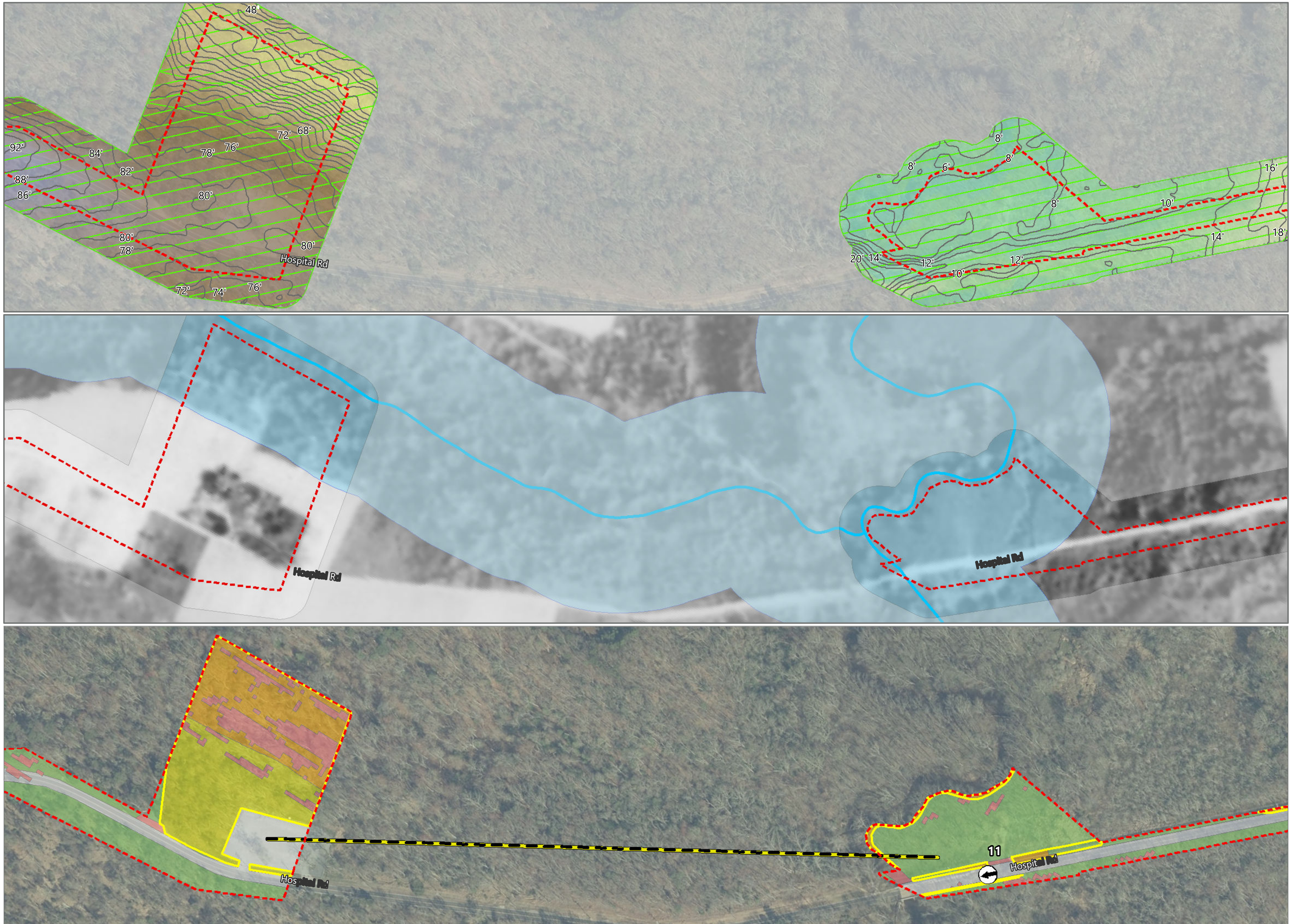
Figure 21. Larrabee Onshore Interconnection Cable - Archaeological Reconnaissance and Desktop Assessment Results



Atlantic Shores South Offshore Wind Project – Onshore Interconnection Facilities

Monmouth and Atlantic County, NJ

Terrestrial Archaeological Resources Assessment

Top Map - Soil and Topography

- Larrabee PAPE Boundary
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Middle Map - 1930 Aerial & Mapped Resources

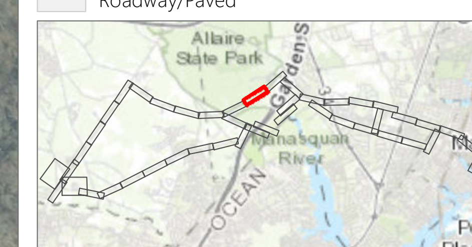
- Larrabee PAPE Boundary
- Waterway
- 500' Waterway Buffer

Bottom Map - Archaeological Sensitivity Results

- Larrabee PAPE Boundary
- Trenchless PAPE
- Photograph Location
- Phase 1B Survey Area

Archaeological Sensitivity

- Excluded from Field Survey Consideration
- Low Sensitivity
- Medium Sensitivity
- Medium-High Sensitivity
- Roadway/Paved



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Feet

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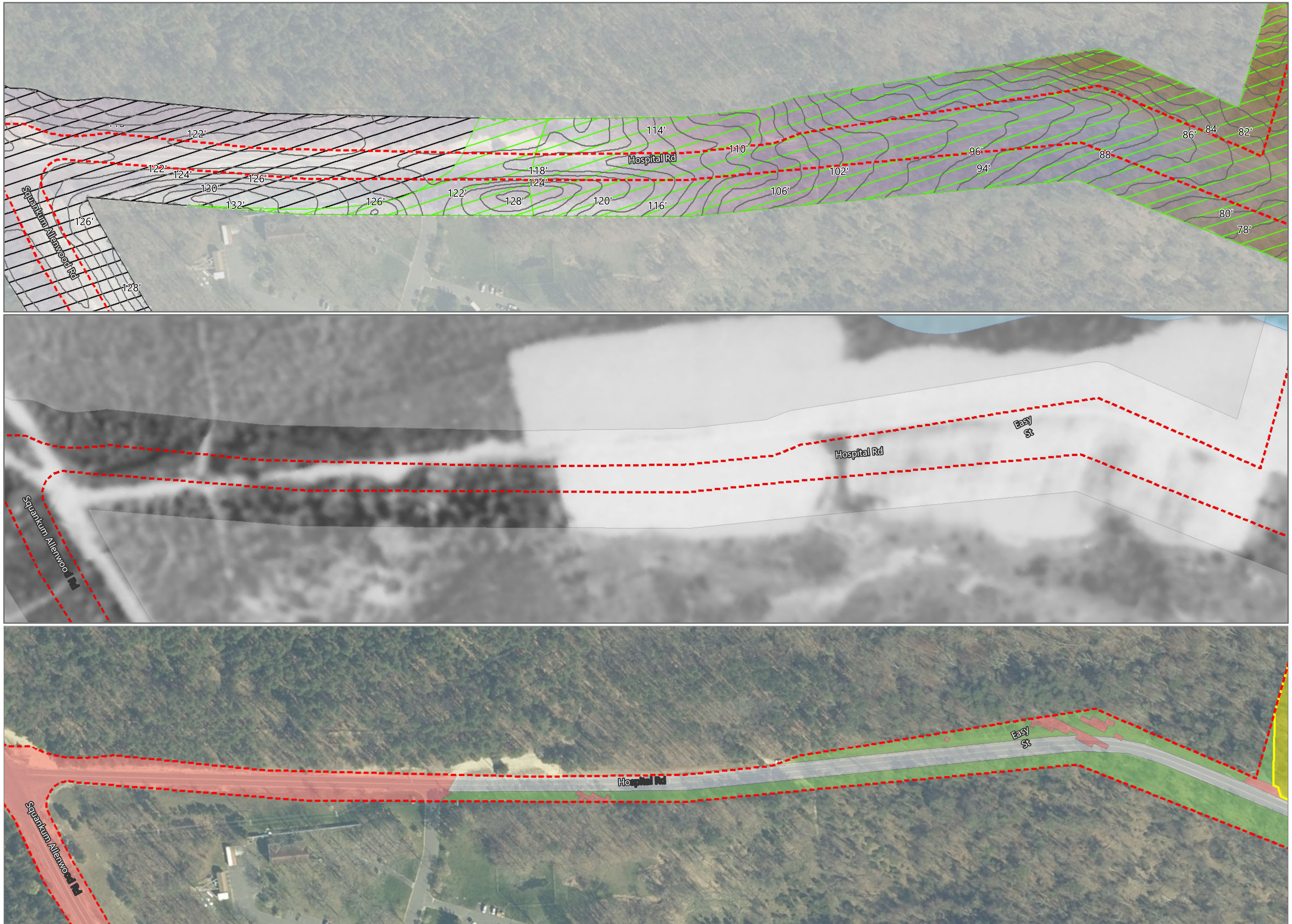

Atlantic Shores South Offshore Wind Project – Onshore Interconnection Facilities

Monmouth and Atlantic County, NJ

Terrestrial Archaeological Resources Assessment

Top Map - Soil and Topography

- Larrabee PAPE Boundary
- 2ft Contour

Soil Condition

- Disturbed
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Value

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Low : 0

Middle Map - 1930 Aerial & Mapped Resources

- Larrabee PAPE Boundary
- 500' Waterway Buffer

Bottom Map - Archaeological Sensitivity Results

- Larrabee PAPE Boundary
- Phase 1B Survey Area

Archaeological Sensitivity

- Excluded from Field Survey Consideration
- Low Sensitivity
- Medium Sensitivity
- Roadway/Paved

0 50 100 200

Feet

Prepared October 31, 2023

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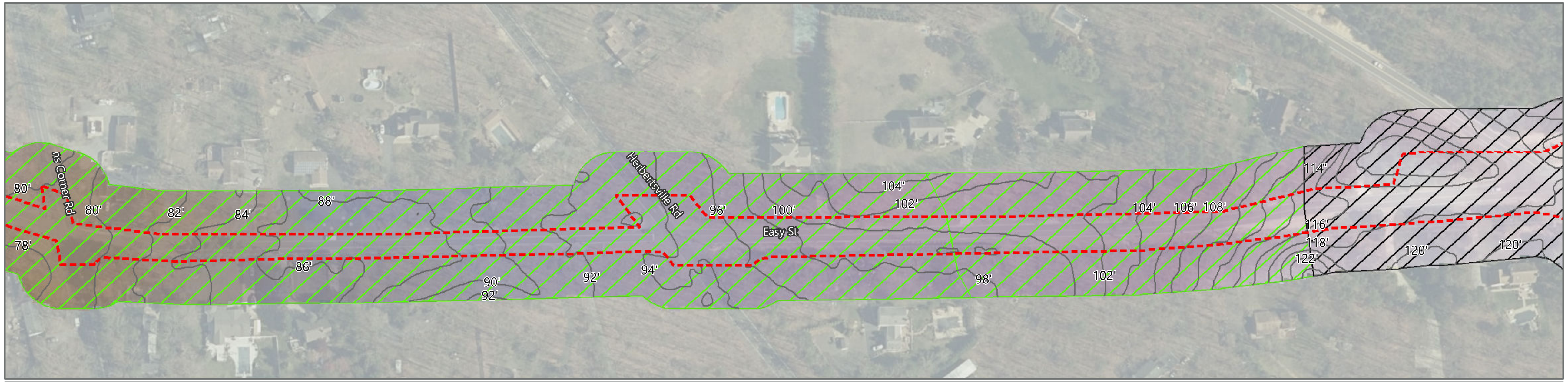
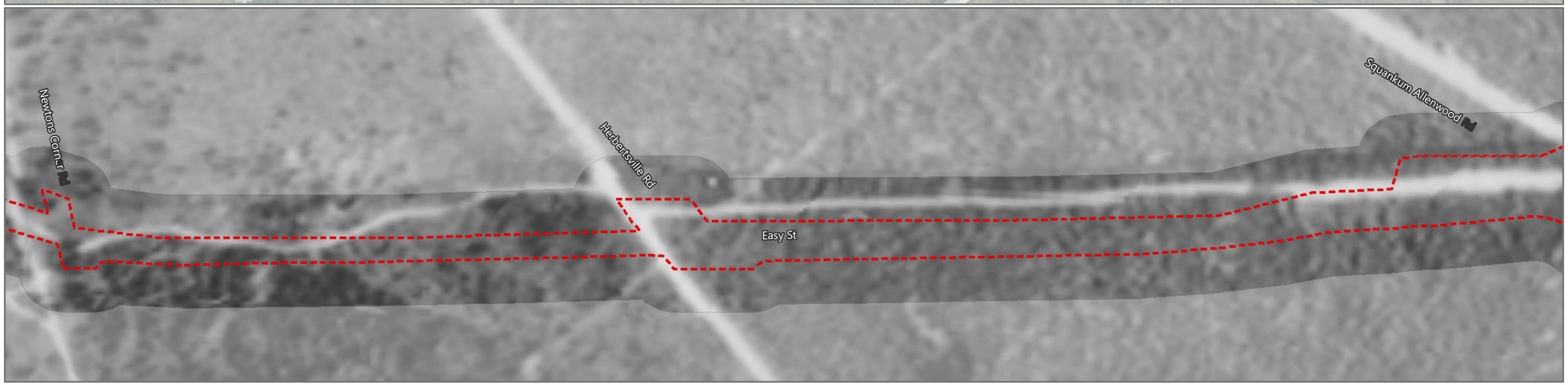
EDR

Figure 21. Larrabee Onshore Interconnection Cable - Archaeological Reconnaissance and Desktop Assessment Results





Atlantic Shores South Offshore Wind Project – Onshore Interconnection Facilities

Monmouth and Atlantic County, NJ

Terrestrial Archaeological Resources Assessment

Top Map - Soil and Topography

Larrabee PAPE Boundary

2ft Contour

Soil Condition

Disturbed

Intact Soils – Subsoil depth approx. 1.0-2.0 ft

Value

High : 40.6205

Low : 0

Middle Map - 1930 Aerial & Mapped Resources

Larrabee PAPE Boundary

Bottom Map - Archaeological Sensitivity Results

Larrabee PAPE Boundary

Archaeological Sensitivity

Excluded from Field Survey Consideration

Low Sensitivity

Roadway/Paved

0 50 100 200

Feet

Prepared October 31, 2023

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EDR

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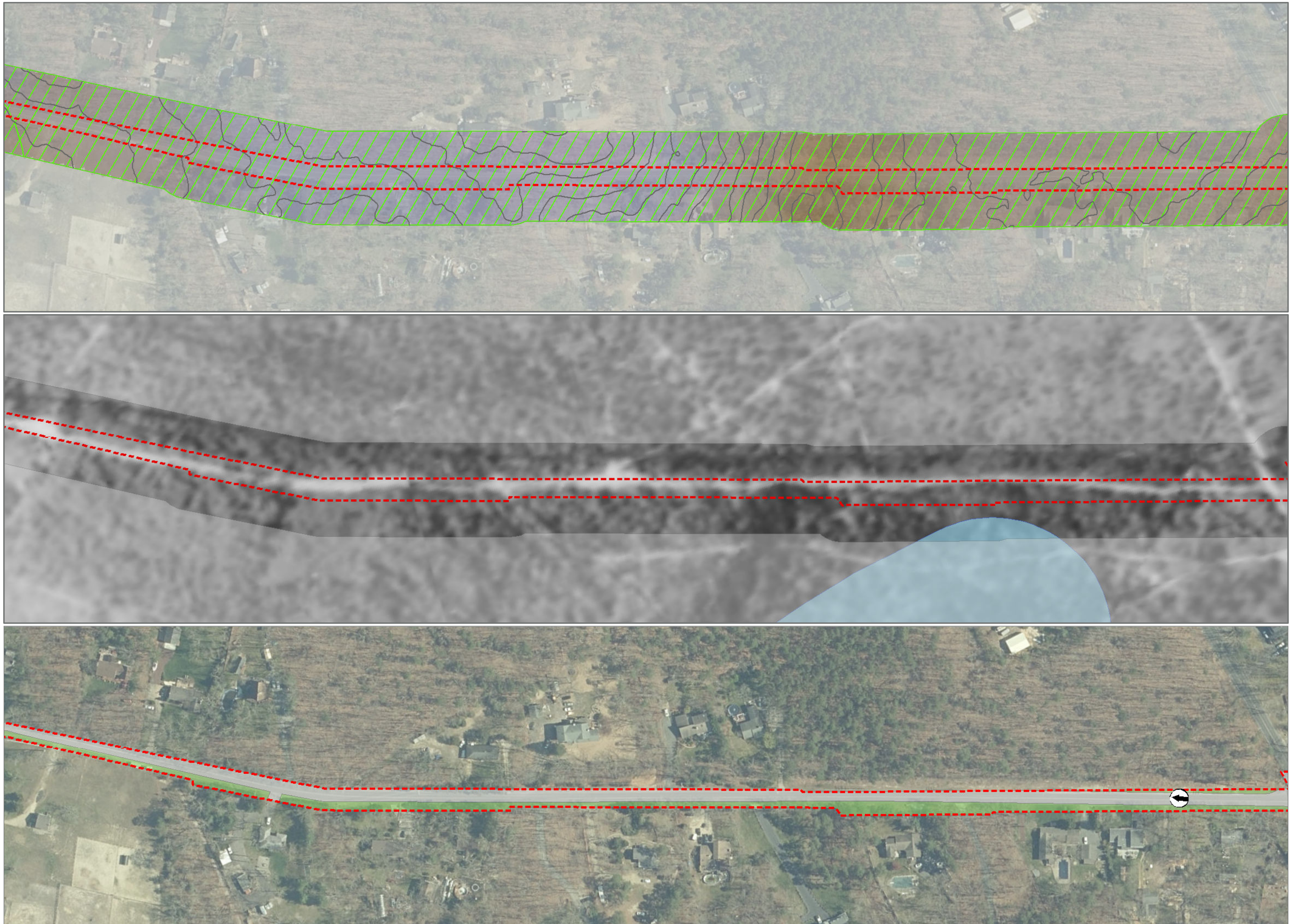

Atlantic Shores South Offshore Wind Project – Onshore Interconnection Facilities

Monmouth and Atlantic County, NJ

Terrestrial Archaeological Resources Assessment

Top Map - Soil and Topography

- Larrabee PAPE Boundary
- 2ft Contour

Soil Condition

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Value

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- Low : 0

Middle Map - 1930 Aerial & Mapped Resources

- Larrabee PAPE Boundary
- 500' Waterway Buffer

Bottom Map - Archaeological Sensitivity Results

- Larrabee PAPE Boundary
- Photograph Location

Archaeological Sensitivity

- Low Sensitivity
- Roadway/Paved

0 50 100 200
Feet

Prepared October 31, 2023
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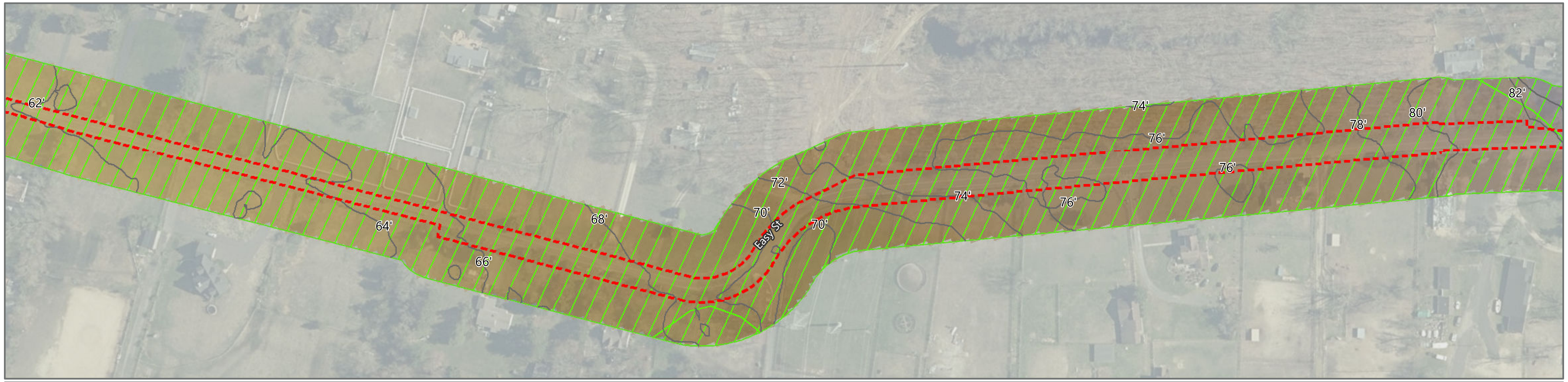

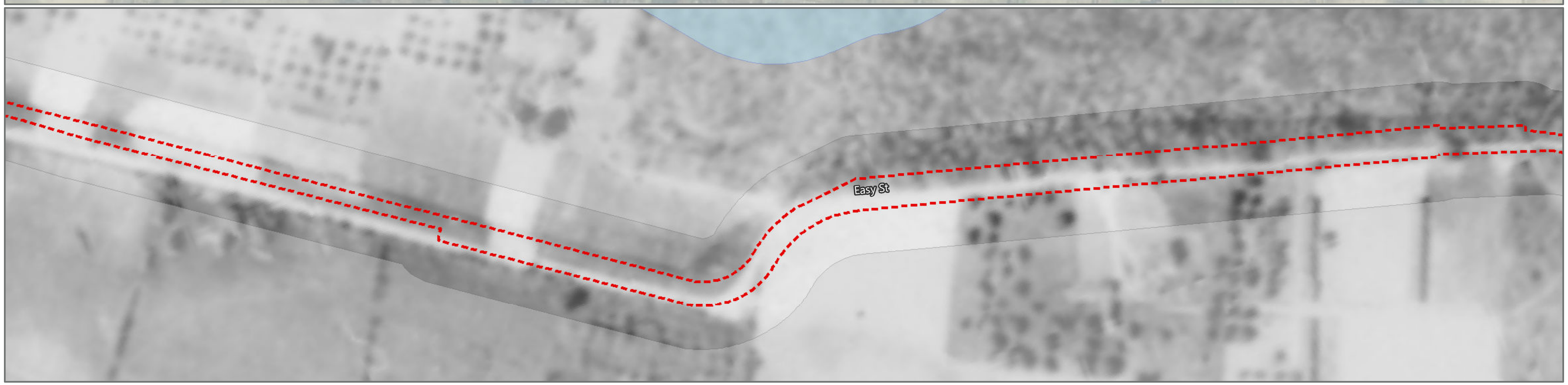

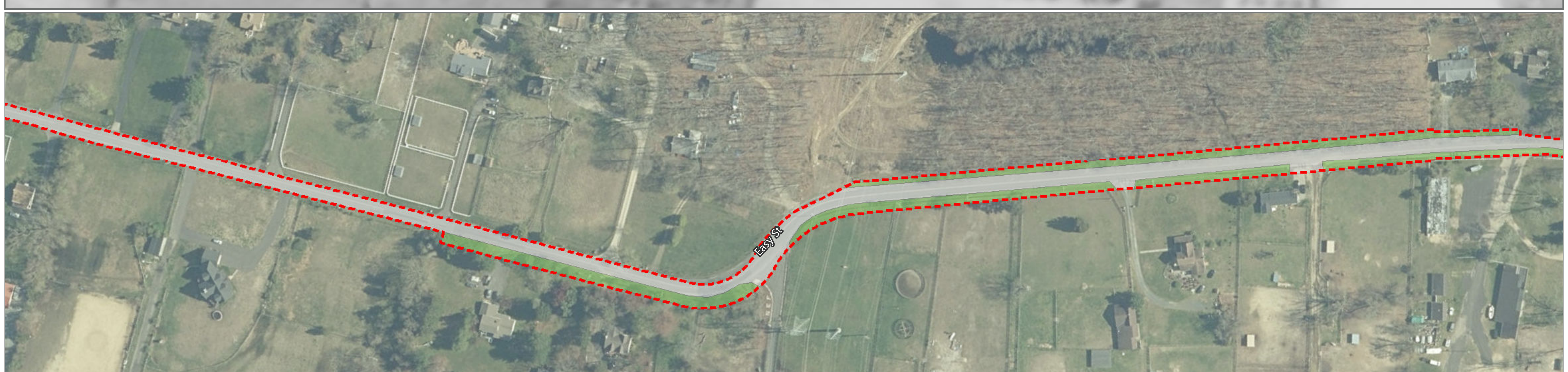

Atlantic Shores South Offshore Wind Project – Onshore Interconnection Facilities

Monmouth and Atlantic County, NJ

Terrestrial Archaeological Resources Assessment

Top Map - Soil and Topography
- Larrabee PAPE Boundary
- 2ft Contour

Soil Condition
- Intact Soils – Subsoil depth approx. 1.0-2.0 ft

Value
- High : 40.6205
- Low : 0

Middle Map - 1930 Aerial & Mapped Resources
- Larrabee PAPE Boundary
- 500' Waterway Buffer

Bottom Map - Archaeological Sensitivity Results
- Larrabee PAPE Boundary

Archaeological Sensitivity
- Low Sensitivity
- Roadway/Paved

0 50 100 200
Feet

Prepared October 31, 2023
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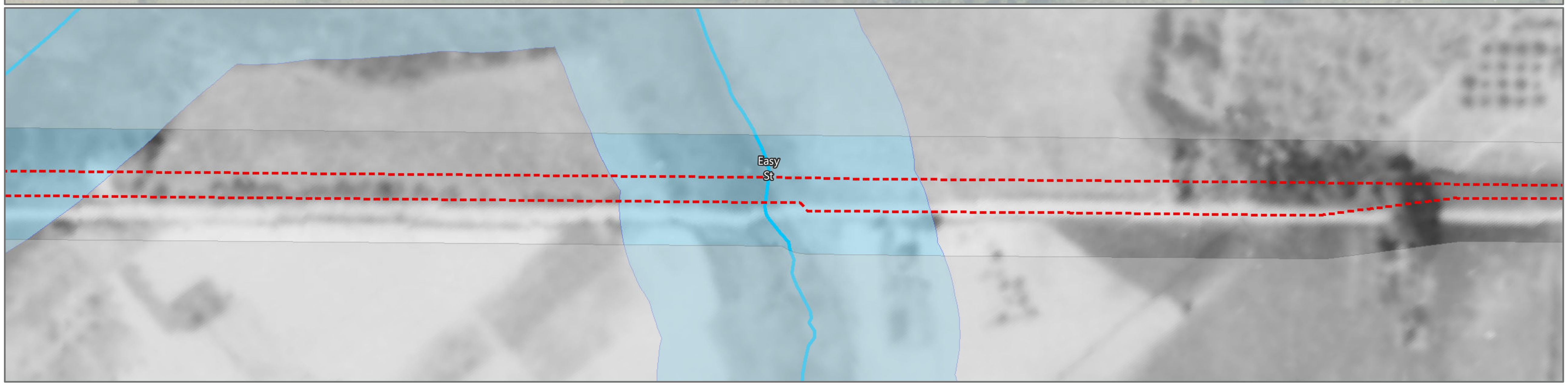
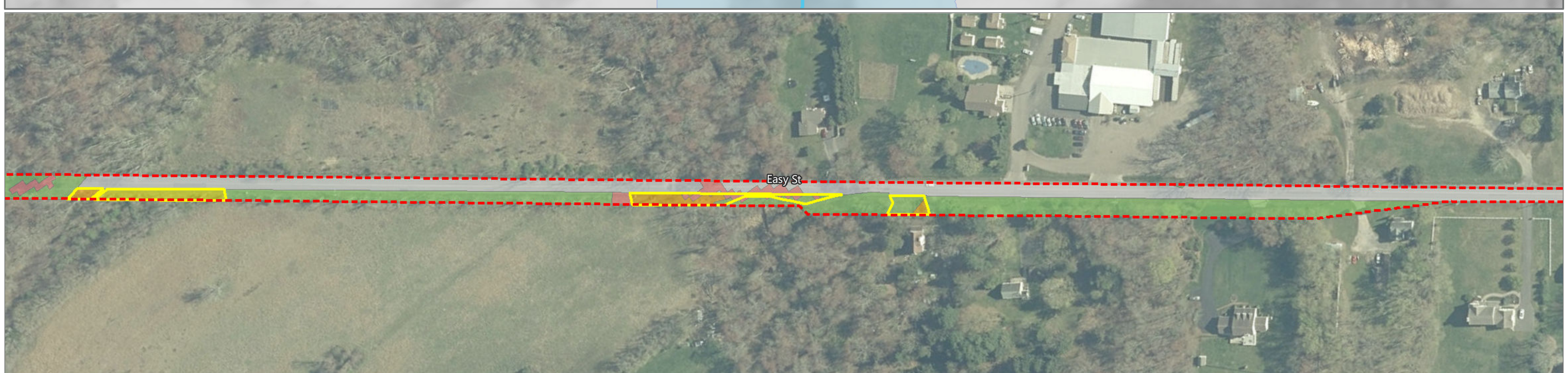
EDR

Figure 21. Larrabee Onshore Interconnection Cable - Archaeological Reconnaissance and Desktop Assessment Results





Atlantic Shores South Offshore Wind Project – Onshore Interconnection Facilities

Monmouth and Atlantic County, NJ

Terrestrial Archaeological Resources Assessment

Top Map - Soil and Topography

- Larrabee PAPE Boundary
- 2ft Contour

Soil Condition

- Intact Soils – Subsoil depth approx. 1.0-2.0 ft
- Intact Soils – Subsoil depth approx. > 2.0 ft

Value

- High : 40.6205
- Low : 0

Middle Map - 1930 Aerial & Mapped Resources

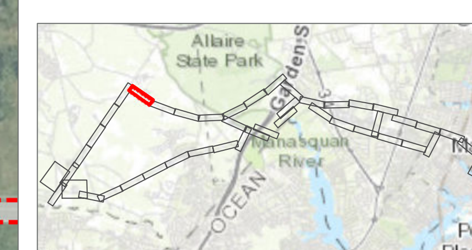
- Larrabee PAPE Boundary
- Waterway
- 500' Waterway Buffer

Bottom Map - Archaeological Sensitivity Results

- Larrabee PAPE Boundary
- Phase 1B Survey Area

Archaeological Sensitivity

- Excluded from Field Survey Consideration
- Low Sensitivity
- Medium Sensitivity
- Medium-High Sensitivity
- Roadway/Paved



0 50 100 200
Feet

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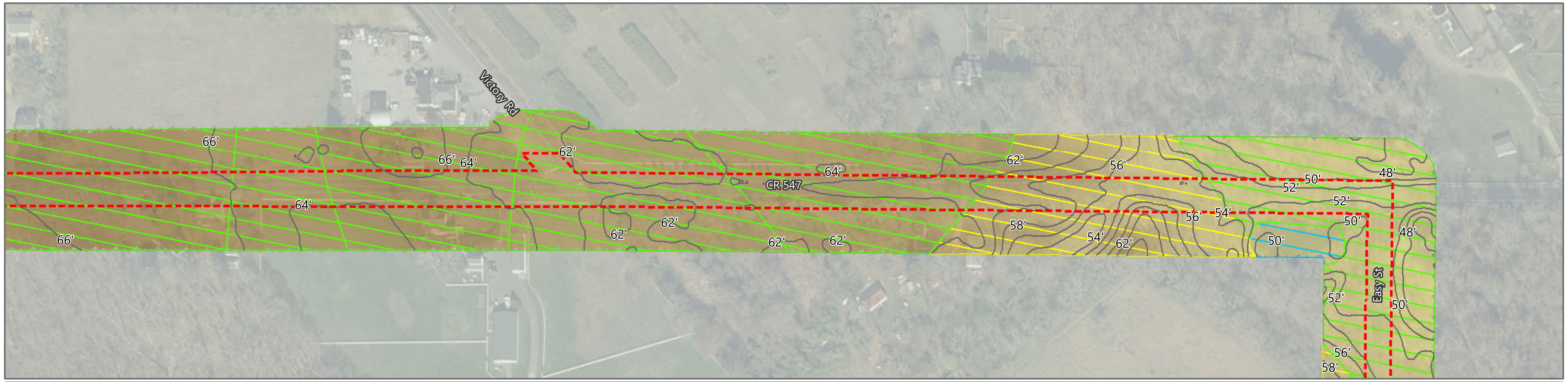
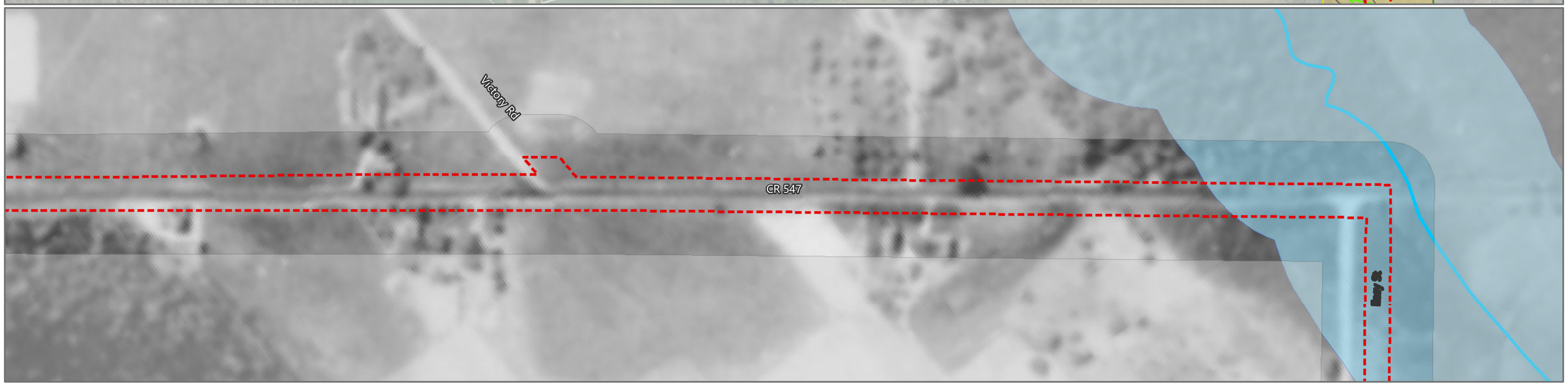
Figure 21. Larrabee Onshore Interconnection Cable - Archaeological Reconnaissance and Desktop Assessment Results





Atlantic Shores South Offshore Wind Project – Onshore Interconnection Facilities

Monmouth and Atlantic County, NJ

Terrestrial Archaeological Resources Assessment

Top Map - Soil and Topography

- Larrabee PAPE Boundary
- 2ft Contour

Soil Condition

- Intact Soils – Subsoil depth approx. 1.0-2.0 ft
- Intact Soils – Subsoil depth approx. > 2.0 ft
- Water

Value

- High : 40.6205
- Low : 0

Middle Map - 1930 Aerial & Mapped Resources

- Larrabee PAPE Boundary
- Waterway
- 500' Waterway Buffer

Bottom Map - Archaeological Sensitivity Results

- Larrabee PAPE Boundary
- Phase 1B Survey Area

Archaeological Sensitivity

- Excluded from Field Survey Consideration
- Low Sensitivity
- Medium Sensitivity
- Medium-High Sensitivity
- Roadway/Paved

0 50 100 200
Feet

Prepared October 31, 2023
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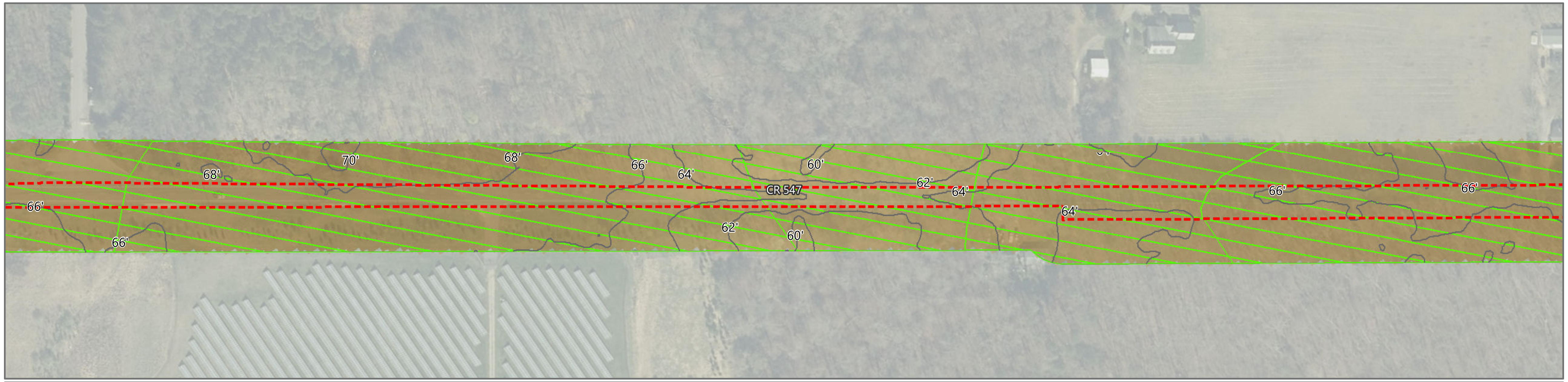

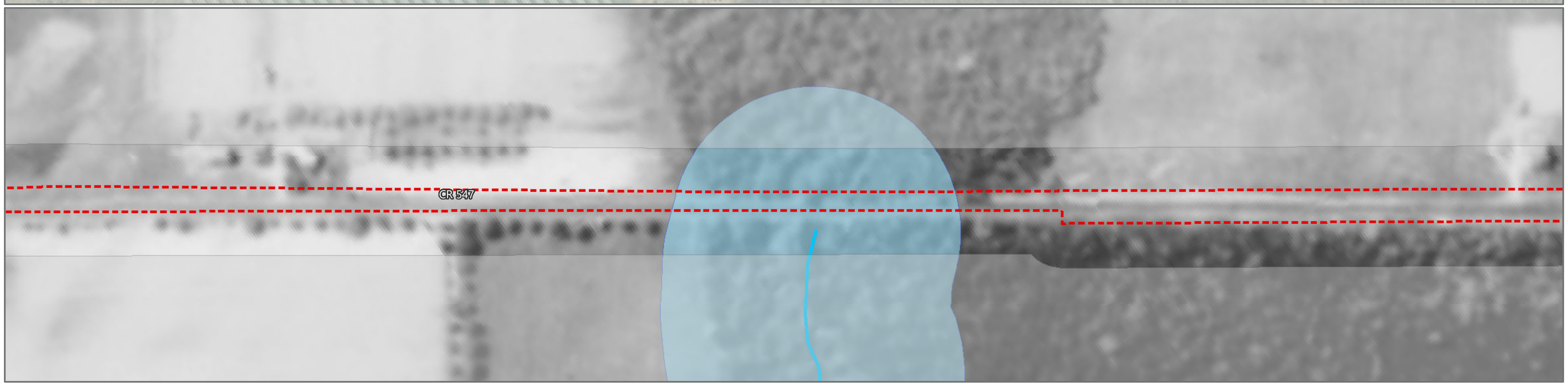

Atlantic Shores South Offshore Wind Project – Onshore Interconnection Facilities

Monmouth and Atlantic County, NJ

Terrestrial Archaeological Resources Assessment

Top Map - Soil and Topography

- Larrabee PAPE Boundary
- 2ft Contour

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- Waterway
- 500' Waterway Buffer

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- Phase 1B Survey Area

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- Roadway/Paved

0 50 100 200
Feet

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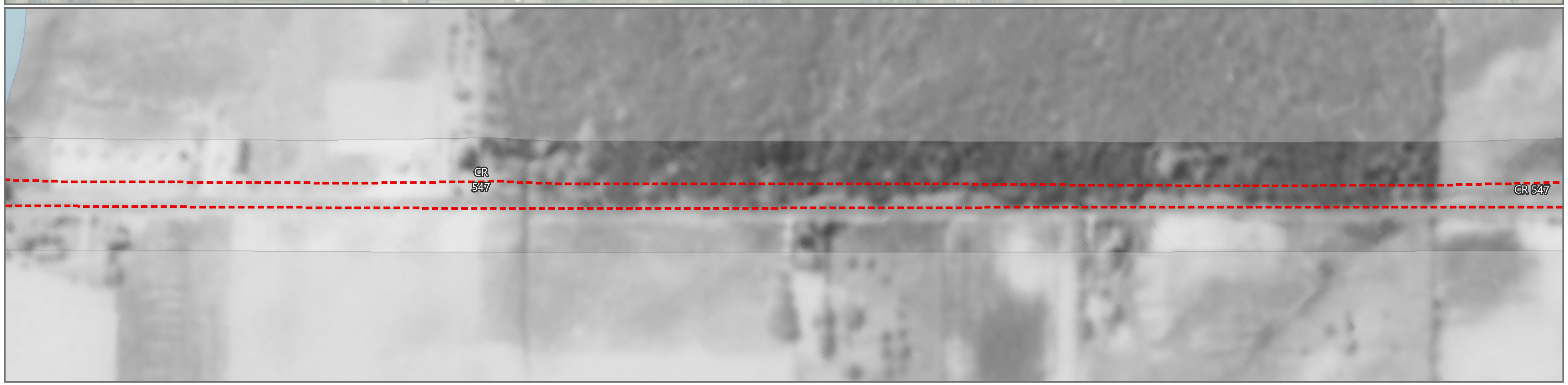

Atlantic Shores South Offshore Wind Project – Onshore Interconnection Facilities

Monmouth and Atlantic County, NJ

Terrestrial Archaeological Resources Assessment

Top Map - Soil and Topography

- Larrabee PAPE Boundary
- 2ft Contour

Soil Condition

- Intact Soils – Subsoil depth approx. 1.0-2.0 ft

Value

High : 40.6205

Low : 0

Middle Map - 1930 Aerial & Mapped Resources

- Larrabee PAPE Boundary
- 500' Waterway Buffer

Bottom Map - Archaeological Sensitivity Results

- Larrabee PAPE Boundary

Archaeological Sensitivity

- Low Sensitivity
- Roadway/Paved

0 50 100 200
Feet

Prepared October 31, 2023
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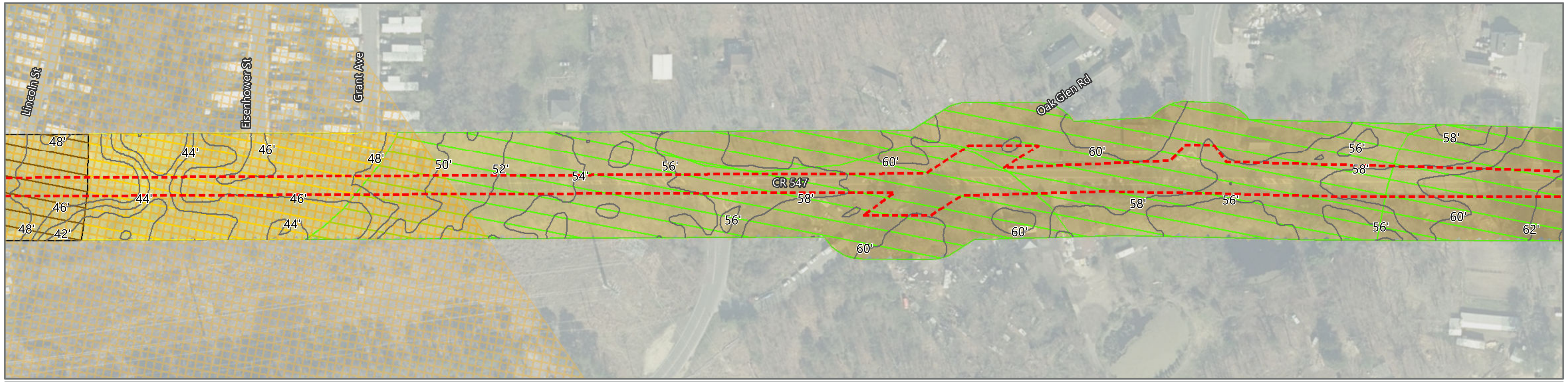

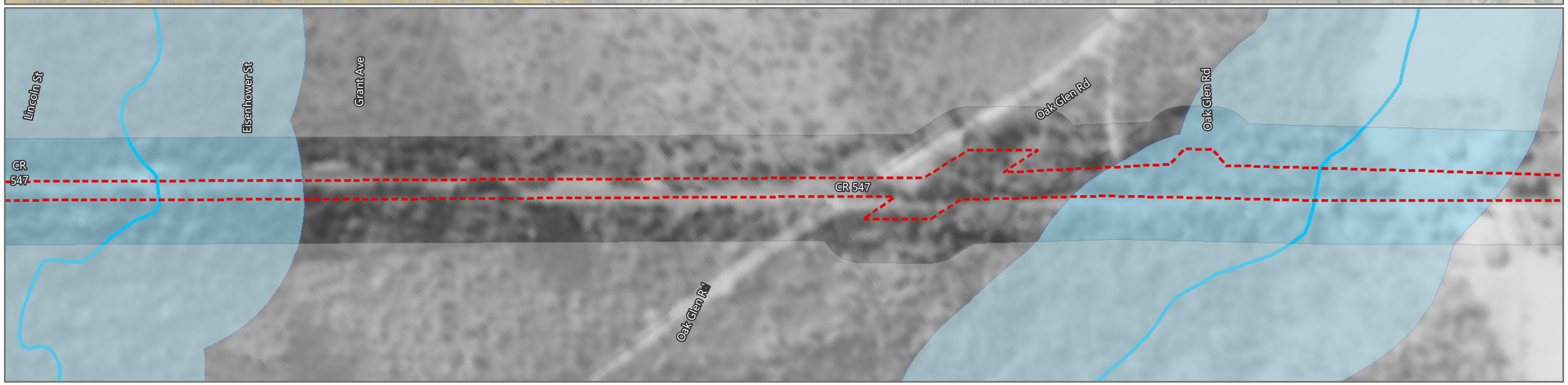

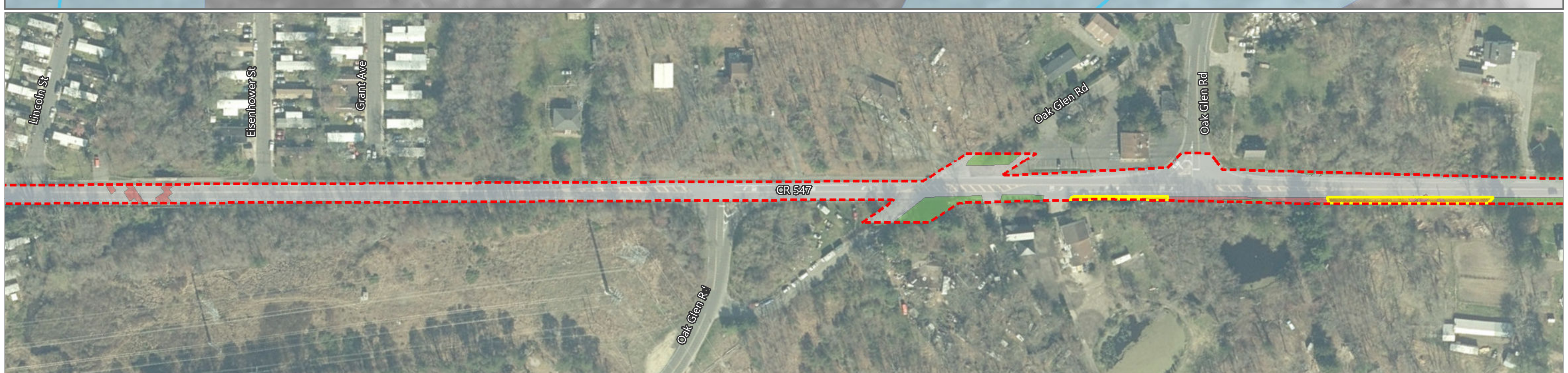

Atlantic Shores South Offshore Wind Project – Onshore Interconnection Facilities

Monmouth and Atlantic County, NJ

Terrestrial Archaeological Resources Assessment

Top Map - Soil and Topography

- Larrabee PAPE Boundary
- 2ft Contour
- Historic Fill

Soil Condition

- Disturbed
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- Intact Soils – Subsoil depth approx. > 2.0 ft

Value

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- Low : 0

Middle Map - 1930 Aerial & Mapped Resources

- Larrabee PAPE Boundary
- Waterway
- 500' Waterway Buffer

Bottom Map - Archaeological Sensitivity Results

- Larrabee PAPE Boundary
- Phase 1B Survey Area

Archaeological Sensitivity

- Excluded from Field Survey Consideration
- Low Sensitivity
- Medium-High Sensitivity
- Roadway/Paved

0 50 100 200
Feet

Prepared October 31, 2023
Basemap: NJ Office of Information Technology and Office of GIS "NJ 2020 Natural Color Imagery" & "New Jersey Black White 1930" Map Service

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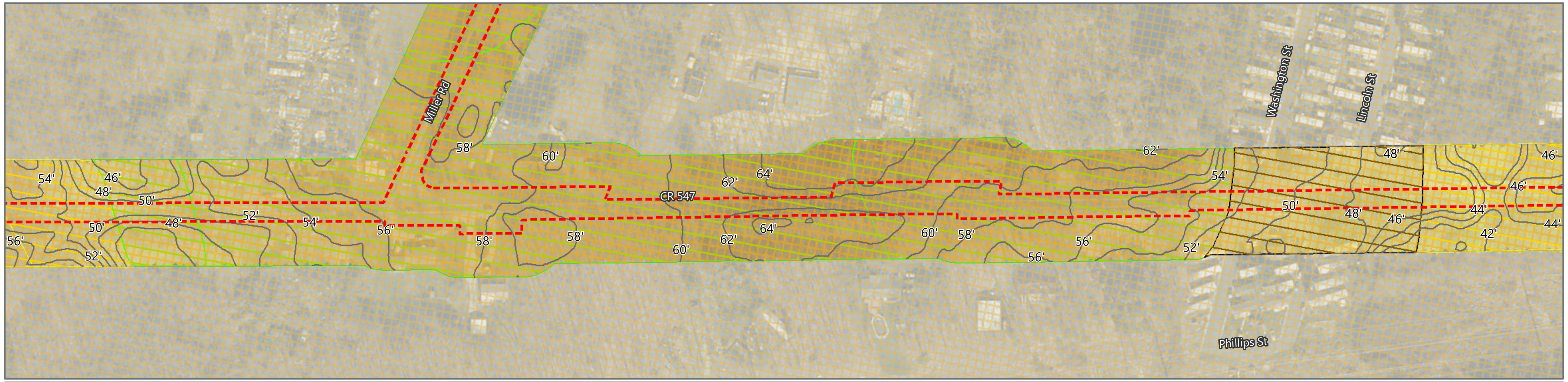
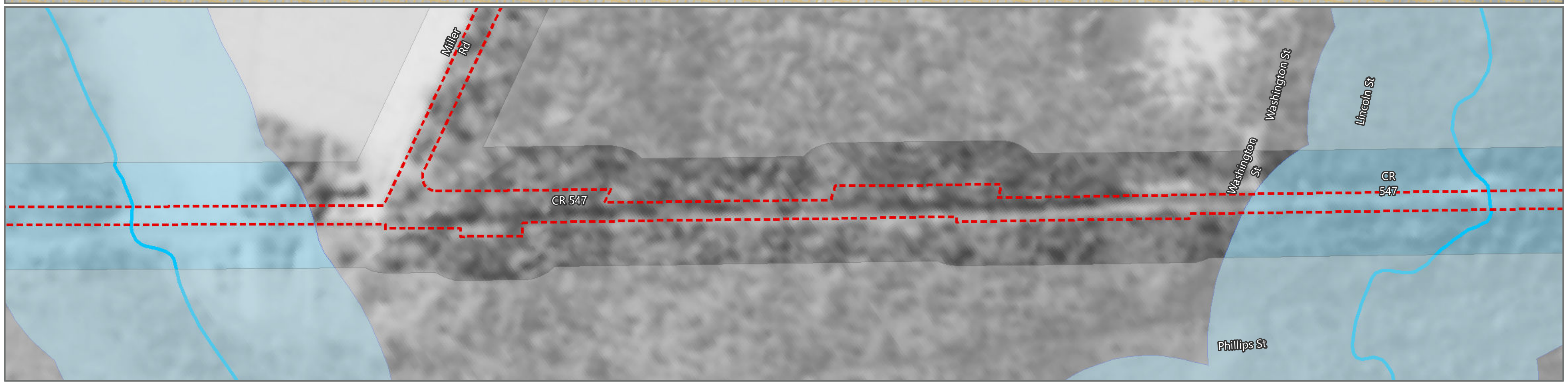
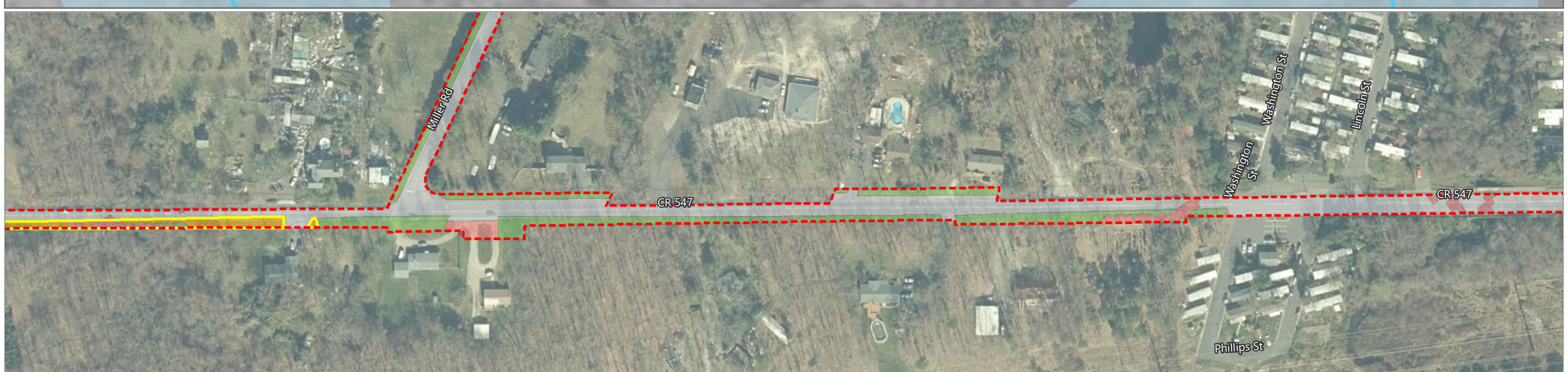
Figure 21. Larrabee Onshore Interconnection Cable - Archaeological Reconnaissance and Desktop Assessment Results







Atlantic Shores South Offshore Wind Project – Onshore Interconnection Facilities

Monmouth and Atlantic County, NJ

Terrestrial Archaeological Resources Assessment

Top Map - Soil and Topography

- Larrabee PAPE Boundary
- 2ft Contour
- Historic Fill

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- Intact Soils – Subsoil depth approx. > 2.0 ft

Value

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Middle Map - 1930 Aerial & Mapped Resources

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- Waterway
- 500' Waterway Buffer

Bottom Map - Archaeological Sensitivity Results

- Larrabee PAPE Boundary
- Phase 1B Survey Area

Archaeological Sensitivity

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- Low Sensitivity
- Medium-High Sensitivity
- Roadway/Paved

0 50 100 200
Feet

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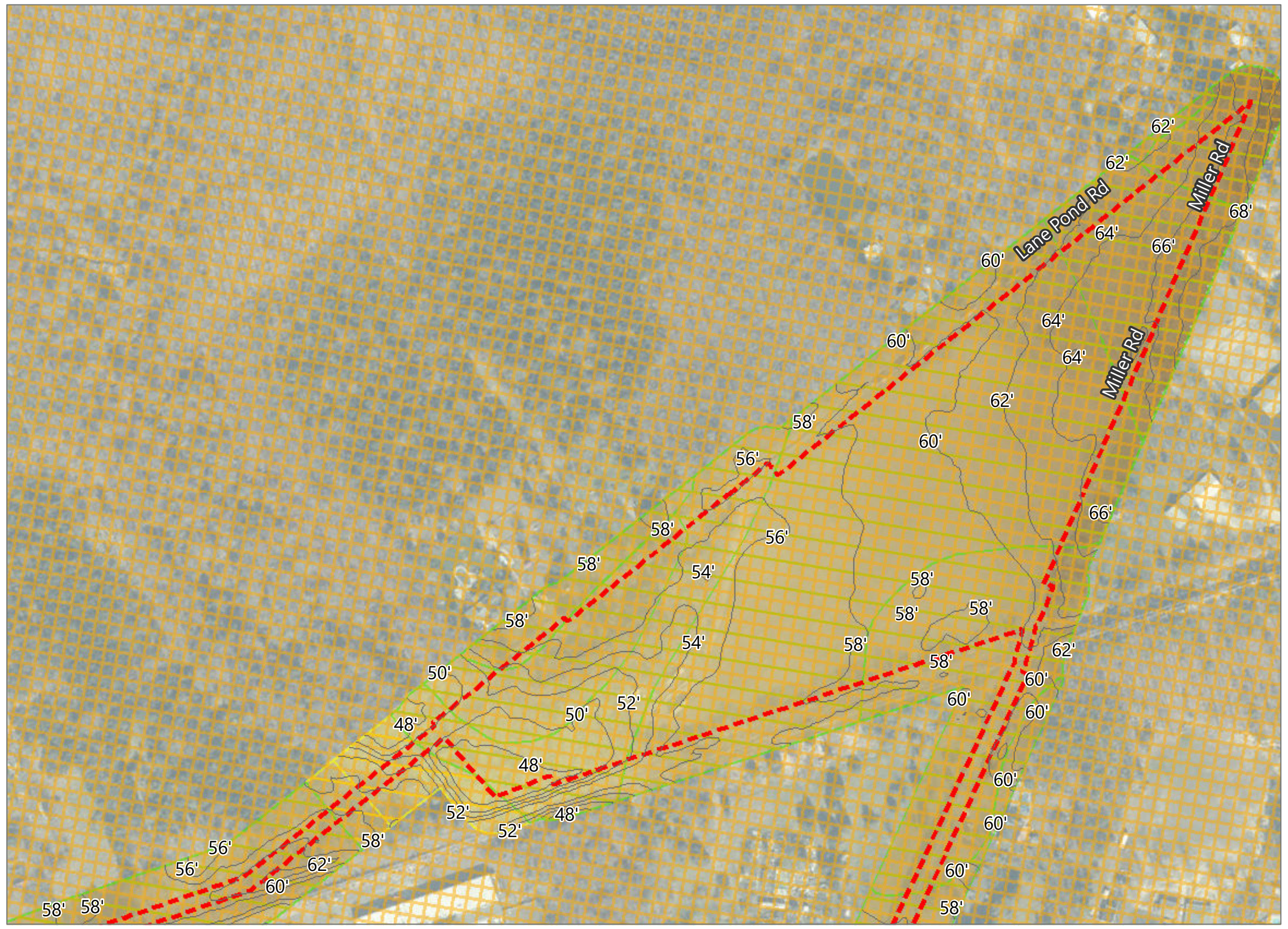
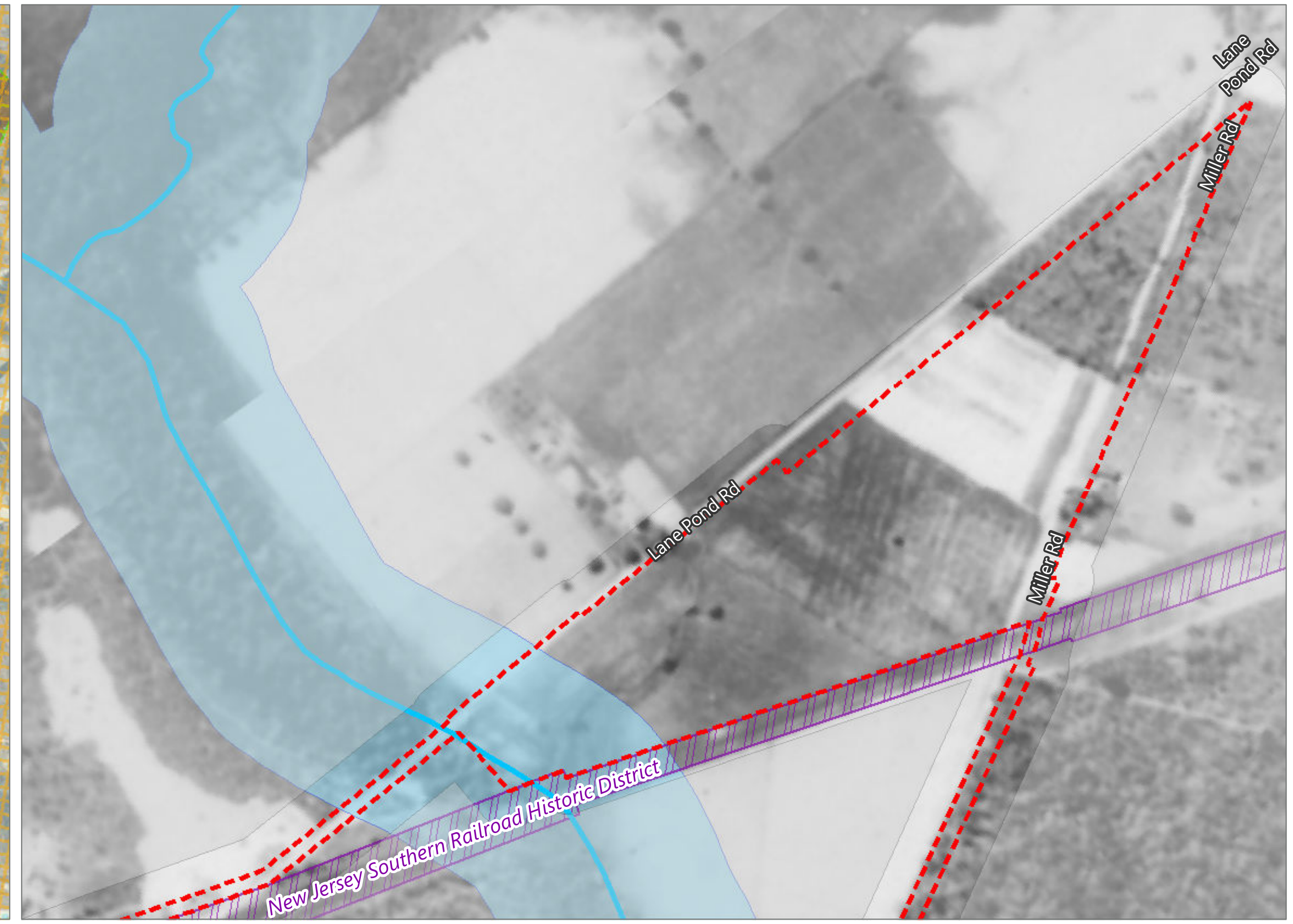
EDR

Figure 21. Larrabee Onshore Interconnection Cable - Archaeological Reconnaissance and Desktop Assessment Results





Atlantic Shores South Offshore Wind Project – Onshore Interconnection Facilities

Monmouth and Atlantic County, NJ

Terrestrial Archaeological Resources Assessment

Top Left Map - Soils and Topography

- Larrabee PAPE Boundary
- 2ft Contour
- Historic Fill

Soil Condition

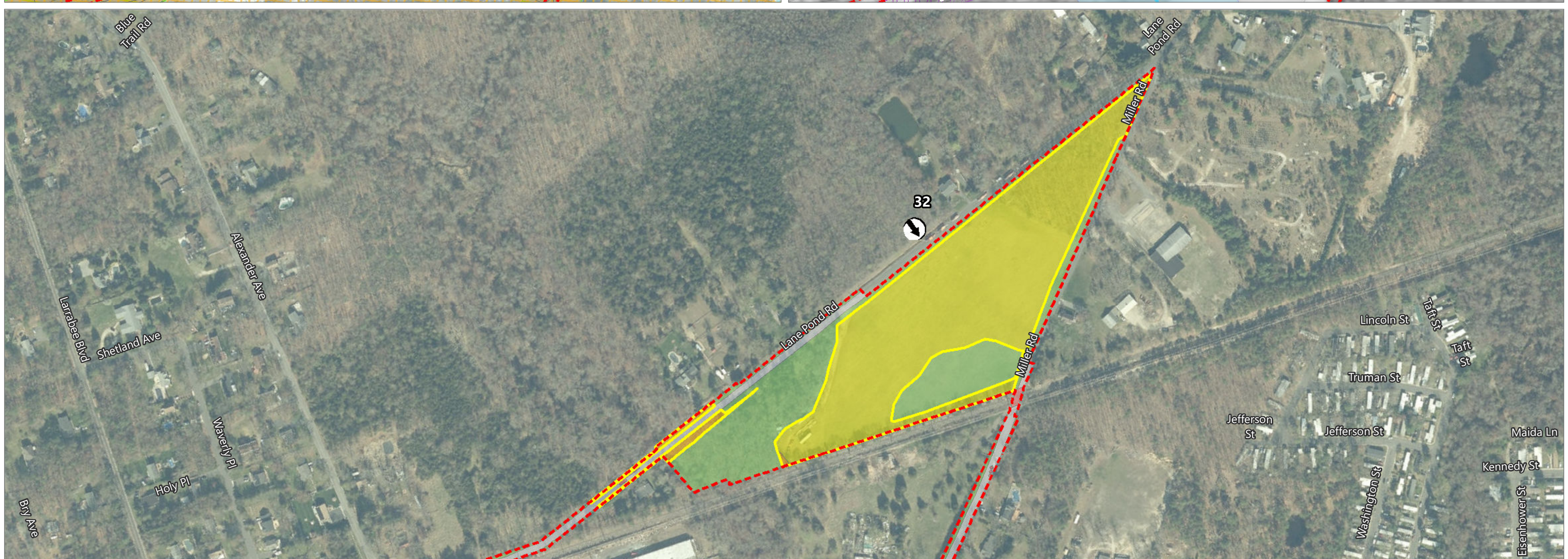
- Intact Soils – Subsoil depth approx. 1.0-2.0 ft
- Intact Soils – Subsoil depth approx. > 2.0 ft

Elevation

- Higher
- Lower

Top Right Map - 1930 Aerial & Mapped Resources

- Larrabee PAPE Boundary
- Waterway
- Historic Districts of New Jersey
- 500' Waterway Buffer



Bottom Map - Archaeological Sensitivity Results

- Larrabee PAPE Boundary
- Photograph Location
- Phase 1B Survey Area

Archaeological Sensitivity

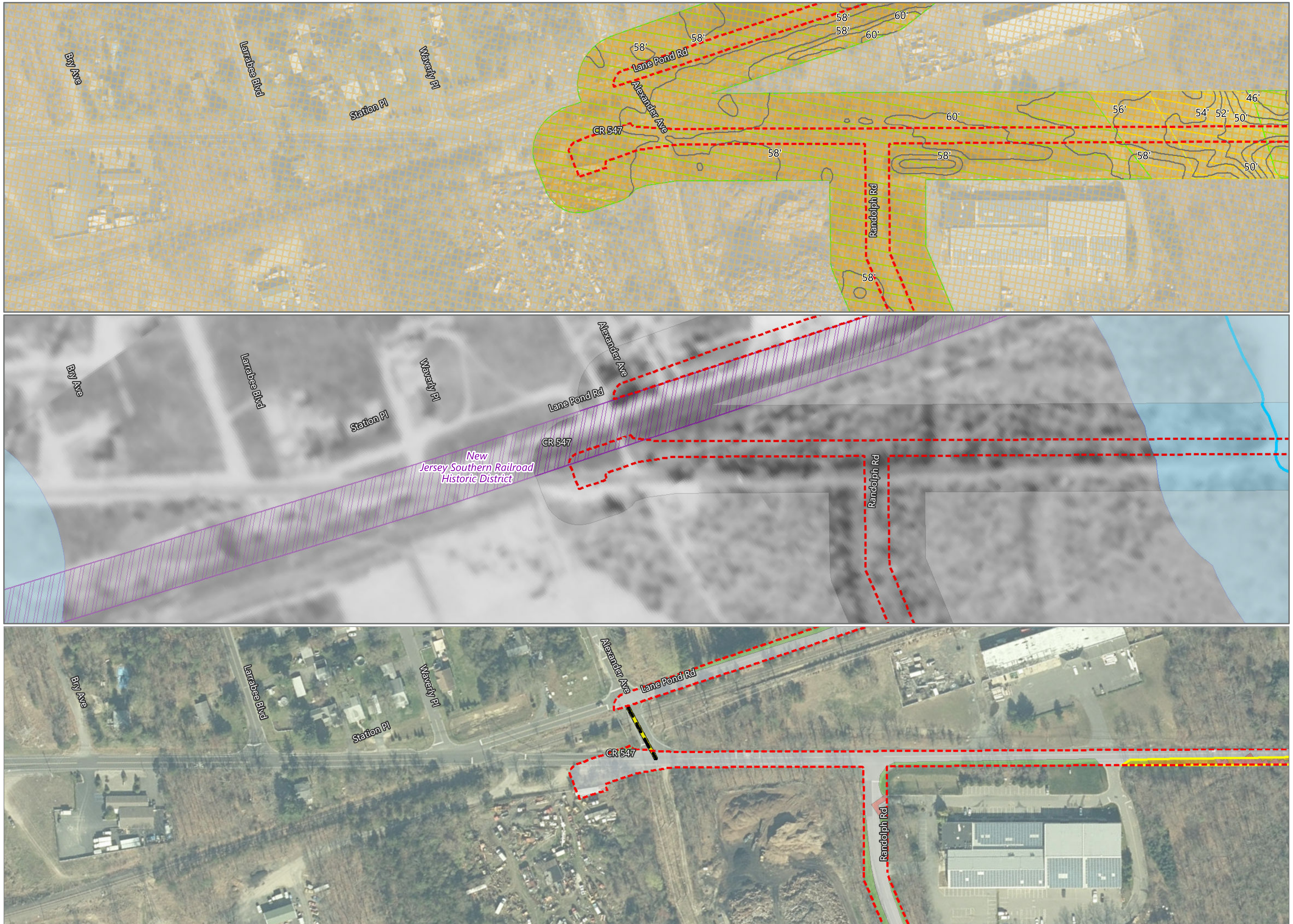
- Excluded from Field Survey Consideration
- Low Sensitivity
- Medium Sensitivity
- Medium-High Sensitivity
- Roadway/Paved

0 100 200 400
Feet

Prepared October 31, 2023
Basemap: NJ Office of Information Technology and Office of GIS "NJ 2020 Natural Color Imagery" & "New Jersey Black White 1940" Map Service

EDR

Figure 21. Larrabee Onshore Interconnection Cable - Archaeological Reconnaissance and Desktop Assessment Results



Atlantic Shores South Offshore Wind Project – Onshore Interconnection Facilities

Monmouth and Atlantic County, NJ

Terrestrial Archaeological Resources Assessment

Top Map - Soil and Topography

- Larrabee PAPE Boundary
- 2ft Contour
- Historic Fill

Soil Condition

- Intact Soils – Subsoil depth approx. 1.0-2.0 ft
- Intact Soils – Subsoil depth approx. > 2.0 ft

Value

- High : 40.6205
- Low : 0

Middle Map - 1930 Aerial & Mapped Resources

- Larrabee PAPE Boundary
- Waterway
- Historic Districts of New Jersey
- 500' Waterway Buffer

Bottom Map - Archaeological Sensitivity Results

- Larrabee PAPE Boundary
- Trenchless PAPE
- Phase 1B Survey Area

Archaeological Sensitivity

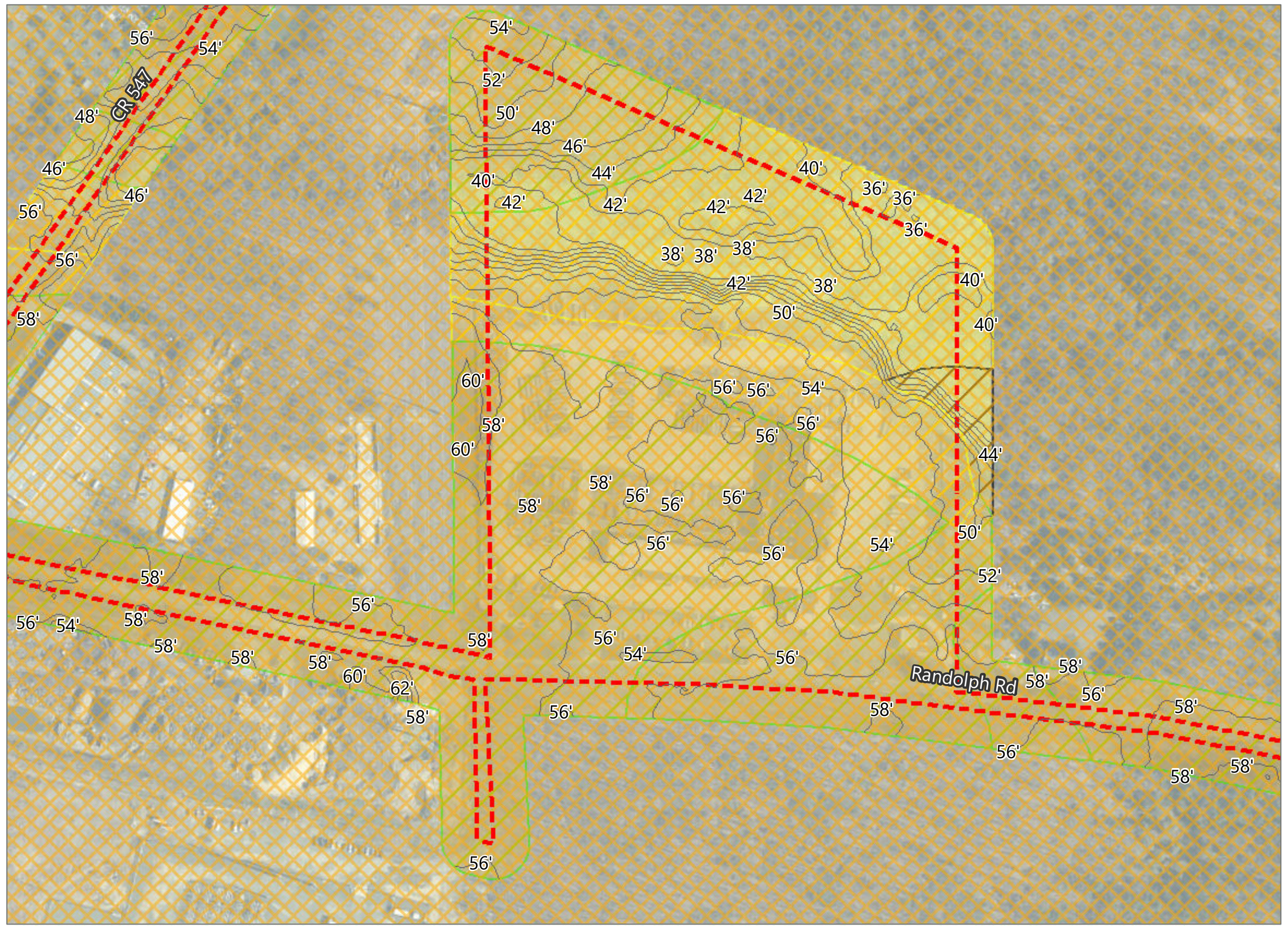
- Excluded from Field Survey Consideration
- Low Sensitivity
- Medium Sensitivity
- Medium-High Sensitivity
- Roadway/Paved

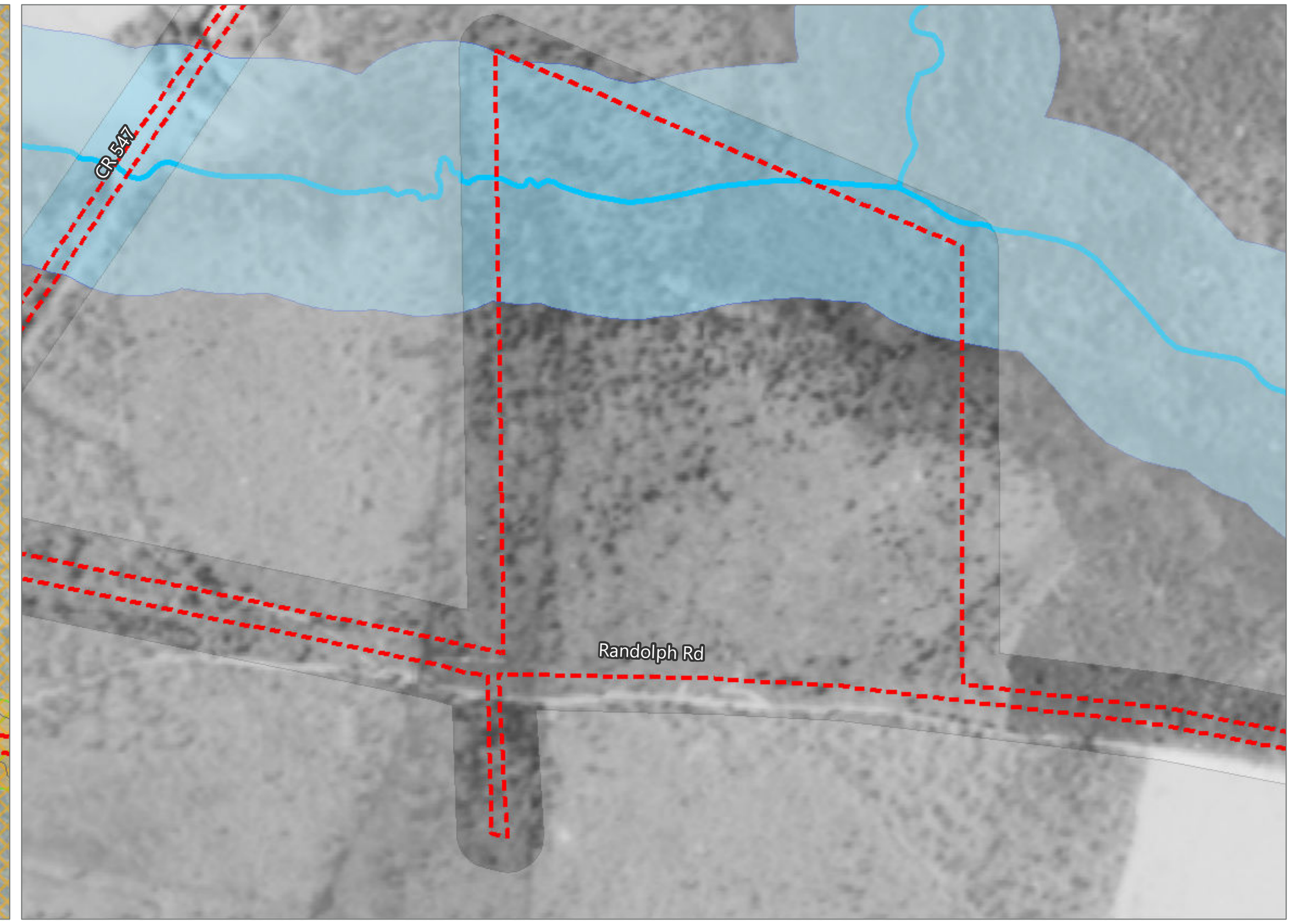
0 50 100 200
Feet

Prepared October 31, 2023
Basemap: NJ Office of Information Technology and Office of GIS "NJ 2020 Natural Color Imagery" & "New Jersey Black White 1930" Map Service

EDR

Figure 21. Larrabee Onshore Interconnection Cable - Archaeological Reconnaissance and Desktop Assessment Results





Atlantic Shores South Offshore Wind Project – Onshore Interconnection Facilities

Monmouth and Atlantic County, NJ

Terrestrial Archaeological Resources Assessment

Top Left Map - Soils and Topography

- Larrabee PAPE Boundary
- 2ft Contour
- Historic Fill

Soil Condition

- Disturbed
- Intact Soils – Subsoil depth approx. 1.0-2.0 ft
- Intact Soils – Subsoil depth approx. > 2.0 ft

Elevation

- Higher
- Lower

Top Right Map - 1930 Aerial & Mapped Resources

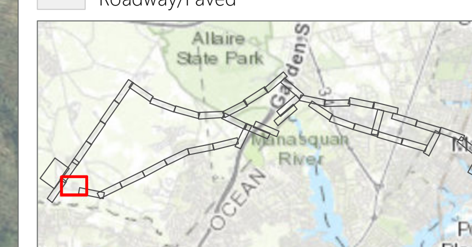
- Larrabee PAPE Boundary
- Waterway
- 500' Waterway Buffer

Bottom Map - Archaeological Sensitivity Results

- Larrabee PAPE Boundary
- Trenchless PAPE
- Photograph Location
- Phase 1B Survey Area

Archaeological Sensitivity

- Excluded from Field Survey Consideration
- Low Sensitivity
- Medium Sensitivity
- Medium-High Sensitivity
- Roadway/Paved



0 100 200 400
Feet

Prepared October 31, 2023
Basemap: NJ Office of Information Technology and Office of GIS "NJ 2020 Natural Color Imagery" & "New Jersey Black White 1940" Map Service

EDR

2.3.9 Phase IB Survey Results

EDR conducted Phase IB archaeological survey fieldwork for the Larrabee Onshore Route in August 2023. Fieldwork was supervised by Amanda Filmyer, RPA, who was assisted by a crew of up to five archaeological field technicians. EDR personnel excavated a total of 202 STPs across 16 survey areas during this mobilization, covering a total of 4.77 acres (1.92 ha) of the Larrabee Onshore Route. Note that not all Phase IB areas were accessible during the August 2023 mobilization and that approximately 21.58 acres of the Larrabee Onshore Route remain to be surveyed. The results of any Phase IB survey conducted in future mobilizations will be presented in an addendum to this TARA.

Survey areas along the Larabee Onshore Route were designated by the street name on which the areas are located and numbered sequentially. In other words, areas along Lakewood-Allenwood Road were designated as LA01, LA02, etc., while areas along Lanes Pond Road were designated as LP01, LP02, etc. Survey Areas within the proposed onshore substation and/or converter stations and landfall sites were designated by the name of the proposed facility (e.g., Hospital Road Parcel becomes HRP1) in a similar manner. Phase IB survey areas located along roadsides were surveyed via a single transect of STPs spaced every 50 ft. (15 m) since their width measured less than 50 ft. Survey areas that are larger in acreage, such as the proposed landfall sites and onshore substation and/or converter stations, were surveyed via a grid of STPs at 50-ft. (15-m) intervals, or 16 STPs per acre.

Table 6 summarizes the Larrabee Onshore Route Phase IB survey areas, including linear feet, acreage totals, STPs excavated, and the map sheets depicting each area (Figure 22). Tabulated STP data is included in Attachment A.

Table 6. Summary of Phase IB Fieldwork for the Larrabee Onshore Route

Phase IB Survey Area	Linear Feet (Meters)	Acres (Hectares)	STP Total	Figure 22
Easy Street		0.27 ac. (0.11 ha)	13	
EA01	427 ft. (130.15 m)	-	8	Sheet 5
EA02	252 ft. (76.8 m)	-	5	Sheet 5
Lakewood-Allenwood Road		1.59 ac. (0.64 ha)	103	
LA01	495 ft. (150.88 m)	-	12	Sheet 1
LA02	635 ft. (193.55 m)	-	14	Sheet 2

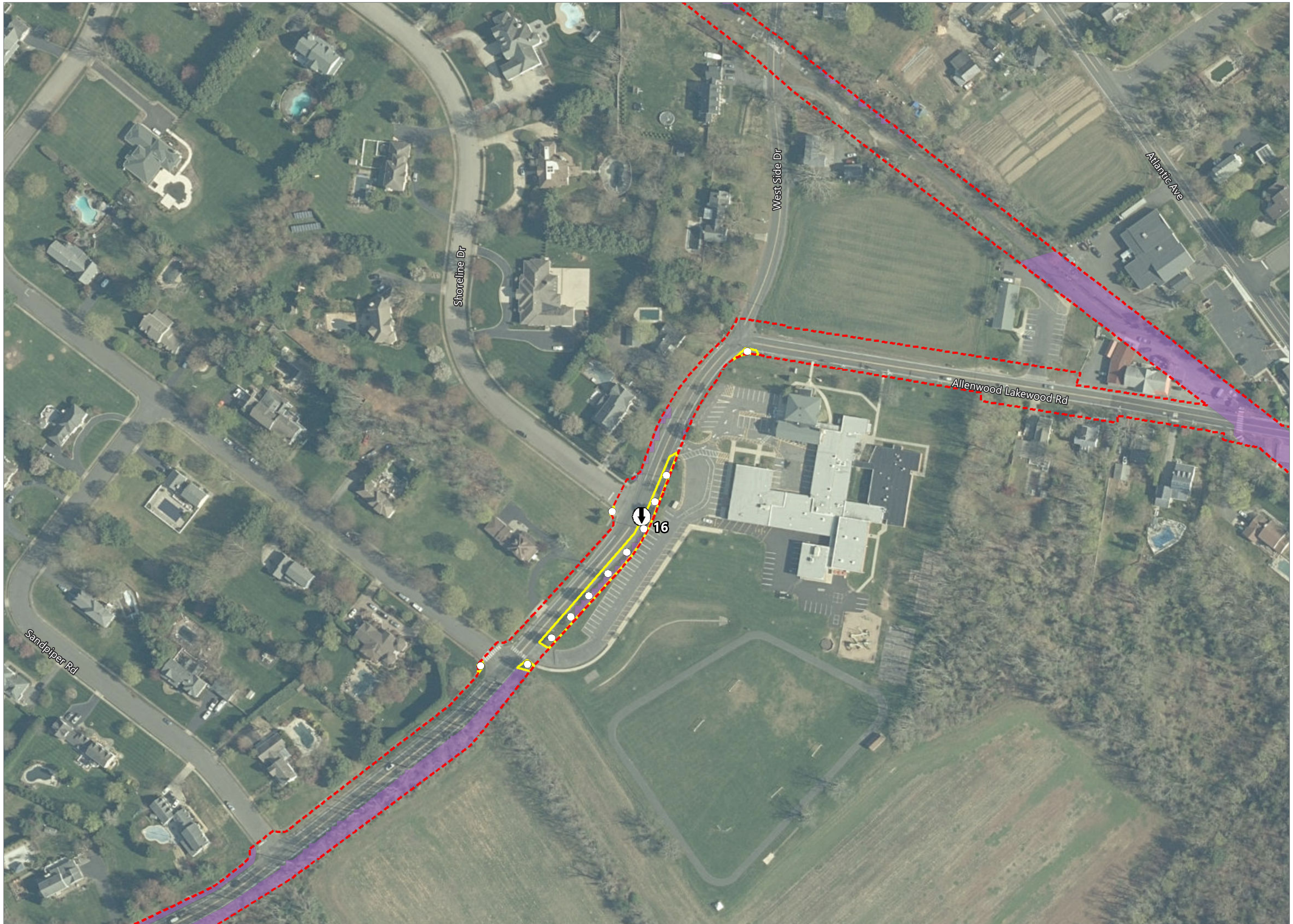
Phase IB Survey Area	Linear Feet (Meters)	Acres (Hectares)	STP Total	Figure 22
LA03	725 ft. (221 m)	-	14	Sheet 3
LA05	1366 ft. (416.4 m)	-	27	Sheet 9-10
LA06	852 ft. (259.8 m)	-	22	Sheet 10
LA07	1032 ft. (314.6 m)	-	14	Sheet 11
Lakewood-Farmingdale Road		0.48 ac. (0.19 ha)	31	
LF01	138 ft. (42 m)	-	3	Sheet 5
LF02	496 ft. (151.18 m)	-	9	Sheet 6
LF03	455 ft. (138.68 m)	-	8	Sheet 7
LF04	594 ft. (181 m)	-	11	Sheet 8
Lanes Pond Road		0.17. ac. (0.07 ha)	15	
LP01	545 ft. (166.1 m)	-	10	Sheet 8
LP02	287 ft. (87.48 m)	-	5	Sheet 8
Hospital Road Parcel (HDD Pits)		2.26 ac. (0.91 ha)	40	
HRP1	-	2.26 ac. (0.91 ha)	40	Sheet 4
Phase IB Survey Total	9037 ft. (2754.6 m)	4.77 ac. (1.92 ha)	202	-

The following subsections (2.3.9.1 through 2.3.9.5) describe the results of the Phase IB archaeological survey conducted within the Larrabee Onshore Route in greater detail, organized geographically from the proposed Monmouth Landfall Site to the existing Larrabee Substation POI.

2.3.9.1 Lakewood-Allenwood Road

General Area Description: Survey areas along Lakewood-Allenwood Road were generally located along grass covered roadside areas adjacent to a variety of settings such as wooded areas and manicured lawns fronting residential and public properties (Photograph 16 through Photograph 22). A total of 103 STPs were excavated across six areas of Lakewood-Allenwood Road between the intersection with West Side Drive and Brook Road.

Survey area LA01 (Figure 22, Sheet 1) encompassed a total of 495 ft. (150.88 m) of cut grass roadside on both sides of Lakewood-Allenwood Road (CR 21). Ten STPs were excavated on the eastern

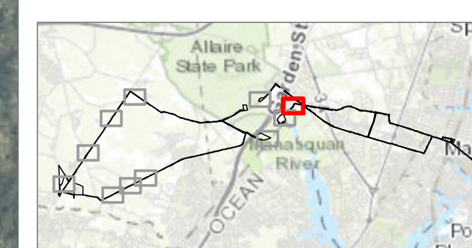


Atlantic Shores South Offshore Wind Project – Onshore Interconnection Facilities

Monmouth and Atlantic County, NJ

Terrestrial Archaeological Resources Assessment

Larrabee PAPE Boundary
Photograph Location
Shovel Test Location
No Cultural Material
Phase 1B Survey Area
Areas Excluded from Field Survey Consideration



0 50 100 200
Feet

Prepared October 31, 2023
Basemap: NJ Office of Information Technology and Office of GIS "NJ 2020 Natural Color Imagery"

EDR

Atlantic Shores South Offshore Wind Project – Onshore Interconnection Facilities

Monmouth and Atlantic County, NJ

Terrestrial Archaeological Resources Assessment

Larrabee PAPE Boundary
Trenchless PAPE
Shovel Test Location
No Cultural Material
Phase 1B Survey Area
Areas Excluded from Field Survey Consideration

Prepared October 31, 2023
Basemap: NJ Office of Information Technology and Office of GIS "NJ 2020 Natural Color Imagery"

EDR

Figure 22. Larrabee Onshore Route - Phase 1B Survey Results

Atlantic Shores South Offshore Wind Project – Onshore Interconnection Facilities

Monmouth and Atlantic County, NJ

Terrestrial Archaeological Resources Assessment

Larrabee PAPE Boundary

Trenchless PAPE

Photograph Location

Shovel Test Location

No Cultural Material

Disturbances

Phase 1B Survey Area

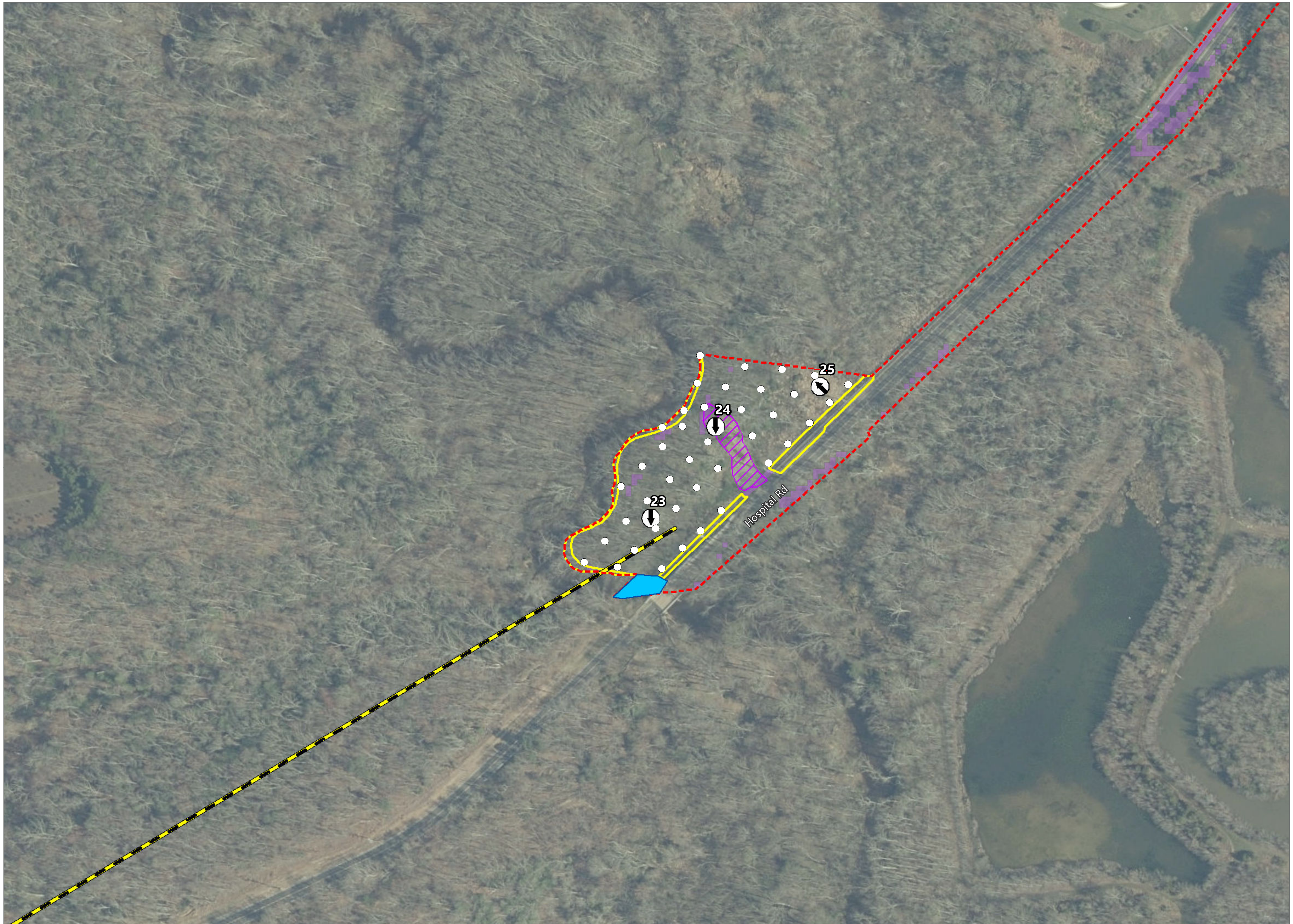
Areas Excluded from Field Survey Consideration

0 50 100 200
Feet

Prepared October 31, 2023
Basemap: NJ Office of Information Technology and Office of GIS "NJ 2020 Natural Color Imagery"

EDR

Figure 22. Larrabee Onshore Route - Phase 1B Survey Results



Atlantic Shores South Offshore Wind Project – Onshore Interconnection Facilities

Monmouth and Atlantic County, NJ

Terrestrial Archaeological Resources Assessment

Larrabee PAPE Boundary

Trenchless PAPE

Photograph Location

Shovel Test Location

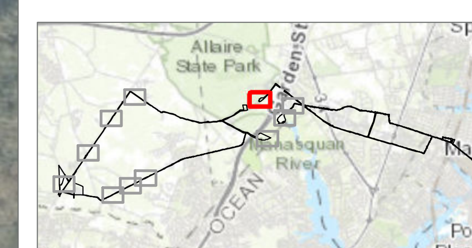
No Cultural Material

Disturbances

Water

Phase 1B Survey Area

Areas Excluded from Field Survey Consideration



0 50 100 200

Feet

Prepared October 31, 2023

Basemap: NJ Office of Information Technology and Office of GIS "NJ 2020 Natural Color Imagery"

EDR

Figure 22. Larrabee Onshore Route - Phase 1B Survey Results

Atlantic Shores South Offshore Wind Project – Onshore Interconnection Facilities

Monmouth and Atlantic County, NJ

Terrestrial Archaeological Resources Assessment

Larrabee PAPE Boundary

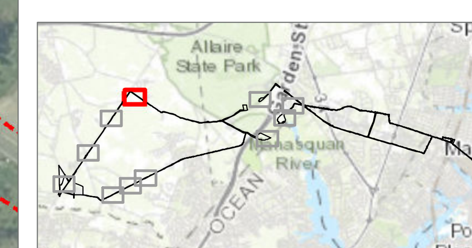
Photograph Location

Shovel Test Location

No Cultural Material

Phase 1B Survey Area

Areas Excluded from Field Survey Consideration



0 50 100 200

Feet

Prepared October 31, 2023

Basemap: NJ Office of Information Technology and Office of GIS "NJ 2020 Natural Color Imagery"

EDR

Atlantic Shores South Offshore Wind Project – Onshore Interconnection Facilities

Monmouth and Atlantic County, NJ

Terrestrial Archaeological Resources Assessment

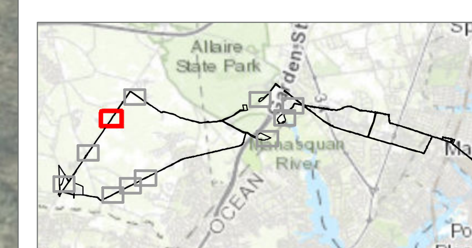
Larrabee PAPE Boundary

Shovel Test Location

No Cultural Material

Phase 1B Survey Area

Areas Excluded from Field Survey Consideration



0 50 100 200

Feet

Prepared October 31, 2023

Basemap: NJ Office of Information Technology and Office of GIS "NJ 2020 Natural Color Imagery"

EDR

Figure 22. Larrabee Onshore Route - Phase 1B Survey Results

Atlantic Shores South Offshore Wind Project – Onshore Interconnection Facilities

Monmouth and Atlantic County, NJ

Terrestrial Archaeological Resources Assessment

Larrabee PAPE Boundary

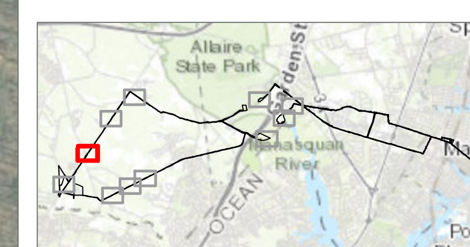
Photograph Location

Shovel Test Location

No Cultural Material

Phase 1B Survey Area

Areas Excluded from Field Survey Consideration

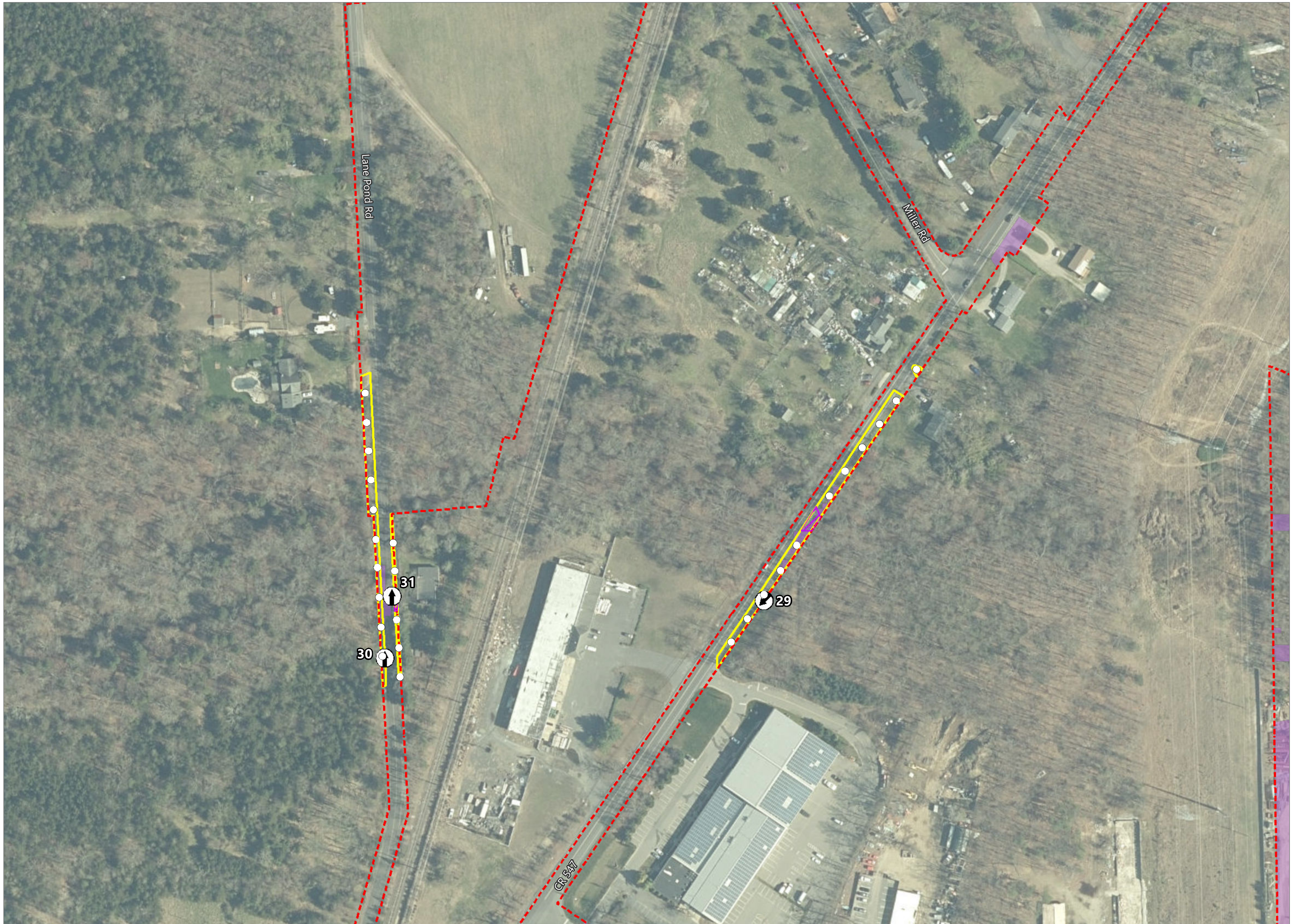


0 50 100 200
Feet

Prepared October 31, 2023
Basemap: NJ Office of Information Technology and Office of GIS "NJ 2020 Natural Color Imagery"

EDR

Figure 22. Larrabee Onshore Route - Phase 1B Survey Results



Atlantic Shores South Offshore Wind Project – Onshore Interconnection Facilities

Monmouth and Atlantic County, NJ

Terrestrial Archaeological Resources Assessment

Larrabee PAPE Boundary

Photograph Location

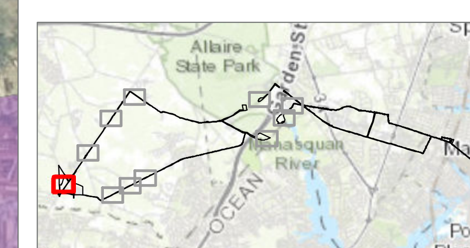
Shovel Test Location

No Cultural Material

Disturbances

Phase 1B Survey Area

Areas Excluded from Field Survey Consideration



0 50 100 200

Feet

Prepared October 31, 2023

Basemap: NJ Office of Information Technology and Office of GIS "NJ 2020 Natural Color Imagery"

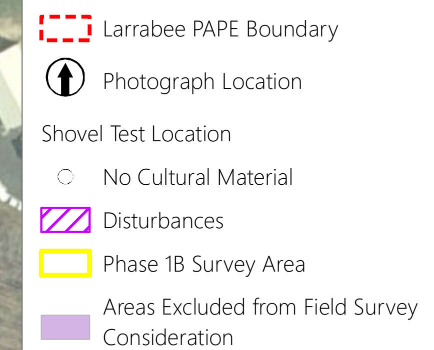
EDR

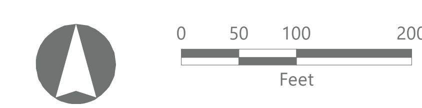
Figure 22. Larrabee Onshore Route - Phase 1B Survey Results

Atlantic Shores South Offshore Wind Project – Onshore Interconnection Facilities

Monmouth and Atlantic County, NJ

Terrestrial Archaeological Resources Assessment





Prepared October 31, 2023
Basemap: NJ Office of Information Technology and Office of GIS "NJ 2020 Natural Color Imagery"

EDR

Figure 22. Larrabee Onshore Route - Phase 1B Survey Results

Atlantic Shores South Offshore Wind Project – Onshore Interconnection Facilities

Monmouth and Atlantic County, NJ

Terrestrial Archaeological Resources Assessment

Larrabee PAPE Boundary

Photograph Location

Shovel Test Location

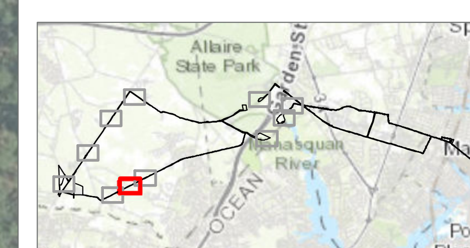
No Cultural Material

Disturbances

Water

Phase 1B Survey Area

Areas Excluded from Field Survey Consideration



0 50 100 200

Feet

Prepared October 31, 2023

Basemap: NJ Office of Information Technology and Office of GIS "NJ 2020 Natural Color Imagery"

EDR

Figure 22. Larrabee Onshore Route - Phase 1B Survey Results

Atlantic Shores South Offshore Wind Project – Onshore Interconnection Facilities

Monmouth and Atlantic County, NJ

Terrestrial Archaeological Resources Assessment

Larrabee PAPE Boundary

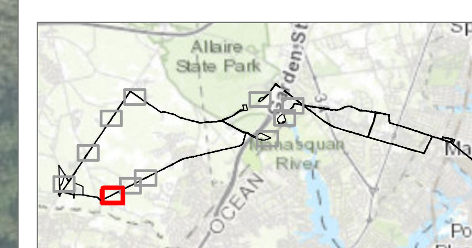
Shovel Test Location

No Cultural Material

Disturbances

Phase 1B Survey Area

Areas Excluded from Field Survey Consideration



0 50 100 200
Feet

Prepared October 31, 2023
Basemap: NJ Office of Information Technology and Office of GIS "NJ 2020 Natural Color Imagery"

EDR

side of the road adjacent to Allenwood Elementary School, while the remaining two STPs were excavated on the western side of the road adjacent at the intersection with Shoreline Drive. Although LA01 did not contain any marked buried utilities, a large portion of the area adjacent to the elementary school was significantly sloped (Photograph 16). To mitigate the slope, archaeologists excavated STPs on the flattest portion of the area, which was either at the top of the slope or at the bottom of slope near the paved roadside. The STPs generally consisted of truncated topsoils with occasional minor surface disturbance including mixing with modern trash, overlying intact subsoils (Attachment A). STP LA01.005 can be considered typical of the survey area. It contained a very pale brown (10YR 7/3) sand E horizon extending to 13.4 in. (34 cm) below ground surface (bgs), overlying a yellow (10YR 7/6) sand B horizon containing subrounded and rounded quartzose pebbles that was excavated to 17.3 in. (44 cm) bgs. No archaeological sites were identified, and no archaeological artifacts were encountered during the Phase IB survey of LA01. As such, no mitigation or avoidance measures are proposed, and no further archaeological work is recommended.

Survey area LA02 (Figure 22, Sheet 2) was located along the eastern side of Lakewood-Allenwood Road (CR 21), across from the planned HDD entrance pit at Robert L Brice Memorial Park (Photograph 17). 14 STPs were excavated on relatively flat cut grass roadside featuring a visible electrical powerline, adjacent to a wooded area of mixed evergreen-deciduous trees and overgrown brush. The STPs generally consisted of intact soils that featured minor surface disturbances including the mixing with modern trash (Attachment A). STP LA02.008 can be considered typical of the survey area. It contained a dark grayish (10YR 4/1) sand A horizon with modern refuse extending to 9.8 in. (25 cm) bgs, overlying a yellowish brown (10YR 5/4) loamy sand B horizon with a rock content of approximately 15% subrounded quartzose pebbles which was excavated to 13.8 in. (35 cm) bgs. No archaeological sites were identified, and no archaeological artifacts were encountered during the Phase IB survey of LA02. As such, no mitigation or avoidance measures are proposed, and no further archaeological work is recommended.

Survey area LA03 (Figure 22, Sheet 3) was located along the southern side of Lakewood-Allenwood Road (CR 21), across from the planned HDD exit pit at re-forested sand and gravel pits. 14 STPs were excavated on relatively flat cut grass roadside adjacent to a wooded area of mixed evergreen-

Photograph 16. Overview of the portion of Survey Area LA01 adjacent to Allenwood Elementary School, view to the southwest. Note the sloped surface in the foreground.

Photograph 17. Overview of Survey Area LA02, view to the south.

Photograph 18. Overview of Survey Area LA03, view to the west.

deciduous tree and overgrown brush (Photograph 18). The STPs generally consisted of shallow or truncated topsoils overlying rocky subsoils (Attachment A). STP LA03.005 can be considered typical of the survey area. It contained a dark grayish (10YR 4/1) sandy loam A horizon extending to 4.7 in. (12 cm) bgs, overlying a brownish yellow (10YR 6/6) sand B horizon with a rock content of approximately 20-25% rounded/subrounded quartzose pebbles which was excavated to.10.2 in. (26 cm) bgs. No archaeological sites were identified, and no archaeological artifacts were encountered during the Phase IB survey of LA03. As such, no mitigation or avoidance measures are proposed, and no further archaeological work is recommended.

Survey area LA05 (Figure 22, Sheets 9-10) encompassed a total of 1366 ft. (416.4 m) of cut grass roadside area on the north side of Lakewood-Allenwood Road. 27 STPs were excavated on a relatively flat terrain marked with a buried gas line and a visible electrical powerline, adjacent to a wooded area of mixed evergreen-deciduous trees and overgrown brush (Photograph 19). The STPs generally consisted of intact soils containing eolian deposits with minor surface disturbance including mixing with modern trash (Attachment A). STP LA05.015 can be considered typical of the survey area. It contained a light brownish gray (10YR 6/2) sandy loam A horizon extending to 9.0 in. (23 cm) bgs overlying a strong brown (7.5YR 5/8) sand B1 horizon with no rock content that extended to 29.9. in. (76 cm) bgs. The B1 horizon overlayed a strong brown (7.5YR 5/8) coarse sand and pebble B2 horizon that was excavated to 33.84 in. (86 cm) bgs. No

Photograph 19. Overview of Survey Area LA05, view to the southwest

archaeological sites were identified, and no archaeological artifacts were encountered during the Phase IB survey of LA05. As such, no mitigation or avoidance measures are proposed, and no further archaeological work is recommended.

Survey area LA06 (Figure 22, Sheet 10) encompassed a total of 852.2 ft. (259.75 m) of cut grass roadside areas on both sides of Lakewood-Allenwood Road (Photograph 20). 14 STPs were excavated on the south side of the road adjacent to Muddy Ford Brook, a wooded area, and residential lots. The remaining eight STPs were excavated on the north side of the road adjacent to residential lots and a former Monmouth County Landfill. A sizable portion of LA06 located on the north side of Lakewood-Allenwood was excluded from excavation due to the presence of a buried gas line utility that did not allow room within the PAPE to offset STPs. (Photograph 21). Approximately 532.8 ft. (162.4 m) of LA06 were not excavated during August mobilization due to time constraints concerning the utility mark outs. Although these portions will be excavated in future survey mobilization efforts, it was noted that a large portion of the remaining areas consisted of paved residential driveways and a residential yard decorated with cobbles (Photograph 22).

The STPs within the survey area fell into two general categories (Attachment A). The first consisted of a topsoil or an exposed E horizon overlying rocky subsoil. STP LA06.013 can be considered typical for this category. It contained a brown (10YR 5/3) sand A horizon extending to 12.5 in. (32 cm)

Photograph 20. Overview of Survey Area LA06, view to the southwest.

Photograph 21. Overview of the portion of LA06 that was excluded from excavation for a buried gas line. The former landfill is located beyond the fence to the right. View to the southwest.

Photograph 22. Overview of a portion of LA06 that has not yet been subjected to subsurface excavation but is observed to feature paved driveways and ornamental landscaping. view to the northeast.

bgs overlying a yellow (10YR 7/6) sand B horizon with a rock content of approximately 15% rounded/sub-rounded quartzose pebbles which was excavated to 16.6 in. (42 cm) bgs. The second category of STP generally consisted of intact soils underlying a fill layer mixed with modern trash. STP LA06.019 can be considered typical for this second category. It contained a fill layer of mixed grayish brown (10YR 5/2) and very pale brown (10YR 7/3) soil contain modern refuse that extended to 8.3 in. (21 cm) bgs . The fill layer overlayed an intact dark gray (10YR 4/1) sandy loam A horizon that extended to 11 in. (28 cm) bgs. The A horizon overlayed a white (10YR 8/1) sand E horizon which extended to 25.2 in. (64 cm) bgs, which in turn overlayed a strong brown (7.5YR 4/6) oxidized sand B horizon with a rock content of approximately 5% subrounded quartzose pebbles that was excavated to 29 in. (74 cm.) bgs. No archaeological sites were identified, and no archaeological artifacts were encountered in the surveyed portions of LA06. As such, no mitigation or avoidance measures are proposed, and no further archaeological work is recommended at this time.

Survey area LA07 (Figure 22, Sheet 11) was located along cut grass roadside areas on both sides of Lakewood-Allenwood Road. 14 STPs were excavated on the southern side of the road along relatively flat terrain marked with buried utilities and adjacent to Haystack Brook and mixed evergreen-deciduous woods. The portion located on the northern side of the road was excluded from excavation due to the presence of a buried gas line utility that did not allow room within the PAPE to offset STPs. The STPs within the LA07 fell into two general categories (Attachment A). The first consisted of a shallow topsoil or exposed E horizon overlying rocky subsoil. STP LA07.004 can be considered typical for this category. It contained a dark gray (10YR 4/1) sand A horizon extending to 4.3 in. (11 cm) bgs overlying a light gray (10YR 7/1) sand E horizon which was excavated to 9.0 in. (23 cm) bgs. The E horizon overlayed a yellowish brown (10YR 5/8) B horizon with a rock content of approximately 20-30% sub-rounded quartzose pebbles that was excavated to 13 in. (33 cm) bgs. The second category of STP uncovered generally intact soils containing possible eolian deposits. STP LA07.010 can be considered typical for this second category. It contained a gray (10YR 5/1) sand topsoil that extended to 7.92 in. (20 cm) bgs overlying a light yellowish brown (10YR 6/4) B1 horizon with no rock content that extended to 23.6 in. (60 cm) bgs. The B1 horizon overlayed a light yellowish brown (10YR 6/4) sand and pebble B2 horizon that was excavated to 27.5 in. (70 cm) bgs. No archaeological sites were identified, and no archaeological artifacts were encountered during the Phase IB survey of LA07. As such, no mitigation or avoidance measures are proposed, and no further archaeological work is recommended.

2.3.9.2 Hospital Road Parcel (HDD Entry Pit)

General Area Description: The Hospital Road Parcel, which is planned to contain an HDD Entry Pit (Figure 22, Sheet 4), is a wooded area located along the southern and eastern banks of the Manasquan River (Photograph 23). The Phase IB survey of the Hospital Road Parcel primarily encountered wooded areas containing scrub brush that is bisected by a large gravel parking lot (Photograph 24) used to access the river for fishing. The southwestern portion of the wooded area contained dense, overgrown brush and is near the modern bridge where Hospital Road crosses over the Manasquan River. Additionally, the northeastern portion of the parcel contained wetland plants in addition to overbrown brush and briars (Photograph 25). The original calculated Phase IB areas for the Hospital Road Parcel encompassed 1,078 ft. (328.6 m) which is estimated to have contained approximately 22 STPs.

Photograph 23. Overview of the Hospital Road Parcel, view to the southwest

Photograph 24. Overview of the gravel driveway which bisects the parcel, view to the south.

Photograph 25. Overview of the wetland located in the northeastern area of the Hospital Road Parcel, view to the north.

However, archaeologists excavated the entire parcel due to the abundance of previously recorded precontact sites located along the Manasquan River. A total of 40 STPs were excavated within the entire 2.26-acre parcel.

STPs throughout the Hospital Road Parcel varied depending on the vegetation setting (Attachment A). The majority of the STPs consisted of largely uniformed floodplain deposits containing little to no rock content. STP HRP1.035 can be used as a representative example of the floodplain deposits in the area. It contained a brown (7.5YR 4/6) sandy loam A horizon with no rock content that extended to 27.9 in. (71 cm) bgs overlying a light brownish gray (10YR 6/2) Sand C horizon with no rock content which was excavated to 35.8 in. (91 cm) bgs. STPs located within the wetland area in the northeastern portion of the parcels uncovered saturated topsoils over saturated gleyed subsoils (Attachment A). HRP1.016 can be used as a representative example of the soil profile in the wetland. It consisted of a brown (10YR 4/3) sandy loam A horizon extending to 15.7 in. (40 cm) overlying a light brownish gray mottled brownish yellow (10YR 6/2 m/w 10YR 5/8) oxidized sandy loam Bg horizon which was excavated to 19.7 in. (50 cm) bgs. It is also worth noting that many of the STPs in the southwestern portion of the Hospital Road Parcel appeared to be moderately to highly disturbed, containing high amounts of subangular cobbles and concrete. HRP1.007, for example, was excavated to 4.7 in. (12 cm) until a concrete slab expanded throughout the entire test pit was uncovered. These disturbances are most likely related to the construction of the nearby bridge. No archaeological sites were identified, and no archaeological artifacts were encountered during the Phase IB survey of the Hospital Road Parcel. As such, no mitigation or avoidance measures are proposed, and no further archaeological work is recommended.

2.3.9.3 Easy Street

General Area Description: Survey areas along Easy Street were generally located along grass covered roadside areas adjacent to wooded areas and residential properties. A total of 13 STPs were excavated across two areas of Easy Street, located east of the intersection with Lakewood-Farmingdale Road (CR 547).

Both EA01 and EA02 (Figure 22, Sheet 5) encompassed a respective total of 427 ft. (130.15 m) and 252 ft. (76.8 m) along the southern side of Easy Street. Eight STPs were excavated in EA01 and five STPs were excavated in EA02. Both areas were located on cut grass roadside containing a visible electrical powerline (Photograph 26). The STPs in both areas generally consisted of intact soils that featured minor surface disturbances such as mixing with modern trash (Attachment A). STPs EA01.003 and EA02.004 can be considered typical of both survey areas. STP EA01.003 contained a shallow dark grayish brown (10YR 4/2) sandy A horizon with modern refuse extending to 9.0 in. (23 cm) bgs, overlying a light yellowish brown (10YR 6/4) sandy BC horizon with a rock content of approximately 25% rounded and well-rounded quartzose pebbles that was excavated to 13.7 in. (35 cm) bgs. STP EA02.004 contained a shallow brown (10YR 4/3) sandy A horizon with modern refuse extending to 8.6 in. (22 cm) bgs, overlying a light yellowish brown (10YR 6/4) sandy B horizon that extended to 12.6 in. (32 cm) bgs. The B horizon overlayed a brown (10YR 5/3) coarse sand C horizon with a rock content of approximately 25% rounded/ well-rounded quartzose pebbles that was excavated to 19.7 in. (50 cm). No archaeological sites were identified, and no archaeological artifacts were encountered during the Phase IB survey of both EA01 and EA02. As such, no mitigation or avoidance measures are proposed, and no further archaeological work is recommended.

Photograph 26. Overview of Survey Area EA02, view to the east.

2.3.9.4 Lakewood-Farmingdale Road (CR 547)

General Area Description: Survey areas along Lakewood-Farmingdale Road (CR 547) were generally located along wooded areas and manicured lawns fronting residential and commercial properties. A total of 31 STPs were excavated across four areas of Lakewood-Farmingdale Road, located between the intersection with Easy Street and Randolph Road.

Both LF01 and LF02 (Figure 22, Sheets 5-6) encompassed a respective total of 138 ft. (42 m) and 496 ft. (151.18 m) of the PAPE. LF01 was located on a manicured lawn fronting a residential property on the eastern side of Lakewood-Farmingdale Road (Photograph 27). LF02 was located on cut grass roadside areas on the eastern side of Lakewood-Farmingdale Road that were adjacent to woods. Three and nine STPs were excavated in LF01 and LF02 respectively. The STPs in both areas generally consisted of intact topsoils overlying rocky subsoils (Attachment A). STP LF02.006 can be considered typical of both survey areas. It contained a dark gray (10YR 4/1) sand A horizon extending to 13.3 in. (34 cm) bgs overlying a yellow (10YR 7/6) sand B horizon containing subrounded and rounded quartzose pebbles which was excavated to 17.3 in. (44 cm) bgs. No archaeological sites were identified, and no archaeological artifacts were encountered during the Phase IB survey of both LF01 and LF02. As such, no mitigation or avoidance measures are proposed, and no further archaeological work is recommended.

Photograph 27. Overview of Survey Area LF01, view to the southwest.

Photograph 28. Overview of LF03, view to the northeast.

Survey area LF03 (Figure 22, Sheet 7) was located along the eastern side of Lakewood-Farmingdale Road and encompassed approximately 455 ft. (138.68 m) of the PAPE. Eight STPs were excavated on grass roadside areas adjacent to a wooded commercial property and a fenced residential property (Photograph 28). The STPs demonstrated various degrees of disturbance ranging from the mottling of soils and mixing with modern trash to the presence of fill layers over intact soils (Attachment A). STP LF03.002 can be considered typical of the survey area. It contained a gray (10YR 5/1) sand fill layer over a second pale brown (10YR 6/3) fill layer. These fills extended to 8.3 in. (21 cm) and 12.1 in. (31 cm) respectively. These fill layers overlayed an intact dark grayish brown (10YR 4/2) sand A horizon which extended to 21.3 in. (54 cm) bgs, which overlayed a yellowish brown (10YR 5/8) sand B horizon a second pale brown (10YR 6/3) fill layer. These fills extended to 8.3 in. (21 cm) and 12.1 in. (31 cm) respectively. These fill layers overlayed an intact dark grayish brown (10YR 4/2) sand A horizon which extended to 21.3 in. (54 cm) bgs, which overlayed a yellowish brown (10YR 5/8) sand B horizon containing subrounded and rounded pebbles which was excavated to 25.2 in. (64 cm) bgs. No archaeological sites were identified, and no archaeological artifacts were encountered during the Phase IB survey of LF03. As such, no mitigation or avoidance measures are proposed, and no further archaeological work is recommended.

Survey area LF04 (Figure 22, Sheet 8) was located along the eastern side of Lakewood-Farmingdale Road and encompassed approximately 594 ft. (181 m) of the PAPE. 11 STPs were excavated on relatively flat cut grass roadside area marked with buried utilities adjacent to a manicured lawn of a commercial property and a wooded area of mixed evergreen-deciduous tree and overgrown brush (Photograph 29). The STPs within the LF04 fell into two general categories (Attachment A). The first consisted of a topsoil or exposed E horizon overlying rocky subsoil. STP LF04.005 can be considered typical for this category. It contained a very dark grayish brown (10YR 3/2) sandy loam A horizon extending to 12.1 in. (31 cm) bgs overlying a yellowish brown (10YR 5/8) sand B horizon with a rock content of approximately 5-10% sub-rounded quartzose pebbles that was excavated to 16.1 in. (41 cm) bgs. The second category of STP uncovered generally intact soils containing possible eolian deposits. STP LF04.010 can be considered typical for this second category. It contained a dark gray (10YR 4/1) sand topsoil that extended to 11.8 in. (30 cm) bgs overlying a light yellowish brown (10YR 6/4) B1 horizon with no rock content that extended to 22.5 in. (57 cm) bgs. The B1 horizon overlayed a brownish yellow (10YR 6/6) sand B2 horizon containing rounded and subrounded pebbles which was excavated to 26.4 in. (67 cm) bgs. No archaeological sites were identified, and no archaeological artifacts were encountered during the Phase IB survey of LF04. As such, no mitigation or avoidance measures are proposed, and no further archaeological work is recommended.

Photograph 29. Overview of LF04, view to the southwest.

2.3.9.5 Lanes Pond Road

General Area Description: Survey areas along Lanes Pond Road were generally located along grass covered roadside areas adjacent to wooded areas and residential properties. A total of 15 STPs were excavated across two areas of Lanes Pond Road, located north of the intersection with Lakewood-Farmingdale Road (CR 547).

Survey area LP01 (Figure 22, Sheet 8) was located along the western side of Lanes Pond Road and encompassed approximately 545 ft (166.1 m) of the PAPE. Ten STPs were excavated on relatively flat cut grass with a visible electrical powerline along the roadside, adjacent to a wooded area of mixed evergreen-deciduous trees (Photograph 30). The STPs demonstrated various degrees of disturbance ranging from the mixing of soils or modern trash to the presence of fill layers over intact soils (Attachment A). STP LP01.007 can be considered typical of the survey area. It contained a dark gray (10YR 4/1) sand fill layer extending to 24.8 in. (63 cm) that was mixed with gray (10YR 6/1), yellow (10YR 7/6), and light yellowish brown (10YR 6/4) soils. This fill layer overlayed a very pale brown (10YR 7/4) sand B horizon containing subrounded and rounded pebbles which was excavated to 31.1 in. (79 cm) bgs. No archaeological sites were identified, and no archaeological artifacts were encountered during the Phase IB survey of LP01. As such, no mitigation or avoidance measures are proposed, and no further archaeological work is recommended.

Photograph 30. Overview of LP01, view to the north.

Photograph 31. Overview of LP02, view to the north.

Survey area LP02 (Figure 22, Sheet 8) was located along the eastern side of Lanes Pond Road and encompassed approximately 287 ft. (87.48 m) of the PAPE. Five STPs were excavated on relatively flat cut grass along the roadside, adjacent to a wooded residential property (Photograph 31). The STPs uncovered generally intact soils with minor surface disturbance including truncation and/or mixing with modern trash (Attachment A). STP LP02.002 can be considered typical of the survey area. It contained a brown (10YR 4/3) sandy loam A horizon extending to 4.3 in. (11 cm) bgs, overlying a yellowish brown (10YR 5/6) sand B horizon with a rock content of approximately 15% quartzose pebbles that was excavated to 8.3 in. (21 cm). No archaeological sites were identified, and no archaeological artifacts were encountered during the Phase IB survey of LP02. As such, no mitigation or avoidance measures are proposed, and no further archaeological work is recommended.

2.4 POTENTIAL LARRABEE SUBSTATION and/or CONVERTER STATION OPTIONS

Atlantic Shores has identified three potential locations for the proposed Larrabee Onshore Substation and/or Converter Station in the vicinity of the Larrabee Onshore Route. Initial desktop assessment of the previously identified archaeological resources and sensitivity within two of these options was previously provided to BOEM under a confidential separate cover (EDR, 2022b)[11]. The archaeological assessment of the presented here includes and expands upon those previous assessments.

2.4.1 Lanes Pond Road Site (formerly Parcel Area 7)

2.4.1.1 Existing Conditions

Existing conditions within and adjacent to the approximately 16.3-acre Lane Pond Road Site were documented during a desktop assessment of resources and field reconnaissance completed by EDR personnel in August 2022. The Lanes Pond Road Site is made up of one parcel (Parcel ID 1321_27_5_QFARM) and is mostly open hayfields and minimal wetlands mapped in the southern portion of the site associated with Dicks Brook (Photograph 32). The Lanes Pond Road Site is bounded to the west by Lanes Pond Road, to the northeast by Miller Road, and to the southeast by railroad tracks (Figure 23).

2.4.1.2 Soils

EDR reviewed NRCS electronic data for information relating to the soils within the Lanes Pond Road Site (NRCS, 2021). Per NRCS soil data, the major soil type mapped in the Lanes Pond Road Site is Klej loamy sand, 0-5% slopes, somewhat poorly drained soils formed in unconsolidated sandy marine deposits. The Lanes Pond Road Site also contains Berryland sand deposits (BerAt), 0-2% slopes, very poorly drained (hydric) which form in sandy fluviomarine deposits associated with Dicks Brook at the southern edge of the option. Also present in the Lanes Pond Road Site are Lakehurst sand soils (LakB),

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[11] Atlantic Shores previous submitted a memorandum to BOEM in August 2022 with information on eight potential locations (Parcel Areas) for the proposed Larrabee Onshore Substation and/or Converter Station. Design decisions since the transmittal of that memorandum have resulted in the removal of six of the previously identified locations (Parcel Areas 1-6), and the addition of one location (Randolph Road Site). The designations of the two retained locations (Parcel Areas 7 and 8) have been updated to the Lanes Pond Road and Brook Road Sites. Note that the Brook Road Site (former Parcel Area 8) is proposed to be developed separately from the Atlantic Shores Offshore wind Project under the New Jersey Board of Public Utilities (NJBPU) State Agreement Approach (SAA). See Section 2.4.2 for greater details.

Photograph 32. Lanes Pond Road Site overview. The view from Lanes Pond Road showing the agricultural hay field. View to the east.

0-5% slopes, which are moderately well drained and also form in sandy fluviomarine deposits. These soils, like the Berryland soils, are not good farmland. Lakewood sands (LasB and LasC), 0-10% slopes, excessively drained, which also form in sandy fluviomarine deposits are also present. These soils are not considered to be prime farmland. Atsion sand (AtsAO), 0-2% slopes, poorly drained (hydric), derived from sandy eolian deposits and/or fluviomarine deposits are also present. These are the only soils good for farming in the project area and are present in the far eastern tip of the area, as well as adjacent to the Berryland sand along Dicks Brook. For the Klej, Lakehurst, Lakewood, and Atsion soils, depth to culturally sterile subsoil is less than approximately 2.0 ft. In the Berryland sand deposits the depth to subsoil is approximately 2.8 ft.

Mapping of the surficial geology of the Lanes Pond Road Site indicates that sediments in the area are Upper Terrace deposits, dating from the middle Pleistocene and Alluvium dating from the Holocene to late Pleistocene (Stanford et al., 2018).

2.4.1.3 Previously Identified Archaeological Sites

No previously recorded archaeological resources are located within the Lanes Pond Road Site. Three New Jersey historic properties are located along the railroad tracks bordering the eastern boundary of the Lanes Pond Road Site. The railroad corridor is listed as the New Jersey Southern Railroad Historic District (LUCY, 2022).

2.4.1.4 Previous Cultural Resource Surveys

A review of LUCY, archaeology site forms, and available online resources identified no previous cultural resource surveys were identified within the Lanes Pond Road Site.

2.4.1.5 Historical Map and Photography Review

A review of historical aerial photography depicting the area in and around the Lanes Pond Road Site revealed the following:

- Aerial photography shows the central portion of the Lanes Pond Road Site as agricultural fields as early as 1930. The northern tip of the parcel at the intersection of Lanes Pond and Miller Roads has remained wooded since that time. The farmhouse and associated outbuildings used to farm the Lanes Pond Road Site fields have historically been located on the west side of Lanes Pond Road, and no structures have been within the Lanes Pond Road Site fields with the exception of an equipment storage area at the south end of the farmed field (Historic Aerials, 2022).

- The southern portion of the Lanes Pond Road Site appears to have been farmed or used for pasture until approximately 1972. Following this it has been allowed to go fallow and revert to light woods.

In brief, the aerial photography review demonstrates that the proposed Lanes Pond Road Site has been a fairly stable mix of plowed fields and light woods since at least 1930. The character of the parcel has remained the same throughout this time period with no major disturbed areas identified.

2.4.1.6 Railroads

A Conrail railroad line runs north to south along the western boundary of the Lanes Pond Road Site. This 26-mi. rail line was built in 1860 by the Raritan & Delaware Bay Railroad, becoming the New Jersey Southern Railroad in 1870. In 1917 it became known as the Central Railroad of New Jersey until it was sold to Conrail in 1976 (MSR, 2022). A review of LUCY indicates the presence of the New Jersey Southern Railroad Historic District to the east of the Lanes Pond Road Site along the existing railroad corridor (LUCY, 2022). Since the New Jersey Southern Railroad Historic District will be completely avoided and is located outside of the PAPE, the Projects will have no effects on this linear historic property.

Figure 23 Lanes Pond Road Site Overview

2.4.1.7 Archaeological Sensitivity Assessment

Since no previously identified Native American or historic archaeological sites are mapped within the vicinity of the Lanes Pond Road Site, the area would appear to have a low sensitivity for the presence of Native American or historic archaeological resources.

NJHPO's Guidelines (see Section 1.5) advise that it may be possible to eliminate part or all of the APE from further investigation if it can be demonstrated that recent disturbance has rendered it unlikely that any potentially significant archaeological sites have survived (NJHPO, 2019). In addition, steep slopes and wetlands are unlikely to contain most types of sites. As such, no further archaeological investigation is recommended within the previously disturbed athletic fields, and they have been categorized as excluded from field survey consideration.

Outside of the athletic fields, no extensive previous ground disturbance is evident within the Lanes Pond Road Site ; as such, additional archaeological investigation is recommended within 10.87 of the 16.27 total acres (approximately 66.81%) of the Lanes Pond Road Site as indicated by the Medium sensitivity "Potential Phase IB Survey Areas" in Figure 21, Sheets 42 & 44 (if the option is ultimately chosen to site an onshore substation and/or converter station), within undisturbed wooded and agricultural areas. Pedestrian survey (with judgmental shovel testing if deemed appropriate based on observed field conditions) is recommended in any wetlands or areas of steep slope.

2.4.2 Brook Road Site (Analysis retained in the TARA assessment, but to be developed separately under NJBPU SAA)

2.4.2.1 Existing Conditions

Existing conditions within and adjacent to the approximately 99.4-acre Brook Road Site were documented during a desktop assessment of resources and field reconnaissance completed by EDR personnel in August 2022. The Brook Road Site is made up of two parcels (Parcel ID's 1321_5_3 and 1321_5_2). The Brook Road Site includes mostly upland forested area with some areas of wetlands associated with the Metedeconk River (Figure 24; Photograph 33). The Brook Road Site is bounded to the north by Randolph Road, to the east by Brook Road, to the west by the Larrabee Substation, and to the south by the North Branch of the Metedeconk River.

Figure 24. Brook Road Site Overview

Photograph 33. Brook Road Site overview. The view of the wooded parcel from Randolph Road. View to the south.

2.4.2.2 Soils

EDR reviewed NRCS electronic data for information relating to the soils within the Brook Road Site (NRCS, 2021). Per NRCS soil data, the primary soil type mapped within the Brook Road Site is Klej loamy sand, 0-5% slopes, somewhat poorly drained soils formed in unconsolidated sandy marine deposits. Lakewood sands (LasB), 0-5% slopes, excessively drained, which form in sandy fluviomarine deposits are the next most common soils type. Atsion sand (AtsAO), 0-2% slopes, poorly drained (hydric), derived from sandy eolian deposits and/or fluviomarine deposits are present in the northern portion of the Brook Road Site . Associated with the North Branch of the Metedeconk River are Berryland sand deposits (BerAt), 0-2% slopes, very poorly drained (hydric) which form in sandy fluviomarine deposits. Evesboro sand soils, 0-10% slopes (EveB and EveC) are mapped in association with these Berryland soils and the Metedeconk River. These derive from sandy eolian deposits and/or sandy fluviomarine deposits and are found on low hills. For the Klej, Lakewood, and Atsion soils, depth to culturally sterile subsoil is less than approximately 2.0 ft. In the Evesboro and Berryland deposits the depth to subsoil is greater than approximately 2.0 ft.

Mapping of the surficial geology of the Brook Road Site indicates that sediments in the area are Upper Terrace deposits dating from the middle Pleistocene, Lower Terrace deposits from the late Pleistocene, and Alluvium dating from the Holocene to late Pleistocene (Stanford et al., 2018).

2.4.2.3 Previously Identified Archaeological Sites

No previously recorded archaeological resources are located within the Brook Road Site.

2.4.2.4 Previous Cultural Resource Surveys

A review of LUCY, archaeology site forms, and available online resources identified no previous cultural resource surveys were identified within the Brook Road Site.

2.4.2.5 Historical Map and Photography Review

A review of historical maps and aerial photography depicting the area in and around the Brook Road Site revealed the following:

- The 1828 T. F. Gordon *A Map of the State of New Jersey* (Figure 18; Gordon, 1828) depicts a mill site in the vicinity of the Brook Road Site south of the existing Larrabee POI.

- Aerial photography shows the northeast portion of the Brook Road Site as farm fields as early as 1930. The farmhouse and associated outbuildings appear to be located along the west side of Brook Road at the east edge of the Brook Road Site. A large oval area, likely once a horse track, is visible on past and present aerial imagery, with subdivided fields evident within the oval road and surrounding it. This oval area could be for rotational grazing of horses and other livestock. Woods west of this oval extending to the western boundary of the Brook Road Site possibly served as a woodlot, as there are paths leading into them and open areas where trees may have been harvested. Fence lines are visible in these woods, so it is possible that livestock were kept in this area as well. Orchards appear to have been planted on the eastern end of the oval road at the edge of the complex of farm buildings, and plowed fields are evident on the east side of Brook Road. Larger trees are visible to the south of the farm, heading toward the riverbank. This area appears to be the wetlands surrounding the North Branch of the Metedeconk River, and this area does not appear to have been extensively utilized by the farm (Historic Aerials, 2022).

- Between 1947 and 1953 a complex of structures is added in the southeast corner of the Brook Road Site. This appears to be two residential structures and three outbuildings. A road connects these buildings with the main farmhouse, so it is possible these are residences for family or for laborers.

- By 1953 the farm fields on the periphery of the oval road started to show signs of neglect, and by 1970 they are almost fully wooded. The interior of the oval road is still maintained at this time, with just a few small trees within it.

- From 1972 to 1995 the interior of the oval road is overtaken with trees. By 2008 the area is completely wooded, with just a trail in place of the oval road.

- By 1995 it looks as if the original farm complex is demolished. The structures in the southeast corner of the Brook Road Site appear to be extant but it is heavily wooded around them, and it is unclear if they are occupied. These structures appear to be gone by 2006.

In brief, the aerial photography review demonstrates that most of the northeast portion of the Brook Road Site was a working farm from at least 1930 until its slow decline from 1972 until 1995. The wooded areas in the west and south of the parcel appear to have been minimally impacted by the farm's activities.

2.4.2.6 Archaeological Sensitivity Assessment

While no previously identified Native American or historic archaeological sites are mapped within the Brook Road Site, the presence of previous structures and activity areas in the eastern end of the option on historic aerial photography suggests a Medium-High sensitivity for historic resources in this area. Likewise, the southern border of the Brook Road Site parallels the north bank of the North Branch of the Metedeconk River, and this suggests a Medium sensitivity for the presence of Native American archaeological resources.

NJHPO's Guidelines (see Section 1.5) advise that it may be possible to eliminate part or all of the APE from further investigation if it can be demonstrated that recent disturbance has rendered it unlikely that any potentially significant archaeological sites have survived (NJHPO, 2019). In addition, steep slopes and wetlands are unlikely to contain most types of sites. As such, no further archaeological investigation is anticipated to be necessary within any wetlands or in areas of steep slope.

No extensive previous ground disturbance is evident within the Brook Road Site; as such, additional archaeological investigation would be recommended within 74.5 of the 99.37 total acres (approximately 75%) of the Brook Road Site, and pedestrian survey (with judgmental shovel testing if deemed appropriate based on observed field conditions) would be recommended in any wetlands or areas of steep slope. However, since the Brook Road Site is to be developed separately from the Project under the NJBPU's SAA, no Phase IB survey is proposed.

2.4.3 Randolph Road Site

2.4.3.1 Existing Conditions

Existing conditions within and adjacent to the approximately 24.6-acre Randolph Road Site were documented during a desktop assessment of resources completed by EDR personnel in November 2022. The Randolph Road Site is made up of three parcels (Parcel ID's 1321_5_3and 1321_5_2). The Randolph Road Site includes a steel fabrication facility with associated laydown yard, offices, and parking, as well as forested wetlands surrounding Dicks Brook. The location in north of Randolph road to the northeast of the existing Larrabee POI in Howell Township (Figure 25; Photograph 34). The location is bounded to the south by Randolph Road, to the east by residential lots and woodland, to the west by an existing high voltage utility corridor, and to the north by forested wetlands surrounding Dicks Brook.

Photograph 34. The Randolph Road Site overview. View of the steel fabricator facility from Randolph Road. View to the north.

Figure 25. Randolph Road Site Overview

2.4.3.2 Soils

EDR reviewed NRCS electronic data for information relating to the soils within the Randolph Road Site. Per NRCS soil data, the primary soil type mapped within the Randolph Road Site is Klej loamy sand, 0-5% slopes, somewhat poorly drained soils formed in unconsolidated sandy marine deposits. Evesboro series sands (EveD), 10-15% slopes, excessively drained, which form in sandy marine and eolian deposits are also present. Associated with the forested wetlands surrounding Dicks Brook are Berryland sand deposits (BerAt), 0-2% slopes, very poorly drained (hydric) which form in sandy fluviomarine deposits. For the Klej soils, depth to culturally sterile subsoil is less than approximately 2.0 ft. In the Evesboro and Berryland sand deposits the depth to subsoil is greater than approximately 2.0 ft.

2.4.3.3 Previously Identified Archaeological Sites

No previously recorded archaeological resources are located within the Randolph Road Site.

2.4.3.4 Previous Cultural Resource Surveys

A review of LUCY, archaeology site forms, and available online resources identified no previous cultural resource surveys were identified within the Randolph Road Site.

2.4.3.5 Historical Map and Photography Review

A review of historical maps and aerial photography depicting the area in and around the Randolph Road Site revealed the following:

- The 1828 T. F. Gordon *A Map of the State of New Jersey* (Figure 18; Gordon, 1828) depicts nothing but a few streams in the vicinity of the Randolph Road Site.

- Aerial photography shows the area completely wooded as early as 1930. Between 1947 and 1953 the portion of the Randolph Road Site between Randolph Road and Dicks Brook has been cleared, and subdivision into separate parcels (matching the present-day parcel boundaries) can be seen by a hedge row and different ground cover. By 1956, what appear to be two large barns (one in the east and one in the west) and other small structures are visible in the area. These occupy the parcels until sometime between 1972 and 1979, when the Arnold Steel facility replaces the eastern barn and the area surrounding the facility becomes a laydown yard. From 1979 to present day grading and clearing gradually expands the footprint of the laydown yard west until it encompasses is present day footprint.

- Aerial photography suggests that the northern wooded portion of the Randolph Road Site has remained relatively undisturbed from 1930 to present day.

In brief, the historical map and aerial photography review demonstrates that the Randolph Road Site was an undeveloped wooded area until the mid-1900s, at which time it was cleared and used for agriculture until the 1970's. Sometime in the mid-1970's the Arnold Steel manufacturing facility and laydown yard was constructed on the site, with the associated laydown areas gradual expanding until present day. The wooded northern portion of the area appears relatively undisturbed.

2.4.3.6 Archaeological Sensitivity Assessment

While no previously identified Native American or historic archaeological sites are mapped within the Randolph Road Site, the presence of previous agricultural structures and activity areas south of Dicks Brook on historic aerial photography suggests a Medium-High sensitivity for historic resources in this area. Likewise, the northern portion of the Randolph Road Site parallels the north bank of the North Branch of the Metedeconk River, and this suggests a Medium sensitivity for the presence of Native American archaeological resources.

NJHPO's Guidelines (see Section 1.5) advise that it may be possible to eliminate part or all of the APE from further investigation if it can be demonstrated that recent disturbance has rendered it unlikely that any potentially significant archaeological sites have survived (NJHPO, 2019). As such, no further archaeological investigation is recommended within the cleared areas of the Randolph Road Site occupied by steel fabrication facility, associated laydown yard, offices, and parking lots and they have been categorized as excluded from field survey consideration (see Figure 21).

No extensive previous ground disturbance is evident within the northern wooded portion the Randolph Road Site; as such, additional archaeological investigation is recommended within 10.66 of the 24.64 total acres (approximately 43.2%) of the Randolph Road Site as indicated by the "Potential Phase IB Survey Areas" in Figure 21, Sheets 28 & 44 (if the option is ultimately chosen to site an onshore substation and/or converter station). Pedestrian survey (with judgmental shovel testing if deemed appropriate based on observed field conditions) is recommended in any wetlands or areas of steep slope.

3.0 CARDIFF PHYSICAL EFFECTS PAPE

The Cardiff Physical Effects PAPE (Cardiff PAPE) describes onshore Project components that have the potential to result in physical effects to above ground historic properties and/or require ground disturbance that has the potential to impact terrestrial archaeological resources. The Cardiff PAPE includes the export cable Atlantic Landfall Site, the Cardiff Onshore Route, and the Fire Road Site (Figure 7; Table 7).[12] As described in Section 1.4, the width of the PAPE along the Cardiff Onshore Route is overly conservative when considering the actual 20-ft (6-m)-wide footprint of potential ground disturbance associated with open trenching during installation of the onshore cables (see Section 1.2, Figure 2-Figure 5).

Table 7. Summary of Cardiff Physical Effects PAPE

Project Component	Maximum Horizontal Effect	Maximum Vertical Effect
Cardiff Physical Effect PAPE	**342.15 ac. (138.46 ha)**	
Landfall Site(s)		
Atlantic Landfall Site	2.90 ac. (1.17 ha)	16.8 ft. (5.12m)
Onshore Substation and/or Converter Station Site(s)		
Fire Road Site	19.71 ac. (7.98 ha)	60 ft. (18.3 m)
Cardiff Onshore Interconnection Cable Route Option (s)[a]		
Cardiff Onshore Route	319.56 ac. (129.31 ha) 20 ft. (6 m) width of Open Trenching	Open Trenching 11.5 ft. (3.5 m) Specialty Installation 30 ft. (9 m)

a. Trenchless portions of the PAPE, including planned HDD and/or jack-and-bore locations, are included as part of the Onshore Routes. The maximum vertical effect of these installations is described as "Specialty Installation" in this table.

A general environmental background and historic context of the Cardiff PAPE is included in Section 3.1. Site specific information on the historical development and extent of prior disturbance for each Onshore Facility Site within the Cardiff PAPE is described in Sections 3.2 through 3.4.

[12] The *Preliminary Area of Potential Effects (PAPE) Memorandum*, which was submitted to BOEM as Appendix I-A of the COP, included substation locations referred to as "Preferred" and "Alternate" (EDR, 2021b). Note that both substation locations from that initial COP filing have been removed from consideration, and replaced with the Fire Road Site.

3.1 CARDIFF PAPE GENERAL BACKGROUND AND RESEARCH

3.1.1 Research Sources

EDR reviewed the following primary and secondary sources to assess the potential for previously unidentified cultural resources within the Cardiff PAPE. Digital collections, online databases, archives, and repositories consulted included the following:

- NJHPO LUCY online database
- New Jersey State Museum archaeological site files
- Library of Congress (LOC) digital collections
- LOC Historic American Building Survey/Historic American Engineering Record digital collections
- New Jersey Historical Society digital collections
- Atlantic County Historical Society website
- David Rumsey Map Collection database
- NRHP nominations as provided by the NPS
- New Jersey State Library Genealogy and Local History collection
- New Jersey State Archives online catalog
- Online academic journal databases.

In addition, local and regional histories were consulted, including the following:

- *Early History of Atlantic County, New Jerse*y by Laura Willis (1915)
- Greater Egg Harbor Township Historical Society website (2020)

The following historical mapping and community management documents were consulted:

- 1828 *A Map of the State of New Jersey: With Part of the Adjoining States* by T. Gordon
- 1860 *Topographical Map of the State of New Jersey* by G.M. Hopkins
- 1864 *Absecom Inlet, New Jersey* by A.D. Bache (Figure 29)
- 1872 *State Atlas of New Jersey* by F.W. Beers
- 1872 *"Topographical Map of Atlantic County, New Jersey: From Recent and Actual Surveys." In State Atlas of New Jersey: Based on State Geological Surveys and From Additional Surveys* by F.W. Beers (Figure 35)

- 1878 *"The State of New Jersey," in Historical and Biographical Atlas of the New Jersey Coast* by Howell, G.W.
- 1888 *A Topographical Map of Egg Harbor and Vicinity including the Atlantic Shore from Barnegat to Great Egg Harbor* by Cook, G.H., Smock, J.C., and Vermeule, C.C. (Figure 36)
- 1893 USGS 1:62,500-scale Topographical Map, *Great Egg Harbor, N.J*. Quadrangle
- 1894 and 1941 USGS 1:62,500-scale Topographical Maps, *Atlantic City, N.J*. Quadrangle (Figure 37)
- 1918 USGS 1:62,500-scale Topographical Map, *Great Egg Harbor, NJ*. Quadrangle
- 1943 USGS 1:62,500-scale Topographical Map, *Pleasantville, N.J*. Quadrangle (Figure 37)
- 1886, 1896, 1906, 1921, and 1943 Sanborn Fire Insurance Maps for Atlantic City, NJ (Figure 30)
- 1886,1891, and 1903 Sanborn Fire Insurance Maps for Egg Harbor City, NJ
- 1906,1911, and 1924 Sanborn Fire Insurance Maps for Pleasantville, NJ
- Historical cartography provided online by Rutgers University
- 2000 *Atlantic County Master Plan* by Atlantic County Department of Regional Planning and Economic Development
- 2002 *Egg Harbor Township Master Plan* by Mott, Polistina & Associates, LLC (Polistina 2002)
- 2008 *City of Pleasantville Master Plan* by Remington, Vernick & Walberg Engineers (Wiser and Walberg 2008).

3.1.2 Environmental Setting

Sea levels along the east coast of North America reached their late Pleistocene nadir during the Last Glacial Maximum, between approximately 26,500 and 20,000 years ago. Deglaciation began in the Northern hemisphere approximately 20,000 years ago and in Antarctica approximately 14,500 years ago. Although physically distant, the timing of deglaciation in Antarctica is relevant to the current along coastal New Jersey because it introduced a large volume of water into the oceans which drastically increased the rate of global sea level rise between approximately 14,500 years ago and 10,000 years ago (Clark et al., 2009). The significantly lower sea levels during glaciation meant that large expanses of the eastern North American continental shelf were exposed, providing habitat for plants and animals, as well humans. In the words of Stanford and Bradley (2012: 91): "during the last ice age the western Atlantic shelf was a vast and environmentally rich plain stretching from the Grand Banks off Newfoundland to Florida and around the Gulf of Mexico." Lower sea levels during the late

Pleistocene epoch and extending into the early Holocene, the outer coastal plain of New Jersey extended the coastal plain to the east by 60 to 80 mi. (97 to 129 km) (Stanzeski, 2005: 58).

In eastern North American, rising sea levels gradually inundated the coastal plain between approximately 20,000 and 10,000 years ago (with the rate of sea level rise increasing between approximately 14,500 and 10,000 years ago), temporarily creating a biotically rich estuarine environment which was also eventually inundated (Stanford and Bradley, 2012: 111). Sea levels along the east coast of North America have continued to rise throughout the last 10,000 years, although at much reduced rates compared to the period between approximately 20,000 and 10,000 years ago.

The Cardiff PAPE is located along the Atlantic Ocean shoreline of New Jersey within the broad, low relief Outer Coastal Plain physiographic province, which formed from rising and falling sea levels over the Cenozoic Era (Figure 26). Subsequently, bedrock and older sediments in this physiographic province are derived from marine and littoral sediments as well as riverine and alluvial deposits originating from the eroding Appalachian Mountains to the west. More recent deposits consist of outwash plains formed during the Pleistocene Epoch and accelerating with the retreat of the Laurentide Ice sheet approximately 12,000 years ago (National Park Service [NPS], 2018; Newell et al., 1998).

The deeper underlying unit below the Outer Coastal Plain is made up of unconsolidated sediments that mainly consist of gravels, sands, and clays that gradually decrease in depth with increasing distance from the coastline, before merging into the Inner Coastal Plain province that precedes the Piedmont further inland. The farthest southern advance of glacial ice during the Pleistocene Epoch terminated north of the Outer Coastal Plain in northern New Jersey and did not significantly alter the composition or relief of the Outer Coastal Plain. However, Pleistocene glaciation created significantly lower sea levels than at present due to the massive amount of seawater absorbed into ice sheets in the northern hemisphere. Sea levels were as much as 394 ft. (120 m) lower than the present day in various settings in North America during the Pleistocene (Gornitz, 2007). As ice sheets melted during the terminal Pleistocene and early to middle Holocene (between approximately 20,000 and 4,000 years ago), global sea levels rose and submerged large areas of once habitable land, including land east of the present New Jersey shoreline. Global sea levels stabilized at current levels approximately 4,000 years ago but seaward coastal conditions and estuaries continued to evolve as they do at the present time.

Like other coastal areas along the North American eastern seaboard, there are relatively few perennial streams in the vicinity of the Cardiff PAPE. The closest named stream to the Cardiff POI, Patcong Creek, drains areas south of the Cardiff Onshore Route and numerous bays, islands, and inlets separate the upland area of Egg Harbor Township from Absecon Island. This is a barrier island that stretches for approximately 8.0 mi. (12.9 km) northeast to southwest, from Absecon Inlet in the north to Great Egg Harbor Inlet in the south. The maximum width of the island is 1.8 mi. (2.9 km). Much of the island is developed for leisure, hotels/resorts, and vacation homes within Atlantic City, with Ventnor City, Margate City, and Longport to the south of Atlantic City.

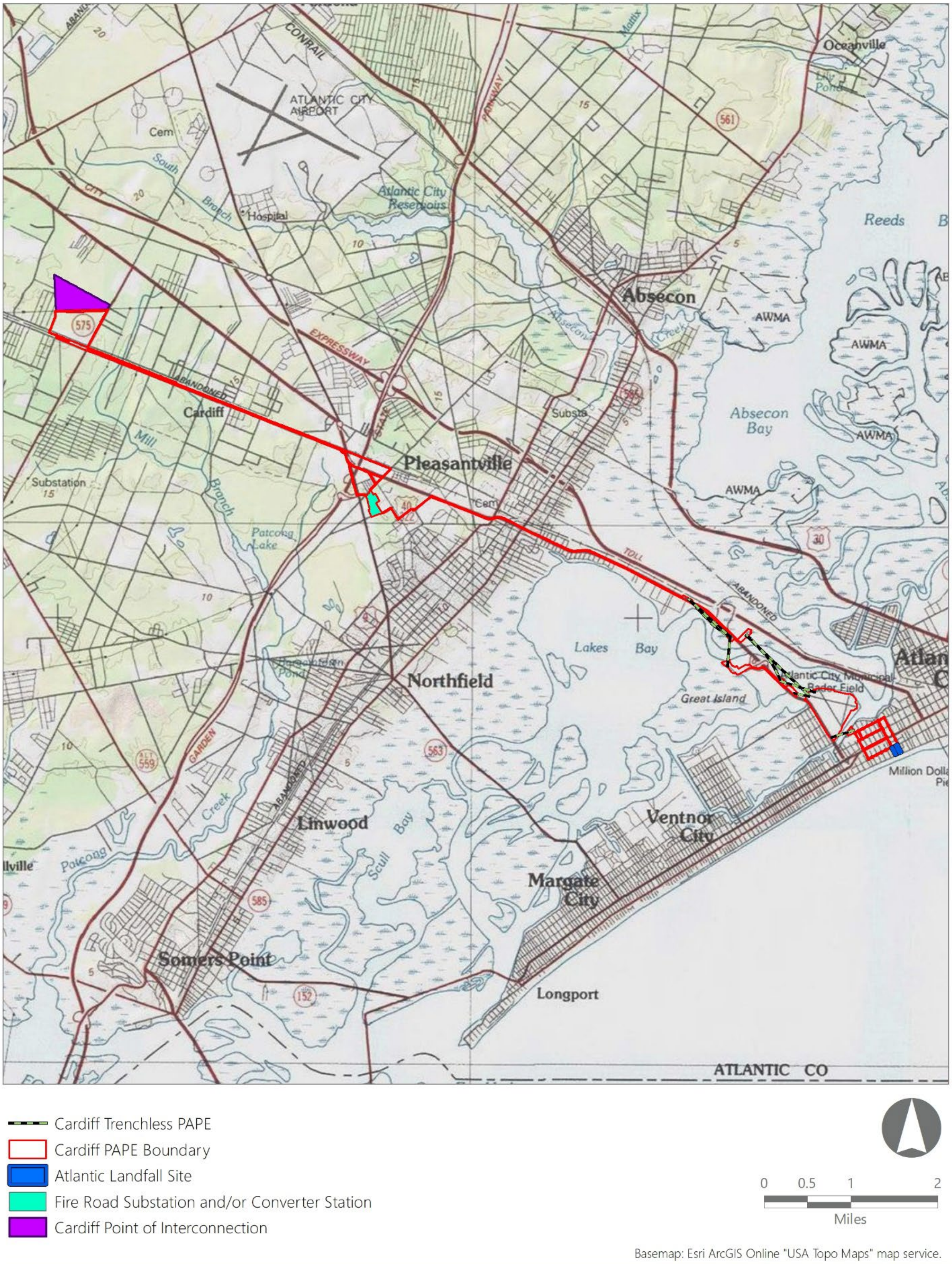
3.1.3 Historic Context

The following cultural context summarizes the Native American and Euro-American settlement of coastal New Jersey as they relate to cultural resources which may be present in the vicinity of the APE. Table 3 (from Section 2.1.3) provides a summary of Native American cultural periods that are typically recognized by archaeologists.

The earliest people to occupy the coastal plain of New Jersey likely focused their subsistence along the plains and estuaries now submerged under the Atlantic Ocean (Stanzeski, 2005). Therefore, due to rising sea levels, many of the earliest archaeological sites in the region are now underwater. Similar to other coastal regions of eastern North America, few archaeological sites representing the Pre-Clovis, Paleoindian, and Early Archaic Periods (i.e., spanning between approximately 13,000 and 8,500 years ago) have been identified along coastal New Jersey (Shrabisch, 1915, 1917; Skinner and Shrabisch, 1913; Stanzeski, 1996, 1998).

However, undisturbed Pre-Clovis (i.e., pre-13,000-year-old) archaeological sites in the region would likely be located on the now-submerged continental shelf east of the present New Jersey shoreline (Stanford and Bradley, 2012). It is also possible early sites dating to the Paleoindian and Early Archaic periods, if they exist on modern-day terrestrial coast of New Jersey, have been overlooked in previous investigations because they often consist of relatively small, low density lithic scatters lacking diagnostic bifaces and dateable carbon-bearing features. This is reflective of the fact that the earliest

Figure 26. Proposed Cardiff Onshore Route and Facilities – Topographic Conditions



human groups who occupied the landscape were highly mobile, existed in relatively low population densities, and did not use ceramic technologies (Ritchie and Funk, 1973).

The Middle and Late Archaic Periods (8,500 to 3,000 years ago) on the coastal plain of New Jersey is characterized by higher mobility, which was likely patterned by seasonal subsistence strategies. Population density increased at a greater rate during these periods than during previous periods and settlement was characterized by small seasonally occupied settlements located in riverine, lacustrine, and coastal environments. This settlement pattern took advantage of the wide variety of natural resources, including marine resources that were available across coastal settings after sea levels stabilized to near present levels (Chesler, 1982). Diagnostic artifacts and features that indicate a Middle Archaic period occupation include Stanly Stemmed and Neville projectile point types with shallow basal notching, while Late Archaic bifaces and tool kits are marked by non-local sources of lithic materials, such as rhyolite and porphyry (Chesler, 1982; Custer, 2001). Late Archaic projectile points have been further characterized by Small Stemmed and the later Susquehanna point traditions in southern New Jersey. The stabilizing oak-chestnut-hickory forests of the eastern Atlantic seaboard began to support larger populations of medium sized game like deer and turkey that in turn led to higher human populations. Sites dating from the Late Archaic further suggest that higher population density led to greater exploitation of niche ecosystems, smaller game, and more attention paid to nuts and wild cereal grains for food (Chesler, 1982). Decreasing mobility coupled with the funerary practice of cremation points to increasing attention to semi-permanent settlements and territoriality (Spier, 1915; Veit and Bello, 2001).

The later portion of the Late Archaic period is referred to as the Transitional Archaic/Terminal Archaic period (Stewart et al., 2015). Trends observed during this Transitional Period include further development of extensive trade networks (Grossman-Bailey, 2001; Stewart et al., 2015). The Transitional Period spanning between the Late Archaic and Early Woodland Periods is defined by somewhat high residential mobility, likely on a seasonal basis to pursue small scale exploitation of marine resources, especially shellfish, during optimum harvest seasons and while shifting to terrestrial, upland resources during other seasons. Coastal camp sites dating to the Transitional Period often contain shell middens, such as the Tuckerton Shell Mound in Burlington County, New Jersey. The period is characterized by material culture that includes small shell middens, formal cemeteries, and distinctive Orient fishtail stemmed projectile points which were often made of locally procured quartzite and occasionally quartz. An important technological change from the Late Archaic Period was the appearance of soapstone vessels that preceded ceramic cultures (Braun, 1974; Ritchie and Funk, 1973; Stewart et al., 2015).

The Early Woodland Period (3,000 to 2,000 years ago) is characterized by a foraging tradition combined with an intensive exploitation of marine resources and the introduction of ceramic technology. Increased sedentism during this period caused large communities to converge on more permanent settlements. These large, semi-permanent settlements left a more distinct material culture trace, and as a result are more archaeologically expressed than the smaller campsites dating to earlier periods. Material culture dating to this period in the Outer Coastal plain is most often included in the Cadwalader Complex which includes the first appearance of early ceramic technology with flat-bottomed vessels, large shell middens/shell rings, and broad side-notched projectile points. Early woodland ceramics tend to be coarser and unrefined in construction, tempered with steatite and quartz, and are rarely extensively decorated (Tuck, 1978).

The Middle Woodland Period (2,000 to 1,000 years ago) is distinguished from earlier periods by increased evidence of foraging and intensive exploitation of marine resources, but also the first appearance of horticulture throughout the Middle Atlantic region and the Atlantic coast. Horticultural economies allowed larger communities to remain sedentary for much of the year, utilizing more resources available around these settlements but with groups rarely exceeding 50 persons. Material culture traditions that are well expressed during the Middle Woodland Period in New Jersey include the Meadowood Culture, which consists of lithic toolkits including various styles of quartz lobate, stemmed, and side-notched projectile points, as well as shell tempered undecorated ceramics, followed by the Fox Creek Culture that placed heavier preference on fishing than upland game (ASNJ, 2013).

During the Late Woodland Period (1,000 to 400 years ago), groups along the coast of New Jersey occupied large villages and engaged in intensive marine and riverine resource exploitation, and terrestrial hunting. Archaeological evidence, including exotic trade goods, indicates complex relationships with both surrounding and more distant cultures which facilitated trade as well as the spread of technologies and cultural practices including ceremonial use of tobacco (Chesler ed., 1982; Veit and Bello, 2004). Usage of decorated ceramics increased dramatically, which has been useful to archaeologists in defining distinct cultural traditions, or *phases*, tied to different areas of the Middle Atlantic region. These phases include a wide variety of projectile point types and a high frequency of triangular projectile points made of local quartz and quartzite, plus exotic traded materials such as rhyolite and chalcedony. Large shell rings, middens, and decorated ceramics (e.g., Overpeck Incised, Bowmans Brook Incised, and Riggins Fabric-Impressed) are also all prevalent during this period (Chesler, 1982). Resource use changed from Paleo-Indian to Late Woodland times, and though the inhabitants of the Outer Coastal Plain remained hunter-gatherers, their use of local food and lithic resources increased (Grossman-Bailey, 2001).

At the time of contact between Native Americans and Europeans, in the sixteenth and seventeenth centuries, the Lenni Lenape people inhabited present day coastal areas and the interior of New Jersey. The local branch was the Unalachtigo Lenape, or the "people who live near the ocean" (Snyder 1969). Within the Cardiff PAPE, Absecon Island (occupied today by Atlantic City) was visited by the Lenni Lenape in the summer months via a trail through the marshland which was located approximately where Florida Avenue is today (City of Atlantic City, 2021). However, contact-period Native American archaeological sites for the coastal region are rare and poorly characterized due to loss of sites from later periods of development and increasing erosion of shorelines and stream and riverbanks.

The first European voyagers included the Dutch, Finns, and Swedes, who founded competing trade settlements along the coast from present-day Cape May to Trenton and into the Delaware River valley. The Finnish and Swedish colonies, however, did not receive enough support from their respective home countries, and suffered from a lack of financial and human resources. In 1655, Peter Stuyvesant sent a fleet of Dutch ships to raid the Finnish and Swedish settlements, resulting in the Dutch taking over control of the area for New Netherland (Meredith and Hood, 1921; Snyder, 1969).

The New Jersey colonies came under English control when the Dutch surrendered New Amsterdam in 1664. For the next century, emigres from Holland, Huguenots from France, and Scots, among others, made New Jersey their home. During this early colonial period, the colony was split into two halves, East and West Jersey. In 1693, Great Egg Harbor Township, or simply Egg Harbor, was formed. During the American Revolution, southern New Jersey was the site of many battles and for four months in 1783, the city of Princeton served as the capitol of the United States (Meredith and Hood, 1921; Snyder, 1969).

Atlantic County was formed in 1837 from the Townships of Egg Harbor, Galloway, Hamilton, and Weymouth (Snyder, 1969). The first deed sold in Atlantic County was in the Township of Egg Harbor in the same year. An economy around the production of iron arose in the early nineteenth century in the vicinity of Egg Harbor City, but the ore supplies were exhausted by the turn of the century (Hall, 1900). In addition, Cape May and Atlantic City emerged as major resort attractions on the Atlantic Ocean during the nineteenth century. In 1854, a rail line connecting the seashore to areas inland was constructed through Egg Harbor Township, which precipitated growth. By the turn of the twentieth century, most of the residents in Atlantic County lived in Atlantic City (Morrison, 1950; Atlantic County Planning, 2000). During the early-twentieth century, Egg Harbor Township was also a center for the manufacturing of cut glass and textiles (Meredith and Hood, 1921).

During the first half of the twentieth century, Atlantic County, specifically Atlantic City, continued to grow and remain popular. However, during the second half of the twentieth century, the population shifted from Atlantic City to the suburban county areas, following the nation-wide trends. In 1976, New Jersey passed an act which legalized gambling in Atlantic City. Consequently, fears of an economic boom in the suburban areas prompted various environmental conservation laws to protect the natural resources from improper development and suburban sprawl. At the beginning of the twenty-first century, Atlantic County was undergoing gentrification in some populated areas where the transition from multi-family apartment housing to new single-family dwellings occurred. In the suburban areas, senior housing developments were built in response to the region's aging population (Atlantic County Planning, 2000).

3.2 ATLANTIC LANDFALL SITE

3.2.1 Existing Conditions

Existing conditions within and adjacent to the Atlantic Landfall Site were observed and photographed during an archaeological reconnaissance completed by EDR personnel on September 14, 2021. The reconnaissance included walking to or across the proposed location for the Atlantic Landfall Site. Recent aerial imagery of the Atlantic Landfall Site is included as Figure 27 and photographic documentation is provided below.

The Atlantic Landfall Site is currently occupied by a paved parking lot and roadway (Figure 27; Photograph 35). This area and its surroundings are highly developed; evidence of multiple buried utilities and stormwater drainage infrastructure was observed. Preliminary mapping from the Project's constructability report also confirms a dense web of buried utilities throughout the Atlantic Landfall Site and Cardiff Onshore Route (Power, 2021a).

Photograph 35. Overview of the proposed Atlantic Landfall Site in a paved parking lot along California Avenue. View to the south.

3.2.2 Soils

EDR reviewed ESRI and NRCS electronic data for information relating to the soils within the Cardiff PAPE (NRCS, 2021). EDR also reviewed preliminary geotechnical data and soil boring logs prepared for the Cardiff Onshore Route (Terracon, 2022). The locations of the soil borings are depicted in Figure 30.

Per NRCS soil data, two distinct soil units are present within the proposed Atlantic Landfall Site between Pacific Avenue and the boardwalk in Atlantic City, New Jersey, representing the primarily coarse sand to sand composition of soils in the vicinity:

- Psamments (PssA) – Gravelly coarse sand to sand, 0-5% slopes. This soil type is well drained and formed from unconsolidated sandy marine deposits on dunes. Derived from sandy human transported material. Found on flats and foot slopes. Comprises approximately 98% of the proposed Atlantic Landfall Site.

- Hooksan-Urban land complex (HoruBr) – Sand, 0-10% slopes. This soil type is excessively drained and derived from eolian sands. Found on dunes on barrier islands. It comprises

Figure 27. Atlantic Landfall Site Overview

approximately 2% of the proposed Atlantic Landfall Site. Its classification as urban land denotes potential human alteration/disturbance of the area.

Depth to subsoil is mapped as approximately 0.5 to 1.0 ft (0.15 to 0.3 m) within the Atlantic Landfall Site (NRCS, 2021). The nearest geotechnical core (B-21-07, near Pete Palitto Field at the intersection of Fairmont and Sovereign Avenue) conducted for the Cardiff Onshore Route encountered the water table at 3.0 ft. (0.91 m) below ground surface and approximately 13 ft. of fill material overlying a thin layer of natural organic clay and loose sandy subsoil.

As noted previously, Atlantic Shores has elected to site the proposed Atlantic Landfall Site within an existing, previously disturbed parking lot and roadway where disturbance during building demolition (see Section 3.2.3) and installation of the existing infrastructure likely exceeded the depth of archaeological deposits. This siting strategy avoids or significantly reduces potential impacts to adjacent undisturbed soils and avoids or minimizes the risk of potentially encountering undisturbed archaeological deposits throughout the Atlantic Landfall Site.

3.2.3 Previously Identified Archaeological Sites

No previously recorded archaeological sites are located within the proposed Atlantic Landfall Site. One archaeological site (28-At-028) identified approximately 0.51 mi. (0.82 km) from the proposed Atlantic Landfall Site is summarized in Table 8 and depicted on Figure 28.

Table 8. Previously Identified Archaeological Sites [redacted] of the Atlantic Landfall Site

Site Number	Site Name	Distance and Direction from PAPE	NRHP Eligibility	Time Period/s	Cultural Affiliation
28-At-028	Greenhouse	[redacted]	Undetermined	Late 19th to early 20th century	Euro-American

- The Greenhouse Site (28-At-028) [redacted] Information from the NJSM site form explains that Stage II investigations carried out in 1985 revealed five subsurface pit features containing a mix of nineteenth- and early twentieth-century architectural and household artifacts including glass bottles, ceramics, animal bone, eggshell, clothing and miscellaneous personal items. Since the time of survey, the site has been developed and is currently occupied by retail stores, restaurants, and parking lots (Google, 2021).

While the proposed Atlantic Landfall Site does not fall within any previously identified archaeological sites, a review of LUCY shows that the Site encompasses or is adjacent to five previously identified historic properties in the city blocks south of Pacific Avenue, between California Avenue and Iowa Avenue. These properties are summarized in Table 9.

Table 9. Previously Identified Historic Properties within or adjacent to the Atlantic Landfall Site

Bounding Streets	Historic Property Name	Within/Adjacent to landfall site	NRHP Eligibility	Condition
S. California / S. Bellmont	102 S. California	Within S. California parking lot parcel	Not eligible	Demolished
S. California / S. Bellmont	118 S. California	Within S. California parking lot parcel	Not eligible	Demolished
S. California / S. Bellmont	120 S. California	Within S. California parking lot parcel	Not eligible	Demolished
S. California / S. Bellmont	111 S. "Trophy House"	Within S. California parking lot parcel	Not eligible	Demolished
S. Bellmont / S. Iowa	Ritz Carlton Hotel	Adjacent to S. California parking lot parcel	Individually Eligible	Standing

Four of the historic properties listed in Table 9 (with the exception of the Ritz Carlton Hotel) were identified during a 1979 survey of historic sites in Atlantic City and are listed as "Not Eligible" and demolished in the LUCY database (NJHPO, 2021; Upenn, 1980). The September 14, 2021 reconnaissance conducted by EDR staff observed a paved parking lot in the mapped vicinity of the demolished properties (Photograph 35). The historic Ritz Carleton Hotel property, which is southwest adjacent to the potential California Avenue parking lot landfall, is currently in use as residences/condominiums.

Figure 28. Previously Identified Archaeological Sites [redacted] of the Atlantic Landfall Site
Confidential – Not for Public Distribution

[redacted]

3.2.4 Previous Cultural Resource Surveys

A review of LUCY, archaeology site forms, and available online resources identified the following previously conducted cultural resource surveys with associated cultural resources adjacent to or intersecting the proposed Atlantic Landfall Site:

- The 1979 intensive architectural survey titled *Historic Sites Inventory [Atlantic City*] by Nancy Bloom identified multiple historic properties in Atlantic City (Bloom, 1979). These properties were previously summarized in Table 9.

- The 1980 intensive architectural survey titled *Atlantic City Historic Building Survey* by the Graduate School of Fine Arts, University of Pennsylvania (Upenn) identified multiple historic properties in Atlantic City (Upenn, 1980). These properties were previously summarized in Table 9.

3.2.5 Historical Map and Photography Review

A review of historical maps and aerial photography depicting the area in and around the Atlantic Landfall Site revealed the following:

- The 1828 *A Map of the State of New Jersey: With Part of the Adjoining States* by Gordon, T. depicts the Atlantic Landfall Site as undeveloped on a barrier island labeled Absecum (today Absecon) Beach (Gordon, 1828). A salt works is depicted to the northeast of the proposed landfall site at the inlet to Absecon Bay.

- The 1864 *Absecom Inlet New, Jersey* by A.D. Bache depicts the early layout of Atlantic City, following the City's incorporation in 1854 (Figure 29; Bache, 1864; City of Atlantic City, 2021). The original city is laid out in a grid pattern that remains largely identical to this day, with the southwest to northeast oriented Pacific and Atlantic Avenues running the length of the developed areas. The Camden and Atlantic Railroad is clearly visible running along Atlantic Avenue.

- The 1886 and 1896 Insurance Maps of Atlantic City, NJ by the Sanborn-Perris Map Co. clearly depict the proposed Atlantic Landfall Site (Figure 30; Sanborn, 1886, 1896). The street and city block configuration depicted in these maps remains the same as the present-day configuration. Most lots south of Pacific Avenue and west of South Florida Avenue (encompassing the area of the proposed Atlantic Landfall Site) are largely vacant, with a few wood frame structures depicted. Subsequent years of the Sanborn maps depict increasing development of the city blocks in the area of the proposed Atlantic Landfall Site.

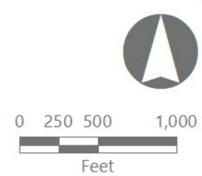
- The 1894 USGS 1:62,500-scale Topographical Map, *Atlantic City, N.J.* illustrates the same street and city block configuration seen in the late nineteenth-century Sanborn mapping (USGS, 1984; Sanborn, 1886, 1896). The 1941 USGS 1:62,500-scale Topographical Maps, *Atlantic City, N.J.* shows significant expansion of the Atlantic City footprint to the northwest and south, with land reclamation and development in areas previously mapped as tidal flats (subsequently depicted in Figure 36 in Section 3.3.5; USGS, 1941).

- Historical aerial imagery from 1920 depicts approximately eight residential properties in the northern portion of the block in what is now the parking lot located south of the intersection of Pacific and California Avenues (Historic Aerials, 2021). Another structure is depicted in the south along the boardwalk. Additional development and improvement of the lot is visible between 1931 and 1970. In 1984, imagery no longer depicts any standing structures, and a parking lot covers the entire city block (similar to the conditions observed during the reconnaissance visit by EDR staff previously discussed in Section 3.2.1).

In brief, the historical map review demonstrates that the proposed Atlantic Landfall Site was an undeveloped beach on Absecon Island before the construction of Atlantic City and its associated street grid. The layout of the streets within the proposed Atlantic Landfall Site has remained largely unchanged from their original establishment to today. Residential and commercial development increases over time. The parking lot for the proposed Atlantic Landfall Site is shown to at one time be partially occupied by structures that have since been demolished.

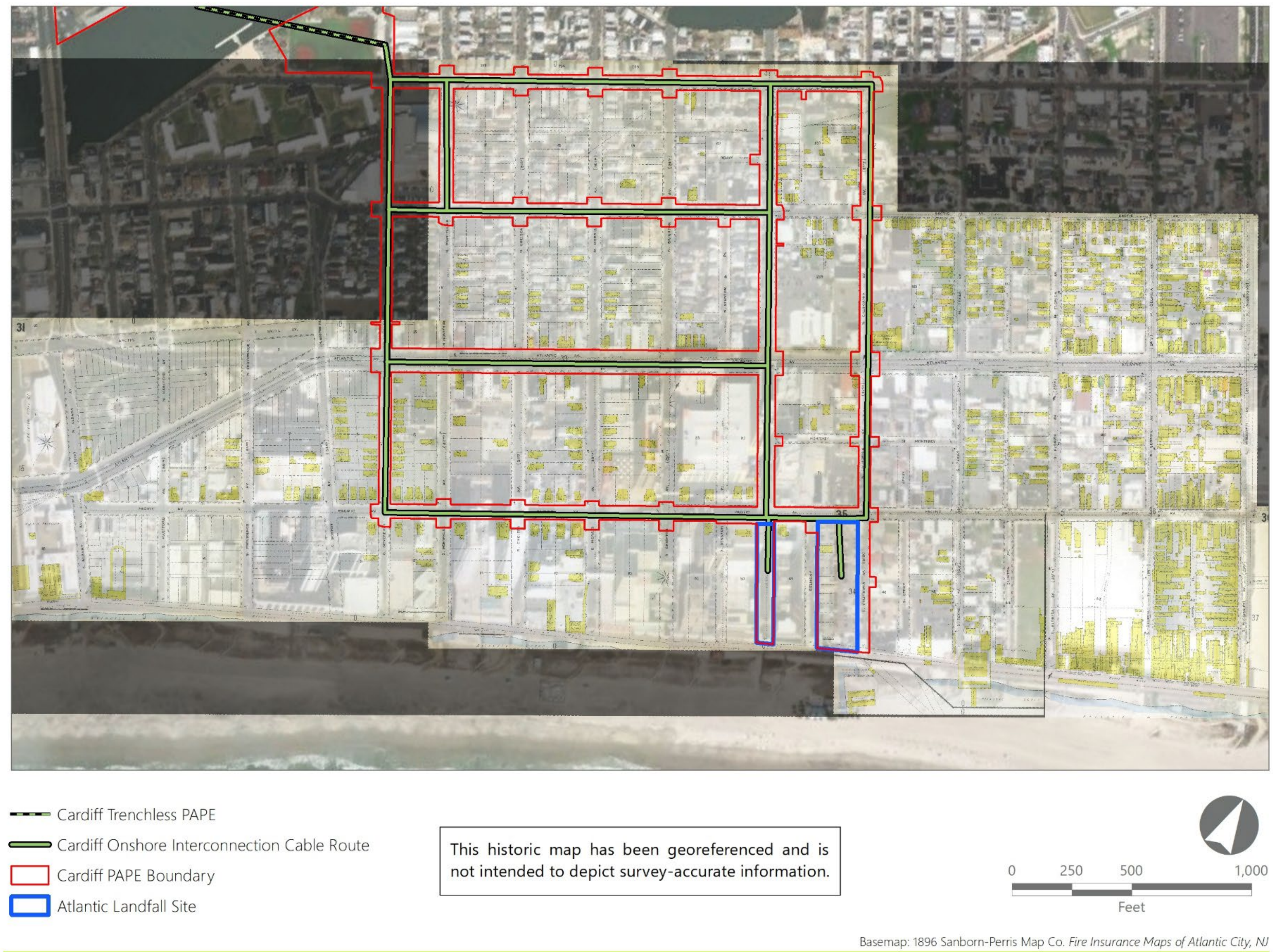
Figure 29. 1864 *Absecom Inlet, New Jersey* by A.D. Bache

This historic map has been georeferenced and is not intended to depict survey-accurate information.



Basemap: 1864 A.D. Bache *Absecom Inlet New Jersey*

Figure 30. 1896 Fire *Insurance Maps of Atlantic City, NJ* by Sanborn-Perris Map Co.



3.2.6 Archaeological Sensitivity Assessment

Though there are no previously identified archaeological sites within the Atlantic Landfall Site, background research (Section 3.1.3) indicates that Native American groups utilized the area. Furthermore, historical map review and aerial photography (Section 3.2.5) illustrate continuous historical habitation and use of the area since at least the mid-nineteenth century to present day. Due to those factors the Atlantic Landfall Site should be considered to have a Medium-High sensitivity for the presence of both Native American and historic-period archaeological resources, if not for prior ground disturbance. However, due to extensive and well documented historical development, it is unlikely that intact previously undocumented Native American archaeological sites exist within the Atlantic Landfall Site.

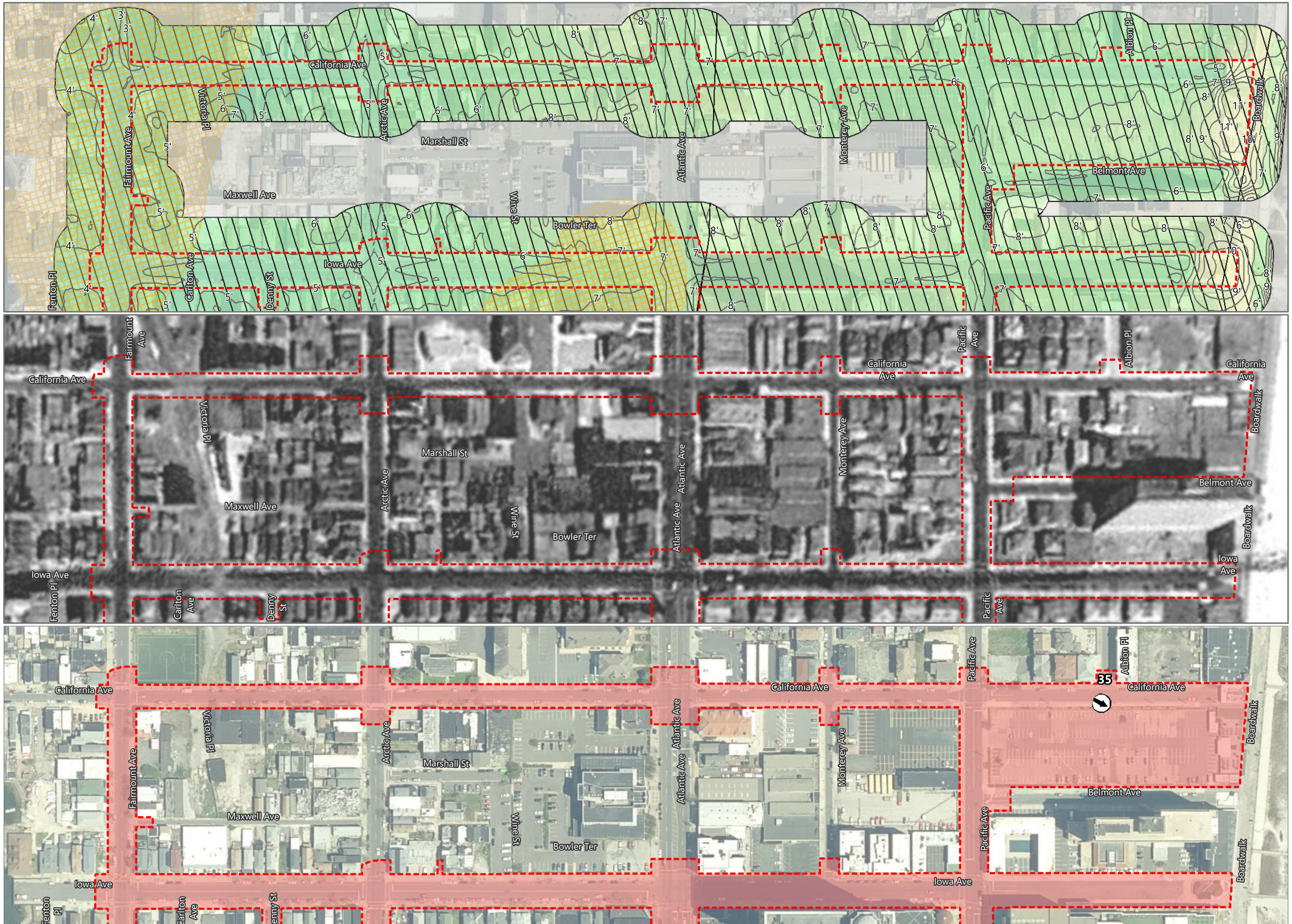
The layout of streets in Atlantic City is well established. Historical maps and aerial images depict the street and block within the proposed Atlantic Landfall Site has maintained its respective position since originally constructed. This fact suggests that it is unlikely that intact, undocumented historic-period archaeological sites or structures would be located within the street ROWs. In addition, observations of current street conditions documented multiple buried utilities and drainage infrastructure, which would lead to significant disturbance beneath the streets (in addition to the disturbance from original street construction). As such, the in-street portion of the Atlantic Landfall Site have a low sensitivity for intact historic-period archaeological resources.

The potential parking lot landfall currently under consideration has a map-documented history of previous structures which were subsequently demolished. South of the intersection of Pacific and California Avenues, a review of LUCY showed four identified historic properties which were determined not eligible for the NRHP and ultimately demolished. The previous determination that identified properties were not NRHP eligible, in combination with the previous disturbance form building demolition and parking lot construction, suggests that it is unlikely that significant, intact historic-period archaeological sites or structures would be located within the Atlantic Landfall Site.

NJHPO's Guidelines (see Section 1.5) advise that it may be possible to eliminate part or all of the APE from further investigation if it can be demonstrated that recent disturbance has rendered it unlikely that any potentially significant archaeological sites have survived (NJHPO, 2019). In addition, steep slopes and wetlands are unlikely to contain most types of sites.

As such, no further archaeological investigation is recommended within the Atlantic Landfall Site as it has been categorized as "Previously Disturbed" and excluded from field survey consideration (Figure 31). Slope is not a significant factor in the archaeological sensitivity of the APE as the proposed Atlantic Landfall Site is predominately located across flat to gently sloping terrain. Previous ground disturbance is evident and significant throughout the Atlantic Landfall Site and vicinity, largely a result of the construction of the roadway and parking lot, and the demolition of previous structures. Grading and construction of the roadway and parking lot would have significantly disturbed, if not destroyed, any archaeological sites that predated construction. Other sources of disturbance include the trenching of buried utilities and drainage infrastructure that are collocated with existing roadways and sidewalks.

Figure 31. Atlantic Landfall Site - Archaeological Reconnaissance and Desktop Assessment Results



Atlantic Shores South Offshore Wind Project – Onshore Interconnection Facilities

Monmouth and Atlantic County, NJ

Terrestrial Archaeological Resources Assessment

Top Map - Soil and Topography

- Cardiff PAPE Boundary
- 2ft Contour
- Historic Fill

Soil Condition

- Disturbed

Value

High : 23.1283

Low : 3.58291e-39

Middle Map - 1940 Aerial & Mapped Resources

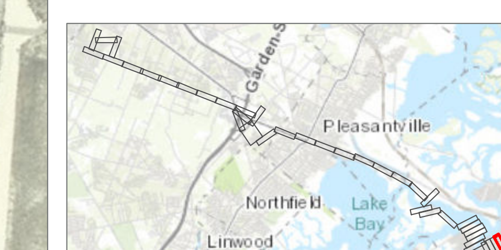
- Cardiff PAPE Boundary

Bottom Map - Archaeological Sensitivity Results

- Cardiff PAPE Boundary
- Photograph Location

Archaeological Sensitivity

- Area Excluded from Field Survey Consideration



0 50 100 200

Feet

Prepared December 7, 2023

Basemap: NJ Office of Information Technology and Office of GIS "NJ 2020 Natural Color Imagery" & "New Jersey Black White 1940" Map Service

EDR

3.3 CARDIFF ONSHORE ROUTE

3.3.1 Existing Conditions

Previous ground disturbance throughout the Cardiff Onshore Route vicinity has been intense over the past century, during which time the area endured significant development and transformed into a densely populated and commercially developed sprawling suburban landscape. This transformation occurred relatively quickly as large tracts of land were developed during the twentieth century and uniformly subdivided neighborhoods were constructed for a rapidly growing population of Americans. Development throughout the Cardiff Onshore Route vicinity continues to the modern day as new residences, businesses, and recreational facilities are constructed within interstitial pockets of undeveloped land. This development would have significantly disturbed, if not destroyed, any archaeological sites that may have been present within now-developed areas. Limited to the Cardiff Onshore Route specifically, this disturbance is predominately the result of road and railroad construction and maintenance.

Existing conditions within and adjacent to the Cardiff Onshore Route were observed and photographed during archaeological reconnaissance completed by EDR personnel on September 22, 2020, December 3, 2020, September 14, 2021, and June 13, 2022. The reconnaissance included observation of the proposed Cardiff Onshore Route which was detailed in Section 1.3. An overview of the Cardiff Onshore Route is included as Figure 32, while more detailed aerial imagery is included in Figure 33. Photographs of the existing conditions within the Larrabee Onshore Route are provided below.

As discussed in Section 1.3, from the location of the Atlantic Landfall Site the Cardiff Onshore Route will split into separate routes and/or routing options and run within the road ROWs of multiple Atlantic City streets. At the intersection of Sovereign and Fairmount Avenues, all of the separate routes are expected to rejoin as a single route within the athletic fields west of the intersection, for a planned HDD crossing of the Intracoastal Waterway to the portion of Bader Airfield along US Route 40 (Figure 33, Sheet 1; Photograph 36 and Photograph 37).

Figure 32. Cardiff Onshore Route Overview

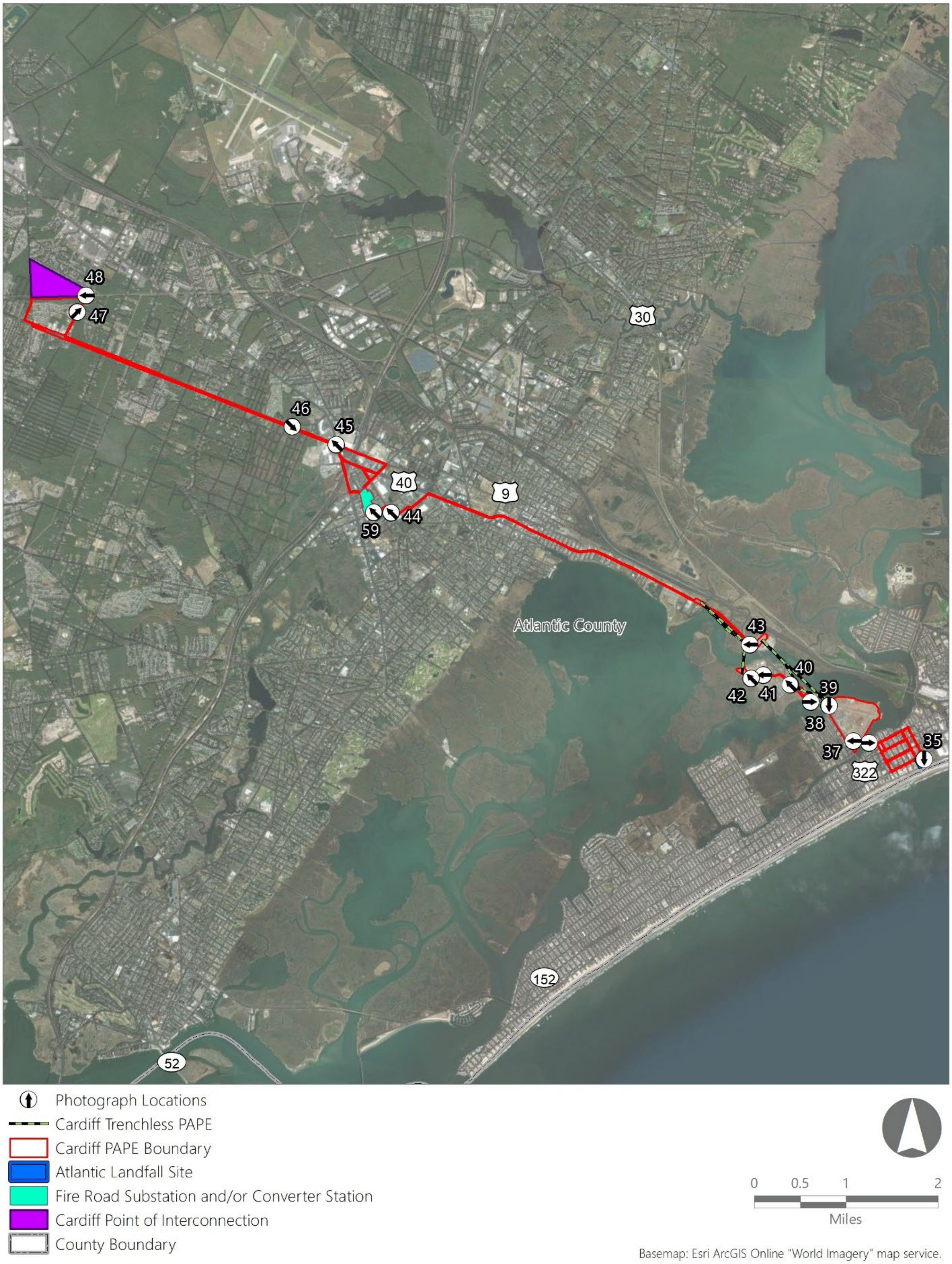


Figure 33. Cardiff Onshore Interconnection Cable – Existing Conditions and Photograph Locations

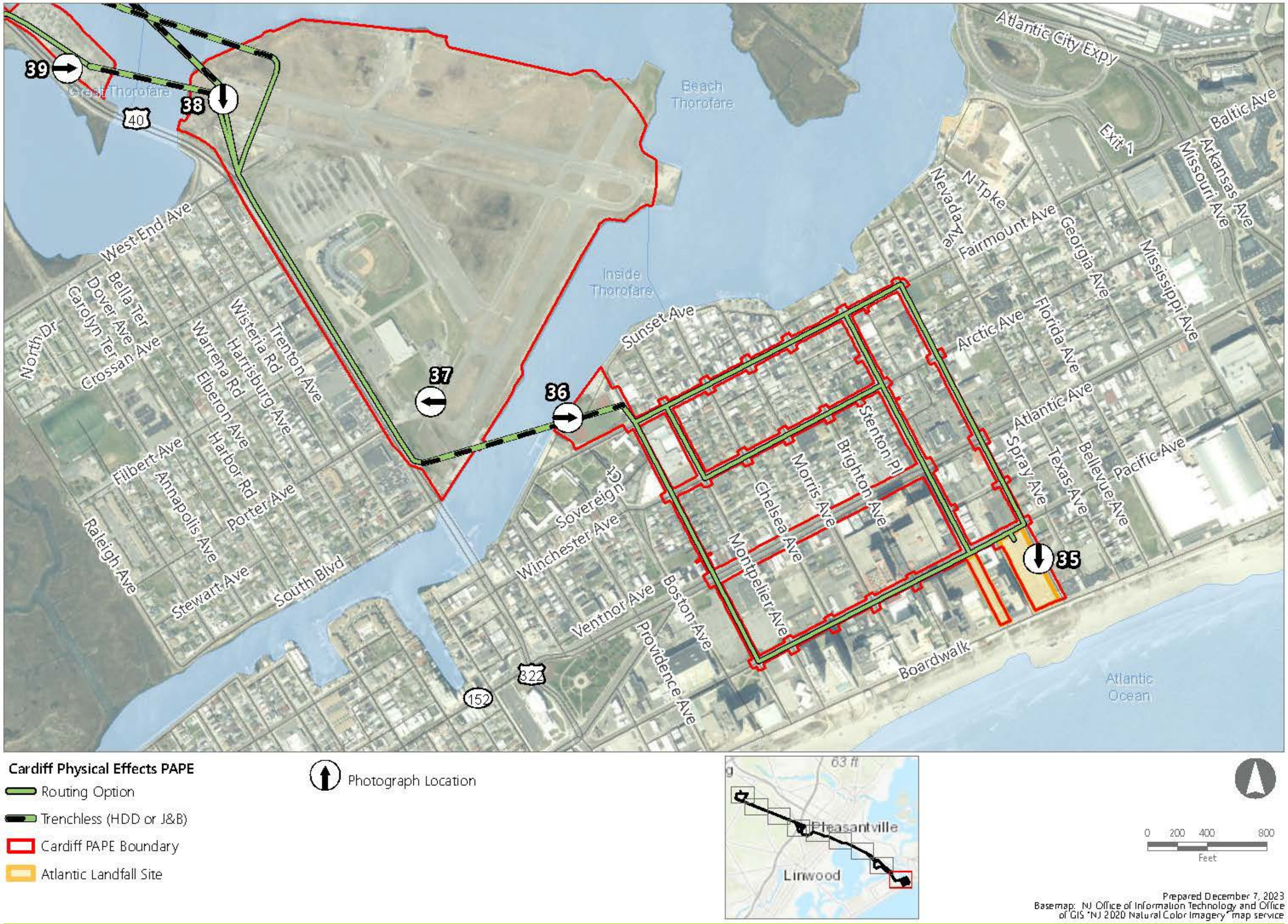


Figure 33, Sheet 2

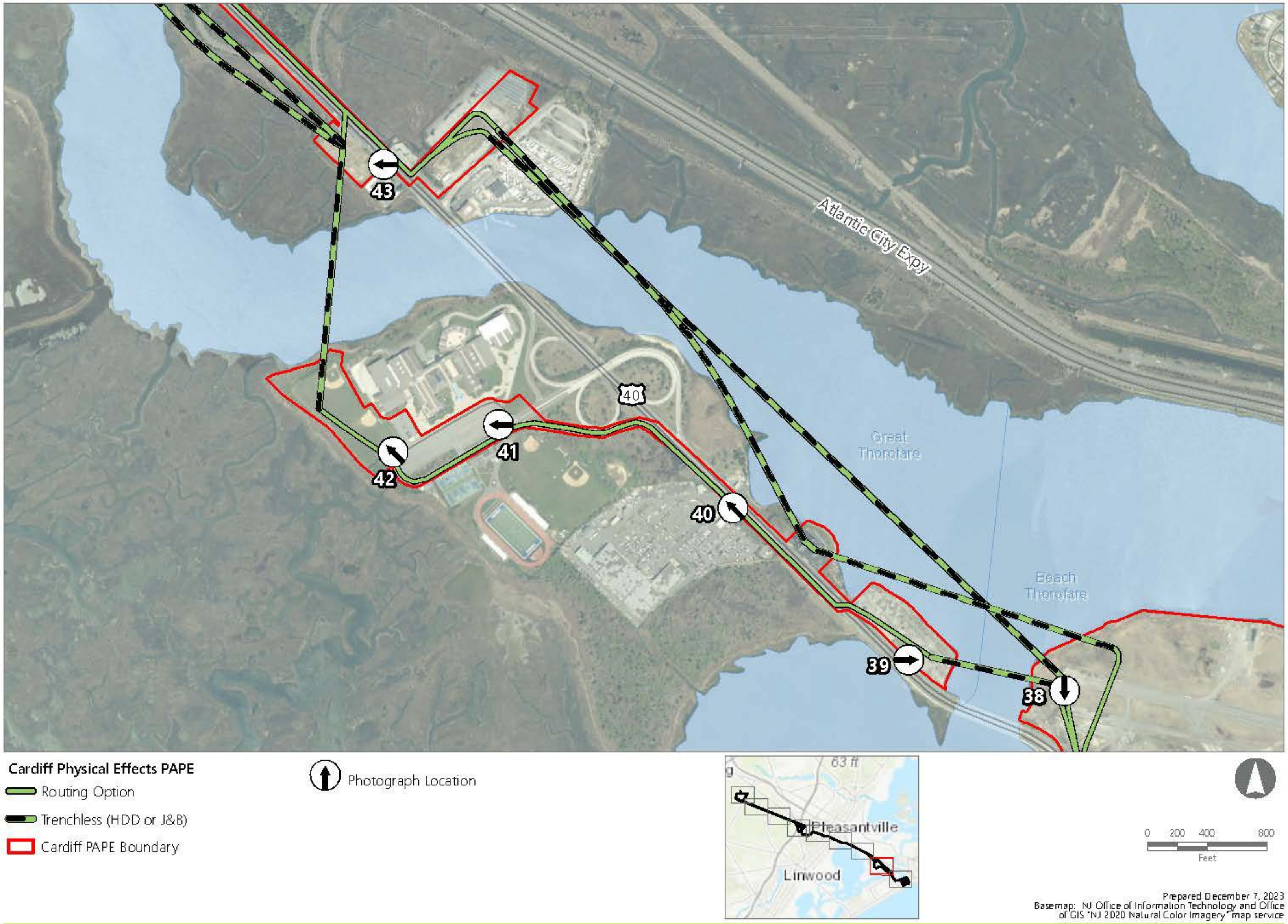


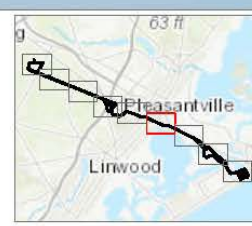
Figure 33, Sheet 3

Figure 33, Sheet 4

Cardiff Physical Effects PAPE

Routing Option

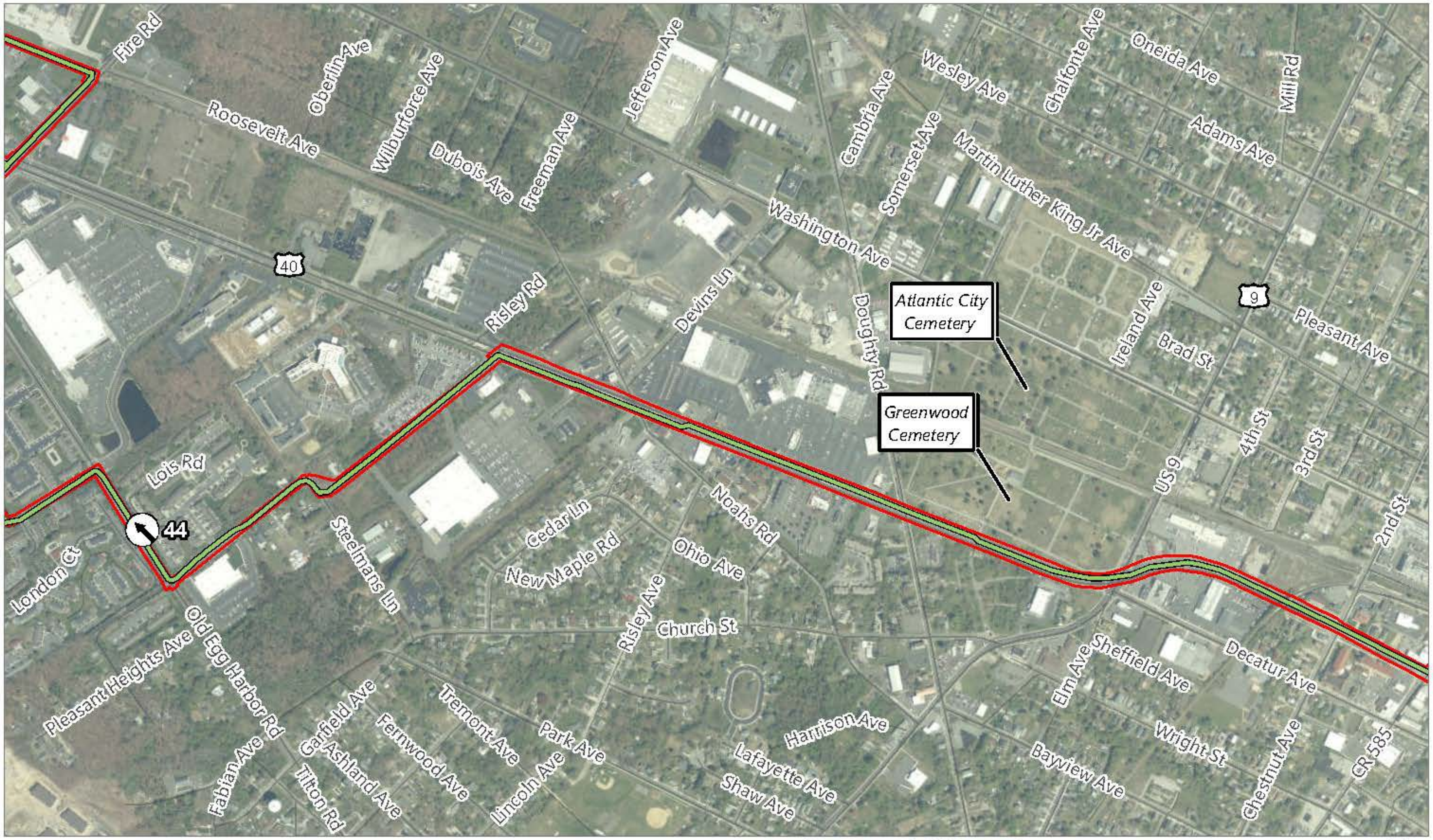
Cardiff PAPE Boundary



0 200 400 800
Feet

Prepared December 7, 2023
Basemap: NJ Office of Information Technology and Office of GIS "NJ 2020 Natural Color Imagery" map service

Figure 33, Sheet 5



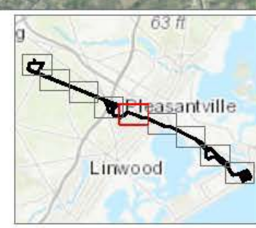
Cardiff Physical Effects PAPE

Routing Option

Substation and/or Converter Station

Cardiff PAPE Boundary

Photograph Location



0 200 400 800
Feet

Prepared December 7, 2023
Basemap: NJ Office of Information Technology and Office of GIS "NJ 2020 Natural Color Imagery" map service

Figure 33, Sheet 6

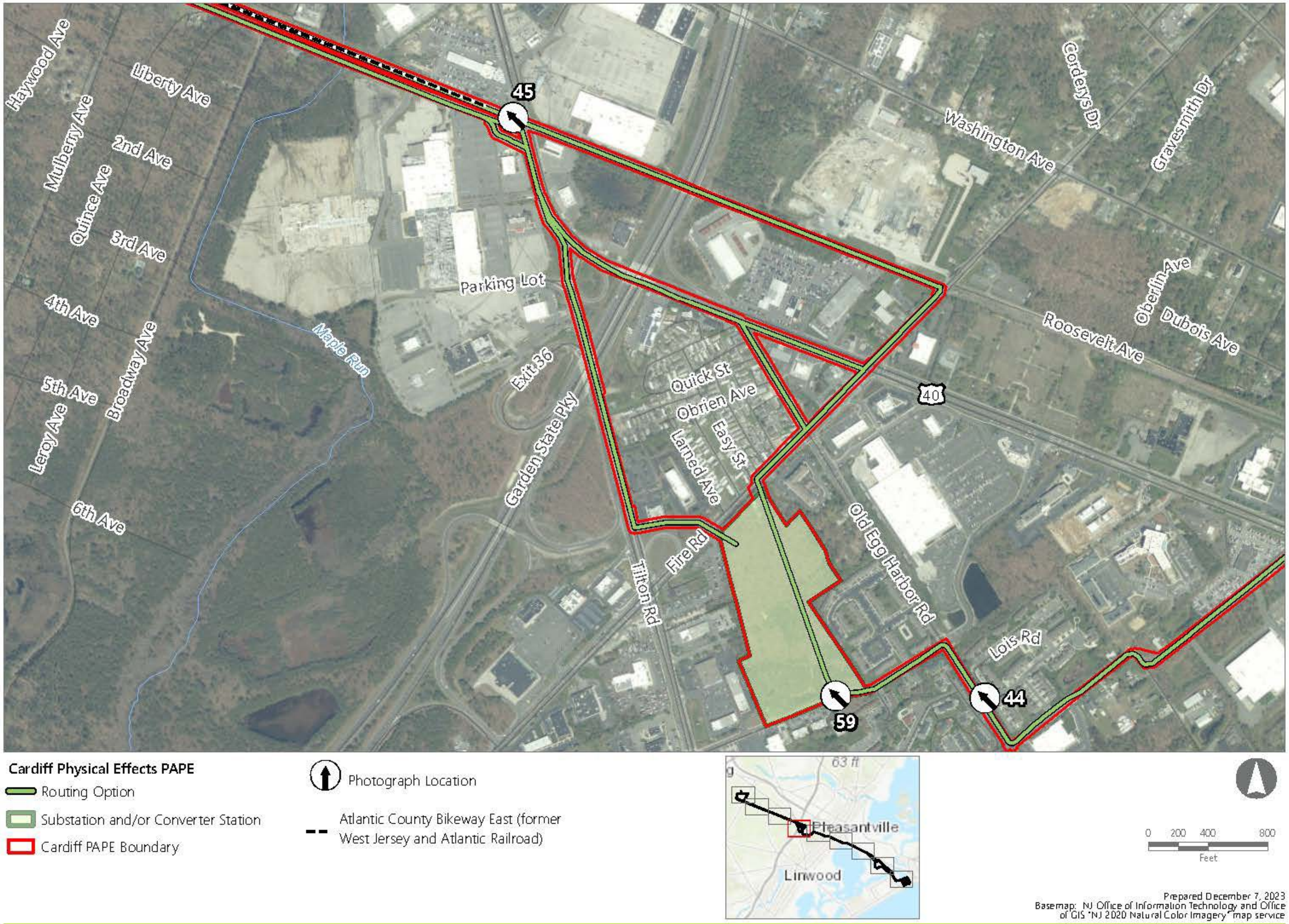


Figure 33, Sheet 7

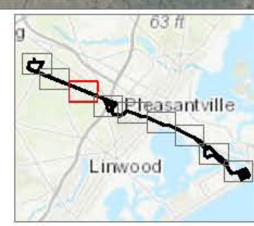
Cardiff Physical Effects PAPE

Routing Option

Cardiff PAPE Boundary

Photograph Location

Atlantic County Bikeway East (former West Jersey and Atlantic Railroad)



0 200 400 800
Feet

Prepared December 7, 2023
Basemap: NJ Office of Information Technology and Office of GIS "NJ 2020 Natural Color Imagery" map service

Figure 33, Sheet 8

Figure 33, Sheet 9

Photograph 36. Planned HDD crossing area within athletic fields west of the intersection of Sovereign and Fairmount Avenues. View to the east.

Photograph 37. Overview of the HDD landing area on Bader Airfield with gravel and paved ground surface disturbances. View to the west.

From the south of Bader Airfield, the Cardiff Onshore Route continues along the paved eastern lanes of U.S. Route 40 before re-entering the north of Bader Airfield across a mix of pavement, gravel, and grass covered land to a planned HDD entry pit (Photograph 38). From this HDD location the Cardiff Onshore Route splits into two routing options.

Photograph 38. Overview of the HDD area on the north side Bader Airfield, with graded, and graveled ground surface. View to the south.

From the planned HDD location on Bader Airfield one routing option crosses under Great Thorofares via HDD on a northwest trajectory to a partially paved and graveled parking lot near an active marina north of U.S. Route 40. The routing option then runs along the paved lanes of U.S. Route 40. Another routing option crosses Beach Thorofare on a western trajectory from another proposed HDD location on Bader Airfield to an abandoned paved parking lot of a (now demolished) to the east of U.S. Route 40 (Figure 33, Sheet 2). From this lot, the HDD route crosses under the Great Thorofare to the mainland within the graveled and paved lot near the marina, converging with the main routing option along U.S. Route 40.

Another routing option begins at the HDD entry pit in the northwest corner of Bader Airfield, crossing Beach Thorofare on a western trajectory to razed industrial lot on the southeastern portion of Great Island to the east of U.S. Route 40 (Photograph 39). The routing option continues northwest within the paved lanes of U.S. Route 40 before turning west toward the Atlantic City Highschool (Photograph 40). The routing option continues through the school's paved parking lot before turning north to a potential HDD entry pit in the school's ballfields (Photograph 41 and Photograph 42). From this point the routing option crosses under the Great Thoroughfare via HDD on a northern trajectory to an HDD exit pit within a razed commercial lot on the mainland south of U.S. Route 40 (Photograph 43), before converging with the routing option within the paved lanes of U.S. Route 40.

Photograph 39. Overview of potential HDD area in graded and disturbed vacant lot on the northeast side of Route 40 to the west of Bader Airfield. View to the east.

Photograph 40. Overview of Cardiff Onshore Route option along U.S. Route 40. Note the multiple buried utilities adjacent to the road. View to the northwest.

Photograph 41. Overview of Cardiff Onshore Route option across paved parking lot of Atlantic City Highschool. View south of west.

Photograph 42. Overview of potential HDD area in baseball field of Atlantic City Highschool. View to the northwest.

Photograph 43. Overview of potential HDD area in graded vacant lot on the southwestern side of Route 40, north of the Great Thorofare. View to the west.

Alternatively, two HDD routing options are proposed from the razed commercial lot south of U.S. Route 40, travelling on a northwestern trajectory underneath the highway and a portion of the Great Thorofare to a lot north of U.S. Route 40 in use for vehicle parking and the storage of road maintenance materials. From this lot the routing option would merge into the paved lanes of U.S. Route 40.

The proposed Cardiff Onshore Route continues within U.S. Route 40 on a course to the northwest, passing into and through the City of Pleasantville by lightly developed mixed-use commercial and industrial areas, residential neighborhoods, and the Greenwood Cemetery (Figure 33, Sheet 5). Additional discussion of the Greenwood Cemetery with respect to the proposed Cardiff Onshore Route is included in Section 3.3.7. At the intersection of Delancy Avenue the Cardiff Onshore Route turns generally southwest, following the paved lanes of multiple streets (Photograph 44) to the proposed onshore substation and/or converter station location at the Fire Road Site (see Section 3.4).

The Cardiff Onshore Route resumes at the north of the Fire Road Site, traveling northeast along the paved lanes of Fire Road before merging with an existing 69 kV ACE transmission line and railroad ROW. The route continues northwest along this corridor to just west of the Garden State Parkway near the Shore Mall (Photograph 45). Another routing option continues along the paved lanes of Fire Road

Photograph 44. Overview of the Cardiff Onshore Route option along old Egg Harbor Road, leading to the Fire Road Site substation location. View to the northwest.

Photograph 45. Overview of the Cardiff Onshore Route west of the Garden State in overgrown ACE and inactive railroad ROW. View to the northwest.

before turning northwest onto U.S. Route 40. The route continues along U.S. Route 40 for 0.6 mi. (0.88 km) before crossing through the parking lot of Shore Mall. Alternatively the route can turn onto Old Egg Harbor Road instead of continuing along Fire Road, and continue northwest until reaching U.S. Route 40.

A second routing option exits the northwest corner of the Fire Road Site, crossing Fire Road, and continuing west along a paved commercial parking lot before intersecting Tilton Road. The routing option turns to the north and follows Tilton Road before converging with U.S. Route 40.

At this point the railroad ROW and all alternate routes transitions to the Atlantic County Bikeway (an asphalt-paved rail-trail that utilizes the former West Jersey Railroad ROW) and the route follows this ROW northwest to English Creek Avenue (Photograph 46). Alternatively, another routing option follows West Jersey Avenue for this distance (Figure 33, Sheets 6-9). From here the route turns northeast onto the paved lanes of English Creek Avenue before reaching an existing ACE 230 kV transmission line ROW (Photograph 47). The west along the cleared ACE ROW before reaching the existing Cardiff Substation POI (Photograph 48).

Photograph 46. Overview of the Cardiff Onshore Route at the intersection of Winter Green Avenue and the Atlantic County Bikeway along the former West Jersey Railroad corridor. View to the southeast.

Photograph 47. Overview of the Cardiff Onshore Route along east side of English Creek Avenue. View to the north.

Photograph 48. Overview of the Cardiff Onshore Route at the interconnection of the existing high-tension ACE transmission corridor at the Cardiff POI. View to the west.

Another routing option begins at the intersection of the Atlantic County Bikeway and Spruce Avenue (CR 684), where instead of following the Atlantic County Bikeway, the route turns northwest onto paved lanes of Reega Avenue and continues for approximately 1.58 mi. (2.54 km), crossing English Creek

Avenue, until reaching Roberta Avenue. From here, the route follows Roberta following Roberta Avenue through a mixed wooded and residential area until reaching the existing ACE 230 kV transmission line ROW. The routing option then travels east to the Cardiff Substation POI.

A second routing option begins at the intersection of the Atlantic County Bikeway/West Jersey Avenue and English Creek Avenue, where instead of following English Creek Avenue, it continues northwest for approximately 0.21 mi. (0.34 km) along the Atlantic County Bikeway and West Jersey Avenue. From this point, the route converges with Reega Avenue and continues along the alternate route option previously described.

3.3.2 Soils

EDR reviewed ESRI and NRCS electronic data for information relating to the soils within the Cardiff PAPE (NRCS, 2021). EDR also reviewed preliminary geotechnical data and soil boring logs prepared for the Cardiff Onshore Route (Terracon, 2022). The locations of the soil borings are depicted in Figure 38. Per NRCS soil data, twelve distinct soil units are present within the Cardiff Onshore Route, representing the primarily sandy loam composition of soils in the vicinity:

- Psammaquents – Generally coarse to gravelly sand over mucky peat. Derived from sandy lateral spread deposits over organic material. Found on flats and foot slopes. Frequently flooded and very poorly drained.

- Transquaking peat – Saltmarsh peat. Derived from organic deposits underlain by loamy mineral sediments. Found in brackish estuarine marshes along tidally influenced zones. Very poorly drained, flooded by tidal waters, and very deep.

- Hammonton loamy sand – Derived from loamy fluviomarine sediments. Found on coastal plain uplands. Moderately well drained and very deep.

- Sassafras sandy loam – Derived from loamy fluviomarine sediments. Found on coastal plain uplands on fluviomarine terraces and flats. Well drained and very deep.

- Galloway loamy sands – Derived from coarse-textured, siliceous, unconsolidated sediments that have been reworked by wind in places. Found on nearly level to undulating marine terraces, upland flats, or shallow depressions. Very deep and moderately well drained.

- Aura sandy loam – Derived from coarse-loamy eolian deposits over loamy gravelly fluviomarine deposits. Found on coastal plan fluviomarine terraces and flats. Well drained and very deep.
- Downer loamy sands – Derived from loamy fluviomarine deposits. Found on broad interfluve, hills, and ridges in the Northern Atlantic Coastal Plain. Very deep and well drained.
- Pits, sand and gravel – Disturbed areas that have been excavated for sand and/or gravel.
- Atsion sand – Derived from sandy marine sediments. Found on coastal plain flats and depressions. Very deep and poorly drained.
- Mullica sandy loam – Derived from sandy and loamy fluviomarine sediments. Found on the coastal plain uplands and lowlands. Very deep and very poorly drained.
- Woodstown sandy loam – Derived from sandy marine and old alluvial sediments. Found on upland marine and old stream terraces. Very deep and moderately well drained.
- Fort Mott sand – Derived from sandy eolian deposits and/or fluviomarine deposits. Found on coastal plain uplands. Very deep and well drained.

In addition to the NRCS soil units, substantial areas of artificial/historic fill were also identified along the eastern half of the Cardiff Onshore Route according to NJDEP online mapping (NJDEP, 2018). This historic fill is mapped as extending from Atlantic City all the way to the mainland in Pleasantville, encompassing all portions of the Cardiff Onshore Route on Bader Airfield, Great Island and the Atlantic City High School, U.S. Route 40, and the existing 69 kV Atlantic City Electric (ACE) transmission line and railroad ROW. The extent of this historic fill roughly coincides with the extent of NRCS mapping of Psammaquents and Transquaking peat along the Cardiff Onshore Route.

Preliminary geotechnical data prepared for the Cardiff Onshore Route confirm the presence of this historic fill, with soil boring logs showing 5.0 to 15 ft. (1.5 to 4.6 m) of layered fill and/or sand deposits over layers of organic silt, clay, and/or peat (Terracon, 2022, see Figure 38). Areas of cutting and filling were also identified through review of lidar and hillshade data, as well as during the in-person archaeological reconnaissance. Preliminary mapping from the Project's constructability report also confirms a dense web of buried utilities throughout the Atlantic Cardiff Onshore Route, specifically along the U.S. Route 40 corridor (Power, 2021a). This installation of these utilities via excavation and trenching would have furthered disturbed soils throughout those areas. All areas of mapped historic fill and sand and gravel pits have been characterized as "Disturbed" and are considered to have no potential for intact archaeological deposits.

Outside of the areas of mapped historic fill, depth to culturally sterile subsoil on the western half of the Cardiff Onshore Route is approximately 1.0 to 2.0 ft. (0.3 to 0.6 m). As noted previously, Atlantic Shores has elected to site the buried onshore cables within existing, previously disturbed road, bike path, and railroad ROWs, where disturbance during construction and installation of the existing infrastructure likely exceeded the depth of potential archaeological deposits. This siting strategy avoids or significantly reduces potential impacts to adjacent undisturbed soils and avoids or minimizes the risk of potentially encountering undisturbed archaeological deposits throughout most of the Cardiff Onshore Route. Some specialty trenchless techniques (i.e., HDD, pipe jacking, and/or jack-and-bore) that avoid surface disturbance will be used to avoid impacts to busy roadways, waterbodies, or existing developments or features at existing developments (see Figure 32 and Figure 37).

The area of mapped Fort Mott series sands, near the intersection of the Atlantic County Bikeway/West Jersey Avenue and English Creek Avenue, potentially contains intact eolian deposits buried deeper in the soil profile. The portion of the Cardiff Onshore Route that fall within mapped Fort Mott soils has been characterized as "Potentially Undisturbed" to account for the increased depth of potentially Holocene deposits (see Section 2.3.8), even though surface ground disturbance was likely in that area during construction of the West Jersey and Atlantic Railroad and later Atlantic County Bikeway. Soil mapping of Aura sandy loam (eolian) and Woodstown sandy loam (alluvial) along the Cardiff Onshore Route indicates a depth to subsoil of approximately 1.0 to 2.0 ft. (0.3 to 0.6 m), within the likely depth of previous infrastructure disturbance.

3.3.3 Previously Identified Archaeological Sites

No previously recorded archaeological resources are mapped within the Cardiff Onshore Route. The eight archaeological sites located [redacted] of the Cardiff Onshore Route are summarized in Table 10 and shown on Figure 34.

Table 10. Previously Identified Archaeological Sites [redacted] of the Cardiff Onshore Route

Site Number	Alternate Number	Site Name	Approx. Distance and Direction from onshore route	NRHP Eligibility	Time Period	Site Type
28-At-028	-	Greenhouse	[redacted]	Undetermined	Late 19th to early 20th century	Euro-American
28-At-003	36-13-5-1-9	Pleasantville	[redacted]	Undetermined	Unspecified	Native American Village site
28-At-004	36-13-5-4-6	Smith's Landing (location 1)	[redacted]	Undetermined	Unspecified	Native American Shell midden
28-At-006	36-13-5-5-4	Smith's Landing (location 3)	[redacted]	Undetermined	Unspecified	Native American Shell midden
28-At-007	36-13-5-2-2	Mt. Pleasant	[redacted]	Undetermined	Unspecified	Native American Camp site
28-At-137	Pinelands Site #: Interim 9	unnamed	[redacted]	Undetermined	Mid-20th century	Agricultural buildings
28-At-160	Pinelands Site #: Interim 35	Pine View Grove	[redacted]	Undetermined	Mid- to late 20th century	Religious meeting camp
28-At-226	Pinelands Site #: 90-B	Broadway	[redacted]	Undetermined	Mid-20th century	Refuse dump

- The Greenhouse Site (28-At-028) [redacted] Information from the NJSM site form explains that Stage II investigations carried out in 1985 revealed five subsurface pit features containing a mix of nineteenth- and early twentieth-century architectural and household artifacts including glass bottles, ceramics, animal bone, eggshell, clothing and miscellaneous personal items. Since the time of survey, the site has been developed and is currently occupied by retail stores, restaurants, and parking lots (Google, 2021).

- Pleasantville (28-At-003) [redacted] According to information on the NJSM site form, Pleasantville now occupies “an old Indian village” site, where artifacts (including banner stones) and shell heaps have been found. It should be noted, however, that the earliest recorded sites (see the single digit site number) lack spatial specificity as they were not formally delineated. As such, their mapped locations should be considered areas of elevated archaeological sensitivity and not be considered equivalent to formally tested and delineated archaeological sites. EDR considered site 28-At-003 as an area of elevated sensitivity which informed archaeological analysis and sensitivity assessment of the Projects, rather than a discrete site area to be avoided (see Section 3.3.8).

- The Smith’s Landing site (28-At-004 and 28-At-006) includes two separate locations for what are described as “large shell heaps” [redacted] were presumably some of the shell heaps described as part of the Pleasantville site (28-At-003). Similar to site 28-At-003, the mapped locations of these sites were considered areas of elevated archaeological sensitivity which informed archaeological analysis and sensitivity assessment of the area, and not considered equivalent to formally tested and delineated archaeological sites (see Section 3.3.8).

- The Mount Pleasant site (28-At-007) [redacted] The site was described as approximately one acre in size, at the source of a branch of Absecon Creek, where arrow points were reported.

- The unnamed Pinelands Site # Interim 9 (28-At-137) [redacted] The NJSM site form describes two standing chicken coops, the demolished remains of a third building/structure, and small refuse dumps with mid-nineteenth century glass and ceramics. The NJSM site form notes that the site is not considered worthy of Pinelands Designation.

- The Pine View Grove Site (28-At-160; Pinelands Site # Interim 35) [redacted]. Information in the NJSM site form has recording archaeologist R. Alan Mounier describing the site as grounds for religious camp meetings. Cabins, a dining hall, and an auditorium were standing at the time of recording. The site was investigated via surface inspection and subsurface posthole testing. Additional archaeological research was not recommended.

Figure 34. Previously Identified Archaeological Sites [redacted] of the Cardiff Onshore Route

Confidential – Not for Public Distribution

[redacted]

- The Broadway Site (28-At-226; Pinelands Site # 90-B) [redacted] Information from the NJSM site form describes surface inspection and 14 test units excavated at the site, which located a trash dump with modern ceramics and glass bottle fragments. It was not regarded as meeting the criteria for S/NRHP eligibility.

All sites with Native American components [redacted] of the Cardiff Onshore Route [redacted] This indicates a higher likelihood for sites to be situated near permanent sources of water, both fresh and salt, [redacted] Locating sites proximal to the coast, freshwater streams, and wetlands would have provided a diverse set of resources to Native Americans. The Native American village site, shell middens, and camp site indicate occupation of the landscape at both a transient and intensive scale. Historic-period sites in the vicinity of the Cardiff Onshore Route include the Greenhouse site in urban Atlantic City (which has been developed into modern commercial buildings) and three mid-twentieth century Pinelands Commission sites which did not meet the criteria for the S/NRHP.

3.3.4 Previous Cultural Resource Surveys

A review of LUCY, archaeology site forms, and available online resources identified the following previously conducted cultural resource surveys with associated cultural resources encompassing or intersecting portions of the Cardiff Onshore Route:

- The 1979 intensive architectural survey titled *Historic Sites Inventory [Atlantic City]* by Nancy Bloom identified multiple historic properties in Atlantic City (Bloom, 1979). These properties were previously summarized in Table 9 in Section 3.2.3.

- The 1980 intensive architectural survey titled *Atlantic City Historic Building Survey* by the Graduate School of Fine Arts, University of Pennsylvania (UPenn) identified multiple historic properties in Atlantic City (UPenn, 1980). These properties were previously summarized in Table 9 in Section 3.2.3.

- The 1980 Phase I archaeology survey titled *Atlantic County Sewerage Authority, Atlantic County, NJ; Lower Great Egg Harbor River Region Facilities Plan; Cultural Resource Survey, Coastal*

Region Alternative Development, Railroad Interceptor Route by Budd Wilson identified historic properties along the abandoned West Jersey and Atlantic Railroad corridor (Wilson, 1980). This survey resulted in the identification of the Greenwood Cemetery (discussed in Section 3.3.7) and the McKee City Station (discussed in Section 3.3.6).

- The 2000 combined architectural and archaeology report titled *Technical Memorandum No. 18, Cultural Resources Investigation, Garden State Parkway Widening, Interchanges 30-80, Ocean, Burlington, and Atlantic Counties, New Jersey* by Richard Grubb & Associates, Inc. (RGA) identified the Garden State Parkway Historic District (RGA, 2000). In October 2001, NJHPO concurred with the determination that the resource was NRHP eligible under criterion A and C, with a period of significance from 1945 to 1957. The PAPE for the proposed Cardiff Onshore Route options cross underneath elevated bridges of the Garden State Parkway in subsurface trenches within U.S. Route 40, Tilton Road, and the existing 69 kV ACE transmission line and railroad ROW. Since the elevated lanes and bridges of the Garden State Parkway Historic District will be completely avoided and are located outside of (above) the PAPE, the Projects will have no effects on this resource.

- The 2016 Phase IB/III archaeology survey titled *Phase IB/II Cultural Resource Investigation: Atlantic City Electric Northern Line Upgrade Program, Salem, Cumberland, Gloucester and Atlantic Counties, New Jersey* by the firm Paulus, Sokoloskwi, and Sartor (PS&S) included survey of the west to east oriented ACE utility corridor on the western end of the Cardiff Onshore Route immediately south of the existing Cardiff Substation POI (Tomaso et al., 2016). Shovel testing conducted in the portion of the ACE utility corridor east of the existing Cardiff Substation POI did not encounter any archaeological resources. This report also included information on the West Jersey and Atlantic Railroad Historic District (discussed in Section 3.3.6).

3.3.5 Historical Map and Photography Review

A review of historical maps and aerial photography depicting the Cardiff Onshore Route illustrate that it is sited within well-established roadway and railroad corridors. The following summary shows that the area in and around the Cardiff Onshore Route underwent gradual development throughout the nineteenth century before undergoing rapid suburbanization in the twentieth century. Some insights gained from the review include:

- During the early- to mid-nineteenth century local road networks were already established throughout the region, as seen in the 1828 Gordon *Map of the State of New Jersey*, but major settlements were not present in the immediate vicinity of the Cardiff Onshore Route. The larger settlements of Bargaintown and Absecon are visible to the south and north of the Onshore Cable Route respectively, and a series of road networks traversed the area joining these larger population areas (Gordon, 1828). The late-nineteenth century witnessed further development within the Cardiff Onshore Route.

- The 1872 Beers *Topographical Map of Atlantic Co*. depicts more development in the vicinity, including the development of Smith's Landing, Pleasantville, and Risleyville near the center of the Cardiff Onshore Route, and development associated with Atlantic City in the eastern portion of the Cardiff Onshore Route (Figure 35; Beers, 1872). The Atlantic City Turnpike, which a portion of the Cardiff Onshore Route parallels, is depicted traversing west from Atlantic City to the more populated areas around Smith's Landing, Pleasantville, and Risleyville. However, the western terminus of the Cardiff Onshore Route remained largely undeveloped, as did the area between the Atlantic Coast and the mainland.

- The 1888 *Topographical Map of Egg Harbor and Vicinity* by Cook, Smock, and Vermeule shows a similar road network as depicted in the 1872 Beers map, but also depicts an influx of rail lines near the Cardiff Onshore Route including the West Jersey & Atlantic Railroad, the Philadelphia and Atlantic City Railroad, the Pleasantville and Ocean City Railroad, the Camden and Atlantic Railroad, and the South Atlantic Railroad (Figure 36; Cook, 1888). A label for "English Creek Station" is depicted near the intersection English Creek Avenue and the West Jersey and Atlantic Railroad corridor.

- Historical map research suggests that the areas adjacent to U.S. Route 40/322 near Great Thoroughfare are built up land and have been modestly developed for light commercial and public buildings since the mid-twentieth century. These transportation networks were still intact and depicted on the 1893 and 1894 *Great Egg Harbor, NJ* and *Atlantic City, NJ* USGS topographical maps (USGS, 1893, 1894).

- The 1918 USGS *Great Egg Harbor, NJ* topographical map of is the first USGS quadrangle depicting a cemetery north of the Cardiff Onshore Route, in the location of the present-day Atlantic City Cemetery, but the Greenwood Cemetery which abuts the Cardiff Onshore Route is not depicted (USGS, 1918).

- The Cardiff Onshore Route was extensively developed by the mid-twentieth century, as visible on the 1941 and 1943 *Pleasantville, NJ* and *Atlantic City, NJ* USGS topographical maps (Figure 37; USGS, 1941, 1943). These maps show increased development both on the Atlantic Coast, south of Atlantic City (present-day Ventnor) and along the mainland abutting the Intracoastal Waterway, as well as the development of West Atlantic City on the north shore of Lake Bay. In addition, development had by then extended west from Pleasantville into the western portion of the Cardiff Onshore Route. Also, a label for "McKee City Station" is depicted near the intersection English Creek Avenue and the West Jersey and Atlantic Railroad corridor, where the 1888 *Topographical Map of Egg Harbor and Vicinity* depicted "English Creek Station". These mid twentieth-century maps indicate increased population density, and the development of a more complex road system and extensive development pattern over the past half century, and development further increased through the end of the twentieth century. These maps illustrate most of the Cardiff Onshore Route's transition from rural agricultural communities to burgeoning suburbs in the twentieth century. The 1943 topographical map is the first to depict the Greenwood Cemetery north of the Cardiff Onshore Route. Additional discussion of the cemetery is included in Section 3.3.7, below.

- Historical aerial imagery from the latter half of the twentieth century shows the construction of the Garden State Parkway in 1955, which precipitated extensive commercial development at the interchanges in the vicinity of the Cardiff Onshore Route, which are mostly intact today. Plazas and shopping centers followed in the 1970s. Some small-scale residential development also took place, including mobile homes parks, and intermittent groups of one-story prefabricated homes around the periphery of the commercial centers (Historic Aerials, 2021).

Figure 35. 1872 *Topographical Map of Atlantic County, New Jersey* by F. W. Beers

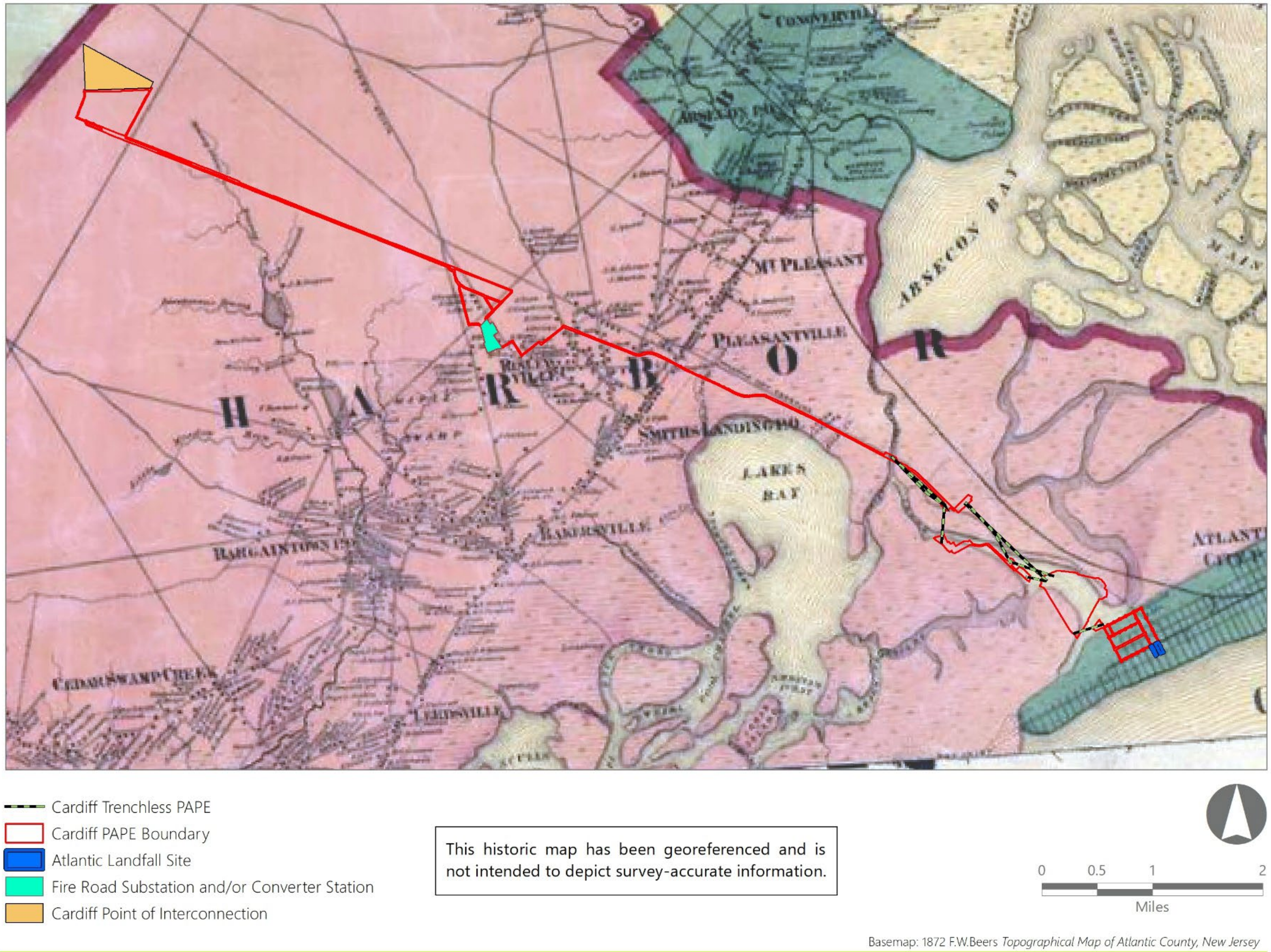
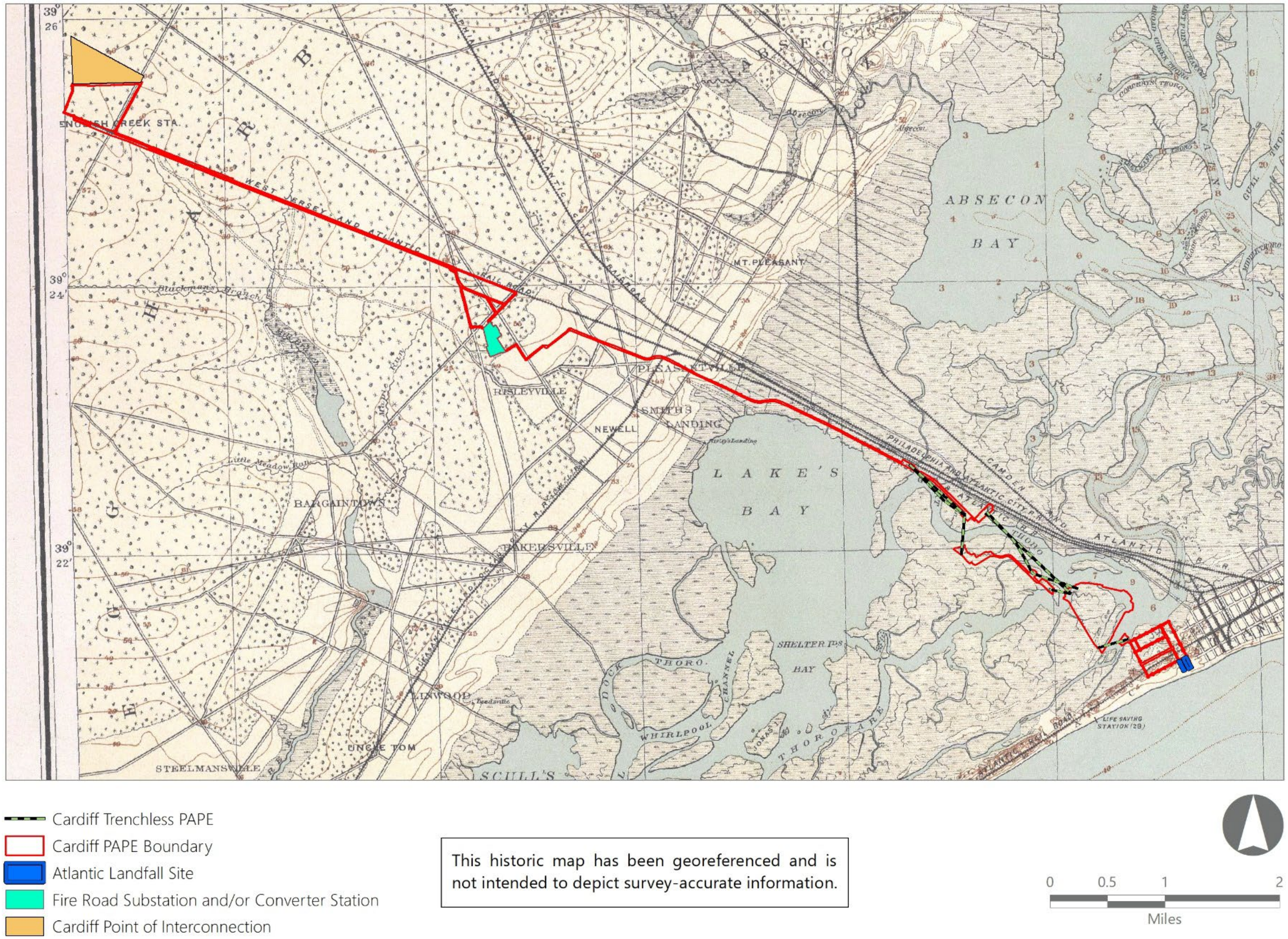
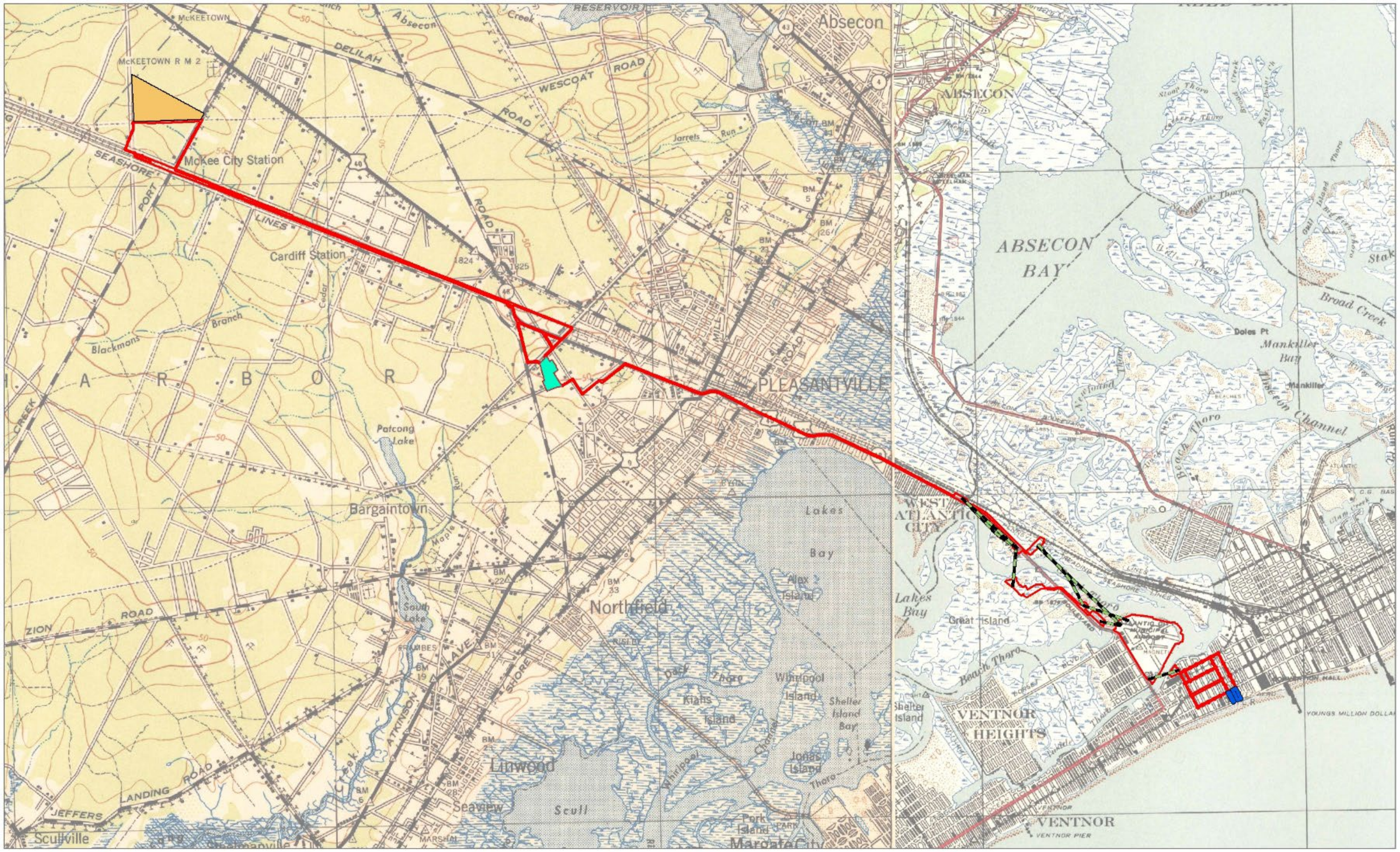


Figure 36. 1888 *Topographical Map of Egg Harbor and Vicinity* by Cook, Smock, and *Vermeule*



Basemap: 1888 Cook, Smock, and Vermeule *Topographical Map of Egg Harbor and Vicinity*

Figure 37. 1941 and 1943 USGS 1:62,500-scale topographical maps, *Atlantic City and Pleasantville, NJ*



Cardiff Trenchless PAPE
Cardiff PAPE Boundary
Atlantic Landfall Site
Fire Road Substation and/or Converter Station
Cardiff Point of Interconnection

This historic map has been georeferenced and is not intended to depict survey-accurate information.

0 0.5 1 2
Miles

Basemap: 1941 USGS *Atlantic City, NJ* and 1943 USGS *Pleasantville, NJ* 1:62,500 Topographic Quadrangles

In brief, the historical map review demonstrates that MDS are mapped in the immediate vicinity of the proposed Cardiff Onshore Route, mostly along existing roadways and at intersections that were largely established by the mid-nineteenth century. Most of the MDS are concentrated in the central and eastern portion of the Cardiff Onshore Route in Smith's Landing, Pleasantville, and Risleyville, as well as in the developed urban environment of Atlantic City. Of note, historical maps illustrated that a portion of the proposed Cardiff Onshore Route runs within the former ROW of the West Jersey and Atlantic Railroad (further discussed in Section 3.3.6).

3.3.6 Railroads

As noted in Section 3.3.1, the proposed Cardiff Onshore Route runs within a portion of the West Jersey and Atlantic Railroad corridor (Figure 33, Sheets 6-9; Figure 38, Sheets 15-17, 27-34, 36). The 34.2 mi. (55 km) former railway was constructed in 1880 between Atlantic City and May's Landing, New Jersey. The West Jersey and Atlantic Line was abandoned by 1966 (Gladulich, 1986).

A review of LUCY shows the railroad depicted as the West Jersey and Atlantic Railroad Historic District, determined eligible for listing on the S/NRHP under criteria A, C, and D by a NJHPO decision dated August 27, 1996 (NJHPO, 2021). The linear historic property was also identified in a 2016 cultural resource survey of an intersecting ACE utility corridor, which included further information on the West Jersey and Atlantic Railroad's NRHP eligibility criteria (Tomaso et al., 2016). According to the 2016 survey:

> In 1980, the segment of the West Jersey and Atlantic Railroad between May's Landing and Pleasantville was given an opinion of eligibility under National Register Criterion A for its contributions to the development of the towns of Minetola, Buena, Richland, Mizpah, Reega, and McKee City, and for linking Mays Landing to other parts of Atlantic County. In addition, it was determined eligible under Criteria C as a representative example of typical 19th-century railroad engineering and architecture, and under Criterion D for having the ability to potentially yield more about history and culture of the region.

West of the Garden State Parkway and U.S. Route 40, the former railroad corridor has been converted into the asphalt paved Atlantic County Bikeway (see Section 3.3.1, Photograph 46). The Bikeway project was authorized by NJHPO in 1996 and determined not to have constituted an adverse effect on the eligible railroad (Tomaso et al., 2016). This conversion is also documented in the 2002 *South Jersey Regional Rail Study*, which provided a description of the rail corridor between Atlantic City and Mays

Landing as "partially abandoned for over 30 years" and "within the sections owned by the county, a bike path is under various stages of planning/design/construction" (Gannett Fleming, 2002). This study also included an inventory list of all structures and crossings identified along the former railroad ROW (Gannett Fleming, 2002: Appendix C). Only a series of at-grade street crossings were identified between English Creek Avenue and Franklin Boulevard (partially within the PAPE), while a series of culverts and rail bridges were identified east of Franklin Boulevard and north of the U.S. Route 40 corridor (outside of the PAPE). Within the PAPE, contributing resources to this linear historic property have been removed, and only the rail prism and associated cuts and embankments remain. The actual fills of the rail prism are not contributing features to the eligibility of the linear historic property. Avoidance of the prism may not be feasible but impacts to the fills of the prism are not anticipated to constitute an adverse effect, especially if restored to present condition (as proposed by Atlantic Shores) following installation of the onshore cable (see Section 3.3.8).

LUCY also depicts the now demolished McKee City Station mapped within the Cardiff Onshore Route [redacted]. Though the location quality is listed as "Low" in the LUCY database, the location of the station corresponds to the MDS locations of the "McKee City Station" and earlier "English Creek Station" identified in the historical map review (Section 3.3.5). This resource is listed as contributing to the West Jersey and Atlantic Railroad Historic District. This documented resource is a demolished historic structure which may exist in the archaeological record. The "Potentially Undisturbed" areas [redacted] have been characterized as Medium-High sensitivity "Potential Phase IB Survey Areas" (Section 3.3.8; Figure 38, Sheets 34 and 36).

If subsurface Phase IB shovel testing does encounter artifacts or features potentially associated with the demolished McKee City Station, EDR recommends additional short interval shovel testing be conducted in an effort to precisely delineate the resource. If possible following precise delineation of a potential resource's extent, micro-siting the buried onshore cables within the Bike Path/ former railroad ROW to avoid any impacts is preferred.

Disturbance during construction and maintenance of the railroad corridor would have likely resulted in the destruction of any potential archaeological deposits within the railroad ROW prior to those activities, outside of areas of mapped Fort Mott eolian sands which have the potential for intact soil deposits deeper in the profile. These areas of Fort Mott sands [redacted] have been characterized as Medium sensitivity "Potential Phase IB Survey Areas."

Since impacts to the fills of the railroad prism from installation of the onshore cables are not anticipated to constitute an adverse effect, and Atlantic Shores is proposing to restore the prism to its current condition following installation of the onshore cable, EDR recommends this would not constitute and adverse effect on the integrity of the linear historic property.

3.3.7 Cemeteries

New Jersey State Law (NJSL) prohibits the unlawful disturbance, movement, or concealment of human remains (NJSA, 2C:22-1(a)(1)). As such, construction and installation activities associated with the Projects will avoid all cemeteries and burials regardless of S/NRHP status or previous disturbance.

As noted in Section 3.3.1, the Cardiff Onshore Route runs adjacent to one cemetery in Pleasantville (Figure 33, Sheet 5). The Greenwood Cemetery is located just north of the Cardiff Onshore Route along U.S. Route 40. It is not anticipated that there is any potential for burials associated with the Greenwood Cemetery to be located within the PAPE along the U.S. Route 40 ROW. The cemetery is absent from the 1872 Beers *State Atlas of New Jersey* and *Topographical Map of Atlantic County, New Jersey* (Figure 35; Beers, 1872) as well as the 1918 USGS *Great Egg Harbor, NJ* topographical map (USGS, 1918), but finally appears on the 1943 *Pleasantville, NJ* topographical maps (Figure 37; USGS, 1943). The Greenwood Cemetery has its earliest burial in the cemetery recorded as 13 March 1893 and belonging to Nellie Ware (Atlantic County Historical Society, 2021; Find a Grave, 2021). The Greenwood Cemetery is included with the Atlantic City Cemetery and identified as a historic property in a 1980 cultural resources survey, which recommended the site as not eligible for the S/NRHP (NJHPO, 2021).

Historical aerial imagery of the area from 1931 shows square parcels and lots, with New Road/U.S. Route 9 on the eastern border of the cemetery, and another road along the southern boundary. Grid lines and burial markers appear to be concentrated in Atlantic City Cemetery to the north of the railroad ROW, with little to no development in the southern lots that now comprise the Greenwood

Cemetery (Historic Aerials, 2021). By 1951, the multi-lane U.S. Route 40 highway has been constructed, bounding the Greenwood Cemetery to the south.

Since the boundaries of the Greenwood Cemetery were well established prior to construction of U.S. Route 40, and use of the area adjacent to the U.S. Route 40 does not appear to happen until after the construction of the highway corridor, it is not anticipated that there is any potential for burials associated with the Greenwood Cemetery to be located within the PAPE along the U.S. Route 40 ROW. As such, construction and installation of the Cardiff Onshore Route will avoid all burials, and no remote sensing survey is anticipated to be necessary. However, out of an abundance of caution, archaeological monitoring of construction and installation in the area is recommended. In addition, the Project's MPRDP (see Section 4.2.1) will be in effect for all construction and installation activities, providing guidance and instructions to all contractors on how to proceed in the event (however unlikely) of encountering unanticipated cultural resources during work in this area. The MPRDP will include appropriate "Stop Work" procedures if potential grave shafts or burials are observed.

3.3.8 Archaeological Sensitivity Assessment

The archaeological sensitivity of the Cardiff Onshore Route was assessed via archaeological reconnaissance and a review of soil mapping, geotechnical data, lidar data, topographic data, archaeological site records, historical mapping, modern and historical aerial imagery, and utility data. The results of this archaeological reconnaissance and desktop assessment can be found in Figure 38, where the PAPE has been classified into "Disturbed" (Excluded from field survey consideration), "Potentially Undisturbed" (Low, Medium, and Medium/High), and "Paved" areas.

As noted in Section 3.3.3, there are no previously recorded archaeological sites mapped within the Cardiff Onshore Route. However, there are eight previously identified archaeological sites located within 0.5 mi. (0.8 km) of the Cardiff Onshore Route, including four Native American sites and four historic-period sites (presented in Table 10 and Figure 34).

All previously identified Native American sites in the vicinity of the Cardiff Onshore Route [redacted], and likely associated with the Pleasantville Site (28-At-003). As discussed in Section 3.3.3, however, the earliest recorded sites (i.e., sites ending in a single digit number) lack spatial specificity as they were not formally delineated. As such, their mapped locations should be considered areas of elevated archaeological sensitivity and not be considered equivalent to formally tested and delineated archaeological sites. This suggests a higher likelihood for Native American sites to be encountered in this area, and the area is considered to have a Medium-High sensitivity for Native American archaeological resources. However, the PAPE for the Cardiff Onshore Route in the vicinity of the Pleasantville area is confined to the heavily disturbed U.S. Route 40 ROW and existing railroad ROW, and preliminary geotechnical data and soil mapping of the area shows the presence of 5.0 to 15 ft. (1.5 to 4.6 m) of layered fill over mucky peat and tidal marshland (see Section 3.3.2). Due to extensive and well documented historical development, it is unlikely that previously undocumented and undisturbed Native American archaeological sites exist within the Cardiff Onshore Route in the vicinity of Pleasantville. No "Potential Phase IB Survey Areas" were identified in the Pleasantville area due to extensive documented previous ground disturbance. However, archaeological monitoring of the construction and installation of the Cardiff Onshore Route in Pleasantville is recommended. The recommended monitoring locations within Pleasantville are detailed in Section 4.2.1. Note that scope of monitoring is subject to change following Section 106 consultation with BOEM and other consulting parties.

Historic-period sites in the vicinity of the Cardiff Onshore Route include the Greenhouse site in urban Atlantic City (which has been developed into modern commercial buildings) and three mid-twentieth century Pinelands Commission sites which did not meet the criteria for the S/NRHP. Historical map research shows that MDS locations near the Cardiff Onshore Route are generally clustered in mixed residential/commercial areas in Smith's Landing, Pleasantville, and Risleyville, as well as in the developed urban environment of Atlantic City. As such, any potential unidentified historic-period archaeological sites encountered within the Cardiff Onshore Route would likely be associated with residences and commercial buildings related to these population centers, though they are unlikely to be identified within the previously disturbed road and railroad ROW within which the Cardiff Onshore Route is sited.

As discussed in Section 3.2.6, the layout of streets in Atlantic City is well established. Historical maps and aerial images depict that Atlantic City streets within the proposed Cardiff Onshore Route have maintained their respective positions since originally constructed. This fact suggests that it is unlikely that any undocumented historic-period archaeological sites or structures would be located within Atlantic City Street ROWs along the proposed Cardiff Onshore Route.

In addition, a portion of the PAPE for the proposed Cardiff Onshore Route runs within the West Jersey and Atlantic Railroad Historic District. West of the Garden State Parkway and U.S. Route 40, the former railroad corridor has been converted into the asphalt paved Atlantic County Bikeway (Figure 33, Sheets 6-9; Figure 38, 28-34, 36). Though Atlantic Shores plans to restore the Atlantic County Bikeway to its present condition following installation of the buried onshore route, the vertical limits of ground disturbance associated with the buried cable possibly exceed those of the previous Bikeway construction.

The prism is the only feature that connects the historical rail line with its current condition. As described in Section 3.3.6, only a series of at-grade street crossings were identified between English Creek Avenue and Franklin Boulevard (encompassing the PAPE) along the former railroad ROW within the Bikeway (Gannett Fleming, 2002: Appendix C). In this area, contributing resources to the linear historic resource have been removed, and only the rail prism and associated cuts and embankments remain. The actual fills of the rail prism are not contributing features to the eligibility of the resource. The dimensions of the prism are what convey the historic nature of the property, not the fills within the prism. Avoidance of the prism may not be feasible but impacts to the fills of the prism are not anticipated to constitute an adverse effect, especially if restored to present condition following installation of the onshore cable. Atlantic Shores is proposing the prism is restored to its current condition following installation of the onshore cable; EDR recommends this would not constitute and adverse effect on the integrity of the linear historic property.

The demolished McKee City Station [redacted] constitutes a buried element adjacent to the Bikeway/former railroad ROW but within the PAPE of the Cardiff Onshore Route (NJHPO, 2021). As described in Section 3.3.6, the “Potentially Undisturbed” portions of the PAPE in this area have been characterized as Medium sensitivity “Potential Phase IB Survey Areas” where subsurface shovel testing will occur [redacted]. If subsurface Phase IB shovel testing does encounter artifacts or features potentially associated with the demolished McKee City Station, EDR recommends additional short interval shovel testing be conducted in an effort to precisely delineate the resource. If possible following precise delineation of a potential resource’s extent, micro-siting the buried onshore cables within the Bike Path/ former railroad ROW to avoid any impacts is preferred.

The Cardiff Onshore is considered to have a Medium sensitivity for archaeological resources associated with the West Jersey and Atlantic Railroad Historic District [redacted] near the demolished "McKee City Station". Prior ground disturbance associated with the construction and maintenance of the railroad ROW would have likely resulted in the destruction of any potential archaeological deposits within the railroad ROW prior to those activities, so there is Low sensitivity to no sensitivity for prior intact historic-period or Native American resources.

Finally, the western end of the proposed Cardiff Onshore Route travels within the existing east to west oriented ACE transmission corridor previously surveyed by PS&S (Figure 32, Sheet 9; Tomaso et al., 2016). This area was subject to previous subsurface archaeological shovel test survey, and no archaeological resources were identified. No additional archaeological investigation in this area is recommended.

Due to the presence of previously identified archaeological sites and MDS locations near the Cardiff Onshore Route, it should be considered to have a Medium sensitivity for the presence of both Native American and historic-period archaeological resources, if not for prior ground disturbance. Since Atlantic Shores has elected to site the buried onshore cables within existing, previously disturbed road, bike path, and railroad ROWs, where disturbance during grading, construction, and installation of the existing infrastructure likely exceeded the approximately 1.0 to 2.0 ft. (0.3 to 0.6 m) depth to subsoil, there is a very low likelihood for intact archaeological resources to be located within the Cardiff Onshore Route. Additionally, in the identified area of potentially intact eolian soils deposits near the intersection of the Atlantic County Bikeway/West Jersey Avenue and English Creek Avenue, the likelihood for intact archaeological resources (below surface disturbances) increases.

NJHPO's *Guidelines* (see Section 1.5) advise that it may be possible to eliminate part or all of the APE from further investigation if it can be demonstrated that recent disturbance has rendered it unlikely that any potentially significant archaeological sites have survived (NJHPO, 2019). In addition, steep slopes and wetlands are unlikely to contain most types of sites.

As such, no further archaeological investigation is recommended within the areas of the Cardiff Onshore Route identified as "Disturbed" in Figure 38. Slope is not a significant factor in the archaeological sensitivity of the proposed Cardiff Onshore Route as it is predominately located across flat to gently sloping terrain. However, previous ground disturbance is evident and significant throughout the Cardiff Onshore Route, largely originating from the construction and expansion of roadways and railroad ROWs along which the Cardiff Onshore Route is collocated with for most of its layout. Grading and construction of these roadways and railroads would have significantly disturbed, if not destroyed, any archaeological sites that predated construction. Other sources of disturbance include extensive historic filling along the U.S. Route 40 and railroad corridor east of Pleasantville, residential and commercial development (especially in the city of Pleasantville and adjacent to U.S. Route 40 at Bader Airfield), and the trenching of buried utilities that are collocated with existing roadways.

Pedestrian survey (with judgmental shovel testing if deemed appropriate based on observed field conditions) is recommended in any Low sensitivity, potentially undisturbed areas adjacent to paved roadways (within which the onshore cables are actually sited) where depth to culturally sterile subsoil is less than approximately 2.0 ft. as well as in any wetlands or areas of steep slope.

Targeted archaeological shovel testing is recommended within 3.07 of the 319.56 total acres (approximately 0.96%) of the Cardiff Onshore Route portion of the PAPE as indicated by the Medium and/or Medium-High sensitivity "Potential Phase IB Survey Areas" in Figure 38. This includes the following areas of the PAPE categorized as "Potentially Undisturbed":

- "Potentially Undisturbed" areas adjacent to Delancy Avenue within mapped eolian soil deposits (Figure 38, Sheet 22)
- Unpaved public ROW on the north side of West Jersey Avenue between U.S. Route 40 and Winter Green Avenue [redacted]26 (Figure 38, Sheets 28-29);
- Unpaved ROW on the south side of West Jersey Avenue between Atlantic County 684 and Ridge Avenue within 500 ft. of surface fresh water (Figure 38, Sheets 30-31);

- Unpaved public ROW on the south side of West Jersey Avenue between Atlantic County 684 and Fernwood Avenue [redacted] (Figure 38, Sheets 31-32);

- Unpaved public ROW on the south side of West Jersey Avenue between Ivins Avenue and English Creek Avenue within 500 ft. of surface fresh water (Figure 38, Sheets 33-34);

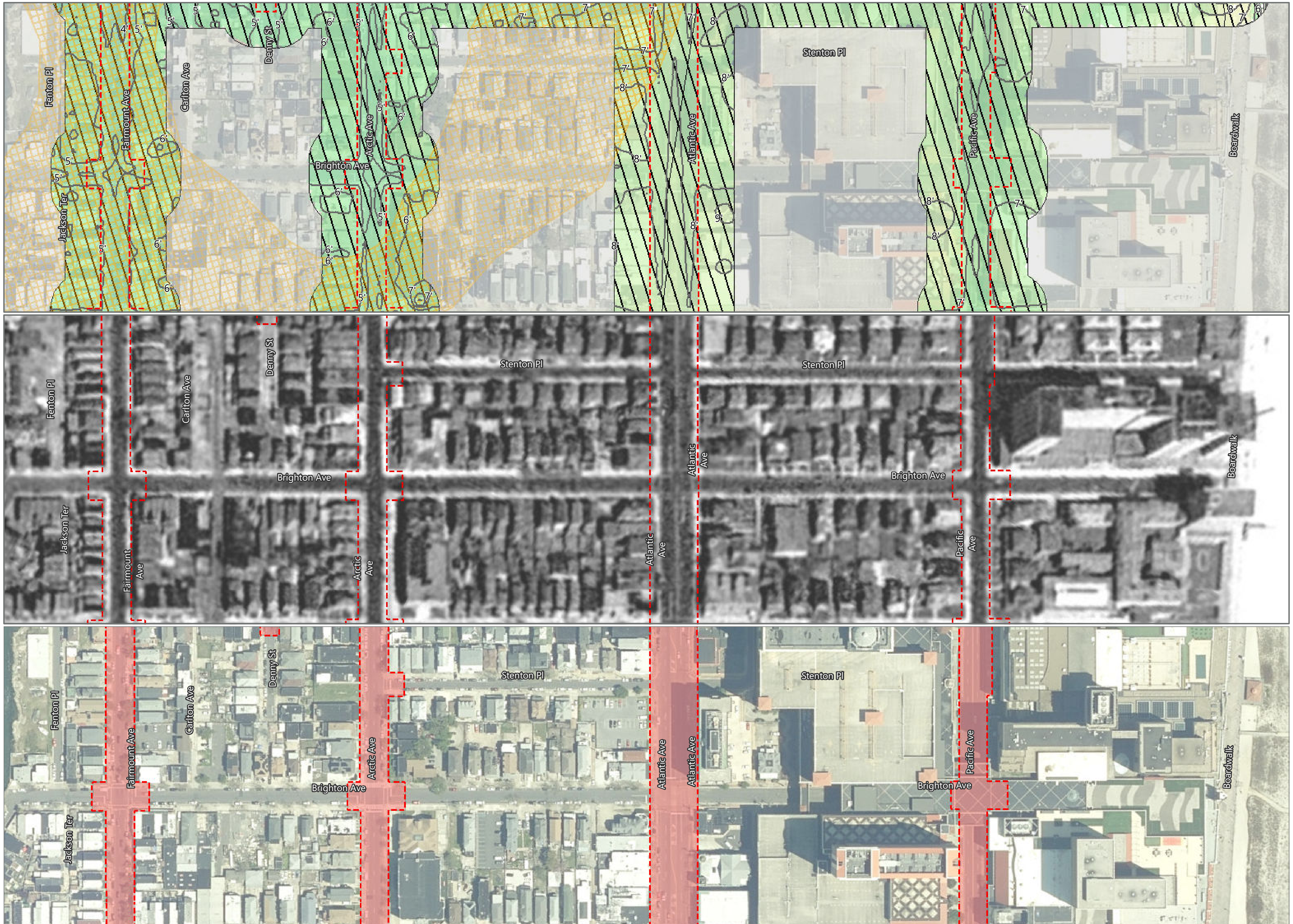
- Unpaved public ROW on the south side of Reega Avenue between Ivins Avenue and English Creek Avenue within mapped eolian soil deposits and within 500 ft. of surface fresh water (Figure 38, Sheets 33-34)

- Unpaved portions of the Atlantic County Bikeway and public ROW north of West Jersey Avenue near the intersection of English Creek Avenue within mapped eolian soil deposits and in the mapped vicinity of the McKee City Station (Figure 38, Sheets 34 and 36); and

- Unpaved public ROW on the east side of English Creek Avenue within mapped eolian soil deposits (Figure 38, Sheets 34-35).

As listed above, some Medium to Medium-High sensitivity areas of the Cardiff Onshore Route are sited within paved bike paths and roadways. Since the paved bike path and roadways are not suitable for subsurface archaeological testing (i.e., shovel testing), it is recommended that STPs be excavated within the ROW on the bike path and roadway margins adjacent to the paved areas, as a proxy for what may be beneath the paved areas. This strategy is based on survey methodology used for the onshore facilities of similar offshore wind projects reviewed by BOEM (EDR, 2020 and 2022). In addition, the Project's MPRDP (see Section 4.2.1) will be in effect for all construction and installation activities, providing guidance and instructions to all contractors on how to proceed in the event (however unlikely) of encountering unanticipated cultural resources during work in this area.

Any routing options removed from Project consideration prior to conducting the recommended Phase IB archaeological field survey for the Project will result in the omission of any corresponding Potential Phase IB Survey Areas from the field effort. Section 3.3.9 describes the results of the Phase IB archaeological survey of the Cardiff Onshore Route. Further information on the design and methodology of the Phase IB archaeological survey is included in Section 1.5.1.



Atlantic Shores South Offshore Wind Project – Onshore Interconnection Facilities

Monmouth and Atlantic County, NJ

Terrestrial Archaeological Resources Assessment

Top Map - Soil and Topography

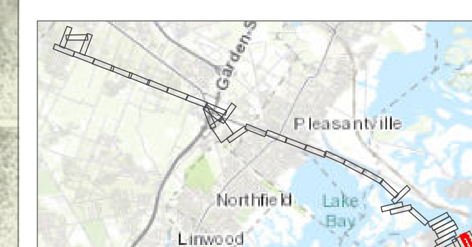
Cardiff PAPE Boundary
2ft Contour
Historic Fill
Soil Condition
Disturbed
Value
High : 23.1283
Low : 3.58291e-39

Middle Map - 1940 Aerial & Mapped Resources

Cardiff PAPE Boundary

Bottom Map - Archaeological Sensitivity Results

Cardiff PAPE Boundary
Archaeological Sensitivity
Area Excluded from Field Survey Consideration



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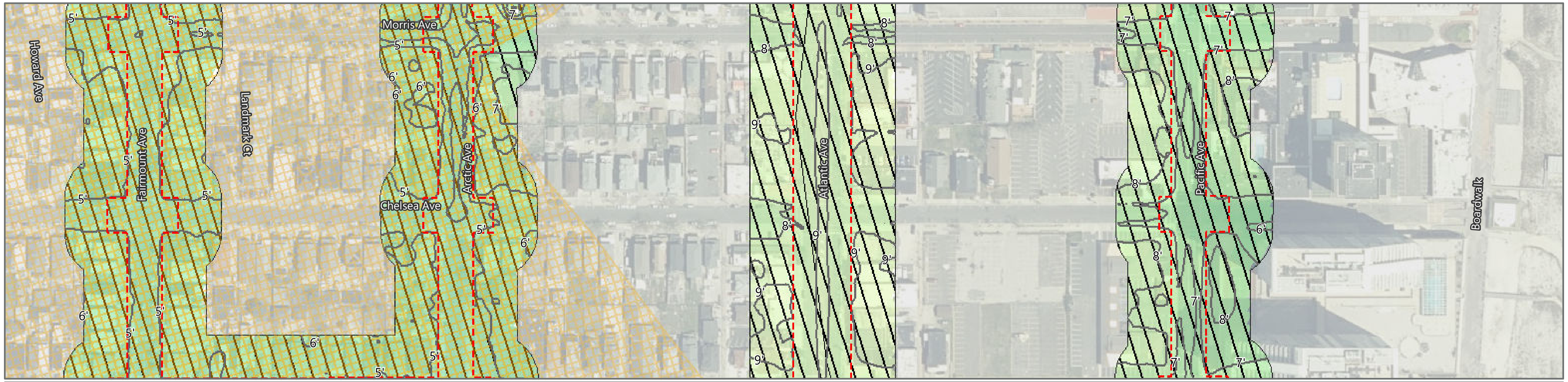
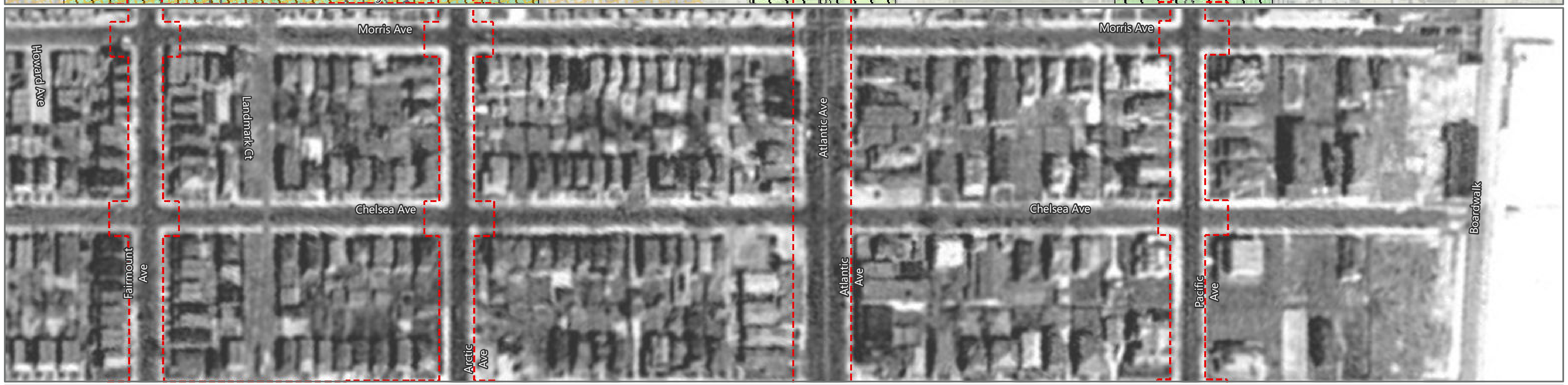
Feet

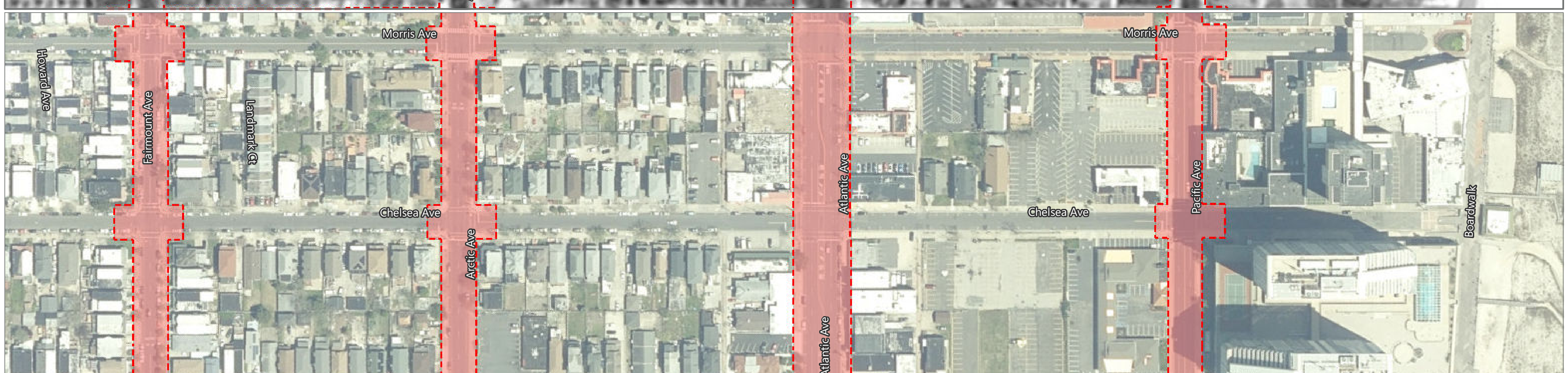
Prepared December 7, 2023
Basemap: NJ Office of Information Technology and Office of GIS "NJ 2020 Natural Color Imagery" & "New Jersey Black White 1940" Map Service

EDR

Figure 38. Cardiff Onshore Interconnection Cable - Archaeological Reconnaissance and Desktop Assessment Results







Atlantic Shores South Offshore Wind Project – Onshore Interconnection Facilities

Monmouth and Atlantic County, NJ

Terrestrial Archaeological Resources Assessment

Top Map - Soil and Topography

- Cardiff PAPE Boundary
- 2ft Contour
- Historic Fill

Soil Condition

- Disturbed

Value

- High : 23.1283
- Low : 3.58291e-39

Middle Map - 1940 Aerial & Mapped Resources

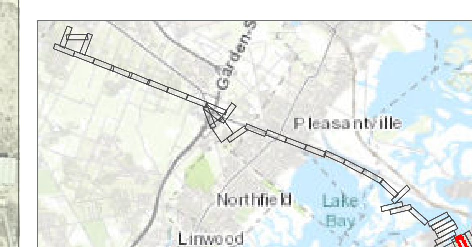
- Cardiff PAPE Boundary

Bottom Map - Archaeological Sensitivity Results

- Cardiff PAPE Boundary

Archaeological Sensitivity

- Area Excluded from Field Survey Consideration



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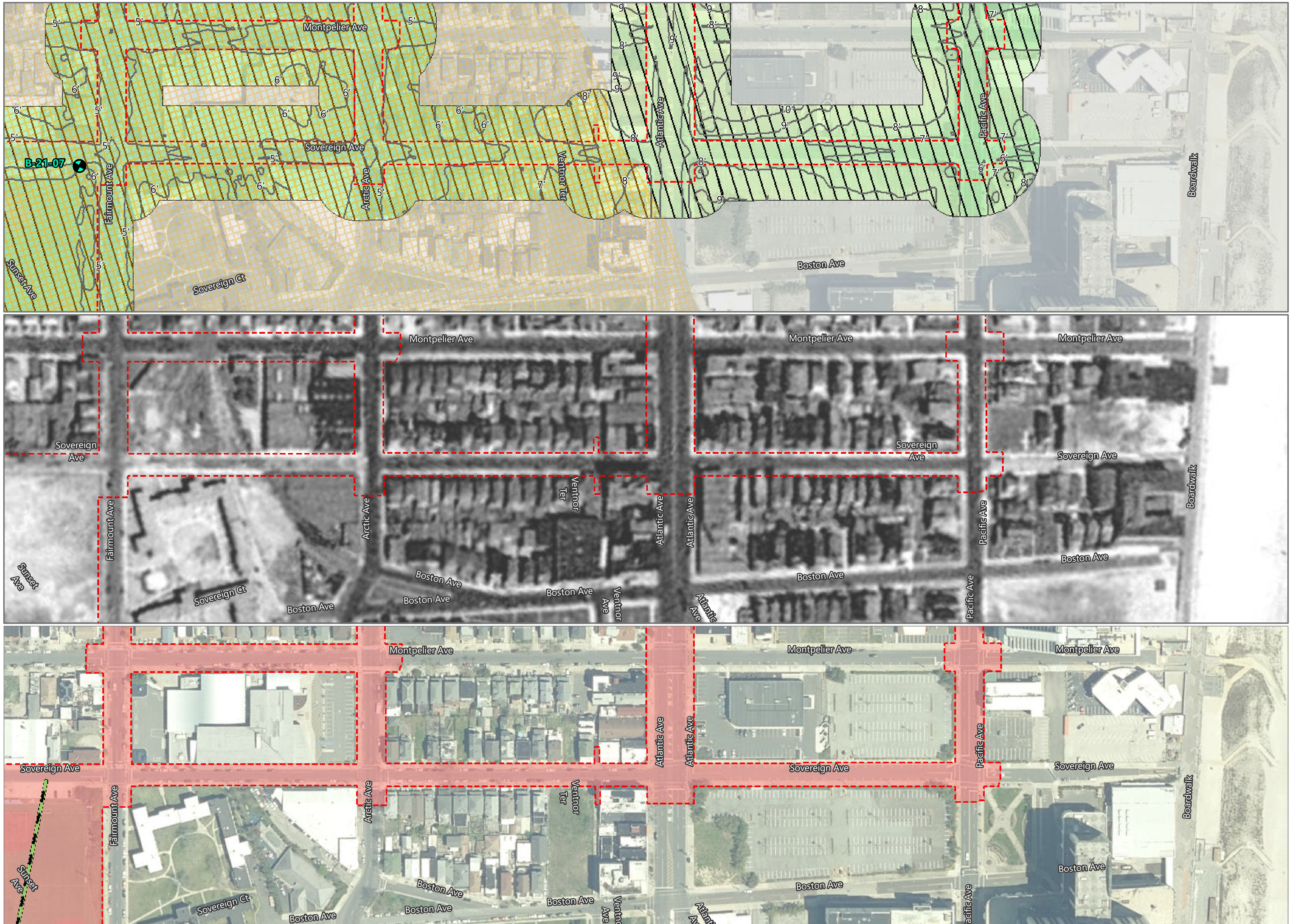
Prepared December 7, 2023
Basemap: NJ Office of Information Technology and Office of GIS "NJ 2020 Natural Color Imagery" & "New Jersey Black White 1940" Map Service

EDR



Atlantic Shores South Offshore Wind Project – Onshore Interconnection Facilities

Monmouth and Atlantic County, NJ

Terrestrial Archaeological Resources Assessment

Top Map - Soil and Topography

- Cardiff PAPE Boundary
- Geotechnical Boring
- 2ft Contour
- Historic Fill

Soil Condition

- Disturbed

Value

- High : 23.1283
- Low : 3.58291e-39

Middle Map - 1940 Aerial & Mapped Resources

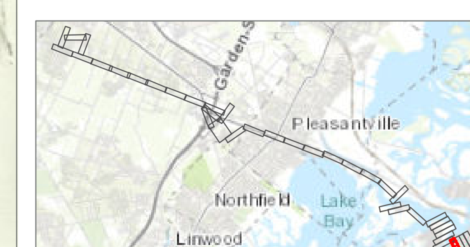
- Cardiff PAPE Boundary

Bottom Map - Archaeological Sensitivity Results

- Cardiff PAPE Boundary
- Trenchless PAPE

Archaeological Sensitivity

- Area Excluded from Field Survey Consideration



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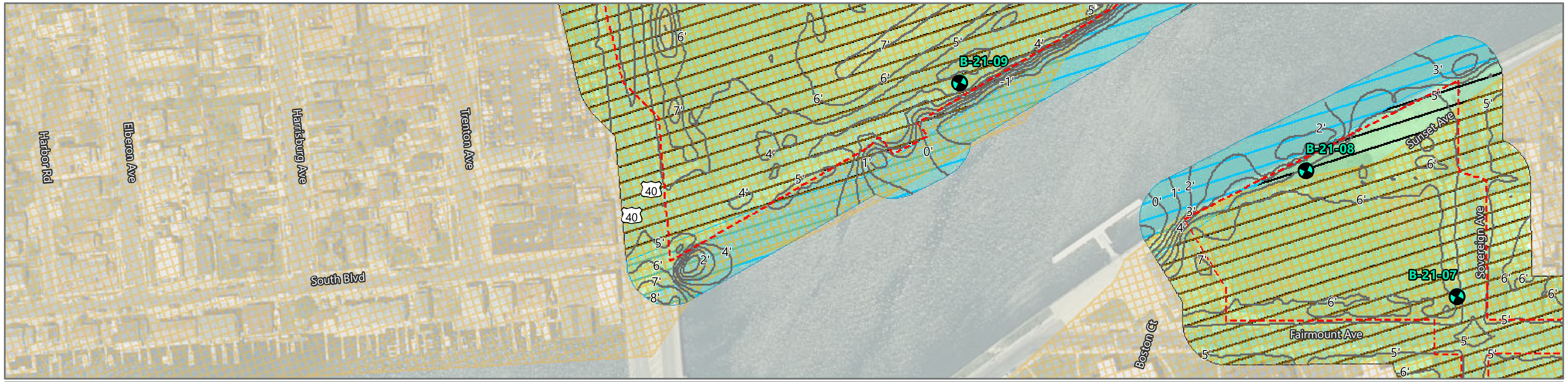
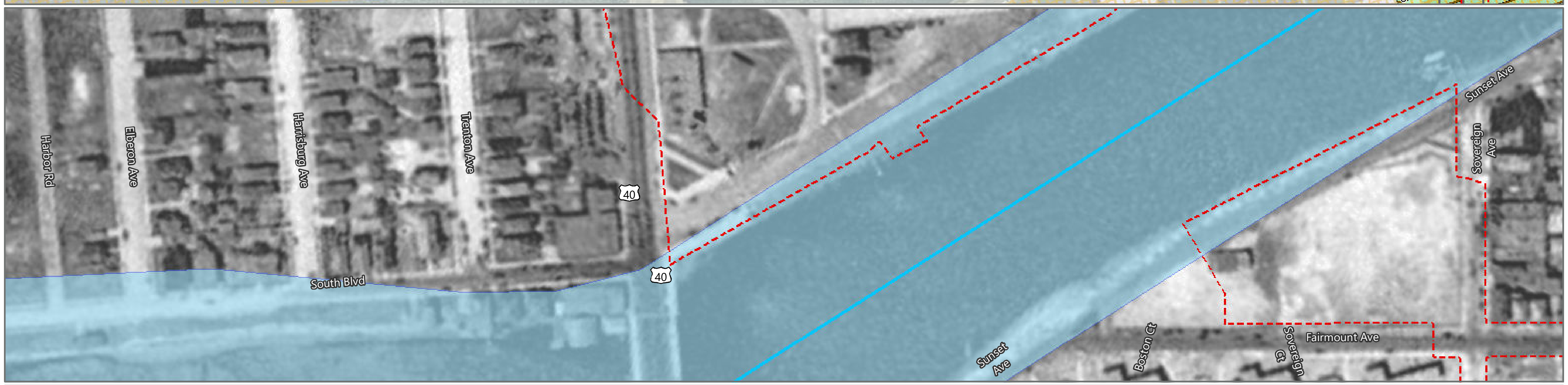
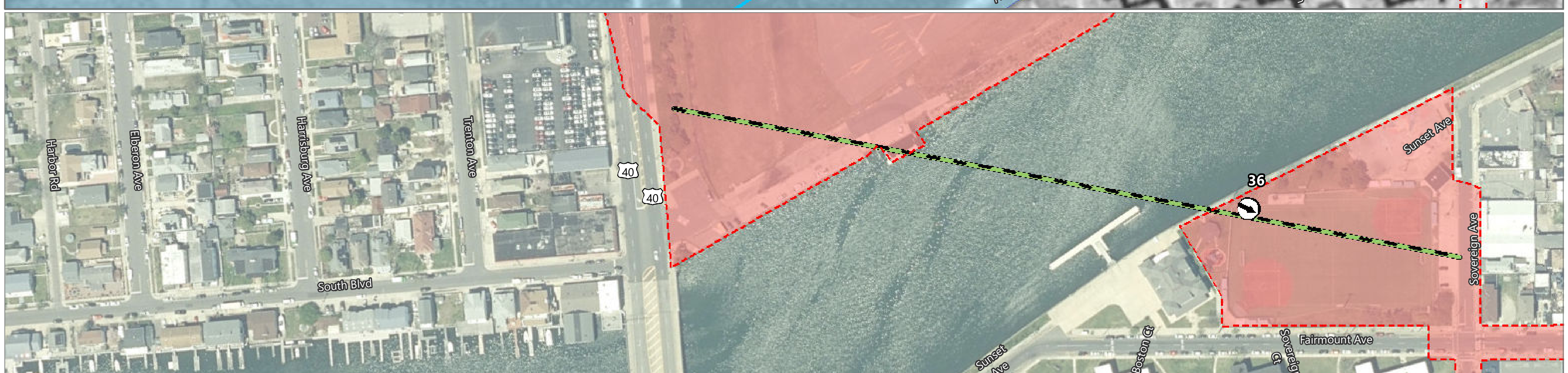
Prepared December 7, 2023
Basemap: NJ Office of Information Technology and Office of GIS "NJ 2020 Natural Color Imagery" & "New Jersey Black White 1940" Map Service

EDR

Figure 38. Cardiff Onshore Interconnection Cable - Archaeological Reconnaissance and Desktop Assessment Results







Atlantic Shores South Offshore Wind Project – Onshore Interconnection Facilities

Monmouth and Atlantic County, NJ

Terrestrial Archaeological Resources Assessment

Top Map - Soil and Topography

- Cardiff PAPE Boundary
- Geotechnical Boring
- 2ft Contour
- Historic Fill

Soil Condition

- Disturbed
- Water

Value

High : 23.1283

Low : 3.58291e-39

Middle Map - 1940 Aerial & Mapped Resources

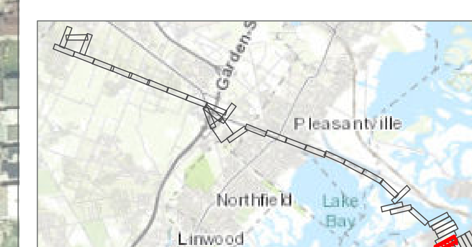
- Cardiff PAPE Boundary
- Waterway
- 500' Waterway Buffer

Bottom Map - Archaeological Sensitivity Results

- Cardiff PAPE Boundary
- Trenchless PAPE
- Photograph Location

Archaeological Sensitivity

- Area Excluded from Field Survey Consideration
- Low Sensitivity



0 50 100 200
Feet

Prepared December 7, 2023
Basemap: NJ Office of Information Technology and Office of GIS "NJ 2020 Natural Color Imagery" & "New Jersey Black White 1940" Map Service

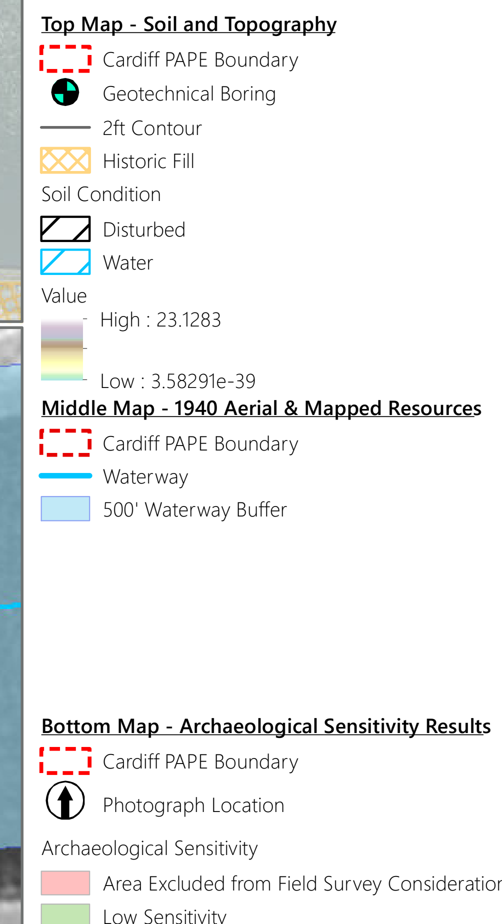
EDR

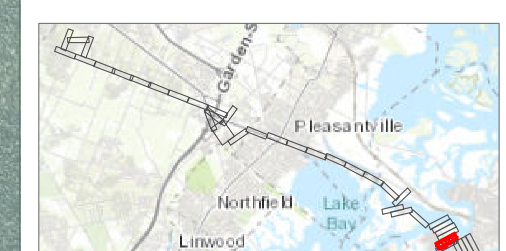
Figure 38. Cardiff Onshore Interconnection Cable - Archaeological Reconnaissance and Desktop Assessment Results

Atlantic Shores South Offshore Wind Project – Onshore Interconnection Facilities

Monmouth and Atlantic County, NJ

Terrestrial Archaeological Resources Assessment





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Atlantic Shores South Offshore Wind Project – Onshore Interconnection Facilities

Monmouth and Atlantic County, NJ

Terrestrial Archaeological Resources Assessment

Top Map - Soil and Topography
- Cardiff PAPE Boundary
- 2ft Contour
- Historic Fill

Soil Condition
- Disturbed
- Water

Value
- High : 23.1283
- Low : 3.58291e-39

Middle Map - 1940 Aerial & Mapped Resources
- Cardiff PAPE Boundary
- 500' Waterway Buffer

Bottom Map - Archaeological Sensitivity Results
- Cardiff PAPE Boundary

Archaeological Sensitivity
- Area Excluded from Field Survey Consideration
- Low Sensitivity

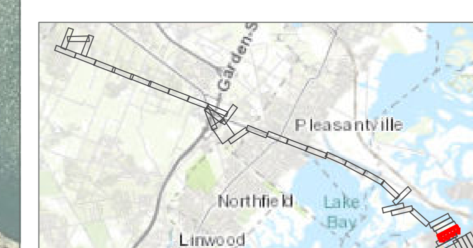

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Figure 38. Cardiff Onshore Interconnection Cable - Archaeological Reconnaissance and Desktop Assessment Results

Atlantic Shores South Offshore Wind Project – Onshore Interconnection Facilities

Monmouth and Atlantic County, NJ

Terrestrial Archaeological Resources Assessment

Top Map - Soil and Topography

- Cardiff PAPE Boundary
- Geotechnical Boring
- 2ft Contour
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Soil Condition

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- Water

Value

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Low : 3.58291e-39

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Bottom Map - Archaeological Sensitivity Results

- Cardiff PAPE Boundary

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- Area Excluded from Field Survey Consideration
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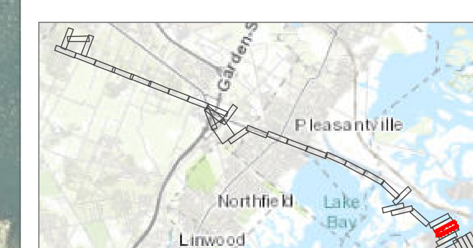

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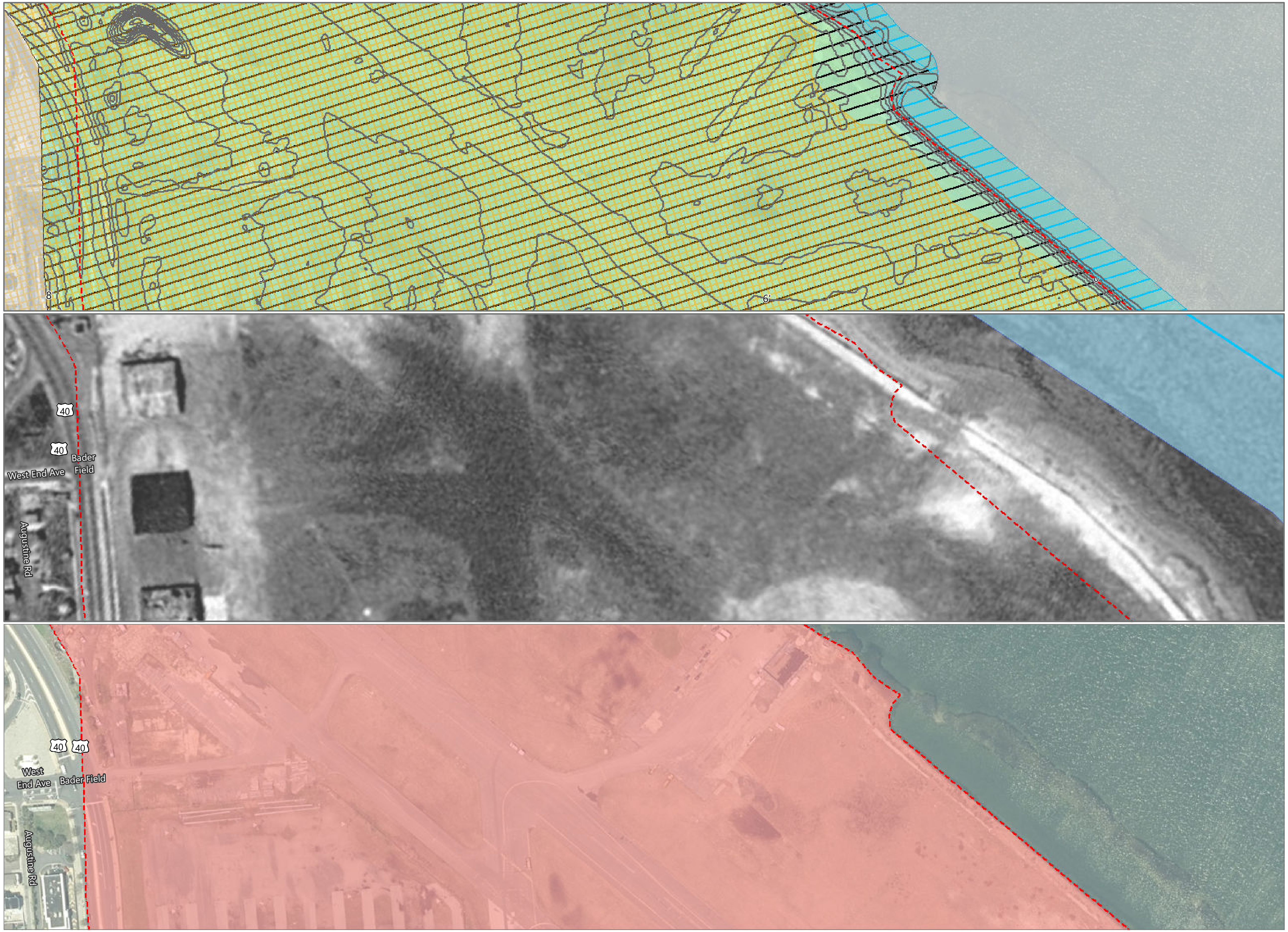
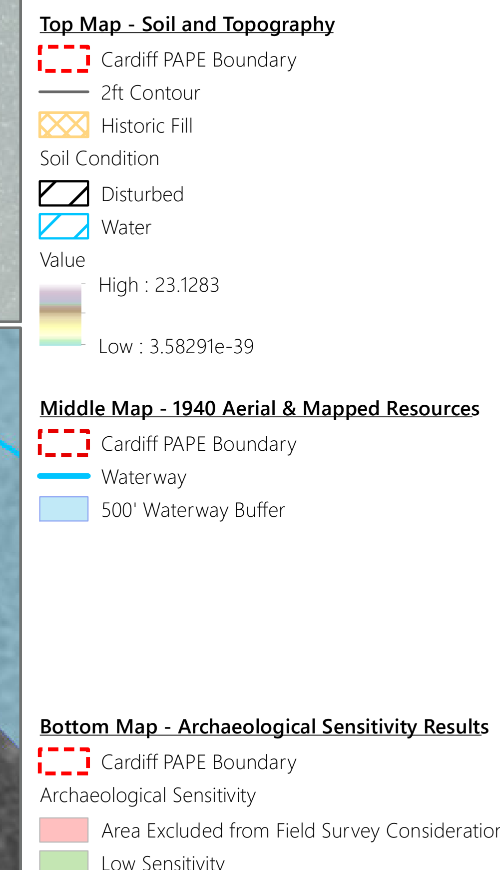
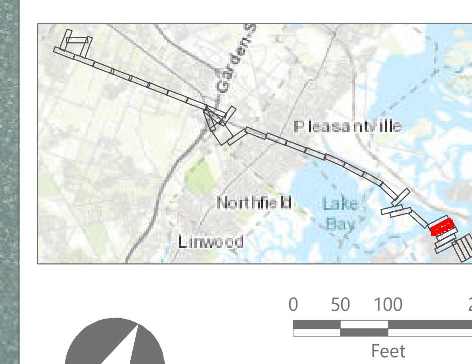


Atlantic Shores South Offshore Wind Project – Onshore Interconnection Facilities

Monmouth and Atlantic County, NJ

Terrestrial Archaeological Resources Assessment





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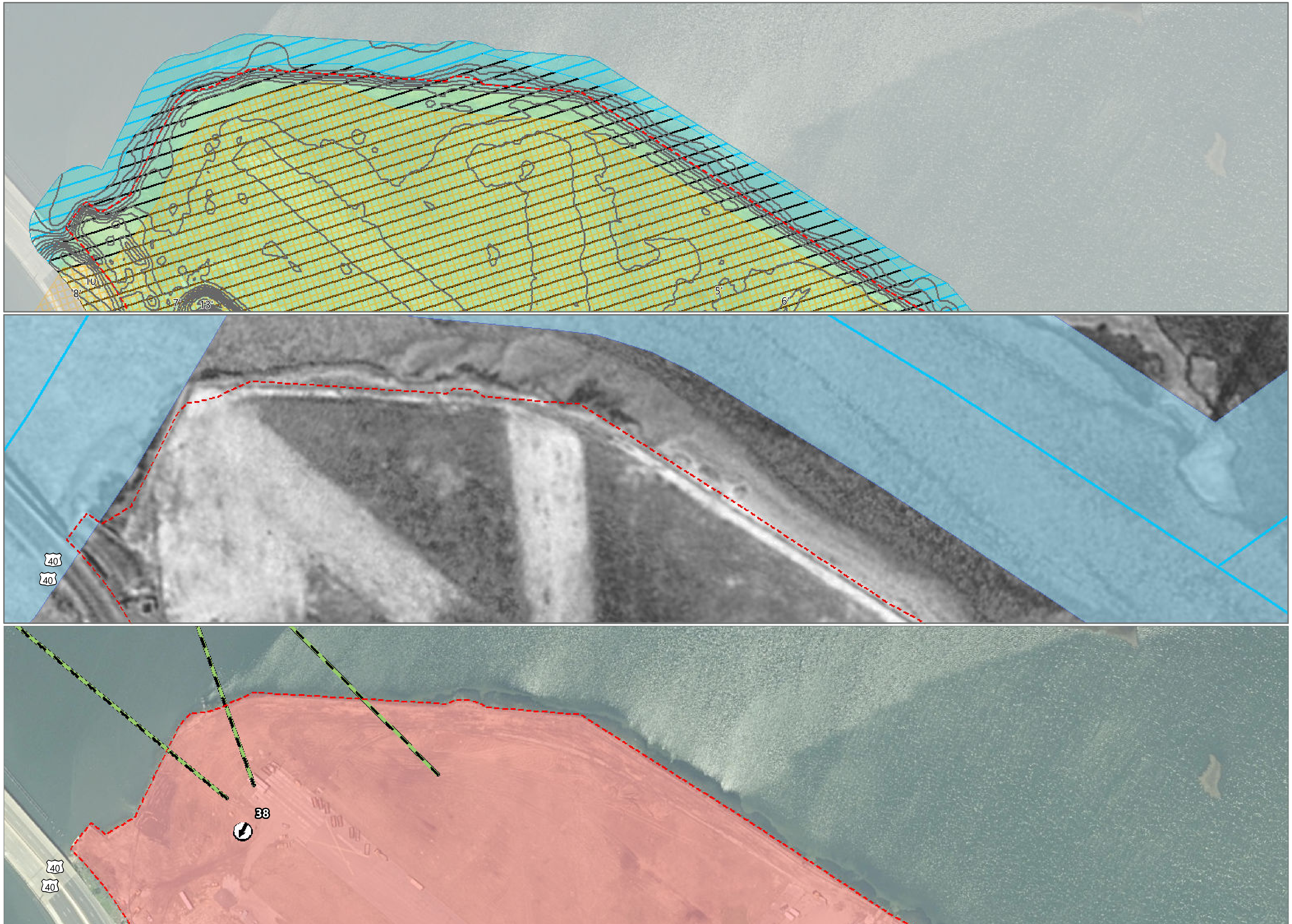

Atlantic Shores South Offshore Wind Project – Onshore Interconnection Facilities

Monmouth and Atlantic County, NJ

Terrestrial Archaeological Resources Assessment

Top Map - Soil and Topography
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- Photograph Location
- Archaeological Sensitivity
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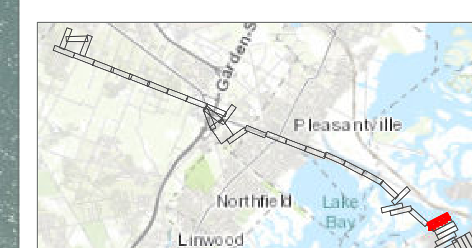

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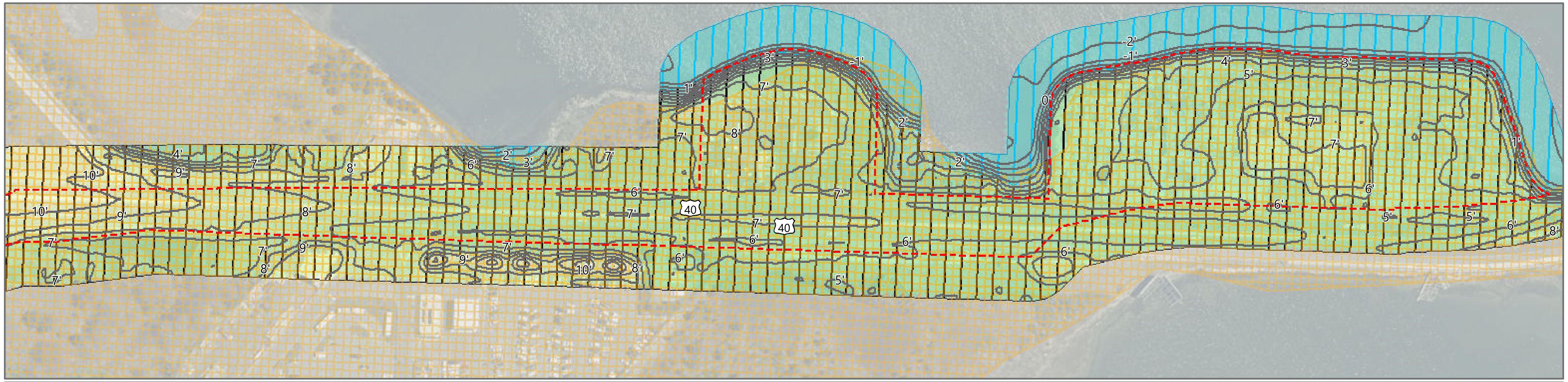

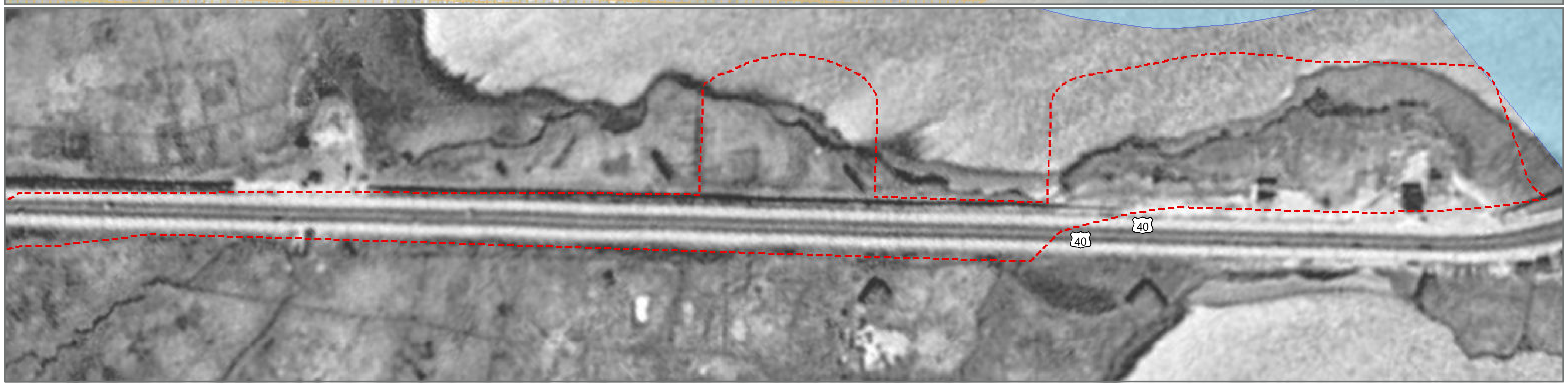

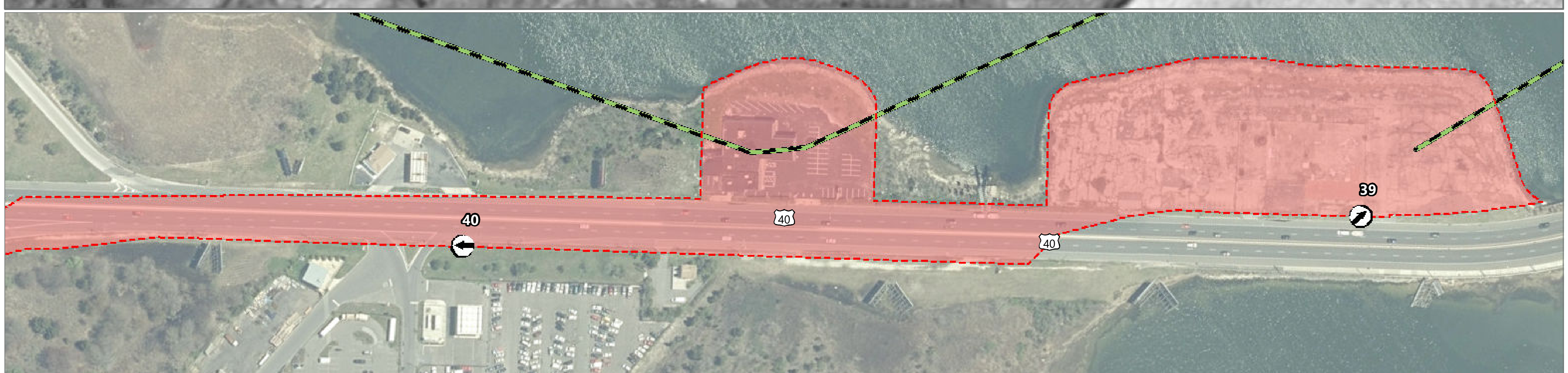

Atlantic Shores South Offshore Wind Project – Onshore Interconnection Facilities

Monmouth and Atlantic County, NJ

Terrestrial Archaeological Resources Assessment

Top Map - Soil and Topography
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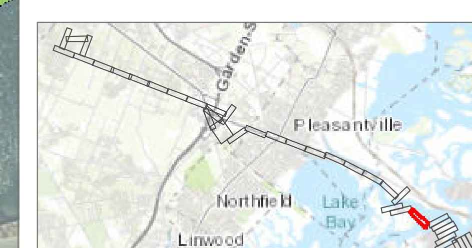

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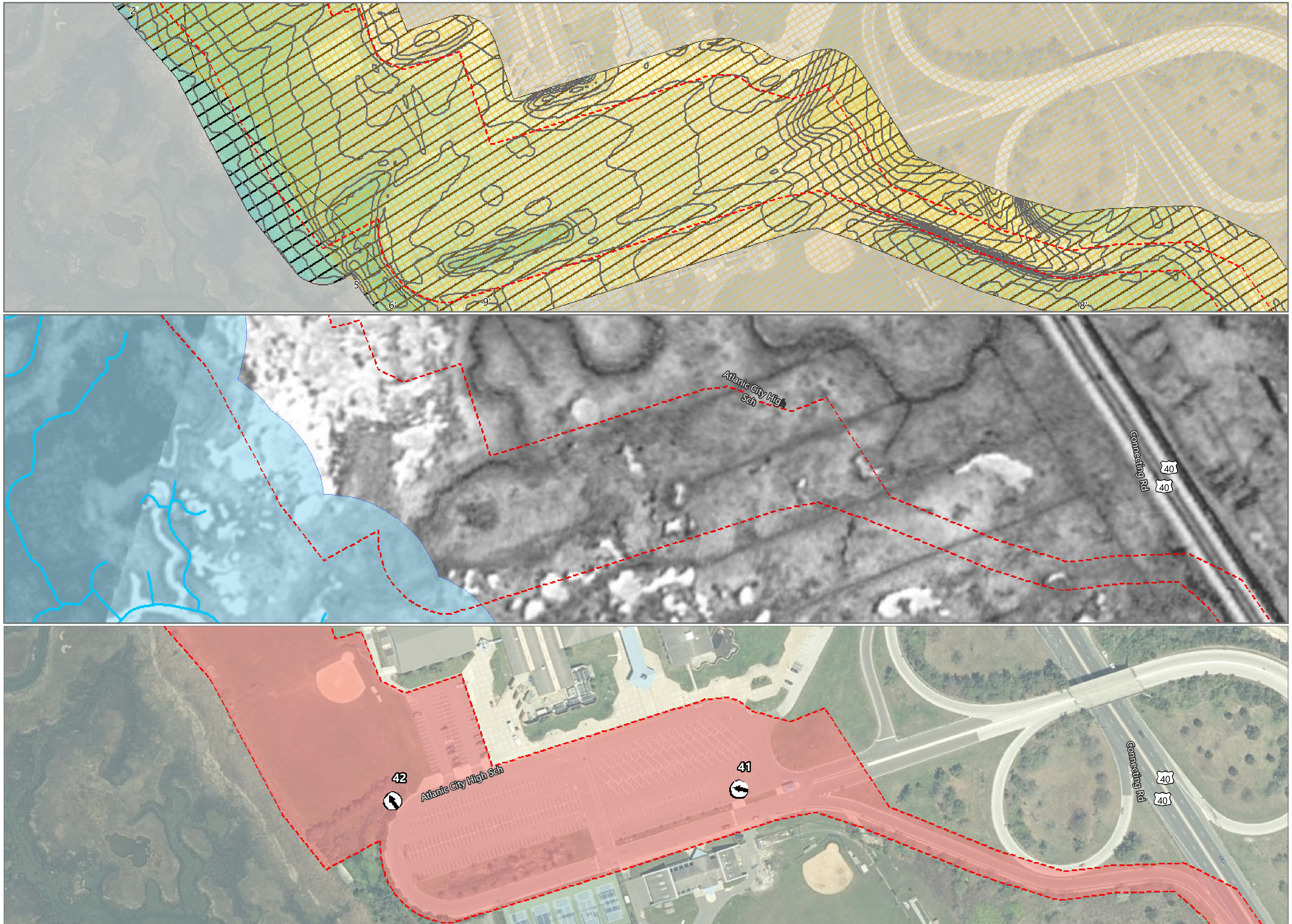

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Monmouth and Atlantic County, NJ

Terrestrial Archaeological Resources Assessment

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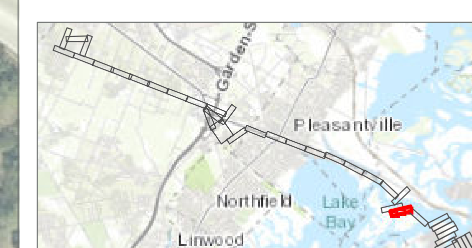

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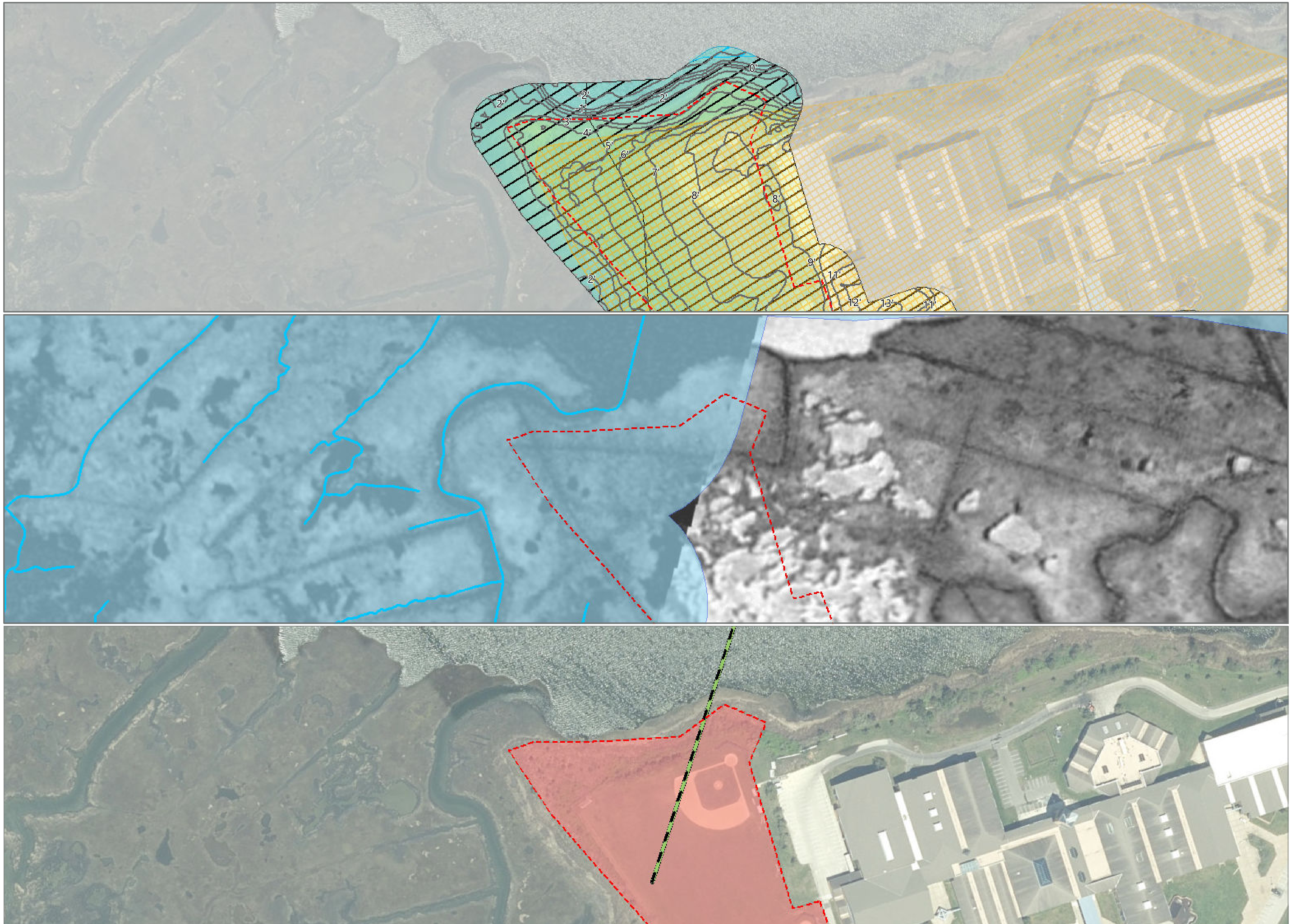
Figure 38. Cardiff Onshore Interconnection Cable - Archaeological Reconnaissance and Desktop Assessment Results



Atlantic Shores South Offshore Wind Project – Onshore Interconnection Facilities

Monmouth and Atlantic County, NJ

Terrestrial Archaeological Resources Assessment

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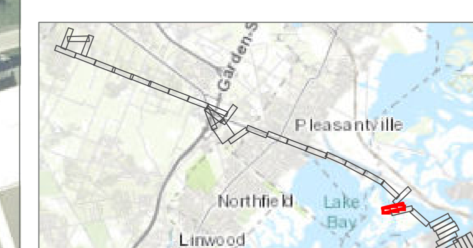
- Trenchless PAPE

Archaeological Sensitivity

- Area Excluded from Field Survey Consideration
- Low Sensitivity



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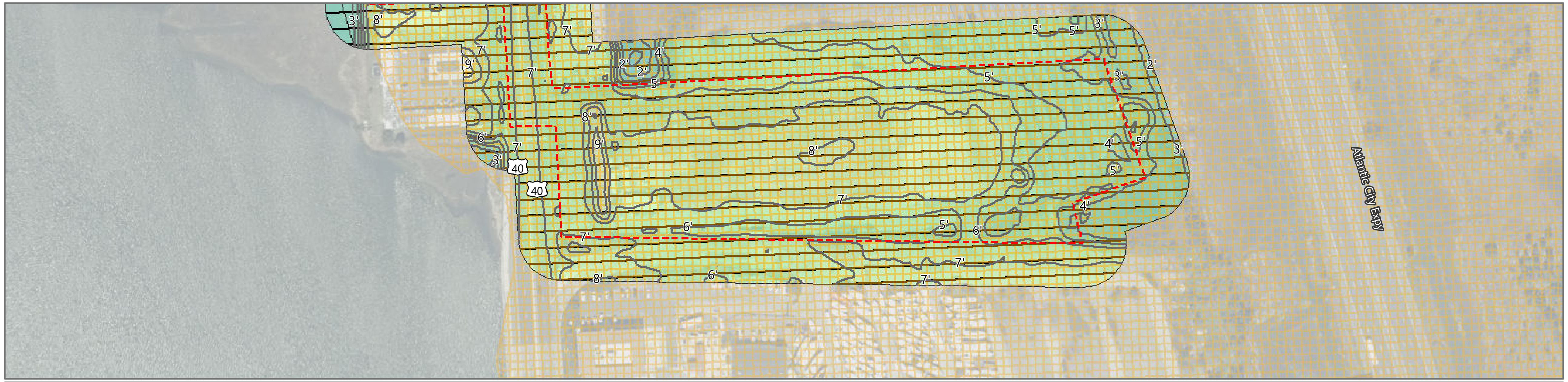

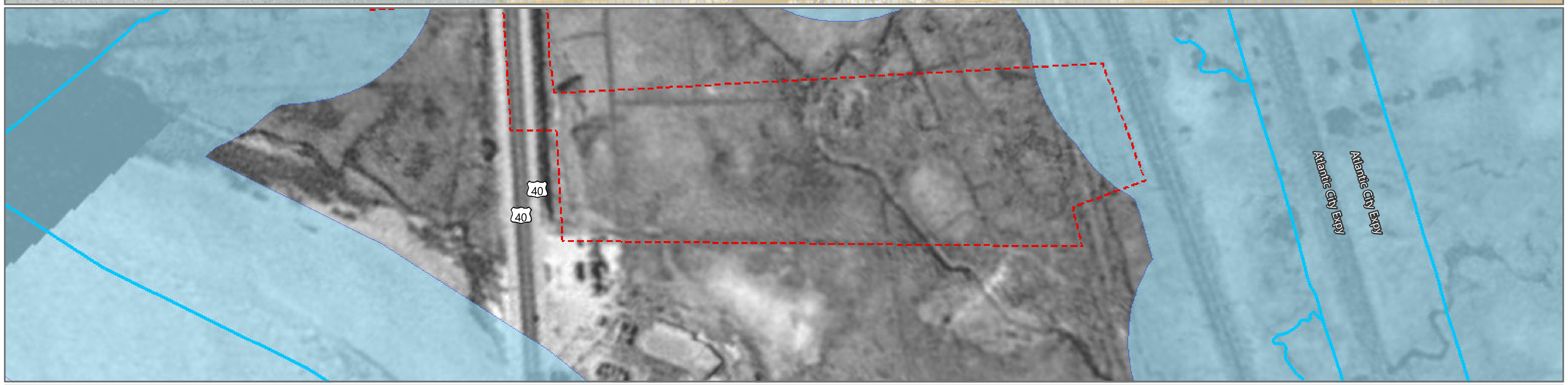

Atlantic Shores South Offshore Wind Project – Onshore Interconnection Facilities

Monmouth and Atlantic County, NJ

Terrestrial Archaeological Resources Assessment

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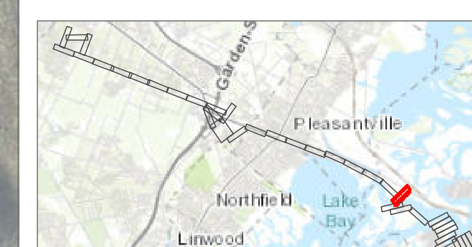

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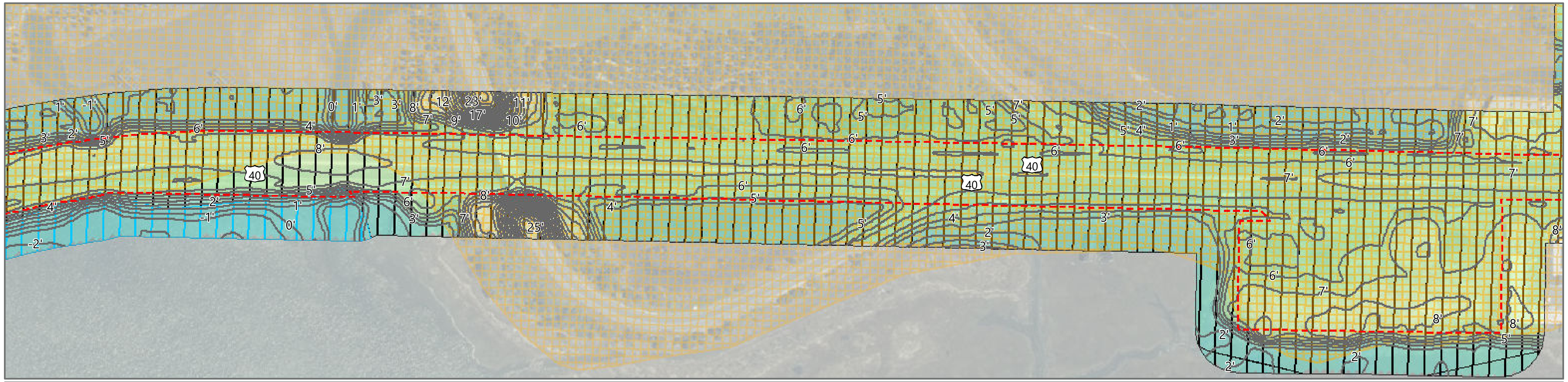

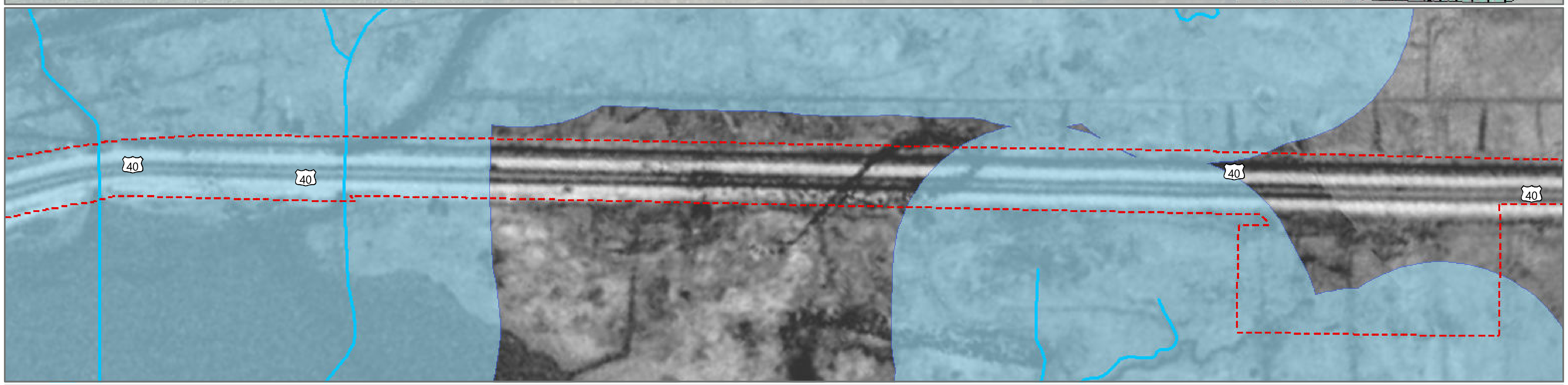

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Monmouth and Atlantic County, NJ

Terrestrial Archaeological Resources Assessment

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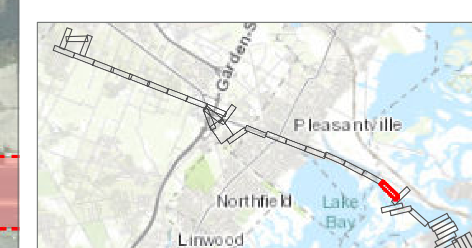

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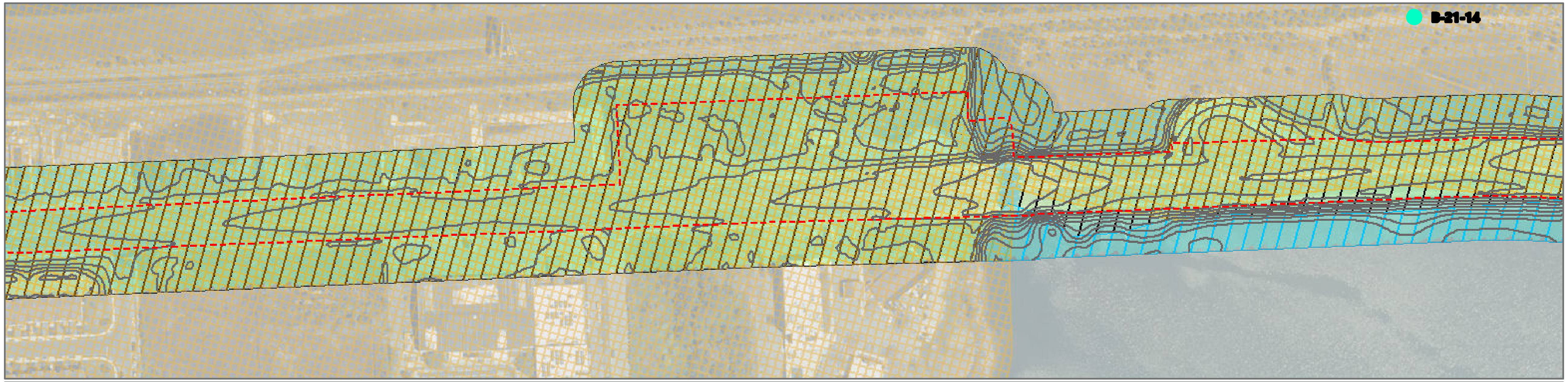

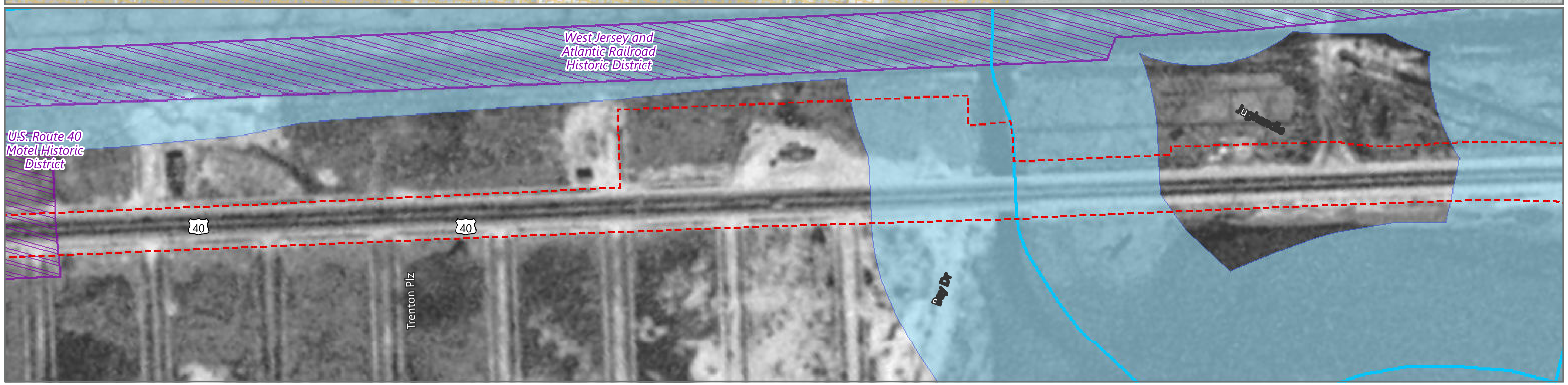

Atlantic Shores South Offshore Wind Project – Onshore Interconnection Facilities

Monmouth and Atlantic County, NJ

Terrestrial Archaeological Resources Assessment

Top Map - Soil and Topography
- Cardiff PAPE Boundary
- Geotechnical Boring
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- Historic Fill

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- 500' Waterway Buffer

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- Trenchless PAPE

Archaeological Sensitivity
- Area Excluded from Field Survey Consideration
- Low Sensitivity

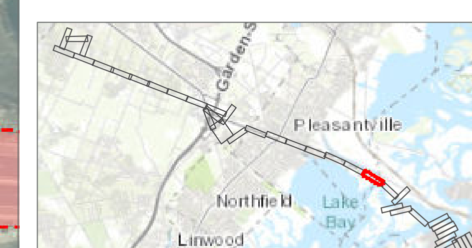

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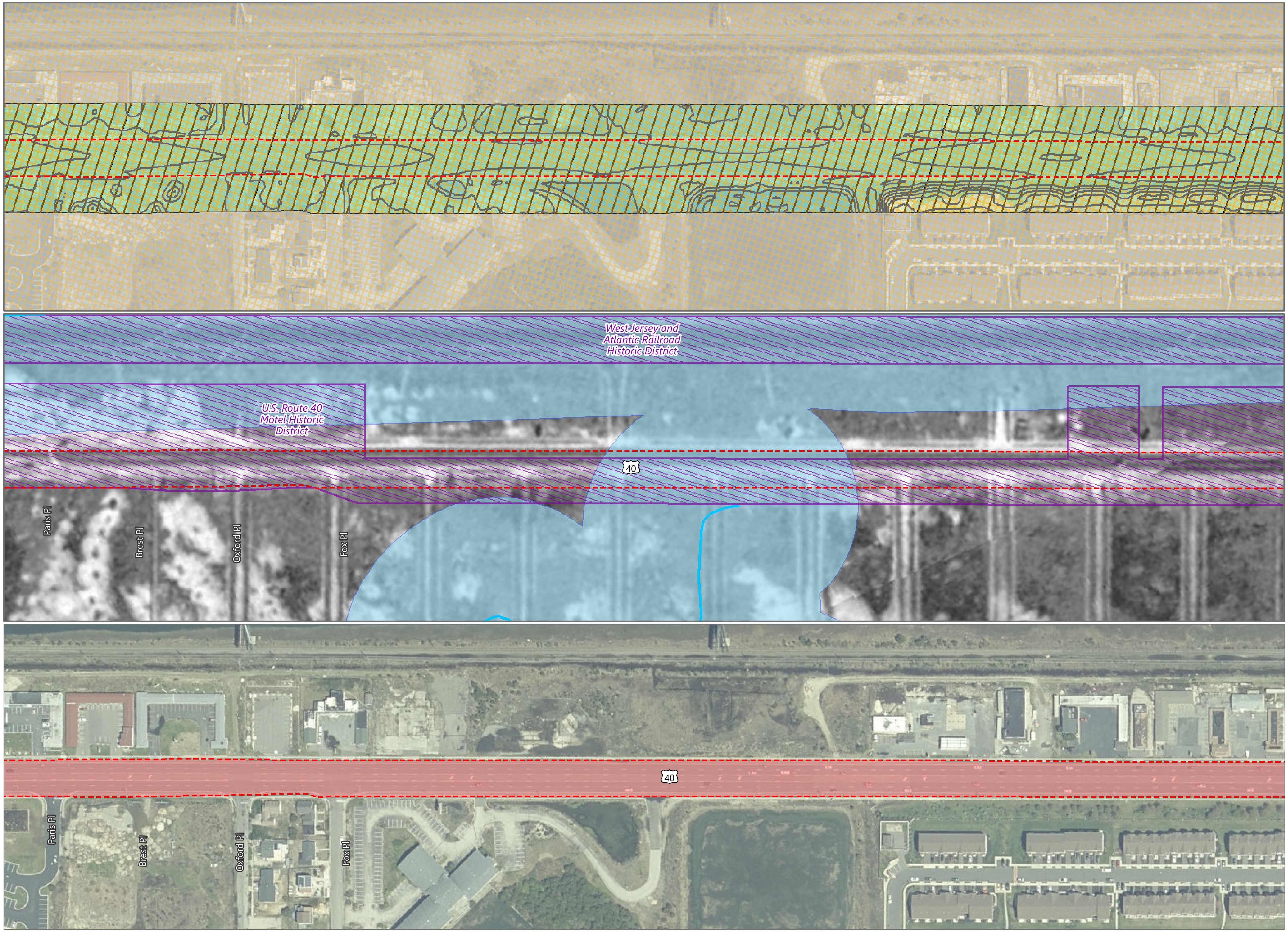
Figure 38. Cardiff Onshore Interconnection Cable - Archaeological Reconnaissance and Desktop Assessment Results



Atlantic Shores South Offshore Wind Project – Onshore Interconnection Facilities

Monmouth and Atlantic County, NJ

Terrestrial Archaeological Resources Assessment

Top Map - Soil and Topography

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- Geotechnical Boring
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- Historic Fill

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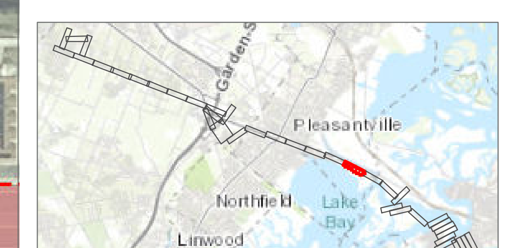
- Waterway
- Historic Districts of New Jersey
- 500' Waterway Buffer

Bottom Map - Archaeological Sensitivity Results

- Cardiff PAPE Boundary

Archaeological Sensitivity

- Area Excluded from Field Survey Consideration



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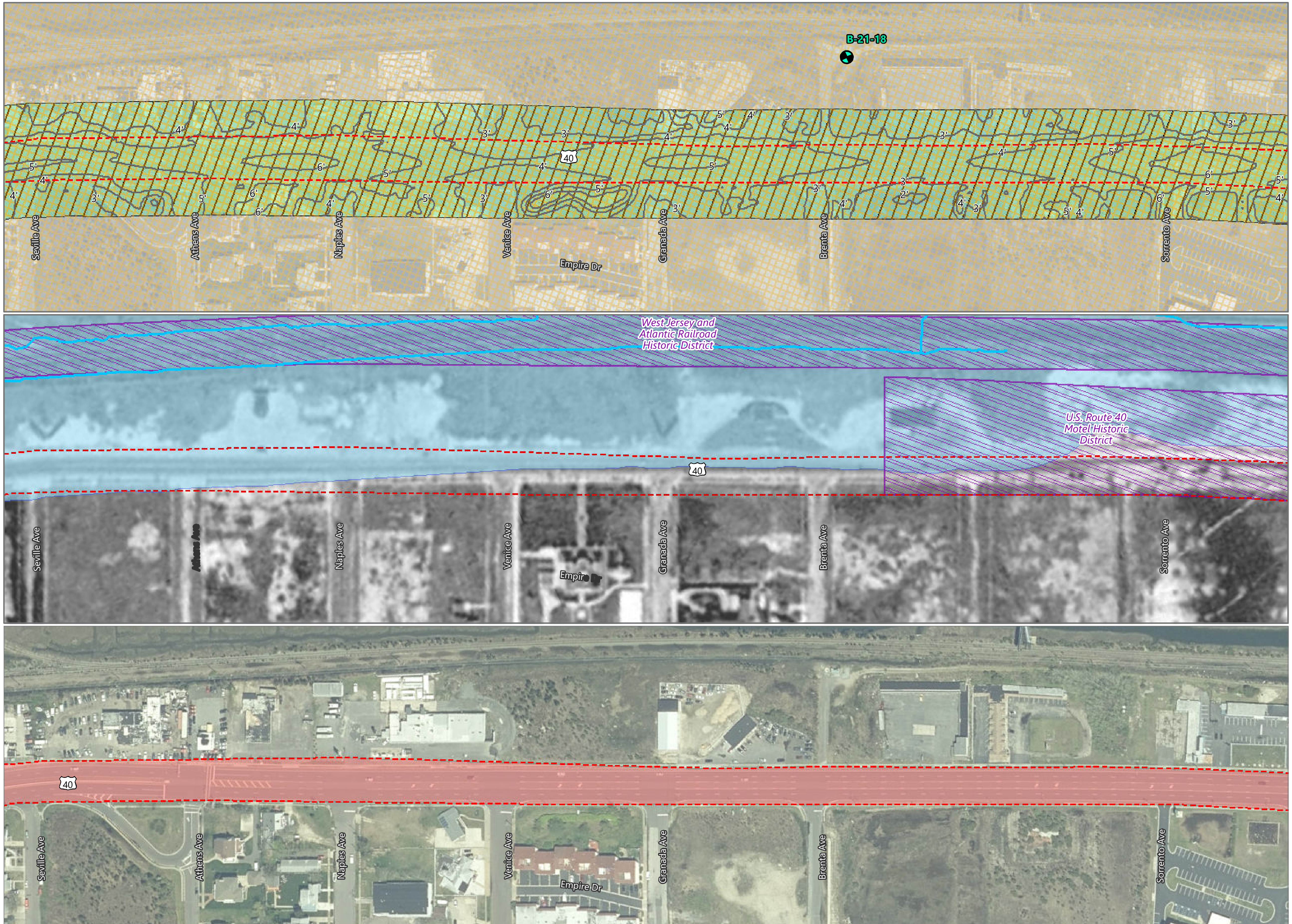

Atlantic Shores South Offshore Wind Project – Onshore Interconnection Facilities

Monmouth and Atlantic County, NJ

Terrestrial Archaeological Resources Assessment

Top Map - Soil and Topography

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- Waterway
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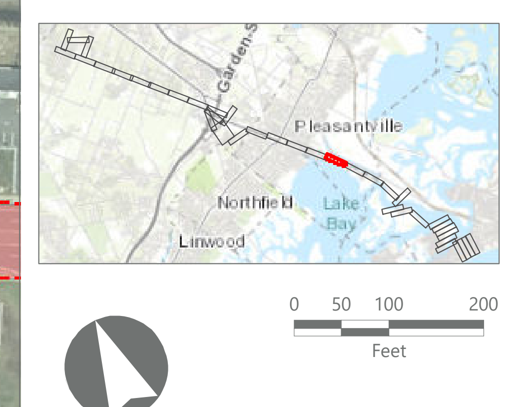
- 500' Waterway Buffer

Bottom Map - Archaeological Sensitivity Results

- Cardiff PAPE Boundary

Archaeological Sensitivity

- Area Excluded from Field Survey Consideration



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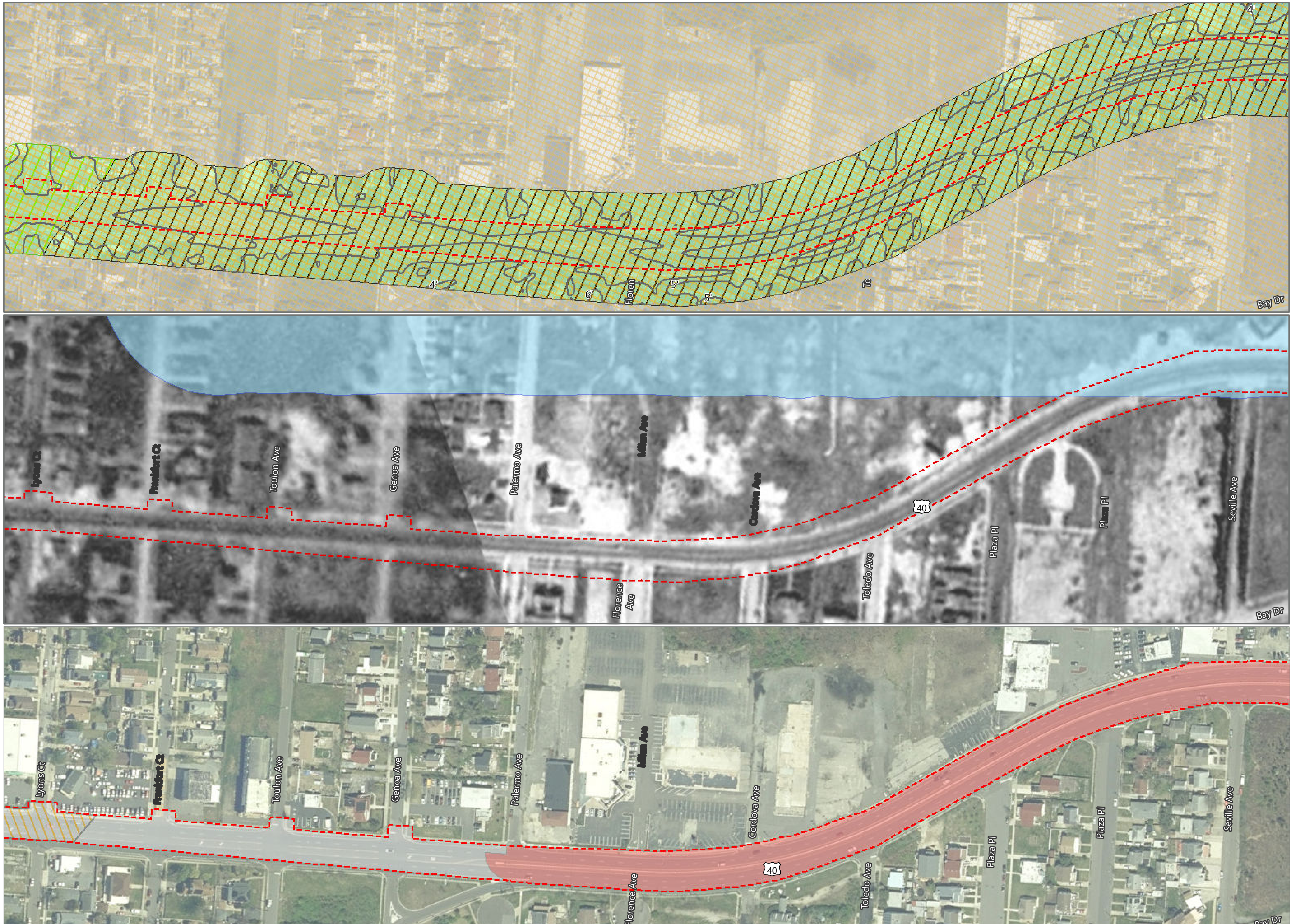

Atlantic Shores South Offshore Wind Project – Onshore Interconnection Facilities

Monmouth and Atlantic County, NJ

Terrestrial Archaeological Resources Assessment

Top Map - Soil and Topography

- Cardiff PAPE Boundary
- 2ft Contour
- Historic Fill

Soil Condition

- Disturbed
- Intact Soils – Subsoil depth approx. 1.0-2.0 ft

Value

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Middle Map - 1940 Aerial & Mapped Resources

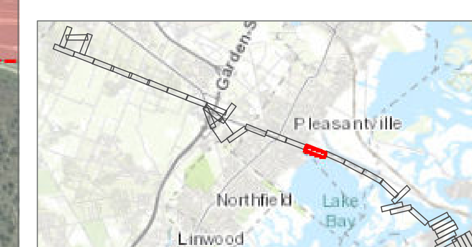
- Cardiff PAPE Boundary
- 500' Waterway Buffer

Bottom Map - Archaeological Sensitivity Results

- Cardiff PAPE Boundary

Archaeological Sensitivity

- Area Excluded from Field Survey Consideration
- Roadway/Paved Medium-High Sensitivity
- Roadway/Paved



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Monmouth and Atlantic County, NJ

Terrestrial Archaeological Resources Assessment

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Archaeological Sensitivity

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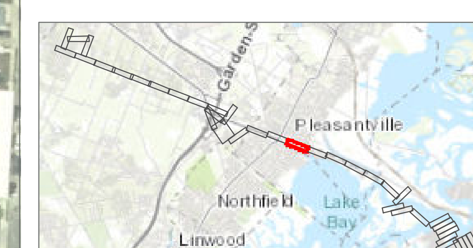

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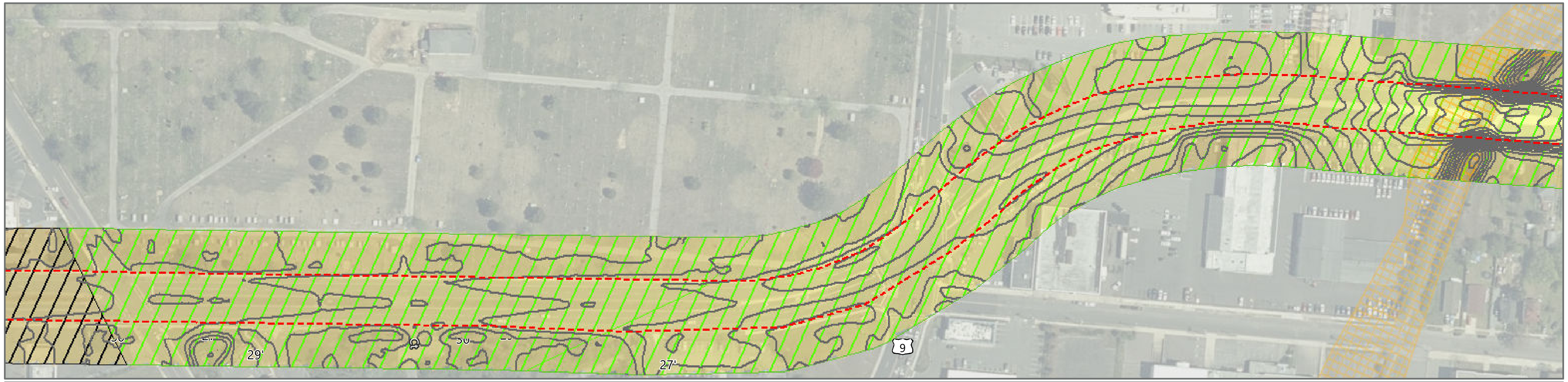

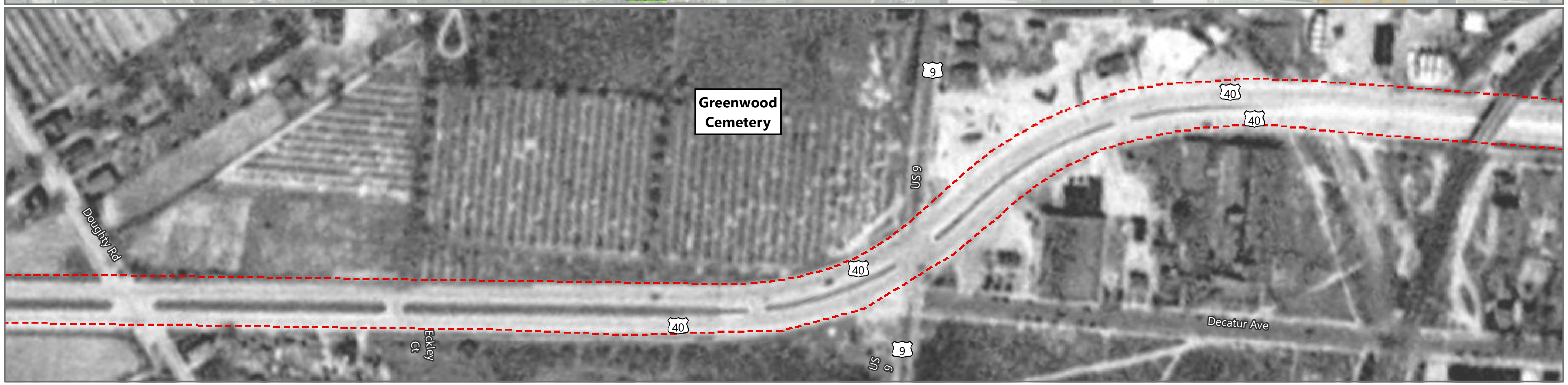

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Monmouth and Atlantic County, NJ

Terrestrial Archaeological Resources Assessment

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Soil Condition
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Cardiff PAPE Boundary

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Cardiff PAPE Boundary
Archaeological Sensitivity
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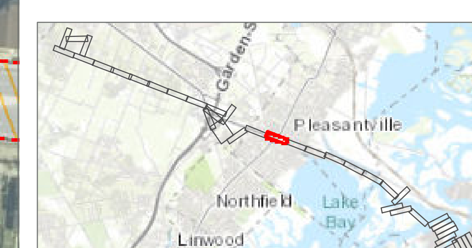
Roadway/Paved



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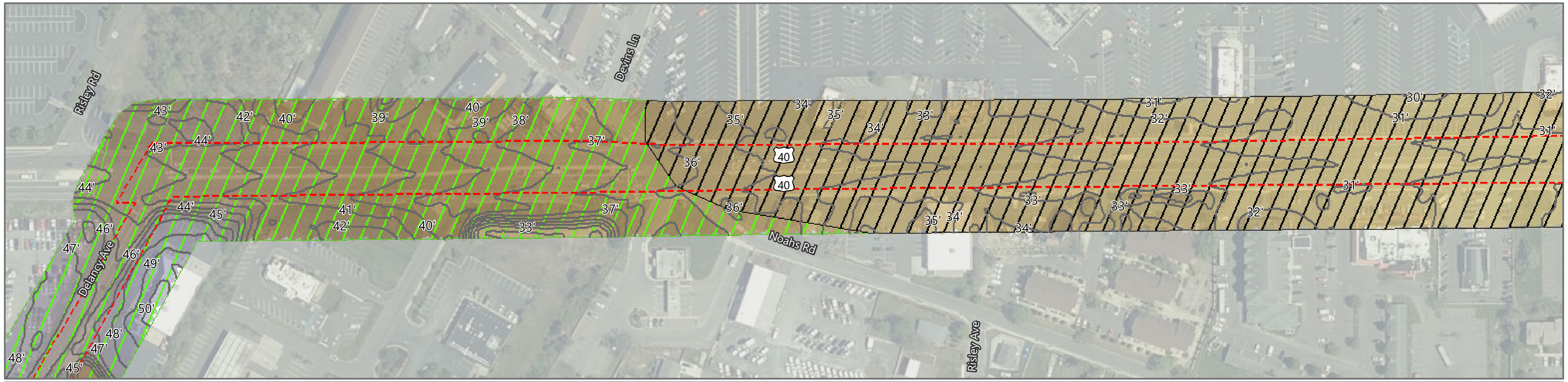

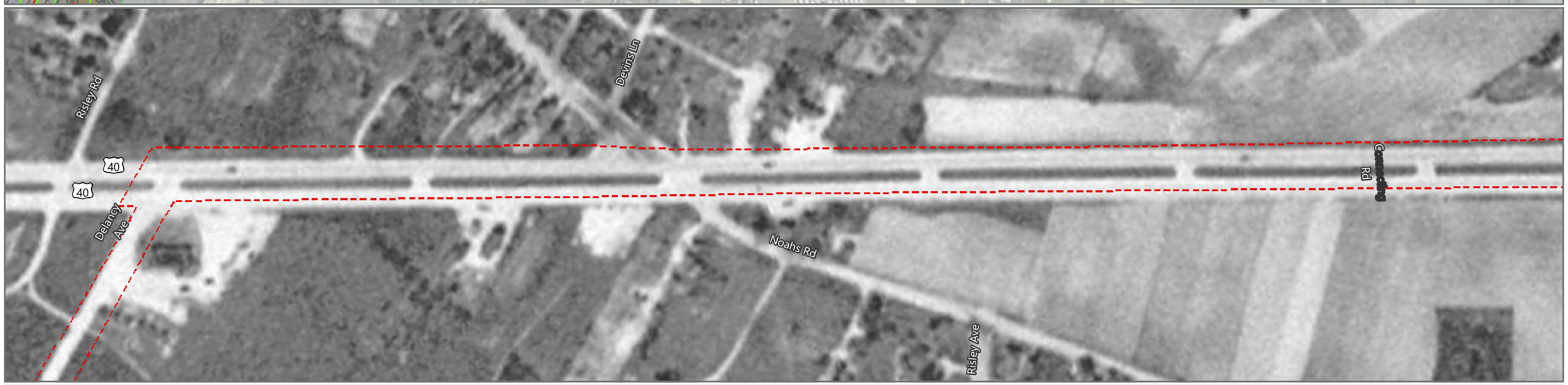

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Monmouth and Atlantic County, NJ

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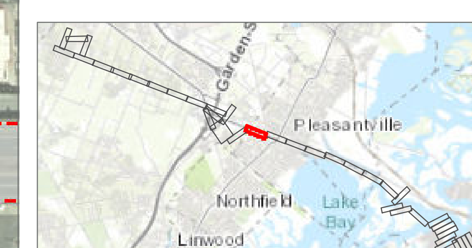

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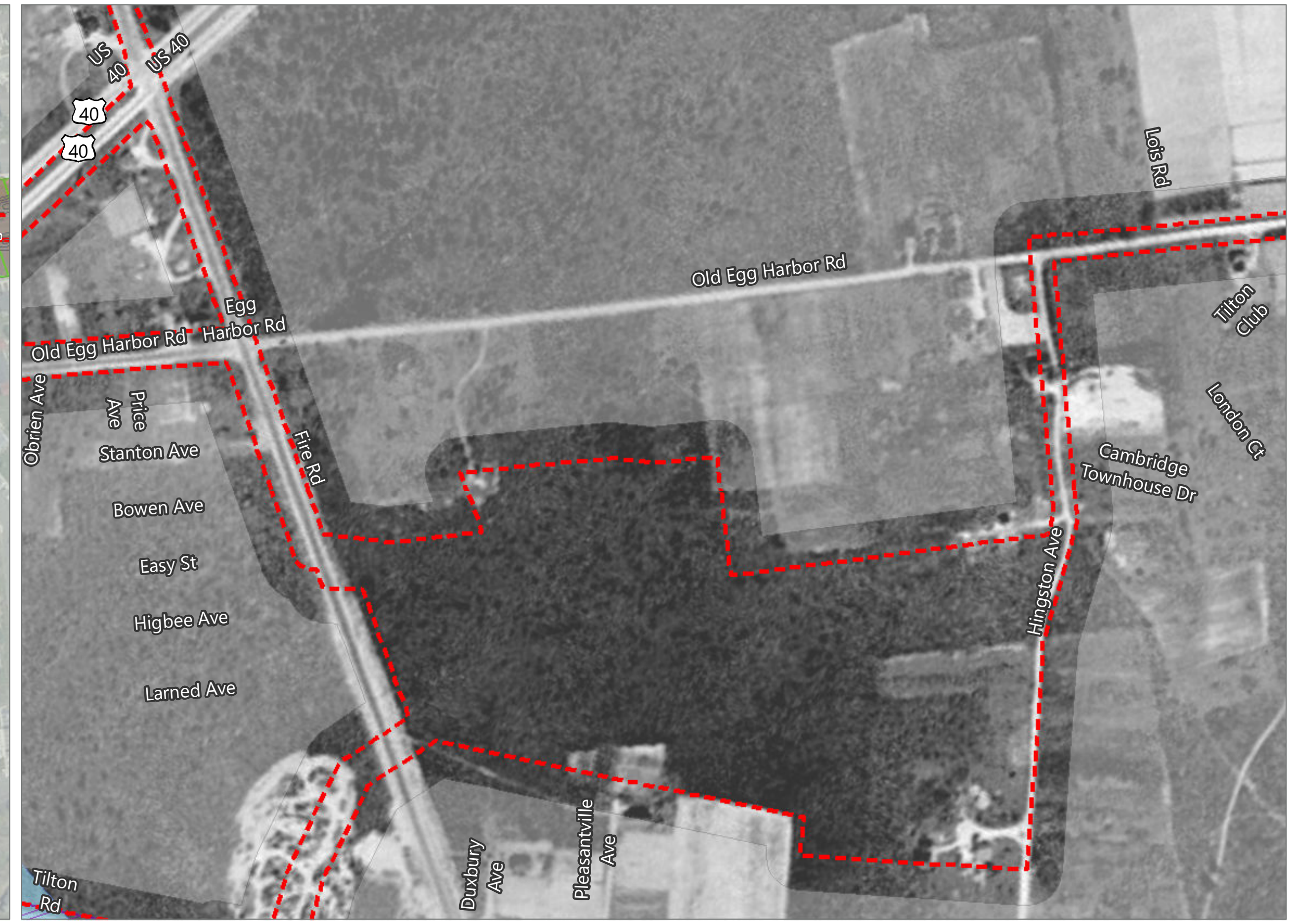
Figure 38. Cardiff Onshore Interconnection Cable - Archaeological Reconnaissance and Desktop Assessment Results



Atlantic Shores South Offshore Wind Project – Onshore Interconnection Facilities

Monmouth and Atlantic County, NJ

Terrestrial Archaeological Resources Assessment

Top Left Map - Soils and Topography

- Cardiff PAPE Boundary
- 2ft Contour

Soil Condition

- Disturbed
- Intact Soils – Subsoil depth approx. 1.0-2.0 ft

Value

- High : 23.1283
- Low : 3.58291e-39

Top Right Map - 1930 Aerial & Mapped Resources

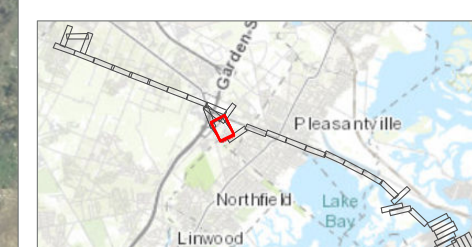
- Cardiff PAPE Boundary
- Historic Districts of New Jersey
- 500' Waterway Buffer

Bottom Map - Archaeological Sensitivity

- Cardiff PAPE Boundary
- Photograph Location
- Phase 1B Survey Area

Archaeological Sensitivity

- Area Excluded from Field Survey Consideration
- Low Sensitivity
- Medium Sensitivity
- Roadway/Paved



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Prepared December 7, 2023
Basemap: NJ Office of Information Technology and Office of GIS "NJ 2020 Natural Color Imagery" & "New Jersey Black White 1940" Map Service

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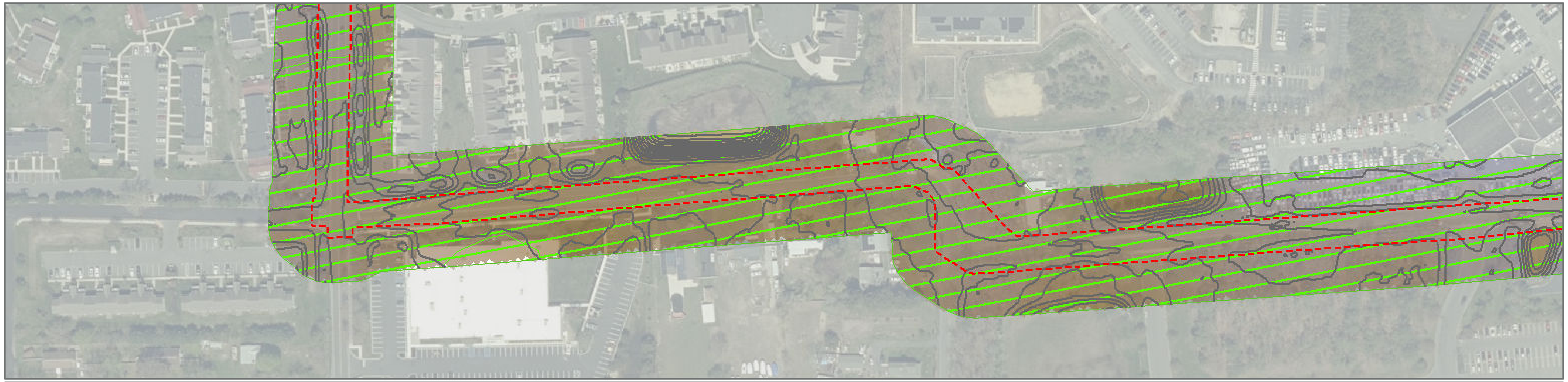
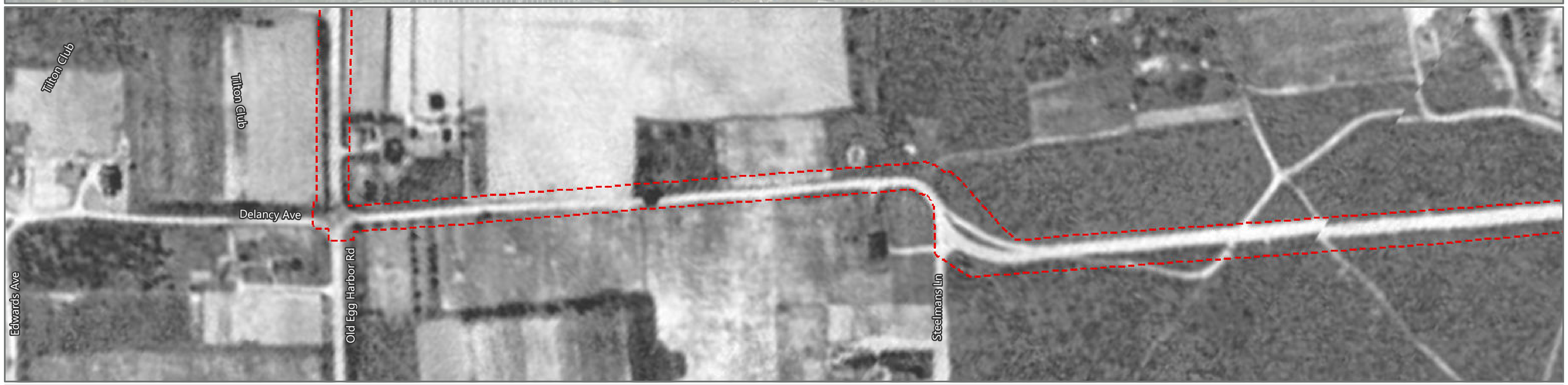
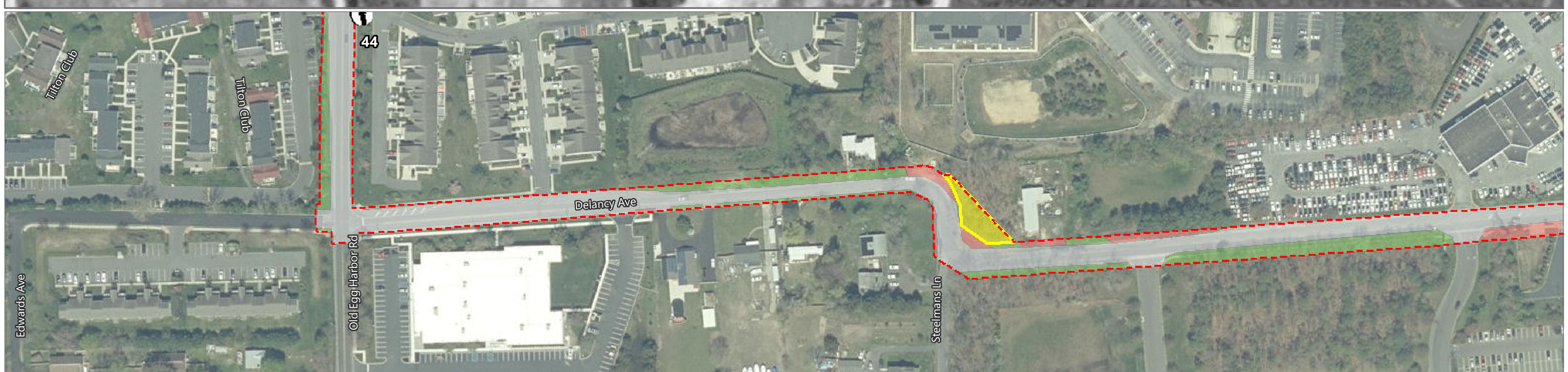






Atlantic Shores South Offshore Wind Project – Onshore Interconnection Facilities

Monmouth and Atlantic County, NJ

Terrestrial Archaeological Resources Assessment

Top Map - Soil and Topography
- Cardiff PAPE Boundary
- 2ft Contour

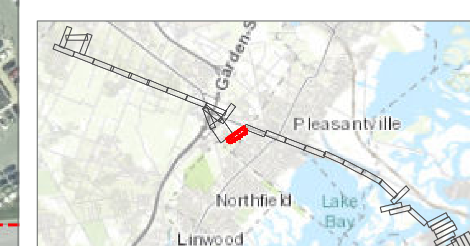
Soil Condition
- Intact Soils – Subsoil depth approx. 1.0-2.0 ft

Value
- High : 23.1283
- Low : 3.58291e-39

Middle Map - 1940 Aerial & Mapped Resources
- Cardiff PAPE Boundary

Bottom Map - Archaeological Sensitivity Results
- Cardiff PAPE Boundary
- Photograph Location
- Phase 1B Survey Area

Archaeological Sensitivity
- Area Excluded from Field Survey Consideration
- Low Sensitivity
- Medium Sensitivity
- Roadway/Paved



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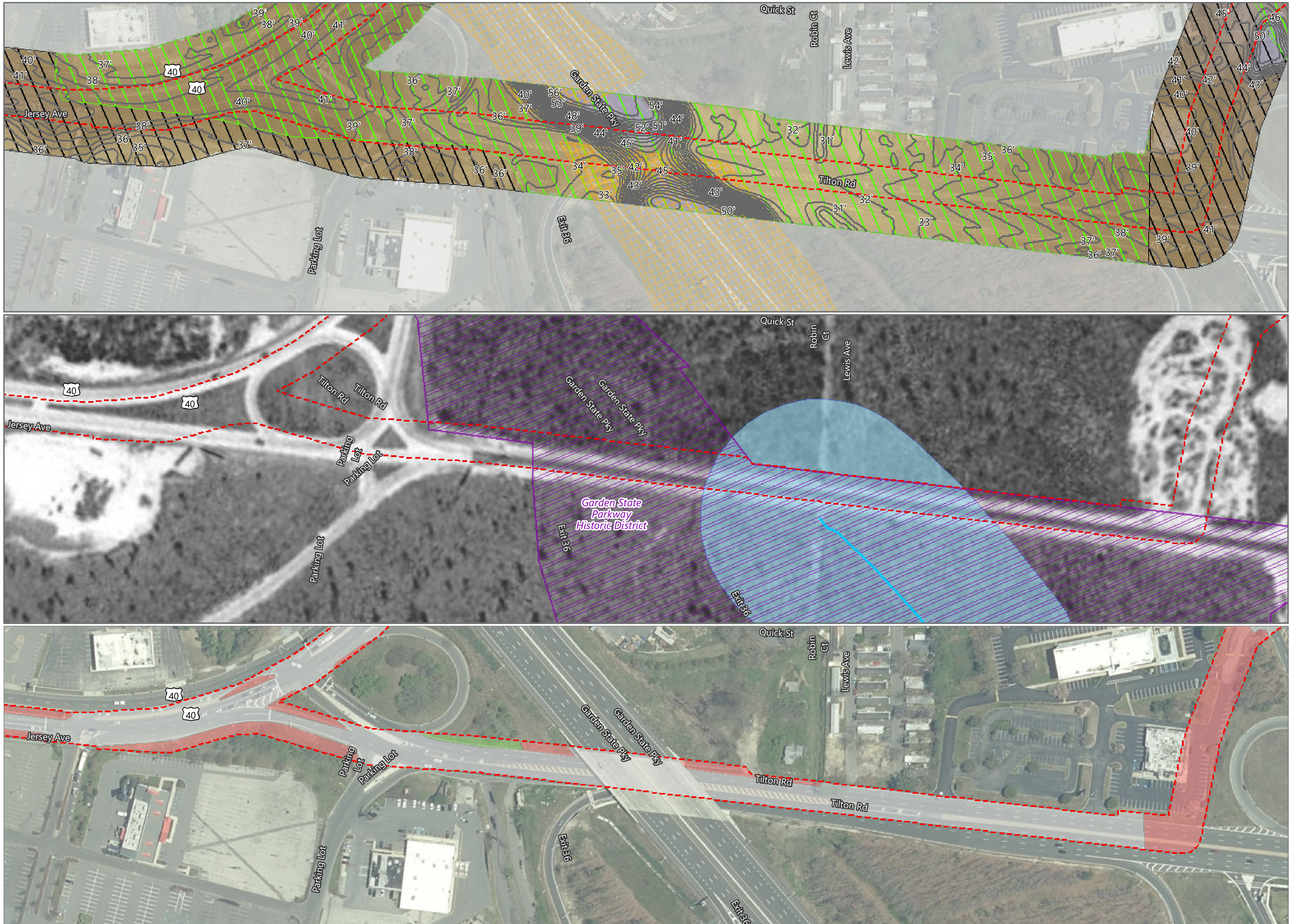
Prepared December 7, 2023
Basemap: NJ Office of Information Technology and Office of GIS "NJ 2020 Natural Color Imagery" & "New Jersey Black White 1940" Map Service

EDR

Figure 38. Cardiff Onshore Interconnection Cable - Archaeological Reconnaissance and Desktop Assessment Results



Atlantic Shores South Offshore Wind Project – Onshore Interconnection Facilities

Monmouth and Atlantic County, NJ

Terrestrial Archaeological Resources Assessment

Top Map - Soil and Topography

- Cardiff PAPE Boundary
- 2ft Contour
- Historic Fill

Soil Condition

- Disturbed
- Intact Soils – Subsoil depth approx. 1.0-2.0 ft

Value

- High : 23.1283
- Low : 3.58291e-39

Middle Map - 1940 Aerial & Mapped Resources

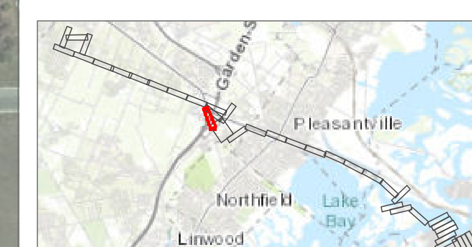
- Cardiff PAPE Boundary
- Waterway
- Historic Districts of New Jersey
- 500' Waterway Buffer

Bottom Map - Archaeological Sensitivity Results

- Cardiff PAPE Boundary

Archaeological Sensitivity

- Area Excluded from Field Survey Consideration
- Low Sensitivity
- Roadway/Paved



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Prepared December 7, 2023
Basemap: NJ Office of Information Technology and Office of GIS "NJ 2020 Natural Color Imagery" & "New Jersey Black White 1940" Map Service

EDR

Atlantic Shores South Offshore Wind Project – Onshore Interconnection Facilities

Monmouth and Atlantic County, NJ

Terrestrial Archaeological Resources Assessment

Top Map - Soil and Topography
- Cardiff PAPE Boundary
- 2ft Contour
- Historic Fill

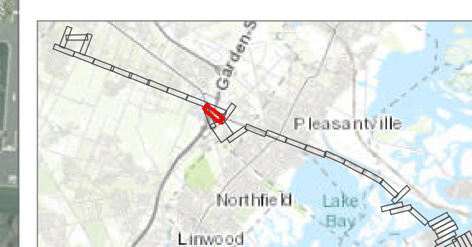
Soil Condition
- Disturbed
- Intact Soils – Subsoil depth approx. 1.0-2.0 ft

Value
- High : 23.1283
- Low : 3.58291e-39

Middle Map - 1940 Aerial & Mapped Resources
- Cardiff PAPE Boundary
- Historic Districts of New Jersey

Bottom Map - Archaeological Sensitivity Results
- Cardiff PAPE Boundary

Archaeological Sensitivity
- Area Excluded from Field Survey Consideration
- Low Sensitivity
- Roadway/Paved



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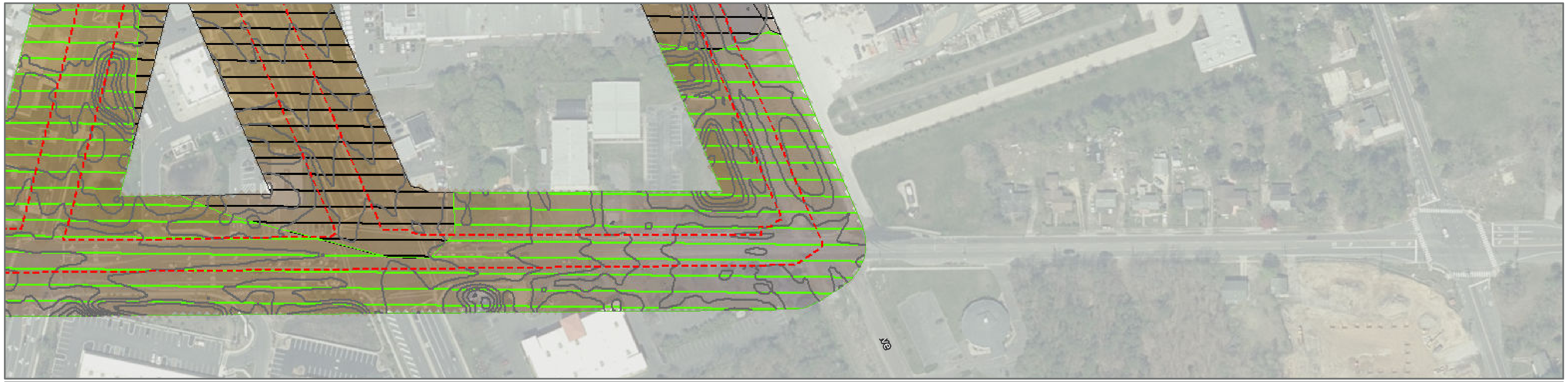
Feet

Prepared December 7, 2023
Basemap: NJ Office of Information Technology and Office of GIS "NJ 2020 Natural Color Imagery" & "New Jersey Black White 1940" Map Service

EDR

Figure 38. Cardiff Onshore Interconnection Cable - Archaeological Reconnaissance and Desktop Assessment Results



Atlantic Shores South Offshore Wind Project – Onshore Interconnection Facilities

Monmouth and Atlantic County, NJ

Terrestrial Archaeological Resources Assessment

Top Map - Soil and Topography

- Cardiff PAPE Boundary
- Geotechnical Boring
- 2ft Contour

Soil Condition

- Disturbed
- Intact Soils – Subsoil depth approx. 1.0-2.0 ft

Value

High : 23.1283

Low : 3.58291e-39

Middle Map - 1940 Aerial & Mapped Resources

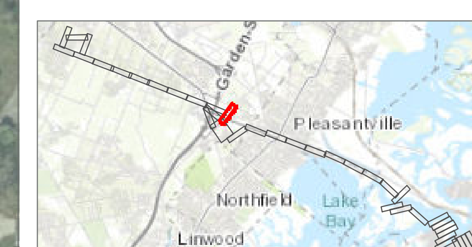
- Cardiff PAPE Boundary
- Historic Districts of New Jersey

Bottom Map - Archaeological Sensitivity Results

- Cardiff PAPE Boundary

Archaeological Sensitivity

- Area Excluded from Field Survey Consideration
- Low Sensitivity
- Roadway/Paved



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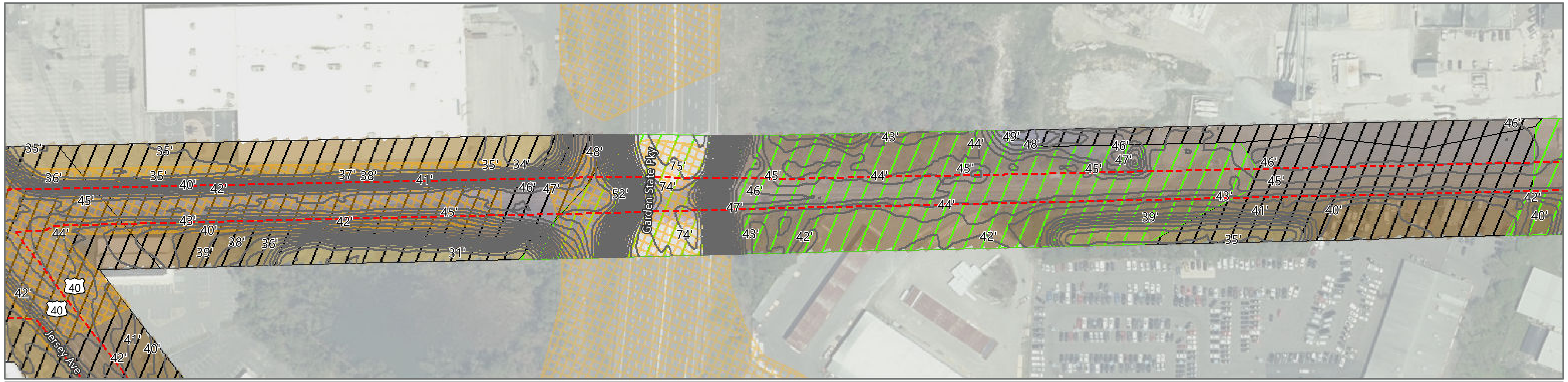
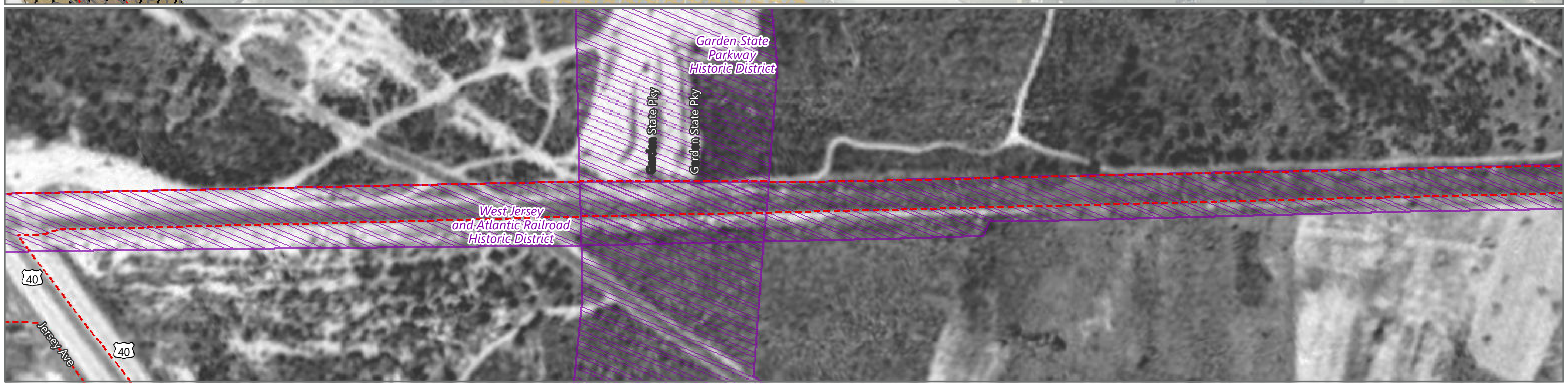
Prepared December 7, 2023

Basemap: NJ Office of Information Technology and Office of GIS "NJ 2020 Natural Color Imagery" & "New Jersey Black White 1940" Map Service

EDR

Figure 38. Cardiff Onshore Interconnection Cable - Archaeological Reconnaissance and Desktop Assessment Results





Atlantic Shores South Offshore Wind Project – Onshore Interconnection Facilities

Monmouth and Atlantic County, NJ

Terrestrial Archaeological Resources Assessment

Top Map - Soil and Topography

- Cardiff PAPE Boundary
- 2ft Contour
- Historic Fill

Soil Condition

- Disturbed
- Intact Soils – Subsoil depth approx. 1.0-2.0 ft

Value

- High : 23.1283
- Low : 3.58291e-39

Middle Map - 1940 Aerial & Mapped Resources

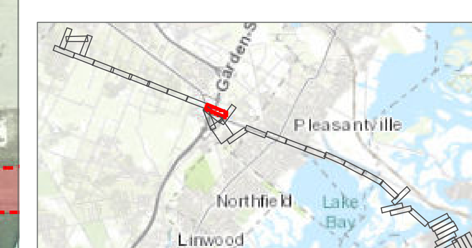
- Cardiff PAPE Boundary
- Historic Districts of New Jersey

Bottom Map - Archaeological Sensitivity Results

- Cardiff PAPE Boundary

Archaeological Sensitivity

- Area Excluded from Field Survey Consideration
- Low Sensitivity
- Roadway/Paved



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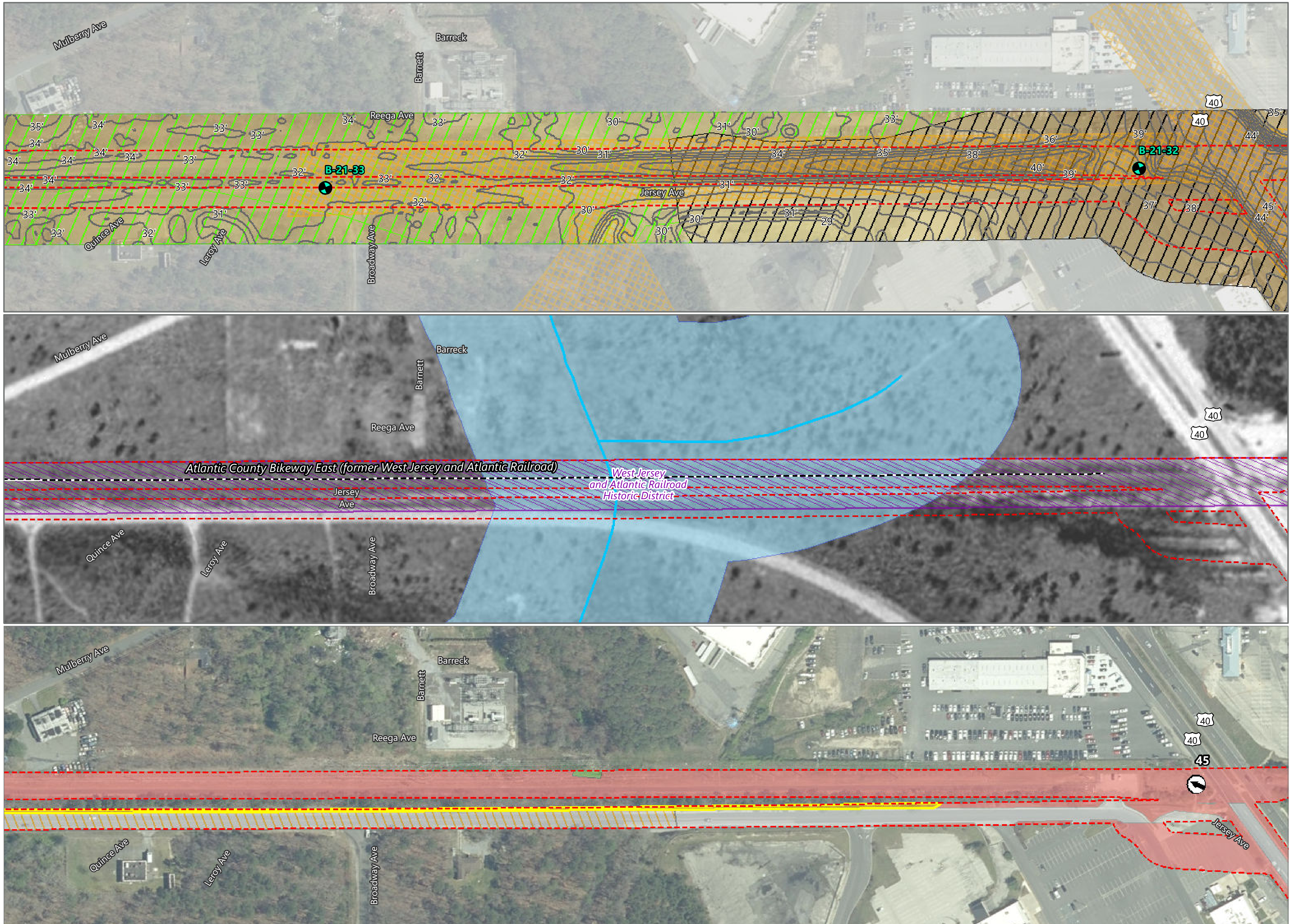


Atlantic Shores South Offshore Wind Project – Onshore Interconnection Facilities

Monmouth and Atlantic County, NJ

Terrestrial Archaeological Resources Assessment

Top Map - Soil and Topography

- Cardiff PAPE Boundary
- Geotechnical Boring
- 2ft Contour
- Historic Fill

Soil Condition

- Disturbed
- Intact Soils – Subsoil depth approx. 1.0-2.0 ft

Value

- High : 23.1283
- Low : 3.58291e-39

Middle Map - 1940 Aerial & Mapped Resources

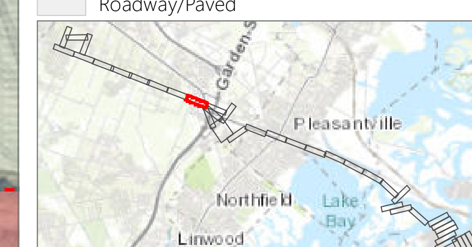
- Cardiff PAPE Boundary
- Atlantic County Bikeway East (former West Jersey and Atlantic Railroad)
- Waterway
- Historic Districts of New Jersey
- 500' Waterway Buffer

Bottom Map - Archaeological Sensitivity Results

- Cardiff PAPE Boundary
- Photograph Location
- Phase 1B Survey Area

Archaeological Sensitivity

- Area Excluded from Field Survey Consideration
- Low Sensitivity
- Medium-High Sensitivity
- Roadway/Paved Medium-High Sensitivity
- Roadway/Paved



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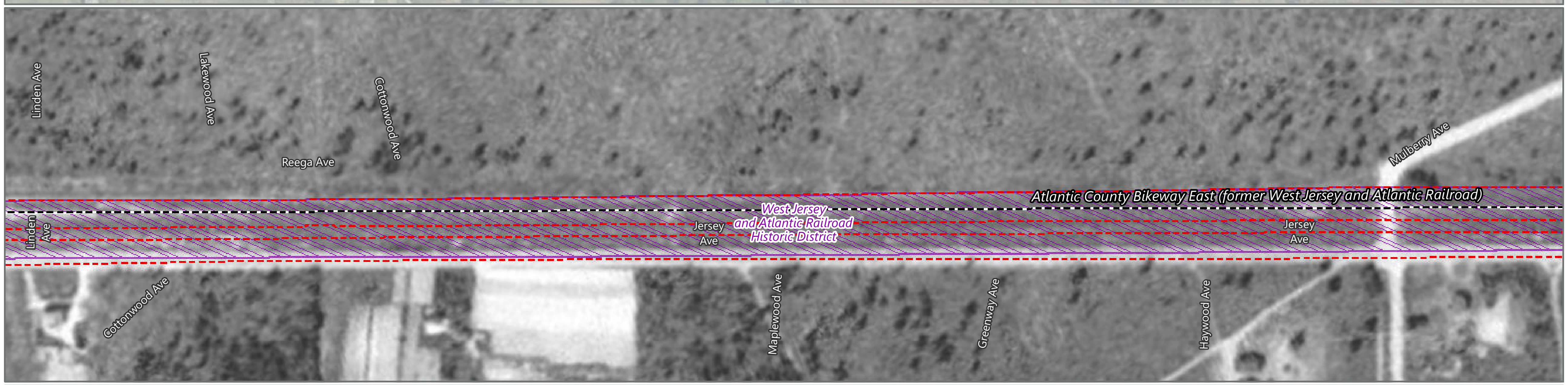
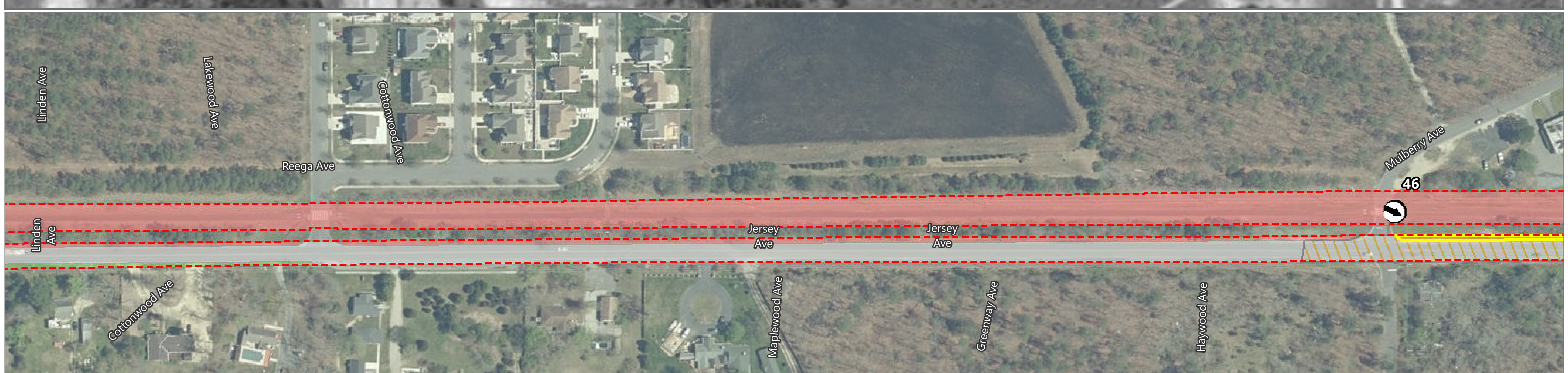
Prepared December 7, 2023
Basemap: NJ Office of Information Technology and Office of GIS "NJ 2020 Natural Color Imagery" & "New Jersey Black White 1940" Map Service

EDR





Atlantic Shores South Offshore Wind Project – Onshore Interconnection Facilities

Monmouth and Atlantic County, NJ

Terrestrial Archaeological Resources Assessment

Top Map - Soil and Topography

- Cardiff PAPE Boundary
- Geotechnical Boring
- 2ft Contour

Soil Condition

- Intact Soils – Subsoil depth approx. 1.0-2.0 ft

Value

- High : 23.1283
- Low : 3.58291e-39

Middle Map - 1940 Aerial & Mapped Resources

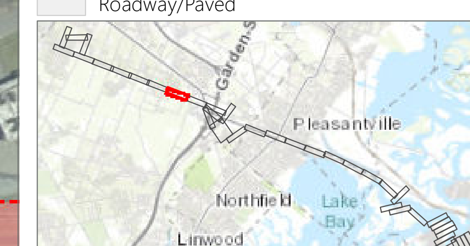
- Cardiff PAPE Boundary
- Atlantic County Bikeway East (former West Jersey and Atlantic Railroad)
- Historic Districts of New Jersey

Bottom Map - Archaeological Sensitivity Results

- Cardiff PAPE Boundary
- Photograph Location
- Phase 1B Survey Area

Archaeological Sensitivity

- Area Excluded from Field Survey Consideration
- Low Sensitivity
- Medium-High Sensitivity
- Roadway/Paved Medium-High Sensitivity
- Roadway/Paved



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Prepared December 7, 2023
Basemap: NJ Office of Information Technology and Office of GIS "NJ 2020 Natural Color Imagery" & "New Jersey Black White 1940" Map Service

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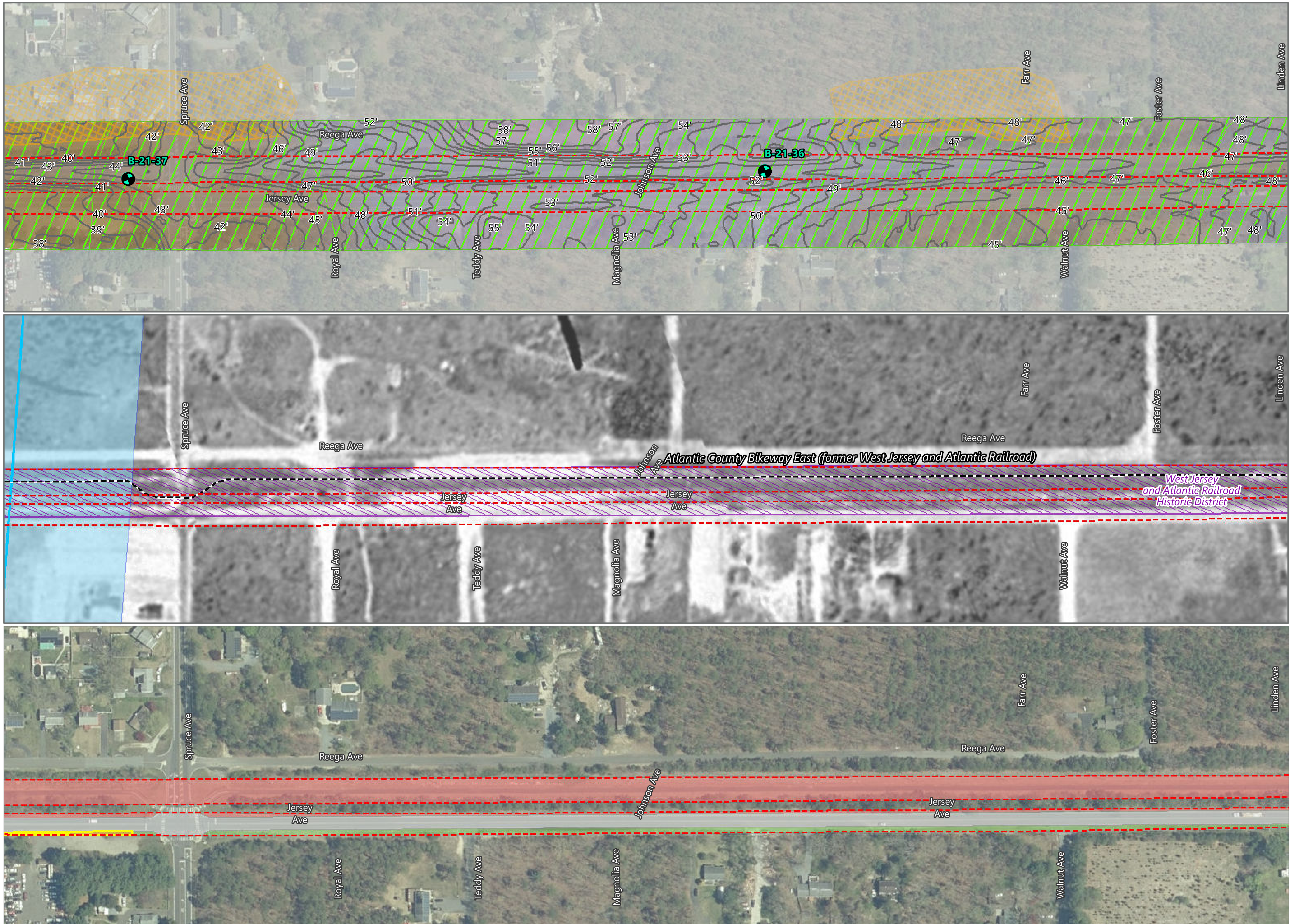


Atlantic Shores South Offshore Wind Project – Onshore Interconnection Facilities

Monmouth and Atlantic County, NJ

Terrestrial Archaeological Resources Assessment

Top Map - Soil and Topography
- Cardiff PAPE Boundary
- Geotechnical Boring
- 2ft Contour
- Historic Fill

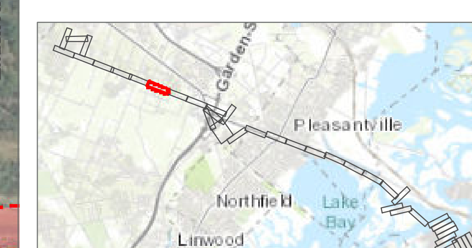
Soil Condition
- Intact Soils – Subsoil depth approx. 1.0-2.0 ft

Value
- High : 23.1283
- Low : 3.58291e-39

Middle Map - 1940 Aerial & Mapped Resources
- Cardiff PAPE Boundary
- Atlantic County Bikeway East (former West Jersey and Atlantic Railroad)
- Waterway
- Historic Districts of New Jersey
- 500' Waterway Buffer

Bottom Map - Archaeological Sensitivity Results
- Cardiff PAPE Boundary
- Phase 1B Survey Area

Archaeological Sensitivity
- Area Excluded from Field Survey Consideration
- Low Sensitivity
- Medium-High Sensitivity
- Roadway/Paved



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Feet

Prepared December 7, 2023
Basemap: NJ Office of Information Technology and Office of GIS "NJ 2020 Natural Color Imagery" & "New Jersey Black White 1940" Map Service

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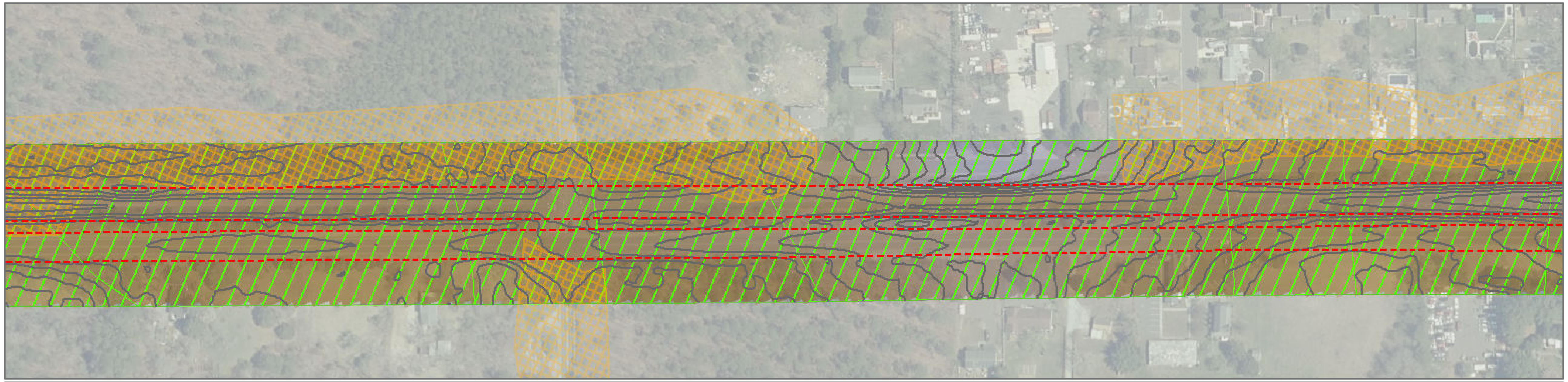
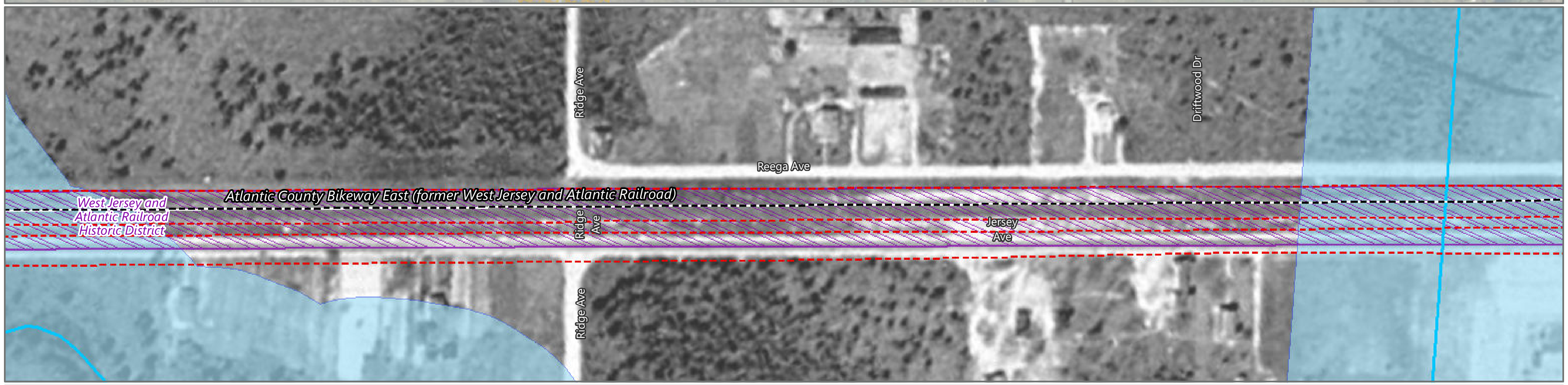
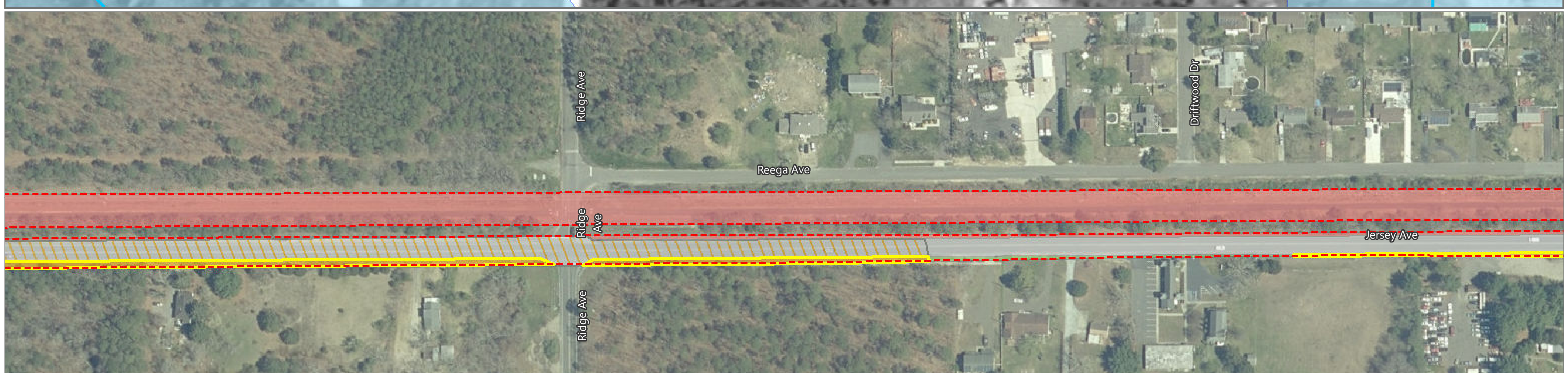
Figure 38. Cardiff Onshore Interconnection Cable - Archaeological Reconnaissance and Desktop Assessment Results







Atlantic Shores South Offshore Wind Project – Onshore Interconnection Facilities

Monmouth and Atlantic County, NJ

Terrestrial Archaeological Resources Assessment

Top Map - Soil and Topography

- Cardiff PAPE Boundary
- Geotechnical Boring
- 2ft Contour
- Historic Fill

Soil Condition

- Intact Soils – Subsoil depth approx. 1.0-2.0 ft

Value

- High : 23.1283
- Low : 3.58291e-39

Middle Map - 1940 Aerial & Mapped Resources

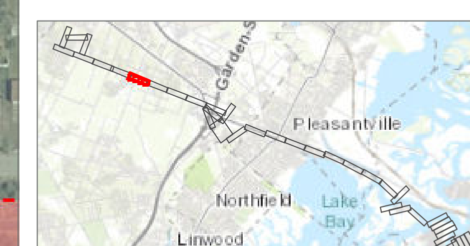
- Cardiff PAPE Boundary
- Atlantic County Bikeway East (former West Jersey and Atlantic Railroad)
- Waterway
- Historic Districts of New Jersey
- 500' Waterway Buffer

Bottom Map - Archaeological Sensitivity Results

- Cardiff PAPE Boundary
- Phase 1B Survey Area

Archaeological Sensitivity

- Area Excluded from Field Survey Consideration
- Low Sensitivity
- Medium-High Sensitivity
- Roadway/Paved Medium-High Sensitivity
- Roadway/Paved



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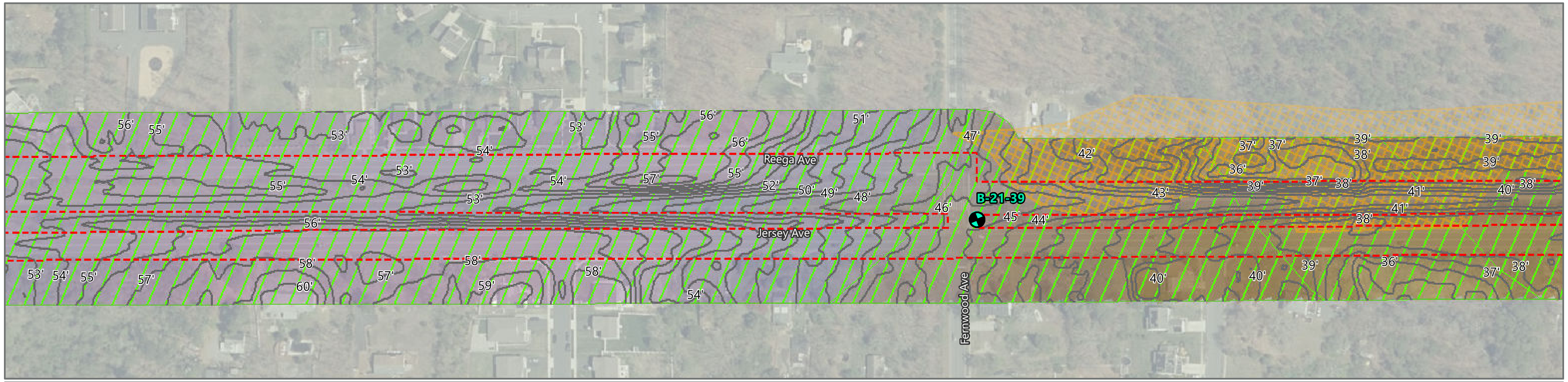
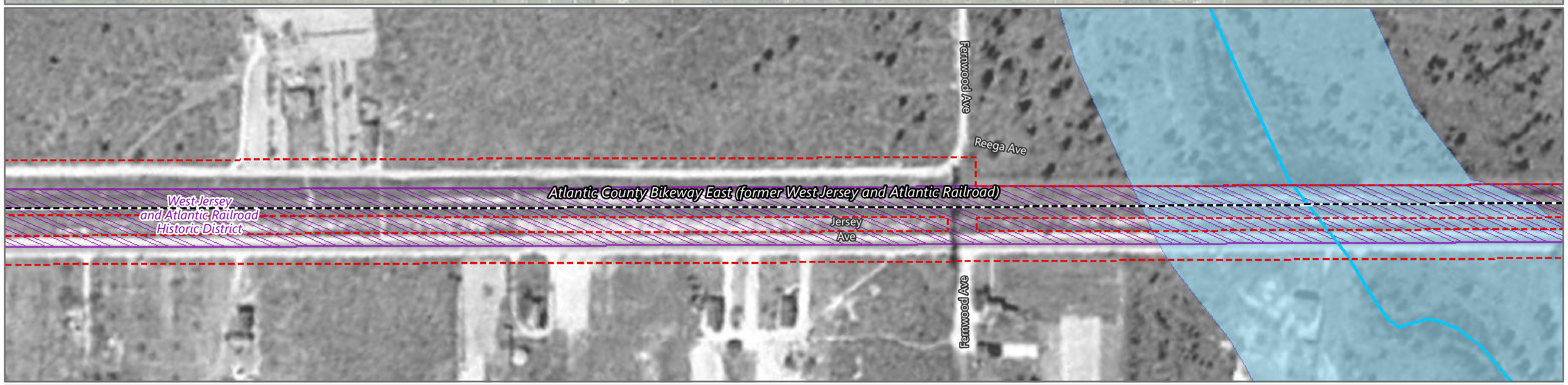
Feet

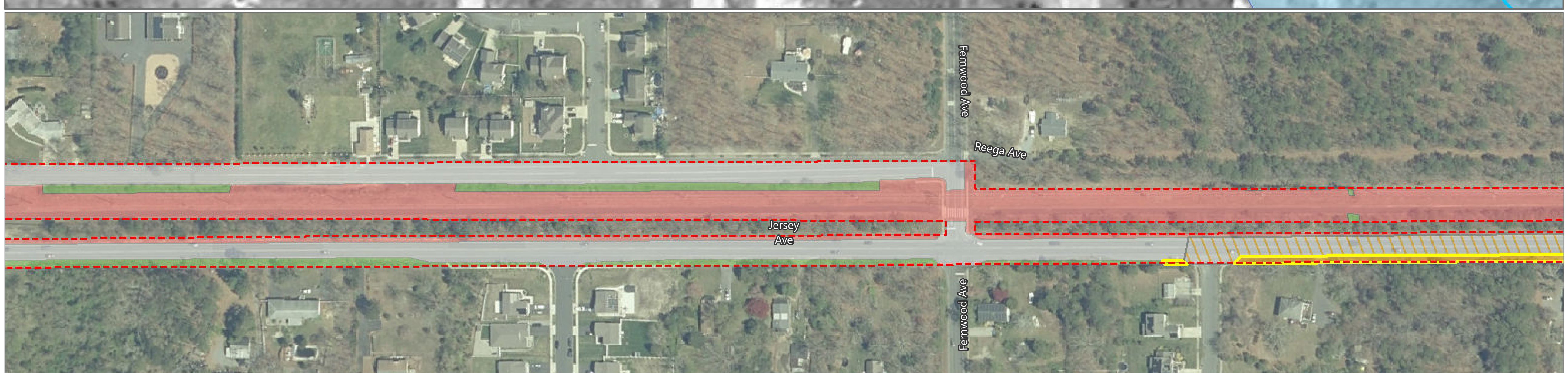
Prepared December 7, 2023
Basemap: NJ Office of Information Technology and Office of GIS "NJ 2020 Natural Color Imagery" & "New Jersey Black White 1940" Map Service

EDR

Figure 38. Cardiff Onshore Interconnection Cable - Archaeological Reconnaissance and Desktop Assessment Results







Atlantic Shores South Offshore Wind Project – Onshore Interconnection Facilities

Monmouth and Atlantic County, NJ

Terrestrial Archaeological Resources Assessment

Top Map - Soil and Topography

- Cardiff PAPE Boundary
- Geotechnical Boring
- 2ft Contour
- Historic Fill

Soil Condition

- Intact Soils – Subsoil depth approx. 1.0-2.0 ft

Value

- High : 23.1283
- Low : 3.58291e-39

Middle Map - 1940 Aerial & Mapped Resources

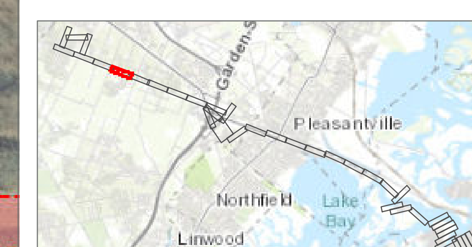
- Cardiff PAPE Boundary
- Atlantic County Bikeway East (former West Jersey and Atlantic Railroad)
- Waterway
- Historic Districts of New Jersey
- 500' Waterway Buffer

Bottom Map - Archaeological Sensitivity Results

- Cardiff PAPE Boundary
- Phase 1B Survey Area

Archaeological Sensitivity

- Area Excluded from Field Survey Consideration
- Low Sensitivity
- Medium-High Sensitivity
- Roadway/Paved Medium-High Sensitivity
- Roadway/Paved



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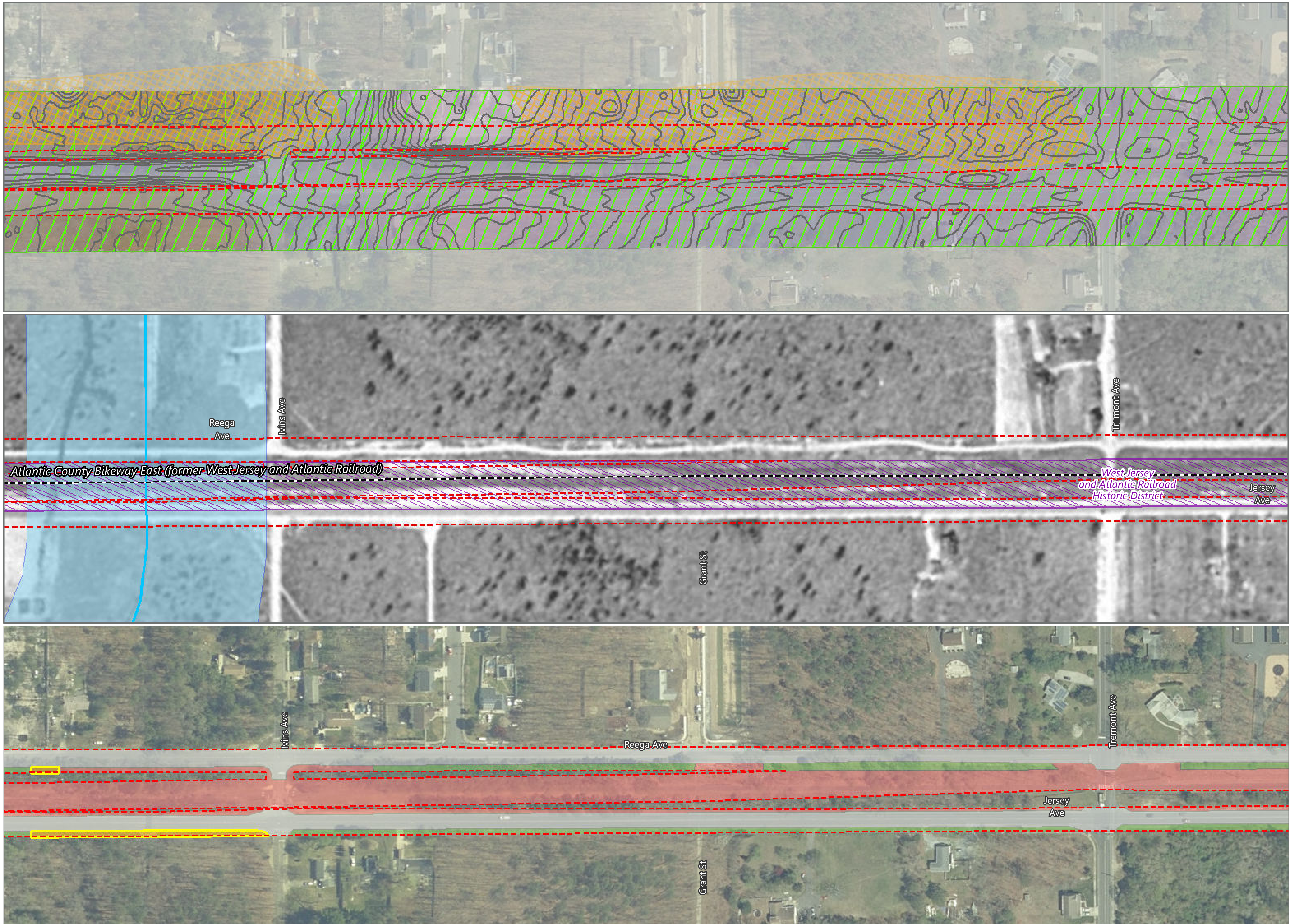
Feet

Prepared December 7, 2023
Basemap: NJ Office of Information Technology and Office of GIS "NJ 2020 Natural Color Imagery" & "New Jersey Black White 1940" Map Service

EDR

Figure 38. Cardiff Onshore Interconnection Cable - Archaeological Reconnaissance and Desktop Assessment Results



Atlantic Shores South Offshore Wind Project – Onshore Interconnection Facilities

Monmouth and Atlantic County, NJ

Terrestrial Archaeological Resources Assessment

Top Map - Soil and Topography

- Cardiff PAPE Boundary
- Geotechnical Boring
- 2ft Contour
- Historic Fill

Soil Condition

- Intact Soils – Subsoil depth approx. 1.0-2.0 ft

Value

- High : 23.1283
- Low : 3.58291e-39

Middle Map - 1940 Aerial & Mapped Resources

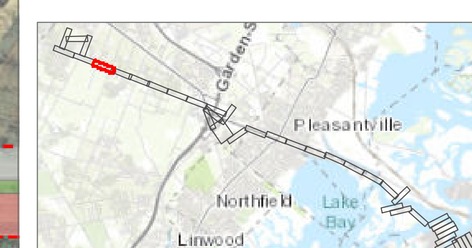
- Cardiff PAPE Boundary
- Atlantic County Bikeway East (former West Jersey and Atlantic Railroad)
- Waterway
- Historic Districts of New Jersey
- 500' Waterway Buffer

Bottom Map - Archaeological Sensitivity Results

- Cardiff PAPE Boundary
- Phase 1B Survey Area

Archaeological Sensitivity

- Area Excluded from Field Survey Consideration
- Low Sensitivity
- Medium-High Sensitivity
- Roadway/Paved

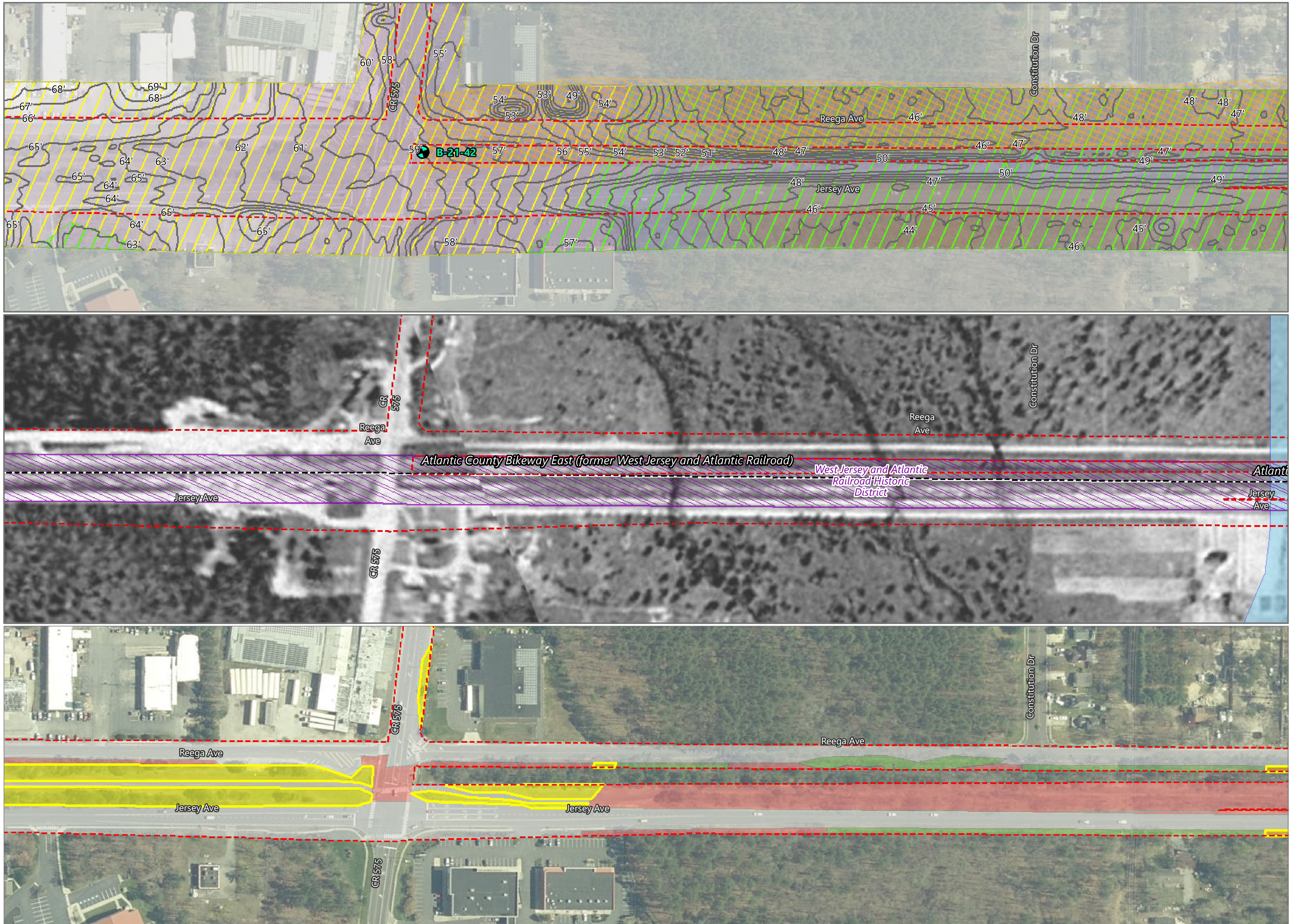


0 50 100 200
Feet

Prepared December 7, 2023
Basemap: NJ Office of Information Technology and Office of GIS "NJ 2020 Natural Color Imagery" & "New Jersey Black White 1940" Map Service

EDR

Figure 38. Cardiff Onshore Interconnection Cable - Archaeological Reconnaissance and Desktop Assessment Results



Atlantic Shores South Offshore Wind Project – Onshore Interconnection Facilities

Monmouth and Atlantic County, NJ

Terrestrial Archaeological Resources Assessment

Top Map - Soil and Topography

- Cardiff PAPE Boundary
- Geotechnical Boring
- 2ft Contour
- Historic Fill

Soil Condition

- Intact Soils – Subsoil depth approx. 1.0-2.0 ft
- Intact Soils – Subsoil depth approx. > 2.0 ft

Value

High : 23.1283

Low : 3.58291e-39

Middle Map - 1940 Aerial & Mapped Resources

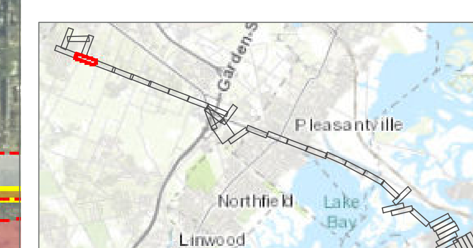
- Cardiff PAPE Boundary
- Atlantic County Bikeway East (former West Jersey and Atlantic Railroad)
- Historic Districts of New Jersey
- 500' Waterway Buffer

Bottom Map - Archaeological Sensitivity Results

- Cardiff PAPE Boundary
- Phase 1B Survey Area

Archaeological Sensitivity

- Area Excluded from Field Survey Consideration
- Low Sensitivity
- Medium Sensitivity
- Medium-High Sensitivity
- Roadway/Paved

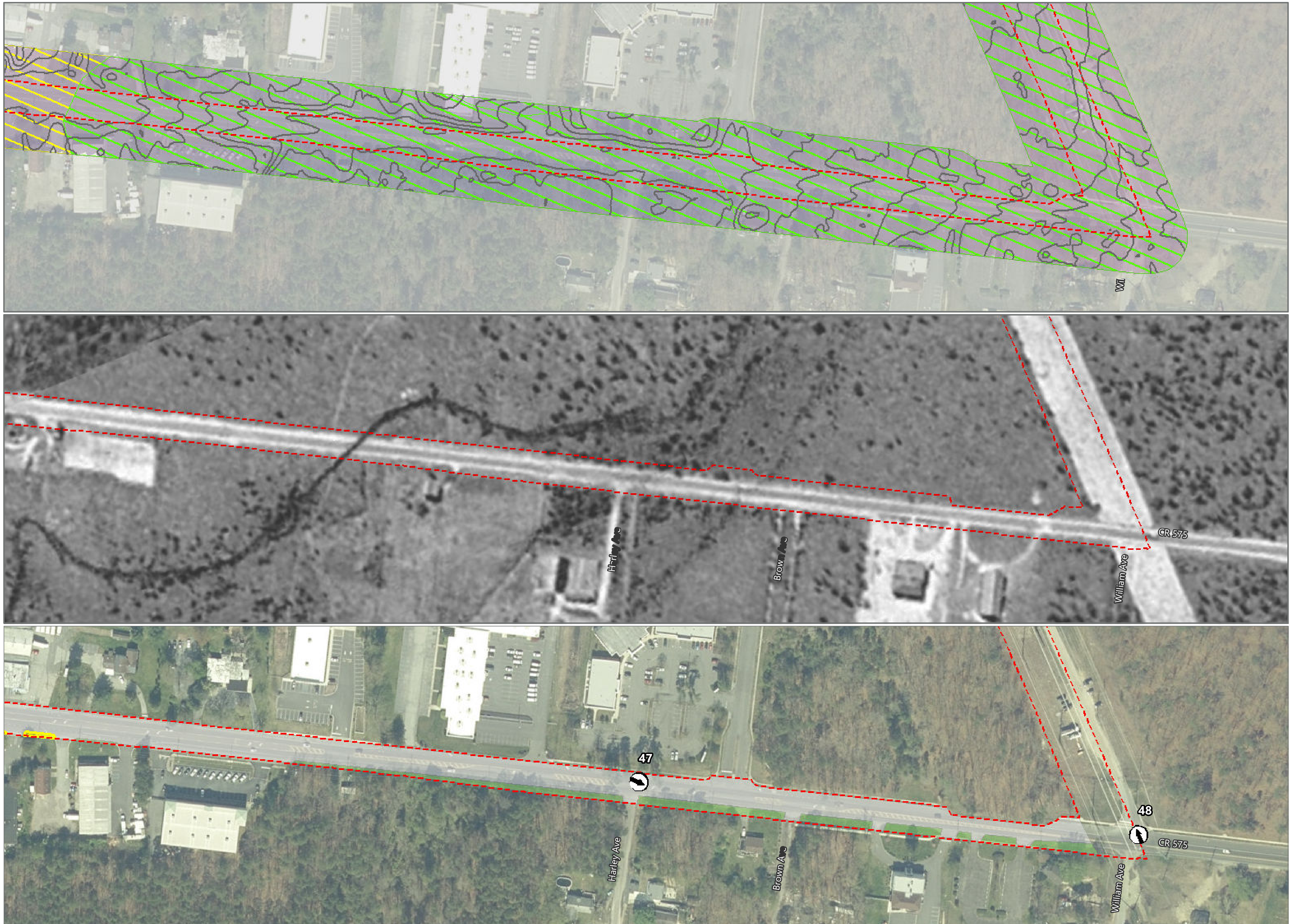


0 50 100 200
Feet

Prepared December 8, 2023
Basemap: NJ Office of Information Technology and Office of GIS "NJ 2020 Natural Color Imagery" & "New Jersey Black White 1940" Map Service

EDR

Figure 38. Cardiff Onshore Interconnection Cable - Archaeological Reconnaissance and Desktop Assessment Results



Atlantic Shores South Offshore Wind Project – Onshore Interconnection Facilities

Monmouth and Atlantic County, NJ

Terrestrial Archaeological Resources Assessment

Top Map - Soil and Topography

- Cardiff PAPE Boundary
- Geotechnical Boring
- 2ft Contour

Soil Condition

- Intact Soils – Subsoil depth approx. 1.0-2.0 ft
- Intact Soils – Subsoil depth approx. > 2.0 ft

Value

- High : 23.1283
- Low : 3.58291e-39

Middle Map - 1940 Aerial & Mapped Resources

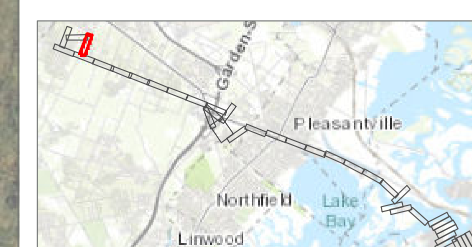
- Cardiff PAPE Boundary

Bottom Map - Archaeological Sensitivity Results

- Cardiff PAPE Boundary
- Photograph Location
- Phase 1B Survey Area

Archaeological Sensitivity

- Low Sensitivity
- Medium Sensitivity
- Roadway/Paved

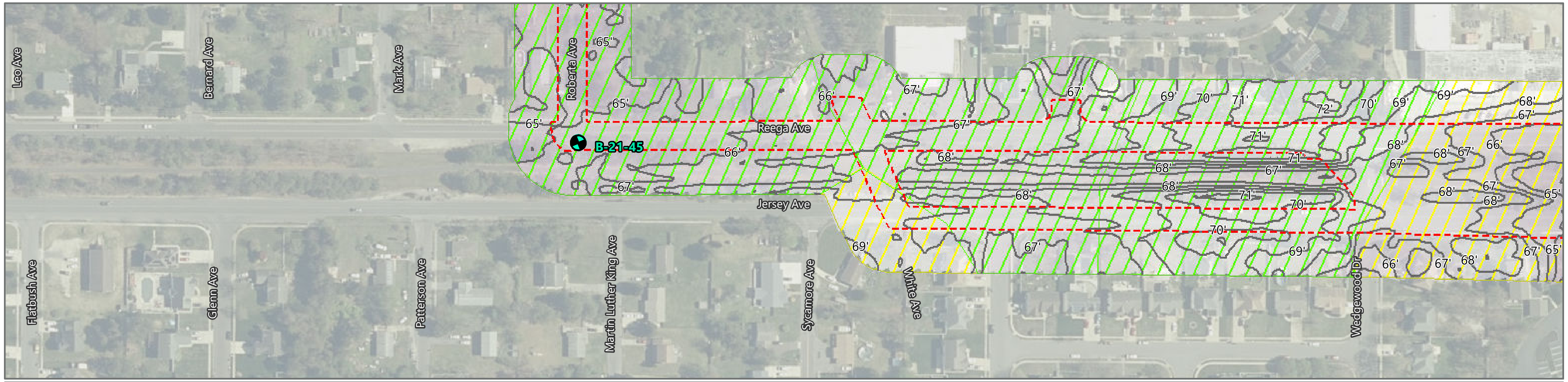


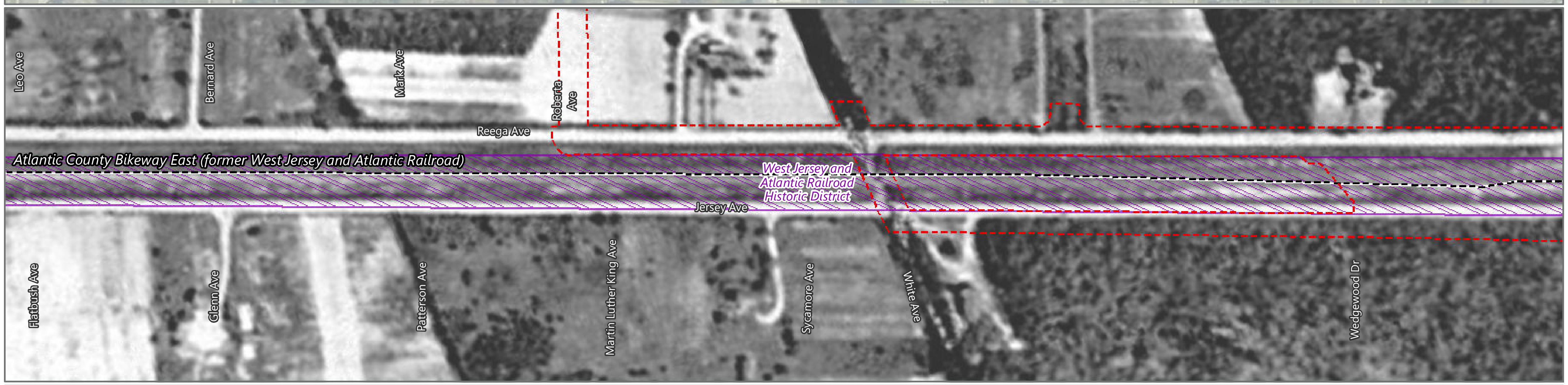
0 50 100 200
Feet

Prepared December 7, 2023
Basemap: NJ Office of Information Technology and Office of GIS "NJ 2020 Natural Color Imagery" & "New Jersey Black White 1940" Map Service

EDR

Figure 38. Cardiff Onshore Interconnection Cable - Archaeological Reconnaissance and Desktop Assessment Results





Atlantic Shores South Offshore Wind Project – Onshore Interconnection Facilities

Monmouth and Atlantic County, NJ

Terrestrial Archaeological Resources Assessment

Top Map - Soil and Topography

- Cardiff PAPE Boundary
- Geotechnical Boring
- 2ft Contour

Soil Condition

- Intact Soils – Subsoil depth approx. 1.0-2.0 ft
- Intact Soils – Subsoil depth approx. > 2.0 ft

Value

High : 23.1283

Low : 3.58291e-39

Middle Map - 1940 Aerial & Mapped Resources

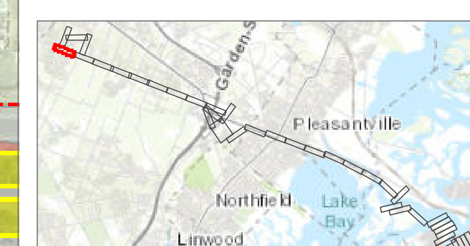
- Cardiff PAPE Boundary
- Atlantic County Bikeway East (former West Jersey and Atlantic Railroad)
- Historic Districts of New Jersey

Bottom Map - Archaeological Sensitivity Results

- Cardiff PAPE Boundary
- Phase 1B Survey Area

Archaeological Sensitivity

- Area Excluded from Field Survey Consideration
- Low Sensitivity
- Medium Sensitivity
- Roadway/Paved

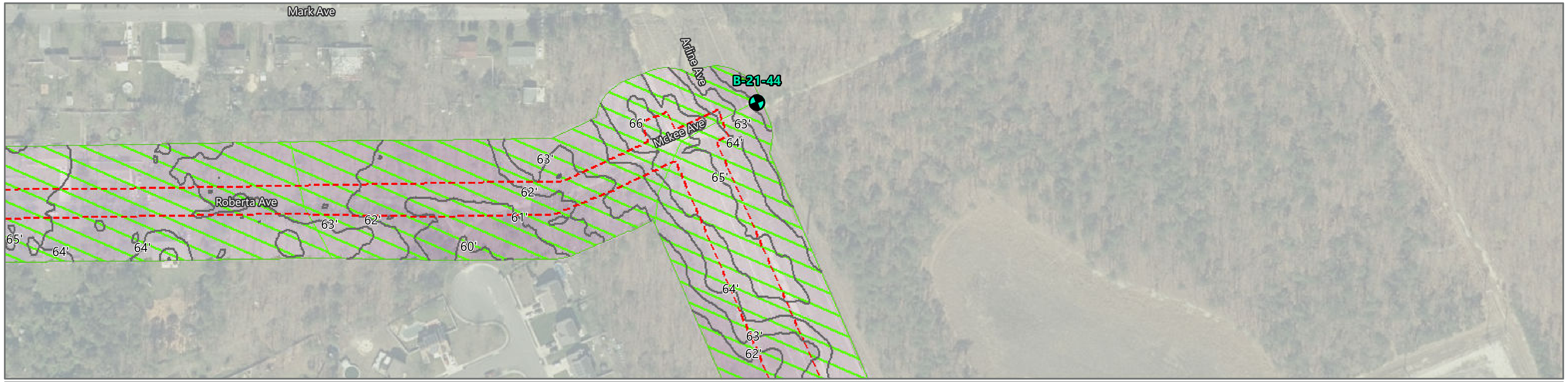


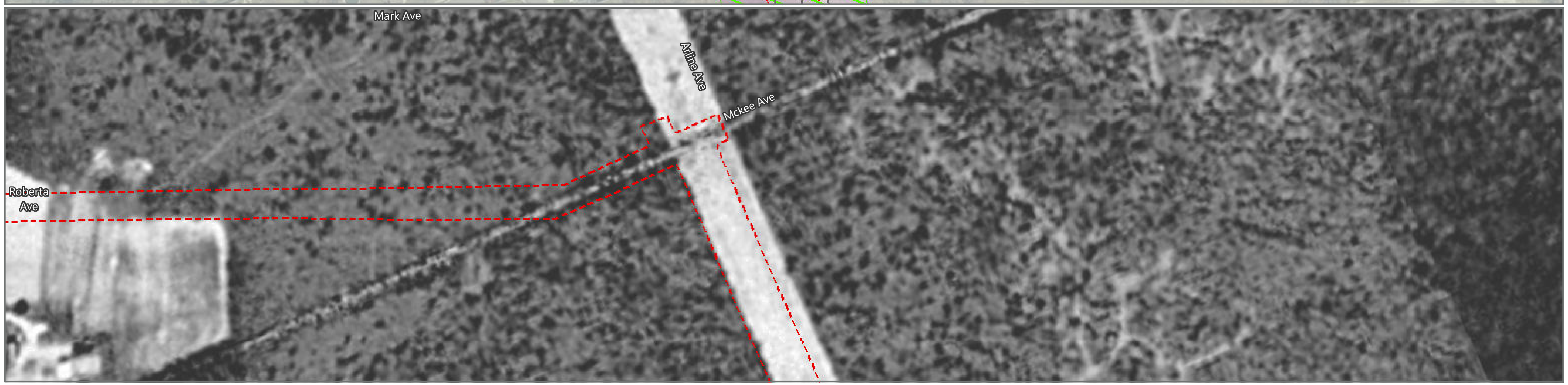
0 50 100 200
Feet

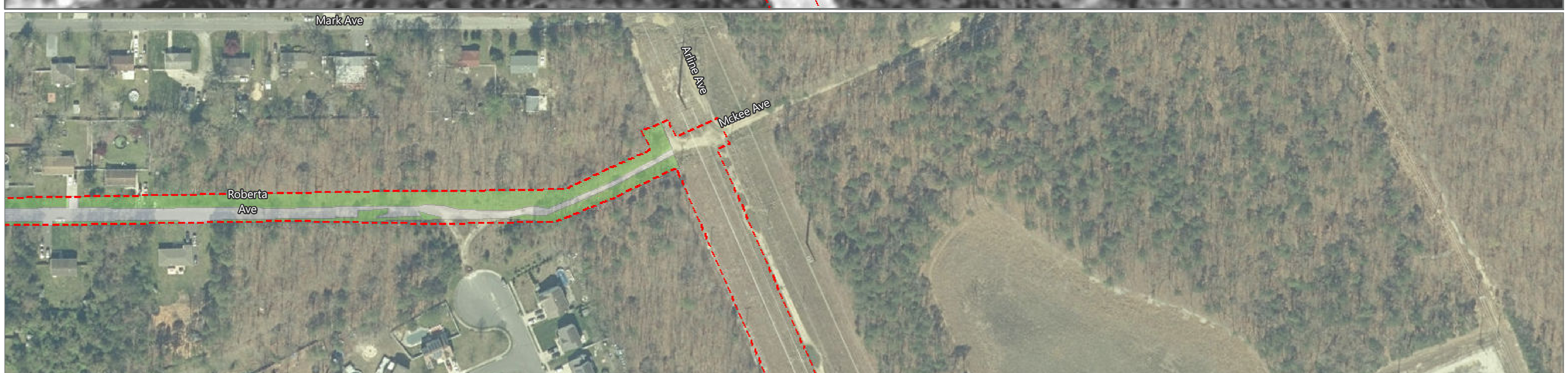
Prepared December 7, 2023
Basemap: NJ Office of Information Technology and Office of GIS "NJ 2020 Natural Color Imagery" & "New Jersey Black White 1940" Map Service

EDR

Figure 38. Cardiff Onshore Interconnection Cable - Archaeological Reconnaissance and Desktop Assessment Results







Atlantic Shores South Offshore Wind Project – Onshore Interconnection Facilities

Monmouth and Atlantic County, NJ

Terrestrial Archaeological Resources Assessment

Top Map - Soil and Topography

- Cardiff PAPE Boundary
- Geotechnical Boring
- 2ft Contour

Soil Condition

- Intact Soils – Subsoil depth approx. 1.0-2.0 ft

Value

- High : 23.1283
- Low : 3.58291e-39

Middle Map - 1940 Aerial & Mapped Resources

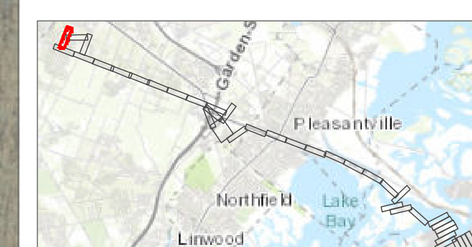
- Cardiff PAPE Boundary

Bottom Map - Archaeological Sensitivity Results

- Cardiff PAPE Boundary

Archaeological Sensitivity

- Low Sensitivity
- Roadway/Paved



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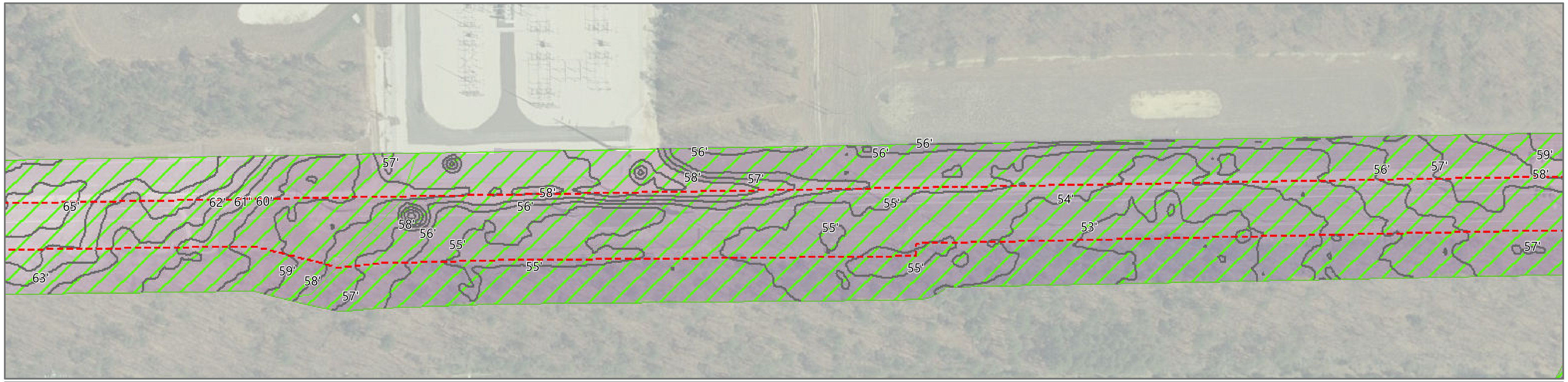
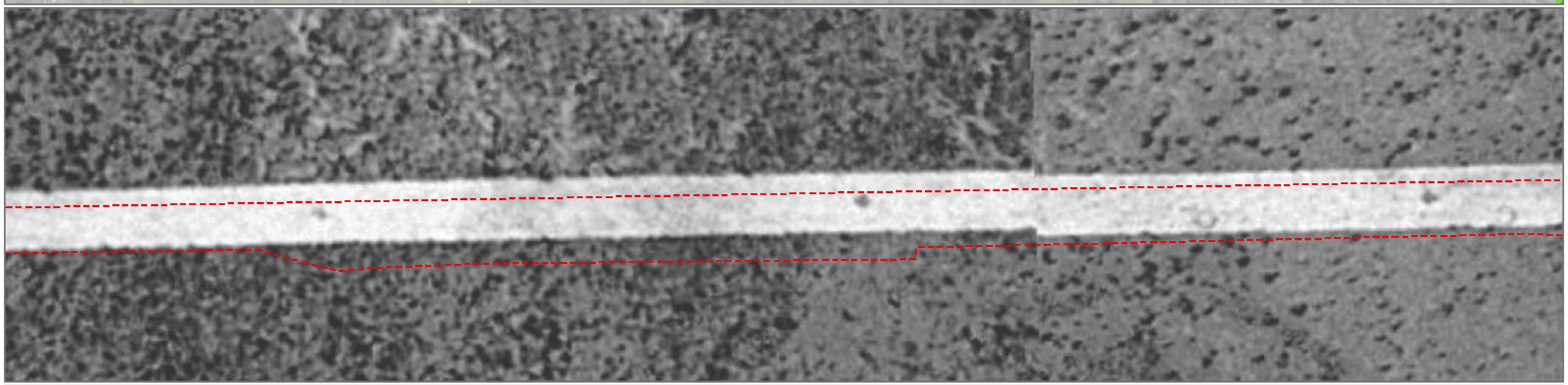
Feet

Prepared December 7, 2023
Basemap: NJ Office of Information Technology and Office of GIS "NJ 2020 Natural Color Imagery" & "New Jersey Black White 1940" Map Service

EDR

Figure 38. Cardiff Onshore Interconnection Cable - Archaeological Reconnaissance and Desktop Assessment Results





Atlantic Shores South Offshore Wind Project – Onshore Interconnection Facilities

Monmouth and Atlantic County, NJ

Terrestrial Archaeological Resources Assessment

Top Map - Soil and Topography

Cardiff PAPE Boundary

2ft Contour

Soil Condition

Intact Soils – Subsoil depth approx. 1.0-2.0 ft

Value

High : 23.1283

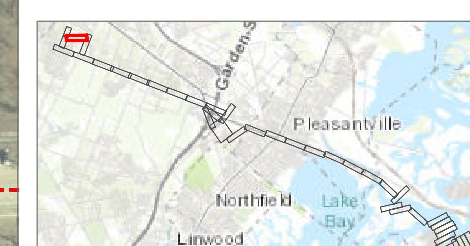
Low : 3.58291e-39

Middle Map - 1940 Aerial & Mapped Resources

Cardiff PAPE Boundary

Bottom Map - Archaeological Sensitivity Results

Cardiff PAPE Boundary



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Feet

Prepared December 7, 2023

Basemap: NJ Office of Information Technology and Office of GIS "NJ 2020 Natural Color Imagery" & "New Jersey Black White 1940" Map Service

EDR

3.3.9 *Phase IB Survey Results*

EDR conducted Phase IB archaeological survey fieldwork for the Cardiff Onshore Route in August 2023. Fieldwork was supervised by Amanda Filmyer, RPA, who was assisted by a crew of up to five archaeological field technicians. EDR personnel excavated a total of 146 STPs across seven survey areas, covering a total of 2.98 acres (1.2 ha) of the PAPE.

Survey areas along the Cardiff Onshore Route were designated by the street name on which the areas are located and numbered sequentially. In other words, areas along West Jersey Avenue Road would be designated as WJ01, WJ02, etc. while the single area along English Creek Avenue was designated as EC. Phase IB survey areas located along roadsides were surveyed via a single transect of STPs spaced every 50 ft. (15 m) since their width measured less than 50 ft.

Table 11 summarizes the Cardiff Onshore Route Phase IB survey areas, including linear feet totals, STPs excavated, and the map sheets depicting each area in Figure 39. Tabulated STP data is included in Attachment A.

Table 11. Summary of Phase IB Fieldwork for the Cardiff Onshore Route

Phase IB Survey Area	Linear Feet (Meters)	Acres (Hectares)	STP Total	Figure 39 (Sheet #/#s)
English Creek Avenue (EC)	236 ft. (71.9 m)	0.05 ac. (0.02 ha)	6	Sheet 6
West Jersey Avenue (WJ)		2.93 ac. (1.18 ha)	140	
WJ01	2173 ft. (662.33 m)	-	43	Sheet 2
WJ02	500 ft. (152.4 m)	-	0	Sheet 3
WJ03	1861 ft. (567.23 m)	-	33	Sheet 4
WJ04	497 ft. (151.48)	-	10	Sheet 5
WJ05	689 ft. (210 m)	-	15	Sheet 6
WJ06	2057 ft. (626.97 m)	-	39	Sheet 6
Phase IB Survey Total	8013 ft. (2442.31 m)	2.98 ac. (1.2 ha)	146	-

The following subsections (3.3.9.1 through 3.3.9.2) describe the results of the Phase IB archaeological survey conducted within the Cardiff Onshore Route in greater detail, organized geographically from the proposed Atlantic Landfall Site to the existing Cardiff Substation POI.

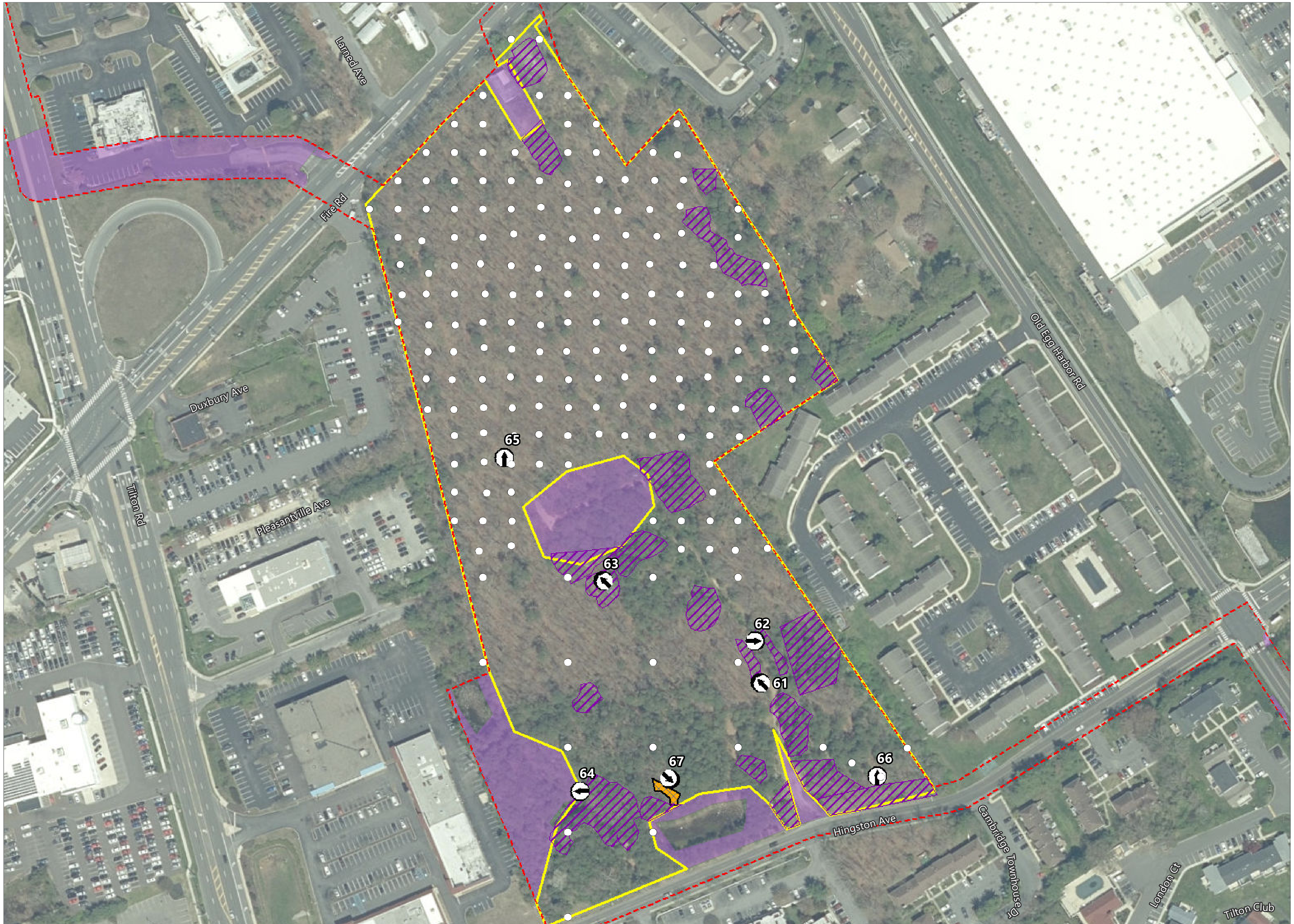
3.3.9.1 West Jersey Avenue

General Area Description: Survey areas along West Jersey Avenue were generally located along grass covered roadside areas adjacent to a variety of settings such as wooded areas and manicured lawns fronting residential and public properties (Photograph 49 through Photograph 57). A total of 140 STPs were excavated across six areas of West Jersey Avenue between the intersections with Black Horse Pike (US Route 40) and Wedgewood Drive. Although no archaeological sites were identified, two railroad tie likely associated with the former West Jersey and Atlantic Railroad corridor were discovered on the surface in area WJ06 (Figure 38, Sheet 6). Details on these railroad ties will be discussed further below.

Survey area WJ01 (Figure 39, Sheet 2) encompassed a total of 2,173 ft. (662.33 m) of roadside area located on the north side of West Jersey Avenue. 43 STPs were excavated on a relatively flat terrain marked with various buried utilities, adjacent to a tree line bordering the Atlantic County bikeway (Photograph 49). The STPs generally consisted of shallow or truncated topsoils over rocky subsoils with surface disturbances such as mixing with modern trash (Attachment A). STPs that were located near utilities such as manholes or storm drains often contained compact soils. STP WJ01.021 can be considered typical of the survey area. It contained a dark grayish brown (10YR 4/2) truncated sand A horizon extending to 5.9 in. (15 cm) below ground surface (bgs), overlying a light yellowish brown (10YR 6/4) sand B horizon with a rock content of 15-20% subrounded quartzose pebbles that was excavated to 9.8. in. (25 cm) bgs. No archaeological sites or archaeological artifacts were uncovered in survey area WJ01. As such, no mitigation or avoidance measures are proposed, and no further archaeological work is recommended.

Survey Area WJ02 (Figure 39 Sheet 3) encompassed a total of 500 ft. (152.4 m) of roadside area located on the south side of West Jersey Avenue, to the west of the intersection with Spruce Avenue (CR 684). Approximately 265 ft. (80.78 m) consisted of a compact dirt driveway for a residential and commercial property (Photograph 50) while the remaining 235 ft. (71.3 m) consisted of cut grass roadside marked with a buried gas line utility, adjacent to a maintained vacant lot. Survey area WJ02 was determined to "Medium-High Archaeological Sensitivity" in the TARA desktop assessment but was reclassified as "Disturbed" upon discovery of the driveway and buried gas line utility, which did allow room to offset STPs. No STPs were therefore excavated within WJ02, and no further archaeological work is recommended.

Figure 39. Cardiff Onshore Route - Phase IB Survey Results

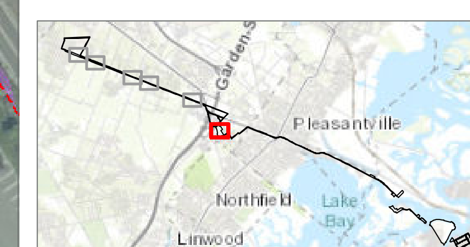


Atlantic Shores South Offshore Wind Project – Onshore Interconnection Facilities

Monmouth and Atlantic County, NJ

Terrestrial Archaeological Resources Assessment

- Cardiff PAPE Boundary
- Photograph Location
- Shovel Test Location
  - No Cultural Material
- Disturbances
- Modern Wall Features
- Phase 1B Survey Area
- Areas Excluded from Field Survey Consideration

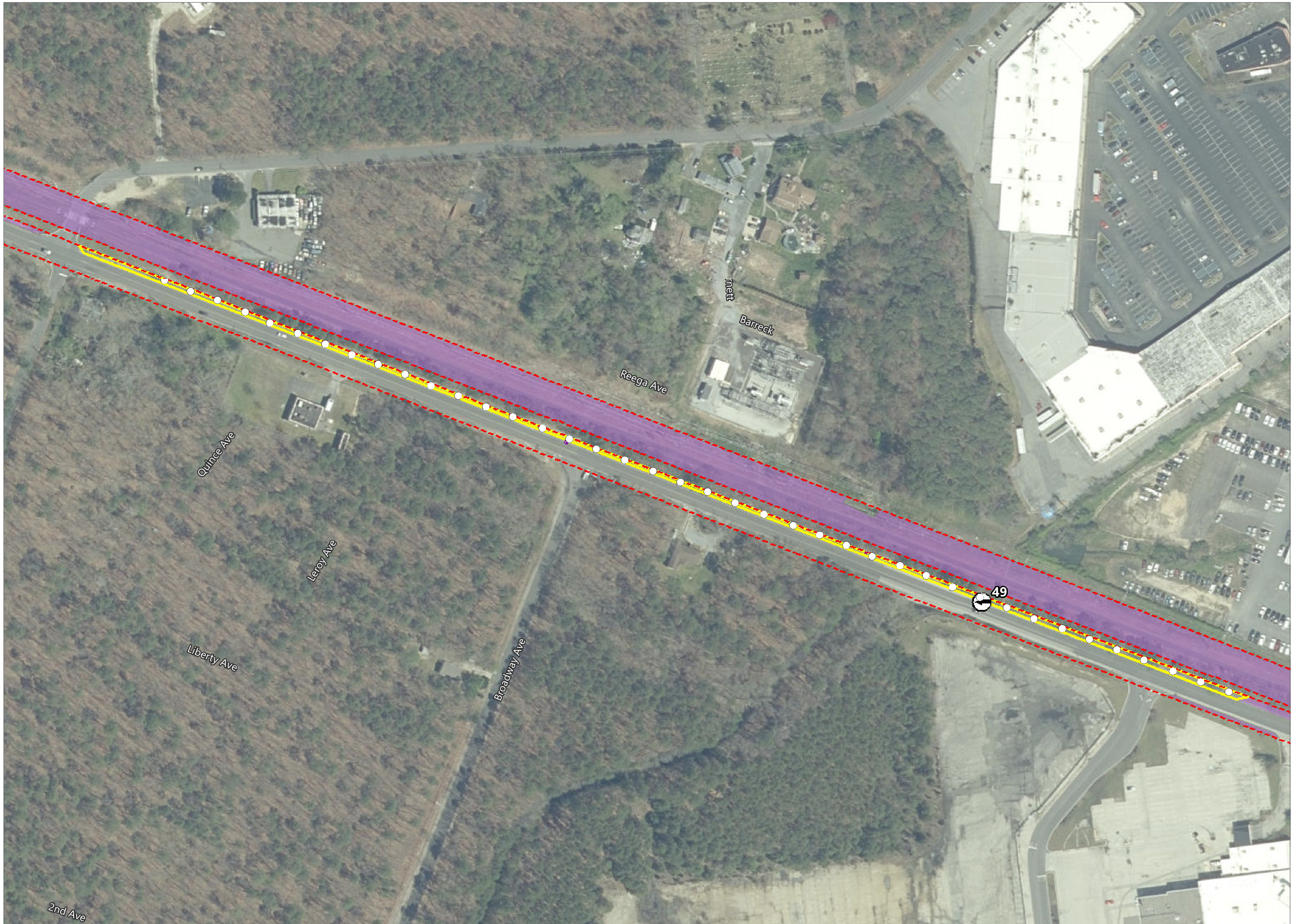


0 50 100 200
Feet

Prepared December 8, 2023
Basemap: NJ Office of Information Technology and Office of GIS "NJ 2020 Natural Color Imagery"

EDR

Figure 39. Cardiff Onshore Route - Phase IB Survey Results



Atlantic Shores South Offshore Wind Project – Onshore Interconnection Facilities

Monmouth and Atlantic County, NJ

Terrestrial Archaeological Resources Assessment

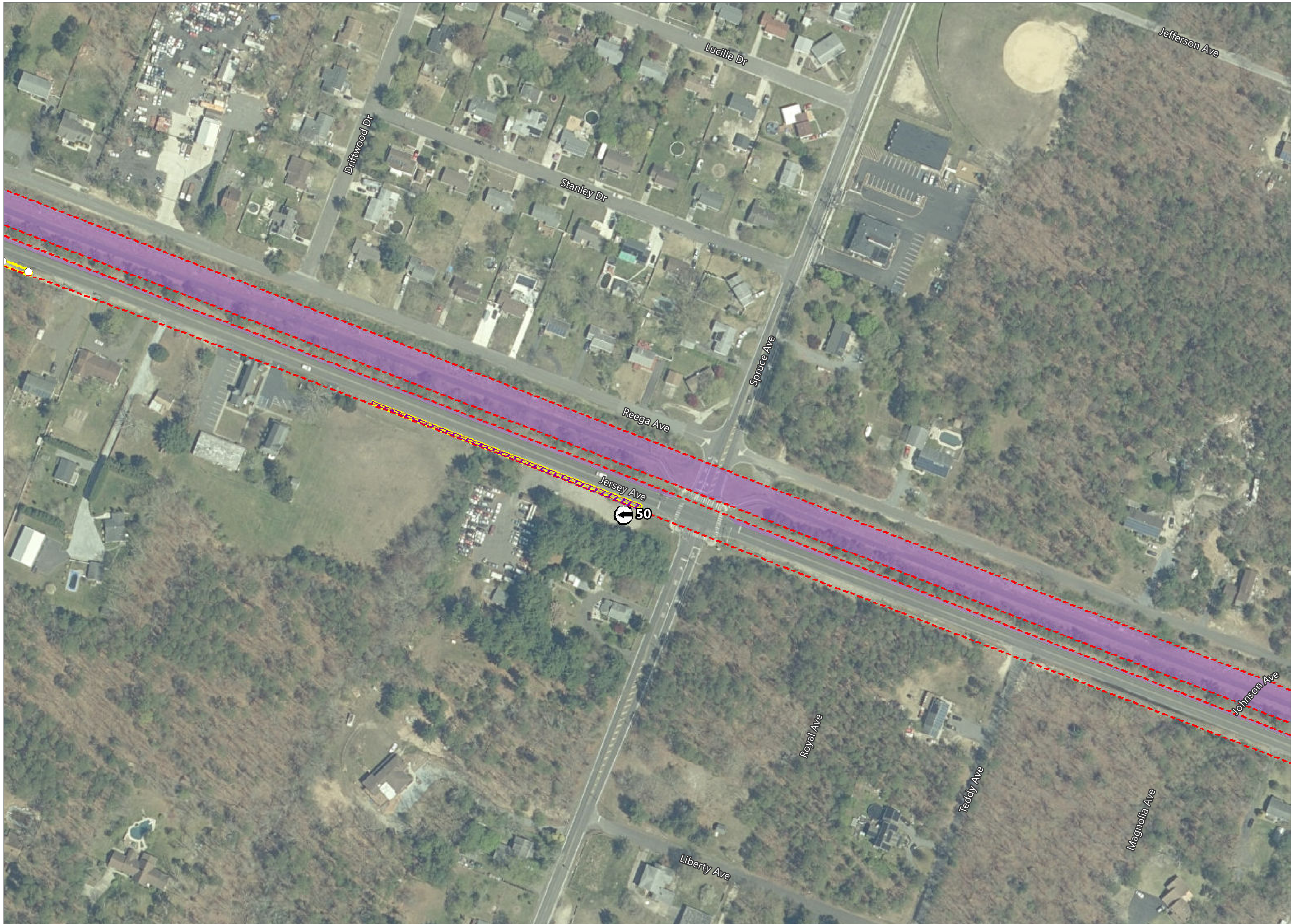
- Cardiff PAPE Boundary
- Photograph Location
- Shovel Test Location
  - No Cultural Material
- Disturbances
- Modern Wall Features
- Phase 1B Survey Area
- Areas Excluded from Field Survey Consideration

0 50 100 200
Feet

Prepared December 8, 2023
Basemap: NJ Office of Information Technology and Office of GIS "NJ 2020 Natural Color Imagery"

EDR

Figure 39. Cardiff Onshore Route - Phase IB Survey Results



Atlantic Shores South Offshore Wind Project – Onshore Interconnection Facilities

Monmouth and Atlantic County, NJ

Terrestrial Archaeological Resources Assessment

Cardiff PAPE Boundary

Photograph Location

Shovel Test Location

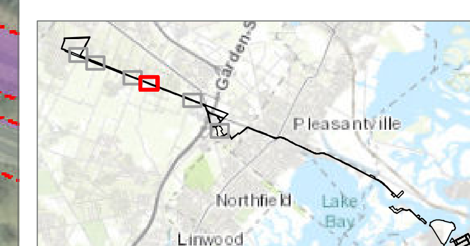
No Cultural Material

Disturbances

Modern Wall Features

Phase 1B Survey Area

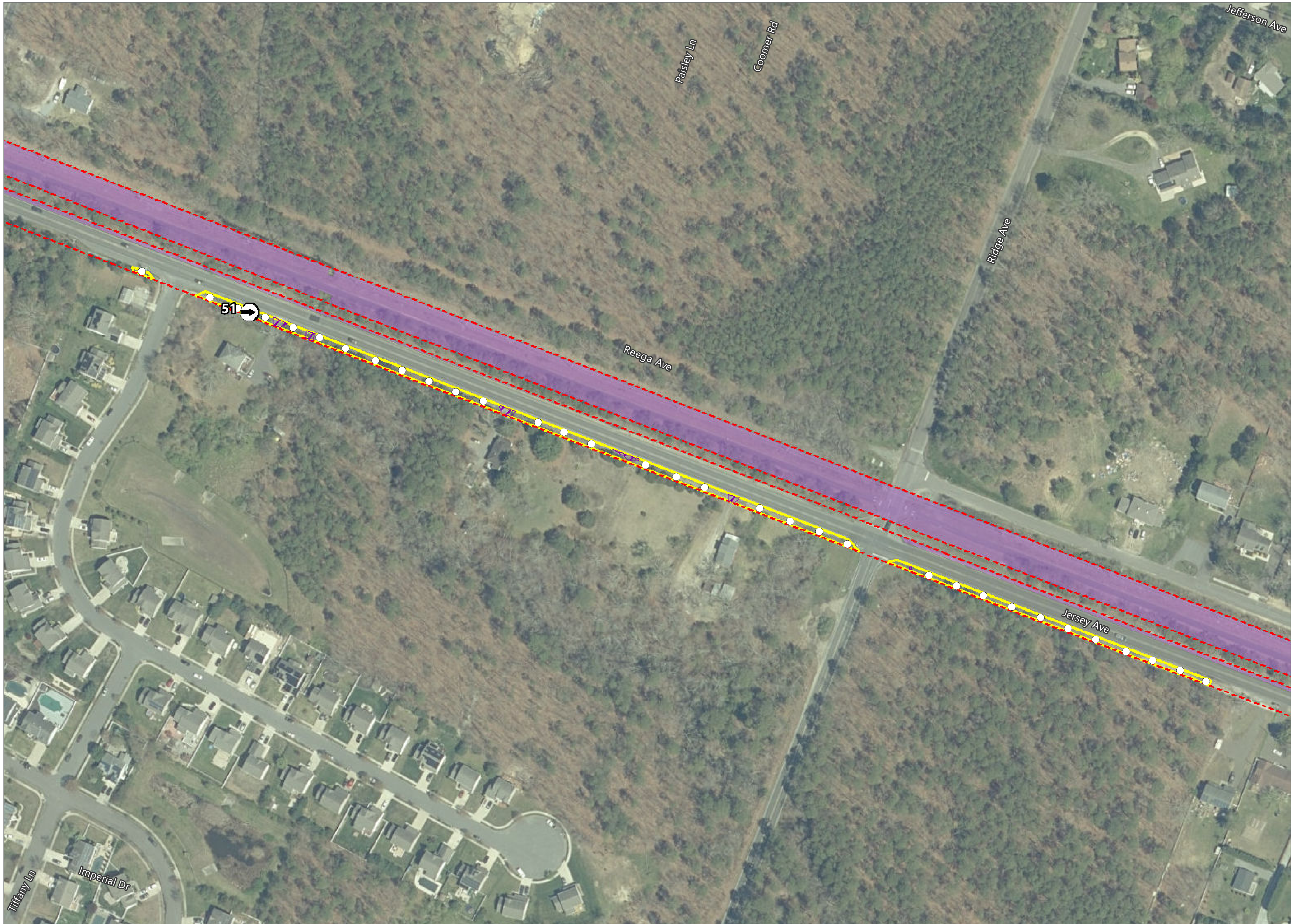
Areas Excluded from Field Survey Consideration



0 50 100 200
Feet

Prepared December 8, 2023
Basemap: NJ Office of Information Technology and Office of GIS "NJ 2020 Natural Color Imagery"

EDR

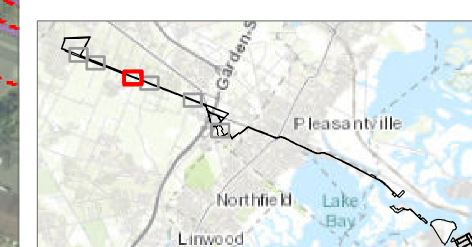


Atlantic Shores South Offshore Wind Project – Onshore Interconnection Facilities

Monmouth and Atlantic County, NJ

Terrestrial Archaeological Resources Assessment

Cardiff PAPE Boundary
Photograph Location
Shovel Test Location
No Cultural Material
Disturbances
Modern Wall Features
Phase 1B Survey Area
Areas Excluded from Field Survey Consideration

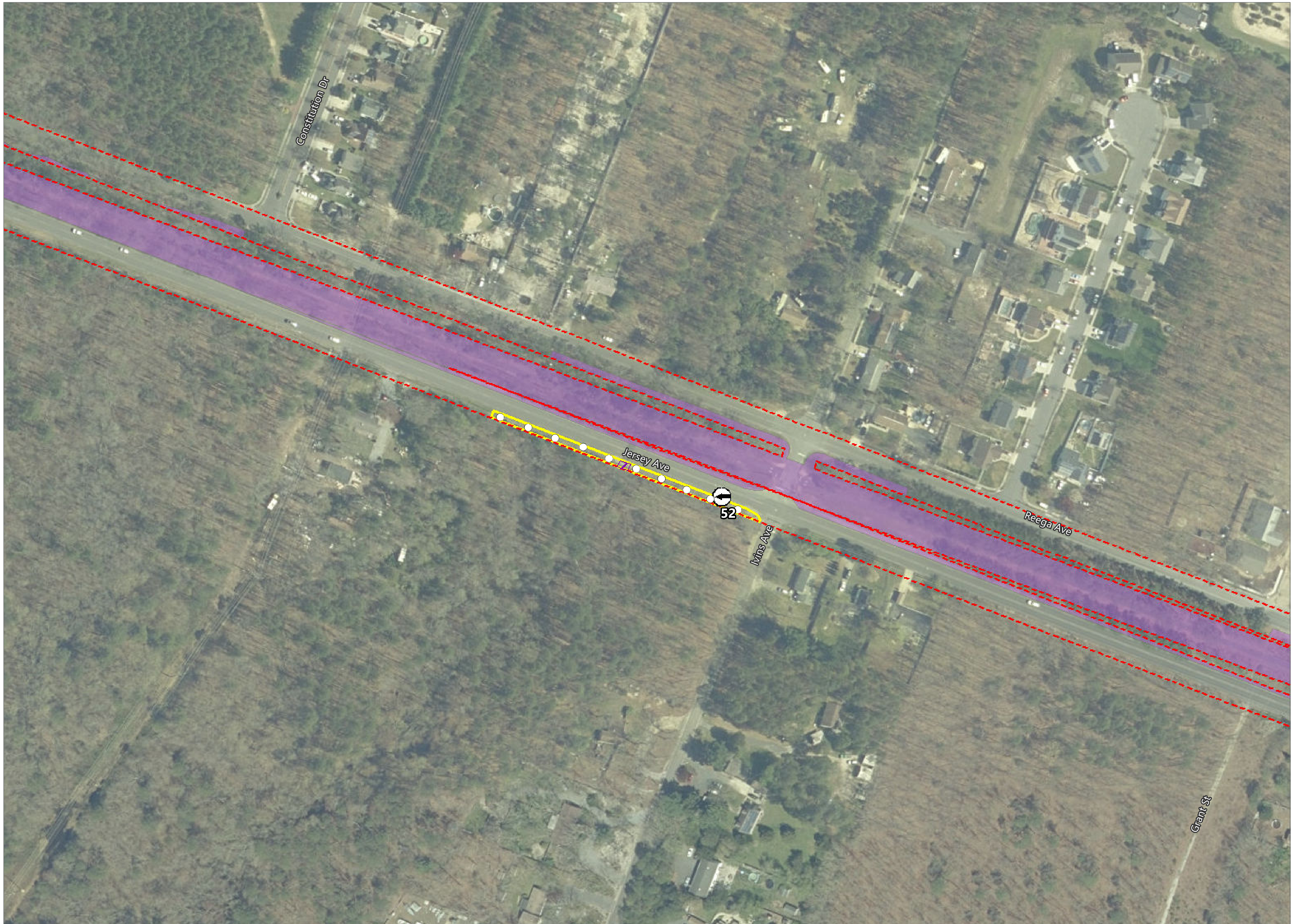


0 50 100 200
Feet

Prepared December 8, 2023
Basemap: NJ Office of Information Technology and Office of GIS "NJ 2020 Natural Color Imagery"

EDR

Figure 39. Cardiff Onshore Route - Phase IB Survey Results



Atlantic Shores South Offshore Wind Project – Onshore Interconnection Facilities

Monmouth and Atlantic County, NJ

Terrestrial Archaeological Resources Assessment

Cardiff PAPE Boundary

Photograph Location

Shovel Test Location

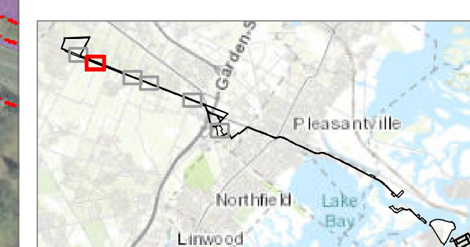
No Cultural Material

Disturbances

Modern Wall Features

Phase 1B Survey Area

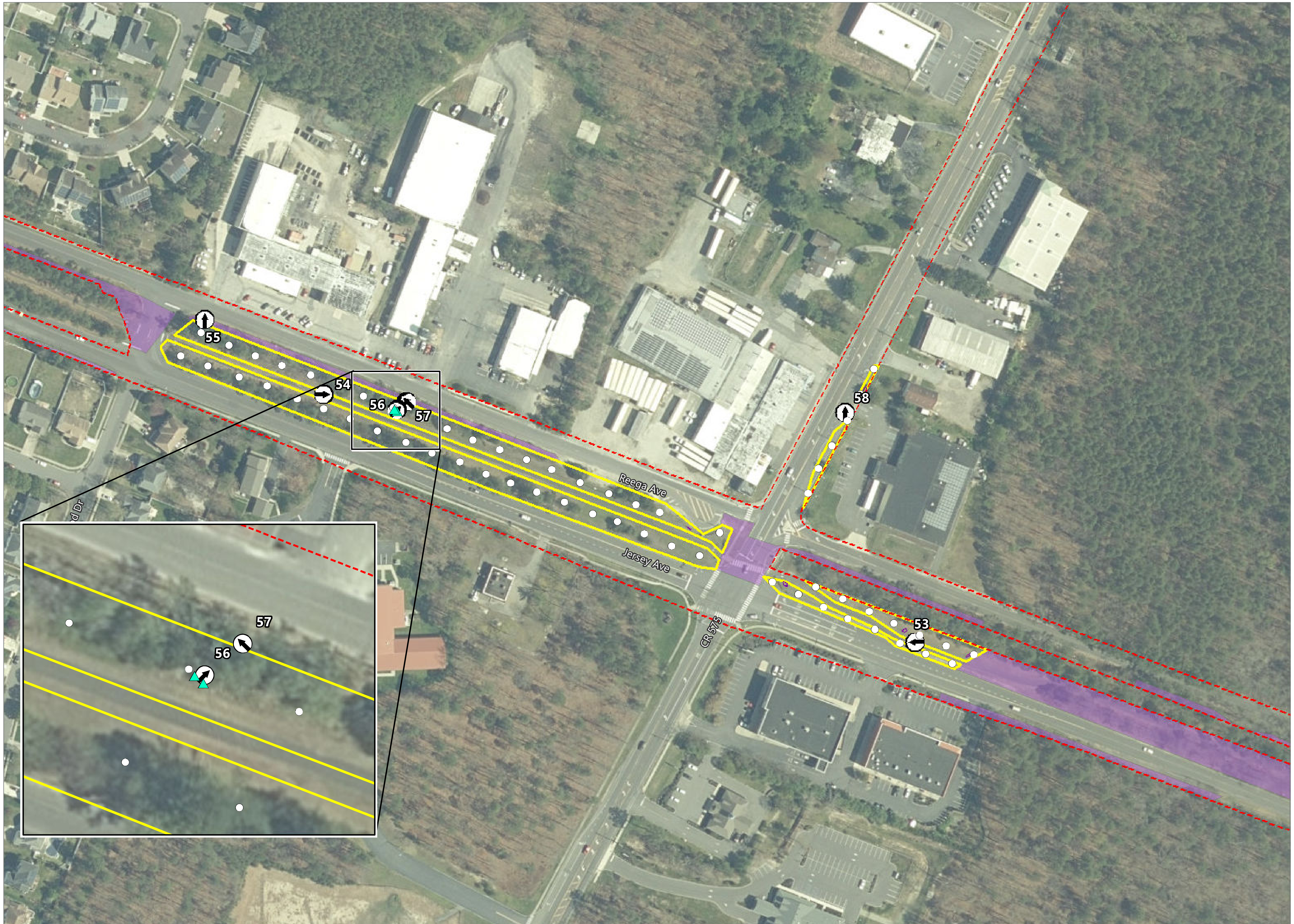
Areas Excluded from Field Survey Consideration



0 50 100 200
Feet

Prepared December 8, 2023
Basemap: NJ Office of Information Technology and Office of GIS "NJ 2020 Natural Color Imagery"

EDR

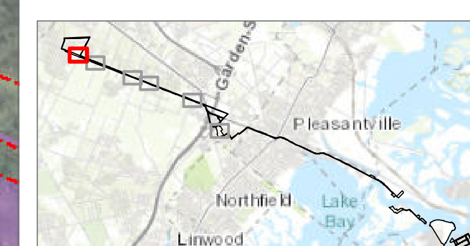


Atlantic Shores South Offshore Wind Project – Onshore Interconnection Facilities

Monmouth and Atlantic County, NJ

Terrestrial Archaeological Resources Assessment

Cardiff PAPE Boundary
Photograph Location
Surface Find
Railroad Ties
Shovel Test Location
No Cultural Material
Disturbances
Modern Wall Features
Phase 1B Survey Area
Areas Excluded from Field Survey Consideration



0 50 100 200
Feet

Prepared December 8, 2023
Basemap: NJ Office of Information Technology and Office of GIS "NJ 2020 Natural Color Imagery"

EDR

Photograph 49. Overview of Survey Area WJ01, view to the west.

Photograph 50. Overview of the driveway in Survey Area WJ02, view to the west.

Survey area WJ03 (Figure 39, Sheet 4) encompassed a total of 1,861 ft. (567.23 m) of roadside area located on the south side of West Jersey Avenue. 33 STPs were excavated on relatively flat cut grass roadside marked various buried utilities and a visible electrical powerline. The survey area was adjacent to various environments including manicured lawns containing residential properties and wooded areas containing mixed evergreen-deciduous trees and overgrown brush (Photograph 51). Many of the STPs excavated in WJ03 featured fills and disturbed soils due to the large amounts of the buried utilities in the survey area, and some STPs were terminated early due to compaction, or the uncovering of objects associated with buried utilities such as tracer wires and old fiber optic cables (Attachment A). The STPs that did contain intact soils were underlying possible fill layers with minor surface disturbances such as mixing with modern trash. STP WJ03.018 can be considered typical of the STPs with intact soils in the survey area. It contained a very dark grayish brown (10YR 3/2) sandy loam redeposited topsoil and very pale brown (10YR 7/3) sand fill layer extending to 4.3 in. (11 cm) bgs and 8.6 in. (22 cm) bgs respectively. These possible fill layers overlayed an intact very dark grayish brown (10YR 3/2) sand A horizon that extended to 16.5 in. (42 cm) bgs. The A horizon overlayed a strong (7.5YR 5/8) sandy clay loam B horizon with a rock content of 15-20% subrounded quartzose pebbles, which was excavated to 20.47 in. (52 cm) bgs. No archaeological sites or archaeological artifacts were uncovered in survey area WJ04. As such, no mitigation or avoidance measures are proposed, and no further archaeological work is recommended.

Survey area WJ04 (Figure 39, Sheet 5) encompassed a total of 497 ft. (151.48 m) of roadside area located on the south side of West Jersey Avenue, west of the intersection with Ivins Avenue. Ten STPs were excavated on relatively flat cut grass roadside with a visible electrical powerline, adjacent to a wooded area of mixed evergreen-deciduous tree and overgrown brush (Photograph 52). The STPs within the survey area fell into two general categories (Attachment A). The first consisted of a shallow or truncated topsoil overlying rocky subsoil. STP WJ04.010 can be considered typical for this category. It contained a dark gray (10YR 4/1) sand A horizon extending to 6.7 in. (17 cm) bgs, overlying a brownish yellow (10YR 6/6) sand B horizon with a rock content of 10-15% quartzose pebbles, which was excavated to 10.6 in. (27 cm) bgs. The second category of STP in this area consisted of possible fill layers with minor surface disturbances such as mixing with modern trash

Photograph 51. Overview of Survey Area WJ03, view to the east.

Photograph 52. Overview of Survey Area WJ04, view to the west.

overlying intact soils and subsoils (Attachment A). STP WJ04.002 can be considered typical for this second category. It contained a very dark grayish brown (10YR 3/2) sandy loam redeposited topsoil and yellowish brown (10YR 5/6) sandy clay loam fill layer extending to 4.3 in. (11 cm) bgs and 7.9 in. (20 cm) bgs respectively. These possible fill layers overlayed an intact very dark grayish brown (10YR 3/2) sandy clay loam A horizon that extended to 15 in. (38 cm) bgs. The A horizon overlayed a brownish yellow (10YR 6/6) sandy clay loam B horizon containing rounded and subrounded pebbles which was excavated to 18.9 in. (48 cm) bgs. No archaeological sites or archaeological artifacts were uncovered in survey area WJ04. As such, no mitigation or avoidance measures are proposed, and no further archaeological work is recommended.

Survey area WJ05 (Figure 39, Sheet 6) was located on a manicured lawn area, between West Jersey Avenue and Reega Avenue, to the east of the intersection with English Creek Avenue (CR 575). 15 STPs were excavated on a relatively flat terrain marked with various buried utilities, on both sides of the Atlantic County Bikeway (Photograph 53). The STPs in this area consisted of shallow or truncated topsoils over compact and rocky subsoils, with surface disturbances such as mixing with modern trash (Attachment A). Many STPs located directly adjacent to the paved bike path or near buried utilities such as manholes, were often terminated early for compaction. STP WJ05.007 can be considered typical of the survey area. It consisted of a grayish brown (10YR 5/2) sandy loam A horizon extending to 3.14 in. (8.0 cm) bgs, overlying a brown (7.5YR 5/4) compact sand B horizon with a rock content of 10-15% subrounded quartzose pebbles which was excavated to 7.0 in. (18 cm) bgs.

[redacted] However, coal slag was noted to be present in STP WJ05.012 which is undoubtedly a remnant of the former railroad. No archaeological sites or artifacts were uncovered in survey area WJ05. As such, no mitigation or avoidance measures are proposed, and no further archaeological work is recommended.

Survey area WJ06 (Figure 39, Sheet 6) was located between West Jersey Avenue and Reega Avenue, to the west of the intersections with English Creek Avenue (CR 575). 39 STPs were excavated on both sides of the Atlantic County Bikeway within manicured lawn marked with buried utilities and at the foot of a pushpile containing an ornamental tree line, located along the south side of Reega Avenue (Photographs 54 and 55). The STPs in this area consisted of shallow or truncated topsoils over compact and rocky subsoils, with surface disturbances such as mixing with modern trash (Attachment A). Many STPs located directly adjacent to the paved bike path or near buried utilities such as manholes, were often terminated early for compaction. STP WJ06.026 can be considered typical of the survey area. It consisted of a very dark grayish brown (10YR 3/2) shallow sand A horizon extending to 6.3 in. (16

Photograph 53. Overview of Survey Area WJ05. the paved Atlantic County bikeway is located directly left of the grass area. View to the west.

Photograph 54. Overview of Survey Area WJ06. The paved Atlantic County bikeway is located directly to the left of the grass area. View to the east.

Photograph 55. Overview of pushpile/treeline located in WJ06, running along Reega Ave. View to the north.

cm) bgs, overlying a yellowish brown (10YR 5/6) sand B horizon with a rock content of 10-15% subangular/subrounded quartzose pebbles that was excavated to 10.2 in. (26 cm) bgs.

[redacted] Survey area WJ06 contained many remnant features of the former West Jersey and Atlantic railroad [redacted] Coal slag was noted to be present in nearly half of the STPs excavated in WJ06. STPs WJ06.017 and WJ06.024 are also noteworthy in that they contained a grayish brown (10YR 5/2) fill between the topsoil and subsoil that contained both coal slag and plaster. Interestingly, both STPs are located approximately 75 m [redacted], across the bike path from each other. No historic artifacts were uncovered from this layer in either STP to support the notion that this layer is an intact historic fill [redacted]. Additionally, the portion of WJ06 closest [redacted] had the highest concentration of buried utilities in the survey area, so it is likely the plaster is related to modern construction.

Two railroad ties were also found on surface near the foot of the pushpile/tree line, approximately 1.5-3 m east of STP WJ06.033 (Photograph 56). Both ties were positioned roughly parallel to the

Photograph 56. Overview of the two railroad ties on the surface directly east of WJ06.033 within the ornamental tree line, view to the northeast.

Photograph 57. Closeup of one of the rail ties found in WJ06. A rail spike and other hardware still intact in the wood. The trowel indicates the direction north

paved bike path, indicating they were not in context or articulated with the path of the former railroad. Archaeologists could not completely expose the ties due to an abundance of Poison Ivy within the tree line but was able to expose at least 1 meter of each for documentation purposes. One tie (Photograph 57; Photograph 56, foreground) was noted to still possess intact hardware.

Although survey area WJ06 had the most potential for historic cultural deposits and contained remnant features of the former railroad, everything was uncovered on or near the surface mixed with modern material and is therefore not intact. No archaeological sites or artifacts were uncovered in WJ06. As such, no mitigation or avoidance measures are proposed, and no further archaeological work is recommended.

3.3.9.2 English Creek Avenue (CR 575)

General Area Description: Survey areas along English Creek Avenue (Figure 39, Sheet 6) were generally located along grass covered roadside areas marked with various buried utilities and a visible powerline, adjacent to manicured lawns fronting commercial properties (Photograph 58). A total of six STPs were excavated on the east side of English Creek Avenue, to the north of the intersection with Reega Avenue.

Photograph 58. Overview of the Phase IB survey along English Creek Avenue, view to the north.

The STPs along English Creek Avenue consisted of an intact topsoil containing modern material such as glass, plastic, and asphalt, overlying rocky subsoils (Attachment A). STP EC.004 can be considered typical of the survey area. It contained a dark gray (10YR 4/1) sandy loam A horizon extending to 9.0 in. (23 cm) bgs, overlying a yellowish brown (10YR 5/8) sand B horizon with a rock content of approximately 15% subrounded quartzose pebbles that was excavated to 13.4. in. (34 cm) bgs. No archaeological sites were identified, and no archaeological artifacts were encountered during the survey of Phase IB areas along English Creek Avenue. As such, no mitigation or avoidance measures are proposed, and no further archaeological work is recommended.

3.4 FIRE ROAD SITE

3.4.1 Existing Conditions

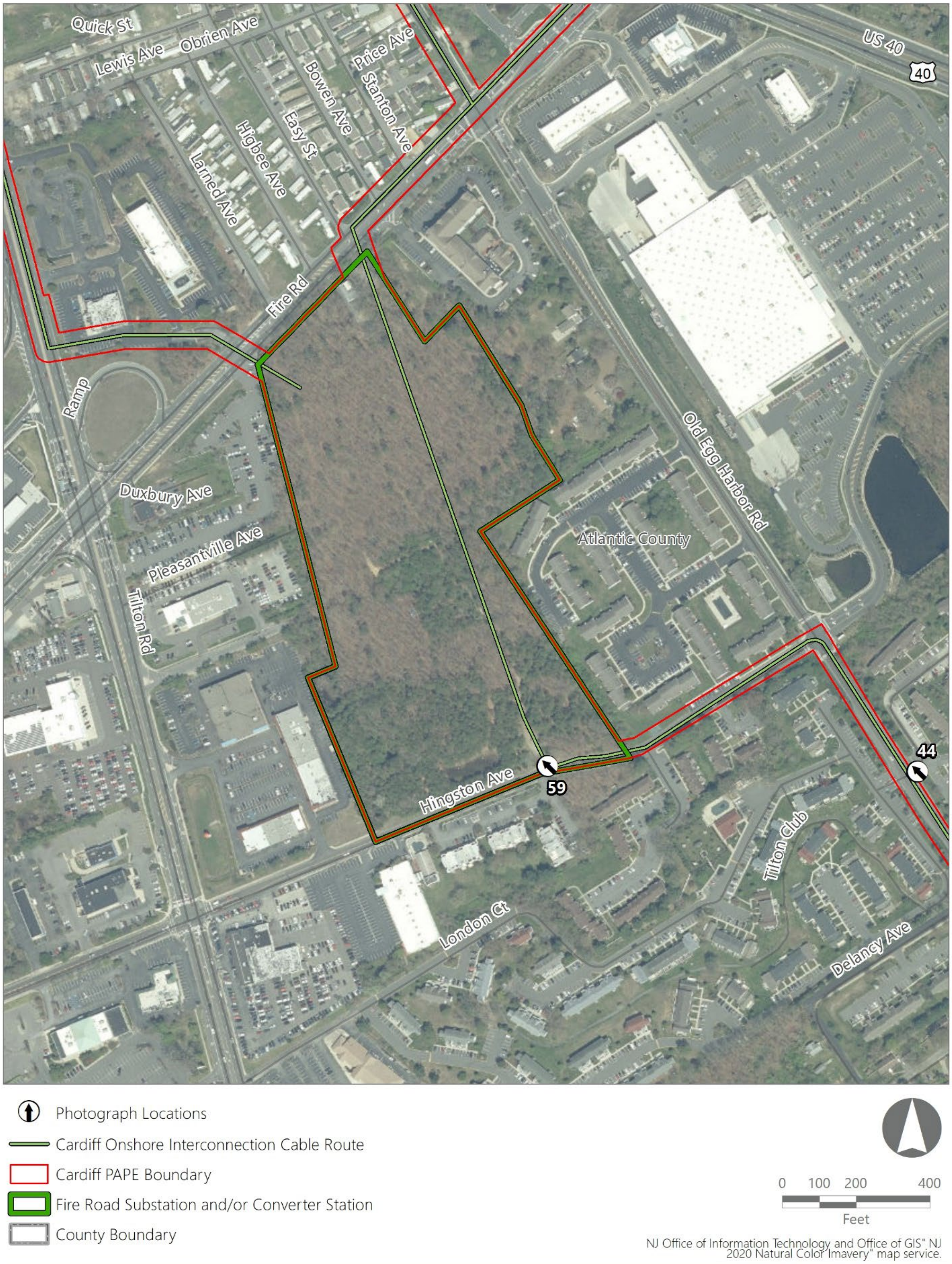
Existing conditions within and adjacent to the Fire Road Site were observed and photographed during archaeological reconnaissance completed by EDR personnel on June 13, 2022. The reconnaissance included observing the proposed location of the onshore substation and/or converter station (detailed in Section 1.3) from public ROW on Hingston Avenue and Fire Road. An overview of the Fire Road Site is included as Figure 40. Photograph 59 and Photograph 60 show the existing conditions at the Fire Road Site.

As described in Section 1.3, the Fire Road Site is situated on approximately 19.71 acres (7.98 ha) of currently wooded and overgrown lots in Egg Harbor Township. The site is bounded by Hingston Avenue to the south and Fire Road to the north (Figure 40). The site is currently vacant. During reconnaissance of the site, EDR personnel observed conditions which matched aerial imagery of the area, with a cleared entranceway off of Hingston Avenue (Photograph 59) leading into an overgrown grass, scrub brush, and wooded lot to the north (Photograph 60). A curb and storm drain were observed at the cleared entranceway, suggesting the parcel was prepared for residential and/or commercial development at one time.

Photograph 59. Overview of the cleared entranceway to the Fire Road Site off of Hingston Avenue. Note the curb, photo left. View to the northwest.

Photograph 60. Overview of the wooded areas of the Fire Road Site from Hingston Avenue. View to the northwest.

Figure 40. Fire Road Site Overview



3.4.2 Soils

Per NRCS soil data, two distinct soil units are present within the proposed onshore substation and/or converter station location, representing the primarily sandy loam composition of soils in the vicinity:

- Sassafras sandy loam - Derived from loamy fluviomarine sediments. Found on coastal plain uplands on fluviomarine terraces and flats. Well drained and very deep.
- Aura sandy loam – Derived from coarse-loamy eolian deposits over loamy gravelly fluviomarine deposits. Found on coastal plan fluviomarine terraces and flats. Well drained and very deep.

A review of hillshade and lidar mapping of the Fire Road Site also revealed areas of significant disturbance, including what appear to be large soil push/spoil piles and a dug out drainage basin.

3.4.3 Previously Identified Archaeological Sites

No previously recorded archaeological resources are located within the Fire Road Site. No previously recorded archaeological sites are located within 0.5 mi. (0.8 km) of the Fire Road Site.

3.4.4 Previous Cultural Resource Surveys

A review of LUCY, archaeology site forms, and available online resources identified the following previously conducted cultural resource surveys in proximity of the Fire Road Site:

- The 2000 combined architectural and archaeology report titled *Technical Memorandum No. 18, Cultural Resources Investigation, Garden State Parkway Widening, Interchanges 30-80, Ocean, Burlington, and Atlantic Counties, New Jersey* by Richard Grubb & Associates, Inc. (RGA) identified the Garden State Parkway Historic District (RGA, 2000). An October 12, 2001, NJHPO decision determined that the resource was NRHP eligible under criterion A and C, with a period of significance from 1945 to 1957. The proposed Fire Road Site is located approximately 500 ft (152 m) east of the Garden State Parkway Historic District boundary.

3.4.5 Historical Map and Photography Review

A review of historical maps and aerial photography depicting the area in and around the Fire Road Site revealed the following:

- The 1872 Beers *Topographical Map of Atlantic Co*. depicts development in the vicinity of Risleyville, with multiple MDS along Old Egg Harbor Road and Tilton Road south of Fire Road, to the east and west of the Fire Road Site (Figure 35; Beers 1872). The 1888 *Topographical Map of Egg Harbor and Vicinity* by Cook, Smock, and Vermeule depicts the same configuration of roadways (Figure 36; Cook, 1888).

- The 1943 Pleasantville, NJ USGS topographical depicts Hingston Avenue south of the Fire Road Site (USGS, 1943; Figure 37).

- Historical aerial photography from 1931 depicts the proposed Fire Road Site as wooded land between what appear to be cleared agricultural tracts (Historic Aerials, 2021). Fire Road, Tilton Road, Old Egg Harbor Road, and Hingston Road are all visible in the same general location as their present day configuration. Imagery from 1951 and 1957 shows little to no change.

- By 1963, imagery shows partial clearing through the center of the Fire Road Site, extending from the back yard of one of the residential lots along Old Egg Harbor Road to the east (Historic Aerials, 2021). By 1970 the cleared area is partially overgrown, and fully reclaimed by forest by 1984. Some of the agricultural land surrounding the Fire Road Site has also been left fallow and started to become vegetated at this time, while an apartment complex (still extant today) has been constructed immediately to the east.

- In 1995, imagery shows significant disturbance and clearing in the southern portion of the Fire Road Site, another clearing in the center of the area, and a series of cleared pathways throughout (Historic Aerials, 2021). From 2002 till present day imagery shows the gradual regrowth of the cleared areas, as well as a retention pond/basin in the south of the area that corresponds to the dugout area identified in lidar data.

In brief, the historical map review demonstrates that location of the Fire Road Site remained undeveloped wooded and/or agricultural land until approximately 1995, at which time the location underwent some clearing and earthmoving, likely as preparation for additional development that never occurred.

3.4.6 Archaeological Sensitivity Assessment

Though no archaeological sites were within a 0.5-mi. buffer of the Fire Road Site, research of the Cardiff Onshore Route suggests Native American groups utilized the general area. For this reason, the proposed Fire Road Site Due is considered to have a Medium sensitivity for the presence of Native American archaeological resources, in the absence of more recent ground disturbance.

A review of historical maps and aerial imagery failed to identify any MDS or development within the proposed Fire Road Site until some areas were cleared and potentially graded circa 1995. However, MDS are depicted on historical maps and confirmed by aerial imagery along Old Egg Harbor Road and Tilton Road to the east and west of the Fire Road Site. For this reason, the proposed Fire Road Site Due is considered to have a Medium sensitivity for the presence of historic-period archaeological resources, in the absence of more recent ground disturbance.

The results of this archaeological reconnaissance and desktop assessment can be found in Figure 38, where the Fire Road has been classified into "Disturbed" and "Potentially Undisturbed" areas, based on lidar data and historical aerial imagery. Areas classified as potentially undisturbed are considered to have Medium sensitivity for both Native American and historic-period archaeological resources.

The NJHPO's *Guidelines* (see Section 1.5) advise that it may be possible to eliminate part or all of the APE from further investigation if it can be demonstrated that recent disturbance has rendered it unlikely that any potentially significant archaeological sites have survived (NJHPO, 2019). In addition, steep slopes and wetlands are unlikely to contain most types of sites. As such, no further archaeological investigation is recommended within the areas of the Fire Road Site identified as "Disturbed" in Figure 38. Soil mapping and historical aerial imagery indicate that previous ground disturbances are located in discrete portions of the Fire Road Site, while the majority has remained as relatively undisturbed wooded and agricultural land.

Additional archaeological investigation of "Potentially Undisturbed" areas was recommended within 17of the 19.71 total acres (approximately 86.2%) of the Fire Road Site portion of the PAPE as indicated by the Medium sensitivity "Potential Phase IB Survey Areas" depicted in Figure 38, Sheet 23. Section 3.4.7, below, describes the results of the Phase IB archaeological survey of the Fire Road Site. Further information on the design and methodology of the Phase IB archaeological survey is included in Section 1.5.1.

3.4.7 Phase IB Survey Results

EDR conducted Phase IB archaeological survey fieldwork for the Fire Road Site in January 2023. Fieldwork was supervised by a combination of Amanda Filmyer, RPA and Moira Magni, who were assisted by a crew of up to five archaeological field technicians. Table 12 summarizes the Fire Road Site Phase IB survey area, including PAPE acreage totals, STPs excavated, and the map sheets depicting the area (Figure 39). Tabulated STP data is included in Attachment A.

Table 12. Summary of Phase IB Fieldwork for the Fire Road Site

Phase IB Survey Area	Linear Feet (Meters)	Acres (Hectares)	STP Total	Figure 39
Fire Road Site (FR)	-	17 ac. (6.87 ha)	188	Sheet 1

The Phase IB survey of the Fire Road Site primarily encountered wooded areas containing scrub brush, briars, and overgrown lots. Initial archaeological reconnaissance conducted on June 13, 2022, identified a retention pond and a curb and storm drain at a cleared entrance way along Hingston Ave, suggesting that parcel was at one time being prepared for residential and/or commercial development. Observations during the Phase IB survey showed that the disturbance associated with preparation of the parcels for residential and/or commercial development was more extensive than previously identified. The surveying archaeologists observed numerous storm drains, manholes, abandoned construction trenches, and massive push piles throughout the southern portion of the Fire Road Site, most notably in its easternmost and southwestern most portions (see Photograph 61 to Photograph 63). Additionally, several abandoned homeless encampments were scattered throughout the southern portion of the Fire Road Site and a large retention Pond was documented in the southwest (Photograph 64). The northern portion of the Fire Road Site appeared to contain significantly less ground disturbance (Photograph 65), although it was littered with modern trash and the occasional push pile.

A total of 188 STPs were excavated across the Fire Road Site (Figure 39, Sheet 1). STPs were excavated on a 50 ft. (15 m) interval grid in the northern, significantly less disturbed portion of the Parcel. When the surveying archaeologists encountered extensive disturbances within the southern half, the survey interval was increased to a 150 ft. (45 m) interval grid. As per NJHPO's *Guidelines*, the intensity of surface and subsurface investigations should be proportional to the probability of site occurrence (NJHPO, 2019). In other words, the testing grid intervals should be smaller in areas with a high potential for archaeological sites and larger in areas with a low potential for archaeological sites. Although the entire Fire Road Site Phase IB Survey Area was determined to have "Medium Archaeological Sensitivity" in the TARA desktop assessment, the southern portion of the survey was reclassified as "Disturbed" after pedestrian survey encountered significant surface disturbance/modification and STPs exhibited pervasive ground disturbance and/or truncated topsoil. Under normal circumstances, areas classified as "Disturbed" would not be tested, but out of an abundance of caution STPs were excavated across the area to confirm the disturbance.

STPs excavated in the northern portion of the Fire Road Site consisted of intact or truncated topsoil or plowzone overlying rocky subsoils (Attachment A). STP FR.080 can be used as a representative example of the first primary soil profile in the area. It contained a gray (10YR 5/1) sandy loam or sand plowzone extending to 9.84 in. (25 cm) bgs, overlying a brownish yellow (10YR 6/8) sand B horizon containing 25-50% rounded pebbles that extended to 13.78 in. (35 cm) bgs. STP FR.127 can be used as a representative example of the second primary soil profile. It consisted of a yellowish brown (10YR 5/8) sand plowzone extending to 12.2 in. (31 cm) containing 25% rounded pebbles overlying a reddish yellow (7.5YR 6/8) sand B horizon containing 25% rounded to well-rounded pebbles extended to 16.14 in. (41 cm) bgs. STPs in the southern portion of the Fire Road Site survey area generally consisted of truncated and/or mixed and disturbed topsoil overlying rocky subsoils. STP FR.182 is a representative example of a disturbed STP in the southern portion of the Fire Road Site. It contained a mottled dark brown and grayish brown (10YR 3/3 and 10YR 5/2) sand fill with 75% pebbles, extending 6.29 in. (16 cm), overlying a reddish yellow (7.5YR 6/8) sand B horizon containing 25% pebbles extending10.23 in. (26 cm). STP FR.002, is another representative example of disturbed STP in the southern portion of the Fire Road Site (Photograph 66). It contained a brown (10YR 4/3) extremely gravelly sand topsoil with gravel extending to 6.3 in. (16 cm) bgs, overlying a yellow (10YR 7/6) sand B horizon containing 25-50% rounded pebbles that extended to 11.8 in. (30 cm) bgs. No artifacts were recovered during the Phase IB survey of the Fire Road Site.

Photograph 61. Overview of Access Road in the southern portion of the Fire Road Site. Storm drains with curbs are visible on either side of the road, view to the north.

Photograph 62. Detail of storm drain and curbs along the access road. An excavation trench can be seen in the background to the right of the photograph, view to the east.

Photograph 63. Large push pile that is located south adjacent to the disturbed area removed from survey in the middle of the Fire Road Site, view to the northwest.

Photograph 64. Large retention pond located southwest of the Fire Road Site. A push pile with obvious non-native vegetation is in the foreground, view from the west.

Photograph 65. Overview of the northern portion of the Fire Road Site, view from the north.

A modern wall feature was observed during pedestrian survey within the southern portion of the Fire Road Site (Photograph 67). The wall is approximately 50 ft. (15 m) long and is made from concrete blocks. It is located immediately north of a retention pond and is believed to have been built in association with the retention pond.

Photograph 66. Profile of STP FR.002, view from the north.

Photograph 67. Overview of modern wall feature in the southern portion of the Fire Road Site, view from the southeast.

No archaeological sites were identified, and no archaeological artifacts were encountered during the Phase IB survey. As such, no mitigation or avoidance measures are proposed, and no further archaeological work is recommended.

4.0 SUMMARY AND CONCLUSIONS

4.1 Summary of TARA Results

The results of the TARA can be summarized as follows with respect to the archaeological potential of the Larrabee and Cardiff PAPEs:

- **Larrabee Physical Effects PAPE**
    - Prior ground disturbance was identified within the proposed Monmouth Landfall Site and Larrabee Onshore Route. Depth to subsoil is approximately 1.0 to 2.0 ft (0.3 to 0.6 m) for most of the Larrabee Onshore Route. As noted previously, Atlantic Shores has elected to site the buried onshore cables within existing, previously disturbed road, bike path, and railroad ROWs, where disturbance during construction and installation of the existing infrastructure likely exceeded the depth of potential archaeological deposits. This siting strategy avoids or significantly reduces potential impacts to adjacent undisturbed soils and avoids or minimizes the risk of potentially encountering undisturbed archaeological deposits throughout most of the Larrabee Onshore Route.
    - One previously recorded archaeological resource (28-Mo-283) [redacted] Phase IB archaeological survey was conducted [redacted] in an attempt to reconfirm the boundaries of 28-Mo-283. The site was not relocated in this survey and most of the terrain [redacted] was determined by the surveying archaeologists to be previously disturbed (Siegel and Baldwin, 2005). Mapping from this cultural resource survey (Figure 11), illustrate that 95 STPs were excavated within the Monmouth Landfall Site PAPE on a terrain that was determined to be almost completely disturbed. 14 STPs excavated in the Landfall Site only uncovered cultural material dating to the twentieth century. Archaeologists recommended no additional survey on the portion of the National Guard Training Center containing the Monmouth Landfall Site PAPE, a sentiment that was concurred by SHPO. As such, no additional archaeological investigation is anticipated to be necessary for the Monmouth Landfall Site within the Larrabee Physical Effects PAPE

- There are ten previously identified archaeological sites [redacted] of the Larrabee Onshore Route. These sites consist of six Native American sites, three historic-period sites, and one multicomponent site. The Native American sites are generally clustered [redacted] One historic-period site is an outbuilding associated [redacted]. The second historic period site (28-Mo-407) [redacted] and is comprised of eighteenth and nineteenth century artifact concentrations and features associated with the Thomas Shearman family, Joseph Mount, and/or Commodore Robert Stockton (HDR, 2014 and 2015).
- Historical map and photography review demonstrates that MDS are mapped in the immediate vicinity of the proposed Larrabee Onshore Route, with most MDS mapped along existing roadways and at intersections that were largely established by the mid-nineteenth century. MDS are concentrated in the eastern portion of the Larrabee Onshore Route along Sea Girt Avenue.
- A portion of the proposed Larrabee Onshore Route is collocated with the Edgar Felix Memorial Bikeway, within the former railroad corridor of the Farmingdale and Squan Railroad. A previous intensive-level architectural survey identified a segment of the Edgar Felix Memorial Bikeway as part of the former Farmingdale and Squan Railroad (RBA, 2012). The research and fieldwork for that survey concluded that the Farmingdale and Squan Railroad was ineligible for listing on the NRHP. A NJHPO opinion letter dated to August 16, 2021 concurred with the results of the survey, stating "No Historic Properties Affected" within the APE for the bridge replacement (NJHPO, 2012).
- Pedestrian survey (with judgmental shovel testing if deemed appropriate based on observed field conditions) is recommended in any Low sensitivity, "Potentially Undisturbed" areas adjacent to paved roadways (within which the onshore cables are actually sited) where depth to culturally sterile subsoil is less than approximately 2.0 ft. as well as in any wetlands or areas of steep slope.
- Targeted archaeological shovel testing is recommended within those portions of, Larrabee Onshore Route, and potential Larrabee Onshore Substation and/or Converter

Station options indicated as Medium and Medium-High sensitivity "Potential Phase IB Survey Areas" in Figure 21.

  - Phase IB STP survey has been completed for several areas along the proposed Larrabee Onshore Route (Figure 22). As discussed in Section 2.3.9, a total of 202 STPs were excavated across 16 designated survey areas along the Larrabee Onshore Route. No archaeological sites were identified, and no archaeological artifacts were encountered during the Phase IB survey. As such, no mitigation or avoidance measures are proposed, and no further archaeological work is recommended for the areas that were surveyed. The areas Larrabee PAPE that have not yet been surveyed include: the Lanes Pond Road Site, the Randolph Road Site, and approximately 21.58 acres of the Larrabee Onshore Route. The Phase IB survey results for these remaining areas will be presented in an addendum to this TARA report at a future date.
  - In addition, the Project's MPRDP (Section 4.2.1) will be in effect for all construction and installation activities, providing guidance and instructions to all contractors on how to proceed in the event (however unlikely) of encountering unanticipated cultural material or cultural features during work in the Larrabee PAPE.

- **Cardiff Physical Effects PAPE**
  - Prior ground disturbance was identified within the proposed Atlantic Landfall Site, Cardiff Onshore Route, and portions of the Fire Road Site. Depth to subsoil is approximately 1.0 to 2.0 ft. (0.3 to 0.6 m) for most of the Cardiff Onshore Route. As noted previously, Atlantic Shores has elected to site the buried onshore cables within existing, previously disturbed road, bike path, and railroad ROWs, where disturbance during construction and installation of the existing infrastructure likely exceeded the depth of potential archaeological deposits. This siting strategy avoids or significantly reduces potential impacts to adjacent undisturbed soils and avoids or minimizes the risk of potentially encountering undisturbed archaeological deposits throughout most of the Cardiff Onshore Route.
  - Substantial areas of artificial/historic fill were identified along the eastern half of the Cardiff Onshore Route according to NJDEP online mapping (NJDEP, 2018). This historic fill is mapped as extending from Atlantic City all the way to the mainland in

Pleasantville, encompassing all portions of the Cardiff Onshore Route on Bader Airfield, Great Island and the Atlantic City High School, U.S. Route 40, and the existing 69 kV Atlantic City Electric (ACE) transmission line and railroad ROW.

- No previously recorded archaeological sites are located within the Cardiff PAPE. The proposed Atlantic Landfall Site does encompass previously identified historic properties, all of which were previously determined ineligible for the S/NRHP and subsequently demolished. Lacking spatial specificity, the mapped locations of the earliest recorded Native American sites (28-At-003, 28-At-004, and 28-At-006) were considered areas of elevated archaeological sensitivity and not be considered equivalent to formally tested and delineated archaeological sites.
- All previously recorded archaeological sites with Native American components [redacted] of the Cardiff Onshore Route are mapped [redacted] As discussed in Section 3.3.3, however, the earliest recorded sites (i.e., sites ending in a single digit number) lack spatial specificity as they were not formally delineated. As such, their mapped locations should be considered areas of elevated archaeological sensitivity and not be considered equivalent to formally tested and delineated archaeological sites. No "Potential Phase IB Survey Areas" were identified in the Pleasantville area due to extensive documented previous ground disturbance. However, archaeological monitoring of the construction and installation of the Cardiff Onshore Route in Pleasantville is recommended.
- Historic-period sites in the vicinity of the Cardiff Onshore Route include the Greenhouse site in urban Atlantic City and three mid-twentieth century Pinelands Commission sites which did not meet the criteria for the S/NRHP.
- Historical map review demonstrates that the proposed Atlantic Landfall Site was undeveloped before the construction of Atlantic City and its associated block and street grid, which has remained largely unchanged from their original establishment to today.
- MDS are mapped in the immediate vicinity of the PAPE, mostly along existing roadways and at intersections that were largely established by the mid-nineteenth century. Most of the MDS are concentrated in the central and eastern portion of the Cardiff Onshore

Route in Smith's Landing, Pleasantville, and Risleyville, as well as in the developed urban environment of Atlantic City.

- A portion of the proposed Cardiff Onshore Route is collocated within a segment of the West Jersey and Atlantic Railroad Historic District (see Figure 38, Sheets 15-17, 24-34, 36). West of the Garden State Parkway and U.S. Route 40 the railroad corridor has been converted into the asphalt paved Atlantic County Bikeway (See Figure 33, Sheets 6-9; Figure 38, Sheets 25-34, 36). Only a series of at-grade street crossings were identified between English Creek Avenue and Franklin Boulevard, an area encompassing the entire portion of the PAPE within the former railroad ROW/Bikeway (Gannett Fleming, 2002: Appendix C). In this area, contributing resources to the linear historic property have been removed, and only the rail prism and associated cuts and embankments remain. The actual fills of the rail prism are not contributing features to the eligibility of the resource. Avoidance of the prism may not be feasible but impacts to the fills of the prism are not anticipated to constitute an adverse effect, especially if restored to present condition (as proposed by Atlantic Shores) following installation of the onshore cable.
- The previously demolished McKee City Station, a contributing resource of the West Jersey and Atlantic Railroad Historic District, [redacted] This documented resource is a demolished historic structure which may exist in the archaeological record. The "Potentially Undisturbed" areas [redacted] have been characterized as Medium sensitivity "Potential Phase IB Survey Areas" [redacted]. During the August 2023 Phase IB survey mobilization, 54 STPs were excavated in the "Potential Phase IB Areas" [redacted] Remnant features of the West Jersey and Atlantic Railroad, such as slag and stray railroad ties, were noted in these survey areas, but were located on or near ground surface mixed with modern material and therefore cannot be considered intact historic cultural deposits. [redacted]

[redacted] As such no mitigation or avoidance measures are proposed, and no further archaeological work is recommended for these areas.

- Construction and installation activities associated with the Projects will avoid all cemeteries and burials regardless of S/NRHP status or previous disturbance. Since the boundaries of the Greenwood Cemetery were well established prior to construction of U.S. Route 40, and use of the area adjacent to the U.S. Route 40 does not appear to happen until after the construction of the highway corridor, it is not anticipated that there is any potential for burials associated with the Greenwood Cemetery to be located within the PAPE along the U.S. Route 40 ROW. As such, construction and installation of the Cardiff Onshore Route will avoid all burials, and no remote sensing survey is anticipated to be necessary. However, out of an abundance of caution, archaeological monitoring of construction and installation in the area is recommended. In addition, the Project's MPRDP (see Section 4.2.1) will be in effect for all construction and installation activities, providing guidance and instructions to all contractors on how to proceed in the event (however unlikely) of encountering potential grave shafts or burials.
- Pedestrian survey (with judgmental shovel testing if deemed appropriate based on observed field conditions) is recommended in any Low sensitivity, "Potentially Undisturbed" areas adjacent to paved roadways (within which the onshore cables are actually sited) where depth to culturally sterile subsoil is less than approximately 2.0 ft. as well as in any wetlands or areas of steep slope.
- No additional archaeological investigation is anticipated to be necessary for the proposed Atlantic Landfall Site within the Cardiff Physical Effects PAPE.
- Targeted archaeological shovel testing is recommended within portions of the Cardiff Onshore Route and Fire Road Site as indicated by the Medium and Medium-High sensitivity "Potential Phase IB Survey Areas" in Figure 38. Targeted Phase IB STP survey for the Fire Road Site and the Cardiff onshore Route were completed in January 2023 and August 2023 respectively.
- Phase IB STP survey has been completed the majority of the proposed Cardiff Onshore Route (Figure 38, Sheets 2-6). As discussed in Section 3.3.9, a total of 146 STPs were excavated across seven designated survey areas along West Jersey Avenue and English

Creek Avenue. No archaeological sites were identified, and no archaeological artifacts were encountered during the Phase IB survey. As such, no mitigation or avoidance measures are proposed, and no further archaeological work is recommended for the areas that were surveyed. Approximately 0.12 acres of the Cardiff Onshore Route have yet to be surveyed. The Phase IB survey results for these remaining areas will be presented in an addendum to this TARA report at a future date.

- Phase IB STP survey has been completed for the proposed Fire Road Site Onshore Substation and/or Converter Station (Figure 38, Sheet 1). As discussed in Section 3.4.7, A total of 188 STPs were excavated in the Fire Road Site. No archaeological sites were identified, and no archaeological artifacts were encountered during the Phase IB survey. As such, no mitigation or avoidance measures are proposed, and no further archaeological work is recommended.
- In addition, the Project's MPRDP (see Section 4.2.1) will be in effect for all construction and installation activities, providing guidance and instructions to all contractors on how to proceed in the event (however unlikely) of encountering unanticipated cultural material or cultural features during work in the Cardiff PAPE.

The results of background research, archaeological reconnaissance, and desktop assessment described herein indicate that the proposed Onshore Facilities associated with the Cardiff and Larrabee Physical Effects PAPEs have been significantly disturbed due to transportation infrastructure development (principally roadways, railroads, and bike paths) and adjoining business and residential neighborhoods.

Since Atlantic Shores has elected to site the buried onshore cables within existing, previously disturbed road, bike path, and railroad ROWs, where disturbance during grading, construction, and installation of the existing infrastructure likely exceeded the approximately 1.0-to-2.0-ft. (0.3 to 0.6-m) depth to subsoil, there is a very low likelihood for intact archaeological resources to be located within the Larrabee or Cardiff Onshore Routes. However, in areas outside of mapped soil disturbance, or in areas of potentially intact eolian soils deposits, the likelihood for intact archaeological resources (below surface disturbances) increases.

Table 13. Summary of Archaeological Sensitivity

Onshore Facility	Archaeological Sensitivity	Mapping
Larrabee Physical Effects PAPE		**Figure #**
Landfall Sites(s)		
Monmouth Landfall Site	Disturbed, Medium-High	Figure 14
Onshore Substation and/or Converter Station Site(s)		
Lanes Pond Road Site	Low to Medium	Figure 21, Sheets: 42 & 44
Randolph Road Site	Disturbed, Medium-High	Figure 21, Sheet: 44
Larrabee Onshore Interconnection Cable Route Options		
Larrabee Onshore Route	Disturbed, Low to Medium-High	Figure 21, Sheets: 1-44
Cardiff Physical Effects PAPE		**Figure #**
Landfall Site(s)		
Atlantic Landfall Site	Disturbed	Figure 31
Onshore Substation and/or Converter Station Site(s)		
Fire Road Site	Disturbed, Medium	Figure 38, Sheet: 23
Cardiff Onshore Interconnection Cable Route Options		
Cardiff Onshore Route	Disturbed, Low to Medium-High	Figure 38, Sheets: 1-38

Therefore, there is very little likelihood for intact or potentially significant archaeological resources to be located within those portions of the PAPE categorized as "Disturbed" in the Archaeological Reconnaissance and Desktop Assessment Results, and they have been excluded from field survey consideration (Figures 14, 21, 31, and 38).

4.2 Potential Additional Measures to Identify Archaeological Resources

Pedestrian survey (with judgmental shovel testing if deemed appropriate based on observed field conditions) is recommended in any Low sensitivity, "Potentially Undisturbed" areas adjacent to paved roadways (within which the onshore cables are actually sited) where depth to culturally sterile subsoil is less than approximately 2.0 ft. as well as in any wetlands or areas of steep slope (Figures 14, 21, 31, and 38). Targeted archaeological shovel testing is recommended within those portions of the proposed Onshore Facilities that are sited within areas of the PAPE categorized as Medium and Medium-High sensitivity and "Potentially Undisturbed" (Figures 14, 21, 31, and 38). This includes targeted areas of the Larrabee and Cardiff Onshore Routes, and portions of the proposed Onshore Substation and/or Converter station locations.

Since Phase IB survey has been completed for the majority of the Cardiff Physical Effects PAPE and for part of the Larrabee Onshore Route, remaining targeted areas consist of the remainder of both Onshore Routes and portions of the proposed Larrabee Onshore Substation and/or Converter station locations. A summary of the sensitivity and the status of Phase IB survey completion for each proposed Onshore Facility Site is included in Table 14

Any alternate routing options or substation and/or converter locations removed from Project consideration prior to conducting any potential Phase IB archaeological field survey for the Projects will result in the omission of any corresponding "Potential Phase IB Survey Areas" from the field effort. Additional "Potential Phase IB Survey Areas" may be added within portions of the PAPE categorized as "Potentially Undisturbed" if Project updates or alterations call for the use of roadside ROW or additional areas outside of the current siting within paved lanes and bikes paths.

Table 14. Summary and Status of Identified Phase IB Survey Areas for Proposed Onshore Facility Sites

Onshore Facility Site	Recommended Additional Measures to Identify Archaeological Resources	Desktop Assessment Mapping	Status of Completion for Recommended Additional Measures	Phase IB Results Mapping
Larrabee Physical Effects PAPE 237.17 ac.	**Combined Phase IB STP Survey 49.14 ac (20.17%)**	**Figure 21**	**Completed Phase IB Survey 4.77 of 49.14 ac. (9.7%)**	**Figure 22**
Landfall Site(s)				
Monmouth Landfall Site 8.32 ac.	No further investigation	N/A	N/A	N/A
Onshore Substation and/or Converter Station Site(s)				
Lanes Pond Road Site 16.27 ac.	Targeted Phase IB STP Survey 10.87 ac. (66.81%)	Sheets: 42 & 44	Survey Pending	N/A
Randolph Road Site 24.64 ac.	Targeted Phase IB STP Survey 11.90 ac. (48.30%)	Sheets: 28 & 44	Survey Pending	N/A
Larrabee Onshore Route Interconnection Cable Route Options				
Larrabee Onshore Route 187.94 ac.	Targeted Phase IB STP Survey 26.35 ac. (14%)	Sheets: 1-2, 4-12, 15-19, 22, 25-32, 36-38, 40-44	4.77 ac. of Targeted Phase IB STP Survey Completed in August 2023	Sheets: 1-11
Cardiff Physical Effects PAPE 342.15 ac.	**Combined Phase IB STP Survey 20.07 ac. (5.86%)**	**Figure 38**	**Completed Phase IB Survey 19.98of 20.07 ac. (99.5%)**	**Figure 39**
Landfall Site(s)				
Atlantic Landfall Site 2.90 ac.	No further investigation	N/A	N/A	N/A
Onshore Substation and/or Converter Station Site(s)				
Fire Road Site 19.71 ac.	Partial Phase IB STP Survey 17.0 ac. (86.2%)	Sheet: 23	Phase IB STP Survey Completed in January 2023. No Further Investigation Needed	Sheet: 1
Cardiff Onshore Interconnection Cable Route Options				
Cardiff Onshore Route 319.56 ac.	Targeted Phase IB STP Survey 3.07 ac. (0.96%)	Sheets 28-36	2.98 ac. of Targeted Phase IB Survey Completed in August 2023	Sheets: 2-6

4.2.1 Archaeological Monitoring

To further mitigate the potential (however unlikely) for encountering archaeological resources during installation of the Onshore Facilities, Atlantic Shores has prepared a Monitoring Plan and Post Review Discoveries Plan (MPRDP) for Terrestrial Archaeological Resources, which includes stop-work and notification procedures to be followed if a cultural resource is encountered during installation. The MPRDP can be found in Attachment 5 of the MOA executed among BOEM, NJHPO, consulting Native Tribes and other consulting parties to memorialize specific measures that Atlantic Shores will take to resolve adverse effects to identified historic resources and to minimize potential effects to other historic properties in the event of a post-review discovery (BOEM, 2023). The MPRDP outlines the steps for dealing with potential unanticipated discoveries of cultural artifacts and/or features, including human remains, during the construction of the proposed Onshore Facilities. In summary the MPRDP:

- Presents to regulatory and review agencies the plan Atlantic Shores and its contractors and consultants will follow to prepare for and potentially respond to unanticipated cultural resources (i.e., terrestrial archaeological) discoveries;

- Includes provisions and procedures allowing for a Cultural Monitor (Archaeologist) and Tribal Monitors to be present during construction and installation activities conducted in targeted areas of concern as identified in the TARA and through consultation with Native American Tribes; and

- Provides guidance and instruction to Atlantic Shores personnel and its contractors and consultants as to the proper procedures to be followed in the event of an unanticipated cultural resource (i.e., terrestrial archaeological) discovery.

Based on the results of the archaeological reconnaissance and desktop assessment, EDR recommends monitoring in portions of the Larabee and Cardiff Physical Effects PAPE adjacent to cemeteries, and in paved portions with Medium-High Sensitivity [redacted] Note that scope of monitoring is subject to change and additional areas maybe recommended following Section 106 consultation with BOEM, NJHPO, and consulting Native American Tribes, and other consulting parties. The recommended monitoring areas are described below in greater detail:

- **Larrabee Physical Effects PAPE**
  - Paved ROW of the Edgar Felix Memorial Bikeway, located west of the intersection with the Wall Township Bike Path [redacted] (Figure 21, Sheet 12).

- **Cardiff Physical Effects PAPE**
  - Paved Road ROW of Black Horse Pike (US Route 40) between Frankfort Court and US Route 9, located [redacted] (Figure 38, Sheets: 18-20);
  - Paved Road ROW of Black Horse Pike (US Route 40) located adjacent to Greenwood Cemetery (Figure 38, Sheet 20)
  - Paved Road ROW of West Jersey Avenue between Black Horse Pike (US Route 40) and Haywood Avenue, [redacted] (Figure 38, Sheets 28-29);
  - Paved Road ROW of West Jersey Avenue between Spruce Avenue and Fernwood Avenue, [redacted] partially within 500 ft. of fresh surface water (Figure 38, Sheets 31-32)

In addition, the Project's MPRDP will be in effect for all construction and installation activities, providing guidance and instructions to all contractors on how to proceed in the event (however unlikely) of encountering unanticipated cultural resources during work in this area. The MPRDP will include appropriate "Stop Work" procedures if potential cultural material and/or features are observed.

4.3 Conclusions

Atlantic Shores has proposed Onshore Facilities be primarily located within previously disturbed lots, paved roadways, railroads ROWs, and bike paths where disturbance during construction and installation of the existing infrastructure likely exceeded the depth of potential archaeological deposits. The results of background research, archaeological reconnaissance, and desktop assessment described herein indicate that the proposed Onshore Facility Sites have been significantly disturbed due to transportation infrastructure development (principally roadways, railroads, and bike paths) and adjoining business and residential neighborhoods. Note that the Brook Road Site is now proposed to be developed separately under the New Jersey Board of Public Utilities (NJBPU) State Agreement

Approach (SAA) and has been removed from the Larrabee Physical Effects PAPE. Although no specific actions or effects are proposed by Atlantic Shores at this location, discussion of the Brook Road Site was retained as part of the study area in the TARA since the project may utilize future facilities at this site.

One previously recorded archaeological resource (28-Mo-283) is purportedly mapped within the Monmouth Landfall Site PAPE, and the entirely of the Larrabee Physical Effects PAPE. Phase IB archaeological survey was conducted [redacted] reconfirm the boundaries of 28-Mo-283. The site was not relocated in this survey and most of the terrain was determined to be previously disturbed. As a result, both JMA archaeologists and NJHPO recommended that no further survey was necessary [redacted] (Siegel and Baldwin, 2005; HDR, 2015). Mapping from this cultural resource survey (Figure 11), illustrates that 95 STPs were excavated within the Monmouth Landfall Site PAPE on terrain that was determined to be almost completely disturbed. Furthermore, no prehistoric cultural material was uncovered within the Monmouth Landfall PAPE. Since previous cultural resource surveys found no trace of archaeological site 28-Mo-283 [redacted] it is highly unlikely that development will have any negative impact on the archaeological site. As such, the Medium-High sensitivity portions of the Monmouth Landfall site have been re-categorized in the Archaeological Reconnaissance and Desktop Assessment Results as "Previously Surveyed" and has been excluded from field survey consideration (Figure 14). No mitigation or avoidance measures are proposed, and no further archaeological work is recommended.

There is a very low likelihood of intact or potentially significant archaeological resources to be located within those portions of the PAPE categorized as "Disturbed" in the Archaeological Reconnaissance and Desktop Assessment Results, and they have been excluded from field survey consideration (Figures 14, 21, 31, and 38).

Pedestrian survey (with judgmental shovel testing if deemed appropriate based on observed field conditions) is recommended in any Low sensitivity, "Potentially Undisturbed" areas adjacent to paved roadways (within which the onshore cables are actually sited) where depth to culturally sterile subsoil is less than approximately 2.0 ft. as well as in any wetlands or areas of steep slope (Figures 14, 21, 31, and 38).

Targeted archaeological shovel testing is recommended within those portions of the proposed Onshore Facilities that are sited within areas of the PAPE categorized as Medium and Medium-High sensitivity and "Potentially Undisturbed" (Figures 14, 21, 31, and 38; Table 14). This includes targeted areas of the Larrabee and Cardiff Onshore Routes, and portions of the proposed Onshore Substation and/or Converter station locations.

A total of 536 STPs have been excavated across the Larrabee and Cardiff Physical Effects PAPE. (Figures 22 and 39; Tables 6, 10, and 11) A total of 146 STPs were excavated across six designated survey areas along the Cardiff Onshore Route (Figure 39; Table 10). [redacted] Remnant features of the West Jersey and Atlantic Railroad were noted in the survey of WJ05 and WJ06 but could not be considered intact cultural features because they were located on ground surface and/or mixed with modern trash. No artifacts or features [redacted] were uncovered during the Phase IB survey. As such no mitigation or avoidance measures are proposed, and no further archaeological work is recommended at the intersection of West Jersey Avenue and the Atlantic County Bikeway. No archaeological sites or archaeological artifacts were identified in the remaining survey areas along the Cardiff Onshore Route. As such, no mitigation or avoidance measures are proposed, and no further archaeological work is recommended for this portion of the PAPE. Phase IB archaeological field survey efforts are still pending for approximately 0.12 acres of the Cardiff Onshore Route. The survey results for these areas will be presented in a future addendum to the TARA that will be submitted to BOEM and all relevant consulting parties prior to construction activities.

A total of 188 STPs were excavated in the Fire Road Site (Figure 39: Sheet 1; Table 11). Although the northern portion of the Fire Road Site was largely undisturbed, the southern portion contained evidence of disturbance associated with residential or commercial development that was not observed during the archaeological reconnaissance. No archaeological sites were identified, and no archaeological artifacts were encountered during Phase IB survey. As such, no mitigation or avoidance measures are proposed, and no further archaeological work is recommended for that portion of the PAPE.

A total of 202 STPs were excavated across 16 designated survey areas (totaling 4.77 acres) along the Larrabee Onshore Route (Figure 22; Table 6). Phase IB survey encountered a mixture of undisturbed terrain and disturbances from buried utilities throughout the PAPE. No archaeological sites were identified, and no archaeological artifacts were encountered during Phase IB survey. As such, no mitigation or avoidance measures are proposed, and no further archaeological work is recommended for that portion of the PAPE. Phase IB archaeological field survey efforts are still pending for the Lanes Pond Road site. The Randolph Road Site, and approximately 21.58 acres of the Larrabee Onshore Route. The survey results for these areas will be presented in a future addendum to the TARA that will be submitted to BOEM and all relevant consulting parties prior to construction activities. Additionally, BOEM has determined, that a Phased Identification approach is appropriate for the survey, reporting, and consultation related to this archaeological investigation while property access permissions are acquired to conduct survey within these remaining survey areas. The Phased Identification schedule is included in the Projects' Phased Identification Plan: Terrestrial Archaeological Resources, which can be found in Attachment 21 of the MOA executed among BOEM, NJHPO, consulting Native Tribes and other consulting parties (BOEM, 2023).

To further mitigate the potential (however unlikely) for encountering archaeological resources during installation of the Onshore Facilities, Atlantic Shores has prepared a Monitoring Plan and Post Review Discoveries Plan (MPRDP) for Terrestrial Archaeological Resources, which includes stop-work and notification procedures to be followed if a cultural resource is encountered during installation. The MPRDP can be found in Attachment 5 of the MOA executed among BOEM, NJHPO, consulting Native Tribes and other consulting parties (BOEM, 2023). Out of an abundance of caution, EDR recommends archaeological monitoring in five areas of the Larabee and Cardiff Physical Effects PAPE (Section 4.2.1) that are adjacent to cemeteries or located in paved portions with Medium-High Sensitivity located within 1,000 ft. of previously recorded archaeological sites. Note that scope of monitoring is subject to change and additional areas maybe recommended following Section 106 consultation with BOEM, NJHPO, and consulting Native American Tribes, and other consulting parties.

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Attachment A.

Shovel Test Logs

Shovel Test	Stratum	Minimum Stratum Depth	Maximum Stratum Depth	Soil Color	Soil Texture	Comments
EA01.001	I	0	15	10YR 4/1	Sand	Disturbed; located in roadside drainge ditch
EA01.001	II	15	27	10YR 7/4	Sand	Sterile subsoil, subrounded/rounded pebbles
EA01.002	I	0	16	10YR 3/2	Sandy Loam	10% subrounded/rounded pebbles
EA01.002	II	16	26	10YR 5/6	Sand	Sterile subsoil, 25% subrounded/rounded pebbles
EA01.003	I	0	23	10YR 4/2	Sand	Modern material (discarded)
EA01.003	II	23	35	10YR 6/4	Sand	Sterile subsoil, 25% rounded/well-rounded pebbles
EA01.004	I	0	42	-	Sandy Loam	Disturbed; soil color is 10YR 4/1 mottled w/ 10YR 6/3 and 10YR 5/4. Contains modern materials, asphalt (both discarded), and gravels
EA01.004	II	42	54	10YR 5/6	Sand	Sterile subsoil, 20% subrounded pebbles
EA01.005	I	0	11	10YR 4/1	Sand	Subangular/subrounded pebbles
EA01.005	II	11	29	10YR 5/3	Sand	10% subrounded/rounded pebbles
EA01.005	III	29	42	10YR 7/4	Sand	Sterile subsoil, 25% subrounded/rounded pebbles
EA01.006	I	0	50	10YR 4/4	Sandy Loam	Redeposited topsoil, 7% rock content
EA01.006	II	50	66	10YR 3/2	Sandy Loam	Subangular/subrounded pebbles
EA01.006	III	66	76	10YR 5/8	Sand	Sterile Subsoil, subrounded/rounded pebbles
EA01.007	I	0	37	10YR 6/1	Sand	Modern material (discarded)
EA01.007	II	37	51	10YR 6/4	Sand	Sterile subsoil, 25% rounded/well-rounded pebbles
EA01.008	I	0	12	10YR 4/1	Sand	Possible redeposited topsoil
EA01.008	II	12	29	10YR 6/3	Sand	Possible fill layer
EA01.008	III	29	42	10YR 4/1	Sand	Intact soils
EA01.008	IV	42	52	10YR 6/8	Sand	Sterile subsoil, subrounded/rounded pebbles

Shovel Test	Stratum	Minimum Stratum Depth	Maximum Stratum Depth	Soil Color	Soil Texture	Comments
EA02.001	I	0	27	-	Loamy Sand	Disturbed; soil color is 10YR 4/1 mottled w/10YR 7/3 and 10YR 6/2. Contains modern materials (discarded) and gravels
EA02.001	II	27	37	7.5YR 5/6	Sand	Sterile subsoil, 20% subrounded pebbles
EA02.002	I	0	24	10YR 4/1	Sand	None
EA02.002	II	24	64	10YR 7/3	Sand	Sterile subsoil, subrounded/rounded pebbles
EA02.003	I	0	22	10YR 5/3	Loamy Sand	3% rock content
EA02.003	II	22	32	10YR 5/8	Sand	Sterile subsoil, 25% subrounded/rounded pebbles
EA02.004	I	0	22	10YR 4/3	Sand	Contains modern material (discarded)
EA02.004	II	22	32	10YR 6/4	Sand	Sterile subsoil, 25% rounded/well-rounded pebbles
EA02.004	III	32	50	10YR 5/3	Coarse Sand	C horizon, 25% rounded/well-rounded pebbles
EA02.005	I	0	84	10YR 3/2	Sand	Disturbed, multiple striated fill layers
EA02.005	II	84	94	10YR 5/6	Sand	Sterile subsoil, subrounded/rounded pebbles
LA01.001	I	0	38	10YR 7/3	Sand	Subangular/subrounded pebbles, STP terminated for root impasse
LA01.002	I	0	29	10YR 7/3	Fine Sand	STP terminated for large root impasse, located next to large tree. Soil is dry and very firable
LA01.003	I	0	17	10YR 6/2	Sand	Contains modern trash (discarded)
LA01.003	II	17	28	10YR 7/4	Sand	Sterile subsoil, 5% subrounded gravel
LA01.004	I	0	72	10YR 7/2	Sand	3% rock content
LA01.004	II	72	82	10YR 6/3	Sand	Sterile subsoil, 25% subrounded/rounded pebbles
LA01.005	I	0	34	10YR 7/3	Sand	None
LA01.005	II	34	44	10YR 7/6	Sand	Sterile subsoil, subrounded/rounded pebbles
LA01.006	I	0	20	10YR 3/2	Sand	Contains modern trash (discarded). STP terminated for compaction

Shovel Test	Stratum	Minimum Stratum Depth	Maximum Stratum Depth	Soil Color	Soil Texture	Comments
LA01.007	I	0	39	-	Sandy Loam	Disturbed; soil color is 10YR 4/2 mottled w/ 10YR 6/4, and 10YR 5/8. Cotnains modern materials,, asphalt (both discarded) and gravels
LA01.007	II	39	54	10YR 6/3	Sand	Sterile subsoil, 10% subrounded gravel
LA01.008	I	0	16	10YR 7/3	Fine Sand	Contains modern trash towards top of strat (discarded)
LA01.008	II	16	27	10YR 7/6	Fine Sandy Loam	Sterile subsoil, subrounded/rounded pebbles. Soils are dry and very friable
LA01.009	I	0	15	10YR 6/3	Sand	None
LA01.009	II	15	22	10YR 8/3	Sand	E horizon, subrounded/rounded pebbles
LA01.009	III	22	32	10YR 7/6	Sand	Sterile subsoil, 25% subrounded/rounded pebbles
LA01.010	I	0	32	10YR 5/3	Loamy Sand	None
LA01.010	II	32	67	10YR 5/4	Sand	Sterile subsoil, subrounded/rounded pebbles
LA01.010	III	67	87	10YR 4/3	Sand	C Horizon, 10% subrounded/rounded pebbles
LA01.011	I	0	10	10YR 7/2	Sand	None
LA01.011	II	10	24	10YR 6/2	Sand	None
LA01.011	III	24	34	10YR 7/4	Sand	Sterile subsoil, 25% subrounded/rounded pebbles
LA01.012	I	0	25	10YR 7/3	Sand	Redeposited topsoil, >25% subrounded/rounded pebbles
LA01.012	II	25	30	10YR 6/3	Sand	STP terminated for compaction from asphalt
LA02.001	I	0	33	-	Sand	Disturbed; soil color is 10YR 5/2 mottled w/ 10YR 5/6 and 10YR 4/1. Contains modern trash (discarded) and gravels
LA02.001	II	33	53	10YR 7/4	Sand	Sterile subsoil, 25% subrounded gravel
LA02.002	I	0	21	10YR 6/3	Sand	>25% pebbles present. STP terminated for compaction

Shovel Test	Stratum	Minimum Stratum Depth	Maximum Stratum Depth	Soil Color	Soil Texture	Comments
LA02.003	I	0	12	10YR 4/3	Loamy Sand	None
LA02.003	II	12	22	10YR 5/6	Sandy Loam	Sterile subsoil, oxidized. 10% subrounded/rounded pebbles
LA02.004	I	0	16	10YR 7/1	Fine Sand	Disturbed; Redeposited sand and gravel. STP on pushpile next to asphalt road, electrical line pole
LA02.004	II	16	34	10YR 6/3	Loamy Sand	Possibly intact soils
LA02.004	III	34	71	10YR 5/6	Loamy Sand	No rock content; possibly eolian deposits
LA02.004	IV	71	100	10YR 6/4	Sand	Oxidated and saturated. Test terminated at 1 meter bgs
LA02.005	I	0	15	10YR 5/1	Sand	None
LA02.005	II	15	29	10YR 6/3	Sand	Subangular/subrounded pebbles
LA02.006	I	0	41	10YR 4/3	Sand	STP terminated for large root impasse, 15% subrounded/rounded pebbles
LA02.007	I	0	35	10YR 4/1	Sand	None
LA02.007	II	35	45	10YR 6/4	Sand	Sterile subsoil, 20-25% subrounded/rounded pebbles
LA02.008	I	0	25	10YR 4/1	Sand	Contains modern trash (discarded)
LA02.008	II	25	35	10YR 5/4	Sand	15% subrounded pebbles
LA02.009	I	0	22	10YR 4/1	Sand	STP terminated for large root impasse, 20-25% subrounded/rounded pebbles
LA02.010	I	0	48	10YR 5/3	Loamy Sand	None
LA02.010	II	48	58	10YR 6/4	Sand	Sterile subsoil, 20% subrounded/rounded pebbles
LA02.011	I	0	8	10YR 4/1	Sand	Possible redeposited topsoil
LA02.011	II	8	12	10YR 6/2	Sand	Possible fill layer
LA02.011	III	12	26	10YR 4/1	Sand	Intact soils
LA02.011	IV	26	37	10YR 6/4	Sand	Sterile subsoil, subrounded/rounded pebbles
LA02.012	I	0	22	10YR 4/3	Sand	None

Shovel Test	Stratum	Minimum Stratum Depth	Maximum Stratum Depth	Soil Color	Soil Texture	Comments
LA02.012	II	22	32	10YR 5/6	Sand	Sterile subsoil, 20-25% subrounded/rounded pebbles
LA02.013	I	0	13	10YR 5/2	Loamy Sand	Contains modern trash (discarded)
LA02.013	II	13	25	10YR 6/4	Sand	Sterile subsoil, oxidized. 15% subrounded pebbles
LA02.014	I	0	15	10YR 3/2	Sandy Loam	None
LA02.014	II	15	25	10YR 5/6	Sand	Sterile subsoil, oxidized. 15% subrounded/rounded pebbles
LA03.001	I	0	8	10YR 6/4	Sand	STP terminated for compaction, >25% rock content
LA03.002	I	0	14	10YR 5/1	Sand	None
LA03.002	II	14	20	10YR 6/4	Sand	Sterile subsoil, 20-25% subrounded/rounded pebbles
LA03.003	I	0	10	10YR 5/2	Sand	None
LA03.003	II	10	20	10YR 6/4	Sand	Sterile subsoil, 20-25% subrounded pebbles
LA03.004	I	0	5	10YR 4/3	Sandy Loam	None
LA03.004	II	5	15	10YR 5/8	Sand	Sterile subsoil, very compact. 15% rounded/well-rounded pebbles
LA03.005	I	0	12	10YR 4/1	Sand	None
LA03.005	II	12	26	10YR 6/6	Sand	Sterile subsoil, 20-25% subrounded/rounded pebbles
LA03.006	I	0	8	10YR 4/3	Sandy Loam	None
LA03.006	II	8	17	10YR 5/8	Sand	Sterile subsoil, very compact. 15% rounded/well-rounded pebbles
LA03.007	I	0	10	10YR 5/1	Fine Sand	None
LA03.007	II	10	15	10YR 6/4	Fine Sand	STP terminated for compaction, >25% rock content
LA03.008	I	0	16	10YR 4/1	Sand	Contains modern materials (discarded)

Shovel Test	Stratum	Minimum Stratum Depth	Maximum Stratum Depth	Soil Color	Soil Texture	Comments
LA03.008	II	16	26	10YR 6/6	Sand	Sterile subsoil, 20-25% subrounded/rounded pebbles
LA03.009	I	0	7	10YR 5/2	Sand	None
LA03.009	II	7	17	10YR 7/4	Sand	Sterile subsoil, 20% subrounded pebbles
LA03.010	I	0	5	10YR 3/3	Sandy Loam	None
LA03.010	II	5	15	10YR 5/8	Sand	Sterile subsoil, very compact. 10% rounded/well-rounded pebbles
LA03.011	I	0	10	10YR 4/2	Sand	None
LA03.011	II	10	21	10YR 6/4	Sand	Sterile subsoil, 20-25% subrounded/rounded pebbles
LA03.011	III	21	31	7.5YR 5/6	Sand	Sterile subsoil, 20-25% subrounded/rounded pebbles
LA03.012	I	0	12	10YR 4/2	Sandy Loam	None
LA03.012	II	12	27	10YR 6/4	Sand	Sterile subsoil, 20% subrounded pebbles
LA03.013	I	0	22	10YR 3/1	Sand	None
LA03.013	II	22	43	10YR 6/3	Sand	Sterile subsoil, 20-25% subrounded/rounded pebbles
LA03.014	I	0	42	10YR 5/2	Sand	None
LA03.014	II	42	52	10YR 5/8	Sand	Sterile subsoil, very compact. 15% rounded/well-rounded pebbles
LA05.001	I	0	25	10YR 4/4	Sand	None
LA05.001	II	25	35	10YR 6/4	Sand	STP terminated due to possible buried utility
LA05.002	I	0	20	10YR 5/1	Sand	STP terminated for rock and root Impasse
LA05.003	I	0	22	-	Sand	Disturbed; soil color is 10YR 4/1 mottled w/ 10YR 5/6. Contains modern trash, rebar (both discarded), and gravels
LA05.003	II	22	36	10YR 6/3	Sand	Sterile subsoil, 20% subrounded pebbles
LA05.004	I	0	29	10YR 5/3	Sandy Loam	Possible fill layer
LA05.004	II	29	37	7.5YR 5/8	Sand	Possble fill layer, rocky and oxidated

Shovel Test	Stratum	Minimum Stratum Depth	Maximum Stratum Depth	Soil Color	Soil Texture	Comments
LA05.004	III	37	40	10YR 2/2	Sandy Loam	Intact layer, no rock content
LA05.004	IV	40	50	10YR 6/2	Sand	E horizon, <5% subrounded/rounded pebbles
LA05.004	V	50	100	7.5YR 7/8	Sand	Sterile subsoil. No rock content; possible eolian deposit. Test terminated a 1 mbgs
LA05.005	I	0	17	10YR 6/1	Sand	Contains modern trash present towards top of strat (discarded)
LA05.005	II	17	53	10YR 5/6	Sand	No rock content, possible eolian deposits
LA05.005	III	53	63	10YR 6/4	Sand	Sterile subsoil, 5% subrounded/rounded pebbles
LA05.006	I	0	24	10YR 5/1	Sand	None
LA05.006	II	24	36	10YR 6/6	Sand	Sterile subsoil, subrounded/rounded pebbles
LA05.007	I	0	24	10YR 7/3	Sand	None
LA05.007	II	24	36	10YR 6/4	Sand	Sterile subsoil, subrounded/rounded pebbles
LA05.008	I	0	28	10YR 4/1	Sand	None
LA05.008	II	28	52	10YR 6/6	Sand	No rock content, possible eolian deposits
LA05.008	III	52	62	10YR 6/6	Sand	Sterile subsoil, 5% subrounded/rounded pebbles
LA05.009	I	0	10	10YR 7/2	Sand	Disturbed; soil color is 10YR 7/2 mixed w/ 10YR 7/4. Contains modern trash (discarded) and gravels
LA05.009	II	10	20	10YR 5/1	Sand	Buried A horizon, 10% pebbles
LA05.009	III	20	25	10YR 7/1	Sand	E horizon, 5% pebbles
LA05.009	IV	25	40	10YR 6/8	Sand	Sterile subsoil, 5% subrounded pebbles
LA05.010	I	0	26	10YR 6/1	Sand	None
LA05.010	II	26	75	10YR 5/6	Sand	No rock content; possible eolian deposits
LA05.010	III	75	85	10YR 6/6	Sand	Sterile subsoil, subrounded/rounded pebbles
LA05.011	I	0	24	10YR 4/1	Sand	None
LA05.011	II	24	35	10YR 6/1	Sand	E horizon, subrounded/rounded pebbles
LA05.011	III	35	92	10YR 5/6	Sand	No rock content, possible eolian deposits

Shovel Test	Stratum	Minimum Stratum Depth	Maximum Stratum Depth	Soil Color	Soil Texture	Comments
LA05.011	IV	92	100	10YR 5/6	Sand	Sterile subsoil, subrounded/rounded pebbles
LA05.012	I	0	22	10YR 4/3	Sandy Loam	None
LA05.012	II	22	32	7.5YR 5/8	Sand	Sterile subsoil, subrounded/rounded pebbles
LA05.013	I	0	22	10YR 5/1	Sand	Contains modern trash (discarded)
LA05.013	II	22	27	10YR 7/1	Sand	E horizon, 5% subrounded pebbles
LA05.013	III	27	38	10YR 6/6	Sand	Sterile subsoil, 5% subrounded pebbles
LA05.014	I	0	22	10YR 5/2	Sandy Loam	None
LA05.014	II	22	60	7.5YR 5/8	Sand	No rock content, possible eolian deposits
LA05.014	III	60	70	7.5YR 5/8	Coarse Sand	Sterile subsoil, subrounded/rounded pebbles
LA05.015	I	0	23	10YR 6/2	Sandy Loam	None
LA05.015	II	23	76	7.5YR 5/8	Sand	No rock content, possible eolian deposits
LA05.015	III	76	86	7.5YR 5/8	Coarse Sand	Sterile subsoil, 5% subrounded/rounded pebbles
LA05.016	I	0	25	10YR 5/1	Sand	None
LA05.016	II	25	77	10YR 6/6	Sand	No rock content, possible eolian deposits
LA05.016	III	77	87	10YR 6/6	Coarse Sand	Sterile subsoil, subrounded/rounded pebbles
LA05.017	I	0	21	10YR 5/1	Sandy Loam	Contains modern trash (discarded)
LA05.017	II	21	29	10YR 8/1	Sand	E horizon, 5% subrounded pebbles
LA05.017	III	29	64	10YR 6/6	Sand	No rock content, possible eolian deposits
LA05.017	IV	64	75	10YR 6/6	Coarse Sand	Sterile subsoil, 5% subrounded pebbles
LA05.018	I	0	16	10YR 3/3	Sand	None
LA05.018	II	16	29	10YR 7/3	Sand	E horizon, subrounded/rounded pebbles
LA05.018	III	29	60	10YR 6/4	Sand	Sterile subsoil, 5% subrounded/rounded pebbles
LA05.019	I	0	33	10YR 7/1	Sand	None
LA05.019	II	33	69	7.5YR 5/6	Sand	No rock content, possible eolian deposits
LA05.019	III	69	79	7.5YR 6/6	Coarse Sand	Sterile subsoil, subrounded/rounded pebbles
LA05.020	I	0	28	10YR 5/1	Sand	None
LA05.020	II	28	96	10YR 6/6	Sand	No rock content, possible eolian deposits
LA05.020	III	96	100	10YR 6/6	Coarse Sand	Sterile subsoil, subrounded/rounded pebbles
LA05.021	I	0	22	10YR 6/2	Sand	None

Shovel Test	Stratum	Minimum Stratum Depth	Maximum Stratum Depth	Soil Color	Soil Texture	Comments
LA05.021	II	22	32	7.5YR 5/8	Sand	Sterile subsoil, subrounded/rounded pebbles
LA05.022	I	0	30	10YR 4/3	Sand	None
LA05.022	II	30	42	10YR 6/4	Sand	Sterile subsoil, subrounded/rounded pebbles
LA05.023	I	0	40	10YR 5/1	Sand	None
LA05.023	II	40	100	10YR 7/6	Fine Sand	No rock content, possible eolian deposits. Test terminated at 1 mbgs
LA05.024	I	0	18	10YR 4/1	Sandy Loam	Contains modern trash (discarded)
LA05.024	II	14	44	10YR 8/1	Sand	E horizon, 5% subrounded pebbles
LA05.024	III	44	57	10YR 5/8	Sand	Sterile subsoil, 5% subrounded pebbles
LA05.025	I	0	15	10YR 3/2	Sandy Loam	None
LA05.025	II	15	45	10YR 6/2	Sand	E horizon, possible eolian deposits
LA05.025	III	45	107	7.5YR 5/8	Sand	No rock content, possible eolian deposits. Test terminated at 1 meter bgs
LA05.026	I	0	31	10YR 6/1	Sand	None
LA05.026	II	31	83	7.5YR 5/6	Sand	No rock content, possible eolian deposits
LA05.026	III	83	93	7.5YR 6/6	Coarse Sand	Sterile subsoil, subrounded/rounded pebbles
LA05.027	I	0	24	10YR 5/1	Sand	None
LA05.027	II	24	53	10YR 8/1	Sand	E horizon, possible eolian deposits
LA05.027	III	53	90	10YR 7/6	Sand	B horizon, possible eolian deposits
LA05.027	IV	90	100	10YR 7/6	Coarse Sand	C Horizon, subrounded/rounded pebbles
LA06.001	I	0	28	10YR 5/1	Sand	Disturbed fill layer
LA06.001	II	28	52	10YR 8/1	Sand	E horizon, possible eolian deposits
LA06.001	III	52	70	10YR 7/6	Sand	Sterile subsoil, subrounded/rounded pebbles
LA06.002	I	0	58	-	Sand	Disturbed; soil color is 10YR 5/2 mottled w/ 10YR 7/4 and 10YR 4/1. Contains modern trash (discarded), asphalt, and gravels. STP terminated for root Impasse
LA06.003	I	0	60	10YR 5/3	Sand	Disturbed; multiple striated fill layers. STP terminated for root Impasse at 60 cmbgs

Shovel Test	Stratum	Minimum Stratum Depth	Maximum Stratum Depth	Soil Color	Soil Texture	Comments
LA06.004	I	0	28	10YR 4/3	Sand	STP terminated for root impasse
LA06.005	I	0	30	10YR 5/1	Sand	STP terminated for root impasse
LA06.006	I	0	18	10YR 7/3	Sand	None
LA06.006	II	18	44	10YR 3/3	Sand	No rock content, possble eolian deposits
LA06.006	III	44	60	10YR 7/1	Sand	Sterile subsoil, subrounded/rounded pebbles
LA06.007	I	0	26	-	Sandy Loam	Disturbed; soil color is 10YR 6/3 mottled w/ 10YR 7/4. Contains modern trash (discarded) and gravels
LA06.007	II	26	36	10YR 3/1	Sand	Buried A horizon, 15% pebbles
LA06.007	III	36	49	10YR 7/1	Sand	E horizon, STP terminated for root Impasse
LA06.008	I	0	70	10YR 5/3	Sand	Disturbed; multiple striated fill layers, 20-25% pebbles
LA06.008	II	70	90	10YR 7/6	Sand	Sterile subsoil, subrounded/rounded pebbles
LA06.009	I	0	55	10YR 5/3	Sand	Disturbed; multiple striated fill layers
LA06.009	II	55	65	10YR 6/2	Sand	Sterile subsoil, 15% subrounded/rounded pebbles
LA06.010	I	0	10	10YR 4/3	Sand	STP terminated for inundation
LA06.011	I	0	20	10YR 7/3	Sand	STP terminated for root impasse
LA06.012	I	0	30	10YR 4/3	Sand	None
LA06.012	II	30	40	10YR 6/4	Sand	STP terminated for root impasse at 40 cmbgs
LA06.013	I	0	32	10YR 5/3	Sand	None
LA06.013	II	32	42	10YR 7/6	Sand	Sterile subsoil, subrounded/rounded pebbles
LA06.014	I	0	12	10YR 5/2	Sandy Loam	Disturbed fill strat; mottled with 10YR 6/3. Contains modern trash (discarded) and gravels
LA06.014	II	12	33	10YR 4/1	Sand	Buried A, 15% subrounded pebbles
LA06.014	III	33	64	10YR 8/1	Sand	E horizon, 20% subrounded pebbles
LA06.014	IV	64	74	10YR 5/8	Sand	Sterile subsoil, 20% subrounded pebbles
LA06.015	I	0	30	10YR 4/3	Sand	None

Shovel Test	Stratum	Minimum Stratum Depth	Maximum Stratum Depth	Soil Color	Soil Texture	Comments
LA06.015	II	30	40	10YR 5/4	Sand	Sterile subsoil, subrounded/rounded pebbles
LA06.016	I	0	10	10YR 5/2	Sandy Loam	STP terminated for compaction
LA06.017	I	0	5	10YR 6/2	Sand	STP terminated for compaction
LA06.018	I	0	21	10YR 5/1	Sand	Disturbed, fill horizon
LA06.018	II	21	67	10YR 8/1	Sand	E horizon, possible eolian deposits
LA06.018	III	67	77	10YR 5/6	Sand	Sterile subsoil, subrounded/rounded pebbles
LA06.019	I	0	21	-	Sandy Loam	Disturbed; soil color is 10YR 5/2 mottled w/ 10YR 7/3. Contains modern trash (discarded) and gravels
LA06.019	II	21	28	10YR 4/1	Sandy Loam	Buried A horizon, 10% subrounded pebbles
LA06.019	III	28	64	10YR 8/1	Sand	E horizon, 10% subrounded pebbles
LA06.019	IV	64	74	7.5YR 4/6	Sand	Sterile subsoil, oxidized. 5% subrounded pebbles
LA06.020	I	0	46	10YR 5/3	Sandy Loam	Disturbed; multiple striated fill layers
LA06.020	II	46	56	10YR 6/2	Sand	Sterile subsoil, subrounded/rounded pebbles
LA06.021	I	0	20	10YR 4/3	Sand	None
LA06.021	II	20	33	10YR 7/2	Sand	E horizon, possible eolian deposits
LA06.021	III	33	50	10YR 6/4	Sand	Sterile subsoil, subrounded/rounded pebbles
LA06.022	I	0	42	10YR 8/1	Sand	Truncated E horizon
LA06.022	II	42	56	10YR 7/6	Sand	Sterile subsoil, subrounded/rounded pebbles
LA07.001	I	0	38	10YR 5/3	Sand	None
LA07.001	II	38	59	10YR 7/8	Sand	Sterile subsoil, 15-20% subrounded/rounded pebbles
LA07.002	I	0	15	10YR 7/3	Sand	None
LA07.002	II	15	22	10YR 6/6	Sand	15-20% subrounded/rounded pebbles
LA07.002	III	22	35	10YR 4/3	Sand	Sterile subsoil, 10% subrounded/rounded pebbles
LA07.003	I	0	33	10YR 3/2	Sandy Loam	None

Shovel Test	Stratum	Minimum Stratum Depth	Maximum Stratum Depth	Soil Color	Soil Texture	Comments
LA07.003	II	33	43	10YR 5/8	Sand	Sterile subsoil, 10% subrounded/rounded pebbles
LA07.004	I	0	11	10YR 4/1	Sandy Loam	None
LA07.004	II	11	23	10YR 7/1	Sand	E horizon, 25% subrounded/rounded pebbles
LA07.004	III	23	33	10YR 5/8	Sand	Sterile subsoil, 20-30% subrounded/rounded pebbles
LA07.005	I	0	52	10YR 5/1	Sand	Truncated E horizon
LA07.005	II	52	67	10YR 4/6	Sand	Sterile subsoil, subrounded/rounded pebbles
LA07.006	I	0	60	-	Sand	Disturbed; soil color is 10YR 6/3 mottled w/ 10YR 5/1 and 10YR 7/2. Asphalt/crushed stone present. STP is located ~1.5 m from a manhole. STP terminated as per supervisor's (AMF) instructions
LA07.007	I	0	5	10YR 6/2	Sand	Impasse from compact roadside fills
LA07.008	I	0	25	10YR 7/3	Sand	None
LA07.008	II	25	35	10YR 6/4	Sand	Sterile subsoil, 20-25% subrounded/rounded pebbles
LA07.009	I	0	66	10YR 3/2	Sandy Loam	Disturbed; multiple striated fill layers
LA07.009	II	66	76	10YR 6/2	Sand	Sterile subsoil, 15% subrounded pebbles
LA07.010	I	0	20	10YR 5/1	Sand	None
LA07.010	II	20	60	10YR 6/4	Sand	No rock content, possible eolian deposits
LA07.010	III	60	70	10YR 6/4	Sand	Sterile subsoil, 15-20% subrounded/rounded pebbles
LA07.011	I	0	34	10YR 7/3	Sand	Disturbed; Mottled with 10YR 6/4
LA07.011	II	34	44	10YR 7/1	Sand	E horizon
LA07.011	III	44	62	10YR 3/3	Sand	Sterile subsoil, subrounded/rounded pebbles
LA07.012	I	0	47	10YR 6/2	Sand	Disturbed; multiple striated fill layers
LA07.012	II	47	78	7.5YR 5/8	Sand	No rock content, possible eolian deposits
LA07.012	III	78	88	7.5YR 5/8	Coarse Sand	Sterile subsoil, subrounded/rounded pebbles

Shovel Test	Stratum	Minimum Stratum Depth	Maximum Stratum Depth	Soil Color	Soil Texture	Comments
LA07.013	I	0	15	-	Sandy Loam	Disturbed; soil color is 10YR 7/4 mottled w/ 10YR 6/2 and 10YR 4/1. Contains modern trash (discarded) and gravels
LA07.013	II	15	48	10YR 8/1	Sand	E horizon, 5% subrounded pebbles
LA07.013	III	48	68	10YR 5/8	Sand	Sterile subsoil, 5% subrounded pebbles
LA07.014	I	0	20	10YR 8/3	Sand	None
LA07.014	II	20	57	10YR 7/1	Sand	E horizon, possible eolian deposits
LA07.014	III	57	73	10YR 7/8	Sand	Sterile subsoil, subrounded/rounded pebbles
LF01.001	I	0	27	10YR 5/2	Sand	STP terminated for large root impasse
LF01.002	I	0	31	10YR 5/2	Sand	None
LF01.002	II	31	41	10YR 6/3	Sand	Sterile subsoil, subrounded/rounded pebbles
LF01.003	I	0	20	10YR 5/2	Sandy Loam	None
LF01.003	II	20	33	10YR 6/4	Sand	Sterile subsoil, 10% subrounded pebbles
LF02.001	I	0	25	10YR 4/3	Sand	Contains modern materials (discarded)
LF02.001	II	25	35	10YR 6/4	Sand	Sterile subsoil, subrounded/rounded pebbles
LF02.002	I	0	25	10YR 5/3	Sandy Loam	Possible fill layer
LF02.002	II	25	36	10YR 5/4	Sand	Possible fill layer
LF02.002	III	36	89	10YR 3/2	Loam	No rock content, possible eolian deposits
LF02.002	IV	89	100	10YR 7/2	Sand	C Horizon, subrounded/rounded pebbles
LF02.003	I	0	52	-	Sandy Loam	Disturbed; soil color is 10YR 5/2 mottled w/ 10YR 6/4 and 10YR 3/2. Contains modern trash (discarded) and gravels
LF02.003	II	52	85	10YR 2/1	Loam	No rock content, possible eolian deposits
LF02.003	III	85	100	10YR 7/1	Sand	C horizon, 10% subrounded pebbles
LF02.004	I	0	15	10YR 4/1	Sand	None
LF02.004	II	15	27	10YR 7/4	Sand	Sterile subsoil, subrounded/rounded pebbles
LF02.005	I	0	22	10YR 4/3	Sand	Contains modern trash (discarded)
LF02.005	II	22	34	10YR 5/3	Sand	Sterile subsoil, subrounded/rounded pebbles
LF02.006	I	0	34	10YR 4/1	Sand	None

Shovel Test	Stratum	Minimum Stratum Depth	Maximum Stratum Depth	Soil Color	Soil Texture	Comments
LF02.006	II	34	44	10YR 7/6	Sand	Sterile subsoil, subrounded/rounded pebbles
LF02.007	I	0	34	10YR 4/3	Sand	None
LF02.007	II	34	46	10YR 6/4	Sand	Sterile subsoil, subrounded/rounded pebbles
LF02.008	I	0	16	10YR 4/1	Sand	STP terminated for large root impasse
LF02.009	I	0	32	10YR 3/2	Sandy Loam	None
LF02.009	II	32	42	10YR 5/8	Sand	Sterile subsoil, 10-15% subrounded/rounded pebbles
LF03.001	I	0	22	10YR 4/3	Sand	None
LF03.001	II	22	35	10YR 6/4	Sand	Sterile subsoil, Subrounded/rounded pebbles
LF03.002	I	0	21	10YR 5/1	Sand	Possible fill layer
LF03.002	II	21	31	10YR 6/3	Sand	Possible fill layer
LF03.002	III	31	54	10YR 4/2	Sand	Possible buried A horizon
LF03.002	IV	54	64	10YR 5/8	Sand	Sterile subsoil, subrounded/rounded pebbles
LF03.003	I	0	15	10YR 3/2	Sandy Loam	Disturbed fill strat; mottled with 10YR 5/2 and 10YR 7/2 soils. Modern trash (discarded) and gravels present
LF03.003	II	15	22	10YR 6/3	Sandy Loam	STP terminated for compaction. Strat largely comprised of crushed stone
LF03.004	I	0	34	10YR 4/3	Sandy Loam	STP terminated for compaction
LF03.005	I	0	29	10YR 4/3	Sand	Contains modern trash and ferrous metals (discarded)
LF03.005	II	29	39	10YR 6/4	Sand	Sterile subsoil, subrounded/rounded pebbles
LF03.006	I	0	42	10YR 4/1	Sand	Contains modern trash (discarded)
LF03.006	II	42	55	10YR 6/8	Sand	Sterile subsoil, subrounded/rounded pebbles
LF03.007	I	0	21	10YR 5/3	Sandy Loam	Possible fill layer, 20% rock content
LF03.007	II	21	32	10YR 5/3	Sand	Possible fill layer
LF03.007	III	32	60	10YR 3/2	Sandy Loam	Possible buried A horizon
LF03.007	IV	60	70	10YR 5/6	Sand	Sterile subsoil, subrounded/rounded pebbles

Shovel Test	Stratum	Minimum Stratum Depth	Maximum Stratum Depth	Soil Color	Soil Texture	Comments
LF03.008	I	0	55	-	Sandy Loam	Disturbed; soil color is 10YR 5/2 mottled w/ 10YR 7/1, 10YR 5/6, and 10YR 3/2. Contains modern trash (discarded) and gravels
LF03.008	II	55	72	10YR 7/4	Sand	Sterile subsoil, 15% subrounded pebbles
LF04.001	I	0	23	10YR 3/2	Sandy Loam	None
LF04.001	II	23	33	10YR 6/2	Sand	Sterile subsoil, 5% subrounded/rounded pebbles
LF04.002	I	0	18	10YR 4/3	Sandy Loam	Contains modern trash (discarded)
LF04.002	II	18	28	10YR 5/6	Sand	Contains modern trash (discarded), STP terminated due to uncovering of buried utility
LF04.003	I	0	20	-	Sandy Loam	Disturbed; soil color is 10YR 3/2 mottled with 10YR 6/3. Contains modern trash (discarded) and gravels
LF04.003	II	20	30	10YR 6/4	Sand	Sterile subsoil, oxidized, 15% subrounded pebbles
LF04.004	I	0	10	10YR 4/1	Sand	None
LF04.004	II	10	30	10YR 6/4	Sand	Sterile subsoil, 5% subrounded/rounded pebbles
LF04.005	I	0	31	10YR 3/2	Sandy Loam	None
LF04.005	II	31	41	10YR 5/8	Sand	Sterile subsoil, 5% subrounded/rounded pebbles
LF04.006	I	0	62	10YR 5/1	Sand	None
LF04.006	II	62	74	10YR 6/3	Sand	Sterile subsoil, subrounded/rounded pebbles
LF04.007	I	0	38	10YR 5/1	Sand	None
LF04.007	II	38	75	10YR 5/6	Sand	No rock content; possible eolian deposits
LF04.007	III	75	100	10YR 4/3	Sand	C horizon, <5% subrounded/rounded pebbles

Shovel Test	Stratum	Minimum Stratum Depth	Maximum Stratum Depth	Soil Color	Soil Texture	Comments
LF04.008	I	0	43	-	Sandy Loam	Disturbed; soil color is 10YR 4/2 mottled w/ 10YR 6/1 and 10YR 6/4. Contains modern trash (discarded) and gravels
LF04.008	II	43	58	10YR 4/1	Sandy Loam	Intact A horizon, 15% subrounded pebbles
LF04.008	III	58	68	10YR 6/1	Sand	E horizon, 10% subrounded pebbles
LF04.008	IV	68	74	10YR 2/2	Sandy Loam	<5% subrounded pebbles
LF04.008	V	74	84	10YR 6/4	Sand	Sterile subsoil, 10% subrounded pebbles
LF04.009	I	0	53	10YR 5/3	Sand	None
LF04.009	II	53	63	10YR 5/6	Sand	Sterile subsoil, 5-10% rounded/subrounded pebbles
LF04.010	I	0	30	10YR 4/1	Sand	None
LF04.010	II	30	57	10YR 6/4	Sand	No rock content, possible eolian deposits
LF04.010	III	57	67	10YR 6/6	Sand	Sterile subsoil, rounded/subrounded pebbles
LF04.011	I	0	38	10YR 5/3	Sandy Loam	None
LF04.011	II	38	48	10YR 5/8	Sand	Sterile subsoil, 5-10% rounded/subrounded pebbles
LP01.001	I	0	13	10YR 5/3	Sand	None
LP01.001	II	13	23	10YR 5/4	Sand	Sterile subsoil, 15% subrounded pebbles
LP01.002	I	0	14	10YR 5/2	Sand	None
LP01.002	II	14	24	10YR 6/8	Sand	Sterile subsoil, 20% subrounded pebbles
LP01.003	I	0	38	10YR 4/3	Sand	None
LP01.003	II	38	50	10YR 6/4	Sandy Loam	Sterile subsoil, oxidized. 3-5% rounded/well-rounded pebbles
LP01.004	I	0	13	10YR 4/3	Sandy Loam	Possible redeposited top soil
LP01.004	II	13	21	7.5YR 5/8	Sandy Loam	Possible fill layer
LP01.004	III	21	37	10YR 4/3	Sandy Loam	Intact soils, 3% rounded/well-rounded pebbles
LP01.004	IV	37	43	10YR 6/2	Sand	E horizon, subrounded/rounded pebbles
LP01.004	V	43	50	7.5YR 5/8	Sand	Bw horizon, oxidized, <5% rounded/well-rounded pebbles

Shovel Test	Stratum	Minimum Stratum Depth	Maximum Stratum Depth	Soil Color	Soil Texture	Comments
LP01.004	VI	50	100	10YR 3/2	Sand	C horizon, possible eolian deposit
LP01.004	VII	100	115	10YR 6/2	Sand	Cg horizon, oxidized, <5% rounded, well-rounded pebbles test terminated at 115 cmgs
LP01.005	I	0	18	10YR 4/1	Sand	None
LP01.005	II	18	30	10YR 7/6	Sand	Sterile subsoil, subrounded/rounded pebbles
LP01.006	I	0	35	-	Sandy Loam	Disturbed; soil color is 10YR 4/1 mixed w/10YR 5/2 and 10YR 6/4, 20% pebbles
LP01.006	II	35	46	10YR 6/6	Sand	Sterile subsoil, 15% subrounded pebbles
LP01.007	I	0	63	-	Sand	Disturbed; soil color is 10 YR 4/1 mottled w/10YR 6/1, 10YR 6/4, and 10YR 7/6
LP01.007	II	63	79	10YR 7/4	Sand	Sterile subsoil, subrounded/rounded pebbles
LP01.008	I	0	88	-	Sand	Disturbed; soil color is 10YR 5/2 mottled w/ 10YR 6/3 and 10YR 4/1 soils. Contains modern trash (discarded) and gravels
LP01.008	II	88	100	10YR 3/2	Sandy Loam	Intact soils, 5% pebbles. Test terminated at 1 meter bgs
LP01.009	I	0	25	10YR 4/3	Sandy Loam	Possible redeposited topsoil, contains modern materials (discarded)
LP01.009	II	25	32	10YR 6/4	Sand	Possible fill layer, contains modern materials (discarded)
LP01.009	III	32	50	10YR 2/1	Sand	Intact soils
LP01.009	IV	50	76	10YR 6/1	Coarse Sand	E horizon, 5% rounded/well-rounded gravels
LP01.009	V	76	100	10YR 4/4	Sand	Sterile subsoil, test terminated at 1 meter bgs
LP01.010	I	0	14	10YR 4/1	Sand	Test terminated due to buried utility tracer wire
LP02.001	I	0	15	10YR 4/1	Sand	Contains modern trash (discarded)
LP02.001	II	15	30	10YR 7/3	Sand	Sterile subsoil, 20% subrounded pebbles
LP02.002	I	0	11	10YR 4/3	Sandy Loam	None
LP02.002	II	11	21	10YR 5/6	Sand	Sterile subsoil, 15% rounded/well-rounded pebbles

Shovel Test	Stratum	Minimum Stratum Depth	Maximum Stratum Depth	Soil Color	Soil Texture	Comments
LP02.003	I	0	50	10YR 6/2	Sand	None
LP02.003	II	50	65	10YR 6/6	Sand	Sterile subsoil, 20-25% subrounded/rounded pebbles
LP02.004	I	0	57	-	Sand	Disturbed; soil color is 10YR 4/1 mottled with 10YR 6/4 and 10YR 6/1
LP02.004	II	57	67	10YR 7/8	Sand	Sterile subsoil, subrounded/rounded pebbles
LP02.005	I	0	12	10YR 5/2	Sand	None
LP02.005	II	12	24	10YR 6/6	Sand	Sterile subsoil, 20% subrounded pebbles
HRP1.001	I	0	80	10YR 4/6	Sandy Loam	Floodplain deposits w/ no rock
HRP1.001	II	80	100	10YR 3/4	Sand	C horizon, floodplain deposits w/ no rock; test terminated at 1 meter bgs
HRP1.002	I	0	100	7.5YR 4/6	Fine Sand	Floodplain deposits w/ no rock; No soil color or texture change. Test terminated at 1 mbgs
HRP1.003	I	0	72	7.5YR 4/6	Sandy Loam	Floodplain deposits w/ no rock
HRP1.003	II	72	100	7.5YR 3/4	Sandy Loam	C horizon, floodplain deposits w/ no rock; test terminated at 1 mbgs
HRP1.004	I	0	54	7.5YR 4/3	Sandy Loam	STP terminated for large root impasse
HRP1.005	I	0	16	7.5YR 4/3	Sandy Loam	STP terminated for rock Impassse, soil contained subangular/subrounded rock
HRP1.006	I	0	12	10YR 4/6	Fine Sand	Disturbed fill layer. Test terminated due to uncovered concrete slab related to adjacent bridge
HRP1.007	I	0	15	10YR 4/3	Sandy Loam	None
HRP1.007	II	15	25	10YR 6/4	Sand	20-25% subangular/subrounded rock
HRP1.008	I	0	39	10YR 4/3	Sandy Loam	Disturbed fill layer, saturated. STP terminated for rock Impasse at 39 cmbgs
HRP1.009	I	0	11	10YR 4/6	Sandy Loam	None
HRP1.009	II	11	24	10YR 6/4	Sandy Clay Loam	Bg horizon, oxidized. <5% rock
HRP1.010	I	0	26	10YR 4/3	Sandy Loam	None

Shovel Test	Stratum	Minimum Stratum Depth	Maximum Stratum Depth	Soil Color	Soil Texture	Comments
HRP1.010	II	26	38	7.5YR 4/4	Sandy Clay Loam	Bg horizon, oxidized, mottled with 10YR 6/2. <5% rock
HRP1.011	I	0	38	10YR 3/3	Sandy Clay	Ag horizon, oxidized and saturated. STP in wetland
HRP1.011	II	38	42	10YR 5/2	Sandy Clay	Bg horizon, oxidized and saturated. <5% rock
HRP1.012	I	0	21	7.5YR 4/4	Sandy Loam	Ag horizon, oxidized and saturated. STP located in wetland
HRP1.012	II	21	31	7.5YR 5/1	Sandy Loam	Bg horizon, oxidized and saturated. <5% rock
HRP1.013	I	0	15	10YR 4/2	Sandy Loam	Ag horizon, oxidized and saturated. STP terminated for inundation
HRP1.014	I	0	32	10YR 4/3	Sandy Clay	Ag horizon, saturated. Inundated at 32 cmbgs
HRP1.015	I	0	41	10YR 3/3	Sandy Clay	Ag horizon, oxidized and saturated. STP terminated for inundation
HRP1.016	I	0	40	10YR 4/3	Sandy Loam	None
HRP1.016	II	40	50	10YR 6/2	Sandy Loam	Bg horizon, oxidized, mottled with 10YR 5/8. <5% rock
HRP1.017	I	0	37	10YR 4/2	Sand	None
HRP1.017	II	37	47	10YR 6/4	Sand	Bg horizon, oxidized. 5-10% rock
HRP1.018	I	0	38	10YR 4/6	Fine Sand	Contains modern trash and concrete fragments (discarded) on topmost levels of strat
HRP1.018	II	38	100	7.5YR 4/6	Fine Sand	Floodplain deposits w/ no rock; test terminated at 1 mbgs
HRP1.019	I	0	30	10YR 4/3	Sandy Loam	None
HRP1.019	II	30	45	7.5YR 5/4	Loamy Sand	Bg horizon, oxidized, Mottled with 7.5YR 6/1 and 7.5YR 5/8
HRP1.020	I	0	44	7.5YR 4/6	Sandy Clay Loam	None
HRP1.020	II	44	52	7.5YR 3/4	Sandy Clay	None

Shovel Test	Stratum	Minimum Stratum Depth	Maximum Stratum Depth	Soil Color	Soil Texture	Comments
HRP1.021	I	0	100	10YR 4/6	Sand	Floodplain deposits w/ no rock; No soil color or texture change. Test terminated at 1 mbgs
HRP1.022	I	0	54	7.5YR 4/3	Sandy Loam	Floodplain deposits w/ no rock, STp terminated for root Impasse at 54 cmbgs
HRP1.023	I	0	70	7.5YR 4/6	Sandy Clay Loam	Floodplain deposits w/ no rock
HRP1.023	II	70	93	7.5YR 3/4	Sandy Clay	C horizon, floodplain deposits w/ no rock. STP terminated for root Impasse at 93 cmbgs
HRP1.024	I	0	100	10YR 4/6	Sand	Floodplain deposits w/ no rock; No soil color or texture change. Test terminated at 1 meter bgs
HRP1.025	I	0	27	7.5YR 4/6	Sandy Clay Loam	A horizon, Floodplain deposits w/ no rock, saturated
HRP1.025	II	27	39	10YR 6/2	Sand	E horizon, floodplain deposits w/ no rock
HRP1.025	III	39	100	5YR 4/6	Sandy Clay Loam	Subsoil, floodplain deposits w/ no rock, saturated and oxidized
HRP1.026	I	0	100	7.5YR 4/6	Fine Sand	Floodplain deposits w/ no rock; No soil color or texture change. Test terminated at 1 mbgs
HRP1.027	I	0	101	7.5YR 4/3	Sandy Loam	Floodplain deposits w/ no rock; No soil color or texture change. Test terminated at 1 mbgs
HRP1.028	I	0	100	10YR 4/6	Sand	Floodplain deposits w/ no rock; No soil color or texture change. Test terminated at 1 mbgs
HRP1.029	I	0	46	7.5YR 4/4	Fine Sand	A horizon, floodplain deposits w/ no rock
HRP1.029	II	46	79	7.5YR 4/6	Sandy Clay Loam	Bw horizon, floodplain deposits w/ no rock
HRP1.029	III	79	100	10YR 6/4	Sandy Loam	C horizon, floodplain deposits w/ no rock. Test terminated at 1 mbgs
HRP1.030	I	0	20	10YR 4/3	Sandy Loam	STP terminated due to presence of aggressive ground nesting bees
HRP1.031	I	0	109	10YR 5/6	Sand	Floodplain deposits w/ no rock; No soil color or texture change. Test terminated at 1 mbgs

Shovel Test	Stratum	Minimum Stratum Depth	Maximum Stratum Depth	Soil Color	Soil Texture	Comments
HRP1.032	I	0	28	7.5YR 4/6	Sandy Loam	Floodplain deposits w/ no rock, STP terminated for root Impasse at 28 cmbgs
HRP1.033	I	0	17	10YR 4/3	Sandy Loam	None
HRP1.033	II	17	31	7.5YR 4/6	Sandy Clay Loam	Bg horizon, oxidized, mottled with 10YR 5/1. <5% rock
HRP1.034	I	0	44	7.5YR 4/6	Sandy Loam	None
HRP1.034	II	44	54	10YR 6/2	Sand	None
HRP1.035	I	0	71	7.5YR 4/3	Sandy Loam	Floodplain deposits w/ no rock
HRP1.035	II	71	91	10YR 6/2	Sand	C horizon, floodplain deposits w/ no rock
HRP1.036	I	0	102	10YR 5/6	Sand	Floodplain deposits w/ no rock; No soil color or texture change. Test terminated at 1 mbgs
HRP1.037	I	0	96	7.5YR 4/6	Sandy Loam	Floodplain deposits w/ no rock
HRP1.037	II	96	106	10YR 6/2	Sand	C horizon, floodplain deposits w/ no rock. Test terminated at 1 mbgs
HRP1.038	I	0	56	7.5YR 4/6	Fine Sand	Floodplain deposits w/ no rock
HRP1.038	II	56	100	7.5YR 5/4	Coarse Sand	C horizon, floodplain deposits w/ no rock. Test terminated at 1 mbgs
HRP1.039	I	0	48	7.5YR 4/3	Sandy Loam	Floodplain deposits w/ no rock
HRP1.039	II	48	104	7.5YR 4/3	Sand	C horizon, floodplain deposits w/ no rock. Test terminated at 1 mbgs
HRP1.040	I	0	100	10YR 5/6	Sand	Floodplain deposits w/ no rock; No soil color or texture change. Test terminated at 1 mbgs

Shovel Test	Stratum	Minimum Stratum Depth	Maximum Stratum Depth	Soil Color	Soil Texture	Comments
WJ01.001	I	0	9	10YR 4/1	Sandy Loam	Redeposited topsoil
WJ01.001	II	9	14	-	Sand	Disturbed; soil color is 10YR 7/2 mottled w/ 2.5Y 6/4. Contains concretions and gravel. STP terminated due to compaction
WJ01.002	I	0	13	10YR 4/2	Sand	None
WJ01.002	II	13	28	10YR 6/3	Sand	Sterile subsoil, 15-20% subrounded pebbles
WJ01.003	I	0	20	10YR 6/2	Sandy Loam	None
WJ01.003	II	20	30	10YR 5/6	Sand	Sterile subsoil, 5-10% rounded to well-rounded pebbles
WJ01.004	I	0	20	10YR 5/2	Sand	None
WJ01.004	II	20	30	10YR 6/4	Sand	Sterile subsoil, 15-20% subrounded pebbles
WJ01.005	I	0	11	10YR 5/1	Sand	None
WJ01.005	II	11	23	10YR 6/3	Sand	Sterile subsoil, 15-20% subrounded pebbles
WJ01.006	I	0	12	10YR 6/2	Sandy Loam	Compact soils
WJ01.006	II	12	22	10YR 5/6	Sand	Compact subsoils, 5-10% rounded to well-rounded pebbles
WJ01.007	I	0	28	10YR 5/2	Sand	Contains modern trash (discarded).
WJ01.007	II	28	38	10YR 6/4	Sand	Sterile subsoil, 15-20% subrounded pebbles
WJ01.008	I	0	15	10YR 4/1	Sandy Loam	Contains modern trash (discarded)
WJ01.008	II	15	25	-	Sand	Disturbed; soil color is 10YR 6/4 mottled w/ 10YR 8/1 & 7.5 YR 5/6. Contains concretions and gravel. STP terminated due to compaction
WJ01.009	I	0	20	10YR 4/1	Sand	None
WJ01.009	II	20	30	10YR 6/3	Sand	Sterile subsoil, 15-20% subrounded pebbles
WJ01.010	I	0	18	10YR 6/2	Sandy Loam	Compact soils
WJ01.010	II	18	28	10YR 5/6	Sand	Sterile subsoil, 15-20% subrounded pebbles
WJ01.011	I	0	12	10YR 4/1	Sand	None
WJ01.011	II	12	22	10YR 6/3	Sand	Sterile subsoil, 15-20% subrounded pebbles

Shovel Test	Stratum	Minimum Stratum Depth	Maximum Stratum Depth	Soil Color	Soil Texture	Comments
WJ01.012	I	0	16	10YR 5/3	Sand	Disturbed; Presence of modern rusted metal object in first strat going into the second strat. Object was discarded.
WJ01.012	II	16	26	10YR 6/4	Sand	Sterile subsoil, 5-10% subrounded pebbles
WJ01.013	I	0	14	10YR 3/2	Sandy Loam	Contains modern material (discarded)
WJ01.013	II	14	24	10YR 5/4	Sand	Compact subsoils, 5-10% rounded to well-rounded pebbles
WJ01.014	I	0	15	10YR 5/2	Sand	STP terminated due to compaction, located directly east of manhole utility
WJ01.015	I	0	18	10YR 4/1	Sandy Loam	Contains modern trash (discarded)
WJ01.015	II	18	29	10YR 6/3	Sand	Sterile subsoil, 5-10% subrounded pebbles
WJ01.016	I	0	14	10YR 4/1	Sand	None
WJ01.016	II	14	24	10YR 6/3	Sand	Sterile subsoil, 15-20% subrounded pebbles
WJ01.017	I	0	20	10YR 4/2	Sand	Contains modern trash (discarded)
WJ01.017	II	20	30	10YR 6/4	Sand	Sterile subsoil, 15-20% subrounded pebbles
WJ01.018	I	0	20	10YR 3/2	Sandy Loam	Contains modern trash (discarded)
WJ01.018	II	20	30	10YR 5/4	Sand	Compact subsoils, 5-10% rounded to well-rounded pebbles
WJ01.019	I	0	8	10YR 4/1	Sand	Possible redeposited topsoil
WJ01.019	II	8	10	10YR 6/3	Sand	Possible fill layer
WJ01.019	III	10	18	10YR 4/1	Sand	Possible intact A horizon
WJ01.019	IV	18	28	10YR 6/3	Sand	Sterile subsoil, 15-20% subrounded pebbles
WJ01.020	I	0	9	10YR 4/2	Sandy Loam	Contains modern trash and asphalt (discarded)
WJ01.020	II	9	22	10YR 6/4	Sand	Sterile subsoil, 5-10% subrounded pebbles
WJ01.021	I	0	15	10YR 4/2	Sand	Contains modern trash (discarded)
WJ01.021	II	15	25	10YR 6/4	Sand	Sterile subsoil, 15-20% subrounded pebbles
WJ01.022	I	0	12	10YR 4/1	Sand	None
WJ01.022	II	12	20	10YR 6/2	Sand	E horizon

Shovel Test	Stratum	Minimum Stratum Depth	Maximum Stratum Depth	Soil Color	Soil Texture	Comments
WJ01.022	III	20	30	10YR 6/6	Sand	Sterile subsoil, 15-20% subrounded pebbles
WJ01.023	I	0	19	10YR 3/2	Sandy Loam	None
WJ01.023	II	19	29	10YR 5/4	Sand	Sterile subsoil, 5-10% subrounded pebbles
WJ01.024	I	0	18	10YR 4/3	Sand	None
WJ01.024	II	18	28	10YR 6/3	Sand	Sterile subsoil, 15-20% subrounded pebbles
WJ01.025	I	0	15	10YR 5/2	Sand	STP terminated for compaction, located directly north of stormdrain utility
WJ01.026	I	0	7	10YR 4/1	Sandy Loam	Contains modern glass (discarded)
WJ01.026	II	7	21	10YR 5/8	Sand	Sterile subsoil, 5-10% subrounded pebbles
WJ01.027	I	0	12	10YR 7/3	Sand	None
WJ01.027	II	12	22	10YR 5/6	Sand	Sterile subsoil, 5-10% subrounded pebbles
WJ01.028	I	0	5	10YR 4/1	Sand	None
WJ01.028	II	5	20	10YR 6/2	Sand	Sterile subsoil, 15-20% subrounded pebbles
WJ01.029	I	0	15	10YR 5/4	Sand	Contains modern trash (discarded)
WJ01.029	II	15	25	10YR 6/3	Sand	Sterile subsoil, 15-20% subrounded pebbles
WJ01.030	I	0	6	10YR 7/3	Sand	None
WJ01.030	II	6	16	10YR 5/4	Sand	Sterile subsoil, 15-20% subrounded pebbles
WJ01.031	I	0	7	10YR 5/1	Sand	None
WJ01.031	II	7	20	10YR 6/2	Sand	Sterile subsoil, 15-20% subrounded pebbles
WJ01.032	I	0	8	10YR 4/1	Sandy Loam	Possible redeposited topsoil
WJ01.032	II	8	16	-	Loamy Sand	Disturbed; soil color is 10YR 7/2 mottled with 10YR 3/2 and 10YR 6/6 clay inclusions
WJ01.032	III	16	26	10YR 6/4	Sand	Sterile subsoil, 5-10% subrounded pebbles
WJ01.033	I	0	19	10YR 4/1	Sandy Loam	None
WJ01.033	II	19	29	10YR 6/3	Sand	Sterile subsoil, 15-20% subrounded pebbles
WJ01.034	I	0	9	10YR 3/2	Sandy Loam	None
WJ01.034	II	9	19	10YR 5/4	Sand	Sterile subsoil, 5-10% subrounded pebbles
WJ01.035	I	0	10	10YR 4/2	Sand	None
WJ01.035	II	10	23	10YR 6/3	Sand	Sterile subsoil, 15-20% subrounded pebbles

Shovel Test	Stratum	Minimum Stratum Depth	Maximum Stratum Depth	Soil Color	Soil Texture	Comments
WJ01.036	I	0	15	10YR 5/4	Sand	Contains modern trash (discarded)
WJ01.036	II	15	25	10YR 6/4	Sand	Sterile subsoil, 15-20% subrounded pebbles
WJ01.037	I	0	12	10YR 4/2	Sand	None
WJ01.037	II	12	23	10YR 6/3	Sand	Sterile subsoil, 15-20% subrounded pebbles
WJ01.038	I	0	15	10YR 7/3	Sand	None
WJ01.038	II	15	25	10YR 5/6	Sandy Loam	Sterile subsoil, 5-10% rounded to well-rounded pebbles
WJ01.039	I	0	15	-	Sandy Loam	Disturbed; soil color is 10YR 4/1 mottled with 10YR 7/2 and 10YR 5/6. Contains modern glass and slag (discarded)
WJ01.039	II	15	22	10YR 4/1	Sandy Loam	Intact A Horizon
WJ01.039	III	22	29	10YR 8/1	Sand	E Horizon
WJ01.039	IV	29	39	10YR 6/4	Sand	Sterile subsoil, 5-10% subrounded pebbles
WJ01.040	I	0	32	10YR 4/1	Sand	None
WJ01.040	II	32	42	10YR 6/6	Sand	Sterile subsoil, 15-20% subrounded pebbles
WJ01.041	I	0	22	10YR 4/1	Sand	Contains modern bottle glass and metal (discarded)
WJ01.041	II	22	32	10YR 6/4	Sand	Sterile subsoil, 15-20% subrounded pebbles
WJ01.042	I	0	34	10YR 3/2	Sandy Loam	None
WJ01.042	II	34	39	10YR 7/3	Sand	E horizon
WJ01.042	III	39	49	7.5YR 5/8	Sand	Sterile subsoil, 5-10% rounded to well-rounded pebbles
WJ01.043	I	0	12	10YR 5/2	Sand	None
WJ01.043	II	12	23	10YR 6/4	Sand	Sterile subsoil, 15-20% subrounded pebbles
WJ03.001	I	0	6	10YR 4/1	Sand	Possible redeposited topsoil
WJ03.001	II	6	10	10YR 5/3	Sand	Possible fill layer
WJ03.001	III	10	17	10YR 4/1	Sand	Charcoal lens present from modern or natural burn, no artifacts uncovered to indicate it as cultural

Shovel Test	Stratum	Minimum Stratum Depth	Maximum Stratum Depth	Soil Color	Soil Texture	Comments
WJ03.001	IV	17	22	10YR 5/3	Sand	E horizon
WJ03.001	V	22	32	10YR 6/6	Sand	Sterile subsoil, 5-10% subrounded to rounded pebbles
WJ03.002	I	0	21	10YR 6/3	Sand	None
WJ03.002	II	21	31	10YR 5/4	Sand	Sterile subsoil, 5-10% subrounded to rounded pebbles
WJ03.003	I	0	15	10YR 3/2	Sandy Loam	Contains modern trash (discarded). STP offset due to telephone pole.
WJ03.003	II	15	21	10YR 7/1	Sand	E horizon
WJ03.003	III	21	34	10YR 7/6	Sand	Sterile subsoil, 5-10% subrounded pebbles
WJ03.004	I	0	15	10YR 4/1	Sand	none
WJ03.004	II	15	25	10YR 5/4	Sand	Sterile subsoil, 15-20% subrounded pebbles
WJ03.005	I	0	15	10YR 3/2	Sandy Loam	Possible redeposited topsoil
WJ03.005	II	15	27	10YR 5/3	Sand	Possible fill layer
WJ03.005	III	27	42	10YR 3/2	Sandy Loam	Intact A Horizon
WJ03.005	IV	42	52	10YR 5/4	Sandy Clay Loam	Sterile subsoil, 5-10% subrounded pebbles. Saturated
WJ03.006	I	0	12	10YR 4/2	Sand	Possible redeposited topsoil
WJ03.006	II	12	18	10YR 3/2	Sand	Intact A Horizon
WJ03.006	III	18	22	10YR 8/1	Sand	E Horizon
WJ03.006	IV	22	32	10YR 5/6	Sand	Sterile subsoil, 5-10% subrounded pebbles.
WJ03.007	I	0	16	10YR 4/2	Sandy Loam	Contains modern trash (discarded)
WJ03.007	II	16	23	10YR 7/2	Sand	E Horizon
WJ03.007	III	23	33	10YR 7/4	Sand	Sterile subsoil, 10-15% subrounded pebbles.
WJ03.008	I	0	47	10YR 4/1	Sand	Contains modern plastic (discarded)

Shovel Test	Stratum	Minimum Stratum Depth	Maximum Stratum Depth	Soil Color	Soil Texture	Comments
WJ03.008	II	47	61	10YR 6/4	Sand	Modern bottle glass uncovered approximately 61 cmgs, making the two strats likely redeposited. Excavation terminated as per the instructions of supervisor (AMF).
WJ03.009	I	0	18	10YR 5/1	Sand	Disturbed; fill containing modern trash (discarded), STP located on artificial slope directly adjacent to paved road
WJ03.009	II	18	49	10YR 3/2	Sand	Disturbed; fill containing modern trash (discarded). STP terminated for compaction
WJ03.010	I	0	47	10YR 4/2	Sandy Loam	Disturbed; fill containing modern trash (discarded)
WJ03.010	II	47	55	10YR 5/2	Sand	Modern plastic and fibers uncovered approximately 55 cmgs, making the two strats likely redeposited. Excavation terminated as per the instructions of supervisor (AMF) due to the uncovering of fibers 30 m east of a fiber optic cable box .
WJ03.011	I	0	42	10YR 3/2	Sandy Loam	Disturbed; fill containing modern trash (discarded)
WJ03.011	II	42	52	10YR 5/6	Sandy Clay Loam	Sterile subsoil, 5-10% subrounded pebbles. No fibers uncovered despite STP being located approxmately 10m east of fiber optic cable box
WJ03.012	I	0	26	10YR 4/2	Sand	Contains asphalt (discarded)
WJ03.012	II	26	33	10YR 6/6	Sand	STP terminated for compaction
WJ03.013	I	0	21	10YR 4/2	Sand	None
WJ03.013	II	21	31	10YR 6/3	Sand	Sterile subsoil, 15-20% subrounded pebbles

Shovel Test	Stratum	Minimum Stratum Depth	Maximum Stratum Depth	Soil Color	Soil Texture	Comments
WJ03.014	I	0	9	10YR 4/1	Sandy Loam	Redeposited topsoil, STP located 1.5 m south of paved roadside
WJ03.014	II	9	40	10YR 5/2	Sand	Disturbed; Contains modern trash and wood debris (discarded) and gravels
WJ03.014	III	40	50	10YR 6/4	Sand	Intact sterile subsoil, 20% subrounded pebbles
WJ03.015	I	0	11	10YR 3/2	Sandy Loam	None
WJ03.015	II	11	21	10YR 6/2	Sand	E Horizon
WJ03.015	III	21	31	10YR 5/4	Sandy Clay Loam	Sterile subsoil, 20% rounded to well-rounded pebbles
WJ03.016	I	0	10	10YR 4/1	Sand	Possibly redeposited topsoil, Contains modern trash (discarded)
WJ03.016	II	10	69	-	Sand	Disturbed; strat contains repeating striated layers of 10YR 4/1 and 10YR 5/3 and 10YR 6/2 colored soils
WJ03.016	III	69	79	10YR 5/3	Sand	Intact sterile subsoil, 5-10% subrounded pebbles
WJ03.017	I	0	16	10YR 4/3	Sand	None
WJ03.017	II	16	27	10YR 6/3	Sand	Sterile subsoil, 15-20% subrounded pebbles
WJ03.018	I	0	11	10YR 3/2	Sandy Loam	Possible redeposited topsoil
WJ03.018	II	11	22	10YR 7/3	Sand	Possible fill layer
WJ03.018	III	22	42	10YR 3/2	Sand	Intact A Horizon
WJ03.018	IV	42	52	7.5YR 5/8	Sandy Clay Loam	Sterile subsoil, 15-20% subrounded pebbles
WJ03.019	I	0	15	10YR 4/3	Sandy Loam	Redposited topsoil. Contains modern trash (discarded)
WJ03.019	II	15	33	10YR 4/2	Sandy Loam	Intact A Horizon
WJ03.019	III	33	47	10YR 5/6	Sand	Sterile subsoil, No rock content. Possible eolian deposits
WJ03.019	IV	47	58	10YR 7/2	Sand	C horizon, 5% subrounded pebbles.

Shovel Test	Stratum	Minimum Stratum Depth	Maximum Stratum Depth	Soil Color	Soil Texture	Comments
WJ03.020	I	0	10	10YR 4/3	Sand	STP terminated at 10 cmbgs due to the presence of a utility tracer wire
WJ03.021	I	0	9	10YR 4/1	Sand	None
WJ03.021	II	9	52	10YR 6/4	Sand	Some intrusions of darker soil present
WJ03.021	III	52	67	10YR 6/6	Sand	Sterile subsoil, 5-10% subrounded pebbles
WJ03.022	I	0	13	10YR 3/2	SaLo	Possible fill layer
WJ03.022	II	13	20	10YR 6/3	Sand	Possible fill layer
WJ03.022	III	20	37	10YR 3/2	Sand	Intact A horizon
WJ03.022	IV	37	47	7.5YR 5/8	Sandy Clay Loam	Sterile subsoil, 15-20% rounded pebbles
WJ03.023	I	0	14	10YR 3/2	Sandy Loam	None
WJ03.023	II	14	24	10YR 5/6	Sand	Sterile subsoil, 15-20% rounded pebbles
WJ03.024	I	0	11	10YR 4/1	Sand	Possible fill layer, contains modern trash such as modern glass, plastic and roofing tile (discarded)
WJ03.024	II	11	33	10YR 6/4	Sand	Possible fill layer, contains modern trash such as modern glass, plastic and roofing tile (discarded)
WJ03.024	III	33	42	10YR 4/1	Sand	Intact A horizon
WJ03.024	IV	42	57	10YR 6/6	Sand	Sterile subsoil, 5-10% subrounded pebbles
WJ03.025	I	0	20	-	Sand	Disturbed; soil color is 10YR 5/2 mottled with 10YR 4/2
WJ03.025	II	20	35	10YR 4/2	Sand	Intact A Horizon
WJ03.025	III	35	53	7.5YR 5/6	Sand	No rock content, possible eolian deposits
WJ03.025	IV	53	63	10YR 6/4	Sand	C horizon, 15-20% subrounded pebbles
WJ03.026	I	0	34	-	Sandy Loam	Disturbed; soil color is 10YR 6/2 mottled with 10YR 4/2 and 2.5Y 5/2. Contains gravels and modern trash (discarded)
WJ03.026	II	34	43	10YR 7/1	Sand	Intact E horizon
WJ03.026	III	43	53	10YR 5/8	Sand	Sterile subsoil, 5-10% subrounded pebbles

Shovel Test	Stratum	Minimum Stratum Depth	Maximum Stratum Depth	Soil Color	Soil Texture	Comments
WJ03.027	I	0	27	10YR 3/2	Sandy Loam	STP terminated due to rock impasse
WJ03.028	I	0	55	10YR 3/2	Sandy Loam	Disturbed; multiple striated layers of fill
WJ03.028	II	55	65	10YR 5/3	Sand	Intact sterile subsoil, 5-10% subrounded pebbles
WJ03.029	I	0	22	10YR 5/4	Sand	STP located between paved driveway and telephone pole. STP terminated due to compaction
WJ03.030	I	0	9	10YR 4/1	Sand	STP offset due to buried gasline utility
WJ03.030	II	9	64	-	Sand	Disturbed; mottled with striated layers of fill of various colors ranging from 10YR 6/6, 10YR 4/1 and 10YR 6/4, and 10YR 6/1. STP terminated as per the instructions of supervisor (AMF)
WJ03.031	I	0	25	10YR 6/3	Sand	STP terminated at 25 cmbs due to presence of PVC pipe
WJ03.032	I	0	15	10YR 4/4	Sand	STP located between paved road and sidewalk. Contains modern trash and corroded metal (discarded). STP terminated due to compaction from old concrete
WJ03.033	I	0	27	10YR 4/2	Sand	None
WJ03.033	II	27	37	10YR 6/6	Sand	Sterile subsoil, 15-20% subrounded pebbles
WJ04.001	I	0	33	10YR 4/2	Sandy Loam	Contained modern trash and asphalt (Discarded)
WJ04.001	II	33	43	10YR 5/6	Sand	Sterile subsoil, 5-10% subrounded pebbles
WJ04.002	I	0	11	10YR 3/2	Sandy Loam	None
WJ04.002	II	11	20	10YR 5/6	Sandy Clay Loam	None
WJ04.002	III	20	38	10YR 3/2	Sandy Clay Loam	Possible buried A
WJ04.002	IV	38	48	10YR 2/6	Sandy Clay Loam	Rounded and subrounded rock, saturated soils

Shovel Test	Stratum	Minimum Stratum Depth	Maximum Stratum Depth	Soil Color	Soil Texture	Comments
WJ04.003	I	0	15	10YR 4/1	Sand	None
WJ04.003	II	15	22	10YR 6/3	Sand	None
WJ04.003	III	22	32	10YR 2/1	Sand	None
WJ04.004	I	0	10	10YR 4/1	Sand	Contained modern trash (discarded). STP offset due to telephone pole
WJ04.004	II	10	38	10YR 5/3	Sand	E horizon
WJ04.004	III	38	48	10YR 6/4	Sand	Sterile subsoil, 10-15% subrounded pebbles
WJ04.005	I	0	16	10YR 4/1	Sand	None
WJ04.005	II	16	26	10YR 4/3	Sand	Sterile subsoil, 10-15% subrounded pebbles
WJ04.006	I	0	16	10YR 4/2	Sandy Loam	Possible redposited topsoil. Contains modern trash (discarded).
WJ04.006	II	16	23	7.5YR 5/6	Sand	Possible fill, mottled with 10YR 7/2
WJ04.006	III	23	33	10YR 6/2	Sand	Sterile subsoil, 5-10% subrounded pebbles
WJ04.007	I	0	21	10YR 4/1	Sand	None
WJ04.007	II	21	40	10YR 6/4	Sand	B Horizon, 10-15% subrounded pebbles
WJ04.007	III	40	50	10YR 5/3	Sand	C Horizon, 10-15% subrounded pebbles
WJ04.008	I	0	12	10YR 3/2	Sandy Loam	None
WJ04.008	II	12	32	10YR 7/3	Sand	Saturated soils
WJ04.008	III	32	38	10YR 3/2	Sandy Clay Loam	Saturated soils
WJ04.008	IV	38	48	10YR 5/4	Sandy Clay Loam	Sterile subsoil, 15% subrounded to rounded pebbles. Saturated soils
WJ04.009	I	0	17	10YR 4/1	Sand	None
WJ04.009	II	17	27	10YR 6/6	Sand	Sterile subsoil, 10-15% subrounded pebbles
WJ04.010	I	0	14	10YR 4/1	Sand	None
WJ04.010	II	14	25	10YR 6/3	Sand	Sterile subsoil, 10-15% subrounded pebbles

Shovel Test	Stratum	Minimum Stratum Depth	Maximum Stratum Depth	Soil Color	Soil Texture	Comments
WJ05.001	I	0	22	10YR 5/1	Sand	STP terminated due to compaction. Located directly adjacent to intersection of West Jersey Ave and English Creek Ave.
WJ05.002	I	0	14	10YR 4/1	Sand	Compact, possible redeposited topsoil
WJ05.002	II	14	24	10YR 6/3	Sand	15-20% subrounded to rounded pebbles
WJ05.003	I	0	9	10YR 4/1	Sandy Loam	Contains modern trash (discarded)
WJ05.003	II	9	25	10YR 6/4	Sand	Sterile subsoil, 10-15% subrounded pebbles
WJ05.004	I	0	20	10YR 7/3	Sand	None
WJ05.004	II	20	30	10YR 5/4	Sand	Sterile subsoil, 15% rounded to well-rounded pebbles
WJ05.005	I	0	15	10YR 5/1	Sand	STP terminated due to compaction. Located directly adjacent to West Jersey Ave
WJ05.006	I	0	13	10YR 5/4	Sand	STP terminated due to compaction and rocky roadside fills, located directly adjacent to West Jersey Ave
WJ05.007	I	0	8	10YR 5/2	Sandy Loam	Contains modern trash (discarded), truncated topsoil
WJ05.007	II	8	18	7.5YR 5/4	Sand	Sterile subsoil, 10-15% subrounded pebbles
WJ05.008	I	0	7	10YR 7/3	Sand	Rocky and truncated topsoil
WJ05.008	II	7	17	10YR 5/4	Sand	Sterile subsoil, 15% subrounded to rounded pebbles
WJ05.009	I	0	7	10YR 4/1	Sand	Compact and rock soils, STP located 4 m east from manhole utility
WJ05.009	II	7	17	10YR 6/3	Sand	15-20% subrounded to rounded pebbled
WJ05.010	I	0	10	10YR 4/3	Sandy Loam	STP terminated due to compaction, located directly adjacent to paved bike path
WJ05.011	I	0	11	10YR 5/1	Sand	Contains modern trash (discarded). STP located directly adjacent to paved bike path
WJ05.011	II	11	14	10YR 5/6	Sand	STP terminated due to compaction

Shovel Test	Stratum	Minimum Stratum Depth	Maximum Stratum Depth	Soil Color	Soil Texture	Comments
WJ05.012	I	0	13	10YR 5/1	Sandy Loam	Contains modern glass, wood debris and coal slag (discarded)
WJ05.012	II	13	23	10YR 6/6	Sand	Sterile subsoil, 10-15% subrounded pebbles
WJ05.013	I	0	8	10YR 4/1	Sand	STP terminated due to compaction, located directly adjacent to paved bike path
WJ05.014	I	0	8	10YR 5/1	Sand	None
WJ05.014	II	8	18	10YR 6/6	Sand	Sterile subsoil, 15-20% subrounded pebbles
WJ05.015	I	0	18	10YR 4/3	Sandy Loam	None
WJ05.015	II	18	28	10YR 5/6	Sand	Sterile subsoil, 10% rounded to well-rounded pebbles
WJ06.001	I	0	15	10YR 5/2	Sandy Loam	Contains modern glass and coal slag (discarded)
WJ06.001	II	15	25	7.5YR 5/6	Sand	Sterile subsoil, 5-10% subrounded pebbles
WJ06.002	I	0	9	10YR 4/2	Sand	Contains modern glass (discarded)
WJ06.002	II	9	19	10YR 6/6	Sand	Sterile subsoil, 15-20% subrounded pebbles
WJ06.003	I	0	12	10YR 5/2	Sandy Loam	None
WJ06.003	II	12	22	7.5YR 5/8	Sand	Sterile subsoil, 5-10% subrounded to rounded pebbles
WJ06.004	I	0	19	10YR 5/1	Sand	Contains coal slag (discarded)
WJ06.004	II	19	29	10YR 5/4	Sand	Sterile subsoil, 15-20% subangular and subrounded pebbles
WJ06.005	I	0	13	10YR 4/2	Sand	None
WJ06.005	II	13	23	10YR 6/4	Sand	Sterile subsoil, 15-20% subrounded pebbles
WJ06.006	I	0	19	10YR 4/1	Sandy Loam	Contains modern trash and coal slag (discarded)
WJ06.006	II	19	29	10YR 7/6	Loamy Sand	Sterile subsoil, 15-20% subrounded pebbles
WJ06.007	I	0	16	10YR 3/2	Sandy Loam	Contains coal slag (discarded)
WJ06.007	II	16	26	10YR 5/3	Sand	Sterile subsoil, 5-10% subangular and subrounded pebbles

Shovel Test	Stratum	Minimum Stratum Depth	Maximum Stratum Depth	Soil Color	Soil Texture	Comments
WJ06.008	I	0	12	10YR 4/2	Sand	Contains modern trash and coal slag (discarded)
WJ06.008	II	12	30	10YR 6/4	Sand	B horizon, 15-20% subangular and subrounded pebbles
WJ06.008	III	30	40	10YR 5/3	Sand	C horizon, 5-10% subrounded pebbles
WJ06.009	I	0	14	10YR 4/1	Sand	None
WJ06.009	II	14	24	10YR 6/4	Sand	Sterile subsoil, 15-20% subangular and subrounded pebbles
WJ06.010	I	0	10	10YR 4/1	Sand	Modern glass and metal slag (discarded)
WJ06.010	II	10	21	10YR 6/4	Sand	Sterile subsoil, 15-20% subrounded to rounded pebbles
WJ06.011	I	0	11	10YR 5/1	Sandy Loam	Contains modern trash and coal slag (discarded)
WJ06.011	II	11	18	10YR 7/2	Sand	E horizon, 15% subrounded pebbles
WJ06.011	III	18	29	7.5YR 5/6	Sand	Sterile subsoil, 10-15% subrounded pebbles
WJ06.012	I	0	15	10YR 7/3	Sand	None
WJ06.012	II	15	25	10YR 5/4	Sand	Sterile subsoil, 5-10% subrounded pebbles
WJ06.013	I	0	14	10YR 3/2	Sandy Loam	None
WJ06.013	II	14	24	7.5YR 5/8	Sand	Sterile subsoil, 10-15% subrounded pebbles
WJ06.014	I	0	10	10YR 6/4	Sand	STP terminated due to compaction
WJ06.015	I	0	13	10YR 4/2	Sand	None
WJ06.015	II	13	24	10YR 5/6	Sand	Sterile subsoil, 15-20% subangular and subrounded pebbles
WJ06.016	I	0	11	10YR 3/2	Sandy Loam	None
WJ06.016	II	11	21	10YR 5/6	Sand	Sterile subsoil, 5-10% subrounded pebbles
WJ06.017	I	0	9	10YR 4/2	Sand	None
WJ06.017	II	9	22	10YR 5/2	Sandy Loam	Possible historic fill, contains plaster and coal slag (discarded) but no historic artifacts
WJ06.018	I	0	11	10YR 5/1	Sandy Loam	Contains coal slag (discarded)

Shovel Test	Stratum	Minimum Stratum Depth	Maximum Stratum Depth	Soil Color	Soil Texture	Comments
WJ06.018	II	11	21	10YR 5/6	Sand	Sterile subsoil, 15-20% subrounded pebbles
WJ06.019	I	0	10	10YR 3/2	Sandy Loam	Contains coal slag (discarded)
WJ06.019	II	10	20	10YR 5/6	Sand	Sterile subsoil, 5-10% subrounded to rounded pebbles
WJ06.020	I	0	10	10YR 3/2	Sand	None
WJ06.020	II	10	15	10YR 5/4	Sand	STP terminated due to compaction, located directly adjacent to paved bike path
WJ06.021	I	0	12	10YR 4/3	Sand	None
WJ06.021	II	12	16	10YR 5/4	Sand	STP terminated due to compaction, located directly adjacent to bike path and near manholes, telephone poles and other buried utilies
WJ06.022	I	0	12	10YR 3/2	Sandy Loam	None
WJ06.022	II	12	22	10YR 5/6	Sand	Sterile subsoil, 15-20% subrounded pebbles
WJ06.023	I	0	9	10YR 4/1	Sandy Loam	Contains modern trash and coal slag (discarded)
WJ06.023	II	9	19	10YR 6/6	Sand	Sterile subsoil, 15-20% subrounded pebbles
WJ06.024	I	0	10	10YR 4/1	Sand	None
WJ06.024	II	10	17	10YR 5/2	Sand	Possible historic fill, contains plaster and coal slag (discarded) but no historic artifacts
WJ06.024	III	17	27	10YR 6/6	Sand	Sterile subsoil, 15-20% subrounded pebbles
WJ06.025	I	0	11	10YR 3/2	Sandy Loam	None
WJ06.025	II	11	21	10YR 5/6	Sand	Sterile subsoil, 5-10% subrounded to rounded pebbles
WJ06.026	I	0	16	10YR 3/2	Sand	None
WJ06.026	II	16	26	10YR 5/6	Sand	Sterile subsoil, 15-20% subangular and subrounded pebbles

Shovel Test	Stratum	Minimum Stratum Depth	Maximum Stratum Depth	Soil Color	Soil Texture	Comments
WJ06.027	I	0	11	-	Sandy Loam	Disturbed; Soil color is 10YR 3/2 mottled with 10YR 5/3. Contains modern glass and coal slag (discarded)
WJ06.027	II	11	21	10YR 5/6	Sand	Sterile subsoil, 15-20% subrounded pebbles
WJ06.028	I	0	8	10YR 3/2	Sandy Loam	None
WJ06.028	II	8	18	7.5YR 5/8	Sand	Sterile subsoil, 5-10% subrounded to rounded pebbles
WJ06.029	I	0	20	10YR 4/1	Sand	None
WJ06.029	II	20	30	10YR 6/6	Sand	Sterile subsoil, 15-20% subrounded pebbles
WJ06.030	I	0	17	10YR 4/2	Sand	None
WJ06.030	II	17	27	10YR 5/6	Sand	Sterile subsoil, 10-15% subrounded and subangular pebbles
WJ06.031	I	0	13	10YR 3/2	Sandy Loam	None
WJ06.031	II	13	23	10YR 5/4	Sand	Sterile subsoil, 5-10% subrounded to rounded pebbles
WJ06.032	I	0	10	10YR 4/1	Sandy Loam	Contains modern trash and coal slag (discarded)
WJ06.032	II	10	20	7.5YR 5/6	Sand	Sterile subsoil, 15-20% subrounded pebbles
WJ06.033	I	0	33	10YR 4/1	Sand	Disturbed; most likely recent fill. Contains modern plastic in STP walls. Rock content inconsistent with previous STPs in this area. STP terminated as per supervisor's (AMF) instructions
WJ06.034	I	0	20	10YR 4/2	Sand	None
WJ06.034	II	20	30	10YR 5/4	Sand	Sterile subsoil, 15-20% subrounded and subangular pebbles
WJ06.035	I	0	17	10YR 3/2	Sandy Loam	None

Shovel Test	Stratum	Minimum Stratum Depth	Maximum Stratum Depth	Soil Color	Soil Texture	Comments
WJ06.035	II	17	27	10YR 5/6	Sand	Sterile subsoil, 5-10% subrounded and subangular pebbles
WJ06.036	I	0	11	10YR 4/2	Sand	Contains modern trash and coal slag (discarded)
WJ06.036	II	11	21	10YR 5/6	Sand	Sterile subsoil, 15-20% subrounded pebbles
WJ06.037	I	0	12	10YR 4/1	Sand	None
WJ06.037	II	12	17	10YR 5/2	Sand	E horizon
WJ06.037	III	17	27	10YR 6/6	Sand	Sterile subsoil, 15-20% subrounded and subangular pebbles
WJ06.038	I	0	17	10YR 7/3	Sand	Compact soils
WJ06.038	II	17	27	7.5YR 5/8	Sand	Sterile subsoil, 20-25% subrounded and rounded pebbles
WJ06.039	I	0	23	10YR 5/1	Sandy Loam	Contains modern trash and coal slag (discarded)
WJ06.039	II	23	33	10YR 5/6	Sand	Sterile subsoil, 15-20% subrounded pebbles
EC.001	I	0	39	10YR 4/1	Sand	STP offset due to buried utilities
EC.001	II	39	49	10YR 6/6	Sand	Sterile subsoil, subrounded to rounded pebbles
EC.002	I	0	28	10YR 3/3	Sandy Loam	None
EC.002	II	28	38	10YR 5/6	Sand	Sterile subsoil, 5% subrounded and subangular pebbles
EC.003	I	0	27	10YR 4/2	Sand	STP offset due to telephone pole
EC.003	II	27	33	10YR 3/2	Sand	Oxidized, 15-20% pebbles
EC.003	III	33	43	10YR 5/4	Sand	Sterile subsoil, 15-20% pebbles
EC.004	I	0	23	10YR 4/1	Sandy Loam	None
EC.004	II	23	34	10YR 5/8	Sand	Sterile subsoil, 15% subrounded pebbles

Shovel Test	Stratum	Minimum Stratum Depth	Maximum Stratum Depth	Soil Color	Soil Texture	Comments
EC.005	I	0	17	10YR 4/1	Sand	Disturbed; Redposited topsoil for landscaping. STP located near Storm drain manhole.
EC.005	II	17	43	10YR 6/3	Sand	Disturbed; loose sand fill. Modern glass bottle (discarded) uncovered at 40 cmbgs. STP terminated for discovery of compact soils at 43 cmbgs
EC.006	I	0	13	10YR 3/3	Sandy Loam	Offset due to buried utilities
EC.006	II	13	23	10YR 5/6	Sand	Sterile subsoil, 5-10% subrounded to rounded pebbles
FR.001	I	0	30	10YR 6/2	Silty Clay Loam	Judgemental STP, Plowzone, 25% pebbles
FR.001	II	30	40	7.5YR 5/8	Sand	Sterile subsoil, 25% pebbles
FR.002	I	0	16	10YR 4/3	Sand	Judgemental STP, Modern trash found (discarded). Disturbed gravelly top layer
FR.002	II	16	30	10YR 7/6	Sand	Rounded to well rounded rock
FR.003	I	0	39	10YR 5/8	Sand	Judgemental STP, Root Impasse
FR.004	I	0	23	10YR 3/3	Sand	Plowzone
FR.004	II	23	33	10YR 5/8	Sand	Sterile subsoil, 50% pebbles
FR.005	I	0	20	10YR 5/3	Sand	Modern trash (discarded)
FR.005	II	20	30	10YR 6/6	Sand	Rounded to well rounded rock
FR.006	I	0	10	10YR 2/2	Sand	None
FR.006	II	10	20	10YR 6/1	Sand	None
FR.006	III	20	31	10YR 6/6	Sand	Subrounded to rounded rock
FR.007	I	0	7	10YR 6/2	Sand	Disturbed; metal cable buried in STP
FR.007	I	0	28	10YR 5/8	Sand	None
FR.008	II	28	38	10YR 6/6	Sand	None
FR.009	I	0	17	10YR 5/3	Sand	None
FR.009	II	17	27	10YR 6/6	Sand	Subrounded to rounded rock
FR.010	I	0	35	10YR 3/3	Sand	Plowzone, 25% pebbles

Shovel Test	Stratum	Minimum Stratum Depth	Maximum Stratum Depth	Soil Color	Soil Texture	Comments
FR.010	II	35	45	10YR 5/8	Sand	Sterile subsoil, 25% pebbles
FR.011	I	0	37	10YR 3/3	Sand	Plowzone, 25% pebbles
FR.011	II	37	47	10YR 5/8	Sand	Sterile subsoil, 25% pebbles
FR.012	I	0	31	10YR 4/3	Sandy Loam	Modern trash found (discarded)
FR.012	II	31	41	10YR 6/6	Sand	None
FR.013	I	0	30	10YR 3/3	Sand	Plowzone, 25% pebbles
FR.013	II	30	40	10YR 5/8	Sand	Sterile subsoil, 25% pebbles
FR.014	I	0	27	10YR 3/3	Sand	Plowzone, 25% pebbles
FR.014	II	27	37	7.5YR 6/8	Sand	Sterile subsoil, 25% pebbles
FR.015	I	0	26	10YR 5/8	Sand	Plowzone, 25% pebbles
FR.015	II	26	36	7.5YR 6/8	Sand	Sterile subsoil, 25% pebbles
FR.016	I	0	24	10YR 5/8	Sand	None
FR.016	II	24	34	7.5YR 6/8	Sand	None
FR.017	I	0	16	10YR 5/1	Sand	None
FR.017	II	16	30	10YR 6/6	Sand	Rounded to well rounded rock
FR.018	I	0	10	10YR 5/1	Sand	Disturbance; possible asbestos and trash bag in hole
FR.019	I	0	13	10YR 6/2	Sand	Plowzone, 25% pebbles
FR.019	II	13	23	10YR 6/8	Sand	Sterile subsoil, 25% pebbles
FR.020	I	0	40	10YR 5/8	Sand	None
FR.020	II	40	50	10YR 6/8	Sand	None
FR.021	I	0	12	10YR 5/1	Sand	None
FR.021	II	12	30	7.5YR 6/8	Sand	Rounded to well rounded rock
FR.022	I	0	27	10YR 5/8	Sand	Plowzone, 25% pebbles
FR.022	II	27	37	7.5YR 6/8	Sand	Sterile subsoil, 25% pebbles
FR.023	I	0	21	10YR 5/1	Sand	None
FR.023	II	21	31	10YR 6/6	Sand	Rounded to well rounded rock
FR.024	I	0	41	10YR 5/8	Sand	Plowzone, 25% pebbles
FR.024	II	41	51	10YR 6/8	Sand	Sterile subsoil, 25% pebbles

Shovel Test	Stratum	Minimum Stratum Depth	Maximum Stratum Depth	Soil Color	Soil Texture	Comments
FR.025	I	0	15	10YR 5/8	Sand	STP terminated for root Impasse
FR.026	I	0	32	10YR 5/8	Sand	None
FR.026	II	32	42	7.5YR 6/8	Sand	None
FR.027	I	0	31	10YR 5/8	Sand	Plowzone, 25% pebbles
FR.027	II	31	41	7.5YR 6/8	Sand	Sterile subsoil, 25% pebbles
FR.028	I	0	16	10YR 4/3	Sand	None
FR.028	II	16	30	7.5YR 6/8	Sand	Rounded to well rounded rock
FR.029	I	0	19	10YR 4/1	Sand	Modern trash on top, not collected
FR.029	II	19	30	7.5YR 6/8	Sand	Rounded to well rounded rock
FR.030	I	0	36	10YR 5/8	Sand	None
FR.030	II	36	46	7.5YR 6/8	Sand	None
FR.031	I	0	32	10YR 5/8	Sand	Plowzone, 25% pebbles
FR.031	II	32	42	7.5YR 6/8	Sand	Sterile subsoil, 25% pebbles
FR.032	I	0	15	10YR 5/1	Sand	None
FR.032	II	15	30	7.5YR 6/8	Sand	Rounded to well rounded rock
FR.033	I	0	36	10YR 5/8	Sand	None
FR.033	II	36	46	7.5YR 6/8	Sand	None
FR.034	I	0	6	10YR 3/3	Sand	Plowzone, 75% pebbles
FR.034	II	6	16	7.5YR 6/8	Sand	Sterile subsoil, 75% pebbles
FR.035	I	0	14	10YR 5/1	Sand	None
FR.035	II	14	30	7.5YR 6/8	Sand	Rounded to well rounded rock
FR.036	I	0	36	10YR 5/8	Sand	None
FR.036	II	36	47	7.5YR 6/8	Sand	None
FR.037	I	0	24	10YR 5/8	Sand	Plowzone. 25% pebbles
FR.037	II	24	35	7.5YR 6/8	Sand	Sterile subsoil, 25% pebbles
FR.038	I	0	34	10YR 5/8	Sand	Plowzone, 50% pebbles
FR.038	II	34	44	7.5YR 6/8	Sand	Sterile subsoil, 25% pebbles
FR.039	I	0	15	10YR 4/1	Sand	None
FR.039	II	15	30	7.5YR 6/8	Sandy Loam	Rounded to well rounded rock

Shovel Test	Stratum	Minimum Stratum Depth	Maximum Stratum Depth	Soil Color	Soil Texture	Comments
FR.040	I	0	41	10YR 5/8	Sand	50% pebbles
FR.040	II	41	51	7.5YR 6/8	Sand	Sterile subsoil,25% pebbles
FR.041	I	0	11	10YR 5/1	Sand	None
FR.041	II	11	30	7.5YR 6/8	Sandy Loam	Rounded to well rounded rock
FR.042	I	0	30	10YR 5/8	Sand	Plowzone, 50% pebbles
FR.042	II	30	40	7.5YR 6/8	Sand	Sterile subsoil, 25% pebbles
FR.043	I	0	12	10YR 4/1	Sand	None
FR.043	II	12	30	7.5YR 6/8	Sandy Loam	Rounded to well rounded rock
FR.044	I	0	33	10YR 5/8	Sand	25% pebbles
FR.044	II	33	43	7.5YR 6/8	Sand	Sterile subsoil, 25% pebbles
FR.045	I	0	32	10YR 5/8	Sand	None
FR.045	II	32	42	7.5YR 6/8	Sand	None
FR.046	I	0	15	10YR 4/1	Sand	None
FR.046	II	15	30	7.5YR 6/8	Sandy Loam	Rounded to well rounded rock
FR.047	I	0	31	10YR 5/8	Sand	Plowzone, 25% pebbles
FR.047	II	31	41	7.5YR 6/8	Sand	Sterile subsoil, 25% pebbles
FR.048	I	0	33	10YR 5/8	Sand	STP terminated for root impasse
FR.049	I	0	12	10YR 5/1	Sand	None
FR.049	II	12	30	7.5YR 6/8	Sandy Loam	Rounded to well rounded rock
FR.050	I	0	37	10YR 5/8	Sand	None
FR.050	II	37	47	7.5YR 6/8	Sand	None
FR.051						Not Excavated due to backyard
FR.052						Not Excavated due to backyard
FR.053						Not Excavated due to backyard
FR.054	I	0	16	10YR 5/2	Sand	None
FR.054	II	16	30	7.5YR 6/8	Sand	Rounded to well rounded rock
FR.055	I	0	13	10YR 5/1	Sand	None
FR.055	II	13	28	7.5YR 6/8	Sandy Loam	Rounded to well rounded rock
FR.056	I	0	10	10YR 5/1	Sand	None

Shovel Test	Stratum	Minimum Stratum Depth	Maximum Stratum Depth	Soil Color	Soil Texture	Comments
FR.056	II	10	27	7.5YR 6/8	Sandy Loam	Rounded to well rounded rock
FR.057	I	0	14	10YR 5/1	Sand	None
FR.057	II	14	30	7.5YR 6/8	Sand	Rounded to well rounded rock
FR.058	I	0	32	10YR 5/8	Sand	None
FR.058	II	32	42	7.5YR 6/8	Sand	None
FR.059	I	0	30	10YR 5/8	Sand	None
FR.059	II	30	40	7.5YR 6/8	Sand	None
FR.060	I	0	36	10YR 5/8	Sand	None
FR.060	II	36	45	7.5YR 6/8	Sand	None
FR.061	I	0	14	10YR 5/8	Sand	Plowzone, 25% pebbles
FR.061	II	14	30	7.5YR 6/8	Sand	Subsoil, 25% pebbles
FR.062	I	0	26	10YR 5/8	Sand	Plowzone, 25% pebbles
FR.062	II	26	36	7.5YR 6/8	Sand	Sterile subsoil,25% pebbles
FR.063	I	0	14	10YR 4/3	Sandy Loam	None
FR.063	II	14	31	10YR 5/4	Coarse Sand	Contains cobbles
FR.064	I	0	18	10YR 4/3	Loamy Sand	None
FR.064	II	18	30	10YR 5/6	Coarse Sand	Contains cobbles
FR.065	I	0	30	10YR 5/8	Sand	Plowzone, 25% pebbles
FR.065	II	30	40	7.5YR 6/8	Sand	Sterile subsoil, 25% pebbles
FR.066	I	0	19	10YR 4/3	Sandy Loam	None
FR.066	II	19	31	10YR 5/4	Coarse Sand	Contains cobbles
FR.067	I	0	18	10YR 5/8	Sand	Plowzone, 25% pebbles
FR.067	II	18	28	7.5YR 6/8	Sand	Sterile subsoil, 25% pebbles
FR.068	I	0	12	10YR 4/3	Sandy Loam	None
FR.068	I	12	28	10YR 5/6	Coarse Sand	Contains cobbles
FR.069	I	0	36	10YR 5/8	Sand	None
FR.069	II	36	46	7.5YR 6/8	Sand	None
FR.070	I	0	34	10YR 5/8	Sandy Loam	None
FR.070	II	34	45	10YR 6/8	Sand	None

Shovel Test	Stratum	Minimum Stratum Depth	Maximum Stratum Depth	Soil Color	Soil Texture	Comments
FR.071	I	0	35	10YR 5/8	Sandy Loam	None
FR.071	II	35	45	7.5YR 6/8	Sand	None
FR.072	I	0	35	10YR 5/8	Sand	None
FR.072	II	35	45	7.5YR 6/8	Sand	None
FR.073	I	0	15	10YR 4/1	Sand	None
FR.073	II	15	30	7.5YR 6/8	Sandy Loam	Rounded to well rounded rock
FR.074	I	0	15	10YR 5/1	Sand	None
FR.074	II	15	30	7.5YR 6/8	Sand	Rounded to well rounded rock
FR.075	I	0	15	10YR 5/1	Sand	None
FR.075	II	15	30	7.5YR 6/8	Sand	Rounded to well rounded rock
FR.076	I	0	25	10YR 5/8	Sand	Plowzone, 25% pebbles
FR.076	II	25	35	7.5YR 6/8	Sand	Sterile subsoil, 25% pebbles
FR.077	I	0	21	10YR 4/3	Sandy Loam	None
FR.077	II	21	31	10YR 5/6	Coarse Sand	Contains gravel and cobbles
FR.078	I	0	27	10YR 5/8	Sand	Plowzone, 25% pebbles
FR.078	II	27	37	7.5YR 6/8	Sand	Sterile subsoil, 25% pebbles
FR.079	I	0	11	10YR 4/1	Sand	None
FR.079	II	11	25	7.5YR 6/8	Sand	Rounded to well rounded rock
FR.080	I	0	25	10YR 5/1	Sand	None
FR.080	II	25	35	10YR 6/8	Sand	Rounded to well rounded rock
FR.081	I	0	19	10YR 4/6	Loamy Sand	Plowzone
FR.081	II	19	29	10YR 5/4	Coarse Sand	Contains Sand
FR.082	I	0	38	10YR 4/3	Sandy Loam	Contains modern trash (discarded)
FR.082	II	38	49	7.5YR 6/8	Sand	None
FR.083	I	0	28	10YR 5/8	Sand	None
FR.083	II	28	38	7.5YR 6/8	Sand	None
FR.084	I	0	31	10YR 5/8	Sand	None
FR.084	II	31	41	7.5YR 6/8	Sand	None

Shovel Test	Stratum	Minimum Stratum Depth	Maximum Stratum Depth	Soil Color	Soil Texture	Comments
FR.085	I	0	6	10YR 5/8	Sand	Disturbed; next to pushpile 45% pebbles. STP terminated due to rock impasse
FR.086	I	0	25	10YR 5/8	Sand	None
FR.086	II	25	35	7.5YR 6/8	Sand	None
FR.087	I	0	34	10YR 5/8	Sand	Plowzone, 25% pebbles
FR.087	II	34	44	10YR 6/8	Sand	Sterile subsoil, 25% pebbles
FR.088	I	0	26	10YR 5/8	Sand	None
FR.088	II	26	36	7.5YR 6/8	Sand	None
FR.089	I	0	37	10YR 5/8	Sand	Plowzone, 25% pebbles
FR.089	II	37	47	10YR 5/8	Sand	Sterile subsoil,25% pebbles
FR.090	I	0	30	10YR 5/8	Sand	None
FR.090	II	30	40	7.5YR 6/8	Sand	None
FR.091	I	0	37	10YR 5/8	Sand	Plowzone, 25% pebbles
FR.091	II	37	47	7.5YR 6/8	Sand	Sterile subsoil, 25% pebbles
FR.092	I	0	26	10YR 5/8	Sand	None
FR.092	II	26	36	7.5YR 6/8	Sand	None
FR.093	I	0	30	10YR 5/8	Sand	Plowzone, 25% pebbles
FR.093	II	30	40	7.5YR 6/8	Sand	Sterile subsoil, 25% pebbles
FR.094	I	0	8	10YR 5/8	Sand	Plowzone, 75% pebbles
FR.094	II	8	18	7.5YR 6/8	Sand	Sterile subsoil, 25% pebbles
FR.095	I	0	15	10YR 5/2	Sand	None
FR.095	II	15	30	7.5YR 6/8	Sand	Rounded to well rounded rock
FR.096	I	0	15	10YR 5/8	Sand	Plowzone, 25% pebbles
FR.096	II	15	25	7.5YR 6/8	Sand	Sterile subsoil, 25% pebbles
FR.097	I	0	15	10YR 3/3	Loamy Sand	None
FR.097	II	15	28	10YR 5/4	Coarse Sand	Contains cobbles
FR.098	I	0	15	10YR 3/3	Loamy Sand	None
FR.098	II	15	30	10YR 5/4	Coarse Sand	Contains cobbles
FR.099	I	0	19	10YR 4/1	Sand	None

Shovel Test	Stratum	Minimum Stratum Depth	Maximum Stratum Depth	Soil Color	Soil Texture	Comments
FR.099	II	19	31	7.5YR 6/8	Sand	Rounded to well rounded rock
FR.100	I	0	18	10YR 3/3	Loamy Sand	None
FR.100	II	18	30	10YR 5/4	Coarse Sand	contains cobbles
FR.101	I	0	13	10YR 5/1	Sand	None
FR.101	II	13	30	7.5YR 6/8	Sand	Rounded to well rounded rock
FR.102	I	0	23	10YR 4/3	Sandy Loam	None
FR.102	II	23	38	10YR 5/4	Coarse Sand	Contains cobbles
FR.103	I	0	14	10YR 5/1	Sand	None
FR.103	II	14	30	7.5YR 6/8	Sand	Rounded to well rounded rock
FR.104	I	0	25	10YR 4/3	Sandy Loam	None
FR.104	II	25	35	10YR 5/4	Coarse Sand	Contains cobbles
FR.105	I	0	11	10YR 4/1	Sand	None
FR.105	II	11	30	7.5YR 6/8	Sand	Rounded to well rounded rock
FR.106	I	0	14	10YR 5/1	Sand	None
FR.106	II	14	28	7.5YR 6/8	Sand	Rounded to well rounded rock
FR.107	I	0	15	10YR 3/3	Loamy Sand	None
FR.107	II	15	28	10YR 5/4	Coarse Sand	Contains Cobbles
FR.108	I	0	19	10YR 5/2	Sand	None
FR.108	II	19	29	7.5YR 6/8	Sand	Rounded to well rounded rock
FR.109	I	0	23	10YR 3/3	Loamy Sand	None
FR.109	II	23	34	10YR 5/6	Coarse Sand	Contains cobbles
FR.110	I	0	20	-	Sand	Disturbed; soil color is 10YR 4/2 mottled with 10YR 3/2. Contains modern trash (discarded)
FR.110	II	20	35	7.5YR 6/8	Sand	Rounded to well rounded rock
FR.111	I	0	19	10YR 3/3	Loamy Sand	None
FR.111	II	19	32	10YR 5/6	Coarse Sand	Contains cobbles
FR.112	I	0	25	10YR 5/8	Sand	Plowzone, 75% pebbles
FR.112	II	25	35	7.5YR 6/8	Sand	Sterile subsoil, 25% pebbles

Shovel Test	Stratum	Minimum Stratum Depth	Maximum Stratum Depth	Soil Color	Soil Texture	Comments
FR.113	I	0	15	10YR 5/1	Sand	None
FR.113	II	15	30	7.5YR 6/8	Sand	Rounded to well rounded rock
FR.114	I	0	23	10YR 5/8	Sand	None
FR.114	II	23	34	7.5YR 6/8	Sand	None
FR.115	I	0	10	7.5YR 6/8	Sand	Disturbed; Stripped top layer and sub filled with gravel and highly compacted
FR.115	I	0	16	10YR 4/1	Sand	None
FR.116	II	16	30	7.5YR 6/8	Sand	Rounded to well rounded rock
FR.116	I	0	15	10YR 5/8	Sand	None
FR.117	II	15	17	7.5YR 6/8	Sand	STP terminated for rock impasse, located on Access Road and contains heavy compacted gravel
FR.118	I	0	16	10YR 5/1	Sand	None
FR.118	II	16	30	7.5YR 6/8	Sand	Rounded to well rounded rock
FR.119	I	0	14	10YR 5/1	Sand	None
FR.119	II	14	30	7.5YR 6/8	Sand	Rounded to well rounded rock
FR.120	I	0	5	10YR 3/3	Loamy Sand	None
FR.120	II	5	15	10YR 5/4	Coarse Sand	Contains cobbles, concreted
FR.121	I	0	22	10YR 3/3	Loamy Sand	None
FR.121	II	22	32	10YR 5/6	Coarse Sand	Contains gravel and cobbles
FR.122	I	0	12	10YR 4/1	Sand	None
FR.122	II	12	30	7.5YR 6/8	Sand	Rounded to well rounded rock
FR.123	I	0	14	10YR 3/3	Loamy Sand	None
FR.123	II	14	32	10YR 5/6	Coarse Sand	Containrs gravel and cobbles
FR.124	I	0	21	10YR 3/3	Loamy Sand	None
FR.124	II	21	31	10YR 5/4	Coarse Sand	Contains cobbles
FR.125	I	0	14	10YR 4/3	Sandy Loam	None
FR.125	II	14	24	10YR 5/4	Coarse Sand	Contains cobbles
FR.126	I	0	24	10YR 5/8	Sand	Plowzone, 25% pebbles

Shovel Test	Stratum	Minimum Stratum Depth	Maximum Stratum Depth	Soil Color	Soil Texture	Comments
FR.126	II	24	34	7.5YR 6/8	Sand	Sterile subsoil, 25% pebbles
FR.127	I	0	31	10YR 5/8	Sand	Plowzone, 25% pebbles
FR.127	II	31	41	7.5YR 6/8	Sand	Sterile subsoil,25% pebbles
FR.128	I	0	30	10YR 5/8	Sand	Plowzone, 25% pebbles
FR.128	II	30	40	7.5YR 6/8	Sand	Sterile subsoil, 25% pebbles
FR.129	I	0	30	10YR 5/8	Sand	Plowzone 25% pebbles
FR.129	II	30	40	7.5YR 6/8	Sand	Sterile subsoil, 25% pebbles
FR.130	I	0	21	10YR 3/3	Loamy Sand	None
FR.130	II	21	31	10YR 5/6	Coarse Sand	Contains cobbles
FR.131	I	0	5	10YR 5/8	Sand	75% pebbles, Rock impasse
FR.132	I	0	12	10YR 3/3	Loamy Sand	None
FR.132	II	12	22	10YR 5/6	Coarse Sand	Contains cobbles
FR.133	I	0	19	10YR 3/3	Loamy Sand	None
FR.133	II	19	32	10YR 5/6	Coarse Sand	Contains cobbles
FR.134	I	0	25	10YR 5/8	Sand	Plowzone, 25% pebbles
FR.134	II	25	35	7.5YR 6/6	Sand	Sterile subsoil,25% pebbles
FR.135	I	0	21	10YR 3/3	Loamy Sand	None
FR.135	II	21	38	10YR 5/4	Coarse Sand	Contains cobbles
FR.136	I	0	31	10YR 5/8	Sand	Plowzone, 25% pebbles
FR.136	II	31	41	7.5YR 6/8	Sand	Sterile subsoil, 25% pebbles
FR.137	I	0	20	10YR 3/3	Loamy Sand	None
FR.137	II	20	34	10YR 5/4	Coarse Sand	Contains cobbles
FR.138	I	0	23	10YR 4/2	Sand	None
FR.138	II	23	35	7.5YR 6/8	Sand	Rounded to well rounded rock
FR.139	I	0	27	10YR 5/8	Sand	Plowzone, 25% pebbles
FR.139	II	27	37	7.5YR 6/8	Sand	Sterile subsoil, 25% pebbles
FR.140	I	0	27	10YR 5/8	Sand	None
FR.140	II	27	37	7.5YR 6/8	Sand	None
FR.141	I	0	23	10YR 3/3	Loamy Sand	None

Shovel Test	Stratum	Minimum Stratum Depth	Maximum Stratum Depth	Soil Color	Soil Texture	Comments
FR.141	II	23	33	10YR 5/6	Coarse Sand	Contains gravel and cobbles
FR.142	I	0	24	10YR 5/8	Sand	Plowzone, 25% pebbles
FR.142	II	24	34	7.5YR 6/8	Sand	Sterile subsoil, 25% pebbles
FR.143	I	0	13	10YR 4/1	Sand	None
FR.143	II	13	30	7.5YR 6/8	Sand	Rounded to well rounded rock
FR.144	I	0	20	10YR 4/2	Sand	Plowzone, 25% pebbles
FR.144	II	20	30	7.5YR 6/8	Sand	Sterile subsoil, 25% pebbles
FR.145	I	0	25	10YR 5/8	Sand	Plowzone,25% pebbles
FR.145	II	25	35	7.5YR 6/8	Sand	Sterile subsoil, 25% pebbles
FR.146	I	0	15	10YR 4/2	Sand	None
FR.146	II	15	30	7.5YR 6/8	Sand	Rounded to well rounded rock
FR.147	I	0	25	10YR 4/3	Silt Loam	STP disturbed due to locale being within 50 to nearby condominiums
FR.147	II	25	35	7.5YR 6/8	Sand	None
FR.148	I	0	24	10YR 3/3	Loamy Sand	None
FR.148	II	24	34	10YR 5/4	Coarse Sand	Contains cobbles
FR.149	I	0	30	10YR 4/2	Sand	Contains modern trash (discarded)
FR.149	II	30	40	7.5YR 6/8	Sand	Rounded to well rounded rock
FR.150	I	0	25	10YR 4/3	Sand	None
FR.150	II	25	35	7.5YR 6/8	Sand	None
FR.151	I	0	24	10YR 5/8	Sand	None
FR.151	II	24	34	7.5YR 6/8	Sand	None
FR.152	I	0	19	10YR 5/1	Sand	None
FR.152	II	19	30	7.5YR 6/8	Sand	Rounded to well rounded rock
FR.153	I	0	26	10YR 4/3	Sand	None
FR.153	II	26	36	7.5YR 6/8	Sand	None

Shovel Test	Stratum	Minimum Stratum Depth	Maximum Stratum Depth	Soil Color	Soil Texture	Comments
FR.154	I	0	15	-	Sand	Disturbed; soil color is 10YR 3/3 mottled with 10YR 5/8 and contains plastic bag fragments. STP located near large pushpile mtn. 75% pebbles
FR.155	I	0	23	10YR 3/3	Loamy Sand	None
FR.155	II	23	33	10YR 5/6	Coarse Sand	Contains gravel and cobbles
FR.156	I	0	14	10YR 5/2	Sand	Plowzone, 25% pebbles
FR.156	II	14	24	7.5YR 6/8	Sand	Sterile subsoil, 25% pebbles
FR.157	I	0	16	10YR 5/8	Sand	Plowzone, 25% pebbles
FR.157	II	16	26	7.5YR 6/8	Sand	Sterile subsoil, 25% pebbles
FR.158	I	0	25	10YR 3/3	Loamy Sand	None
FR.158	II	25	35	10YR 5/6	Coarse Sand	Contains gravel and cobbles
FR.159	I	0	20	10YR 3/3	Loamy Sand	None
FR.159	II	20	30	10YR 5/6	Coarse Sand	Contains cobbles
FR.160	I	0	17	10YR 5/1	Sand	None
FR.160	II	17	30	7.5YR 6/8	Sand	Rounded to well rounded rock
FR.161	I	0	17	10YR 3/3	Loamy Sand	None
FR.161	II	17	28	10YR 5/6	Coarse Sand	Contains cobbles
FR.162	I	0	15	7.5YR 6/8	Sand	75% pebbles, truncated to subsoil. Disturbed
FR.163	I	0	23	10YR 4/3	Sand	None
FR.163	II	23	35	7.5YR 6/8	Sand	Rounded to well rounded rock
FR.164	I	0	20	10YR 4/3	Sand	None
FR.164	II	20	30	7.5YR 6/8	Sand	None
FR.165	I	0	15	10YR 3/3	Sand	Pushpile over subsoil, no structure , 25% pebbles
FR.165	II	15	25	7.5YR 6/8	Sand	Sterile, 25% pebbles
FR.166	I	0	16	10YR 4/3	Sand	Compacted soil/gravel. STP located on possible condominium trail
FR.166	II	16	26	7.5YR 6/8	Sand	Rounded to well rounded rock

Shovel Test	Stratum	Minimum Stratum Depth	Maximum Stratum Depth	Soil Color	Soil Texture	Comments
FR.167	I	0	17	10YR 3/3	Sand	Plowzone, 25% pebbles, no structure. Pushpile over subsoil
FR.167	II	17	27	7.5YR 6/8	Sand	Sterile subsoil, 25% pebbles
FR.168	I	0	10	7.5YR 6/8	Sand	75% pebbles, located next to access road, heavily disturbed
FR.169	I	0	15	10YR 4/2	Loamy Sand	STP terminated for compaction, located on access road, compaction impasse
FR.170	I	0	10	10YR 5/2	Sand	Plowzone, 50% pebbles, disturbed, next to access road
FR.170	II	10	20	7.5YR 6/8	Sand	50% pebbles
FR.171	I	0	11	10YR 3/3	Sand	Pushpile over subsoil, no structure , 25% pebbles
FR.171	II	11	21	7.5YR 6/8	Sand	Sterile subsoil, 25% pebbles
FR.172	I	0	17	10YR 3/3	Sand	Disturbed; no structure. Near pushpile, 25% pebbles
FR.172	II	17	27	7.5YR 6/8	Sand	Sterile subsoil, 50% pebbles
FR.173	I	0	25	10YR 3/3	Loamy Sand	None
FR.173	II	25	35	10YR 5/6	Coarse Sand	Contains gravel and cobbles
FR.174	I	0	19	10YR 5/1	Sand	Contains modern trash on top (discarded)
FR.174	II	19	30	7.5YR 6/8	Sand	Rounded to well rounded rock
FR.175	I	0	16	10YR 5/1	Sand	Very disturbed top soil with modern trash, STP next to wetland
FR.175	II	16	30	7.5YR 6/8	Sand	Rounded to well rounded rock
FR.176	I	0	30	10YR 5/8	Sand	None
FR.176	II	30	40	7.5YR 6/8	Sand	None
FR.177	I	0	12	-	Sand	Disturbed; soil color is 10YR 3/3 mottled with 10YR 5/8 and 4/3. 50% pebbles.
FR.177	II	12	22	7.5YR 6/8	Sand	Sterile subsoil, 25% pebbles
FR.178	I	0	16	10YR 4/3	Sand	Root impasse

Shovel Test	Stratum	Minimum Stratum Depth	Maximum Stratum Depth	Soil Color	Soil Texture	Comments
FR.179	I	0	9	10YR 3/3	Loamy Sand	None
FR.179	II	9	19	2.5Y 5/6	Coarse Sand	Contains cobbles
FR.180	I	0	5	10YR 3/3	Loamy Sand	None
FR.180	II	5	15	10YR 5/6	Coarse Sand	Contains cobbles
FR.181	I	0	27	10YR 5/1	Sand	Backfill and disturbed.
FR.181	II	27	38	10YR 6/8	Sand	Rounded to well rounded rock
FR.182	I	0	16	-	Sand	Disturbed; soil color is 10YR 3/3 mottled w/ 10YR 5/2, no structure. Located near base of large pushpile. 75% pebbles
FR.182	II	16	26	7.5YR 6/8	Sand	Sterile subsoil, 25% pebbles
FR.183	I	0	18	10YR 4/3	Oxidized Sandy Loam	Disturbed; STP adjacent to pushpile and pond. Medium root activity,
FR.183	II	18	28	10YR 5/8	Sand	Rounded to well rounded rock
FR.184	I	0	13	10YR 3/3	Loamy Sand	None
FR.184	II	13	23	10YR 5/6	Coarse Sand	None
FR.185	I	0	15	-	Sand	Disturbed; soil color is 10YR 5/8 mottled w/ 10YR 4/6, No structure. On road shoulder. Modern trash (discarded). 75% pebbles.
FR.186	I	0	20	10YR 3/3	Loamy Sand	None
FR.186	II	20	30	10YR 5/6	Coarse Sand	Contains cobbles
FR.187	I	0	23	10YR 3/3	Loamy Sand	None
FR.187	II	23	34	10YR 5/6	Coarse Sand	Contains cobbles

Attachment B.

Resumes of Key Personnel

Joseph Kwiatek

Archaeology Project Manager

Education

- Bachelor of Science, Evolutionary Anthropology and Archaeology, Minor in Geology, Rutgers University, New Brunswick, NJ, 2010
- Koobi Fora Field School, Koobi Fora, Kenya, 2008

Registration / Certifications

- OSHA 40-hr HAZWOPER, Safety Unlimited
- OSHA 30-hr Construction Outreach
- Competent Person Excavation Safety
- Long Island Railroad (LIRR) Roadway Worker Protection Training
- Adult First Aid/CPR/AED, American Red Cross

Professional Affiliations

- Archaeological Society of New Jersey

Employment History

- Project Archaeologist, Environmental Design & Research, Landscape Architecture, Engineering & Environmental Services, D.P.C., 2021-present
- Archaeological Supervisor, AECOM, Burlington, NJ, 2016-2021

Joseph is an Archaeology Project manager with over 10 years of experience in Cultural Resource Management. He has successfully directed Phase I through Phase III archaeological investigations in rural upland settings, within agricultural floodplain deposits, and inner-city urban environments. Joseph has extensive experience in field survey, site excavation, and managing client/contractor relationships. His technical skills include use of GIS/ArcMap software, Trimble and Arrow GPS devices, Total Station/Transits with data collectors, and metal detectors. He has worked across the Mid-Atlantic region, as well as in the high Sierras of California and the desert of northern Kenya and has authored or co-authored numerous technical reports for projects in New Jersey, Pennsylvania, Delaware, New York, Connecticut, and Rhode Island.

As an Archaeology Project Manager with EDR, Joseph is responsible for directing archaeological studies and investigations. This includes directing junior staff and/or personally conducting literature review/research in support of cultural resources and environmental analyses; compiling and analyzing data from cultural resources and/or archaeological surveys; evaluating archaeological site significance; GIS based archaeological sensitivity analysis; artifact processing, analysis, and curation; and preparing archaeological survey reports. Documents prepared pertain to Phase IA/IB cultural resources surveys, Phase II site investigations, Phase III data recoveries, and similar types of studies including the following: Section 94-c exhibits, Renewable Energy Construction and Operations Plan (COP) exhibits, New York State Article VII application exhibits, Unanticipated Discoveries Protocols, Monitoring and Post Review Discoveries Plans, Phased Identification Plans, Site Avoidance and Protection Plans, Native American Tribal Communications Plans, and Historic Property Treatment Plans. Kwiatek also supports clients/developers in consultation meetings with state and/or federal agencies and other consulting parties, prepares project proposals and manages budgets, and contributes to Critical Issues Analyses.

Project Experience

Terrestrial Archaeological Resources Assessments for the Atlantic Shores North Offshore Wind Project, Monmouth and Atlantic Counties, NJ, and Kings and Richmond County, NY – Archaeology Project Manager. Conducted Phase IA assessment and background research, including GIS based sensitivity analysis of potential landfall sites, onshore cable routes, and substation locations. Co-authored State Historic Preservation Office (SHPO) reports and supplemental exhibits for the project's COP submittal to the Bureau of Ocean Energy Management (BOEM).

Terrestrial Archaeological Resources Assessments for the Atlantic Shores South Offshore Wind Project, Monmouth and Atlantic Counties, NJ – Archaeology Project Manager. Conducted Phase IA assessment and background research, including GIS based sensitivity analysis of potential landfall sites, onshore cable routes, and substation locations. Produced Phased Identification and Monitoring and Post Review Discoveries Plans. Co-authored SHPO reports and supplemental exhibits for the project's COP submittal BOEM. Provides ongoing support such as managing ongoing Phase IB survey effort and responding to agency RFIs.

Phase IA/IB Archaeological Survey for the Sunrise Wind Farm Project, Suffolk County, NY – Archaeology Project Manager. Conducted Phase IA assessment and background research. Directed Phase IB field activities, including supervising multiple work crews during STP excavation in residential neighborhoods, DOT ROW, and utility corridors. Scheduled mark outs and coordinated with utility locators. Prepared state/county/town highway work permit applications. Co-authored SHPO reports for the project's COP submittal BOEM. Provides ongoing support for Section 106 consultation meetings between the developer, federal agencies, and consulting parties.

Cultural Resources Support for the Queensboro Renewable Express, Kings, Queens, and New York Counties, NY – Archaeology Project Manager. Provided technical expertise through review of subconsultant technical reports and review/edits to NYS Article VII application exhibits. Served as primary SHPO contact.

Historic Property Treatment Plans (HPTPs) for the Revolution Wind Farm Project – Project Archaeologist. Conducted research on how maritime views contributed to the setting and feeling of historic properties within a theoretical viewshed of the project. Co-authored HPTPs including proposed mitigation measures for historic properties identified as potentially adversely effected.

NYS Article VII Application for Beacon Wind 1, Astoria, Queens County, NY – Project Archaeologist. Reviewed subconsultant technical reports for sufficiency. Authored NYS Article VII application exhibits on terrestrial and marine archaeological resources.

Phase IA Archaeological Survey for the Little Falls Connector Project, Herkimer County, NY – Project Archaeologist. Conducted Phase IA archaeological assessment and background research for proposed construction activities within and adjacent to the New York State Barge Canal. Prepared technical report subject to review by the New York Power Authority, the U.S. Army Corps of Engineers, and other agencies.

Supplemental Archaeological Assessment and Phase IB Archaeological Survey for the South Fork Export Cable, Suffolk County, NY – Project Archaeologist. Conducted archaeological assessment and background research for proposed construction easements adjacent to the LIRR railroad. Directed Phase IB fieldwork. Co-authored SHPO report.

Phase I Archaeological Survey for the Elm Line Battery Storage Project, Tioga County, NY – Project Archaeologist. Conducted Phase IA assessment and background research. Managed Phase IB field work. Co-authored SHPO report.

Phase IA Archaeological Survey for the Moraine Solar Energy Center, Allegany County, NY – Project Archaeologist. Conducted Phase IA assessment and background research. Co-authored SHPO report and supplemental exhibits for the project's 94-c application. Drafted outreach letters to Native American Nations.

Phase IB Archaeological Survey for the Bear Ridge Solar Project, Niagara County, NY – Project Archaeologist. Analyzed and researched artifact collection. Co-authored SHPO report and supplemental exhibits for the project's 94-c application. Drafted outreach letters to Native American Nations.

Phase IB Archaeological Survey for the Hemlock Ridge Solar Project, Orleans County, NY – Project Archaeologist. Directed Phase IB field activities for renewable energy client, including STPs and Pedestrian Survey. Processed and analyzed artifact collection. Co-authored SHPO report, supplemental exhibits for the project's 94-c application, and a Site Avoidance and Protection Plan. Drafted outreach letters to Native American Nations.

Phase I Archaeological Investigation for the West Camden Bypass Project, Kent County, DE - Archaeological Supervisor. Directed Phase I field activities on behalf of Delaware Department of Transportation (DelDOT), including STPs, Test Units, Controlled Surface Collection, and Metal Detecting. Co-authored SHPO report.

Phase IB Archaeological Survey for the Shaft 17B Site, Sunnyside, Queens, NYC, NY - Archaeological Monitor. Monitored ground disturbing activities during the site preparation phase of the Shaft 17B construction. Observed and documented underlying soil conditions during installation of two construction entrances. Primary author of SHPO report.

Phase I and II Archaeological Survey of the PennEast Natural Gas Pipeline Project, PA and NJ - Archaeological Supervisor. Directed field crews for Phase I survey and multiple Phase II investigations along 113-mile-long proposed natural gas pipeline corridor. Coordinated and completed imminent domain surveys. Point of contact between public and client. Supervised deep testing of Susquehanna River floodplain while excavating pre-contact native village site. Co-authored SHPO reports and authored New Jersey State Museum Archaeological Site Registration Forms.

Phase III Excavations at Split Site East (36BU0449) and Unami Creek Open Site (36BU0445), PA - Archaeological Supervisor. Directed field crews for Phase III archaeological data-recovery including block excavations and machine assisted trenching. Co-authored SHPO report sections on pre-contact feature descriptions and projectile point analysis. Produced artifact table graphics via Access and Excel.

Trenton Water Power Channel and Delaware and Raritan Canal Historic District, I-95/Scudder Falls Bridge Replacement, NJ - Archaeological Monitor. Monitored ground disturbing activities related to new pier construction for highway lanes and canal side pedestrian/bicycle path. Documented conditions and prepared periodic progress reports. Coordinated with contractors and client.

New Haven Downtown Crossing CATEX Phase II, CT - Archaeological Monitor. Monitored ground disturbing activities in a dense urban environment related to old utility removal and new storm drain installation. Documented conditions. Coordinated with contractors.

River House at Odette's Hotel Development Along the Delaware River, New Hope, PA - Archaeological Monitor. Monitored ground disturbing activities related to all construction within the Delaware Canal National Historic District. Documented conditions and prepared periodic progress reports. Identified and protected unanticipated historic resources within the canal prism. Coordinated with DCNR, contractors, and client.

Phase IB Archaeological Survey and Phase II Investigation, Site 7S-F-152, Park Avenue Realignment Project, Sussex County, DE - Archaeological Supervisor. Directed Phase I and Phase II excavations, including short interval STPs, Test Units, and Strip Trenches. Mapped site with Total Station and GPS. Consulted with DelDOT archaeologists on testing strategies. Co-authored SHPO report.

Phase IB Survey of Area H-2 and Phase II Evaluation of Area H-5, Naval Station Newport, Newport County, RI - Field Director. Directed field crew for Phase I and Phase II excavations of historic buildings on Navy property. Mapped site with Total Station and GPS. Co-authored SHPO reports.

Phase I Archaeological Investigation, Putnam Ash Residue Landfill, Phases 7 through 11, Putnam, CT - Field Director. Directed field crew for Phase I survey of a planned 150-acre expansion to the existing landfill on a terrace adjacent to the Quinebaug River. Co-authored SHPO report.

Phase IB Archaeological Survey for the Dredging of the Delaware and Raritan Canal, NJ - Archaeological Supervisor and Monitor. Directed Phase I survey for planned access areas along the historic Delaware and Raritan canal. Monitored contractors performing dredging activities. Co-authored SHPO report.

Phase IB Archaeological Survey for the James River Sustainable Water Initiative for Tomorrow Project, Newport News, VA - Archaeological Supervisor. Directed field crew for Phase IB of existing wastewater facility and surrounding properties. Investigated previously registered historic and prehistoric artifact scatters near the James River.

Phase I Archaeological Investigation for the Kenton Road, SR8 to Chestnut Grove Road Project, Kent County, DE - Archaeological Supervisor. Directed field crew for Phase I survey of roadside shoulders and work areas for infrastructure expansion. Discovered and documented a domestic site attributed to C.I. Dupont. Primary author of SHPO report.

Phase I Archaeological Survey of 102 Acres on Lippincott Hill, Naval Weapons Station Earle, Colts Neck, Monmouth County, NJ - Field Director. Directed field crew for Phase I survey of hilltop Coastal Plain setting on Navy property. Expanded and refined the boundaries of the Lippincott Hill prehistoric site. Primary liaison with Navy personnel.

Phase I/II Archaeological Investigations, Deepwater/Churchtown Reterminations Project, Atlantic City Electric, Salem County, NJ - Field Director. Supervised the excavation of STPs and Test Units during Phase II evaluation of historic and prehistoric resources in 16-acre project area near the Delaware Bay.

Phase I/II Archaeological Investigations for the Proposed Petrochemicals Complex, Potter and Center Townships, Beaver County, PA - Archaeological Crew Chief. Directed Phase II investigations on the bank of the Ohio River within the floodplain contexts of site 36BV0051. Supervised the excavation of multiple deep testing units containing prehistoric artifacts and features. Responsible for safety measures such as hydraulic shoring and rescue harnesses while working at depths of greater than two meters below ground surface.

Whiskey Ridge Ecological Restoration Project, Sierra National Forest, CA - Archaeological Technician. Conducted systematic Phase I pedestrian survey in the Sierra Nevada mountains. Authored and edited Department of Parks and Recreation (DPR) site records according to established standards for historic period railroad grades, work camps and prehistoric food processing sites. Produced site maps and updated the forest-wide GIS database in ESRI ArcGIS.

Phase I Archaeological Investigation, Northeast Pocono Reliability Project, PPL Electric Utilities, Northeastern PA - Field Technician. Surveyed a 64-mile electric transmission line right of way and two 100+ acre substations. Identified nine historic Euro-American sites and one Native American archaeological site.

Phase I and II Archaeological Survey of the Constitution Natural Gas Pipeline Project, PA and NY - GIS/Field Technician. Participated in Phase I and II survey along 600-foot wide and 126-mile long proposed natural gas pipeline corridor. Utilized a handled Trimble GPS unit to locate predetermined GPS shovel test locations based on a predictive modeling grid and to record site boundaries, historic foundation walls and judgmental shovel tests.

Williams Leidy Southeast Natural Gas Pipeline Project, NJ - Field Technician. Excavated shovel test transects during Phase I survey across multiple agricultural fields, residential yards, and numerous drainages. Testing was conducted based on specialized prehistoric and historic probability models.

Archaeological Investigations of the I-95/Girard Avenue Improvement Project, Philadelphia, PA - Field Technician. Conducted Phase III data recovery in the urban contexts of downtown Philadelphia. Excavated historic-era privies and recovered numerous household artifacts dating from the earliest settlement of the city to the early 20th century.

Phase I and II Archaeological Survey of Mashipacong Island, Northeast Upgrade of the Tennessee Gas 300 Line, Montague, NJ - Field Technician. Shovel tested floodplain soils down to a depth of 2.5 meters below ground surface on an island in the Delaware River. Multiple areas of the island contained moderate concentrations of prehistoric artifacts and one excavation unit uncovered a cache of over 200 net sinkers.

Phase II Archaeological Excavations at the Vanderbilt Mansion National Historic Site, Hyde Park, NY - Field Technician. Conducted Phase II shovel testing and unit excavation on the grounds of the Vanderbilt Mansion. Investigations uncovered high concentrations of architectural and household artifacts while attempting to pinpoint the location of a lost toll house.

Additional Employment History

- Archaeological Crew Chief, AECOM, Burlington, NJ, 2015-2016
- Archaeological Technician, United States Forest Service, North Fork, CA, 2014
- Archaeological Technician, ACHEO-TEC, Palo Alto, CA, 2014
- Field Archaeologist, AECOM, Burlington, NJ, 2012-2013
- Field Technician, Richard Grubb & Associates, Cranbury, NJ, 2013
- Field Technician, Horizon Research Consultants, Philippi, WV, 2012
- Field Technician, AK Environmental, Binghamton, NY, 2012
- Field Technician, Gray & Pape Inc., Providence, RI, 2011-2012
- Field Technician, ASC Group Inc., Various Locations, PA, 2011
- Field Technician, Maser Consulting, Various Locations, NJ, 2011
- Field Technician, The RBA Group Inc., Atlantic County, NY, 2011
- Field Technician, Paciulli, Simmons & Associates Ltd., Hyde Park, NY & Manassas, VA, 2011
- Laboratory Intern, American Museum of Natural History, New York, NY, 2009

Amanda Filmyer, MA, RPA

Archaeologist

Education

- Master of Arts, Applied Archaeology, Indiana University of Pennsylvania, Indiana, PA, 2022
- Bachelor of Arts, Classical and Near Eastern Archaeology, Bryn Mawr College, Bryn Mawr, PA, 2014

Registration / Certifications

- Registered Professional Archaeologist (RPA), 2023
- OSHA 10-hr Construction Outreach

Professional Affliations

- Society of Pennsylvania Archaeology (SPA)

Employment History

- Archaeologist, Environmental Design & Research, Landscape Architecture, Engineering & Environmental Services, D.P.C., 2022-present
- PA-SHARE Contractor, Pennsylvania State Historic Preservation Office, Harrisburg, PA, 2021
- Archaeological Crew Chief, AECOM, Burlington, NJ, 2018-2022

Amanda is an Archaeologist and holds a Master of Applied Archaeology with concentrations in Prehistoric (Precontact) Archaeology and Geoarchaeology. She has worked in Cultural Resource Management since 2014 and has archaeological field and laboratory experience in all phases of survey. She has four years of experience supervising crews in the capacity of crew chief. This experience includes supervising archaeological field survey and excavation (Phase I, II, and III), precontact and historical artifact analysis and curation, data management, cultural resource platform finalization with SHPO, and contributing sections for technical reports. Her technical skills include use of GIS/ArcMap software, Trimble GPS devices, Arrow GPS devices, and Total Station/Transits with data collectors. Additionally, she is adept in specialized field survey techniques such archaeological geophysics, geochemical analysis (portable X-Ray Fluorescence Spectroscopy), and cemetery recovery. Amanda has excavated and documented archaeological sites in rural upland settings, agricultural floodplain deposits, and urban environments and has worked across the Midwest, Mid-Atlantic, and Southeastern United States, as well as the Cilician Plains of Turkey.

As an Archaeologist with EDR Amanda is responsible for directing archaeological studies and investigations, compiling and organizing data from cultural resource investigations, conducting literature reviews, evaluating archaeological site significance, digital mapping, global positioning system (GPS) data entry, and preparing cultural resources analyses and permitting documents including archeological reports and historic resources surveys. Documents prepared pertain to Phase IA/IB cultural resources surveys, Phase II site investigations, Phase III data recoveries, historic resources surveys, and National Register of Historic Places (NRHP) nominations.

Project Experience

Terrestrial Archaeological Resources Assessments for the Atlantic Shores North Offshore Wind Project, Monmouth and Atlantic Counties, NJ, and Kings and Richmond County, NY – Archaeologist, serving as deputy archaeology project manager. Assisted in conducting Phase IA assessment and background research, including GIS based site digitization and sensitivity analysis of potential landfall sites, onshore cable routes, and substation locations. Co-Produced Phased Identification Plans. Co-authored State Historic Preservation Office (SHPO) reports and supplemental exhibits for the project's COP submittal to the Bureau of Ocean Energy Management (BOEM)

Terrestrial Archaeological Resources Assessments for the Atlantic Shores South Offshore Wind Project, Monmouth and Atlantic Counties, NJ – Archaeologist, serving as deputy archaeology project manager. Assisted in conducting Phase IA assessment and background research, including GIS based site digitization and sensitivity analysis of potential landfall sites, onshore cable routes, and substation locations. Co-Produced Phased Identification Plans. Co-authored SHPO reports and supplemental exhibits for the project's COP submittal to the Bureau of Ocean Energy Management (BOEM)

Phase IA/IB for the Atlantic Shores South Offshore Wind Project, Monmouth and Atlantic Counties, NJ – Archaeological Field Lead. Directed Phase I field activities on behalf of Atlantic Shores, LLC, including STPs and Field Reconnaissance. Produced and managed Permits and survey authorization of Phase IB areas. Coordinated with various municipal, county and state agencies for survey authorization.

Phase IB Archaeology Survey for the Oxbow Solar Project, Fenner, Madison County, NY – Archaeological Field Lead. Directed Phase I field activities on behalf Cypress Creek Renewable, LLC, including STPs and Controlled Surface Collection.

Archaeological Monitoring ArtPark, Lewiston, Niagara County, NY – Archaeologist. Monitored ground disturbing activities during the site preparation phase of the red brick roadway construction adjacent to 4th Street. Observed and documented underlying soil conditions during installation of drainage pipe, swale, and road expansion. Prepared periodic progress reports.

Phase IB Archaeological Survey for the Mink Solar Project, Defiance & Paulding Counties, OH – Archaeological Field Lead. Directed Phase I field activities on behalf of Mink Solar, LLC, including Controlled Surface Collection.

Phase IB Archaeological Survey for the Crossroads Solar Project, Morrow County, OH – Archaeological Field Lead. Directed Phase I field activities on behalf of Crossroads Solar I, LLC, including Controlled Surface Collection.

Phase IB Archaeological Survey for the Richwood Solar Project, Union County, OH – Archaeologist. Supervised Phase I field activities on behalf of Samsung C&T Renewables, LLC, including STPs and Controlled Surface Collection.

Phase IB Archaeological Survey for the Frasier Solar Project, Knox County, OH - Archaeologist. Supervised Phase I field activities on behalf of Open Road Renewables, including STPs and Controlled Surface Collection.

Phase IB Report Writing for Miller's Fork Solar Project, Preble County, OH–Archaeologist. Served as contributing author to the Phase IB archaeology report.

Phase IB Archaeological Geophysical Survey of Braddock's Road, State Route 119, Scottdale, PA - Archaeological Supervisor. Directed Ground Penetrating Radar (GPR) survey of a 0.69-acre parcel believed to contain a portion of the historic Braddock's Road, as part of a Phase IB survey for the expansion of SR 119. One of the primary liaisons with client.

Cemetery Recovery of African Friends to Harmony Burial Ground, Philadelphia, PA. – Archaeological Crew Chief. Supervised the recovery of human remains from historic African American burial ground. Involved in outreach interaction with representatives from descendant church congregations.

Phase IB Archaeological Survey of the NextEra Torrecillas Wind Energy Center, Webb and Duval Counties, TX – Archaeological Crew Chief/Field Technician. Directed field crews for Phase I survey of connector routes, turbine locations, and service roads for a proposed 300 MW wind farm in the South Texas Plains. Documented conditions and prepared periodic progress reports.

Phase IB Archaeological Survey of Elwyn to Wawa Service Restoration Project APE Extension, Chester Heights, PA – Archaeological Crew Chief. Directed field crew for Phase I Survey of a 0.99-acre APE extension. Uncredited contributing author of SHPO report.

Phase IB and II Archaeological Survey of the PennEast Natural Gas Pipeline Project, PA and NJ - Archaeological Crew Chief. Supervised field crews for Phase I survey and multiple Phase II investigations along 113-mile-long proposed natural gas pipeline corridor. Coordinated and imminent domain surveys. Conducted data management for the project and prepared daily progress reports.

Phase III Excavations at Split Site East (36BU0449) and Unami Creek Open Site (36BU0445), PA - Archaeological Crew Chief. Supervised the excavation of Test Units and block excavations during Phase III archaeological data recovery. Conducted site set up and data management for the project.

Archaeological Monitoring for the Dredging of the Delaware and Raritan Canal, NJ - Archaeological Monitor. Monitored ground disturbing activities related to all dredging within the Delaware Canal National Historic District. Documented conditions and prepared periodic progress reports. Identified and protected unanticipated historic resources within the canal prism. Coordinated with contractors, and client.

Cemetery Recovery of First Baptist Church Cemetery of Philadelphia on Arch Street, Philadelphia, PA – Field Technician. Recovered 18th century human remains from an active construction site in Historic Old City, Philadelphia.

Phase I Archaeological Survey of 102 Acres on Lippincott Hill, Naval Weapons Station Earle, Colts Neck, Monmouth County, NJ - Field Technician. Participated in Phase I survey of hilltop Coastal Plain setting on Navy property. Expanded and refined the boundaries of the Lippincott Hill prehistoric site.

Phase I/II Archaeological Investigations, Deepwater/Churchtown Reterminations Project, Atlantic City Electric, Salem County, NJ - Field Technician. Participated in the excavation of STPs and Test Units during Phase II evaluation of historic and prehistoric resources in 16-acre project area near the Delaware Bay.

Phase IB Archaeological Survey of the Dominion Moore to Chappells Natural Gas Pipeline, Spartanburg, Laurens, and Greenwood Counties, SC – Field Technician. Participated in Phase I survey of a 55-miles long natural gas pipeline corridor. Coordinated and imminent domain surveys. Utilized a handled Trimble GPS unit to locate predetermined GPS shovel test locations based on a predictive modeling grid and to record sites boundaries and judgmental shovel tests.

Phase II Archaeological Investigations for the Proposed Petrochemicals Complex, Potter and Center Townships, Beaver County, PA – Field Technician. Participated in Phase II investigations on the bank of the Ohio River within the floodplain contexts of site 36BV0051. Participated in excavation of multiple deep testing units containing prehistoric artifacts and features at depths of greater than two meters below ground surface.

Phase II Archaeological Investigations of the Constitution Natural Gas Pipeline Project, PA, and NY - Field Technician. Participated in Phase II investigations along 600-foot wide and 126-mile-long proposed natural gas pipeline corridor. Utilized a handled Trimble GPS unit to locate predetermined GPS shovel test locations based on a predictive modeling grid and to record site boundaries, historic foundation walls and judgmental shovel tests.

Archaeological Investigations of the I-95/Girard Avenue Improvement Project, Philadelphia, PA - Field/Lab Technician. Conducted Phase III data recovery and cemetery recovery in the urban contexts of downtown Philadelphia. Excavated historic-era privies and fills, Precontact settlements, and mid-19th century human remains in the former burial ground of First Presbyterian Church in Kensington. Lab analysis and curation for thousands of historical domestic and industrial artifacts dating from the earliest settlement of the city to the early 20th century. Participated in public outreach events for the local community.

Additional Employment History

- Archaeological Field Technician, AECOM, Burlington, NJ, 2014-2018
- Field Supervisor, Boğaziçi University Tarsus-Gözlükule Excavations, Tarsus, Mersin Province, Turkey, 2016-2017
- Assistant Supervisor, Boğaziçi University Tarsus-Gözlükule Excavations, Tarsus, Mersin Province, Turkey, 2014
- Special Collections Assistant, Bryn Mawr College Special Collections Department, Bryn Mawr, PA, 2011-2014
- Near Eastern Collections Intern, University of Pennsylvania Museum of Archaeology and Anthropology, Philadelphia, PA, 2012

Daniel Seib
Senior Archaeologist

Education

- Master of Arts, Anthropology, Indiana University, Bloomington, IN, 2002
- Master of Arts, Criminal Justice, Indiana University, Bloomington, IN, 1998
- Bachelor of Arts, Criminal Justice, Indiana University, Bloomington, IN, 1995

Registration/Certifications

- Registered Professional Archaeologist (RPA), 2023.
- Meets the Secretary of Interior's Standards for Historic Preservation Projects (36 CFR Part 61).
- HAZWOPER 40-hour
- PADI Scientific Diver & Rescue Diver

Employment History

- Senior Archaeologist, Environmental Design & Research, Landscape Architecture, Engineering, and Environmental Services, D.P.C., Syracuse, NY, 2022
- Project Director, Public Archaeology Facility, State University of New York at Binghamton, Binghamton, NY, 2002-2022
- Crew Chief, Lab Tech, Glen Black Lab, Indiana University, Bloomington, IN, 2000-2002

Daniel Seib is a Senior Archeologist at EDR with over 20 years of experience. He has expertise directing all phases of archaeological investigations, including archaeological monitoring, urban archaeology, complex construction monitoring projects, hazardous materials (HAZMAT) projects, and sensitive excavations such as unmarked burials. Daniel has significant experience and expertise conducting archaeological projects for the New York State Department of Transportation and a primary focus of his role is to serve as EDR's archaeology technical lead for the replacement of Interstate 81 in Syracuse. He has a B.A. in Criminal Justice from Indiana University, with M.A.s in Anthropology and Criminal Justice, both from Indiana University. As a Senior Archaeologist, Daniel provides support to the Cultural Resources Division by conducting/directing archaeological fieldwork, laboratory analysis, research, writing, mapping, geographic information systems (GIS) analysis, and preparation of report figures. Technical Expertise includes archaeological monitoring, urban (machine-aided) archaeology, faunal analysis, hazardous materials archaeology, human osteology, archaeological metal detecting, and underwater archaeology.

Project Experience

Interstate 81 Viaduct Project, Syracuse, NY – Project Manager of archaeological monitoring for the demolition of the I-81 viaduct, its redesign into Business Loop 81, and redesign of existing I-481 into the new I-81.

Harvest Hills Solar Project, Cayuga County, NY – Project Manager and field director of a Phase I archaeological survey conducted in support of the 94-c application with the New York Office of Renewable Energy Siting for a 300-megawatt solar installation.

Smithers Solar Project, Oswegatchie, NY – Co-author of a Phase I archaeological survey conducted in support of the 94-c application with the New York Office of Renewable Energy Siting for a 5-megawatt solar installation.

Robert Treman State Park Sanitary Improvements, Tompkins County, NY – Project Manager for a Phase IB cultural resources survey conducted at Robert H. Treman State Park in support of the Section 14.09 of the New York State Parks, Recreation, and Historic Preservation Law.

EDR

Daniel Forrest

Cultural Resources Practice Leader
Offshore Wind & New England

Education

- Graduate Studies Program, Archaeology/Anthropology, University of Connecticut, Mansfield, CT, 1998-2001
- Bachelor of Arts, Archaeology and Philosophy, University of Connecticut, Mansfield, CT, 1993

Professional Affiliations

- American Cultural Resources Association
- Business Network for Offshore Wind

Employment History

- Cultural Resources Practice Leader Offshore Wind & New England, Environmental Design & Research, Landscape Architecture, Engineering, and Environmental Services, D.P.C., Syracuse, NY, 2021-present
- Senior Operations Manager, Public Archaeology Laboratory, Inc., Pawtucket, RI, 2015-2021
- State Historic Preservation Officer (SHPO) and Director of Arts and Historic Preservation, State of Connecticut, Hartford, CT, 2013-2015
- Deputy State Historic Preservation Officer (SHPO) and Staff Archaeologist, State of Connecticut, Hartford, CT, 2009-2013

Daniel Forrest serves as EDR's Cultural Resources Practice Leader for Offshore Wind and the New England Region. Dan has more than 25 years of experience in in cultural resource management (CRM). He has a BA in Anthropology and Philosophy from the University of Connecticut, where he also completed graduate studies in their Archaeology and Anthropology department. Included in his professional experience prior to joining EDR, Dan served as the State Historic Preservation Officer (SHPO) for the State of Connecticut. He has particular expertise in complex consultations regarding the identification, evaluation, and treatment of historic properties. Other areas of expertise include Pre-Contact Native American archaeology, lithic technology, and geoarchaeology.

Dan provides clients with senior strategic advice, planning, and technical support for projects requiring review under Sections 106 and 110 of the National Historic Preservation Act (NHPA), the National Environmental Policy Act (NEPA), and Section 4(f) of the Department of Transportation Act. As a consultant, he has managed dozens of cultural resources survey, planning, and mitigation projects for major projects in the areas of offshore wind, transportation, electrical transmission, telecommunications, housing, and civil engineering. As Connecticut SHPO, he managed all operations of both Connecticut Office of the Arts and the State Historic Preservation Office, directed the operations of four state historic museums, and developed statewide preservation policy in coordination with a broad range of local, state, and federal stakeholders.

Project Experience

Revolution Wind Farm, Section 106 & Cultural Resources Strategic Oversight, Offshore, MA, RI - Technical oversight and strategic consulting for cultural resources assessments, Section 106 of the NHPA, SHPO, and Tribal consultation for a proposed 880-MW offshore wind farm located off the coast of southern New England. Served as client's point-of-contact and lead with Bureau of Ocean Energy Management (BOEM) staff and stakeholders for marine archaeological assessment, terrestrial archaeological assessment, historic resources effects analysis, and proposed mitigation strategies.

South Fork Wind Farm, Section 106 & Cultural Resources Strategic Oversight,, Offshore, NY/New England – Technical oversight and strategic consulting for cultural resources assessments, Section 106 of the NHPA, SHPO and Tribal consultation for a proposed 132-megawatt offshore wind farm located off the coast of southern New England. Served as client's point-of-contact and lead with BOEM staff and stakeholders for marine archaeological assessment, terrestrial archaeological assessment, historic resources effects analysis, and proposed mitigation strategies.

Sunrise Wind, Section 106 & Cultural Resources Strategic Oversight, Offshore NY/New England – Technical oversight and strategic consulting for cultural resources assessments, Section 106 of the NHPA, SHPO, and Tribal consultation for a proposed 880-MW offshore wind farm located off the coast of Southern New England. Served as client's point-of-contact and lead with BOEM staff and stakeholders for marine archaeological assessment, terrestrial archaeological assessment, and historic resources effects analysis.

Skipjack Wind Farm, Section 106 & Cultural Resources Strategic Oversight, Offshore, MD, DE – Technical oversight and strategic consulting for cultural resources assessments, Section 106 of the NHPA, SHPO, and Tribal consultation for a proposed 120-MW offshore wind farm located off the coast of Delaware and Maryland. Served as client's point-of-contact and lead with BOEM staff and stakeholders for marine archaeological assessment, terrestrial archaeological assessment, and historic resources effects analysis.

Selected Professional Experience (Prior to EDR)

Block Island Wind Farm, Cultural Resources Surveys & Oversight, New Shoreham, RI and RI State Waters – Managed and coordinated dispute resolution for post-review discoveries; Tribal coordination/consultations; managed cultural resource studies for planned export cable reburial at Block Island landing.

Connecticut State Historic Preservation Officer/Director of Arts and Historic Preservation (2013-2015) – Managed Connecticut's historic preservation and arts programs. Served as Executive Director of the State Historic Preservation Council, Historic Preservation Review Board, and Arts Council. Responsible for all state and federal preservation grant programs, state preservation policy development and implementation, Section 106/110 reviews and consultations, disaster recovery coordination with local, state, and federal partners, drafting and revising Section 106 agreement documents, and coordination with legislative and executive branch officials. Integrated arts and historic preservation funding and programs among eight regional arts, culture, and tourism organizations serving the state's constituents. Served as co-chair of CT Natural and Cultural Resources Task Force for Disaster Recovery and Response from Spring 2013 to Fall 2015.

Connecticut Deputy State Historic Preservation Officer (2012-2013) – Led SHPO coordination and consultations with federal and state agencies. Prepared preservation legal agreements to improve regulatory compliance and resolve preservation considerations under state and federal law (Connecticut & National Environmental Policy Acts, Section 106 of the National Historic Preservation Act, and Section 4(f) of the U.S. DOT Act). Coordinated with State Attorney General and SHPO legal counsel for potential litigation to prevent the unreasonable destruction of National Register-listed properties under the Connecticut Environmental Protection Act. Provided technical assistance to the Office of the Arts in developing new grant programs and outcome tracking for regional arts organizations. Served as liaison to the Native American Heritage Advisory Council and collaboratively developed new protocols for tribal consultations on state projects. Led SHPO response to Superstorm Sandy, including initial field surveys for damaged historic properties, identification, protection, and reburial of Native American remains damaged by the storm, and inter-agency coordination with FEMA, USACE, USDA, FHWA, and HUD. Led twenty-month-long consultations with developers, DECD, HUD, the Mohegan Tribe, and ACHP regarding adverse effects to a Mohegan Traditional Cultural Property in Montville, CT.

Connecticut State Historic Preservation Office, National Register Specialist – Archeologist (Staff Archaeologist/Environmental Review Coordinator; 2009-2013) – Served as primary point of contact and review team lead for state and federal agencies in Connecticut Environmental Policy Act and Section 106 reviews. Reviewed all federal and state projects (>3,000 per year) with the potential to affect archaeological resources, including all those entailing ground disturbance or site work. Led review staff in consultations with the National Park Service, Advisory Council on Historic Preservation, and State Attorney General's Office. Reviewed proposed legislation and regulations affecting historic properties and coordinated with the CT Office of Policy and Management on legislative priorities. Reviewed all nominations to the State and National Registers of Historic Places. Led SHPO's response to Hurricane Irene and interagency coordination under the disaster response and recovery phases. Served as liaison to the state Native American Heritage Advisory Council and organized field reviews of potential TCPs and other resources of concern to Connecticut's state- and federally-recognized tribes. Established new SHPO procedures for early notification and tribal consultations for state projects.

Senior Archaeologist/Field Director (1998-2009) – Designed and implemented over 50 assessment (Phase IA), identification (Phase IB), and site evaluation (Phase II) surveys in coastal, inland, rural, suburban, and urban sections of Connecticut and Rhode Island. Designed and implemented data recovery (Phase III) excavations at over a dozen pre-contact and post-contact sites in Connecticut. Conducted National Register eligibility assessments for archaeological sites and districts.

Research Assistant – University of Connecticut, Department of Anthropology (1997-1999) – Directed multi-disciplinarian research, archaeological field schools, and professional excavations of the Sandy Hill Site, a large early Holocene settlement (10,500 to 8,700 cal BP) on the present-day Mashantucket Pequot Tribal Nation Reservation in southeastern Connecticut.

Adriean's Landing, Hartford, CT (1999-2003) – Project lead for archaeology review of an urban redevelopment project along the Connecticut River. Designed and led implementation of a multi-disciplinary geoarchaeological and paleoenvironmental research program to reconstruct Pleistocene and Holocene paleoenvironments in central CT and assess archaeological potential of the Connecticut River Valley between Massachusetts and Long Island Sound. The research program was, at the time, the largest archaeological mitigation program ever completed in Connecticut.

Publications & Presentations

Co-Host. *Archaeology of Connecticut*. Internet Radio Program, iCRV Radio, (July 2019 to February 2020)

Presenter. *Archaeology of Early Holocene New England.* Eastern States Archaeological Federation (2019); Society for American Archaeology (2007); Conference on New England Archaeology (2000); Northeastern Anthropological Association (1999); Archaeological Society of Connecticut (1998).

Discussant. *Person, Place, or Thing: Ongoing Questions and Evidence for New England Settlement and Material Culture*. Society for American Archaeology. Annual Conference. Vancouver, BC. (2017).

Robert Thorson, Daniel Forrest, & Brian Jones. 2014. "Hydraulic back-flood model for the archaeological stratigraphy of the Connecticut River Alluvial Lowland, central Connecticut, USA". *Quaternary International* 342(25):173-185.

Panelist. *Stone Cultural Features and Ceremonial Landscapes Roundtable*. Institute for American Indian Studies. Washington, CT (2014).

Presenter. *The Archaeology of Trash.* Sloan-Stanley Museum, Kent, CT (2012).

Presenter. *The Archaeology of African-Americans in Connecticut.* Prudence Crandall Museum, Canterbury, CT (2012).

Presenter. *Prehistory of the Quinebaug River Valley.* Prudence Crandall Museum, Canterbury, CT (2011).

Daniel Forrest. 2010. The Middle to Late Archaic Transition in the Still River Valley of Western Connecticut. *Bulletin of the Connecticut Archaeological Society* 72: 63-72.

National Register Nomination for the *Quinebaug River Prehistoric Archaeological District.* Used as a model for archaeological property nominations by the National Park Service (2009).

Daniel Forrest, Brian Jones, & Robert Thorson. 2008. "The Adriaen's Landing Project & the Development of the Connecticut River Floodplain at Hartford" with Brian Jones and Robert Thorsen. *Bulletin of the Archaeological Society of Connecticut* 70:5-16.

Presenter. *Archaeobotanical Contributions to Paleo-Environmental Studies.* Archaeological Society of Connecticut (2007).

Panelist. *Identity and Community in Native Southern New England: Archaeology's Role and Responsibility in Contemporary Politics.* Institute for American Indian Studies. Washington, CT (2007).

Presenter. The Quinebuag River Prehistoric Archaeological District: Creative Stewardship. Archaeological Society of Connecticut (2004).

Brian Jones & Daniel Forrest. 2003. "Life in a Postglacial Landscape: Settlement-Subsistence during the Pleistocene-Holocene Transition in Southern New England". In *Geoarchaeology of Landscapes in the Glaciated Northeast*, edited by David Cremeens and John Hart, pp. 75-89. New York State Museum Bulletin 497. State Education Department, Albany, New York.

Panelist. *Perspectives on Archaeological Preservation.* Archaeological Society of Connecticut (2003).

Presenter. *Prehistory of Andover*. Archaeological Society of Connecticut (2001).

Daniel Forrest, Robert Thorson, & Brian Jones. 2000. "Adriaen's Landing – Archaeology, Geology, and Palynology in Connecticut's Central Valley". *CRM: Cultural Resource Management* 23(10):30-33.

Daniel Forrest. 1999. "Beyond Presence or Absence: Demonstrating Diversity in Connecticut's Early Holocene Archaeological Record". *Bulletin of the Connecticut Archaeological Society* 62:79-99.

Nicholas Conrad, Daniel Adler, Daniel Forrest, & Peggy Kaszas. 1994. "Current Middle Paleolithic excavations in Wallertheim, Rheinhessen" in *Ethnographische-Archaologische Zeitschrift – Berlin*. 35:81-87.

Selected Professional Development and Certifications

Section 106 Essentials – Advisory Council on Historic Preservation, Native American Consultations – Advisory Council on Historic Preservation, Best Practices in Native American Consultations – Federal Highway Administration

Conference on New England Archaeology – Steering Committee (2003 – 2004), New England Foundation for the Arts – Board Member (2014 – 2015)

Patrick J. Heaton, RPA

Principal, Cultural Resources & GIS Services

Patrick is a Principal and leads Cultural Resources and GIS Services at EDR. He is a Registered Professional Archaeologist (RPA) with more than 20 years of experience managing and directing cultural resources (i.e., archaeological, and historic sites) compliance, environmental permitting, and historic preservation projects, and meets the Qualifications for the Secretary of the Interior's Standards for Archaeology (per 36 CFR 61). His areas of technical expertise include archaeology, historic preservation, visual impact assessment, cultural resources impact avoidance and mitigation strategies, GIS applications for cultural and environmental resources, and environmental permitting, including State Historic Preservation Office (SHPO) and Tribal Historic Preservation Office (THPO) consultation, Section 106 of the National Historic Preservation Act, the National Environmental Policy Act (NEPA), and the New York State Environmental Quality Review Act (SEQRA).

Education

- Master of Arts, Anthropology, New York University, 1999
- Bachelor of Arts, Anthropology, Hartwick College, 1994

Registration / Certifications

- Registered Professional Archaeologist (RPA), 2000
- Meets the Secretary of Interior's Standards for Archaeology (36 CFR Part 61)

Professional Affiliations

- Board of Directors, The Gustav Stickley House Foundation (2021-present)
- Board of Directors, Onondaga Historical Association (2019-present)
- New York State Archaeological Association (NYSAA)
- Council for Northeast Historical Archaeology
- Board of Directors, New York Archaeological Council (2018-2021)
- Vice-President, Board of Directors (2014-2016), Preservation Association of Central New York (PACNY)
- Village of Fayetteville, Historic Preservation Commission (2010-2014)
- Executive Board (2006-2007), Professional Archaeologists of New York City (PANYC)

Project Experience

Mohawk Solar, Montgomery County, NY - Principal-in-Charge and Project Manager for environmental permitting studies for a proposed 90 MW solar energy facility, the first solar project to pursue a certificate of environmental compatibility and public need under Article 10 of the New York State Public Service Law (NYSPSC Case No. 17-F-0182). Services have included preparation of a Public Involvement Program Plan, Preliminary Scoping Statement, Article 10 Application, GIS data management and mapping, archaeological and historic resources surveys, wetland delineation, threatened and endangered species habitat assessment, avian surveys, agricultural land use analysis, socioeconomic analysis, visual impact assessment, visual mitigation planting plan, public outreach support, stakeholder engagement, agency consultation, and Public Service Commission Siting Board testimony.

Flint Mine Solar, Greene County, NY - Principal-in-Charge for environmental permitting studies for proposed 100 MW solar energy facility pursuing a certificate of environmental compatibility and public need under Article 10 of the New York State Public Service Law (NYSPSC Case No. 18-F-0087). Services have included preparation of an environmental permitting Critical Issues Analysis, siting design support, assistance with Public Involvement Program Plan, preparation of a Preliminary Scoping Statement, preparation of the Article 10 Application, Phase IA and IB archaeological investigation, SHPO consultation, wetland delineation, threatened/endangered species habitat assessment, socioeconomic analysis, visual impact assessment, visual mitigation planting plan, public outreach, stakeholder engagement, regulatory agency consultation, and Public Service Commission Siting Board testimony.

Sunrise Wind, Visual and Cultural Resources Assessment, Offshore NY/New England - Principal-in-Charge for an historic resources visual effects analysis and visual impact assessment in support of the Constructions and Operations Plan (COP) for a proposed 880-MW offshore wind farm located off the coast of Southern New England. EDR's services include an onshore archeological survey, historic resources, survey, and visual resources assessment in support of a New York State Public Service Commission Article VII Application for the onshore interconnection cable route and substation located in Suffolk County (Long Island), New York. As part of a consultant team with Stantec for Orsted, provided technical oversight and QA/QC for technical analyses and reports, consultation with relevant state and federal agencies, and client/team coordination.

Gowanus Repowering Project, Kings County, NY - Technical oversight for Phase IA cultural resources survey, SHPO consultation, and Siting Board testimony in support of

Article 10 Application to the New York State Board on Electrical Generating Siting and the Environment (NYSPSC Case No. 18-F-0758) for the proposed repowering of a 640 MW energy facility.

Morris Ridge Solar Project, Livingston County, NY - Technical oversight for Phase IA cultural resources surveys, Phase IB archaeological survey, historic resources survey/effects analysis, SHPO consultation, and Siting Board testimony in support of Article 10 Application to the New York State Board on Electrical Generating Siting and the Environment (NYSPSC Case No. 18-F-0440) for a proposed 175 MW wind energy facility.

Riverhead 2 Solar Project, Suffolk County, NY- Technical oversight for Phase IA cultural resources survey, Phase IB archaeological survey, SHPO consultation, and Siting Board testimony in support of Article 10 Application to the New York State Board on Electrical Generating Siting and the Environment (NYSPSC Case No. 17-F-0655) for a proposed 36 MW solar energy facility.

Bluestone Wind Farm, Broome County, NY -Technical oversight for archaeological survey, historic resources survey and effects analysis, SHPO and THPO consultation, cultural resources mitigation, and Siting Board testimony in support of Article 10 Application to the New York State Board on Electrical Generating Siting and the Environment (NYSPSC Case No. 16-F-0559) for a proposed 124 MW wind energy facility.

Skipjack Wind Farm, Visual and Historic Resources Assessment, Offshore, DE - Principal-in-Charge for an historic resources visual effects analysis and visual impact assessment in support of the Constructions and Operations Plan (COP) for a proposed 120-MW offshore wind farm located off the coast of Delaware and Maryland. As part of a consultant team with Stantec for Orsted, provided technical oversight and QA/QC for technical analyses and reports, consultation with relevant state and federal agencies, and client/team coordination.

South Fork Export Cable, On-shore Transmission Line & Substation Facilities, Suffolk County, NY - Principal-in-Charge and Project Manager for SHPO consultation, Phase I archaeological survey, historic-architectural resources survey, and Visual Impact Assessment (VIA) as part of consultant team in support of an New York State Public Service Law Article VII application (NYSPSC Case No. 18-T-0604) for a 138kV underground transmission line and new substation associated with a proposed 90-MW offshore wind energy project.

South Fork Wind Farm, Outer Continental Shelf, Rhode Island-Massachusetts Wind Energy Lease Area - Provided technical oversight for historic resources visual effects analysis and terrestrial archaeological assessments in support of National Environmental Policy Act (NEPA) and Section 106 of the National Historic Preservation Act by the Bureau of Ocean Energy Management (BOEM) review for a proposed 90-MW offshore wind energy project.

High Bridge Wind Farm, Chenango County, NY - Technical oversight for archaeological survey, historic resources survey and effects analysis, State Historic Preservation Office (SHPO) consultation, cultural resources mitigation, and Siting Board testimony in support of Article 10 Application to the New York State Board on Electrical Generating Siting and the Environment (NYSPSC Case No. 18-F-0262) for a proposed 100 MW wind energy facility.

Coxsackie Correctional Facility, Greene County, NY - Principal-in-Charge for a Phase I-III archaeological site investigation and data recovery, wetland delineations, wetland permitting, threatened and endangered species surveys, Incidental Take Permit, and preparation of a habitat conservation plan for a proposed 8-acre Training Facility. Directed archaeological field investigations, artifact analysis, and technical report for a Pre-Contact Native American archaeological site resulting in the recovery of approximately 7,000 artifacts. On behalf of the New York State Department of Corrections and Community Supervision (DOCCS) and Office of General Services (OGS), coordinated agency and stakeholder consultation pursuant to Section 14.09 of the New York State Historic Preservation Act and Section 106 of the National Historic Preservation Act with the New York SHPO, Department of Environmental Conservation, United States Army Corps of Engineers, Stockbridge-Munsee Band of Mohican Indians, and Delaware Nation.

Interstate 81 (I-81) Viaduct Project (NYSDOT PIN 3501.60), Archaeological Assessment, City of Syracuse, Onondaga County, NY - Managed the Phase IA Archaeological Sensitivity Assessment and Phase IB shovel testing survey conducted to help support Section 106 of the National Historic Preservation Act consultation and National Environmental Policy Act (NEPA) review as part of a consultant team with Parsons and AKRF, Inc. on behalf of the New York State Department of Transportation (NYSDOT) for the replacement of approximately 5 miles of elevated highways. Coordinated SHPO consultation and assisted with public outreach events/meetings and preparation.

Interstate 81 (I-81) Viaduct Project (NYSDOT PIN 3501.60), Visual Impact Assessment, City of Syracuse, Onondaga County, NY - Managed the Visual Impact Assessment in accordance with Federal Highway Administration (FHWA) standards conducted to help support NEPA review as part of a consultant team with Parsons, AKRF, Inc., and TWMLA for the replacement of approximately 5 miles of elevated highways.

Project Icebreaker, Erie County, Cleveland, OH -Technical oversight for historic resources effects analysis conducted in support of Section 106 of the National Historic Preservation Act and National Environmental Policy Act (NEPA) compliance, Certification Application submitted to the Ohio Power Sitting Board (OPSB), and Ohio Historic Preservation Office (OHPO) consultation for a proposed 20 megawatt (MW) offshore wind project.

Cassadaga Wind Farm, Chautauqua County, NY - Directed the Phase I Archaeological Survey, Historic Resources Survey, SHPO consultation, Visual Impact Assessment, cultural resources mitigation, and Siting Board testimony in support of Article 10 Application to the New York State Board on Electrical Generating Siting and the Environment (NYSPSC Case No. 14-F-0490) for a proposed 70 wind turbine, 126 MW wind energy facility.

Baron Winds Project, Steuben County, NY - Directed the Phase I Archaeological Survey, Historic Resources Survey, State Historic Preservation Office (SHPO) consultation in support of Article 10 Application to the New York State Board on Electrical Generating Siting and the Environment (NYSPSC Case No. 15-F-0122) for a proposed (up to) 300 MW wind energy project with up to 80 wind turbines.

Hillcrest Solar Project, Brown County, OH - Principal-in-Charge and technical oversight for archaeological and historic resources investigations in support of OPSB Certificate Application and SHPO consultation for a proposed 125 MW solar energy project that will be sited on an approximately 1,400-acre parcel.

Timber Road IV Wind Farm and Transmission Line, Paulding County, OH - Technical oversight for archaeological survey, historic resources survey, and cultural resources mitigation plan in support of an OPSB Certificate Application (OPSB Case No. 18-1293-EL-BTX) and SHPO consultation for a proposed 37- turbine, 125-MW wind energy project.

Great Bay Solar I, Somerset County, MD - Project Manager for environmental permitting studies in support of Maryland Public Service Commission review for a Certificate of Public Convenience and Necessity (CPCN), including preparation of an Environmental Review Document (ERD), wetland delineations, visual Assessment, Phase I archaeological survey, Phase II archaeological site investigation, historic resources assessment, rare plant survey, wetland permitting, and local permitting for a proposed 100 MW solar energy project located on 800-acres.

Church Street Bridge (NYSDOT PIN 1760.55), Washington County, NY - Principal-in-Charge for Section 106 Project Submittal Package, Historic-Architectural Resources Survey, and Phase I Archaeological Survey for a proposed bridge replacement project.

Village of Mohawk Water Wells, Herkimer County, NY - Principal-in-Charge for archaeological monitoring of excavation/construction of water wells within a 1.2-acre parcel being redeveloped with storm-resilient municipal and utility infrastructure. Monitoring conducted as part of Section 106 of the National Historic Preservation Act consultation for the New York Governor's Office of Storm Recovery (GOSR) and Federal Emergency Management Agency (FEMA).

City of Oneida Storm Recovery Project, City of Oneida, Madison County, NY - Principal-in-Charge for archaeological investigations, construction monitoring, SWPPP preparation, and SWPPP inspections for demolition of 154 structures in the City of Oneida. Phase I archaeological survey/testing and construction monitoring during construction activities as part of Section 106 of the National Historic Preservation Act compliance for the Federal Emergency Management Agency (FEMA; HMGP Project #4031-0035).

Block Island Wind Farm, Block Island, RI - Assisted with management and preparation of VIA for the first offshore wind farm constructed in the United States. Block Island Wind Farm includes 5 wind turbines and is a 30 MW facility located 3 miles off Block Island in the Atlantic Ocean. Project role included field photography, coordination of visual impact analyses, and technical report writing.

Master Agreement for Class III Cultural Resources Services, Wyoming Department of Transportation, (2018-2019) - Principal-in-Charge for Master Agreement, numerous Class III inventories statewide in support of transportation infrastructure projects. To date, projects have been completed in Big Horn, Converse, Fremont, Hot Springs, Park, and Washakie Counties under this master agreement.

Bates Creek Cultural Resources Inventory Project, Albany, Carbon, Converse, & Natrona Counties, WY (2017) - Principal-in-Charge for Class III Inventory in support of Section 106 compliance for proposed range improvements for the Bureau of Land Management, Casper Field Office.

Solar Development Project (Private Client), Worcester County, MD - Oversaw the environmental permitting studies in support of an application for a Certificate of Public Convenience and Necessity (CPCN) from the Maryland Public Service Commission, including preparation of an Environmental Review Document (ERD), wetland delineation and permitting, threatened/endangered species habitat assessment) and cultural (archaeological and historic) resources studies for a proposed 100 MW solar energy project located on 900-acres.

Walton River Gas Main HDD, Delaware County, NY -Principal-in-Charge for Phase I archaeological survey and Phase II archaeological site investigations for a proposed gas main adjacent to the West Branch of the Delaware River.

Beaver Road Industrial Park, Monroe County, NY - Oversaw the Phase IB archaeological investigations for a 49-acre parcel.

Onondaga Creekwalk Phase II (NYSDOT PIN 355.14), City of Syracuse, Onondaga County, NY - Managed the environmental permitting services and cultural resources surveys as part of a consultant team with C&S Engineers for a 2.2-mile recreational trail along Onondaga Creek. Services provided as part of coordinated SEQRA/NEPA review included: preparation of a Section 106 Project Submittal Package; Phase I Archaeological and Historic Resources Surveys; rare, threatened, and endangered (RTE) species assessments; Section 4(f) Consultation correspondence; and the environmental portions of a NYSDOT Design Approval Document.

Term Contract for Bridge Rehabilitation, New York State Thruway Authority (NYSTA), Western New York - Managed the environmental and cultural resources services to support environmental permitting as part of consultant team with Stantec for NYSTA bridge rehabilitation projects. Services include: preparation of Section 106 Project Submittal Packages; Phase IA Archaeological Assessments and/or Phase I Archaeological Surveys; wetland reconnaissance and/or delineations; rare, threatened, and endangered (RTE) species assessments; Section 4(f) Consultation correspondence; and, the environmental portions of Design Approval Documents.

Onondaga Lake Parkway/NY Route 370 (NYSDOT PIN 3287.17), City of Syracuse, Onondaga County, NY - Managed environmental permitting studies as part of coordinated SEQRA/NEPA review as part of a consultant team with Lochner for the reconstruction and safety improvements of 2-mile parkway. Services include wetland delineation and permitting, rare, threatened, and endangered (RTE) species assessments, and visual impact assessment.

Arkwright Summit Wind Farm, Chautauqua County, NY - Managed the environmental permitting for a proposed 36-turbine, 78-megawatt (MW) wind energy facility and associated 3-mile generator lead line. Services include managing review under New York State Environmental Quality Review Act (SEQRA), including Lead Agency coordination, preparation of Supplemental Environmental Impact Statement (SEIS), Final Environmental Impact Statement (FEIS), Visual Impact Assessment, shadow flicker analysis, supplemental Phase IB Archaeological Survey, Historic Resources Assessment, and preparation of Joint Application for Permit for wetland permitting for submission to the U.S. Army Corps of Engineers and New York State Department of Environmental Conservation (NYSDEC).

Jericho Rise Wind Farm, Franklin County, NY - Directed the Phase IB archaeological survey, historic resources survey and effects analysis, and SHPO consultation in support of SEQRA review and U.S. Army Corps of Engineers wetland permitting for a proposed 37 wind turbine, 78 MW wind energy facility.

North Carolina Wind Energy Lease Areas, NC - Managed the visual assessment conducted as part of a National Environmental Policy Act (NEPA) Environmental Assessment for the North Carolina Wind Energy Area. Commissioned by the Bureau of Ocean Energy Management (BOEM) and ICF, EDR's visual assessment included identification of visually sensitive sites (e.g., historic sites), field photography, and the production of daytime and nighttime photo simulations demonstrating the potential visibility and visual impact of offshore meteorological towers. This project also included the production of time-lapse videos showing the towers visual impact over an 18-hour period.

Emerging Technology & Entrepreneurship Complex (ETEC), University at Albany, Albany County, NY - Oversaw the SEQRA review, including preparation of a Scoping Document, Supplement Environmental Impact Statement (SEIS), Phase IB Archaeological Survey, Visual Assessment, FEIS, SEQRA Findings Statement, and coordination of traffic study (by sub-consultant) on behalf of the State University Construction Fund (SUCF) for a 12-acre site proposed for new academic building on the New York State Office of General Services (OGS) Harriman Campus.

Amherst State Park Pedestrian Improvements Project, Town of Amherst, Erie County, NY - Directed the Phase I Archaeological Survey, SHPO consultation, and development of archaeological site avoidance measures for a proposed 1-mile multi-use/pedestrian trail.

Seneca Bus Facility, Rochester Genesee Regional Transit Authority (RGRTA), Village of Waterloo, Seneca County, NY - Prepared the Phase I Archaeological Survey and wetland reconnaissance as part of consultant team with AKRF, Inc. in support of NEPA review of 1-acre transit facility.

West River Greenway Trail, Grand Island, NY - Oversaw the Phase I Archaeological Survey and visual renderings as part of consultant team with C&S Engineers, Inc. under a Term Services Agreement with the New York State Office of Parks, Recreation, and Historic Preservation (NYSOPRHP) for a proposed 8-mile multi-use/pedestrian trail along the Niagara River.

American Packaging Facility, Town of Chili, Monroe County, NY - Prepared the Phase I Archaeological Survey and SHPO consultation for a proposed 35-acre commercial/light industrial facility.

Interstate 690 (I-690) Teall Avenue & Beech Street Interchange (NYSDOT PIN 3501.60), City of Syracuse, Onondaga County, NY - Oversaw the Visual Assessment and Archaeological Resources Screening for National Environmental Protection Act (NEPA) and Section 106 consultation as part of a consultant team with Parsons and AKRF, Inc. on behalf of the NYSDOT for a bridge replacement and intersection improvement of 0.5-mile elevated highway.

Canalways Trail (NYSDOT PIN 3950.49), City of Syracuse, Onondaga County, NY – Oversaw preparation of Section 106 Project Submittal Package and Phase IA Archaeological Assessment as part of a consultant team with CHA for the design and construction of a 2.7-mile recreational trail along the shoreline of Onondaga Lake.

Penn Forest Wind Farm, Carbon County, PA - Supervised the preliminary visual assessment, visual fieldwork, viewshed analysis, visual simulations, and preparation of public outreach materials for proposed 40-turbine wind energy facility.

Stiles Brook Wind Farm, Towns of Windham and Grafton, VT - Oversaw the preliminary visual assessment, visual fieldwork, viewshed analysis, visual simulations, and preparation of public outreach materials for proposed 30-turbine wind energy facility.

Substation Relocation, Village of Mohawk, Herkimer County, NY - Managed the Phase I Archaeological Survey conducted as part of Section 106 of the National Historic Preservation Act consultation for a proposed 1.2-acre substation relocation project. Project sponsored by New York Governor's Office of Storm Recovery (GOSR) and Federal Emergency Management Agency (FEMA).

Highway Garage, Town of Nichols, Tioga County, NY - Supervised the Phase I Archaeological Survey conducted as part of Section 106 of the National Historic Preservation Act consultation for a 7.0-acre site proposed for relocation of a municipal highway garage. Project sponsored by New York Governor's Office of Storm Recovery (GOSR) and U.S. Department of Housing and Urban Development (HUD).

Liverpool Village Cemetery Restoration Plan, Village of Liverpool, Onondaga County, NY - Oversaw the historic landscape preservation planning and restoration project, associated NYS Consolidated Funding Application (CFA), and public outreach for a 6-acre cemetery listed on the National Register of Historic Places (NRHP).

Cumberland Bay State Park, Camping Area Comfort Station Replacements, Clinton County, NY - Principal-in-Charge and Project Manager for a Phase I Archaeological Survey for proposed comfort station replacements in a state park on Lake Champlain. Services provided as part of a consultant team with Beardsley Architects & Engineers, D.P.C. under a Term Services Agreement with the New York State Office of Parks, Recreation, and Historic Preservation (NYSOPRHP).

Montezuma Heritage Park & Giardina Park, Town of Montezuma, Cayuga County, NY - Supervised the Phase IA Archaeological Resources Surveys in support of historic preservation planning for a proposed 168-acre heritage park that interprets archaeological remains of the Erie and Cayuga-Seneca Canals and an additional 16-acre town park.

Main Street Campus Improvements, Rochester Genesee Regional Transit Authority (RGRTA), City of Rochester, Monroe County, NY - Prepared a Phase IB Archaeological Survey in support of NEPA review of this 3-acre transit facility.

School of Pharmacy, Binghamton University, Village of Johnson City, Broome County, NY - Supervised the SEQRA review (including preparation of a Full Environmental Assessment Form, or EAF) and Phase IA Archaeological Assessment on behalf of the State University Construction Fund (SUCF) for a 5.5-acre site proposed for new academic building.

Maxwell Field Streambank Stabilization Project, City of Oneida, Madison County, NY - Prepared the Phase I Archaeological Survey for this 0.3-acre streambank stabilization project.

Chain Works District Redevelopment Project, City of Ithaca, Tompkins County, NY - Prepared a Phase IA Archaeological Survey in support of SEQRA review of 95-acre historic industrial site proposed for redevelopment.

Central Hudson Gas & Electric W-H & G Transmission Lines, Ulster County & Dutchess County, NY - Directed the SHPO consultation, Phase I archaeological surveys, and visual impact studies in support of NYS Public Service Commission Part 102 Applications for the refurbishment of a 13-mile transmission-line and an 11-mile transmission line.

Coye Hill Wind Farm, Tolland County, CT - Supervised the Natural Resources Impact Evaluation Report and consultation with the Connecticut SHPO in support of Petition for a Declaratory Ruling from the Connecticut Siting Council for proposed 4-turbine, 12 MW wind energy project.

NFG Dunkirk Pipeline, Chautauqua County, NY - Supervised the SHPO consultation and Phase I Archaeological Surveys in support of NYS Public Service Commission Article VII Application for a proposed 9-mile natural gas pipeline.

Orleans County Transit Facility, Rochester Genesee Regional Transit Authority (RGRTA), Orleans County, NY - Prepared the Phase IA Archaeological Survey in support of NEPA review of proposed 2-acre bus storage/service facility.

Great Bay Wind Project, Somerset County, MD - Prepared the cultural resources surveys, the consultation with the Maryland Historical Trust (MHT), and the Visual Impact Assessment for a proposed 35-turbine, 100 MW wind energy project. Services provided in support of Maryland Public Service Commission review for a CPCN and Section 106 consultation as part of NEPA review by the U.S. Fish and Wildlife Service in association with Bald and Golden Eagle Protection Act take permit review.

Onondaga Lake West Revitalization Area, Village of Solvay, Onondaga County, NY - Prepared a Phase IA cultural resources surveys of 400-acre brownfield area and proposed streetscape improvements.

National Grid Van Dyke Road Substation, Albany County, NY - Directed the Visual Impact Assessment and Phase I archaeological survey for a proposed 4.3-acre substation site and 1.6-mile underground transmission duct bank.

Batavia Senior Housing Project, Genesee County, NY - Supervised the Phase I Archaeological Survey and prepared Phase II Archaeological Site Investigation Work Plan/Research Design for a 13.5-acre site proposed for development as a senior housing facility.

Copenhagen Wind Project, Lewis County, NY - Prepared the Phase I Archaeological Survey and Historic Resources Survey, New York SHPO consultation, Visual Impact Assessment, and prepared sections of Draft Environmental Impact Statement (DEIS) and FEIS as part of SEQRA review for proposed 47-turbine, approximately 79 MW wind energy project.

Black Oak Wind Farm, Tompkins County, NY - Directed the Phase IA Cultural Resources Survey, Historic Resources Visual Effects Analysis, and SHPO consultation in support of SEQRA review for a proposed 7-wind turbine, 14-MW wind energy project.

Downtown Syracuse Commercial Historic District, City of Syracuse, Onondaga County, NY - Prepared the National Register of Historic Places (NRHP) nomination and Multiple Property Documentation Form on behalf of the Downtown Committee of Syracuse, Inc. for a proposed 21-acre historic district. The nomination was approved by the National Park Service and listed on the NRHP on May 7, 2013.

Chittenango Landing Dry Dock Complex Cultural Landscape Report, Town of Sullivan, Madison County, NY - Prepared the Part 1 of a Cultural Landscape Report (CLR) on behalf of the Chittenango Landing Canal Boat Museum for a 6-acre historic site/museum listed on the NRHP. The interpretive site includes a 19th-century dry dock complex and associated buildings located on the Erie Canal.

National Grid Aquidneck Island Reliability Project, Newport, RI - Directed visual fieldwork, visual simulations, and report preparation for a Visual Impact Assessment (VIA) for the proposed upgrade of approximately 4.4 miles of National Grid 69 kV transmission line to 115 kV.

Mary Cariola Children's Center, Town of Henrietta, Monroe County, NY - Supervised a Phase I Archaeological Survey conducted as part of SEQRA review for a proposed residential facility for disabled children located on 1.3-acres.

Central Hudson Gas & Electric A & C Transmission Lines, Dutchess County, NY - Directed SHPO consultation, Phase I Archaeological Survey, and Visual Impact Assessment in support of Article VII application (NYSPSC Case No. 13-T-0469) for the rebuild of 11 miles of 115 kV transmission lines.

Indian Point Energy Center (IPEC), Westchester County, NY - On behalf of Scenic Hudson, Inc., and Riverkeeper, coordinated preparation of visual simulations and Visual Impact Assessment for a proposed closed-cycle cooling (CCC) system at a nuclear energy facility.

Scioto Ridge Wind Farm, Hardin & Logan Counties, OH - Prepared Cultural Resources Survey Work Plans in support of Ohio Power Siting Board (OPSB) Certificate Application for proposed wind energy project with up to 176 wind turbines and a generating capacity of up to 300 MW.

School of Medical & Biological Sciences, University at Buffalo, City of Buffalo, Erie County, NY - Supervised the SEQRA process on behalf of the State University Construction Fund, including preparation of DEIS and support studies (Visual Assessment, Archaeological Sensitivity Assessment, and Historic Resources Impact Assessment), conducted SEQRA public hearing, preparation of FEIS, and SEQRA Findings Statement for a proposed ~600,000 gross square foot medical/educational facility located on the University at Buffalo's Downtown Campus.

Wild Meadows Wind Project, Grafton & Merrimack Counties, NH - Directed visual fieldwork/photography and presented visual resources analyses and simulations at public open houses conducted in support of Section 106 of the National Historic Preservation Act (NHPA) consultation for a proposed 37-turbine, 74 MW wind energy project.

Loveless Farms, Town of Skaneateles in Onondaga County, NY - Directed the Phase I Archaeological Survey and Visual Impact Assessment in support of SEQRA review for a proposed 18-lot subdivision located on 47-acres.

White Pine Commerce Park, Town of Clay, Onondaga County, NY - Supervised the Phase I Archaeological Survey and SHPO consultation for Onondaga County Industrial Development Authority (OCIDA) in support of SEQRA review for a 300-acre parcel and 4-mile sewer line.

Empire Brewing Company Farmstead Brewery, Town of Cazenovia, Madison County, NY - Oversaw the visual assessment, viewshed analyses, visual simulations, and analysis of visual effects on NRHP-listed properties as part of SEQRA review for a proposed craft brewery.

Wilcox Estates, Town of Barton in Tioga County, NY - Oversaw the Phase I Archaeological Survey as part of SEQRA review for a proposed 32-lot subdivision located on 20-acres.

Barcelona Water Improvement District, Town of Westfield in Chautauqua County, NY - Prepared the Phase I Archaeological Survey as part of Section 106 of the NHPA review for a 4-mile-long public water system located in the hamlet of Barcelona.

Village of Danforth Historic Resources Survey, Syracuse, Onondaga County, NY - Developed the public outreach strategy, historic resource inventory forms, and visual field guide to enable community volunteers to conduct a Neighborhood Historic Resource Survey and NRHP eligibility evaluation of over 300 buildings for the City of Syracuse Bureau of Planning and Sustainability.

Student Life Center, SUNY Cortland, City of Cortland, Cortland County, NY - Supervised the SEQRA process on behalf of the State University Construction Fund, including preparation of DEIS, support studies (including, Visual Impact Assessment, Phase IA Cultural Resources Survey, and Phase 1 Environmental Site Assessment), FEIS and SEQRA Findings Statement for proposed recreational athletic facility.

Newfield Covered Bridge (NYSDOT PIN 37550), Town of Newfield, Tompkins County, NY - Prepared the Phase IA Cultural Resources Survey for a NRHP-listed historic bridge rehabilitation.

Owasco River Greenway Trail (NYSDOT Project 375557), City of Auburn & Town of Fleming, Cayuga County, NY - Directed the Phase IA Cultural Resources Survey for a proposed 8.4-mile-multi-modal recreational trail.

Niagara Falls Underground Railroad Heritage Area Management Plan, Niagara County, NY - Prepared a Heritage Area Management Plan (HAMP) authorized under Section 35.05 of the New York State Parks, Recreation, and Historic Preservation Law to identify and encourage heritage tourism opportunities related to the Underground Railroad in the Niagara Falls vicinity. American Society of Landscape Architects (ASLA) Upstate Chapter Award for Historic Preservation.

Seneca Park Zoo Parking Lot Expansion, City of Rochester & Town of Irondequoit, Monroe County, NY - Managed a Phase I Archaeological Survey in support of SEQRA review on behalf of Monroe County Parks Department for a 1.5-acre parcel.

Crown City Wind Project, Cortland County, NY - Managed the Cultural Resources Survey, Visual Impact Assessment, and prepared DEIS sections as part of SEQRA review for proposed 44-turbine, approximately 71 MW wind energy project.

Buckeye II Wind Project, Champaign County, OH - Directed the Visual Impact Assessment for a proposed 56-turbine, 140 MW wind energy project in support of an Application for a Certificate of Environmental Compatibility and Public Need to the Ohio Power Siting Board (OPSB).

Monticello Hills Wind Project, Otsego County, NY - Supervised the SEQRA process and preparation of permitting support studies (including Full Environmental Assessment Form, Visual Impact Assessment, wetland delineation, shadow-flicker analysis, Phase IA Cultural Resources Survey, Historic Resources Survey, and Phase IB Archaeological Survey) for a proposed six-turbine, 18 MW wind energy project.

South Mountain Wind Project, Delaware County, NY - Managed the preparation of environmental permitting studies in support of SEQRA review (including wetland delineation, threatened and endangered species habitat assessment, and timber rattlesnake survey) for a proposed community-scale wind energy project.

Smokey Avenue Wind Project, Otsego County, NY - Supervised the preparation of environmental permitting studies in support of SEQRA review (including Shadow Flicker Analysis, ballooning fieldwork and visibility study, and Phase IA Cultural Resources Survey) for proposed community-scale wind energy project.

Roaring Brook Wind Power Project, Lewis County, NY - Directed the supplemental/addendum Phase IB Archaeological Survey in association with project layout revisions for a proposed 79MW wind energy project.

Sackets Harbor Battlefield National Historic Landmark (NHL) Nomination, Jefferson County, NY - Prepared sections of NHL nomination and Battlefield Preservation Plan for the 260-acre War of 1812 battlefield in Sackets Harbor, under a grant from the American Battlefield Protection Program of the National Park Service.

Warren Hull Family Home & Farmstead, Erie County, NY - Coordinated preparation of graphic displays for cultural landscape historic overview and treatment plan to support restoration of the landscape at a ca. 1825 landmark house museum.

Long Island - New York City Offshore Wind Project, Queens, Nassau, & Suffolk Counties, NY - Supervised the preparation of visual simulations, web-based presentation, and associated visualization services for a proposed 350 MW offshore wind energy project located in the Atlantic Ocean approximately 13-miles off the coast.

Allegany Wind Power Project, Cattaraugus County, NY - Prepared the supplemental/addendum Phase IB Archaeological Survey in association with review of construction plans by New York SHPO for a proposed 29-turbine, 72.5 MW wind energy project.

Horse Creek Wind Farm, Jefferson County, NY - Directed the Visual Impact Assessment, including viewshed analysis, field work, photographic simulations, and VIA report for a proposed 50-turbine, 100 MW wind energy project.

Tioga Downs Wastewater Improvement Project, Tioga County, NY - Supervised the Phase I Archaeological Survey and Phase 2 Archaeological Site Investigation of a pre-contact Native American archaeological site for a wastewater treatment facility and 0.5-mile water line.

Collegetown Terrace, Tompkins County, NY - Managed the SEQRA review and prepared FEIS on behalf of the City of Ithaca Planning & Development Board for a 16-acre, 1,260-unit student housing project.

Big Savage 138 kV Generator Lead, Allegany County, MD - Managed the Visual Impact Assessment and Cultural Resources Assessment for Maryland Public Service Commission CPCN review of a proposed 7-mile transmission line.

Marble River Wind Project, Clinton County, NY - Supervised the cultural resources and visual impacts analyses for SEQRA permitting review of a revised layout for a 74-wind turbine, 222 MW wind energy project.

Amherst State Park Veterans Memorial, Erie County, NY - Managed the Phase IB Archaeological Survey for a proposed veterans' memorial and 1,500-foot footpath in Amherst State Park.

Timber Road II Wind Project, Paulding County, OH - Directed the Visual Impact Assessment for a 109-turbine, 150 MW wind energy project in support of an Application for a Certificate of Environmental Compatibility and Public Need submitted to the Ohio Power Siting Board (OPSB).

Hardscrabble Wind Power Project, Herkimer County, NY - Directed the supplemental Phase IB Archaeological Survey, construction monitoring, and compliance with U.S. Army Corps of Engineers/SHPO Memorandum of Agreement for a 37-turbine, 74 MW wind energy project.

Benson Mines Meteorological Tower, St. Lawrence County, NY - Directed the visual assessment, ballooning fieldwork, and visual simulations in accordance with the Adirondack Park Agency (APA) Visual Analysis Methodology for a proposed 160-foot meteorological tower.

Deerfield Wind Power Project, Bennington County, VT - Prepared sections of Supplemental DEIS for a 15-turbine, 30 MW wind energy project located in the Green Mountain National Forest, as part of NEPA review on behalf of the U.S. Department of Agriculture (USDA) National Forest Service.

National Grid 115 kV Line, Lighthouse Hill to Coffeen Street, Oswego & Jefferson Counties, NY - Prepared visual impact assessment portion of Part 102 Report for a 40-mile 115 kV transmission line maintenance and refurbishment project.

National Grid Eastover Road Substation & Tap Line, Town of Schagticoke, Rensselaer County, NY - Ballooning/visual impact assessment fieldwork for a proposed 6.4-acre 230/115 kV substation and 0.75-mile 155 kV tap line.

NYSED / CULTURAL RESOURCE SURVEY PROGRAM (2011-2016) – Principal-in-Charge currently responsible for directing the EDR Team providing cultural resource survey services (on call, as needed), associated with NYSDOT and other State agency undertakings, in the role of sub-consultant to three Prime Consultant teams, on three separate NYSED regional contracts.

RELEVANT NYSED CULTURAL RESOURCE SURVEY PROGRAM EXPERIENCE prior to joining EDR in 2010:

- 2008-2009 New York State Museum, NYSDOT PIN 3314.35.121, City of Auburn, NY, Cultural Resources Specialist - Phase 1 cultural resources survey for highway reconstruction of NYS Route 34.
- 2008 New York State Museum, NYSDOT PIN 304765.121, Town of Cicero, Onondaga County, NY, Cultural Resources Specialist - Phase 1 cultural resources survey for reconstruction of NYS Route 31.
- 2007-2008 New York State Museum, NYSDOT PIN 3045.52.121, Oswego County, NY, Cultural Resources Specialist - Phase 1 cultural resources survey for reconstruction of NYS Route 104.
- 2007 New York State Museum, NYSDOT PIN 3033.17.121, Village of Freeville, Tompkins County, NY, Cultural Resources Specialist - Phase 1 cultural resources survey for reconstruction of NYS Routes 366 & 38.
- 2007 New York State Museum, NYSDOT PIN X731.05.101, Richmond County, NY, Cultural Resources Specialist - Phase 1 cultural resources survey for proposed park and ride facility, West Shore Expressway/NYS Route 440.
- 2005 New York State Museum, NYSDOT PIN 9066.96.121 & 9067.10.121, Sullivan County, NY, Cultural Resources Specialist - artifact analysis for Phase 2 site examinations of historic-archeological sites (NYSM Sites 10966, 11456, 11569, & 11572) for the upgrade of NYS Route 17 to Interstate I-86.
- 2004 New York State Museum, NYSDOT PIN 9066.96.121 & 9067.12.121, Sullivan County, NY, Cultural Resources Specialist - historical research and report preparation for multiple Phase 1 cultural resources surveys associated with the upgrade of NYS Route 17 to Interstate I-86.
- 2003 New York State Museum, NYSDOT PIN 4753.13.121, Wayne County, NY, Cultural Resources Specialist - Phase 1 cultural resources survey for bridge replacement project, County Route 143 over Sodus Bay.
- 2003 New York State Museum, NYSDOT PIN 4015.02.101, Monroe County, NY, Cultural Resources Specialist - historical research and report preparation for Phase 1 cultural resources survey for intersection improvement project.

Publications & Presentations

Poster Presentation. *Cultural Resources: Proactive Approaches to Managing Potential Risks*. 2022 American Clean Power (ACP) Siting and Environmental Compliance Conference, Round Rock, TX. March 2022.

Panel Discussion Chair and Participant. *Renewable Energy and Historic Preservation: Impacts and Opportunities*. 2020 New York Statewide Preservation Conference. Online/remote. December 2020.

Panel Discussion Participant. *Native American Consultation Practices*. 2019 Spring Meeting, New York Archaeological Council (NYAC). April 2019.

Presenter. *It's a Brave New World: Online Consultation with the New York State Historic Preservation Office* (SHPO). 2015 New York State Wetlands Forum Conference, Syracuse, NY. April 2015.

Poster Presentation. *The Effect of Larger Rotor Diameters and Taller Hub Heights on Shadow Flicker Impacts*. 2013 American Wind Energy Association (AWEA) Wind Conference, Chicago, IL. May 2013.

Presenter. *Cultural Heritage Planning: History as a Marketable Asset*. Annual Conference of the New York Upstate Chapter of the American Planning Association, Corning, NY. September 2012.

Presenter. *Use of Visualization Techniques and Computer Graphics to Address the Visibility and Appearance of Offshore Wind Projects*. 2011 AWEA Offshore Wind Conference, Baltimore, MD. October 2011.

Heaton, Patrick J., J. Sanderson Stevens, L.E. Branch-Raymer, & J. Wettstaed. 2010. "Archaeological Investigations of an Early Farmstead Site in Shelby County, Indiana". *Indiana Archaeology* 5(2):74-95.

Heaton, Patrick J. 2003. "The Rural Settlement History of the Hector Backbone." *Northeast Historical Archaeology* 32:19–28.

Heaton, Patrick J. 2003. "Farmsteads and Finances in the Finger Lakes: Using Archival Sources in a GIS Database." *Northeast Historical Archaeology* 32:29–44.

Six, Janet, Patrick J. Heaton, Susan Malin-Boyce, & James A. Delle. 2003. "The Artifact Assemblage from the Finger Lakes National Forest Archaeology Project." *Northeast Historical Archaeology* 32:79–94.

Delle, James A., & Patrick J. Heaton. 2003. "The Hector Backbone: A Quiescent Landscape of Conflict." *Historical Archaeology* 37(3):93-110.

Heaton, Patrick J. 2000. Book review of *Nineteenth- and Early Twentieth-Century Domestic Site Archaeology in New York State*, edited by John P. Hart and Charles L. Fisher, New York State Museum Bulletin No. 495, Albany, NY, 2000. Published in *Northeast Anthropology* 60:93-94.

Employment History

Principal, Cultural Resources Services, Environmental Design & Research, Landscape Architecture, Engineering and Environmental Services, D.P.C., Syracuse, NY, 2013-present

Project Manager, Environmental Design & Research, Landscape Architecture, Engineering and Environmental Services, D.P.C., Syracuse, NY, 2013-2013

Associate, Principal Archaeologist and Project Manager, John Milner Associates, Inc., Croton-on-Hudson, NY, 2004-2010

Project Archaeologist, John Milner Associates, Inc., Croton-on-Hudson, NY, 2000-2004

Graduate Teaching Assistant, Anthropology Department, New York University, New York, NY, 1997-2000

Research Consultant, Sass Conservation, Inc., Yonkers, NY, 1998-2000

Field Archaeologist, Various Firms, NY, RI, MA, PA, CT, 1995-1999

Douglas J Pippin, PhD, RPA

Senior Project Manager, Archaeology

Doug is an Archaeology Project Manager at EDR. Dr. Pippin has over 20 years of professional experience as an archaeologist and was previously a professor in the Department of Anthropology at SUNY Oswego. On behalf of the college, he directed compliance efforts for the Native American Graves Protection and Repatriation Act (NAGPRA). In addition, he has published numerous peer-reviewed articles and makes regular presentations at academic and professional conferences. Doug's areas of expertise include historic-period archaeology, NAGPRA, State Historic Preservation Office and Tribal Historic Preservation Office consultation, archaeological collections management, and colonial-period military history in the northeastern United States and Canada.

As a Senior Project Manager Doug directs cultural resources surveys and develops strategies for the identification, protection, and/or mitigation of archaeological and historic resources.

Education

- Doctorate, Anthropology, Maxwell School of Citizenship & Public Affairs, Syracuse University, Syracuse, NY
- Master of Arts, Anthropology, Maxwell School of Citizenship & Public Affairs, Syracuse University, Syracuse, NY
- Bachelor of Science, Photojournalism, University of Maryland

Registration

- Registered Professional Archaeologist #17571

Professional Affiliations

- President, Lewis Henry Morgan Chapter (Rochester), NYS Archaeological Association
- New York Archaeology Council
- Society for Historical Archaeology

Employment History

- Senior Project Manager, Archaeology, Environmental Design & Research, Landscape Architecture, Engineering & Environmental Services, D.P.C, Syracuse, NY, 2021-present
- Archaeology Project Manager, Environmental Design & Research, Landscape Architecture, Engineering & Environmental Services, D.P.C., Syracuse, NY, 2018-2021

Project Experience

Sunrise Wind, Onshore Transmission Line, Suffolk County, NY – Project Manager for a Phase I archaeological survey of the onshore interconnection cable route and substation for a proposed 880-MW offshore wind farm located off the coast of Southern New England. EDR's services were in support of a New York State Public Service Commission Article VII Application.

Seneca Nation of Indians Transportation Services – Project manager for cultural resources assessment of improvements to STS Cattaraugus and Allegany Garages.

Willowbrook Solar, Highland and Brown Counties, Ohio – Project manager for Phase IB archaeological survey in support of an OPSB Application for a proposed solar energy project that will be sited on an approximately 2,200-acre area.

Clearview Solar, Champaign County, Ohio - Project manager for Phase IB archaeological survey in support of an OPSB Application for a proposed solar energy project that will be sited on an approximately 1,196-acre area.

Powell Creek Solar, Putnam County, Ohio - Project manager for Phase IB archaeological survey in support of an OPSB Application for a proposed solar energy project that will be sited on an approximately 2,013-acre area.

Prattsburgh Wind Farm, Steuben County, New York - Project manager for Phase IB archaeological survey in in support of a DPS Article 10 application for a proposed wind farm energy project.

Morris Ridge Solar Energy Center, Livingston County, NY – Project Manager for a Phase I archaeological survey at a proposed 177-MW solar facility. Services provided in support of the New York State Department of Public Service Article 10 Application review.

South Fork Wind, Onshore Transmission Line, Suffolk County, NY – Project Manager for a Phase I archaeological survey of the onshore interconnection cable route for a proposed 132-MW offshore wind farm located off the coast of Southern New England. EDR's services were in support of a New York State Public Service Commission Article VII Application.

Flint Mine Solar, Greene County, NY – Project Manager for a Phase I archaeological survey at a proposed 100-MW solar facility. Services provided in support of the New York State Department of Public Service Article 10 Application review.

Heritage Wind Project, Orleans County, NY – Project Manager for a Phase I archaeological survey at a proposed 200-MW solar facility. Services provided in support of the New York State Department of Public Service Article 10 Application review.

Riverhead Solar 2, Suffolk County, NY – Project Manager for a Phase I archaeological survey at a proposed 36-MW solar facility. Co-author of final report, submitted to New York State Historic Preservation Office (SHPO). Services provided in support of the New York State Department of Public Service Article 10 Application review.

Alamo Solar, Preble County, OH – Project Manager for the Phase I archaeological survey and co-author of the archaeological research design, in consultation with the Ohio Historic Preservation Office (OHPO). Services provided in support of an Application to the Ohio Power Siting Board (OPSB) for the proposed 70-MW solar energy project sited on approximately 1,002-acres.

Angelina Solar, Preble County, OH – Project Manager for the Phase I archaeological survey and co-author of the archaeological research design, in consultation with OHPO. Services provided in support of an Application to the OPSB for the proposed 80-MW solar energy project sited on approximately 934-acres.

Coxsackie Correctional Facility, Greene County, NY – Co-authored the Phase III archaeological survey report for a Pre-Contact Native American archaeological site identified and excavated pursuant to Section 14.09 of the New York State Historic Preservation Act and Section 106 of the National Historic Preservation Act. Directed laboratory analysis of approximately 7,000 artifacts.

Hillcrest Solar Project, Brown County, OH – Project Manager for the Phase I archaeological survey at a proposed 125-MW solar energy project sited on approximately 1,400-acres. Cultural resources survey conducted in consultation with the OHPO pursuant to conditions of Certificate approved by the OPSB.

Cassadaga Wind Project, Chautauqua County, NY – Co-authored a Phase II documentary research report for three historic-period sites identified during the previous Phase IB archaeological survey, related to layout changes to a proposed 126-MW wind farm. Services provided in support of the New York State Department of Public Service Article 10 Application review.

Johnson Hall State Historic Site, Fulton County, NY – Project Manager for Phase I archaeological survey at the eighteenth century colonial mansion of Sir William Johnson. Services were in support of building improvements for drainage around the foundation walls. Co-author of the final report submitted to SHPO.

Lake Road Improvement Project, Monroe County, NY – Project Manager for Phase II archaeological survey in support of a roadway improvement project. Responsible for overseeing the survey in a DOT right-of-way, developing a Phase II investigation strategy, and contributing to the final report for a pre-contact Native American site.

Timber Road IV, Paulding County, OH – Assisted in the revision of the Phase I archaeological survey report for the 100-MW wind farm in the Great black Swamp region.

Village of Mohawk Water Wells, Herkimer County, NY – Assisted in the report for the archaeological monitoring of excavation/construction of water wells within a 1.2-acre parcel being redeveloped with storm-resilient municipal and utility infrastructure. Monitoring was conducted as part of Section 106 of the National Historic Preservation Act consultation for the New York Governor's Office of Storm Recovery (GOSR) and Federal Emergency Management Agency (FEMA).

Project experience prior to joining EDR

Native American Graves Protection and Repatriation Act Compliance Director, State University of New York (SUNY) at Oswego- Coordinated tribal and agency consultation along with federal regulatory compliance for the inventory of SUNY Oswego's archaeological collections. Managed a collection of over 150,000 artifacts from more than 125 archaeological sites. Prepared grant applications, managed grant funding, directed student laboratory assistants, and prepared comprehensive inventory of archaeological collections. Consulted with law enforcement agencies, the Oneida Indian Nation of New York, the Onondaga Nation, the Mohawk Nation at Akwesasne, the U.S. Department of the Army, the National Park Service, the New York State Museum and the New York State Historic Preservation Office to coordinate the reparation of sacred/ceremonial objects and human remains to Nations. 2005-2018.

Carleton Island, Cape Vincent, NY- Ph.D. Dissertation Research Project. Archaeological survey and excavation at the site of Fort Haldimand, a late-eighteenth century British military fortification located in the Thousand Islands. Excavations at both soldiers' and officers' barracks to better understand living conditions in the eighteenth century upper St. Lawrence Valley. 1998-2002, 2011–Present.

Tram Site, Livonia, NY- Supervised the public excavation conducted through the Lewis Henry Morgan Chapter, New York State Archaeological Association. Goals include mapping the extent of the Tram Site settlement area, outside of that protected by the Archaeological Conservancy. Survey and testing of approximately 5 acres. 2016-Present

Burning Springs Site, Bristol, NY- Supervised the public excavation conducted through the Lewis Henry Morgan Chapter, New York State Archaeological Association. A multi-component seventeenth century site visited by the explorer LaSalle while he was in the Seneca territory before moving westward. As a result, the site appears on some of the earliest maps of North America. Archaeological testing of approximately 6 acres to investigate any long-term use of the springs area by the Haudenosaunee, and early historic-period residents of the Bristol Valley. 2010-2013.

Warderwick Wells, Exuma Cay Land & Sea Park, Bahamas- Worked within the Exuma Cays Land and Sea Park to map and survey archaeological sites believed to be associated American Loyalist refugee settlements. Six activity areas mapped and recorded, including potential burial ground. Archival investigations completed at the Bahamas National Archives, Nassau and the National Archives, UK. 2010-2012.

John Brown Hall at the Harriet Tubman Home, Auburn, NY- Field Supervisor for the Syracuse University archaeological field school at the site of the home that Harriet Tubman built for elderly, former slaves. 1998.

Chittenango Landing Canal Boat Museum, Chittenango, NY- Field Supervisor for the Syracuse University archaeological field school at a nineteenth century worker's house at an Erie Canal dry dock complex. 1994.

Publications and Reports

"A very laborious task:" British colonial policy and Fort Haldimand on Carleton Island, New York (1778-1784). In *British Forts and Their Communities: Archaeological and Historical Perspectives,* Christopher R. DeCorse and Zachary James Beier, eds. Gainesville: University Press of Florida, 2018.

NAGPRA Consultation/Documentation Grant Final Project Report, Grant # 36—12—GP—583. Submitted to National NAGPRA, United States Department of the Interior on behalf of the Research Foundation for the State University of New York. 2016

NAGPRA Consultation/Documentation Grant Final Project Report, Grant # 36—11—GP—553. Submitted to National NAGPRA, United States Department of the Interior on behalf of the Research Foundation for the State University of New York. 2016

Summary of archaeological investigations at the Chittenango Landing Canal Boat Museum. In *Chittenango Landing Canal Boat Museum Cultural Landscape Report.* Patrick Heaton, ed. Prepared by EDR, Syracuse, NY, 2014.

NAGPRA Consultation/Documentation Grant Final Project Report, Grant # 36—08—GP—488. Submitted to National NAGPRA, United States Department of the Interior on behalf of the Research Foundation for the State University of New York. 2011

"Distressed for want of provision:" Supplying the British soldier on Carleton Island (1778-1784). In *Soldiers, Cities and Landscapes: Papers in honor of Charles L. Fisher.* Penelope Drooker and John Hart, eds. Albany: New York State Museum Bulletin 513, 2010.

For want of provisions: an archaeological and historical investigation of the British soldier at Fort Haldimand, 1778–84. Dissertation produced for Doctor of Philosophy degree in anthropology. Maxwell School of Citizenship and Public Affairs, Syracuse University. 2010.

The British soldier on Carleton Island: an archaeological perspective. *Historic Kingston 53 (1)*. 2005. century worker's house at an Erie Canal dry dock complex. 1994.

Conference Presentations

Reforming the Collection: Documentation, Fieldwork and the NAGPRA Process at State University of New York (SUNY), College at Oswego. Poster presentation for the annual meeting of the Society for Historical Archaeology, New Orleans, 2018.

The British on Lake Ontario During the American Revolution: an Archaeological Perspective. Paper presented at the Fort Ontario Conference on Military History and Archaeology, Oswego, NY, 2017.

Archaeological Review of New York's British & American Revolutionary War Fortifications. Presentation at the second annual Conference on the American Revolution in the Mohawk Valley, Fort Plain, NY, 2016.

On the Border, in Between Two Wars: Carleton Island in Canadian and American Identity. Paper presented at the annual meeting of the Council for Northeast Historical Archaeology, Ottawa, Ontario, 2016

(*Aericka Pawlikowski and Kyle Honness, co-authors*) Class and Status in the British Army at Fort Haldimand, Carleton Island, New York. Poster presentation for the annual meeting of the Society for Historical Archaeology, Seattle, 2015.

The Officers' Barracks and Current Archaeological Investigations at Fort Haldimand, Carleton Island, New York. Poster presentation at the annual meeting of the Society for Historical Archaeology, Quebec City, Quebec, 2014

"It is promised to them:" Loyalist refugees' adaptation in the Exuma Cays, Bahamas (1784-1810). Paper presented at the annual meeting of the Society for Historical Archaeology, Leicester, UK, 2013.

"A very laborious task:" British colonial policy and the establishment of Fort Haldimand on Carleton Island (1778–1784). Paper presented at the annual meeting of the Society for American Archaeology, Honolulu, HI, 2013.

The SUNY Oswego NAGPRA Compliance Project. Progress report delivered to the NAGPRA Review Committee, National Museum of the American Indian, Washington, D.C., 2012.

Grants and Awards

Faculty Scholarly and Creative Activity Grant. Awarded by SUNY Oswego, to support archival research in London, 2016-17.

President's Award for Excellence in Academic Advisement. SUNY Oswego, 2012.

NAGPRA Consultation and Documentation Grant. Project director & co-recipient with Paul Tomascak and Kathleen Blake. Awarded $49,500 from the National Park Service for the acquisition of a portable, x-ray fluorescence analyzer for the NAGPRA archaeology lab, The Research Foundation for the State University of New York, SUNY Oswego, 2012.

NAGPRA Consultation and Documentation Grant. Project director. Awarded $90,000 from the National Park Service to support collections management at SUNY Oswego, The Research Foundation for the State University of New York, 2011.

NAGPRA Consultation and Documentation Grant. Project director. Awarded $75,000 from the National Park Service to support collections management at SUNY Oswego, 2008.

Award for Meritorious Service. Given by the New York State Archaeological Association for service to the Lewis Henry Morgan Chapter, Rochester, 2006.

Public Archaeology and Invited Presentations

Panel Discussant, Oswego in the French and Indian War and the War of 1812. Plenary session. The Fort Ontario Conference on Military History and Archaeology, Oswego, NY, 2017.

Plates, Buttons and Bowls: The Domestic Life of the British Soldier on Carleton Island 1778–1784. Invited presentation at the Cape Vincent Historical Weekend Celebration, Cape Vincent, NY, 2016.

TILT Trek. On-site archaeological presentation, activities, and tour of Fort Haldimand, Carleton Island, NY. Organized by the Thousand Islands Land Trust, Clayton, NY, 2015.

Archaeological Investigation of the Royal Highland Emigrants on Carleton Island, 1778–1784. Invited presentation at the International Archaeology Day Symposium, Fort Stanwix National Monument, Rome, NY, 2014.