DRAFT
FINDING OF NO SIGNIFICANT IMPACT

Environmental Assessment
Streambank Stabilization
Manasquan River at Bergerville Road
Howell Township
Monmouth County, New Jersey

OVERVIEW
The United States Army Corps of Engineers has evaluated a range of bank stabilization and other measures to arrest encroachment of the Manasquan River into Bergerville Road in Howell Township, New Jersey.

PURPOSE
Bank erosion and flooding of the Manasquan River has undermined the stability of embankment supporting Bergerville Road, which is located approximately eight to twelve feet from the south bank of the river. Howell Township has conducted emergency repairs to shore up the road twice in the last three years. Underground utilities that are located along the road are also threatened by this problem. The embankment is approximately 26 feet high at this location and poses a safety issue to motorists traveling along this suburban connector. The goal of the project is to stabilize the embankment and prevent further bank erosion.

SPECIFICATIONS
The selected alternative includes stabilization of the embankment using a Cellular Confinement System (CCS) wall design to rebuild a stable slope and prevent further bank erosion. In this design, the toe of the CCS wall would be filled with concrete to protect the bank from erosion and flooding while the upper half of the CCS wall would be filled with soil and planted to reestablish vegetation on the bank. The foundation for this wall would extend out approximately 10 feet from the current bank, resulting in a slight shift in the stream centerline towards the north. The cost of construction would be approximately $445,000.

COORDINATION
The draft Environmental Assessment has been forwarded to the U.S. Environmental Protection Agency, Region II, the U.S. Fish and Wildlife Service, the New Jersey Department of Environmental Protection, and all other interested parties. In compliance with the National Environmental Policy Act of 1969 (NEPA) and the Clean Water Act of 1977 (CWA), the proposed project has been coordinated with other concerned resource agencies. Comments received in response to this coordination and other communications are included in the Environmental Assessment.

CRITICAL HABITAT IMPACT
The Environmental Assessment has determined that the proposed project is not likely to jeopardize the continued existence of any species or critical habitat of any fish, wildlife or plant that is designated as endangered or threatened pursuant to the Endangered Species Act of 1973, as amended by P.L. 96-159.

WATER QUALITY
The Environmental Assessment has concluded that the selected plan can be conducted in a manner that should not violate New Jersey's Water Quality Standards. Pursuant to Section 401 of the Clean Water Act, a 401 Water Quality Certificate will be requested from the New Jersey Department of Environment Protection. A consistency determination by the NJDEP will be requested. No work will begin before a water quality certificate determination is obtained from the New Jersey Department of Environmental Protection.

CULTURAL IMPACTS
There are no known properties listed on, or eligible for listing on, the National Register of Historic Places that would be affected by the proposed activity. The selected plan has been designed to avoid archaeologically sensitive areas, and is therefore not expected to impact any cultural resources.

RECOMMENDATION
Because the Environmental Assessment concludes that the proposed project is not a major Federal action significantly affecting the human environment, I have determined that an Environmental Impact Statement is not required.

______________________________ ______________________________
Date

U.S. Army Corps of Engineers
Philadelphia District

Contract No. DACW61-00-D-0009-0034

DRAFT ENVIRONMENTAL ASSESSMENT

STREAMBANK STABILIZATION
MANASQUAN RIVER AT BERGERVILLE ROAD
HOWELL TOWNSHIP
MONMOUTH COUNTY, NEW JERSEY

June 2003

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APPENDICES

1. PURPOSE OF AND NEED FOR ACTION

The project site is located along Bergerville Road (a.k.a. Casino Road) in Howell Township, Monmouth County, New Jersey. Approximately, 500 feet west of the project site, Casino Drive becomes Bergerville Road as it crosses into Freehold Township. The road is owned and maintained by Howell Township, who has requested the assistance of the U.S. Army Corps of Engineers (USACE) in alleviating damage to the road by flooding and erosion resulting from encroachment of the Manasquan River. Howell Township is the non-Federal sponsor of this activity.

At the project site, Bergerville Road is approximately eight to twelve feet from the south bank of the Manasquan River at a point where the river makes a U-shaped bend (Figure 1-1). The river is somewhat downcut at this location, with floodplain wetlands located inside the meander bend and residential properties located on a low terrace just outside the meander to the north (Figure 1-2). During high flow periods, water is directed into this bend at sufficient velocity to undercut the south bank. Further up the bank, above the area being undercut, additional erosion is resulting from bank slumping. Bergerville Road has been repaired twice in the last three years after being damaged by bank slumping. The bank in this area is approximately 26 feet high. Approximately 200 linear feet of stream bank requires some form of stabilization and erosion control to protect Bergerville Road.

2. PROPOSED ACTION AND ALTERNATIVES

The USACE undertook a multi-objective planning process for this project where economic, social, and environmental considerations were taken into account. During the formulation process, several alternative plans were developed to alleviate the identified problems at Bergerville Road in ways that were consistent with both Federal objectives and the desires of the community. The alternative plan that best met the environmental and technical criteria for this project site was selected as the proposed action. The full range of reasonable alternatives was considered during the National Environmental Policy Act (NEPA) process, resulting in the systematic elimination of alternatives that did not meet the purpose of and need for the action. The alternatives considered in detail in this Environmental Assessment (EA) include the No-Action Alternative, the Proposed Action, and two action alternatives (A and B).

2.1 No-Action Alternative

Analysis of the No-Action Alternative is prescribed by the regulations of the Council on Environmental Quality and serves as the benchmark against which the environmental and socioeconomic effects of the Proposed Action and other reasonable alternatives can be evaluated. At this location, existing conditions without corrective action will lead to continued streambank erosion that, within approximately five years, would undermine the road bank, leading to road failure and damage to the underground gas and water lines, as well as utility poles along the road, and ultimately result in the abandonment of the existing road and a permanent traffic detour. Estimates by the Township Engineer indicate that a 2.0-mile detour would be needed if this major connector between various housing developments were not available to traffic. A permanent traffic detour would result in increased vehicle operating and opportunity costs to the

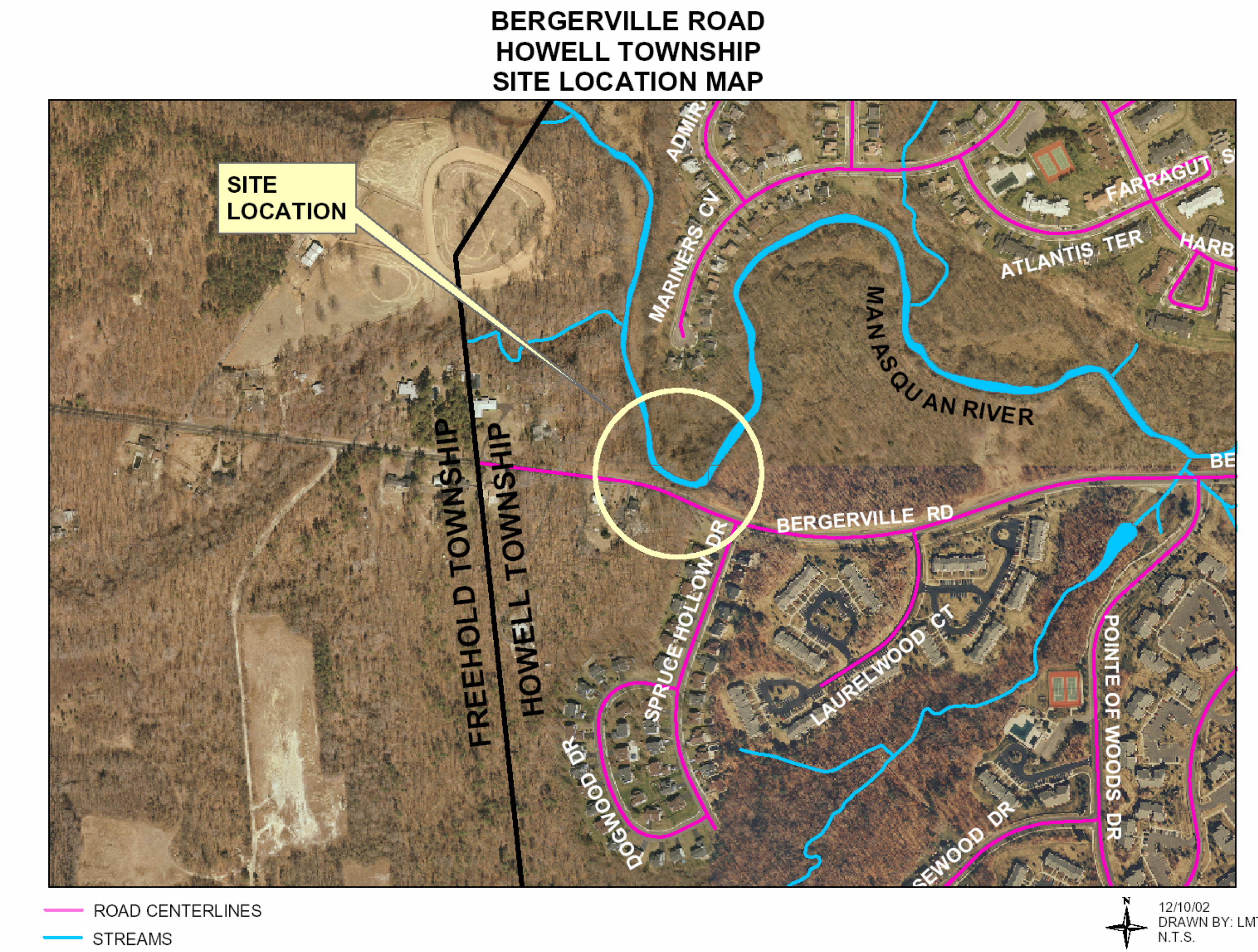

Figure 1-1. Aerial photograph showing the site location

Figure 1-2. Photographs of Manasquan River Stream Bank Stabilization project location

drivers and passengers due to the increased travel time. At an estimated annual average cost of approximately $1,040,000, this condition is not considered cost effective. In addition, permanent road closure is contrary to the desires of Howell Township, which endeavors to keep this road from failing. Therefore, the No-Action alternative does not meet the purpose and need. As previously noted, the road also connects to Freehold Township and would presumably be detrimental to that Township as well.

2.2 Development of and Elimination of Alternatives

A full range of alternatives was developed through coordination between Howell Township, USACE, the New Jersey Department of Environmental Protection (NJDEP), the U.S. Fish and Wildlife Service, and consultants. These alternatives fall into the following categories: bioengineering and other soft engineering techniques, engineered structures, stream relocation, road relocation combined with stream bank stabilization, and retaining walls (Table 2-1). Specific alternatives within each category are described in this section and their reasons for inclusion or exclusion from further consideration are discussed.

Table 2-1. List of Potential Alternatives for the Manasquan River Emergency Stream Bank Stabilization Project

Alternative	Advantages	Disadvantages
Bioengineering and Other Soft Engineering Techniques		
Bio Logs	Protect toe of slope and lower banks; low environmental impacts; aesthetically pleasing; inexpensive	Insufficient protection of upper banks; unstable due to high velocities in the vicinity of the project site; insufficient project life span
Mud Sill	Protect toe of slope and lower banks; low environmental impacts; aesthetically pleasing; inexpensive	Insufficient protection of upper banks; unstable due to high velocities in the vicinity of the project site; insufficient project life span
Bank Crib	Protect toe of slope and lower banks; low environmental impacts; aesthetically pleasing; provide instream habitat; inexpensive	Insufficient protection of upper banks; unstable due to high velocities in the vicinity of the project site; insufficient project life span
Root Wads	Protect toe of slope and lower banks; low environmental impacts; aesthetically pleasing; provide instream habitat; inexpensive	Insufficient protection of upper banks; unstable due to high velocities in the vicinity of the project site; insufficient project life span; insufficient room to anchor properly
Lunkers	Protect toe of slope and lower banks; low environmental impacts; aesthetically pleasing; provide instream habitat; inexpensive	Insufficient protection of upper banks; unstable due to high velocities in the vicinity of the project site; insufficient project life span
Deflectors	Protect toe of slope and lower banks; low environmental impacts; aesthetically pleasing; provide instream habitat; inexpensive	Insufficient protection of upper banks; unstable due to high velocities in the vicinity of the project site; insufficient project life span

Table 2-1. Continued

Alternative	Advantages	Disadvantages
Engineered Structures		
Rock Vanes	Protect toe of slope and lower banks; provide instream habitat	Insufficient protection of upper banks; not aesthetically pleasing
Rip Rap	Protect toe of slope and lower banks; offer some habitat value	Restricts revegetation of the stream bank; not aesthetically pleasing; insufficient project life span
A-Jacks	Protect toe of slope and lower banks; offer some habitat value	Do not allow for revegetation of the stream bank; not aesthetically pleasing; more effective in wider streams
Concrete-lined Channel	Very effective in controlling bank erosion	Drastic reduction in habitat value; not aesthetically pleasing; increase flow velocities at project site
Articulated Concrete Mat	Very effective in controlling bank erosion	Drastic reduction in habitat value; not aesthetically pleasing; increase flow velocities at project site
Stream Relocation		
Stream Relocation	Remove encroachment threat to road	Substantial wetlands disturbance in new stream location; hydrology of stream altered and flow velocities increased; reduction in habitat value due to lining of new channel; localized flooding problems; land ownership issues
Road Relocation Combined with Stream Stabilization		
Road Relocation and Bank Stabilization	Remove encroachment threat to road; some habitat value depending on stabilization technique used	Temporary road closure; cost involved in moving utilities; land ownership issues
Retaining Walls		
Gabion Baskets	Relatively inexpensive	Insufficient project life span; poor aesthetics; limited vegetation regrowth
Modular Block Walls	Stabilize entire bank; somewhat aesthetically pleasing	Limited vegetation regrowth; substantial cost; drainage system and some excavation necessary
Sheet Piling	Stabilize entire bank; very long lasting	Very expensive; extensive use of heavy machinery; loss of most riparian vegetation with limited regrowth; not aesthetically pleasing; drainage system and some excavation necessary
CCS Walls	Stabilize entire bank; less expensive and more aesthetically pleasing than other retaining walls; revegetation possible; not necessary to move utilities; more natural stream substrates than other options	Substantial construction costs; need to shift streambed away from road; drainage system and some excavation necessary

2.1.1 Bioengineering and Other Soft Engineering Techniques

The first category of alternatives considered for use at the project site was bioengineering and other soft engineering techniques. Several different techniques were considered but all were ultimately eliminated as inadequate for achieving the purpose and need. Bio logs are generally used for protecting the toe of streambanks against fluctuating stage height and velocities, and as a natural planting medium for vegetation. They are made from coir fiber, are biodegradable, and last for 4 to 10 years. Mud sills and bank cribs are natural bank stabilization techniques that help prevent erosion near the waterline. Root wads are tree trunks with large masses of roots still attached. The trunks are buried in the bank and anchored with large boulders such that the root masses abut along an outside bend of the stream. Root wads stabilize the outside bend of the stream during periods of high flow and provide cover and habitat for fish. Lunkers and deflectors are structures that serve the same purpose.

While these techniques have low environmental impacts and are relatively inexpensive to install, they are unstable given the high flow velocities in the vicinity of the project site. In the case of root wads, there is insufficient room to properly anchor the trunks without interfering with the road and utilities.

2.1.2 Engineered Structures

The second category of alternatives considered was engineered structures such as rock vanes, riprap, and A-jacks. All of these are in-stream structures constructed for the purpose of reducing shear stress on stream banks. These structures consist of rocks and other materials placed against the stream bank to reduce erosion and bank slumping. These techniques, while offering some habitat value, frequently have limited project life spans, can restrict vegetation along the stream bank, and are not aesthetically pleasing. For these reasons, they were determined not to meet the purpose and need, and eliminated from further consideration. In general, these techniques tend to work optimally on more gradual bends or in streams wider than the Manasquan River at the project location.

Another type of engineered structure is the channelization of the stream by using an articulated concrete mat or by lining the channel with concrete. Because the riverbank would be armored with concrete under this scenario, it would effectively control bank erosion at the project site and reduce erosional threats to the road. However, the smoothness of a concrete channel would also alter flow velocities where constructed, increasing flows and changing the hydrology (and erosion potential) downstream. In addition, concrete channels are not aesthetically pleasing and would drastically reduce the habitat value of the river at the project location. Therefore, articulated concrete mats or lining the channel with concrete were found not to meet the purpose and need, and were eliminated from further consideration.

2.1.3 Stream Relocation

The third category of alternatives considered was the relocation of the river. The meander bend at the project site could be cut off, moving the river further away from the road and towards the housing development to the north. This alternative would alleviate the need to move the road, but would create other environmental problems. Relocating the river to this location would cause substantial wetlands disturbance in the riparian area immediately adjacent to the river. Straightening the river would also increase its slope and change the hydrology of the stream by increasing flow velocities and shear stresses; this would ultimately lead to downstream adjustments to channel bed and banks and likely affect habitat below the project. To provide grade controls and prevent channel adjustments in the straightened reach, the new channel would have to be lined with concrete or rip-rapped, thereby significantly reducing the habitat value of this section of the river. This approach has the potential to create localized flooding problems and significant public concerns. The relocation of the stream would also involve land ownership constraints because private landowners currently hold the land immediately adjacent to the river. Lastly, it would be costly to construct.

Although the stream relocation approach poses several environmental and cost problems, it would meet the purpose and need and, therefore, was retained for further consideration.

2.1.4 Road Relocation Combined With Bank Stabilization

The fourth category of alternatives considered involves the relocation of Bergerville Road further away from the riverbank. After the road has been moved and the slope of the stream bank decreased, a variety of bank stabilization techniques discussed in Section 2.2.1 could be employed to prevent further erosion problems.

For the stream bank slope to achieve a stable 2:1 ratio along the road, Bergerville Road would have to be shifted away from the river approximately 18 feet at the outside of the meander bend. In order to achieve this shift, the horizontal alignment of the road would have to be changed and utilities such as gas pipes, water mains, and utility poles would have to be relocated. This alternative would affect approximately 400 linear feet of roadway in the vicinity of the project site. Relocation of the road would affect at least two adjacent landowners, though no structures would be involved, and would require permits and permissions. Relocation alone is expected to have a 10-year project life at a cost of approximately $450,000. Once the roadway was shifted, bank stabilization could be implemented at an additional cost in a variety of forms, including riprap, gabions, a CCS wall, or an articulated concrete mat. Incorporating bank stabilization measures would likely extend the project life of the road relocation project.

Although the road relocation combined with bank stabilization would have substantial cost implications, it would meet the purpose and need and, therefore, was retained for further consideration.

2.1.5 Retaining Walls

The last category of alternatives considered was retaining walls to stabilize approximately 400 feet of streambank. Several techniques may be used to accomplish this alternative. Four techniques are discussed in further detail. Each of these techniques achieves the same approximate result, only the most promising was carried forward for further analysis. Gabion baskets, wire mesh cages filled with large rocks, were considered for the construction of a retaining wall. Recent experience with gabion baskets has shown that their longevity is much shorter than originally anticipated and of insufficient duration to satisfy the goals of this project.

A second technique is sheet piling, in which large sheets of steel are driven vertically into the toe of the stream and anchored in place on the stream bank. While this alternative is very sturdy and would have a project life span greater than 50 years, it has several drawbacks that make it unappealing for this case. First of all, a project of this magnitude requires extensive use of heavy machinery for installation, costing more than $1,000,000 and placing a prohibitive burden on the non-Federal sponsor. Most, if not all, vegetation would have to be removed from the riverbank in order to install the sheet piling (specifically those trees that are in the way of driving the sheet pile) and, after installation, the pilings would limit the regrowth of vegetation on the riverbank. This lack of vegetation and the appearance of the sheet piling would not be aesthetically pleasing. Bergerville Road would also have to be closed during construction, leading to traffic problems in the immediate vicinity of the project site. The driving of the pilings, as well as placing the anchor system into the riverbank, could be a difficult and lengthy procedure that might require excavation of the streambed to anchor the base of the wall if there are large rocks on the stream bottom. Otherwise, the use of grouted soil anchors would eliminate the need for excavation of the streambed. Also, a drainage system would be required to release water buildup from behind the structure.

A third type of vertical retaining wall could be constructed using modular blocks. This system is similar to sheet piling, but is more visually attractive and considerably less expensive. It consists of interlocking concrete blocks that are anchored into the earth. The foundation for a modular block wall would need to be constructed in the streambed, shifting the centerline of the stream towards the inside of the meander bend approximately 10 feet. Although more economical than sheet piling, it has many of the same drawbacks: vegetation cannot be established on the front face of the wall, an anchor system has to be created in the riverbank, excavation of the riverbed is required, and a drainage system is required. Costs for this type of project could be substantial given the length of the riverbank affected.

The most promising type of retaining wall considered for this project is a Cellular Containment System (CCS). A CCS wall consisting of a three-dimensional honeycomb structure made of polyethylene would be constructed along the steeply sloping bank. CCS walls are less expensive and more aesthetically pleasing than either sheet piling or modular block walls. While cells in the lower portions of the CCS wall would be filled with concrete to protect the lower banks, cells on the upper portions of the bank would be filled with soil and then vegetated. This vegetation could lead to improved riparian habitat on the riverbank. Construction impacts would be similar to those from sheet piling or modular block walls. Construction of the CCS wall would involve moving the centerline of the stream approximately 10 feet away from the existing right bank to provide a stable foundation and slope for the wall. The configuration would shift the river to an historical alignment that currently consists of a gravel point bar and riparian wetlands. This adjustment is expected to cause fewer environmental affects than other proposed alternatives; in addition, hydrologic modeling indicates that stage heights would be reduced because the modified channel would have greater capacity. Utilities would not have to be moved as in the road relocation alternative. Although construction impacts, the need to anchor the wall into the stream bottom, and the need for a drainage system are similar to the other types of retaining walls, the CCS wall allows for more natural stream substrates, bank slopes, riparian vegetation, and aesthetics. The project life span for the CCS wall is expected to be greater than 50 years and cost approximately $450,000. For these reasons, the CCS wall was selected from among the retaining wall options for further consideration.

2.3 Proposed Action – CCS Retaining Wall

As discussed in Section 2.2, the majority of potential alternatives were eliminated as not meeting the purpose and need.

The most promising alternative category is the construction of a retaining wall using CCS. Therefore, the construction of a CCS wall was selected as the Proposed Action. A CCS wall consisting of a honeycomb structure made of polyethylene would be constructed along the steeply sloping bank. This structure best mimics a natural streambank while affording protection to the streambank and road. It is also the most aesthetically pleasing alternative as it can be revegetated along the upper section of the wall.

2.4 Alternative A – Stream Relocation

As discussed in Section 2.2, this alternative was retained for detailed consideration in this EA. The meander bend of the river could be cut off, moving the river further away from the road and toward the housing development to the north.

2.5 Alternative B – Road Relocation Combined with Bank Stabilization

As discussed in Section 2.2, this alternative was retained for detailed consideration in this EA. This alternative involves the relocation of Bergerville Road further away from the riverbank. After the road has been moved and the slope of the stream bank decreased, a variety of bank stabilization techniques, including riprap, gabions, a CCS wall, or an articulated concrete mat could be employed to prevent further erosion problems.

3. AFFECTED ENVIRONMENT

3.1 Topography

Monmouth County's topography is dominated by hills extending across the county line from south to northeast. These hills become the Highlands of Navesink above Sandy Hook Bay, which is the highest point on the eastern coastline south of Maine at 269 ft above sea level. In contrast, the topography of Ocean County, which neighbors Monmouth County to the south is flat with few hills. Sand dunes line the coast to the east and the Pine Barrens lie to the west.

The study area is situated within the Manasquan River Basin, which is located in the Outer Coastal Plain of central New Jersey and encompasses a total drainage area of roughly 80 miles. Approximately 90 percent of the basin is in Monmouth County and the remaining 10 percent is in Ocean County. The basin includes parts of five townships in Monmouth County and two in Ocean County. The headwaters of the Manasquan River begin southwest of Freehold, NJ. The river is 24.5 miles in length and flows southeast, primarily through rural areas towards its outlet to the Atlantic Ocean near Point Pleasant, NJ. River flow is comprised of both surface runoff and groundwater discharge.

The study site is located on an upper portion of the Manasquan River and has a drainage area of approximately 20-square miles. The site is located on an outside bend in the river and consists of a narrow channel, with a steep, eroding cutbank on the south side of the channel. Figure 3-1 illustrates local topography in the project area.

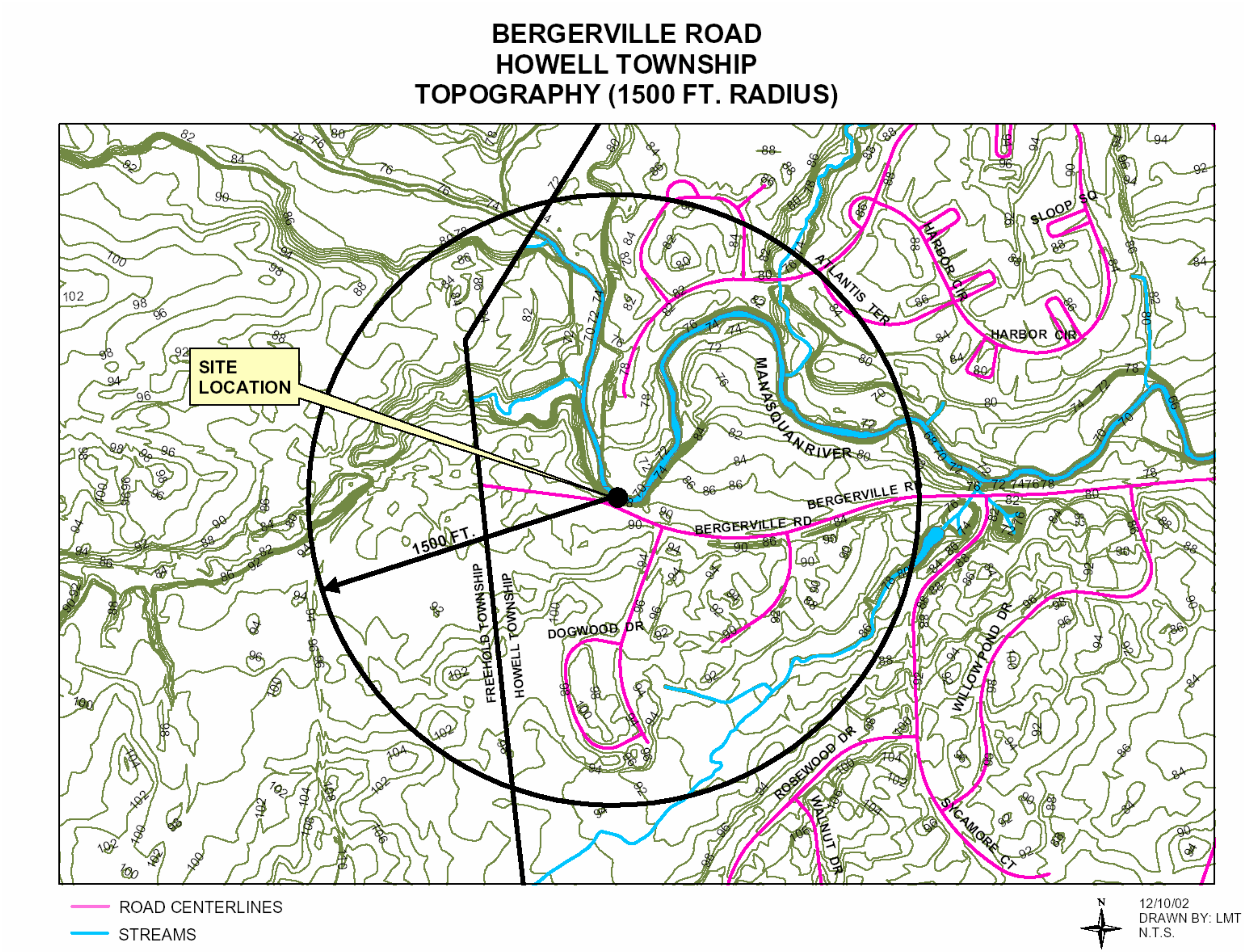

Figure 3-1. Topography (feet) in the vicinity of the project site.

3.2 Geology and Soils

The Outer Coastal Plain physiographic province is unique among other provinces of New Jersey in terms of relief, rock properties, and origin. The low-lying, rolling hills in the region are developed on Cretaceous and Tertiary coastal plain sediments that underlie the area. The sediments are mainly of marine origin deposited during alternating periods of sea level encroachment and retreat. The coastal plain is composed of sand and clay layers that vary in extent and thickness. The sand and clay formations are characteristically loose and soft, and where they are cemented, the cementing agent is not hard.

Soils within the Manasquan Basin are potentially acidic. The principal cause of potential acidity is associated with the presence of iron pyrite (FeS_2) and marcasite (crystallized pyrite). Exposure of these mineral components to oxygen in the air or surface waters results in the production of sulfuric acid. Such exposure can result in environmental impacts by lowering the pH and increasing heavy metal solubility. Figure 3-2 and Table 3-1 identify soil types in the vicinity of the project area.

Table 3-1. Soil types found within the vicinity of the project site

Soil Type	Description
Ats	Atsion sand
EveB	Evesboro sand, 0 to 5 percent slopes
Eve D	Evesboro sand, 10 to 15 percent slopes
Frf B	Frehold sandy loam, 0 to 5 percent slopes
PegB	Pemberton loamy sand, 0 to 5 percent slopes
SUBT	Sulfaquents and Sulfihenmists, frequently flooded
ThgB	Tinton loamy sand, 0 to 5 percent slopes
the	Tinton loamy sand, 10 to 25 percent slopes

Soil borings in the project area and visual observations indicate that a loosely cemented layer was present at the base of the eroded cutbank. Soil borings also indicated that the site is underlain by sand and silty sand layers.

3.3 Land use

Bergerville Road borders the southern bank of the Manasquan River for approximately 150 feet. This two-lane township road serves as a major connector between various housing developments, and between Howell and Freehold Townships. Land use in the area is predominantly a mix of forested lands and low-to-medium density residential properties.

As shown in an aerial photograph of the project area (Figure 1-1), much of the area immediately adjacent to the river is forested. Two large-lot residential properties are located on uplands approximately 200 feet southwest Bergerville Road. In addition, two residential subdivisions are located nearby. One subdivision, located on Spruce Hollow Drive off Bergerville Road, is

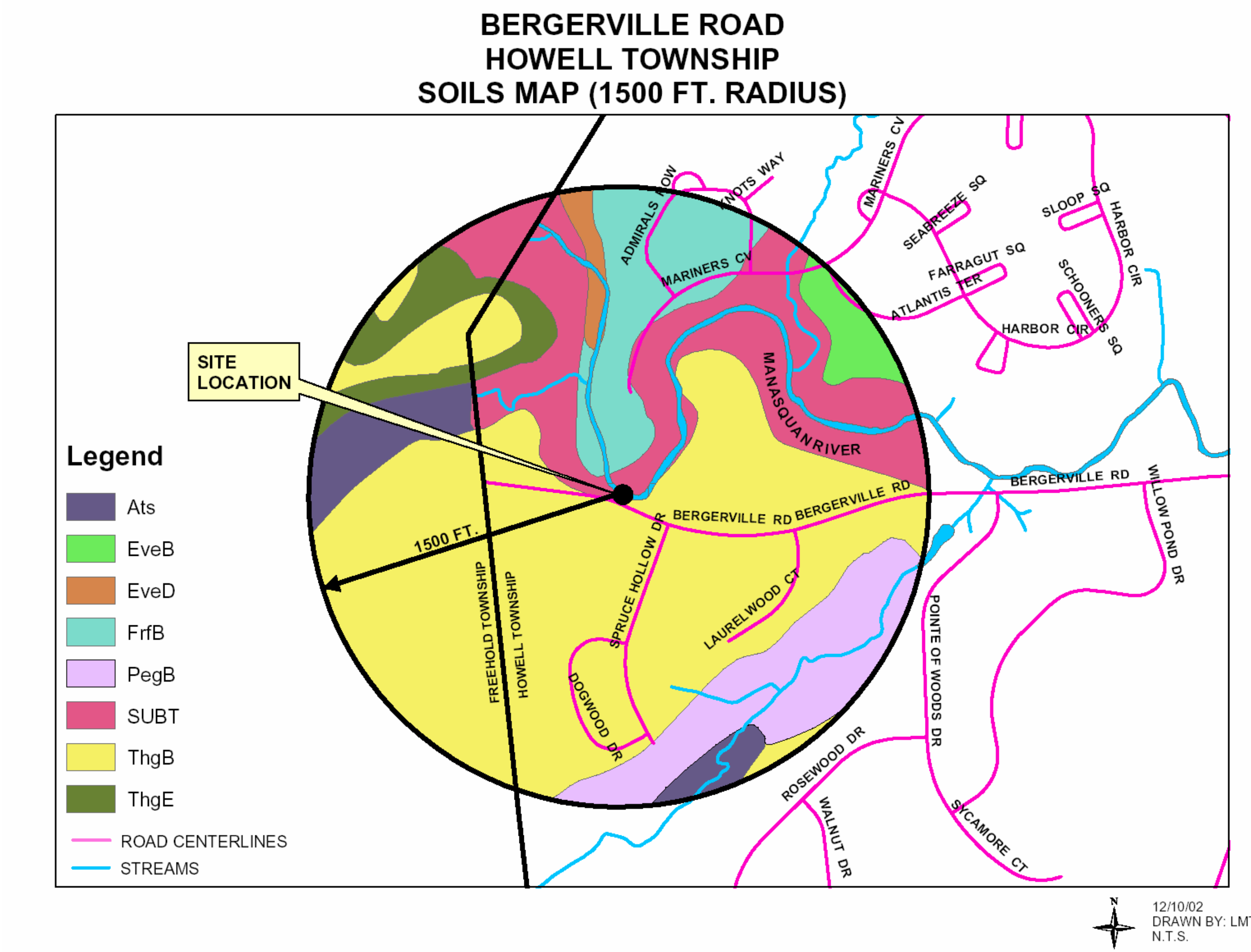

Figure 3-2. Soils in the vicinity of the project site

situated on uplands about 400 feet southeast of the project site. The second subdivision, on Mariners Cove, is located north of the project site, and extends down into the low-lying terrace formed by the Manasquan River in the meander bend.

3.4 Air Quality

There are currently 87 air monitoring stations located throughout New Jersey that actively monitor for carbon monoxide (CO), nitrogen dioxide (NO_2), ambient ozone (O_3), sulfur dioxide (SO_2), lead (Pb), or particulate matter (PM_{10}). There are two monitoring stations in Monmouth County. Ozone is monitored at Monmouth College and West Long Branch, and sulfur dioxide concentrations are monitored in Freehold.

The U.S. Environmental Protection Agency (USEPA) has reported that ozone levels within Monmouth County persistently exceed national air quality standards, causing the County to be classified as a non-attainment area for ozone. All other listed pollutants are in attainment status as of May 2002 (USEPA 2002).

3.5 Hydrology and Water Quality

The Manasquan River is classified as FW2-NT (Non-Trout) by the New Jersey DEP from its source, down through the project area, to the US Route 9 bridge approximately 0.75 miles downstream of the project area. The FW2 class includes freshwater suitable for natural and established biota, recreation, water supply with appropriate treatment, and other reasonable uses. Below the US Route 9 bridge, the classification changes to FW2-TM (Trout maintenance). Trout maintenance waters support trout throughout the year, or have the potential for such with some environmental modifications. Trout maintenance waters within the Manasquan River are annually stocked and heavily fished (NJDEP 1999).

Field observations indicate that significant trash accumulation and historical dumping may adversely affect water quality conditions. Prior to 1985, there were a number of point sources discharging directly to the Manasquan River or its tributaries. These discharges adversely affected stream water quality parameters including biological oxygen demand, suspended solids, fecal coliform, pH, and iron, and were sources of cyanide, algaecide, chlorinated hydrocarbons, surfactants, and thermal pollution. Removal of these point sources in 1985 has significantly improved the water quality of the River (USACE 1994). The NJ DEP has placed the Manasquan River on its 303(d) list of impaired waters; TMDLs for metals are anticipated by the end of 2002 (USEPA 2003).

Several agencies monitor water quality in the vicinity of the project site, including the NJDEP, the NJ Water Supply Authority, and the Monmouth County Department of Health. One site sampled by the County near the project site is located on Swankam Brook in Howell Township. This site showed exceedances of state environmental standards for fecal coliform in both spring and summer of 2002. Ammonia and phosphorus did not exceed State standards in 2002 (Monmouth County Department of Health 2002).

3.6 Wetlands

Wetland habitats in the Manasquan River Basin include saline, brackish, tidal freshwater, and non-tidal freshwater wetlands. Palustrine forested wetlands exist on the north side of the project site (Figure 3-3). These wetlands are densely vegetated with species common to outer coastal plain palustrine wetlands such as: red maple, green ash, and American beech. Other species include spicebush, southern arrowwood, and skunk cabbage.

Wetlands in the vicinity of the project were all riparian (associated with the adjacent Manasquan River); many areas were densely forested with nearly complete canopy closure. Shading of the forest floor was often dense. Principal tree species in the forested wetlands included red maple (*Acer rubrum*), green ash (*Fraxinus pennsylvanica* var. *subintegerrima*), and American beech (*Fagus grandifolia*). The shrub layer was occasionally dense in the wetland forest; principal species included spicebush (*Lindera benzoin*), sweet pepperbush (*Clethra alnifolia*), and southern arrowwood (*Viburnum dentatum*). Many of the trees present possessed diameters of 12 inches at breast height (dbh) or greater. The herbaceous layer was typically very sparse under the dense canopy, but included a mixture of cinnamon fern (*Osmunda cinnamomea*), jewelweed (*Impatiens duthicae*), skunk cabbage (*Symplocarpus foetidus*), and other species.

3.7 Aquatic Resources

The Manasquan River in the vicinity of the project site supports a variety of fish, herpetofauna, and benthic macroinvertebrate species. A trout fishery is located downstream of the project site. This area is stocked annually and provides for numerous man-hours of trout fishing every year. Other common freshwater fish species include black crappie, bluegill, brown bullhead, golden shiner, silvery minnow, white sucker, yellow perch, pumpkinseed, and tessellated darter. In addition, anadromous and catadromous species such as alewife, American eel, blueback herring, white perch, and sea lamprey may be found near the project site (USACE 1994).

Approximately 12 species of amphibians and 16 species of reptiles are known to occur in the vicinity of the Manasquan River Basin. These species include, but are not limited to wood frog, American toad, Fowler's toad, spotted salamander, common snapping turtle, stinkpot, Eastern box turtle, bog turtle, Easter garter snake, and northern black racer (USACE 1994).

Benthic macroinvertebrates are an important component of aquatic communities because they serve as a food source for many fish and other wildlife. The Monmouth County Department of Health runs a rapid bioassessment program in which a dip net is used to sample benthic organisms. The macroinvertebrates are then identified to the family taxonomic level and then scored based on the tolerance of the family to pollution. The final stream score is calculated using the variety of insects, the number of insect families present in the sample that are intolerant to pollution, the family with greatest number of individuals, and the family tolerance values. This score is then used to determine the level of impairment of the stream. A County monitoring site is located in the vicinity of the project area on the Manasquan River at Bergerville Road. During a sampling event on June 8, 2001, this site contained 79 individuals. The site was dominated by Chironomidae, a family group moderately tolerant of pollution. The final site score was 18, on a scale of 0-30. This score falls into the Moderately Impaired category, indicating that taxa

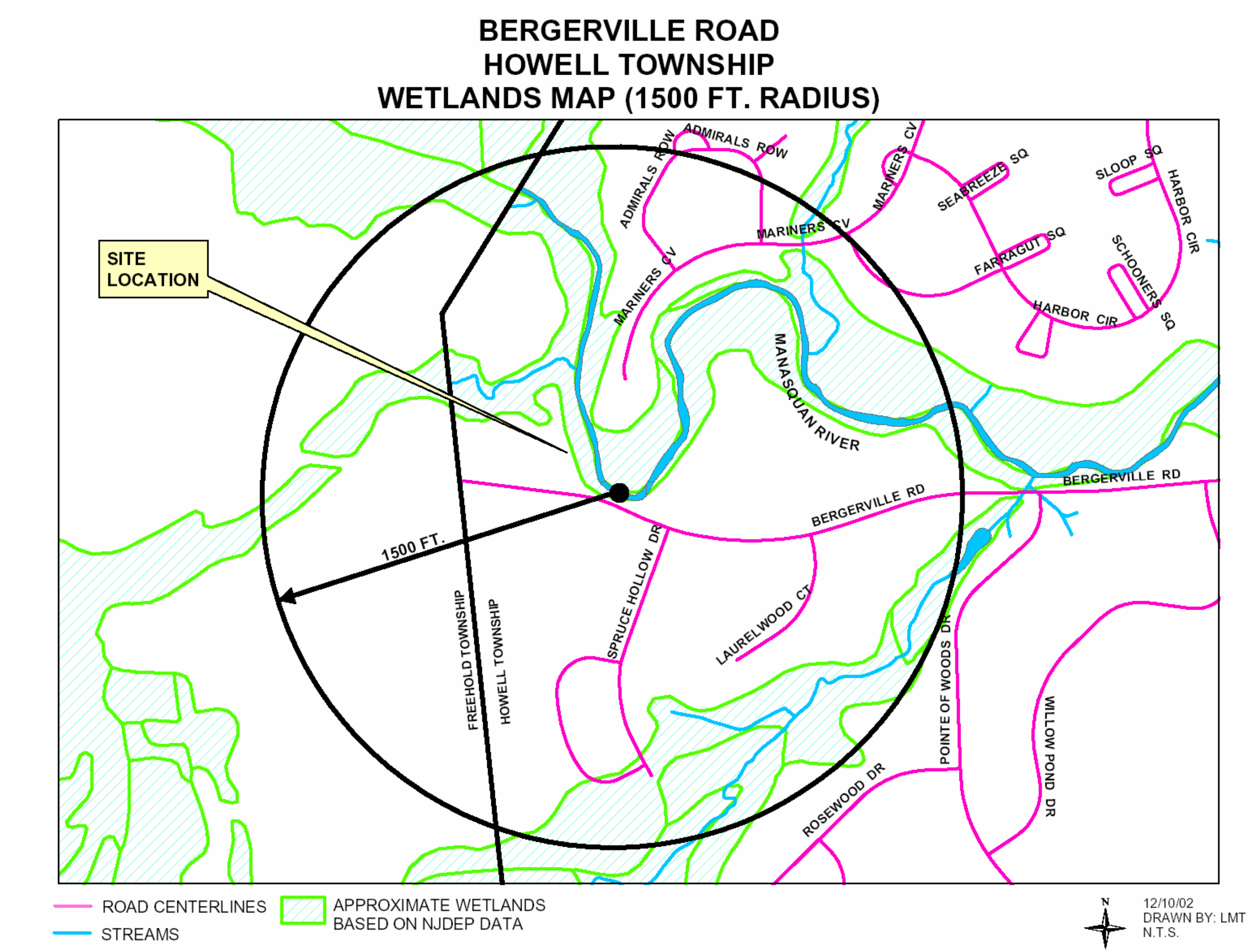

Figure 3-3. Wetlands in the vicinity of the project site

richness is reduced, particularly among the more intolerant taxa (Monmouth County Department of Health 2001).

3.8 Terrestrial Resources

Although portions of the Manasquan River lie within the New Jersey Pine Barrens, the majority of the riparian vegetation and surrounding forests are more characteristic of woodlands typical of Northern New Jersey. The dominant natural vegetation is a mixed-oak and pine-oak forest. Bergerville Road is adjacent to the southern bank of the project site, while the northern bank is dominated by a palustrine forested wetland. A residential subdivision along Mariners Cove is located beyond the palustrine forested wetland to the north.

The vegetation in the area supports a variety of wildlife species. Animals commonly found in the habitat near the study area include snapping turtles, box turtles, some snake species, opossums, moles, shrews, cottontails, squirrels, woodchucks, raccoons, skunks, and white-tailed deer. A number of bird species such as the common flicker, Eastern kingbird, veery, and song sparrow are also known to frequent forested areas in the vicinity of the project site (USACE 1994).

3.9 Threatened and Endangered Species

The U.S. Fish and Wildlife Service (USFWS), was contacted concerning the presence of Federally listed rare, threatened, and endangered species in the vicinity of the project site. Based on correspondence dated January 12, 2003, the USFWS detected two Federally listed species in the vicinity of the project site (Appendix A). The Federally threatened bald eagle currently nests at the Manasquan Reservoir 2.5 miles southeast of the project site. Eagles from the reservoir nest site may occasionally forage or roost in the vicinity of the project area. Upon evaluation of the habitat and proposed activities at the site, USFWS has determined that the proposed project is not likely to adversely affect the bald eagle due to the fact that eagles are attracted to open bodies of water and there is significant tree cover at the project site.

A second Federally listed species known to occur in the vicinity of the project site is the Federally threatened bog turtle. One occurrence of the bog turtle is known within five miles downstream of the project site. Suitable habitat was documented approximately four miles downstream and USFWS records indicate that a habitat survey was conducted one mile upstream, but that the habitat was determined to be unsuitable for bog turtles. In accordance with a USFWS request for additional information concerning the habitat suitability for the bog turtle in the immediate vicinity of the project site, a Phase 1 bog turtle habitat survey was performed in April 2003 by a qualified wetlands scientist. Results of the survey determined that suitable bog turtle habitat was not present in the immediate vicinity of the project site (Appendix B). Findings of this survey have been forwarded to USFWS for review in order to confirm that project activities will not adversely affect bog turtles.

NJ Department of Environmental Protection, Natural Heritage Program, was contacted concerning the presence of State rare, threatened, and endangered species near the project site. Based on correspondence dated January 2, 2003, the Natural Heritage Database does not have any records for rare plants or natural communities on the project site. The Landscape Project

(Version 1.0) shows that suitable habitat patches of forest and forested wetland occur on the project site and has records for bird species of special concern, northern pine snake, and pine barrens treefrog in these habitat patches. A complete list of rare species and natural communities found in Monmouth County can be found in Appendix A

Correspondence received from both the USFWS and NJDEP, Natural Heritage Program, can be found in Appendix A.

3.10 Hazardous, Toxic, and Radioactive Wastes

A hazardous, toxic, and radioactive waste (HTRW) literature search was completed in 1994 for the majority of the Manasquan River Basin, as part of the NEPA process for the Manasquan Reservoir located approximately 2.5 miles downstream from the study area. Flood-prone areas along the River and its tributaries, as well as the project site, were reviewed. Seventy-three (73) possible HTRW sites located in the Manasquan River Basin were considered as potential risks to the reservoir project. A majority of the sites identified in this study were located in urbanized areas such as Freehold, Farmingdale, and Brielle. Sites on the National Priorities List (NPL), which are investigated and remediated under Federal "Superfund" legislation, are considered the most serious HTRW threats. Several sites currently on the NPL are located in Howell Township, including Bog Creek Farm and the Zschiegner Refining Company; however, both are located downstream of the project site.

A review of current HRTW information contained within EPA's Envirofacts database indicated that no Federally regulated sites of any kind were located within a 1-mile radius of the project site (USEPA 2003).

3.11 Cultural Resources

The NJ Department of Environmental Protection, Historic Preservation Office, was contacted concerning the identification of cultural resources in the vicinity of the project site. Based on correspondence dated January 8, 2003, there are no known properties of historical significance located near the site (Appendix A). There are several properties considered eligible for the National Register in Howell Township, but these are outside the project area. However, the Manasquan River is the principal waterway in this portion of New Jersey and sites from the major prehistoric periods have been found along the river above and below the project area. Therefore, this site may have been utilized by prehistoric peoples, but no physical evidence of their presence has been observed.

3.12 Recreational and Aesthetic Resources

Several New Jersey State Parks are located in the region around the project site. Island Beach State Park is located along the Atlantic shoreline and contains the State's largest osprey colony, as well as peregrine falcons and numerous species of waterfowl. The park also contains the largest expanse of beach heather in New Jersey. Also in Monmouth County are Allaire State Park in Farmingdale downstream of the project site, and Monmouth Battlefield State Park, in Manalapan upstream of the project site.

Monmouth County also operates an extensive park system featuring 36 recreational facilities totaling more than 12,000 acres. Located in Howell Township 2.5 miles southeast of the project site, 720-acre Manasquan Reservoir features ice-skating, fishing, kayaking, and rowboats. The Reservoir is a source of drinking water for municipalities and utilities. It is part of a 1,200-acre park that includes woods and wetlands, a 5-mile perimeter hiking trail, and an environmental center. The Howell Park Golf Course, also operated by the County, is located adjacent to Manasquan Reservoir property. Manasquan River Linear Park, located along the river in Howell and Freehold Townships, is land area preserved by the County as open space, including canoe and kayak access to the Manasquan River.

3.13 Socio-Economic Conditions

3.13.1 Demographic Information

Howell Township, located in south-central Monmouth County, has a land area of 62.1 square miles, making it the largest municipality in the County. Residential development in this area began largely in the 1960s and has exploded in recent decades, as has commercial development. With access to Route 9, Route 195, and the Garden State Parkway, this centrally located municipality is one of the fastest growing townships in Monmouth County today.

According the Monmouth County Planning Board, 48,903 people lived in Howell Township in 2000 (MCPB 2002). An estimated 49,643 people will live there in 2001, and 57,354 people are expected to live in the Township by 2020. In the year 2000, 86% of the Township was white, 3% was black, 6% was Asian and Other, and 5% were of Hispanic origin. Fifty-eight percent of residents are of working age (20-64 years old). The projected median per capita and family income for 2000 was $27,372 and 84,238, respectively. The unemployment rate in Howell Township in the year 2000 was 3.4%.

As previously mentioned, Bergerville Road serves as a major traffic route between Howell and Freehold Townships. If the road were permanently closed, estimates by the Township Engineer indicate that a 2.0-mile detour would be needed. A permanent traffic detour would result in increased vehicle operating and opportunity costs to the drivers and passengers due to the increased travel time. At an estimated annual average cost of approximately $1,040,000, this condition is not considered cost effective (USACE 2000).

3.13.2 Environmental Justice

On February 11, 1994, President Clinton issued Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*. This Executive Order is designed to focus the attention of Federal agencies on the human health and environmental conditions in minority communities and low-income communities. It requires Federal agencies to adopt strategies to address environmental justice concerns within the context of agency operations. In an accompanying Presidential memorandum, the President emphasized that existing laws, including NEPA, provide opportunities for Federal agencies to address environmental hazards in minority communities and low-income communities. In April of 1995, the EPA released the document titled *Environmental Justice Strategy: Executive Order 12898*.

The document established Agency-wide goals and defined the approaches by which EPA will ensure that disproportionately high and adverse human health or environmental effects on minority communities and low-income communities are identified and addressed.

Also within the context of the NEPA process, effects of the action on children should be reviewed under environmental justice. Executive Order 13045, Protection of Children from Environmental Health Risks and Safety Risks, directs Federal agencies to ensure that their policies, programs, activities, and standards address disproportionate risks to children that result from environmental health or safety risks. An estimated 49,643 people will live there in 2001, and 57,354 people are expected to live in the Township by 2020. In the year 2000, 86% of the Township was white, 3% was black, 6% was Asian and Other, and 5% were of Hispanic origin. Fifty-eight percent of residents are of working age (20-64 years old). The projected median per capita and family income for 2000 was $27,372 and 84,238, respectively. The unemployment rate in Howell Township in the year 2000 was 3.4%.

Approximately 4.5% of County residents are below the poverty level. The distribution of minority and low-income residents is not greater in the project area than elsewhere in the county or Township.

4. ENVIRONMENTAL CONSEQUENCES

4.1 Topography

Under the No-Action Alternative, lateral bank erosion would continue, contributing to changes in bank slope and local topography as the river channel migrates laterally into the road in the vicinity of the project site.

The remaining alternatives – the Proposed Action (CCS wall) and Alternatives A (stream relocation) and B (road relocation and bank stabilization) – would all involve minor changes in local topography. The Proposed Action would make the topography more uniform, while stabilizing and reducing the slope of the bank. Alternative A would require the excavation of a new channel and backfilling the existing channel. The stream stabilization associated with moving the road in Alternative B would decrease the slope of the bank and decrease bank erosion.

4.2 Geology and Soils

The No-Action Alternative would result in continued bank erosion and soil loss in the vicinity of the project site.

The remaining alternatives, including the Proposed Action, would all result in minor construction impacts such as soil compaction and regrading. It is expected that Best Management Practices (BMPs) would be implemented during the construction phase of the project and efforts would be made to reduce soil erosion and minimize long term effects on the soils in the vicinity of the project area.

4.3 Land Use

The permanent closing and abandonment of Bergerville Road would be the eventual result of the No-Action Alternative. This would lead to the re-routing of traffic through suburban residential areas and increased inconvenience and opportunity costs for the residents of Howell Township and the surrounding area.

Alternative A, the relocation of the stream, is expected to result in minor to moderate land use impacts. A new stream channel would be created in the wetlands area north of the current channel and wetlands could be created in the backfilled channel. Changes in hydrologic and sediment transport regimes could lead to increased downstream flooding, channel adjustments, and habitat loss.

Alternative B, the relocation of the road and subsequent stream stabilization would result in the conversion of a small strip of adjacent residential land use to road.

No adverse land use effects are anticipated if the Proposed Action is implemented.

4.4 Air Quality

Road closure and subsequent traffic detours associated with the No-Action Alternative are expected to increase driving distances and travel times. The resulting increased motor vehicle use could pose minor threats to local air quality in the vicinity of the project site.

The remaining alternatives, including the Proposed Action, would have short-term, localized construction impacts resulting from emissions from construction vehicles. No long-term impacts to air quality are expected to occur.

4.5 Hydrology and Water Quality

The No-Action Alternative is expected to result in increased bank erosion, causing downstream channel adjustments, possibly affecting the downstream trout fishery on the Manasquan River. Increased erosion would also lead to an increased sediment load in the river, increasing turbidity and reducing water quality in the vicinity of the project site.

Alternative A is expected to dramatically increase water velocities in the vicinity of the project site, leading to possible adverse downstream effects resulting from increased stream power and sediment transport. Temporary construction impacts resulting from the implementation of this alternative would result when trees were cut down or moved. This would decrease shading and increase water temperature in the river, as well as increasing sediment load and turbidity due to increased soil erosion. Once trees were replanted or allowed to grow back, this impact would be alleviated.

Because the current planform alignment of the channel would be maintained with Alternative B, only minimal impacts to water quality are anticipated. These impacts would be limited to short term construction impacts associated with regrading the south bank of the river. Perhaps the most significant impact would be the loss of shade provided by the mature trees along the south bank, which would result in localized increases in water temperature. Stabilization of the eroding right bank is anticipated to outweigh short-term construction impacts and localized temperature increases that would occur until mature vegetation re-establishes at the site.

Minor hydrologic changes are anticipated with the Proposed Action as the channel centerline is shifted north approximately one half channel width (approximately 10 feet). This planform adjustment would result in minor increase in flow velocities as channel slope is increased. Increased flow velocities would help flush accumulated sediment from the existing pools along the outside bend, thereby improving habitat quality and diversity in the river. Designs for the CCS wall call for additional channel capacity that would alleviate flooding by reducing stage height compared to the No-Action Alternative. Stabilization of the eroding right bank is anticipated to outweigh short-term construction impacts and localized temperature increases that would occur until mature vegetation re-establishes at the site.

4.6 Wetlands

Both the No-Action Alternative and Alternative B are not anticipated to have any expected impact on wetlands in the vicinity of the project site.

Alternative A, stream relocation, is expected to result in major impacts to wetlands as a new stream channel is constructed across the forested wetlands on the meander bend. These wetland impacts could be mitigated somewhat by creating wetlands in the existing stream channel after it is backfilled. Wetland soils and vegetation could be transferred from the new channel to the backfilled channel to preserve the wetland soils, seed bank, and plant diversity.

The Proposed Action will shift the stream channel approximately 10 feet toward the inside of the meander bend, into the gravel point bar and wetlands along the river's left bank. This shift will return the channel to a preexisting channel configuration. Adverse impacts to the riparian wetlands that have established along the gradually expanding point bar and adjacent floodplain over time are expected to be minor, and limited to the project area.

4.7 Aquatic Resources

Under the No-Action Alternative, increased sedimentation due to continued bank erosion could have adverse impacts on the fish, benthic macroinvertebrates, and other aquatic wildlife in the vicinity of the project site. Additionally, aquatic wildlife, especially in the trout waters downstream of the project site may be impacted by sedimentation under this alternative.

Alternative A, stream relocation, would require the stream to be blocked or diverted during the construction phase of the project. Recolonization of the new stream channel could take some time and affect the diversity of organisms in the stream. Because the new stream channel would have to be lined with concrete or riprap, habitat diversity would decrease significantly. Construction impacts, such as a temporary increase in sedimentation and the removal of trees causing a decrease in shading may occur, but would decrease over time once the construction phase of the project was completed.

Both the Proposed Action and Alternative B would have similar impacts on aquatic resources in the area. Under the Proposed Action, the hardened lower portion of the CCS wall would slightly reduce habitat diversity of the stream bottom, potentially impacting the local benthic community slightly. The impacts to aquatic resources under Alternative B would depend significantly upon the type of bank stabilization technique used. Certain techniques could add to the habitat diversity of the area, while techniques such as riprap and gabions would decrease the diversity of habitat available to aquatic wildlife. Temporary construction impacts similar to those listed under Alternative A would also occur, but would also decrease over time.

4.8 Terrestrial Resources

As increased bank slumping and lateral bank erosion occurs under the No-Action Alternative, trees and other riparian vegetation will fall into the stream causing further soil erosion and impacting the hydrology of the stream itself.

Impacts resulting from both Alternatives A and B, as well as the Proposed Action, are similar. Short-term construction impacts will harm the riparian vegetation in the vicinity of the project site for all of these alternatives. For each alternative, replanting after the construction phase will help alleviate the impacts to terrestrial resources.

4.9 Threatened and Endangered Species

Because there are no known State- or Federally-listed threatened or endangered species in the vicinity of the project site, there are no anticipated effects on threatened or endangered species under any of the listed alternatives.

4.10 Hazardous, Toxic, and Radioactive Wastes

Because there are no known hazardous, toxic, or radioactive waste sites in the vicinity of the project site, impacts associated with these types of sites are not anticipated under any of the listed alternatives.

4.11 Cultural Resources

Because there are no known cultural resources near the project site, impacts to cultural resources under any of the listed alternatives are not anticipated.

4.12 Recreational and Aesthetic Resources

Under the No-Action Alternative, increased sedimentation due to bank erosion may adversely affect the trout fishery downstream of the project site. If this occurs, the recreational value of the downstream trout fishery is likely to be reduced.

The remaining alternatives may also have temporary impacts to the downstream trout fishery due to increased sedimentation during the construction phase of the project. In addition, during construction, the presence of construction equipment will temporarily lower local aesthetic quality. Once the project is completed, site-related stresses on downstream water quality and habitat condition are expected to be greatly reduced. Under each of these Alternatives, impacts to State or Township park properties are not anticipated.

4.13 Socio-Economic Conditions

Under the No-Action Alternative, Bergerville Road would be permanently closed and traffic would have to be re-routed for two miles through suburban areas, causing increased traffic and safety concerns in those areas. A permanent traffic detour would result in increased opportunity costs to drivers due to increased travel time. The estimated annual cost of this alternative is approximately $1,040,000.

Under the remaining alternatives, Bergerville Road would be closed periodically during construction activities and fully reopened once construction has been completed. Also, under Alternative B, the relocation of the road would involve moving several utility poles and pipelines, increasing the cost of this Alternative significantly.

None of the listed alternatives is expected to have disproportionate, adverse environmental or human health impacts on minority or low-income populations. Also, none of the proposed alternatives is expected to have disproportionate impacts on children. Therefore, the Proposed Action or its alternatives would have no adverse impacts on environmental justice.

4.14 Cumulative Effects

Because of the relatively small scale of this project and the lack of other stream altering projects in the surrounding area, any cumulative effects associated with this stream bank restoration project are expected to be minimal.

5. COORDINATION AND PERMITS

As described earlier, letters were submitted to and comments received from USFWS and NJ DEP, Natural Heritage Program, and NJ Historic Preservation Office, addressing potential environmental impacts from the proposed project. After negative findings in the Phase 1 Bog Turtle Survey, the USFWS is expected to find that no adverse effects on listed species are expected. No potential impacts on state listed species or cultural resources were identified by NJ DEP, Natural Heritage Program, and NJ Historic Preservation Office, respectively.

In addition to agency coordination, this EA has supported the development of applications for the following permits:

- Section 401 Water Quality Certificate - New Jersey Department of Environmental Protection, Land Use Regulation Program, *New Jersey Surface Water Quality Standards, NJSA 58: 10A-1*

- Freshwater Wetlands Permit - New Jersey Department of Environmental Protection, Land Use Regulation Program, *Freshwater Wetlands Protection Act Rules, NJAC 7:7A* as amended March 16, 1999

- Stream Encroachment Permit - New Jersey Department of Environmental Protection, Land Use Regulation Program, *Stream Encroachment, NJAC 7:13-4-1*

- Soil Erosion Sediment Control Permit - New Jersey Soil Erosion and Sediment Control Act of New Jersey, Chapter 251; *P.L. 1975*

The EA also includes an evaluation of the Proposed Action using the "*Guidelines for Specification of Disposal Sites for Dredged or Fill Material*" (40 CFR Part 230) by the United States Environmental Protection Agency.

6. CONCLUSIONS

The Proposed Action involves arresting encroachment of the Manasquan River into Bergerville Road using a CCS wall design to stabilize the embankment. This Proposed Action meets the project objectives by providing long-term (>50 year) protection of Bergerville Road at a reasonable cost for the non-Federal sponsor, while minimizing associated environmental consequences. While the CCS wall design will require shifting the river channel approximately 10 feet toward the inside of the meander bend, the design will return the river to a historical planform alignment, provide additional channel capacity, and reduce or eliminate the project site's harmful influences on downstream habitat and water quality. The other alternatives considered under this assessment could meet some or all of these objectives, but at greater environmental, economic, or opportunity cost.

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APPENDIX A

AGENCY CORRESPONDENCE – USFWS, NJDEP, NJHPO

APPENDIX B

PHASE 1 BOG TURTLE SURVEY RESULTS