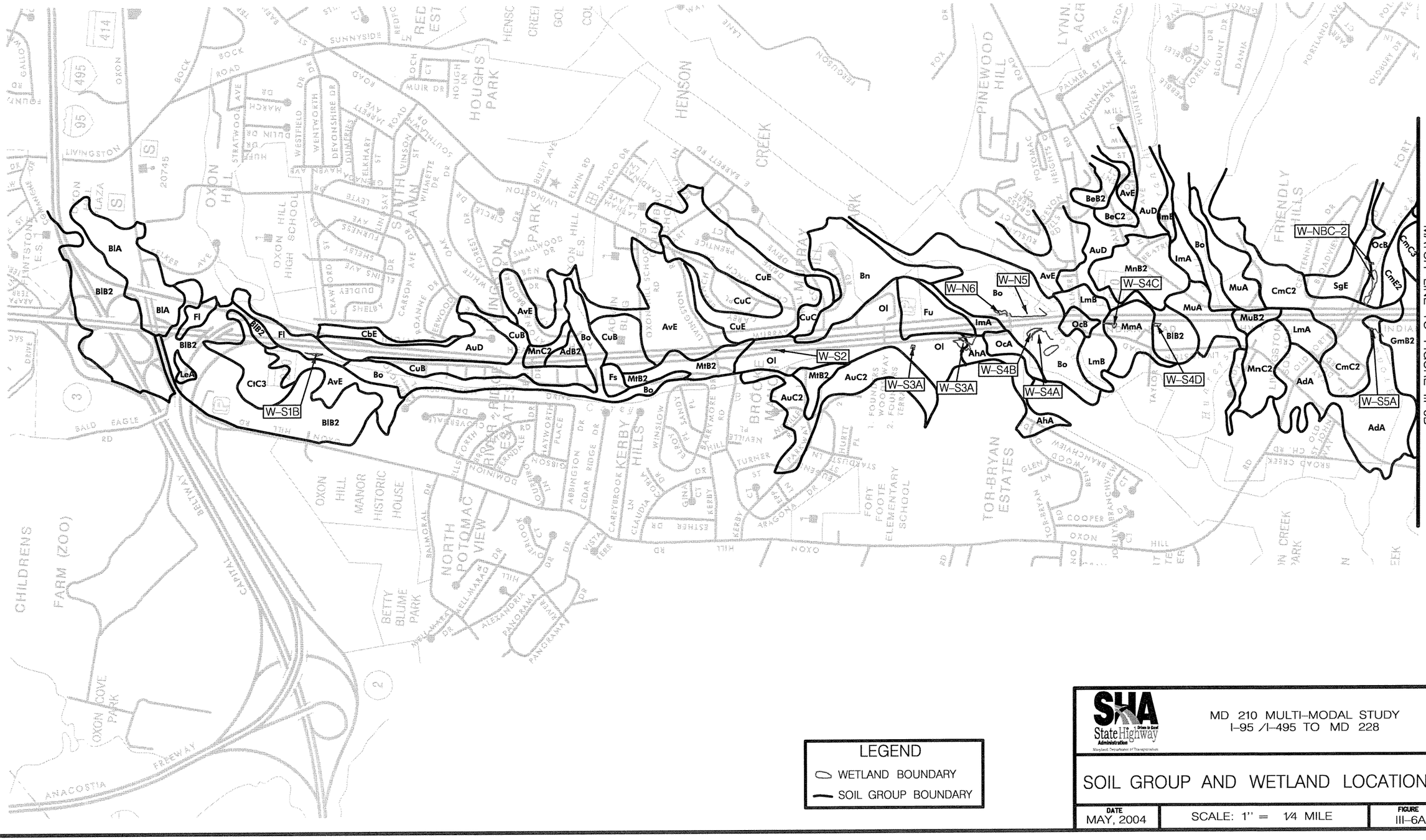
Table III-4. Description of Soils in the Project area

See Figures III-6 A, B, C

Symbol	Soil Description	Drainage Class
AdA	Adelphia fine sandy loam, 0-2% slopes	B
AdB2	Adelphia fine sandy loam, 2-5% slopes, moderately eroded	B
AhA	Adelphia silt loam, 0-2% slopes	B
AuC2	Aura gravelly loams, 6-12% slopes	B
AuD	Aura gravelly loams, 12-20% slopes	B
AvE	Aura and Croom gravelly loams, 20-50% slopes	B-C
BlA	Beltsville silt loam	C
BlB2	Beltsville silt loam, 2-5% slopes, moderately eroded	C
BlC2	Beltsville silt loam, 5-10% slopes, moderately eroded	C
BmB	Beltsville – Urban land complex, 0-5% slopes	C
BmC	Beltsville – Urban land complex, 5-15% slopes	C
Bo	Bibb silt loam	D
BtB2	Butlertown silt loam, 0-5% slopes, moderately eroded	C
CaC2	Chillum silt loam, 6-12% slopes	C
CbE	Chillum – Urban land complex, 12-35 % slopes	C
CmB2	Collington fine sandy loam, 2-5% slopes, moderately eroded	B
CmC2	Collington fine sandy loam, 5-10% slopes, moderately eroded	B
CsC2	Croom gravelly loam, 8-15% slopes, moderately eroded	C
CtC3	Croom gravelly sandy loam, 8-15% slopes, severely eroded	C
CtD2	Croom gravelly sandy loam, 15-25% slopes, moderately eroded	C
CuB	Croom – Urban land complex, 0-8% slopes	C
CuC	Croom – Urban land complex, 8-15% slopes	C
Ek	Elkton silt loam	D
Fl	Fallsington loam	D
Fs	Fallsington sandy loam	D
Fu	Fallsington – Urban land complex	D

Symbol	Soil Description	Drainage Class
HwC2	Howell silt loam, 6-12% slopes, moderately eroded	B
ImA	Iuka sandy loam, 0-2% slopes	C
ImB	Iuka sandy loam, 2-5% slopes	C
In	Iuka silt loam	C
IoB	Iuka silt loam, 2-5% slopes	C
KpA	Keyport silt loam, 0-2% slopes	B
KpB2	Keyport silt loam, 2-5% slopes, moderately eroded	B
MlE	Marr fine sandy loam, 20-35% slopes	B
MmA	Matapeake fine sandy loams, 0-2% slopes	B
MmB2	Matapeake fine sandy loams, 2-5% slopes, moderately eroded	B
MnA	Matapeake silt loam, 0-2% slopes	B
MnB2	Matapeake silt loam, 2-5% slopes, moderately eroded	B
MnC2	Matapeake silt loam, 5-10% slopes, moderately eroded	B
MtB2	Mattapex fine sandy loam, 2-5% slopes, moderately eroded	C
MuA	Mattapex silt loam, 0-2% slopes	C
MuB2	Mattapex silt loam, 2-5% slopes, moderately eroded	C
MvB	Mattapex – Urban land complex, 0-5% slopes	C
OcA	Ochlockonee sandy loam, 0-2% slopes	B
OcB	Ochlockonee sandy loam, 2-5 % slopes	B
Ol	Othello fine sandy loam	D
Ot	Othello silt loam	D
SaE	Sandy land, steep	B
SfB2	Sassafras gravelly loam, 2-5% slopes, moderately eroded	B
SgE	Sassafras gravelly sandy loam, 15-30% slopes	B
SlE	Sassafras – Collington – Aura gravelly sandy loams, 20-35% slopes	B
SmA	Shrewsbury fine sandy loam, 0-2% slopes	D
WoA	Woodstown sandy loam, 0 to 2 percent slopes	B



LEGEND

- WETLAND BOUNDARY
- SOIL GROUP BOUNDARY

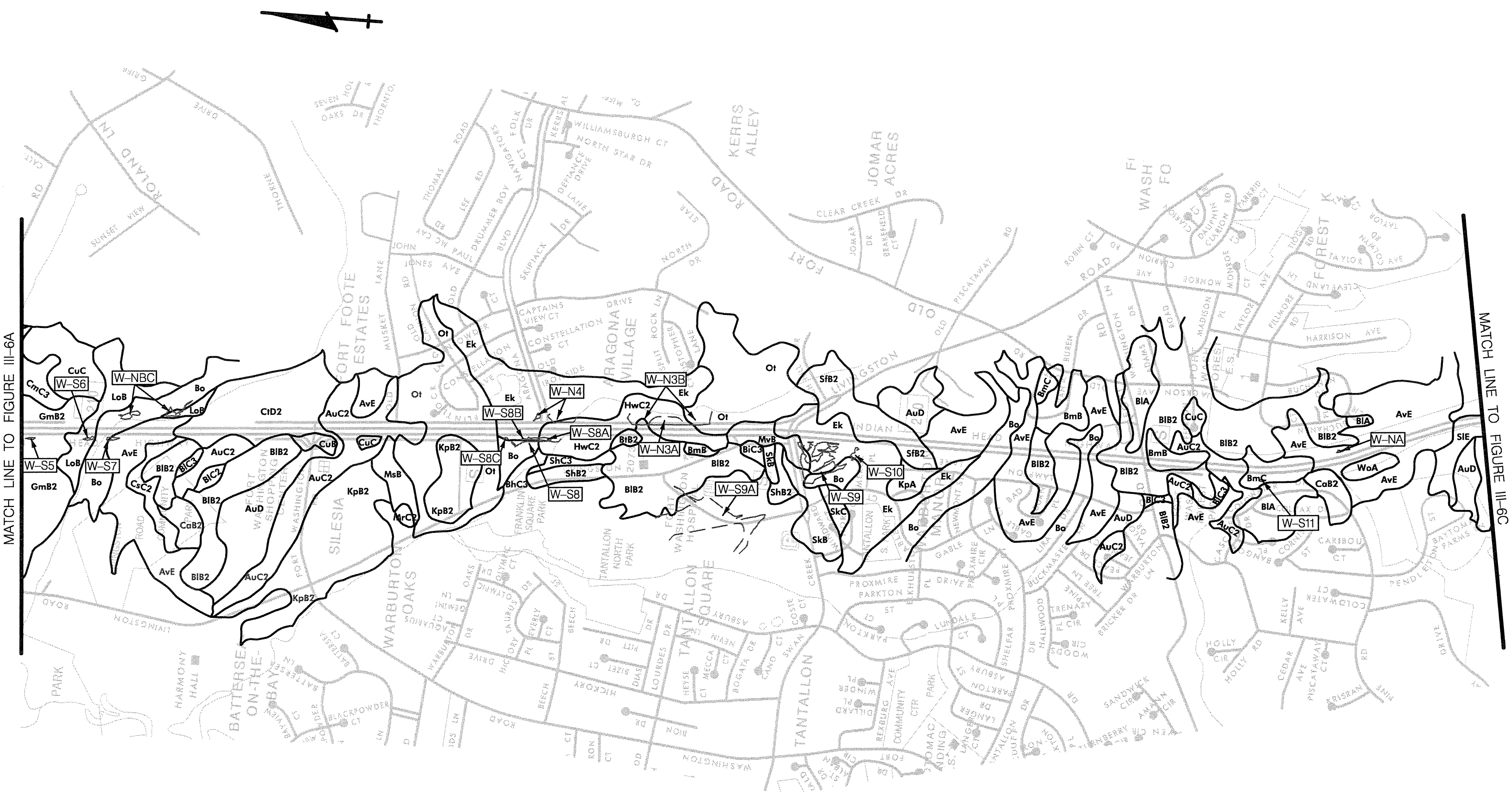
SHA State Highway Administration — Maryland Department of Transportation

MD 210 MULTI-MODAL STUDY
I-95 /I-495 TO MD 228

SOIL GROUP AND WETLAND LOCATIONS

DATE	SCALE	FIGURE
MAY, 2004	SCALE: 1'' = 1/4 MILE	III-6A

emxdisp1.dgn
04-28-04 TLL



LEGEND

- WETLAND BOUNDARY
- SOIL GROUP BOUNDARY

MD 210 MULTI-MODAL STUDY
I-95 /I-495 TO MD 228

SOIL GROUP AND WETLAND LOCATIONS

DATE	SCALE	FIGURE
MAY, 2004	SCALE: 1" = 1/4 MILE	III-6B

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LEGEND

- WETLAND BOUNDARY
- SOIL GROUP BOUNDARY

SHA State Highway Administration — Maryland Department of Transportation

MD 210 MULTI-MODAL STUDY
I-95 /I-495 TO MD 228

SOIL GROUP AND WETLAND LOCATIONS

DATE	SCALE	FIGURE
MAY, 2004	SCALE: 1" = 1/4 MILE	III-6C

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04-28-04 TLL

2. Sedimentation and Soil Erosion

Sediment yield from construction sites is dependent upon soil erodibility, rainfall frequency and magnitude, degree of vegetative cover, slope, and degree of control practiced. It ranges from 35 tons to 45 tons of soil per acre per year (Schueler, 1987). Sediment and erosion controls which may greatly limit the amount of sediment actually leaving a construction site are about 65 percent efficient overall, and about 46 percent efficient for outfall flows (Schueler, 1990). All soils identified in the project area are erodible, moderately erodible, or highly erodible.

3. Prime Farmland Soils and Soils of Statewide Importance

Eighteen prime farmland soils and seventeen soils of statewide importance, as defined through coordination with the U.S. Department of Agriculture, occur in the project area (Table III-5). These soil classification groups, identified by the Natural Resources Conservation Service, have the potential for high agricultural productivity. They are located throughout the project area as shown on Figures III-6A, III-6B and III-6C. The completed Farmland Conversion Impact Rating Form is located in the Appendix.

TABLE III-5. PRIME FARMLAND AND SOILS OF STATEWIDE IMPORTANCE

Symbol	Soil Description	Class
AdA	Adelphia fine sandy loam, 0-2% slopes	PF
AdB2	Adelphia fine sandy loam, 2-5% slopes, moderately eroded	PF
AhA	Adelphia silt loam, 0-2% slopes	PF
AuC2	Aura gravelly loams, 6-12% slopes	SI
BlA	Beltsville silt loam	SI
BlB2	Beltsville silt loam, 2-5% slopes, moderately eroded	SI
BlC2	Beltsville silt loam, 5-10% slopes, moderately eroded	SI
CaC2	Chillum silt loam, 6-12% slopes	SI
CmB2	Collington fine sandy loam, 2-5% slopes, moderately eroded	SI
CmC2	Collington fine sandy loam, 5-10% slopes, moderately eroded	SI
CsC2	Croom gravelly loam, 8-15% slopes, moderately eroded	SI
Fl	Fallsington loam	SI
Fs	Fallsington sandy loam	SI

Symbol	Soil Description	Class
HwC2	Howell silt loam, 6-12% slopes, moderately eroded	SI
ImA	Iuka sandy loam, 0-2% slopes	PF
ImB	Iuka sandy loam, 2-5% slopes	PF
In	Iuka silt loam	PF
IoB	Iuka silt loam, 2-5% slopes	PF
KpA	Keyport silt loam, 0-2% slopes	SI
KpB2	Keyport silt loam, 2-5% slopes, moderately eroded	SI
MmA	Matapeake fine sandy loams, 0-2% slopes	PF
MmB2	Matapeake fine sandy loams, 2-5% slopes, moderately eroded	PF
MnA	Matapeake silt loam, 0-2% slopes	PF
MnB2	Matapeake silt loam, 2-5% slopes, moderately eroded	PF
MnC2	Matapeake silt loam, 5-10% slopes, moderately eroded	SI
MtB2	Mattapex fine sandy loam, 2-5% slopes, moderately eroded	PF
MuA	Mattapex silt loam, 0-2% slopes	PF
MuB2	Mattapex silt loam, 2-5% slopes, moderately eroded	PF
OcA	Ochlockonee sandy loam, 0-2% slopes	PF
OcB	Ochlockonee sandy loam, 2-5 % slopes	PF
Ol	Othello fine sandy loam	SI
Ot	Othello silt loam	SI
SfB2	Sassafras gravelly loam, 2-5% slopes, moderately eroded	PF
SmA	Shrewsbury fine sandy loam, 0-2% slopes	SI
WoA	Woodstown sandy loam, 0 to 2 percent slopes	PF

SI = Soils of Statewide Importance

PF = Prime Farmland Soils

F. Water Resources and Fish Fauna

1. Surface Water

a. Surface Water Quality

The designated use of the streams within or adjacent to the project area is Use I-P (water contact recreation, protection of aquatic life and public water supply) which is discussed later in this section. Perennial streams crossed by or potentially impacted by the project were surveyed in May and June of 1999, for benthic macro invertebrates and analyzed with respect to chemical/physical/biological water quality. Ten benthic macro invertebrate samples were taken from nine streams: Carey Branch (two samples), Henson Creek, Hunter's Mill Creek, two unnamed tributaries to Broad Creek, Piscataway Creek, and three unnamed tributaries of Piscataway Creek (see Figure III-7A through III-7H). A discussion of methods and results of the analyses follows.

1) Benthic Macro invertebrates

a) Methods

The benthic macro invertebrate survey was performed following the U. S. Environmental Protection Agency (EPA) Rapid Bioassessment Protocol II (Plafkin, et al 1989). One hundred count benthic macro invertebrate samples were collected from riffle and run habitats in each stream and supplemented with separate samples from coarse particulate organic matter (such as leaf packs) that collect in depositional areas. Benthic Macro invertebrates were collected from the referenced streams in the Spring and Summer seasons. Benthic organisms were sorted and identified to the family taxonomic level in the field. All organisms were classified according to functional feeding groups (Cummins and Wilzbach, 1985) and tolerance values (Hilsenhoff, 1987). Samples from riffle/run habitats were taken using kick seines, sampling approximately 1 square meter. Due to impoundment by beavers no riffle or run habitats occurred within the southern unnamed tributary to Broad Creek, samples were taken using D-frame nets. Similarly, in Piscataway Creek, a deep, slow moving stream, organisms were picked from an artificial substrate (rock baskets). Organisms were also picked from leaves and woody debris in depositional areas.

b) Results

Carey Branch North: This site is located approximately 0.4 miles south of I-495, west of MD 210. This is a headwater section of Carey Branch, a first and second order stream that parallels MD 210 for more than 1.5 miles. Low flow, cobble and rubble substrate, and a general

lack of habitat diversity characterize the stream section sampled. This part of the stream is predominately riffle and run habitat. Few fish are present; only black nose dace, a pollution tolerant species, is apparent. Periphyton is abundant, filamentous algae are common, and benthic macro invertebrates occur in relatively poor densities. Pollution tolerant Chironomid midges dominate the benthic macro invertebrate community. Only three Ephemeroptera, Plecoptera, and Tricoptera (mayflies, stoneflies, and caddisflies) (EPT) taxa occur: the caddis flies Hydroptilidae and Hydropschidae, and the mayfly Baetidae. Stoneflies and the other pollution sensitive taxa are absent. Of the functional feeding groups, only scrapers are well represented with 25% of the sample; shredders are absent.

Carey Branch South: This site is located approximately 1.8 miles south of I-495, west of MD 210. The stream receives large inputs of storm water discharge. Carey Branch is a third order stream in this section with portions that are channelized immediately upstream. The sampled stream section is characterized by silt, sand, gravel and cobble substrate. Pools and riffles occur in this section. The water is turbid. No fish are apparent. Periphyton is abundant and filamentous algae are common. Benthic macro invertebrate diversity and abundance are very poor. Pollution tolerant Chironomid midges and black flies Simulate dominate the benthic macro invertebrate community. Only two EPT taxa occur: the caddis fly Hydropschidae and the mayfly Baetidae. Stoneflies and the other pollution sensitive taxa are absent. Of the functional feeding groups, scrapers are well represented with 11% of the sample; shredders are absent.

Henson Creek: This site is located approximately 2.4 miles south of I-495. This is a third order stream with a sand and gravel substrate. The sampled section of stream contains a variety of habitats including riffles, runs, and pools. There is much evidence of flooding and scouring. Fishes are abundant, predominantly black nose dace and tessellated darters in the pools and long nose dace in the riffles. Periphyton and filamentous algae are not apparent. Benthic macro invertebrates occur in poor diversity and numbers. Pollution tolerant Chironomid midges dominate the benthic macro invertebrate community. Only one EPT taxon occurs: the caddis fly Hydropschidae. Stoneflies, mayflies and the other pollution sensitive taxa are absent. Of the functional feeding groups, scrapers and shredders occur (9% and 14% of the sample, respectively).

Hunter's Mill Creek: This site is located approximately 2.9 miles south of I-495. This is a third order stream with a sand and gravel substrate. The sampled section contains a variety of habitats including riffles, runs, and pools. This stream receives relatively large amounts of storm water runoff, resulting in streambed scouring. Fishes are uncommon, with only black nose dace apparent. Periphyton and filamentous algae are common. Benthic macro invertebrates occur in fair diversity and numbers. Pollution tolerant crane flies Tipulidae dominate the benthic

macro invertebrate community. Only one EPT taxon occurs: the caddis fly Hydroptilidae. Stoneflies, mayflies, and other pollution sensitive taxa are absent. Of the functional feeding groups, scrapers are well represented with 10% of the sample, but shredders are absent.

Broad Creek North: This site is located approximately 3.7 miles south of I-495. This is an unnamed tributary to Broad Creek and is a second and third order stream with a sand and gravel substrate. The sampled section of stream contains a series of semi-isolated pools connected by riffles with very low flow. There is much evidence of flooding and scouring. Periphyton is common and filamentous algae are rare. Water and substrate were stained orange-brown indicating a high concentration of iron bacteria. Fishes are abundant, predominantly black nose dace, rosy side dace, creek chubs and tessellated darters in the pools. Periphyton is common and filamentous algae are rare. Benthic macro invertebrates occur in poor diversity and numbers. The benthic macro invertebrate community is dominated by crane flies Tipulidae. Only two EPT taxa occur: the caddis fly Hydroptilidae and the mayfly Baetidae. Stoneflies and the other pollution sensitive taxa are absent. Of the functional feeding groups, only scrapers are well represented (28% of the sample) and shredders are absent.

Broad Creek South: The site is located approximately 4.8 miles south of I-495. This is an unnamed tributary to Broad Creek and is a second order stream that has been dammed by beavers. The water is deep and nearly stagnant. Benthic macro invertebrates occur in poor diversity and numbers. The benthic macro invertebrate community is dominated by predaceous water beetles (Dytiscisdae). No EPT taxa occur. Pollution sensitive taxa are absent. Of the functional feeding groups, only scrapers are well represented (20% of the sample) and shredders are absent.

Piscataway Creek: The site is located approximately 7.2 miles south of I-495. This is a fourth order stream that is deep, slow moving, with a sand and silt substrate. An artificial substrate was used to obtain riffle/run community representation. Filamentous algae are common. Benthic macro invertebrates occur in poor diversity and numbers. Pollution tolerant Chironomid midges dominate the benthic macro invertebrate community. Only one EPT taxon occurs: the mayfly Baetidae. Stoneflies, caddis flies and the other pollution sensitive taxa are absent. Of the functional feeding groups, only scrapers are present (1% of the sample) and shredders are absent.

Piscataway Creek Tributary 1: The site is located approximately 7.2 miles south of I-495, east of MD 210. This is a second order stream with a sand and gravel substrate. The sampled section of stream contains a variety of habitats including riffles, runs, and pools. Few fish are present; only black nose dace, a tolerant species, is apparent. Periphyton occurs but

filamentous algae are absent. Benthic macro invertebrates occur in moderate diversity and numbers. The pollution tolerant mayfly Baetidae dominates the benthic macro invertebrate community. Six EPT taxa occur: the mayflies Baetidae and Siphlonuridae, the stonefly Perlodidae, and the caddis flies Hydropsychidae, Hydroptilidae, and Rhyacophilidae. Of the functional feeding groups, scrapers occur in 31% of the sample, but shredders are absent.

Piscataway Creek Tributary 2: The site is located approximately 8.2 miles south of I-495. This is a second order stream with a sand and gravel substrate. The sampled section of stream contains a variety of habitats including riffles, runs, and pools. There is much evidence of flooding and scouring. Fishes are abundant, predominantly black nose dace, rosy side dace, and tessellated darters in the pools and long nose dace in the riffles. Periphyton occurs but filamentous algae appear to be lacking. Benthic macro invertebrates occur in greater diversity and numbers than in any of the sampling sites in this project. The pollution sensitive stoneflies and mayflies dominate the benthic macro invertebrate community. Five EPT taxa occur: the mayflies Baetidae and Tricrythodes, the stoneflies Capriidae and Perlodidae, and the caddis fly Rhyacophilidae. Of the functional feeding groups, scrapers and shredders occur in 6% and 34% of the sample, respectively.

Piscataway Creek Tributary 3: The site is located approximately 10.6 miles south of I-495. This is a first order stream with a rubble substrate. The sampled section of stream contains a variety of habitats including riffles, runs, and pools. Fish are not present. Periphyton occurs but filamentous algae are not apparent. Benthic macro invertebrates occur in moderate diversity and numbers. The benthic macro invertebrate community is dominated by a pollution tolerant caddis fly. Three EPT taxa occur: the mayfly Baetidae, the stonefly Perlodidae, and the caddis fly Hydropsychidae. Of the functional feeding groups, scrapers occur (10% of the sample), but shredders are absent.

a) Summary

Of the ten-benthic macro invertebrate sampling sites two are in the “good” category, six are in the "fair category, and two are in the poor category (see DEIS Table III-6 page III-39 and Table III-7 page III-40). The relatively low scores are attributable to a general lack of diversity, EPT taxa, and shredders in the benthic macro invertebrate community (see DEIS Table III-7, page III-40). While this is a generalization, there are few exceptions to this in the Study Area’s streams. The two streams rated good for benthic macro invertebrates are the streams with the least amount of urbanization and other development in their watersheds.

Piscataway Creek Tributary 1, located east and parallel to MD 210 and south of the MD 210 Bridge over Piscataway Creek, had the highest water quality rating of the streams in the

project area, based on benthic biodiversity and community composition. Piscataway Creek Tributary 2, located near the sewage treatment plant, was also rated in the "good" range.

Carey Branch North, Henson Creek, Hunters' Mill Creek, Broad Creek North, Broad Creek South, and Piscataway Creek Tributary 3 rated in the "fair" range.

Carey Branch South and Piscataway Creek rated "poor".

2) Chemical, Physical, and Bacteriological Analyses

a) Methods

Seven streams potentially impacted by this project were selected for chemical, physical, and bacteriological analyses. The streams were selected based on size and potential for supporting fish populations. They are the largest perennial streams within the project limits. Water samples were collected from each stream, fixed with nitric acid, and transported to Phase Separation, Inc. for metal analyses. An additional water sample was collected from each stream for five-day BOD (biochemical oxygen demand) testing using BOD apparatus. Dissolved oxygen was measured on site using a dissolved oxygen meter. Conductivity, temperature, and total dissolved solids were measured on site using a conductivity meter. A pH meter was used to determine hydrogen ion-concentration on site. A Direct Reading Environmental Laboratory spectrophotometer was used on site to measure concentrations of ammonia, nitrite, nitrate, phosphate, and turbidity. A Millipore Field Filtration kit was used on site to collect samples for total coliform and fecal-coliform bacteria analyses. Sampling, assay, and quality control/quality assurance procedures followed EPA accepted protocols for water quality data reporting.

b) Results

Carey Branch South: All of the measured water quality parameters are within the Use I criteria (see DEIS Table III-8 page III-42 and Table III-9 page 44). The phosphate concentration of 0.04mg/l is elevated. Elevated phosphate concentration accelerates the eutrophication process in receiving waters.

Henson Creek: All of the measured water quality parameters are within the Use I criteria (see DEIS Table III-8 page III-42 and Table III-9 page 44). The phosphate concentration of 0.04mg/l is elevated. Elevated phosphate concentration accelerates the eutrophication process in receiving waters.

Hunter's Mill Creek: The phosphate concentration 7.2mg/l is far higher than the recommended maximum level for streams (recommended maximum level is 0.1mg/l) (see DEIS

Table III-8 page III-42 and Table III-9 page 44) Fecal coliform numbers of 1920/100ml sample exceed the Use I criterion of not more than 400/100ml sample. The silver concentration of 57μg/l is far higher than the allowable limit of 4.1μg/l for Use I waters.

Broad Creek North: All of the measured water quality parameters are within the Use I criteria (see DEIS Table III-8 page III-42 and Table III-9 page 44). The phosphate concentration of 0.05mg/l is elevated. Elevated phosphate concentration accelerates the eutrophication process in receiving waters.

Broad Creek South: The dissolved oxygen criterion for Use I streams is not less than 5.0mg/l (see DEIS Table III-8 page III-42 and Table III-9 page 44). The measured concentration is 4.1mg/l. Percent dissolved oxygen saturation is only 49%, indicating the presence of biodegradable waste. Five-day biochemical oxygen demand is elevated at 5.6mg/l. fecal coliform numbers 550/100ml sample exceed the Use I criterion of not more than 400/100ml sample. The phosphate concentration 0.06mg/l is elevated. Elevated phosphate concentration accelerates the eutrophication process in receiving waters. The silver concentration of 6μg/l is higher than the allowable limit of 4.1μg/l for Use I waters.

Piscataway Creek: The measured concentration of dissolved oxygen is 5.6mg/l. Percent dissolved oxygen saturation is only 58%, however, indicating the presence of biodegradable waste (see DEIS Table III-8 page III-42 and Table III-9 page 44). Five-day biochemical oxygen demand is elevated at 6.4mg/l; this falls within the "poor" range. Ammonia concentrations are the highest of any sampled stream in the study area 0.77mg/l. Concentrations higher than 0.06mg/l can cause gill damage in sensitive fish species**.** Ammonia in streams can result from bacterial decomposition of urea and protein or from contamination by fertilizers. This ammonia concentration accelerates the eutrophication process in receiving waters. Fecal coliform numbers of 2020/100ml sample exceed the Use I criterion of not more than 400/100ml sample.

Piscataway Creek Tributary 2: The dissolved oxygen criterion for Use I streams is not less than 5.0 mg/l. The measured concentration is 4.6mg/l (see DEIS Table III-8 page III-42 and Table III-9 page 44). Percent dissolved oxygen saturation is only 50%, indicating the presence of biodegradable waste. Five-day biochemical oxygen demand is elevated at 5.4mg/l. The phosphate concentration of 0.45mg/l is greatly elevated. This phosphate concentration far exceeds the recommended maximum concentration for streams of 0.1 mg/l.

The designated use of the streams within or adjacent to the project area is:

> **Use I-P -** (water contact recreation, the protection of aquatic life, and public water supply) for all waters within the project area.

Water quality criteria for Use I-P streams is summarized in Table III-9. (See DEIS page III-44)

The land along the Potomac River is within the Chesapeake Bay Critical Area and is regulated in accordance with the Chesapeake Bay Critical Area Protection Act to minimize damage to water quality and natural habitats along the shoreline of the Chesapeake Bay and its tidal tributaries. All land and water areas within 1,000 feet landward of the heads of tide or State and private wetlands designated under the Annotated Code of Maryland, Natural Resources Article are included in the Chesapeake Bay Critical Area. In addition, a Critical Area Buffer has been established that extends at least 100 feet inland from the edge of mean high tide or the banks of tributary streams and includes adjacent nontidal wetlands, the 100-year floodplains, and steep slopes. The Chesapeake Critical Area Buffer is a vegetated area that serves to protect aquatic wetland, shoreline, and terrestrial environments from manmade disturbances. A portion of the project area in the vicinity of Piscataway Creek is located in the Chesapeake Bay Critical Area (Figure III-3B).

2. Groundwater Resources

Aquifers are geologic units that yield economic quantities of water. The project area is underlain by at least two aquifers of varying thickness and yields. The Patuxent and Patapsco Aquifers, at depths of 400 feet to 800 feet and 0 to 100 feet, respectively, yield commercial quantities of groundwater. The 1985 withdrawals of groundwater by Prince Georges' County were 2.4 million gallons per day (mgd) from the Patuxent Aquifer and 0.87 mgd from the Patapsco Aquifer (MDE 1987).

The Patuxent formation consists of irregularly stratified, cross-bedded and lenticular moderately sorted sands and quartz gravels with silt and clay beds. The Patuxent formation is fluvial in origin and dates from the early Cretaceous period (98-144 million years old). This is a multi-aquifer unit and is one of the most productive water-bearing formations in Maryland. Well yields range from a few hundred to 1,200 gallons per minute (gpm). Specific capacity ranges from 130 to 10,700 feet squared per day. The average storage coefficient is 0.0001. The natural quality is generally good in most up dip areas. In these areas the formation's water is commonly soft, low in total dissolved solids (TDS) and low in chlorides, pH levels are moderately low, but acceptable.

The Patapsco formation consists of fluvial and swamp sediments deposited during the early Cretaceous period. The Patapsco is also a multi-layered aquifer and consists of irregularly stratified and inter-bedded, silt and clay, fine to medium-grained quartz sand with minor amounts of gravel. Well yields range from 3 to 2,160 gpm. Specific capacity ranges from 160 to 6,700 feet squared per day. The average storage coefficient ranges from 0.005 to 0.00005. The natural

quality of Patapsco formation groundwater is good in most up dip areas. In these areas, the formation's water is commonly acidic with high iron concentrations, low in chlorides and TDS.

3. Fish Fauna

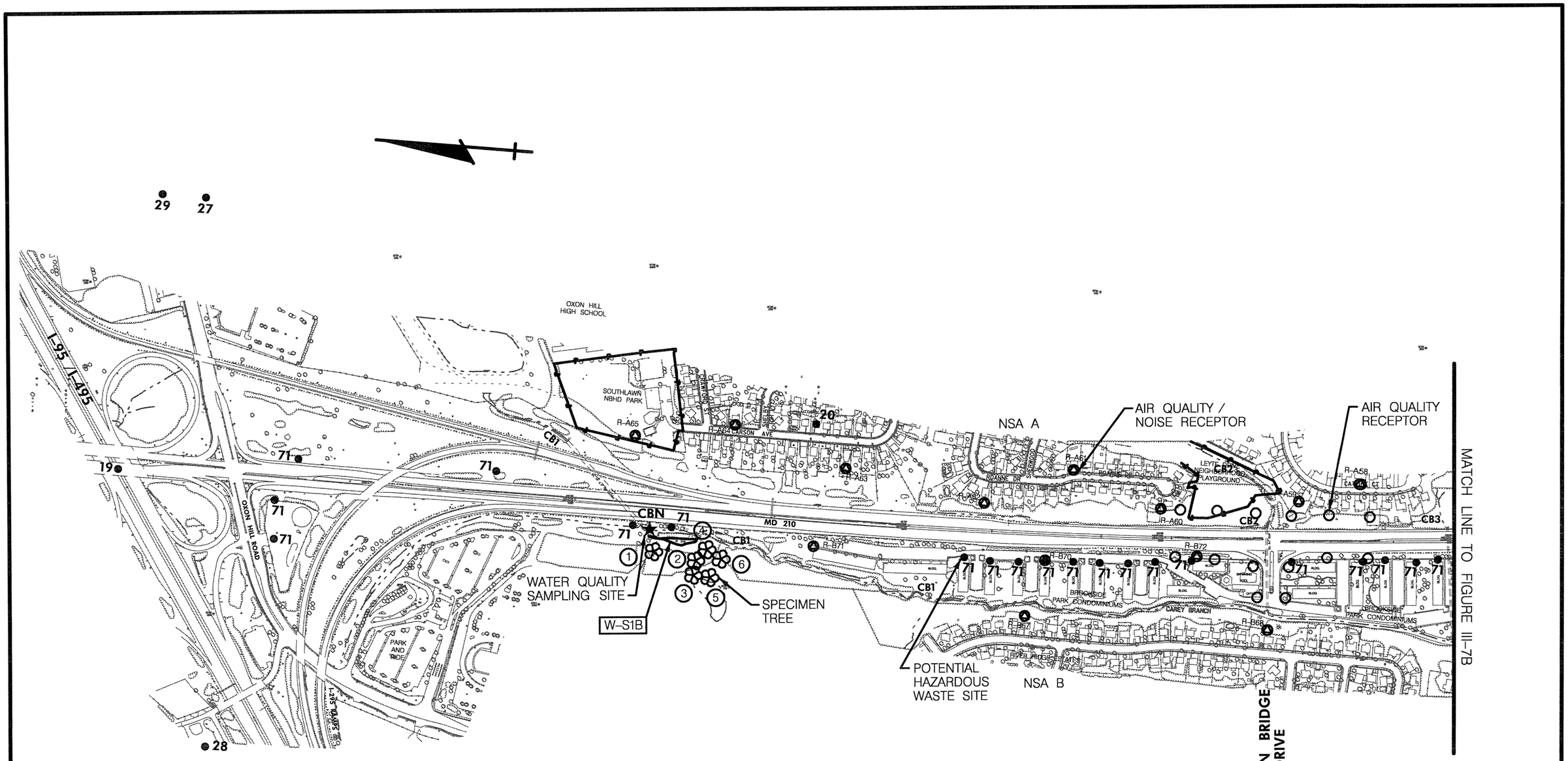
The fish fauna of the project area is diverse and includes anadromous (fish that live the majority of their life in brackish or saltwater and migrate to freshwater for spawning), catadromous (fish that live the majority of their life in freshwater and migrate to saltwater for spawning), and freshwater fishes. The only anadromous fish with documented spawning in the project area are the white perch (*Morone Americana*) and herring (Alosa sp.). The yellow perch (perca flavescens) is also listed as occurring but without documented spawning. The only catadromous fish species with documented spawning in the project area is the American eel (*Anguilla rostrata*). The Piscataway Creek and its associated tributaries were sampled in the mid 1980's by the Storm Water Management Technical Group and more recently by DNR as part of the ongoing Maryland Biological Stream Survey (MBSS). The freshwater fishes collected during both surveys are listed in the Appendix. The data for the Henson Creek watershed is only from the MBSS.

G. Waters of the U.S. Including Wetlands

1. Introduction

Waters of the United States, including wetlands, potentially affected by the proposed project have been identified. Waters of the U.S. include resources such as streams, lakes, tidal waters, and wetlands, which are transitional areas between water and land. The federal government defines wetlands as "those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas" (EPA, 40 CFR 230.3 and CE, 33 CFR 328.3).

Primarily Section 404 of the Clean Water Act administered by the U.S. Army Corps of Engineers regulates these resources, which provide many valuable functions in both the natural and cultural environment. The U.S. Environmental Protection Agency, U.S. Fish & Wildlife Service, National Marine Fisheries Service, and Natural Resources Conservation Service also are involved with the protection of these resources at the federal level. The Maryland Department of the Environment also regulates waters and wetlands at the state level.



INTERSECTION – A

LEGEND

W-S1B	WETLANDS
● 28	POTENTIAL HAZARDOUS WASTE SITE
③	SPECIMEN TREE
CB1	WATERS OF THE U.S.
★CBN	WATER QUALITY SAMPLING SITE
NSA B	NOISE SENSITIVE AREA
△	NOISE RECEPTOR
○	AIR QUALITY RECEPTOR
R-67	AIR QUALITY /NOISE RECEPTOR

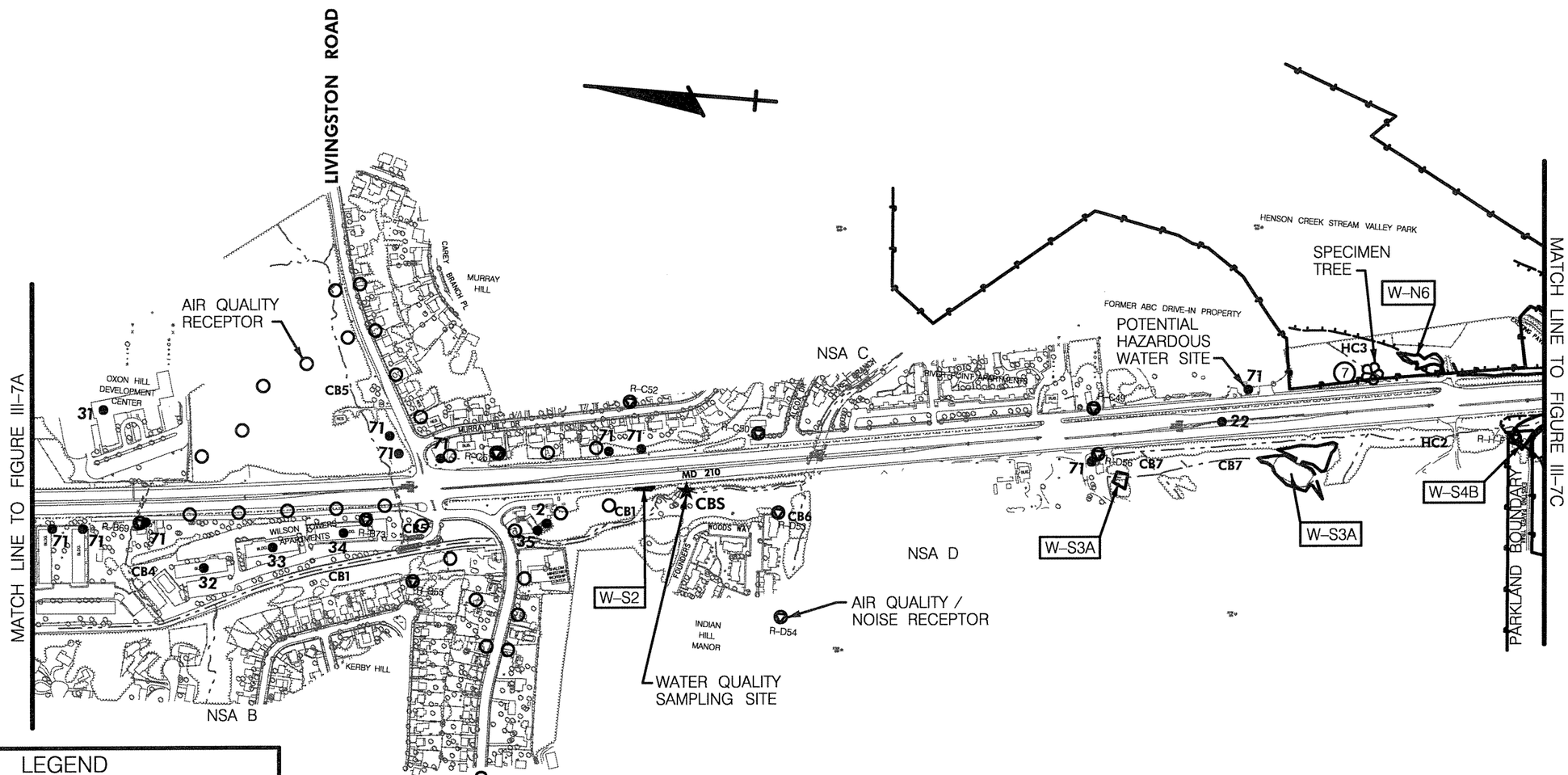
SHA State Highway Administration — Maryland Department of Transportation

MD 210 – I-95 /I-495 TO MD 228

ENVIRONMENTAL BASEMAP

DATE	SCALE	FIGURE
MAY, 2004	SCALE: 1" = 500'	III-7A

ps01-ef.dgn
08-26-03 TLL



LEGEND

W-S2	WETLANDS
● 71	POTENTIAL HAZARDOUS WASTE SITE
③	SPECIMEN TREE
CB1	WATERS OF THE U.S.
★ CBS	WATER QUALITY SAMPLING SITE
NSA B	NOISE SENSITIVE AREA
△	NOISE RECEPTOR
○	AIR QUALITY RECEPTOR
R-67	AIR QUALITY /NOISE RECEPTOR

MD 210 – I-95 /I-495 TO MD 228

ENVIRONMENTAL BASEMAP

DATE	SCALE	FIGURE
MAY, 2004	SCALE: 1" = 500'	III-7B

ps02-ef.dgn
08-26-03 TLL

INTERSECTION – C

INTERSECTION – D

PALMER ROAD

DEVON HILLS

POTOMAC HEIGHTS

FRIENDLY HILLS

AIR QUALITY RECEPTOR

NOISE RECEPTOR

AIR QUALITY / NOISE RECEPTOR

NSA E

W-S4D

W-S4C

W-S4A

W-NBC-2

W-NBC

W-S5A

W-S5

W-S6

W-S7

OLD PALMER ROAD

CENTENNIAL DR

BROADMOOR RD

HM1

HM2

HM

HMZ

R-E44

R-E45

R-E46

R-E43

R-E48

R-F46

R-F47

R-Bc-F1

BC1

BC2

BCN

MD 210

WATER QUALITY SAMPLING SITE

LIVINGSTON SQUARE SHOPPING CENTER

LIVINGSTON ROAD

NSA F

100-YR. FLOODPLAIN BOUNDARY

FORT WASHINGTON GOLF RANGE

PARKLAND BOUNDARY

POTENTIAL HAZARDOUS WASTE SITE

OLD FORT ROAD NORTH

HISTORIC BOUNDARY

BROAD CREEK HISTORIC DISTRICT

SPECIMEN TREE

LIVINGSTON RD.

MATCH LINE TO FIGURE III-7B

MATCH LINE TO FIGURE III-7D

LEGEND

W-S4A	WETLANDS
● 71	POTENTIAL HAZARDOUS WASTE SITE
③	SPECIMEN TREE
HM1	WATERS OF THE U.S.
★ HM	WATER QUALITY SAMPLING SITE
NSA E	NOISE SENSITIVE AREA
△	NOISE RECEPTOR
○	AIR QUALITY RECEPTOR
◬ R-67	AIR QUALITY /NOISE RECEPTOR

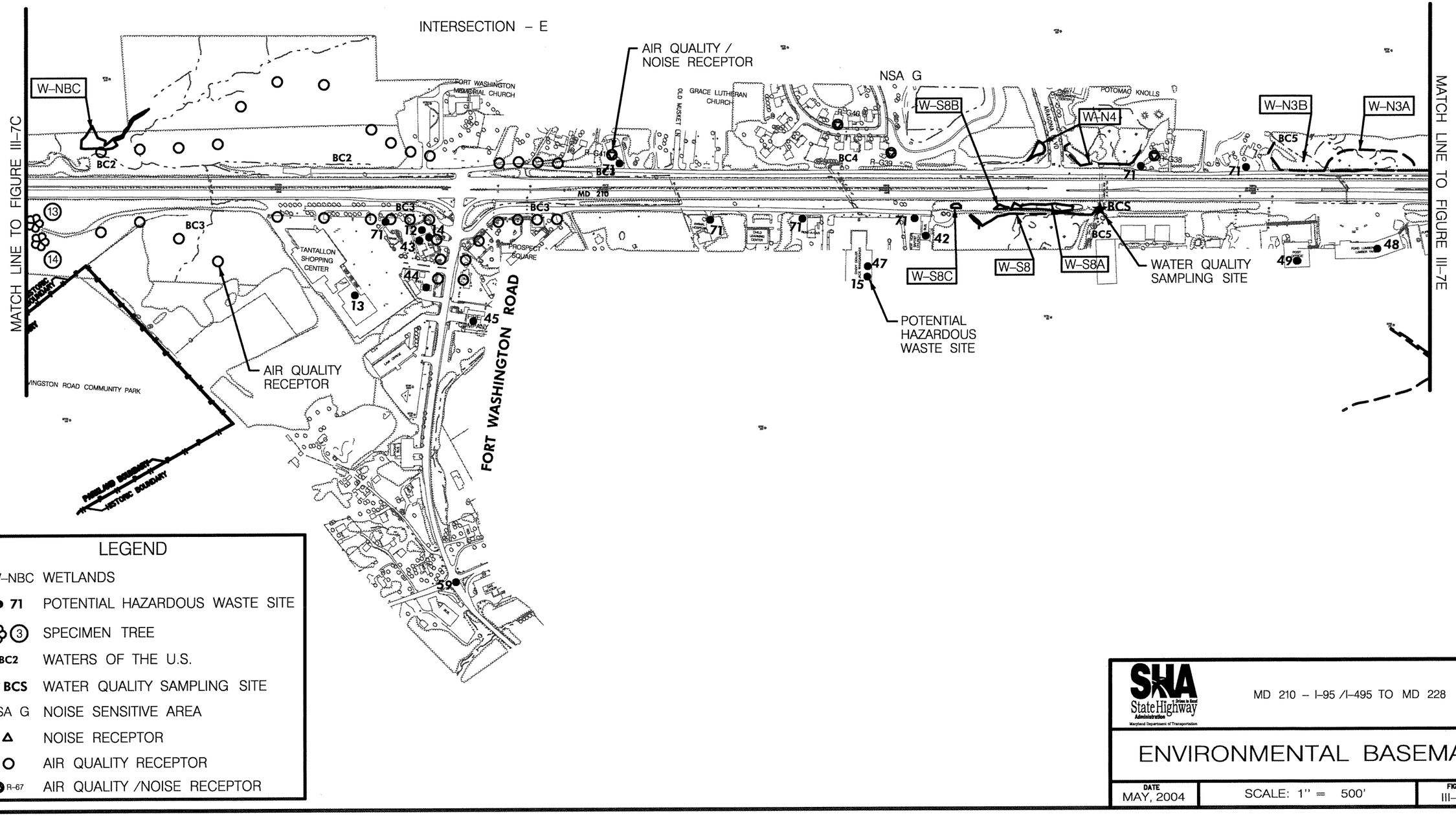
SHA State Highway Administration — Maryland Department of Transportation

MD 210 – I-95 /I-495 TO MD 228

ENVIRONMENTAL BASEMAP

DATE	SCALE	FIGURE
MAY, 2004	SCALE: 1'' = 500'	III-7C

ps03-ef.dgn
08-26-03 TLL



LEGEND

W–NBC	WETLANDS
● 71	POTENTIAL HAZARDOUS WASTE SITE
③	SPECIMEN TREE
BC2	WATERS OF THE U.S.
★ BCS	WATER QUALITY SAMPLING SITE
NSA G	NOISE SENSITIVE AREA
△	NOISE RECEPTOR
○	AIR QUALITY RECEPTOR
◬ R–67	AIR QUALITY /NOISE RECEPTOR

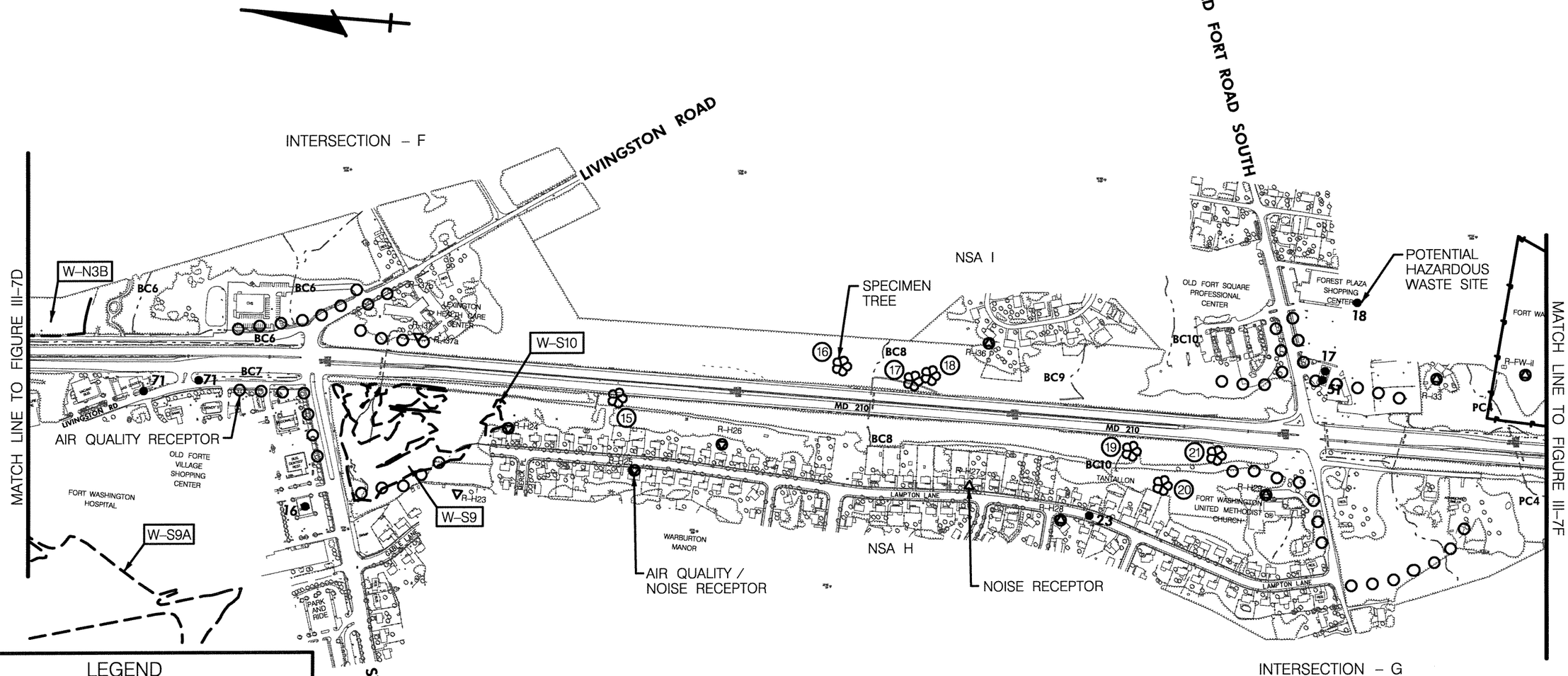
SHA State Highway Administration — Maryland Department of Transportation

MD 210 – I–95 /I–495 TO MD 228

ENVIRONMENTAL BASEMAP

DATE	SCALE	FIGURE
MAY, 2004	SCALE: 1" = 500'	III–7D

ps04-ef.dgn
08-26-03 TLL



LEGEND

W–S9	WETLANDS
● 71	POTENTIAL HAZARDOUS WASTE SITE
⑬	SPECIMEN TREE
BC6	WATERS OF THE U.S.
NSA H	NOISE SENSITIVE AREA
△	NOISE RECEPTOR
○	AIR QUALITY RECEPTOR
R-67	AIR QUALITY /NOISE RECEPTOR

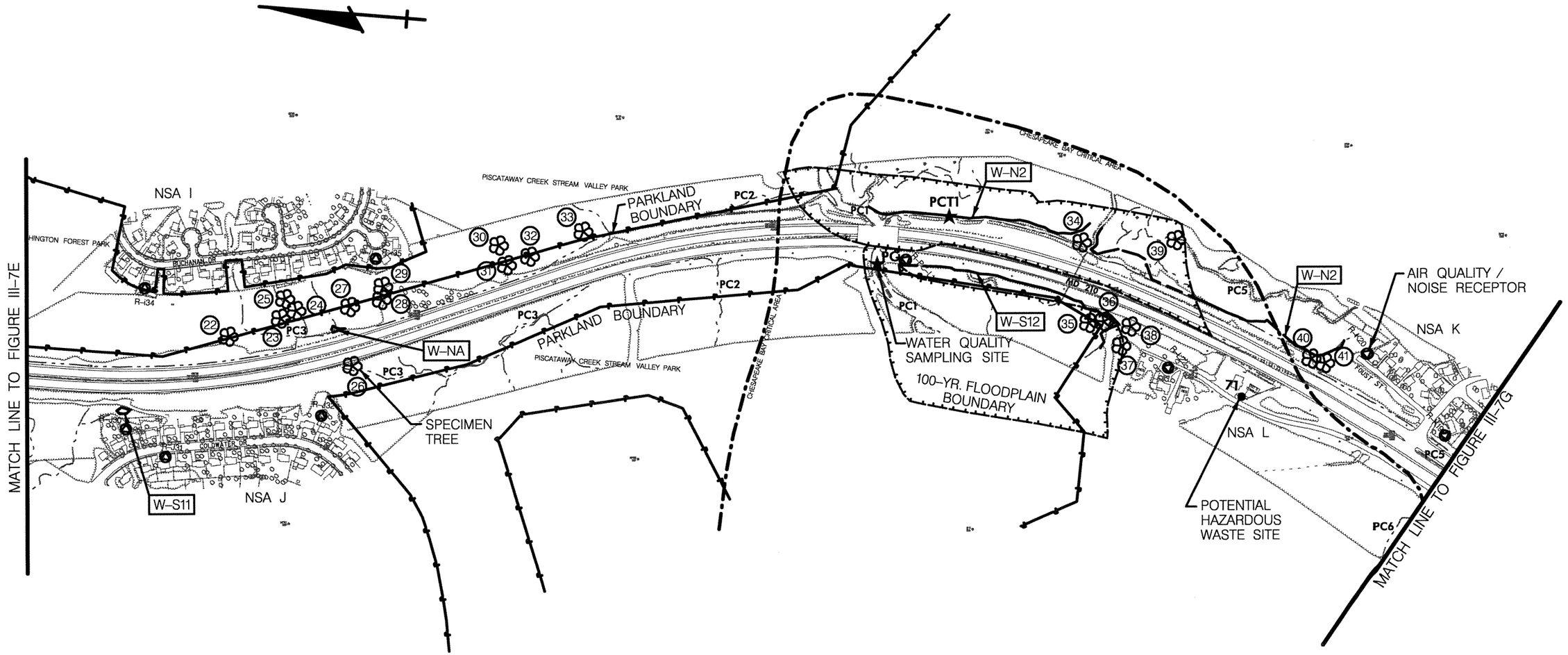
SHA State Highway Administration — Maryland Department of Transportation

MD 210 – I–95 /I–495 TO MD 228

ENVIRONMENTAL BASEMAP

DATE	SCALE	FIGURE
MAY, 2004	SCALE: 1" = 500'	III–7E

ps05-ef.dgn
08-26-03 TLL



LEGEND

W-S11	WETLANDS
● 71	POTENTIAL HAZARDOUS WASTE SITE
③	SPECIMEN TREE
PC2	WATERS OF THE U.S.
★ PC	WATER QUALITY SAMPLING SITE
NSA J	NOISE SENSITIVE AREA
△	NOISE RECEPTOR
○	AIR QUALITY RECEPTOR
R-67	AIR QUALITY /NOISE RECEPTOR

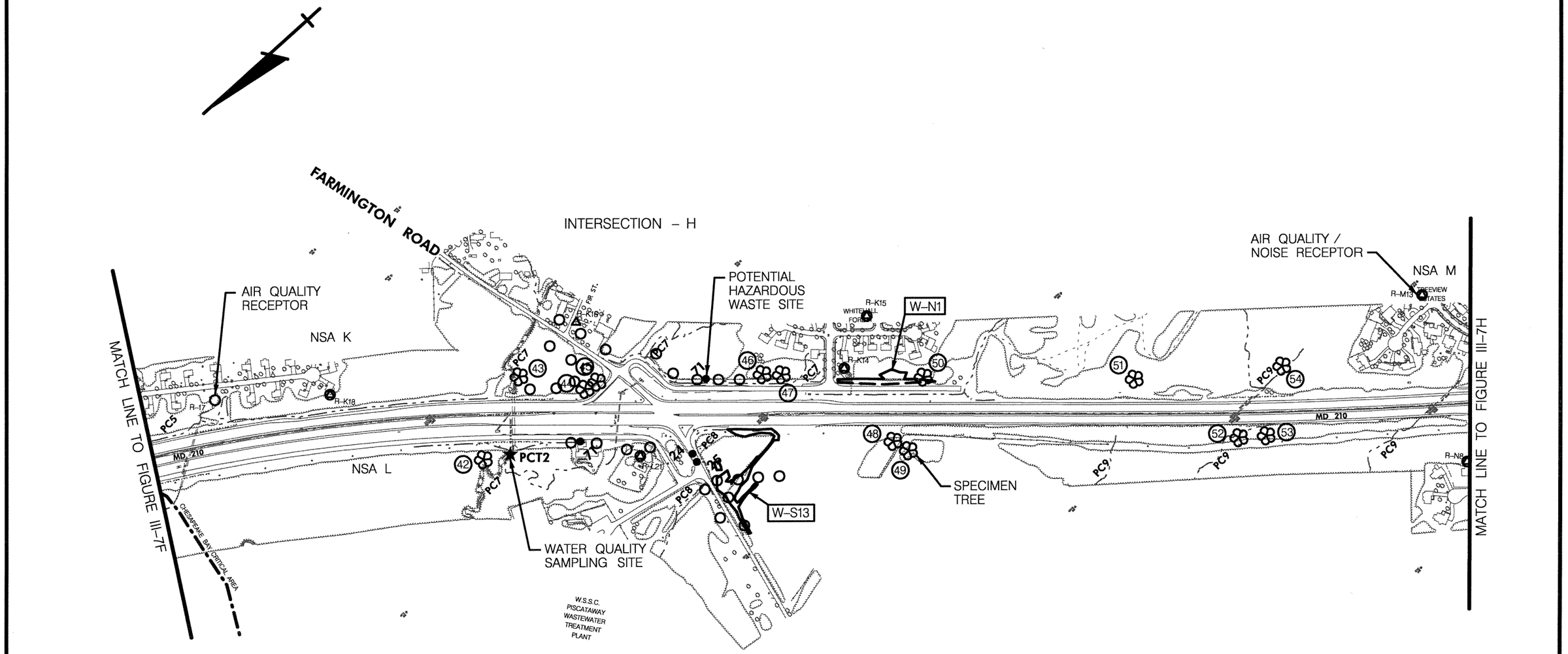
SHA State Highway Administration — Maryland Department of Transportation

MD 210 – I-95 /I-495 TO MD 228

ENVIRONMENTAL BASEMAP

DATE	SCALE	FIGURE
MAY, 2004	SCALE: 1" = 500'	III-7F

ps06-ef.dgn
08-26-03 TLL



LEGEND

W–S13	WETLANDS
● 71	POTENTIAL HAZARDOUS WASTE SITE
③	SPECIMEN TREE
PC5	WATERS OF THE U.S.
★PCT2	WATER QUALITY SAMPLING SITE
NSA K	NOISE SENSITIVE AREA
△	NOISE RECEPTOR
○	AIR QUALITY RECEPTOR
R-67	AIR QUALITY /NOISE RECEPTOR

ps07-ef.dgn
08-26-03 TLL

SHA State Highway Administration — Maryland Department of Transportation

MD 210 – I–95 /I–495 TO MD 228

ENVIRONMENTAL BASEMAP

DATE	SCALE	FIGURE
MAY, 2004	SCALE: 1" = 500'	III–7G

MD 373

MD 228

AIR QUALITY / NOISE RECEPTOR

W–N1A

POTENTIAL HAZARDOUS WASTE SITE

NSA M

FOOD LION

MATCH LINE TO FIGURE III–7G

MD 210

R–M10

R–M11

R–N6

R–N9

R–N3

R–N4

R–N5

PCT3

WATER QUALITY SAMPLING SITE

NSA N

AIR QUALITY RECEPTOR

INTERSECTION – I

LEGEND

W–N1A	WETLANDS
● 71	POTENTIAL HAZARDOUS WASTE SITE
③	SPECIMEN TREE
PC10	WATERS OF THE U.S.
★PCT3	WATER QUALITY SAMPLING SITE
NSA N	NOISE SENSITIVE AREA
△	NOISE RECEPTOR
○	AIR QUALITY RECEPTOR
R-67	AIR QUALITY /NOISE RECEPTOR

ps08-ef.dgn
08-26-03 TLL

SHA State Highway Administration — Maryland Department of Transportation

MD 210 – I–95 /I–495 TO MD 228

ENVIRONMENTAL BASEMAP

DATE	SCALE	FIGURE
MAY, 2004	SCALE: 1" = 500'	III–7H

Existing information, including National Wetland Inventory (NWI) mapping, soil survey mapping, and U.S. Geological Survey topographic maps were reviewed by the Study Team in the early stages of the present study.

2. Methods

All jurisdictional wetlands were identified, mapped, and described in accordance with procedures outlined in the U.S. Army Corps of Engineers Wetlands Delineation Manual (USACOE, 1987). This study used a three-parameter approach to wetland identification and delineation in which all three parameters, hydrophytic vegetation, hydric soils, and wetland hydrology must be met to qualify for jurisdictional wetland status. A Routine Data Sheet was completed for each wetland, providing documentation for these parameters. Soil information was obtained from the Prince Georges' Soil Survey published by the U.S. Soil Conservation Service (Natural Resources Conservation Service). The indicator status for the dominant plant species encountered was taken from the National List of Plant Species That Occur in Wetlands: Maryland (Reed, 1988). The Classification of Wetlands and Deepwater Habitats of the United States (Coward in, et al., 1979) developed by the U.S. Fish and Wildlife Service was used to classify wetlands in the Study Area. Wetland limits were mapped using topographic and plan metric features and were not surveyed.

The Evaluation for Planned Wetlands method (1994) was used as a guide for assessing the potential impacts of the proposed alternates to wetlands. Evaluation for Planned Wetlands: A Procedure for Assessing Wetland Functions and a Guide to Functional Design (Bartoldus et. al, 1994) was used to assess the functions and values of potentially impacted wetlands and wetland systems greater than one acre in size. The final result of this methodology is a numerical quantification of the primary functions and values that exist in a particular wetland or wetland system. The functions and values that were assessed by this methodology in the study area are as follows:

Sediment Stabilization - This function considers the potential capacity of a wetland to stabilize and retain previously deposited sediments.

Water Quality - This function considers the capacity of a wetland to retain and process dissolved or particulate materials to the benefit of downstream surface water quality.

Wildlife Habitat - This function considers the capacity of a wetland to provide habitat for various types and populations of animals typically associated with wetlands and the wetland edge.

Fish Habitat (non-tidal stream/river) - This function considers the degree to which a wetland's habitat meets the food, cover, reproductive, and water quality requirements of fish.

Uniqueness/Heritage - These values consider the presence of characteristics that distinguish a wetland as unique, rare, or valuable; among these values are considerations to endangered species, public park property, recreation, uniqueness, etc.

3. Results

A total of 39 surface water resource areas and 27 wetland areas were identified during the present study. Table III-6 provides general information for each surface water resource area, and Figure III-7A through 7H is a generalized summary map of these resource areas.

TABLE III-6
WATERS OF THE U.S./WETLANDS SUMMARY

Area	Resource	Watershed	Wetland Type	Associated Wetlands
CB 1	Carey Branch	Henson Creek	1st-3rd order stream	WS-1B, WS-2
CB 2	Unnamed tributary	Henson Creek	1st-2nd order stream	-
CB 3	Unnamed tributary	Henson Creek	1st order stream	-
CB 4	Unnamed tributary	Henson Creek	1st order stream	-
CB 5	Unnamed tributary	Henson Creek	2nd order stream	-
CB 6	Unnamed tributary	Henson Creek	1st order stream	-
CB 7	Unnamed tributary	Henson Creek	1st-2nd order stream	WS-3A
HC 1	Henson Creek	Henson Creek	3rd order stream	WS-4A/B/C/D, WN-5
HC 2	Unnamed tributary	Henson Creek	1st-2nd order stream	-
HC 3	Unnamed tributary	Henson Creek	2nd order stream	WN-6
HC 4	Unnamed tributary	Henson Creek	1st order stream	-
HC 5	Unnamed tributary	Henson Creek	1st order stream	-
HM 1	Hunter's Mill Creek	Henson Creek	3rd order stream	WS-4C, WS-4D
HM 2	Unnamed tributary	Henson Creek	1st-2nd order stream	-
BC 1	Broad Creek	Henson Creek	2nd order stream	WN-BC2
BC 2	Unnamed tributary	Henson Creek	1st-3rd order stream	WS-5, WS-5A, WS-6, WS-7, WN-BC
BC 3	Unnamed tributary	Henson Creek	1st-2nd order stream	-

Area	Resource	Watershed	Wetland Type	Associated Wetlands
BC 4	Unnamed tributary	Henson Creek	2nd order stream	-
BC 5	Unnamed tributary	Henson Creek	1st-3rd order stream	WS-8, WN-4
BC 6	Unnamed tributary	Henson Creek	1st-2nd order stream	-
BC 7	Unnamed tributary	Henson Creek	1st order stream	WS-9, WS-10
BC 7A	Unnamed tributary	Henson Creek	1st order stream	WS-9
BC 7B	Unnamed tributary	Henson Creek	1st order stream	WS-10
BC 8	Unnamed tributary	Henson Creek	1st order stream	-
BC 9	Unnamed tributary	Henson Creek	1st order stream	-
PC 1	Piscataway Creek	Piscataway Creek	4th order stream	WS-12, WN-2
PC 2	Unnamed tributary	Piscataway Creek	1st-2nd order stream	-
PC 3	Unnamed tributary	Piscataway Creek	1st-2nd order stream	WN-A
PC 4	Unnamed tributary	Piscataway Creek	1st-2nd order stream	WS-11
PC 5	Unnamed tributary	Piscataway Creek	1st-3rd order stream	WN-2
PC 6	Unnamed tributary	Piscataway Creek	1st order stream	-
PC 7	Unnamed tributary	Piscataway Creek	1st-3rd order stream	WN-1
PC 8	Unnamed tributary	Piscataway Creek	1st-2nd order stream	WS-13
PC 9	Unnamed tributary	Piscataway Creek	1st-2nd order stream	-
PC 10	Unnamed tributary	Piscataway Creek	1st-2nd order stream	WN-1A
PC 11	Unnamed tributary	Piscataway Creek	1st-2nd order stream	-
PC 12	Unnamed tributary	Piscataway Creek	1st-2nd order stream	-
PC 13	Unnamed tributary	Piscataway Creek	1st-2nd order stream	-
PC 14	Unnamed tributary	Piscataway Creek	1st-2nd order stream	-

Resources CB 1 - 7 (Waters of the U.S.)

These resources are Carey Branch and associated unnamed tributaries. Carey Branch is a tributary to Henson Creek. These resources are 1st - 3rd order streams. Portions of these resources are channeled and receive large volumes of storm water discharge. There is moderate associated flooding and scouring of the unchannelized and unstabilized portions of these streams. Water quality for these resources ranges from poor to fair (see Section III.F.1.b.). Associated wetlands are WS-1B, WS-2, and WS-3A.

Resources HC 1 - 5 (Waters of the U.S.)

These resources are Henson Creek and associated unnamed tributaries. Henson Creek is a tributary to the Potomac River. These resources are 1st - 3rd order streams. For much of their length these resources receive large volumes of storm water discharge. There is substantial associated flooding and scouring of portions of these streams. Water quality for these resources is fair (see Section III.F.1.b). Associated wetlands are WS-4A, WS-4B, WS-4C, WS-4D, WN-5, and WN-6.

Resources HM 1 - 2 (Waters of the U.S.)

These resources are Hunter's Mill Creek and associated unnamed tributaries. Hunter's Mill Creek is a tributary to Henson Creek. These resources are 1st - 3rd order streams. For much of their length these resources receive large volumes of storm water discharge. There is minimal associated scouring of these streams. Water quality for these resources is fair (see Section III.F.1.b.). Associated wetlands are WS-4C and WS-4D.

Resources BC 1 - 9 (Waters of the U.S.)

These resources are unnamed tributaries to Broad Creek. Broad Creek is a tributary to the Potomac River. These resources are 1st - 3rd order streams. Portions of some of these resources are channeled and receive large volumes of storm water discharge. There is moderate associated flooding and scouring of the unchannelized and unstabilized portions of these streams. Water quality for these resources is fair (see Section III.F.1.b.). Associated wetlands are WS-5A, WS-5, WS-6, WS-7, WS-8, WS-9, WS-10, WN-4, WN-3, WN-BC, and WN-BC2.

Resources PC 1 - 14 (Waters of the U.S.)

These resources are Piscataway Creek and associated unnamed tributaries. Piscataway Creek is a tributary to the Potomac River. These resources are 1st – 4th order streams. These resources receive large volumes of storm water discharge. There is moderate associated flooding and scouring of portions of these streams. Water quality for these resources ranges from poor to good (see Section III.F.1.b.). Associated wetlands are WS-11, WS-12, WS-13, WN-1A, WN-1, WN-2, and WN-A.

Resource WS-1B (PEM/PSS Wetland)

This resource is a small, disjointed wetland system within the influence of Carey Branch. It is located west of MD 210, just south of I-495. Because this resource is less than one acre in size, functions and values were not assessed. The dominant vegetation includes *Salix nigra,*

Typha latifolia, Juncus effusus, and *Carex lurida.* These plants are either Obligate Wetland Plants (OBL) or Facultative Wetland Plants (FACW) for Maryland. The soil consists of an A layer from 0-2 inches with a matrix color of 10 YR 4 chroma 4 with a silt clay texture and a B layer from 2 inches down with a matrix color of 2.5 Y 5 chroma 2 with a gravely sandy clay texture.

Resource WS-2 (PEM Wetland)

This resource is a small roadside wetland associated with Carey Branch. It is located west of MD 210, south of Kerby Hill Road. Because this resource is less than one acre in size, functions and values were not assessed. The dominant vegetation includes *Juncus effusus* and *Carex lurida.* These plants are either OBL or FACW for Maryland. The soil consists of an A layer from 0 – 4 inches with a matrix color of 10 YR 3 chroma 1 with a silt clay texture over a B layer of sandy gravel.

Resource WS-3A (POW/PEM/PSS Wetland)

This resource is a small wetland associated with CB7 and Henson Creek. It is located west of MD 210, north of Livingston Road. Because this resource is less than one acre in size, functions and values were not assessed. The dominant vegetation includes *Juncus effusus, Carex lurida,* and *Acer rubrum.* These plants are FACW and OBL for Maryland. The soil consists of an A layer from 0 – 18+ inches with a matrix color of 10 YR 3 chroma 2 with a silt loam texture.

Resource WS-4A (PFO Wetland)

This resource is part of a large wetland system within the floodplain of Henson Creek. It is located west of MD 210, north of Livingston Road. Functions and values were assessed and functional capacity indices follow: sediment stabilization 0.98, water quality 0.86, wildlife habitat 0.87, uniqueness and heritage 0.24. The dominant vegetation includes *Acer negundo, Sambucus canadensis, Cornus amomum, Lonicera japonica,* and *Cinna arundinacea.* These plants range from FACW+ to FAC- for Maryland. The soil consists of an A layer from 0 – 12+ inches with a matrix color of 10 YR 4 chroma 3 with a silty sandy loam texture.

Resource WS-4B (PEM Wetland)

This resource is part of a large wetland system within the floodplain of Henson Creek. It is located west of MD 210, north of Livingston Road. Functions and values were assessed and functional capacity indices follow: sediment stabilization 0.98, water quality 0.86, wildlife habitat 0.87, uniqueness and heritage 0.24. The dominant vegetation includes *Impatiens capensis, Typha latifolia, Juncus effusus* and *Carex lurida.* These plants range from OBL to

FACW for Maryland. The soil consists of an A_1 layer from 0 – 10 inches with a matrix color of 10 YR 3 chroma 4 with a silt clay texture over an A_2 layer from 10 inches down with a matrix color of 10 YR 3 chroma 3 and a silt clay texture.

Resource WS-4C (PEM/PFO Wetland)

This resource is a small wetland associated with an unnamed tributary to Henson Creek. It is located west of MD 210 and south of Livingston Road. Because this resource is less than one acre in size, functions and values were not assessed. The dominant vegetation includes *Fraxinus pennsylvanica, Rosa multiflora, Ambrosia artemisifolia,* and *Graminae* spp. These plants range from OBL to FACU for Maryland. The soil consists of an O layer from 0 – 6 inches with a matrix color of 10 YR 3 chroma 2 with an organic texture over an A_1 layer from 6 inches down with a matrix color of 10 YR 4 chroma 2 and a gravely clay loam texture.

Resource WS-4D (PFO Wetland)

This resource is a small wetland associated with an unnamed tributary to Henson Creek. It is located west of MD 210 and south of Livingston Road. Because this resource is less than one acre in size, functions and values were not assessed. The dominant vegetation includes *Liquidambar styraciflua, Acer rubrum, Toxicodendron radicans, Juncus effusus,* and *Impatiens capensis.* These plants range from FACW+ to FAC for Maryland. The soil consists of an A_1 layer from 0 – 4 inches with a matrix color of 10 YR 3 chroma 2 with an organic clay texture over an A_2 layer from 4 inches down with a matrix color of 10 YR 4 chroma 2 with a clay texture.

Resource WS-5 (PFO Wetland)

This resource is a small wetland associated with an unnamed tributary to Broad Creek. It is located west of MD 210 and south of Old Fort Road North. Because this resource is less than one acre in size, functions and values were not assessed. The dominant vegetation includes *Smilax rotundifolia* and *Acer rubrum.* These plants are FAC for Maryland. The soil consists of an A_1 layer from 0 – 4 inches with a matrix color of 10 YR 3 chroma 2 with an organic clay texture over an A_2 layer from 4 inches down with a matrix color of 10 YR 4 chroma 2 with a clay texture.

Resource WS-5A (PFO/PEM Wetland)

This resource is a small wetland associated with an unnamed tributary to Broad Creek. It is located west of MD 210 and north of Old Fort Road North. Because this resource is less than one acre in size, functions and values were not assessed. The dominant vegetation includes *Acer*

negundo, Fraxinus pennsylvanica, Leersia oryzoides, Impatiens capensis, and *Polygonum sagittatum.* These plants range from OBL to FACW for Maryland. The soil consists of an organic muck layer over a layer of confining silt clay.

Resource WS-6 (PFO Wetland)

This resource is a small wetland associated with an unnamed tributary to Broad Creek. It is located west of MD 210 and south of Old Fort Road North. Because this resource is less than one acre in size, functions and values were not assessed. The dominant vegetation includes *Liquidambar styraciflua, Acer rubrum,* and *Smilax rotundifolia.* These plants are FAC for Maryland. The soil consists of an organic muck layer over a confining layer of gravel.

Resource WS-7 (PFO Wetland)

This resource is a small wetland associated with an unnamed tributary to Broad Creek. It is located west of MD 210 and south of Old Fort Road North. Because this resource is less than one acre in size, functions and values were not assessed. The dominant vegetation includes *Arisaema triphyllum, Toxicodendron radicans,* and *Ulmus rubra.* These plants range from FACW to FAC- for Maryland. The soil consists of an A layer from 0 – 8+ inches with a matrix color of 10 YR 3 chroma 3 and a silt loam texture.

Resource WS-8 (PFO and PEM Wetland)

This resource is a large wetland system along the floodplain of an unnamed tributary to Broad Creek. It is located west of MD 210, between Fort Washington and Livingston Roads. Functions and values were assessed and functional capacity indices follow: sediment stabilization 0.8, water quality 0.94, wildlife habitat 0.68, fish support 0.35, uniqueness and heritage 0.9. The dominant vegetation includes *Betula nigra, Juncus effusus* and *Carex lurida.* These plants range from OBL to FAC for Maryland. The soil consists of an O layer from 0 – 2 inches over an A_1 layer from 2 – 11 inches with a matrix color of gley 15/10Y with a clay texture over an A_2 layer from 11 inches down with a matrix color of gley 4/N with a clay texture.

Resource WS-9/9A (PFO and PEM Wetland)

WS-9 is a large wetland system associated with an unnamed tributary to Broad Creek. It is located west of MD 210, south of Swan Creek Road. Functions and values were assessed and functional capacity indices follow: sediment stabilization 0.75, water quality 0.95, wildlife habitat 0.36, uniqueness and heritage 0.9. The dominant vegetation includes *Acer rubrum, Quercus palustris, Ulmus rubra, Lindera benzoin, Viburnum dentatum, Alnus serrulata, Lonicera japonica, Liquidambar styraciflua, Impatians capensis, Sambucus canadensis,* and

Cinna arundinacea. These plants range from OBL to FAC- for Maryland. The soil consists of an A_1 layer from 0 - 4 inches with a matrix color of 10 YR 3 chroma 3 with a loam texture over an A_2 layer from 4 - 6 inches with a matrix color of 10 YR 5 chroma 4 with a clay loam texture over an B layer from 6 inches down with a matrix color of 2.5 Y 5 chroma 2 with a clay texture.

WS-9A is a large wetland system associated with an unnamed tributary to Broad Creek. It is located west of MD 210, north of Swan Creek Road. Functions and values were assessed and functional capacity indices follow: sediment stabilization 0.48, water quality 0.86, wildlife habitat 0.56, and uniqueness and heritage 0.9. The dominant vegetation includes *Acer rubrum, Liquidambar styraciflua, Vaccinium corymbosum, Lindera benzoin, Viburnum dentatum, Smilax rotundifolia, Lonicera japonica, Toxicodendron radicans, Symplocarpus foetidus, Claytonia virginiana, Typha latifolia, Glyceria striata, Juncus effuses,* and *Carex lurida.* These plants range from OBL to FAC for Maryland. The soil consists of an A_1 layer from 0 - 4 inches with a matrix color of 2.5 Y 6 chroma 3 with a silt clay texture over an A_2 layer from 4 - 10+ inches with a matrix color of 2.5 Y 6 chroma 2 with large distinct mottles of 7.5 YR 4 chroma 6 of a clay texture.

Resource WS-10 (PFO Wetland)

This resource is a small wetland associated with an unnamed tributary to Broad Creek. It is located west of MD 210 south of Swan Creek Road. Because this resource is less than one acre in size, functions and values were not assessed. The dominant vegetation includes *Liquidambar styraciflua, Parthenocissus quinquefolia, Acer rubrum,* and *Cinna arundinacea.* These plants range from OBL to FACU for Maryland. The soil consists of a silty clay loam from 0 – 12+ inches with a matrix color of 2.5 Y 4 chroma 2.

Resource WS-11 (PFO Wetland)

This resource is a small wetland associated with an unnamed tributary to Piscataway Creek. It is located west of MD 210, south of Swan Creek Road. Because this resource is less than one acre in size, functions and values were not assessed. The dominant vegetation is *Liquidambar styraciflua.* This plant is FAC for Maryland. The soil consists of an O layer from 0 – 1 inches with an organic texture over an A layer from 6 inches down with a matrix color of 2.5 Y 5 chroma 4 and a silt clay texture.

Resource WS-12 (PFO Wetland)

This resource is a large wetland system within the floodplain of Piscataway Creek. It is located west of MD 210 and south of Piscataway Creek. Functions and values were assessed and

functional capacity indices follow: sediment stabilization 1.0, water quality 1.0, wildlife habitat 0.85, uniqueness and heritage 1.0. The dominant vegetation includes *Fraxinus pennsylvanica, Viburnum dentatum, Ulmus rubra, Acer negundo, Leersia oryzoides, Iris pseudoacorus,* and *Carex crinita.* These plants range from OBL to FAC for Maryland. The soil consists of an O layer from 0 – 2 inches over an A_1 layer from 2 – 10 inches with a matrix color of 10 YR 3 chroma 2 with a silt clay loam texture over an A_2 layer from 10 inches down with a matrix color of 5 Y 5 chroma 1 with a clay texture.

Resource WS-13 (PEM /PSS/PFO Wetland)

This resource is a small wetland associated with an unnamed tributary to Piscataway Creek. It is located west of MD 210, north of Farmington Road. Because this resource is less than one acre in size, functions and values were not assessed. The dominant vegetation is *Liquidambar styraciflua, Acer rubrum, Juncus effusus,* and *Typha latifolia.* These plants are OBL and FACW+ for Maryland. The soil consists of an A_1 layer from 0 - 4 inches with a matrix color of 10 YR 3 chroma 3 with a loam texture over an A_2 layer from 4 - 8 inches with a matrix color of 10 YR 4 chroma 3 with a clay loam texture over an A_3 layer from 8 inches down with a matrix color of 10 YR 5 chroma 3 with a gravely clay loam texture.

Resource WN-1A (PFO Wetland)

This resource is a small wetland associated with an unnamed tributary to Piscataway Creek. It is located east of MD 210, south of MD 373. Because this resource is less than one acre in size, functions and values were not assessed. The dominant vegetation includes *Betula nigra, Podophyllum peltatum, Claytonia virginica,* and *Lonicera japonica.* These plants range from FACW to FACU for Maryland. The soil consists of an A_1 layer from 0 – 6 inches with a matrix color of 10 YR 4 chroma 2.5 with a sandy loam texture over an A_2 layer from 6 inches down with a matrix color of 2.5 Y 4 chroma 4 with a gravely clay texture.

Resource WN-1 (PFO/PEM Wetland)

This resource is a small wetland associated with an unnamed tributary to Piscataway Creek. It is located east of MD 210, north of Farmington Road. Because this resource is less than one acre in size, functions and values were not assessed. The dominant vegetation includes *Liquidambar styraciflua, Acer rubrum, Juncus effusus,* and *Carex lurida.* These plants are OBL and FACW for Maryland. The soils consist of silty loams.

Resource WN-2 (PFO/PEM/PSS Wetland)

This resource is a large wetland system within the floodplain of Piscataway Creek. It is located east of MD 210 and south of Piscataway Creek. Functions and values were assessed and functional capacity indices follow: sediment stabilization 1.0, water quality 1.0, wildlife habitat 0.91, fish support 0.48, uniqueness and heritage 1.0. The dominant vegetation includes *Fraxinus pennsylvanica, Cornus ammomum, Acer negundo, Leersia oryzoides, Carex crinita* and *Carex lurida.* These plants range from OBL to FAC+ for Maryland. The soil consists of an organic muck over confining clay layers.

Resource WN-A (PFO Wetland)

This resource is a small wetland associated with an unnamed tributary to Piscataway Creek. It is located east of MD, 210 north of Piscataway Creek. Because this resource is less than one acre in size, functions and values were not assessed. The dominant vegetation includes *Liquidambar styraciflua, Lonicera japonica, Impatiens capensis,* and *Festuca arundinacea.* These plants range from FACW to FACU for Maryland. The soil consists of an A_1 layer from 0 – 6 inches with a matrix color of 10 YR 4 chroma 2 with a clay loam texture over an A_2 layer from 6 inches down with a matrix color of 10 YR 4 chroma 2 with a clay texture.

Resource WN-3A/B (PFO/PEM Wetland)

This resource is a large wetland system within the Broad Creek watershed. It is located east of MD 210 and north of Livingston Road. Functions and values were assessed and functional capacity indices follow: sediment stabilization 1.0, water quality 0.8, wildlife habitat 0.865, uniqueness and heritage 0.9. The dominant vegetation includes *Liquidambar styraciflua, Acer rubrum, viburnum dentatum, Toxicodendron radicans, Leersia oryzoides, Cephalanthus occidentalis,* and *Carex lurida.* These plants range from OBL to FAC for Maryland. The soil consists of an A_1 layer from 0 – 6 inches with a matrix color of 2.5 Y 5 chroma 2 with a silty clay texture over an A_2 layer from 6 inches down with a matrix color of 2.5 Y 6 chroma 2 with a clay texture. A second sampling point revealed soils consisting of an A layer from 0 –12+ inches with a matrix color of 10 YR 6 chroma 2 with a silt clay loam texture.

Resource WN-4 (PEM Wetland)

This resource is a large wetland system within the Broad Creek floodplain. It is located east of MD 210 at Aragona Boulevard. Functions and values were assessed and functional capacity indices follow: sediment stabilization 1.0, water quality 1.0, wildlife habitat 0.95, uniqueness and heritage 0.9. The dominant vegetation includes *Liquidambar styraciflua, Acer*

rubrum, Juncus effusus, Leersia oryzoides, and *Carex lurida.* These plants range from OBL to FAC for Maryland. The soils are inundated by beaver activity.

Resource WN-BC (PFO Wetland)

This resource is a small wetland system within the floodplain of Broad Creek. It is located east of MD 210, north of the Fort Washington Memorial Church. Because this resource is less than one acre in size, functions and values were not assessed. The dominant vegetation includes *Betula nigra, Liquidambar styraciflua, Lindera benzoin, Claytonia virginiana, Onoclea sensibilis, Lonicera japonica, Arisaema triphyllum,* and *Podophyllum peltatum.* These plants range from FACW to FACU for Maryland. The soil consists of an A_1 layer from 0 – 2 inches with a matrix color of 2.5 Y 3 chroma 2 with a loam texture over an A_2 layer from 2 inches down with a matrix color of 2.5 Y 4 chroma 3 with a clay loam texture.

Resource WN-BC2 (PFO Wetland)

This resource is a small wetland system within the floodplain of Broad Creek. It is located east of MD 210, south of Old Fort Road North. Because this resource is less than one acre in size, functions and values were not assessed. The dominant vegetation includes *Platanus occidentalis, Liquidambar styraciflua, Lindera benzoin, Lonicera japonica,* and *Acer rubrum.* These plants range from FACW- to FAC- for Maryland. The soil consists of an A_1 layer from 0 – 3 inches with a matrix color of 2.5 Y 3 chroma 1 with a loam texture over an A_2 layer from 3 inches down with a matrix color of 2.5 Y 4 chroma 3 with a sandy clay texture.

Resource WN-5 (PFO Wetland)

This resource is a large wetland within the floodplain of Henson Creek. It is located east of MD 210, north of Henson Creek. Functions and values were assessed and functional capacity indices follow: sediment stabilization 0.83, water quality 0.80, wildlife habitat 0.72, uniqueness and heritage 1.0. The dominant vegetation includes *Fraxinus pennsylvanica, Acer negundo, Asimina triloba, Luzula sp.,* and *Polygonum japonica.* These plants range from FACW to FACU+ for Maryland. The soil consists of a silty clay from 0 – 12+ inches with a matrix color of 2.5 Y 5 chroma 2.

Resource WN-6 (PFO Wetland)

This resource is a small wetland system Associated with Henson Creek. It is located east of MD 210, north of Henson Creek. Because this resource is less than one acre in size, functions and values were not assessed. The dominant vegetation includes *Platanus occidentalis, Acer rubrum, Carpinus caroliniana,* and *Toxicodendron radicans.* These plants range from FACW+-

to FAC for Maryland. The soil consists of a silty gravely loam from 0 – 12+ inches with a matrix color of 2.5 Y 4 chroma 2.

H. Hazardous Materials/Waste Sites

A hazardous waste/materials investigation was performed in accordance with American Society for Testing and Materials (ASTM) 1527-97 guidelines (ASTM, 1997) to identify any hazardous substances or petroleum product within the study area under conditions that indicate an existing release, past release, or a material threat of a release. Hazardous waste/materials investigations involve inquiries into previous property ownership and uses consistent with good commercial or customary practice as defined by the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA).

The investigation was completed by conducting on-site inspections and through a review of the following:

- Historical information;
- Federal and state environmental databases;
- Topographical and geological information; and
- Local agency records.

Historical Review

Aerial photographs, provided by the Maryland Geological Survey, show the area to be heavily wooded along the study corridor up to 1979. Community development is observed in the Oxon Hill and Fort Washington areas in the earliest photos. Indian Head Highway, MD 210, is first seen in 1963. Commercial and residential development north of the Piscataway Waste Treatment Plant continues in earnest by 1979. Current property uses include a wide spectrum of activities. These range from industrial/commercial facilities, shopping centers, residential uses including apartments, individual homes, and townhouses, gas stations, parklands, farmland, and undeveloped properties. Surface and near surface groundwater will mimic surface topography and eventually flow to the Potomac River through tributaries.

Database Review

Electronic databases were searched for all businesses within the ASTM standard radius around the study corridor that have been registered with local, state, or federal environmental regulatory agencies. The databases include all ASTM required lists including CERCLA sites,

RCRA generators, RCRA violators, landfills, National Priorities List (NPL) and superfund sites, sites with registered underground storage tanks, spill sites, and many other lists that indicated sites with known or suspected contamination.

Field Investigation

In April 2000, a site reconnaissance of the study corridor was conducted. The purpose of the inspection was to verify the location and current status of the facilities identified from the database searches and to identify facilities not included that might be of environmental concern. The field investigation sought to identify any or all of the following, which may indicate environmental concern:

- Discolored or disturbed soils areas
- Areas of leachate breakouts and sparse, sick, or dead vegetation
- Drums, storage tanks, and product/waste storage areas
- Unusual or noxious odors
- Groundwater monitoring wells
- Roads or tracks with no apparent outlet or purpose
- Transformers which contain or may have contained PCB's
- Potential sources and route of contamination from adjacent or nearby properties

In addition to determining that all currently operating gasoline service stations had groundwater monitoring wells on site, one promiscuous dumpsite was discovered. Fifty pole mounted non-PCB-containing transformers were observed throughout the study corridor. There is no evidence of staining on or around the transformers. None of the other aforementioned items were observed during the site reconnaissance.

Results

The findings, resulting from a database search of federal, state, and county records and a site reconnaissance, revealed several facilities or properties within 300 ft of either side of the highway, that are of environmental concern of varying degrees to the study corridor. Table III-11 lists the sites and their project impact rankings. Each facility's project impact ranking was determined by using SHA's Project Impact Ranking Criteria (PIRC) see Table III-12.

According to PIRC, twenty-six High and Medium/High impact sites were identified. All of these facilities are current or past gasoline service stations, dry cleaners, and/or currently listed underground storage tanks; several are also listed as small quantity generators. The currently operating gasoline stations have groundwater monitoring wells on site. Seven Emergency Response Notification System Sites (ERNS) were identified, however because of government agency intervention and clean up, these sites were given a low impact ranking.

An open field, east of the 8500 block of Indian Head Highway, is described as a promiscuous dumpsite. Several piles of construction waste were observed. Materials at the site include wood, concrete, and some metal debris. Two dumpsters are found along the access road with household waste around them. There is evidence of some burning at the site. Fifty non-PCB-containing transformers were located and given a low impact ranking.

TABLE III-7
SITE IDENTIFICATION AND PROJECT IMPACT RANKING
(FIGURES III-7A through 7H)

ID NUMBER	SITE NAME/ADDRESS	PROJECT IMPACT RANKING
2, 35	Kerby Hill Shell - 8005 Indian Head Highway	High
3, 36	7-Eleven - 9413 Livingston Road	High
4	American Boot Center of Maryland - 9409 Livingston Road (now Harley Davidson of Washington)	Low
5	Clinton Cycles – 9504-A Livingston Road	Low
8	Hunter's Mill Cleaners - 9513 Livingston Road	High
9	Merchant's Tire & Auto - 9210 Livingston Road	Low
11, 40	Texaco Service Station - 9100 Livingston Road	High
12, 14, 43	Exxon Company USA #24617 - 10815 Indian Head Highway	High
13	State Cleaners - 10753 Indian Head Highway	High
15, 47	Jack Winegardner Chevrolet - 11101 Indian Head Highway	Low
16	Olde Forte Cleaners - 970 East Swan Creek Road	High
17, 51	Exxon Company USA #25687 - 12800 Old Fort Road	High
18	Super Cleaners - 12770 Old Fort Road	High
19	Atlantic Coast Express - I-495 at MD 210	Low
20	Maryland Public Sanitation Service - 706 Carson Avenue	Low
22	8500 Indian Head Highway	Low
23	Residence - 12601 Lampton Lane	Low
24	Eastern Petroleum Corporation - 11 West Farmington Avenue	Low
25	Eastern Petroleum Corporation - 11 West Farmington Avenue	Low
27	Bradbury Heights Elementary School - 6360 Oxon Hill Road (now Forestville High School Annex)	Low
28	Oxon Hill Farm - 6411 Oxon Hill Road	Low
29	Susse Chalet Hotel - 6363 Oxon Hill Road	Medium/High
31	Oxon Hill Staff Development Center - 7711 Livingston Road	Medium/High
32	Wilson Towers Apartments - 7903 Indian Head Highway	Medium/High
33	Wilson Towers Apartments - 7907 Indian Head Highway	Medium/High
34	Wilson Towers Apartments - 7911 Indian Head Highway	Medium/High
37	Day Star Nursery - 915 Palmer Road	Medium/High

ID NUMBER	SITE NAME/ADDRESS	PROJECT IMPACT RANKING
38	Griffith Consumers Company - 9116 Livingston Road (now Fort Laundromat/Eddie's Food)	Low
39	Oxon Hill Rentals Inc. - 9120 Livingston Road	Medium/High
42	Dotson Electric Company – 11101 Indian Head Highway	Low
44	Fort Washington Shell - 10901 Fort Washington Road	High
45	Silesia VFD #47 - 10900 Fort Washington Road	Medium/High
48	Ford Lumber Company - 11616 Livingston Road	Medium/High
49	Fort Washington Postal Service – 11550 Livingston Road	Medium/High
56	Sisko Service Station - 201 Bryan Point Road (now Accokeek Gas & Company)	High
59	To Line Pool & Spa Service – Fort Washington/Livingston Roads	Low
64	Clagett Realty - 16001 Indian Head Highway	High
65	Capital Marine Service - 15806 Livingston Road	
66	Exxon Service Station - 15979 Indian Head Highway	High
67	Pride of America Fuel - 11800 Indian Head Highway	High
68	Ted's Towing & Auto Service - 14700 block Indian Head Highway	High
69	Open Field (adjacent to Henson Creek Stream Valley Park)	Medium
70	National Tire & Battery - 11700 block Livingston Road	High
71	Transformers - 50 located throughout project area	Low

TABLE III-8
PROJECT IMPACT RANKING CRITERIA

High	• Industrial facilities • Gasoline stations • Auto repair facilities • Pits and lagoons • Above-ground storage tanks with a large amount of staining • PCB containing transformers with major stains • Landfills • Surface dumps with drums or other hazardous materials • Paint manufacturing facilities • Dry cleaners • USTs containing gasoline, jet fuel, kerosene, diesel fuel, waste oil, or solvents • Remediation systems in place
Listed Sites	• Sites reported on the EDR Data Base that indicate the presence of hazardous materials • Sites reported on the EDR Data Base that indicate the presence of USTs or leaking USTs
Medium/High	• USTs containing materials other than listed above • Surface dumps with empty drums or other materials of concern • Mounds • Above-ground storage tanks with several medium stains • PCB containing transformers with minor stains
Medium	• Small amounts of surface staining • Slightly discolored water • PCB containing transformers, no staining • Unmarked transformers • Stressed vegetation • Large surface dumps containing household wastes • Above-ground storage tanks with a few small stains or no staining, but of questionable integrity
Low	• Small surface dumps containing household wastes • Above-ground storage tanks with no staining or evidence of poor structural integrity • Septic systems • Non-PCB containing transformers with no stains (relatively new)

I. Floodplains

Floodplains have been identified in the Study Area in accordance with Executive Order 11988, Floodplain Management, and 23 CFR 650, Subpart A. State regulations impose limitations on construction activities within floodplains. The purpose of these regulations is to avoid the long and short-term impacts associated with the occupancy and modification of floodplains, and to restore and preserve the natural and beneficial values served by floodplains. These values include floodflow alteration, sediment and toxicant retention, nutrient removal, production export, and fish and wildlife habitat. The floodplain found in the study area is largely natural and not modified, except in the vicinity of the existing road crossing.

The 100-year floodplains have been delineated using a variety of sources: the Federal Emergency Management Agency (FEMA), Flood Insurance Rate Maps (FIRM); floodplain studies prepared by Prince George's County; and floodplain studies prepared in conjunction with this study. The figures of the Alternative 5A Modified are contained in Section II of this document show the 100-year floodplain in the project area, generally in the Henson Creek area north of Palmer/Livingston Road and the Piscataway Creek area south of Old Fort Road South.

J. Terrestrial Ecosystem

1. Flora

a. Plant Communities

1) Introduction

Because of human activity ranging from agriculture to urbanization, little of Prince George's County's original landscape remains. The forests and woodlands that are present have undergone many changes. Most forest stands are in their third or fourth successional cycle, having been cut numerous times in the past 300+ years. Repeated cutting of the regenerating forest and agricultural practices have caused changes in the variety of species present that has resulted in an increase of coniferous species. Before colonists settled Prince George's County, the county was almost entirely covered by deciduous forest. The dominant trees were most probably red and white oaks, sweet gum, and yellow poplar. Virginia, loblolly, and short leaf pine are now dominant species in many forest tracts. As these existing forests continue to mature the deciduous trees oaks, sweet gum, and yellow poplar of the virgin forest will eventually replace the pines. Each stand of trees in the project area is at a different point in this process of succession. The longer a forest is undisturbed the closer it will approximate the pre-colonial state.

Similar to trees in modern forest stands the shrub and herbaceous layers are also in a state of transition from one ecological community to the next. When disturbed land is left fallow, succession begins by proceeding from old-field habitat, to scrub/shrub, to pioneer forest, etc. The scrub/shrub ecological community is usually comprised of drought tolerant shrubs and tree saplings. As the trees grow and shade the shrub species the ground temperature lowers due to reduced light penetration, and the soil becomes moister and begins to contain more organic material. These changes in light, temperature, moisture, and soil composition cause changes in the species composition of the shrub layer. As the forest continues to mature the conditions underneath the trees continue to change and exert an influence on the shrub species. Shrub species will progress from drought tolerant open field species such as black haw *(Viburnum prunifolium)* and multiflora rose *(Rosa multiflora)* to more moisture and shade tolerant species like southern arrow-wood *(Viburnum dentatum)*, witch hazel *(Hamamelas virginiana)*, and spicebush *(Lindera benzoin)* in the more moist areas. Dry areas progress toward maple-leaved viburnum *(Viburnum acerifolium)*, low bush blueberry *(Vaccinium angustifolium)*, mountain laurel *(Kalmia latifolia)*, and various deciduous azalea species *(Rhododendron spp.)* in the shrub layer. The herbaceous layer will change from a dominance of grasses, grasslike species, and forbs in the old field and scrub/shrub ecological community to the rich layer of ferns, spring ephemerals, and mosses of the mature moist forest. Dry areas will progress to species such as spotted wintergreen *(Chimaphila maculata)*, partridgeberry (*Mitchella repens)*, and ground pine *(Diphasiastrum digitatum)*.

2) Methods

Forest stand descriptions include forest stand determinations, based on the species present and the relative age of the stand where a scale of dominant canopy tree diameter at breast height (dbh) is used. Plant communities were labeled by forest cover type, as recognized by the Society of American Foresters (SAF). Cover types were further divided according to age based on average dbh, where a stand with most dominant trees in the 0-5” dbh range is considered pioneer, 6”-20” young, and a stand with the majority of dominant canopy trees over 20” is mature. While these groups have a disparity in ranges, they represent the relative ages of successional stages in a dynamic forest. Each age grouping may occur for different successional stages in a dynamic forest.

In this study all forest stands were further grouped by quality based upon species diversity, uniqueness of habitat, and presence or lack of invasive alien species. Generally high species diversity (large numbers of different species in one area) is considered a hallmark of ecological health. Where invasive alien species are present the overall diversity tends to be reduced because the alien species are able to out-compete native species usually due to a lack of

predators. Some areas have had the entire herbaceous layer replaced with introduced species like Chinese packing grass *(Microstegeum vimineum)*, Indian strawberry *(Duchesnea indica)*, ground ivy *(Glechoma hederacea)*, garlic mustard *(Alliaria officinalis)*, etc. Some vine layers have succumbed to the onslaught of oriental bittersweet *(Celastrus orbiculatus)*, and Japanese honeysuckle *(Lonicera japonica)*. Other alien species that affect the canopy layer are tree-of-heaven *(Ailanthus altissima)*, Empress tree *(Paulownia tomentosa)*, and Norway maple *(Acer platanoides)*. In the old fields and along roadsides many native grasses have been displaced by more vigorous species introduced for hay and animal fodder, ornamental reasons, and for erosion control.

3) Results

Communities encountered and a brief description of the plant species most commonly found is shown below. Descriptions used by the SAF have been modified to reflect the average conditions for each cover type as it occurs within the study area. The common plant names used in the following descriptions follow those used by the SAF. A list of common to scientific names is included in the Appendix.

Suburban – manicured lawns and ornamental plantings. The small natural areas that occur are often pruned and altered for aesthetic and recreational purposes.

Agricultural – composed of active farmlands.

Old Field – Meadow – abandoned land that has a large portion of shrubs, a few trees (0-10% a real coverage) and a large herbaceous layer. The common trees are yellow poplar, sweet gum, red maples, Virginia pine, eastern cedar, and black locust. The most common shrubs are multiflora rose, brambles, arrow-wood, and browsed/stunted trees. The herbaceous layer is comprised of grasses, sedges, goldenrods, and various other species.

Scrub – Shrub – transitional between old-field – meadow and a pioneer forest, and is characterized by greater tree coverage (10-40%) and less herbaceous coverage than old-field – meadow. The tree species are older but are similar to those listed for old-field – meadow. The shrub and herbaceous layers also resemble those of the old field – meadow type.

Forest Associations

Black Locust – occurs primarily on recently abandoned or disturbed soils. This is a short-lived pioneer type and may contain in association a wide variety of other trees, shrubs, and herbaceous species. On all but the poorest sites, other hardwood types rapidly succeed this type.

Chestnut Oak – occurs primarily on the driest slopes, with south facing slopes and ridge tops. Other species associated with this type include white oak, black gum, common high bush and late low blueberry, deer berry, mountain laurel, multiflora rose, maple-leaved viburnum, eastern chinquapin, and brambles. The herbaceous layer is usually sparse with common occurrences of partridgeberry, striped wintergreen, Indian pipe, and ebony spleenwort.

Mixed Oak – the climax forest type of dry slopes. White oak, black oak, and northern red oak together comprise a majority of the stocking. Other tree associates include chestnut oak, American beech, mocker nut and pignut hickory, flowering dogwood, yellow poplar, black gum, red maple, black cherry, and American beech. Common shrub associates include multiflora rose, brambles, spicebush, maple-leaved viburnum, deer berry, and late low blueberry. The herbaceous is often sparse, containing southern running pine, partridgeberry, bellworts, sedges, and a variety of ferns.

Red Maple – occurs on a wide variety of sites, from dry ridge tops to hydric (wet) bottomland. Red maple comprises a majority of the stocking. Common tree associates are yellow poplar, black cherry, northern red oak, white oak, chestnut oak, pin oak, American beech, river birch, flowering dogwood, sycamore, black walnut, sweet gum, and black gum. Due to the varied site conditions, shrub and herbaceous associates are too vast to enumerate adequately.

Yellow Poplar – found on most moist slopes, in deep, well drained soils. Yellow poplar comprises a majority of the stocking. Common tree associates include American beech, red maple, northern red oak, white oak, black gum, black walnut, ironwood, and flowering dogwood. Common shrub associates include spicebush, multiflora rose, brambles, and southern arrow-wood. The herbaceous layer is commonly lush with large occurrences of jack-in-the-pulpit, enchanter's nightshade, white avens, and ferns.

b. Specimen Trees

Specimen or large trees are reported because they are important factors in regenerating forest stands. They provide viable seed sources for pioneer forest stands, they provide shaded moist growing conditions under their canopies, and where plentiful they are an indication of age, health, and equilibrium of a given forest stand. Specimen trees for this study were defined as any tree over 30” dbh or any tree within 75% dbh of the county or state champion for that species. A total of 56 specimen trees were identified and mapped. The largest specimen tree is an 80.2” dbh yellow poplar near Broad Creek. Table III-13 lists the specimen trees found within the project area. Locations of specimen trees are shown in Figure III-7.

TABLE III-9

SPECIMEN TREES FOUND WITHIN THE PROJECT AREA

ID #	Size	Species	ID #	Size	Species
1	47.8”	Yellow poplar	**29**	36.1”	Chestnut oak
2	30.6”	Yellow poplar	**30**	44.0”	White oak
3	33.1”	Yellow poplar	**31**	34.0”	Yellow poplar
4	30.4”	Yellow poplar	**32**	33.5”	Yellow poplar
5	31.0”	Yellow poplar	**33**	33.2”	Northern red oak
6	47.8”	Yellow poplar	**34**	37.6”	Pin oak
7	45.0”	Yellow poplar	**35**	34.1”	Pin oak
8	30.0”	Northern red oak	**36**	30.7”	Pin oak
9	31.4”	Northern red oak	**37**	34.5”	Northern red oak
10	41.8”	American beech	**38**	34.2”	Green ash
11	80.2”	Yellow poplar	**39**	39.2”	Sycamore
12	40.0”	Yellow poplar	**40**	33.4”	Northern red oak
13	39.0”	White oak	**41**	39.2”	Yellow poplar
14	53.4”	Northern red oak	**42**	46.0”	American beech
15	31.8”	Northern red oak	**43**	34.0	Southern red oak
16	37.2”	Yellow poplar	**44**	38.7”	Southern red oak
17	35.6”	Yellow poplar	**45**	39.5”	Southern red oak
18	40.7”	Yellow poplar	**46**	29.4”	Willow oak
19	33.0”	Yellow poplar	**47**	31.7”	Yellow poplar
20	43.0”	Yellow poplar	**48**	34.1”	Red maple
21	30.5”	White oak	**49**	46.4”	Pin oak
22	32.0”	Chestnut oak	**50**	41.0”	Red maple
23	44.8”	Chestnut oak	**51**	31.2”	American beech
24	33.8”	Chestnut oak	**52**	38.0”	Yellow poplar
25	38.9”	Chestnut oak	**53**	31.6”	White oak
26	30.5”	Sycamore	**54**	41.5”	White oak
27	32.4”	American beech	**55**	45.9”	Yellow poplar
28	51.0”	Chestnut oak	**56**	30.1”	Red maple

2. Fauna

The fauna inventory included in the Appendix contains lists of vertebrates (herptiles, birds, and mammals) known or expected to occur in the project area, exclusive of fish fauna. Fishes that occur in the Study Area are listed in the Appendix of this document. The Storm Water Management Technical Group conducted the only comprehensive survey of wildlife occurring within the Piscataway Creek watershed in the mid 1980s. Their findings are included within the list in the Appendix.

Some of the birds within the study area depend upon large areas of forest interior, collectively they are known as forest interior dwelling birds (FIDs). Many of these species are neo-tropical migrants that only nest in North American forests in summer and fly to the tropics in winter. They are particularly susceptible to nest predation and parasitation. Generally forest edge dwelling species gain access to FID nest sites through timbering that reduces the overall size of forests resulting in a greater ration of edge to interior.

3. Rare, Threatened and Endangered Species

The Maryland Natural Heritage Program (Maryland Department of Natural Resources) (NHP) is the lead agency in the Maryland State government for the identification and protection of rare, threatened, and endangered species and their habitats. The NHP staff collects, records, and analyzes information about the state's biotic diversity, and maintains the most extensive database of information about rare species and their habitats in Maryland. The NHP also tracks known occurrences of federally listed threatened and endangered species. No Federally listed threatened or endangered species are known to occur within the project area (see letter from USFWS dated July 18, 2000 in Section VI). Two plant species known to exist near the project area are on the state list of Rare, Threatened, or Endangered Species; Torrey's rush *(Juncus torreyi)* is listed as State Endangered, while Small flowered-baby-blue-eyes *(Nemophila aphylla)* is listed as Highly State Rare Area (letter from MDNR dated July 31, 2000 in Section VI). Subsequent to completion of the DEIS, at the request of MDNR, SHA conducted a field survey in search of Torrey's rush and Small-flower-baby-blue-eyes. Torrey's rush was not identified in the project area. Small-flower-baby-blue-eyes was identified near the project area but not within the project grading limits.

Where this species occurs near the project area, Small flowered-baby-blue-eyes usually comprises a dominant species in the spring ephemeral plant community. The identified population is robust and comprises thousands of stems. No voucher specimen was collected. This population is currently on record with DNR.

One species listed on the State Watch List, Lancaster's sedge *Cyperus lancastriensis,* was identified during the plant community studies near Piscataway Creek. The identified population contains a single plant. No voucher specimen was collected.

K. Existing Noise Conditions

As shown in Table III-14, there are 72 receptor sites grouped into 14 Noise Sensitive Areas (NSA's) based upon the noise characteristics of the receptor sites. Overall, the NSA's are comprised mainly of residential areas. The receptor sites include residential homes, a religious facility, parks, and a business. These sites were selected to best represent the existing and future noise environment. Noise receptor sites are indicated on Figures III-7A through III-7H.

Ambient noise level measurements were conducted in October 1999 and March 2000. The method used to model noise levels was developed by the FHWA. In acoustical studies, measurement of the ambient noise levels is required to establish the basis of impact analysis and to calibrate the TNM computer model used in the analysis. The ambient noise levels shown in Table III-14, as recorded over 15-minute intervals, represent a generalized view of the existing noise levels. Ambient noise levels are due to background and traffic noise from adjacent roadways. The measured ambient noise includes the contribution of existing MD 210 and other roadways such as Livingston Road/Palmer Road, Fort Washington Road, etc. Monitoring sessions were performed using ANSI type 2 integrating sound level meters Model DB3080 and model DB308, manufactured by Metro Sonics, Inc.

During the ambient monitoring sessions, counts of traffic on the existing roads were made that correlated to the noise measurements. These traffic counts were then used to calibrate the noise model. In addition, 24-hour noise measurements were taken at several locations within the study area. The purpose of these measurements was to obtain a generalized view of noise fluctuations over time. Using this data, an adjusted peak ambient noise level was developed at each receptor site. This adjusted level represents the peak existing noise level to be expected during a 24-hour period.

The counted traffic volumes combined with existing topographic and roadway alignment data were used in the computer model. In order to assure site-specific model calibration for receptors adjacent to existing roads, counted traffic and speeds are input into the computer model and the resulting noise levels are compared to measured ambient levels. If the difference between these two is greater than 3 dBA, the model is revised or additional measurements are made. It should be noted that, in addition to noise generated by traffic, the ambient measurements include

background noise such as wind, rustling leaves and aircraft/helicopter flyovers. However, when there is significant traffic, the contribution of background noise to the ambient noise level is usually negligible. Background noise that could be considered excessive is noted at the time of the measurement. If background noise prevents proper calibration of the model at a given location, the measurement is retaken.

A detailed Noise Analysis Technical Report has been prepared for this project. The report is available at the SHA, 707 North Calvert Street, Baltimore, Maryland 21202. Table III-10 outlines the relevant components of each NSA. The receptor sites, land use type, date measurement was taken, starting time of measurement, and measured ambient are all included. The peak ambient levels ranged from 53 to 72 dBA. The lower noise levels were found in isolated areas and the higher noise levels were found close to the existing roadway.

TABLE III-10
AMBIENT NOISE LEVELS (dBA)

NSA	RECEPTOR	ADDRESS	LAND USE TYPE	DATE AND START TIME	AMBIENT Leq, dBA
A	R-57	7525 Catone Court	Residence	10/19/99 1:58 p.m.	65
	R-58	7518 Catone Court	Residence	10/19/99 1:58 p.m.	57
	R-59	7511 Catone Court	Residence	10/26/99 10:26 a.m.	69
	R-60	7409 Roanne Drive	Residence	10/26/99 10:26 a.m.	72
	R-61	7306 Roanne Drive	Residence	10/26/99 11:41 a.m.	59
	R-62	7231 Roanne Drive	Residence	10/26/99 11:41 a.m.	68
	R-63	713 Carson Avenue	Residence	10/26/99 2:05 p.m.	62
	R-64	608 Carson Avenue	Residence	10/26/99 2:05 p.m.	60
	R-65	Southlawn Park	Park	10/26/99 2:43 p.m.	63
B	R-55	510 Winslow Road	Residence	10/19/99 10:57 a.m.	61
	R-67	7212 Abington Road	Residence	10/19/99 11:37 a.m.	57
	R-68	7414 Abington Road	Residence	10/19/99 11:37 a.m.	59

NSA	RECEPTOR	ADDRESS	LAND USE TYPE	DATE AND START TIME	AMBIENT Leq, dBA
B	R-69	7801 Indian Head Highway	Residence	10/19/99 10:21 a.m.	69
	R-70	530 Wilson Bridge Drive	Residence	10/19/99 9:51 a.m.	71
	R-71	584 Wilson Bridge Drive	Residence	10/19/99 9:51 a.m.	71
	R-72	506 Wilson Bridge Drive	Residence	10/19/99 10:21 a.m.	71
	R-73	7911 Indian Head Highway	Residence	10/19/99 10:57 a.m.	69
C	R-49	8416 Service Road	Residence	10/15/99 1:19 p.m.	71
	R-50	8223 Service Road	Residence	10/15/99 1:19 p.m.	71
	R-51	8005 Murray Hill Drive	Residence	10/19/99 1:20 p.m.	70
	R-52	8106 Murray Hill Drive	Residence	10/19/99 1:20 p.m.	61
D	R-53	8353 Founder's Woods Way	Residence	10/15/99 2:18 p.m.	66
	R-54	8317 Founder's Woods Way	Residence	10/15/99 2:18 p.m.	56
	R-56	8411 Indian Head Highway	Residence	10/15/99 1:45 p.m.	67
E	R-42	10000 Old Fort Road	Residence	10/14/99 2:47 p.m.	68
	R-43	1001 Centennial Drive	Residence	10/15/99 10:35 a.m.	64
	R-44	9410 Old Palmer Road	Residence	10/15/99 10:35 a.m.	61
	R-45	9215 Old Palmer Road	Residence	10/15/99 11:11 a.m.	59
	R-46	900 Palmer Road	Residence	10/15/99 11:11 a.m.	66
F	R-47	7707 Kay Dot Road	Residence	10/15/99 10:03 a.m.	55
	R-48	9709 Kay Dot Road	Residence	10/15/99 10:03 a.m.	57
	R-H1	Henson Creek Park	Park	3/8/00 9:51 a.m.	68
	R-BC1	Broad Creek Park	Park	3/8/00 11:00 a.m.	65

NSA	RECEPTOR	ADDRESS	LAND USE TYPE	DATE AND START TIME	AMBIENT Leq, dBA
G	R-38	11308 Service Road	Residence	10/14/99 1:22 p.m.	67
	R-39	10927 Flintlock Lane	Residence	10/14/99 2:14 p.m.	64
	R-40	10920 Flintlock Lane	Residence	10/14/99 2:14 p.m.	61
	R-41	10922 Service Road	Residence	10/14/99 1:22 p.m.	68
H	R-23	12300 Gable Lane	Residence	10/13/99 11:22 a.m.	58
	R-24	12308 Lampton Lane	Residence	10/13/99 11:22 a.m.	61
	R-25	12411 Lampton Lane	Residence	10/13/99 10:40 a.m.	59
	R-26	12504 Lampton Lane	Residence	10/13/99 10:40 a.m.	58
	R-27	12612 Lampton Lane	Residence	10/13/99 10:00 a.m.	53
	R-28	12709 Lampton Lane	Residence	10/13/99 10:00 a.m.	54
	R-29	Fort Washington Methodist	Church	10/12/99 1:12 p.m.	57
I	R-33	1200 Jefferson Road	Residence	10/13/99 1:57 p.m.	57
	R-34	13452 Buchannon Drive	Residence	10/13/99 1:13 p.m.	56
	R-35	1200 Buchannon Circle	Residence	10/13/99 1:13 p.m.	56
	R-36	1219 Van Buren Drive	Residence	10/13/99 1:57 p.m.	59
	R-37	Health Care Center	Business	10/14/99 11:49 a.m.	63
	R-FW1	Fort Washington Local Park	Park	3/8/00 1:30 p.m.	67
J	R-30	13208 Coldwater Drive	Residence	10/12/99 12:35 p.m.	58

NSA	RECEPTOR	ADDRESS	LAND USE TYPE	DATE AND START TIME	AMBIENT Leq, dBA
J	R-31	13211 Coldwater Drive	Residence	10/12/99 1:12 p.m.	55
	R-32	13312 Coldwater Drive	Residence	10/12/99 12:35 p.m.	56
K	R-14	701 Chatsworth Drive	Residence	10/11/99 10:40 a.m.	65
	R-15	700 Edelen Court	Residence	10/11/99 10:40 a.m.	56
	R-16	14900 Fir Street	Residence	10/11/99 11:30 a.m.	58
	R-18	14517 Foust Street	Residence	10/12/99 10:24 a.m.	68
	R-19	14401 The Mall	Residence	10/12/99 10:24 a.m.	69
	R-20	14300 Foust Street	Residence	10/12/99 11:12 a.m.	63
L	R-21	1 Farmington Service Road	Residence	10/11/99 11:30 a.m.	62
	R-22	14309 Farmington Service Rd.	Residence	10/12/99 11:12 a.m.	62
	R-PC1	Piscataway Creek	Park	3/8/00 1:00 p.m.	62
M	R-10	15650 Indian Head Highway	Residence	10/8/99 1:55 p.m.	65
	R-11	200 Jennifer Drive	Residence	10/8/99 2:37 p.m.	66
	R-13	15508 Emily Court	Residence	10/8/99 2:37 p.m.	53
N	R-2	15814 Livingston Road	Residence	10/8/99 11:47 a.m.	61
	R-3	111 Biddle Street	Residence	10/8/99 11:12 a.m.	66
	R-4	304 Biddle Street	Residence	10/8/99 11:47 a.m.	63
	R-5	315 Biddle Street	Residence	10/8/99 11:12 a.m.	55
	R-6	103 Whistling Wood Court	Residence	10/8/99 1:55 p.m.	60
	R-8	15404 Whistling Oak Way	Residence	10/8/99 1:15 p.m.	59
	R-9	15609 Blue Willow Lane	Residence	10/8/99 1:15 p.m.	56

L. Existing Air Quality

The project area is located in Prince George's County, Maryland. This county is not designated as non-attainment for carbon monoxide (CO) or particulate matter (PM_{10}), but is designated as a serious non-attainment area for ozone (O_3). Since the project area is designated non-attainment for ozone, the region is subject to transportation control measures such as the Vehicle Emissions Inspections Program (VEIP).

A detailed micro scale air quality analysis has been performed to determine the local CO impact of the proposed project. The location of air quality sensitive receptors used in the analysis is shown on Tables III-15 and III-16 and Figures III-7A through III-7H. The results are summarized in Section IV.L. A copy of the technical analysis report is available at the State Highway Administration, 707 North Calvert Street, Baltimore, Maryland 21202.

TABLE III-11
AIR QUALITY RECEPTOR LOCATIONS INTERSECTION ANALYSIS

RECEPTOR	LOCATION
INT-A	MD 210 / Wilson Bridge Drive Intersection (Matrix of 14 receptors)
INT-B	MD 210 / Livingston Road / Kerby Hill Road Intersection (Matrix of 29 Receptors)
INT-C	MD 210 / Palmer Road / Livingston Road Intersection (Matrix of 37 Receptors)
INT-D	MD 210 / Old Fort Road North Intersection (Matrix of 32 Receptors)
INT-E	MD 210 / Fort Washington Road Intersection (Matrix of 35 Receptors)
INT-F	MD 210 / Livingston Road / Swan Creek Road Intersection (Matrix of 25 Receptors)
INT-G	MD 210 / Old Fort Road South Intersection (Matrix of 28 Receptors)
INT-H	MD 210 / Farmington Road Intersection (Matrix of 26 Receptors)
INT-I	MD 210 / MD 373 Intersection (Matrix of 28 Receptors)

TABLE III-12
AIR QUALITY RECEPTOR LOCATIONS - MAINLINE ANALYSIS

RECEPTOR	LOCATION	RECEPTOR	LOCATION
R-2	15814 Livingston Road	R-41	10922 Service Road
R-3	111 Biddle Street	R-42	10000 Old Fort Road
R-4	304 Biddle Street	R-43	1001 Centennial Drive
R-5	315 Biddle Street	R-44	9410 Old Palmer Road
R-6	103 Whistling Wood Court	R-46	900 Palmer Road
R-8	15404 Whistling Oak Way	R-47	7707 Kay Dot Road
R-9	15609 Blue Willow Lane	R-48	9709 Kay Dot Road
R-10	15650 Indian Head Highway	R-49	8416 Service Road
R-11	200 Jennifer Drive	R-50	8223 Service Road
R-13	15508 Emily Court	R-51	8005 Murray Hill Road
R-14	701 Chatsworth Drive	R-52	8106 Murray Hill Road
R-15	700 Edelen Court	R-53	8353 Founder's Woods Way
R-17	14508 Foust Street	R-54	8317 Founder's Woods Way
R-18	14517 Foust Street	R-55	510 Winslow Road
R-19	14401 The Mall	R-56	8411 Indian Head Highway
R-20	14300 Foust Street	R-57	7525 Catone Court
R-21	1 Farmington Service Road	R-58	7518 Catone Court
R-22	14309 Farmington Service Rd.	R-59	7511 Catone Court
R-24	12308 Lampton Lane	R-60	7409 Roanne Drive
R-25	12411 Lampton Lane	R-61	7306 Roanne Drive
R-26	12504 Lampton Lane	R-62	7231 Roanne Drive
R-28	12709 Lampton Lane	R-63	713 Carson Avenue
R-29	Ft Washington United Methodist Church	R-64	608 Carson Avenue
R-30	13208 Coldwater Drive	R-65	Southlawn Park
R-31	13211 Coldwater Drive	R-67	7212 Abbington Road
R-32	13312 Coldwater Drive	R-68	7414 Abbington Road
R-33	1200 Jefferson Road	R-69	7801 Indian Head Highway
R-34	13452 Buchannon Drive	R-70	530 Wilson Bridge Drive
R-35	1200 Buchannon Circle	R-71	584 Wilson Bridge Drive

RECEPTOR	LOCATION	RECEPTOR	LOCATION
R-36	1219 Van Buren Drive	R-72	506 Wilson Bridge Drive
R-37a	Lexington Health Care Center (Northwest Corner)	R-73	7911 Indian Head Highway
R-37b	Lexington Health Care Center (Southeast Corner)	PC-1	Piscataway Creek Stream Valley Park
R-38	11308 Service Road	FW-1	Fort Washington Forest Local Park
R-39	10927 Flintlock Lane	BC-1	Broad Creek Park
R-40	10920 Flintlock Lane	H-1	Henson Creek Stream Valley Park