Dewberry

Environmental Impact Statement for CAFRA Individual Permit Application

Colonial Drive Bridge Replacements

Township of Manchester, Ocean County, New Jersey

August 2019

SUBMITTED BY:

Dewberry
200 Broadacres Drive, Suite 410
Bloomfield, NJ 07003

SUBMITTED TO:

New Jersey Department of Environmental Protection
Division of Land Use Regulation
PO Box 420
Trenton, NJ 08625

ON BEHALF OF:

County of Ocean
129 Hooper Ave,
Toms River, NJ 08754

TABLE OF CONTENTS

APPENDICES

I. A. PROPOSED ACTIVITY

Ocean County Bridges Nos. 1518-017 and 1518-018 carry Colonial Drive northbound and southbound, respectively, over Union Branch in the Township of Manchester. The 25 ft. +/- two span structures, with an approximate overall length of 52 ft., were originally constructed in 1968, are located between Huntington Drive on the north and Route 37 on the south.

The project will replace the existing two span pier supported precast concrete slab beam bridges with single span simply supported bridges in the same alignment. The proposed roadway configuration will consist of one bridge with as 16 ft. northbound lane, a 10 ft. shoulder, and a 5 ft. sidewalk, and a separate bridge with a 16 ft. southbound lane, a 10 ft. shoulder, and a 5 ft. sidewalk. The construction will be completed with 3 stages and no provision of temporary bridge is required.

The alignment of the roadway and the bridges widths will not change. The proposed low chord elevation of the bridges will be lowered from the existing condition. The existing stormwater outfalls will be reconstructed to discharge through their respective new wingwalls.

The proposed project will include relocation of utilities including water, gas and aerial utilities. Utility poles carrying aerial lines will be relocated off the roadway to prevent interference with construction of the proposed bridge. The existing gas line that is attached to the downstream side of the northbound bridge will be relocated and placed underground by directionally drilling below the channel.

B. SITE CHARACTERISTICS

The project area is located in a wooded area. The bridges carry Colonial Drive, which runs north and south, over Union Branch, which flows from west to east. The site contains Freshwater Wetlands and Riparian Zones and is located in the Coastal Zone.

C. PROPOSED REGULATED ACTIVITIES

The impacts from this project include the disturbance of State open waters, freshwater wetlands, and riparian buffer zones. The Permit Plans submitted with this report identify the impact areas throughout the project limits.

The existing pier is to be removed and the bridge opening will be widened. This will involve placing cofferdams around the abutments during construction. The cofferdams will be left in place and cut off below the grade of the streambed. The existing wingwalls will be removed and replaced with a fill slope. The pier will be removed via crane stationed behind the existing abutments to reduce disturbance.

Riprap will be placed at reconstructed outfalls at three of the new wingwalls.

The proposed project is not a major development per the Stormwater Management Rules at N.J.A.C. 7:8, there is less than 0.25 acres of proposed increase of impervious area and

less than an acre of disturbance. All temporary impact areas will be restored to preconstruction conditions. No mitigation is proposed for this project.

II. APPLICABILITY OF COASTAL ZONE MANAGEMENT RULES

Per 7:7-23.6 Additional requirements specific to an application for an individual permit, the following statement of compliance addresses rules applicable to this proposed development. (Non-applicable sections are not listed).

SUBCHAPTER 1. GENERAL PROVISIONS

7:7-1.4 Standards for evaluating permit applications

The Department shall issue a permit pursuant to CAFRA only upon a finding as required by N.J.S.A. 13:19-10 that the development: 1. Conforms with all applicable air, water and radiation emission and effluent standards and all applicable water quality criteria and air quality standards; 2. Prevents air emissions and water effluents in excess of the existing dilution, assimilative and recovery capacities of the air and water environments at the site and within the surrounding region; 3. Provides for the collection and disposal of litter, recyclable and solid waste in such a manner as to minimize adverse environmental effects and the threat to the public health, safety and welfare; 4. Would result in minimal feasible impairment of the regenerative capacity of water aquifers or other ground or surface water supplies; 5. Would cause minimal feasible interference with the natural functioning of plant, animal, fish and human life processes at the site and within the surrounding region; 6. Is located or constructed so as to neither endanger human life or property nor otherwise impair the public health, safety and welfare; 7. Would result in minimal practicable degradation of unique or irreplaceable land types, historical or archaeological areas and existing public scenic attributes at the site and within the surrounding region; and 8. Provides, pursuant to standards established in this chapter, onsite public access to the waterfront and adjacent shoreline, or offsite public access to the waterfront and adjacent shoreline if on-site public access is not feasible as determined by the Department.

Response: The proposed bridge replacement project will have no air emissions, water effluents, and collection or disposal of litter, recyclable and solid waste associated with the development. There will be no impacts to water aquifers or other ground or surface water supplies. All impacts to the surrounding area have been minimized to prevent interference with the natural functioning of plant, animal, fish and human life processes. There are no unique or irreplaceable land types, historical or archaeological areas near the project site. All temporary impacts of surrounding areas will be restored to their preconstruction condition.

IMPACT TYPE	ALLOWABLE DISTURBANCE, SF	PERMANENT DISTURBANCE, SF	TEMPORARY DISTURBANCE, SF	TOTAL DISTURBANCE, SF	PORTION EXCEEDING ALLOWABLE LIMIT, SF
Reconstructed Roadway (Crossing)	3,000	931	0	931	0

The FHA total impacts, both temporary and permanent, are 931 square feet which is less than the allowable disturbance. Therefore, the project is consistent with N.J.A.C. 7:7-9.26.

7:7-9.27 Wetlands

Wetlands or wetland means an area that is inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support, and that under normal circumstances does support, a prevalence of vegetation typically adapted for life in saturated soil conditions, commonly known as hydrophytic vegetation.

Response: Dewberry performed site reconnaissance activities in the study area on May 16, 2018. The wetlands delineated consisted of forested areas and shrub-scrub areas. The Freshwater Wetlands (FWW) impacts are summarized below:

IMPACT TYPE	PERMANENT IMPACTS, AC	TEMPORARY IMPACTS, AC	TOTAL, AC
Freshwater Wetlands	0.0129	--	0.0129
Transition Area	0.1053	0.0508	0.1561
State Open Water	0.0056	0.0347	0.0403
Created State Open Water	-0.0199	--	-0.0199
Total Impact	0.1039	0.0855	0.1894

The total impact (both temporary and permanent) is 0.189 acres, which is less than the allowable disturbance limit of 0.25 acres permitted under Freshwater Wetlands General Permit 10B, therefore, the project complies with this regulation.

7:7-9.28 Wetlands buffers

Wetlands buffer or transition area means an area of land adjacent to a wetland which minimizes adverse impacts on the wetlands or serves as an integral component of the wetlands ecosystem. Wider buffers than those noted below may be required to establish conformance with this chapter, including, but not limited to, N.J.A.C. 7:7-9.36 and 9.37.

Response: As defined by the NJ Freshwater Wetlands Protection Act rules, there are wetlands in the project area classified as exceptional resource value. The wetland classified as an exceptional resource have a width of 150-feet. The project will impact wetland buffer areas as shown on the attached Permit Plans.

As per the applicable policies associated with the Freshwater Wetlands General Permit 10B, mitigation of wetland buffer/transition areas is not required.

7:7-9.36 Endangered or threatened wildlife or plant species habitats

Endangered or threatened wildlife or plant species habitats are terrestrial and aquatic (marine, estuarine, or freshwater) areas known to be inhabited on a seasonal or permanent basis by or to be critical at any stage in the life cycle of any wildlife or plant identified as "endangered" or "threatened" species on official Federal or State lists of endangered or threatened species, or under active consideration for State or Federal listing. The definition of endangered or threatened wildlife or plant species habitats includes a sufficient buffer area to ensure continued survival of the population of the species as well as areas that serve an essential role as corridors for movement of endangered or threatened wildlife. Absence of such a buffer area does not preclude an area from being endangered or threatened wildlife or plant species habitat.

Response: A response from the NJDEP Natural Heritage Program (NHP – see Appendix B), dated September 27, 2018, included records on the following habitats/species:

- **One state threatened Ave on the project site**
- **One state threatened and one state endangered Reptilia within the immediate vicinity of the project site**
- **Four potential vernal pool habitat areas within one mile of the project site**
- **One state threatened Amphibia, one state threated and two state endangered Aves (including Bald Eagle) within one mile of the project site**

According to the New Jersey Freshwater Wetlands Protection Act Rules, "vernal habitat" means a wetland as identified at N.J.A.C. 7:7A-2.3, or State open water, as defined at N.J.A.C. 7:7A-1.4. None of the species identified in the September 27, 2018 NHP response are included on the NJDEP's list of obligate or facultative vernal habitat species, therefore, the proposed project is not expected to impact vernal habitats. A wetland buffer width of 150-feet has been applied to the wetlands in the vicinity of the identified Bald Eagle foraging sites.

Proposed work on the Colonial Drive Bridges has been designed to minimize potential environmental impacts, and avoiding possible disturbances to any threatened or endangered species in the area of the project site, therefore, the project complies with this regulation.

7:7-9.37 Critical wildlife habitat

Critical wildlife habitats are specific areas known to serve an essential role in maintaining wildlife, particularly in wintering, breeding, and migrating.

Response: A response from the NJDEP Natural Heritage Program (NHP – see Appendix B), dated September 27, 2018, included records of Great Blue Heron nesting colonies and foraging sites.

Proposed work on the Colonial Drive Bridges has been designed to minimize potential environmental impacts, and there are no alternative sites for the proposed work, therefore, the project complies with this regulation.

7:7-9.38 Public open space

Public open space constitutes land areas owned or maintained by State, Federal, county and municipal agencies or private groups (such as conservation organizations and homeowner's associations) and used for or dedicated to conservation of natural resources, public recreation, visual or physical public access or, wildlife protection or management. Public open space also includes, but is not limited to, State Forests, State Parks, and State Fish and Wildlife Management Areas, lands held by the New Jersey Natural Lands Trust (N.J.S.A. 13:1B-15.119 et seq.), lands held by the New Jersey Water Supply Authority (N.J.S.A. 58:1B-1 et seq.) and designated Natural Areas (N.J.S.A. 13:1B-15.12a et seq.) within DEP-owned and managed lands.

Response: There are no public open space areas at the project location. All construction activity will take place in the County right-of-way or easement and will not impact any public open space areas.

7:7-9.42 Pinelands National Reserve and Pinelands Protection Area

The Pinelands National Reserve includes those lands and water areas defined in the National Parks and Recreation Act of 1978, Section 502 (P.L. 95-625), an approximately 1,000,000 acre area ranging from Monmouth County in the north, south to Cape May County and from Gloucester and Camden County on the west to the barrier islands of Island Beach State Park and Brigantine Island along the Atlantic Ocean on the east (see Appendix, Figure 10, incorporated herein by reference). The "Pinelands Area" is a slightly smaller area within the Pinelands National Reserve. It was designated for State regulation by the Pinelands Protection Act of 1979 (N.J.S.A. 13:18-1 et seq.). The Pinelands Commission adopted a Comprehensive Management Plan in November, 1980. Within the Pinelands Area, the law delineates a Preservation Area, where the plan shall "preserve an extensive and contiguous area of land in its natural state, thereby insuring the continuation of a Pinelands environment...." (Section 8c).

Response: The project is located outside of the Pinelands Area, see map in Appendix A.

SUBCHAPTER 12. GENERAL WATER AREAS

7:7-12.14 Bridges

Bridges are conditionally acceptable provided: 1. There is a demonstrated need that cannot be satisfied by existing facilities; 2. Pedestrian and bicycle use is provided for unless it is demonstrated to be inappropriate; and 3. Fishing catwalks and platforms are provided to the maximum extent practicable. This shall be taken into consideration during the design phase of all proposed bridge projects.

Response: The replacement of the bridges' is warranted based on the structural deterioration observed.

The project does have pedestrian sidewalks and will incorporate 10 ft. wide shoulders that can be used by bicycles on Colonial Drive northbound and southbound.

Provisions of fishing facilities from the bridges are neither practical nor safe for this location.

7:7-12.15 Submerged pipelines

Submerged pipelines (pipelines) are underwater pipelines which transmit liquids or gas, including crude oil, natural gas, water petroleum products or sewerage.

Response: The existing gas line that is attached to the downstream side of the northbound bridge will be relocated and placed underground by directionally drilling below the channel. The pipelines will not be sited within special areas and will be buried at a sufficient depth to avoid exposure and hazard.

7:7-12.16 Overhead transmission lines

Overhead transmission lines are wires hung between supporting pylons for transmission from the site of origin to the site of consumption. Overhead transmission lines include electrical, telecommunication and cable television lines.

Response: Utility poles carrying aerial lines will be relocated off the roadway to prevent interference with construction of the proposed bridge. Aerial utilities will be relocated with the addition of two poles each on the upstream north side and south side of the bridge crossing. The relocated aerial utilities will cross the Union Branch, which is not a navigable channel, and there will be no visual impacts to the roadway or stream.

7:7-12.18 Outfalls and intakes

Outfalls and intakes are pipe openings that are located in water areas for the purpose of intake of water or discharge of effluent including sewage, stormwater and industrial effluents.

Response: There are no intake pipes in this project, however there will be disturbance resulting from reconstructed stormwater outfalls. The outfalls are located on the upstream south wingwall, and the downstream north and south wingwalls. All the outfalls will be stabilized with preformed scour holes in accordance with the *Standards for Soil Erosion and Sediment Control in New Jersey*. Calculations for the riprap stabilization measures can be found in the Engineering Report submitted concurrently with this report. The outfalls and preformed scour holes cannot be placed in another location. There will be no stormwater management measures proposed for the project; therefore, the project is in compliance with this policy.

Subchapter 14. General Location Rules

7:7-14.1 Rule on location of linear development

A linear development shall comply with the specific location rules to determine the most acceptable route, to the maximum extent practicable. If part of the proposed alignment of a linear development is found to be unacceptable under the specific location rules (for example, the proposed alignment does not result in the linear development impacting the least possible area), that alignment may nonetheless be acceptable, provided the following conditions are met:

1. There is no prudent or feasible alternative alignment which would have less impact on sensitive areas and marine fish or fisheries, as defined at N.J.A.C. 7:7-16.2;
2. There will be no permanent or long-term loss of unique or irreplaceable areas;
3. Appropriate measures will be used to mitigate adverse environmental impacts to the maximum extent feasible, such as restoration of disturbed vegetation, habitats, and land and water features; and
4. The alignment is located on or in existing transportation corridors and alignments, to the maximum extent practicable.

Response: The proposed bridges will be constructed with no changes to the existing roadway alignment. There is no alternative that would have less impact to the area. All disturbed areas will be restored to the pre-construction conditions. There are no proposed permeant or long-term loss of unique or irreplaceable areas.

7:7-14.2 Basic location rule

A location may be acceptable for development under N.J.A.C. 7:7-9, 12, 13, and 14, but the Department may reject or conditionally approve the proposed development of the location as reasonably necessary to: 1. Promote the public health, safety, and welfare; 2. Protect public and private property, wildlife and marine fisheries; and 3. Preserve, protect and enhance the natural environment.

Response: The project will comply with these policies through the environmental review and permitting process. Relevant approvals and standards would be obtained and adhered to; therefore, the project is consistent with this policy.

7:7-14.3 Secondary impacts

Secondary impacts are the effects of additional development likely to be constructed as a result of the approval of a particular proposal. Secondary impacts can also include traffic increases, increased recreational demand and any other offsite impacts generated by onsite activities which affect the site and surrounding region.

Response: Since the project is limited to the replacement of existing public infrastructure approval of the proposal will not result in any secondary impacts.

Further the project will not generate an increase in traffic generation or result in any off site impacts

Subchapter 15. USE RULES

7:7-15.5 Transportation

Standards relevant to roads are as follows: 1. New road construction must be consistent with the rule on location of linear development at N.J.A.C. 7:7-14.1, and shall be limited to situations where: i. A clear need exists, taking into account the alternatives of upgrading existing roads and of using public transportation to meet the need; ii. Provision is made to include construction of bicycle and foot paths, except where these would not be feasible; iii. Provision is made to include, where appropriate, catwalks and parking access to nearby waterbodies. iv. Provision is made for coordinated construction of public transportation rights-of-way and facilities, such as bus lanes, rail lines, and related transit stop or station facilities and parking, except where such construction would not be feasible; v. Visual and physical access to the coastal waters is maintained, to the maximum extent practicable; and vi. Induced development in conflict with coastal rules would not be expected to result.

Response: The project will be a replacement of existing bridges in the same alignment as the existing roadway. No new roadway will be built. Sidewalks and shoulders will be constructed to accommodate pedestrians and bicycles.

SUBCHAPTER 16. RESOURCE RULES

7:7-16.3 Water quality

Coastal development which would violate the Federal Clean Water Act, or State laws, rules and regulations enacted or promulgated pursuant thereto, is prohibited. In accordance with N.J.A.C. 7:15 concerning the Water Quality Management Planning and Implementation process, coastal development that is inconsistent with an approved Water Quality Management (208) Plan under the New Jersey Water Quality Planning Act, N.J.S.A. 58:11A-1 et seq., is prohibited.

Response: The project would comply with applicable state standards via NJPDES criteria and State water quality certification guidelines. Impacts to surface waters will be minimized through the use of accepted soil erosion/sediment control practices for the construction areas, and phasing the construction work to minimize the amount of exposed soil surfaces at any given time. Therefore, the project is consistent with this policy.

7:7-16.6 Stormwater management

If a project or activity meets the definition of "major development" at N.J.A.C. 7:8-1.2, then the project or activity shall comply with the Stormwater Management rules at N.J.A.C. 7:8.

Response: The project does not meet the definition of a "major development" per the Stormwater Management Rules at N.J.A.C. 7:8. The total disturbance of 0.52 acres is less than the regulatory threshold of 1 acre. Similarly, there is a 0.061 acre increase in impervious cover, which is less than the 0.25 acre threshold. Therefore in accordance with N.J.A.C. 7:8, stormwater management is not required for this project.

7:7-16.7 Vegetation

Coastal development shall preserve, to the maximum extent practicable, existing vegetation within a development site. Coastal development shall plant new vegetation, particularly appropriate coastal species, native to New Jersey to the maximum extent practicable.

Response: Permanent impacts will be minimized. Actively disturbed areas will be replanted and restored to preconstruction conditions. Tree removal has been limited to the maximum extent possible, trees in the median and in the area adjacent to the stream banks will be removed and the area will be restored with vegetation. Based on NJDOT Highway Design Manual Standards, the trees in the medians will not be replanted.

7:7-16.12 Traffic

Coastal development shall be designed, located and operated in a manner to cause the least possible disturbance to traffic systems.

Response: The proposed roadway will be in the same alignment as the existing roadway and is designed to cause the least possible disturbance to the traffic system by staging construction to keep both directions of traffic open at all times. There will be no increase in trip generation or change in level of service.

III. QUALIFICATIONS OF PREPARER

The qualifications of the preparer of this Environmental Impact Statement is included in Appendix C.

Appendix A: FEMA Map and Pinelands Area Map

NOTES TO USERS

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The **community map repository** should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where **Base Flood Elevations** (BFEs) and/or **floodways** have been determined, users are encouraged to consult the Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Coastal Base Flood Elevations shown on this map apply only landward of 0.0' North American Vertical Datum of 1988 (NAVD 88). Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations tables in the Flood Insurance Study report for this jurisdiction. Elevations shown in the Summary of Stillwater Elevations tables should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures.** Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study report for information on flood control structures for this jurisdiction.

The **projection** used in the preparation of this map was New Jersey State Plane FIPSZONE 2900. The **horizontal datum** was NAD 83, GRS80 spheroid. Differences in datum, spheroid, projection or State Plane zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same **vertical datum.** For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at http://www.ngs.noaa.gov or contact the National Geodetic Survey at the following address:

Spatial Reference System Division
National Geodetic Survey, NOAA
Silver Spring Metro Center
1315 East-West Highway
Silver Spring, Maryland 20910
(301) 713-3191

To obtain current elevation, description, and/or location information for **bench marks** shown on this map, please contact the Information Services Branch of the National Geodetic Survey at **(301) 713-3242**, or visit its website at http://www.ngs.noaa.gov.

Base map information shown on this FIRM was provided in digital format by State of New Jersey Office of Information Technology. This information was derived from digital orthophotos produced at a scale of 1:2,400 with 1-foot pixel resolution from photography dated April 2002.

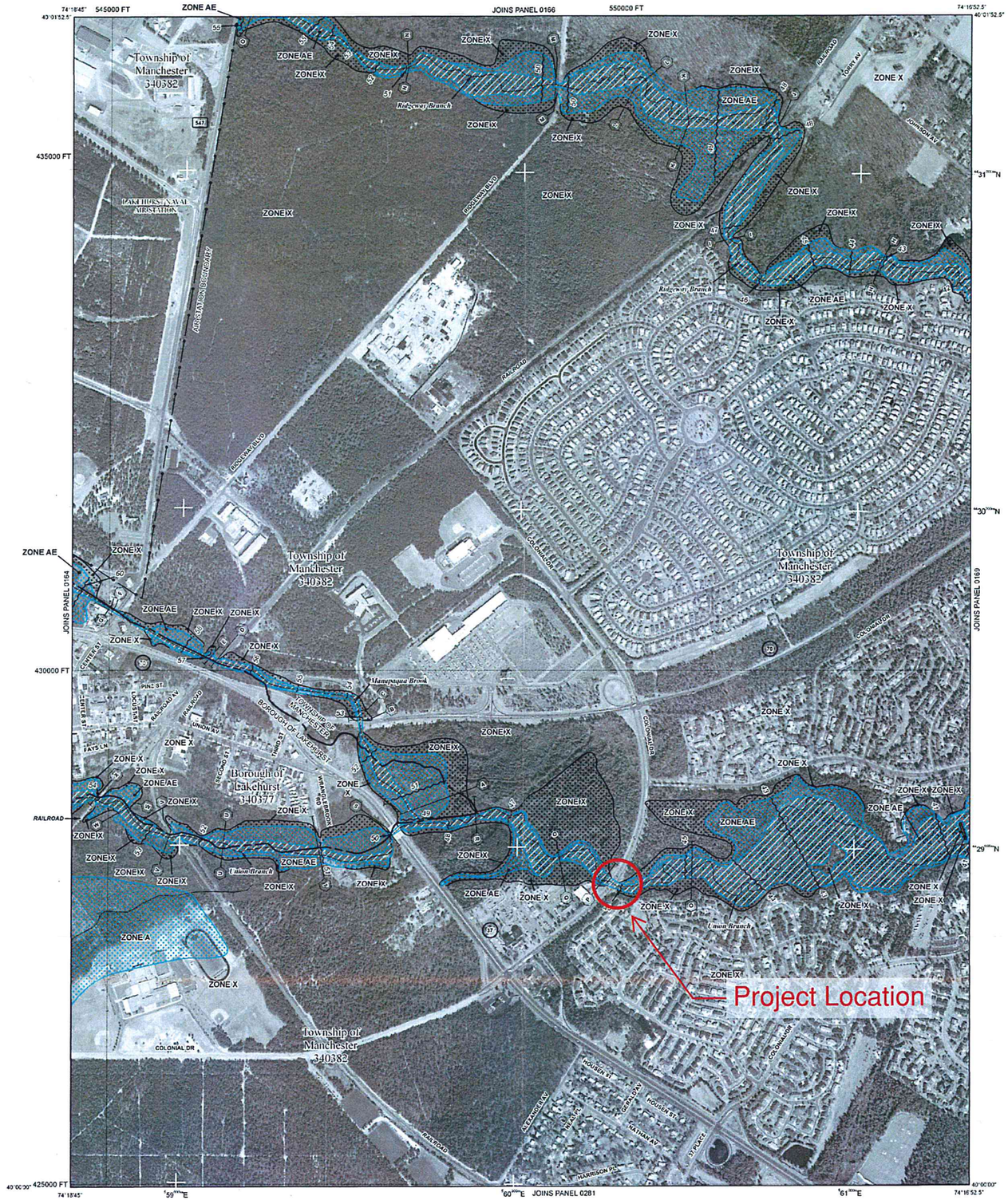
This map reflects more detailed and up-to-date **stream channel configurations** than those shown on the previous FIRM for this jurisdiction. The floodplains and floodways that were transferred from the previous FIRM may have been adjusted to confirm to these new stream channel configurations. As a result, the Flood Profiles and Floodway Data tables in the Flood Insurance Study Report (which contains authoritative hydraulic data) may reflect stream channel distances that differ from what is shown on this map.

Corporate limits shown on this map are based on the best data available at the time of publication. Because changes due to annexations or de-annexations may have occurred after this map was published, map users should contact appropriate community officials to verify current corporate limit locations.

Please refer to the separately printed **Map Index** for an overview map of the county showing the layout of map panels; community map repository addresses; and a Listing of Communities table containing National Flood Insurance Program dates for each community as well as a listing of the panels on which each community is located.

Contact the **FEMA Map Service Center** at 1-800-358-9616 for information on available products associated with this FIRM. Available products may include previously issued Letters of Map Change, a Flood Insurance Study report, and/or digital versions of this map. The FEMA Map Service Center may also be reached by Fax at 1-800-358-9620 and its website at http://www.msc.fema.gov.

If you have **questions about this map** or questions concerning the National Flood Insurance Program in general, please call **1-877-FEMA MAP** (1-877-336-2627) or visit the FEMA website at http://www.fema.gov.



LEGEND

SPECIAL FLOOD HAZARD AREAS SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A	No Base Flood Elevations determined.
ZONE AE	Base Flood Elevations determined.
ZONE AH	Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
ZONE AO	Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
ZONE AR	Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
ZONE A99	Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
ZONE V	Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
ZONE VE	Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X	Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile, and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X	Areas determined to be outside the 0.2% annual chance floodplain.
ZONE D	Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

	1% annual chance floodplain boundary
	0.2% annual chance floodplain boundary
	Floodway boundary
	Zone D boundary
	CBRS and OPA boundary
	Boundary dividing Special Flood Hazard Area Zones and boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.
513	Base Flood Elevation line and value; elevation in feet*
(EL 987)	Base Flood Elevation value where uniform within zone; elevation in feet*

* Referenced to the North American Vertical Datum of 1988

A — A	Cross section line
23 — 23	Transect line
87°07'45", 32°22'30"	Geographic coordinates referenced to the North American Datum of 1983 (NAD 83), Western Hemisphere
76°''W	1000-meter Universal Transverse Mercator grid values, zone 18
600000 FT	5000-foot grid ticks: New Jersey State Plane coordinate system, FIPSZONE 2900, Transverse Mercator projection
DX5510	Bench mark (see explanation in Notes to Users section of this FIRM panel)
M1.5	River mile

MAP REPOSITORY
Refer to listing of Map Repositories on Map Index

EFFECTIVE DATE OF COUNTYWIDE
FLOOD INSURANCE RATE MAP
SEPTEMBER 29, 2006

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your Insurance Agent or call the National Flood Insurance Program at 1-800-638-6620.

MAP SCALE 1" = 500'

250 0 500 1000 FEET
150 0 150 300 METERS

NFIP

PANEL 0168F

FIRM

FLOOD INSURANCE RATE MAP

OCEAN COUNTY, NEW JERSEY
(ALL JURISDICTIONS)

PANEL 168 OF 611

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS

COMMUNITY	NUMBER	PANEL	SUFFIX
LAKEHURST, BOROUGH OF	340377	0168	F
MANCHESTER, TOWNSHIP OF	340382	0168	F

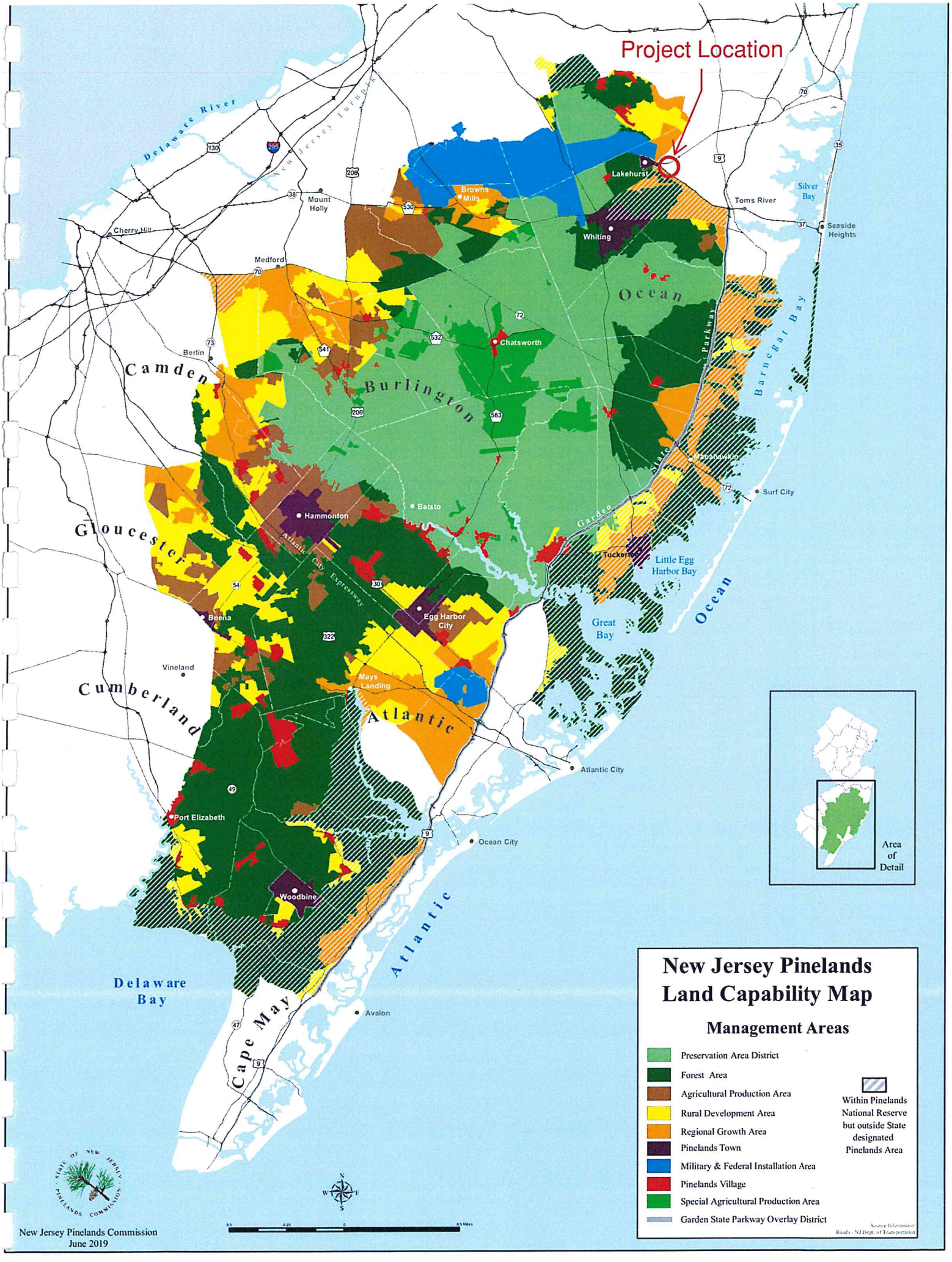
Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
34029C0168F

EFFECTIVE DATE
SEPTEMBER 29, 2006

Federal Emergency Management Agency

NATIONAL FLOOD INSURANCE PROGRAM


Project Location
Delaware River
New Jersey Turnpike
Lakehurst
Browns Mills
Mount Holly
Cherry Hill
Medford
Toms River
Silver Bay
Seaside Heights
Whiting
Ocean
Barnegat Bay
Garden State Parkway
Chatsworth
Berlin
Camden
Burlington
Hammonton
Batsto
Surf City
Tuckerton
Little Egg Harbor Bay
Great Bay
Ocean
Gloucester
Atlantic City Expressway
Egg Harbor City
Beena
Vineland
Cumberland
Mays Landing
Atlantic
Atlantic City
Port Elizabeth
Ocean City
Woodbine
Delaware Bay
Cape May
Atlantic
Avalon
Area of Detail
New Jersey Pinelands Land Capability Map
Management Areas
Preservation Area District
Forest Area
Agricultural Production Area
Rural Development Area
Regional Growth Area
Pinelands Town
Military & Federal Installation Area
Pinelands Village
Special Agricultural Production Area
Garden State Parkway Overlay District
Within Pinelands National Reserve but outside State designated Pinelands Area
Source Information: Roads - NJ Dept. of Transportation
New Jersey Pinelands Commission
June 2019

Appendix B: Correspondence

State of New Jersey
MAIL CODE 501-04
DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF PARKS & FORESTRY
NEW JERSEY FOREST SERVICE
OFFICE OF NATURAL LANDS MANAGEMENT
P.O. BOX 420
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PHILIP D. MURPHY
Governor

SHEILA Y. OLIVER
Lt. Governor

CATHERINE R. McCABE
Commissioner

September 27, 2018

Ian Abrahamsen
Dewberry Engineers, Inc.
200 Broadacres Drive, Suite 410
Bloomfield, NJ 07003

Re: Colonial Drive over Union Branch
Manchester Township, Ocean County

Dear Mr. Abrahamsen:

Thank you for your data request regarding rare species information for the above referenced project site.

Searches of the Natural Heritage Database and the Landscape Project (Version 3.3) are based on a representation of the boundaries of your project site in our Geographic Information System (GIS). We make every effort to accurately transfer your project bounds from the topographic map(s) submitted with the Natural Heritage Data Request Form into our Geographic Information System. We do not typically verify that your project bounds are accurate, or check them against other sources.

We have checked the Landscape Project habitat mapping and the Biotics Database for occurrences of any rare wildlife species or wildlife habitat on the referenced site. The Natural Heritage Database was searched for occurrences of rare plant species or ecological communities that may be on the project site. Please refer to Table 1 (attached) to determine if any rare plant species, ecological communities, or rare wildlife species or wildlife habitat are documented on site. A detailed report is provided for each category coded as 'Yes' in Table 1.

We have also checked the Landscape Project habitat mapping and Biotics Database for occurrences of rare wildlife species or wildlife habitat in the immediate vicinity (within ¼ mile) of the referenced site. Additionally, the Natural Heritage Database was checked for occurrences of rare plant species or ecological communities within ¼ mile of the site. Please refer to Table 2 (attached) to determine if any rare plant species, ecological communities, or rare wildlife species or wildlife habitat are documented within the immediate vicinity of the site. Detailed reports are provided for all categories coded as 'Yes' in Table 2. These reports may include species that have also been documented on the project site.

We have also checked the Landscape Project habitat mapping and Biotics Database for all occurrences of rare wildlife species or wildlife habitat within one mile of the referenced site. Please refer to Table 3 (attached) to determine if any rare wildlife species or wildlife habitat is documented within one mile of the project site. Detailed reports are provided for each category coded as 'Yes' in Table 3. These reports may include species that have also been documented on the project site.

For requests submitted as part of a Flood Hazard Area Control Act (FHACA) rule application, we report records for all rare plant species and ecological communities tracked by the Natural Heritage Program that may be on, or in the immediate vicinity of, your project site. A subset of these plant species are also covered by the FHACA rules when the records are located within one mile of the project site. One mile searches for FHACA plant species will only report precisely located occurrences for those wetland plant species identified under the FHACA regulations as being critically dependent on the watercourse. Please refer to Table 3 (attached) to determine if any precisely located rare wetland plant species covered by the FHACA rules have been documented. Detailed reports are provided for each category coded as 'Yes' in Table 3. These reports may include species that have also been documented on, or in the immediate vicinity of, the project site.

NHP File No. 18-4007413-15081

The Natural Heritage Program reviews its data periodically to identify priority sites for natural diversity in the State. Included as priority sites are some of the State's best habitats for rare and endangered species and ecological communities. Please refer to Tables 1, 2 and 3 (attached) to determine if any priority sites are located on, in the immediate vicinity, or within one mile of the project site.

A list of rare plant species and ecological communities that have been documented from the county (or counties), referenced above, can be downloaded from http://www.state.nj.us/dep/parksandforests/natural/heritage/countylist.html. If suitable habitat is present at the project site, the species in that list have potential to be present.

Status and rank codes used in the tables and lists are defined in EXPLANATION OF CODES USED IN NATURAL HERITAGE REPORTS, which can be downloaded from http://www.state.nj.us/dep/parksandforests/natural/heritage/nhpcodes_2010.pdf.

Beginning May 9, 2017, the Natural Heritage Program reports for wildlife species will utilize data from Landscape Project Version 3.3. If you have questions concerning the wildlife records or wildlife species mentioned in this response, we recommend that you visit the interactive web application at the following URL, https://njdep.maps.arcgis.com/apps/webappviewer/index.html?id=0e6a44098c524ed99bf739953cb4d4c7, or contact the Division of Fish and Wildlife, Endangered and Nongame Species Program at (609) 292-9400.

For additional information regarding any Federally listed plant or animal species, please contact the U.S. Fish & Wildlife Service, New Jersey Field Office at http://www.fws.gov/northeast/njfieldoffice/endangered/consultation.html.

PLEASE SEE 'CAUTIONS AND RESTRICTIONS ON NHP DATA', which can be downloaded from http://www.state.nj.us/dep/parksandforests/natural/heritage/newcaution2008.pdf.

Thank you for consulting the Natural Heritage Program. The attached invoice details the payment due for processing this data request. Feel free to contact us again regarding any future data requests.

Sincerely,

Robert J. Cartica
Administrator

c: NHP File No. 18-4007413-15081

Table 1: On Site Data Request Search Results (6 Possible Reports)

Report Name	Included	Number of Pages
1. Possibly on Project Site Based on Search of Natural Heritage Database: Rare Plant Species and Ecological Communities Currently Recorded in the New Jersey Natural Heritage Database	No	0 pages included
2. Natural Heritage Priority Sites On Site	No	0 pages included
3. Rare Wildlife Species or Wildlife Habitat on the Project Site Based on Search of Landscape Project 3.3 Species Based Patches	Yes	1 page(s) included
4. Vernal Pool Habitat on the Project Site Based on Search of Landscape Project 3.3	No	0 pages included
5. Rare Wildlife Species or Wildlife Habitat on the Project Site Based on Search of Landscape Project 3.3 Stream Habitat File	No	0 pages included
6. Other Animal Species On the Project Site Based on Additional Species Tracked by Endangered and Nongame Species Program	Yes	1 page(s) included

Rare Wildlife Species or Wildlife Habitat on the Project Site Based on Search of Landscape Project 3.3 Species Based Patches

Class	Common Name	Scientific Name	Feature Type	Rank	Federal Protection Status	State Protection Status	Grank	Srank
Aves								
	Barred Owl	Strix varia	Breeding Sighting	3	NA	State Threatened	G5	S2B,S2N
	Cooper's Hawk	Accipiter cooperii	Breeding Sighting	2	NA	Special Concern	G5	S3B,S4N
	Great Blue Heron	Ardea herodias	Foraging	2	NA	Special Concern	G5	S3B,S4N
	Great Blue Heron	Ardea herodias	Nesting Colony	2	NA	Special Concern	G5	S3B,S4N
	Wood Thrush	Hylocichla mustelina	Breeding Sighting	2	NA	Special Concern	G4	S3B,S4N

Other Animal Species On the Project Site Based on Additional Species Tracked by Endangered and Nongame Species Program

Scientific Name	Common Name	Federal Protection Status	State Protection Status	Grank	Srank
Invertebrate Animals					
Catocala herodias gerhardi	Herodias or Pine Barrens Underwing			G3T3	S3
Cicindela patruela consentanea	New Jersey Pine Barrens Tiger Beetle			G3T1T3	S2S3
Grammia placentia	Placentia Tiger Moth			G3G4	S1S3
Lithophane lemmeri	Lemmer's Noctuid Moth			G3G4	S2
Metarranthis pilosaria	Coastal Bog Metarranthis			G3G4	S3S4
Ptichodis bistrigata	Southern Ptichodis			G3	S1S3
Zanclognatha dentata	A Noctuid Moth			G3G4	S3

Total number of records: 7

Table 2: Vicinity Data Request Search Results (6 possible reports)

Report Name	Included	Number of Pages
1. Immediate Vicinity of the Project Site Based on Search of Natural Heritage Database: Rare Plant Species and Ecological Communities Currently Recorded in the New Jersey Natural Heritage Database	No	0 pages included
2. Natural Heritage Priority Sites within the Immediate Vicinity	No	0 pages included
3. Rare Wildlife Species or Wildlife Habitat Within the Immediate Vicinity of the Project Site Based on Search of Landscape Project 3.3 Species Based Patches	Yes	1 page(s) included
4. Vernal Pool Habitat In the Immediate Vicinity of Project Site Based on Search of Landscape Project 3.3	No	0 pages included
5. Rare Wildlife Species or Wildlife Habitat In the Immediate Vicinity of the Project Site Based on Search of Landscape Project 3.3 Stream Habitat File	No	0 pages included
6. Other Animal Species In the Immediate Vicinity of the Project Site Based on Additional Species Tracked by Endangered and Nongame Species Program	Yes	1 page(s) included

Rare Wildlife Species or Wildlife Habitat Within the Immediate Vicinity of the Project Site Based on Search of Landscape Project 3.3 Species Based Patches

Class	Common Name	Scientific Name	Feature Type	Rank	Federal Protection Status	State Protection Status	Grank	Srank
Aves								
	Barred Owl	Strix varia	Breeding Sighting	3	NA	State Threatened	G5	S2B,S2N
	Cooper's Hawk	Accipiter cooperii	Breeding Sighting	2	NA	Special Concern	G5	S3B,S4N
	Great Blue Heron	Ardea herodias	Foraging	2	NA	Special Concern	G5	S3B,S4N
	Great Blue Heron	Ardea herodias	Nesting Colony	2	NA	Special Concern	G5	S3B,S4N
	Wood Thrush	Hylocichla mustelina	Breeding Sighting	2	NA	Special Concern	G4	S3B,S4N
Reptilia								
	Corn Snake	Pantherophis guttatus	Occupied Habitat	4	NA	State Endangered	G5	S1
	Northern Pine Snake	Pituophis melanoleucus melanoleucus	Occupied Habitat	3	NA	State Threatened	G4T4	S2

Other Animal Species
In the Immediate Vicinity of the Project Site Based on Additional Species Tracked by Endangered and Nongame Species Program

Scientific Name	Common Name	Federal Protection Status	State Protection Status	Grank	Srank
Invertebrate Animals					
Catocala herodias gerhardi	Herodias or Pine Barrens Underwing			G3T3	S3
Cicindela patruela consentanea	New Jersey Pine Barrens Tiger Beetle			G3T1T3	S2S3
Grammia placentia	Placentia Tiger Moth			G3G4	S1S3
Lithophane lemmeri	Lemmer's Noctuid Moth			G3G4	S2
Metarranthis pilosaria	Coastal Bog Metarranthis			G3G4	S3S4
Ptichodis bistrigata	Southern Ptichodis			G3	S1S3
Zanclognatha dentata	A Noctuid Moth			G3G4	S3

Total number of records: 7

Table 3: Within 1 Mile for FHACA Searches (6 possible reports)

Report Name	Included	Number of Pages
1. Rare Plant Species Occurrences Covered by the Flood Hazard Area Control Act Rule Within One Mile of the Project Site Based on Search of Natural Heritage Database	No	0 pages included
2. Natural Heritage Priority Sites within 1 mile	No	0 pages included
3. Rare Wildlife Species or Wildlife Habitat Within One Mile of the Project Site Based on Search of Landscape Project 3.3 Species Based Patches	Yes	3 page(s) included
4. Vernal Pool Habitat Within One Mile of the Project Site Based on Search of Landscape Project 3.3	Yes	1 page(s) included
5. Rare Wildlife Species or Wildlife Habitat Within One Mile of the Project Site Based on Search of Landscape Project 3.3 Stream Habitat File	No	0 pages included
6. Other Animal Species Within One Mile of the Project Site Based on Additional Species Tracked by Endangered and Nongame Species Program	Yes	1 page(s) included

Rare Wildlife Species or Wildlife Habitat Within One Mile of the Project Site Based on Search of Landscape Project 3.3 Species Based Patches

Class	Common Name	Scientific Name	Feature Type	Rank	Federal Protection Status	State Protection Status	Grank	Srank
Amphibia								
	Pine Barrens Treefrog	Hyla andersonii	Breeding Sighting	3	NA	State Threatened	G4	S2
	Pine Barrens Treefrog	Hyla andersonii	Occupied Habitat	3	NA	State Threatened	G4	S2
	Pine Barrens Treefrog	Hyla andersonii	Vernal Pool Breeding	3	NA	State Threatened	G4	S2
Aves								
	Bald Eagle	Haliaeetus leucocephalus	Foraging	4	NA	State Endangered	G5	S1B,S2N
	Barred Owl	Strix varia	Breeding Sighting	3	NA	State Threatened	G5	S2B,S2N
	Black-throated Green Warbler	Dendroica virens	Breeding Sighting	2	NA	Special Concern	G5	S3B,S4N
	Cooper's Hawk	Accipiter cooperii	Breeding Sighting	2	NA	Special Concern	G5	S3B,S4N
	Grasshopper Sparrow	Ammodramus savannarum	Breeding Sighting	3	NA	State Threatened	G5	S2B,S3N
	Great Blue Heron	Ardea herodias	Foraging	2	NA	Special Concern	G5	S3B,S4N
	Great Blue Heron	Ardea herodias	Nesting Colony	2	NA	Special Concern	G5	S3B,S4N

Rare Wildlife Species or Wildlife Habitat Within One Mile of the Project Site Based on Search of Landscape Project 3.3 Species Based Patches

Class	Common Name	Scientific Name	Feature Type	Rank	Federal Protection Status	State Protection Status	Grank	Srank
	Least Tern	Sternula antillarum	Foraging	4	NA	State Endangered	G4	S1B,S1N
	Snowy Egret	Egretta thula	Foraging	2	NA	Special Concern	G5	S3B,S4N
	Wood Thrush	Hylocichla mustelina	Breeding Sighting	2	NA	Special Concern	G4	S3B,S4N
	Worm-eating Warbler	Helmitheros vermivorum	Breeding Sighting	2	NA	Special Concern	G5	S3B,S4N
Insecta								
	Dotted Skipper	Hesperia attalus slossonae	Casual Flyby	2	NA	Special Concern	G3G4T3	S3
	Hessel's Hairstreak	Callophrys hesseli	Casual Flyby	2	NA	Special Concern	G3G4	S3
	Pine Barrens Bluet	Enallagma recurvatum	Occupied Habitat	2	NA	Special Concern	G3	S3
	Scarlet Bluet	Enallagma pictum	Occupied Habitat	2	NA	Special Concern	G3	S3
	Two-spotted Skipper	Euphyes bimacula	Casual Flyby	2	NA	Special Concern	G4	S3
Reptilia								
	Bog Turtle	Glyptemys muhlenbergii	Occupied Habitat	5	Federally Listed Threatened	State Endangered	G3	S1
	Corn Snake	Pantherophis guttatus	Occupied Habitat	4	NA	State Endangered	G5	S1

Rare Wildlife Species or Wildlife Habitat Within One Mile of the Project Site Based on Search of Landscape Project 3.3 Species Based Patches

Class	Common Name	Scientific Name	Feature Type	Rank	Federal Protection Status	State Protection Status	Grank	Srank
	Northern Pine Snake	Pituophis melanoleucus melanoleucus	Occupied Habitat	3	NA	State Threatened	G4T4	S2
	Timber Rattlesnake	Crotalus horridus horridus	Occupied Habitat	4	NA	State Endangered	G4T4	S1

Vernal Pool Habitat Within One Mile of the Project Site Based on Search of Landscape Project 3.3

Vernal Pool Habitat Type	Vernal Pool Habitat ID
Potential vernal habitat area	1285
Potential vernal habitat area	1286
Potential vernal habitat area	1306
Potential vernal habitat area	1312

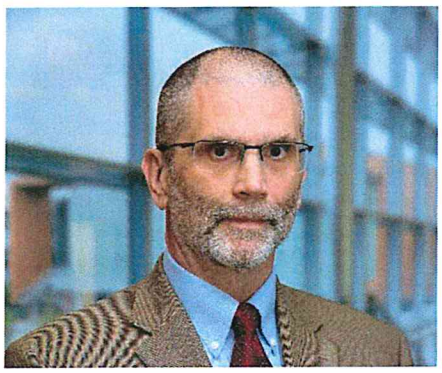
Total number of records: 4

Other Animal Species Within One Mile of the Project Site Based on Additional Species Tracked by Endangered and Nongame Species Program

Scientific Name	Common Name	Federal Protection Status	State Protection Status	Grank	Srank
Invertebrate Animals					
Catocala herodias gerhardi	Herodias or Pine Barrens Underwing			G3T3	S3
Cicindela patruela consentanea	New Jersey Pine Barrens Tiger Beetle			G3T1T3	S2S3
Grammia placentia	Placentia Tiger Moth			G3G4	S1S3
Lithophane lemmeri	Lemmer's Noctuid Moth			G3G4	S2
Metarranthis pilosaria	Coastal Bog Metarranthis			G3G4	S3S4
Ptichodis bistrigata	Southern Ptichodis			G3	S1S3
Zanclognatha dentata	A Noctuid Moth			G3G4	S3

Total number of records: 7

Appendix C: Qualifications of EIS Preparer



Brian Lainson PE, CME

Senior Project Manager

EDUCATION:
BSCE, Civil Engineering, New Jersey Institute of Technology

REGISTRATIONS:
Professional Engineer: NJ
Certified Municipal Engineer: NJ

YEARS OF EXPERIENCE:
27

Brian Lainson has extensive experience in civil engineering. His work has included feasibility studies, conceptual site planning, hydraulic and hydrology design, comprehensive site plan drawings, specifications and planning board testimony. These varied projects have included regulatory permitting from municipal, county and state agencies, including NJDEP and NJDOT. Brian also has experience with infrastructure projects for municipalities such as roadway, drainage and athletic fields. Additionally he has managed national programs for Amtrak and the Unites States Postal Service. A substantial portion of his career has been focused on land development projects that span many market sectors including education, institutional, medical, retail, office and residential. Projects stakeholders have included such diverse organizations as Goldman Sachs, Rutgers University, IBM and the United States Military Academy.

RELEVANT EXPERIENCE

Maintenance Bridge Scour Countermeasures, New Jersey Department of Transportation, Multiple Locations, NJ. Deputy Project Manager for preliminary engineering services for 14 bridges statewide that have been designated as scour critical. This program's goal is to protect and stabilize the structures. Work includes data collection, hydraulic and hydrologic modeling (using HEC-RAS) and design of scour countermeasures for each bridge (using HEC-18 and HEC-23). The scope also includes preparation and submittal of permit applications including NJDEP Freshwater Wetlands, Flood Hazard Area and Coastal Wetlands, USACE and USCG.

NJDOT Scour Countermeasures Concept Development, New Jersey Department of Transportation, Multiple Locations, NJ. Project Manager for performing data collection, prepared mapping, performed data analysis, and developed alternatives for scour countermeasures for the following bridges: US 206 over Big Flat Brook, milepost 122.61; and US 206 over Tributary to Drakes Brook, milepost 92.46. Services include: initiating concept development, data collection and analysis, performing alternative analysis, selecting preliminary preferred alternative, preparing a concept development report, and obtaining concept development approvals.

I-295/I-76/Route 42 Direct Connection, New Jersey Department of Transportation, Camden and Gloucester Counties, NJ. Water Resources Engineer responsible for providing construction phase support services related to stormwater management and drainage work. Also coordinated review of working drawings and RFI's for this $900-million project consisting of one of the largest and most congested interchanges in southern New Jersey. From 26 alternatives, one alternative with a six-lane direct connection overpass alignment was chosen

Brian Lainson, PE, CME
Hydraulics/Hydrology/Permits Task Leader

which includes the realignment of six ramps including one in a depressed section under I-76, 13 bridges, two culverts, 22 retaining walls, 42 sign structures and numerous noise walls. Environmental issues include eight stormwater management basins, and the creation of four acres of wetlands.

I-80/ Route 15 Interchange Improvements, New Jersey Department of Transportation, Morris County, NJ. Water Resources Engineer responsible for stormwater management design and roadway drainage for this $50-million interchange improvements project along the Route 80 and Route 15 Interchange within Rockaway Township and Wharton Borough. Designed bio retention basins and selected MTD's for water quality and included provisions in the basins to address runoff quantity requirements. The project is located along a C1 waterway requiring compliance with stringent TSS removal standards.

Route 206, Doctors Way to Brown Avenue, New Jersey Department of Transportation, Hillsborough, NJ. Water Resources Engineer responsible for hydraulic design for two new bridges to convey Route 206 and Valley Road over Tributary C of Royce Brook. Performed HEC RAS analysis to support the design of the new structures to meet NJDOT and NJDEP requirements. Prepared engineering reports in support of Flood Hazard Area Permit for the new bridges and the Route 206 roadway construction.

Route 9 Indian Head Road Concept Development, Advantage Engineering Associates, PC, Toms River, NJ. Senior Water Resources Engineer responsible for obtaining maps for stormwater management rules compliance, preparing drainage area maps, conducting hydrologic and hydraulic analysis, performing storm water management analysis, and coordinating with permitting agencies. This project is studying an eight-mile-long stretch of Route 9 to determine options to reduce traffic congestion. The scope of work includes two bridges, one at Route 70 and at Lake Manetta, and 20 signalized intersections along this urban principal arterial roadway.

Pulaski Skyway Rehabilitation, Contract 7, New Jersey Department of Transportation, Newark, Kearny & Jersey City, NJ. Water Resources Engineer for drainage design for the $85-million Contract 7, which involves the East End of the Mainline, the West End of the Mainline, and the 18-span Newark Ramp Structure. With on-going construction of Contracts #3 and #4 for the mainline deck replacement and five design segments in the design phase for the bridge substructure and superstructure components, extensive coordination is required between the NJDOT, contractors and designers of the other four segments.