Report

Permit Support Document and Wetland Restoration Plan

Milstead and Poclain Ponds Deactivation Spotsylvania County, Virginia

Prepared for:
The National Park Service
Fredericksburg and
Spotsylvania National Military Park
120 Chatham Lane
Fredericksburg, Virginia 22405

Prepared by
Vanasse Hangen Brustlin, Inc.
Abingdon Office Park, Suite 12
7188 Chapman Drive
Hayes, Virginia 23072

January 1995

VHB

It should be noted that the proposed project plans do not include the discharge of any fill material into jurisdictional areas, as all spoil deposition and restoration activities occur landward of our field-flagged jurisdictional boundaries. Additionally, the Virginia Department of Environmental Quality (DEQ) has stated it was not likely that their agency will assert jurisdiction over the activities associated with the proposed pond deactivation project.

Habitat conversions resulting from the proposed deactivation project will include:

	Milstead A (Square Feet)	**Milstead B (Square Feet)**	**Poclain C (Square Feet)**
Convert Open Water Habitat to Forested Wetland	32,500	18,300.	11,100
Total ± 61,900 (1.42 acres)			
Convert Open Water Habitat to Upland Buffer	23,910	11,800	5,000
Total ± 40,170 (.93 acre)			
Convert Fringe Habitat to Upland Buffer	4,540	900	N/A
Total ± 5,440 (.12 acre)			

Total Conversion (Waters to Wetlands)	1.42 acres
Total Conversion (Waters/Wetlands to Upland Buffers)	1.05 acres

All figures are in approximate square footage/acreage.

VHB, as agent for the National Park Service, is submitting the enclosed data for your information and review in determining compliance with Pre-Discharge notification procedures, and permission to proceed with the proposed project under authority granted by Corps Nationwide Permit requirements.

VHB

Should you have any questions regarding this matter, please contact me at 804-642-0448. On behalf of the National Park Service, we sincerely appreciate your efforts in expediting this project in a timely manner.

Very truly yours,

VANASSE HANGEN BRUSTLIN, INC.

Nancy G. Barker
Environmental Services Manager

Enclosures:

1) Permit Support Document and Wetland Restoration Plan
2) Plan Sheets

cc: Mr. Mike Johnson, NPS

PERMIT SUPPORT DOCUMENT AND WETLAND RESTORATION PLAN

MILSTEAD AND POCLAIN PONDS
SPOTSYLVANIA COUNTY, VIRGINIA

Prepared for:

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120 Chatham Lane
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A: Coordination and Correspondence; U.S. Department of the Interior, Fish and Wildlife Service, Letter dated November 10, 1994.

Commonwealth of Virginia Department of Conservation and Recreation, Division of Natural Heritage, Letter dated November 10, 1994.

B: Wildlife Species List, Spotsylvania County, Virginia

C: National Historic Preservation Act (NHPA), Section 106 Compliance Report, prepared by Noel Harrison, dated January 6, 1995.

D: U.S. Army Corps of Engineers (USCE) Wetland Delineation Data Sheets

E: Details of Erosion and Sediment Control Measures

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	Pond Deactivation Conceptual Plans	(Attached)

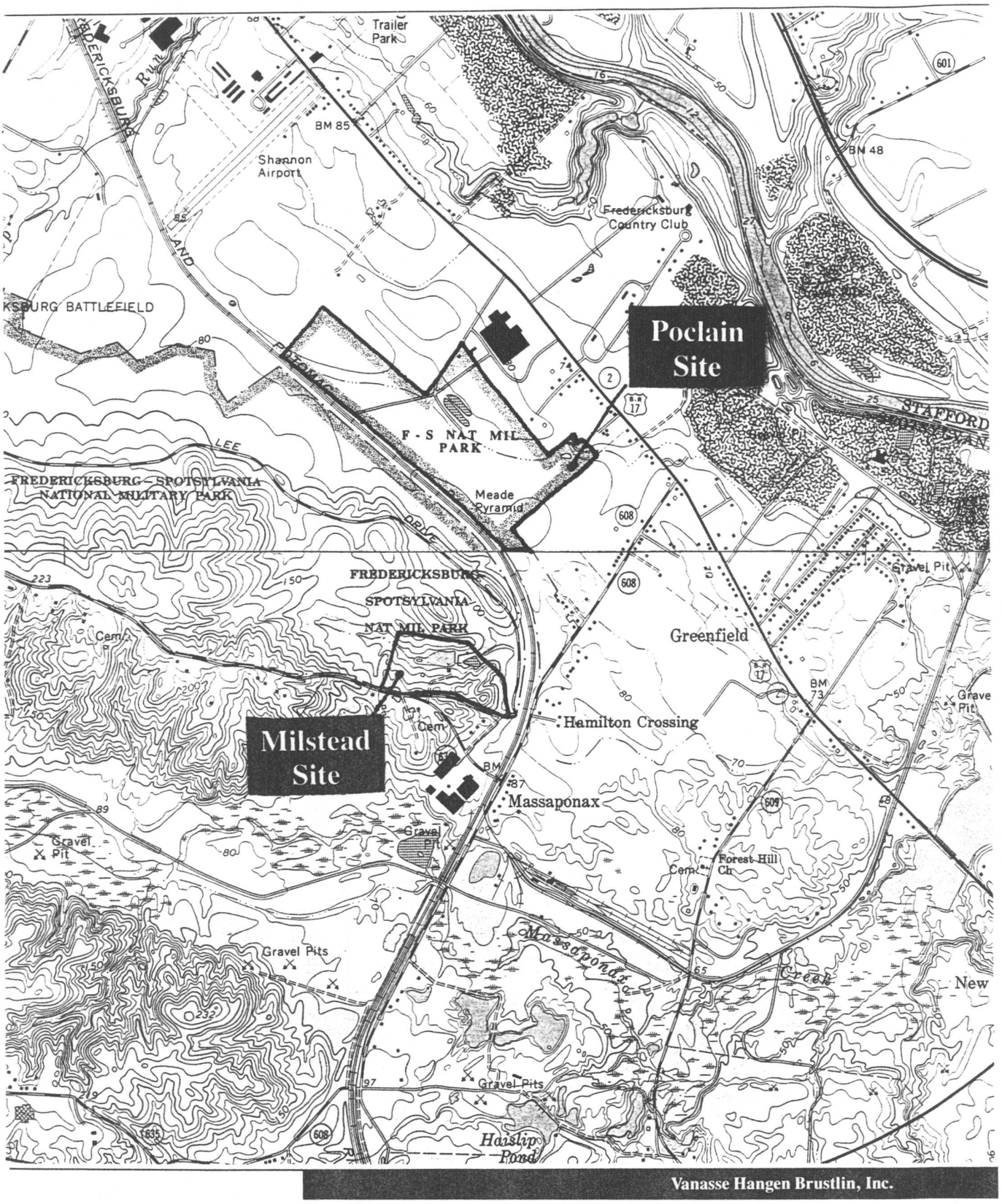
INTRODUCTION

PROJECT DESCRIPTION

Vanasse Hangen Brustlin, Inc. (VHB) has been retained by the U.S. National Park Service (NPS) to prepare a Pre-discharge Notification, Wetland Restoration Plan, and Erosion and Sediment Control Plan in conjunction with the deactivation of three constructed livestock ponds, located within the Fredericksburg-Spotsylvania National Military Park (Park) in Spotsylvania County, Virginia (Figure 1). Deactivation of the ponds was prompted by the need to address public safety concerns due to the presence of open water areas in the proximity of residential neighborhoods, instability of the main earthen dam, and historical landscape considerations. Acquisition of the subject parcel by the National Park Service was completed in 1985 in order to provide a vegetative buffer for historically significant battlefields and Confederate encampments. Deactivation of these ponds will serve the dual purpose of historical landscape restoration and elimination of public safety hazards.

The focus of this support document is to provide detailed documentation of the existing site conditions, proposed project impacts, proposed wetland restoration and other mitigation measures designed to reduce the transport of pollutants to both on- and off-site receiving waters during construction. This will be achieved through minimal land disturbance, environmentally sensitive construction techniques and best management practices. This project will meet or surpass all minimum standards for erosion and sedimentation control.

The National Park Service proposes to commence with restoration operations during the summer of 1995. Permanent ground cover will be established immediately thereafter, with completion of the restoration activities occurring approximately two months after commencement. Sediment and erosion control measures will be employed to provide a practical and workable means of minimizing detrimental impacts to soil and water resources as a result of the construction and de-watering activities. These measures are detailed in this report and are illustrated on the Conceptual Plans and Erosion and Sediment Control Plan Drawings (Appendix E).



Vanasse Hangen Brustlin, Inc.

Site Location Map **Figure 1**

Source: Fredericksburg and Guinea, VA USGS Quad

FIGURE 1 LOCATION MAP

PROJECT PURPOSE AND NEED

The proposed project is consistent with the General Management Plan adopted by the National Park Service (August 1986), which describes the need for re-establishing historic open areas present during the 1860's. Deactivation of the livestock ponds is necessary to achieve historical landscape conditions and to address safety considerations. Risk of uncontrolled dam breaching and subsequent damage to Park resources and the Richmond Fredericksburg & Potomac Railroad (RF&P) located downstream of the Milstead Ponds is also a contributing factor in the overall long-term need to undertake the project.

EXISTING CONDITIONS

GENERAL DESCRIPTION

Physiographically, the project area is located west of the fall line, the boundary separating the soft sedimentary rock of the Coastal Plain from the more resistant metamorphic rock of the outer Piedmont physiographic province (Woodward and Hoffman 1991). The three subject ponds are located on two different parcels within the Fredericksburg-Spotsylvania National Military Park, an historic Park maintained by the National Park Service in Spotsylvania County, Virginia. The Milstead parcel is composed of approximately 33 acres of moderately sloping hardwood forest through which flows an intermittent stream. Two interconnected livestock ponds (ponds A and B) are formed by the impoundment of the drainageway and comprise approximately 1.62 acres of open water habitat. The ponds are surrounded by abandoned pastures, scrubby woodlands and old farm buildings. The Milstead area is bounded by State Routes 636, 608, the RF&P railroad, and Lee Drive to the south, east, and north, respectively (Figure 1).

The Poclain parcel is located in the northeastern most corner of the Park, north and east of the intersections of State Route 2 and County Route 608 (Figure 1). This area, once utilized for pasture, has regenerated as a young pine and mixed deciduous forest. Poclain Pond is a small impoundment (.37 acre) along an intermittent stream that flows to the east through a network of old ditches, swales and drains.

Both parcels were historically associated with Massaponax Creek. Past gravel mining within Massaponax Creek has formed the feature known as Ruffins Pond, to which the Milstead Ponds now drain. Drainage from Poclain Pond eventually finds its way into an isolated gravel pit located at the terminus of Powell Road, behind the Greenfield Village subdivision.

DRAINAGE AND TOPOGRAPHY

Moderately steep slopes (10-15%) occur along the Milstead drainageway. The primary drainage feature is an intermittent stream and two manmade livestock impoundments constructed around 1958. The largest pond (Pond A) is formed by a manmade dam and occupies approximately 1.1 acres of

APPENDIX C
FAMILY AND SPECIES-LEVEL MACROINVERTEBRATE TOLERANCE CLASSIFICATION

C.1 FAMILY-LEVEL TOLERANCE CLASSIFICATION

RBP II is based on family-level identifications. The adequate assessment of biological condition for RBP II requires the use of a tolerance classification for differentiating among responses of the benthic community to pollutants. Hilsenhoff's Family Biotic Index (FBI) is used as a basis for the family-level tolerance classification presented in this document.

A brief description of the FBI is taken from Hilsenhoff's paper entitled "Rapid Field Assessment of Organic Pollution with a Family Biotic Index" (Hilsenhoff 1988). The family-level tolerance values assigned for western Great Lakes region stream arthropods are presented in Table C-1.

A special symposium on rapid biological assessment at the 1986 meeting of the North American Benthological Society stressed the need for rapid field-based assessment approaches. It was recognized that in order to save time, a degree of accuracy would be sacrificed. Consequently, I adapted the biotic index (BI) of organic pollution (Hilsenhoff 1987b) for rapid evaluation by providing tolerance values for families (Table C-1) to allow a family-level biotic index (FBI) to be calculated in the field. The FBI is an average of tolerance values of all arthropod families in a sample. It is not intended as a replacement for the BI and can be effectively used in the field only by biologists who are familiar enough with arthropods to be able to identify families without using keys.

Using the same method and more than 2,000 stream samples from throughout Wisconsin that were used to revise tolerance values for species and genera (Hilsenhoff 1987b) family-level tolerance values were established by comparing occurrence of each family with the average BI of streams in which they occurred in the greatest numbers. Thus, family-level tolerance values tend to be a weighted average of tolerance values of species and genera within each family based on their relative abundance in Wisconsin.

C.2 GENUS/SPECIES-LEVEL TOLERANCE CLASSIFICATION

The tolerance classification used in RBP III is based on Hilsenhoff (1987b). Because Hilsenhoff's tolerance classification is restricted to arthropods, nonarthropod tolerance designations have been taken from Bode (1988). Some of these tolerance values for macroinvertebrates not listed in Hilsenhoff (1982, 1987b) are presented in Table C-2.

C.3 REFERENCES FOR DETERMINING FAMILY AND SPECIES-LEVEL TOLERANCE CLASSIFICATIONS

Beck, W.M., Jr. 1977. Environmental Requirements and Pollution Tolerance of Common Freshwater Chironomidae. Environmental Monitoring and Support Laboratory, Report No. EPA-600/4-77-024. U.S. EPA, Cincinnati.

Bode, R.W. 1988. Quality Assurance Workplan for Biological Stream Monitoring in New York State. New York State Department of Environmental Conservation, Albany, New York.

Dawson, C.L. and R.A. Hellenthal. 1986. A Computerized System for the Evaluation of Aquatic Habitats Based on Environmental Requirements and Pollution Tolerance Association of Resident Organisms. Report No. EPA-600/S3-86/019.

Harris, T.L. and T.M. Lawrence. 1978. Environmental

TABLE C-2 TOLERANCE VALUES FOR SOME MACROINVERTEBRATES NOT INCLUDED IN HILSENHOFF (1982, 1987b)[a]; FROM BODE (1988)

Acariformes	4
Decapoda	6
Gastropoda	
Amnicola	8
Bithynia	8
Ferrissia	6
Gyraulus	8
Helisoma	6
Lymnaea	6
Physa	8
Sphaeriidae	8
Oligochaeta	
Chaetogaster	6
Dero	10
Nais barbata	8
Nais behningi	6
Nais bretscheri	6
Nais communis	8
Nais elinguis	10
Nais pardalis	8
Nais simplex	6
Nais variabilis	10
Pristina	8
Stylaria	8
Tubificidae	
Aulodrilus	8
Limnodrilus	10
Hirudinea	
Helobdella	10
Turbellaria	4

(a) These values are for use with the biotic index scale of 0-10. Additional tolerance values are available in Bode (1988).

First Resolution Water Quality Assessment*

For a Summer or Winter Assessment.

Test for Impairment:

Kicknet sample macroinvertebrates in a $1m^2$ area.

Criteria

IF the number of organisms is less than one or only one family is present, and **IF** no fish are observed along a 100 foot course of the stream this reach of the stream is **BIOLOGICALLY IMPAIRED.**

Suspect: Organic or inorganic pollution, thermal pollution, sediment pollution.

IF the number of organisms is more than one per $1m^2$ and **IF** 90% or more of the sample are white, gray, red and worm-like (fly larvae), and **IF** no fish are observed along a 100 foot course of the stream then this reach is considered **IMPAIRED.**

Suspect: Organic or inorganic pollution and/or sediment pollution.

IF the number of organisms per $1m^2$ is more than one and 20% to 30% are tan, brown, black or green; resembling caddisflies or mayflies, and if you can pick out 3 to 6 kinds of organisms with the unaided eye, and if no one kind makes up 90% of the sample, and fish are observed along a 100 foot course of the stream, then this reach is considered **FAIR to MODERATELY IMPAIRED.**

Suspect: Moderate organic enrichment or sediment pollution.

IF the number of organisms per $1m^2$ is more than one, and 30% or more are tan, brown, black or green in color and resemble caddisfly, stonefly, or mayfly larvae, or you can pick out six or more kinds of organisms with the unaided eye, and no one kind makes up more than 50% of the sample, and fish are observed along a 100 foot of stream course, then the stream reach is **UNIMPAIRED.**

*This water quality assessment provides a general indication of water quality by relying on the number and abundance of taxonomic families of stream macroinvertebrates. If stress is indicated by this assessment, more rigorous tests should performed using taxonomic richness statistics and functional feeding group ratios. **This test does not necessarily mean biological damage to a stream ecosystem is present.**

N = 100 organism count

$BI = \frac{\Sigma n_i a_i}{N}$

n_i = # in each family

a_i = Pollution Tolerance

Rapid Bioassessment Protocol II

Biosurvey Field Data Sheet

RELATIVE ABUNDANCE OF AQUATIC BIOTA

Periphyton	0	1	2	3	4	Slimes	0	1	2	3	4
Filamentous Algae	0	1	2	3	4	Macroinvertebrates	0	1	2	3	4
Macrophytes	0	1	2	3	4	Fish	0	1	2	3	4

0 = Absent/Not Observed 1 = Rare 2 = Common 3 = Abundant 4 = Dominant

MACROBENTHOS QUALITATIVE SAMPLE LIST		List Families Present/Indicate Abundance
Oligochaeta (T)		
	Anisoptera	
Gastropoda		Coleoptera
	Zygoptera	
Bivalvia		Diptera (T)
	Plecoptera (S)	
Ephemeroptera (S)		
	Trichoptera (S)	

Other

RIFFLE SAMPLE FUNCTIONAL FEEDING GROUPS (Indicate No. of Individuals Representing Group)	
Scrapers	Filtering Collectors
CPOM SAMPLE FUNCTIONAL FEEDING GROUPS (Indicate No. of Individuals Representing Group)	
Shredders	Total Org. in Sample

Observations

(S) sensitive (T) tolerant

Figure 6.2-1. Biosurvey Field Data Sheet for use with Rapid Bioassessment Protocol II.

Site _____ Description _____

Habitat-Organic Resource Categories

Functional Group	Leaf Pack Count	Leaf Pack F*	Rock (Periphyton) Count	Rock (Periphyton) F*	Fine Sediments (Pools) Count	Fine Sediments (Pools) F*	Wood Count	Wood F*	Vascular Plants Count	Vascular Plants F*	Σ
Shredders (SH)											
Collectors - Total (C)											
Filtering (FC)											
Gathering (GC)											
Scrapers (SC)											
Total w/o Predators (T)											
Predators (P)											
Total with Predators (PT)											

*F = Recruitment factor to indicate importance of new generations entering a given group

RATIOS (General ranges in parentheses) Riparian Habitat	Stream Orders 1-3 (Approx. 0.5-10 m wide)		Stream Orders 4-6 (Approx. 10-0 m wide)	Stream Orders > 6 (Approx. > 30 m wide)
	Shaded well developed, trees and/or shrubs	Open low shrubs and/or herbs and/or grasses	Open variable, trees and/or shrubs	Variable, flood plain or "green belt" forest
Functional Group Ratios	Calculated (Examples)	Calculated (Examples)	Calculated (Examples)	Calculated (Examples)
SH/C	(> 0.30)	(> 0.15)	(< 0.10)	(< 0.05)
SC/C	(< 0.25)	(> 0.25)	(> 0.25)	(< 0.10)
FC/GC	(< 0.50)	(∿ 0.40)	(∿ 0.50)	(∿ 0.50)
SH/T	(> 0.25)	(> 0.10)	(< 0.05)	(< 0.01)
C/T	(> 0.50)	(> 0.40)	(> 0.50)	(> 0.75)
SC/T	(< 0.10)	(∿ 0.25)	(> 0.40)	(< 0.10)
P/PT	(∿ 0.10)	(∿ 0.10)	(∿ 0.10)	(∿ 0.10)

An Introduction to the Stream Macroinvertebrates of the Rappahannock River

John E. Anderson

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Section One - Introduction

The role of stream macroinvertebrates in the maintenance of water quality and nutrient cycling is matched in importance only by the role of aquatic plants and microorganisms. These organisms, which include insects, snails, crayfish, and mussels, are specifically designed to occupy a rung on the trophic ladder of the stream ecosystem. Each organism is adapted with morphological characteristics that distinguish its place in the food web and place it in a special taxonomic niche. This introductory guide is designed for those interested in learning more about some of these creatures and their world beneath the flowing waters of the Rappahannock River. This guide is meant for those who have limited experience in biology and ecology, but are interested in the "inner space" of the aquatic environment.

The Rappahannock - A Lotic Ecosystem

Lotic ecosystems, or flowing water ecosystems, represent the principal evolutionary pathway of animals from sea to land. These ecosystems, which include streams and rivers, are characterized by turbulent flowing waters, high oxygen concentrations, high sediment loads, and a more consistent temperature regime when compared to lake or pond environments (lentic ecosystems). Lotic ecosystems have a higher habitat heterogeneity or variability. Additionally, the main source of energy driving the lotic environment is externally (allochthonous) produced plant material, much of it decayed or detrital.

Lotic systems are classified based on stream order, which represents the bifurcation of a stream or river's branches (Figure 1). The composition of a region's surface materials and geology contributes to the shape and drainage basin of a stream. A stream tends to cut through soft materials, taking a path of least resistance around harder, more resistant materials. The path taken can influence the water quality and composition of organisms in a lotic environment. For example, if a stream drains a region containing mostly acidic granitic rocks, the water may tend to be more acidic and soft. Mollusks, which depend upon harder waters containing calcium carbonate, will not be abundant in softer acidic waters.

The flow of the water itself can influence the abundance and distribution of organisms. Water in streams flows in a helical manner, which promotes undercutting, erosion, and deposition. This flow characteristic develops the

habitats aquatic organisms depend upon—riffles and pools (Figure 2). Riffles generally are areas that hold more organism diversity and habitat heterogeneity. These areas are characterized by stones, cobbles, and coarse gravel that are aerated and well flushed. Organisms that live here are adapted to live in high-oxygenated waters and have morphological adaptations to allow them to withstand high water velocities (i.e. hooks, grapples, streamlined shape). These organisms live in a two-dimensional world, holding fast to the rock substrates.

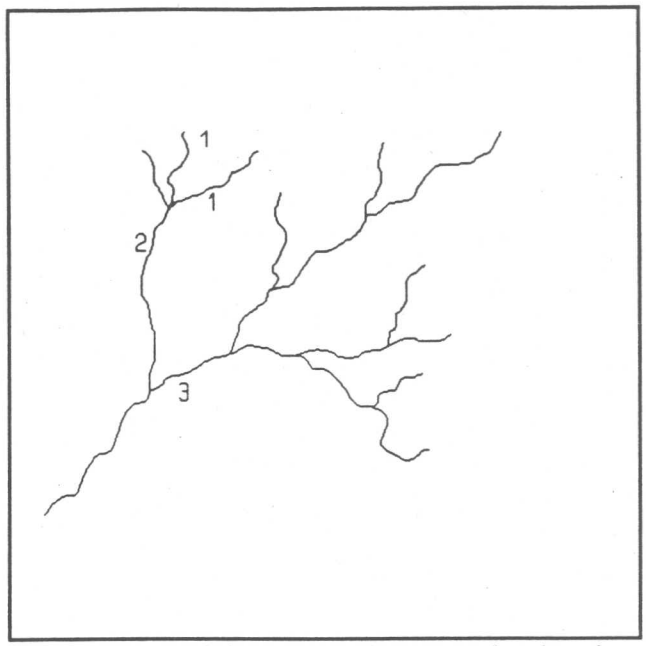


Figure 1 *Stream bifurcation and associated order of segments.*

Pool areas, in contrast, are characterized by deeper, slower moving waters. Depositional material (decaying plant material) tends to collect here if the pool is along the stream's edge. In these leaf packs, a host of organisms survives, digesting and breaking down the plant material with the aid of microorganisms. Organisms living here can withstand lower oxygen levels, and some may actually obtain oxygen outside the stream environment. In still pool areas, mosquito larvae (*Culicidae*) may be found. The substrate here also becomes finer with sands and silts. This change in substrate offers burrowing organisms a three-dimensional habitat and may be characterized by aquatic worms and fly larvae.

As a stream matures, moving from headwaters to an embayment or coastal zone, the ecosystem changes both in function and organism type. The lotic ecosystem may be broken down into a series of regions that are dominated by major organisms which support the food web of that region and which are especially adapted to live in the habitat provided by the region. The concept of functional feeding groups serves to classify and predict the trophic structure of a stream using the feeding habits of the indigenous organisms. The health of a stream can be assessed according to the occurrence and diversity of the organisms found in a particular region (Figure 3).

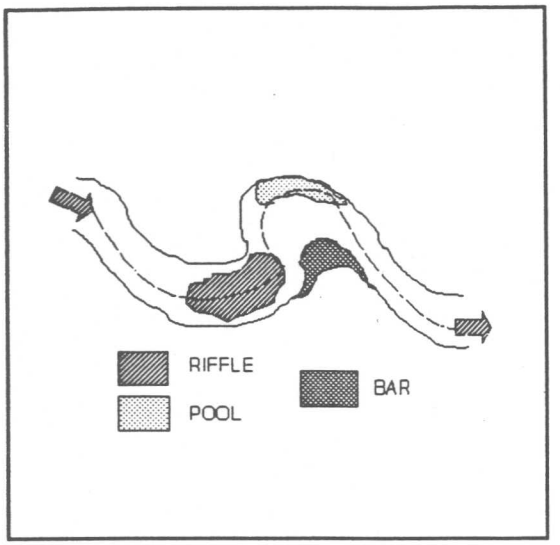


Figure 2 *Arrangement of riffle and pool complexes in a meandering stream.*

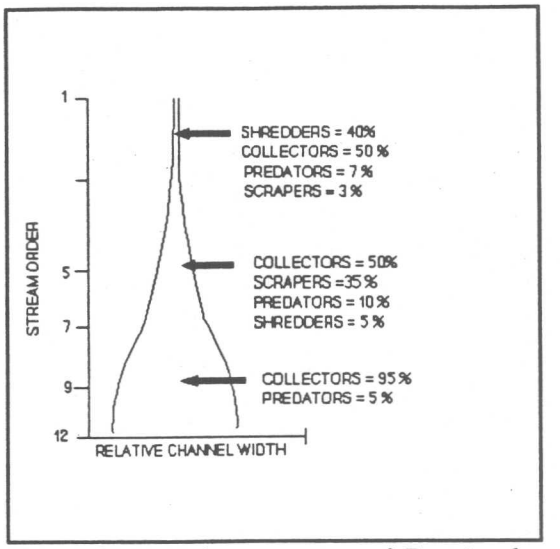


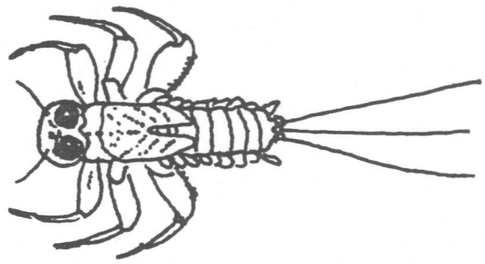
Figure 3. *General arrangement of Functional Feeding Groups in relation to channel width and order.*

Section Two – Common Freshwater Benthic Macroinvertebrates

Functional Feeding Groups (FFG)

Stream macroinvertebrates are classified into four functional feeding group categories – *shredders, collectors, scrapers*, and *predators.* Shredders break down decaying plant material that occurs near riparian zones. This material consists of leaves, twigs, bark, pine needles, and other plant parts and pieces. Collectors feed upon small particles of organic matter either by filtration or by gathering material from the stream bottom. Scrapers remove algae from rocks and wood surfaces. Predators are adapted to capture and seize prey. Dominance of any one group can indicate environmental stress. Additionally, the absence of one or several groups can indicate stress. Stress on the ecosystem can be defined as organic enrichment, inorganic enrichment, physical disturbance, or a combination of all three. Functional feeding group characteristics are described for the organisms presented in this guide.

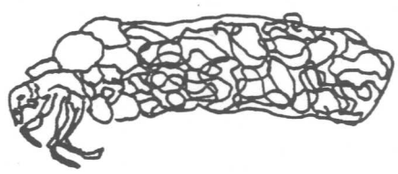
Phylum Arthropoda – Class Insecta



Order Ephemeroptera
Common Name – Stream Mayfly
Family – Ephemerellidae
FFG – Scraper
Habitat – Riffles



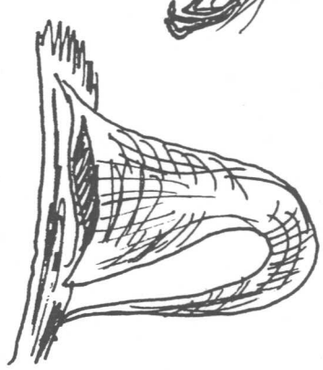
Order Tricoptera
Common Name – Organic Case Caddisfly
Family – Limnephilidae
FFG – Shredder
Habitat – Rock substrates



Order Tricoptera
Common Name – Mineral Case Caddisfly
Family – Glossosomatidae or Limnephilidae
FFG – Scrapers
Habitat – Rock substrates



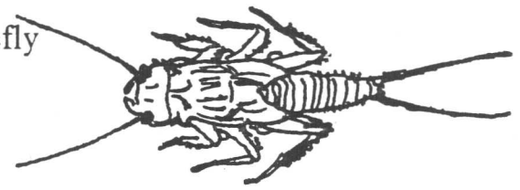
Order Tricoptera
Common Name – Free–living Caddisfly
Family – Rhyacophilidae (green)
FFG – Predators
Habitat – Rock substrates and leaf material



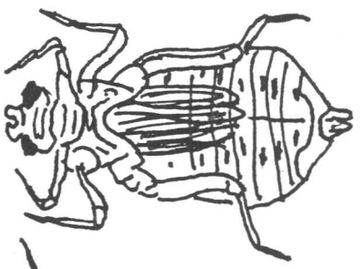
Order Tricoptera
Common Name – Net Spinning Caddisfly
Family – Philopotimidae or Hydropsychidae
FFG – Filtering collectors
Habitat – Rock substrates and leaf material

Phylum Arthropoda - Class Insecta

Order Plecoptera
Common Name – Setipalpian Stonefly
Family – Perlidae
FFG – Predators
Habitat – Rock substrates



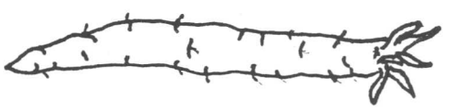
Order Odonata
Common Name – Dragonfly
Family – Anisoptera
FFG – Predators
Habitat – Sandy substrates



Order Odonata
Common Name – Damselfly
Family – Zygoptera
FFG – Predators
Habitat – Sandy substrates



Order Diptera
Common Name – Cranefly
Family – Tipulidae
FFG – Shredder
Habitat – Leaf material



Order Diptera
Common Name – Cranefly
Family – Tipulidae
FFG – Shredder / Predator
Habitat – Leaf material



Phylum Arthropoda - Class Insecta

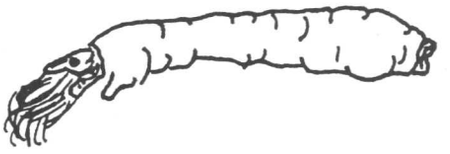


Order Diptera
Common Name – Mosquito
Family – Culicidae
FFG – Collector
Habitat – Pool and attached to substrates

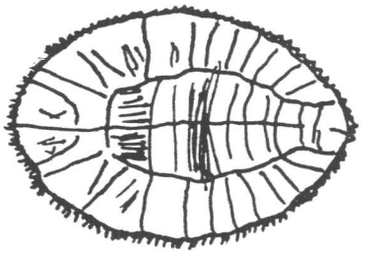


Order Diptera
Common Name – Midge fly
Family – Chironomidae
FFG – Collector
Habitat – Sediments and silt tubes strung with silk strands

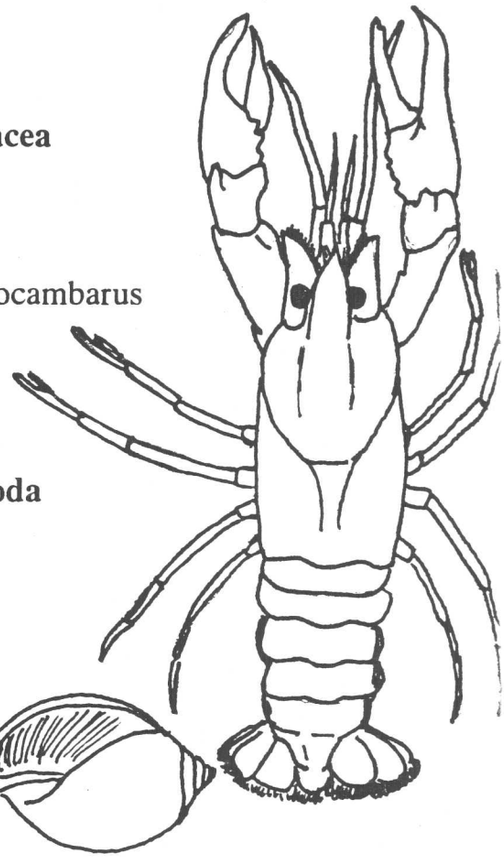
Order Diptera
Common Name – Black fly
Family – Simulidae
FFG – Collector
Habitat – Clinging to substrates



Order Coleoptera
Common Name – Water Penny
Family – Psephenidae
FFG – Scrapers
Habitat – Rock substrates

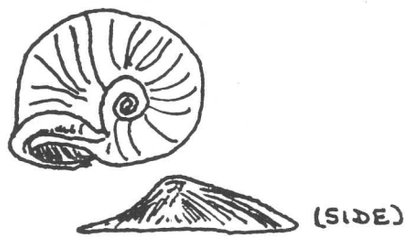


Phylum Arthropoda - Class Crustacea



Order Decapoda
Common Name - Crawfish
Common Piedmont Families - Orconectes, Cambarus, Procambarus
FFG - all trophic levels (polytrophic)
Habitat - Burrows or under rocks and leaf pack

Phylum Mollusca - Class Gastropoda

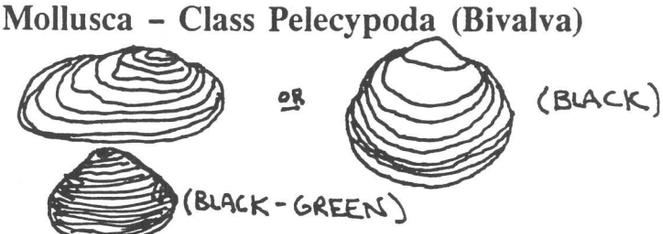


Subclass Prosobranchia
Family - Planorbidae

Family - Ancylidae

Family - Physidae

Phylum Mollusca - Class Pelecypoda (Bivalva)

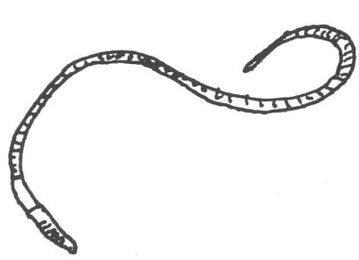


Family - Unionidae

Family - Corbiculidae

Phylum Annelida - Class Oligocheata

Family - Naidadae



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Cummins, K.W. and R.W. Merritt. 1988. *An Introduction to the Aquatic Insects of North America.* Dubuque: Kendall/Hunt Publishers.

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Hilsenhoff, W.L. 1988. Rapid field assessment of organic pollution with a family-level biotic index. *North American Benthological Society* 7 (No. 1): 65-68.

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Illustration Credits

Cummins, K.W. and R.W. Merritt. 1988. *An Introduction to the Aquatic Insects of North America.* Dubuque: Kendall/Hunt Publishers.

Cummins, K.W. and M.A. Wilzbach. 1985. *Field Procedures for Analysis of Functional Feeding Groups of Stream Macroinvertebrates.* Linesville: University of Pittsburgh.

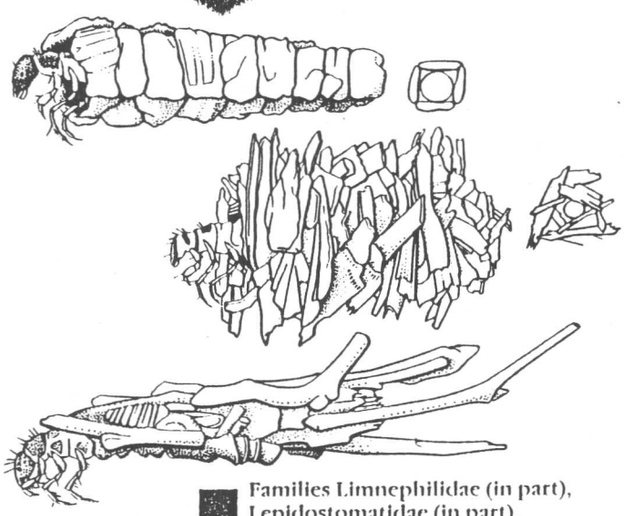
Pennak, R.W. 1989. *Fresh-Water Invertebrates of the United States, 3rd Ed. Protozoa to Mollusca.* New York: John Wiley & Sons, Inc.

LOTIC

FIRST LEVEL OF RESOLUTION

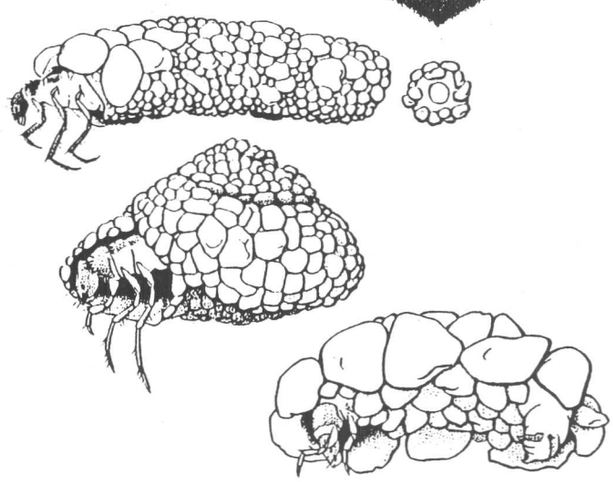
LARVAE IN PORTABLE CASE
Caddisflies (Order Trichoptera)

CASES ORGANIC
Leaf, stick, needle, bark



Families Limnephilidae (in part), Lepidostomatidae (in part), Phryganeidae, Leptoceridae (in part)

CASES MINERAL
Sand, fine gravel



Families Glossosomatidae, Limnephilidae (in part), Helicopsychidae

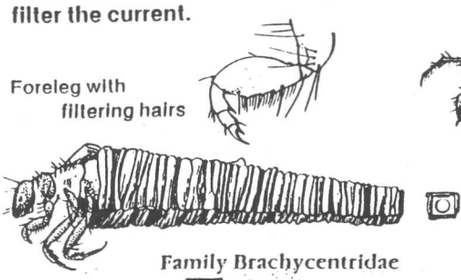
SHREDDERS

SCRAPERS

SECOND LEVEL OF RESOLUTION considers a few fairly common caddisflies that would be misclassified above on the basis of case composition alone.

CASES ORGANIC

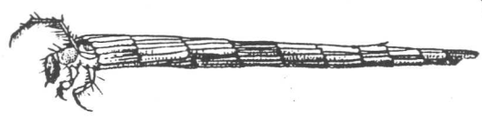
Cases square in cross section and tapered, with no bark or flat leaf pieces included. Front attached to substrate. Larvae extend legs and filter the current.



Family Brachycentridae

FILTERING COLLECTORS

Cases long, slender, and tapered, made of plant material

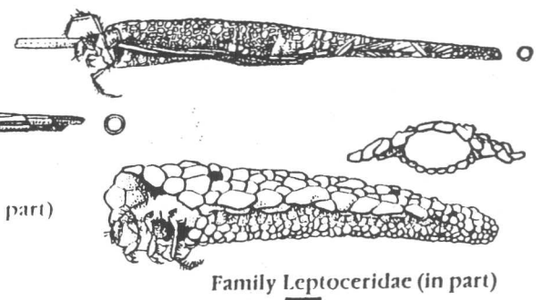


Family Leptoceridae (in part)

GATHERING COLLECTORS

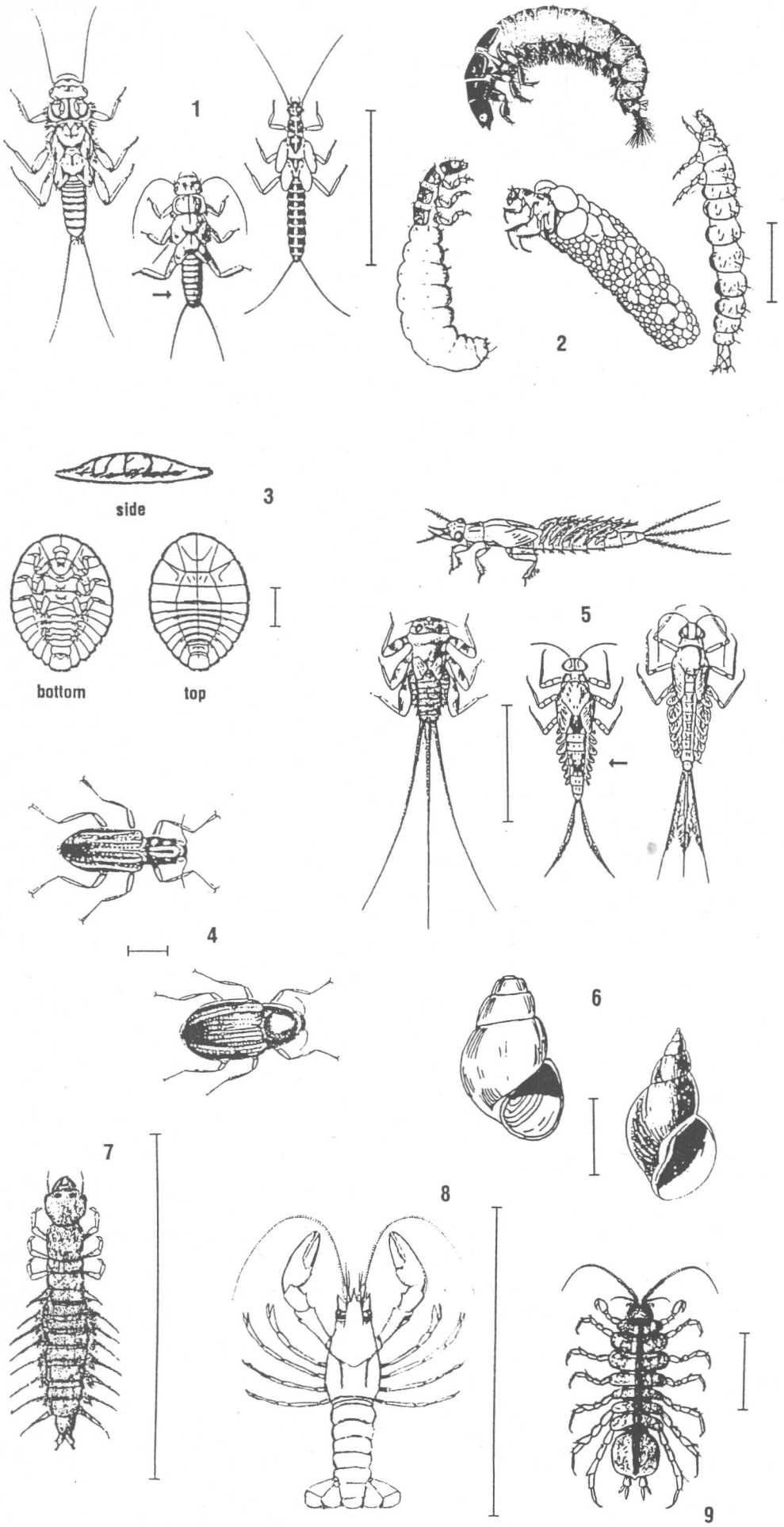
CASES MINERAL

Cases long, slender, and tapered (mostly fine sand) *or* cases ovoid and very flat in cross section



Family Leptoceridae (in part)

GATHERING COLLECTORS



Bar lines indicate relative size

Stream Insects & Crustaceans

GROUP ONE TAXA

Pollution sensitive organisms found in good quality water.

1 *Stonefly: Order Plecoptera.* 1/2" - 1 1/2", 6 legs with hooked tips, antennae, 2 hair-like tails. Smooth (no gills) on lower half of body. (See arrow.)

2 *Caddisfly: Order Trichoptera.* Up to 1", 6 hooked legs on upper third of body, 2 hooks at back end. May be in a stick, rock or leaf case with its head sticking out. May have fluffy gill tufts on lower half.

3 *Water Penny: Order Coleoptera.* 1/4", flat saucer-shaped body with a raised bump on one side and 6 tiny legs on the other side. Immature beetle.

4 *Riffle Beetle: Order Coleoptera.* 1/4", oval body covered with tiny hairs, 6 legs, antennae. Walks slowly underwater. Does not swim on surface.

5 *Mayfly: Order Ephemeroptera.* 1/4" - 1", brown, moving, plate-like or feathery gills on sides of lower body (see arrow), 6 large hooked legs, antennae, 2 or 3 long, hair-like tails. Tails may be webbed together.

6 *Gilled Snail: Class Gastropoda.* Shell opening covered by thin plate called operculum. Shell usually opens on right.

7 *Dobsonfly (Hellgrammite): Family Corydalidae.* 3/4" - 4", dark-colored, 6 legs, large pinching jaws, eight pairs feelers on lower half of body with paired cotton-like gill tufts along underside, short antennae, 2 tails and 2 pairs of hooks at back end.

GROUP TWO TAXA

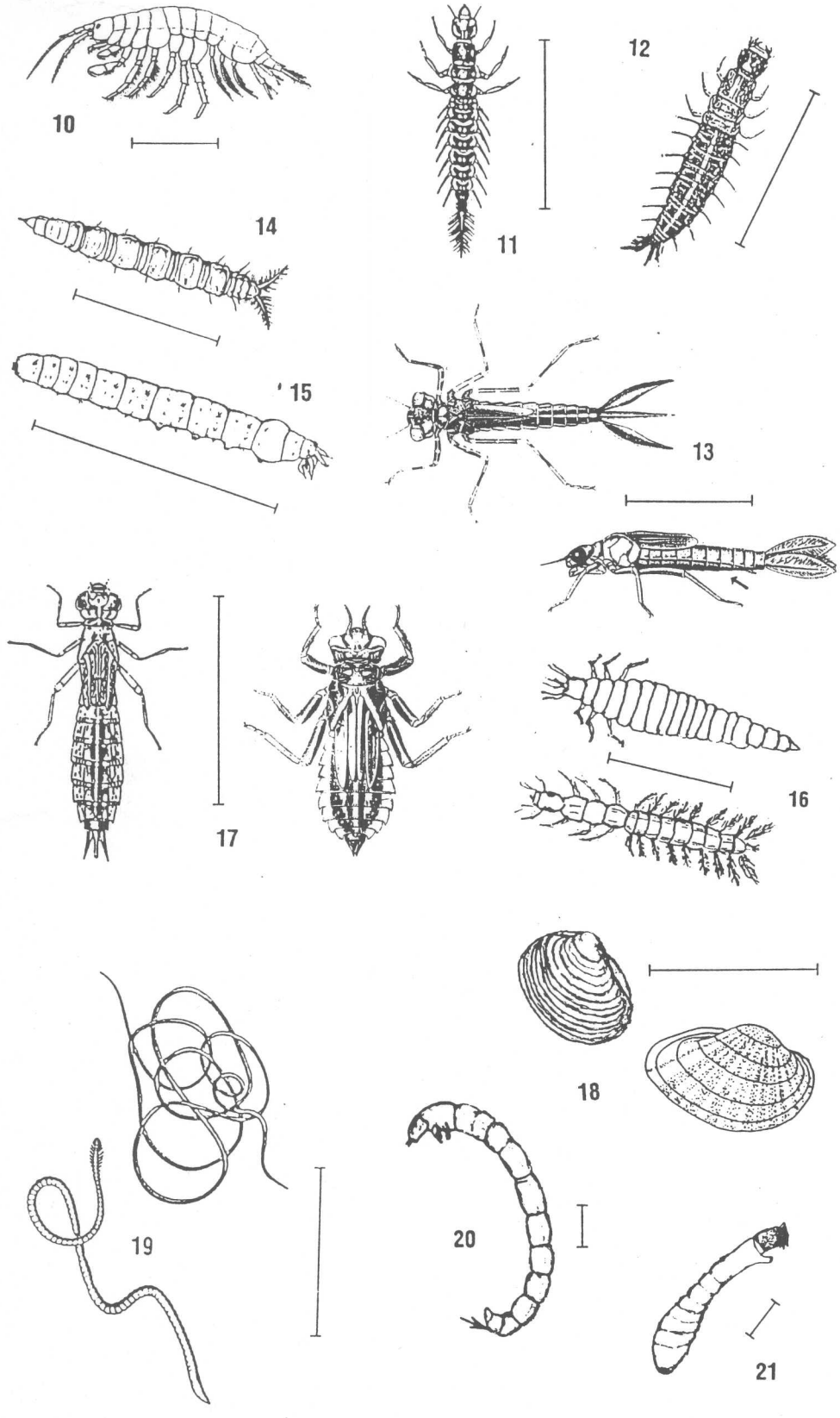
Somewhat pollution tolerant organisms can be in good or fair quality water.

8 *Crayfish: Order Decapoda.* Up to 6", 2 large claws, 8 legs, resembles small lobster.

9 *Sowbug: Order Isopoda.* 1/4" - 3/4", gray oblong body wider than it is high, more than 6 legs, long antennae.

Save Our Streams

Izaak Walton League of America
1401 Wilson Blvd. Level B
Arlington, VA 22209



Bar lines indicate relative size

GROUP TWO TAXA continued

10 *Scud: Order Amphipoda.* 1/4", white to grey, body higher than it is wide, swims sideways, more than legs, resembles small shrimp.

11 *Alderfly larva: Family Sialidae.* 1" long. Looks like small hellgrammite but has 1 long, thin, branched tail at back end (no hooks). No gill tufts underneath

12 *Fishfly larva: Family Corydalidae.* Up to 1 1/2" long. Looks like small hellgrammite but often a lighter reddish-tan color, or with yellowish streaks. No gill tufts underneath.

13 *Damselfly: Suborder Zygoptera.* 1/2" - 1", large eyes, 6 thin hooked legs, 3 broad oar-shaped tails, positioned like a tripod. Smooth (no gills) on sides of lower half of body. (See arrow.)

14 *Watersnipe Fly Larva: Family Athericidae (Atherix).* 1/4" - 1", pale to green, tapered body, many caterpillar-like legs, conical head, feathery "horns" at back end.

15 *Crane Fly: Suborder Nematocera.* 1/3" -2", milky, green, or light brown, plump caterpillar-like segmented body, 4 finger-like lobes at back end.

16 *Beetle Larva: Order Coleoptera.* 1/4" 1", light-colored, 6 legs on upper half of body, feelers, antennae.

17 *Dragon Fly: Suborder Anisoptera.* 1/2" - 2", large eyes, 6 hooked legs. Wide oval to round abdomen.

18 *Clam: Class Bivalvia.*

GROUP THREE TAXA

Pollution tolerant organisms can be in any quality of water.

19 *Aquatic Worm: Class Oligochaeta.* 1/4" - 2", can be very tiny; thin worm- like body.

20 *Midge Fly Larva: Suborder Nematocera.* Up to 1/4" dark head, worm-like segmented body, 2 tiny legs on each side.

21 *Blackfly Larva: Family Simulidae.* Up to 1/4", one end of body wider. Black head, suction pad on end.

22 *Leech: Order Hirudinea.* 1/4" - 2", brown, slimy body, ends with suction pads.

23 *Pouch Snail and Pond Snails: Class Gastropoda.* No operculum. Breathe air. Shell usually opens on left.

24 *Other snails: Class Gastropoda.* No operculum. Breathe air. Snail shell coils in one plane.

DEFENDERS OF SOIL, AIR, WOODS, WATERS AND WILDLIFE
THE IZAAK WALTON LEAGUE

Table 4 Biotic Index, scores for individual taxa (see text) (adapted from Hilsenhoff, 1977)

Taxonomic Group	Pollution tolerance Score
Plecoptera	
(Stoneflies)	
Capniidae, Leuctridae, Nemouridae	0
Taeniopterigidae	1
Chloroperlidae, Perlidae, Perlodidae	0
Pteronarcidae	1
Ephemeroptera	
(Mayflies)	
Baetidae	2.5
Baetiscidae	2
Caenidae	
Caenis	4
Brachycerus	2
Ephemerellidae	0.5
Ephemeridae	1.5
Heptageniidae	
Epeorus	0
Rhithrogena	0
Stenonema	2
Heptagenia	2
Leptophlebiidae	
Paraleptophlebia	1
Leptophlebia	3
Polymitarcidae **(Ephoron)**	1
Siphlonuridae	2
Tricorythidae	2
Odonata	
(Dragonflies and Damselflies)	
Agrionidae	0
Cordulegastridae	0
Aeshnidae	1
Gomphidae	0.5
Lestidae	3
Coenagrionidae	3
Trichoptera	
(Caddisflies)	
Brachycentridae	0.5
Helicopsychidae	1
Hydroptilidae	3
Molannidae	1
Philopotamidae	0
Rhyacophilidae	0
Hydropsychidae **(Cheumatopsyche)**	4
Polycentropodidae **(Neuroclipsis)**	4
Megaloptera	2
(Alderflies and Dobsonflies)	
Coleoptera	
(Beetles)	
Elmidae	2
Psephenidae	2
Diptera	
(True Flies)	
Blephariceridae	0
Ceratopogonidae **(Bezzia)**	3
*Chironomidae **(Chironomus)**	5
Empididae	4
Ephydridae	4
Rhagionidae	2
Tabanidae	2
Tipulidae	2
**Syrphidae	5

*Some members of this family have a score of 0.

**(Not from Hilsenhoff; added by DML)

Table 5 Water Quality (see text) (adapted from Hilsenhoff, 1977)

Biotic Index	Water Quality
under 1.75	Excellent, no disturbance
1.75-2.25	Good, possibly some disturbance or

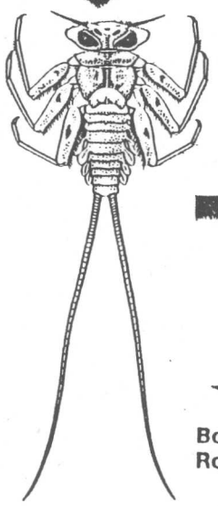
pods in the sample. Thus, for each taxon, multiply the number of individuals collected by the score in Table 4 for that group. Add the values for all the groups present, and divide by the total number of insects collected. This will give the biotic index (BI). Table 5 gives an

LOTIC

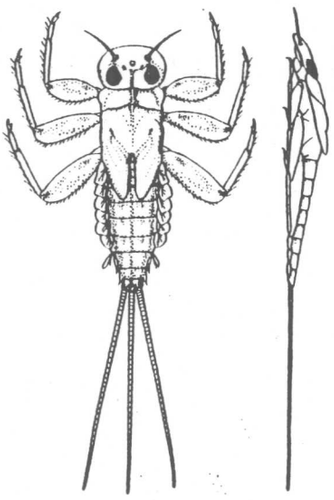
FIRST LEVEL OF RESOLUTION

NYMPHS WITH JOINTED LEGS

THREE (OR TWO) TAILS
WITH LATERAL ABDOMINAL GILLS
Mayflies (Order Ephemeroptera)



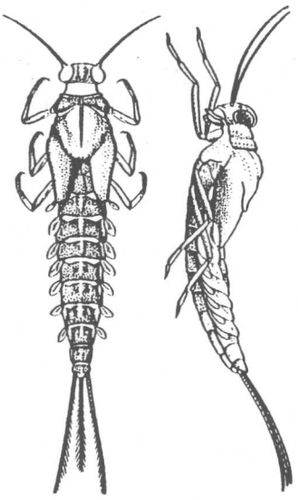
Body shape ovoid
Flat in cross section



Families Heptageniidae, Ephemerellidae (in part)

SCRAPERS

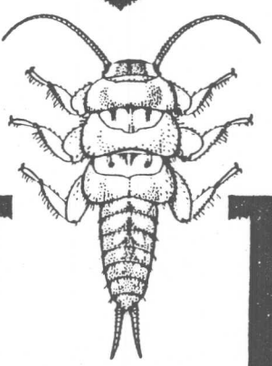
Body shape cylindrical
Round in cross section



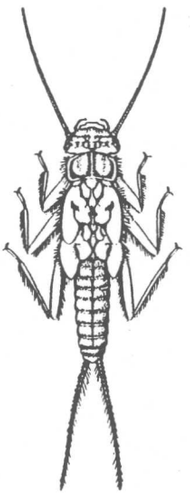
Families Baetidae, Leptophlebiidae, Ephemerellidae (in part), Ephemeridae

GATHERING COLLECTORS

TWO TAILS
WITHOUT LATERAL ABDOMINAL GILLS
Stoneflies (Order Plecoptera)



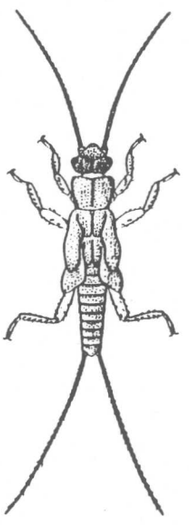
Bright color pattern
Very active



Setipalpian Stoneflies

PREDATORS

Dull brown or black
Sluggish



Filipalpian Stoneflies

SHREDDERS

IMPAIRMENT ASSESSMENT SHEET

1. Detection of impairment: Impairment detected (Complete items 2-6) — No impairment detected (Stop here)

2. Biological impairment indicator:

Benthic macroinvertebrates	Other aquatic communities
___ absence of EPT taxa	✓ Periphyton
___ dominance of tolerant groups	___ filamentous
___ low benthic abundance	___ other
___ low taxa richness	✓ Macrophytes
___ other	✓ Slimes
	✓ Fish

3. Brief description of problem: _____

Year and date of previous surveys: _____

Survey data available in: _____

4. Cause: (indicate major cause) organic enrichment toxicants flow habitat limitations other _____

5. Estimated areal extent of problem (m^2) and length of stream reach affected (m), where applicable: _____

6. Suspected source(s) of problem:

___ point source discharge (name, type of facility, location)
___ construction site runoff
___ combined sewer outfall
___ silviculture runoff
___ animal feedlot
___ agricultural runoff
___ urban runoff
___ ground water
___ other
___ unknown

Briefly explain:

Figure 6.1-2. Impairment Assessment Sheet for use with macroinvertebrate Rapid Bioassessment Protocols.

Rapid Bioassessment Protocol II

Biosurvey Field Data Sheet

RELATIVE ABUNDANCE OF AQUATIC BIOTA

Periphyton	0	1	2	3	4	Slimes	0	1	2	3	4
Filamentous Algae	0	1	2	3	4	Macroinvertebrates	0	1	2	3	4
Macrophytes	0	1	2	3	4	Fish	0	1	2	3	4

0 = Absent/Not Observed 1 = Rare 2 = Common 3 = Abundant 4 = Dominant

MACROBENTHOS QUALITATIVE SAMPLE LIST		List Families Present/Indicate Abundance
Oligochaeta (T)		
1 Naididae		
	Anisoptera	
Gastropoda		Coleoptera
1 Physidae		11 Elmidae
	Zygoptera	
Bivalvia		Diptera (T)
	Plecoptera (S)	IIII II (Last Pupa)
	11 Perlidae	Chironomidae
Ephemeroptera (S)		
IIII IIII	Trichoptera (S)	
Siphlonuridae		25 Hydropsychidae
Other	(H) IIII IIII IIII IIII IIII	
RIFFLE SAMPLE FUNCTIONAL FEEDING GROUPS	(B) IIII II — Rhyacophilidae (I) Polycentropodidae	(Indicate No. of Individuals Representing Group)
Scrapers		Filtering Collectors
CPOM SAMPLE FUNCTIONAL FEEDING GROUPS		(Indicate No. of Individuals Representing Group)
Shredders		Total Org. in Sample
Observations		

(S) sensitive (T) tolerant

Figure 6.2-1. Biosurvey Field Data Sheet for use with Rapid Bioassessment Protocol II.

HORSEPEN RUN
6/30
INITIAL SURVEY

Impair Assessment Sheet

1. Detection of impairment: A. Impairment Detected (complete items 2–6).
(B.) No impairment detected (**STOP**).

2. Biological impairment indicator:

Benthic macroinvertebrates	Other Aquatic Communities
___ absence of EPT taxa	___ Periphyton
___ dominance of tolerant groups	___ filamentous
___ low benthic abundance	___ other
___ low taxa richness	___ Macrophytes
___ other	___ Slimes
	___ Fish

3. Brief description of problem: _____
Year and date of previous surveys: _____
Survey data available in: _____

4. Cause: (indicate major cause) *organic enrichment* *toxicants* *flow* *habitat limitations* *other*_____

5. Estimate areal extent of problem (m^2) and length of stream reach affected (m), where applicable:_____

6. Suspected source(s) of problem:

___ point source discharge (name, type of facility, location)
___ construction site runoff
___ combined sewer outfall
___ silviculture runoff
___ animal feedlot
___ urban runoff
___ ground water
___ other
___ unknown

Briefly explain:

REFERENCE STATION

Metric Values, Percent Comparison, and Bioassessment Score Table

Replicate Sample Average of All Stations

METRIC	Metric Value Station				% Comparison Station				Bioassay Score Station			
	1	2	3	R	1	2	3	R	1	2	3	R
Taxa Richness	8	5	8	11	72	45	72	100	3	3	3	6
FBI Modified	4.82	5.01	4.64	3.77	78	75	81	100	3	3	3	6
FFG Riffle Community: Scrapers/ Filter Collectors	1.90	0	0	4.25	44	0	0	100	3	0	0	6
CPOM Community: Shredders/Total	1.66	2.33	5	7.6	21	30	65	100	0	3	6	6
EPT/Chironomidae	.95	.006	.316	12	7	.05	2	100	0	0	0	6
% Contribution (dominant taxon)	25	39	35	21	25	39	35	21	0	3	3	6
EPT Index	4.6	1	2.6	6	66	16	43	100	0	0	0	6
Community Similarity Index	3.7	3.3	9	0					0	0	0	6
Total Score									9	12	15	48
***Biologic Condition**									S	S	M	N

** Refer to EPA Guidelines for scoring RPB II, page 6-12 of EPA's RPB Protocols Manual.*

Horsepen Run

Comments:

Scoring criteria is based upon a percentage comparison of the study site score to the reference score. Biological condition is reflected as a function of that percentage. Categories are presented below:

> 79% Non-impaired - N
29 to 72% Moderately impaired - M
< 21% Severely impaired - S

IMPAIRMENT ASSESSMENT SHEET

1. Detection of impairment: Impairment detected (Complete items 2-6) No impairment detected (Stop here)

2. Biological impairment indicator:

Benthic macroinvertebrates	Other aquatic communities
___ absence of EPT taxa	___ Periphyton
___ dominance of tolerant groups	___ filamentous
___ low benthic abundance	___ other
___ low taxa richness	___ Macrophytes
___ other	___ Slimes
	___ Fish

3. Brief description of problem: _____

Year and date of previous surveys: _____

Survey data available in: _____

4. Cause: (indicate major cause) organic enrichment toxicants flow habitat limitations other _____

5. Estimated areal extent of problem (m^2) and length of stream reach affected (m), where applicable: _____

6. Suspected source(s) of problem:

___ point source discharge (name, type of facility, location)
___ construction site runoff
___ combined sewer outfall
___ silviculture runoff
___ animal feedlot
___ agricultural runoff
___ urban runoff
___ ground water
___ other
___ unknown

Briefly explain:

Figure 6.1-2. Impairment Assessment Sheet for use with macroinvertebrate Rapid Bioassessment Protocols.

Rapid Bioassessment Protocol II

Biosurvey Field Data Sheet

RELATIVE ABUNDANCE OF AQUATIC BIOTA

Periphyton	0	1	2	3	4	Slimes	0	1	2	3	4
Filamentous Algae	0	1	2	3	4	Macroinvertebrates	0	1	2	3	4
Macrophytes	0	1	2	3	4	Fish	0	1	2	3	4

0 = Absent/Not Observed 1 = Rare 2 = Common 3 = Abundant 4 = Dominant

MACROBENTHOS QUALITATIVE SAMPLE LIST		List Families Present/Indicate Abundance
Oligochaeta (T)		
	Anisoptera	
Gastropoda		Coleoptera
	Zygoptera	
Bivalvia		Diptera (T)
	Plecoptera (S)	
Ephemeroptera (S)		
	Trichoptera (S)	

Other

RIFFLE SAMPLE
FUNCTIONAL FEEDING GROUPS (Indicate No. of Individuals Representing Group)

Scrapers	Filtering Collectors

CPOM SAMPLE FUNCTIONAL FEEDING GROUPS (Indicate No. of Individuals Representing Group)

Shredders	Total Org. in Sample

Observations

(S) sensitive (T) tolerant

Figure 6.2-1. Biosurvey Field Data Sheet for use with Rapid Bioassessment Protocol II.

6/30
INITIAL SURVEY

Impair Assessment Sheet

1. Detection of impairment: A. Impairment Detected (complete items 2–6).
(B.) No impairment detected (**STOP**).

2. Biological impairment indicator:

Benthic macroinvertebrates	Other Aquatic Communities
___ absence of EPT taxa	___ Periphyton
___ dominance of tolerant groups	___ filamentous
___ low benthic abundance	___ other
___ low taxa richness	___ Macrophytes
___ other	___ Slimes
	___ Fish

3. Brief description of problem: _____
Year and date of previous surveys: _____
Survey data available in: _____

4. Cause: (indicate major cause) *organic enrichment* *toxicants* *flow* *habitat limitations* *other*_____

5. Estimate areal extent of problem (m^2) and length of stream reach affected (m), where applicable:_____

6. Suspected source(s) of problem:

___ **point source discharge (name, type of facility, location)**
___ **construction site runoff**
___ **combined sewer outfall**
___ **silviculture runoff**
___ **animal feedlot**
___ **urban runoff**
___ **ground water**
___ **other**
___ **unknown**

Briefly explain:

REFERENCE STATION

Metric Values, Percent Comparison, and Bioassessment Score Table

Replicate Sample Average of All Stations

METRIC	Metric Value Station				% Comparison Station				Bioassay Score Station			
	1	2	3	R	1	2	3	R	1	2	3	R
Taxa Richness	8	5	8	11	72	45	72	100	3	3	3	6
FBI Modified	4.82	5.01	4.64	3.77	78	75	81	100	3	3	3	6
FFG Riffle Community: Scrapers/ Filter Collectors	1.90	0	0	4.25	44	0	0	100	3	0	0	6
CPOM Community: Shredders/Total	1.66	2.33	5	7.6	21	30	65	100	0	3	6	6
EPT/Chironomidae	.95	.006	.316	12	7	.05	2	100	0	0	0	6
% Contribution (dominant taxon)	25	39	35	21	25	39	35	21	0	3	3	6
EPT Index	4.6	1	2.6	6	66	16	43	100	0	0	0	6
Community Similarity Index	3.7	3.3	9	0					0	0	0	6
Total Score									9	12	15	48
*Biologic Condition									S	S	M	N

** Refer to EPA Guidelines for scoring RPB II, page 6-12 of EPA's RPB Protocols Manual.*

Horsejaw Run

Comments:

Scoring criteria is based upon a percentage comparison of the study site score to the reference score. Biological condition is reflected as a function of that percentage. Categories are presented below:

> 79% Non-impaired - N
29 to 72% Moderately impaired - M
< 21% Severely impaired - S

Stream Survey Parameters

Reference Reach: Horsepen Run

METRIC SCORES:

1. Taxa Richness = 11
2. FBI = 3.77
3. Scrapers/Filtering Collectors = 4.25
4. CPOM: Shredders/TOTAL = 7.6
5. EPT/Chironomidae = 12
6. % Contribution of Dominant Taxa = 21
7. EPT Index = 6
8. Community Loss Index = 0

Biological Scoring Criteria:

Metric	Biological Condition		
	6	3	0
1[a]	>80%	40 – 80%	<40%
2[b]	>85%	50 – 85%	<50%
3[a]	>50%	25 – 50%	<25%
4[a]	>50%	25 – 50%	<25%
5[a]	>75%	25 – 75%	<25%
6[a]	<30%	30 – 50%	>50%
7[a]	>90%	70 – 90%	<70%
8[c]	>.5	.5 – 4.0	>4.0

a Score is a ratio of study site to reference X 100.
b Score is a ratio of reference site to study site X 100.
c Range of values obtained. Comparison to reference is incorporated in value.

RBP SCORES BASED ON TROPHIC STRUCTURE

%Comparison to Reference	Condition
>79%	Non-impaired
29 – 79%	Mod. Impairment
<21%	Severe Impairment

METRICS COMPUTATIONS FOR 100 ORGANISM SAMPLE

1. Taxa Richness

This is the total number of families present in the RIFFLE SAMPLE ONLY.

2. Modified FBI

This is the sum of the number of taxa times the corresponding taxa pollution tolerance score divided by the number of organisms. in the sample.

$$\frac{\sum xiti}{N}$$

where: xi is the number of individuals in a taxonomic group.
ti is the tolerance score of the taxa.
N is the total number of organisms (100).

3. Ratio of Scrapers/Filtering Collectors

This is the ratio of two important functional feeding groups grazing periphyton.

4. CPOM: Shredders/TOTAL

This metric is used to characterize the leaf pack shredder communities as an indicator of organic enrichment.

5. Ratio of EPT/Chironomidae

This metric is used to characterize the abundance of pollution–sensative EPT taxa and pollution–tolerant Chironomidae.

6. % Contribution of dominant taxa

This metric establishes the percent of the sample dominated by a certain taxonomic family.

7. EPT Index

This number establishes the total distinct EPT taxa in the sample.

8. Community Loss

Used with a reference community, this metric establishes the loss of benthic communities as a degree of dissimilarity between least impaired streams and impaired streams.

$$\frac{d-a}{e}$$

where: d is the total taxa in the reference sample.
a is the total taxa common to the reference and the study site.
e is the number of taxa in the study site.

First Resolution Water Quality Assessment*

For a Summer or Winter Assessment.

Test for Impairment:

Kicknet sample macroinvertebrates in a $1m^2$ area.

Criteria

IF the number of organisms is less than one or only one family is present, and **IF** no fish are observed along a 100 foot course of the stream this reach of the stream is **BIOLOGICALLY IMPAIRED.**

Suspect: Organic or inorganic pollution, thermal pollution, sediment pollution.

IF the number of organisms is more than one per $1m^2$ and **IF** 90% or more of the sample are white, gray, red and worm-like (fly larvae), and **IF** no fish are observed along a 100 foot course of the stream then this reach is considered **IMPAIRED.**

Suspect: Organic or inorganic pollution and/or sediment pollution.

IF the number of organisms per $1m^2$ is more than one and 20% to 30% are tan, brown, black or green; resembling caddisflies or mayflies, and if you can pick out 3 to 6 kinds of organisms with the unaided eye, and if no one kind makes up 90% of the sample, and fish are observed along a 100 foot course of the stream, then this reach is considered **FAIR to MODERATELY IMPAIRED.**

Suspect: Moderate organic enrichment or sediment pollution.

IF the number of organisms per $1m^2$ is more than one, and 30% or more are tan, brown, black or green in color and resemble caddisfly, stonefly, or mayfly larvae, or you can pick out six or more kinds of organisms with the unaided eye, and no one kind makes up more than 50% of the sample, and fish are observed along a 100 foot of stream course, then the stream reach is **UNIMPAIRED.**

*This water quality assessment provides a general indication of water quality by relying on the number and abundance of taxonomic families of stream macroinvertebrates. If stress is indicated by this assessment, more rigorous tests should performed using taxonomic richness statistics and functional feeding group ratios. **This test does not necessarily mean biological damage to a stream ecosystem is present.**

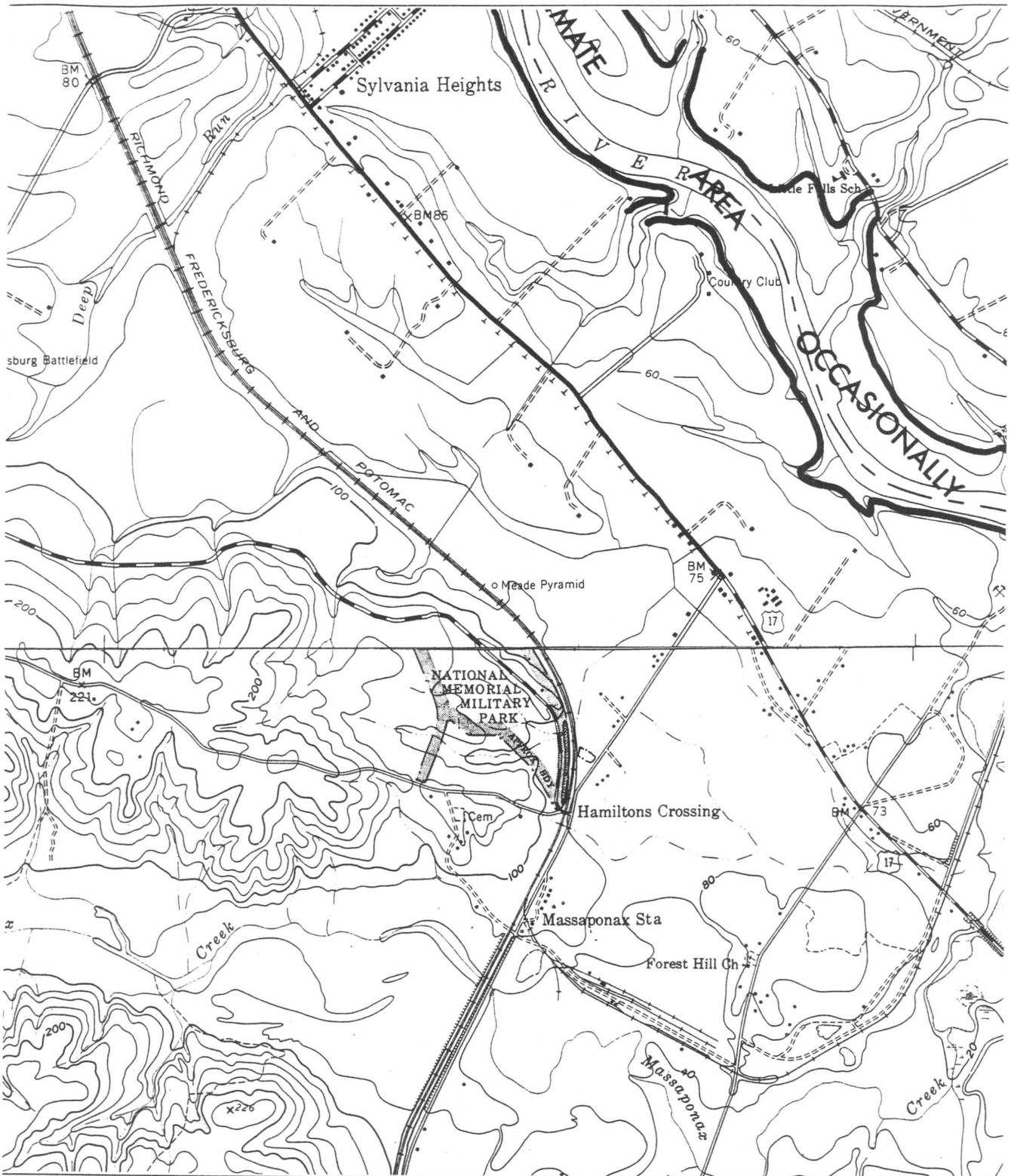
open water habitat. The smaller pond, Pond B, comprises 0.52 acres of open water habitat and is located immediately downstream of the large pond. It discharges to a remnant intermittent stream system that is not well defined in the upper reaches, but, in the vicinity of its intersection with Lee Drive, is characterized by a three-foot deep channel (Conceptual Plans, Drawing C-4). Observation of downstream channel morphology indicate that flow conditions through this area are now reduced; upstream retention facilities have effectively restricted downstream flows by providing additional upstream storage capacity and constricted flows. The open water habitats presently on site will be drained and a mitigation plan will be designed to return these areas to their historical forested wetland cover type and re-establish the previous hydrologic continuity.

Both project areas have been preliminarily divided into drainage units. There is one sub-watershed area (A-1) that drains the Milstead site from east to west. The sub-watershed draining the Poclain pond (A-2) flows through a network of drains and eventually into an isolated gravel pit at the terminus of Powell Road. All runoff will be contained within the bounds of the property. The sub-watershed areas are depicted on Figure 2, and associated acreages are provided in the following graphic (Table 1):

Table 1 **Sub-Watershed Drainage Area**

	Sub-Watershed	Acreage
Milstead	A-1	85.4
Poclain	A-2	67.1

FIGURE 2 DRAINAGE AREAS



Vanasse Hangen Brustlin, Inc.

Historic USGS Quad (1949) **Figure 2**

Source: Guinea & Fredericksburg, VA Quads

VEGETATION

Vegetation communities identified within the proposed project area include upland mixed hardwood forest, successional pastureland, vegetated fringe wetlands, and wetland hardwood forest. The dominant species composition for each community type includes the following:

Upland Hardwood Forest

White oak	(Quercus alba)
Northern Red Oak	(Quercus rubra)
Bitter-nut hickory	(Carya cordiformis)
Red maple	(Acer rubrum)
Black oak	(Quercus velutina)
Flowering dogwood	(Cornus florida)
Partridgeberry	(Mitchella repens)
Ebony Spleenwort	(Asplenium platyneuron)
Christmas fern	(Polystichum acrostichoides)

Successional Pastureland

Red cedar	(Juniperus virginiana)
Black cherry	(Prunus serotina)
Scrub pine	(Pinus virginiana)
Blackberry	(Rubus argutus)
Tall goldenrod	(Solidago altissima)
Wrinkled goldenrod	(Solidago rugosa)
Kentucky fescue	(Festuca arundinacea)
Honeysuckle	(Lonicera japonica)
Broom-sedge	(Andropogon virginicus)
Purple-top	(Tridens flavus)
Early goldenrod	(Solidago juncea)
Beggar-ticks	(Desmodium canescens)
Ragweed	(Ambrosia artemisiifolia)
Multiflora rose	(Rosa multiflora)
Sweetgum	(Liquidambar styraciflua)
Fragrant goldenrod	(Euthamia graminifolia)
Winged sumac	(Rhus copallina)
Willow oak	(Quercus phellos)

Fringe Wetlands

Panic Grass	(Panicum dichotomiflorum)
Grass-leaf Rush	(Juncus marginatus)

Soft Rush	(Juncus effusus)
Marsh Seedbox	(Ludwigia palustris)
Cypress Witchgrass	(Dichanthelium dichotomum)
Slender spikerush	(Eleocharis tenuis)
Shallow sedge	(Carex lurida)
White grass	(Leersia virginica)
Fetter-bush	(Leucothoe racemosa)
Common boneset	(Eupatorium perfoliatum)
Black willow	(Salix nigra)
River birch	(Betula nigra)
Red maple	(Acer rubrum)

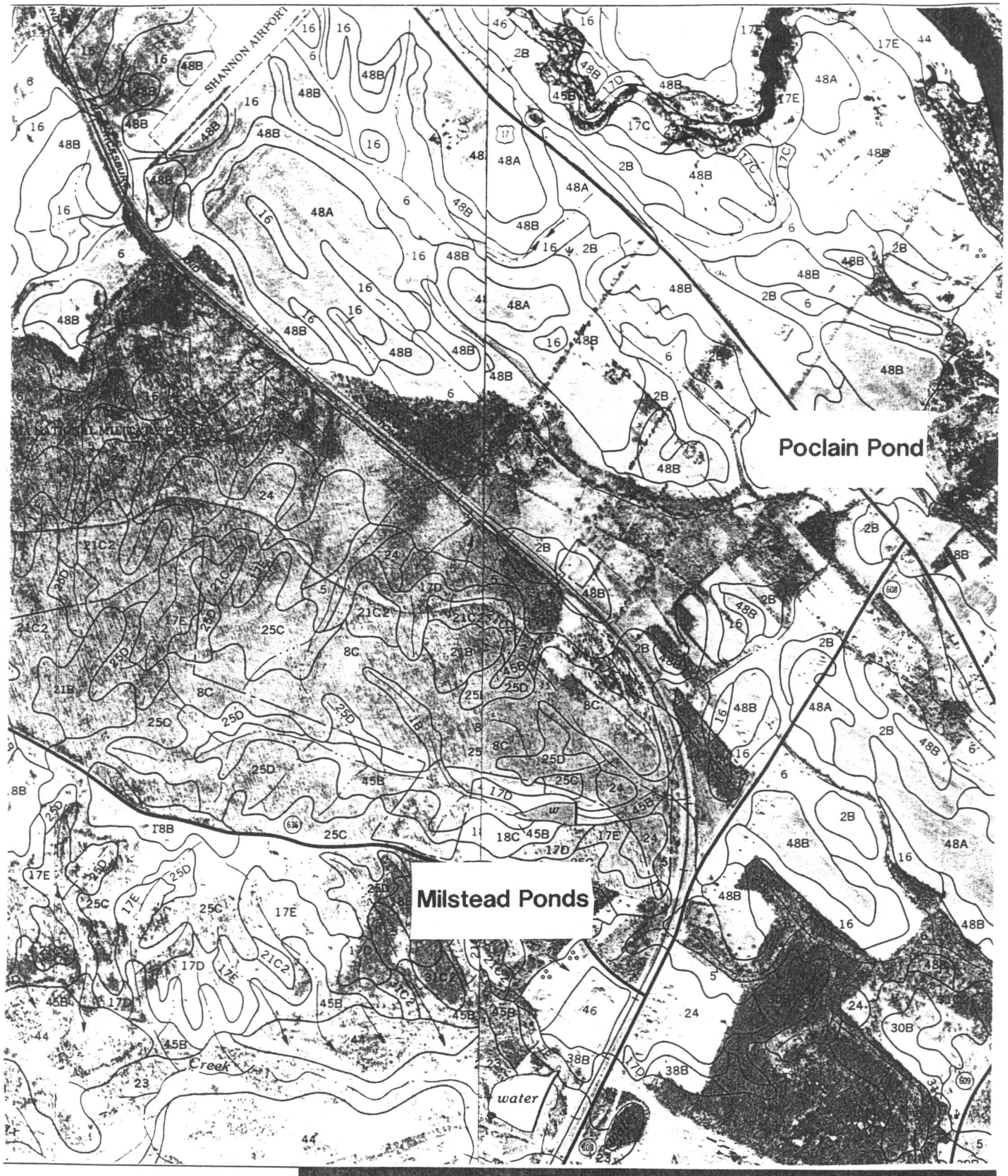
Wetland Hardwood Forest

Red Maple	(Acer rubrum)
Sweetgum	(Liquidambar styraciflua)
Black gum	(Nyssa sylvatica)
Willow oak	(Quercus phellos)
Highbush blueberry	(Vaccinium corymbosum)
Fetter-bush	(Leucothoe racemosa)
Waxy sedge	(Carex glaucescens)
Greenbriar	(Smilax rotundifolia)

SOILS

Soil information for the sites was obtained from the Soil Survey of Spotsylvania County, Virginia (Elder, 1985) supplemented by on-site investigation and sampling. Four soil series are mapped for the Milstead project area (Figure 3). Udifluvents, a mixed alluvial soil type, is mapped for the pond and adjacent intermittent drainageway. Soils mapped along the sideslopes of the Milstead ponds include Udorthents, Emporia, Kempsville, and Dystrochrepts-Udults complex. At Poclain Pond, the soil type is a gravelly analog to the Aquults soil mapping unit. (Figure 3).

FIGURE 3



Soils Map

Figure 3

Source: Soil Survey of Spotsylvania County, VA.

Udifluvents along the intermittent drainageway are characterized by deep, moderately-well drained soils formed in sandy, loamy, and clayey alluvium. Although these sediments are fairly well drained, some are wet or flooded for long periods due to their low landscape position and seepage. Udorthents consist of deep, somewhat excessively drained to moderately well drained soils formed in sandy and loamy sediments. Often these soils are mixed with materials such as rock, gravel, rubble and organic debris. Dystrochrepts and Udults are deep, somewhat excessively drained to moderately well drained eroded materials from higher landscape positions.

The Dystrochrepts-Udults complex is composed of deep, somewhat excessively drained to moderately well drained soil on narrow ridges and side slopes. Permeability of this complex is variable due to the inherent nature of this series. Available water capacity, surface runoff, and erosion potential also vary considerably.

The Kempsville series is composed of deep, well drained soil formed in sediment of fluviomarine origin. These soils are located on ridgetops and sideslopes of up to 25 percent. Permeability of the Kempsville series is moderate in the topsoil. The upper subsoil of the Kempsville series has moderate permeability, but the lower subsoil is moderately low. Kempsville subsoil has a low permeability rating. There is a low shrink-swell potential at all depths. Available water capacity is very low. Surface runoff is moderate and the soil erosion hazard can be severe if the surface is exposed.

Emporia sandy loam is composed of deep, well drained soil that formed in fluviomarine sediments. This series is found on ridgetops and side slopes usually in the 2-15% range. Permeability is moderately rapid in the topsoil and slow in the subsoil. Surface runoff is slow, and the available water capacity is moderate. There is a low shrink-swell potential in Emporia soils at all depths. A perched seasonally high water table is present at depths between 3 - 4.5 feet in winter and early spring.

Aquults gravelly substratum, is a deep, poorly drained silt loam on broad, flat areas in Rappahannock River paleochannels. Permeability of this soil is slow, and runoff is very slow. Erosion is a negligible hazard due to flat topography. Aquults have a seasonally high water table from 0-18 inches during winter and early spring.

HYDROLOGY

The current hydrologic regime on the Milstead site is characterized by two abutting manmade ponds, with a combined open water habitat of approximately 1.62 acres. The largest pond (Pond A) covers approximately 1.1 acres, while the smaller (Pond B) is approximately 0.52 acre. Hydrologic inputs to these ponds are derived from upstream discharge of a

wetland hardwood forest intermittent streamflow, hillside groundwater discharge, and overland sheet flow. The headwaters of Pond A is characterized by a relatively undisturbed wetland hardwood forest and a sluggish intermittent stream channel complex. Intermittent flows enter Pond A through two unmaintained culvert pipes crossing an old earthen road. A long narrow emergent wetland strip east of the culvert assists in dispersing this headwater discharge into the upper reaches of the pond (Conceptual Plans, Drawing C-2).

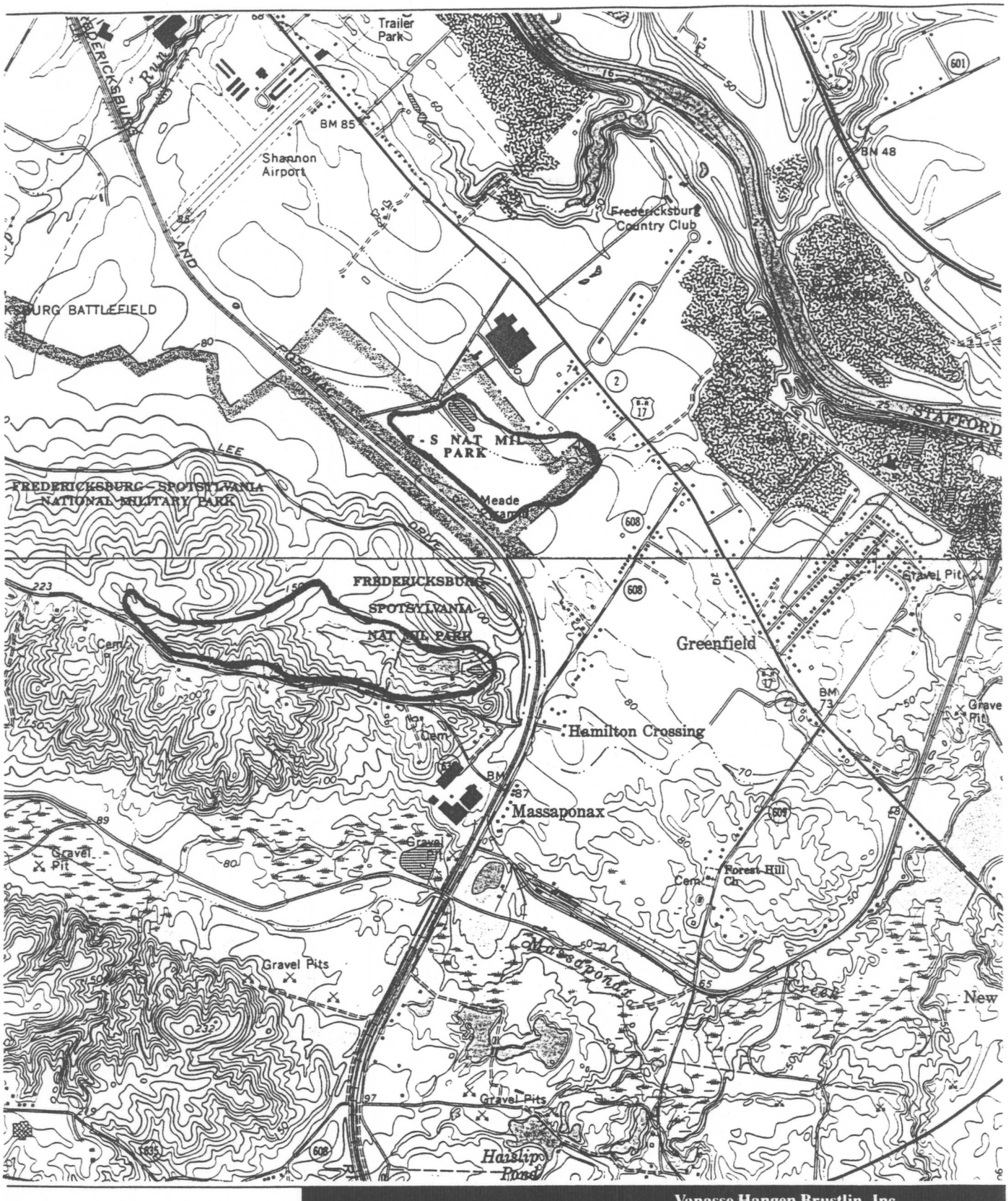
The hydrologic connection between Ponds A and B is formed by a six inch stand pipe, which provides flow when levels in Pond A surpass the normal pool elevation (Conceptual Plan, Drawing C-7). Pool elevations in Pond B are controlled by a set of culvert pipes that discharge to the downstream intermittent stream channel (Conceptual Plan, Drawing C-7). Portions of this hydrologic connection have been altered by former landowners to facilitate the flushing of several now-abandoned livestock pens.

The waterway downstream from Pond B is not well defined. This intermittent drainageway extends from the outfall of Pond B eastward to a stone culvert beneath Lee Road. From this point, drainage spreads out in a flat, scrubby area between Lee Road and the RF&P Railroad easement. It travels southward, entering a culvert beneath the railroad, and then discharges to a network of narrow ditches that drain northeastward into Ruffins Pond.

Poclain Pond is drained through a network of old pasture ditches, swales and drains that wind their way eastward across Route 2 and through new housing developments. Drainage eventually flows into an old Massaponax sand and gravel borrow pit located at the terminus of Powell Road behind the Greenfield Village Subdivision.

Historic USGS quadrangle maps were utilized to determine the historic hydrologic patterns of the area. Figure 4 depicts site conditions in 1949. As shown, much of the area appeared to be utilized for agricultural and pasture land. Hydrologic modifications to the landscape are evidenced by the numerous linear ditches which drained the vicinity. This map was instrumental in formulating the proposed wetland restoration plan.

FIGURE 4 HISTORIC USGS MAP



Watershed Sub-basin Map **Figure 4**

Source: Fredericksburg and Guinea, VA USGS Quad

WILDLIFE RESOURCES

According to correspondence from both the U.S. Fish and Wildlife Service and the Virginia Division of Natural Heritage (Appendix A), there are no known occurrences of state or federally listed threatened or endangered species and/or habitat on the subject property. Species endemic to the area that are expected to utilize the habitats on and adjacent to the subject property are provided in a list developed by the Virginia Game and Inland Fisheries Department (Appendix B). Those species observed or for which evidence existed of their presence, as documented on a November 3, 1994 site visit, are indicated. The proposed action will result in the permanent conversion of open water habitat to a mosaic of forested wetland habitats and wetland fringe areas. This action while restoring the sites to their former condition, will result in the displacement of fisheries resources. These resources were initially introduced by stocking in 1958. Fish and other aquatic organisms will be translocated to a privately owned pond where they will be released. This translocation will take place during separate dewatering operations. Based on the vegetation characteristics of the historical reference wetland system (adjacent forested wetland), the desired level of plant community development and maturation should be attainable following planting. Structural development characteristics within the restoration zone (species composition, diameter distribution, and stratification), are dependent upon successional processes, which would also influence the habitat suitability for a selected group of species.

CRITICAL AREAS

Critical areas on the sites have been defined as those areas that support hydrophytic vegetation, hydric soils, and hydrology as defined in the 1987 U.S. Army Corps of Engineers Wetland Delineation Manual, as well as areas of cultural and historic significance, and steep slopes.

Cultural and Historic Resources

Pursuant to the requirements of Section 106 of the National Historic Preservation Act of 1966, the National Park Service has prepared a Section 106 case report detailing the finding of "no effect" on the historic integrity of the Park (Appendix C). Sensitive historical features (earthworks) and desired 20-foot peripheral non-disturbance buffers have been identified on the Conceptual Plans and Appendix E drawings for the Milstead site. All protected areas of historical significance (as determined by NPS officials) are delineated in the field using orange flagging tape. All construction activities will occur outside of these designated areas. There are no identified cultural or historic resources at the Poclain Pond site.

Wetlands /Watercourses and Waterbodies

In the mid-1950's, three areas along intermittent waterways associated with the headwaters of an unnamed tributary of Ruffin's Pond were dammed for the purpose of creating livestock watering ponds. The proposed deactivation of the Milstead and Poclain Ponds involves conversion of manmade openwater habitat into forested wetlands and non-wetland fringe. This will be achieved through a combination of creating temporary construction vehicle access, draining existing waters, breaching of impoundment structures to permanently lower the pool elevation, site preparation, and restorative replanting.

At the Milstead site, two adjacent ponds were constructed within an intermittent section of a drainageway that eventually winds its way eastward through gently rolling to moderately steep mature oak woods. This drain crosses Lee Drive and the RF & P Railroad via a series of poorly maintained stone culverts and pipes. Small diameter buried pipes provide the hydrologic connection between the earthen berm that separates the two Milstead Ponds. Poorly maintained outfall structures and broken retaining walls currently hold back the waters of Pond B. The wetlands associated with the Milstead Ponds form a fringe around Ponds A and B. At the head of Pond A, a narrow forested wetland (0.02 ac.) dominated by red maple and river birch saplings is found. Further east toward Pond A, a wider, but densely vegetated rush marsh (0.40 ac.) is found. Between these two features, a transitional zone (0.05 ac.) comprised of both samplings and herbs exists. Meadow-like emergent marshes (0.22 ac.) lie on depressional terraces above the fringe wetlands around Pond A. Here, hillside seepage creates the hydrology for maintaining the taller hydrophytes found in this habitat.

At the Poclain site, a former network of pastureland ditches were impounded in the late 1950's to serve as a watering hole for livestock. A narrow earthen berm was installed along the northern perimeter of the pond, and a small, shallow area of open water and fringing wetland habitat (0.37 ac.) was created. Currently the areas of poor drainage are becoming reforested with water-tolerant trees including red maple and sweetgum. A sluggish narrow channel drains the pond's waters only during intense or prolonged storm events. The wetlands at Poclain Pond are found on the spongy fringe around its periphery. In addition to scattered red maple and black willow saplings, sedges, rushes and other emergents dominate the marshy ground around Poclain Pond.

Wetland delineations were performed on both the Milstead and Poclain sites. Army Corps of Engineers data sheets, which describe specific vegetation, soils and hydrology characteristics, are provided in Appendix D.

Steep Slopes

According to Elder (1985), the predominant slopes at the Milstead site are gently rolling to moderately steep (0-15%). Only a portion of the southern slope east of Pond B is identified as having a steep slope (of greater than or equal to 25 percent. This slope is not proposed for any disturbance of any kind, and thus problems associated with erosion are not anticipated. Likewise, other slopes at the Milstead site are well-vegetated and thus, with the assistance of proposed sediment and erosion control measures and careful disturbance planning, erosion problems are not anticipated.

The slopes at the Poclain Pond site are flat (0-3%), thus with the implementation of adequate sediment and erosion control measures, no drainage problems are anticipated.

Hillside Seepage Slopes

Groundwater discharge from hillside seeps is responsible for forming portions of the surface waters around the ponds on the Milstead project sites. Numerous seeps are located in meadow-like swales surrounding Milstead Pond A. A single emergent wetland of this type has been identified at Pond B, in the vicinity of the outfall pipe of Pond A. Land clearing, grading and other disturbances that intersect discharge areas of underground aquifers will be avoided to the maximum extent possible. This will reduce the risk of siltation, land slumping and streambank erosion (See Conceptual Plans, Drawings C-2, C-4 and C-5).

ALTERNATIVES DISCUSSION

PREFERRED ALTERNATIVE

The preferred alternative, as described in this document, would serve the dual purpose of habitat and historical landscape restoration goals set by the National Park Service. These goals will be achieved through the conversion of manmade open water habitat features to historical forested wetland conditions that existed prior to construction around 1958. Public safety issues will be addressed through the deactivation of unnecessary dams. Soils removed from dam breaching activities will be transported to an adjacent upland habitat. The proposed restoration and spoil disposal procedures are consistent with NPS Section 106 goals for historical preservation (Appendix C).

ALTERNATIVE 1

Alternative 1 entails considerations similar to those of the preferred alternative with two important distinctions. The most distinguishing characteristic of this Alternative is the placement of spoil materials. In this scenario, excavated materials will be hauled off-site by trucks to an approved disposal facility in Spotsylvania County. Alternative 1 would also consider simply draining the three ponds by excavating dam notches, and allowing the ponds to revegetate naturally.

This alternative was deemed unacceptable primarily from a cost standpoint. Hauling the spoil to an off-site disposal area could triple the construction costs of the job. In an effort to keep the costs to a minimum, the NPS exhaustively coordinated with the State Historic Preservation Officer and Advisory Council, and obtained a Section 106 finding of "no significant effect" (Appendix C).

"NO ACTION"

The "No Action" alternative would result in no change to the current historically incompatible landscape conditions, and continued safety hazards posed by an unstable dam at Milstead Pond A, unpatrolled open water and current lack of trespass prevention measures.

PROPOSED WETLANDS RESTORATION PLAN

Plan view and cross sections showing the proposed restoration/conversion plan are provided in the attached plan set titled, "Deactivation of Milstead and Poclain Ponds," Deactivation Conceptual Plans, sheets C-1 through C-8, dated January 1995.

The need for the proposed habitat conversion has been established based on the objectives of diminishing public safety hazards and the need to re-establish historical landscape conditions and ecological communities. Evidence from historical aerial photography and USGS topographic mapping (Figure 4) indicates a palustrine forested wetland community existed at one time along the area now occupied by Milstead and Poclain ponds. Conversion of forested wetlands for livestock pond creation was completed in 1956 by the U.S. Soil Conservation Service and entailed dredging and berming the existing intermittent stream channel.

The proposed restoration will result in the conversion of palustrine open water (POWZ) wetland classes to temporary flooded palustrine forested (PFO1A), thereby eliminating this habitat type from the Park. Deactivation of Milstead ponds A and B will involve minimal earth moving activities and will primarily rely upon the long-term natural colonization for revegetation. The conversion process will be phased as follows: 1) dewater, 2) earthworks, 3) stabilization and 4) planting. The initial dewatering phase will involve the mechanical pumping of water from Pond A into a dewatering structure located to the east of Pond B. Following sufficient drawdown, Dam A will be notched as shown in the Conceptual Plans (Cross Section A'-A', Drawing C-7 and Appendix E, Sheet 7). The new dam elevation will be established to allow for minimal retention in Pond A, which will be suitable for the establishment of woody vegetation. A hydrologic connection between the former Pond A and Pond B will be established in order to restore the previous hydrological continuity of the corridor. Pond B will be de-watered in a similar manner, whereby water will be mechanically pumped at a controlled rate to an adjacent downgradient dewatering structure, followed by removal of the existing berm/concrete dam structure. Following sufficient drawdown, Dam B will be notched as shown in the Conceptual Plans (Cross Section B'-B', Drawing C-7 and Appendix E, Sheet 8).

Material excavated from the notches created in Dams A and B will be transported and spread in the designated stockpile area as shown on the Conceptual Plans (Drawing C-4 and Appendix E, Sheet 4). This area has been designed to accommodate as much as twelve inches of material and is located in a remote southwest area at the Milstead site. Seeding of this area will occur following completion of earth work activities.

The proposed stabilization plan will involve the planting of young stock (bareroot or potted) similar to that found in adjacent habitats. The species are indicated in the planting schedule. (Conceptual Plans, Drawing C-8 and Appendix E, Sheets 15 and 16). Bareroot whips will be planted on twenty-foot centers throughout A and B. Approximately 1.16 acres (50,800 square feet) of open water habitat will be converted to forested wetlands as a result. (Conceptual Plans, Drawing C-5, and Appendix E, sheet 5). Establishment of herbaceous wetland vegetation will be accomplished through sprigging in the saturated drawdown zone, now identified as the shaded central corridor in Ponds A and B. Proper spacing will be approximately 25 feet on center and will be composed of a mix of species identified in the planting schedule (Conceptual Plans, Drawing C-8, and Appendix E, Sheets 5 and 16).

1.16 A

Poclain Pond will require considerably less earthwork and control measures. Notching of the existing earthen berm will be done by hand and will conform to the elevation shown in Conceptual Plans, Drawing C-6, C-7 and Appendix E, Sheets 6 and 9. Excavated earth will be deposited on the existing earthen berm. The re-vegetation scheme will be consistent with that described for Milstead Ponds A and B.

Short-term impacts associated with the proposed habitat conversion include increased potential for erosion and sedimentation to downstream waters and loss of habitat for aquatic creatures. Prior to final dewatering, fish and other aquatic organisms will be collected and transported to another nearby open water habitat.

GENERAL DESCRIPTION OF CONSTRUCTION ACTIVITIES

CLEARING AND GRUBBING

Pond deactivation on the Milstead and Poclain sites should not require clearing or grubbing of vegetation. The Milstead site is abandoned pastureland with several shrubby fencerows, therefore clearing /grubbing would not be necessary. There may be some trimming of tree limbs in the hedgerows or along the roadway in order to allow equipment access, temporary access roads construction, existing road improvement or equipment access as necessary. Equipment used to facilitate site construction includes tracked excavators, haul trucks and bulldozers.

Disturbance of any kind is prohibited within all designated buffer zones (as shown on the Conceptual Plans and Appendix E) in order to protect identified historic resources at the Milstead Pond site.

GRADING

The design of the restoration areas utilize pre-existing submerged contours and surface grades to the maximum extent possible, thereby reducing land disturbance and potential erosion damage to existing aquatic habitat. The only significant proposed earthwork is limited to dam breaching activities, soil stockpiling and spreading. At the Milstead site, all dam removal spoil will be transported to a designated upland location (Conceptual Plans, Drawings C-4 and C-5, and Appendix E, Sheets 4 and 5) and spread evenly across the existing grade. This site will then be re-vegetated with appropriate ground cover. At Poclain, the impoundment berm will be excavated using handtools and wheelbarrows. Deposition of spoil will occur on-site along the existing berm, which will be treated similarly by revegetating with a grass seed mixture.

STREAM AND WETLAND CROSSING

Except where designated, no wetlands, waterways or open water areas will be encroached and permanently impacted by land moving activities. Notched weirs, rip-rap and other drainage structures, as depicted on the plan sheets, will be implemented in the restoration effort. All track vehicles and similar machinery will, to the maximum extent possible, utilize pre-existing roads, berms and trails to avoid unnecessary disturbance. Well maintained soil and erosion control measures will be frequently inspected to ensure waterway protection. As mentioned previously, vegetation clearing within any of these sensitive areas will be conducted with the utmost regard for preserving as much undisturbed habitat as possible.

SLOPE AND SOIL STABILIZATION

Temporary slope and soil stabilization methods will be implemented during construction and will be followed by permanent measures as soon as possible after construction activities are completed. Temporary measures include silt fencing, hay bales, inlet protectors, and rock check dams. Permanent measures to be installed include seeding, mulching and similar slope restoration treatment.

Wetland flagging found on both sites delineates the boundary between non-regulated uplands and jurisdictional waters and wetlands. This flagged boundary will be used to locate appropriate upslope positions for silt fencing. Silt fencing and hay bale barriers will be placed in dewatering areas, immediately upstream and downstream of all potentially affected jurisdictional areas and around the periphery of the spoil disposal site. To trap any residual silt, hay bales will be staked along the narrow intermittent channel below Milstead Pond B for a distance of approximately 100 linear feet.

Soil stabilization and slope treatment will be as specified in the following section of this document. Critical areas, such as the steep slopes rising abruptly at the dam breach at Milstead Pond A will include the installation of rock rip rap or, if necessary, soil stabilization blankets, matting or other similar measures to provide semi-permanent slope stability.

In addition to their depiction on the Conceptual Plans, all proposed measures and structures are further explained in Details of Erosion and Sediment Control Measures (Appendix E).

FUELING OPERATIONS

To reduce the possibility of fuel spills into sensitive areas at the Milstead site, all dispensing of fuels will be performed in uplands near the construction entrance off Lee Drive. Appropriate pollution control equipment, such as oil spill booms and absorbent diapers, will be available at or near the dispensing areas.

FINAL SITE CLEANUP

The final clean up of disturbed areas will immediately follow the final wetland plantings in the restoration areas. Design contours for the dam spoil area (as depicted on Conceptual Plans, Drawings C-4 and C-5) will be achieved and the area revegetated. Permanent seeding will commence at an appropriate time of year; otherwise, temporary annual seed will be applied to obtain temporary vegetative cover.

All temporary erosion and sediment control measures will be removed only when all previously denuded areas protected by the devices have become stabilized. The stone and/or rock used at construction entrances and any other location on the site will be removed and disposed in a manner consistent with NPS policy. The silt fences and/or straw bales used will be removed only when vegetative cover and permanent slope stability have been attained. Any other areas disturbed by construction activities will also be permanently seeded.

CONSTRUCTION SEQUENCE

The following outlines the general construction sequence that will be employed during the commission of the described project:

Milstead Ponds

Install construction entrance, inspect existing roads and trails then construct temporary access roads. Inspect overhead conditions to ascertain whether any tree trimming will be necessary for equipment access. Install silt fencing and hay bales around spoil containment area and upland dewatering sites around Milstead Ponds A and B; install hay bales along outfall channel below Milstead Pond B for a distance of one hundred linear feet beyond outfall structure; install rock check dam. Install culvert inlet protection at stone culvert beneath Lee Drive. Implementation of these measures/structures are to be carried out in accordance with Conceptual Plans and Erosion and Sediment Control Plan (Appendix E).

Commence the dewatering of Milstead Pond A. Place pump and screened outlet and inlet hoses into proper position. Remove fish and other aquatic

organisms as necessary. Inspect silt and erosion control measures; inspect and maintain pump and filter bag; frequently inspect dewatering area hay bales and silt fencing; replace hay bales as necessary. Inspect downstream drainageway to prevent ponding and flow obstructions.

Construct dam notch, rip-rap side slopes and stabilize with matting if necessary. Inspect silt fencing, rock check dam and hay bales. Spread and grade excavated spoil from notch installation in designated area, temporarily seed with annual ryegrass. Commence dewatering Milstead Pond B. Place pump and screened outlet and inlet hoses into proper position. Remove fish and other aquatic organisms as necessary. Inspect silt and erosion control measures ; inspect and maintain pump and filter bag; frequently inspect dewatering area hay bales and silt fencing; replace hay bales as necessary. Inspect downstream drainageway to search for ponding and flow obstructions.

Construct dam notch, rip-rap side slopes and stabilize with matting if necessary. Inspect silt fencing, rock check dam and hay bales. Spread and grade excavated spoil from notch in designated area; stabilize with annual ryegrass or perennial cover and topdress with straw mulch. Conduct final site cleanup by removing litter and any construction related debris. Seed and stabilize all disturbed ground with fescue seed and additional straw mulch; inspect regularly to ensure germination; repeat seeding if germination is poor or seedling establishment is spotty.

Poclain Pond

Commence dewatering Poclain Pond by installing hay bales and silt fencing at the designated dewatering site as shown on Drawings C-4 and C-6. Begin excavation of dam notch with hand-tools. Gaudily let water filter through silt fence. Remove fish and aquatic organisms as necessary. Inspect downstream drainageway for ponding and flow obstructions.

Using a wheelbarrow, transport spoil to adjacent upland berm and spread out evenly. Seed with grass seed mixture and topdress with straw mulch.

The construction contractor will be responsible for scheduling and conducting all necessary inspections with the appropriate local and state officials. Coordination with the appropriate entities will be executed by the contractor.

REFERENCES

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Virginia Division of Soil and Water Conservation. Virginia Erosion and Sediment Control Handbook(VESCH). Third Edition. Virginia Department of Conservation and Recreation, 1992.

Virginia Soil and Water Conservation Board. Virginia Erosion and Sediment Control Regulations (VESCR), VR 625-02-00. Virginia Department of Conservation and Recreation, September 1990.

Woodward, S.L. and R. L. Hoffman. 1991. The Nature of Virginia. pp. 23-48, In: Terwilliger, K. (coord.). Virginia's Endangered Species: Proceedings of a Symposium. McDonald and Woodward Publishing Company, Blacksburg, Virginia, 667 pages.

U.S. Army Corps of Engineers 1987. Wetlands Delineation Manual. Waterways Experiment Station, Technical Report Y-87-1. Vicksburg, Mississippi.

Appendix A

United States Department of the Interior

FISH AND WILDLIFE SERVICE
ECOLOGICAL SERVICES
P.O. BOX 480
6983 MID-COUNTY DRIVE, SUITE D
WHITE MARSH, VIRGINIA 23183

RECEIVED
NOV 16 1994
VHB - VA

November 10, 1994

To: Mr. Warren P. Gray
Vanasse Hangen Brustlin, Inc.
Abingdon Office Park
U.S. Route 17, Suite 12
Route No. 4, Box No. 1299
Hayes, Virginia 23072

Re: Deactivation of three livestock ponds on the Fredericksburg-Spotsylvania National Military Park, Spotsylvania Couty, Virginia

Greetings:

We have reviewed your request for information on endangered and threatened species and their habitats for the above referenced project. Based on the project description and location, it appears that no impacts to Federally listed species will occur. Should project plans change, or if additional information on the distribution of listed or proposed species becomes available, this determination may be reconsidered.

Sincerely,

for Cindy Schulz
Karen L. Mayne
Supervisor
Virginia Field Office

RECEIVED
NOV 15 1994
VHB - VA

ADMINISTRATION
NATURAL HERITAGE
PLANNING AND RECREATION RESOURCES
SOIL AND WATER CONSERVATION
STATE PARKS

COMMONWEALTH of VIRGINIA

DEPARTMENT OF CONSERVATION AND RECREATION

DIVISION OF NATURAL HERITAGE

Main Street Station, 1500 East Main Street — Suite 312

TDD (804) 786-2121 Richmond, Virginia 23219 (804) 786-7951 FAX: (804) 371-2674

November 10, 1994

Mr. Warren Gray
VHB, Inc.
7188 Chapman Drive
Hayes, VA 23072

Re: National Park Service - Frederickburg - Spotsylvania National Military Park, Milstead Poclain Ponds Deactivation

Dear Mr. Gray:

The Department of Conservation and Recreation's Division of Natural Heritage (DNH) has searched its Biological and Conservation Data System (BCD) for occurrences of natural heritage resources from the area outlined on the submitted map. Natural heritage resources are defined as the habitat of rare, threatened, or endangered plant and animal species, unique or exemplary natural communities, and significant geologic formations.

According to the information currently in our files, there are no natural heritage resources documented in the project area. The absence of data may indicate that the project area has not been surveyed, rather than confirm that the area lacks natural heritage resources.

To review the Natural Heritage Technical Report 93-9: A Natural Heritage Inventory of Mid-Atlantic Region National Historical Parks in Virginia: Fredericksburg-Spotsylvania National Military Park, please contact John Karish with the National Park Service at 814-865-7974. This report is not the property of the Division of Natural Heritage; therefore, we are unable to supply it to you for your review.

DNH's Biological and Conservation Data System is constantly growing and revised. Please contact DNH for an update on this natural heritage information if a significant amount of time passes before it is utilized.

A fee of $40.00 has been assessed for the service of providing this information. Please find enclosed an invoice for that amount. Please return one copy of the invoice along with your remittance made payable to the Treasurer of Virginia, Department of Conservation and Recreation, Post Office Box 721, Richmond, VA 23206-0721, ATTN: Financial Services. Payment is due within thirty days of the invoice date.

Thank you for the opportunity to comment on this project.

Sincerely,

Lesa S. Berlinghoff

Lesa S. Berlinghoff
Acting Project Review Coordinator

Appendix B

Wildlife species known or likely to occur in Spotsylvania County -

NAME	SCIENTIFIC NAME	* Observed on Site	T.STATUS
BIRDS			
Barn-owl, common	Tyto alba pratincola		Federal Migratory State Special Con
Blackbird, red-winged	Agelaius phoeniceus		Federal Migratory Nongame-Protected
Bluebird, eastern	Sialia sialis		Federal Migratory Nongame-Protected
Bobwhite, northern	Colinus virginianus	*	Game (Consumptive
Bufflehead	Bucephala albeola		Game (Consumptive Federal Migratory
Bunting, indigo	Passerina cyanea		Nongame-Protected Federal Migratory
Bunting, snow	Plectrophenax nivalis nivalis		Federal Migratory Nongame-Protected
Canvasback	Aythya valisineria		Federal Migratory Game (Consumptive
Cardinal, northern	Cardinalis cardinalis	*	Federal Migratory Nongame-Protected
Catbird, gray	Dumetella carolinensis		Federal Migratory
Chat, yellow-breasted	Icteria virens virens		Federal Migratory Nongame-Protected
Chickadee, Carolina	Parus carolinensis	*	Federal Migratory
Cowbird, brown-headed	Molothrus ater		Federal Migratory Nongame-Protected
Crow, American	Corvus brachyrhynchos	*	Federal Migratory Nongame-Protected
Cuckoo, yellow-billed	Coccyzus americanus		Federal Migratory Nongame-Protected
Dickcissel	Spiza americana		Federal Migratory State Special Con
Dove, mourning	Zenaida macroura carolinensis	*	Federal Migratory Game (Consumptive
Dove, rock	Columba livia		Game (Consumptive Federal Migratory
Duck, American black	Anas rubripes		Game (Consumptive Federal Migratory
Duck, ruddy	Oxyura jamaicensis		Federal Migratory
Duck, wood	Aix sponsa		Federal Migratory Game (Consumptive
Finch, house	Carpodacus mexicanus		Federal Migratory Nongame-Protected
Flicker, northern	Colaptes auratus		Federal Migratory Nongame-Protected
Flycatcher, Acadian	Empidonax virescens		Federal Migratory Nongame-Protected
Flycatcher, great crested	Myiarchus crinitus		Federal Migratory Nongame-Protected
Gadwall	Anas strepera		Federal Migratory Game (Consumptive
Gnatcatcher, blue-gray	Polioptila caerulea		Federal Migratory Nongame-Protected
Goldfinch, American	Carduelis tristis		Federal Migratory Nongame-Protected
Goose, Canada	Branta canadensis		Game (Consumptive Federal Migratory
Goose, greater snow	Chen caerulescens atlanticus		Federal Migratory Game (Consumptive

Wildlife species known or likely to occur in Spotsylvania County -

NAME	SCIENTIFIC NAME	*	T.STATUS
			* Observed on Site
Goose, lesser snow	Chen caerulescens caerulescens		Game (Consumptive
			Federal Migratory
Grackle, common	Quiscalus quiscula		Federal Migratory
			Nongame-Protected
Grosbeak, blue	Guiraca caerulea caerulea		Federal Migratory
			Nongame-Protected
Gull, herring	Larus argentatus		Federal Migratory
			Nongame-Protected
Hawk, broad-winged	Buteo platypterus		Federal Migratory
			Nongame-Protected
Hawk, red-shouldered	Buteo lineatus lineatus	*	Federal Migratory
			Nongame-Protected
Hawk, red-tailed	Buteo jamaicensis		Federal Migratory
			Nongame-Protected
Hawk, sharp-shinned	Accipiter striatus velox		Federal Migratory
Heron, great blue	Ardea herodias herodias		Federal Migratory
			Nongame-Protected
Heron, green-backed	Butorides striatus virescens		Federal Migratory
			Nongame-Protected
Hummingbird, ruby-throated	Archilochus colubris		Federal Migratory
			Nongame-Protected
Jay, blue	Cyanocitta cristata	*	Federal Migratory
			Nongame-Protected
Junco, dark-eyed	Junco hyemalis		Federal Migratory
			Nongame-Protected
Kestrel, American	Falco sparverius sparverius		Federal Migratory
			Nongame-Protected
Killdeer	Charadrius vociferus		Federal Migratory
			Nongame-Protected
Kingbird, eastern	Tyrannus tyrannus		Federal Migratory
			Nongame-Protected
Kingfisher, belted	Ceryle alcyon		Federal Migratory
			Nongame-Protected
Mallard	Anas platyrhynchos		Federal Migratory
			Game (Consumptive
Martin, purple	Progne subis		Federal Migratory
			Nongame-Protected
Meadowlark, eastern	Sturnella magna		Nongame-Protected
			Federal Migratory
Mockingbird, northern	Mimus polyglottos		Federal Migratory
			Nongame-Protected
Nighthawk, common	Chordeiles minor		Federal Migratory
			Nongame-Protected
Oriole, orchard	Icterus spurius		Federal Migratory
			Nongame-Protected
Osprey	Pandion haliaetus carolinensis		Federal Migratory
			Nongame-Protected
Ovenbird	Seiurus aurocapillus		Federal Migratory
			Nongame-Protected
Phoebe, eastern	Sayornis phoebe		Federal Migratory
Raven, common	Corvus corax		Federal Migratory
			Nongame-Protected
Robin, American	Turdus migratorius	*	Federal Migratory
			Nongame-Protected
Screech-owl, eastern	Otus asio	*	Federal Migratory
			Nongame-Protected
Snipe, common	Gallinago gallinago		Game (Consumptive
			Federal Migratory

Wildlife species known or likely to occur in Spotsylvania County -

NAME	SCIENTIFIC NAME		T.STATUS
		* Observed on Site	
Sparrow, chipping	Spizella passerina		Federal Migrator
			Nongame-Protecte
Sparrow, field	Spizella pusilla	*	Nongame-Protecte
Sparrow, house	Passer domesticus		Pest/Nuisance
Sparrow, song	Melospiza melodia		Federal Migrator
			Nongame-Protecte
Swallow, bank	Riparia riparia		Federal Migrator
			Nongame-Protecte
Swallow, barn	Hirundo rustica		Federal Migrator
			Nongame-Protecte
Swallow, northern rough-winged	Stelgidopteryx serripennis		Federal Migrator
			Nongame-Protecte
Swift, chimney	Chaetura pelagica		Federal Migrator
			Nongame-Protecte
Tanager, scarlet	Piranga olivacea		Federal Migrator
			Nongame-Protecte
Tanager, summer	Piranga rubra		Federal Migrator
			Nongame-Protecte
Thrasher, brown	Toxostoma rufum		Federal Migrator
Thrush, wood	Hylocichla mustelina		Federal Migrator
			Nongame-Protecte
Titmouse, tufted	Parus bicolor		Federal Migrator
			Nongame-Protecte
Towhee, rufous-sided	Pipilo erythrophthalmus		Federal Migrator
			Nongame-Protecte
Vireo, red-eyed	Vireo olivaceus		Federal Migrator
			Nongame-Protecte
Vireo, white-eyed	Vireo griseus		Federal Migrator
			Nongame-Protecte
Vulture, black	Coragyps atratus		Federal Migrator
			Nongame-Protecte
Vulture, turkey	Cathartes aura		Federal Migrator
			Nongame-Protecte
Warbler, black-and-white	Mniotilta varia		Federal Migrator
			Nongame-Protecte
Warbler, hooded	Wilsonia citrina		Federal Migrator
			Nongame-Protecte
Warbler, northern parula	Parula americana		Federal Migrator
			Nongame-Protecte
Warbler, palm	Dendroica palmarum		Federal Migrator
			Nongame-Protecte
Warbler, pine	Dendroica pinus		Nongame-Protecte
			Federal Migrator
Warbler, prairie	Dendroica discolor		Federal Migrator
			Nongame-Protecte
Warbler, yellow-rumped	Dendroica coronata cornata		Federal Migrator
			Nongame-Protecte
Waterthrush, Louisiana	Seiurus motacilla		Federal Migrator
			Nongame-Protecte
Waxwing, cedar	Bombycilla cedrorum		Federal Migrator
			Nongame-Protecte
Whip-poor-will	Caprimulgus vociferus		Federal Migrator
			Nongame-Protecte
Wigeon, American	Anas americana		Federal Migrator
			Game (Consumptiv
Woodcock, American	Scolopax minor		Federal Migrator
			Game (Consumptiv
Woodpecker, downy	Picoides pubescens medianus		Federal Migrator
			Nongame-Protecte

Wildlife species known or likely to occur in Spotsylvania County -

NAME	SCIENTIFIC NAME	*	T.STATUS
			* Observed on Site
Woodpecker, hairy	Picoides villosus		Federal Migratory
			Nongame-Protecte
Woodpecker, pileated	Dryocopus pileatus		Nongame-Protecte
			Federal Migratory
Woodpecker, red-bellied	Melanerpes carolinus		Federal Migratory
			Nongame-Protecte
Woodpecker, red-headed	Melanerpes erythrocephalus		Federal Migratory
			Nongame-Protecte
Wren, Carolina	Thryothorus ludovicianus	*	Federal Migratory
Yellowthroat, common	Geothlypis trichas brachidactylus		Federal Migratory
			Nongame-Protecte

Wildlife species known or likely to occur in Spotsylvania County - Chancellorsville Quad

NAME	SCIENTIFIC NAME	* Observed on Site	T.STATUS
MAMMALS			
Bat, seminole	Lasiurus seminolus		Nongame-Protected
Beaver	Castor canadensis	*	Game (Consumptive Furbearer
Cottontail, eastern	Sylvilagus floridanus mallurus	*	Game (Consumptive Furbearer
Deer, white-tailed	Odocoileus virginianus	*	Game (Consumptive Pest/Crops
Fox, eastern gray	Urocyon cinereoargenteus		Game (Consumptive Furbearer
Fox, red	Vulpes vulpes fulva		Game (Consumptive
Mink, common	Mustela vison mink		Furbearer
Mole, eastern	Scalopus aquaticus aquaticus		Nongame-Protected
Mole, small star-nosed	Condylura cristata parva		State Special Con Nongame-Protected
Mouse, eastern harvest	Reithrodontomys humulis virginianus		Nongame-Protected
Mouse, house	Mus musculus		Pest/Nuisance
Mouse, northern white-footed	Peromyscus leucopus noveboracensis		Pest/Nuisance
Muskrat, large-toothed	Ondatra zibethicus macrodon	*	Game (Consumptive Furbearer
Opossum, Virginia	Didelphis virginiana virginiana		Game (Consumptive Furbearer
Otter, river	Lutra canadensis lataxina		State Special Con
Pipistrelle, eastern	Pipistrellus subflavus subflavus		Nongame-Protected
Raccoon	Procyon lotor lotor	*	Game (Consumptive Furbearer
Rat, Norway	Rattus norvegicus		Pest/Nuisance
Rat, marsh rice	Oryzomys palustris palustris		Nongame-Protected
Shrew, Kirtland's short-tailed	Blarina brevicauda kirtlandi		Nongame-Protected
Shrew, least	Cryptotis parva parva		Nongame-Protected
Shrew, southern short-tailed	Blarina carolinensis carolinensis		Nongame-Protected
Squirrel, fox	Sciurus niger vulpinus		Game (Consumptive
Squirrel, northern gray	Sciurus carolinensis pennsylvanicus	*	Game (Consumptive
Squirrel, southern flying	Glaucomys volans volans		Pest/Nuisance
Squirrel, talkative red	Tamiasciurus hudsonicus loquax		Nongame-Protected
Vole, meadow	Microtus pennsylvanicus		Pest/Crops
Vole, pine	Microtus pinetorum scalapsoides		Nongame-Protected
Weasel, long-tailed	Mustela frenata noveboracensis		Furbearer
Woodchuck	Marmota monax monax	*	Game (Consumptive
AQUATIC INVERTEBRATES			
Crayfish	Cambarus robustus		Nongame-Protected
Crayfish	Cambarus acuminatus		Nongame-Protected
Crayfish	Orconectes immunis		Nongame-Protected
Crayfish	Orconectes limosus		Nongame-Protected
Crayfish	Cambarus bartonii bartonii		Nongame-Protected
Crayfish	Orconectes obscurus		Nongame-Protected

Wildlife species known or likely to occur in Spotsylvania County -

FISH

* Observed on Site

NAME	SCIENTIFIC NAME	T.STATUS
Bass, largemouth	Micropterus salmoides	Sport Fish
Bass, smallmouth	Micropterus dolomieui	Sport Fish
Bluegill	Lepomis macrochirus	Sport Fish
Bullhead, brown	Ameiurus nebulosus	Sport Fish
Bullhead, yellow	Ameiurus natalis	Nongame-Protected
Carp, common	Cyprinus carpio	Biological Indicat
Catfish, channel	Ictalurus punctatus	Sport Fish
Chub, bluehead	Nocomis leptocephalus	Nongame-Protected
Chub, creek	Semotilus atromaculatus	Biological Indicat
Chub, river	Nocomis micropogon	Nongame-Protected
Chubsucker, creek	Erimyzon oblongus	Nongame-Protected
Crappie, black	Pomoxis nigromaculatus	Sport Fish
Crappie, white	Pomoxis annularis	Sport Fish
Dace, blacknose	Rhinichthys atratulus	Biological Indicat
Dace, longnose	Rhinichthys cataractae	Nongame-Protected
Darter, glassy	Etheostoma vitreum	Nongame-Protected
Darter, shield	Percina peltata	Nongame-Protected
Darter, stripeback	Percina notogramma	Nongame-Protected
Darter, tessellated	Etheostoma olmstedi	Nongame-Protected
Fallfish	Semotilus corporalis	Nongame-Protected
Hogsucker, northern	Hypentelium nigricans	Nongame-Protected
Madtom, margined	Noturus insignis	Commercial
Madtom, tadpole	Noturus gyrinus	Nongame-Protected
Minnow, eastern silvery	Hybognathus regius	Nongame-Protected
Mudminnow, eastern	Umbra pygmaea	Nongame-Protected
Perch, pirate	Aphredoderus sayanus sayanus	Nongame-Protected
Perch, yellow	Perca flavescens	Sport Fish
Pickerel, chain	Esox niger	Nongame-Protected
Pumpkinseed	Lepomis gibbosus	Sport Fish
Redhorse, shorthead	Moxostoma macrolepidotum	Sport Fish
Sculpin, mottled	Cottus bairdi	Nongame-Protected
Shiner, bridle	Notropis bifrenatus	State Special Conc
Shiner, comely	Notropis amoenus	Nongame-Protected
Shiner, common	Luxilus cornutus	Biological Indicat
Shiner, golden	Notemigonus crysoleucas	Biological Indicat
Shiner, rosyface	Notropis rubellus	Nongame-Protected
Shiner, satinfin	Cyprinella analostamas	Nongame-Protected
Shiner, spottail	Notropis hudsonius	Commercial
Shiner, swallowtail	Notropis procne	Nongame-Protected
Sucker, white	Catostomus commersoni	Sport Fish
Sunfish, bluespotted	Enneacanthus gloriosus	Nongame-Protected
Sunfish, green	Lepomis cyanellus	Sport Fish
Sunfish, mud	Acantharchus pomotis	Nongame-Protected
Sunfish, redbreast	Lepomis auritus	Sport Fish
Sunfish, redear	Lepomis microlophus	Sport Fish
Warmouth	Lepomis gulosus	Sport Fish

Wildlife species known or likely to occur in Spotsylvania County -

NAME	SCIENTIFIC NAME	* Observed on Site	T.STATUS
AMPHIBIANS			
Bullfrog	Rana catesbeiana		Nongame-Protected
Frog, Brimley's chorus	Pseudacris brimleyi		Nongame-Protected
Frog, green	Rana clamitans	*	Nongame-Protected
Frog, northern cricket	Acris crepitans crepitans		Nongame-Protected
Frog, pickerel	Rana palustris		Nongame-Protected
Frog, southern leopard	Rana utricularia		Nongame-Protected
Frog, upland chorus	Pseudacris triseriata feriarum		Nongame-Protected
Newt, red-spotted	Notophthalmus viridescens		Nongame-Protected
Peeper, northern spring	Hyla crucifer crucifer		Nongame-Protected
Salamander, eastern mud	Pseudotriton montanus montanus		Nongame-Protected
Salamander, four-toed	Hemidactylium scutatum		Nongame-Protected
Salamander, marbled	Ambystoma opacum		Nongame-Protected
Salamander, northern dusky	Desmognathus fuscus fuscus		Nongame-Protected
Salamander, northern red	Pseudotriton ruber ruber		Nongame-Protected
Salamander, northern two-lined	Eurycea bislineata bislineata		Nongame-Protected
Salamander, redback	Plethodon cinereus		Nongame-Protected
Salamander, slimy	Plethodon glutinosus glutinosus		Nongame-Protected
Salamander, spotted	Ambystoma maculatum		Nongame-Protected
Salamander, three-lined	Eurycea longicauda guttolineata		Nongame-Protected
Toad, American	Bufo americanus	*	Nongame-Protected
Toad, Fowler's	Bufo woodhousii fowleri		Nongame-Protected
Toad, eastern narrowmouth	Gastrophryne carolinensis		Nongame-Protected
Treefrog, Cope's gray	Hyla chrysoscelis		Nongame-Protected
Treefrog, gray	Hyla versicolor		Nongame-Protected
Treefrog, green	Hyla cinerea		Nongame-Protected
REPTILES			
Cooter, Florida	Chrysemys floridana floridana		Nongame-Protected
Copperhead, northern	Agkistrodon contortrix mokason		Nongame-Protected
Kingsnake, eastern	Lampropeltis getulus getulus		Nongame-Protected
Lizard, northern fence	Sceloporus undulatus hyacinthinus		Nongame-Protected
Racer, northern black	Coluber constrictor constrictor		Nongame-Protected
Racerunner, six-lined	Cnemidophorous sexlineatus		Nongame-Protected
Skink, broadhead	Eumeces laticeps		Nongame-Protected
Skink, five-lined	Eumeces fasciatus		Nongame-Protected
Skink, ground	Scincella lateralis		Nongame-Protected
Skink, southeastern five-lined	Eumeces inexpectatus		Nongame-Protected
Snake, black rat	Elaphe obsoleta obsoleta		Nongame-Protected
Snake, corn	Elaphe guttata guttata		Nongame-Protected
Snake, eastern earth	Virginia valeriae		Nongame-Protected
Snake, eastern garter	Thamnophis sirtalis sirtalis		Nongame-Protected
Snake, eastern hognose	Heterodon platyrhinos		Nongame-Protected
Snake, eastern worm	Carphophis amoenus amoenus		Nongame-Protected
Snake, northern brown	Storeria dekayi dekayi		Nongame-Protected
Snake, northern ringneck	Diadophis punctatus edwardsii		Nongame-Protected
Snake, northern water	Nerodia sipedon sipedon		Nongame-Protected
Stinkpot	Sternotherus odoratus		Nongame-Protected
Turtle, common snapping	Chelydra serpentina serpentina	*	Game (Consumptive
Turtle, eastern box	Terrapene carolina carolina		Nongame-Protected
Turtle, eastern mud	Kinosternon subrubrum subrubrum		Nongame-Protected
Turtle, eastern painted	Chrysemys picta picta		Nongame-Protected

Appendix C

United States Department of the Interior

NATIONAL PARK SERVICE
Mid-Atlantic Region
143 South Third Street
Philadelphia, PA 19106

IN REPLY REFER TO



H30(MAR-PRP)

January 6, 1995

Memorandum

To: Superintendent, Fredericksburg & Spotsylvania NMP

From: Chief, Park Historic Preservation Branch

Subject: Section 106 Compliance

Consultation with the Virginia State Historic Preservation Officer has been completed on the following project, and it is now approved for Section 106 compliance purposes:

Fredericksburg Battlefield: Drain two adjacent ponds by cutting notches in earthen dams.

for J. Keith Everett

PRP, Jacox Reading File
PRP, Drain Two Ponds Section 106 Compliance File

FRSP, Noel Harrison

ASSESSMENT OF ACTIONS HAVING AN EFFECT ON CULTURAL RESOURCES

A. ORIGINATING OFFICE

1. Park: Fredericksburg & Spot. N.M.P. Park district (optional) Fredericksburg Bfld.

2. Work/Project Description:
a. Project name drain two adjacent ponds park project #(s)
b. Describe project and area of potential effects (as defined in 36 CFR Part 800.2(c)); explain why work/project is needed.

See attached 106 Effect Report

3. Has the area of potential effects been surveyed to identify cultural resources?
___ No
_x_ Yes Source or Reference HRS (including overlay map); pedestrian svy. by park C.R.M.
___ Check here if no known cultural resources will be affected. (If area has been disturbed in the past, please explain or attach additional sheets to describe nature, extent, and intensity of disturbance.)

4. Affected Resource(s):
Name and number(s): Fredericksburg Bfld. location: Spotsylvania Co NR status: entered
Name and number(s): location: NR status:
(REPEAT FOR EACH AFFECTED RESOURCE)

5. The proposed action will: (Check as many as apply.)
___ Destroy, remove, or alter features/elements from a historic structure
___ Replace historic features/elements in kind
___ Add nonhistoric features/elements to a historic structure
___ Alter or remove features/elements of a historic setting or environment (inc. terrain)
_x_ Add nonhistoric features/elements (inc. visual, audible, or atmospheric) to a historic setting or cultural landscape
_x_ Disturb, destroy, or make archeological resources inaccessible, or alter terrain
_x_ Potentially affect presently unidentified cultural resources
___ Begin or contribute to deterioration of historic fabric, terrain, setting, landscape elements, or archeological or ethnographic resources
___ Involve a real property transaction (exchange, sale, or lease of land or structures)
___ (OPTIONAL) Meet criteria for Programmatic Exclusion C.1 ___ in the 1990 Servicewide Programmatic Agreement for Section 106 compliance.
___ Other (please specify)

6. Measures to prevent or minimize loss or impairment of historic/prehistoric fabric, setting, integrity, or data:

See attached 106 Effect Report

7. Supporting Study Data: (attach if feasible; if action is in a plan, give name and project or page number):

8. Attachments: [ ] Maps [ ] Archeological Clearance, if applicable [ ] Drawings [ ] Specifications
[ ] Photographs [ ] Scope of Work [ ] Site plan [ ] List of Materials [ ] Samples
[ ]Other 106 Effect Report and its attachments

9. Prepared by Noel Harrison Date June 20, 1994

Title Cult. Resources Specialist Telephone 703-898-7941

10. I certify that the proposed work conforms to NPS Management Policies and NPS-28.

Signature of Superintendent [signature]

Date June 20, 1994

B. REGIONAL ASSESSMENT

RECOMMENDED ASSESSMENT OF EFFECT (completed by Regional compliance coordinator):

✓ No Effect _____ No Adverse Effect _____ Adverse Effect

COMPLIANCE REQUIREMENTS–PLEASE INDICATE WHICH OF THE FOLLOWING APPLIES.

[✓] 1. STANDARD 36 CFR PART 800 CONSULTATION No effect
Consultation under 36 CFR Part 800 has been carried out subsequent to preparation of this XXX form.

[ ] 2. PROGRAMMATIC EXCLUSION
The above action meets all conditions for a programmatic exclusion under Stipulation C.1 or C.2 of the 1990 Servicewide PA.
APPLICABLE EXCLUSION(s): C.1 _____ (specify a-m) or C.2 addition.

[ ] 3. PLAN-RELATED UNDERTAKING
Consultation about the proposed undertaking was completed in the context of a plan review process, in accordance ...n the 1990 Servicewide PA, Stipulation E or F, and 36 CFR Part 800. (If Stipulation F of the 1990 PA applied to this case, please so note.)

[ ] 4. MOA-RELATED UNDERTAKING
Consultation about the proposed action was conducted in development of a Memorandum of Agreement or Programmatic Agreement approved by NPS, the SHPO and the Advisory Council.

Contingent upon stipulations developed in the consultation process or listed above, requirements for Section 106 compliance have been met.

STIPULATIONS/CONDITIONS:

Signed [signature] Date 1/6/95
Regional Compliance Coordinator

Approved X [signature] for Date 1/6/95
Regional Director

C. REGIONAL CULTURAL RESOURCES SPECIALIST REVIEW

REGIONAL CONTROL# ERSD 94-322 IDLCS#_____ IDCLI#_____ CSI/ARI#_____

I have reviewed this proposal for conformity with requirements for the Section 106 process, with the 1990 Servicewide Programmatic Agreement (if applicable), and applicable parts of the Secretary of the Interior's Standards and Guidelines for Archeology and Historic Preservation, NPS Management Policies, and NPS-28. I have stated any additional stipulations that should apply, and I concur in the recommended assessment of effect above.

SIGNED:

[signature] 8·17·94

REGIONAL ARCHEOLOGIST Date

Comments:_____

[signature] 10·1·94

REGIONAL HISTORICAL LANDSCAPE ARCHITECT* Date

Comments:_____

_____ _____

REGIONAL CURATOR Date

Comments:_____

_____ _____

REGIONAL ETHNOGRAPHER* Date

Comments:_____

[signature] 12/

REGIONAL HISTORIAN Date

Comments:_____

[signature] 10/5/94

REGIONAL HISTORICAL ARCHITECT Date

Comments:_____

_____ _____

OTHER Date

Comments:_____

* Regions without a Regional historical landscape architect or ethnographer leave these lines blank.

United States Department of the Interior

NATIONAL PARK SERVICE
Mid-Atlantic Region
143 South Third Street
Philadelphia, PA 19106

IN REPLY REFER TO:

H30(MAR-PRP)

OCT 6 1994

OCT 1994
RECEIVED

H. Alexander Wise
State Historic Preservation Officer
Department of Historic Resources
221 Governor Street
Richmond, Virginia 23219

Dear Mr. Wise:

The National Park Service proposes to drain two adjacent ponds at the Fredericksburg Battlefield unit of the Fredericksburg and Spotsylvania National Military Park. The unit is located in Spotsylvania County and Fredericksburg, Virginia. Because the park is listed on the National Register of Historic Places, this undertaking is being submitted for review under the provisions of Section 106 of the National Historic Preservation Act of 1966, as amended, and the regulations of the Advisory Council on Historic Preservation.

The proposed undertaking entails cutting notches into each of the earthen dams forming the ponds. The project also entails spreading the removed earth over a three-quarter-acre deposition area in a portion of a nearby field, itself cleared from the surrounding forest about 1958. Through this undertaking, the National Park Service seeks to both eliminate a major safety hazard and to expand the visual buffer surrounding a battlefield driving-tour stop.

We believe that this undertaking will have "no effect" on the qualities of the park that make it eligible for listing on the National Register of Historic Places. Enclosed for your review are photographs of the dam and surrounding area, as well a Section 106 Case Report which describes the project in further detail. Also enclosed is a copy of the concurrence received from your office, that several other structures located at the site are not eligible for National Register listing. If you have any questions regarding this undertaking please contact Mr. Noel Harrison, Cultural Resource Specialist, Fredericksburg NMP, at (703) 898-7941. Please continue to address all Section 106 comments regarding this undertaking to my office, Attention: Diann L. Jacox. Ms. Jacox can be reached at (215) 597-6524.

Sincerely,

B. J. Griffin (Ms.)
Regional Director

Enclosures

cc:
Superintendent, Fredericksburg & Spotsylvania NMP

Concurrence in finding of "no effect":

Virginia State Historic Preservation Officer — 11/21/94 Date

Appendix D

Vanasse Hangen Brustlin, Inc.

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: MILSTEAD AND POCLAIN PONDS Applicant/Owner: NATIONAL PARK SERVICE Investigator: WARREN P. GRAY & ROBERT A.S. WRIGHT	Date: NOVEMBER 3, 1994 County: SPOTSYLVANIA State: VIRGINIA
Do Normal Circumstances exist on the site? (Yes) No Is the site significantly disturbed (Atypical Situation)? Yes (No) Is the area a potential Problem Area? Yes (No) (If needed, explain on reverse.)	Community ID: _____ Transect ID: _____ Plot ID: MILSTEAD A-1

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. PANICUM DICHOTOMIFLORUM	H	FACW-	9.		
2. JUNCUS MARGINATUS	H	FACW	10.		
3. LUDWIGIA ALTERNIFOLIA	H	FACW+	11.		
4. GRATIOLA VIRGINIANA	H	OBL	12.		
5.			13.		
6.			14.		
7.			15.		
8.			16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). 100

Remarks: SAmple area satisfies hydrophytic vegetation criterion

HYDROLOGY

___ Recorded Data (Describe in Remarks):
- ___ Stream, Lake, or Tide Gauge
- ___ Aerial Photographs
- ___ Other

✓ No Recorded Data Available

Field Observations:

Depth of Surface Water: surface (in.)

Depth to Free Water in Pit: surface (in.)

Depth to Saturated Soil: surface (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- ___ Inundated
- ✓ Saturated in Upper 12 Inches
- ___ Water Marks
- ___ Drift Lines
- ___ Sediment Deposits
- ___ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ✓ Oxidized Root Channels in Upper 12 Inches
- ___ Water-Stained Leaves
- ✓ Local Soil Survey Data
- ___ FAC-Neutral Test
- ___ Other (Explain in Remarks)

Remarks: field indicators of supporting hydrology present; satisfies criterion

Vanasse Hangen Brustlin, Inc.
Environmental Services
Abingdon Office Park
U.S. Route 17, Suite 12
Route No. 4, Box No. 1299
Hayes, Virginia 23072
804 642 0448 • FAX 804 642 0344

Vanasse Hangen Brustlin, Inc.

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: MILSTEAD AND POCLAIN PONDS
Applicant/Owner: NATIONAL PARK SERVICE
Investigator: WARREN P. GRAY & ROBERT A.S. WRIGHT

Date: NOVEMBER 3, 1994
County: SPOTSYLVANIA
State: VIRGINIA

Do Normal Circumstances exist on the site? (Yes) No
Is the site significantly disturbed (Atypical Situation)? Yes (No)
Is the area a potential Problem Area? Yes (No)
(If needed, explain on reverse.)

Community ID: _____
Transect ID: _____
Plot ID: MILSTEAD A-2

VEGETATION

Dominant Plant Species	Stratum	Indicator
1. EUTHAMIA TENUIFOLIA	H	FAC
2. DICHANTHELIUM DICHOTOMUM	H	FAC
3. JUNCUS EFFUSUS	H	FACW
4. ANDROPOGON VIRGINICUS	H	FACU
5. BETULA NIGRA	Sh	FACW
6.		
7.		
8.		
9.		
10.		
11.		
12.		
13.		
14.		
15.		
16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). 100

Remarks: SAMPLE AREA SATISFIES HYDROPHYTIC VEGETATION CRITERION

HYDROLOGY

___ Recorded Data (Describe in Remarks):
___ Stream, Lake, or Tide Gauge
___ Aerial Photographs
___ Other
✓ No Recorded Data Available

Field Observations:

Depth of Surface Water: surface (in.)
Depth to Free Water in Pit: surface (in.)
Depth to Saturated Soil: surface (in.)

Wetland Hydrology Indicators:
Primary Indicators:
___ Inundated
✓ Saturated in Upper 12 Inches
___ Water Marks
___ Drift Lines
✓ Sediment Deposits
✓ Drainage Patterns in Wetlands
Secondary Indicators (2 or more required):
✓ Oxidized Root Channels in Upper 12 Inches
___ Water-Stained Leaves
✓ Local Soil Survey Data
___ FAC-Neutral Test
___ Other (Explain in Remarks)

Remarks: FIELD INDICATORS OF SUPPORTING HYDROLOGY PRESENT; SATISFIES CRITERION

Vanasse Hangen Brustlin, Inc.
Environmental Services
Abingdon Office Park
U.S. Route 17, Suite 12
Route No. 4, Box No. 1299
Hayes, Virginia 23072
804 642 0448 • FAX 804 642 0344

Vanasse Hangen Brustlin, Inc.

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: MILSTEAD AND POCLAIN PONDS Applicant/Owner: NATIONAL PARK SERVICE Investigator: WARREN P. GRAY & ROBERT A.S. WRIGHT	Date: NOVEMBER 3, 1994 County: SPOTSYLVANIA State: VIRGINIA
Do Normal Circumstances exist on the site? (Yes) No Is the site significantly disturbed (Atypical Situation)? Yes (No) Is the area a potential Problem Area? Yes (No) (If needed, explain on reverse.)	Community ID: _____ Transect ID: _____ Plot ID: MILSTEAD A-3

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. ACER RUBRUM	Sa	FAC	9.		
2. BETULA NIGRA	Sh	FACW	10.		
3. RUBUS ARGUTUS	H	FACU	11.		
4. LONICERA JAPONICA	H	FAC-	12.		
5. AMBROSIA ARTEMISIIFOLIA	H	FACU	13.		
6.			14.		
7.			15.		
8.			16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). 40

Remarks: sample area does not satisfy the hydrophytic vegetation criterion

HYDROLOGY

___ Recorded Data (Describe in Remarks):
- ___ Stream, Lake, or Tide Gauge
- ___ Aerial Photographs
- ___ Other

✓ No Recorded Data Available

Field Observations:

Depth of Surface Water:	none	(in.)
Depth to Free Water in Pit:	> 18	(in.)
Depth to Saturated Soil:	> 18	(in.)

Wetland Hydrology Indicators:

Primary Indicators:
- ___ Inundated
- ___ Saturated in Upper 12 Inches
- ___ Water Marks
- ___ Drift Lines
- ___ Sediment Deposits
- ___ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ___ Oxidized Root Channels in Upper 12 Inches
- ___ Water-Stained Leaves
- ___ Local Soil Survey Data
- ___ FAC-Neutral Test
- ___ Other (Explain in Remarks)

Remarks: no field indicators of supporting hydrology present; fails criterion

Vanasse Hangen Brustlin, Inc.
Environmental Services
Abingdon Office Park
U.S. Route 17, Suite 12
Route No. 4, Box No. 1299
Hayes, Virginia 23072
804 642 0448 • FAX 804 642 0344

Vanasse Hangen Brustlin, Inc.

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: MILSTEAD AND POCLAIN PONDS Applicant/Owner: NATIONAL PARK SERVICE Investigator: WARREN P. GRAY & ROBERT A.S. WRIGHT	Date: NOVEMBER 3, 1994 County: SPOTSYLVANIA State: VIRGINIA
Do Normal Circumstances exist on the site? (Yes) No Is the site significantly disturbed (Atypical Situation)? Yes (No) Is the area a potential Problem Area? Yes (No) (If needed, explain on reverse.)	Community ID: _____ Transect ID: _____ Plot ID: MILSTEAD A-4

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. ACER RUBRUM	Sa	FAC	9.		
2. BETULA NIGRA	Sh	FACW	10.		
3. ANDROPOGON VIRGINICUS	H	FACU	11.		
4. RHYNCHOSPORA CHALAROCEPHALA	H	OBL	12.		
5. JUNCUS DICHOTOMUS	H	FACW	13.		
6.			14.		
7.			15.		
8.			16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). 90

Remarks: SAMPLE AREA SATISFIES HYDROPHYTIC VEGETATION CRITERION

HYDROLOGY

___ Recorded Data (Describe in Remarks):
- ___ Stream, Lake, or Tide Gauge
- ___ Aerial Photographs
- ___ Other

✓ No Recorded Data Available

Field Observations:

Depth of Surface Water: NONE (in.)

Depth to Free Water in Pit: 6 (in.)

Depth to Saturated Soil: SURFACE (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- ___ Inundated
- ✓ Saturated in Upper 12 Inches
- ___ Water Marks
- ___ Drift Lines
- ___ Sediment Deposits
- ✓ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ✓ Oxidized Root Channels in Upper 12 Inches
- ___ Water-Stained Leaves
- ✓ Local Soil Survey Data
- ___ FAC-Neutral Test
- ___ Other (Explain in Remarks)

Remarks: FIELD INDICATORS OF SUPPORTING HYDROLOGY PRESENT; SATISFIES CRITERION

Vanasse Hangen Brustlin, Inc.
Environmental Services
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Route No. 4, Box No. 1299
Hayes, Virginia 23072
804 642 0448 • FAX 804 642 0344

Vanasse Hangen Brustlin, Inc.

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: MILSTEAD AND POCLAIN PONDS Applicant/Owner: NATIONAL PARK SERVICE Investigator: WARREN P. GRAY & ROBERT A.S. WRIGHT	Date: NOVEMBER 3, 1994 County: SPOTSYLVANIA State: VIRGINIA
Do Normal Circumstances exist on the site? (Yes) No Is the site significantly disturbed (Atypical Situation)? Yes (No) Is the area a potential Problem Area? Yes (No) (If needed, explain on reverse.)	Community ID: _____ Transect ID: _____ Plot ID: MILSTEAD B-1

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. PRUNUS SEROTINA	T/Sa	FACU	9.		
2. JUNIPERUS VIRGINIANA	T/Sh	FACU	10.		
3. FESTUCA ELATIOR	H	FACU	11.		
4. SOLIDAGO ALTISSIMA	H	FACU	12.		
5. LONICERA JAPONICA	H	FAC-	13.		
6.			14.		
7.			15.		
8.			16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). 0

Remarks: sample area does not satisfy the hydrophytic vegetation criterion

HYDROLOGY

___ Recorded Data (Describe in Remarks):
- ___ Stream, Lake, or Tide Gauge
- ___ Aerial Photographs
- ___ Other

✓ No Recorded Data Available

Field Observations:

Depth of Surface Water:	none	(in.)
Depth to Free Water in Pit:	>18	(in.)
Depth to Saturated Soil:	>18	(in.)

Wetland Hydrology Indicators:

Primary Indicators:
- ___ Inundated
- ___ Saturated in Upper 12 Inches
- ___ Water Marks
- ___ Drift Lines
- ___ Sediment Deposits
- ___ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ___ Oxidized Root Channels in Upper 12 Inches
- ___ Water-Stained Leaves
- ___ Local Soil Survey Data
- ___ FAC-Neutral Test
- ___ Other (Explain in Remarks)

Remarks: no field indicators of wetland hydrology present; fails criterion

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Vanasse Hangen Brustlin, Inc.

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: MILSTEAD AND POCLAIN PONDS Applicant/Owner: NATIONAL PARK SERVICE Investigator: WARREN P. GRAY & ROBERT A.S. WRIGHT	Date: NOVEMBER 3, 1994 County: SPOTSYLVANIA State: VIRGINIA
Do Normal Circumstances exist on the site? (Yes) No Is the site significantly disturbed (Atypical Situation)? Yes (No) Is the area a potential Problem Area? Yes (No) (If needed, explain on reverse.)	Community ID: _____ Transect ID: _____ Plot ID: MILSTEAD B-2

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. SALIX NIGRA	Sh	FACW	9.		
2. JUNCUS EFFUSUS	H	FACW+	10.		
3. CAREX LURIDA	H	OBL	11.		
4. LEERSIA OZYROIDES	H	OBL	12.		
5.			13.		
6.			14.		
7.			15.		
8.			16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). 100

Remarks: SAMPLE AREA SATISFIES HYDROPHYTIC VEGETATION CRITERION

HYDROLOGY

___ Recorded Data (Describe in Remarks):
- ___ Stream, Lake, or Tide Gauge
- ___ Aerial Photographs
- ___ Other

✓ No Recorded Data Available

Field Observations: (pond)
- Depth of Surface Water: +24 (in.)
- Depth to Free Water in Pit: surface (in.)
- Depth to Saturated Soil: surface (in.)

Wetland Hydrology Indicators:
Primary Indicators:
- ✓ Inundated
- ___ Saturated in Upper 12 Inches
- ___ Water Marks
- ___ Drift Lines
- ___ Sediment Deposits
- ✓ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ___ Oxidized Root Channels in Upper 12 Inches
- ___ Water-Stained Leaves
- ___ Local Soil Survey Data
- ___ FAC-Neutral Test
- ✓ Other (Explain in Remarks) (livestock pond)

Remarks: field indicators of wetland hydrology present; satisfies criterion

Vanasse Hangen Brustlin, Inc.
Environmental Services
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Vanasse Hangen Brustlin, Inc.

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: MILSTEAD AND POCLAIN PONDS Applicant/Owner: NATIONAL PARK SERVICE Investigator: WARREN P. GRAY & ROBERT A.S. WRIGHT	Date: NOVEMBER 3, 1994 County: SPOTSYLVANIA State: VIRGINIA
Do Normal Circumstances exist on the site? (Yes) No Is the site significantly disturbed (Atypical Situation)? Yes (No) Is the area a potential Problem Area? Yes (No) (If needed, explain on reverse.)	Community ID: _____ Transect ID: _____ Plot ID: POCLAIN-1

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. ACER RUBRUM	Sa	FAC	9.		
2. SALIX NIGRA	Sh	FACW+	10.		
3. JUNCUS EFFUSUS	H	FACW+	11.		
4. CAREX LURIDA	H	OBL	12.		
5.			13.		
6.			14.		
7.			15.		
8.			16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). 100

Remarks:
SAmple area satisfies the hydrophytic vegetation criterion

HYDROLOGY

___ Recorded Data (Describe in Remarks):
___ Stream, Lake, or Tide Gauge
___ Aerial Photographs
___ Other
✓ No Recorded Data Available

Field Observations:

Depth of Surface Water: + 6 (in.)
Depth to Free Water in Pit: surface (in.)
Depth to Saturated Soil: surface (in.)

Wetland Hydrology Indicators:
Primary Indicators:
✓ Inundated
___ Saturated in Upper 12 Inches
✓ Water Marks
✓ Drift Lines
✓ Sediment Deposits
✓ Drainage Patterns in Wetlands
Secondary Indicators (2 or more required):
___ Oxidized Root Channels in Upper 12 Inches
✓ Water-Stained Leaves
___ Local Soil Survey Data
___ FAC-Neutral Test
___ Other (Explain in Remarks)

Remarks: field indicators of supporting hydrology present; satisfies criterion

Vanasse Hangen Brustlin, Inc.
Environmental Services
Abingdon Office Park
U.S. Route 17, Suite 12
Route No. 4, Box No. 1299
Hayes, Virginia 23072
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Vanasse Hangen Brustlin, Inc.

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: MILSTEAD AND POCLAIN PONDS Applicant/Owner: NATIONAL PARK SERVICE Investigator: WARREN P. GRAY & ROBERT A.S. WRIGHT	Date: NOVEMBER 3, 1994 County: SPOTSYLVANIA State: VIRGINIA
Do Normal Circumstances exist on the site? (Yes) No Is the site significantly disturbed (Atypical Situation)? Yes (No) Is the area a potential Problem Area? Yes (No) (If needed, explain on reverse.)	Community ID: _____ Transect ID: _____ Plot ID: POCLAIN-2

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. PINUS TAEDA	Sa	FAC-	9.		
2. ACER RUBRUM	Sa	FAC	10.		
3. ANDROPOGON VIRGINICUS	H	FACU	11.		
4. RUBUS ARGUTUS	H	FACU	12.		
5. SOLIDAGO RUGOSA	H	FAC	13.		
6.			14.		
7.			15.		
8.			16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). 40

Remarks: sample area does not satisfy the hydrophytic vegetation criterion

HYDROLOGY

___ Recorded Data (Describe in Remarks):
- ___ Stream, Lake, or Tide Gauge
- ___ Aerial Photographs
- ___ Other

✓ No Recorded Data Available

Field Observations:

Depth of Surface Water: none (in.)

Depth to Free Water in Pit: >18 (in.)

Depth to Saturated Soil: 16 (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- ___ Inundated
- ___ Saturated in Upper 12 Inches
- ___ Water Marks
- ___ Drift Lines
- ___ Sediment Deposits
- ___ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ___ Oxidized Root Channels in Upper 12 Inches
- ___ Water-Stained Leaves
- ✓ Local Soil Survey Data
- ___ FAC-Neutral Test
- ___ Other (Explain in Remarks)

Remarks: insufficient field indicators of supporting hydrology present; fails criterion

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Environmental Services
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Route No. 4, Box No. 1299
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Appendix E

APPENDIX E

DETAILS OF EROSION AND SEDIMENT CONTROL MEASURES

Because disturbance and land moving activities are kept to a minimum, the proposed erosion and sediment control plan is simple in its approach and implementation. In brief, the proposed action seeks to install temporary E & S measures to prevent significant drainage problems in the areas most likely to cause problems. This includes disturbed, unvegetated ground along temporary access roads, at excavation points (dam breaches), and in areas around existing ponds and wetlands where sloughing might occur if physical barriers such as silt fences and hay bales fail.

Silt fencing and hay bales will be installed at strategic points to provide a physical barrier to prevent sediment contamination of identified waters. A stone construction entrance will be installed to retard and prevent unnecessary contamination of public highways from mud, silt and sand, which can contaminate adjacent waterways by entering roadside ditches. A rock check dam will be installed at a strategic location within an intermittent drainage to provide protection to downstream resources by retarding high velocity flows, which can carve out huge swaths of unvegetated and unprotected waterway channels. An inlet protection device will be installed to prevent downstream erosion and backflooding caused by increased flow to an upgraded culvert crossing.

Rock rip rap will be employed at dam breaches to prevent soil slumpage and associated siltation to downstream waters. If necessary, semi-permanent soil stabilization matting will be utilized to supplement the anchoring effects of the rip-rap.

After installation of appropriate temporary structures, the proposed action seeks to deactivate three livestock ponds by pumping the water out to adjacent uplands. Utilizing a dewatering structure, constructed of a series of silt fencing, staked hay bales and filter cloth, the pond water will be allowed to slowly percolate over the upland slope. Sediment and particulates will precipitate onto the land surface, thus reducing downstream sedimentation. The pump utilized for the job will have a filter bag on the outlet hose port and a small sieve screen on the inlet hose port to prevent uptake of debris, fish and mud. As the pond water draws down, the existing aquatic resources in each pond will be translocated to another open water habitat.

After inspection of installed and established E & S measures, dam notches will be excavated to permanently lower the pool elevation of each pond's water surface. The exposed slopes will be stabilized. The spoil material will be transported to a previously identified upland disposal site where it will be spread and stabilized with a grass mixture. Once the sites are stabilized, restorative plantings will be established to return the ponds' lowest topography to their original forested character. Following the

TEMPORARY CONTROL MEASURES

Silt Fence

Silt fencing shall be erected in dewatering areas and elsewhere as depicted on the Conceptual Plans and Appendix E drawings. It may also be placed where deemed necessary based on field conditions at the boundary between existing wetlands/pond, and/or at the dam breach notches where sloughing and erosion is most likely to occur. Additionally, silt fence may be installed in areas deemed necessary as the contractor inspects site conditions. Silt fencing will be erected following the standards established by "Standard and Specification 3.05" of the Virginia Erosion and Sediment Control Handbook (VESCH) and as depicted in Appendix E (Sheet 15) and the Conceptual Plan (Drawing C-8). It shall be installed prior to any ground disturbing activities. Damaged silt fences shall be repaired/replaced immediately upon discovery.

Straw Bale Barriers/Dewatering Structure

Before construction commencement, straw bale barriers will be installed behind silt fencing where reinforcement of the silt fencing may be needed. Installation of the straw bale barriers will be in conformance with "Standard and Specification 3.04" of the Virginia Erosion and Sediment Control Handbook (VESCH) and as depicted in Appendix E (Sheet 15) and Conceptual Plan (Drawing C-8). The intent of the straw bale barriers is to provide additional support for the silt fencing in those areas where the failure of the silt fencing would be of critical concern. Straw bales will be erected in a square box-like arrangement for use in overland filtration of the dewatering solution. Two dewatering structures surrounded by silt fencing will be erected at the Milstead site; one at Pond A, and the other Pond B. These will be implemented to prevent silt from directly entering the ponds during dewatering operations.

The dewatering structures are detailed in the Conceptual Plans (Drawing C-8) and Appendix E (Sheet 14).

Construction Entrances

A single construction entrance consisting of crushed stone will be installed at construction vehicle entryway to the Milstead Pond site located at its intersection with Lee Drive as shown on the Conceptual Plans (Drawings C-4 and C-8). By providing a stabilized surface, this stone entrance will retard or eliminate the transfer of mud and debris onto public roadways from the project site. The entrance will be constructed in conformance with VESCH "Standard and Specification 3.02" as shown in Appendix E (Sheet 10).

Inlet Protection

An inlet protection device shall be installed immediately upstream of the culvert beneath Lee Drive within the intermittent stream that drains eastward from the Milstead Ponds. This device shall be constructed in accordance with VESCH "Standard and Specification 3.08" as shown on Conceptual Plans (Drawings C-4 and C-8) and Appendix E (Sheet 12). The inlet protector will remain in place until the Milstead project site is completed and fully stabilized.

Rock Check Dam

A rock check dam shall be constructed in accordance with VESCH Standard and Specification 3.20 as shown on Conceptual Plans (Drawing C-4) and Appendix E (Sheet 11). These protection measures will be installed across swales of drainage ditches to reduce the velocity of concentrated flows. The dams will be temporary in nature, but remain in place until the surrounding areas draining into the feature are completely stabilized.

PERMANENT CONTROL MEASURES

Slope Stabilization

Areas denuded by construction activities having moderate slopes will be stabilized using perennial grasses in accordance with specifications noted in the permanent seeding section below. Straw mulch shall be placed over the seeded areas. Topsoil requirements, if any, shall be determined in the field prior to permanent seeding.

If deemed necessary by the site construction manager, steep slopes (>33%) shall be stabilized with soil stabilization blankets and/or matting (treatment 1) and used in conjunction with rock rip rap. The application of these measures, if implemented, will be in accordance with VESCH Standard and Specification 3.36 as shown in Appendix E (Sheet 13). These stabilization measures control erosion in critical areas by providing a microclimate that protects young vegetation and promotes its establishment.

Permanent Seeding

Permanent seeding shall occur as soon as possible after final contours have been established. All disturbed areas on the project sites will be temporarily seeded, and, when conditions are right, will be permanently vegetated with fescue/rye/millet mixture. Seed mixtures will be applied in accordance with recommendations by the Spotsylvania Water Conservation District office. All seeding will be followed by mechanical or hand spreading of straw mulch.

Unless specific recommendations or requests are received; the contractor will, in accordance with VESCH Standard and Specification 3.32, use the state's recommended rates of application as outlined in the following graphic (Table 2):

Table 2 **SEEDING APPLICATION RATES**

Application	Rate
Lime	2.0 tons per acre
Fertilizer (10-20-10)	1,000 pounds per acre
Seed Mixture	150 pounds per acre
Mulch (small grain straw)	2.0 tons per acre

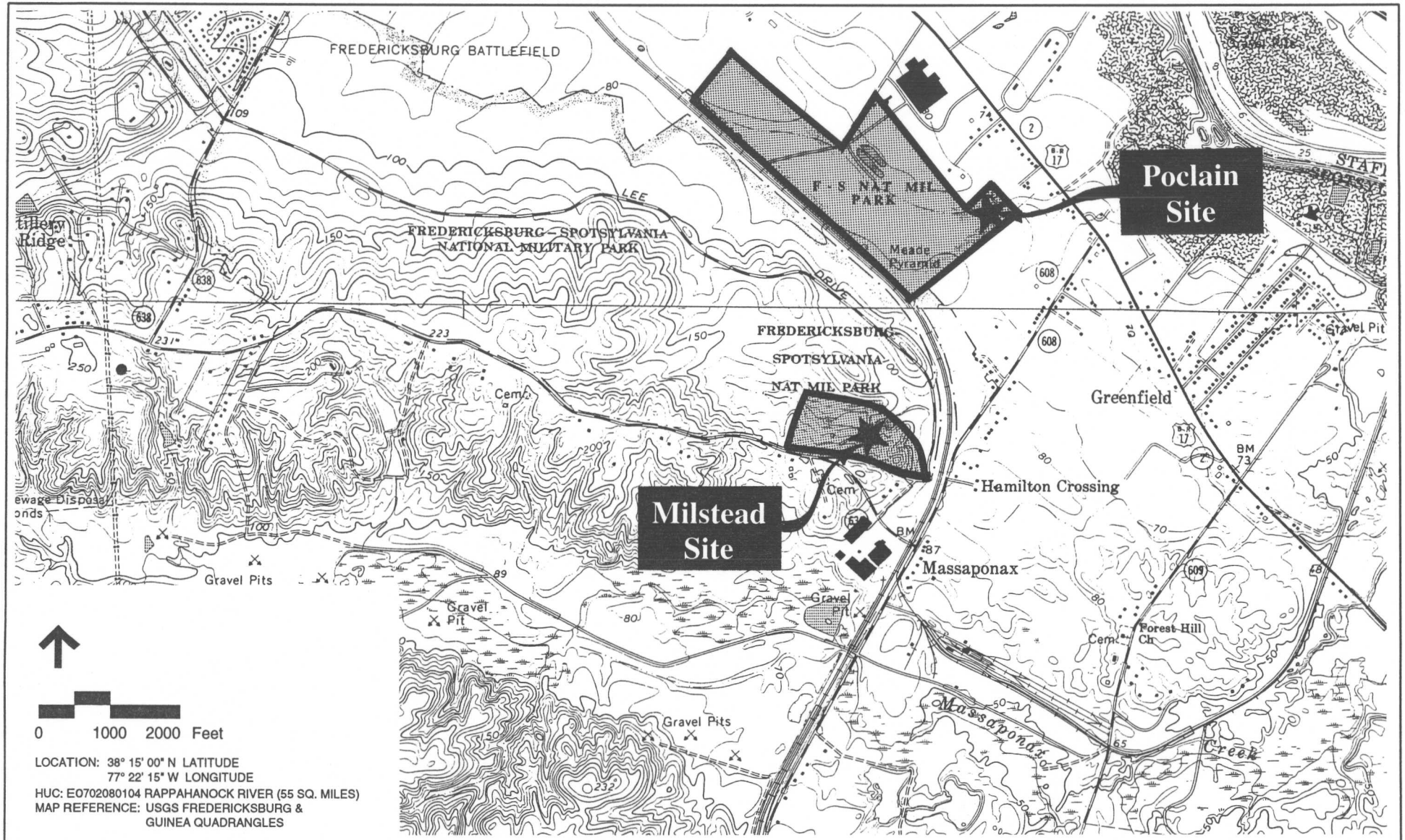
Seed mixtures may vary slightly depending upon the planting period, but typically annual rye and/or foxtail millet or a tall fescue will be used in most instances.

MAINTENANCE OF EROSION AND SEDIMENT CONTROL FACILITIES

All maintenance of temporary and permanent erosion and sediment control facilities shall be carried out in accordance with Section 1.7 of the Virginia Erosion and Sediment Control Regulations (VR 625-02-00). During the period that the project site is under construction, the contractor will be responsible for maintenance of the temporary erosion and sediment control facilities. The contractor will inspect erosion and sediment control facilities on a regular basis, especially after periods of prolonged or heavy rainfall. Any damage discovered will be repaired promptly by the contractor. Furthermore, a readily available supply of erosion and sediment control materials will be maintained by the contractor at all times.

Upon completion of construction, NPS officials or their designees will begin a maintenance program that will include regular inspection of the permanent erosion and sediment control facilities. The primary goal of this maintenance program is the rapid identification of possible erosion and sedimentation problems that may develop. The contractor will then take the necessary action to correct these problems before major repairs are required.

After vegetation has been fully established on the project site, some of the erosion and sediment control facilities remaining such as silt fences and hay bales will be removed. Within thirty days after final stabilization, all remaining temporary erosion and sediment control measures will be removed if conditions so warrant.



LOCATION: 38° 15' 00" N LATITUDE
77° 22' 15" W LONGITUDE
HUC: E0702080104 RAPPAHANOCK RIVER (55 SQ. MILES)
MAP REFERENCE: USGS FREDERICKSBURG & GUINEA QUADRANGLES

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ADJACENT PROPERTY OWNERS:
1. National Park Service
2. CSX Railroad
3. VDOT

DATUM: NGVD

DEACTIVATION OF MILSTEAD AND POCLAIN PONDS

VICINITY MAP

AT: RUFFINS POND ON MASSAPONAX CREEK
IN: COUNTY OF SPOTSYLVANIA

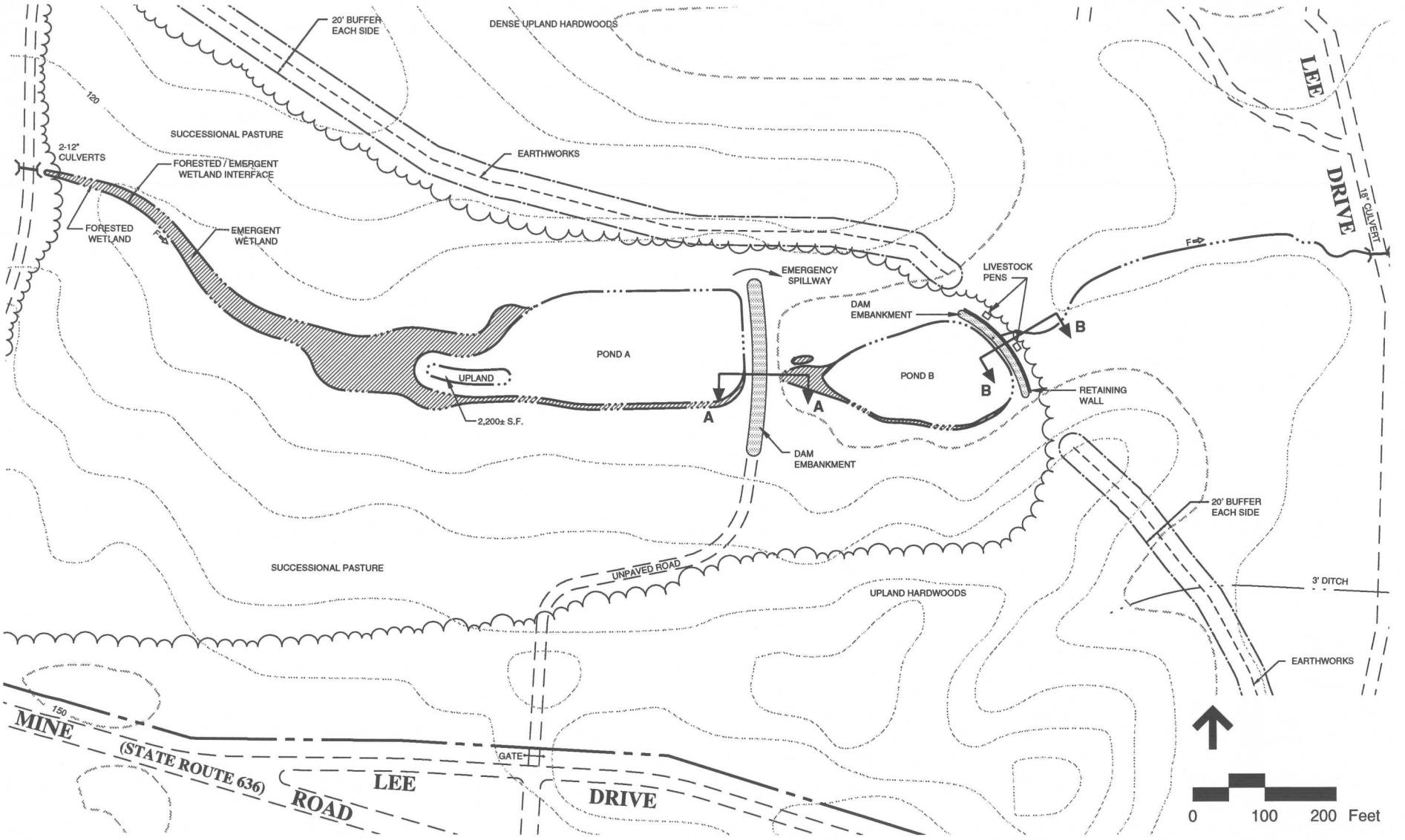
PURPOSE: RESTORE HISTORIC LANDSCAPE

APPLICATION BY: NATIONAL PARK SERVICE

DATE: January 1995

SHEET 1 OF 16

170JPA



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DATUM: NGVD

DEACTIVATION OF MILSTEAD AND POCLAIN PONDS

EXISTING CONDITIONS
MILSTEAD PONDS

AT: RUFFINS POND ON MASSAPONAX CREEK
IN: COUNTY OF SPOTSYLVANIA

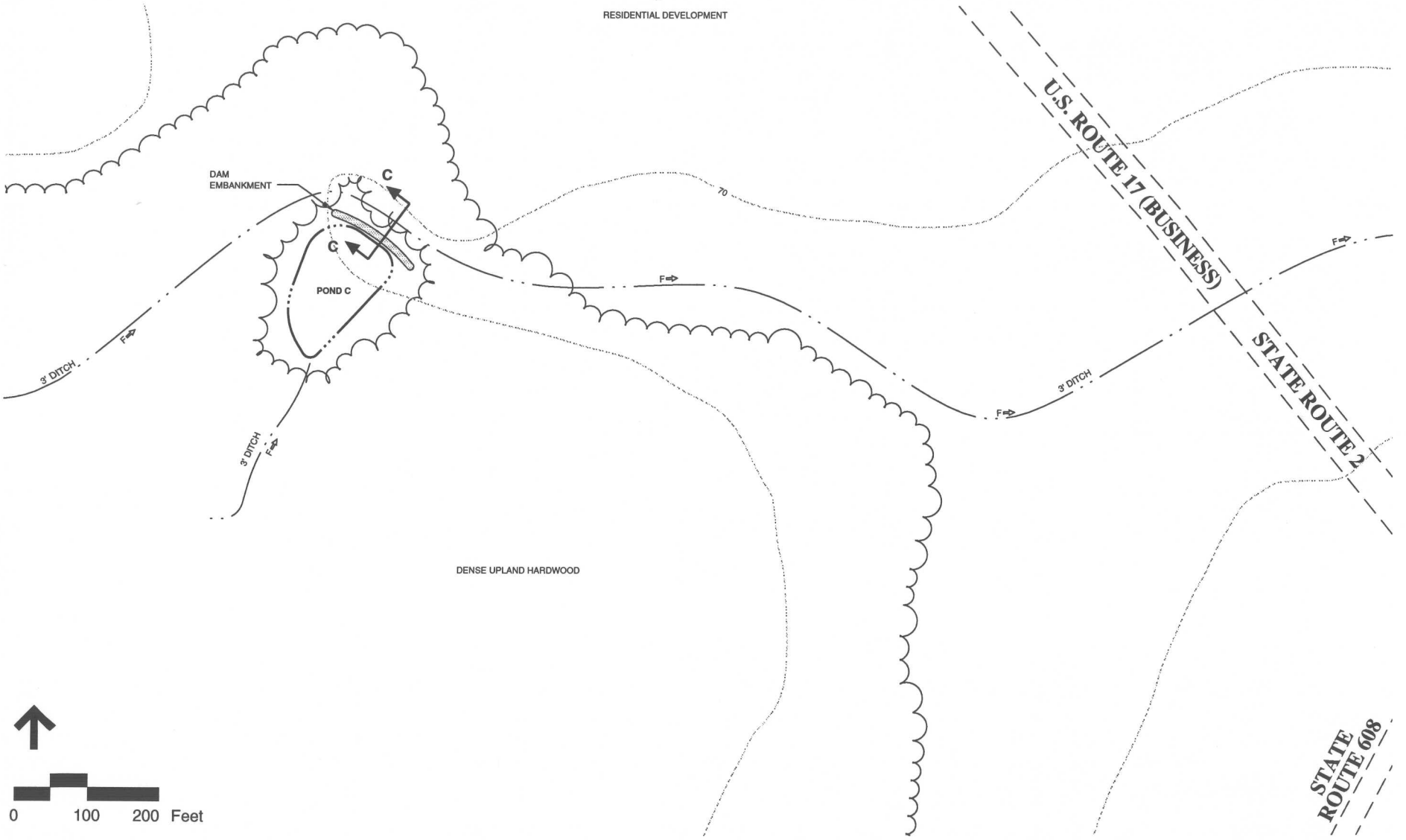
PURPOSE: RESTORE HISTORIC LANDSCAPE

APPLICATION BY: NATIONAL PARK SERVICE

DATE: January 1995

SHEET 2 OF 16

170JPA2



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Hayes, Virginia 23072

ADJACENT PROPERTY OWNERS:
1. National Park Service
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3. VDOT

DATUM: NGVD

DEACTIVATION OF MILSTEAD AND POCLAIN PONDS

EXISTING CONDITIONS
POCLAIN POND

AT: RUFFINS POND ON MASSAPONAX CREEK
IN: COUNTY OF SPOTSYLVANIA

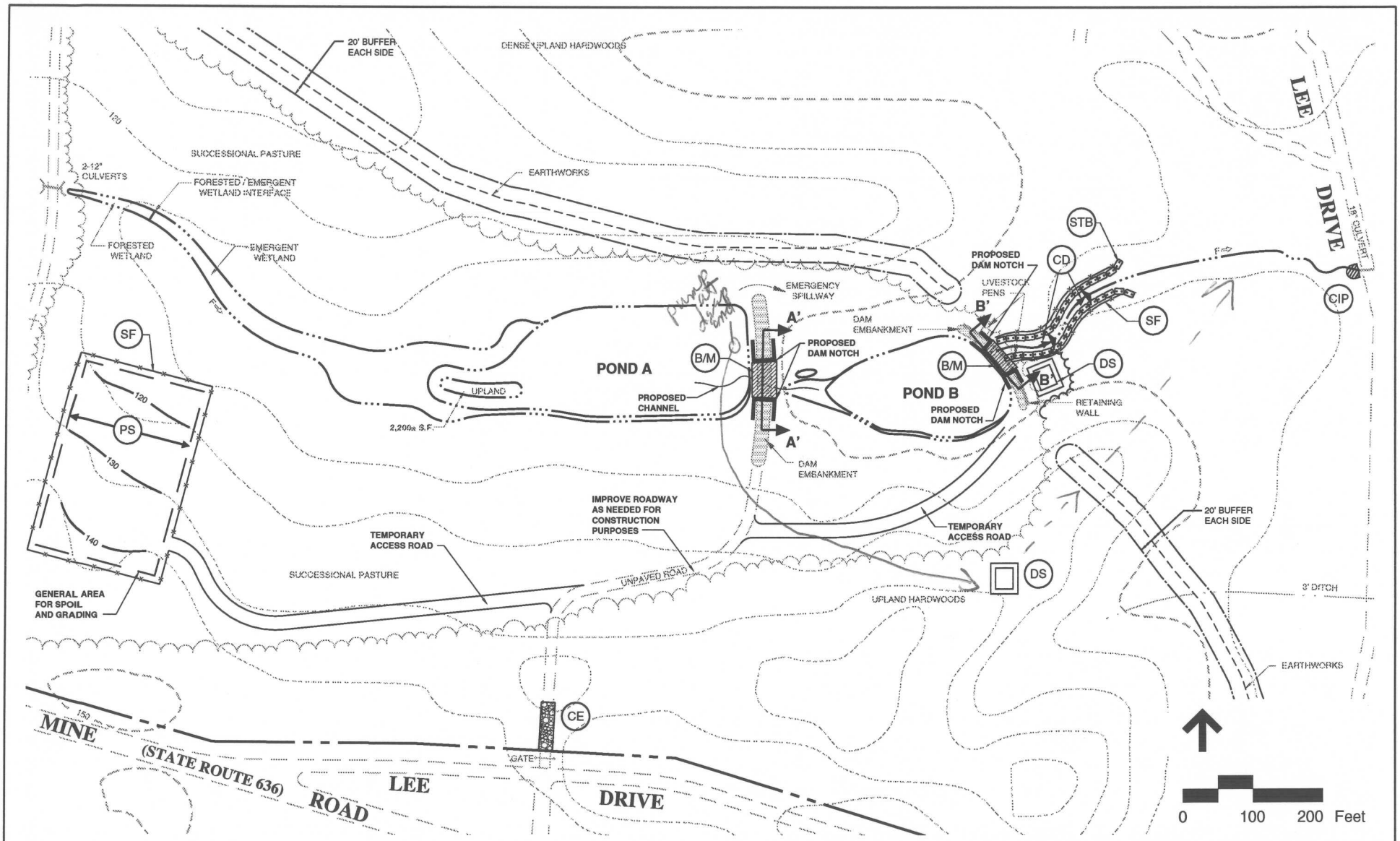
PURPOSE: RESTORE HISTORIC LANDSCAPE

APPLICATION BY: NATIONAL PARK SERVICE

DATE: January 1995

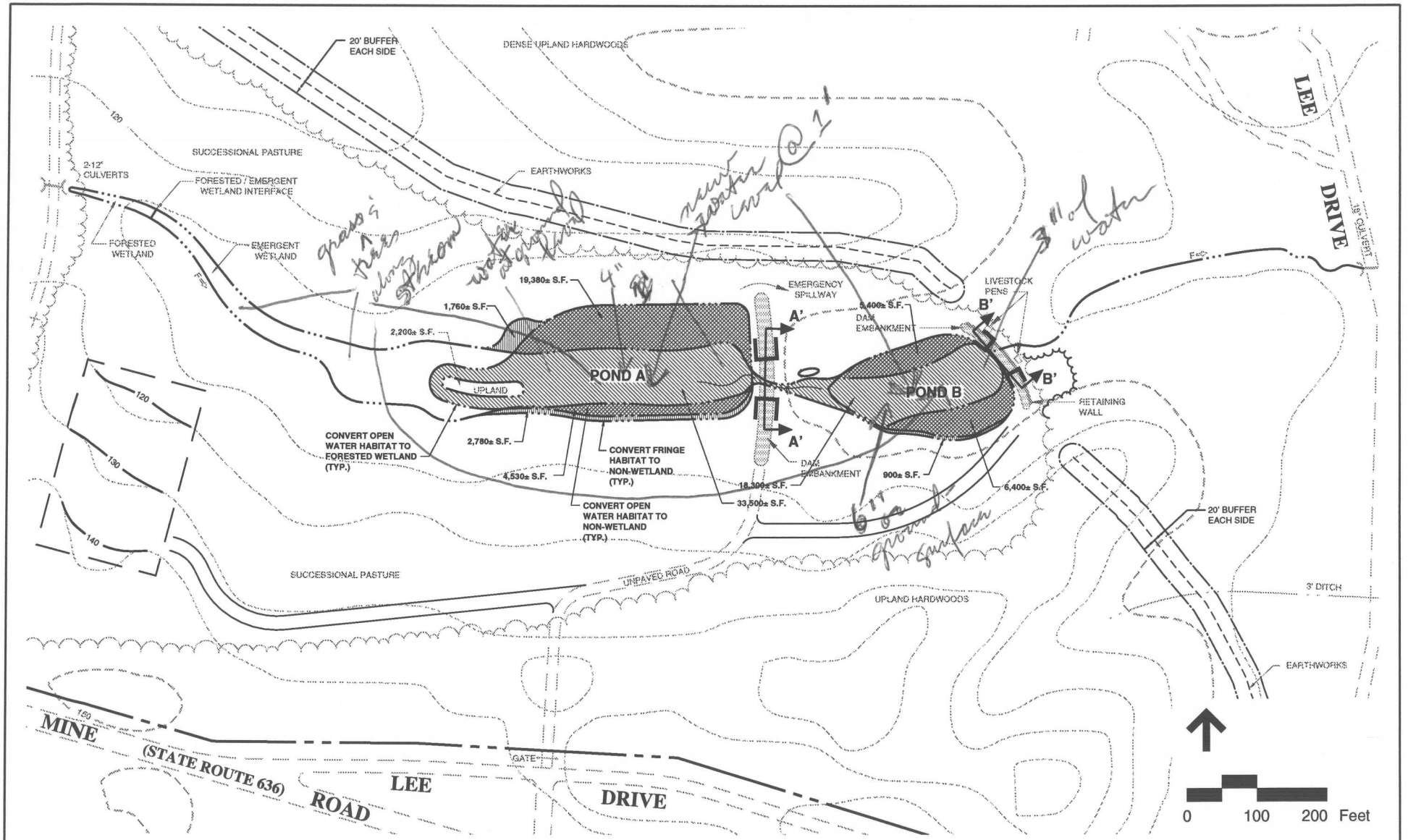
SHEET 3 OF 16

170JPA3



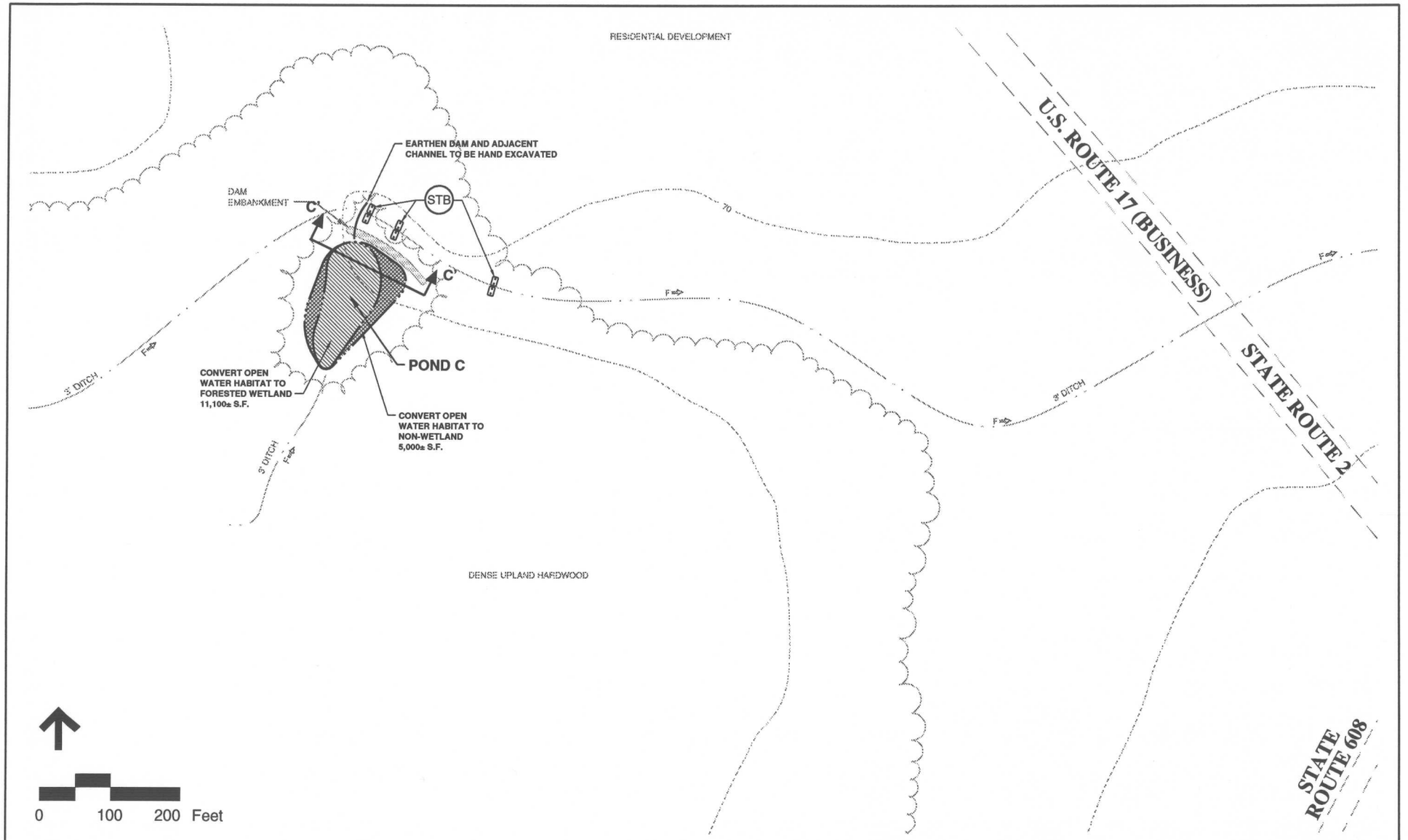
VHB Vanasse Hangen Brustlin, Inc. Abingdon Office Park U.S. Route 17, Suite 12 7188 Chapman Drive Hayes, Virginia 23072	**ADJACENT PROPERTY OWNERS:** 1. National Park Service 2. CSX Railroad 3. VDOT **DATUM:** NGVD	**DEACTIVATION OF MILSTEAD AND POCLAIN PONDS** **GRADING, EROSION AND SEDIMENT CONTROL PLAN** **MILSTEAD PONDS** **AT:** RUFFINS POND ON MASSAPONAX CREEK **IN:** COUNTY OF SPOTSYLVANIA **PURPOSE:** RESTORE HISTORIC LANDSCAPE	**APPLICATION BY:** NATIONAL PARK SERVICE **DATE:** January 1995 **SHEET** 4 OF 16

170JPA4



VHB Vanasse Hangen Brustlin, Inc. Abingdon Office Park U.S. Route 17, Suite 12 7188 Chapman Drive Hayes, Virginia 23072	**ADJACENT PROPERTY OWNERS:** 1. National Park Service 2. CSX Railroad 3. VDOT **DATUM:** NGVD	**DEACTIVATION OF MILSTEAD AND POCLAIN PONDS** **RESTORATION PLAN** **MILSTEAD PONDS** **AT:** RUFFINS POND ON MASSAPONAX CREEK **IN:** COUNTY OF SPOTSYLVANIA **PURPOSE:** RESTORE HISTORIC LANDSCAPE	**APPLICATION BY:** NATIONAL PARK SERVICE **DATE:** January 1995 **SHEET** 5 OF 16

170JPA4



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ADJACENT PROPERTY OWNERS:
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DATUM: NGVD

DEACTIVATION OF MILSTEAD AND POCLAIN PONDS

RESTORATION, EROSION AND SEDIMENT CONTROL PLAN POCLAIN POND

AT: RUFFINS POND ON MASSAPONAX CREEK
IN: COUNTY OF SPOTSYLVANIA

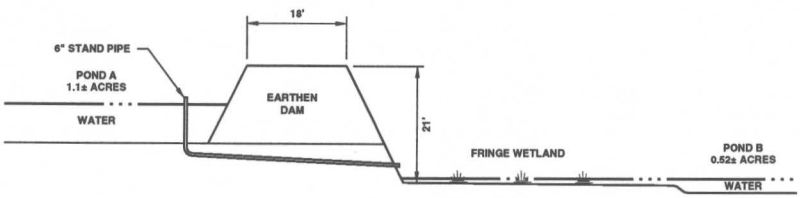
PURPOSE: RESTORE HISTORIC LANDSCAPE

APPLICATION BY: NATIONAL PARK SERVICE

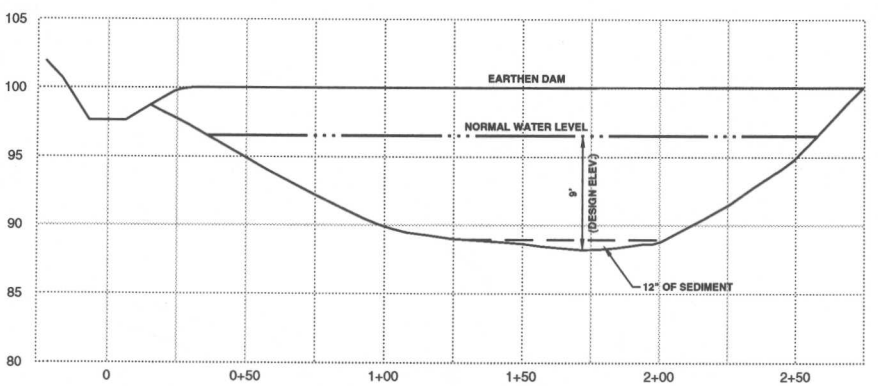
DATE: January 1995

SHEET 6 OF 16

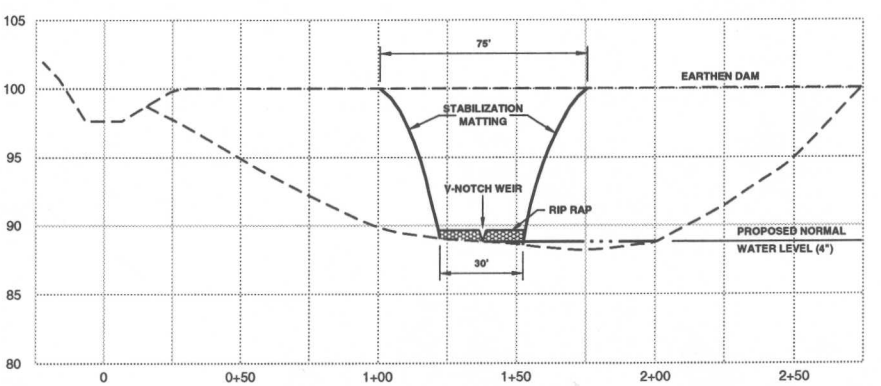
170JPA6



CROSS SECTION A-A
EXISTING CONDITIONS
SCALE: 1" = 35'



POND A CROSS SECTION A'-A'
EXISTING CONDITIONS
SCALE: HOR. 1" = 70'
VERT. 1" = 14'



POND A CROSS SECTION A'-A'
PROPOSED CONDITIONS
SCALE: HOR. 1" = 70'
VERT. 1" = 14'

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DATUM: NGVD

DEACTIVATION OF MILSTEAD AND POCLAIN PONDS
CROSS SECTIONS
POND A

AT: RUFFINS POND ON MASSAPONAX CREEK
IN: COUNTY OF SPOTSYLVANIA

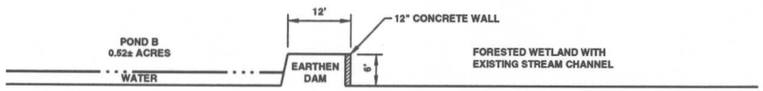
PURPOSE: RESTORE HISTORIC LANDSCAPE

APPLICATION BY: NATIONAL PARK SERVICE

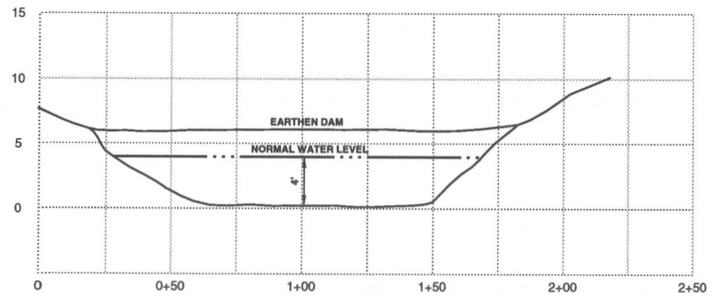
DATE: January 1995

SHEET 7 OF 16

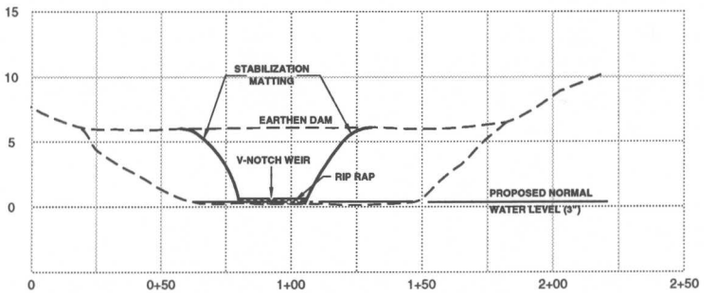
170JPA7



CROSS SECTION B-B
EXISTING CONDITIONS
SCALE: 1" = 35'



POND B CROSS SECTION B'-B'
EXISTING CONDITIONS
SCALE: HOR. 1" = 70'
VERT. 1" = 14'



POND B CROSS SECTION B'-B'
PROPOSED CONDITIONS
SCALE: HOR. 1" = 70'
VERT. 1" = 14'

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DATUM: NGVD

DEACTIVATION OF MILSTEAD AND POCLAIN PONDS
CROSS SECTIONS
POND B

AT: RUFFINS POND ON MASSAPONAX CREEK
IN: COUNTY OF SPOTSYLVANIA

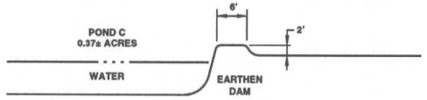
PURPOSE: RESTORE HISTORIC LANDSCAPE

APPLICATION BY: NATIONAL PARK SERVICE

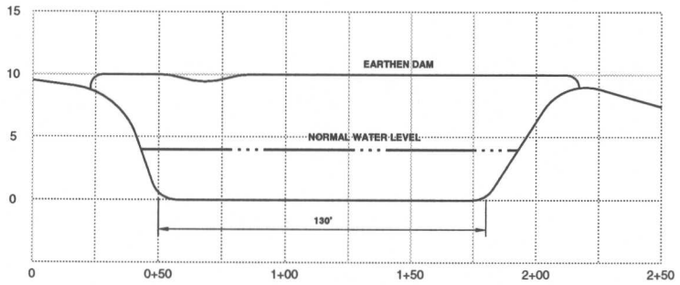
DATE: January 1995

SHEET 8 OF 16

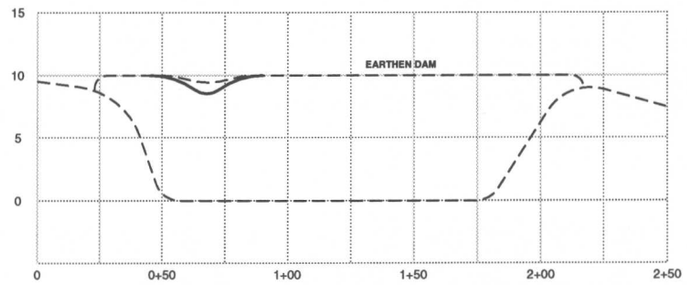
170JPA7



CROSS SECTION C-C
EXISTING CONDITIONS
SCALE: 1" = 35'



POND C CROSS SECTION C'-C'
EXISTING CONDITIONS
SCALE: HOR. 1" = 70'
VERT. 1" = 14'



POND C CROSS SECTION C'-C'
PROPOSED CONDITIONS
SCALE: HOR. 1" = 70'
VERT. 1" = 14'

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ADJACENT PROPERTY OWNERS:
1. National Park Service
2. CSX Railroad
3. VDOT

DATUM: NGVD

DEACTIVATION OF MILSTEAD AND POCLAIN PONDS
CROSS SECTIONS
POND C

AT: RUFFINS POND ON MASSAPONAX CREEK
IN: COUNTY OF SPOTSYLVANIA

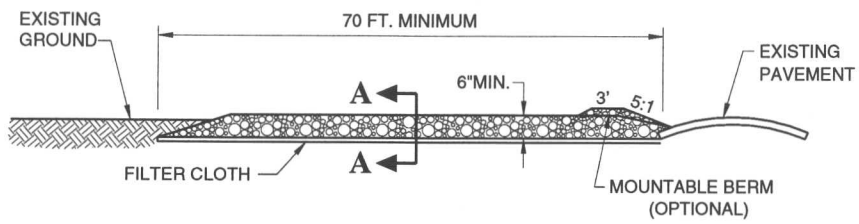
PURPOSE: RESTORE HISTORIC LANDSCAPE

APPLICATION BY: NATIONAL PARK SERVICE

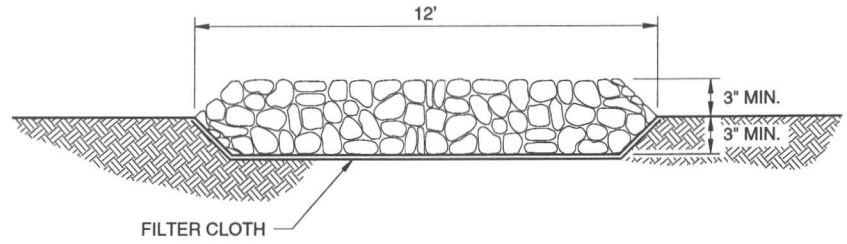
DATE: January 1995

SHEET 9 OF 16

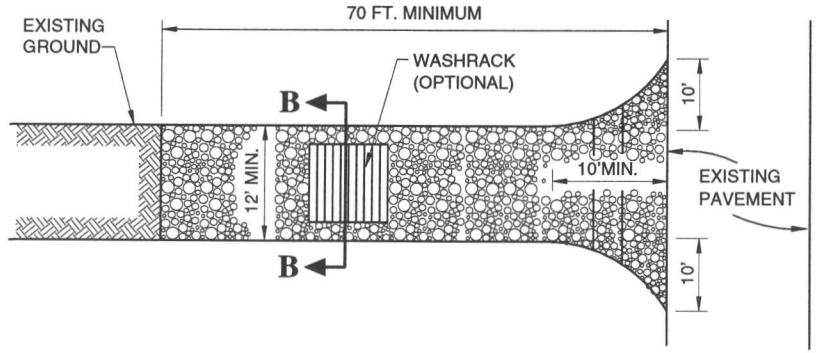
170JPA7



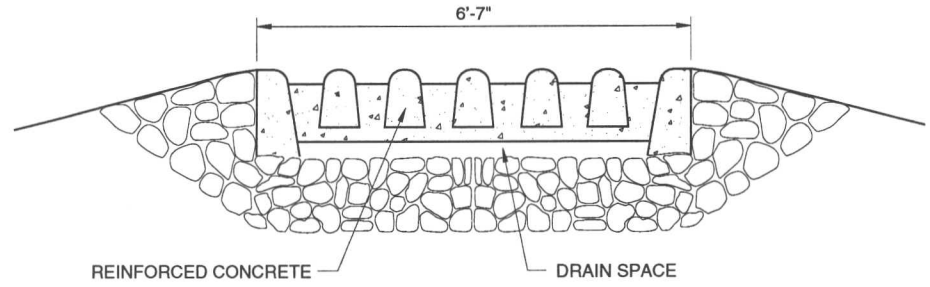
CROSS-SECTION
NOT TO SCALE



SECTION A-A
NOT TO SCALE



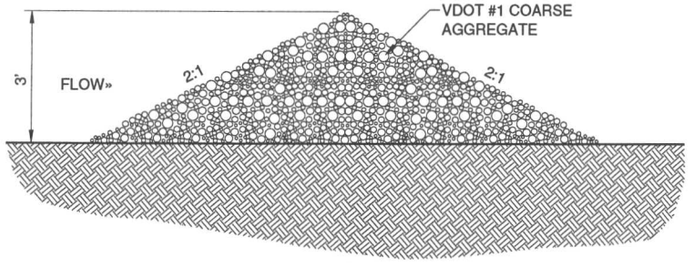
PLAN VIEW
NOT TO SCALE

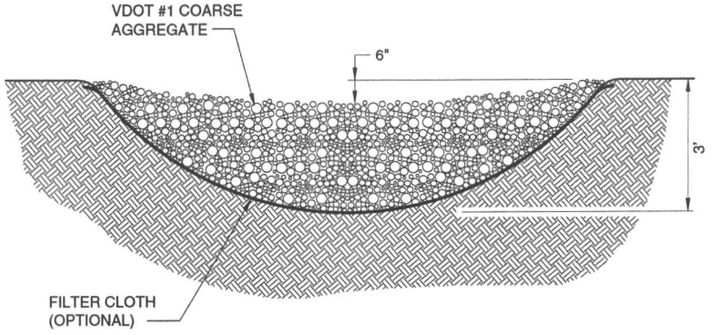


SECTION B-B
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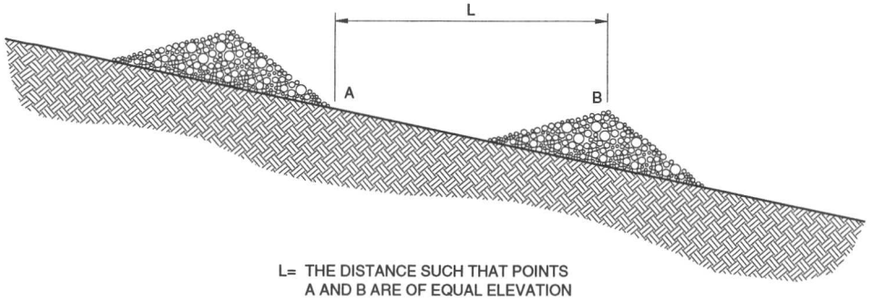
VHB Vanasse Hangen Brustlin, Inc. Abingdon Office Park U.S. Route 17, Suite 12 7188 Chapman Drive Hayes, Virginia 23072	**ADJACENT PROPERTY OWNERS:** 1. National Park Service 2. CSX Railroad 3. VDOT **DATUM:** NGVD	**DEACTIVATION OF MILSTEAD AND POCLAIN PONDS** **TYPICAL DETAIL SHEET** **STONE CONSTRUCTION ENTRANCE** **AT:** RUFFINS POND ON MASSAPONAX CREEK **IN:** COUNTY OF SPOTSYLVANIA **PURPOSE:** RESTORE HISTORIC LANDSCAPE	**APPLICATION BY:** NATIONAL PARK SERVICE **DATE:** January 1995 **SHEET 10** OF 16

170JPA8





DOWNSTREAM VIEW

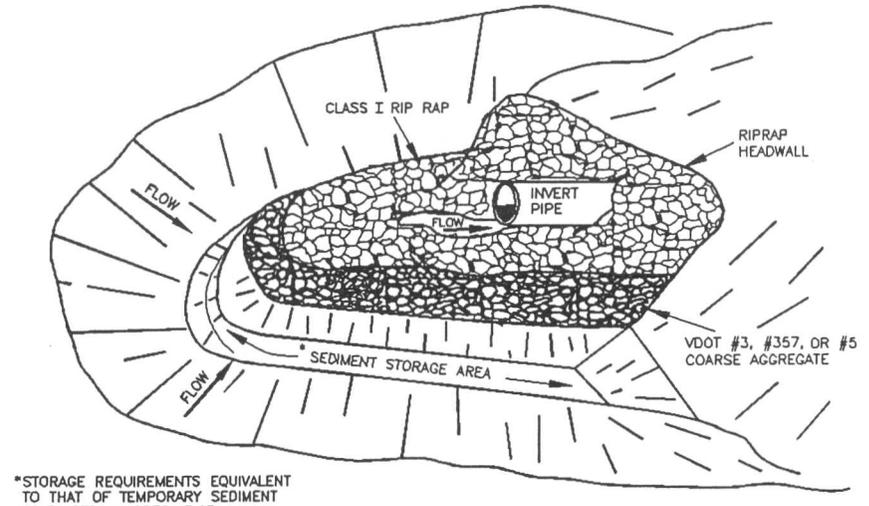


L= THE DISTANCE SUCH THAT POINTS
A AND B ARE OF EQUAL ELEVATION

SPACING BETWEEN CHECK DAMS

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	DATUM: NGVD	**AT:** RUFFINS POND ON MASSAPONAX CREEK **IN:** COUNTY OF SPOTSYLVANIA **PURPOSE:** RESTORE HISTORIC LANDSCAPE	**DATE:** January 1995 **SHEET 11** OF 16

170JPA9

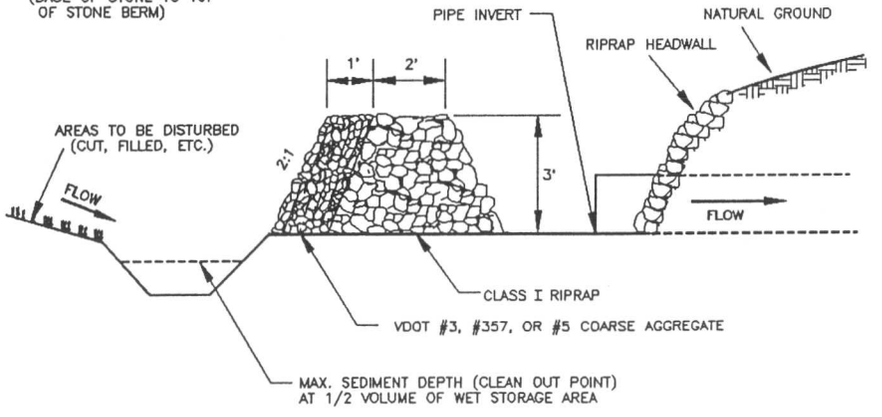


*STORAGE REQUIREMENTS EQUIVALENT TO THAT OF TEMPORARY SEDIMENT TRAP, STD. & SPEC. 3.13

67 C.Y./ACRE WET STORAGE (BELOW BASE OF STONE)

67 C.Y./ACRE DRY STORAGE (BASE OF STONE TO TOP OF STONE BERM)

PERSPECTIVE VIEW



ELEVATION

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Abingdon Office Park
U.S. Route 17, Suite 12
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Hayes, Virginia 23072

ADJACENT PROPERTY OWNERS:
1. National Park Service
2. CSX Railroad
3. VDOT

DATUM: NGVD

DEACTIVATION OF MILSTEAD AND POCLAIN PONDS

TYPICAL DETAIL SHEET
CULVERT INLET PROTECTION

AT: RUFFINS POND ON MASSAPONAX CREEK
IN: COUNTY OF SPOTSYLVANIA

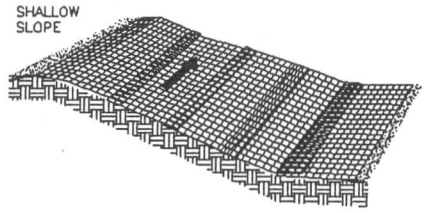
PURPOSE: RESTORE HISTORIC LANDSCAPE

APPLICATION BY: NATIONAL PARK SERVICE

DATE: January 1995

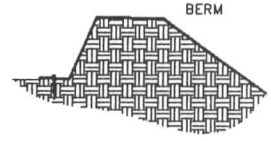
SHEET 12 OF 16

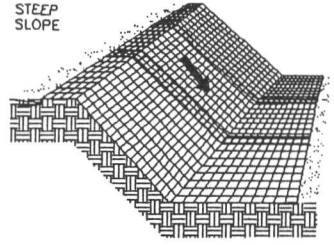
170JPA



ON SHALLOW SLOPES, STRIPS OF NETTING PROTECTIVE COVERINGS MAY BE APPLIED ACROSS THE SLOPE.

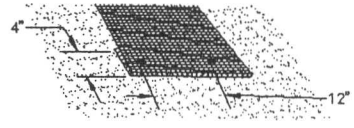
WHERE THERE IS A BERM AT THE TOP OF THE SLOPE, BRING THE MATERIAL OVER THE BERM AND ANCHOR IT BEHIND THE BERM.

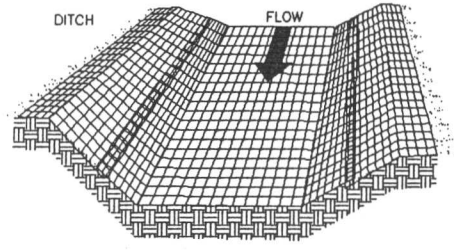




ON STEEP SLOPES, APPLY PROTECTIVE COVERING PARALLEL TO THE DIRECTION OF FLOW AND ANCHOR SECURELY.

BRING MATERIAL DOWN TO A LEVEL AREA BEFORE TERMINATING THE INSTALLATION. TURN THE END UNDER 4" AND STAPLE AT 12" INTERVALS.

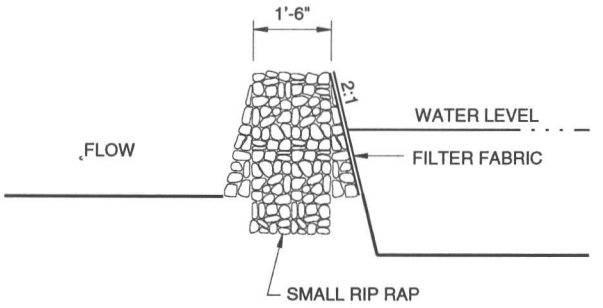




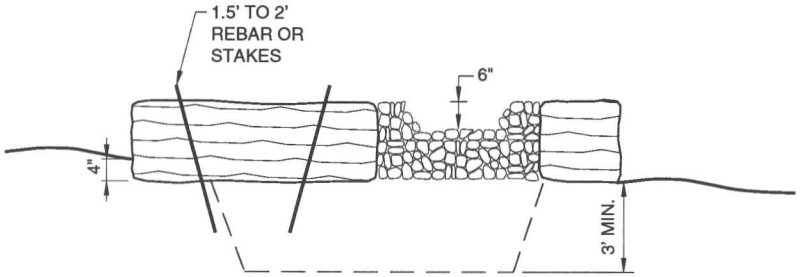
IN DITCHES, APPLY PROTECTIVE COVERING PARALLEL TO THE DIRECTION OF FLOW. USE CHECK SLOTS AS REQUIRED. AVOID JOINING MATERIAL IN THE CENTER OF THE DITCH IF AT ALL POSSIBLE.

VHB Vanasse Hangen Brustlin, Inc. Abingdon Office Park U.S. Route 17, Suite 12 7188 Chapman Drive Hayes, Virginia 23072	**ADJACENT PROPERTY OWNERS:** 1. National Park Service 2. CSX Railroad 3. VDOT **DATUM:** NGVD	**DEACTIVATION OF MILSTEAD AND POCLAIN PONDS** **TYPICAL DETAIL SHEET** **SOIL STABILIZATION BLANKETS & MATTING** **AT:** RUFFINS POND ON MASSAPONAX CREEK **IN:** COUNTY OF SPOTSYLVANIA **PURPOSE:** RESTORE HISTORIC LANDSCAPE	**APPLICATION BY:** NATIONAL PARK SERVICE **DATE:** January 1995 **SHEET 13 OF 16**

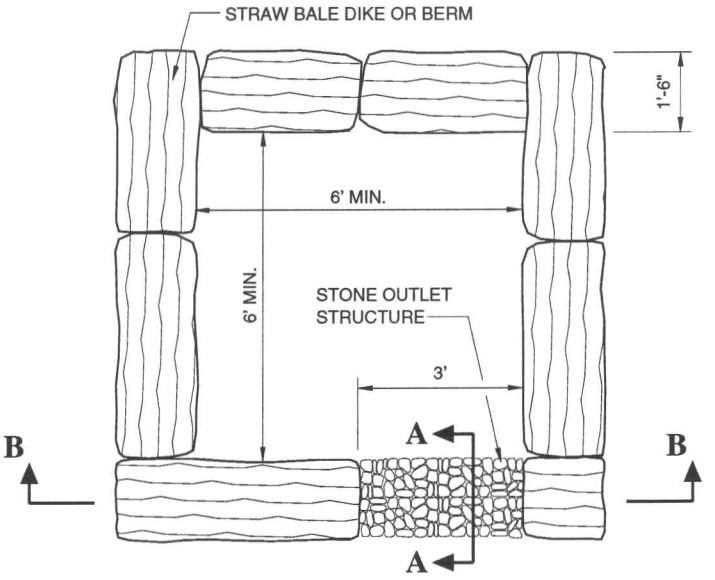
170JPA



SECTION A-A



SECTION B-B



PLAN VIEW

VHB **Vanasse Hangen Brustlin, Inc.**
Abingdon Office Park
U.S. Route 17, Suite 12
7188 Chapman Drive
Hayes, Virginia 23072

ADJACENT PROPERTY OWNERS:
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2. CSX Railroad
3. VDOT

DATUM: NGVD

DEACTIVATION OF MILSTEAD AND POCLAIN PONDS

TYPICAL DETAIL SHEET
DEWATERING STRUCTURE

AT: RUFFINS POND ON MASSAPONAX CREEK
IN: COUNTY OF SPOTSYLVANIA

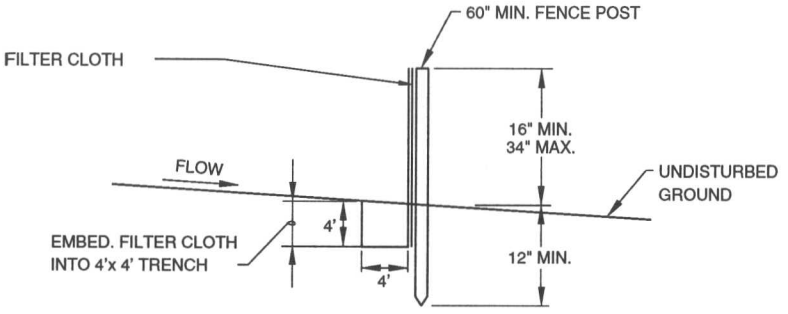
PURPOSE: RESTORE HISTORIC LANDSCAPE

APPLICATION BY: NATIONAL PARK SERVICE

DATE: January 1995

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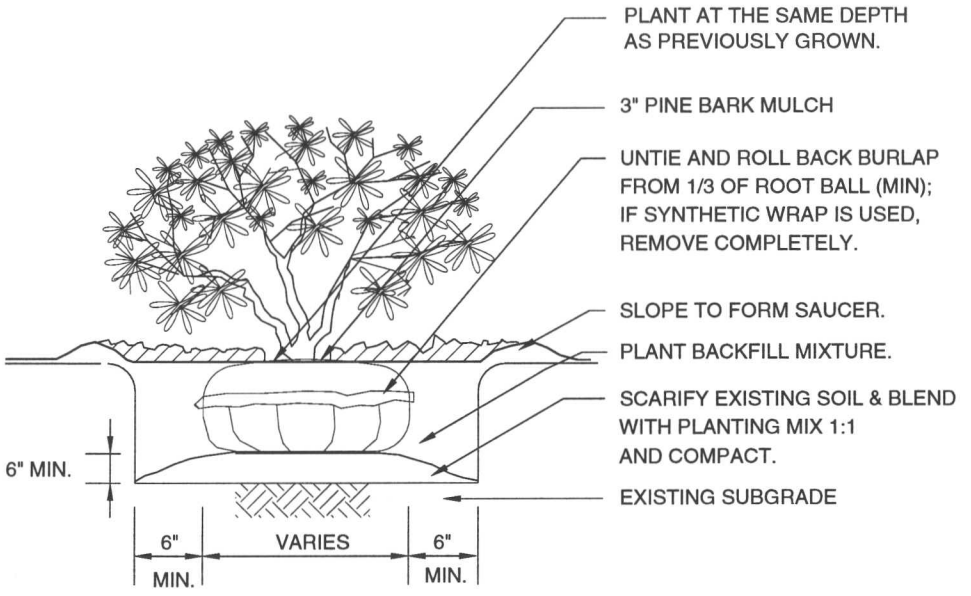
CROSS-SECTION
N.T.S.

CONSTRUCTION NOTES FOR FABRICATED SILT FENCE

1. FILTER CLOTH SHALL BE FASTENED SECURELY TO WOODEN FENCE POSTS WITH WIRE TIES OR STAPLES AND SHALL BE SPACED EVERY 6 FEET.
2. WHEN TWO SECTIONS OF FILTER CLOTH ADJOIN EACH OTHER THEY SHALL BE OVERLAPPED BY SIX INCHES AND FOLDED AT SUPPORT POLE ONLY.
3. MAINTENANCE SHALL BE PERFORMED AS NEEDED.

POSTS:	2" OAK OR 4" PINE
FILTER FABRIC:	FILTER X, MIRAFI 100X, STABILINKA T140N OR APPROVED EQUAL.

SILT FENCE



SHRUB PLANTING

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U.S. Route 17, Suite 12
7188 Chapman Drive
Hayes, Virginia 23072

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2. CSX Railroad
3. VDOT

DATUM: NGVD

DEACTIVATION OF MILSTEAD AND POCLAIN PONDS

TYPICAL DETAIL SHEET
SILT FENCE / SHRUB PLANTING

AT: RUFFINS POND ON MASSAPONAX CREEK
IN: COUNTY OF SPOTSYLVANIA

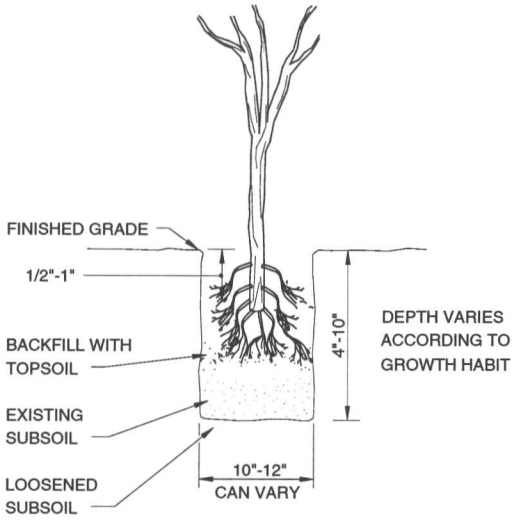
PURPOSE: RESTORE HISTORIC LANDSCAPE

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DATE: January 1995

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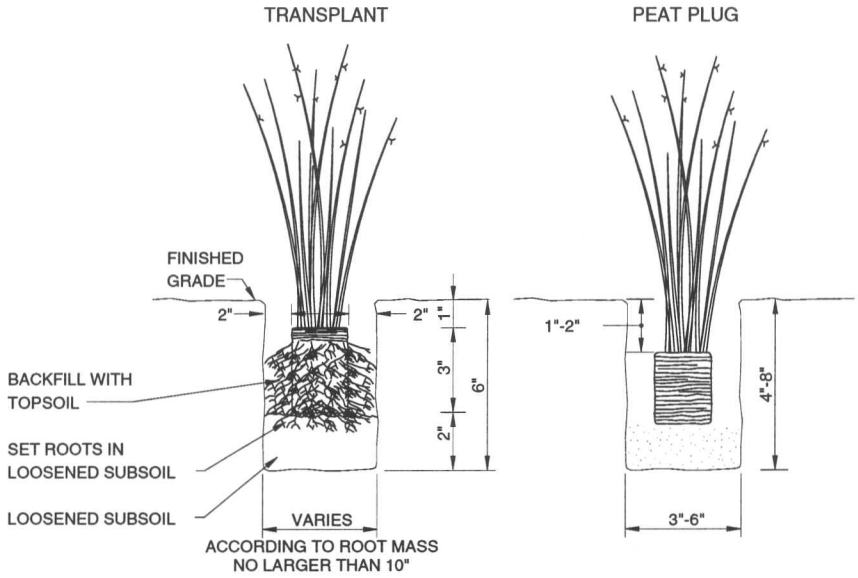
170JPA11



HAND SPREAD ROOTS EVENLY IN PLANTING HOLE. DO NO BEND ROOTS.

WHIPS SHOULD BE PLANTED UPRIGHT, NOT AT AN ANGLE.

BARE ROOT PLANTING



CUT LINEAR SLITS IN ORGANIC CONTAINER TO FACILITATE ROOT PENETRATION

IF CONTAINER IS NON-ORGANIC COMPLETELY REMOVE

EMERGENT PLANTING

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DEACTIVATION OF MILSTEAD AND POCLAIN PONDS

TYPICAL DETAIL SHEET
BARE ROOT PLANTING / EMERGENT PLANTING

AT: RUFFINS POND ON MASSAPONAX CREEK
IN: COUNTY OF SPOTSYLVANIA

PURPOSE: RESTORE HISTORIC LANDSCAPE

APPLICATION BY: NATIONAL PARK SERVICE

DATE: January 1995

SHEET 16 OF 16

170JPA12